

Lavaland

Vernacular Seismology in Volatile Volcanic Environments in Puna, Hawai'i



Eilin Holtan Torgersen

Thesis for the degree of Philosophiae Doctor (PhD)
University of Bergen, Norway
2022

UNIVERSITY OF BERGEN



Lavaland

Vernacular Seismology in Volatile Volcanic
Environments in Puna, Hawai'i

Eilin Holtan Torgersen



Thesis for the degree of Philosophiae Doctor (PhD)
at the University of Bergen

Date of defense: 23.09.2022

© Copyright Eilin Holtan Torgersen

The material in this publication is covered by the provisions of the Copyright Act.

Year: 2022

Title: Lavaland

Name: Eilin Holtan Torgersen

Print: Skipnes Kommunikasjon / University of Bergen

For Maile. Mahalo nui loa, tusen takk.

Abstract

Kīlauea Volcano on Hawai‘i’s Big Island is one of the most active volcanoes in the world. People have lived in high-risk areas on this volcano for over 1000 years, within the District of Puna. This dissertation is about how people in Puna have developed systems of knowledge and coping mechanisms in order to sustain social life there. It is also an ethnography of the Big Island, Hilo town and, especially, the Puna district, with a focus on developments of contemporary social and physical environments. The dissertation is epistemological in its quest to look into questions about how people in Puna know what they know, and what knowledges are valid to whom. It addresses anthropological approaches to environmental change, relationships between land and people, and peoples’ management of volatility.

Through descriptions of how a damaging storm and two different volcanic eruptions affected Puna in 2014 and 2018, the dissertation argues for the generative potential of such events in showing how they can transform and create social relationships and order. Considering the local social, cultural, ethnic, economic and spiritual diversity, the dissertation looks into the social life of Puna in which relationships between different social groups contribute to the making of ‘vernacular seismology’. It specifically focuses on a form of vernacular seismology that develops in the spaces between ‘Western’ and Hawaiian forms of seismological sciences. Pelehonuamea, or Pele, the main volcano deity in Hawaiian cosmology, is presented as a common denominator in vernacular forms of seismology on Kīlauea. The dissertation shows how Hawaiian social and spiritual ideas become guidelines for all who live in Puna in efforts to make sense of the volcanic environment that is their home. Looking into indigenous Hawaiian cosmologies and forms of spirituality, the dissertation explores relationships between people and environments through philosophical perspectives on immanence and transcendence, arguing that immanent spiritual relationships with the volcanic environments in Puna make people resilient to volcanic volatility. In this argument, it also contributes to global debates about the sustainability of human life in changing and volatile environments.

Acknowledgements

Anthropological fieldwork demands a great deal of trust, cooperation and compassion from people who incorporate the anthropologist into their everyday lives. Without these people, anthropology would not be possible. First and foremost, to people in Hilo and Puna, who have welcomed me warmly into their lives and shared insights to the topics of this dissertation with me, I am forever grateful and in your debt for your kindness, patience, wisdom and knowledge. Without you, this dissertation would not exist. What I have learned from you reaches far beyond this research project, and I value your friendships deeply. To my kumu hula and my hula sisters, who have continuously treated me with aloha and opened my mind to a world unlike the one I knew, thank you for your acceptance, love and knowledge, and for challenging me to think differently.

A doctoral project is a lengthy and complex affair. Along the pathway to completion are many distractions, hurdles and time stealers one must navigate to reach the finish line. I would like to take this opportunity to thank the many people that have guided me on this path and have made this work possible.

I am eternally grateful to the Center for Pacific Island Studies at University of Hawai'i at Manoa (UHM) for hosting me as a visiting scholar in 2014. To UHM scholars Terence Wesley-Smith, Tarcisius Kabutaulaka, Alexander Mawyer and Vilisoni Hereniko, I am always grateful for your kindness, encouragement, collegial discussions and wise words, about scholarship and life. I am also very grateful to my colleagues around the globe, who I have had the pleasure to work with in the Research Council of Norway funded Pacific Alternatives project and the EU funded ECOPAS project, and to meet at conferences and seminars in the Pacific, the US and Europe. A special thank you to Joeli Veitayaki at the University of the South Pacific, Simone Pauwells at CREDO, Aix-Marseilles University, Margaret Jolly at Australian National University and Craig Lind for your scholarly guidance, wisdom, kindness and friendship.

I would like to thank the University of Bergen and the Department of Social Anthropology for giving me the opportunity to pursue a doctoral degree. To my supervisors, Edvard Hviding and Ingjerd Hoëm, I am deeply grateful for your highly intellectual inputs, constructive criticism and fruitful discussions. In addition to academic scholarship, I am fortunate to have experienced your friendship, enthusiasm and encouragement throughout this project. To John Knudsen, thank you for your support, critical reflections, encouraging words and many jokes.

I would also like to extend my gratitude to the Bergen Pacific Studies Research Group, both current and former active members, for your scholarship and deep friendships that have formed throughout my years at the University of Bergen. A special thank you to Ane Straume, Tom Bratrud, Kristine Sunde Fauske, Tammy Tabe, Tom Mountjoy, Hildur Thorarensen, Camilla Borrevik and Nora Haukali for Pacific discussions, reflections on life itself and lots of laughs. Being a part of this research group has been incredibly rewarding and has contributed greatly to the forming of my identity as an anthropologist, a colleague and friend. To the faculty and department administrations, especially to Gro Aase, Marianne Soltveit and Ann-Kathrin Thomassen, thank you for your professional support, encouragement and kindness throughout my years as an employee at the department.

To my fellow PhD comrades, thank you for creating a truly fantastic environment for academic endeavours and joyful social gatherings. It is a privilege to be a part of such a talented, promising and inspiring group of people, and I am grateful to each and every one of you for the energy and contributions you bring to the office every day. I would like to especially thank my colleague, friend, travel companion and housemate, Giorgi Cheishvili, for accompanying me on this PhD journey. Thank you for all our discussions, writing sessions, travel adventures and meal sharing. To my office mate Tord Austdal, thank you for your academic expertise, friendship and common enthusiasm for ‘hyttedømmen’, ‘Taco Friday’ and conversations about ‘life itself’. Also, a special thank you to Mari Hanssen Korsbrekke for being a great writing partner in the final stages of this project.

Beyond the realms of the Pacific and academia, I am forever grateful to my partner, Truls, my mother, Synnøve, my brother, Mats, and friends who are always supportive and patient in my endeavours.

For all its weaknesses and flaws, this dissertation is entirely my work. The responsibility of any misrepresentations, misinterpretations and breach of trust lies solely with me.

Table of Contents

Abstract	iii
Acknowledgements	v
Table of Contents	ix
List of Figures	xiii
List of Acronyms and Abbreviations	xiv
Note on Language and Orthography	xvi
Maps	xvii
<i>Map 1: Oceania</i>	<i>xvii</i>
<i>Map 2: Pacific Ring of Fire</i>	<i>xviii</i>
<i>Map 3: The Hawaiian Islands</i>	<i>xix</i>
<i>Map 4: Hawai'i Island / The Big Island</i>	<i>xx</i>
<i>Map 5: Lava Flow Hazard Zones</i>	<i>xxi</i>
<i>Map 6: Kilauea's East Rift Zone</i>	<i>xxiii</i>
Prologue	1
<i>Puna, August 2014</i>	<i>1</i>
<i>Chapter outline</i>	<i>4</i>
1 INTRODUCTION Approaching Volatile Environments and Land in the Making	7
<i>First Glance, 2 January 2007</i>	<i>7</i>
<i>Positioning the Project in Puna – anthropology, environment, and disaster</i>	<i>13</i>
<i>Anthropology and volcano research</i>	<i>19</i>
<i>A note on cosmology</i>	<i>24</i>
<i>A condensed history of Hawai'i</i>	<i>24</i>
<i>Methodology and reflections on the researcher's outset</i>	<i>31</i>
Fieldwork	<i>31</i>

The researcher	43
<i>Photography and Notes in Data Collection</i>	47
<i>A Note on Social Categories</i>	48
2 HAWAI‘I A Quintuple Volcano Island	53
<i>Volatility in the Sea of Islands: The Pacific ‘Ring of Fire’</i>	57
<i>A human approach to volcanic activity</i>	59
<i>The Volcanic Hawaiian Islands</i>	62
<i>The Big Island – Five Visible Volcanoes</i>	65
Kohala	65
Mauna Kea	69
Hualālai	75
Mauna Loa	77
Kīlauea	80
<i>Summing up</i>	85
3 LAYERS OF ROCK, LAYERS OF MEANING The windward side of the Big Island.....	87
<i>Anthropological Perspectives on Temporality, Historicity and Events</i>	90
<i>Hilo – a global hub and the gateway to the volcano</i>	96
<i>Puna – a district located on the world’s most active volcano</i>	106
<i>A division of land in Puna</i>	110
<i>Puna in 2014</i>	115
<i>Lower Puna and the end of the road</i>	119
<i>Social life in lower Puna</i>	124
<i>Pele’s plains – From the end of the road at Kaimū to the unwelcoming desert of Ka‘ū</i>	134
<i>Summing up</i>	141
4 PELEHONUAMEA: THE GODDESS OF FIRE Immanent spirituality and cosmology in practice	143
<i>Who and what is Pele?</i>	146
<i>Pele’s coming to Kīlauea</i>	152
<i>Pele and Hi‘iaka – the epic hula myth</i>	155
<i>Performing Pele</i>	158

<i>Pele today</i>	161
Visiting Pele in Kalapana/Kaimu, February 2011:.....	162
<i>Positioning Pele in Puna Spirituality</i>	168
<i>Immanence and Hawaiian spirituality</i>	171
<i>Why do people believe in Pele?</i>	176
<i>Practising Cosmology: Immanence as Resilience</i>	177
<i>Summing up</i>	180
5 HURRICANE ISELLE AND THE JUNE 27TH LAVA FLOW ‘Natural Disasters’ on the Big Island	183
<i>Hurricane Iselle, August 2014</i>	186
‘ <i>Iselle introduced me to my neighbours</i> ’	189
<i>The June 27th Lava Flow</i>	192
‘ <i>We Gotta Aloha</i> ’ – <i>Thinking Like a Collective Group</i>	198
<i>State of emergency and bracing for disaster</i>	201
<i>Spiritual guidance, infrastructural challenges and economic inequality</i>	206
<i>Scientific language and local understanding</i>	210
<i>Closing in</i>	213
<i>Storms, lava and infrastructure – the situation continues</i>	217
<i>First slow, then fast, then stalled...</i>	221
<i>Social and personal challenges</i>	226
<i>The end</i>	232
<i>Summing up</i>	233
6 VERNACULAR SEISMOLOGY Epistemological Dimensions in a Volatile Volcanic Environment	235
<i>Approaching ‘the vernacular’</i>	238
<i>Vernacular seismology</i>	241
<i>Vernacular approaches to a volcanic environment</i>	249
<i>Knowledge, stakeholders and the role of vernacular advice in ‘disaster’ management</i>	256
<i>Vernacular seismology and societal resilience to volcanic volatility</i>	263
<i>Summing up</i>	267

7 HANA HOU ‘Here we go again...’	269
<i>Unfortunately, a hana hou</i>	272
<i>Multiple volcanic challenges and emergency fatigue</i>	276
<i>Searching for information</i>	280
<i>Vulnerability and resilience</i>	282
<i>Rebuilding</i>	286
<i>Returning</i>	289
<i>Pele rests, again</i>	291
Appendix A: Glossary of Hawaiian words and expressions	295
Appendix B: FEMA Definition of Habitability	298
Appendix C: Home Insurance and Lava Flow FAQ	300
List of References	302

List of Figures

FIGURE 3.1: Visualisation of Layers and Historicity in Hilo and Puna	93
FIGURE 3.2: Hilo and Mauna Kea	96
FIGURE 3.3: Satellite Image of Hilo	101
FIGURE 3.4: Pele's Kitchen	118
FIGURE 3.5: New Kalapana Village	121
FIGURE 4.1: Model of Immanence and Transcendence	173
FIGURE 5.1: First Community Meeting	194
FIGURE 5.2: Collage of News Stories About the <i>June 27th Lava Flow</i>	216
FIGURE 5.3: Chain of Craters Road in Volcanoes National Park in 2014	219
FIGURE 6.1: Vernacular Seismology in Puna	245
FIGURE 7.1: Pu'u 'Ō'ō Ash Cloud	270
FIGURE 7.2: The eruption begins in Leilani Estates	273
FIGURE 7.3: Fissure 8	277
FIGURE 7.4: 'Ailā'au	284

List of Acronyms and Abbreviations

AAA	American Anthropological Association
ABC	American Broadcasting Company
CBS	CBS Broadcasting Inc.
CDC	Centers for Disease Control and Prevention
CDP	Census Designated Place
CSA	Coordination and Support Action
ECOPAS	European Consortium for Pacific Studies
ESfO	European Society for Oceanists
EU	European Union
EU FP7	European Union's Framework Programme 7
FAQ	Frequently Asked Questions
FCC	Federal Communications Commission
FEMA	The Federal Emergency Management Agency
GMO	Genetically Modified Organisms
H ₂ S	Hydrogen Sulphide
HCCD	Hawai'i County Civil Defence
HELCO	Hawaii Electric Light Company
HPP	Hawaiian Paradise Park
HVNP	Hawai'i Volcanoes National Park
HVO	Hawai'i Volcanoes Observatory
LGBTIQA+	Lesbian, Gay, Bisexual, Transgender, Intersex, Queer/questioning, Asexual, +
NBC	National Broadcasting Company
NIOSH	National Institute for Occupational Safety and Health
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
OHA	Office of Hawaiian Affairs
PGV	Puna Geothermal Venture
PNG	Papua New Guinea
ROD	Rapid 'Ōhi'a Death
SNAP	The Supplemental Nutrition Assistance Programme
SO ₂	Sulphur dioxide
UN	United Nations

UN SDGs	United Nations Sustainable Development Goals
USGS	United States Geological Survey
WWOOF	“World Wide Opportunities on Organic Farms” or “Willing Workers on Organic Farms”.

Note on Language and Orthography

The text on the following pages is written in British English but contains American English in some quotes. The text also has a considerable number of words from *‘Ōlelo Hawai‘i*, or the Hawaiian language. My understanding of *‘Ōlelo Hawai‘i* is limited and to me it is a foreign language. The knowledge I possess about this language is based on hula training, learning Hawaiian place names and reading Hawaiian words in the literature I have engaged with during this and previous research projects. I have followed the version of *‘Ōlelo Hawai‘i* as standardised by Mary Kawena Pukui and Samuel H. Elbert in the *Hawaiian Dictionary*, published in 1986. All translations from *‘Ōlelo Hawai‘i* to English and vice versa are based on this standardisation unless referenced otherwise. Some Hawaiian words in quotes are not based on this standardisation and may read different than those in the general text. Hawaiian words are italicised when mentioned the first time. Words that are not listed in the *Oxford English Dictionary* are followed by a short English translation in parentheses upon first mention and italicised throughout the dissertation. Some Hawaiian words, like *aloha*, are italicized throughout to emphasise the Hawaiian meaning of words and concepts that have been appropriated and grossly exploited by other cultures throughout the world. All Hawaiian words used in the dissertation are listed in Appendix A.

The Hawaiian alphabet has twelve letters – five consonants and seven vowels – also found in the Latin alphabet: a, e, i, o, u, h, k, l, m, n, p and w, which represent all the basic phonemes in *‘Ōlelo Hawai‘i*. These letters are those that were recognised by early missionaries in Hawai‘i who established the first written forms of *‘Ōlelo Hawai‘i*. The language additionally contains two phonemes, or diacritical marks, known as the *‘okina* (‘), which is a glottal stop and considered a consonant, as well as the *kahakō* (¯), a macron placed above vowels to elongate the sound of the letter. These two phonemes clarify the language and can completely change the meaning of words. The *kahakō* is often used to indicate plural versions of words or expressions, as demonstrated in the glossary in Appendix A.

All personal names in this dissertation are pseudonyms. All place names, where mentioned, are actual names.

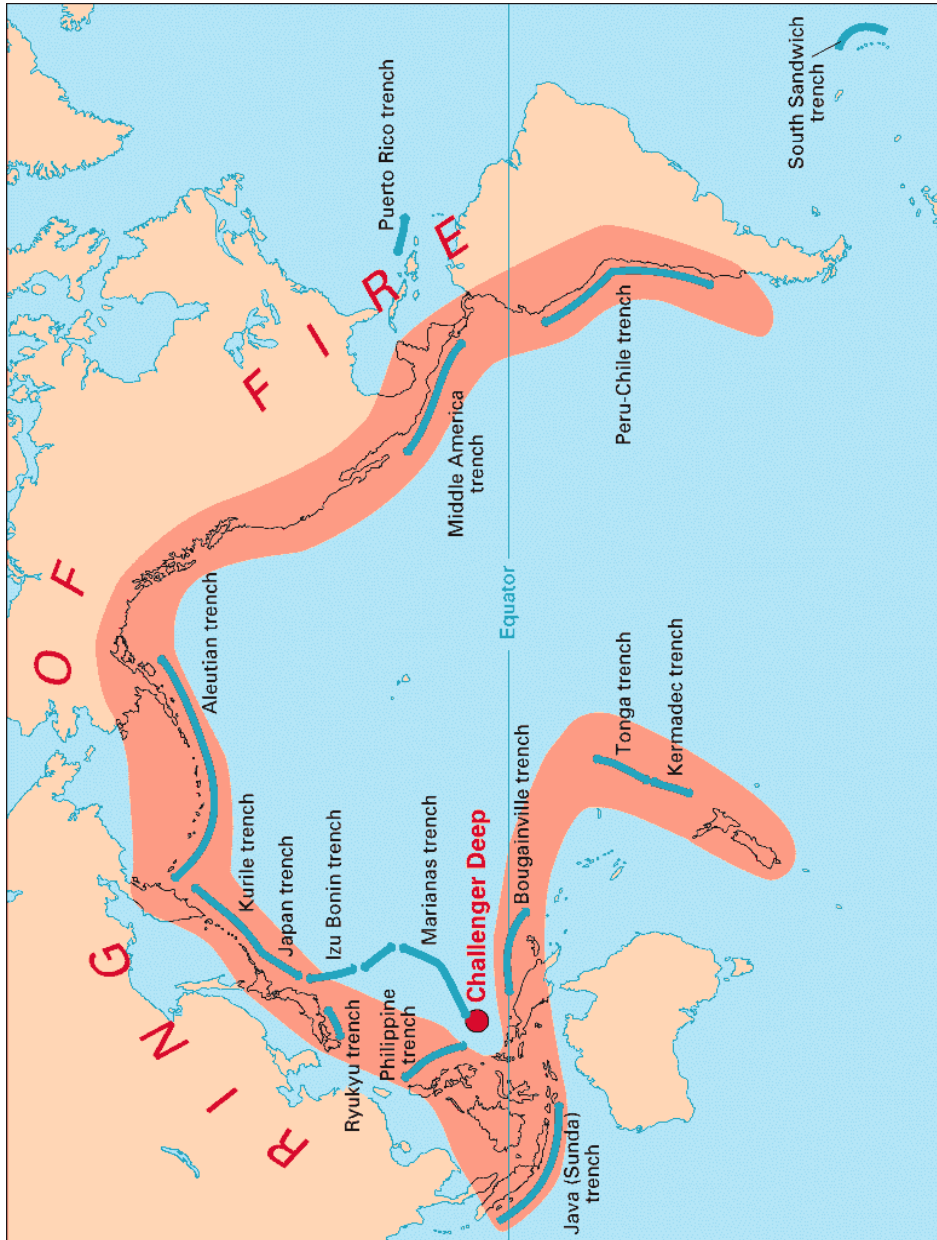
Maps

Map 1: Oceania



Map 1: Oceania with the three subregions of the Pacific Ocean – Micronesia, Melanesia and Polynesia. Image by CartoGIS Services, College of Asia and the Pacific, The Australian National University. <http://asiapacific.anu.edu.au/maponline/base-maps/subregions-oceania>

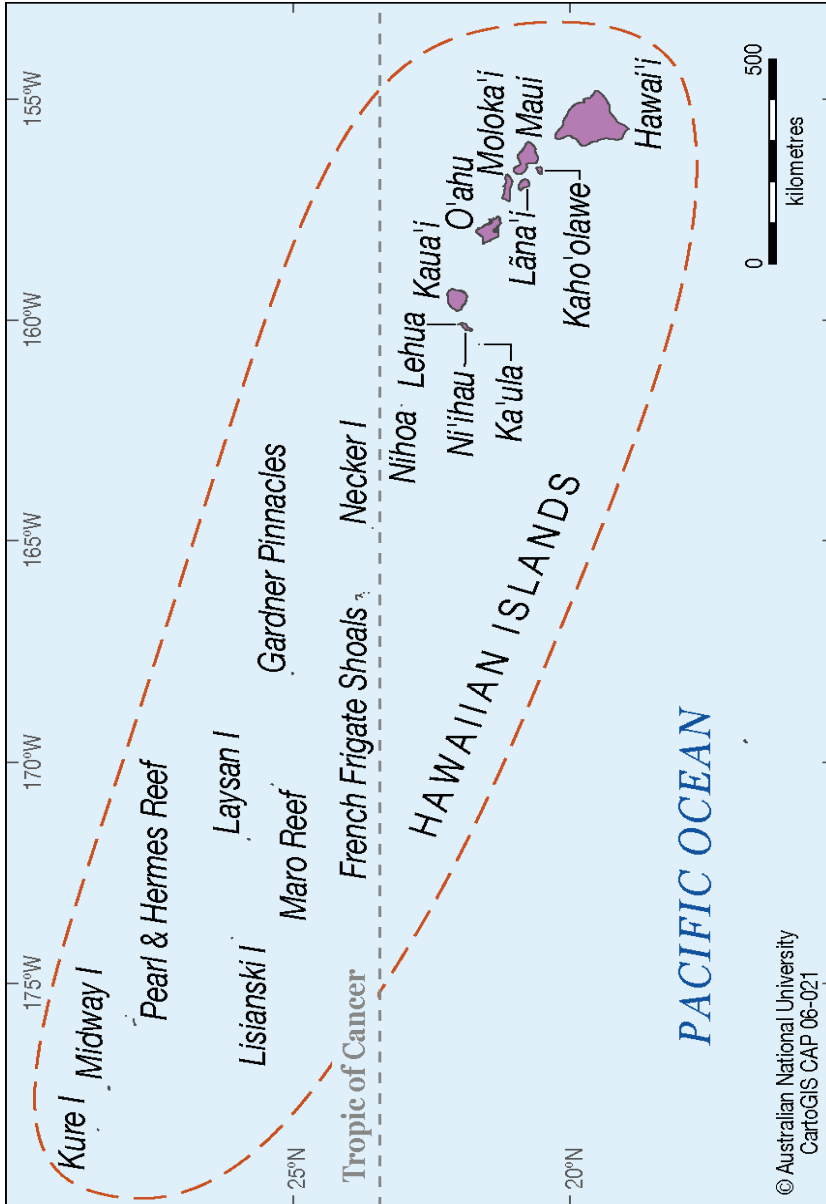
Map 2: Pacific Ring of Fire



Map 2: The Pacific Ring of Fire. Image by W. Jacquelyne and Robert I. Tilling, USGS.

<https://pubs.usgs.gov/gip/dynamic/fire.html>

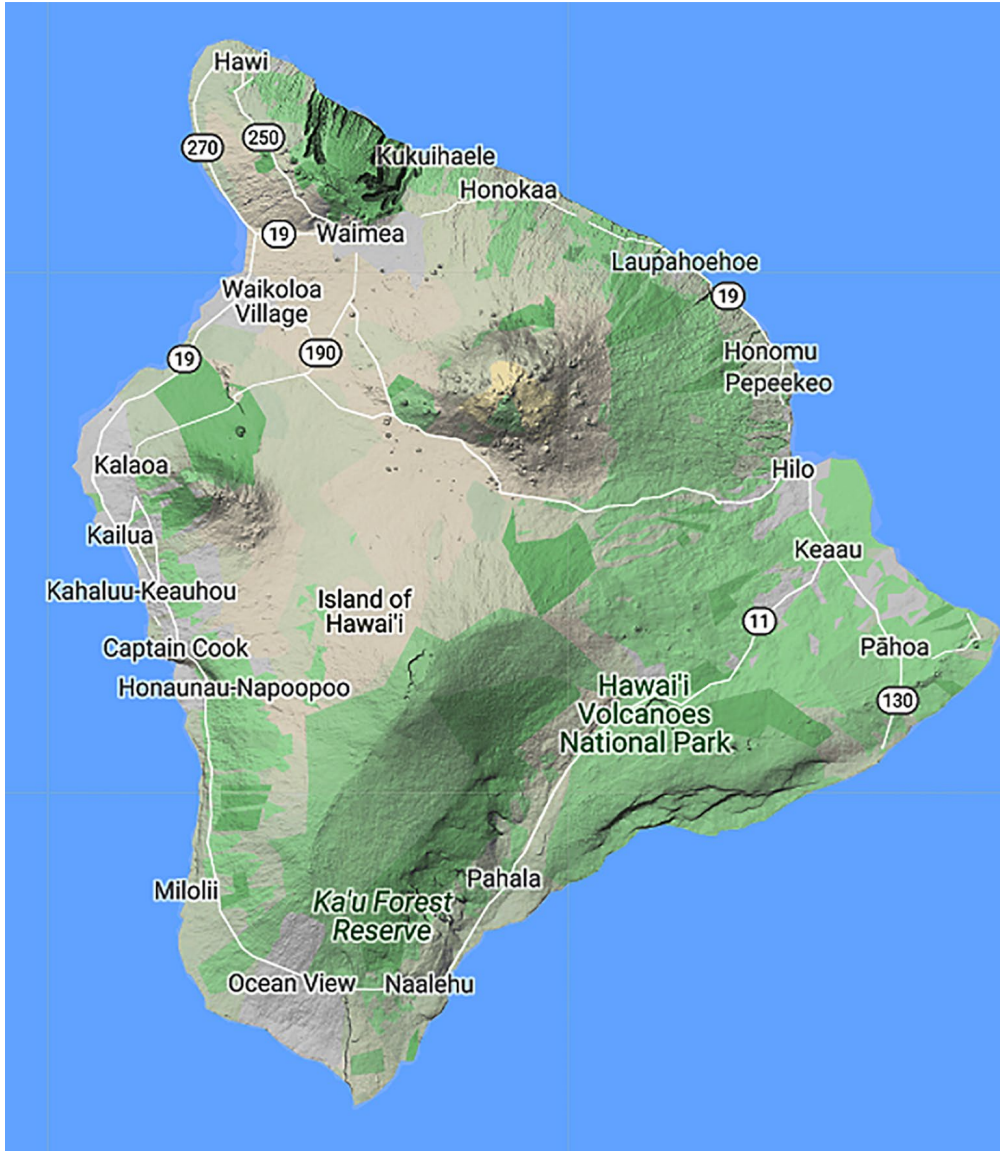
Map 3: The Hawaiian Islands



Map 3: Islands, reefs and shoals of the Hawaiian Islands. Hawai'i/The Big Island is located at the southernmost tip of the archipelago. Image by CartoGIS Services, College of Asia and the Pacific, The Australian National University.

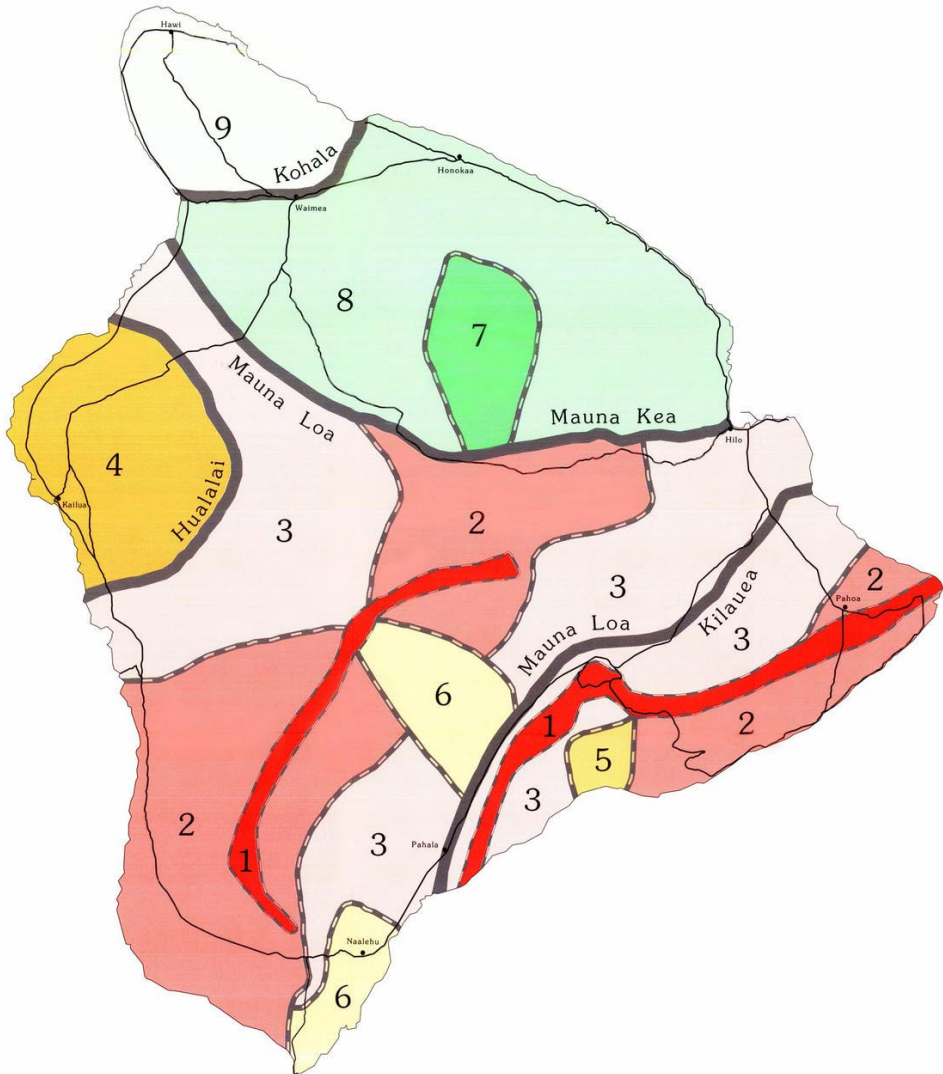
<http://asiapacific.anu.edu.au/maponline/base-maps/hawaii>

Map 4: Hawai'i Island / The Big Island



Map 4: Hawai'i Island, or the Big Island. Hilo, the district of Puna and Pāhoa Village is located on the east side of the island. Image by Google Maps 2022.

Map 5: Lava Flow Hazard Zones



Map 5: Map of lava-flow hazard zones - Based on location of eruptive vents, past lava coverage, and topography. Image and the following explanation (direct quotation) by Wright et al., 1992.

Zone 1: Includes summits and rift zones of Kīlauea and Mauna Loa, where vents have been repeatedly active in historical time.

Zone 2: Areas adjacent to and downslope of zone 1. In Zone 2, 15% to 25% of land has been covered by lava since 1800, and 25% to 75% has been covered within the past 750 years.

Relative hazard within zone 2 decreases gradually as one moves away from zone 1.

Zone 3: Areas less hazardous than zone 2 because of greater distance from recently active vents and (or) because of topography. In Zone 3, 1% to 5% of land has been covered since 1800, and 15% to 75% has been covered within the past 750 years.

Zone 4: Includes all of Hualālai, where the frequency of eruptions is lower than that for Kīlauea or Mauna Loa. Lava coverage is proportionally smaller, about 5% since 1800, and less than 15% within the past 750 years.

Zone 5: Area on Kīlauea currently protected by topography.

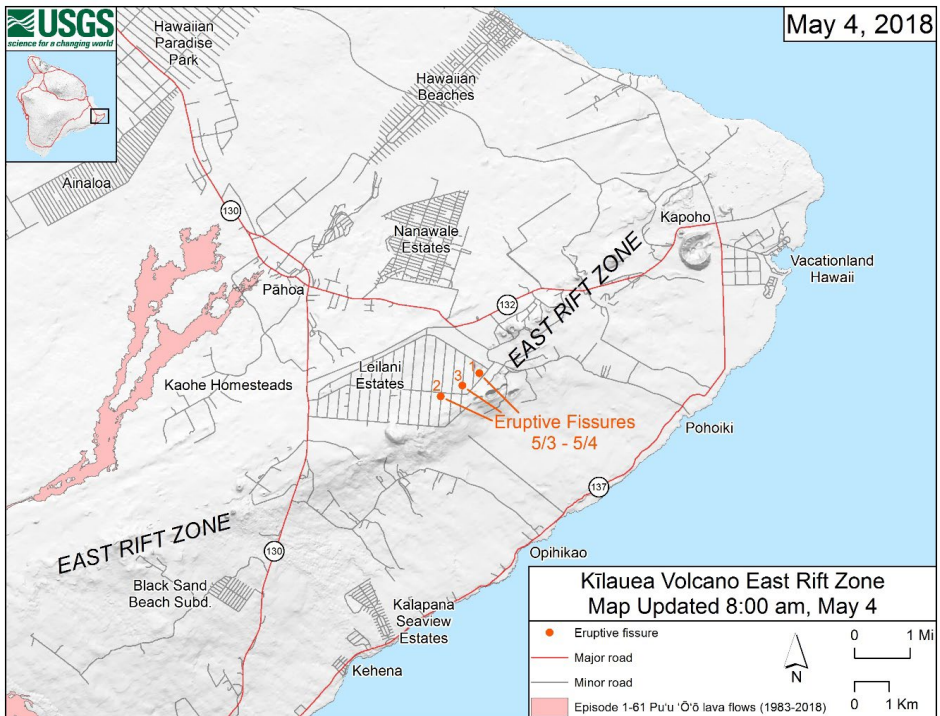
Zone 6: Two areas on Mauna Loa, both protected by topography.

Zone 7: Younger part of dormant volcano Mauna Kea. In this area, 25% of land was covered by lava in the past 10,000 years.

Zone 8: Remaining part of Mauna Kea. Only a few percent of this area has been covered by lava in the past 10,000 years.

Zone 9: Kohala Volcano, which last erupted more than 60,000 years ago.

Map 6: Kīlauea's East Rift Zone



Map 6: Kīlauea's East Rift Zone in lower Puna on May 4, 2018. The June 27th Lava Flow (Chapter 5) is marked in pink colour west of Kaōhe Homesteads, and the 2018 LERZ eruption (Chapter 7) has just started with eruptive fissures in Leilani Estates. Map by USGS (Public domain).

Prologue

Puna, August 2014

On 27 June 2014, an eruption from the Pu‘u Ō‘ō vent on Kīlauea Volcano’s north-eastern flank started a new lava flow that moved slowly in a northeasterly direction. The flow was headed towards Pāhoā Village, located in the Puna district on the Big Island in the Hawaiian Islands. On 7 August, the same area was severely damaged by Iselle, a Category 1 hurricane, which made landfall directly in the lower part of Puna and was immediately downgraded to a tropical storm that swept over the rest of the east side of the Big Island. Two weeks later, the district was in a state of emergency when Hawai‘i County Civil Defence (HCCD) called all residents in Puna to a ‘community meeting’ to inform about the threat of the new lava flow. Residents showed up, in larger numbers than expected, and listened carefully to information given by representatives from the HCCD and Hawaiian Volcano Observatory (HVO). Some had faced this type of threat before – when Kalapana Village in lower Puna was covered in lava during the early 1990s – and dove headfirst into this challenge with a sense of humour.

‘Let me hear a *hana hou!*’¹ a *Kānaka Maoli* (indigenous Hawaiian) woman laughed while settling down on the chair in front of me, referring to the Hawaiian expression which is often heard from audiences who desire an encore from a band. ‘Here we go again’, another woman replied while discouragingly throwing her arms up in the air. Other people were more anxious – some even on the verge of panic – and what they all had in common was that they were facing a situation that could not be controlled. ‘How can you do this to us!?’ a woman cried out, addressing the representatives at the front of the room, as if they were to blame for the circumstances

¹ *Hana hou* can be translated to ‘encore’, ‘da capo’ or ‘one more time’. This expression is commonly used in Hawai‘i to bring music or dance performers back on stage after a finished set. It is also used as title for Chapter 7 in this dissertation and will be mentioned again several times in the following chapters.

lower Puna was currently in. ‘First Iselle, and now this lava flow? Haven’t we suffered enough!?’ The leader of Hawai‘i County Civil Defence answered her, calmly and respectfully, that this is no one’s doing and that ‘these are forces we cannot control, but the Civil Defence will do their best to keep everyone safe’.

During the following three months, ‘community meetings’ were held two to three times per week, with increasingly more accessible and apprehensible information available to the public. Geologists from HVO were challenged with developing a scientific language the population at large could understand. The population at large was challenged with geological models and words that they did not understand but knew explained something crucial about their current and future everyday lives. Scientists and the public managed to meet somewhat halfway, and different knowledges merged to create a common ground for understanding the precarious situation they were all in – a *vernacular seismology*.

The local newspaper published stories with headlines, such as ‘*My outlook is pretty much doomsday*’ – *Too close for comfort* and ‘*Slow-motion torture*’ – *Man vs. lava: Pahoā resident wages daily battle against molten threat* (*Hawai‘i Tribune Herald* 22 Sept and 1 Nov 2014). Residents who lived in the predicted path of the lava flow started reorganising their homes, moving out little by little, and arranging to stay with family and friends elsewhere. Farmers organized moving their animals, and many quit animal husbandry altogether and gave their cows, horses, goats and birds ‘up for adoption’. State and federal organisations, local, national and international media, and military personnel found their way to Pāhoā. Hawai‘i Electric Light Company (HELCO) was working tirelessly to restore power supply to the district’s subdivisions where Iselle had brought down power lines in August, and to secure electric poles from being burned up by the approaching lava. Sometimes the streets looked like scenes from a disaster movie, and other times everything seemed completely normal.

Lessons about local approaches to the volcanic environments of lower Puna were taught and learned by residents. Residents who had not been born in Puna suggested diversion techniques or other types of disturbances of the lava and met strong resistance from locals and Kānaka Maoli, who have deep relationships with lava and believe lava flows should not be disturbed. During the intense months of autumn 2014,

people who lived in Pāhoa were forced to move elsewhere in anticipation of the lava flow. Business owners in Pāhoa were forced to shut down their businesses, and a few of those who decided to stay were evacuated several times.

The lava reached a recycling station, buried a Japanese graveyard and burned down a house on a property with a fishpond, killing all the fish in the pond. It continued further down towards the village centre, swallowing a storage shack and a large pile of tyres in a yard.

And then it stalled – right at the edge of Pāhoa Village.

Chapter outline

In the following, I provide brief outlines of the seven chapters of this dissertation, establishing the major analytical progression and indicating how the chapters are interrelated.

Chapter 1: Introducing Lavaland – Approaching Volatile Environments and Land in the Making

This introductory chapter aims to introduce the main topics and objectives of this dissertation. While looking into the thought processes behind this research project and its connection to the overarching *ECOPAS* project, this chapter also dives into a discussion about methodology and anthropological approaches to environmental change, relationships between land and people, and ‘land in motion’. The chapter raises important questions in relation to adaptation and everyday life in volatile, and sometimes hazardous environments. Drawing on previous writings about anthropology and environment as well as anthropology and natural disasters, this chapter places the project within the anthropology of environment. Additionally, this chapter provides a brief social history of Hawai‘i, as well as discusses my methodology and fieldwork.

Chapter 2: Hawai‘i – A Quintuple Volcano Island

This chapter traces a journey through the volcanic environments of Hawai‘i Island/the Big Island, following a pathway from the oldest volcano, Kohala, through the five visible volcanoes that have made or are continuously making the island. Introducing the chapter with a quote from Epele Hau‘ofa’s article, *Our Sea of Islands* (1993), the chapter holds a focus on the creative, destructive, and preserving powers of volcanoes in the Pacific ‘Ring of Fire’ and, specifically, on the Big Island. Throughout the chapter, I address historical processes related to human development of infrastructure, industry, homes, and social lives in the island’s volcanic environments.

Chapter 3: Layers of Rock, Layers of Meaning – the Windward Side of Hawai‘i Island

This chapter is primarily an ethnographic description of Hilo and Puna. I focus on geography and topography, as well as sociality and ‘life itself’ in ‘urban’ Hilo and in ‘rural’ Puna. The chapter is based on approaches to layers and temporality in anthropology, archaeology, and geology, as well as event theory from anthropology. The physicalities of volcanic environments are used as analogies for understanding the body of history, culture and development that has made and is making contemporary Hilo and Puna. Additionally, I discuss social diversity and how complexities within diversity and social relationships are handled in the Puna district.

Chapter 4: Pele: The Goddess of Fire – Immanent Spirituality and Cosmology in Practice

This chapter addresses cosmologies that hold precedence in places with high volcanic activity. The chapter focuses on the volcano deity Pelehonuamea, or Pele, and peoples’ relationships with this deity in Hawai‘i and, specifically, in Puna. With a particular focus on the philosophical perspectives of immanence and transcendence in relationships between humans and deities, the chapter discusses how these perspectives differentiate people’s perceptions of who and what Pele is. Through their relationships with Pele, people in Puna manage in different ways to accept the volcanic environment and, respectively, their place within it. The chapter shows how Pele plays an important role in sustaining social life on Kīlauea Volcano.

Chapter 5: Hurricane Iselle and the June 27th Lava Flow

In this chapter, I address two events that unfolded on the Big Island in 2014, Hurricane Iselle and the June 27th Lava Flow. This chapter is primarily descriptive, based on empirical material collected through participation in ‘lava flow community meetings’ in 2014. Additionally, analyses and discussions are shaped by news stories related to these events along with informal interviews and conversations with people who were affected by them. I analyse how otherwise dormant forms of social interaction are activated during threats such as hurricanes and volcanic eruptions in Puna. In these

analyses I argue that social relationships emerge among people who otherwise do not interact in everyday life, when they must manage environmental threats and crisis together.

Chapter 6: Vernacular Seismology – Epistemological Dimensions in a Volatile Volcanic Environment

In this chapter, I discuss epistemological dimensions in the volatile volcanic environments in Puna. I argue that vernacular seismology is a place specific form of knowledge about these environments, which is grown or developed by Puna residents during seismological and volcanic events. Vernacular seismology does not belong to *anyone*, rather to the place, and is developed in the spaces between Hawaiian seismology and ‘Western’ seismology. I discuss relationships between the public and ‘the state’, in matters of disaster preparedness and management. I argue that social relationships and responsibilities, built on genealogies and the Hawaiian concept of *aloha*, enable a more cooperative management of volcano and hurricane events between governmental entities and the public in Puna.

Chapter 7: Hana Hou

In this last chapter, I discuss an event that unfolded in Puna in 2018, when a volcanic eruption from Kīlauea volcano buried large areas of lower Puna with lava. This chapter compares the events described in Chapter 5 with the 2018 Lower Puna Eruption, an eruption that was destructive on a much larger scale than the eruption in 2014. This is a concluding chapter where I reflect on arguments and discussions I have made throughout the dissertation.

1

INTRODUCTION

Approaching Volatile Environments and Land in the Making

First Glance, 2 January 2007

The aircraft shook a little as we moved into a formation of rather heavy grey clouds. The Hawaiian Airlines route from Honolulu to Hilo was estimated to be a short 52 minutes in the air but, after travelling from the other side of the planet for the past 55 hours, this last hour felt closer to a decade. I was travelling to Hilo for the very first time, to study anthropology at the University of Hawai‘i at Hilo for 12 months. While bumping around in the turbulent clouds, the occasional glimpse of a massive green and black island with a white blanket of snow resting on top of one of its peaks emerged beyond the tip of the aircraft’s right wing. The ocean surrounding the island was a vivid blue. As the aircraft descended towards Hilo International Airport, the view became more detailed with clearly visible patches of cultivated land, large buildings and houses, increasingly closer to each other. On the shoreline, rough, black rocks and cliffs dove into the waves, which rushed up on the rocks and created a white stripe of foam where they crashed. A long breakwater stretched across a bay located in front of a small town with buildings of distinct colonial-style architecture, bearing colours of different shades of pastel. In front of the buildings, a four-lane highway ran parallel with the shoreline towards the airstrip, while behind the buildings the town and suburban areas stretched far up the mountainside. As we approached the landing strip, which seemed to be located very close to the town centre, we passed several different kinds of views, all testifying to the many faces of this little town. Large green grass

parks separated by ponds and creeks as well as large buildings, sports arenas and an industrial area, became visible from the little window in the back of the aircraft. An area that featured what seemed like large hotels emerged before we reached the port where shipping containers were stacked and stored; a massive white cruise ship made the surrounding areas look comparatively tiny. The aircraft turned 180 degrees and came in for landing. A single landing strip fronted a small low lying beige coloured terminal building, covered with a mint green roof made of corrugated plates. The airport was surrounded by lush green tropical vegetation and carefully groomed green lawns. We landed, and while taxiing into our gate we passed a helicopter pad where a crew with t-shirts that read *Paradise Helicopters* loaded a group of people into a helicopter. The aircraft docked with a jet bridge leading to our arrival gate. When exiting the plane, dense, warm, humid air hit my face, and the smell of greenery and flowers teased my nose even before I had stepped onto the escalator from the second level of the concrete building down to the ground level and the baggage claim. Hilo – I had finally arrived.

In anthropology, the place in which we decide to conduct our research is neither random nor insignificant to the hypotheses we pose before embarking on our fieldwork. This dissertation is primarily an ethnographic description of Hawai‘i Island, or the Big Island², and especially the districts of Hilo and Puna, where people live in close proximity to active volcanoes. Secondly, and derived from empirical data, it is about knowledge. According to Nuttall (2009, 293), ‘[a]nthropology reminds us that our task is both epistemological and ontological in how we grapple with an understanding [of] what people know about the world, how they move within it, how they relate to it, how they think and feel about it, and what they say about it’. As anthropologists, we should always look to our empirical material as a basis for this task. This dissertation specifically focuses on *knowledge*, on how people know what they know, and on what knowledge is valid for whom, because knowledge in different forms is a topic of great interest and discussion among people who live on the Big Island. Simply put, *knowledge* is something people *talk about*.

² Hawai‘i Island is most often referred to as the Big Island in everyday speech on the island. I will refer to the island as the Big Island throughout this dissertation.

Anthropology as a discipline has the academic privilege of being descriptive, and rather than cast aside this privilege, we should embrace it in our contributions to scientific knowledge production. All theoretical approaches and ethnographic analyses in this dissertation are grounded in empirical material and in peoples' expressions and descriptions of what is important in their everyday lives. It is not my intention to claim any rights of definition to any of the knowledges represented in this dissertation but rather to show how epistemological dimensions in the District of Puna on the Big Island can contribute to our search for answers as we grapple with some of the greatest challenges we face in our time. How can we sustain life across cultures and peoples in a fast-changing environment and over-populated global world? How can vernacular³ models of knowledge and understanding contribute to solutions to how we can live with massive environmental changes?

The Hawaiian language has provided the established geological sciences with three words that refer to geological formations in volcanic environments: 'a'ā, *pāhoehoe* and *kīpuka*. In the United States Geological Survey (USGS) Volcano Hazards Program Glossary (2013), 'a'ā is defined as

a Hawaiian term for lava flows that have a rough rubbly surface composed of broken lava blocks called clinkers. The incredibly spiny surface of a solidified 'A'ā flow makes walking very difficult and slow. The clinkery surface actually covers a massive dense core, which is the most active part of the flow. As pasty lava in the core travels downslope, the clinkers are carried along at the surface. At the leading edge of an 'A'ā flow, however, these cooled fragments tumble down the steep front and are buried by the advancing flow. This produces a layer of lava fragments both at the bottom and top of an 'A'ā flow.

Pāhoehoe is defined as a smooth, unbroken type of basaltic lava, which advances slowly and leaves smooth or ropey surfaces. A *kīpuka* is a section of land which has higher elevation than a lava flow and remains as a (often) vegetated island in the middle

³ Vernacular is used as a word for a 'local way' or local practice in this dissertation, in addition to the linguistic definition of vernacular, which is narrower and refers to a local language or dialect.

of a hardened lava flow. Following McGregor (2007, 7-8), a *kīpuka* is a section of forest that is not overtaken by lava during a volcanic eruption, and much resembles an oasis in a desert. Many of these can be found in the Hawaiian lava fields, and typically feature tall ‘*ōhi‘a*⁴ trees, tree ferns, creeping vines and mosses. The *kīpuka* are not only able to resist the destructive forces of the lava, but also regenerate life on the barren lava fields surrounding them by dispatching seeds and spores, carried by birds or the wind to sprout upon the new lava.

Considering the limited spread of the Hawaiian language, and how remote the Hawaiian Islands are in relation to other places in the world, it is impressive that this small vernacular language has penetrated the global scientific language of geology – a testament to the meaning of this place as, indeed, *Lavaland*. This dissertation strives to promote an understanding of *vernacular seismology* as peoples’ local response to volcanic volatility, built on and between a multitude of knowledges, concerns, solutions and possibilities for life itself on an active volcano. My main argument is that people in Puna create a vernacular seismology in the spaces between ‘Western’ geological sciences, spiritual orientations and Hawaiian cosmology, to enable possibilities to maintain a life on the slopes of Kīlauea Volcano.

My project is a contribution to the larger global discourse on how we can live sustainable lives in ever-changing and volatile natural and social global environments, with reference to the 2030 Agenda, agreed upon by the United Nations member states in 2015 (United Nations 2015). The working title for the research project from which this dissertation derives reads *Vernacular Seismology in the Pacific: Volatile Environments, Cosmologies and Local Knowledge in the Pacific Islands*, a title that throughout the project has greatly assisted in maintaining a focus on the important components that build this dissertation. As with most working titles and project proposals, the focus changed slightly during the course of the project and was geographically narrowed to a main focus on the Puna district on the northeast coast of the Big Island, the southernmost island in the Hawaiian Islands chain. Other Pacific

⁴ The ‘*ōhi‘a* is an endemic species of tree in the Hawaiian Islands of great importance in Kanaka Maoli culture and traditions. The tree, with its red flowers, ‘*ōhi‘a lehua*, adorns the volcanic landscapes of the Big Island and is commonly used in costumes in hula.

islands and locations have remained as places for comparative analysis throughout the project and have helped anchor the project in a Pacific as well as an American context. The project takes on the important task of drawing lines between other Pacific islands and the Big Island in order to accentuate the Big Island, Hilo and Puna as Pacific places, not unambiguously American. The Hawaiian Islands do not solely compose an American state; they are Pacific islands, with Polynesian cultural veins and a Pacific history that plays a major role in the forming of everyday life in Hilo and Puna. I present these places as Pacific, mainly through Polynesian and Hawaiian cosmology and local traditions, as well as American, through ethnographic glimpses of everyday life, historical recounts and current political debates.

The thematic foci suggested by the project's working title have remained central in this dissertation, but additional topics have developed throughout the project period. While focusing on knowledge, cosmology and volatility, this dissertation has firm thematic roots in the anthropology of ethnicity, environment, emergency response, social diversity, public management and spirituality. Simultaneously, it relates to the overall themes and discussions in the overarching EU-funded project *ECOPAS – Climate Change Uncertainties and Policy Making for the Pacific Front*. ECOPAS was a 3-year international Coordination and Support Action (CSA) project,⁵ funded by the European Union's Seventh Framework Programme (EU FP7) and coordinated by the Bergen Pacific Studies Research Group at the University of Bergen in Norway. The project focused on the human side of climate change in the Pacific, a topic that involves a large variety of sub-topics, such as how people live in and adapt to an environment that is constantly 'on the move' and is often dramatically altered.

ECOPAS was a networking project, concerned with creating important connections between decision makers in higher levels of global diplomacy and local peoples and challenges on the ground in the Pacific. The overall goal of the project was to make Pacific Island states and peoples more visible to large stakeholders, such as the European Union, in relation to policies and issues concerning climate change.

⁵ CSA-projects within the EU's Seventh Framework Programme (FP7) do not fund research but focus on the coordination and networking of researchers, projects, programmes and policies.

While working with connecting bureaucrats and diplomats within the EU with bureaucrats and diplomats in Pacific countries, the project approached climate change through Pacific narratives, performance and arts, and focused on how social sciences and the arts can contribute to the understanding of how climate change affects everyday life in rural and urban areas in the Pacific. *Restoring the Human to Climate Change*, a vision brought to the project in its early stages by Professor Vilisoni Hereniko, became the backbone of the *ECOPAS* agenda as the project cleared a path for the important contribution social sciences could make to a primarily natural sciences focus on climate change issues in the Pacific.

The themes of the *ECOPAS* project, specifically the focus on human life in volatile natural environments in the Pacific, are at the core of this dissertation. Volatile natural environments exist across the planet in various forms, and volatility is increasing with the effects of climatic changes and increased extreme weather events. Sometimes, volatility in natural environments threatens human populations, and volatile events can lead to societal disaster. In some cases, the disaster is of such large scale that it involves larger parts of international society, like the tsunamis in the Indian Ocean in 2004 and in Japan in 2011 or the earthquake in Nepal in 2015, while other times it involves society on a smaller national and local scale. Human lives and existence are often at the mercy of natural forces, be they seismic, wind-, fire- or water-related. Earthquakes, tsunamis, hurricanes, landslides, floods, fires or avalanches are all somewhat unpredictable events that often lead to loss of human lives, property and livelihoods.

What happens when a place is subjected to a cataclysmic event, such as a volcanic eruption, an earthquake, or a hurricane, which rapidly changes the landscape? In this dissertation, I have particularly focused on the role of volcanoes in the everyday lives of people who live on and under the threat of these powerful agents of environmental force. The ethnographic focus is on a society where local cosmologies are strongly influenced by the presence of volcanic forces and where locally central deities take on the forms of 'seismic gods'. My aim is to investigate the meaning of the

Hawaiian volcano goddess, *Pelehonuamea* (Pele for short⁶), in the context of everyday life in Puna and on the Big Island more generally. Who is Pele? What does she mean to people? How is Pele amplified, visualized and reproduced during volcanic eruptions in Puna? How can spiritual connections between land and people mitigate challenging effects of volcanic eruptions? One of my overall claims is that people living in volatile environments in the Pacific have developed systems of knowledge, rooted in cosmologies, that enable social and cultural reproduction and transformation in order to cope with long term, as well as abrupt, changes in the local environment. I explore how people whose ontologies⁷ are to such an extent experienced through place, landscape, and environment relate to apocalyptic scenarios in which their environments may see rapid change into uninhabitable space and where place and environment are forever altered.

Positioning the Project in Puna – anthropology, environment, and disaster

My previous writings in social anthropology about society in Hawai‘i have focused on identity, environment, and the Hawaiian hula tradition (Torgersen 2010 and 2018). These writings build mainly on ethnographic fieldwork, as well as monographs and articles on Hawaiian identity and colonialism written by the political scientist and Hawaiian scholar, Haunani-Kay Trask (1999, 2000), the American studies professor and Hawaiian scholar, J. Kēhaulani Kauanui (2008), as well as on anthropologist Marshall Sahlins’ theories on Hawaiian performative identities (1981, 1985). Working as an anthropologist in Hawai‘i, as in any society, requires deep reflections about past scholarly work and, specifically there, heated debates about the power of definition by

⁶ Throughout this dissertation, I will mostly use the short version of *Pelehonuamea*, *Pele*, although I will occasionally use her whole name to acknowledge the importance of full names in the Hawaiian language in the following chapters. According to Beckwith (1970) *Pelehonuamea* – *Pele* of the sacred earth – is the most common *chant name* for *Pele* (short version). *Pelehonuamea* is mostly used in chants, academic texts and in relation to rituals and spirituality within the hula tradition. The short name, *Pele*, is widely used in everyday speech, local media and literature in the Hawaiian Islands.

⁷ I follow anthropologist Michael W. Scott’s (2013, 259) definition of ontology as ‘experiences and understandings of the nature of being itself’. I also use the expression ‘worldviews’ in reference to people’s reflections, experiences and understandings of being in their world.

white American scholars in an indigenous Hawaiian society (see, for example, Linnekin 1983, Keesing 1989, Friedman 1993, Trask 2000 and Osorio 2001). Indigenous Hawaiian scholarship is at the forefront of debates about culture and indigenous knowledge in Hawai‘i (see, for example, Trask 1999 and 2000, Kauanui 2008, Silva 2004, Tengan 2008, Kanahele 2011). Political debates and strong, detailed ethnographies from the aforementioned authors have deeply inspired me in my efforts to understand some of the complexities in the very diverse and simultaneously closely linked socialites on the Big Island and, especially for this dissertation, in Puna.

Concerning Hawaiian cosmology, spirituality and traditional belief systems, my work is particularly inspired by Pualani Kanaka‘ole Kanahele and her beautifully written monograph, *Ka Honua Ola* (2011), as well as Martha Beckwith’s classic *Hawaiian Mythology* (1970). In my ethnographic analyses of Puna, I am greatly inspired by Davianna Pōmaika‘i McGregor (2007) and her rich monograph, *Nā Kua‘aina*, and the works of anthropologist Kale Langlas – particularly his 2016 book, *Under the Volcano: The People of Kalapana, 1823 to 2010* – who has worked with the residents of lower Puna for many years. Anthropologist Ann M. Iwashita’s Ph.D. dissertation, *Geothermal potentials in Puna, Hawai‘i: How Pele teaches the spaces between* (2017), an inspiring ethnography of Puna, geothermal energy, indigenous environmental politics and Pele, has been a valuable comparison to the themes and analysis of this dissertation.

Throughout this research project, environment has remained a central topic in analysis and discourse. Vernacular models of environment in Hawai‘i, with specific attention towards Hawaiian cosmology and the concept of ‘āina, have been the basis for exploring the relationships between people and environment in this project. ‘Āina is the Hawaiian word for land and additionally translates as ‘to eat’. As with many words in the Hawaiian language, ‘āina points to a much more complex concept than the simple English translation ‘land’ offers, and the additional translation ‘to eat’ demonstrates some of this complexity. For Kānaka Maoli, or indigenous Hawaiians, ‘āina is everything that sustains human life, and humans hold the responsibility of caring for, or *mālama*, ‘āina through ritual, embodiment, and interaction. Quoting indigenous Hawaiian scholar Jonathan K. Osorio (2014, viii), ‘[...] Kanaka are

inseparable from the *‘āina*. Additionally, this relationship between people and land is widely recognised by non-Hawaiians who live in Puna and Hilo. Thus, it is this relationship that forms the basis of this dissertation’s approaches to people’s interaction with environment in these places. Building on this, I have found great inspiration in different approaches to environment in anthropology and have utilised these perspectives throughout my analysis to develop and strengthen my arguments.

Anthropology has maintained dynamic cycles of enthusiasm towards the study of relationships between people and environments. According to Dove and Carpenter (2008, xiv), there have been at least three distinct periods of intense interest in environmental anthropology: one immediately prior to and following World War II, one during the rise of environmentalism in the 1960s, and one during the rise of post-modern theory in the 1990s. In the mid-1990s, the renewed enthusiasm for this topic resulted in several important books with phenomenological perspectives by (mostly British) authors and editors like Barbara Bender (1993), Kay Milton (1993), Tim Ingold (1993; 2002; 2004; 2011), Christopher Tilley (1994), Eric Hirsch and Michael O’Hanlon (1995) and Phillipe Descola and Gisli Pálsson (1996), which discuss different approaches to understanding these relationships. Bender (1993) approached the debate with an argument that landscapes are created by people through their experience and engagement with the world around them. Her book focused on the complexity and power of landscape and included contributors from different fields such as geography, anthropology, and archaeology.

Milton (1993, ix) addressed the role of anthropology in public discussions about ‘green issues’, and the importance of ‘culture’ in scientific debates about environmentalism. She also addressed the boundaries and potentials found in interdisciplinary research about environmentalism, and her book includes contributions by anthropologists, as well as specialists within sociology and law. Milton (1993, 1-2) argued that ‘[i]t is a truism that nothing evolves in isolation, and the specific character of anthropology’s relationship with environmentalism can only emerge through interaction with other disciplines.’

Ingold’s (1993; 2002; 2004; 2011) approaches to the relationships between people and environments have greatly inspired me, both in my methodology and in my

ethnographic analysis of Puna. His perspectives on ‘dwelling’, ‘temporality’ and ‘historicity’ have been useful in my approaches to the volcanic environments in Puna in Chapter 3, where I use ‘layers’ as an analytical tool appropriate for how these environments have come into being. Ingold (1993, 171) critiques the use of layers as analytical approaches by specifically Basso (1984) and Cosgrove (1989), where ‘layers’ represent a blanketing of the environment, and the idea that meaning covers over the world ‘layer upon layer’ suggests that the only way to uncover humans’ practical involvement with the environment is to strip these layers away. Following Ingold (1993, 159), I suggest a dialogical relationship between layers, where a new layer does not blanket or cover another but builds on what is already there, or ‘gathers the past and future into itself’. See more of this discussion in Chapter 3.

Tilley (1994) maintained a phenomenological approach, focusing on topography, on how landscape is experienced and how natural features create a landscape with meaning. His analysis centred on how individuals experience the environment in the present and in the past, with a focus on how they separate themselves from their environments and reconnect through perception, embodiment, movement, emotion, and awareness, all structured through systems of belief.

Hirsch and O’Hanlon (1995) focused on the concept of landscape from an anthropological perspective and discussed how landscape should be brought into the anthropological debate along the lines of for example exchange, ritual and history. They argued (1995, 1) that,

Landscape shares a similar status to the body in anthropology, that despite its ubiquity it has remained largely unproblematized. [...] The black box of landscape requires ‘opening’ and its content themselves brought into view.

Descola and Palsson (1996, 1) discussed ‘the place of nature and the environment in anthropological theory and social discourse’ and focused in their work on preventing a dualistic approach, where ‘nature’ and ‘culture’ are separated, in ecological discourses.

When reflecting upon the anthropologist’s role in the production of scientific knowledge about volatile environments and, not least, volcanic eruptions that critically

affect people's lives, I also turn to anthropologists who have written on the subject of 'disaster'. At the end of the 1990s and beginning of the 2000s, anthropologists Anthony Oliver-Smith and Suzanna Hoffman shifted the focus in the nature/society debate towards disaster and a volatile and aggressive form of environmental agency. The edited volume, *The Angry Earth: Disaster in Anthropological Perspective* (Oliver-Smith and Hoffman 1999), focused on the cultural and social organization of disasters; the challenges with cultural continuity in the wake of disaster; and how disasters affect culture and environment. In their introduction (1999, 1), they wrote,

Disasters sometimes strike with the sudden impact of an earthquake or nuclear meltdown. At other times they accumulate over long periods of time with the slowness of a drought or toxic exposure. In whatever manner they arrive, abrupt or subtle, disasters are all-encompassing occurrences. In their wake they sweep across every aspect of human life: environmental, biological, and sociocultural. By their very constitution disasters spring from the nexus where environment, society, and technology come together – the point where place, people, and human construction of both the material and nonmaterial meet. It is from the interplay of these three planes that disasters emanate, and in their unfolding, they reimplicate every vector of their casual interface.

Of particular interest to my analysis is their concern with both rapid and slow-moving disasters, and the differences in consequences they have on societies in which they unfold. As will be elaborated on later in this chapter, this dissertation specifically addresses three environmental events of disastrous or potentially disastrous scale, all three with different measures of rapidity and societal impact. While adaptation is a more accessible solution in slow-moving environmental events on the Big Island than in rapid environmental events, psychosocial challenges can be just as great or even greater in peoples' anticipation of for example a slow-moving lava flow's arrival at their property. Elaborate discussions about these issues can be found in Chapters 5, 6 and 7.

In 2002, Hoffman and Oliver-Smith published another edited volume, titled *Catastrophe and Culture: The Anthropology of Disaster*, where one of the main

arguments concerns why anthropologists should study disasters. In their definition of *disaster*, they claimed that a disaster does not just happen, but ‘becomes unavoidable in the context of a historically produced pattern of ‘vulnerability’, evidenced in the location, infrastructure, socio-political organization, production and distribution systems, and ideology of a society’ (Hoffman and Oliver-Smith 2002, 3). Further, they argued:

A society’s pattern of vulnerability is a core element of a disaster. It conditions the behavior of individuals and organizations throughout the full unfolding of a disaster far more profoundly than will the physical force of the destructive agent.

Hoffman and Oliver-Smith 2002, 3

In their discussion of why anthropologists should study disasters, Hoffman and Oliver-Smith argued that the holistic hallmark of the discipline is of particular use. Through this,

anthropology provides a theoretical framework that can encompass the entire scope of disaster causation and impact, including even analysis of the essentially novel conditions that have emerged in human-environment relations in the latter half of the twentieth century. As anthropology entails a comprehensive format shared by no other social science, it can – and well should – take a place at the center of disaster theory, research and practice.

Hoffman and Oliver-Smith 2002, 6–7

These arguments have been at the core of this dissertation, in which the perspectives anthropology can provide to knowledge production and in understanding people’s lives on active volcanoes take centre stage. It is anthropology that can connect the different perspectives on seismology, cosmology and volcanic activity that exist in Puna. This will be further discussed, particularly in Chapter 6.

With the recent focus in anthropology on climate change (see, for example, Hulme 2009, Crate and Nuttall 2009, Baer and Singer 2018, Dove 2013 and Crate 2011) – one of the largest contemporary global challenges – another renaissance in the

enthusiasm towards studying peoples' relationships with natural environments has emerged. When attending recent Pacific Anthropology conferences, for example those of the Association for Social Anthropology in Oceania (ASAO) in 2013, 2014 and 2017 and the European Society for Oceanists (ESfO) in 2015, conference attendees have seen that discussions concerning people and natural environments in the Pacific have continued to be popular in many well-attended sessions. The ESfO-conference in Munich in June 2017, titled *Experiencing Pacific Environments*, had several sessions concerning natural environments, including one on natural disasters and one on climatic change. This dissertation takes place in this cyclical and current anthropological debate, where it seems the ever becoming natural environment (following Nuttall 2009) returns anthropologists to these discussions. While this dissertation is dedicated to a focus on volatile environments and, to some extent, disasters, it will not specifically focus on the ongoing political and scientific debate on climate change in the Pacific but will touch upon many of the same topics in its capacity as a case study of how people handle environmental change in their everyday lives.

Anthropology and volcano research

According to anthropologist Mark Nuttall (2009, 299), people in small Greenlandic communities 'do not necessarily talk of the environment around them as changing, but of it being in a constant process of *becoming*'. Particularly, I find this form of rhetoric useful and fitting when approaching the subject of volcanoes. Volcanoes are often regarded as both destructive and generative in that they can destroy human life and infrastructure as well as natural environments, but they simultaneously create new land and new environments. As long as a volcano is either active or dormant, it is in a process of becoming. Kīlauea Volcano on the Big Island, which takes centre stage in this project, is very active – the most active volcano in the world according to the USGS – and is the volcano on the Big Island that most often challenges peoples' everyday lives. Mauna Loa, the largest volcano on the Big Island and the largest active volcano in the world, is also relatively active with its last eruption in 1985, and Hawaiian Volcano Observatory (HVO) has stated that it is not unlikely it will have another eruption within the next ten years. When Mauna Loa erupts, the societal consequences

of the eruption can potentially be more severe, because the lava flows of Mauna Loa reach larger residential areas, for example the two towns Hilo and Kailua.

In comparison, the lava flows from Kīlauea usually travel northeast and east towards the lower Puna area and within Hawai‘i Volcanoes National Park. However, the frequent eruptions of Kīlauea more broadly affect peoples’ everyday lives on the Big Island. For example, its continuous eruptive activities have inspired a long-term development of myths and cosmologies, concerning gods, demigods, spirits, and people, rooted in the volcano itself. According to Hawaiian cosmology and mythology, Halema‘uma‘u, the caldera crater of Kīlauea, is the home of a family of volcano spirits (Beckwith 1970, Kāne 1987/2013). In contemporary Hilo and Puna, the ‘fire goddess’ Pelehonuamea (Pele) figures regularly in discourses about Kīlauea. The different volcanoes on the Big Island, as well as Pele, will be discussed in more detail in the following chapters.

In this project, I have been inspired by scholars both within the social and geological sciences who have written about relationships between people and volcanoes. Especially, I have looked to Nancy Lutkehaus’ monograph, *Zaria’s Fire: Engendered Moments in Manam Ethnography* (1995), in an effort to find perspectives on volcano spirits and their agency. *Zaria’s Fire* is an anthropological monograph with a historical review of research done among the Manam, a people who live on the slopes of Manam Volcano, which forms a small island near the mouth of Sepik River in Papua New Guinea. Of particular interest to this research project is the relationship between the Manam and the spirit of Manam Volcano, Zaria. Zaria is a fiery, female volcano spirit, similarly powerful to Pele, who according to Manam myth resides in the volcano’s crater (Lutkehaus 1995). Much like Pele, Zaria is a spirit who mainly belongs in the myths and legends of the Manam but still appears in contemporary interpretations of volcanic activity. According to Lutkehaus (1995, 4–6),

most people no longer believe that volcanic eruptions are manifestations of a supernatural spirit, [but] some Manam say that Zaria still lives in the mouth of the crater. She is described as a wild-looking creature who spews fire from her armpits and vagina. When she walks about she wears an incandescent skirt aglow with flickering

flames. In essence, Zaria is the volcano – *Manam eoa* (*eo*, ‘fire’) – as the island’s inhabitants call the fiery mountain. When humans provoke her or she becomes angry, Zaria emerges from her cavernous home in the crater’s depths and roams the slopes of the volcano, leaving a trail of fire and burning lava in her wake.

This perspective is similar to the perspectives people on the Big Island have on Pele, as will be discussed in Chapter 4.

Lutkehaus’s long experience and extensive research with the Manam has additionally enabled analyses of issues regarding peoples’ management of environmental changes, such as volcanic eruptions and climate change. Together with human geographer John Connell, Lutkehaus published an article on resettlement in the wake of volcanic events on Manam Island, in which they presented a web of complexities in the resettling of an entire island population to other islands following eruptions from Manam volcano in 2004–2005 (Connell and Lutkehaus 2017). The instability of volcanoes creates particular challenges in the relationships between people and governmental agencies, who are often unwilling to allow residents to return to their volcanic island homes or unwilling to provide necessary support for residents to rebuild their lives under the volcano (Connell & Lutkehaus 2017). In the Manam case, relationships between people who were resettled and local populations in the resettlement areas became tense, reciprocal systems between different villages broke down and Manam Islanders were required to adapt their food production to less fertile soils and an environment different from that of Manam Island.

Connell and Lutkehaus further mentioned a long list of cultural, social, political, and economic complexities that followed the eruptions of Manam volcano. Many of the Manam Islanders were willing to undergo extensive changes in their cultural and social lives as they did not want to return to the volatile volcano. ‘Because of the active volcano, they had been given no alternative’ (Connell and Lutkehaus 2017, 21). Others wanted to return, arguing that ‘the role that Manam Island and the surrounding sea play in their spiritual and cultural life, was more important than any volcanic threat’ (2017, 21). These perspectives can also be found in Puna and in places where parts of the Puna population have relocated after being severely affected by eruptions from Kīlauea.

Anthropologist Anna Synnøve Hovstein's MA thesis titled *'We are doers!' – The social life of silence: Risk awareness and risk perception at the foot of Katla, Iceland* (2016), has been inspirational and comparative in this project, especially in terms of how local populations, who live in close proximity to volcanoes, and 'outsiders' approach volcanic activity in different ways. Hovstein addressed local approaches to risk management on the slopes of the volcano Katla, Iceland's most active volcano, which is hidden under the large glacier Mýrdalsjökull. She wrote,

'Katla will come when she comes', the local villagers will tell you if you press them for information about how they make sense out of living close to a highly pregnant volcano and having done so for many years. 'It is only outsiders who worry about it', they will add if you push the topic even further.

Hovstein 2016, 1–2

Hovstein argued that the local population of the village, Mýrdalur, address the issue of risk in relation to volcanic activity from Katla by what she calls a 'non-construction of risk', in which risk perception is silenced in social life (2016). Instead of talking about Katla and the risks involved in the volcano's location under the glacier and its proximity to the village, the local population express their *action plans* in case of a volcanic eruption. Hovstein (2016, 83) commented that a possible reason why the local population chose to silence their relationship with Katla is that a volcanic eruption is terrifying, and that silence allows locals, especially children, to feel safe. In conclusion, she wrote that the local populations who live with Katla every day express that they cannot live their lives in fear but would rather prepare in the best way possible for an eruption. This philosophy relates to vernacular models of risk management found in local populations in Puna.

In the natural sciences, several scholars have suggested there is an important link between cosmologies, myths and legends, and timelines of volcanic eruptions. Volcanologist Paul W. Taylor (1995) argued that myths and legends of the people living in volcanic islands can be used in an interdisciplinary approach to better understand the timing of volcanic eruptions. HVO geologist Don Swanson (2008)

discussed how the epic Hawaiian myth about Pele and her sister *Hi 'iakaikapoliopele* (see Emerson 2005) gives indications to the timing of eruptive events at Kīlauea and suggested that geologists should dive deeper into Hawaiian myths and cosmologies to look for evidence of past eruptions. Volcanologists Katharine V. Cashman and Shane J. Cronin (2008, 407) argued that 'repeated volcanism over many generations produces rich webs of cosmology and history surrounding volcanoes'. Their study covers the Pacific region, stretching from New Zealand to the Pacific Northwest, where, they argued,

cosmologies and mythologies not only document the attempts of past cultures to recover from the impacts of volcanic disasters, but also provide a means by which following generations can understand, contextualize, and therefore recover from, future volcanic catastrophes.

Cashman and Cronin 2008, 407

Following relevant arguments from both the social and natural sciences, this dissertation, from an anthropological perspective, looks into how vernacular seismology in Puna, which includes adaptive, mitigating and transitional strategies that draw on Hawaiian cosmology, encourages a continued life on Kīlauea Volcano, before, during and after eruptive events. Environmental anthropologist Gísli Pálsson and his co-authors (2013) called for more involvement in pressing global environmental challenges from the human and social sciences and for cooperation with the natural sciences in efforts to adapt sustainable transitions in meeting these challenges. In interdisciplinary research on volcanic eruptions, anthropology plays the important part of elevating vernacular knowledge in approaches to volcanic activity, which is necessary for a continued focus on the human in our understanding of processes of change and transition when living with environmental volatility.

A note on cosmology

Throughout this dissertation, cosmology is used as a framework of understanding worldviews, histories of volcanic eruptions, seismic agency, spirituality, and resilience. I will not go into a detailed discussion about how cosmology has been interpreted and used by other anthropologists, but refer rather to Abramson and Holbraad (2014) for a detailed overview. I will use cosmology analytically, to approach the relationship people in Puna have with Pelehonuamea today. I have found anthropologists Daniel de Coppet and Andre Iteanu's edited volume, *Cosmos and Society in Oceania* (1995), particularly useful for this analysis. From this publication, the work of Alfred Gell (1995), who argued that Polynesian cosmology can be compared to the concept of immanence in monotheistic religions, has been a great inspiration in analysing the relationships between people and environment as well as seismic agency in Puna.

A condensed history of Hawai'i

Hawaiian oral history is thoroughly recorded by many Hawaiian, European, and American writers and scholars who collected stories and noted them down in written form from about the time of the arrival of missionaries in Hawai'i (see, for example, Emerson 1907/1998). According to Terence Barrow in the introduction to Westervelt's *Hawaiian Historical Legends* (1923/2011, 6–7),

[t]he traditional way of preserving information, in the absence of any written script, was to cultivate the memory. Recitation by rhythmical chant was usual and absolute accuracy was expected of the trained person. Any error, such as an omitted word, could cause disaster. Misfortune and even death itself were thought to result from such carelessness.

The body of literature addressing Hawaiian myths, legends and stories of everyday life is rich, vast, and detailed, and is a great resource for historians, geologists and anthropologists alike. Many scholars have written extensively on history in Hawai'i (see, for example, Daws 1968, Takaki 1984, Sahlins 1981, 1985, Cooper and Daws

1990, Kamakau 1961/1992, Kame‘eleihiwa 1992, Kirch and Sahlins 1994, Trask 1999, Osorio 2002, Silva 2004, McGregor 2007, Kauanui 2008, Tengan 2008, Kirch 2011, McLennan 2014, Valentine 2014, Langlas 2016). In the following chapters, historical accounts of the Big Island will be prioritised over a general history of the Hawaiian Islands. In this section, I will provide a brief general historic backdrop to themes and discussions in this dissertation, but for detailed historical accounts of Hawai‘i, I refer to the aforementioned authors.

Human life in the Hawaiian Islands began with the arrival of the first Polynesians who voyaged from the Marquesas and Tahiti, possibly in several migration waves, between approximately 1000 and 1200 AD (Kirch 2011). The people who settled in the islands developed societies in which hierarchical structures of governance and custody of land shaped everyday lives. According to Kāne (1997, 31), *ali‘i nui* (kings or high chiefs) awarded custody of land to ‘their loyal supporters’. *Mokupuni* (island kingdoms) were divided into *moku‘āina/moku* (districts), which in turn were divided into smaller chiefdoms called *ahupua‘a* (Ladefoged et. al. 2006). The *ahupua‘a* were further divided into *‘ili*, which were typically managed by extended families, and in turn divided into smaller plots of land called *mo‘o*, worked by smaller family units (Ladefoged et. al 2006). An ideal *moku* included land from the top of a mountain down to the ocean, cross-cutting a variety of environments with different resources, and most *ahupua‘a* were also sectioned in this way. Within this land management system, it was believed that humans were not able to own land. Kāne (1997, 31) wrote,

Because land was immortal and humans mortal, the idea that humans could own land was beyond imagining. Their attitude was one of territorial custody rather than ownership. It was said that land could not belong to [people] because [people] belonged to the land.

Those who worked the land and produced food, the *maka‘āinana*, did not have custody of the land. The land was usually in the hands of *ali‘i nui* and was managed by a hierarchy of lesser *ali‘i* (Ladefoged et. al. 2006, Sahlins 1985).

Two key concepts from this Hawaiian society that are of particular interest to this research project, are the complex concepts of *kapu* and *aloha*. Both these concepts were, and still are, important parts of societal structure, and ensured resource sustainability and ordering and maintenance of human social relationships. In the Hawaiian Dictionary, *kapu* is translated to ‘taboo, prohibition; special privilege or exemption from ordinary taboo; sacredness; prohibited, forbidden; sacred, holy, consecrated; no trespassing, keep out’ (Pukui and Elbert 1986). According to Ty Kawika Tengan (2008, 35), the *kapu* system, or the ‘*aikapu*, was a ritual system and ‘religiopolitical set of laws that separated men and women during eating periods.’ Further, the system ‘separated the classes of the ali‘i (chiefs) from maka‘āinana (commoners) and imbued the class of specialists called *kāhuna* [priest, sorcerer], with powerful ritual authority that could direct the political and spiritual course of events in the islands’ (Kame‘elihewa 1992, 39; Tengan 2008, 35, parentheses in original). The system ordered society through sacred restrictions on natural resources, types of food, relationships between commoners and chiefs, relationships between men, women and children, ordering of space and of places that were believed to hold strong spiritual power or belong to any of the gods in Hawaiian cosmology. The *kapu* system was abolished in 1819 by the Hawaiian king Kamehameha II, in collaboration with his mother Queen Keōpūolani and his father’s other queen, Ka‘ahumanu, as they shared a meal of *kapu* foods together in the court. In contemporary Hawai‘i, *kapu* is often used to manage peoples’ movement in different environments to protect sacred sites and to manage natural resources. Put together with the English words ‘no trespassing’ it is also used to control peoples’ movement on private properties.

According to the Hawaiian Dictionary by Pukui and Elbert (1986), *aloha* can be translated to ‘love, affection, compassion, mercy, sympathy, pity, kindness, sentiment, grace, charity; greeting, salutation, regards; sweetheart, lover, loved one; beloved, loving, kind, compassionate, charitable, lovable; to love, be fond of; to show kindness, mercy, pity, charity, affection; to venerate; to remember with affection; to greet, hail’. While these translations give indications to the meaning of *aloha*, they fail to recognise the social responsibility associated with *aloha* and the social consequences of failing to ‘show *aloha*’. Sahlins (1985, 3) wrote,

Aloha can refer to the beloved, but its meaning extends to *pitié* in the Rousseauian sense, the sympathy we feel for the suffering of any sensible being, especially those like ourselves. In this sense, aloha suggests a kinship of substance with the other and a giving without thought of immediate returns.

Aloha was used in the old Hawaiian society to manage and nurture social relationships and alliances, and it was maintained between family members and extended kin, but also between neighbours and people of different rank. It crosscut the hierarchical political system in that *ali'i* and *maka'āinana* showed *aloha* for one another (Kirch and Sahlins 1994, 131). In my experience, based on the teachings of my *kumu hula*, *aloha* is often used in contemporary Hawai'i as a moral compass and can be described as a socially binding contract and system of reciprocity. *Aloha* is reciprocal in that maintaining it requires giving and receiving, and it is performative through acts that signify it. In contemporary Hawai'i, this sometimes becomes problematic in social situations or relationships where the people involved have different understanding of *aloha*.

The Hawaiian society that had been in the making for several hundred years took a new turn in 1778, when the British explorer, Captain James Cook, arrived in the islands, establishing what is believed to be the first contact between Europe and the Hawaiian Islands (Sahlins 1981). After several expeditions to the islands by other explorers as well as traders and whalers in the following years, missionaries arrived in the islands in 1820. Owing to a collapse of the kapu system in 1819, shortly after the death of the first king of a united Hawaiian Kingdom, Kamehameha I, a spiritual void left Hawaiians receptive to a new spiritual direction (Haas 1998). Conversion to Christianity was welcomed by many, and according to Haas (1998), mass baptisms were performed in the 1830s. After contact with British explorers and the fall of the kapu system, the social and natural environments in the islands changed. Venereal diseases brought by immigrants affected a large part of the indigenous population, whose numbers dropped dramatically (Trask 1999). According to David E. Stannard (1990), the number of people in the Hawaiian Islands in 1778 is estimated to have been

as high as 800 000. Only one hundred years later, the indigenous Hawaiian population had dropped to just 40 000.

American businesspersons who had close ties to and cooperated with missionaries, established large companies in the islands, and sugar cane became the largest export during the reign of the Hawaiian monarchy (Takaki 1984, Wilcox 1996). Kamehameha III signed *the Great Māhele* in 1848, an act that changed rights to land ownership, and broke down the traditional Hawaiian land system (Chinen 1958). This document ensured foreigners the right to own land in Hawai'i for the first time. Following this, import of cattle and horses made way for ranching as a form of land management, and the use and export of native tree types for construction of houses and other structures forever altered the forest landscapes of Hawai'i (Maly and Wilcox 2000). The Hawaiian islands' geographical locations made them ideal for large-scale production of the aforementioned sugar cane, pineapple, papaya and macadamia nuts. Especially for the production of sugar cane, companies needed a labour force they could not find in the islands alone, and workers were brought to Hawai'i from Europe, Asia and Oceania (Takaki 1984). This wave of immigration created the base for contemporary social, cultural and linguistic diversity in the islands.

While some of the monarchs of the Hawaiian Kingdom steered away from the 'old ways' of Hawaiian traditions in the rapidly changing society, some were concerned with bringing back some of the traditions that had been banned by early missionaries because they were considered heathen. During his reign in the late 1800s, King David (Kawika) Kalākaua, also referred to as *the Merrie Monarch*, brought back the hula, a Hawaiian tradition and philosophy, which is often expressed through performance of chant and dance (Silva 2004). Kalākaua was the last king of Hawai'i, as he left the role of regent to his sister, Lydia Lili'u Loloku Waiania Kamaka'eha, better known as *Queen Lili'uokalani*, who became the last regent of the Hawaiian Kingdom. The power of the Hawaiian monarchy was irreversibly weakened as Kalākaua was militarily forced to sign the *Bayonet Constitution* in 1887, a constitution that stripped the regent of his executive powers (Silva 2004, Osorio 2002). In 1893, under the rule of Queen Lili'uokalani, the Hawaiian throne was overthrown by a new elite of businesspersons and landowners, and the islands were illegally annexed by the United States in 1898

(Trask 1999). In 1959, after a biased public vote, Hawai‘i became the 50th American state. Hawaiian scholar, activist, and poet Haunani-Kay Trask (1999, 76) wrote,

At the creation of the United Nations in 1946, Hawai‘i was listed as a non-self-governing territory under U.S. administration. Such a status was considered a ‘trust’ relationship, whereby the United States had an obligation to promote the political aspirations of the Hawaiian people toward attaining self-government. [...] In 1959, Hawai‘i became a state. The vote on statehood included only two options: continuation of territorial status or statehood. Neither commonwealth status nor independence appeared on the ballot.

After 1959, Americans from the continental, or ‘mainland’,⁸ U.S. could easily move to Hawai‘i or purchase a summer home in the new state. Thus, several waves of mainly white Americans migrated to the islands in the following decades (Cooper and Daws 1990). Additionally, in the 1950s, tourism began a steep ascent into the contemporary large-scale industry. Throughout these waves of immigration, the indigenous Hawaiian population – that had been in the islands for centuries when the British explorers ‘discovered’ them – found themselves at the margins of a new society that was forming, while losing their language, culture, knowledge, philosophy, and spiritual orientations rapidly. Due to the dramatic decrease in the Hawaiian population mentioned above, as well as the development of a ‘multi-ethnic’ society rooted in immigration from the US, Japan, China, Korea, the Philippines, Oceanic countries and European countries like Portugal and Norway, indigenous Hawaiians were at this point in history often genetically part-Hawaiian, with ‘multi-ethnic’ genealogies (Holt 1964/1995). In this new ‘multi-ethnic’ society (following Holt 1964/1995), ‘Western’ systems of politics, power, economy, religion, culture and social norms took centre stage.

As a response to the marginalisation of Hawaiians, indigenous Hawaiian political activists and scholars started addressing the wrongful treatment of the Hawaiian people, as well as issues regarding what it meant to be Hawaiian. John

⁸ ‘Mainland’ is the word most often used for the continental U.S. in everyday speech in Hawai‘i.

Dominis Holt, part-Hawaiian of chiefly background and writer, poet and cultural historian, wrote about emerging issues regarding ethnicity and identity in his well-known piece *On Being Hawaiian*, which was first published in 1964. He argued that after being somewhat ‘culturally numb’ for many years, part-Hawaiians such as himself were starting to ‘wake up’ and realise the importance of their heritage. Holt (1964/1995, 9) wrote:

Our young people look now with fervor to the possibility of becoming once again Polynesian Hawaiians in spirit. They march, they carry placards, they read, more importantly, they have learned to speak out – to externalize rage and frustration, if you wish to put it into a high-flown psychological phrase. They have begun to sense, as only Hawaiians can sense this particular thing, that a greatness, something intangible yet powerful and enduring belonged to our people. They know that some of this lives on in us. We are links to the ancients: connected by inheritance to their mana [spiritual power], their wisdom, their superb appreciation of what it is to be human. This is the foundation of the aloha spirit. It comes from many things, from knowing what it is to care, to truly care about other people. To understand the value of loving what is in nature: living with it in a balance of coexistence; respecting all things of the earth, including rocks and dirt as living things related somehow through a cosmic connection to ourselves.

Following an eviction struggle in Kalama Valley on the island of O‘ahu, indigenous Hawaiian rights activists established a sovereignty movement in the 1970s (Trask 1999). This struggle marked the starting point of what is known as *the Hawaiian Renaissance* and ensured that ‘the issue of land and land claims would characterize public debate for the next [fifty] years’ (Trask 1999, 67). Dr George S. Kanahale, president of the Hawaiian Music Foundation, wrote in the foundation’s magazine, *Ha‘ilonno Mele* (1979),

Like a dormant volcano coming to life again, the Hawaiians are erupting with all the pent-up energy and frustrations of people on the make. This great happening has been called a ‘psychological renewal’, a ‘reaffirmation’, a ‘revival’ or ‘resurgence’ and a

‘renaissance’. No matter what you call it, it is the most significant chapter in 20th century Hawaiian history. [...] Why? Because it has reversed years of cultural decline; it has created a new kind of Hawaiian consciousness; it has inspired greater pride in being Hawaiian; it has led to bold and imaginative ways of reasserting our identity; it has led to a new political awareness; and it has had and will continue to have a positive impact on the economic and social uplifting of the Hawaiian community.

Reviving a focus on Hawaiian culture, identity, power and legal rights, indigenous scholars and activists started the massive struggle of ensuring indigenous Hawaiian’s rights to sovereign rule, land, education, health services, and the right to live Hawaiian lives, which is still ongoing, half a decade after the struggle started. The Hawaiian Renaissance also brought discussions about ethnicity and cultural heritage, and about who has the right to claim an indigenous Hawaiian identity in what Holt (1964/1995) referred to as a multi-ethnic Hawai’i (see Kauanui 2008 for more on Hawaiian ethnicity, indigeneity and identity).

Massive efforts from the sovereignty movement throughout the 70s and 80s led to the *Apology Bill* passed by the U.S. Congress in 1993, which stated that ‘the indigenous Hawaiian people never directly relinquished their claims to their inherent sovereignty as a people or over their national lands to the United States, either through their monarchy or through plebiscite or referendum’ (Trask 1999, 76). Even though the sovereignty movement has achieved great things and ensured better conditions for indigenous Hawaiians since the 1970s, indigenous Hawaiians are still marginalised in Hawai’i and live under conditions of US colonial rule.

Methodology and reflections on the researcher’s outset

Fieldwork

At the beginning of this chapter, I stated that the place in which we do our fieldwork is neither random nor insignificant in relation to our research questions and topics. Neither are the methods we apply during our fieldwork and in our writings. This dissertation is based on altogether three years of studies and qualitative research in Hilo and Puna, between 2007 and 2015, with the majority of the research conducted for

seven months in 2009 and for the whole year in 2014. While working with a variety of anthropological qualitative methods in the field, I have also utilized methods and analyses from other academic disciplines, mainly geology and cosmology, in this dissertation. This research project has always been an anthropological project, with interdisciplinary qualities that add value to the anthropological analyses. In Chapter 6, interdisciplinarity is discussed in detail, where two forms of knowledges – Hawaiian seismology and ‘Western’ seismology – are connected through anthropological analysis, enabling a third form of knowledge – vernacular seismology. When doing anthropological research on how people live under Kīlauea volcano, I argue that an interdisciplinary approach, which considers the roles of cosmology and geology in the everyday lives of people, is utterly necessary for a successful anthropological analysis.

In 2007, I was an undergraduate student of anthropology on international exchange at the University of Hawai‘i at Hilo (UH Hilo). During that year I became familiar with some of the topics that have led to further research for my MA thesis and for this dissertation, including Hawaiian history and political science, Pacific and Hawaiian anthropology, sociology of religion, communication and Hawaiian cultural resource management. During this first stay on the Big island, I visited Hawai‘i Volcanoes National Park (HVNP) three times. In 2007, Crater Rim Drive, the 11-mile road that encircles the rim of Kīlauea’s Halema‘uma‘u crater, was open to visitors of the park. I remember driving around the large crater the first time I visited the park and feeling incredibly small compared to my surroundings. I had never been in a volcanic environment and did not feel completely safe. I was anxious about volcanic volatility and the unbelievable power I associated with volcanoes. The sulphuric scent from vents along the route represented something dark and ominous to me, and I focused on the volcano’s destructive powers.

In 2009, I conducted fieldwork in Hilo for seven months, primarily in the role of a student and dancer in ‘Hālau o Halia’, a hula school with a focus on training students to become a *kumu hula*. *Hālau hula* can be translated to ‘hula school’. *Kumu hula* is the Hawaiian phrase for mentor or teacher of hula. *Kumu* directly translates to source, bottom, origin, base or foundation, and a *kumu hula* is a person who embodies knowledge about the complexities of hula, Hawaiian cosmology, history, places,

spirituality and about how to be in the world. During this fieldwork I spent three days each week in the *hālau*, as well as occasional gatherings on the weekends to prepare for performances or collect materials for costume making. In between my hula classes I spent time with other members of the *hālau*, practising choreographies and chants together, and visiting places we were learning about. Additionally, I explored the environments of the Big Island with interlocutors outside of my *hālau*, as well as on my own as instructed by my *kumu hula*. The empirical material from this fieldwork was the basis for my MA thesis, which discussed the Hawaiian hula, performativity and the politics of Hawaiian identity (see Torgersen 2010 for more details). The fieldwork in 2009 was the beginning of a different relationship with the volcano, developed mainly through the hula tradition and with a focus on the volcano goddess Pelehonuamea. HVNP was re-introduced to me as a place for tradition, ritual, spirituality, and cosmology, and I became increasingly familiar with and aware of the multitude of meanings ascribed by different people to this place.

In 2011, I spent about 1.5 months in Hilo, following an Association for Social Anthropology in Oceania (ASAO) conference in Honolulu. I spent this time continuing hula training in my *hālau* and exploring places on the Big Island as encouraged or instructed by my *kumu hula*, both with interlocutors and on my own. In 2011, Kīlauea had surface lava flows accessible to the public, and I spent an evening visiting the lava flow with an anthropologist, a climate scientist and a biologist from the University of Hawai‘i, as well as a local guide. This visit is recounted in Chapter 4 (page 162). During the stay in 2011, I became more conscious of social diversity in Puna and the different meanings Kīlauea, lava and Pele hold to different people who live there.

In 2012, I spent about two months in Hilo, doing much of the same as in my previous visit, including continuing my hula training. During this visit, I was invited to come on a three-day camping trip in HVNP with a group of people who worked with my housemate Sarah at the University of Hawai‘i at Mānoa’s Hawai‘i Forestry Extension (see Chapter 3, pages 134-138). The group consisted of a mix of people with different social backgrounds, some who had lived on the Big Island their entire life and others who had come there from other US states as university students or employees. The trip was guided by Sarah’s co-worker Kahena, a Kanaka Maoli man who had

grown up in Volcano Village and thus lived on Kīlauea volcano his entire life. During our trip, he shared knowledge about how to act and behave in these volcanic environments, as well as stories of an earthquake and tsunami that took the lives of two people in the place we were staying. During my stay in 2012, I was also invited along to a day of mapping and registering old grid markers in the dense forests of the Hāmākua Coast on the northeast side of the Big Island, together with Sarah and one of her co-workers at the Hawai‘i Forestry Extension. The mapping included finding old metal pole markers and marking them with GPS coordinates, as well as registering the types of trees, shrubs and other plants that grew within the grid sections we were mapping. This specific activity is not mentioned further in this dissertation but is an example of my engagement with the environments of the Big Island during fieldwork.

During these shorter visits to the Big Island a world in which people reside on an active volcano and live their lives adjacent to active lava flows revealed itself – I was intrigued, fascinated and, simultaneously, puzzled. I was especially interested in finding out how people in this place, which I had perceived as rich in social diversity, with an indigenous population living side by side with several generations of immigrants from the continental US, Oceania, Asia and Europe, together managed life on the volcano. Additionally, I was intrigued by the fact that, impressively, the Hawaiian language, a small vernacular language from the middle of the Pacific Ocean, as mentioned in the beginning of this chapter, had managed to penetrate the globally universal language of geological sciences with the words *pāhoehoe*, *‘a‘ā* and *kīpuka*. I was left with the impression that this was a highly significant place in the development of volcanology. I developed several fundamental questions about life itself in this place: Aside from the overwhelming beauty of natural environments on a calm sunny day in lower Puna and the seemingly relaxed lifestyles associated with this area, what reasons would people have to choose to live on an active volcano, which threatens your life, home, and livelihood regularly? Do people live there by choice? How is the volcano affecting people’s everyday lives? How has the volcano affected the social, economic and cultural conditions in Puna? How do residents utilize the volcano in their favour? How is fear relevant in peoples’ relationships with the volcano? How are people’s spiritual orientations related to the volcano? How do people relate to

environmental changes? How do they relate to global climate change discourses? These were some of the questions I wanted to explore when I initiated this research project.

In 2014, the main focus during my fieldwork was on people's everyday life on Kīlauea Volcano, as well as on two events that serve as examples of how people in Puna manage environmental volatility: *Hurricane Iselle* and the *June 27th Lava Flow* which I discuss in detail in Chapter 5. My research was conducted as a resident of the town of Hilo and participating observer in the district of Puna and, more broadly, on the Big Island. My methodology was a continuation from my previous research, and I continued as a hula student in 'Hālau o Halia', although less intensively than before. I maintained my hula training two days a week for the first five months of the fieldwork. After these initial five months, my *kumu hula* encountered some challenges in her personal life which forced her to move to another US state. She did not return to the Big Island until late 2014, and my hula training was paused during these months.

Many of my interlocutors from previous fieldwork periods in Hilo had moved to other US states or to Honolulu when I arrived in 2014, and thus I spent much time establishing relationships with new interlocutors. During the first half of the fieldwork, I spent a lot of my time in Hilo, while travelling to Puna about three times a week. In the second half of my fieldwork, I was in Puna generally five days a week following developments of the two aforementioned events and participating in 'community meetings' organised by the Hawai'i County Civil Defence (HCCD) and the HVO. I also spent time in HVNP volunteering for a non-profit organisation called Friends of Hawai'i Volcanoes National Park, or Friends of the Park for short. This organisation leads a project within HVNP which focuses on removing invasive species of plants in the park, while simultaneously planting endemic species of plants that for different reasons are decreasing in numbers. The volunteers of Friends of the Park during my time with them were mostly pensioners, and many had worked as biologists during their active work years. Additionally, the organisation was aided in their work by interns at HVNP.

In Hilo, I continued to work with my *kumu hula* and the members of my *hālau*. After informing my *kumu* about this research project when I arrived in 2014, she decided that the training we did in hula class would focus on understanding Pele in the

context of hula and Hawaiian culture. We had already worked on topics concerning Pele when I did fieldwork in Hilo in 2009, but in 2014 we concentrated even more on chants and stories about Pele. I also spent time during the first six months of 2014, particularly in the beginning of the year, doing archival work at the university library, as well as visiting the anthropology department at the University of Hawai'i at Hilo. The opportunity to do this type of work in the field was particularly useful to me during times when I was progressing slowly with building new social relationships.

One part of my methodology consists of mapping the many physical environments of the large Big Island through hiking trips, camping trips, backcountry explorations, and many road trips around the island together with interlocutors, with my partner and on my own. The times I spent alone in different environments on the Big Island were usually as instructed by my *kumu hula*, who wanted me to visit the places we talked about in hula class and experience them on my own. Once I returned to class, we would discuss the places I had been to. Sometimes, I explored places on my own simply because I needed to be alone. As an introvert but very social person, I need to seek solitude to recharge and followed the same recipe for this in Hawai'i as I do when I am in Norway – to be alone while surrounded by nature. I explored the Big Island alone also whenever I found myself with 'nothing' to do, which happened every now and then because my interlocutors had busy lives with work, school or family they tended to. The Big Island is a large island and mapping the places I address in my previous research and in this dissertation demands considerable amounts of time and energy, which my interlocutors could not always give me.

To describe the drama of volcanic environments on the Big Island, I have allowed myself to use space in this dissertation to share some of my interactions with these environments. Research, conducted in relation to the two events mentioned previously – Hurricane Iselle and the June 27th lava flow – is additionally based on participation in community meetings, interviews with representatives of the HCCD, local newspaper articles, archival work, following activities and conversations in social media, as well as many conversations with residents, business owners and other members of the lower Puna community, who were affected by both these events. My interlocutors in this research project are people I have worked with in my previous

research, like my *kumu hula*, my hula sisters, my house mate Sarah, friends from my time as a student at the university, like Alamea and Sophie, and academic staff at UH Hilo. Additionally, I formed new relationships during 2014 with neighbours, friends and family of established interlocutors and Puna residents I have met at community meetings, workshops and during leisure activities in Puna, such as Mark. My interlocutors all live on the east side of the Big Island, between Honoka‘a Village in the north, and Volcano Village in the south. They have diverse social backgrounds, live different lives and while some have lived on the Big Island their entire life, others have moved there during their university education or later in life. They represent different perspectives on the volcanic environments they live in, and on relationships with and beliefs in Pele, which are reflected upon in this dissertation.

When I arrived on the Big Island in 2014, I stayed for about a month with my friend Sophie who lives in a subdivision of Puna called Eden Rock. Luckily, she had a spare room in her house where I could stay until I found a house I could rent. After searching a while for an affordable place to stay, I ended up renting a house in Hilo. Lower Puna was located about 45 minutes’ drive from the house in Hilo – which created a bit of a challenge for the fieldwork I wanted to conduct in Puna. This situation was difficult to avoid, as appropriate and affordable housing was hard to find in the lower Puna area when I arrived on the Big Island. Additionally, I travelled to the field with a partner, and for him to be able to stay in the field throughout the year and have something to do, we decided to stay in town. This challenge proved to be both productive and counterproductive. Although I sometimes questioned my decision to live in Hilo rather than in lower Puna, which would possibly bring me closer to everyday life in Puna and to the people living there, the decision persisted throughout the whole 12 months.

While living in a low-income area in Hilo, I was able to experience parts of everyday life in this town that thus far had been unfamiliar to me. For instance, on the other side of a small forest area located across the lot from my house was a neighbourhood with public housing units, occupied mostly by Micronesian immigrants. The relationships between these immigrants and other residents in the area was rather tense, and I came to learn that Micronesian immigrants experience

discrimination from both Hawai‘i residents and, systematically, in public and private sectors of management (see more on this in Chapter 3). I became familiar with some of the Micronesian residents as we did our laundry at the same local laundromat on the same nights of the week. The house I lived in was located on a lot with eight houses and was surrounded by neighbours of different kinds on all sides, including families with small children and drug dealers who had several visits from the local police throughout the year. One family was Kanaka Maoli, who kept chickens and grew a taro patch in the back of their property. Another family was South Korean and kept mostly to themselves. A single ‘local’⁹ mother with her teenage son lived on one side of my house, while a middle-aged couple of Irish descent lived in the house located diagonally across the lot. Some of the houses on the lot were empty. Some of the residents worked as gardeners, some as truck-drivers, and some worked at Walmart, located a 5-minute drive from the lot. Some of the residents were unemployed and came over to hang out when I was home. I experienced neighbourly kindness as well as hearing domestic disputes that often ended in violence and the need for a phone call to the local police. Nonetheless, I could talk with the people in my neighbourhood about their relationships with people who live in Puna, which gave me valuable insights into differences and similarities between people in Hilo and in Puna, and, importantly, reflections from people in Hilo about the ‘unknown’ and ‘mysterious’ people in Puna. For example, several of my neighbours referred to people in Puna as ‘Punatics’, an ascribed and self-ascribed social category I discuss further in Chapter 3. Overall, the decision to live in Hilo instead of in lower Puna turned out to be the right decision.

In addition to the different periods of residing and doing fieldwork on the Big Island between 2007 and 2015, I conducted fieldwork from May to September in 2018 on social media and via other digital channels. I followed the developments of the *2018 Lower Puna Eruption*, which started at the end of April 2018, and is addressed in Chapter 7. Since I had previously conducted fieldwork in the places affected by this eruption, kept in touch with interlocutors in lower Puna since 2015, and had followed discussion groups about volcanic activity in Puna on social media since my previous

⁹ See *Note on social categories* on page 48.

fieldwork, I was able to follow interesting discussions among Puna residents during the eruption. It was an intense form of fieldwork, in which I was ‘glued’ to my phone and computer from early May to September. Since I was in Norway, 12 time zones from Puna, my daily rhythm shifted as I followed discussions and developments that happened during the day in Puna. In 2018, my interlocutors were active users of social media, predominantly Facebook, and communicated their stories about what was happening in their neighbourhoods on this ‘international stage’ with immediate global reach.

I became aware of sudden environmental changes in Leilani Estates, a subdivision in lower Puna (see Chapters 3 and 7 for details), when my friend Mark posted a story on Facebook about a series of earthquakes (earthquake swarm) in lower Puna at the end of April, showing photos of cracks in the road in his neighbourhood. Soon, a group I followed on Facebook became the main social media communication channel for what was happening as the eruption developed, where Puna residents discussed developments and posted photos from both within and outside areas that were evacuated due to volcanic activity. There was a constant flow of information in the group, and residents and others shared their personal stories as well as discussed information that was given by Hawai‘i County and in scientific reports from the Hawaiian Volcano Observatory. This group has since been a space for discussing the aftermaths of the 2018 Lower Puna Eruption, as well as social, cultural, political and scientific topics regarding Puna and Kīlauea.

Participant observation has been my main method of research, with phenomenological and experiential approaches, which in large part have been exercised through hula dance and spending much time moving about in the volcanic landscapes of the Big Island. According to Sands (2002, 123), experiential ethnography, in which the researcher ‘[lives] through the body’, uncovers aspects that participant observation alone does not, such as ‘feelings, ambiguities, temporal sequences [or] blurred experiences’. Ingold (1993, 166) argued that through movement we incorporate the landscape into our muscular consciousness:

It is the movements of falling away from, and rising up towards, that specify the form of the hill; and the movements of falling away towards, and rising up from, that specify the form of the valley. Through the exercises of descending and climbing, and their different muscular entailments, the contours of the landscape are not so much measured as felt – they are directly incorporated into our bodily experience. [...] movement is the very essence of perception.

I argue that embodying knowledge about Pele and the volcanic landscapes of the Big Island through Hawaiian hula dance as well as moving about in the volcanic landscapes enables the ability to understand Pele as an immanent goddess, as will be discussed further in Chapter 4. A hula dancer's embodied interaction with the physical environment enables an experience-based analysis of the Hawaiian recognition of gods and myths as immanently present in the physical environments of the Hawaiian Islands. Furthermore, the performative aspects of dance ties into the performative aspects of participant observation, in which the anthropologist adopts different roles in relation to different people and situations in the field. According to Lutkehaus (1995, 15),

[f]ieldwork is fictive in the sense that by definition participant-observation means learning how to assume a particular role. Like any performer, an anthropologist must believe in her ability to establish rapport and to be accepted in the role of cultural novice by the society within which she works.

For me, the role of 'the anthropologist in the field' has always been a subjective and deeply personal role to play, both in terms of psychosocial and physical presence. Kapferer (2007, 82) argued that the experiencing body and reflective consciousness of the anthropologist becomes the crucial scientific instrument for the establishment of objective knowledge. The reason for this is that 'ideally the anthropologist is placed in a crucial situation of self-awareness and openness, which is an anthropological methodological emphasis' (Kapferer 2007, 82). While anthropological methods can be critiqued for being subjectivist and therefore non-scientific, Kapferer argued that it is exactly within the subjectivity of the method, in which we are challenged to be open and self-aware, we are able to establish objective knowledge.

Years ago, I learned from social anthropologist Andrew Lattas that the most important tools anthropologists have in the field are empathy and sensitivity, and, even more importantly, comedy and humour. Especially, I have found, comedy and humour have been important ingredients in seeking acceptance as, as Lutkehaus comments above, the ‘cultural novice’. Due to the history of colonisation and white American power over indigenous peoples in America overall, and in Hawai‘i specifically in this case, being a white Norwegian fieldworker in Hilo and Puna can sometimes be challenging. Your subjective physical self is not possible to conceal, and sometimes your white skin colour is associated with the role of ‘coloniser’. I recognize fully the scepticism towards a white anthropologist who is ‘trying to figure out’ Hawaiian culture and indigenous ownership of knowledge about Hawaiian cosmology, history, culture and traditions. Simultaneously, I believe anthropology as a discipline prepares you in the best way possible to be sensitive, tread lightly, and show respect for the people who live their lives in the places you do fieldwork. I also believe that the element of being an outsider to a society can bring fruitful observations and analysis that might be missed when doing fieldwork in your own society. Likewise, you miss important elements when you are an outsider, and you might lack access to knowledge you would have access to as an insider. I thus argue that my perspectives, as an outsider to Hawaiian society coming from a small country in northern Europe, can contribute to the overall anthropological knowledge about society in Hilo and Puna.

The ethical dimensions of participant observation are not to be taken lightly. According to the *European Code of Conduct Principles for Research Integrity* (All European Academies 2017, 4):

Good research practices are based on fundamental principles of research integrity. They guide researchers in their work as well as in their engagement with the practical, ethical and intellectual challenges inherent in research. These principles are:

- **Reliability** in ensuring the quality of research, reflected in the design, the methodology, the analysis and the use of resources.
- **Honesty** in developing, undertaking, reviewing, reporting and communicating research in a transparent, fair, full and unbiased way.

- **Respect** for colleagues, research participants, society, ecosystems, cultural heritage and the environment.
- **Accountability** for the research from idea to publication, for its management and organisation, for training, supervision and mentoring, and for its wider impacts.

These principles, I argue, are at the core of our discipline and are taught to anthropology students from an early stage. Anthropology prepares us to consider ethical dimensions and dilemmas in our research, as demonstrated by Kapferer (2007) and Lattas (in conversation). We have extensive training in ethical dilemmas from our discipline, which enables us to conduct responsible research in the field and in our writing. Still, we are faced with a multitude of ethical dilemmas in our research, especially while doing fieldwork, to which we must find immediate responsible solutions. An ethical dilemma I often faced during my research in 2014 had to do with expectations to and roles of ‘a researcher’ in critical situations, where people feel frustrated, anxious, and even afraid of what is happening in their lives. For example, at a community meeting¹⁰ I attended during a volcanic eruption in 2014, a woman asked me why I was at the meeting. I told her that I was a researcher. When hearing this, the woman exclaimed, ‘Oh my goodness, I am so thankful for all the work you do to keep us safe’. I immediately felt I was in an ethical dilemma, as I could not see how my research contributed to peoples’ *safety* in Puna during this eruption. My solution to this dilemma was to tell her that I was an anthropologist, not a geologist who could tell her which direction the lava would flow. She asked me what type of research I was doing. I told her I did anthropological research on how people sustain social lives on active volcanoes, and that my project was a contribution to the wider debate on climate change challenges and on how people can adapt to increasingly volatile environments. When saying this, I was surprised to see that the woman remained interested, and she told me that my research was very important, and she was still thankful for my efforts. In this case, my ethical dilemma was solved in a way that allowed for a continuation of the relation that was established with the woman in this particular meeting, but ethical

¹⁰ See Chapter 5 for more information about these meetings.

dilemmas can sometimes force you to change or even end relations you have established in the field.

During my fieldwork in 2014, I realised just how different a Big Island hula dancer's relationship with Pele is from, particularly, that of a migrant 'mainlander'. As I had come to know Pele through Hawaiian hula dance in 2009, I was surprised by what I initially identified as naïve, rather silly, and sometimes even disrespectful approaches to Pele, particularly from newcomers to the Big Island from the continental United States or other countries. The immanent approaches to Pele I discuss in Chapter 4, in which, I argue, Pele represents the physical volcanic environments of the Big Island, complied with my perception and experience of who and what Pele is, which I had gained through fieldwork, anthropological training and personal background. My experiential approaches in the field thus gave possibilities for me to approach Pele in ways similar to how she is approached by hula dancers on the Big Island, and, simultaneously, made me aware that many people on the Big Island did not have any immanent relationship with Pele.

The researcher

In this section, I will approach the challenges and advantages associated with the subjective researcher. As argued by Kapferer (2007, 82), anthropologists are challenged to be self-aware and open when we do fieldwork, and it is through this self-awareness and openness we can achieve objectivity in our methods. However, I argue, this self-awareness and openness are rarely reflected upon in detail when we produce textual analyses based on data we have collected during fieldwork. Additionally, I argue that 'revealing' some of the basic personal qualities of the researcher within qualitative research is an ethical exercise which makes the research more transparent. How do we utilize our habitual (Bourdieu 1987) qualities to access social scenes, groups, situations, and relationships in the field? To sustain self-awareness and openness in my writings, I will emphasize my subjective qualities as a researcher, with reference to my abilities to perform as a participant observer in the field.

When we travel to the other side of the world to participate in a social and cultural scene, as well as in a natural environment different from our own, there are

situations and ways of thought we can identify with but also those that seem foreign and incomprehensible. As mentioned above, following Lutkehaus (1995), an anthropologist's identity in the field is of a performative character, and you adjust to different roles in different social situations. Into this performative character, you bring different parts of your subjective self. An anthropologist's main tool for research in the field is oneself, a person with a set of social skills and regulations, with advantages and limitations. You are culturally conditioned, you have personal beliefs and, following Bourdieu (1987), you are at the mercy of your habitus. I argue that while our social and cultural background can challenge us when approaching the field, we can also benefit from utilizing the skills and beliefs we have developed throughout our social lives.

I grew up in a small town on the east side of southern Norway, about an hour-long drive from the capital, Oslo. My childhood was spent in a suburban area, with a large beach on the shore of the Oslo Fjord as my closest neighbour. The summer I was born, my mother and father started building our family vacation vessel, *Callisto*, a 26-foot sailboat with a glass fibre hull and teak wood interior – cleverly furnished to include a toilet, a kitchen with a sink and a camping stove, and sleeping space for four people. This boat was my summer home for about 10 years, on board which our family of four, with the occasional addition of friends of mine or my brother, ventured to near and distant pieces of my childhood paradise; the archipelagos of south-eastern Norway and south-western Sweden. Crisscrossing the Skagerrak Strait, usually powered by the wind in our sails, we made our way in many different forms of sea, from giant waves to a completely still ocean surface, from cold to warm ocean and air temperatures, and in different currents. We travelled the pathways of the sea to villages and islands along the coast and further out to sea, for three continuous weeks and close to every weekend throughout the spring, summer, and early autumn months.

My family are sea people, with generations of sailors, whalers and stewards on large vessels travelling the world oceans for trade or catch. Since I was little, I have been told by my senior family members that I have salt-water running through my veins (translated from the Norwegian 'du har saltvann i årene'). My immediate and extended family categorise themselves as 'saltvannsfolk' (salt-water folk) who live on the coast, as opposed to 'ferskvannsfolk' (freshwater folk) who live inland. I feel comfortable in

the ocean, whereas freshwater lakes in the country's interior make me feel uneasy. A passion for nature and its creatures has also been prominent in my family lineages. A deep respect for and understanding of our natural surroundings as well as an idea of a reciprocal relationship with nature, has been engraved in my moral compass since early childhood. The lessons were expanded with knowledge about fruits and berries in the garden; where to find wild berries and mushrooms in the forest; how to catch fish, crabs, and lobsters from the ocean – even hunting for small game like rabbits and wild birds in the mountains. The focus was always on reciprocity and respect for our surroundings, but also on utility value and what nature can provide. Whenever we foraged, fished, or hunted, we would also prepare, cook and share a meal from the ingredients once we were back home, be it in our house, on our boat or in the little hunting cabin we rented from a sheep farmer up in the mountains.

When I moved to Bergen on the west coast of Norway in 2004, I fell in love with the western country's dramatic topography, and I have hiked in the mountains regularly ever since. Particularly, I loved the way the mighty mountains made me feel small and somewhat insignificant, a feeling that is deeply therapeutic and relieves the stress that can build up in professional or personal life. When I set out to do my first fieldwork in 2009, I was a person who had deep personal ties to my natural surroundings. The lessons from my childhood had turned into a passion for being in the forest and hiking in the mountains. I loved being close to animals and needed to live close to the sea. I was a very social person who liked getting to know people and places different to what I had met and seen before. I was a musician, I loved dancing, but was terribly ungraceful, and I did not like hot weather. This is where you start: a third of a lifetime of experiences, moral orientations, and embodied knowledge combined with several years of academic training and tuning, which enables 'the fieldworker'.

Throughout this project, I have become increasingly aware of how my qualities as a researcher have influenced my understanding of the world I have studied, which again affects my analysis and representation of this world. As anthropologists in the field, we can pick the skills we need in our efforts to play a part, understand, or blend in. One of the first things I noticed when doing fieldwork was that I treated indoor

space in much the same way as Kānaka Maoli do, in that I find it both rude and unclean when people do not remove their shoes before entering a home. I remember asking my hula sisters why they found the need to have a sign outside the house that encouraged people to remove their shoes, as this behaviour was completely natural for me, having grown up in Norway. Realising that other social groups living in the islands did not necessarily remove their shoes unless specifically told so, I had found the first specific Hawaiian cultural trait I could identify with. I also realised rather quickly that my relationship with nature, with a specific focus on respect for uncharted and rough terrain, was different from that of friends who within the past few years had migrated to the Big Island from different parts of California and America's Midwest. Maybe my respect was built on my experiences with the wildness of nature, and on how small you can feel when you are on a tiny sailboat in the middle of the ocean or standing at the base of a massive mountain stretching a thousand metres above your head. Being of 'salt-water folk' connected me easily to other 'salt-water folk' through our understanding of the ocean as an integral part of human life and as a major pathway between all the islands of this world. I found more common ground when learning how my interlocutors engaged with the natural environment, and Hawaiian immanent approaches to and explanations about the natural environment made sense to me.

During my fieldwork in 2009, I had the privilege of working with a wise, knowledgeable, and kind *kumu hula*, who had the courage to take on a student from a different background to that of her other students. 'Kumu Halia' treated me with respect and strictly coordinated my education in the hula tradition with high expectations of my progress, as well as showing a distinct gratitude when witnessing my strenuous efforts to understand the knowledge she shared with me. Still, over a decade after my introduction to this universe of knowledge, I feel I have barely scratched the surface. At the time, I did not fully realise that the way I learned to perceive Hawai'i and its people would differ so much from that of my American friends who had not spent much time learning about history and culture in Hawai'i, and I believe this perspective was formed during my year as a student at the University of Hawai'i at Hilo in 2007 and during my first fieldwork in 2009. When I was introduced to immanent approaches to spirituality and Hawaiian mythical landscapes, which I discuss in Chapter 4, they were

foreign to me but not completely incomprehensible, as I had learned about immanent approaches to mythical characters in Norwegian natural environments throughout my entire life. Although these Norwegian mythical characters are not similar to Pele or other mythical characters in Hawai‘i, their immanent presence is, in the way that immanent mythical or spiritual characters are a part of the human sensory world. Who we are and what set of skills we possess greatly affect our ability to participate in the field and to get access to social relations and information; consequently, this affects our anthropological projects and data analyses. In this research project, I argue that my gradually developed social and cultural background, as well as my skills developed through my previous research, enabled access I would not gain if I were part of the ‘colonising power’. The qualities and advantages found in *longue durée* fieldwork in the same location, with participant observation as the main method of investigation, have been a great advantage for me in this research project.

Photography and Notes in Data Collection

Photography and film were used as documentation methods during my fieldwork. To protect people’s identities and comply with guidelines for personal data protection, I did not take photos of people unless I was in public meetings where the audience had agreed to be photographed. My photographs were mainly of landscapes and features of natural environments, while some of my film material is from hula training and rituals. I sometimes filmed during hula training to document the choreographies for the purpose of personal practice outside of hula class. All this material is securely stored on external hard discs or in secure and protected locations on a university computer, in line with university data protection guidelines. About mid-way through the fieldwork in 2014, I went on a trip to Fiji and New Zealand. Unfortunately, en route back from Fiji to Hilo, a small bag containing some personal items and a memory card from my camera was stolen from my luggage. Some pictures, not containing personal information, from different excursions on the Big Island were lost, and although I managed to get back to some of the sites and take new photos, I do not have photos of all the sites I write about in this dissertation. Thus, some of the photos in this

dissertation have been downloaded from a tourism website or stock photography bank and credited accordingly.

To ensure protection of personal data during anthropological fieldwork, all field notes have been written in physical notebooks. No personal data have been stored digitally, and personal data written down in notebooks have been anonymised, using pseudonyms or a no-name policy. The risks involved in this method of documentation are the physical loss of notebooks, through either misplacement, theft, or critical incidents such as fire or flooding, the lack of possibilities for protection of information in notebooks, like passwords, and the risk that extrinsic persons might access your data material if they access your notebooks. None of these risk factors have threatened my data material, neither during nor after fieldwork.

A Note on Social Categories

In this dissertation, social diversity in Hilo and Puna is at the core of ethnographic analyses. To approach and account for social categories in the following chapters, I will give a short introduction to them here. The definitions and reflections given here are my own as developed through participant observation during fieldwork, as well as based on linguistic details from the Hawaiian Dictionary (Pukui and Elbert 1986) and other mentioned sources. I would also like to mention that the US Census system (and other American bureaucratic systems) firmly use ‘ethnicity’ and ‘race’ as identifiers of diversity. In this dissertation I have used census data in addition to my own empirical data and literature to address social categories in Hilo and Puna. Even though I find this classificatory system problematic from an anthropological perspective, it is a system most people in Hilo and Puna are accustomed to.

I have found that people use different terms when identifying as of indigenous Hawaiian decent or when identifying someone of indigenous Hawaiian descent. These terms are both self-ascribed and ascribed, and they have in common a ‘genealogical marker’ in which the person in question is genealogically linked to the ‘pre-contact’¹¹

¹¹ That is, before Captain James Cook visited the Hawaiian Islands in 1778.

population of the Hawaiian Islands. In this dissertation, I use four expressions when addressing this social group. **Indigenous Hawaiian** is an expression used most often as an ascribed term, an academic term or political term. It can also be used as a self-ascribed term, but the following terms are used more widely from a self-ascribed perspective. **Hawaiian** is an expression with the same meaning as indigenous Hawaiian and is often used in daily general speech. **Native Hawaiian** is a term that lingers in the American ‘system of racial categorisation’ (see Chapter 3, page 105 for more details), typically used in census data, policy, State documents and in the tourism industry, and while indigenous Hawaiians are not necessarily offended when being addressed with this term, it is my impression that they much prefer one of the following two terms. In contemporary Hawai‘i, **Kanaka Maoli** is used by and for people who have genealogical ties to the population of ‘pre-contact’ Hawai‘i. In the *Hawaiian Dictionary* (Pukui and Elbert 1986), *kanaka* translates to ‘human being, man, person, individual, party, mankind, population’, and *maoli* translates to ‘native, indigenous, aborigine, genuine, true, real, actual’. Put together, Mary Kawena Pukui translated Kanaka Maoli to ‘full-blooded Hawaiian person’ (see Kauanui 2008 and Torgersen 2010 for a critical discussion of the problematic approach to blood quantum as identity marker in Hawai‘i). I have used this term throughout this dissertation when I refer to people of indigenous Hawaiian descent. **Kanaka ‘Ōiwi** is another term used mostly to identify as of indigenous Hawaiian descent. Pukui translated ‘Ōiwi to ‘native; native son’, and the word could also be translated to ‘of the ancestral bone’. This term is mostly used by indigenous Hawaiians as an identity marker and as a political statement, and it demonstrates how the Hawaiian language much more profoundly identifies what it means to be indigenous in Hawai‘i.

‘**Local**’ is a comprehensive social category that can be challenging to define in Hawai‘i. Discussions about what it means to be ‘local’ have been continuous throughout my period as a researcher on the Big Island. Local and national media publish articles every now and then, often written by people who defend their ‘localness’, which discuss what it means to be ‘local’, or the differences between being ‘local’ and indigenous Hawaiian, and ‘local’ and *haole*, another complicated term

referring to people of Caucasian decent. Indigenous Hawaiian anthropologist Ty Kawika Tengan stated in an article in *The Huffington Post*:

I think (being local) means spending a significant amount of time in the islands so you're rooted in the community. [...] A sense of localness is one that doesn't erase Native Hawaiian history. [...] I see local ... as how invested they are at maintaining Hawaii as a unique place.

Riker 2015

I use the term 'local' in this dissertation in much the same way Tengan uses it, not pointing towards a specific ethnicity but towards how people relate to socialites, environments and history in Hawai'i. However, it should be noted that I have yet to come across a person of the American 'racial category' 'Caucasian' who is granted full 'local' status by other 'locals'. Additionally, I have experienced the category 'local' being used in a derogatory fashion, mainly by white immigrants to Hawai'i. When referring to this social category in this dissertation, I use quotation marks: 'local'.

Haole is another complicated social category in Hawai'i. The direct translation of the word, according to the *Hawaiian Dictionary* (Pukui and Elbert 1986), is 'White person, American, Englishman, Caucasian'. Formerly, according to Pukui and Elbert (1986), it was translated to 'any foreigner; foreign, introduced, of foreign origin'. Haole is often used as a derogatory term and often suggests racial resentment. It is a highly politicized term in that it refers to a group of people who historically have oppressed the indigenous Hawaiian population. In several social situations I have participated in, haole has been preceded by the words 'fucking' or 'damn', and racial resentment has come across rather clearly. In other social situations I have participated in, the category haole has simply been used to define a white person. I have yet to experience someone expressing pride in belonging to this social category.

A **mainlander** is a person who at some point in their life has migrated to Hawai'i from the continental U.S., also referred to as 'the mainland' in the Hawaiian Islands. In my experience, mainlander is most often an ascribed term, as those who have migrated from 'the mainland' often seek out a deeper belonging in the islands

than this term allows. Depending on how much you adjust to Hawaiian ways of life (with reference to the definitions of ‘local’ and haole above), you can be called a mainlander for a short period after you arrive or for as long as you live in the islands.

‘**Hippie**’ is a term used on the Big Island, and in this dissertation, to categorise people in Puna who often identify with a ‘New Age’ spiritual orientation, which I discuss further in Chapter 3. Most often, I have experienced this category as ascribed to this particular group of people in lower Puna. However, I have also met persons who self-ascribe hippie as an identity marker.

Punatic is a social category, ascribed and self-ascribed to and by people who live in lower Puna and who often have mixed spiritual orientations and live what they call ‘alternative’ lifestyles. It is a wordplay on the English word *lunatic*, which refers colloquially to a person with mental health challenges. While I have heard this term used with a derogatory undertone, I have also met people in Puna who proudly identify with this term, as it includes the ‘alternativeness’ these people cherish. Sometimes, I have heard it ascribed to people in Puna with a certain fondness.

2

HAWAI‘I

A Quintuple Volcano Island

The drive from Kona to Hilo was my ‘road to Damascus’. I saw such scenes of grandeur as I had not seen before: the eerie blackness of regions covered by recent volcanic eruptions; the remote majesty of Maunaloa, long and smooth, the world's largest volcano; the awesome craters of Kilauea threatening to erupt at any moment; and the lava flow on the coast not far away. Under the aegis of Pele, and before my very eyes, the Big Island was growing, rising from the depths of a mighty sea. The world of Oceania is not small; it is huge and growing bigger every day.

– Epeli Hau‘ofa in *Our Sea of Islands* (1993, 5)

Hawai‘i Island – Ka Moku o Keawe (the Island of Keawe), the Orchid Isle, or the Big Island (as it is referred to by most of its inhabitants) – is a large volcanic island at the south-eastern tip of the Hawaiian Islands chain, which is located at the very top of the Polynesian Triangle in the Pacific Ocean. The Hawaiian name of the island, Ka Moku o Keawe, springs from the name of a respected high chief who famously ruled the Big Island in the late 17th century – Keawe, or Keawe‘īkekahiali‘iokamoku (Kamakau 1961/1992, 64). As mentioned in the previous chapter, the human history of the Hawaiian islands began with the arrival of voyagers from other Polynesian islands

between 1000 and 1200 AD (Kirch 2011). However, the islands' creation far predated the arrival of humans. While cultural perspectives on the creation of the Hawaiian islands are presented later in this chapter through creation myths and stories from Hawaiian cosmology, I will in the next three paragraphs demonstrate the established 'earth science' perspective on how the Hawaiian islands came into being using articles written by scientists at the USGS and HVO from between 1999 and 2017 (see bibliography for more details).

The Hawaiian Islands are entirely of volcanic origin and consist of hundreds of islands and atolls, all shaped by an interplay between a fixed volcanic 'hot spot' in the earth's crust and the rotation of the Pacific tectonic plate. A hot spot is a volcanic area that is fed by underlying lava and is thus unusually warm compared to its surrounding areas. Hot spots are independent of tectonic plate boundaries and can be seen for example in the Hawaiian Islands, Iceland and the Canary Islands. As tectonic plates move, fixed hot spots create chains of volcanic islands. In the case of the Hawaiian Islands, the island chain has been formed by plate movement from the northwest to the southeast of the northern part of the Pacific Ocean. As time has passed, the ocean has once again taken control over landmass in the far northern part of the chain, where erosion and subsidence has transformed the volcanic islands into small atolls. The lava rock of the most north-western inhabited island in the chain, Kaua'i, is over 5.5 million years old and heavily eroded. In comparison, the Big Island's oldest exposed rock is less than 700,000 years old, and new lava is continuously creating the island.

The Big Island is formed by five separate volcanoes, of which four are still considered active. The volcanoes there are classified as shield volcanoes, a definition deriving from the shape of the volcanoes, created by successive, mostly effusive (non-explosive) eruptions of lava. This does not mean that the volcanoes of Hawai'i never have explosive eruptions, but rather that most eruptions are effusive. Kohala volcano in the north is considered extinct, but Mauna Kea, Hualālai, Mauna Loa and Kīlauea are all monitored by the HVO on their different levels of activity. Of the four, Kīlauea takes the lead, being the most active volcano in the world, with almost continuous eruptions from its Pū'u Ō'o vent since 1983. After Kīlauea, ranks Mauna Loa, with the most frequent eruptions in recent time: 33 eruptions since 1843, the most recent in

1984. Additionally, Mauna Loa is the largest volcano in the world when measured in total landmass, with the summit located about 17 km above its base on the deep seafloor. Hualālai has not erupted since 1801 but is covered 80% by lava flows that are younger than 5000 years old. Mauna Kea is the highest volcano on the Big Island and stretches over 4200 metres above sea level. It has not erupted in the past 4000 years and is considered a much smaller hazard than the other three volcanoes.

On the southeast side of the Big Island, a younger volcano named Lō‘ihi is creating landmass beneath the ocean surface. The volcano is situated about 975 metres beneath the surface and generates frequent earthquake swarms, the most recent between July and August in 1996 when over 4000 earthquakes were recorded. The Hawaiian name Lō‘ihi can be translated to long or length in English and was introduced in 1955 in reference to the long shape of the volcano. According to one of my interlocutors, it was the Hawaiian wife of a volcanologist at HVO who encouraged her husband to look for a volcano off the south point of the island, because according to Hawaiian cosmology, a volcano should lie in this area. I never had this story confirmed by anyone at HVO. However, in an article about Lō‘ihi it is noted that more recently, Hawaiian scholars have found evidence of the volcano’s existence in the story about Kama‘ehu, ‘the red island child of Haumea (earth) and Kanaloa (sea) that rises from the deep in the ocean floor ... [which] may also be a reference to this submarine volcano’ (HVO 2017a). According to HVO scientists, it is hard to say when Lō‘ihi will reach the ocean surface as it is difficult to predict its eruption patterns, but if the volcano grows 5 metres per 1000 years it will take as many as 200,000 years before Lō‘ihi becomes visible above the ocean surface (HVO 2017a). Still, it is already present in discussions about land in Hawai‘i.

Epeli Hau‘ofa’s quote at the beginning of this chapter marks the turning point in his long and careful reflection on the Pacific Islands’ role in the world, with a focus on the countries that form Micronesia and Polynesia. In his famous essay, ‘Our Sea of Islands’, first published in the anthology *A New Oceania: Rediscovering Our Sea of Islands* (Hau‘ofa 1993), subsequently in the journal *The Contemporary Pacific* (Hau‘ofa 1994), and later in *We are the Ocean* (Hau‘ofa 2008), he argued that it was this drive across the Big Island that made him think of Oceania as large and as growing

every day. While recognising the Hawaiian Islands as truly Oceanic, Hau'ofa discussed scale in Oceania in a revolutionary way. He argued that Oceania is massive, in land mass, people, language, culture, cosmologies and history, and that the ocean, which is the largest of it all, does not make Oceania weaker by dividing the islands but stronger by connecting them, providing pathways which have been used by Pacific peoples for centuries (Hau'ofa 2008). This perspective represents a more holistic approach to the Pacific Islands, where islands are seen 'in the totality of their relationships', empowering the large region on a global scale instead of understanding it as weak because of its small, widely dispersed islands and remote location from the globe's centres of power (Hau'ofa 2008, 31). This argument has been utilized both within and outside the Pacific Islands in recent debates about climate change and continues to stand as a pillar in Oceanic world views.

The Big Island of Hawai'i becomes a metaphor and symbol of largeness, development and future in Hau'ofa's work, where it represents the continuous physical and social growth of the Pacific region. This chapter will focus in large part on the geographies and human histories of the Big Island, as well as on the volatility and versatility of its environment. The chapter's main task is to stage this dissertation in the Big Island's volcanic environment and *introduce* why particularly this island and this place in the world can give us answers to questions regarding how, and perhaps also why, people live in volatile environments. The chapter begins a discussion on what it is about the Big Island that makes it a particularly good place to study how people handle living in hazardous environments. Is it merely grounded in the fact that the island, as so many other Pacific islands, is subjected to volcanic eruptions, seismic activity, hurricanes and tsunamis, or is there more to the Big Island that creates ideal conditions for this type of research?

This chapter is in large parts a descriptive one, in which the Big Island's five visible volcanoes function as vantage points for a mapping of natural and social environments on the island. It focuses on establishing the frames of reference to topographic and geographic features, as well as the various natural environments and climate zones on the Big Island. As mentioned in Chapter 1, this dissertation looks specifically at how solutions for maintaining social life on Kīlauea volcano are created

in the spaces between different forms of knowledges that exist in Puna. The social diversity of this district, which will be discussed in Chapter 3, enables a co-existence of worldviews and interaction with the volcanic environments; this diversity is rather unique in global perspectives on people who live under active volcanoes. Thus, the interplay between volatile volcanic environments and social diversity in Puna makes the Big Island a valuable and interesting site for this type of research. This chapter will briefly touch on this argument, and the discussions around these issues will go into more depth in the following chapters. First, however, I will look more closely at the volcanic environments in the Pacific and especially in the Hawaiian Islands, and their interactions with human everyday life and cultural history.

Volatility in the Sea of Islands: The Pacific ‘Ring of Fire’

The Pacific plate is the world’s largest tectonic plate, embracing almost the entire Pacific Ocean, and is encircled by several other large and small tectonic plates. These plates constantly move towards or away from each other, above or below each other or sideways along each other’s rims. Due to the numerous connection points between the Pacific plate and the encircling plates, the rim of the Pacific plate is home to the deepest ocean trench on the planet, the Mariana Trench, as well as the majority of Earth’s volcanoes and epicentres for a large number of earthquakes. Seismic activity on the rim of the plate, or the Circum-Pacific Belt, is so common that this area has been given the additional name *Ring of Fire* (see Map 2: Pacific Ring of Fire). In the Ring of Fire, volcanic eruptions, earthquakes, land shifts and tsunamis occur regularly, and people living in the areas close to the rim are used to handling volatility continuously. Even so, the high levels of activity create challenges and problems for people living there. Major earthquakes followed by tsunamis have in recent years devastated countries, cities and villages as well as fishing grounds, gardens and agricultural land. The earthquake and the subsequent tsunami in Japan in 2011 even caused a nuclear disaster and radioactive spillage into the Pacific Ocean. Earthquakes, tsunamis and cyclones also claim lives and destroy infrastructure and environments. Suffice it to say, living in this part of the world can at times be very challenging. While environmental change and volatility found in the Ring of Fire is a focal point in this dissertation, a specific

focus on active Pacific volcanoes and their capacities as creative and destructive agents will be prominent. Examples of such active volcanoes can be found in Papua New Guinea (PNG), Solomon Islands, Vanuatu, Tonga, Samoa, Fiji, New Zealand and Hawai'i.

The harbour of Rabaul town on the island of New Britain in PNG was naturally formed by a volcanic eruption in the 6th century AD (Siebert, Simkin and Kimberly 2011). Rabaul was the capital of PNG from 1910 to 1940, before it became the capital of the province of East New Britain. In 1934, an eruption from Rabaul volcano claimed the lives of 441 people who lived beneath the volcano (Siebert, Simkin and Kimberly 2011). This event led to the founding of Rabaul Volcanological Observatory, one of the world's pre-eminent observatories of its kind. In 1994, Rabaul town was again destroyed during a major eruption from the volcano, leading East New Britainers to move their provincial capital to the town of Kokopo, located 20 km away from Rabaul (Siebert, Simkin and Kimberly 2011).

Manam volcano on Manam Island in PNG, which was mentioned in Chapter 1, has erupted twice in the last century, with dramatic consequences for the population on the island. According to Connell and Lutkehaus (2017), the Manam eruptions in 1957–1958 and in 2004–2005 initiated evacuations of the entire population, and after the latter eruption, the PNG government prohibited Manam islanders from returning to live on the island. Both events were dramatic and created difficult situations for Manam islanders:

The 2004–2005 eruptions lasted about two months, damaged many houses (through tephra falls) and valuable trees, such as coconuts, buried food gardens and polluted water supplies. Some islanders were injured from tephra falls and a handful died from gas inhalation and polluted water. The island became uninhabitable and islanders moved to the mainland.

Connell and Lutkehaus 2017, 17

While the evacuees from the eruptions in 1957–1958 were able to live in coastal villages on the mainland with people whom they had maintained reciprocal exchange partnerships, until Manam was safe to return to, the large-scale evacuation in 2004–2005 became a strain on these relationships, and the reciprocal system broke down

(Connell and Lutkehaus 2017). Thus, the Manam evacuees were forced to relocate to areas where subsistence economy and the life they had led on the island proved difficult to maintain because of a lack of resources and changes in their environment (Connell and Lutkehaus 2017). This example shows how such abrupt changes in the natural environment can cause a collapse in the reproduction of social capital, and thus illustrates possible severe social consequences of living in such volatile environments.

In the western parts of Solomon Islands, some 30 km south of the island of Vangunu, lies Kavachi, an active submarine volcano whose continuous eruptions from time to time reach above the surface of the sea (Hviding 1996). The people of Marovo Lagoon tell stories about huge floating stones that reach their shores during Kavachi's eruptions, and people who 'are diving for fish or shells, even inside the barrier reef in the lower south-eastern parts of the lagoon, may hear a distant underwater rumbling coming from the south' (Hviding 1996, 55). The Solomon Islands are located right along the Ring of Fire, where people experience environmental volatility on a regular basis. An earthquake in the Western Province of the Solomon Islands on 1 April 2007 generated a tsunami that swept over large portions of the nearby islands and took the lives of more than 50 people (USGS 2016a). An additional consequence of this earthquake was a rise in the fringing reefs of Ranongga Island to one meter above the high-water mark in the north and as much as between two and three meters in the south, while the northwest coast of Vella Lavella sank about as much as the reefs of Ranongga rose (Albert et. al. 2007). The earthquake caused a tilt in the tectonic plate beneath these islands. Many Ranonggans were convinced that what had happened was not that the reef was uplifted, but that the water had subsided and would come back. However, the reefs of Ranongga remained elevated and the coral died, causing the Ranonggan people to lose their fishing grounds and face great challenges in the procurement of their everyday food supply (Albert et. al. 2007).

A human approach to volcanic activity

People have managed and interpreted challenging environments along the Ring of Fire for centuries through the creation and use of myths and cosmologies to deal with the social and psychological stress of volatility and disasters. A fundamental human

response in confrontation with disruptive events is the need to make sense, or construct meaning, of the event itself. In the case of volcanic and other seismic events, the destructive and constructive forces are so formidable that the meanings constructed to make sense of them are often of godly or epic character (Oliver-Smith 1996, Cashman and Giordano 2008). Making sense of seismic events has often been done through constructing epic myths or cosmologies, which are based in seismic activity, where central deities take on the form of seismic gods. The stories found in these myths and cosmologies can also serve as historical records of change in the environments they portray. Volcanologist Paul W. Taylor (1995) argued that myths and legends of the people living in volcanic islands can be used in an interdisciplinary approach to better understand the timing of volcanic eruptions. In his article, he gave examples of Pacific and particularly Tongan legends that portray changes in the natural environment that can be associated with volcanic eruptions, such as longer periods of darkness, and argued that these legends may have originated in a volcanic eruption (Taylor 1995). As volcanoes erupt, massive ash clouds can form, which can potentially block the sun, creating the illusion of twenty-four hours of night several days in a row. Taylor also emphasized that such myths and legends often stay alive through oral traditions.

In his book *Vanished Islands and Hidden Continents of the Pacific* (2009, 87), oceanic geoscientist Patrick D. Nunn argued that catastrophic and/or abrupt events are more likely given space in oral traditions than other less disruptive or, in his words, ‘remarkable’ events:

Oral traditions about vanished islands could be argued as having a higher probability of being authentic than traditions that concern other, less memorable events. Instinctively it may be felt that the fact of an island disappearing, particularly if that disappearance was catastrophic and/or abrupt, is a subject worthy of embodiment into oral tradition, which may attract less subsequent embellishment than a less-remarkable story.

In mapping Pacific islands that have disappeared, Nunn searches for clues in what he refers to as ‘authentic’ oral traditions (2009, 86). From his perspectives as a geoscientist, he regards oral traditions as ‘more authentic’ in relatively isolated island

societies than in societies that have been strongly influenced through external social interaction, and that these oral traditions indicate islands that once existed but have disappeared. While anthropology regards authenticity much more complex than Nunn demonstrates in his book, a discussion I will not elaborate on in this dissertation, his methodology in the search for geological variations and events in the Pacific demonstrates the potentials of interdisciplinary research within such topics.

Tongan historian Sione Latukefu (1968, 143) argued that ‘oral traditions after being carefully and critically submitted to the canons of historical and anthropological criticism, have helped tremendously to make the history of Tonga more alive, more interesting, exciting and [...] more accurate’. In seeking to understand a timeframe for volcanic eruptions, it can be useful to investigate oral traditions, as they can often indicate patterns of climate, catastrophes and environmental change in the past. HVO geologist Donald A. Swanson (2008) argued that the epic Hawaiian myth about the volcano goddess, Pelehonuamea, and her sister, Hi‘iaka, refers to two significant volcanic events on the Big Island – the roughly 60-year-long ‘*Ailā‘au*¹² eruption during the fifteenth century and the forming of Kīlauea’s caldera. Swanson (2008) suggested diving deeper into more of the stories found in the oral traditions of Hawai‘i to find evidence of other volcanic events of the past, and combine them with the dating techniques and science used in the field of geology to better understand the timelines of volcanic activity pre-dating written documentation. The inclusion of oral tradition in Swanson’s methods also showed that Kīlauea had an explosive nature, in addition to the effusive eruptions scientists had been able to measure through geological methods at the time. Interpretation of chants and stories also showed that Kīlauea was older than previously thought. Particularly from a hazards perspective, the information about Kīlauea’s explosive abilities and the frequency of explosive events is important knowledge to incorporate in hazard and mitigation mapping and plans (Swanson 2008).

Volcanologists Katharine V. Cashman and Shane J. Cronin (2008, 407) argued that history, written as well as oral, has shown that people persist in living with active

¹² ‘*Ailā‘au* is the name of the volcano god who resided on the Big Island before Pele came to the island. See more about this deity in Chapter 4, page 153-155.

volcanism, despite repeated catastrophes caused by damaging eruptions. This suggests that 'past societies developed strategies that provided them with long-term physical and psychosocial resilience to volcanic disruption' (Cashman and Cronin 2008, 407). In modern societies, however, adaptation to the physical hazards posed by volcanoes has led to a range of coping mechanisms developed from various forms of 'Western' science and technology, including engineering solutions, monitoring systems, evacuation plans and land-use restrictions. They argued that, in contrast to the models of earlier community recovery and adaptive strategies, modern societies have not managed to the same extent to develop such strategies to cope with the psychosocial impacts of catastrophes (Cashman and Cronin 2008). They suggest looking at knowledge that has been passed successfully down through generations to strengthen the strategies for coping with psychosocial impacts.

Life itself in volatile physical environments as well as human agency in knowledge production about volcanic events are underlying themes throughout this dissertation and will reappear in discussions and analysis throughout the following chapters. However, before diving deeper into these discussions, I will first focus on how the Hawaiian Islands were created, from the perspectives of Hawaiian cosmology and geological history.

The Volcanic Hawaiian Islands

Here I began to realize the universally igneous origin of Hawaii, as I had not done among the finely disintegrated lava of Hilo. From the hard black rocks which border the sea, to the loftiest mountain dome or peak, every stone, atom of dust, and foot of fruitful or barren soil bears the Plutonic mark. In fact, the island has been raised heap on heap, ridge on ridge, mountain on mountain, to nearly the height of Mont Blanc, by the same volcanic forces which are still in operation here, and may still add at intervals to the height of the blue dome of Mauna Loa, of which we caught occasional glimpses above the clouds. Hawaii is actually at the present time being built up from the ocean, and this great sea of pahoehoe is not to be regarded as a vindictive eruption, bringing desolation on a fertile region, but as an architectural and formative process.

- Isabella Bird travelling up to Kīlauea volcano in Hawai‘i 1872 (1875, Letter V).

The Hawaiian Islands have been formed by volcanic activity over millions of years. The top of the Hawaiian Ridge, which stretches from the northernmost Hawaiian atolls to the Big Island in the south, is dated to be 43 million years old (USGS 2017g). Of the inhabited islands, Kaua‘i is the oldest, dated to be 5.6 million years old (USGS 2017g). The creation of the island chain has been thoroughly studied by geologists in recent times, but before the methods of modern science revealed a version of this creation, other versions, rooted in oral traditions, cosmology and myth, served to explain how and where the islands were formed.

According to the *Kumulipo*, a Hawaiian creation and genealogy chant belonging to Hawaiian *ali‘i* (ruling chiefs/monarchs), all living things, the building blocks of the world, from leaf to rock, water to fire and scales to skin, were created in *pō* (Beckwith 1951). *pō* is the female, dark realm of the world, where all things are born and where all things return after death. The word *kumulipo* can be translated to ‘beginning in great darkness’, referring to the darkness *pō* represents (Beckwith 1951). Social anthropologist and linguist Ingjerd Hoëm (2000, 193) translates (to Norwegian; translation from Norwegian to English by author) *kumulipo* directly to ‘dark origins’, and more elaborately as ‘the source of the universe’s creation is in the colour of the ocean where it is deepest’. The opposite of *pō* is *ao*, which represents the male, light realm, where all living things dwell. Papa (Earth Mother) was created in *pō*, and Wākea (Sky Father) was created in *ao* (Beckwith 1951). In their union, the Hawaiian Islands were born:

Papa-seeking-earth

Papa-seeking-heaven

Great-Papa-giving-birth-to-islands

From the *Kumulipo* in Beckwith (1951, 124)

There are a few different versions of this story that so centrally describes the creation of the Hawaiian Islands. In Beckwith’s (1951) work on the *Kumulipo*, which is a

translation and interpretation of a text originally written in the Hawaiian language by King David Kalākaua, Papa made the land fertile, while Wākea fertilized the land with rain and sunshine. In this story, Wākea stretches towards Papa, and together they create life. This myth is common throughout Polynesia, where Father Sky and Mother Earth are the first parents of all living things on earth (Beckwith 1951). Kāne (1987/2013, 10) addressed creation in much the same way in his interpretation:

In the beginning there was only the Darkness, an infinite, formless, black nothingness. But within that void there emerged a Thought, an intelligence that brooded throughout aeons of Darkness over an immensity of time and space. [...] And in that darkness was created the womb of the Earth Mother whom the ancients knew as Papa. Light was created, the light of the Sky Father Wākea. In their embrace male light penetrated female darkness, and from this union of opposites was created a universe of opposites. [...] So it was that the universe was given form and life. For only in the marriage of light and darkness can there be form. And only in sunlight can there be life and growth of living things, all of which must be fathered by light and mothered in the darkness of the womb, the egg or the soil.

In a version of the origins story told to me by a Kanaka Maoli interlocutor, the islands were born from Papa – which translates to flat surface or foundation – as she was reaching for the sky to be united with Wākea. Here Papa first established flat land (‘seeking earth’), before raising the land in an effort to reach Wākea (‘seeking heaven’). Similarly, from a geological perspective the islands were built by layer upon layer of lava rock, making the islands taller and closer to the sky with every eruption.

In yet another version of the creation of the islands told to me by *kumu* Halia, Pele gave birth to the islands as she was chased by her older sister, Nāmakaokahai or Nāmaka, from north to south, forming a chain of volcanoes on her way as she dug with her fire stick in search of a new home. This version resembles the geological interpretation of how a hot spot combined with a rotating globe formed the islands over time from north to south. However, the creation story is more often told as the story of how Pele searched for a home in the Hawaiian Islands. In this version, she started searching in the northern islands and moved down the chain until she could dig a hole

so deep that Nāmaka could not put out the fire (Kāne 1987/2013). This story insinuates that the islands had already been created when Pele and Nāmaka arrived, but that the volcanic activity throughout the chain was brought there by the rivalry between them. Stories of where Pele came from and how she became the deity she is in contemporary Hawai‘i will be further discussed in Chapter 4.

The Big Island – Five Visible Volcanoes

Five different volcanoes are visible on the Big Island – Kohala, Mauna Kea, Hualalai, Mauna Loa and Kīlauea. The northernmost volcano, Kohala, is considered extinct by geologists. On the ocean floor southeast of the island, the hotspot is building a possible new island, with eruptions from the submarine volcano, Lō‘ihi. In between, four active volcanoes engage the island’s inhabitants and visitors daily in matters of seismicity and volcanic activities. Throughout the rest of this chapter, the five interconnected volcanoes on the Big Island are presented in some detail through a focus on their geological history, on their place in the lives of people on the Big Island, and on development of social life on their slopes. I use the volcanoes as guides to the Big Island’s historic and contemporary diverse natural, social, cultural and economic environments. The volcanoes are monuments in the island’s topography, and for the most part they appear as gentle giants. However, their levels of activity repeatedly challenge human lives, homes and infrastructure, and ensure continuous interest from geologists and volcanologists from around the world.

Kohala

The Big Island is in fact the result of *seven* interconnected volcanoes. These seven include the five previously mentioned, plus, Māhukona, which today is below sea level and overgrown by Kohala volcano, and Lō‘ihi, the submarine volcano located southeast of the island (Moore and Clague 1992). Kohala, which is translated as ‘cherished land’ in the *Hawaiian Dictionary* (Pukui and Elbert 1986), is the oldest visible volcano on the Big Island and is estimated to have breached the ocean surface about 500,000 years ago (Moore and Clague 1992). Located on the north side of the

island, it is by far the most eroded of the five visible Big Island volcanoes and features large valleys, including Pololū, Honokāne, Waimanu and, not least, Waipi‘o. The valleys on the north side of the Big Island are deep, lush with greenery on volcanic soil and feature rivers leading out into the ocean via large black sand beaches.

Waipi‘o valley is rather accessible and frequently visited by tourists who are intrigued by its beauty, historical and cultural importance as well as by getting a glimpse of the everyday life of mainly Kanaka Maoli taro farmers. Several tour companies offer guided tours in vans or on foot down to the valley via a very steep and narrow access road, which is illegal to drive unless you have a 4WD vehicle. Once down in the valley, tourists can enjoy guided walks or horseback riding which bring them along lush trails, roads and creeks, while experiencing the presence of wild horses, green taro patches, farmers at work and surfers catching waves at the black sand beach that connects the valley with the deep blue ocean. Some tourists travel far back in the valley, with a hope of getting a view of the magnificent Hi‘ilawe waterfall. Waipi‘o valley is a culturally significant area, where efforts are made to preserve Hawaiian culture (McGregor 2007). While taro farming has been and continues to be a main activity there, historically, the valley has been rich with social and spiritual life, home to several important *ali‘i* and a seat of political power. McGregor (2007, 8) classifies Waipi‘o valley as a *cultural kīpuka*, which she defines as traditional centres of spiritual power:

In traditional Hawaiian chants and mythology, major *akua* or Gods and Hawaiian deities were associated with these wahi pana [(sacred and significant places)]. These districts were isolated and difficult to access over land and by sea. Owing to the lack of good anchorage and harbors, early traders often bypassed these districts in favor of more accessible areas. The missionaries entered these areas and established permanent stations during a later period than others in Hawai‘i. Thus, traditional Native Hawaiian spiritual beliefs and practices persisted here, without competition, for a longer period of time. When Christian influences entered these areas, they had to coexist with traditional beliefs and practices.

Waipi‘o valley remains one of the most sacred and important cultural preservation sites on the Big Island. A few people currently reside in the valley, but most have been chased away by several floods and, in particular, a large and devastating tsunami in 1946 (McGregor 2007). Contemporary life in Waipi‘o remains simple and rather quiet, with the exception of the previously mentioned steady flow of tourists.

Northwest of Waipi‘o, at the end of the stretch of northern Kohala valleys, is Pololū valley, which is also a popular and accessible tourist destination. The Pololū valley lookout and parking lot, located on the northwest side of the valley, is the starting point for the access trail, which twists and turns down the steep cliff to the river at the base of the valley. Pololū is a popular destination for people on camping trips, as it is rather easy to access even when carrying heavy camping gear. To access the valleys located between Waipi‘o and Pololū, one must travel by foot or horseback over the cliffs from either side or access the valleys by way of the ocean, which makes these valleys popular for the more adventurous tourists and Big Islanders.

Hawi and Waimea are two Big Island towns that are located on Kohala volcano. The small and rather quiet Hawi is located far to the north on the island, while the busier Waimea is located on the southern slope of Kohala, almost bordering the northwest slope of Mauna Kea volcano. Waimea is the home of Parker Ranch, one of the largest cattle ranches in the US, which provides the Hawaiian Islands with meat products from local, grass-fed cattle. Waimea is thoroughly influenced by the *paniolo* (Hawaiian cowboy) period on the Big Island and continues to be a town where ranching and paniolo culture are represented. Cattle was introduced to Hawai‘i in 1793 by Captain James Vancouver, who brought a herd as gift to King Kamehameha I (Maly and Wilcox 2000).¹³ This herd of cattle were put under a ten-year *kapu*, or taboo, to protect them and allow them to reproduce. New herds of cattle were brought to the island between 1793 and 1811, and the numbers of cattle increased dramatically. Soon the animals became a major nuisance for the local population and upland forests, as natural environments became overgrazed and trampled down. To control the animals,

¹³ The descriptions about paniolo culture and ranching on the Big Island in the following paragraphs are based on the writings of Maly and Wilcox (2000).

King Kamehameha III brought Mexican-Spanish cow handlers to the islands to teach the Hawaiians the skills of herding and handling cattle. The Hawaiians quickly learned the skills of ranching and became known as paniolo, gradually managing to regain control over the wild herds of cattle. Eventually, people on the Big Island came to terms with ranching as a new way of stewarding land, and paniolo culture emerged from this new form of land management. Paniolo culture had deep roots in American ranching culture but maintained a firm focus on Hawaiian elements of land tenure. This included a deep reciprocal relationship with natural environments and a cattle management system built on rotational placements of grazing cattle. Rotational management of natural resources was inspired by the Hawaiian kapu system mentioned in Chapter 1, in which restrictions were enforced on exhausted natural resources to ensure their reinforcement and continuation.

While this Hawaiian style of ranching has declined in contemporary Hawai'i, Parker Ranch continues to operate with Hawaiian perspectives on land management and is run by a trust which was set up by the last heir of the ranch, Richard Smart. However, compared to the size of the Parker Ranch herd in the first half of the 1900s, today's herd is significantly reduced. While Parker Ranch continues to raise cattle, and people who live and work on the ranch continue a paniolo-influenced lifestyle, the ranch also manages the leasing and sale of land to development projects in Waimea as well as to resort development on the south Kohala coast. An example of this development is the Parker Ranch Center in the middle of Waimea town, which functions as a shopping centre and community centre, and provides several dining options for Waimea's residents and visitors. The centre houses different businesses, including large enterprises, like Foodland, Starbucks and Burger King, and local businesses, including Village Burgers, Parker Ranch Store and Lilikoi Café. Outside of the Parker Ranch Center, Waimea is home to several other businesses, including popular local restaurants, such as the Fish and the Hog and Big Island Brewhaus, two local favourites that are also frequently visited by tourists. Local craft beer production has been a popular venture on the Big Island since long before the latest hype in craft beer production and home brewing around the globe, and Mehana Brewing Company

in Hilo, Big Island Brewhaus in Waimea and Kona Brewing Company in Kailua are all successful beer distributors locally, nationally and internationally.

Much of Kohala volcano is covered in 'ranch land'. Since the volcano has not erupted for a very long time, and its slopes have been cultivated by grazing cattle, the landscapes around Waimea are dominated by a distinct green and soft-looking aesthetic, which stands out, particularly in comparison to the dark and rocky lava fields of west Big Island. The first time I saw the green hilltops in Waimea, they reminded me of the landscape aesthetics in the late 1990s British children's television show, *Teletubbies*: perfectly round, bright green and smooth. The coastline from south to north Kohala however, is dryer, more rugged and scarcely populated. Along this coast, a large *heiau*, or Hawaiian temple of spiritual power, named Pu'uhokolā, has been well preserved and now serves as a popular tourist destination. This *heiau*, one of the largest remaining *heiau* in Hawai'i, was built by Kamehameha I. Other *heiau* can also be found along this coastline, still standing because Kohala volcano has not erupted for about 120,000 years. In other parts of the island, eruptions from the Big Island's most active volcanoes have buried these types of important spiritual centres and temple structures.

As mentioned previously, Kohala volcano borders Mauna Kea volcano in the south. The view of the grand mountain, Mauna Kea, from Waimea is spectacular, as the naked slopes, formed by over-exploitation of the island's native upland forests in the early 1800s, enhances one's perception of the mountain's elevation against the sky (Maly and Wilcox 2000). It is a majestic-looking mountain, with an important place in the lives and cosmologies of Big Islanders and Kānaka Maoli across the world.

Mauna Kea

Mauna Kea volcano started emerging on the southern flank of Kohala Volcano's eastern rift zone about one million years ago (USGS 2016). Mauna Kea's latest eruption is estimated to have happened between 4000 and 6000 years ago, and the volcano is today considered dormant because of its infrequent eruptions and its movement away from the Hawaiian hotspot (USGS 2017). Mauna Kea is the highest volcano on the Big Island, stretching 4205 metres above sea level (USGS 2016). The name is short for *Mauna a Wākea*, or Mountain of Wākea, Sky Father in Hawaiian

cosmology. Additionally, Mauna Kea is translated to *White Mountain* – *kea* translates as ‘white’ in English, and the top of the volcano is often covered in snow during the winter months. In Hawaiian cosmology, the volcano is the first-born mountain son of Wākea and Papa, who are considered progenitors of the indigenous Hawaiian people (Maly & Maly 2005). According to Cultural Historians Kepa Maly and Onaona Maly (2005, v), the mountain is believed to be a connection between the Hawaiian physical and spiritual worlds: ‘Mauna Kea is symbolic of the *piko* (umbilical cord) of the island-child, Hawai‘i, and that which connects the land to the heavens.’

The slopes of Mauna Kea feature a number of urban centres, including the towns of Waikoloa, Honoka‘a and Hilo, with the latter situated within both the realms of Mauna Kea and Mauna Loa. The slopes of the volcano feature large forest reserves and valleys with both dry and tropical climates. The Hāmākua coast, famed for its beauty and for being a particularly productive region during the ‘sugar era’ on the Big Island, rests on the northeast side of Mauna Kea, stretching from Kohala volcano towards Hilo. The sugar industry boomed there from the late 1830s, following a global rise in demand for sugar. The global industrial revolution made large-scale production of sugar possible in remote areas of Hawai‘i, where steam-powered locomotives would transport produce to nearby harbours for further transport on the ocean. The large amounts of water required for the sugar crops led to significant transformation of the Hāmākua coastal environment to a landscape dominated by constructed ditches that brought water from both Kohala and Mauna Kea towards the coast. To transport sugar from Kohala and Hāmākua to Hilo harbour, plantations, new settlements and a new railroad were developed (Wilcox 1996). A rapid increase in Hawai‘i’s population due to high numbers of work immigrants from Japan, China, the Philippines, islands in the Pacific as well as from a few countries in Europe, including Portugal and Norway, influenced housing development both within and outside of many of the already inhabited areas on the Hāmākua coast. The sugar industry on the Big Island remained productive for a little over 100 years. It experienced two separate booms during the productive years, caused by political events that changed regulations concerning land ownership and taxation of sugar. The first boost happened in 1848, in accordance with the previously mentioned Great Māhele, and the second in accordance with the

American annexation of Hawai‘i in 1898, which eliminated the tax on sugar exported to the United States. The sugar industry was incredibly profitable until 1946, when a devastating tsunami destroyed much of the infrastructure built for the industry, including the railroad on the coast, and initiated the demise of the sugar era on the Big Island. In contemporary Hāmākua, remnants of this industry are visible along the entire coast, and sugar cane is a common wild and cultivated crop.

The Hāmākua coast is considered one of the best places to live on the Big Island. Residents there, who live outside more populated areas like villages or small towns, have often bought large plots of undeveloped land that they develop over time. These plots are often covered with dense tropical or sub-tropical forest, and they require significant amounts of effort to make the space inhabitable. However, once new owners have cleared a plot on their land large enough to fit a house, maybe some sheds, and a garden where they can cultivate different types of food crops, they tend to stay for a very long time. Many of the properties on the Hāmākua coast host several generations of the same family, and co-habitation with relatives or in-laws is not uncommon there.

To the east of the Hāmākua coast, on the border between Mauna Kea and Mauna Loa, lies Hilo, the largest city on the Big Island.¹⁴ From the vantage point of Hilo, the views of Mauna Loa and Mauna Kea are spectacular, especially on a clear sunny winter day when the tops of the volcanoes are covered in snow. Driving up Waianuenue Avenue from Hilo Bay, which merges with Kaumana Drive at the upper parts of the town, you reach Saddle Road, the main road across the island, that runs between Mauna Kea and Mauna Loa. Saddle Road is named after the area between the peaks of the two volcanoes, which resembles the shape of a saddle when viewed from a distance. The road has been extensively improved in recent years, from a rather rough backcountry road to a smooth and wide highway, to manage increased commercial and private commuter traffic between Hilo in the east and Kailua Kona in the west. The road up the mountain is steep and winding, but changes into an open three-lane road – two lanes going up the mountain and one going down – with clear views to the sides and distance once you reach above the forested areas at lower altitudes.

¹⁴ A more detailed description of Hilo will be presented in Chapter 3.

In the middle of the saddle, about halfway across the island, is Pōhakuloa Training Area, an American military base that uses the rough volcanic environment to train soldiers for war. Pōhakuloa is the largest military training area in the Hawaiian Islands and has been and continues to be a source of one of the biggest controversies in the islands, involving the United States Military's use of land that is sacred to Kānaka Maoli for training purposes. One of the most difficult issues in this debate concerns how extensive use of bombs and heavy military equipment, in combination with a storage of depleted uranium in the soil from past military training, threatens natural environment, as well as disrespecting Kānaka Maoli ties and relationships to this area. The Big Island newspaper *West Hawai'i Today* published a story on 20 March 2017, about protesters gathering at the gates of the training ground to protest an intensified training period, 'involving ground-based training for Army and Marines, including training with mortar and artillery, machine guns, grenade launchers, rifle grenades and demolitions' (Lauer 2017). According to one of the protesters, Nanci Munro of Keaau, one of the main purposes for the protest was to speak up about the uranium: 'The bombing is just too much, [...] They know there's depleted uranium there. The bombing is just going to blow the dust around' (Lauer 2017). Ruth Aloua, another protester and farmer from Waikii, expressed concerns regarding the management of her farm, which is located downwind from the training area: 'I'm concerned about our water, our aquifer [...] That affects the feed we give the animals we raise' (Lauer 2017).

Kānaka Maoli consider Mauna Kea to be an ancestor, traced back in genealogies as the first-born mountain son of Wākea and Papa. During a hula class in 2009, my *kumu* told me that Lake Waiau, an alpine lake located inside the Pu'u Waiau cinder cone on top of Mauna Kea, serves as a sacred place where Kānaka Maoli bring the umbilical cords of their new-borns to connect them to Mauna Kea and their family ancestors and to ensure long life. Additionally, the lake is a source for the *sacred water of Kāne*.¹⁵ These rituals have been parts of Kānaka Maoli spiritual practices for

¹⁵ Kāne is a male procreative god in Hawaiian cosmology (Beckwith 1970, 85). *Wai kapu a Kāne*, the sacred water of Kāne, is water used for purification purposes (Beckwith 1970). Kāne, often coupled with Kanaloa in Hawaiian cosmology, is associated with fresh water and the bringing of foods to Hawai'i (Beckwith 1970). 'Pigs, coconuts, breadfruit, awa, and the *wauke* plant from which bark cloth is made, are sacred to Kāne' (Beckwith 1970, 62).

centuries and are still practiced in contemporary Big Island families, such as the family of my friend Alamea, who told me that she buried her children's umbilical cords on the family's property and planted a tree on top of each of them to connect the children to the land. Mauna Kea is also the home of the mountain goddess Poliahu, who covers the volcano with snow during winter storms. Poliahu is sometimes referred to as a rival of Pele, as her snow cover can be viewed as an attempt to cool down Pele's lava flows (Beckwith 1970). During the hurricane season on the Big Island, which lasts from mid-May to mid-September, Poliahu becomes instrumental in the handling of storms that directly hit the island, where she is said to cool down the air when the storm hits the mountain thus causing the strong winds, which are fuelled by warmer temperatures, to die out.

Considering Mauna Kea's status in Hawaiian cosmology, many Big Islanders approach this volcano as a sacred space. According to Maly & Maly (2005), several burial sites (*ilina* in Hawaiian) can be found on the slopes of the volcano, from the summit to the lowlands. Families who had genealogical ties to Mauna Kea used to bury their dead there, and in contemporary Hawai'i, the remains of individuals who have a connection to the mountain can be laid to rest at these burial sites. These past and current spiritual connections between Big Islanders and Mauna Kea can lead to complexity or conflict in approaches to the utilization of the volcano's resources. In addition to hosting the aforementioned military base, Mauna Kea is the home of thirteen telescopes – funded by eleven different countries – that together serve as *Mauna Kea Observatories*, the largest and most advanced astronomical research facility in the world (Institute for Astronomy, University of Hawai'i 2016). The remoteness of the Big Island from large and bright urban centres makes it ideal for astronomical research. Additionally, 'a tropical inversion cloud layer about 600 meters (2,000 ft.) thick, well below the summit, isolates the upper atmosphere from the lower moist maritime air, and ensures that the summit skies are pure, dry and free from atmospheric pollutants' (Institute for Astronomy, University of Hawai'i 2016).

As these research facilities were constructed on what is considered sacred ground to Kānaka Maoli and other Big Islanders, the telescopes have created considerable controversy on the Big Island, both within and between resident

communities and scientific communities. The latest planned addition to the facilities, the *Thirty Meter Telescope* (TMT) – the most advanced telescope in the world – caused anger and frustration in late 2014 and in 2015, and a large group of protesters, consisting of Kānaka Maoli and their supporters from the Big Island and beyond, blocked the access road which leads up to the top of the volcano to protect their sacred place. The protesters stood their ground and eventually managed to stop construction. The TMT protest, which started out as local engagement, spread state-wide, nationally and eventually internationally, and Kānaka Maoli received support from sympathisers around the globe, including other indigenous groups and celebrity activists with Hawaiian ancestry. The development of scientific knowledge within the field of astronomy was not among the issues that generated protest; rather, the issues that engaged them concerned ownership of land, respect for indigenous traditions, beliefs and worldviews, and the control over sacred sites in Hawai‘i – issues that have created controversy regarding Mauna Kea Observatories throughout their existence.

The State and Military use of the mountain continues to conflict with the meanings attributed to it by Kānaka Maoli and other Big Islanders. Recently, the Office of Hawaiian Affairs (OHA) filed a lawsuit against the State of Hawai‘i and the University of Hawai‘i for mismanagement of Mauna Kea (OHA 2017). The OHA is a State agency which was established as a result of indigenous Hawaiian activism in the 1970s and is no insignificant actor in terms of indigenous representativity. The OHA is semi-autonomous and responsible for the ‘well-being of all Native Hawaiians (regardless of blood quantum)’ (OHA 2021, para. 1, parentheses in original). It is governed by a Board of Trustees, consisting of nine indigenous Hawaiian members who are elected state-wide to serve a four-year term, administered by a Chief Executive Officer appointed by the Board of Trustees and it employs about 170 people. The OHA is actively engaged in State of Hawai‘i policy and land resource use and development and manages several funding and scholarship programmes for indigenous Hawaiians. It is also tasked with addressing historical injustices and challenges, and with managing a land trust which receives a pro rata portion of the revenue from leasing out State of Hawai‘i lands that were illegally taken by the U.S. government in the overthrow of the Hawaiian Kingdom in 1897, also known as the ‘ceded lands’ (see Trask 1999 for more

on the illegal overthrow of the Hawaiian Kingdom and indigenous Hawaiian rights to these lands).

According to OHA (2017), the university has held a general lease on Mauna Kea since the construction of the first telescope in 1968, and according to several reports including an initial audit in 1998 and a study in 2010, little has been done to avoid ‘substantial and adverse impacts to the mauna’s cultural, archaeological, historical and natural resources’. OHA sought to cancel the general lease, as the university had not met the obligations to the mountain or to the expectations of Kānaka Maoli and other Hawai‘i residents. Dan Ahuna, chair of OHA’s *Ad Hoc Committee on Mauna Kea*, commented, ‘It’s time to abandon any hope that UH is capable or even willing to provide the level of aloha and attention to Mauna Kea that it deserves [...]. We need to come together as a community to completely re-think how we care for the mauna, and that starts with cancelling the university’s master lease’ (OHA 2017). The State’s approaches to activities on Mauna Kea have created a political entanglement, in which the protectors of Mauna Kea have exhausted their options in showing patience for a long overdue change in the management of the mountain.

Of the volcanoes on the Big Island, Mauna Kea currently seems the second most contested, after Kīlauea, which I will return to later in this chapter. Hualālai volcano, which is located on the opposite side of the island from Hilo, is a rather quiet volcano, but remains active, and poses a significant threat to the populated areas below its summit.

Hualālai

Hualālai volcano lies on the west side of the Big Island and is the third youngest and third most historically active volcano on the island (USGS 2017b). It typically erupts two to three times every one hundred years and erupted last in 1801 (USGS 2017c). In 1929, USGS reported more than 6200 earthquakes around Hualālai, two of which reached such magnitude (6.5 on the Richter scale) that residential structures and roadways located close to the volcano were destroyed. The earthquakes were most

likely cause by an intrusion of magma¹⁶ beneath the volcano (USGS 2017b). Because of these events, which spanned a little over a month, USGS classifies Hualālai as a potentially dangerous volcano that is likely to erupt again.

Hualālai is the home of several small towns and villages, including Kalaoa and Holualoa, as well as Kailua (also known as Kailua-Kona or Kona), the second largest town on the island. A dry volcanic environment dominates the west side of the Big Island, and lava flows from Hualālai and Mauna Loa have carved vertical stripes in different shades of black and brown. Some lava flows from Hualālai have travelled all the way down to the ocean and have built new land with fresh layers of lava. Built on top of one of these flows within the boundaries of Kalaoa is the main airport of the Big Island, the Ellison Onizuka Kona International Airport at Keahole. The airport accommodates domestic travel, as well as international, interisland, commuter/air taxi services and other aviation activities, including cargo. The dry and sunny climate on the west side of the Big Island has encouraged a large scale tourism development, and the districts of South Kohala and North Kona host a large body of hotel resorts as well as a long stretch of lava rock coastline, embellished with white sand beaches and clear turquoise-coloured water. The large tourism industry on this side of the island shapes everyday life in local towns and villages, especially in and around the major town, Kailua.

Kailua is a rather slow-paced, quiet town but was once a seat of power in the former Hawaiian Kingdom. Due to tourism, typical views in downtown Kailua include rental cars, often in the shape of red or yellow Ford Mustang and Chevrolet Camaro cabriolets, with tourist families or newly wedded couples walking about the shops or looking for dining options. Ali'i Drive, the main road in downtown Kailua, hosts a wide variety of resorts, restaurants, shops and tourist market places, as well as buskers, water sport entrepreneurs and local coffee bars. Located further uphill in Kailua are larger enterprises like Walmart, Target, Costco, Safeway and Home Depot – all of which cater more to the local population than to tourists – as well as Kona Brewing

¹⁶ Magma is the expression used to describe molten rock underground. When magma surfaces, it is referred to as lava.

Company, a globally successful Hawaiian brewery. Residential areas are also located in the upper parts of Kailua, which, due to ‘recent’ volcanic activity from Hualālai and Mauna Loa, are built on top of much newer lava flows than, for example, Waimea and Hilo.

Mauna Loa

Mauna Loa is the second most active volcano on the Big Island. Additionally, it is the world’s largest active volcano and the world’s tallest mountain – 17 km high – when measured from its base on the ocean floor (USGS 2017d). It covers half of the Big Island, and, by itself, amounts to about 85 per cent of the area of all the other Hawaiian Islands combined. Above sea level, Mauna Loa stretches a little over 4000 metres in the air, only slightly lower than its neighbour, Mauna Kea. The massive volcano started growing on the flanks of Mauna Kea and Hualālai between 600 000 and 1 million years ago and had its last eruption in 1984 but has shown an increase in activity in recent years (USGS 2017d). At the time of writing, a series of earthquakes and ground deformations have caused a raise in alert level for Mauna Loa to *advisory*, a step up from *normal*, and the aviation code¹⁷ is set to yellow (USGS 2021).

Geologists divide Mauna Loa into five broad sections, all of which are monitored for potential earthquakes and eruptions (USGS 2017d). They have also identified 33 vents on the north and west sections of the volcano that can possibly erupt, in addition to eruptions from the rift zones. Mauna Loa is a prime example of a shield volcano, especially for non-experts, as when it is viewed from a distance it is very easy to spot its shield-like form. However, the volcano has a history of explosive eruptions, and there is geological evidence that suggests such an eruption could happen again. Depending on where an eruption from Mauna Loa begins, people in populated areas below the volcano will have very differently timed slots for evacuating from the lava’s path. Some residential areas are located on steeply elevated slopes, where potential fluid lava could travel fast. Thus, destruction of property, infrastructure and homes are likely to occur if Mauna Loa erupts there. However, with the close observation of the

¹⁷ Volcano monitoring systems use coloured aviation codes to advise the aviation sector about potential eruptions that could emit ash into the atmosphere.

volcano by the Hawaiian Volcano Observatory, loss of human lives in the event of an eruption is unlikely.

The areas located below Mauna Kea, south of Kailua on the west side of the island, are lush, and agriculture there is dominated by coffee production. Kona coffee is a world-famous type of coffee, known for its unique flavour thanks to production in volcanic soils, and coffee farmers in this area sell their products as much to international as to local markets. Small villages are located along the highway route towards the southern tip of the island. These include: Kealahou and Kealahou Bay, the latter famous for the death of Captain James Cook in a skirmish between his crew and Hawaiians in 1779; Pu‘uhonua¹⁸ O Honaunau National Park, which was a place of refuge during times of war in pre-contact Hawai‘i; and Miloli‘i, an ‘off-grid’ village¹⁹ claimed by its inhabitants to be the last true Hawaiian fishing village in the islands. Even further down the coast, on the south-western slope of Mauna Loa and crossing into the District of Ka‘ū, is Hawaiian Ocean View, a Census Designated Place (CDP)²⁰ established in the 1950s, consisting of seven different subdivisions that stretch from the ocean and up the mountainside. At the end of the road, on the southernmost tip of the island, lies South Point, or Ka Lae, the southernmost point of the United States, as well as a very popular beach called Green Sands, or Papakōlea, Beach. The sand dunes around South Point are known for being studied by archaeologists in efforts to create a timeline for ancient settlement in Hawai‘i (see, for example, Kirch 2011). South Point is also a popular place for cliff jumping, fishing and diving, as whale sharks often visit the waters there. The environment there, which is open, dry and very windy, has encouraged instalment of wind turbines along the coast, which together make the

¹⁸ According to the Hawaiian Dictionary (Pukui and Elbert 1986), Pu‘uhonua is translated primarily as ‘place of refuge, sanctuary, asylum, place of peace and safety’. The secondary translation is ‘a level area, as used for game sites; also used for grave plots in Puna’.

¹⁹ ‘Off-grid’ refers to the state of being disconnected from State infrastructure, such as an electrical grid, a water grid, or internet grid.

²⁰ A CDP is a concentration of population defined by the United States Census Bureau for statistical purposes.

Pakini Nui Wind Farm. The wind farm is owned by the company, Tawhiri Power LLC, whose business model is built on producing green energy for Hawai‘i.

Following the coastline to the east, one enters Hawai‘i Volcanoes National Park’s Kahuku unit. Much of Mauna Loa is integrated in Hawai‘i Volcanoes National Park (hereafter mainly referred to as HVNP or *the park*), including the summit area, or Moku‘āweoweo caldera, the Mauna Loa Wilderness and the Kahuku Unit to the south of the caldera. The park was established on 1 August 1916, during an American increase in tourism to ‘scenic and health-enhancing areas’ (Nakamura 2016, 3). The focus on recreational tourism led to development around scenic beauty, which in the case of HVNP meant developing the area around volcanic activity (Nakamura 2016). The same year, the National Park Service (NPS) was established as the agency that would manage all national parks across the United States, building on the management of Yellowstone National Park, which ‘established a precedent for preserving large land areas for “non-consumptive use”’ where ‘unrestricted free enterprise and exploitation of natural resources (was) prohibited’ (Nakamura 2016, 4). Although Hawai‘i was not yet an American state, its relationship to the international community of adventurers, scientists, entrepreneurs and tourists had long been established, and the first recorded writings about visits to the volcanoes of Hawai‘i date back to 1794, when a ‘naturalist’ named Archibald Menzies, aboard Captain George Vancouver’s ship *Discovery*, climbed Hualālai and Mauna Loa (Nakamura 2016). Reverend William Ellis, a missionary from the London Mission Society, arrived in the islands in 1822 and was the first European to witness and record an eruption at Kīlauea volcano.

The District of Ka‘ū is rather scarcely populated, and aside from small towns and villages, including Wai‘ōhinu, Nā‘ālehu, Nīnole and Pāhala, it consists mostly of a rather rough desert-like landscape and a rocky coastline. Despite the modest population numbers of the south-eastern parts of this district, its authority as an important Hawaiian region stands strong. Close to Nīnole lies a black-sand beach called Punalu‘u, which is known for its beauty and popularity among both residents and tourists. Several Hawaiian heiau from pre-contact times are in close proximity to Punalu‘u. The beach and its surrounding areas are home to several endangered Hawaiian animal species, and are popular nesting grounds for the hawksbill turtle, *honu*

ea, and the green turtle, *honu*, as well as the endangered Hawaiian hawk, *ʻIo*. Residents around Punaluʻu utilise the beach and its surrounding areas for recreational and subsistence activities and can express frustration towards tourists who come to close to them during their everyday routines. Following the coastline further up to the northeast, one enters the Kaʻū Desert and a large area of the Big Island managed by HVNP, including the most active volcano on the island, Kīlauea.

Kīlauea

[Here] was a vast, perpendicular, walled cellar, nine hundred feet in some places. Thirteen hundred in others, level-floored, and ten miles in circumference! Here was a yawning pit upon whose floor the armies of Russia could camp, and have room to spare.

Mark Twain about Halemaʻumaʻu crater (1990, 67-68)

Samuel Langhorne Clemens, better known under his pseudonym, Mark Twain, was one of the early authors to write about the Hawaiian Islands. He was sent on a reporting mission to the then Sandwich Islands by the *Sacramento Union*, the most prominent newspaper on the US West Coast in the mid-1800s (Twain 1990). His articles in the newspaper were later the source for his book, *Roughing It*, a collection of travel articles including the writings from his time in Hawaiʻi. Twain is one of many writers who have expressed their awe for Kīlauea volcano. In 1866, when Twain embarked upon his Sandwich Islands adventure, *Volcano House*, a hotel resting on the rim of Kīlauea's caldera crater, Halemaʻumaʻu, had already existed for 20 years. Constructed in 1846 as a one-room shelter made of grass and endemic *ʻōhiʻa* wood, Volcano House was enlarged in 1866 to a four-bedroom wooden frame structure, and it housed several notable guests through the years (Volcano House 2017). At the time of writing, a larger version of Volcano House is still resting on the crater rim with a view of Halemaʻumaʻu crater, accommodating guests from all corners of the world who have come to experience the active Kīlauea volcano.

Kīlauea is currently the most active and intensively studied volcano in the world. The name can be translated to ‘spewing’ or ‘much spreading’, referring to the level of activity of the volcano. For the past hundred years, since the founding of the HVO by geologist Thomas Jaggar in 1912, Kīlauea has been closely monitored geologically, geophysically and geochemically (HVO 2017b, Swanson 2008). Since the Hawaiian Renaissance in the 1970s, a cultural revival which placed Hawaiian culture, traditions, language, history and spirituality in focus, the cultural and spiritual connections between Kīlauea and the Hawaiian people have also become subjects of study. Oral traditions that concern the volcano have been studied in order to verify volcanic eruptions in the past. Don Swanson (2008, 430), geologist with HVO, argued that the epic hula myth about Pele and her sister Hi‘iaka describes 400 years of volcanic activity:²¹

If my interpretations are correct, it is fair to say that volcanologists were led astray by not paying close attention to the Hawaiian oral traditions. Had we looked for geologic evidence to test the traditions, rather than ignoring them, we probably would have realized much sooner that the formation of the caldera closely followed the eruption of the ‘Ailā‘au flow and that both took place centuries before 1790. There is a lesson here, plain to see. [...] But it is difficult to interpret anecdotes, particularly those cloaked in thick poetic metaphor. We are used to thinking scientifically, not metaphorically, when we tackle volcanic problems.

Swanson illustrates that the merging of different types of science and knowledge may be necessary in order to get a fuller picture of past events, which is in line with my arguments and analyses throughout this dissertation. This attitude is increasingly common amongst volcano scientists on the Big Island and will be further discussed in later chapters.

Kīlauea volcano is located next to the eastern slope of Mauna Loa volcano. The level of activity at this volcano has made it difficult for scientists at HVO to fully map

²¹ For a short summary of this myth, as well as Swanson’s interpretation of hints to volcanic activity in this myth, see Chapter 4.

its eruption history, as new lava flows have continuously covered previously exposed older rocks (USGS 2017f).²² Only 10 per cent of the lava flows from Kīlauea are over 1000 years old. 90 per cent are younger than 1000 years, and 20 per cent of these are younger than 200 years old. Estimating Kīlauea's age is a work in progress, but current research indicates the first flows on the ocean floor to be between 210,000 and 280,000 years old. It is likely that the volcano displayed active lava flows when Polynesians arrived on the Big Island, and it has inspired people's development of volcano resilience as well as creations of myths and stories about the volcano and its relationship with inhabitants of the Big Island throughout the human history of the island. Within the last century, Kīlauea has erupted many times and at different locations, or vents, on the volcano. In 1924, Halema'uma'u crater at Kīlauea's summit had a series of explosive eruptions as well as sending magma down the East Rift Zone, which caused an earthquake swarm to the lower Puna area of the Big Island destroying infrastructure including roads and railroad. The coastline sank with about 3.7 metres, and a new lagoon reaching 60 metres inland was formed. One person died during this eruption as he was too close to the crater and was hit by a large rock thrown out of the crater by the explosive powers, while several other people were close to a fatal outcome by standing at an unwise distance to the crater.

In 1959, Kīlauea Iki, a smaller crater on the summit of Kīlauea, erupted in a spectacle, as a fountain of lava shot to heights of up to 580 metres above the vent. My hula sister, Suzanna, and *kumu* Halia told me that they were nine years old when Kīlauea Iki erupted, and that they remembered how fantastic and terrifying it was at the same time. Suzanna said that as they did not have the typical information channels we have today, like social media or online newspapers, if you did not hear the news about the volcano on the radio, you could see that something was happening from the line of cars that moved from Hilo towards the volcano. At this time there were mostly 'locals' and very few tourists on the Big Island, and everybody wanted to go up to the volcano and see what was happening. Suzanna and Halia both remember being dressed well by their parents before travelling up to the volcano, as the altitude up there makes

²² This and the following paragraphs about Kīlauea are based on writings by USGS (2017f).

the air chilly. When they reached the park (HVNP) and the eruption site, they remember how hot it was to face the eruption compared to how cold the air was when they turned around. Suzanna told me she remembers the fountain and compared its height to the height of the Empire State Building in New York City. Halia also remembered the leaves on the ‘ōhia tree turning red from the heat of the eruption. The Kīlauea Iki eruption, which had 17 explosive episodes, lasted for about a month between November and December in 1959.

About a month later, in January 1960, another part of Kīlauea volcano erupted, a continuation of the activity levels seen a month before at Kīlauea Iki. This eruption affected lower Puna, especially the village of Kapoho, which was terrorized initially by a multitude of earthquakes and tephra fall, and eventually by lava flows that destroyed the village (Gregg et. al. 2008). Sulphur dioxide emissions from the eruption became a major health concern across large parts of the island and threatened evacuation of Hilo, which is located 30 km north of Kapoho (Gregg et. al. 2008). According to the USGS (2017f): ‘The Kapoho eruption caused havoc in lower Puna, which was considered an idyllic rural paradise until the lava fountains and flows covered farmland and villages.’ During the eruption, ‘papaya, coconut, orchid, and coffee groves were taking a beating from the heavy pumice fallout as well as the lava itself, and outlying homes and farmsteads [were] destroyed’ (USGS 2017f). The roughly 300 residents of Kapoho evacuated voluntarily, and no human casualties were recorded. The Kapoho eruption brought about heated discussions about trying to divert the lava flow away from the village. After several suggestions from Hawai‘i County and the residents, they attempted to build barriers intended to change the direction of the lava or stop it altogether (USGS 2017f, Gregg et. al. 2008). However, this initiative did not help, as the lava either found its way around the barriers or ran over them as the flow inflated and reached the top of the barriers.

On 24 May 1969, after some smaller scale activity in the previous nine months, Mauna Ulu, one of Kīlauea’s vents in the East Rift Zone, started an eruption that would last for over five years. At the time, this would be the ‘longest-lasting and most voluminous eruption on Kīlauea’s flank in at least 2200 years’ (USGS 2017f). Access to the eruption was quite available to the public, and a viewing platform looking over

a lava lake was constructed during the eruption period. In the beginning, the eruption was characterized by fountains as high as 540 metres and lava falls as high as Niagara Falls. Mauna (mountain) Ulu (to grow, increase) got its name as lava filled the crater and continued building a shield after the initial fountain phase, thus ensuring that the resemblance and structure of a mountain took form. The eruption from Mauna Ulu was grand, and since it did not pose a threat to the communities downhill, it was easier for researchers and the public to experience awe and excitement when approaching the spectacular events.

A recent eruption at Kīlauea, which started in 1983 and continued to 2018, challenged communities and people living under the volcano on several occasions over 35 years. This eruption began in January as several fissures broke out in Kīlauea's East Rift Zone. From June 1983, the eruption was concentrated at one vent, and a series of 44 lava fountains over the next three years built a cinder-and-spatter cone later named Pu'u 'Ō'ō. The Royal Gardens subdivision in Puna, located downhill from the vent, was the first residential area affected by this eruption, and several houses were taken by the lava flows between 1983 and 1986. In 1986, the eruption shifted and started making its way down towards the ocean and the coastal residential areas of Kapa'ahu and Kalapana. Between 1986 and 1992, effusive (non-explosive) pāhoehoe flows slowly buried both areas. Kalapana was more densely populated than Kapa'ahu, and the residents there went through a very slow and painful process, their only option to watch as their properties and houses were taken by the lava. This was a culturally significant place and one of the few places on the island that had maintained a 'Hawaiian lifestyle', as well as an area cherished for its historic sights and black sand beaches. Kalapana was buried beneath 15 to 25 metres of lava before the flow was diverted back into Hawai'i Volcanoes National Park by a new lava tube²³ in 1990.

²³ According to the USGS Volcano Hazards Glossary, 'lava tubes are natural conduits through which lava travels beneath the surface of a lava flow. Tubes form by the crusting over of lava channels and pāhoehoe flows. A broad lava-flow field often consists of a main lava tube and a series of smaller tubes that supply lava to the front of one or more separate flows. When the supply of lava stops at the end of an eruption or lava is diverted elsewhere, lava in the tube system drains downslope and leaves partially empty conduits beneath the ground. Such drained tubes commonly exhibit "high-lava" marks on their walls, generally flat floors, and many lava stalactites that hang from the roof. Lava can also erode downward, deepening the tube and leaving empty space above the flowing lava.'

During these years a large coastal section of Highway 130, or Chain of Craters Road, which connected lower Puna to the park, was also covered in multiple layers of lava.

Between 1992 and 2007, eruptions from the Pu‘u ‘Ō‘ō vent mostly stayed within the boundaries of HVNP and posed no threats to residential areas in Puna. Lava most often travelled from Pu‘u ‘Ō‘ō to the ocean and created about 1.7 square kilometres of new land on the Big Island. Between 2007 and 2014, activity shifted a bit, and between 2010 and 2011, three houses that had been built on the lava flows that covered Kalapana in the early 1990s were buried by lava. In 2014, a lava flow from Pu‘u ‘Ō‘ō moved from the vent towards the town of Pāhoa, the urban centre of the lower Puna district, an event which will be discussed in detail in Chapter 5. Another shift in eruptive activity happened in 2018 when a major eruption challenged residents in lower Puna; this will be discussed in Chapter 7. This eruption ended the almost continuous eruption from 1983 to 2018. In 2020, a lava lake formed yet again in Halema‘uma‘u, and at the time of writing, there is an ongoing eruption in the crater. The continuous volatility of Kīlauea makes life in lower Puna especially unpredictable for residents – a central topic in several chapters of this dissertation.

Summing up

This chapter started out with an introduction to a discussion that will continue throughout the following chapters, about the relationship between people and volcanoes and about how an interdisciplinary approach to understanding this relationship can provide insights one discipline alone may not be able to provide. While introducing the Big Island’s environmental and human history, with vantage points in the five visible volcanoes of the island: Kohala, Mauna Kea, Hualālai, Mauna Loa and Kīlauea, this chapter is the beginning of a discussion about how this place can contribute to an understanding of how people manage to live in volatile environments. In the following chapters, I will go deeper into the places that are directly connected to Kīlauea volcano and give insights into the lives of people who live there. I will also increasingly focus on an argument about interdisciplinarity in the approach to understanding *how* and *why* people live there. While geology has long been the main discipline for research on volcanoes, anthropology has stated the importance of

indigenous knowledge, maintained through oral traditions, in understanding history and culture in pre-literate societies in relation to volcano research. Acknowledging these sources of knowledge, geologists in Hawai'i have used oral traditions in their efforts to understand the timelines of different lava flows and volcanic events in the past, and how they affected the population on the island at the time. The next chapter will give an ethnographic account of Hilo and, especially, Puna, with a focus on relationships between people and environments and social diversity.

3

LAYERS OF ROCK, LAYERS OF MEANING

The windward side of the Big Island

Welcome to lava land.

Why would anyone choose to live on the most active volcano in the world?

We live in the rainforest. The nearby volcano is an ongoing source of wonder and drama. We accept the fact that in its ever-changing extreme beauty, in the profound lessons of the spirit it provides, there also lies danger. The danger to us personally is [usually] not extreme, but as with almost every spot on this planet, there are natural hazards. We are experiencing an extreme version of them now.

Last night we had a flurry of small earthquakes, shallow ones with the epicentre nearby. Shifts in the plates of lava beneath us can be abrupt.

When we excavated our pond, the earthmover revealed layer upon layer of lava deposited from eruptions long ago, longer than any of our recorded history and perhaps longer than the Hawaiians themselves have been here. Knowing how the land beneath us is layered helps me understand what is going on. Underneath these layers and winding through them are lava tubes, open tunnels. It is a vast labyrinth beneath our feet, and there are openings near us where spelunkers can descend and explore. [...]

We cannot know what will happen. We just watch, observe, and enjoy our island for all that it is. We are here for all these reasons, and nothing changes because our volcano does these things that let us know we live where the earth is alive.

Gail W. Armand, Puna resident (6 May 2018)²⁴

²⁴ Used with permission from the author.

Lavaland – the title of this dissertation and a fond reference to the Puna district on the Big Island as communicated to me by Puna residents and other Big Islanders– is a fitting description of the part of the Big Island that is continuously formed by Kīlauea volcano. Puna resident and ‘wordsmith’ Gail W. Armand wrote this text as a comment to the 2018 Lower Puna Eruption in the beginning of May 2018. As Armand refers to in the quote, the historicities of volcanic environments often materialises in volcanic rock layers in the ground, visible when, for example, excavating a pond in a garden. The stratum of volcanic layers reminds residents of how the island was formed and how environments will continue to form and reform in the future. In this chapter, I approach historicity, environment and sociality on the Big Island’s windward (east) side, using *layers* as an analytical perspective. This analytical approach is rooted in ideas of my own but developed from empirical material and local perspectives; people use *layers* in everyday speech when they describe what they refer to as the uniqueness of this part of the Big Island, especially in reference to Puna, as seen in the quote above, for example. While the previous chapter featured a mapping of the Big Island’s different volcanoes based on a predominantly linear model of geological and social historical references, this chapter will look at historicity from a different perspective. It is my intention to bring into focus what life is about in social and physical environments specifically in contemporary Hilo and Puna, and although I will present details about historicity in Hilo and Puna, a recount of a more general Hawaiian historical narrative will not be given much space in this chapter.

I follow Hirsch and Stewart (2005, 262), who define *historicity* as ‘[how persons] come in to being through relationships of various forms and scales, forging these relations anew from each epochal moment’. Historicity is used more frequently to define a ‘social situation open to ethnographic investigation’. Additionally, this chapter contains descriptive sections and spatial narratives, where landscape and environment are described from a phenomenological perspective. In these descriptive sections, I am inspired by Tilley’s (1994, 31) approaches to spatial stories and narratives:

In movement on a path though the landscape something is constantly slipping away and something is constantly gained in a relational tactile world of impressions, signs, sights, smells and physical sensations. To understand a landscape truly it must be felt, but to convey some of this feeling to others it has to be talked about, recounted, or written and depicted. In the process of movement a landscape unfolds or unravels before an observer. [...] The importance and significance of a place can only be appreciated as part of movement from and to it in relation to others, and the act of moving may be as important as that of arriving.

Throughout this chapter, I use spatial narratives and historicity to describe social and physical environments that form the districts located on the windward side of the Big Island. The primary focus is an ethnographic account of social life on, or near, Kīlauea volcano. This includes a large descriptive section about places in Hilo and Puna as well as the volcanic landscapes of Hawai‘i Volcanoes National Park (HVNP) and the District of Ka‘ū. I use empirical material and relevant literature to support my analysis, and borrow analytical terms and scientific facts from the disciplines of geology and archaeology. Using layers as a method for analysis is common within these academic disciplines, where a layer is referred to as a stratum (plural: strata) and the method used to analyse layers is called stratigraphy. By combining this with theory and methods in anthropology, I engage in a discussion about the temporalities of landscapes, historicities and dynamic relationships between past and present that I find relevant in an analysis of the volcanic environments on the Big Island.

Keeping in mind the quote at the beginning of this chapter, I argue that historicities in Hilo and Puna consist of dynamic and dialogical relationships between layers of meaning. Each layer contains important events, which have altered the physical and social environments in these places. Looking at historicity from this perspective allows room for an accumulation and continuation of experience and knowledge, as the layers build on each other, bringing the content of the former layer into the next.²⁵ Experiences from events are brought into the next layer and form

²⁵ Production of knowledges in the volcanic environments on the Big Island will be further explored in Chapter 6.

knowledges that are more comprehensive. Older knowledges communicate with more recent knowledges in dynamic, dialogical relationships between past and present. In this chapter, perspectives on historicity, combined with theories of layered temporality and events, are important tools when analysing contemporary social relationships between people, and between people and environments on the Big Island.

Anthropological Perspectives on Temporality, Historicity and Events

Tim Ingold (1993, 152) suggested that ‘human life is a process that involves the passage of time ... [and] this life-process is also the process of formation of the landscapes in which people have lived’. By focusing on ‘the temporality of the landscape’, Ingold attempted to bring together social anthropology and archaeology in order to move beyond the ‘sterile opposition between the naturalistic view of the landscape as a neutral external backdrop to human activities, and the culturalistic view that every landscape is a particular cognitive or symbolic ordering of space’ (1993, 152). He argued that we should rather adopt a ‘dwelling perspective’, where the lives and works of past generations who have dwelt there are recorded in the landscape (1993, 152). To perceive a landscape, we must ‘carry out an act of remembrance and remembering is not so much a matter of calling up an internal image, stored in the mind, as of engaging perceptually with an environment that is itself pregnant with the past’ (Ingold 1993, 152–153). I find this perspective particularly useful when combining geological approaches to lava flows with cosmological approaches to the past, where myths and stories of old are often linked to physical features in the natural environment.

As you move about in an environment, you remember stories from the past when perceptually engaging with it (Tilley 1994). For example, while I was a hula student during the fieldwork for my M.A. in 2009, my *kumu hula* would tell me to go to different places in Hilo and Puna and engage with the environments described in the stories and chants she taught me. I remember well bicycling to *Wailuku*, a river which runs from the upper slopes of Mauna Kea and all the way down to Hilo Bay, to find the place where the demigod Maui came to his mother Hina’s rescue, when she was harassed by a *mo’o* (lizard-like creature) in her home in a cave behind the section of

the river called Waianuenu, or Rainbow Falls.²⁶ The story, as told by Mary Kawena Pukui (in Beckwith 1970, 232), is as follows:

Hina, mother of Maui, lives in a cave by the Wailuku River in Hilo on Hawaii where she beats bark cloth. While Maui is away at Aleha-ka-la (now called Hale-a-ka-la) snaring the sun, Lono-kaheo (some say Kuna the eel) comes to woo her and when she refuses him he almost drowns her. She calls to Maui for help and he throws about Lono-kaheo the snares with which he has overcome the sun and turns him into a rock which stands there today. The stone image of Hina could in the old days be seen with water dripping from its breasts, but a landslide has covered it.

This place, along with countless other places in the Hawaiian Islands, represents an environment that is itself, as Ingold argued, pregnant with the past. Specific features of the natural environment often function as keepers of stories associated with the past; additionally, Hawaiian place names are often constructed in a manner that describes either an event from the past or recurring features associated with the place. Wailuku, for example, can be translated to *waters of destruction* and refers to the river's recurring intense wildness when rain falls heavy on its path. Another example is *Lele'iwi*, a cape northeast of Hilo which today is mostly associated with recreational fishing, swimming or snorkelling. The direct translation of *Lele'iwi* is *bone altar* while the poetic meaning is often translated to *a symbol of disaster or anger*, and *Lele'iwi* was formerly a place where human corpses were left on altars or platforms until their bones were exposed and ready for burial (Pukui, Elbert and Mookini 1966/2021). While *Lele'iwi* does not have the same function today, past events are kept current through the practice of using Hawaiian place names in for example hula. The meanings of Hawaiian place names are part of the 'curriculum' in hula education, and my *kumu hula* emphasized these meanings when teaching her students about different places in the islands, while simultaneously teaching us the meanings of Hawaiian words.

Ingold (1993, 171) criticizes earlier writings (specifically Basso 1984 and Cosgrove 1989) where layers are used as an analytical approach to landscapes. In this

²⁶ See Torgersen (2018) for more on Wailuku River.

critique, he argued that a blanketing of the environment – and the idea that meaning covers over the world ‘layer upon layer’ – suggests that the only way to uncover humans’ practical involvement with the environment is to strip these layers away (1993, 171). In this approach, a layer covers another layer, and the covered layer is forgotten until the layer covering it is stripped away. In my approach, I suggest a much more dialogical relationship between layers, where a new layer does not blanket or cover another but rather builds on what is already there. The freshly developed layer becomes integrated in the already established layers. In this perspective, layers are not meant as secluded or separated, nor buried to be forgotten until uncovered, but rather as a continued accumulation of historicity, sociality and events, that together form present environments on the Big Island. Buried layers are not forgotten but integrated in Big Islanders’ present understandings of social and physical environments.

Following Ingold (1993, 159), I look at the present in a way where it is not marked off from a past that it has replaced or a future that will in turn replace the present: ‘it rather gathers the past and future into itself’. The present holds the past and the future. An observation I have made frequently, when conversing with people who live in lower Puna, is that their relationship with the future, especially the distant future, is not emphasized as much as their relationships with the past and present. Although it is fair to say that most people in lower Puna know that the very active volcano they live on may some day in the near future erupt right beneath their house, this prospect does not overly concern them until it actually happens. This attitude can be compared to the ‘silencing’ method of the inhabitants of Mýrdalur in Iceland, as demonstrated by Hovstein (2016) and discussed in Chapter 1. Many people in Puna live ‘in the moment’ and do not worry too much about a possibly grim future. On the other hand, some of the residents in lower Puna have decided at some point in the past that this place *is* their future and have purchased plots of land decades ago to ensure a relaxed and quiet retirement in what they define as ‘paradise’. However, as many people in Puna often have a ‘grab the moment’ or ‘live in the now’ type of attitude, my focus here is mostly on the relationships between past and present, as the future is often regarded as entirely unknown due to the agency of the volcano. As Armand wrote (in the quote at the beginning of the chapter), ‘We cannot know what will happen. We just watch, observe

and enjoy our island for all that it is'. Armand's comment, I believe, is a reference to the lack of control people have over this environment, where it is often said that Pelehonuamea, goddess of the volcano, does what she wants to do; there is no way of stopping her. Living at the mercy of a powerful fire goddess creates an uncertainty in people about their futures, which again might explain why many people are generally more concerned about 'living in the moment'. For those in Puna who have Hawaiian immanent perspectives on the environment, which will be discussed further in Chapter 4, uncertainties about the volatility of the volcanic environment referred to here is much less challenging. I will come back to a discussion about the differences in these perspectives later.

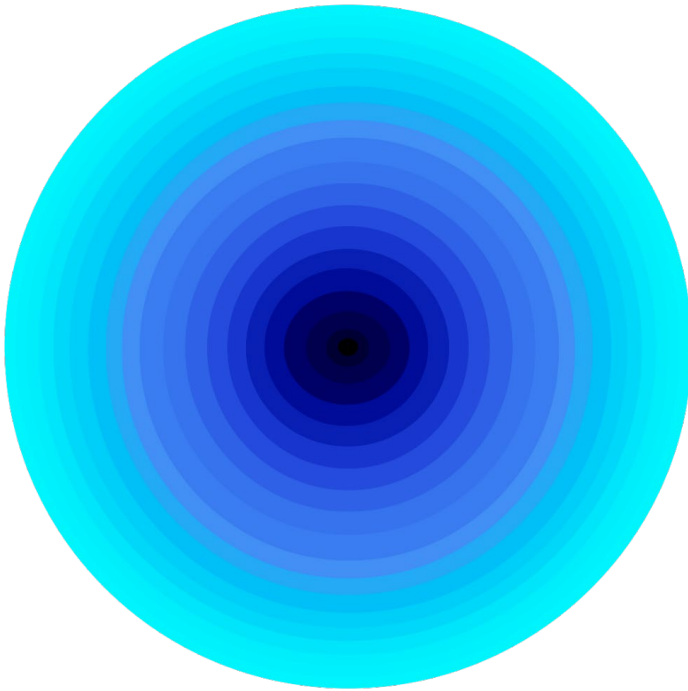


Figure 3.1: Visualisation of layers and historicity in Hilo and Puna. The outermost layer is the present, while the centre of the model represents a gaze into the past. Figure by author.

Figure 3.1 is a visualisation of my argument about layers and historicity in Hilo and Puna, in which layers are shown as rings that build out from the centre. As Hirsch and Stewart (2005, 262) pointed out, *historicity* concerns how persons ‘come in to being through relationships of various forms and scales, forging these relations anew from each epochal moment’, and is an expression used more frequently to define a ‘social situation open to ethnographic investigation’. It can be analogous to the expression *historicality*, which can be seen as ‘the past of objects and persons’ and in conflict with the ‘Western’ notion of history, where the past is separate from the present and where history is regarded as an object and a string of events which is gone forever (Hirsch and Stewart 2005, 262–263). This is a useful perspective to include in an analysis of sociality in Hilo and Puna today, as Hirsch and Stewart’s definition of historicity provides room for understanding social relationships in the present as a product of relationships that have been formed over time in the past.

Hirsch and Stewart’s ‘epochal moment’ or ‘social situation open to ethnographic investigation’ can be comparable to an *event*. Each layer of Figure 3.1 contains an event, or as inspired by Kapferer (2010, 2015), a social construction of an atypical happening with generative potentials that disrupted daily routine and altered society in Hawai‘i. The theorization of events has continuously been debated within anthropology, and according to Kapferer (2010, 2015), event theory was of particular interest to members of the Manchester School of Social Anthropology, including Max Gluckman (1961, 2006), J. Clyde Mitchell (1956a, 1956b, 1969, 1974), Victor Turner (1957, 1968), and Jaap van Velsen (1964, 1967). According to Kapferer (2010/2015, 8), Max Gluckman’s situational analysis is a methodological approach in social anthropology which focuses on the atypical in everyday life and where the idea is that ‘human beings do not live their worlds as coherent wholes but always in a situated and fractionalized way’. Gluckman’s situational orientation was a ‘shift away from a totalizing concept of society (or community) as a bounded, integrated whole [and] the critical focus of analysis was not society but rather the event or situation as entities of practice’ (Kapferer 2010/2015, 9). Jaap van Velsen (1967) and Victor Turner (1957, 1968) further developed Gluckman’s ideas, and shifted even more towards an ‘event-focused interactional perspective’, from which Turner moved further towards

understanding the event as a ‘locus of creativity and change’ (Kapferer 2010/2015, 10). For Turner, the event is a ‘relatively open phenomenon that manifests a multiplicity of potential [and] a diversity of possible outcomes’ (Kapferer 2010/2015, 11). He argued for a potential of change during the liminal events of rituals and, further, of historical and contemporary world-changing happenings.

The work on Hawaiian history by Marshall Sahlins (see, for example, 1981 and 1985) are classic contributions to anthropological studies of Hawaiian society, but also to theoretical approaches to the anthropology of history, structure and events. Sahlins (1985) developed a theory somewhat parallel to the theories of the Manchester School, in which he approached the event as created, based on what he referred to as the ‘structure of the conjuncture’. Sahlins’ event theory grappled with the notion of culture and human agency in the making of history, and with how the force of a ‘conjuncture’ can enable agency in individuals to create and alter historical memory. He argued that ‘events [...] cannot be understood apart from the values attributed to them: the significance that transforms a mere happening into a fateful conjuncture. What is for some people a radical event may appear to others as a date for lunch’ (Sahlins 1985, 154). In his famous case study of the death of Captain James Cook in Kealakekua on the Big Island in 1779, Sahlins (1981, 1985) argued that the murder of Cook likely happened accidentally in a moment of tension and emotional turmoil on the beach between Hawaiians and Cook and his crew, but was after the fact reconstructed as an intentional sacrifice of Cook (see Sahlins’ original work for a detailed examination of this case). This reconstruction of the significance of the ‘conjuncture’ enabled the Hawaiians to incorporate the death of Cook into their historical memory as a mythical event. In Sahlins’ complex analysis of structure, history, culture and events, conjunctures are structural dynamics in themselves, which through human action and attribution of significance can generate events that in turn can transform culture and history.

Kapferer (2010, 2015) argued that events are not ‘natural phenomena[. t]hey are always constructions and do not exist apart from this fact’. Following Sahlins (1985), he further argued that ‘events achieve their import and effects through the meaning or the significance that human beings attach to them, and it is this which yields their

generative impact'. It is in human interpretation and 'meaning-making' happenings or occurrences can generate societal change and can be defined as events. Kapferer (2010, 2015) further discussed *the potential* of the event, in which the event itself can transform and create societal orders. In this dissertation, I am inspired by Sahlins' and Kapferer's arguments about the potential of the event, in which I approach events as potentially generative of transformations in social relationships and coping mechanisms in people's management of volcanic volatility. My approaches to these arguments are further elaborated in Chapter 6, where I discuss volcanic events as potentially generative in relation to production of vernacular seismology.

Layers, historicity and events serve as useful analytical backdrops to keep in mind throughout this dissertation, both in relation to descriptive parts and ethnographic analyses of places and peoples, and, especially, in relation to the events I discuss in Chapters 5, 6 and 7. For now, I will leave the theoretical discussion, and will in the next pages of this chapter focus on descriptions of social life, geography and historicity in Hilo and Puna.

Hilo – a global hub and the gateway to the volcano



Figure 3.2: Hilo and Mauna Kea. Photo 3966460 © John Dibelka | Dreamstime.com

Fieldnotes, 25 June 2014:

The clock on my bedside table shows 6:56 on a Wednesday summer morning, and the sun is rising on the horizon. The night has been dominated by the sounds of coqui

frogs,²⁷ crickets and heavy tropical rain showers falling on the banana trees and *kī*²⁸ in the back of the property. A group of Zebra Doves and Common Myna, both bird species introduced to the Hawaiian Islands, have been communicating enthusiastically in the morning hours and are now starting to settle down and go about their day of patrolling our lawn for seeds and insects. Our neighbours have started sorting their recycling, as they, like so many others in Hilo, have two recycling barrels made of hog wire where bottles of glass and plastic as well as aluminium cans are placed throughout the week. To be reimbursed for your used cans and bottles you must sort them into bags with similar items and take the bags to one of the several recycling centres in or around Hilo, where the weight of the bags will determine how much money you will be reimbursed.

For the past hour or so, one of the chicks from the neighbour's rooster and from one of his chosen hen's most recent clutches has been separated from the rest of the group and been running around our garden, desperately calling for them. The rooster, a magnificent and strong Chinese Cochin with a black underside and golden white top, used regularly by my neighbours in cockfights, is answering the chick's call in an effort to navigate the little one towards the rest of the group. They are all gathered right under my window for their morning dust-bathing routine, combined with attempts to break into our vegetable garden. Down on the road cars have started bustling by, carrying their drivers and passengers to or from work, to school or to the beach for an early morning swim, surf or paddle in Hilo bay or along the coast in Keaukaha. Across the lot, another neighbour has enthusiastically, and loudly, started his daily routine of online gaming, while on the opposite side of the lot a man is playing his ukulele and singing with a soft, mellow voice. The sky is clear, the air is still, and above, the

²⁷ Coqui frogs are a species of frog that is invasive to Hawai'i but thrives in the Hawaiian climate and is spreading rapidly and in large numbers on the Big Island. They are rather small, and the male makes a loud sound that resembles their name – co-qui – which many Big Islanders, and visitors, find incredibly annoying. If a male coqui frog has decided to make a tree right outside your bedroom window his home, you might find it hard to sleep because of the loudness of his call. The coqui frog has become a major nuisance in the Big Island ecosystem, where they have almost eradicated several species of native crickets.

²⁸ *Kī* is the Hawaiian word for the plant *Cordyline fruticosa*. In other parts of Polynesia this plant is often referred to as *Tī*, and this word is used commonly also in Hawai'i. Like many other Pacific Islanders elsewhere in Oceania, Kānaka Maoli attribute this plant protective powers, and it is often found in the corners of Hawai'i residents' properties, in flower garlands or *lei*, and in hula costumes. Hawaiian mothers often sew pieces of *Kī* into their family member's clothes before they travel.

mountains of Mauna Kea and Mauna Loa, the latter the largest volcano on Earth, witness the beginning of yet another busy day in Hilo.

Hilo is a town located on the northeast side of the Big Island, in the District of South Hilo. Hilo is the largest town on the Big Island and the second largest in the Hawaiian Islands. Isabella Bird (1875, 53–55), well-known author and adventurer, was one of the earliest writers to describe Hilo in her book, *Six Months among the Palm Groves, Coral Reefs, & Volcanoes of the Sandwich Islands*, in which she referred to Hilo as ‘the paradise of Hawai‘i’, and that it ‘effortlessly is what Honolulu attempts to be’.

Native houses, half hidden by greenery, line [Hilo] bay, and stud the heights above the Wailuku, and near the landing some white frame houses and three church spires above the wood denote the foreign element. Hilo is unique. Its climate is humid, and the long repose which it has enjoyed from rude volcanic upheavals has mingled a great depth of vegetable mould with the decomposed lava. Rich soil, rain, heat, sunshine, stimulate nature to supreme efforts, and there is a luxuriant prodigality of vegetation which leaves nothing uncovered but the golden margin of the sea, and even that above high-water-mark is green with the *Convolvulus maritimus*^[29]. So dense is the wood that Hilo is rather suggested than seen.

Bird (1875, 53)

Her descriptions match the impressions I was left with the first time I came to Hilo and the way I feel whenever I return to Hilo from other places in the world. Hilo is a green oasis, wonderfully lush due to fertile volcanic soils, regular rain showers and a great variety of tropical plants that have migrated there from a multitude of places in the world. However, the density of the wood suggested by Bird has somewhat diminished and been replaced with houses and building structures in the years between her description and the early 21st century. Additionally, physical and social upheaving events have altered the appearance and feel of this Pacific town. Nonetheless, much

²⁹ Also known as Beach Morning Glory, a creeping green vine often found on beaches in tropical environments.

has remained the same. Hilo is located within the realms of both Mauna Kea and Mauna Loa; it is still incredibly lush, with a wide variety of tropical plants, and very humid; and, on many occasions, residents and visitors alike have told me that the environment has a ‘tropical feel’. In a conversation I had with ‘John’ (J), a young migrant from the mainland, he told me (E) what he found to be special about Hilo:

J: The land here is alive, pulsating. People come to Hawai‘i to look for something they are missing in their lives. There are many methods you can learn to make money, but money is not everything. People who have money often feel like they are missing something in their lives. They come here to find it.

E: Yes, people come here for a fresh start, they come to find love, to find freedom and spare time.

J: Yeah, to find freedom and time. And they connect with the place on a deeper level than they have connected with any place before.

E: [humoristic tone] And some of them come as climate refugees

J: Haha, yeah, many of them.

E: But Hilo is such a different place, you know, it is so ‘local’, what you see in the streets here is just peoples’ everyday lives.

J: Exactly, Hilo is like the hidden gem of Hawai‘i, it is such a special place.

E: Not plastic like Waikīkī, it is not constructed to fit into a tropical fantasy.

J: No, Hilo is the real deal. No plastic and no tourism.

‘John’ was, like Bird, referring to Hilo as a special place and a ‘hidden gem’ of Hawai‘i. From a different perspective, I have been told by visitors from other Hawaiian Islands or other places in the Pacific that Hilo, and much of the east side of the Big Island, feel ‘heavy’, with a reference to the *mana* associated with these places. *Mana* is a pan-Pacific expression that in Hawai‘i translates to *supernatural, divine, or spiritual power* (Pukui and Elbert 1986). When visitors and residents have referred to the west side of the Big Island as ‘heavy’, they link this description to Pele and her family’s dwelling at Kīlauea volcano and Poliahu’s home on Mauna Kea, which is a reference to the central roles Hilo and Puna hold in the cosmologies of the Hawaiian Islands.

The mighty mountains stretch up towards the sky from the shoreline and give Hilo a look of authority. The heavy rain clouds that often rest above the town along with dense humidity, might further promote the feeling of ‘heaviness’ people refer to. Simultaneously, visitors, especially those who come from other islands in the Hawaiian archipelago, know that this is Pele’s domain, and the ‘heavy feeling’ people refer to can be encouraged through this conviction. Another comment I have often heard from visitors is that Hilo feels like a Pacific port town, whereas Honolulu, for example, feels more American. Possibly, this is what Bird also referred to when suggesting that Hilo effortlessly was what Honolulu attempted to be. I have heard Hilo compared to the small provincial capital of Gizo in the Solomon Islands, and I often compare it to Suva in Fiji, although Hilo is much slower and does not provide the scene for high-level Pacific business, diplomacy and politics one can find in Suva. I believe the recognition of Hilo as primarily a Pacific town is often based on its size, its lush plant life, the aesthetics of its colonial style buildings and the selection of local businesses strategically placed in the pathway of tourists. The non-industrial colonial style of downtown Hilo, with a mix of residential structures and local businesses, promotes the ‘authenticity’ Hilo is known for.

Authenticity is a problematic term within social anthropology and has been extensively discussed within the discipline since the 1980s (see, for example, Linnekin 1983, Keesing 1989, Friedman 1993, Trask 2000 and Osorio 2001). I will not argue for or against authenticity in Hilo here (see Torgersen 2010 for an earlier discussion of the term), nor will I go into the debate about authenticity between Linnekin, Friedman, Trask and Keesing in the early 1990s. Rather, I use it here because ‘authentic’ is a term often used by Hilo’s residents when describing their town. Throughout the years, I have understood this to mean that Hilo residents view their town as a ‘local’ and less touristy place, as well as more Hawaiian than many other towns in the Hawaiian Islands. Hilo also holds a considerable standing in regards to the continuation of Hawaiian cultural forms and is home to old Hawaiian family lines and world-famous *hālau hula* that specialise in *hula Pele*, i.e., hula that pay tribute to Pele. One such *hālau* is Hālau O Kekuhi, which is a part of the Edith Kanaka‘ole Foundation, a Hawaiian culture-based non-profit organisation which mission is ‘to elevate Hawaiian intelligence through

cultural education founded on the teachings and traditional practices of Edith and Luka Kanaka‘ole’ (Edith Kanaka‘ole Foundation 2017). The foundation specialises in Hawaiian knowledge and skills about land and resource practices, cultural site restoration, ritual, protocol and education.



Figure 3.3: Satellite image of Hilo. (Google Earth 2018)

The location of Hilo, on the windward side of the Big Island and at the base of the island’s two largest volcanoes, is not accidental. Hilo has been an urban centre for several centuries, although not always the town it is today. Before the development of a larger urban centre in this area, the districts of North Hilo and South Hilo encompassed several smaller villages, mostly located on the banks of rivers such as the Wailuku and the Waiākea (Valentine 2014). Sources of fresh water attract social life, and in addition to the fresh water concentrated in the rivers in Hilo, I argue that the weather phenomenon *orographic rainfall* gives even more opportunities for a thriving social life in this location. Orographic rainfall occurs in Hilo when evaporated water

from the ocean is collected and stored in clouds that are transported to the island with the north-eastern trade winds, where eventually the clouds are pushed upwards and over the mountains. Once the clouds move into colder air temperatures up on the mountainside, they release their collected water over the city. Combined with fertile volcanic soil, the orographic rainfall over Hilo ensures that an abundance of different food crops can be grown there. It also means that Hilo is an incredibly wet city. According to the *Rainfall Atlas of Hawai‘i*, developed by Giambelluca et. al. (2013) at the University of Hawai‘i’s Geography Department, the city has an annual precipitation of between 3550 and 5400 mm, which again is one reason for less tourism there than on the west side of the island.

Another reason for the location of Hilo is the crescent form of Hilo Bay, which makes excellent conditions for launching and landing both fishing and voyaging vessels. During the time of Kamehameha I, the first king of the Hawaiian Kingdom, Hilo was a seat of political power, as well as a launching site for war canoes going to battle on other islands in Kamehameha’s belligerent efforts to unite the islands under his rule (Valentine 2014). In 2014, large cruise ships made landfall in Hilo on average every other day, and container ships, which provided the island’s industry and general population with most of its imported goods, travelled continuously in and out of the harbour. Historically, the shape of Hilo Bay provided a good launching spot for voyaging canoes and fishing vessels of different types and sizes, and the villages on the coast were great fishing villages high in resources. Fishing is still an important activity, on both the commercial and recreational levels, and Hilo still offers launching facilities for fishing vessels.

In the mid-1800s, American businesspeople initiated the beginning of a sugar industry in the Hawaiian Islands, which influenced both natural and social environments throughout the islands.³⁰ Until the 1870s, sugar was grown in the then Hawaiian Kingdom on a smaller scale, but global policies and the cut-off of goods transport between the North and the South during the American Civil War led to a rise

³⁰ See Carol A MacLennan’s *Sovereign Sugar: Industry and environment in Hawaii* (2014) for more details about the sugar industry in Hawai‘i.

in demand of imported sugar from Hawai'i to the northern states. On the Big Island, the sugar industry was largest on the Hāmakua coast, north of Hilo (McLennan 2014). Infrastructure for maintaining the industry, such as irrigation systems and a state-of-the-art railway which included large bridges across the many gulches that form the Hāmakua coastline, was developed between the northern tip of the Big Island and Hilo, where the bay provided easy access for larger shipping vessels. The sugar boom led to an industrialisation of the physical landscape on the north-eastern side of the island and initiated great changes in sociality in the Hawaiian Kingdom. The expanding industry demanded a labour force that the island group alone could not provide, and groups of workers immigrated from Asia, the Pacific and Europe. Ethnic, cultural and social diversity developed rapidly in the entire Kingdom, especially in the centres of the industry, like Hilo town. The workers laboured under socially challenging conditions, as they spoke different languages, ate different types of foods, led different religious and spiritual lives, and carried different cultural traditions from their respective, previous homes. In the (sugar)cane fields, new forms of socialities across ethnic groups were formed, a new universal language, Hawaiian pidgin, was constructed, and musical instruments (including the ukulele) imported by the workers became integrated in Hawaiian music. The sugar industry changed the small Hilo town monumentally and began shaping the socially and culturally diverse contemporary Hilo.

Rapid environmental changes induced by volcanic events, two large tsunamis in 1946 and again in 1960, as well as human activities like immigration, industry, development and tourism, have all left their mark on Hilo. Some of the more recent developments become visible when comparing it with the Hilo described by Bird almost 150 years ago. An initial gaze towards the mountains from the vantage point of the Hilo breakwater, a structure that did not exist when Bird wrote about Hilo in 1875, still reveals forests, and several church spires can be easily spotted up the hill from the downtown area. However, the urban areas of Hilo have expanded, and the town is much larger both geographically and in population than in 1875.

Hilo is an urban centre of relatively small scale, with about 45000 inhabitants. When compared to the state capital, Honolulu, it is a small and slow-moving town, but when compared to a small town, such as Hawi in the District of North-Kohala on the

northwest side of the Big Island, it has as much of a bustling urban environment as a city would have. Hilo is a hybrid of small town and city, and although a visitor from larger urban centres like New York, London, Auckland, or Beijing would likely view Hilo as a very quiet small town, this is not necessarily the opinion of the local population. Many indicators suggest that Hilo offers an urban way of life, including chain stores like Walmart, Target, Macy's, Starbucks, Home Depot and Sears, as well as movie theatres, restaurants, malls and coffee shops. On the other hand, Hilo consists of mostly low-rise buildings and wooden residential houses, with plots big enough to grow taro and other vegetables as well as to keep chickens. The town also features a local farmers market with produce and crafts along with small independent shops and businesses, and is small enough for you to have a good chance of running into someone you know when going to the supermarket or to one of the local restaurants.

Additionally, Hilo features one of the campuses of the University of Hawai'i (UH), which has about 3000 students in any given semester and was ranked the number one Most Diverse National University by the US News and World Report in 2020 (UHH 2020). According to the UH Hilo website, Kānaka Maoli and part-Kānaka Maoli students make up the largest part the student body with 31.73 per cent, while the category 'Caucasian' ranks as number two with 20.31 per cent and 'Mixed (2 or more)' ranks as number three with 13.14 per cent (UHH 2020). Other categories mentioned in the UH presentation of student diversity are 'Filipino' 6.55 per cent, 'Japanese' 4.92 per cent, 'Pacific Islander' 1.01 per cent, 'Chinese' 0.44 per cent, and 'All Other' 15.75 per cent (UHH 2020). In 2020, 198 international exchange students from 37 countries in Oceania, Asia, Africa, Europe and the Americas enrolled at UH Hilo. The university provides Hilo and the east side of the Big Island with local and global diversity and contributes in this way to the shaping of Hilo's social environments. Population statistics produced by the US Census Bureau in 2019 indicate similar diversity in Hilo's population, but there the category with the highest percentage is the 'Mixed (2 or more)' with 36 per cent of the total. Following this are the categories 'Asian, alone' with 32.4 per cent, 'White, alone' with 19.7 per cent, 'Hispanic or Latino' with 11.8 per cent, and 'Native Hawaiian and Other Pacific Islander, alone' with 10.3 per cent (U.S. Census Bureau, 2019).

The United States Census Bureau uses the following terms to categorise what they refer to as *race* in their census data: ‘White’, ‘Black or African American’, ‘Asian American’, ‘American Indian/Alaska Native’, and ‘Native Hawaiian/Pacific Islander’. ‘Hispanic’ or ‘Latino’ are the only terms used to categorise *ethnicity* in the US Census Bureau’s system of categorisation. The bureau has been criticised by, for example, the American Anthropological Association (AAA) for their categorisation of race on ‘biology-like terms’ (American Anthropological Association, 1997). I use the categories from the US Census Bureau to discuss the American categorisation of ethnic and social diversity in Hawai‘i, but I agree with the criticism posed by the AAA and find these forms of categorisations problematic.

While the statistics produced by the US Census Bureau can give us indications about diversity, the categorisations say little about social life in Hilo, in which, I argue, diversity refers to multiplicity rather than difference. The categories referred to by UHH and the U.S. Census Bureau are not separated, but rather integral parts of a more united social scene. People of different ethnic backgrounds are neighbours, friends, co-workers and fellow ‘Hiloans’, who for the most part benefit from the social and cultural diversity of Hilo. Specifically visible to anyone who visits Hilo is an international selection of restaurants and other commercial providers of food available to the general population and visitors alike. However, as in most ethnically diverse urban centres in the world, tensions between individuals and groups of ethnically different backgrounds occur occasionally, and structural racism, especially towards Micronesian immigrants³¹ as well as class-based inequalities can be found in Hilo. According to the U.S. Census Bureau, 17.1 per cent of Hilo’s inhabitants live in poverty, and homelessness is a challenge. Additionally, Hilo welcomes about 500,000 visitors yearly, most of whom come to see Kīlauea (Munekiyo & Hiraga, Inc. 2014). To tourists, Hilo, with its international air and shipping ports, is primarily the gateway to the volcano, and not a tourist destination as such.

³¹ See the non-profit organisation *Micronesians United – Big Island* at <https://www.mu-bi.org/> for more information.

Puna – a district located on the world’s most active volcano

South to southeast of Hilo lies the large district of Puna. It is located entirely on the slopes of Kīlauea volcano and borders the district of South Hilo to the north and the district of Ka‘u to the south. The size of Puna is, with its approximately 1300 square kilometres, only slightly smaller than the entire island of Kaua‘i, and due to a less expensive property market and a land division scheme that started in the mid-1900s, the population has grown vastly over the past 50 years (Cooper and Daws 1990, Houghton et. al 2021). Most of the Puna district is located in Lava Flow Hazard Zones 1, 2 and 3 (see Map 5). For comparison, the district of Kohala, which is located on the extinct Kohala Volcano, lies within Lava Flow Hazard Zone 9. Thus, the entire district of Puna is, to varying degrees, riskier to inhabit than several other districts on the island. Despite this risk, people have inhabited the district for a very long time. Myths and oral tradition tell us that Puna has been a place of significance throughout the human history of the Big Island, and according to Beckwith (1970), it was on the Puna coast that Pele first disembarked when she came to Hawai‘i. Pele and members of her fire clan dominate the myths and legends about Puna (McGregor 2007). Stories about villages and place names in this area have been collected and published in major works such as Beckwith (1970) and Westervelt (1916; 1923/2011). Remnants of old human settlements and social life, some entirely intact and others partly or entirely covered by lava flows, have been found in various locations in the Hawai‘i Volcanoes National Park (HVNP 2021).

According to McGregor (2007), very little subsurface excavation has been conducted in the Puna district. She argued that the first settlers in Puna lived along the shoreline because of a lack of running streams in the entire district. Along the coast, settlers had access to resources in the ocean as well as freshwater springs and arable land. Archaeological excavations in Puna conclude that the earliest settlements are dated between 300 and 600 A.D. (Burtchard and Moblo 1994), but according to McGregor (2007), it is possible for these dates to be revised if more subsurface studies are conducted. Oral history tells stories about Puna as a magnificent country with fertile soils and an abundance of food, and some of these stories explain how Puna chiefs and their followers had several trials with Pele and her ‘fiery temper’ (McGregor 2007,

149). One such story, as told by Chief Kanuha to the French explorer Jules Remy in the nineteenth century, is about a high chief who left Puna on a voyage, only to return to a completely changed landscape:

A certain high chief reigned in Puna. He journeyed to the island of O‘ahu where he met a prophet of Kaua‘i, named Kāneakalau, who asked him who he was. ‘I am,’ replied the chief, ‘Keli‘ikuku of Puna.’ The prophet then asked him what sort of country he possessed. The chief said: ‘My country is charming. Everything is found there in abundance. Everywhere are sandy plains which produce marvellously.’ ‘Alas!’ replied the prophet, ‘Go. Return to your beautiful country. You will find it overthrown, abominable. Pelehonuamea has made it into a heap of ruins. The trees of the mountains have descended toward the sea. The ‘ōhi‘a and pandanus are on the shore. Your country is no longer habitable.’ The chief made answer: ‘Prophet of evil, if what you now tell me is true, you shall live. But if, when I return to my country, I prove the falsity of your predictions, I will come back on purpose and you shall die by my hand.’

Unable, in spite of his incredulity, to forget this terrible prophecy, Keli‘ikuku set sail for Hawai‘i. He reached Hāmākua, landed, and travelled home by short stages. From the heights of Hilo at the village of Makahanaloa, he beheld in the distance his entire province overwhelmed in chaotic ruin, a prey to fire and smoke. In despair, the unfortunate chief hung himself on the very spot where he first discovered this sad spectacle.

McGregor 2007, 149

According to McGregor, the Puna district has had varied forms of political control and rule. From the late 1400s up to British contact in 1778, political power in Puna varied between being autonomous within the district and being dependent, where an *ali‘i nui* (high chief) would be in control over several districts, and lower ranking Puna chiefs would be subordinate to this *ali‘i nui* (see McGregor 2007, 150–158 for more details on the ruling chiefs of Puna).

As with the rest of the Hawaiian Islands, a dependent form of governance was adopted on the Big Island under the rule of Kamehameha I, the first *ali‘i nui* to gather all the islands and form the Hawaiian monarchy. According to McGregor (2007, 155),

the followers of Kamehameha I referred to the districts of Ka‘u and Puna as ‘*He moku ‘āleuleu* (district of ragamuffins)’, a reference to the people of these two districts as low ranking farmers who worked hard and wore mostly old worn-out clothes. This definition indicates that the people of Puna were not among those who prospered during the rule of Kamehameha I (McGregor 2007, 155). Throughout the 1800s, people in Puna experienced a wave of change as missionaries arrived and started preaching in the district from about 1823 (McGregor 2007, Langlas 2016). The conversion of Kānaka Maoli to the Catholic faith and the church in Puna intensified in the mid-1830s, and several churches were built in the district from the late 1830s throughout the 1840s (McGregor 2007, Langlas 2016). In 1864, Father Damien de Veuster, known for his dedicated work at Kalaupapa, the leprosy colony on Molokai, was assigned to Puna where he established regular catholic services and baptised about one hundred Kānaka Maoli (McGregor 2007, Langlas 2016). Throughout this period of change in spirituality, the people of Puna remained farmers, growing papaya, taro, sugar and coconuts in areas with fertile soil.

The Puna district is, in the early twenty-first century, composed of sections of land with different forms of administration and ownership. After the Great Māhele in 1848, a land division act which enabled private ownership of land in Hawai‘i, much of the Hawaiian Islands’ fertile lands were bought from the King by politicians or other persons of power, property developers and businesspeople interested in sugar or pineapple farming. According to McGregor (2007, 158), ‘Puna is distinguished as the district on Hawai‘i with the smallest amount of private land awards under the 1848 Māhele and Kuleana Act’, because the Puna District was somewhat separated from the economy and politics of the Hawaiian Kingdom; the district was not at all developed with infrastructure, nor were people following the economic developments of monetary returns on labour or crops (McGregor 2007). Thus, it is possible that word never reached Kānaka Maoli in Puna, neither about the land division act nor about how one applied for land awards. Almost none of the population of Puna applied for land awards, either through ignorance of the newly changed law, a lack of funding to pay for the land survey needed for the application or a lack of willingness to file for a particular lot in a seismically active district where mobility was a key factor for people

living there (McGregor 2007). It is also possible that a considerable number of Kānaka Maoli in Puna, although Christianised, believed the land in Puna belonged to Pele and could not be owned. These factors resulted in the majority of Kānaka Maoli not owning their own land but remaining in areas owned by the Crown and the government in Puna.

With the Great Māhele, Kānaka Maoli were pushed into the cash and market economy, and the use of resources and the sociality in family life changed in Puna. A growing industry focusing on the extraction of pulu, the hairy fibres of the *hapu'u* fern found in the native rainforests in Hawai'i, was established in Puna, and many families participated in the industry (McGregor 2007). Sometimes these capitalistic ventures broke apart established homes, as some members of the family would move into the forest to work while the rest stayed behind at home. Sometimes, whole families were employed and often moved from their home to areas where food was not readily available and where they lived in poorly constructed temporary huts that did not provide adequate shelter from the rain; as a result, many fell ill (McGregor 2007). Other marketable resources in Puna were focused around coastal fisheries, salt production and the extraction of timber from the native 'ōhi'a tree. Cultivation on the slopes of Kīlauea volcano, largely covered by vast lava fields, was incredibly labour intensive and sometimes impossible, so did not hold any significant economic value to the plantation business that was booming elsewhere in Hawai'i and the rest of the islands. Most of the land in Puna thus stayed in the government's ownership and remained undeveloped for a long time after agricultural and tourism industries intensified elsewhere in the islands.

Anthropologist Charles 'Kale' Langlas conducted a large research project from 1987 to 1990, involving anthropology students at the University of Hawai'i at Hilo and Kānaka Maoli *kūpuna* (elders or ancestors) about the people of Kalapana in lower Puna between the years 1823 and 2010. During these years, Kīlauea was very active in the lower Puna area, and Kalapana itself was covered by a large lava flow beginning in April 1990 (Langlas 2016). In the introduction to the book that was published from the research project, Langlas (2016, 1) presents a story of how he came to be interested in researching the people of Kalapana:

This book took place when I went to Kalapana to work at the election polls. Early in the day, my attention was caught when I heard several elderly Hawaiian voters speaking Hawaiian to each other. That was not a common occurrence in Hawai'i during those years, when the Hawaiian language had nearly died out. It was my first indication that Kalapana had endured for an unusually long time as a Hawaiian community.

According to Langlas (2016), Kalapana was one of the few Hawaiian settlements that persisted into the 20th century. In most of Hawai'i, Kānaka Maoli families had been displaced by sugar planters, ranchers and pineapple companies, and by the year 1900, 24 per cent of Kānaka Maoli had left the countryside and moved to urban areas in Honolulu. The rural Hawaiian settlements were broken up and replaced by ethnically diverse plantations and ranches. However, Kalapana remained Hawaiian, and, according to Langlas (2016, 1), because Kalapana was 'lava land', devoid of the resources desired by plantation owners and ranchers.

A division of land in Puna

In 1958, two businesspeople from Denver, Colorado, organised a Hawai'i-based corporation, called Tropic Estates Ltd., and bought 1200 acres of land between Kurtistown and Mountain View in Puna (Cooper and Daws 1990).³² They divided the land into 4000 lots, which were put on the market for \$500–\$1000 with terms as low as \$150 down and monthly payments of \$8, and named the subdivision Hawaiian Acres. This was the beginning of a Big Island subdividing boom, and for the next nine years, multiple large-scale subdivisions were approved by Hawai'i County. In the same period, other types of development were happening all over the island, and in Hilo, resort hotels were developed along with an international-size airstrip which would accommodate an expected rise in tourism as the resort developments continued.

On the west side of the island, resorts and condominiums were developed, and a project spearheaded by the governor of the Big Island at the time, Governor Burns,

³² This section is based on Cooper and Daws' *Land and Power in Hawaii* (1990).

aimed at transforming the entire northern stretch of the west coast into a regional resort complex Burns referred to as a ‘Gold Coast’ (Cooper and Daws 1990, 259). This type of development was common throughout the islands, but the development of subdivisions in Puna was unique: ‘sizable acreage in remote areas of little or no real economic use value, subdivided into house lots on which practically no one ever actually built homes’ (Cooper and Daws 1990, 259). The Big Island was the only island that had such vast amounts of land with no obvious economic benefits, and thus was the only place where this speculative subdivision development took place. By the time the subdivision boom came to a halt in the mid-1970s, about 80,000 subdivision lots had been created, on an island that at the time had a population of less than 80,000.

Big Islanders at the time of the boom participated greatly in the market, and approximately one out of four Big Island families bought lots in one of the subdivisions. However, even with this eager participation, local families had purchased fewer than 12 per cent of the approximately 65,000 lots sold by 1975. The rest were sold to members of the post-war middle class, often for the purpose of vacation and retirement, and to speculators who left the lots vacant with minimal site improvements for the next 25 to 30 years. As this was a time for economic development for families on the Big Island, and especially for the families who had invested in a lot in one of the subdivisions, resistance towards outsiders, be they retirement investors or speculators, was not common. The *Hilo Tribune Herald* (in Cooper and Daws 1990, 260) reported within the first twelve months of the boom:

This newspaper goes along with the optimists, confident that the eager buying of land, much of it sight unseen, means that the Big Island is finally coming into its own, and that we are on the threshold of development that has kept Oahu singing with prosperity ... Here on the Big Island we don’t much care what brings them in as long as they come and as long as they buy...

However, resistance to the subdivision development began to emerge in the upper levels of Hawai‘i County in 1960, with Planning Director Hiroshi Kasamoto calling the subdivision ordinance a ‘bad law’, and County Attorney Yoshito Tanaka describing it as ‘a mess’ (Cooper and Daws 1990, 260). This was the beginning of an attempt on

behalf of County and State politicians to control the situation, even though it cut into potential revenues.

The people who bought the lots in the subdivisions were often blinded by a marketing scheme focusing on promoting the lot as their very own piece of paradise. The names given to the subdivisions often blurred the fact that they were placed in the most hazardous lava zones on the island. Examples can be seen in the names: Royal Gardens, Vacationland, Leilani Estates, Eden Rock, Hawaiian Paradise Park, Orchidlands Estates and Hawaiian Beaches. Interestingly, the old Hawaiian names for some of these places tell rather the opposite version of the story. An example is the name of the *ahupua'a* where Leilani Estates was developed, *Keahialaka*, which means *the fire of Laka*. Laka is the main goddess of the Hawaiian hula and one of Pele's sisters (Beckwith 1970). In Hawaiian, this name tells you that this is a place where fire resides, whereas Leilani could be translated to *heavenly flowers*, suggesting a rather different environment than the one represented in the old Hawaiian name.

There was also little information given by real estate agents about the proximity of the lots to the active Kīlauea volcano. Most of the buyers did not know what they were getting when they bought lots in the subdivisions. This was especially the case in Royal Gardens, and according to a survey carried out by Cooper and Daws (1990), 72 per cent of the buyers thought their lot had fertile soil, and about 69 per cent were not aware that their lot was situated in the most hazardous volcanic zones on the island. In the developers' public offering statements, there were no discussions about volcanic hazards until 1972, some ten years after the first sales of lots in Royal Gardens. None of the sales brochures for Royal Gardens, available from the two government agencies that were most responsible for the development and sale of this subdivision – Hawai'i County Planning Department and the State Department of Commerce and Consumer Affairs (DCCA) – mentioned anything about the serious volatility of the environment in which Royal Gardens was located. Additionally, the lots in this subdivision were sold without infrastructure, including water lines, electricity or sewage, and the roads leading into and around the subdivision were of varying standard. Royal Gardens was not the only subdivision with these types of deficiencies; this was the case for many of the subdivisions that were developed on the Big Island in the boom years. The Big

Island subdivisions were advertised nationwide but were banned for sale in California because the sales brochures were perceived as deceptive, as they suggested the lots had government standard infrastructure when in fact they did not.

The Royal Gardens brochures also suggested that the lots were within walking distance to beautiful beaches and shorelines, when in fact they were on average about three kilometres away from the nearest beach at Kalapana. The coastline close to the Royal Gardens was rough and rocky, and the ocean was wild, crashing violently against the rugged volcanic rocks. It also bore clear marks of the great seismic forces attributed to this area in the fissures and different lava formations, and water access was not gained easily. As so many buyers bought the lots unseen, the information they were able to acquire made it unlikely that they would find out what the lots were like in reality before visiting them in person. In 1975, after the subdivision boom on the Big Island had ended, 97.5 per cent of all lots in Puna, in subdivisions of 100 or more lots, were still vacant. By the end of 1983, only about 5 per cent of the lots were inhabited. It seemed then that the subdivision boom was not about creating homes, or even about developing the subdivisions fully, but rather about political power, capital and ownership of land. The losers of the whole ordeal were the Kānaka Maoli, who had previously been able to relocate when a lava flow would come their way but were now mostly ignored when such abrupt environmental changes dislocated them.

According to Cooper and Daws (1990, 275), tourism had become common on the Big Island by the mid-1980s and the subdivisions of Puna had become objects of tourists' desires:

In the mid-1980s, those boom-time subdivisions were a kind of spectacle the Big Island possessed, along with active volcanic craters, snowcapped volcanic peaks, papaya trees growing in lava, and the simple vastness of the island compared to the rest of the state. If they wanted to, tourists on their way from Hilo to Volcano National Park could wander along rutted roads laid out in perfect grid patterns regardless of the landscape, looking at dilapidated street signs in semi-wilderness, aware of the strangeness of being in a lava field, and seeing, every once in a great while, a house.

The tourists who visited the subdivisions in Puna, especially in lower Puna, often found a closed and sometimes hostile attitude from the people who lived there. This had much to do with illegal development of marijuana plantations in the subdivisions. Because marijuana is an illegal crop, there are few exact figures describing the grandness of the marijuana business in the Hawaiian Islands but estimates in the early 1980s describe it as large as sugar and pineapple combined, and the magazine *Newsweek* wrote in October 1982 that the Hawaiian marijuana business ‘by most estimates...now tops half a billion dollars annually’ (Cooper and Daws 1990, 275). The Big Island, with its multitude of remote places and underdeveloped subdivisions where farmers could hide their crops, became the marijuana capital of the State of Hawai‘i, and Puna was the perfect place for this type of business, which has still been thriving during my years of fieldwork in Hilo and Puna.

As mentioned in the previous chapter, the most recent eruption from Kīlauea started in 1983, with the villages of Kalapana and Kaimū almost completely buried under layers of lava in the early 1990s. This event displaced many Kānaka Maoli families, who were forced to move elsewhere, often into one of the subdivisions, and thus finalised the demise of this Hawaiian place. One can argue that the lava flows destroyed Kalapana. However, a Kanaka Maoli man I talked to during a festival in Kalapana/Kaimū that focused on sustainability in Puna argued that Kalapana saw its end as the secluded Hawaiian place it was when ‘the state’³³ decided to build a road as well as other types of infrastructure from Hilo and all the way down to Kalapana.

³³ This research project does not focus on an anthropological theorisation of ‘the state’ in Puna. However, different levels of ‘state’ are presented in different situations, for example the US Federal State, the State of Hawai‘i (the State), Hawai‘i County, Hawai‘i County Civil Defence (HCCD) the state (referring to the Hawaiian Islands as a US state) and ‘the state’. In this dissertation, I use quotation marks to address ‘the state’ in Puna with regards to how people relate to this concept and to suggest that ‘the state’ is a somewhat undefinable and abstract entity to, especially, people who live ‘off-grid’ (this is discussed further in Chapter 5). In everyday life, people who live ‘off-grid’ want little to do with what they refer to as ‘the state’. However, during my fieldwork I have come across several examples of when ‘the state’ becomes important in people’s lives. ‘The state’ is an undefinable entity people in Puna refer to when something needs to be addressed, fixed or managed, and an entity that should take responsibility for matters that are challenging and difficult in Puna, such as for example volcanic eruptions. ‘The state’ becomes definable when it is represented by a person that people can relate to, such as the head of the HCCD or a local person that runs for the title of Mayor of Hawai‘i.

According to the *kūpuna*, he told me, the road and the water lines pushed modernity on the people of Kalapana, and, he said, ‘it wasn’t for them’.

In the years following the beginning of Kīlauea’s 1983 eruption and leading up to the second decade of the 21st century, more people settled in the Puna district. Many had already bought a lot during the subdivision boom and had come from the mainland to spend their retirement in Puna. Others had come because property in the rest of the state was unaffordable. However, with Royal Gardens, Kapoho and Kalapana buried by lava flows, people had started to understand the risk of developing property in this area. On the other hand, a ‘living in the moment’ type of attitude was adopted by many, and since it was impossible to predict a future eruption in Puna, people developed their properties with spacious houses and beautiful gardens, often including fishponds, a large variety of tropical flowers and food resources. A desire to pursue a ‘symbiotic’ relationship with the land, along with a ‘worry free existence’, usually in reference to their financial situation, continued to encourage people to settle there. Real estate other places in Hawaii continued to increase in value, and many continued to buy lots and houses in Puna as this was the only place they could afford to live.

Puna in 2014

With a long history characterized by social and natural environmental change, Puna is a socially diverse district, home to a variety of ethnic groups and people with different religious, spiritual and ontological perspectives. Layers of lava and historicity on Kīlauea Volcano forms an ever-changing district, where people are often on the move around, in and out of the district. As Armand mentioned in the quote at the beginning of this chapter, the volcano is not just a risk factor people are willing to live with, it is also a ‘constant source of wonder and drama’. Kīlauea attracts people who find deep meaning in a life lived in such a volatile natural environment.

The subdivision system remains, but the subdivisions themselves continuously form and reform with the movement of people and the movement of lava, or Pele. When entering Puna from the South Hilo district by car, the first subdivision you reach is Kea‘au. Kea‘au is a CDP and an urban centre, with supermarkets, a McDonalds restaurant, an Ace hardware store and several schools and community buildings.

According to the American Community Survey (2019a), about 2,613 people live in Kea‘au, and of these, 51 per cent are categorized as ‘Asian, alone’, 23.7 per cent are ‘two or more races’, 12.7 per cent are ‘White, alone’, and 12.3 per cent are ‘Native Hawaiian and Other Pacific Islander alone’. Furthermore, 37.8 per cent of residents in Kea‘au speak languages other than English at home. These numbers are indicators of the social diversity one can find throughout the Puna district; however, it is important to factor in that there are people living in Puna who are not interested in or willing to register their data in community surveys and census polls. Kea‘au offers education up through high school level, after the Kea‘au High School was built in 1999 to avoid overcrowding at Waiakea High School in Hilo and Pāhoā High and Intermediate School in lower Puna. As Kea‘au is so close to Hilo and is connected to Hilo through two large State highways, people who live there often work in Hilo, and traffic jams between Kea‘au and Hilo are common in the mornings and in the afternoons.

Southbound from Kea‘au on State Highway 130, also known as the Kea‘au-Pāhoā Road, several streets on the left-hand side lead into the most densely populated subdivision and CDP (Census Designated Place) in Puna: Hawaiian Paradise Park (HPP). On the right-hand side of State Highway 130 lies Orchidlands Estates, another subdivision. According to the American Community Survey (2019b), Hawaiian Paradise Park is home to 11,202 residents. Life in HPP can be idyllic, depending on which area you reside in. The lots closest to the coast often feature large, somewhat luxurious homes, while lots located further uphill can reflect a different side of the economy in HPP. According to the 2010 census by the US Census Bureau, as many as 29.9 per cent of residents living in HPP lived in poverty. However, in the American Community Survey in 2019, persons living in poverty was estimated to about 10 per cent, which, with reference to the statistical data, would mean that the poverty level in HPP has been reduced by almost 20 per cent over ten years between 2009/2010 and 2019/2020. HPP’s population number is dominated by residents of the category ‘White alone’ at 35.9 per cent, followed by ‘Asian alone’ at 26.7 per cent, ‘Two or more races’ at 23.2 per cent and ‘Native Hawaiian and Other Pacific Islander alone’ at 10.5 per cent. Additionally, ‘Some other race alone’ represent 3.4 per cent of the population and ‘American Indian and Alaska Native alone’ represent 0.4 per cent. Like the rest of the

Puna district, HPP is socially diverse, and is dominated by residents in the age group 18–65 years. The short commute time to Hilo of about thirty minutes makes HPP an ideal place to live while one is part of the workforce, as many of those who live in HPP have their place of employment in Hilo. Simultaneously, HPP, and the Puna district in general, have a reputation of being challenged with illegal activities, often involving drug trafficking as well as production of both marihuana (often referred to as *pakalolo*) and methamphetamine (usually referred to as ICE). These activities often lead to other types of illegal activities, such as violence, drug abuse, theft, vandalism and fraud. Especially challenging is the production and use of methamphetamine, a drug that when consumed in high dosages can precipitate psychosis, paranoia, rapid mood swings and violent behaviour. Violent crime happens occasionally in HPP, and in some cases, confrontations between residents, or residents and the police, have had a deadly outcome.

Further down in the Puna district, parallel to Highway 130, is a vibrant town buzzing with social life, Pāhoa Village. Pāhoa serves as the commercial centre of the lower Puna district, with a community centre, schools up to high school levels, medical clinics, a fire and police station, a pharmacy, grocery stores, restaurants, building supply stores, clothing stores, bars and gas stations, as well as a transfer station, a senior centre and several churches. Pāhoa is a CDP and is the home of about 800 inhabitants (American Community Survey 2019c). Pāhoa's population numbers are dominated by residents of the category 'Asian alone' at 35 per cent, followed by 'Two or more races' at 27.7 per cent, 'Native Hawaiian and Other Pacific Islander alone' at 21.2 per cent, 'White alone' at 15.4 per cent, and 'American Indian and Alaska Native alone' representing 0.6 per cent of the population. The poverty rate in Pāhoa is 23.6 per cent, and people there often live simple non-materialistic lives. In 2014, favourite local hangouts in Pāhoa included Kaleo's Bar and Grill, a Hawaiian American style restaurant with live entertainment and delicious food; Luquins Mexican restaurant³⁴, which also functioned as a sports bar; Boogie Woogie pizza; Black Rock Café; Pele's

³⁴ The building where Luquins was originally located tragically burned down in 2016 but has been rebuilt in another location in Pāhoa.



Figure 3.4: *Pele's Kitchen*, a Pāhoā restaurant with a colourful façade featuring words and graphics with references to life in lower Puna (2021 location). *Photo by Pele's Kitchen 2021, used with permission from Pele's Kitchen.*

Kitchen (see Figure 3.2); and La Hiki Ola Awa³⁵ Bar, which served kombucha and awa and often played reggae music that could be heard throughout the main street of the town. Pāhoā also featured a couple of clothing shops and some arts and crafts shops and was (and still is at the time of writing) home to one of the Big Island's *Island Naturals*³⁶ stores. *Island Naturals* is a successful local chain of health food stores that focus on local organic produce and health items. It was established by Russel Ruderman, Senator of the Puna district from 2012 to 2020, and is located in Pāhoā, Hilo and Kailua-Kona. Ruderman was instrumental in the passing of the plastic bag reduction bill on the Big Island in 2011, and his local politics particularly concern organic farming and sustainable lifestyles in the Puna district. Ruderman's interests in these issues are representative of many inhabitants of Pāhoā and Puna in general, who are often passionately concerned with sustainability and eco-friendly solutions, and care much for reuse and recycling as well as growing their own foods. They are also

³⁵ Hawaiian for kava, a Pacific Islands intoxicating drink extracted from the root of the kava plant.

³⁶ See <https://www.islandnaturals.com/> for more information.

engaged in the growing and consumption of organic foods, and many are politically opposed to genetically modified organisms (GMOs).

Lower Puna and the end of the road

Surrounding Pāhoa, mostly to the north and east, are other subdivisions that together define ‘lower Puna’. Some of these include Nanawale Estates, Hawaiian Beaches, Hawaiian Shores, Kapoho Beach Lots, Vacationland, Lanipuna Gardens, Leilani Estates, Kaohe Homesteads, Black Sands Beach Estates, Kalapana Seaview Estates and Kalapana/Kaimū. Most of these subdivisions are located in lava zones 1 and 2 and in very close proximity to, or directly on top of the East Rift Zone of Kīlauea Volcano. Some of the subdivisions, including Leilani Estates, Lanipuna Gardens and Kapoho, are located directly on top of the rift zone and are high-risk areas for eruptions from Kīlauea.³⁷ According to the *American Community Survey* (2019d), these subdivisions are inhabited mainly by people who fall under the category ‘White Alone’, and the poverty rate in, for example, Leilani Estates is at 26.3 per cent. Many who live in these subdivisions are self-employed and run small local businesses. Kaimū/Kalapana are the last residential areas located by Highway 130 before you reach Hawai‘i Volcanoes National Park, stretching south towards Ka‘ū. I have chosen to write the two place names with a slash in between, because both Kalapana and Kaimū were taken by lava flows in the 1990s, leaving only a few houses standing when the flow stopped. All other houses and properties were buried under several metres of lava, and the landscape beyond the houses and properties that remain features a vast slope of black and grey stripes of a‘a and pāhoehoe flows that have made their way from the Pu‘u ‘Ō‘ō vent and down to the ocean.

Kaimū/Kalapana is a place for social gatherings in lower Puna, and residents there have worked hard on re-establishing social life after the destructive volcanic eruption in 1990. Before the lava flows in 1990, Kalapana was dominated by Hawaiian and Japanese families; however, most of them moved further up in the Puna district as

³⁷ See Chapter 7 for more on this.

the lava took their homes. The eruption was a traumatising event for residents in Kalapana and Kaimū, and most of the original residents did not want to re-establish the villages. Most decided to sell the properties they owned there at a very low price. Combined with low property taxes, this attracted new settlers, often people who came to Hawai'i to 'find paradise'. Property sales in old Kalapana have encouraged the establishment of a new village built on top of the lava flow from the 1990s, mostly populated by new settlers (See Figure 3.5).

A Kanaka Maoli man who worked as a security guard in this area told me that the people who settle on the lava fields are not the same as the people who lived in Kalapana before the lava flows in 1990, they are new settlers who 'like to live off-grid and do what they want without being interfered by law enforcement'. The man told me about his friend, who's family owned a farm in Kalapana that was buried in the lava flows. The grandfather of the family had died five months after their farm was destroyed and the family insisted the cause of his death was grief over their lost livelihood and 'family legacy'. The man told me his friend's parents had never been back to see their property because their sorrow was too deep. The friend would inherit the property but did not know what to do with it as the value of the property was so low, and it represents 'a devastating bit of family history'. 'Those who lived here then would never rebuild here again, they know the lava would just come and take it all away again. I think these new settlers are crazy and stupid for building here', he told me. While I have heard this perspective on the new settlers of Kalapana by residents in Puna and Hilo before, it must be said that it seems as if the settlers have managed to create a local community in which solidarity and togetherness are core values.



Figure 3.5: New Kalapana Village. Photos by author.

The eruption of 1990 claimed all of Kalapana Village, except a property belonging to the now well-known Keli'icho'omalua family. This family has lived on their property since long before State infrastructure was established and was for many years headed by Robert Keli'icho'omalua Jr., or Uncle Robert as he was called by most people. Uncle Robert was dedicated to educating tourists and locals about the Hawaiian way of life, sustainable farming, self-sufficiency, sovereignty activism, Hawaiian kingdom law and the illegal overthrow of the Hawaiian Kingdom. He also promoted sustainable local produce through the *Kaimū Farmers Market* and the *Wednesday Night Ho'olaule'a*, a weekly Hawaiian style luau (feast) and market that attracts people from all over the Big Island. Another important place that was lost in the 1990 eruption was

Kaimū Black Sand Beach, a beach that functioned as something of a gathering centre for residents in the area. People would meet daily for fishing, surfing, swimming and other social activities, and it was a highly cherished part of Kalapana/Kaimū. In the years after the eruption in 1990, residents in the area have worked on reclaiming this beach, albeit in a slightly different location, by planting coconut trees and making pathways through the lava field and down to the ocean shoreline. Lower Puna features some of the most picturesque places on the Big Island, like the Kapoho-Kalapana Road (also known as the Red Road), Champagne Pond in Kapoho, Wai‘ōpae (Kapoho tide pools in Vacationland) and Ahalanui warm pond, a small bay heated by geothermal energy.³⁸ Natural saunas are also a feature of lower Puna, where caves formed by lava flows feature steam vents caused by the combination of water and heat from the volcano. Lower Puna is a stunningly beautiful area, and once you are there, you tend to forget how volatile the volcano is in this location – it is easy to develop an understanding for wanting to live exactly there.

Geothermal energy has long been a desirable energy resource in Hawai‘i, ever since King David (Kawika) Kalakaua and his attorney general William Armstrong discussed the geothermal potentials in Puna with Thomas Edison in 1881 (Szvetecz 2001). The first drilling for geothermal energy started in 1961, and after several different business ventures on geothermal energy were attempted, the construction of the Puna Geothermal Venture (PGV) began in 1991 (Szvetecz 2001, Iwashita 2017).³⁹ PGV is located on a property between Leilani Estates and Nanawale Estates and has been the source of major controversy in the years of its existence. According to Iwashita (2017, 11), PGV is owned and operated by Ormat, a ‘publically-traded Israeli geothermal development company’ headquartered in Reno, Nevada (US), and that sells the energy extracted to Hawai‘i Electric Light Company. Iwashita (2017, 35) argued

³⁸ At the time of writing, these places were still popular local recreation spots in Puna. Unfortunately, many were lost to the 2018 Lower Puna Eruption.

³⁹ See Ann M. Iwashita’s doctoral dissertation *Geothermal Potentials in Puna, Hawai‘i: How Pele Teaches the Spaces Between* (2017) for a deep analysis of the extraction of geothermal energy in Puna. See also Annie Szvetecz MSc dissertation *Geothermal energy in Hawai‘i: an analysis of promotion and regulation* (2001) for more details.

that there were (mainly) two sides of the discussion when the venture was in the planning process.

One side, those in favour of geothermal energy extraction, argued that this was a ‘no brainer’, as geothermal classifies as a “clean” form of energy, producing comparatively little of the carbon and methane emissions of fossil fuel-fired plants that are responsible for the degradation of the ozone and the rapid warming of the earth’. Additionally, the pro side argued, geothermal energy extraction would provide Hawai‘i with jobs, keep electricity costs down and benefit Kānaka Maoli ‘through land trust royalties equalling 20% of all State geothermal mineral rights earnings transferred to the Office of Hawaiian Affairs (OHA)’ (Iwashita 2017, 35–36). Geothermal energy is a renewable source of energy that would also reduce the state’s dependency on imported oil and coal.

The con side of the debate argued that ‘geothermal energy developments are dangerous to people and degrading to air, water, earth, sea; and that extraction of geothermal heat is theft of Pele’s breath, is sacrilegious, would extinguish the heat resource, and would lead to the passing of a Hawaiian way of life’ (Iwashita 2017, 36). As will be argued in the following chapters, from an indigenous Hawaiian perspective the drilling of wells in search for geothermal energy sources, or for other purposes such as redirecting lava flows, involves piercing the flesh of Pele. Obviously, this is deeply problematic for the indigenous people. Regardless of the controversy on geothermal energy extraction in Puna and the arguments from the con side of the debate, the Puna Geothermal Venture (PGV) was constructed and has been operating in Puna since 1993. Residents in lower Puna have voiced their concerns about the risks of PGV on several occasions, including when, during a powerful storm in 2014, the plant had an uncontrolled release of hydrogen sulphide, which caused health problems for residents in the area around the plant (Iwashita 2017).⁴⁰ PGV continues to give rise to controversy, and according to Iwashita (2017, 18), geothermal energy production is not as sustainable as it is marketed to be. ‘Production through contemporary energy technologies makes the resource remarkably short-lived; the quality of the environment

⁴⁰ See Chapter 5 for more details.

is not improved from its existing state; and the lives of people – different communities, in different ways – are put at risk to loss of life’. Resistance against PGV and their operations does not only come from Kānaka Maoli, but from all types of residents in lower Puna.

Social life in lower Puna

As indicated through the historicities of social life in Puna and in the census data, the people of Puna are diverse and the district is home to residents of different lifestyles and needs. The different people living in lower Puna are often referred to by other Big Islanders as ‘hippies’, federal runaways, ‘punatics’, Hawaiian sovereignty activists, ‘locals’, pakalolo (marijuana) farmers, ‘meth-heads’ or ‘alternativists’. The State of Hawai‘i often refers to people in lower Puna as ‘the lower Puna community’, which indicates a collected social group, while in my experience, lower Puna is a much more socially fragmented place with its differences in ethnicity, class, and political and spiritual orientations. This social fragmentation is situational, which I will discuss further in Chapters 5 and 6, and can make management of volcanic volatility in lower Puna challenging. However, the social lives of residents in lower Puna are remarkably flexible when they face great challenges, for example volcanic eruptions or hurricanes, as will be discussed in Chapter 5, and Puna residents take great pride in being part of a society where they ‘have each other’s backs’ when critical situations occur.

Since Pāhoa is the urban centre of this area, it is a place where all the different people of lower Puna can meet. Other residents on the Big Island define Pāhoa as primarily a ‘hippie community’, a generalisation about the lifestyles and spiritual orientations of the residents in Pāhoa, and, more broadly, in lower Puna. While I have met lower Puna residents who were part of the original hippie movement in the 1960s-70s and now live their retirement days in Puna, the ‘hippie’-label usually refers to young people who themselves often identify with the type of lifestyles and spiritual orientations associated with *New Age*. According to philosopher of religion George D. Chryssides in the first chapter of *Handbook of New Age* (2007), the hippie movement consisted mostly of ‘anti-establishment’ youth. Chryssides (2007, 8) argued that there is a connection between the hippie movement and the growth in popularity of New Age

in the 1970s (2007). He argued that a development of New Age possibly started as early as between the First and Second World Wars (2007). While not engaging in a discussion about the historicity of New Age here, I bring it to attention because people in Puna are often ascribed a lifestyle and beliefs in accordance with New Age philosophy and spirituality. Borrowing Chryssides' (2007, 22) definitions of New Age, I argue that people who identify with these values, beliefs and lifestyles can be found throughout the Puna district:

There is an optimistic view of the self, even to the extent of [identifying] the self with a 'God within', allied to which there is a belief in the desirability of self-improvement or 'empowerment', which manifests itself in a variety of ways. One such manifestation is the emphasis on health and healing—physical, mental and spiritual—which expresses itself in alternative medicine, as well as spiritual practices such as various types of meditation. Belief in the self's potential also incorporates the development of personal skills such as positive thinking, assertiveness and methods of wish-fulfilment. There is a questioning of traditional authority, particularly the long-established authority of the male-dominated Christian Church. The questioning of traditional religion results in an eclectic approach to a variety of forms of religious expression, ranging from eastern spirituality to neo-Paganism and shamanism, as well as an uptake of practices such as divination, mediumship and witchcraft, of which the Church has characteristically disapproved. In place of obedience to authority, there is a heightened emphasis on activities associated with the 'right hand side of the brain': intuition, creativity, imagination, compassion, healing, the celebration of the feminine, and so on.

I argue that one of the reasons why 'hippie' lifestyles flourish in Puna are the parallels we can draw between New Age and Hawaiian beliefs, especially with regards to the New Age interpretations of *love* and *environment* in comparison with the Hawaiian *aloha* and *'āina*. As mentioned in Chapter 1 (page 27), *aloha* is a complex social concept in which reciprocity is key. The management of a balance of *aloha* is important to sustain harmony in social relationships or relationships between people and environments. I argue that people who identify with the premises of New Age

spirituality readily attach themselves to the concepts of *aloha* and *‘āina* when moving to Puna, but initially have a ‘Western’ approach to these concepts, translating them to merely ‘love’ and ‘land’ or ‘nature’. As they familiarise themselves with the Hawaiian concepts of *aloha* and *‘āina* they develop their understanding of these and often attempt to adopt them, as Hawaiian definitions of these concepts are even more in tune with their spiritual orientation than ‘Western’ notions of love and nature. While some manage this transition, others end up with an approach to *aloha* and *‘āina* that is somewhat a mix of mainly ‘Western’ and Hawaiian understandings of these concepts.

While the New Age definition of love is different to the Hawaiian *aloha*, I believe the ‘authenticity’ the Hawaiian *aloha* represents, and the philosophy associated with the concept is attractive to ‘hippies’ in Puna, who are often concerned with love as ‘the compassion for other beings’. I dare argue that the Hawaiian concept of *aloha*, although often misinterpreted or simplified, represents for many non-Hawaiians a desirable ‘way of life’, in which living in harmony with one’s surroundings is a key element. This desire has unfortunately led to gross exploitations and cultural appropriation of the Hawaiian *aloha* for commercial purposes by small- and large-scale actors around the world, in both personal and business-related endeavours. But, in Puna, it is my impression that Kānaka Maoli and ‘locals’ attempt to teach ‘hippies’, newcomers or tourists about *aloha* by showing *aloha*, and that it is possible for this complex social concept to impact and regulate social relationships across groups and ethnicities.

As discussed in Chapter 1 (page 14), *‘āina* is the Hawaiian word for ‘land or earth’, and the first syllable of the word, *‘ai*, means ‘to eat’ (Pukui and Elbert 1986). The concept of *‘āina* has been an important ingredient in sovereignty struggles in Hawai‘i and has often been used together with the word *mālama* (to take care of, tend, attend, care for, preserve, protect, beware, save, maintain) to communicate one of the key aspects of Hawaiian sovereign rule over the lands of Hawai‘i. *Mālama ‘āina* can be translated to ‘to care for/preserve the land’ and is a relatable concept for ‘hippies’ in Puna that are engaged in preserving and protecting natural environments and have spiritual relationships with what they call ‘Mother Earth’. The state motto for Hawai‘i, as declared in 1843 by King Kamehameha III, is *‘Ua mau ke ea o ka ‘āina i ka pono* -

the life of the land is preserved in righteousness' (Kauanui 2018, 28). The word *ea*, translated in the previous sentence to 'life', can also be translated to sovereignty, rule and independence, and the Hawaiian state motto is commonly used by sovereignty activists (Pukui and Elbert 1986, Kauanui 2018). The motto, or expression, is the main content of a well-known Hawaiian protest song titled *Hawai'i 78*, written by Mickey Ioane and recreated by Hawaiian musician Israel 'Iz' Kamakawiwo'ole. The song is a call to all Hawaiians to choose to identify as Hawaiian instead of American and live a life in accordance with the beliefs of their ancestors. It is a song that is favoured by many, and whenever I have heard it played at the previously mentioned Wednesday Night Ho'olaule'a in Kalapana/Kaimū, Puna residents of all types have fallen silent and listened carefully.

I argue that Hawaiian sovereignty and indigenous rights struggles are also topics that 'hippies' in Puna identify with, as they are concerned with human rights issues and are activists within these problematics themselves. Thus, 'hippies' in Puna are often allies of Hawaiian sovereignty movements, which again strengthens the relationships between them and Kānaka Maoli, although, I must add that these relationships are not necessarily conflict free. An example of harmony and common ground between people of these two different social groups is a ceremony I attended in Kaimū, in which lower Puna residents established what they called a 'Star Visitor Sanctuary' on the lava fields right outside the village. The sanctuary was a circle measuring about thirty metres in diameter with a somewhat flat lava rock surface that was bordered by encircling metal poles with rope tied around them and marked a space on the lava field in which extra-terrestrial visitors could land safely and know that they had arrived in a friendly place. In front of the circle was a sign that explained what the circle represented, and that it was part of the sovereignty movement *Kingdom of Hawai'i*. Two 'hippies' were playing didgeridoos and 'singing bowls' on one side of the circle, and above the circle and the crowd of participants flew two drones that represented the spaceship aspect of the ceremony.

The ceremony started with a prayer performed by 'the Minister of Foreign Affairs' in the Kingdom of Hawai'i movement, followed by a blessing and purification ritual by Kānaka Maoli. After this, a spiritual leader representing a New Age

perspective led a prayer to ‘spirits of the north, east, south and west, mother earth and father sky and the spirits of the stars’, before inviting an all-female prayer group who identified as *Women of the Womb* to bless the platform through ritual dance and singing. The ceremony ended with a declaration from the Kingdom of Hawai‘i representative about the meaning of the platform and of how the idea to create it was rooted in Hawaiian cosmology, which according to the representative started with ‘beings who came from the stars’.

The ceremony was particularly fascinating to me, as Kānaka Maoli stood side by side with New Age oriented ‘hippies’ and even a couple of people dressed in tin foiled hats, and they had found a common project with somewhat a common spiritual ground, which they executed together. I believe the reciprocity and creation of alliances that builds from *aloha* in Puna and people’s willingness to find common ground despite differences make these types of collaborations possible. Social relationships between especially Kānaka Maoli, ‘locals’ and ‘hippies’ are continuously negotiated through these principles, and *aloha* and *‘āina* are concepts that enable these negotiations. That is not to say that relationships between these different groups are uncomplicated, and it is important to note that tensions between them can challenge the seemingly harmonious togetherness illustrated in the example above.

While some of the people identified by other Big Islanders as ‘hippies’ would claim a belonging to New Age, others would not be interested in describing their spirituality or lifestyle as anything that fits within a set framework of something that can be defined (however ‘free’ or ‘loose’ that framework might be). I believe the reason for this is an approach to life as lived in a way they would refer to as *completely free*, i.e., free to do what they want and to believe what they want, in line with Chryssides’s ‘anti-establishment’ argument above. This does not mean that they do not believe in anything, but rather that they mix and match available beliefs. This sort of mixing and matching often involves Hawaiian beliefs, New Age, Buddhism, Christianity and different vernacular forms of beliefs, which I will further discuss in the following chapters. Another possible reason why it is important for some in Puna not to be categorised as a practitioner of one belief or the other is that the already set (American) categories for different social groups in Puna are too narrow and exclusive (see

examples from the census data above). The need to keep oneself outside of or above these categories might be a form of protest against the American categorising system that often involves genetics. This system enhances a range of socio-political challenges, especially for those who identify as Hawaiian but who are not Hawaiian enough genetically to be eligible for different benefit programmes reserved for Kānaka Maoli (see Kauanui 2008 for more on this issue).

Generally, people in Puna are, although sometimes a bit sceptical, friendly towards strangers; family oriented; and often claim to have a strong ‘sense of community’. Following Bradshaw (2008, 5), a broad definition of *community* is ‘social relations that bond people’. Community can also be a measure of perceived qualities of interaction. In Puna (and in the US in general), community is a regularly used expression when addressing a group of people who are engaged in social relationships based on their residency in a district or defined place. Community can sometimes be used when referring to everyone who lives in Puna, i.e., *the Puna community*, or to more localized groups of people, i.e., *the Pāhoā community*. It can also be based on, for example, interests, profession, politics or religion to name a few and, following Bradshaw (2008), not necessarily determined by place. Examples are *the Hawaiian community*, *the hippie community*, *the farming community* and *the surfer community*, all of which in the Puna district and beyond. Community connotes belonging or membership and involves expectations of reciprocity, responsibility and empathy in relation to others who belong to the same community. In Puna, having a ‘strong sense of community’ means being someone who is committed to the social relationships they have with others in a defined community as well as being engaged and helpful. Community in Puna is usually understood as somewhat separated from ‘the state’, and when, for example, representatives from HCCD refer to work they do in Puna, they usually define it as ‘going out to the communities’ and ‘working with the communities on their own terms’, sentences I heard multiple times during a series of community meetings in Pāhoā in 2014. I saw examples of Puna residents’ ‘sense of community’ during and after the (previously mentioned) powerful storm of August 2014, when residents in lower Puna worked together and helped each other with the management of fallen trees and power lines as well as tackling a lack of food, water and cooling

possibilities. Neighbours would help each other, and those who possessed power tools and trucks would drive around the subdivisions and help everyone they could with clearing driveways and properties of trees and debris from the storm. I will elaborate on this event in Chapter 5.

People in Pāhoa and lower Puna often lead simple non-materialistic lives with a focus on sociality, gatherings, ocean activities, gardening and farming. Many have small businesses within the tourism industry like holiday rental properties, BnBs, yoga retreats, restaurants and tour companies. As already mentioned, many people in Puna have low incomes and over 20 per cent live below the poverty limit, including, for example, those who have left behind a ‘stagnant’ life in the continental US and travelled to Hawai‘i to live a financially freer life with more possibilities of ‘making it on your own’. This is an emic concept I have often heard mentioned when asking people why they have moved to Puna. ‘Making it on your own’ does not imply that you ‘make it’ by building a corporate career or acquiring substantial financial assets, which I have been told have been measures of success in their previous lives on the mainland. Rather, it means creating a life for yourself which involves growing your own food or working on someone else’s farm in exchange for accommodation and diet, for example by woofing.⁴¹ For some, especially young people, this is initially a somewhat whimsical lifestyle which can develop into something more established and permanent if they manage to start their own businesses in, for example, sustainable small-scale farming and food production, arts and crafts, or manufacture of health and beauty products. Some establish illegal businesses, such as pakalolo farming.

Kalapana/Kaimū hosted a ‘sustainability festival’ in 2014, where local entrepreneurs who had managed to achieve a comfortable financial situation in combination with an ‘island lifestyle’, which usually refers to a slower pace, stress-free environment and more spare time, presented their success stories. The different speakers at the festival lectured about organic farming; about how to escape ‘corporate America’, a term often used in Hilo and Puna to describe the world of corporations and

⁴¹ Woofing is an acronym-based verb, which is developed from the act of working on organic farms. The acronym, WWOOF, derives from ‘World Wide Opportunities on Organic Farms’ or ‘Willing Workers on Organic Farms’.

big business in the United States, arguing it is bad for your personal health; about bee keeping and honey production; about small business venturing; about how to be more involved in local politics; and about community security. The focus of the festival was sustainability in doing something that benefits yourself, without becoming a liability to other residents and the physical environments of the Big Island. A common opinion among residents in Puna is that ideally you should give back to ‘the community’ a little more than you take, and if you are unable to give back, you should not take much at all. This perspective is further demonstrated in many of Puna’s residents’ ‘off-grid’ styles of living, where they live on properties that are not connected to State infrastructure, including an electrical grid, water grid or internet grid. Rather, they collect their water in large catchment tanks, install solar technology for power on their properties and access the internet via satellite or 4G technology; they strive to be as infrastructurally independent as possible. Simultaneously, however, many residents in Puna are dependent on some sort of welfare programme provided by ‘the state’ such as SNAP, or the Supplemental Nutrition Assistance Program, more commonly known as ‘food stamps’. Food stamps and coupon shopping are common in Puna, in fact so common that even the farmers markets accept food stamps and coupons as payment for goods. According to the State of Hawai‘i Department of Human Services (2018), SNAP helped put food on the table for 193,565 Hawai‘i residents in 2014.

People in Puna have a complicated relationship with ‘the state’. While most Puna residents I have met express a desire to be independent from different State services, and many express a concern about possibly being under surveillance by ‘the state’ when using State infrastructure, many are simultaneously dependent on State services. Likewise, the State of Hawai‘i, and more specifically, Hawai‘i County on the Big Island, has a complicated relationship with people in Puna. Puna is a challenging area to manage for Hawai‘i County, as it is populated by people who generally do not like being managed. This anarchic attitude can pose challenges for different Hawai‘i County offices, especially in their work with Puna residents in regard to possible threatening events caused by hurricanes, earthquakes, tsunamis and lava flows. Generally, people in Puna have good intentions in their relationships with fellow residents, but nevertheless illegal activities, poverty and substance abuse are challenges

residents face in their everyday lives. These factors, combined with the high cost of living in Hawai‘i, create conflicts between Puna residents, and between residents and Hawai‘i County. The Hawai‘i County Police Department is often called out to domestic disputes, drug related conflicts and incidents where weapons like guns, knives or machetes are used in conflict ‘solving’. Sometimes these conflicts have a fatal outcome, where citizens and police officers become victims of situations that escalate and ‘go bad’.

One summer day in 2014, I was spending time with ‘Mark’, an American man in his mid-40s I had met through a Meetup-group⁴² at Isaac Hale Beach Park, or Pohoiki, a recreational park and favourite local surf spot along the lower Puna coastline. ‘Mark’ lived in Leilani Estates and told me that someone had broken into his house and stolen all of his valuable possessions the previous day. While originally residing on the North Shore of Oahu, he had come to Puna because he wanted to escape stress connected to his life situation. While renting out his house on the North Shore, he purchased a much cheaper home in Puna, and this opened up his finances enough for him to spend more time with his kids and more time relaxing. However, he told me he missed the security he felt in his neighbourhood on the North Shore, where he claimed he never locked the door to the house. After the break-in, he organized a neighbourhood watch programme to feel more secure in the neighbourhood.

Another story of an unlawful incident was told to me by ‘Robert’, a man in his mid-50s, who was involved in a robbery at Pohoiki in lower Puna. He told me about his current male partner, and I asked him some questions regarding local attitudes towards the LGBTIQ+ community in Hilo. He said that the LGBTIQ+ community were in a good place, and he felt safer now about being openly gay in Hilo. However, he had not always felt so safe. The story of the robbery started on a beautiful Puna evening at Pohoiki. The sun was setting over the mountains to the west, and a group of

⁴² Meetup is a social medium where one can organise face-to-face meetings between people who are looking to engage in the same activities. Through Meetup you can, for example, meet someone to learn a new language, join a group who cooks food once a week, or, as I did, join a group of people wanting to go on adventures around Hilo. An example of activities the club did together was an exploration of a rather well-known Hilo sight: an old lava tube system called Kaumana Caves, located just off Kaumana Drive above Hilo on the way towards Saddle Road.

friends were enjoying the last hour of daylight in this popular recreational spot. As the man was walking across the parking lot after the sun had set, he was attacked by a group of young men and stabbed with a knife multiple times in his buttocks and upper thigh. He raised the hemline on his shorts to show me the scarring on his upper thighs. He told me the people who stabbed him wanted money, but he did not have anything on him as he had spent the whole day at the beach, in and out of the water. When he told them that he had no money, they stabbed him again and left him bleeding on the ground. The man told me he managed to get to the hospital with help from his friends but has gone through multiple reconstructive operations to mend the damage done by the stabbing. He also told me that even though this assault was explained as a robbery, he felt certain it had much more to do with his sexual orientation than his lack of money.

As a Caucasian woman in my 20s and early 30s during my several stays in Hawai'i, I have been advised and warned on many occasions about walking around alone at night in both Hilo and Puna. Personally, I have never experienced a situation in either place where I have felt unsafe, but I have heard stories of young women who have been sexually assaulted and young men who have been victims of violence because of their skin colour. Alamea, a friend of mine and Kanaka Maoli woman in her early 30s, told me once how angry she got at the 'local boys' who thought it was acceptable and even good fun to harass white women and men, solely based on their skin colour, and that she used to call them out on it and yell at them if they misbehaved. These forms of racial and ethnic tensions are common in Hilo and Puna, and they contribute to social distancing between ethnic groups. Simultaneously, those who are concerned with following the principles of *aloha* attempt to advocate acceptance of differences in ethnicity, sociality or class, and engender mutual respect between residents regardless of these factors.

The next and final part of this chapter leaves the populated areas of Puna behind and moves into the rugged and rougher landscapes of Puna that are mostly located within HVNP. This last part is mainly descriptive in that I use an example of a camping trip in remote areas of HVNP to set the scene for this environment. The camping trip is a typical example of how residents in Hilo and Puna use the park for leisure activities, and as safe hiking in these volcanic environments is challenging and is wisely done

with the company of someone experienced, this type of activity is not usually included in tourists' activity itineraries.

Pele's plains – From the end of the road at Kaimū to the unwelcoming desert of Ka'ū

South of Kalapana/Kaimū lies a vast volcanic landscape with lava flows featured as stripes of different shades of grey, brown and black from the top of Kīlauea and down to the ocean. The landscape visibly represents Kīlauea's presence in the physical landscapes of the Big Island, and it stretches from the end of Highway 130 south to Ka'ū across a large section of land that is administered by Hawai'i Volcanoes National Park (HVNP). The section of this landscape that is included in HVNP is protected under the guidelines of the US National Park Service (NPS). This means that the area is protected against urban development and monitored and cared for by NPS's employees and volunteers, and that people who wish to visit the park need to follow certain guidelines. HVNP requires an entrance fee for visitors, which in 2014 was about 10 dollars for a single day pass, but at the time of writing, the fee system had changed, where the only option for one-day visitors, in one personal vehicle, was to pay 30 dollars for a seven-day entry. If you wish to camp in remote areas in the park, you must acquire a camping permit, not only to contribute financially to the park but also to regulate the flow of people to protected areas, and inform the Park Service about your location in case of an emergency. As an example of Hilo and Puna residents' interaction with the volcanic landscapes of the east side of the Big Island, the following excerpt from my field notes describes a hike and the first day of a three-day camping trip in HVNP, where I joined a group of 12 young adults from the Big Island headed for the two remote coastline destinations Keauhou and Halapē:

Steep cliffs, rocks and volatility, March 2012

We woke up from an alarm clock at 4.30 in the morning. Outside, the night cast darkness over the lush property, where coqui frogs and loud insects were singing along in the trees or on strains of grass on the ground. The light was already on in the kitchen. Kahena, a Kanaka Maoli man in his late 20s, and his mother were up, preparing

breakfast for everyone. The day before, our group of 12 people, all friends, and colleagues of my housemate, ‘Sarah’, had travelled up to Kahena’s family in Volcano Village, a 45-min drive from our home in Hilo. Their house was located at the end of a long dirt driveway leading down from a main road in the native rainforest and was surrounded by lush greenery. Outside the house, on the front *lanai* (porch), hiking gear was spread out, revealing the activities awaiting us all the next morning. Heavy-duty hiking boots, large backpacks, water containers and walking sticks are all good companions on the journey we were making in the early hours of the next day. We had spent the evening before with Kahena’s mother, eating homemade stew and watching the hula kāhiko performances of the Merrie Monarch Festival⁴³ live on TV, while the physical festival was held at the Edith Kanaka‘ole Stadium in Hilo. The dancers were dancing a ‘Pele hula’, a type of hula dedicated to Pele, and moved in a synchronized motion that resembled a lava flow crawling down a mountainside. They wore costumes with the colours of lava and fire and flower garments put together by flowers and plants found in volcano country. The performance set the mood for conversations about Pele and our upcoming journey across her lands, before we drifted off to sleep.

We had to get up early to reach the start of our hike through various lava fields before the sun came up, as the sun can be your worst enemy when hiking in these open spaces on the east side of the Big Island. With no shelter from sun, rain or wind for five to six hours, and considering the difficulty of finding one’s way on the dark lava in the darkness of the night, it is wise to start walking just as the sun is starting to rise. After eating a good breakfast, we left the house and headed towards HVNP in three cars. Kahena and two others in the group had retrieved camping permits for Keauhou shelter, located on the southeast coast of the Big Island, from the Backcountry Office in HVNP two days prior to our trip. HVNP requires hikers to buy permits in order to fund maintenance at the camping shelters, which are equipped with biodegradable toilets, a water catchment and fire pits, as well as to be aware of who and how many are camping at the different camping grounds in the park at all times. Our original plan was to camp at Halapē, a beach south of Keauhou which brings out ambivalent feelings in Big Islanders, as this was the site of a tragic event in 1975 when an earthquake

⁴³ The Merrie Monarch Festival – named after King David ‘Kāwika’ Kalākaua, also known as the Merrie Monarch – is the most recognised hula festival in the world and is held annually at the Edith Kanaka‘ole Stadium in Hilo. The festival is extremely popular, is of great importance to the continuation of the hula tradition and tickets to the live event are difficult to come by.

generated a tsunami that destroyed Halapē and took the lives of two campers. When conversing with my *kumu hula* about going on this trip, she wondered why in the world I would want to go to Halapē, as for her the place only represents loss and sadness, and she remembers well the tragic event of 1975. Halapē is located directly under the Pu‘ukapukapu *pali* (cliff), a high, steep, rocky cliff that dives straight into a little lagoon at Halapē Iki, a smaller beach located just south of Halapē. When the earthquake happened in 1975, the campers at Halapē ran towards the beach as large rocks started falling from Pu‘ukapukapu. As they reached the shoreline, they noticed the sea level rising, slowly at first, then rapidly, before they were washed inland and dumped in a deep pool where they were violently thrown around by the massive forces of the water. One of the campers drowned in the pool, and another was swept out to sea and was never recovered.

Several groups of campers had been lined up in front of the HVNP Backcountry Office when Kahena went to get our permit, and one of them had acquired a permit for the Halapē shelter before he managed to get a hold of one. Thus, we would instead stay at the shelter at Keauhou, located slightly northeast of Halapē. One of the groups of campers was travelling on horseback, which to many in our group seemed cruel to the animals considering the rough paths they were about to embark upon. We met the group and their restless horses after driving about 15 minutes from Kahena’s house, through the entrance to the park and down to a parking lot located below Mauna Ulu, a cone-shaped mountain formed by the 1969-1974 eruption from Kīlauea’s Ulu vent. Our starting point, Mau Loa o Mauna Ulu, was located right next to the parking lot where the beginning of the Keauhou Trail down east towards the ocean was barely visible on the dark lava rock. We parked one of the cars in the parking lot below Mauna Ulu and the other two cars in a parking area down by the coast, as we would hike the Puna Coast Trail along the coastline on the way out from Keauhou. As we stepped on to the trail, Kahena performed a Hawaiian chant asking Pele for permission to enter the area and for safe passage through the sharp lava rock formations down the slopes to the ocean. After chanting, he continued with informing everyone about the volatility of the environment we would be staying in for the next few days. He emphasized that if we felt the ground shake, we must drop whatever we were doing at the time and run as fast as we could towards higher elevations, as an eventual earthquake was likely to cause a tsunami. We took a group picture and then stood still and in silence for a while,

breathing in the cool, slightly sulphuric thin air of higher elevation, before embarking upon the hike through a narrow stretch of ‘ōhi‘a forest.

The trail was clearly marked with *ahu* (rock piles), the next one always visible when passing one. The tradition of building rock piles, or cairns, is not limited to the Hawaiian Islands, and can be seen many other places in the world (for example in the Himalayas and the mountainous regions of Scandinavia), the purpose often being to create visible landmarks to make navigation across plains and through mountain passes easier to travellers. The *ahu* found in the lava fields in Hawai‘i often have a piece of white coral on top of all the black rocks to make it somewhat possible to spot them in the dark. While we hiked through the ‘ōhi‘a forest with no visible trail because the ground was solid pāhoehoe lava rock, the *ahu* provided us with great directional guidance. Exiting the forest further down the slopes, a spectacular view of an open, rough and mighty landscape appeared, and Pu‘ukapukapu, the cliff which rises straight up from the beach at Halapē Iki, stood tall in the far distance, marking our destination. The landscape before us stretching down to the coast looked dry and windswept. The different lava flows of Kīlauea were clearly visible along the ridge like dark black, brown and grey rivers plunging into the ocean. On the ground, the path had turned into finely ground sand with elements of sharp lava rock poking up, vigorously challenging our feet and legs with keeping our balance, and it felt as if the soles of our shoes were shaved off little by little as we walked on. The sun had risen fully, and the air got hotter as we continued walking down towards the ocean.

In this section of HVNP the lava flows are old enough for grass and shrubbery to have grown up from the nutritious volcanic soil, but there are no trees or other types of shade where one can hide from the sun. Thus, when hiking in this environment a large hat made of straw/plant fibres is, if not an absolute necessity, extremely appreciated. As our legs were getting increasingly shaky from walking down the steep slopes, we slowed down a little to make sure nobody would take an unfortunate step and twist their ankles or knees. A part of the group had chosen a faster pace, and about halfway through the hike the rest of us caught up with them because one of them had twisted her ankle so badly she could not walk on it. Kahena and one of his friends decided to take turns carrying her down to the campgrounds, hoping her foot would heal enough for her to manage the hike out along the coastline in a few days. As they were already carrying camping gear, food and water for a several days long trip, the extra weight of a person was challenging, but at this point in our journey, options were

limited. After redistributing some of their camping gear between us to relieve them of some weight, we continued towards the coast.

In and along the grassy and rocky path, we encountered several types of critters and insects, including praying mantis, centipedes, different types of wasps, ants and butterflies. Other than these small non-human encounters, we did not detect much fauna during our hike. With our legs shaking tiredly, we reached Keauhou a little after mid-day, some five and a half hours after we had started walking, and made our way down towards the ocean where we would set up camp. On the other side of a section of dense shrubbery, a beautiful black and white sand beach surrounded by a lush mix of invasive shrubs and hala trees⁴⁴ caught our eyes. We noticed that currents in the water had made black and white patterns in the sand, as we walked across the beach to a section of shrubbery where we would set up camp. On the other side of what initially seemed like a wall of plants, we found a sheltered space with a fire pit in the middle and several good spots for setting up tents. A few sturdy trees could be used for hanging up hammocks and for hanging up backpacks to lessen the possibility of rats and mongooses finding and eating our food. We set up our tents safely distant to and in a circle around the fire pit, making sure the mosquito nets were securely closed as we left them. As the sun set, the fire pit came to life, not just with flames, but also with cockroaches and centipedes. There were hundreds of roaches, most of them between five and ten centimetres long, and cooking on the fire came to be a challenge as the roaches would jump into our bowls of food as soon as we directed our headlamps away from the bowl. After one of the group members, a Californian man in his early 30s, unintentionally swallowed a cockroach after drinking from his cup, we all decided it was time to call it a night and retire to the comforts of our roach-free tents.

This trip was the first but not the last trip to remote locations in HVNP I participated in. When walking in this landscape, you experience several forms of challenges brought by this environment on the human physicality. Towards the end of this trip, I ran out of water and felt how fast the body is dehydrated in this environment, and on my next trip, the sharp lava rocks in combination with the heat of the sun, completely

⁴⁴ Hala is the Hawaiian name for the tree type *Pandanus*, a native tree in the Pacific region. The leaves of the hala tree (*lau hala*) are used in mat and basket weaving and in clothing and accessories, and the tree is of importance within the Hawaiian hula tradition.

shredded my hiking boots. On another trip, a part of the group I was with decided to start hiking in the middle of the night, became lost in the dark lava fields, and I had to ‘rescue’ and guide them back to camp to wait for the sunrise. With the knowledge of how challenging it can be to interact with this environment, it is even more interesting and impressive that humans have dwelled there and formed societies there in the past. Human settlements and Hawaiian *heiau* (temples) in these areas are evidence of human activity, and some remain in HVNP. Others, such as Waha‘ula Heiau located on the Puna coast within HVNP, have been buried by lava flows from Kīlauea.

While volunteering for an organization called *Friends of Hawai‘i Volcanoes National Park* (FHVNP or *Friends of the Park* for short) in 2014, I met Jamon, a young American man who served as an intern at the HVNPs Park Service in order to qualify for graduate school. Friends of the Park were in 2014, and still at the time of writing, involved in a forest restoration project where they plant native Hawaiian tree types, such as *koa* and ‘*ōhi‘a*, and remove invasive species, like blackberry bush, in response to a rapid decline in these species caused by over-exploitation or disease. Approximately once a month, the Friends of the Park gather in different locations in HVNP to work on this project. Jamon was a biologist, and while the rest of the group consisted of mostly retired men and women of different professional and social backgrounds, Jamon had somewhat of an authority in the group because of his involvement in the Park Service and his schooling. Simultaneously, he was viewed as the kid in the group, due mostly to his age, and he was the only person there who was not a volunteer. They referred to him as ‘the muscle’ of the group, as he was usually assigned the responsibility of carrying water from the road to the planting area, a task I offered to help him with.

Jamon was happy to share his knowledge of biology, and he taught me about the different species of plants we stumbled upon during the days of planting, and especially about how the native ‘*ōhi‘a* trees were dying. The ‘*ōhi‘a* is a culturally significant tree, as its leaves, buds and flowers are used in flower lei (garlands), headpieces and other costume pieces within the hula tradition, especially within the hula schools found on the Big Island. At this time, researchers had not yet concluded why the trees were dying, and as many of them were very old, a possible explanation

was simply that they had reached the end of their life span. However, Jamon told me, they suspected that the trees were being attacked by some kind of disease, which they were not capable of fending off. I have since learned that this ‘disease’, alarmingly named *Rapid ‘Ōhi‘a Death (ROD)*, is a fungus that has attacked the Big Island ‘ōhi‘a trees on a large scale. According to the University of Hawai‘i at Mānoa’s College of Tropical Agriculture and Human Resources (2017), hundreds of thousands of trees have been killed by ROD in the past few years. While it seems difficult to fight this development, the Friends of the Park are doing what they can to plant new trees, to ensure the future of the ‘ōhi‘a tree on the Big Island.

After one of our planting sessions, Jamon took me on a little tour of the park to show me things he thought I might not have seen yet. We drove down Chain of Craters Road and parked the car on the side of the road below some of the cliffs made by Kīlauea’s many eruptions. Hiking over several fields of ‘a‘ā flows, I was once again reminded of how difficult it is to navigate this landscape, and how hard the sharp rocks are on your shoes. After walking for about 15 minutes, Jamon stopped ahead of me. ‘This is it!’ he said eagerly, looking down from a small vantage point in the lava field. We had arrived at the ruins of a former Hawaiian settlement, one of the few on this side of the island that Kīlauea’s constant lava activity had not buried. We could see that the lava flows had moved around the structures, which were placed lower in the ground than the surrounding lava field, leaving a few of them visible to the trained eye. The structures were constructed with dark lava rocks and could easily be missed by someone who did not have the same awareness of their existence as Jamon did. As so many places on the east side of the Big Island, this settlement had been both destroyed and preserved by lava and served as evidence that there was a time in the human history of the Big Island when Kīlauea was not active on this side of the volcano. Whether the village was abandoned before the eruption that caused its destruction, or because of it, is unknown. However, it does bear witness to the fact that Kānaka Maoli lived in this seismically active area a long time ago, and the continuous presence of people in this harsh environment says something about how capable people on the Big Island are at persisting and adapting to it.

Leaving the site to return to the Park Service buildings, Jamon told me that whenever he had friends visiting him in the park, they always compared the environment with Tolkien's (1994/1999) *Mordor*, where the ever-active volcano *Mount Doom* continuously covered *the plains of Gorgoroth* in black sharp rocks. I told him I have heard the same interpretation by visitors. 'However, I said to Jamon, the pure evil described in Tolkien's *Mordor*, is far too one-dimensional for the godly powers and mana that represents Kīlauea'. Jamon agreed. Kīlauea, and with it, large parts of Puna and Ka'ū, is controlled by Pelehonuamea, a power that not only devours and destroys, but also creates and preserves land. Pele has many attributes and is depicted as a powerful, wild, warm, angry, irrational, merciful, jealous and passionate goddess, who often seeks communication with the people who live on her lands but is not known to be an evil or dark goddess. She is a vital and welcomed part of the historicities of places in Puna and Ka'ū, and with layers of lava, she continuously constructs and reconstructs the volcanic landscapes of the Big Island.

Summing up

This chapter has addressed the social and physical environments on the east side of the Big Island, with a main focus on the District of Puna. Following Armand's quote about 'lava land' at the beginning of the chapter, these environments are results of layers of geological and social change that together have formed the premises for life in these places over time. The reason for choosing 'layers' as an analytical 'backdrop' in this chapter is empirical; 'layers' is used by people in everyday speech when they describe what they refer to as the uniqueness of these places. These analytical tools refer especially to life in Puna, a highly seismologically active district where Pele directs the possibilities for human dwelling and settlements, and constructs and reconstructs the physical environments continuously. The historicities of Hilo and Puna, including events that have altered social and physical environments, have shaped these places to be socially, ethnically and physically diverse. People who live there have been born there; have moved from other places in the Hawaiian Islands because of high property prices; have moved from the mainland United States to live a different form of life; or have migrated from other countries in search for the 'tropical lifestyle' Hawai'i is

rumoured/advocated to accommodate. The social diversity of Hilo and Puna shown throughout this chapter adds an extra complexity when approaching what outsiders might refer to as a conundrum: Why would anyone choose to live on an active volcano? In the following chapter, I will address how people of different beliefs and social backgrounds relate to Pele as they try to understand and adapt to the volcanic environments they live in.

4

PELEHONUAMEA: THE GODDESS OF FIRE

Immanent spirituality and cosmology in practice

So long as the earth is alive with quakes and eruptions, Pele will live in Hawaiian hearts and minds as the personification of the natural phenomena of volcanic activity. She is perceived not through scientific experience but through the emotional experience created by the majesty and power of Hawai'i's volcanoes, and it is this experience that science alone cannot describe.

Herb Kawainui Kāne (1987/2013, 6)

Pelehonuamea, or Pele, the goddess of the volcano, is a mighty force in historic and contemporary Hawai'i. She is feared and respected, with the power to convert sceptics into believers and with a temper one is wise to acknowledge when moving about in her domain. Her physical presence is visible almost everywhere on the Big Island: as black lava rock under your feet; as glowing red lines on the slopes of Kīlauea; as a sulphuric scent in the air; as small earthquakes or trembles in the ground; as thin strains of

volcanic glass called *Pele's Hair*; and as volcanic glass drops, called *Pele's Tears*, found in cracks and dents on lava fields across the Big Island. Her presence in peoples' minds is evident in behaviour and conversations among Hawai'i's residents and visitors, especially on the east side of the Big Island, where she is a popular topic of conversation. 'Oooh, she is stirring today!' or '*Tūtū*⁴⁵ is on the move' are sentences often heard in conversations about daily life topics, such as the weather. As Kīlauea's frequent activities are representative of Pele's moods and movements, this particular deity has a physical presence that is impossible for most to ignore. Her powers over people and places on the Big Island are relative to peoples' beliefs in her, and this chapter will address questions about why and how people from diverse social groups and different spiritual orientations adapt a belief in and great respect for Pele.

In this chapter, I will focus on the complexities that lie in different definitions of Pele, whose identity is continuously defined and redefined by people in Puna, on the Big Island and from all over the world, in everyday life, ritual, politics and academia. I will look at Pele's place in Polynesian cosmology and history to place her in a pan-Oceanic context and to define her place in Hawai'i. I will also focus on the contemporary Pele and the meaning she holds in Hawai'i today. Who or what is Pele? What is it about Pele that has secured her survival in the historicities of the ever-changing social environments of the Big Island? In what ways do people believe in Pele? Considering the diversity of social environments on the windward side of the Big Island, what are the mechanisms drawing people with different cultural and spiritual orientations towards believing in Pele? In approaching the various relationships people in Puna have with Pele, I will focus on different forms of understanding and experiencing divinity. In this analysis, I am inspired by Kant's (1998) definitions of how divinity is experienced as transcendent or immanent, in which he argued that immanence is connected to the empirical and experienced, whereas transcendence is connected to metaphysics. I touch upon Deleuze's (1997) discussions about *pure* immanence, in which he presents a theoretical 'plane of immanence', a state in which

⁴⁵ According to the Hawaiian Dictionary (Pukui and Elbert 1986), *tūtū* or *kūkū*, is the Hawaiian word for grandparent. The full word for grandmother is *tūtū/kūkū wahine* – *wahine* is the word for woman/female – and the full word for grandfather is *tūtū/kūkū kāne* – *kāne* is the word for man/male.

immanence is not immanence to anything other than itself. Central to my analysis are Alfred Gell's (1995, 50) arguments about Polynesian cosmology as 'correlated with the religious attitude of immanence', where gods and divinity exist in the same world as humans. I argue that peoples' different approaches to and understandings of Pele in Puna are shaped by their experiences of divinity as either transcendent or immanent. In other words, I argue that Pele is experienced as either separated (or transcended) from one's sensory world or as dwelling within it (immanent).

I address the importance of looking at the basic principles of Polynesian cosmology in relation to Christianity or other religious beliefs in Puna to better understand why people relate to Pele in such different ways. To get to know Pele, her place in Puna and in Puna residents' cosmologies, this chapter will elaborate on the Hawaiian cosmological approaches to her arrival in the Hawaiian Islands and, more specifically, in Puna. Further, a summary of the most elaborate myth about Pele as well as recounts of personal stories about Pele encounters told to me by Big Islanders are included in this chapter to stress the complexities and importance of this contemporary deity. I will focus on *why* people in Puna believe in Pele, and on how Pele becomes instrumental in people's relationships with volatile volcanic environments. Additionally, I suggest that certain understandings of Pele create resilience towards disastrous outcomes of volcanic eruptions.

Methodologically, I have approached these issues through long-term engagement with different social groups in Hilo and Puna. My relationship with Pele and efforts to understand what she means to residents in Puna and Hilo started developing during fieldwork in 2009, when I was dancing hula in 'Hālau o Halia' in Hilo. In 2014, I continued to use the qualitative and phenomenological method of experiential ethnography mentioned in Chapter 1 to approach who and what Pele is, while simultaneously bringing these topics into everyday conversations with my interlocutors as often as possible. Additionally, I went to lectures, seminars and informal talks about Pele, held by different organisers in Hilo and Puna, and participated in frequent community meetings about an eruption during the second half of my doctoral fieldwork. 'Experiencing' Pele (and other characters, places or objects we were studying in hula class), was often the focus of my *kumu hula*, and thus, I have

spent much time walking about in both the easily accessible and not so accessible lava fields of the eastern side of the Big Island, both in Puna and in Ka‘ū, with and without the company of interlocutors, friends and family.

Who and what is *Pele*?

Pelehonuamea – Pele – is a female deity in the Hawaiian spiritual world, who is mostly associated with the volcanoes of the Hawaiian Islands. In the Hawaiian language, the word for volcano is *pele* or *lua pele*, and Pele’s name is used in reference to many volcanic phenomena. According to Ku‘ualoha Ho‘omanawanui, professor of literature at the University of Hawaii at Manoa (in Meyer 2018, 5),

Pele is not just the goddess of lava. Lava is Pele [...]. The lava flows basically reaffirm what our literature tells us – that the land is alive, that Pele is alive. When we talk about the lava being alive, it’s a metaphor for the earth itself being alive. The lava is Pele, the magma is Pele, the lava flow and then when the lava hardens, each you can just replace with Pele.

Pele is sacred to Kānaka Maoli and others who adopt a Hawaiian spiritual relationship with this deity, and those who believe in her offer her great respect. According to Beckwith (1970), Pele presides over a larger family of volcano deities, consisting of five brothers and eight sisters. Pele governs the activities of lava flows, while her brothers are associated with thunderstorms and volcanic activity and her sisters are associated with cloud formations. Today’s stories about Pele are rooted in a comprehensive oral storytelling tradition in the Hawaiian Islands, both before and after the introduction of the written word, post-contact in 1778. According to Ho‘omanawanui (in Dawrs 2010), there are two types of *Pele* stories: one type concerns stories that were published in Hawaiian newspapers between the 1830s and 1940s and have later become the popular Pele narratives;⁴⁶ the other consists of the secret stories, stories that belong to certain families or certain *hālau hula*. The second type of stories

⁴⁶ See Ulukau: Hawaiian Electronic Library at www.nupepa.org.

are deeply personal and sacred stories that you will not hear and cannot retell without permission from the owners of the story. If you are deeply involved in a *hālau hula* that focuses on Pele (as many *hālau* in Hilo, Puna and Ka'ū are), you might reach a level of belonging and understanding which enables you to hear some of these secret stories, but you might still not be allowed to retell them. I argue that there is a third type of Pele story: the everyday stories you hear from people who live on the Big Island and especially in Puna. These stories are often styled as typical 'ghost stories', where Pele is a supernatural being who haunts you if you do not treat her with the respect she demands. This dissertation does not include any secret stories, and the Pele narratives presented here are either publicly available or recounted with permission from the storyteller.

According to mythologist Anthony Alpers (1987, 385), Pele did not exist before people came to Hawai'i (i.e. the myth was born there), and thus stories of Pele that come from elsewhere are to be seen as having travelled *from* Hawai'i to other places in Polynesia. As Alpers (1987, 385) argued, 'Pele seems to have been created in Hawai'i in her own image'. Folklorist and ethnographer Martha Beckwith (1970, 168) supported this theory and argued,

[t]he Pele myth is believed to have developed in Hawai'i where it is closely associated with aumakua [ancestral spirits] worship of the deities of the volcano, with the development of the hula dance, and with innumerable stories in which odd rock or cone formations are ascribed to contests between Pele and her rivals, human or divine.

According to traditions recorded by historian and artist Herb Kawainui Kāne (1987/2013), the mortal Pele was torn apart in a battle with Nāmaka, her older sister, near Hāna on Maui, and with the death of her mortal self, her spirit was freed and became elevated to godly status. Given that this event took place in the Hawaiian Islands, it 'made her a goddess native to these islands' (Kāne 1987/2013, 13). Alpers (1987) argued that very few Polynesian gods exist without equivalents or relatives in some other part of Polynesia, but that Pele is an exception. Ethnographer and founding

member of *The Polynesian Society* in New Zealand,⁴⁷ James Lyle Young (1898), recounted a story of how Tahiti got its name as told to him by Marerenui of Faaiti Island in the Paumotu group. In the story, ‘Fakarawa’ (Fakarava), a low-lying coral atoll, called Havaiki at the time, has ‘lost its top from the anger of Pere’ – a reference to a volcanic eruption (Young 1898, 109). When the Polynesian demigod, Maui, caught Tahiti on his fishhook, he thought he had caught the top of Fakarawa/Havaiki, and thus called Tahiti Havaiki. In this story, Pere, described as a chief of Fakarawa, figures as the equivalent of the Hawaiian Pele (Young 1898, 110). Beckwith (1970, 178) argued that ‘[in] Tahiti, the uninhabited islet of Tubai, most northern of the group, is Pere’s home during her visits to the south. Ti‘ara‘a-o-Pere (Standing place of Pele) is the name of the assembly ground of the district of Tautira, on Tai-a-rapu’ (parentheses in original). The arguments of Alpers, Beckwith and Kāne, enable the possibility that godly volcanic agency in other parts of Polynesia, such as in Marerenui’s story, comes *from* the Hawaiian Pele, not the other way around. Based on these sources, it is reasonable to argue that Hawaiians created Pele, a character with godly qualities within the Polynesian cosmological system and brought her along when voyaging to other places in Polynesia as an explanation to and spiritualisation of volcanic activity.

Anthropologist Caroline Humphrey (1995, 135) discussed peoples’ recognition of ‘human agency and choice’ in interaction with the agency of what she calls ‘entities of the land’ in Mongolia. She argued that ‘the idea that entities in nature have their own “majesty” (*sur*) or effectiveness (*chadal*) which does not derive from human spirits but is simply there’ is a fundamental Mongolian attitude (Humphrey 1995, 136, parentheses and italics in original). Further she argued that ‘people have their own relationships with particular mountains, cliffs, or trees [...] which they feel to be especially influential in their lives’ and suggested that these relationships could be seen as different ‘views’ of interaction (Humphrey 1995, 137). Before I started researching who and what Pele is, I believed she belonged to the wider Polynesian cosmology and had regarded her a more pan-Polynesian goddess, brought with the navigators who voyaged from the Marquesas and Tahiti to Hawai‘i, possibly in several migration

⁴⁷ See <https://thepolynesiansociety.org/> for details.

waves from about 1000 A.D. (Kirch 2011). However, when becoming more familiar with Pele stories, I discovered that the great majority of them take place in the Hawaiian Islands, which indicated that Pele belonged there. This might explain why spiritual relationships with Pele have not diminished on the Big Island, as opposed to the fate of many other Hawaiian deities that derive from a broader pan-Polynesian cosmology. Many of the deities in Hawaiian cosmology were brought along with the Polynesian voyagers who settled in Hawai‘i, but it is reasonable to assume that the powerful and very active volcanoes of Hawai‘i inspired them to create a new deity that could explain this type of agency. I argue that this agency is part of the reason why people in Hawai‘i still believe in Pele, and why, following Humphrey (1995), people have their own relationships with Pele and interact with her from different ‘views’, or, following Scott (2013), different ontological perspectives. As Kāne (1987/2013, 7) argued: ‘Born in the awe experienced by an ancient people, her majestic presence is felt by those who visit her domain today’. Hawaiian scholar and *kumu hula* Pualani Kanaka‘ole Kanahahele (2011, xv) argued, that ‘Pelehonuamea [...] is one of Hawai‘i’s dominant female akua [deity] of past and present. For those of us here in the islands, it is impossible not to see evidence of Pele’s volcanic impression on our natural and cultural landscape’. When experiencing the powerful agency of the volcano, my interlocutors have told me they feel a deep respect for its characteristics, in awe of its extreme uncontrollable power and realise their small and fragile position in this environment. Often, this leads to a deeper spiritual orientation towards the environment involving a belief in Pele; this will be discussed in more detail towards the end of this chapter.

In Hawaiian (and Polynesian) cosmology, deities are manifested in environmental agency. Godly power and agency are tightly bound to land, sea and sky⁴⁸. As Beckwith (1970, 87) argued, ‘[i]t is often to secure the powers obviously belonging to the object, or to some other object, generally analogous in name or attribute, whose nature it is believed to share, that natural objects are worshiped as gods’. Hence, there are multiple deities and spirits in Hawaiian cosmology, and, for example, any stone you can find on the ground may possess potential spiritual power,

⁴⁸ See, for example, Beckwith (1970), Gell (1995), Kanahahele (2011), Kāne (1987/2013).

or *mana*. Each deity plays a role in the environment. As beliefs and practices directly related to Pele, as well as the social and political implications of these beliefs and practices, are at the very centre of this dissertation, she will be prioritised over other intriguing deities. However, I will briefly introduce a few other volcano spirits.

According to Kāne (1987/2013), at least ten spirits are important in relation to the Hawaiian volcanoes and in relation to Pele. *Kamapua‘a* is a spirit of rain, moisture and growing things, and can appear as a man, a large eight-eyed hog, a plant or a fish. Kamapua‘a and Pele have a stormy relationship in which they are both lovers and enemies. In a battle between them, where Kamapua‘a threatened to extinguish the sacred fires and soak the sacred fire sticks if Pele did not yield before him, Pele’s brothers intervened and ordered her to surrender. Pele then decided to take Kamapua‘a as her lover, and they divided the island between them: Pele on the dry leeward side, and Kamapua‘a on the rainy and lush side. In contemporary Hawai‘i, whenever new life emerges on a recent lava flow, it can be interpreted as the continuous battle between Pele and Kamapua‘a, where Pele must always yield. ‘Pele may build the island with her lava, but it is the incessant attentions of Kamapua‘a that makes it fertile’ (Kāne 1987/2013, 30). This resonates with Humphrey’s (1995, 137) argument from similar models of understanding in Mongolia, where ‘power relationships between natural entities are used as explanations of the visible features of the land’. This pairing of male and female as well as of a wider repertoire of opposites are examples of how the world is given form in Polynesian cosmology, where these types of relationships are common. I will elaborate on this towards the end of the chapter.

Another important spirit in the volcano pantheon is the aforementioned Poliahu, Pele’s rival who lives on top of Mauna Kea and whose elemental attribute is cold (Beckwith 1970, and see Chapter 2). According to Kāne (1987/2013), the opposition between fire and ice in Hawaiian cosmology is personified in the relationship between these two deities. Poliahu often covers the top of Mauna Kea in a white blanket of snow, and sometimes she ventures into Pele’s domain covering the top of Mauna Loa as well. As mentioned in Chapter 2, Mauna Kea volcano is considered dormant by geologists, and in Hawaiian cosmology this is due to a great battle between Poliahu and Pele. The battle resulted in lasting victory for Poliahu, as she extinguished Pele’s

fire forever with a thick layer of snow. As previously mentioned, Poliahu is additionally instrumental in the Big Island's resilience towards hurricanes, as the cool air she provides on the mountaintops slows down strong hurricane winds that are fuelled by warm ocean temperatures.

Pele is member of a family of spirits – considered as related in a manner analogous to human families – with specific attributes. Her sister, *Laka*, is a gentle spirit, goddess of fertility and patroness of hula dance, but can, according to Kāne (1987/2013), sometimes appear as a goddess and sorceress with dark powers named *Kapo*. *Hi'iakaikapoliopole*, *Hi'iaka* – Pele's little sister, is the spirit of the dance and Pele's favourite. *Hi'iaka* came to Hawai'i in the shape of an egg, carried by Pele in her armpit. As she arrived, she hatched and thus became Hawaiian by birth. *Kāmohoali'i* is Pele's older brother, who can appear as a man with black tattooed hands or as a great shark 'and a king of sharks' (Kāne 1987/2013, 14). He is the keeper of the water of life, which could revive the dead. According to Kāne (1987/2013), Pele has four additional brothers who are all spirits of different features of volcanic eruptions. *Kanehekili* is the spirit of thunder, *Kapohoikahiola* is the spirit of explosions, *Keuaakepō* is the spirit of rain of fire, and *Keōahikamakaua* is the spirit of lava fountains. In addition to these, *Lonomakua* is part of the volcano pantheon as the keeper of the sacred fire sticks, and he makes volcanic fire on Pele's command, as women are forbidden to perform this act.

While these deities and spirits are historically important characters in the volcano pantheon, most of them are not in focus in public discourse in contemporary Hawai'i. Of the family of powerful volcano gods, I argue that Pele is the only one who is still portrayed as exceptionally powerful by people on the Big Island. As Kīlauea is a highly active volcano and visible lava flows have frequented Puna in the last century, it is reasonable to argue that the visibility and presence of Pele reminds people of her powers to a larger extent than other deities. *Hi'iaka* and *Laka* are still central deities in relation to hula dance, and *Poliahu* is discussed in relation to both weather phenomenon and political protests against development on Mauna Kea, but the other spirits mentioned here are not usually part of everyday conversations among the majority of Big Islanders. Some *hālau hula* acknowledge the wider volcano pantheon in their

practice of Hawaiian spirituality and give space for all these deities. However, Pele most often takes centre stage even in these *hālau* (for example, *Hālau o Kekuhi*, which is particularly known for its focus on hula Pele).

Pele's coming to Kīlauea

To reach a deeper understanding of Pele's roles in Hawaiian cosmology, I suggest dividing them in to three components. The first concerns the coming of Pele to the Big Island; the second concerns a story of lust, love and jealousy between Pele, her sister Hi'iaka and a Kaua'i chief named *Lōhiau*; and the third concerns her contemporary presence on the Big Island. There are many versions of the establishment of Pele's home at Kīlauea volcano.⁴⁹ One of the first versions I learned, as mentioned in Chapter 2, was told to me by *kumu* Halia during hula class and was the story of a rivalry between Pele and Nāmaka, the goddess of the sea, in which Nāmaka chased Pele from island to island in the Hawaiian archipelago by drowning her fire with water from the ocean. In the story, Pele travelled to Hawai'i from Tahiti in a canoe with her brothers and her little sister Hi'iaka in the shape of an egg. They reached the northern parts of the Hawaiian Islands first, and Pele dug in the ground with her fire stick to see if she could make this her home. The sacred fire was extinguished by Nāmaka, who created stormy seas that washed the fire away. Throughout the archipelago, Nāmaka drove Pele further and further south until she reached the shores of Puna on the Big Island. She travelled up to Kīlauea where she again dug in the land a pit so deep and so resistant that Nāmaka could not extinguish the sacred fires with her water, and Pele settled down in Halema'uma'u, Kīlauea's large caldera crater.

Other versions claim that Pele and her family originally settled on Mauna Loa in Moku'āweoweo⁵⁰ crater, then later go on to talk of Pele's home in Halema'uma'u. According to Emerson (1998), Pele (and her family) landed on the Big Island at Puakō,

⁴⁹ See, for example, Beckwith (1970), Kāne (1987/2013), Kanahale (2011).

⁵⁰ According to the Hawaiian dictionary (Pukui and Elbert 1986), *moku* can be translated to 'district' or 'section'. *āweoweo* are a species of Hawaiian red fish, and the red colour of the fish is believed to be analogous to volcanic fire.

a place between Kawaihae and Kailua on the west side of the island before embarking on a journey inlands and eastwards that led them to the place they named Moku‘āweoweo. Emerson argued that this place was not in the same location that Moku‘āweoweo crater is today; it was located on the caldera of Kīlauea. Emerson also argued that members of this group of travellers named the large mountain to their west Mauna Loa (long mountain) because the journey from the west to the east was long, not because the mountain itself was long. Today, it is widely believed that Pele lives at Halema‘uma‘u, the large caldera crater of Kīlauea volcano, but that she sometimes visits her second home at Moku‘āweoweo on the top of Mauna Loa. Kanahale (2011, 40–46) mentioned a chant that describes Pele and her family’s journey, which is told in first person and, according to Kanahale, is one of the few chants rendered in Pele’s voice. This chant describes Pele’s family as a warm and caring family, whose members have much respect for each other and are concerned with the importance of *kuleana*, the act of carrying out responsibility. In the chant, we follow the journey of Pele’s family from northwest to southeast and learn about their many encounters with different places in the Hawaiian Islands. An important feature of this story is the family’s desire to search for the rising sun, which makes them travel east. At the end of the chant, they end up in Puna, which is the easternmost district in the Hawaiian archipelago. This focus separates this story as a bit different in the recounting of where Pele’s family settled in the end.

According to Westervelt (1916), *Pele* found a god associated with fire already ‘in possession’ of the Big Island when she arrived on the shore in Puna. His name was ‘*Ailā‘au*, and he was commonly known as ‘the Forest Eater’, as ‘*ai* translates to ‘the one who eats or devours’ and *lā‘au* translates to tree or forest (Westervelt 1916, 2; Pukui and Elbert 1986). ‘He was the god of the insatiable appetite, the continual eater of trees, whose path through forests was covered with black smoke fragrant with burning wood, and sometimes burdened with the smell of human flesh charred into cinders in the lava flow’ (Westervelt 1916, 2). While ‘*Ailā‘au* was feared by people on the Big Island, they also recognized his ability to create and build the island. He lived for a long time in Kīlauea Iki, an old crater separated from Halema‘uma‘u by a narrow ledge and the first crater following Halema‘uma‘u in a chain of craters extending to the

sea. After a while he left Kīlauea Iki and moved into Halema‘uma‘u, where he was when Pele arrived on the island. Westervelt (1916, 3) recounted a story of Pele’s conquering of Kīlauea:

When Pele came to the island Hawaii, she first stopped at a place called Ke-ahi-a-laka^[51] in the district of Puna. From this place she began her inland journey toward the mountains. As she passed on her way there grew within her an intense desire to go at once and see Ai-laau, the god to whom Kilauea belonged, and find a resting-place with him as the end of her journey. She came up, but Ai-laau was not in his house. Of a truth he had made himself thoroughly lost. He had vanished because he knew that this one coming toward him was Pele. He had seen her toiling down by the sea at Ke-ahi-a-laka. Trembling dread and heavy fear overpowered him. He ran away and was entirely lost. When she came to that pit she laid out the plan for her abiding home, beginning at once to dig up the foundations. She dug day and night and found that this place fulfilled all her desires. Therefore, she fastened herself tight to Hawaii for all time. [...] These are the words in which the legend disposes of this ancient god of volcanic fires. He disappears from Hawaiian thought and Pele from a foreign land finds a satisfactory crater in which her spirit power can always dig up everlastingly overflowing fountains of raging lava.

When ‘Ailā‘au saw Pele arriving, he disappeared. Historically, this can resonate with the different waves of settlers in the Hawaiian Islands consistent with Hawaiian mythology as recorded by Beckwith (1970, 321–336).

According to myth (in Beckwith 1970), the first settlers were physically smaller than the taller Polynesians who settled in Hawai‘i later. These people are referred to as the *Menehune* and are believed to have gradually been driven into the forests and wilderness by new settlers. Beckwith (1970, 334) mentioned equivalents of Menehune in Tahiti and the western Tuamotu Islands in French Polynesia, where they are known as *Manahune*, in Rarotonga as *Mana-une*, and in New Zealand as Patupaiarehe. In

⁵¹ Today most commonly known as the *ahupua‘a*, or the district where Leilani Estates is located. A destructive eruption hit Leilani Estates in the spring and summer months of 2018; see Chapter 7 for more details.

contemporary Hawai‘i, the Menehune have become part of mythology and are believed to resemble gnomes, who live in the forest and meddle mischievously in people’s lives. It is reasonable to argue that there are people in contemporary Hawai‘i who are genealogically linked to the Menehune.

Hypothetically, it is possible that the first group of settlers, who came from the Marquesas Islands, attributed volcanic agency on the Big Island to ‘Ailā‘au, and when other groups came from Tahiti, they dismissed ‘Ailā‘au and replaced him with Pele and her family. In the myths about ‘Ailā‘au and Pele, ‘Ailā‘au was driven away by Pele, much like the Menehune were driven away by new, possibly more powerful settlers. In this hypothesis it is interesting also to note that volcanic agency was attributed to a male deity by the first settlers, but when other settlers arrived they attributed volcanic agency mainly to a female deity, which suggests that their ideas about gender might have been radically different from that of the first settlers. However, from archaeologist Patrick V. Kirch’s (2011) perspective and recent archaeological findings, it is not certain that Hawai‘i was originally colonised by several waves of settlers; thus this suggestion remains a hypothesis. In any case, in contemporary Hawai‘i, it is believed that the family of fire gods inhabit Kīlauea volcano, but of the family members, Pele is best known to the people of the Big Island. She presides over the other gods and governs the activities of the lava flows (Beckwith 1970, 167) and is continuously portrayed in myths and stories within the Hawaiian hula tradition. One of those stories is the epic myth about Pele and her sister Hi‘iaka, which is discussed further in the following section.

Pele and Hi‘iaka – the epic hula myth

Of the several early writers who documented stories about Pele (see, for example, Ellis 1827/1917, Kalākaua 1888, Rice 1923 and Westervelt 1916), it was the physician Nathaniel B. Emerson who most comprehensively documented and published the important myth about Pele and her sister Hi‘iaka. According to Hoomanawanui (in Dawrs 2010) there are thirteen different narratives about Pele and Hi‘iaka, none of which share the same cast of characters, except for Pele. Even Hi‘iaka and *Lohi‘au*, the main characters in the Emerson version, do not appear in some versions.

Hoomanawanui pointed out that the Emerson version is only one version of the story, and it is severely edited. While Emerson followed the storyline of that one story he collected, he edited and deleted chants and complex passages to make the story more comprehensible to non-Hawaiians, thus undermining the story's commentary on Hawaiian protocol and social behaviour (Dawrs 2010). Nevertheless, this version of the Pele and Hi'iaka narrative is widely used as a reference by *hula haumāna* (hula students).

The Emerson version of the Pele and Hi'iaka myth entails a story about love, lust, wonder, jealousy and anger, as Pele sent her sister Hi'iakaikapolio'pele to Kaua'i to retrieve her lover, a chief named Lohi'au. According to the story retold by Emerson (1907/1998) and Beckwith (1970), Pele lives with her brothers and sisters in Moku'āweoweo crater, the crater located on top of Mauna Loa, when she falls into a deep sleep during which her spirit leaves her body and follows the sound of a nose flute and a whistle to Kaua'i island. There, she takes the form of a beautiful woman dancing hula, and she wins the young chief, Lohi'au, as her husband. She spends three nights (or nine, according to Beckwith [1970]) with him, and leaves him while telling him to await her messenger who will bring him to her and the home she is making for him.⁵² While Pele is in her deep sleep, her sister Hi'iaka watches over her body and is relieved when Pele returns to consciousness. When Pele calls for a messenger to retrieve Lohi'au from Kaua'i, Hi'iaka volunteers, and she is given godly powers in order to secure a safe passage to Kaua'i and back. After agreeing with Pele's demands, which include that the journey must not take more than 40 days and that a romantic relationship between Hi'iaka and Lohi'au is strictly forbidden, she leaves her beloved *'ōhi'a lehua* forest and her friend, *Hopoe*, behind in Pele's care and embarks upon the journey.

To summarize the rest of the story, as the details are comprehensive and not necessary within the context of this dissertation, Hi'iaka travels to Kaua'i on an eventful journey, crossing many obstacles on her way, which she overcomes with the

⁵² According to Rice (1923) the meeting between Pele and Lohi'au precedes Pele's efforts to find a place to live, where Pele is chased away by Nāmaka's water wherever she digs with her fire stick, and Pele thus meets Lohi'au before she settles on the Big Island.

help of her godly powers and friends who travel with her. She reaches Kaua‘i with her travelling companion, a half-goddess named Wahine‘omao, and learns that Lohi‘au has died of grief over the disappearance of the beautiful woman who came to him during the hula dance. Hi‘iaka resurrects Lohi‘au and begins her journey with him back to the Big Island, although the 40-day limit given to her by Pele has already passed. Upon reaching Oahu, Hi‘iaka can see that Pele, in her anger over Hi‘iaka’s betrayal of not keeping their agreement about the 40 days, has covered the *‘ōhi‘a lehua* forest with fire and wrapped Hi‘iaka’s friend, Hopoe, in lava. When Hi‘iaka, Wahine‘omao and Lohi‘au reach the Big Island, Pele, furious over the long delay and jealous of the relationship she believes has formed between Hi‘iaka and Lohi‘au, overwhelms the travellers with fire. At this point, Hi‘iaka accepts the embraces of Lohi‘au for the first time, at the very edge of the crater in clear sight of Pele. Pele encircles them with flames and Lohi‘au’s mortal body is consumed by lava. After this, Hi‘iaka digs down through the layers in the earth to find Lohi‘au: ‘[She] digs down after him through the earth, passing at the first stratum of earth the god of suicide, at the fourth the bodies of her two woman friends, whom she restores to life. She is about to rend the tenth layer when Wahine‘omao warns her against letting in the water upon her sister’ (Beckwith 1970, 177). Lohi‘au’s spirit is located and restored to life and eventually reunited with Hi‘iaka.

The several narratives of Pele and Hi‘iaka not only tell a story about the social and divine structures of Hawaiian society long ago, they give geologists and volcanologists clues about volcanic activity that has been difficult to date. As mentioned previously, the Pele and Hi‘iaka myth has been studied to find historical mentions of seismic and eruptive activity, and as Swanson (2008) argued, the myth has revealed surprising seismic characteristics of Kīlauea volcano, such as the volcano’s ability to produce explosive eruptive events. Thus, as illustrated in Chapter 2 (page 61), geologists on the Big Island have found it important to regard the oral traditions of old, as the narratives’ attention to detail can provide information that is otherwise difficult to come by. Additionally, the narratives of Pele’s travel and fire probing throughout the Hawaiian Islands resonate with the movements of the aforementioned hot spot in the Earth’s crust. This suggests that, in Hawaiian cosmology, the geological formation

of the many Hawaiian Islands was considered to be compatible with the ongoing geological formation of the Big Island. Volcanic activity and creativity play central roles in Hawaiian cosmology, which suggests that the practical aspects of the geological and seismic science, established much later, regarding this creation was widely understood in ancient Hawai‘i. As will be discussed further in the following chapters, these types of interdisciplinary approaches in Hawaiian geology – fusing seismological models with central myths – enable a type of knowledge production that correlates with epistemological discourses related to natural disasters and hazards on the Big Island.

Performing Pele

Pele as deity is usually experienced through interaction with the contemporary volcanic and seismic environments of the Big Island. She is arguably most visible in active lava flows or hardened a‘a and pāhoehoe flows in all parts of the island, but there is another arena where she often takes centre stage. Many *hālau hula* keep Pele alive through *oli* (chants), *mele* (songs) and dance. Hula is a cultural form which involves choreographed performance, environmental knowledge, historical knowledge and knowledge within crafts, including drum-making, mat-braiding, sowing and lei-making (see Torgersen [2010] for more details). Hula is an embodiment of generations of Hawaiian traditions and stories related to Hawaiian cosmology as well as to the genealogy of the Hawaiian royal family. During a training session in my *hālau* in 2014, *kumu Halia* told me that ‘bodies are vessels of knowledge, and in hula we use our bodies to carry on the knowledge, the stories and the myths’. After a hula performance during the Merrie Monarch hula festival in Hilo in 2014, another *kumu hula* told me ‘without the human body, hula cannot live’. Hula is thus seen as one of the most important Hawaiian cultural forms and is continuously developing.

The hula community is large and thriving, as the ability to dance hula and to possess knowledge about Hawaiian traditions are of increasingly high value in the current indigenous rights struggles and identity politics in Hawai‘i (as I briefly mentioned in Chapter 1). Different hula schools have different approaches to hula, and there are many styles and traditions. There is also a difference in how much a *hālau*

focuses on the spiritual side of hula, and while some *hālau hula* practice worship of, for example, the hula goddess Laka, others do not. The focus of the *hālau hula* also depends on where they are located. *Hālau* on the Big Island, especially the east side, are famous for their dedication to and mastering of *hula Pele*, i.e. dances that pay tribute to Pele. Of these, *Hālau o Kekuhi*, which springs from the Edith Kanakaole Foundation and is currently lead by *kumu hula* Nālani Kanakaole and Huihui Kanahale-Mossman, is the most prestigious. *Hālau o Kekuhi* is located in Kehaukaha in Hilo and are famous for their mastering of the *'aiha'a* style of hula Pele, a style which is low-postured, vigorous and bombastic. It springs from the eruptive and volcanic personalities of Pele and her sister Hi'iaka and often portrays the creative forces on the Big Island.⁵³

As already mentioned, hula concerns not only dancing: it is a spiritual and philosophical education, in which what you learn and what is given emphasis depends on the *hālau hula* you belong to. Several books and articles have been written about the connection between hula and philosophy, among which *Ka Houna Ola* (2011), a book authored by Dr. Pualani Kanaka'ole Kanahale, is a pillar in Hawaiian philosophy. The book, which title translates to *the living earth*, includes a collection of 25 songs and chants from the Pele and Hi'iaka saga accompanied by the author's English translations (2011). Kanahale argued that this piece of literature should be regarded as a 'portal to the expanse of ancestral memory' (2011, xiii). According to Kanahale (2011), knowledge about Hawaiian culture, history and philosophy is inherited through the matriline of Hawaiian families. Ancestral memories are transferred from mother to child while the child is still in the womb, and the child is born with these memories. She emphasizes that ancestral memories are gifts from *kūpuna* that should be cherished:

Ancestral memories offer us many lifetimes of experience, love, pain, belief, understanding, and wisdom. They come to our *lāhui* [nation or people] as a gift, and we can decide how this gift is used. Some use the gift as an intellectual exercise. Others carry the gift around but do not bother to unwrap it. Some disregard the gift, tossing it

⁵³ See more about the Edith Kanaka'ole Foundation and *Hālau o Kekuhi* at <http://edithkanakaolefoundation.org/halauOKekuhi.php>

aside as worthless, old-fashioned, and even frightening. [...] Others of us see that this gift is all we have; it is a start for our life. When we realize that we have been trusted with this ancestral gift, it is important to take the necessary time to unwrap, enjoy and understand the magnitude of what we possess.

Kanahele 2011, xiii

Kanahele's stories about Pele and her family reveal several versions of their arrival on the Big Island, as well as complicated genealogies referring to Pele's relationships with her siblings and other family members. She emphasised that these deities manifest themselves as environmental agency more than taking on a human form, as seen for example in *Kānemiloa 'i*, Pele's brother, who is described as the 'movement of magma vertically from its source to the earth's surface, weaving and twisting its way up through many layers of earth' (2011, 6). This argument resonates with Humphrey's work in Mongolia, where anthropomorphising environmental agency is common, and powers of the land can often be depicted as powerful humans, like warriors and kings. But, as Humphrey (1995, 135) argued, 'it is not contemplation of the land (*gazar*) that is important but interaction with it, as something with energies far greater than the human'. Kanahele explains that another of Pele's brothers, *Kūha'imoana*, is the horizontal movement of magma under the ocean and through the earth (2011). These deities both take on the physical form of a shark. The eldest female in Pele's family, *Nāmakaokaha'i*, or *Nāmaka* for short, is responsible for fault lines in the earth.⁵⁴ This connection between the spiritual and the physical environment is evident throughout all hula, and much of what you learn as a *hula haumāna* is to be able to grasp this connection.

My hula sister, Kaila, told me a story of when *kumu* Halia took the class down to *Ha'ena*, a beach on the coast in north Puna, to dance because 'this is where the dancing lady used to be'. Kaila was referring to Hi'iaka's mortal friend, Ho'poe, who taught Hi'iaka how to dance hula but was turned to stone by Pele in the Pele and Hi'iaka story (see Emerson 1907/1998 for more details). At *Ha'ena*, there used to be a rock

⁵⁴ A fault is a fracture along which the blocks of crust on either side have moved relative to one another parallel to the fracture (USGS 2017h).

formation in the shape of a hula dancer that moved with ‘dance-like-motions’ when the waves came in, but this rock formation was swept to sea by the large tsunami of 1946. Ha‘ena is considered a sacred place within the hula community; a place attributed much spiritual and historical meaning. Kaila told me it was a quiet day and the ocean was calm. As the group started dancing a chant from the Pele and Hi‘iaka myth that told a story about a big wave (or tsunami), a big wave came in and washed over their feet, even though the tide was out, and the beach was quiet. The group found the experience a little daunting and hesitated in continuing the dance, but *kumu* Halia instructed them to keep dancing as they were enticing the land with their feet.

A hula dancer is in constant communication with the environment. While hula performances can be experienced throughout the Hawaiian Islands in hotels, shopping centres and *luau*, the sacred dances and the dances that are dedicated to Pele are often saved for sacred spaces, such as Ha‘ena, the *pā hula* (hula platform) in Hawai‘i Volcanoes National Park (HVNP), or the edge of Halema‘uma‘u crater. After a hula performance at the hula platform in HVNP, I asked the *kumu hula* a question about how she approached Hawaiian spirituality, and she told me that ‘deity is less religion and more environment’. From this statement, combined with my training from my *hālau*, I gathered that Hawaiian spirituality and environment are strongly interconnected, which I will discuss further later in this chapter.

Pele today

As I have argued so far, Pele is well known in legends, myths and stories in the Hawaiian Islands. In this section, I will look closer at her role in contemporary Big Islanders’ lives. It is widely experienced that stories about who Pele is and what she does are among the first you hear when moving to the east side of the Big Island. For those born and raised there, Pele is part of the stories you hear as a child, and very early in life you are taught to respect, acknowledge and/or believe in her. I have found that you do not need to be of a particular spiritual orientation to believe in Pele. Pele is more than spirituality; she is physical and present in the everyday lives of Big Islanders. You do not have to believe in ghost stories to believe in her. Pele is power: creative and destructive, preserving and destroying, wrathful and considerate, full of vengeance yet

protective. She is unpredictable, fiery, jealous and extremely powerful. Pele is the land, and the land is Pele. You can smell her in the air, see her breath on the horizon and feel her stirring the earth through rumbling earthquakes.

Friends who have travelled from their homes on other Hawaiian islands to visit me on the Big Island, have told me that in addition to experiencing awe of the beauty of Puna, they feel a pressing darkness when visiting areas where the volcano is clearly exposed. They have said there is something gloomy and somewhat ominous about the landscape they experience when travelling to the lava fields of lower Puna or through the Hawai'i Volcanoes National Park. While it is easy to understand this experience, people who reside in these areas do not necessarily experience the environment in this way. People who live in the lush areas of lower Puna, often say that they live in the most beautiful place on earth. They are usually aware of the volatility of the environment they live in, and often consider this when describing the beauty of their surroundings and what they experience as paradise. As a Puna resident rather poetically stated to me, 'out of hellfire and death, springs paradise, one of the most beautiful places on earth'. Of course, when residing in Puna, you have different perceptions of and interactions with the environment than someone visiting for a week or two would have. As the tourism industry uses the volatile environment and Pele myths as selling points in their advertising and in management of tourists, people who visit the Big Island for a short time have a specific focus on these aspects of the place. On the other hand, people who live there do not focus on volatility, unless there is seismic activity to remind them of the risks associated with this type of environment. They go about their daily lives, which include work, tending to their lush gardens, and swimming or surfing in the warm Pacific Ocean at one of the many beautiful beach parks along the coast. Meanwhile, visitors might have experiences of this environment that are similar to the one I had when I visited the lava flow in Kalapana the first time in 2011, with a group of four friends from the university, none of which lived in lower Puna:

Visiting Pele in Kalapana/Kaimu, February 2011:

It was pitch black when we turned off the headlights. Everyone was silent as our feet hit the gravelled ground, and we began preparing our walk through the lava fields. We

had driven the long road down to Kalapana/Kaimu from Hilo, a 45-minute drive, to see the lava flow this evening. Pu‘u ‘Ō‘ō had sent lava down to the east and towards the ocean for a little while, making it accessible for curious people, both residents and tourists. The air smelled of sulphur. The stars painted a magnificent picture of the galaxy, and where we stood, on this island located so far from anywhere else in the world, we felt closer to them than we had ever been. The feeling of being amongst the stars, instead of removed from them, was hypnotizing and we discussed and dwelled on this experience for a few minutes before embarking upon the walk towards the active lava flow. We lit our flashlights and parted with the path before freshly made lava rock crushed under our feet like thousands of small pieces of broken glass. The topography in the terrain shifted continuously, and we had to focus hard on placing our feet wisely to avoid injuries on the way. Our group of five was silent. We could all feel it, a deep respect, sometimes shifting to fear, for this environment we already knew as potentially dangerous rested heavy on our shoulders.

We passed a shelter-like structure half buried under solidified lava. Next to the structure, a roof of a house was visible on the top of an elevated area. The front of a rusty old truck poked out from the side of a small mound. The black surroundings communicated danger and warning, and we listened quietly. The ground was gradually getting warmer, and the soles of our shoes were not thick enough to prevent the heat from reaching the bottom of our feet. It felt risky, walking on newly formed lava rock. We could see stripes of red and orange down the slopes of the volcano and were amazed with the glow these stripes projected towards the sky. A few days earlier we had driven down towards Hilo on Saddle Road, and as we saw a cloudier Kalapana/Kaimu glowing bright orange in the distance.

The lava flow was only about 50 metres away from us now. The heat from the ground was getting increasingly intense, and we were getting worried the soles of our shoes would melt. The uncertainty of not *really* knowing whether or not a lava tube was flowing under us – if its ceiling would at any moment collapse and gravity would pull us down into flowing lava – was utterly unnerving even though we had been reassured by the daily eruption updates from HVO that this was a surface flow. Despite having this information, there is something about such a volatile environment that makes you act and think with a rather solemn sense of veneration and awe. We reached the lava flow. Our cheeks had a burning sensation when we placed our faces closer to

the ground to look closely at the amazingly beautiful colour schemes formed by the small rivers of molten rock.

A 'hippie' couple, which we had not seen because of the utterly black darkness beyond the reach of the glow, asked us to quiet down while we expressed our excitement verbally, as they were having a 'ceremony of silence'. I thought that to me, this was not a place for silence but a place where, while you show a deep respect to both the environment and the local beliefs connected to and concerning the volcano and lava flows, you can also show excitement about the fire, wildness and movement. The 'ceremony' was bewildering to me, as I have never experienced Kānaka Maoli being overly concerned with silence when moving about in the natural environment; on the contrary, people with connections to Hawaiian worldviews have been concerned with communication and interaction in their environment through dance, chants, songs and conversations with plants, trees, rocks and spirits who reside in certain areas of the islands. Several times, as I have entered Pele's domain with someone from the hula community or otherwise engaged in Hawaiian spirituality, they have chanted before entering – to ask for permission, or to let Pele know we are about to enter – which is common practice in Pacific societies. Thinking about this way of interaction alongside the silent approach of the couple out on the lava field, I was once again reminded of the many meanings this place holds to different people.

We stayed with the lava flow for about 40 minutes before embarking on the walk back to the car. The group was a lot chattier on the way back and seemed less concerned with the warm ground crushing beneath our feet. Taking approximately the same route back we felt safer as we had already tested the stability of the ground, and we spent a little more time exploring structures, cars and other things that were half-buried under lava, before walking back to the parking lot. Although we had read the information statements from HVO to make sure it would be safe for us to walk out to the active lava flow, the conditions in this area can change so rapidly that the observatory will not have time to warn people. Especially along the freshly made coastline, the ground can be very unstable. Our walk was quite far inland, so we did not worry about cliff collapses or the land beneath our feet being swept away into the ocean, but knowing that these things happen in this area makes you humble, careful and respectful. People who live on this island know that this is Pele's domain, and that Pele is a force of temperament, passion, jealousy and unexpected actions. It would be foolish not to respect the kind of power she is.

I have found that the myths concerning Pele currently play their biggest roles in the Hilo, Puna and Ka‘ū districts on the east side of the Big Island. As this area is greatly affected by the activities of Kīlauea Volcano, it is reasonable to believe that Pele holds a firmer grasp on the environment in this part of Hawai‘i. However, Pele is believed in and discussed throughout the island and in other Hawaiian islands, as she is firmly associated with any volcanic activity, including *vog* (volcanic gas) or earthquakes, which are seen and felt in other locations than the east side of the Big Island. *Vog* is similar in appearance to fog or to smog found in large cities with high levels of air pollution and usually limits visibility on the horizon, often preventing the beholder from separating the ocean surface from the sky. It travels easily with trade winds coming in from the east and moving towards the west, and due to Kīlauea’s high levels of activity, the Hāmākua coast, Saddle Road and the district of Kona are all continuously affected by *vog*. However, as the east side is closer to volcanic activity, people there experience the presence of Pele in a different way. Puna often has an active lava flow moving east from the very active East Rift Zone on Kīlauea’s north-eastern flank, and sometimes a lava flow moves through inhabited areas. Thus, the eastern Big Islanders often have more physical, awe-inspiring and frightening confrontations with Pele, and many understand the moving lava as being Pele’s body, dancing down the mountainside, and making her way to the ocean where she wants to swim and cool down.

As argued in Chapter 3, the lower Puna district on the Big Island is inhabited by people with diverse ethnic, cultural and social backgrounds. The people who live there are mostly low-income families who have settled in Puna because it is where they can afford to live, people who have been born and raised in Puna, or people who have come from outside the Hawaiian Islands, often seeking a different lifestyle. Since the demography of the area is so diverse, people believe in and express their relationship with Pele in different ways. As mentioned previously, Pele is often visible on the hula stage where dancers and teachers pay tribute to her personality through different forms of movement. Additionally, Pele is a source of inspiration to many artists living in Puna, Ka‘ū and Hilo. Painters, glass blowers, sculptors, patch workers, metalworkers and musicians are inspired by Pele, and the ‘volcanic art scene’ is rich and widespread

in these districts. Relationships with Pele are also expressed through stories, often told around dinner tables, bonfires or during story-telling sessions at social gatherings. Throughout my altogether three years of residing and doing fieldwork on the Big Island, I heard several stories of Pele encounters. These stories were told to me in different social situations. Sometimes I asked directly if a person had a Pele story. Other times I heard a Pele story through my involvement in hula – including storytelling in hula class and personal encounters recounted at performances and workshops. I also heard Pele stories around bonfires and at barbecue parties in relaxed social settings. It is therefore clear to me that personal stories about Pele are not reserved for people of indigenous Hawaiian descent or people who practice Hawaiian traditions but apply to all sorts of people on the Big Island. I will here recount some of the stories I have heard:

Kaila's uncle's story (as told by Kaila):

My uncle had an encounter with Pele one time on Saddle Road. He and my aunt were driving from Kona to Hilo in the evening, and right as they were turning down the hills towards Hilo, he noticed that one of his back tyres had gone flat. He pulled over to the side and got out of the car to change the tyre. As he started jacking up the car, my aunt came around the back of the car with a flashlight in her hand, lighting up the area where the tyre was sitting. My uncle finished the job and, while packing up the jack and loading the flat tyre in the back, my aunt went back around the car to the passenger side. As he got back into the car and started driving again, he thanked her for helping him light up the area where he was working, and she looked at him with a confused expression. 'I have been sitting here in the car the whole time', she said to him. After telling her what he had experienced outside the car, they agreed that it must have been 'Tūtū Pele' helping him.

Kaila's story about her uncle is not the only story I have heard about Pele on Saddle Road. Another story came from Kaila's father, who had an encounter with Pele on the same road as he picked up a female hitchhiker. She sat in the back and asked him for a cigarette and a light. When he turned around to give her a light, she was gone. Jack told me that there is an area on that road where people and cars are known to get into trouble,

and it is believed that Pele is responsible. Jack had a story about a situation he found himself in while he was a firefighter for Hawai‘i County:

My team and I were travelling on Saddle Road, when suddenly the headlights on the car went out. We pulled over to the side of the road where they tried to figure out what was wrong with the headlights. Finding nothing wrong, we decided we would have to call roadside assistance and went back into the car to wait. Suddenly, after about ten minutes the head lights on the car were turned back on, and the vehicle never had this particular problem again. Some members of the team believed Pele had controlled our headlights.

Another story was told to me by my friend, Sophie, who lives in upper Puna in a subdivision north-west of Pu‘u Ō‘ō. She told me one day that she had called a *kahuna* (Hawaiian priest, ritual expert, magician and healer) to her house to do a cleansing ritual, because one of the rooms had suddenly started to ‘feel creepy’. I asked her what this ‘creepiness’ entailed, and she said it was hard to explain, but it felt like someone had possessed the room and she was not welcome there anymore. She also told me she had noticed that the door to the room closed while she was in another room, and she noticed this when coming back to place something in the room. At this point, Sophie housed a tenant who also told me about the sensation of someone being in the house – someone who did not want her to be there. After the *kahuna* had performed the cleansing ritual, which involved sprinkling salt water along the walls inside the house,⁵⁵ he encouraged Sophie to plant more *kī* around her property to protect her from Pele, simultaneously suggesting Pele had occupied Sophie’s room.

⁵⁵ This ritual is also common practice in *hālau hula* and is performed in the training space in order to protect *hula haumāna* from bad spirits. *Haumāna* are believed to be particularly vulnerable to spirits as their minds are open during training.

Positioning Pele in Puna Spirituality

I have rarely met anyone on the Big Island who identifies as a complete atheist, that is, someone who does not believe in any form of divinity. Many people I have met identify as theist, which means they believe in one or more divine characters, and if they are not theist, they are usually agnostic, which means that they are unsure whether or not divine characters exist. My friend, Sophie, explained her approach to the subject to me one day while we were chatting about spirituality in Puna:

I have always been an atheist. I was raised as one and continued to be one until I moved out here. Now I guess I consider myself an agnostic because I feel a spiritual connection to the land. [...] My family does not understand it, but they have not been here as long as I have. I have become a spiritual person because the land here is so alive.

While people usually identify with a spiritual orientation, the type of spirituality is different from person to person, and group to group. As Puna is a place where people from many different backgrounds live side by side, it is easy to see how spirituality can exist in many different forms. As mentioned in the previous chapter, many of the people living in Puna identify with New Age spirituality, in which an introverted form of spirituality takes precedence over any social or cultural form.

New Age spirituality is about and within the individual, and the focus is on the potential of the self and, even, the god within. In practice, people with this spiritual orientation emphasize healing along with physical, mental and spiritual health, which they express through different forms of alternative medicine, yoga practice and variations of meditation (Chryssides 2007). Looking back, the ‘ceremony of silence’ that we encountered in the lava fields at Kalapana was a form of meditation, and it is safe to assume that this powerful place would give an even deeper sense of spiritual connectedness to the meditators. The environment in Puna fuels the spiritual notion of the ‘living Mother Earth’, which many Puna residents believe in. Thus, it is a place where people of these types of beliefs easily can ‘fit’, and where they have room for exploring these beliefs even further. It is also easy for them to adapt to the vernacular

terms for the environment in Puna, as Hawaiian cosmology and language often talks about environmental features, and terms often translate to something very familiar like Papa – Earth Mother and Wākea – Sky Father.⁵⁶

However adaptable to the Hawaiian spiritual mindset, people in Puna who are not Kanaka Maoli, or relate to the Hawaiian worldview through hula or other Hawaiian cultural forms, usually do not experience spirituality in the same way Kānaka Maoli do. Looking at the example of the ‘ceremony of silence’ again, my reaction of surprise was fuelled by an experience from hula, where communication with the environment is important in seasonal cycles, fertility rituals and symbiosis. The environment is not utilized for personal realization, but rather, a dialogue is emphasised for the sake of mutual benefits. In a Hawaiian worldview, the spiritual world and the physical world are one and the same. There is, for example, no divide between the spiritual Pele and the physical lava flow. For residents who have not adopted this approach but have adopted the belief in Pele, a separation or divide between the spiritual Pele and the physical lava is evident. It seems their spiritual world is not necessarily merged or intertwined in the same way with the physical world.

If your basic framework for understanding and experiencing spirituality is rooted in, for example, a monotheistic religion such as Christianity, in which God is essentially divine and considered other-worldly, it might be difficult to fully submerge oneself in a different mind-set. In Hawaiian spirituality, spirits and deities are connected to living people via genealogies, ancestors and kinship, and they exist alongside the living. Hawaiians refer to Pele through genealogy and think of her as an ‘*aumakua* (ancestor or ancestral spirit). They refer to her as ‘Tūtū Pele’; *tūtū* is the Hawaiian word for grandmother. In this way, she is understood as part of their own genealogies. People of non-Hawaiian spiritual orientations often refer to Pele as *Madam Pele*, a reference in which a respect for Pele can be detected, but which does not place her within their genealogy in the same way. From a Christian perspective, Pele would perhaps be considered otherworldly and divine – not physically burning and melted rock. A Christian could believe Pele *sent* the lava flow, while Hawaiians believe

⁵⁶ See Chapter 2, pages 63-64 for more on these characters.

Pele *is* the lava flow. These different perceptions affect peoples' understanding of the environment and of who and what Pele is, but they do not necessarily affect peoples' respect for and belief in Pele.

Additionally, many Kānaka Maoli practise Hawaiian traditions while simultaneously identifying as Christian or with other religious or spiritual orientations. This is a common practice of Christianity in the Pacific (see, for example, Tomlinson 2020). I asked Mapunaleo, a Kanaka Maoli woman from Puna, how it was possible for her to believe in the Christian god as well as in Hawaiian gods and spirits, and she explained it to me in uncomplicated terms: 'It is easy for me to believe in Pele as a Christian. God created everything, so he must have created the Hawaiian gods and spirits as well. I believe God created Pele and gave her, like the humans, free will.' Considering that the hula tradition I was a student of included many Catholic traditions, I asked *kumu* Halia the same question, and she answered: 'I am Japanese by blood, Buddhist by religion, Hawaiian by tradition, and Catholic by upbringing. It is completely uncomplicated for me to practice a combined spirituality from all these different parts of my life; I just practice the best parts from each of them.' I dwelled on these two uncomplicated answers for a while and realised that one of the reasons I felt the need to question them is because Christian theology, which was the main religion in the society where I grew up, clearly states that one should not have any other gods than the one God. Practised belief in other deities is blasphemous. However, for Kānaka Maoli I have talked with about these issues, and others who share the same view as Mapunaleo and *kumu* Halia, it seems that believing in more than one deity while identifying with a monotheistic religion like Christianity is not a problem.

Anthropologist Joel Robbins (2004, 13) approached these issues in an analysis of what he terms an 'encounter between a relational culture and an individualist one'. In this analysis, which focuses on Urapmin (of Papua New Guinea) conversion to Pentecostal Christianity, he argued that the Urapmin, and other Melanesian societies he referred to as relationalist, get caught between what he referred to as relationalist culture (in this case Urapmin traditional culture) and individualist culture (in this case Christian). His claim was criticized by Eric Hirsch (2008), who built his criticism on Marilyn Strathern's (1985, 75) suggestion that 'conceptualisation is inevitably

reconceptualization’. Following Strathern’s argument, Hirsch (2008, 142) argued that ‘if the Urapmin potentially have a “relationalist” understanding of an “individualist” culture, then they reconceptualise an individualist culture in relationalist terms’. In other words, Melanesian Christians are not caught between cultures, but rather, the different forms of Melanesian Christianity express conventional Melanesian approaches to what is certain, what is truth and what constitutes power, all of which to some extents are influenced by Christian values, conceptions and behaviour (Hirsch 2008, 141).

Building on Hirsch’s argument, I argue that different conventions about and approaches to certainty, truth and power are the main reasons why people in Puna have such different approaches to who and what Pele is. To transfer and repeat Hirsch’s (2008, 141) argument in the Hawaiian context, one can say that the different forms of Hawaiian Christianity express conventional Hawaiian approaches to what is certain, what is truth and what constitutes power, all of which are to some extent influenced by Christian values, conceptions and behaviour. The experiences of Pele are based on different approaches to and perceptions of knowledges and spiritualities, and different worldviews are used as frames of reference in the effort to understand the activities of Kīlauea volcano. More specifically, I argue that the different ways in which people relate to spirituality and how they understand divinity – or the godly qualities of characters related to peoples’ spiritual understanding of the world – explains how they can combine different worldviews and how Pele becomes real. In people’s effort to conceptualize her, I argue, following Strathern (1985), Pele is reconceptualised to fit with already established conventions of spirituality and knowledge. My main argument, then, centres on the differences in conventions concerning immanent and transcendent forms of spirituality, which I will discuss further in the next section.

Immanence and Hawaiian spirituality

Immanence and transcendence are two different perspectives on divine manifestation, which, I argue, defines a person’s relationship with spirituality. Immanence expresses the divine as intimate rather than as alien, as indwelling and near dwelling rather than remote, whereas transcendence expresses the divine as existing over and beyond the

universe (Reese 1998). According to philosopher Marc Rölli (2004), the concept of immanence was first established by the two medieval scholastics, Duns Scotus and William of Ockham. What is important in their work for later philosophers is that they claimed that ‘immanence is not oriented *against* a divine transcendent position, but is conceived as a form of manifestation (not in the sense of a spiritual being-within-itself)’ (Rölli 2004, 52, parentheses in original). This can be exemplified by how the divine is understood in Christianity’s holy Trinity, where God would maintain a divine transcendent position whereas Jesus and the Holy Spirit would manifest God in their immanent form. Scotus and William of Ockham further argue that immanence is limited to the activity of understanding. This aspect was further developed by philosopher Baruch de Spinoza, who argued that transcendence is a contrast to immanence, and that a transcendent god, who has turned away from the world or who created the world, is an abstract magnitude which cannot be explained and thus not comprehended (Rölli 2004).

Immanuel Kant (1998) argued that immanence is connected to the empirical and experienced, whereas transcendence is connected to metaphysics. In other words, the immanent is within the experienced world, and the transcendent is beyond the experienced world (see Figure 4.1). While Kant’s philosophy centres much on epistemology, knowledge and the question of what we can know, his contribution to the (long and substantial) debate on immanence and transcendence, as well as to ‘Western’ philosophy in general, has been highly influential (see McCormick 2001, Rölli 2004). Of the philosophers building further on Kant’s work, Gilles Deleuze (often in collaboration with Felix Guattari; see, for example, Deleuze and Guattari 1987) stands out in his effort to define *pure* immanence. His concept of *the plane of immanence* refers to a state where immanence is in itself: ‘Immanence does not relate to a Something that is a unity superior to everything, nor to a Subject that is an act of operating the synthesis of things: it is when immanence is no longer immanence to anything other than itself that we can talk of a plane of immanence’ (Deleuze 1997, 4).

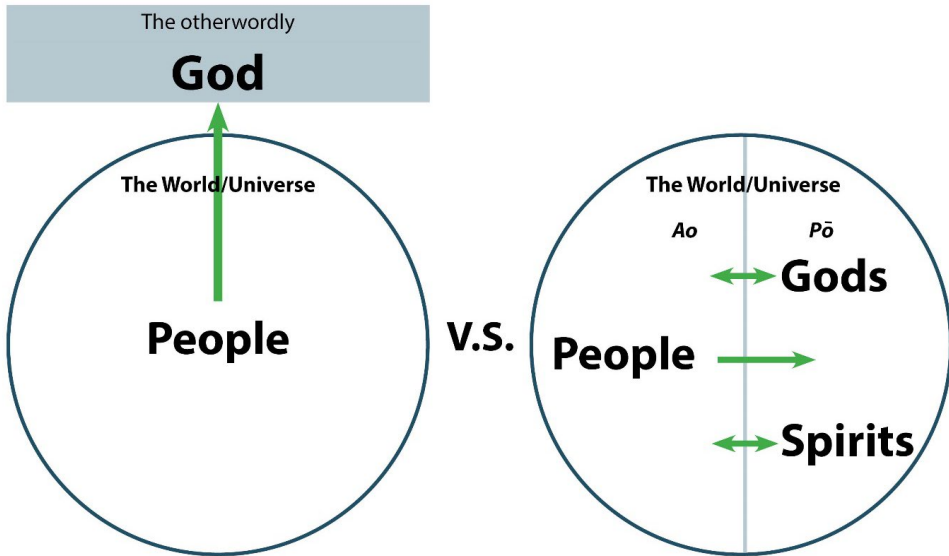


FIGURE 4.1: The left circle shows a transcendent understanding of the universe, while the right circle shows an immanent understanding of the universe. In the case of the Polynesian ordering of the universe (which is discussed further in the following sections), many different models are used to describe where one can find *ao* and *po*. For example, according to Bausch (1978, 175), many sources place *pō* in the lower part of the world and *ao* in the upper, some models resemble a layered cake, and some resemble an onion. Figure by author.

While not arguing directly for the existence of Deleuze’s plane of immanence or pure immanence, neither in Hawaiian cosmology nor in Puna spirituality, there are some aspects of Deleuze’s arguments I believe can enable a description of who and what Pele is and how she exists in people’s minds. Following Deleuze’s arguments, the Hawaiian understanding of Pele is not simply as a subject within the environment; she *is* the environment.

Alfred Gell (1995, 50) argued that Polynesian cosmology is ‘correlated with the religious attitude of immanence’. According to Gell, the Polynesian Creation happened as the God divided the world into two parts, *ao* and *pō*, light and dark, life and death. The world became a ‘space within the deity [...] that is kept apart through the

preservation of difference' (Gell 1995, 50). Thus, instead of perceiving Creation as *ex nihilo*, or out of nothing, Creation was the differentiation or categorisation of a whole that already existed. There are many versions of Creation in Polynesian cosmology, but according to Christia Bausch (1978), most of the creation myths start with a thick black darkness. Gods, animals and plant life were born in the darkness. The arrival of the human marks the end of the dark era, and the period of light begins. Bausch collected creation myths from Hawaii, New Zealand, Tahiti, the Tuamotuan archipelago and Samoa, and while there are differences in how light came to be, most of them begin with darkness; *pō*. Bausch (1978, 170) defined *pō* in the following way:

In everyday life *po* was used to denote dark, black, obscurity, night, darkness, to set (sun), have rotten smell, decayed [parentheses in original]. The esoteric meanings were night-realm, nether-world, place of departed spirits, spirit world, spirit land, the unknown eternity, the beginning of things, the cosmic darkness out of which all forms of life were afterwards evolved or procreated, the 'spirit-world' in contrast to the 'world of living men' with whom the 'world of reason' began [...]. In numerous religious terms *po* indicated a special sacred quality of something [...].

Further, she defined *ao* in the following way:

The profane meaning of *ao* was day, light, daylight, open day, daytime as opposed to night, world, cloud, bud, dawn, bright, happy, happiness, radiance; in Samoa *aoao* meant excellent, supreme. The esoteric meanings were universe, upper world, world of light, primal deities, heaven, blessedness, the good reign of a prince, the present life, the heart of something, the king as heart of the country, the first or chief part of things, authority, government, mankind.

Bausch (1978, 170)

Gell (1995, 26) defined *pō* as 'the inaccessible, threatening, but ever-present unseen', which suggests that *pō* is always present even though it is out of sight. Bausch (1978, 170) described *pō* and *ao* as more than mere concepts: 'They were religious realities, the supernatural roots of the world.' Polynesian gods are part of the same world as

humans, but the world is divided into two realms. Gods can cross the divide and visit the living in *ao*, but if the living cross over into *pō*, they have left their physical state. Thus, the human body belongs in *ao*, but the spirit can exist in both realms in the form of dreams, trances or prayers, or in the case of a spirit departing the body permanently. If a spirit comes back to *ao* and manifests itself in a human body, that human will be considered sacred and of divine qualities.

The immanent gods in Polynesia were a source of constant anxiety. Ritual, physical objects, tattoos and protective plants have been, and are still, used as protection from them. When the Polynesians discovered that the Christian god was transcendent, not part of this world and thus not able to ‘reach’ them in the same way as their immanent gods, they converted to Christianity more rapidly and enthusiastically (Gell, 1995). The transcendent God was a god they did not need to interact physically with, and thus a relationship with this god was much safer. I argue that this distinction is visible in different peoples’ interactions with the physical environments of the Big Island, especially volatile volcanic environments. As mentioned in the methodology section in Chapter 1, I realised that my perception of risky behaviour in and respect for ‘wild’ natural environments was different to that of friends from the mainland or people who had not grown up with a close connection with nature. They did not express any need to be careful or respectful of the places we explored together. Similarly, the couple who held the ‘ceremony of silence’ by the lava flow were not at all nervous or anxious about the environment in the same way I was. Often, when I have told my *kumu* I am going to explore different parts of the island, there are places where she has told me not to go and places where she has not understood at all why I would want to go. I have also had conversations with Kānaka Maoli who express frustration with the lack of respect mainlanders can have for sacred places, and for places they regard as volatile because of *mana* (spiritual power). This separation in spiritual connections with the environment is often a source of conflict or negotiation between the different social groups on the Big Island.

Why do people believe in *Pele*?

Following Gell's (1995) argument about immanence in Polynesian cosmology, it is safe to assume that *Pele* is immanent to Kānaka Maoli and others who have adopted a Hawaiian spiritual orientation. When Mapunaleo told me she believed that the Christian god has created the universe and everything that exists within it and that the Hawaiian gods were given free will or agency, she referred to the Christian god as transcendent and the Hawaiian gods, especially *Pele*, as immanent. However, as people in Puna have different understandings of what spirituality is and how one relates to it, some believe in *Pele* as transcendent – she controls the lava flow from a transcendent position instead of *being* the physical lava flow. This often creates a conflict of interpretation when an eruption happens in Puna, and people who understand her in this way often see an eruption as a punishment for something they have done wrong, as opposed to something that is out of their control and that happens ‘simply’ because *Pele* controls the volcanic environment in Puna.

Throughout this chapter, I have discussed who *Pele* is and how people believe in her. However, I believe another question should be added to the discussion: why do people believe in *Pele*? What are the mechanisms behind a conversion to believing in *Pele*, for so many people who move to Puna from places where *Pele* does not exist in their minds? I would claim this question can potentially be answered simply, but that there is complexity to be found in the mechanisms. When you move to Puna, you are either automatically or with effort associated with Puna sociality. Given that people in Puna generally believe in *Pele* in one way or the other, you are almost instantly introduced to the idea of a goddess who controls the area and thus might easily adapt to this belief yourself. Another argument could be that once you move there you experience the land as ‘being alive’ – as something that is in constant and unpredictable motion –and thus you will understand and adopt the beliefs that Puna residents have in *Pele*. Although people in Puna differ in their understanding of *Pele* as immanent or transcendent, most understand the environment as being under the control of *Pele*.

I believe there is an additional and more complicated reason why people believe in *Pele*, and it has much to do with peoples’ resilience in the Puna environment. By believing in *Pele*, you gain a stronger feeling of control over your environment, and it

is within your power to attempt mitigation efforts when faced with a threatening eruption. By mitigation efforts I refer to spiritual communication with Pele through prayer, chant and ceremonies (often associated with hula), to the planting of *kī* plants in the corners and borders of your property, as well as material offerings presented to Pele at Halema'uma'u crater or at the place of the eruption. I also argue that one of the main reasons why so many people come to believe in Pele when they settle in Puna is that Pele is too frightening not to believe in. The consequences are too great and too terrifying for residents to risk not believing in her. For those who live in Puna, she cannot be disregarded.

Practising Cosmology: Immanence as Resilience

Gell (1995, 24) argued that, in Polynesia, the immanence of the gods 'was the source of continuous anxiety' and that the reason why Polynesians converted rather easily to Christianity was an 'untold relief upon discovering that [the Christian] God was, after all, transcendent, not part of this world'. He further argued that this anxiety about the immanent shaped the patterns of Polynesian cultural life, and that sacred rituals of different scales were continuously performed in order for people to keep the immanent at bay. The function of the most important Polynesian rituals was meant to be the opposite from the Christian communion, as the intention was to 'cause the divinity to leave (some part of) the world, rather than to induce the divinity to enter (some part of) it' (Gell 1995, 25, parentheses in original). The separation between *ao* and *pō*, as discussed previously, meant that deities and the sacred could remain unseen in *ao*, sneak up on you when you least expected it and cause harm. A feeling of anxiety for the spirit world is, in this case, arguably relatable. My argument about the fear of Pele, as well as mitigating actions to protect oneself from her, fits well with this form of anxiety, which springs from Pele's immanent presence, for example, as an active lava flow. I believe people in Puna are anxious about Pele, but instead of being paralysed by this anxiety, it leads to an active formation of resilience in people's relationships with the Puna environment. Those who relate to the immanent Pele are more anxious about her presence and thus more prepared for and resilient towards the volatility she represents.

Human geographer W. Neil Adger (2000) argued that resilience is a loose antonym to vulnerability, as it increases the capacity to cope with stress. According to Adger (2000, 348), social vulnerability is the 'exposure of groups of people or individuals to stress as a result of the impacts of environmental change. Stress and anxiety, in the social sense, encompass disruption to groups' or individuals' livelihoods and forced adaptation to the changing physical environment'. He further argued that such stresses are related to the underlying economic and social situation, 'both of lack of income and resources, but also to war, civil strife and other factors' (Adger 2000, 348). Further, resilience is defined by Adger as a group or community's ability to cope with external stresses and disturbances. These can be based in social, political and environmental change and are institutionally determined. The disturbances can further be examined through several proxy indicators, including economic structure, institutional change and demographic change (Adger 2000, see also Nuttall 2009). Adger also argued that social resilience depends on resource dependency, and a community that is completely dependent on resources from a resilient ecological system is thus automatically more resilient. If, then, Puna society relates to the immanent Pele and plans economic structure, housing/property development and food production from the outset of this relationship, the immanent belief in Pele becomes a resource in building resilience towards the volatile environment. However, if the immanent Pele is not taken into account in the planning of these vital structures of Puna society, it all becomes more vulnerable to environmental changes caused by volcanic activity.

Climate change scientist Donald Nelson and colleagues (Nelson et al. 2007, 396) argued that resilience can be defined as 'the amount of change a system can undergo and still retain the same function and structure while maintaining options to develop'. Social ecologist Brian Walker and colleagues (Walker et al. 2004, 2), on the other hand, defined resilience as 'the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity and feedbacks'. Anthropologist Mark Nuttall (2009, 299) argued that social resilience should be seen in light of how people perceive and conceptualise change: 'in short, one's world view goes some way to determine the kinds of adaptive strategies

people utilize'. When going through the disaster of losing everything you own, you seek explanations as to why this has happened to you. What have you done to deserve this? Who is to blame for this disaster? People in Puna use Pele and other deities in Hawaiian cosmology and their respect and anxiousness in relation to these deities as a model in accepting possible disasters caused by 'extreme nature and weather events' (i.e. 'natural disasters'). For example, Pele is associated with volcanic activity like eruptions and earthquakes, and Nāmaka, Pele's sister, is associated with hurricanes and tsunamis. This model is one reason why disasters on the Big Island are often not as disastrous as they might have been, especially from a socio-psychological perspective, and one reason why Puna and Big Island societies have a resilience towards these types of events.

While Pele can be a source of anxiety and your enemy when she devours your property and home, she also provides a comprehensible explanation as to why this happened to you. In determining the justice or fairness of the disaster, a belief in the immanent Pele offers a simple explanation: the land she took was not yours in the first place and now she has taken it back. Although people on the Big Island make personal offerings to Pele and engage in mitigating actions, such as planting *kī* plants in the corners of their properties, it seems to me that the general perception of punishment initiated by Pele is not necessarily personal. If Pele takes your house and not your neighbour's house, she is not necessarily punishing you specifically for something you did wrong; rather, she wanted that piece of land for herself and decided to kick out whoever was living there. Still, your neighbour, whose house was spared, will probably be thankful to Pele for deciding not to take their house. As Kāne (1987/2013, 5) poetically argued:

Pele is of godly status and as a mere human being you have little to say in her matters: She is Pele-honua-mea, Pele of the sacred land. She is Pele-'ai-honua, Pele the eater of land, when she devours the land with her flames. [...] She rules the volcanoes of Hawaii, and Mankind has no power to resist her. When Pele is heard from, her word is the final word.

The agency and practice represented by an immanent form of spirituality resonates well with what I propose to call a cosmology in practice, where immanence becomes a tool in coping with the volatile environment. When deities are so inherently associated with environment, cosmology becomes present, real and practical. Those who are victims of the volcano often need an explanation to cope with what has happened, one that shows them that they are not to blame for the eruption that took everything they owned. They feel the need to understand why it happened, in order to either move on or rebuild their lives. Therefore, immanence with regard to Pele becomes an important tool for resilience in Puna. As Pele is physically present in disaster, it is much easier to accept – philosophically, psychologically and spiritually – that she is responsible for what is happening. The burden is off your shoulders, you are left with only the responsibility of accepting that it is happening. As Kāne (1987/2013, 68) argued, ‘Mankind may feel driven to explain everything within the Universe, but most of us who live on Pele’s island simply accept the reality of events that defy explanation’. This, I argue, is the essence of the immanent understanding people have of Pele in Puna.

Summing up

In this chapter, I have presented a perspective on who and what Pele is and why she plays an important part in understanding how people can live under the active Kīlauea volcano. Pele holds a central position in Hawaiian cosmology and is one of few gods who is still undoubtedly present in people’s minds and in the environments of the Big Island. While presenting an image of the historical and mythical Pele, I have attempted to also incorporate the relationships that exist today between this Hawaiian deity and the people who live on her land. The understanding and practice of spirituality in Puna play an important part in how people relate to Pele, and the difference between understanding her as transcendent or immanent profoundly influences how people understand and even accept her behaviour. Whereas those who see Pele as a transcendent deity, removed from the human sensory world, have a harder time coping with the disastrous outcomes of her movements in Puna, people who see her as an immanent deity, who is autonomous and has agency, can benefit from this by giving the responsibility for potential loss and damage from volcanic events to Pele. The

psychological burden of blame does not fall on the victim but is rather attributed to the unpredictable temperament of Pele.

When exploring different philosophical ideas and theoretical arguments throughout this chapter, it becomes clear that Puna is a place where Pacific, American and other worldviews exist side by side. A common denominator in these worldviews is a relationship with Pele. In most ways, I would say that Pele is Hawaiian, but given that she is differently interpreted and given meaning by such a diversity of people, she also penetrates the worlds of Americans, Japanese, Filipino, Pacific Islanders, Germans and others who live in Puna. Everyone who lives in Puna has a relationship with Pele, in one form or another. She is not simply a spiritual character or a physical manifestation of Hawaiian cosmology – she is a common denominator for sociality in an ethnically diverse society and a structural steppingstone to relationships formed across the defined lines of different social groups. During a volcanic eruption or an earthquake, Pele takes centre stage and is a model explanation for the potentially confusing and surprising outcomes of such events. She is an equalizer, who does not distinguish between class, ethnicity, gender, or social status, but who creates a common ground for all people under Kīlauea Volcano.

In Chapter 5, a detailed description of two major environmental events that happened in Puna in 2014 will further emphasize Pele's presence in the lives of Puna residents. The first event was a hurricane that directly hit lower Puna in August, and the second was a lava flow that slowly moved towards Pahoa, the urban centre in lower Puna, over a period of six months. Chapter 5 is based on empirical material, predominantly derived directly from field notes and contains a detailed story about life in Puna during these events.

5

HURRICANE ISELLE AND THE JUNE 27TH LAVA FLOW 'Natural Disasters' on the Big Island

I am having dinner in Pāhoā on a Friday night at a favourite local hangout spot, and the restaurant is thriving! Residents of lower Puna are here with their families, and tourists are here to get what they believe to be a last glimpse of Pāhoā town. There is laughter and excited chatting, and when talking to people and listening to conversations around the room, I find a humorous tone being used when addressing the current situation in Pāhoā. Right beyond the trees in the back of the property, lava is moving slowly but surely, closer and closer.

Field notes, October 2014

The Big Island of Hawai‘i is exposed to extreme weather phenomena as well as seismic forces every year. The hurricane season in the northern part of the Pacific runs from April to October, and every year, hurricanes that are formed in the East Pacific travel towards the Hawaiian archipelago. According to the National Oceanic and Atmospheric Administration (NOAA), 22 named storms formed in the ‘East Pacific’ in 2014, of which 16 were hurricanes, and nine of these were major hurricanes (Category 3 or higher) (2015). While most of the storms formed during the hurricane season do not hit the Hawaiian Islands directly but veer either a little south or a little

north, some do hit directly. One example is Hurricane Iniki, a Category 4 hurricane that hit Kaua‘i Island in 1992, causing severe damage to people’s homes and livelihoods and to infrastructure on the island. In 1992, the Pacific region was experiencing an El Niño event, which indicates that the ocean holds higher temperatures than usual (for more on El Niño, see Trenberth 1997). Rising ocean temperatures fuel storms that form during the hurricane season, causing higher velocity winds and more damaging storm events. Hurricane Iniki is remembered by Kaua‘i residents as a traumatising event which claimed lives and destroyed many homes on the island. My landlady in Hilo in 2014, a Kaua‘i resident who has lived on Kaua‘i since childhood, told me that the roof of her house had been ripped off during the hurricane. Her neighbour’s house was swept away and crashed into her garage. One of the resorts that was severely damaged in the hurricane never re-opened and remains as a ghostly reminder of the incredible wind forces that swept Kaua‘i Island that day.

As mentioned in previous chapters, within the last century, Hilo and Puna have been subjected to several major hurricanes, tsunamis and volcanic events, which have altered environments and architectural landscapes in urban and rural areas. Several eruptions and lava flows have altered Puna environments over the past hundred years. Development of human settlements in this area during the same period is partly the reason why these seismic forces have become more challenging to residents of the Big Island than before. The tsunamis in Hilo in 1946 and 1960, which were caused by major earthquakes in, respectively, the Aleutian Islands off Alaska and Chile on the western coast of South America, radically altered the coastal and downtown area of the city. In contemporary Hilo, many of the affected areas from the 1960 tsunami remain without buildings. The downtown areas of Waiakea and Wailoa are now dominated by parks, soccer fields and a tsunami monument, whereas these areas featured both residential and commercial buildings before the tsunamis. The Hilo breakwater, a long sea wall that was constructed after the 1960 tsunami to protect the city from massive damage when the next tsunami hits, also changed the architectural landscape of Hilo and created some challenges the city did not have before, such as pollution in the bay caused by the shipping industry, as well as entrapment of sediments from the Wailuku River. On this

island, there is no doubt that what is often referred to as ‘natural disasters’ will happen again; the question is rather when and how it will happen.

In this chapter, I will address two so-called ‘natural disasters’, or what I, inspired by Sahlins (1985) and Kapferer (2010, 2015), define as events, that greatly affected Puna in 2014: *Hurricane Iselle* and *The June 27th Lava Flow*. I continue my arguments from Chapter 3, in which I define events as generative moments of societal transformation and change. The impact that these two events had on society in Puna will be presented through empirical representations of community meetings, local and global news stories, observations and conversations with people affected by the events. This chapter holds a strong empirical focus, as the unfolding of interesting social dynamics and developments in social relationships and forms during the unpredictability of, in particular, the lava flow can best be communicated through fine-grained ethnography. The chapter is written as a chronological narrative based on field notes taken during the autumn months of 2014, which reveals empirical glimpses of what unfolded in Puna during these challenging events. Further analyses of these glimpses and situations as well as discussions about how people in Puna make meaning of such events will continue in the following chapters.

This chapter is based in the social diversity of Puna, and in the ways in which the people who live there experience the challenging environment from different vantage points. As previously argued, Puna has a rich social environment with people who have been born and raised there, people of indigenous Hawaiian ancestry, people who have come there in search of a different life, people who live there because it is the only place in the islands where they can afford to own property, and people of different ethnicities and social status. I have also argued that sociality in Puna can be fragmented, and that the district, with its opportunities to live an ‘off-grid’ existence, attracts people who like to keep to themselves, both because they enjoy solitude and prefer to be self-sufficient. Simultaneously, Puna residents have told me that living in Puna requires that you have a ‘strong sense of community’ and that residents often find their own solutions to challenges ‘the state’ are not offering to help them with. This chapter addresses some of the social complexities that surface when this region is challenged by the volatile environment it is known for. I analyse how otherwise

dormant forms of social interaction are activated during challenging events like hurricanes and volcanic eruptions. I also look at how community meetings, arranged by 'the state' as an arena for knowledge and information exchange, functioned as a social arena for lower Puna residents, in which they learned about social life in this district, gained knowledge about the volatile environment and learned to know others who live there.

Hurricane Iselle, August 2014

In 2014, the first three months of the hurricane season were rather quiet on the Big Island. A few hurricanes passed the islands close enough to shower the Big Island with a little more rain than usual, as well as providing ideal wave conditions for the most eager surfers, but until July, no major effects from hurricanes had affected the island. Then, shortly after the tropical storm, Genevieve, had provided the islands with heavy rain and high surf at the end of July, Hurricane Iselle and Hurricane Julio were moving towards the Big Island, and the projected storm paths put lower Puna right in the eye of the storm. Both storms, which were formed in the East Pacific and now travelled north-west directly towards the Hawaiian Islands, were under surveillance at the Pacific Hurricane Center and the US National Weather Service. Iselle would be the first to hit, with a projected arrival of 7 August, and the local news and weather services had already started addressing the hurricane as a real threat to the Big Island in the first days of August.

The HCCD started broadcasting hurricane warnings on the radio on Tuesday 5 August, informing the public about the current situation and possible future scenarios as well as asking Big Islanders to stock up on emergency supplies, including water, bleach,⁵⁷ flashlights, canned foods, batteries and medication. They also shared information about several hurricane shelters that would be open to the public, and directly addressed people whom the HCCD believed should consider evacuation. Flooding and high surf were expected, and people living in coastal areas were advised

⁵⁷ Bleach, or chlorine, is typically a part of your 'emergency kit' on the Big Island and is used to sanitize drinking water.

to evacuate. Supermarkets in Hilo and Puna had already run almost completely out of water, bleach and toilet paper by the previous day, Monday 4 August. An employee at Safeway in Hilo informed me that the bottles on the shelves in the market were the last of the bottled water on the island, and that same afternoon a couple of customers had got into a fight in the parking lot over a six-pack of water.

Approaching Thursday 7 August, the day Iselle was predicted to hit lower Puna and Hilo, my neighbours, along with businesses in the neighbourhood and in downtown Hilo, started to prepare houses and buildings by boarding up or taping windows and putting down sandbags in front of the entrances, as is common practice in Pacific countries when preparing for strong storms. The boarding up and taping of windows is a safety measure intended to prevent glass from breaking into very small pieces, which would become a deadly hazard if strong winds got a hold of them and tossed them around at very high speed. The sandbags are put in front of entrances to prevent floodwater from entering a house or building. I asked my neighbours what they did to make their homes safer and copied them by taping the windows of our house. On Wednesday 6 August, the Civil Defence, which by this time broadcasted a message on the radio every ten minutes, advised people to stay off the roads and remain inside their houses.

Thursday morning, 7 August, started out with grey skies and rain getting heavier as the day went by. I decided to go for a short drive to see how people had prepared for the storm in town and found most businesses boarded up or at least with taped windows. The Hilo fire station was full of military personnel practicing the use of fire hoses, but the rest of downtown was quiet and seemed evacuated. When returning to my neighbourhood, I could see that my neighbours had all finished boarding up their houses and one of them informed me she would not be staying in her house during the hurricane because the house was very unstable. She would evacuate to higher ground, to the property of her mother-in-law. Later that day she called me to ask if she could stay with me during the storm instead, because she felt anxious being alone in the unfamiliar house up the hill, so I invited her to stay with me all night until the storm was over. The house I lived in was a single-story building with no basement, structure or space under the main floor, and would thus be safer if subjected to strong wind gusts

than my neighbour's house, which was built as a raised one-story house with a large storage area under the main floor. The risk of flooding was low in our area, so we were not expecting this to be a challenge during or after the storm. My neighbour's house also lacked glass windows on one side, as simple mosquito screens are commonly used as windows in houses in the mild temperatures of Hilo's tropical climate. As the day went by, we did everything we could to make sure there were no loose items outside the house that could be caught in the wind, so we secured the rubbish bins with ratchet straps and brought all potted plants in the vegetable garden under the roof and alongside the house. I parked the car as far into the carport as I could, along with plants and rubbish bins, and brought everything else we had outside into the house.

Iselle was still a Category 1 hurricane when it directly hit the Puna area, although as soon as it hit land it was downgraded to a tropical storm. We started to feel the winds picking up in Hilo around 11 o'clock that night, and by 3:00 in the morning, we felt the winds had passed and left us very lucky, with no damage in our area. However, the next morning we woke up to a different reality. The winds had torn down half of the large trees in the forest in the back of the property, one of our banana trees had fallen to the ground and a big tree had fallen on my neighbours' house and cars. On the street, the power line was on the ground and several houses with weaker structure than ours had parts of their roofs torn off. As I took a drive around Hilo, however, I could see that the town had not been that badly hit, and radio messages and news reports stated that the island had been spared from major damage. A few days after the storm, local media and radio messages from the HCCD informed that the lower Puna district was in much worse shape. The power and phone lines were down throughout the district, and the settlements located by the coast had been badly hit by storm surge. Houses in Kapoho, located by the coast in lower Puna, were flooded and many had significant structural damage. Kapoho was closed off to the public by the HCCD immediately after the storm. The situation in Puna was so challenging for different State agencies and residents to handle that HCCD advised outsiders who were not part of an aid organisation or initiative to stay away from the area, until residents had got a grasp on what had happened.

Driving through the Puna district a week after the storm, I witnessed the extent of Iselle's damages. Several roads were still closed and massive fallen Albizia⁵⁸ trees were cleared to the sides by County road workers and the Hawai'i Electric Light Company (HELCO). Most power lines were still on the ground and were possible threats to people, and several power stations were severely damaged. Along the roads, people had put up signs advertising free ice and food. Immediately after the storm, non-profit organisations as well as concerned residents encouraged Big Islanders to help people in Puna by donating basic commodities like canned goods, gas for generators, ice for food preservation, and money to help people repair their houses and clear their properties. Puna residents gathered and helped each other with removing trees, raising collapsed roofs and making sure those in need got medical attention. Several County offices were working full time in Puna, and HELCO handled the substantial task of reconnecting the district to the power grid. People in Puna were put in challenging situations after the storm and expressed frustration towards different State departments which were involved in recovery work in the district.

'Iselle introduced me to my neighbours'

The effects of Hurricane Iselle, which was 'only' a Category 1 hurricane the moment it hit the lower Puna district, went far beyond the structural damage seen throughout the district's subdivisions and major roadways. After the storm, people emerged from their houses and experienced a form of togetherness I was told is not necessarily experienced in everyday life in Puna, but that typically emerges in situations of crisis, or, following Sahlins (1985), conjunctures. As I have previously argued, Puna has a somewhat fragmented sociality, partly due to the size of the district and physical distance between people but mainly due to social and cultural diversity of its inhabitants, with a mix of 'Western'/New Age and Hawaiian/Oceanic forms of sociality and economy, but it seemed as if this fragmentation was blurred by the event of the hurricane. Anthropologist Ann Iwashita (2017) discussed this social

⁵⁸ An invasive species of tall tree which grows rapidly and has shallow roots.

fragmentation in Puna, arguing that different ontological perspectives of mainly Kānaka Maoli and those she called ‘White settlers’ become problematic in social relationships. According to Iwashita (2017, 129), ‘locals’ in Puna have negative impressions of ‘White settlers’ as

loud and obnoxious and full of their own ideas, and [they] don’t want to listen to you, and...these people from somewhere else, they brought all the baggage with them and they just can’t figure out how to live in Hawai‘i. They’re all armed, packed for the apocalypse...

While these fragmentations between mainly Kānaka Maoli/‘locals’ and those Iwashita refers to as ‘White settlers’ are prevalent in Puna, Hurricane Iselle, which happened to everyone in Puna, forced people to find common ground and served as a stark reminder to those who practice individualism or isolationism in Puna of the importance of thinking collectively. While many residents were social with their neighbours before the storm, many also liked to keep to themselves and not have much to do with other Puna residents. After the hurricane, it seemed as if otherwise dormant forms of sociality broke with everyday isolationism practiced by residents in Puna. A farmer from the Black Sands subdivision, who told me she liked to keep to herself, said: ‘Everyone came out and helped their neighbours with the downed trees, or with fixing structural damage on your house. We all offered to help where we could, including giving out food and lending out our aggregate. [...] For me, it was like Iselle introduced me to my neighbours.’

The Puna district is large, and the State departments who work within disaster relief, such as the Civil Defence and the Hawai‘i Fire Department, were overloaded with different tasks and assignments in the weeks following the storm. They were unable to help everyone and tried to focus their aid on those who needed it most. This approach left many Puna residents frustrated and angry, especially those who needed help removing trees from their property, and it enabled a renewal in Puna residents’ approaches to social life and togetherness, initially in opposition to ‘the state’. In Puna, people do not necessarily talk much with their neighbours even though they live in

close proximity. Sometimes, social differences can cause tense situations between neighbours. However, it seemed as if shared experiences of the storm blurred these differences and made them less important. Finding themselves in much the same situations and sharing the struggle to ‘get back on the grid’, that is, getting their properties reconnected with State infrastructure like electrical and water lines, brought people closer together. ‘The state’ became a common ‘enemy’, to a larger extent than usual, and neighbours formed a collective to handle infrastructural complications caused by the storm. This change in sociality across social and cultural boundaries in the aftermaths of Iselle is an example of my approach to the theory of events, inspired by Sahlins (1985) and Kapferer (2010, 2015) and discussed in Chapter 3 (pages 94-96), in which an event is a social construction of an atypical happening with generative potentials that disrupts daily routine and alters society. Hurricane Iselle became an event when it not only changed the physical environments of Puna but transformed social relationships and structures.

While the post-storm situation in Puna developed, the political climate in Hawai‘i in general was a little livelier than usual, as the State Primary Elections were being held on 9 August, just two days after Iselle hit the Puna district. Two Democrat representatives campaigning for Hawai‘i’s position in the US Senate handled the situation in Puna in different ways, as one of them went to Puna to campaign and the other decided to stay out of Puna out of respect for a community in the middle of a crisis. Candidate no. 1 was accused by several residents in Puna of taking advantage of the situation to campaign in an area where her opponent held most of the votes. Candidate no. 2 was praised for giving people in Puna space and respect in their stressful situation. As the elections were held shortly after the storm, many residents in Puna were not able to vote because they were occupied with managing the aftermaths of the storm or were not able to travel to the voting facilities. Candidate no. 1 thus strongly encouraged a second voting opportunity for two electoral districts in Puna. Although this enabled the possibility for more people to vote, the result of the second vote was the same as the results from the first vote: Candidate no. 2 won the election, and Candidate no. 1’s campaigning in a disaster-ridden Puna was seen by many as inappropriate.

In addition to the added stress of the Primary Elections, Puna residents were bracing for a second hurricane forecast to hit the district directly. Hurricane Julio, also formed in the East Pacific, followed the same path as Iselle and was projected to hit the Big Island in much the same way within a week after Iselle hit. According to a report from the NOAA, this was the first time in recorded history that two hurricanes threatened the state simultaneously (2015). As the damage in Puna from Hurricane Iselle were severe, residents were anxious about a possible second storm. However, after causing a few days of stressful anticipation, Julio turned north and moved away from the island, leaving Big Islanders to continue the clean-up after Iselle. Infrastructure in Puna, especially in the lower parts of the district, was in a fragile state in the weeks and months following the hurricane. Hawai'i County departments of public works and water supply, HCCD, HELCO and other infrastructure providers worked non-stop in the district to get infrastructure, such as power and water, back up and running. In addition to the post hurricane challenges the district and its people were facing, the anxiety people expressed about a possible second storm and stress related to the heated political situation, the HVO and the HCCD publicly announced news of a lava flow approaching Pāhoā Town towards the end of August.

The June 27th Lava Flow

On 27 June 2014, a new lava flow erupted from Kīlauea volcano's Pu'u Ō'ō vent. The flow moved slowly in a northeast direction, initially only through forest areas. Two months later, on 25 August, the HCCD and HVO called all residents of Puna to a community meeting to inform them of a potential lava threat to Pāhoā Town, the urban centre of the lower Puna District. *The June 27th Lava Flow* was heading straight towards Pāhoā, and the topography of the land within the pathway of the flow enabled a possibility that the lava would reach, and possibly damage, the town. Residents in lower Puna reached a new level of stress, and the next six months in Puna were shaped by this event. The following is an excerpt from fieldnotes taken at the first of a series of community meetings in Pāhoā. It is long, but it has been included here in full to set the scene and communicate the atmosphere of this first of many such meetings, where many Puna residents came to get information about the current lava flow situation.

Fieldnotes: First 'Community Meeting' on 25 August 2014, Pāhoā Community Center, organised by HCCD and HVO

Today, on 25 August 2014, a new lava flow from the Pu'ū Ō'ō vent is slowly approaching the Pāhoā area and HCCD is holding a community meeting at the Pāhoā Community Center. I am sitting in the back of the room, which is filled with concerned residents from the different subdivisions in Puna. People are anxious, and the atmosphere feels restless. The meeting starts with some basic information from the Civil Defence Administrator and representatives from the Hawaiian Volcano Observatory about the location and composition of the lava flow and its predicted path, followed by a 'pep-talk' from the Mayor of the Big Island. The Mayor said, 'We gotta pray and we gotta *aloha*. Right now, it's all Madam Pele'. The meeting participants are very concerned about access to Puna and Hilo and ask questions about what will happen if the lava flow crosses Highway 130, the main road from Hilo, leading through the Puna district all the way down to Kaimū/Kalapana. Some are also expressing great concern about the effects this lava flow might have on the geothermal power plant, which is located in lower Puna. In general, the meeting attendees express a deep frustration and anger towards governmental institutions and what they claim is a lack of help in both pre- and post-disaster situations.

The Civil Defence Administrator informs us that HCCD are working closely with farmers to relocate farm animals. Representatives from the Mayor's Office and the HCCD tell us they are in close conversation with representatives of the indigenous Hawaiian population about possibilities of diverting the lava flow. After all the prepared information has been presented by the different governmental agencies, they have opened up the floor for questions from the meeting attendees. A line, consisting mainly of middle-aged White men and women is formed in front of a microphone. As I am sitting amongst a group of Kānaka Maoli at this first meeting, I notice their resigned reactions to the questions, which neither seem well thought through nor educated. They express their frustration with newcomers and people who have no clue as to what it means to live in Puna and on the Big Island. They express that this is Tūtū Pele 'on the move', you cannot stop her, you just have to listen carefully to what USGS and HCCD say so 'you know when to do what you need to do'. I ask them if they have experienced similar situations before, and they elaborate on how some of them were a part of the disaster in Kalapana in the early 1990s, and that they have experience with

HCCD from that situation. They say they have complete trust in HCCD, and that they know they will be better off with listening to what HCCD representatives have to say. One of them expressed humorously, as they entered the room of the meeting, ‘Let me hear a *hana hou!*’, then everyone laughed and said, ‘here we go again...’.

The Civil Defence Administrator warns us that, if the lava flows into residential areas around and in Pāhoā (and possibly further), these areas will immediately be closed off to the public. He additionally tells us that this was not done immediately during the Kalapana disaster, and HCCD have learned that this can possibly be a slow and painful process for the people involved and that they should be able to mourn without the presence of a curious audience.



FIGURE 5.1: The first community meeting about the June 27th lava flow in Pāhoā Community Center. Photo by author.

The information that to me seemed most stressful in this community meeting was that this situation could potentially last for a very long time. It is impossible to know if or when lava will stop. Comparing it to the hurricane that residents in Puna were still managing, the lava could potentially be even more difficult to relate to and manage, because there was no end in sight. However, for many of the meeting participants, the

message of an approaching lava flow was a shock, especially to those who had no experience with the volatility of this environment.

During this first meeting, three types of people were noticeable: 1. The very panicked; 2. The joking and experienced; and 3. The inexperienced but interested. During the questions and answers (Q&A) session of the meeting, attendees showed different understandings of what was happening and the very panicked attendees were especially eager to raise questions to the organisers of the meeting. A large majority of those who expressed panic seemed to be residents who had moved to Puna after the eruptions in Kalapana in the early 1990s. Thus, they had not experienced this type of threat in Puna before, as the lava flows from Kīlauea had moved primarily outside of residential areas since the Kalapana eruptions.

For example, one man, whom I had previously met at a disaster workshop at HCCD, was frustrated because he could not understand why they ‘could not just get an oil rig from Alaska shipped down to Puna to drill a hole in the ground for the lava to enter into’. I remembered well the conversations we had in the ‘disaster workshop’ earlier that year, where he had exclaimed that if there were a disaster (of apocalyptic proportions) he was prepared with firearms he would use if anyone stepped onto his property. I was astonished by this attitude, which I had previously only experienced in Hollywood disaster films and asked him if he had ever thought about the possibility that a person would knock on his door to ask him if he was okay or if he needed help. He laughed at me when I asked him this and said, ‘nah, people don’t do that!’ At the time, I remember thinking to myself, ‘he must be new here on the island’, but I never got the chance to ask him if that was the case.

In the community meeting, he was even more frustrated when he was told by the HCCD Administrator that his oil rig suggestion would be extremely expensive, and it would be incredibly insensitive to indigenous perspectives on the volcanic environments in Puna. At the time, and from a geological perspective, a continuous eruption from Kīlauea had lasted for over 30 years and was not showing any signs of

stopping.⁵⁹ Drilling a hole to redirect lava back into the ground, where it originally comes from, would not solve the lava flow threat to residential areas. Upon receiving this information, the man additionally expressed that he could not understand why the military could not help more or be visibly present during these types of crises.

Another example was a woman who somewhat blamed the HCCD (which represents ‘the state’) for the ‘natural disasters’ people in Puna had experienced lately, by saying: ‘First Iselle, and now this lava flow, how can you do this to us!?’ She further expressed that it was ‘the state’s’ sole responsibility to ‘fix’ the situation.

A third example was a woman who expressed how she was in shock and terrified as she had moved to Puna from Germany only three months previously, thinking she was moving to paradise on earth: ‘Then the hurricane hit and now the lava flow, I didn’t even know there was a volcano here!’

Common for the three examples above, as well as several other similar reactions and questions not directly quoted, is a distinguishable frustration aimed at ‘the state’ for not giving enough support to Puna residents through financial and other types of aid in the aftermath of Iselle. People in Puna who criticise ‘the state’ usually see it as a rather abstract entity, rather than a democratically decided system of government. ‘The state’ is usually seen as an enemy, as a controlling unit and a limiting factor in the ‘free’ lives they strive to live. Only two women stood up to speak against those who were complaining about the aid efforts of ‘the state’. One of them stated, ‘Stop complaining and take some responsibility for your own choices. We have all chosen to live in an out-of-the-way place, which is located on an active volcano’. She was referring to those who move to lower Puna from other places in Hawai‘i, the mainland or the world, who often choose this place because it is separated from the infrastructure provided by the State. They seek to live ‘off-grid’, outside of mainstream society and not connected to the State provided power grid, State road infrastructure, State provided water and sewage or communication services, and, according to this speaker, should therefore be aware of how this lifestyle might rule out immediate help from ‘the state’ in cases of

⁵⁹ This continuous eruption from Kīlauea lasted from 1983 to 2018, when it came to a halt. More about this in Chapter 7.

emergency. Although the two women who defended ‘the state’ presented a fair point, the frustrations about State involvement in Puna are not necessarily unprecedented, as the district often experiences being ‘at the end of the line’ in matters of positive State initiatives. In the aftermaths of Hurricane Iselle, many residents were left to handle challenges on their own, with little support from ‘the state’.

A considerable proportion of the people at this first meeting, who were clearly new to the volatility of Puna environments, were unaware of where Pāhoā was located on a map of the Puna district. Many were also unable to point out where they lived on a map of the Big Island. The HCCD and HVO operated with both geographic and topographic maps in their presentations as to where the lava was located as well as the predicted paths it could take in the next week or month. Many found it difficult to understand the physics of their environment; for example, one woman asked how the lava could flow north, as north to her meant the same as up. Thus, at this first meeting it became very clear that both residents and expert scientists would have a challenging time ahead with regards to communicating about the activities of the volcano.

Meanwhile, ‘locals’ and Kānaka Maoli, who were very familiar with the volatile environment of Puna, mainly represented the second category of people (the joking and experienced) and were mostly concerned with the fact that no lives had been lost during Hurricane Iselle, and that everyone should focus on helping each other. They also expressed a joking relationship with the ongoing crisis, and sarcastically addressed the fact that there is nothing you can do to stop the unfolding lava situation. A ‘local’ woman expressed that ‘nature does what she wants, and we cannot stop it’. The Civil Defence Administrator mentioned that even though the HCCD were in close conversation about redirecting the lava flow or other mitigation methods with representatives of the indigenous Hawaiian population, this was difficult, as meddling with the ‘will of Pele’ did not cohere with Hawaiian ‘cultural beliefs’. A ‘local’ woman expressed, ‘Pele does what she wants, she takes, and she gives, and people should not meddle’. The level of rationality and calmness of this group was impressive, even at this first meeting.

The third category of attendees at the meeting were those who did not have much experience with lava flows in Puna, but who managed to keep calm and listen carefully

to what the HCCD and HVO were telling them. They were interested in learning more about the volcano and the science of predicting lava pathways through lower Puna topography. After the meeting, they stayed behind to discuss the situation with HVO scientists and learn more about what to expect in the coming months. Interestingly, as the situation developed over the next few months, these different types of ‘audience’ would always be at the meetings, but they would not always be the same people. People’s approach to the situation differed from time to time, often depending on how threatened they were by the lava flow. Most of the people who had been through a similar situation before were rather calm throughout the event. They listened carefully to the HCCD and to HVO, and only attended the first few meetings. The inexperienced but interested people usually came to the meetings every time, as they were interested in talking to the representatives from the different agencies. Many of them stayed behind to discuss geology and the workings of the volcano with HVO staff after the meetings. The very panicked people came to all the meetings, and while they started out with panic, they would swing a little back and forth between this state and a more collected and calm state as they had the situation explained to them at the meetings. However, if the lava was behaving in an unpredictable and rapid manner, the panic would return.

‘We Gotta Aloha’ – Thinking Like a Collective Group

As already mentioned, residents in lower Puna have a somewhat fragmented social organisation, due to social diversity and individualist, or, according to Iwashita (2017), liberalist attitudes which break with social conventions practiced by ‘locals’ and Kānaka Maoli. As Iwashita (2017, 129) argued, the ‘new settlers’ in lower Puna did not share the Hawaiian social attitude:

Through decades, direct confrontation of ‘Punatics,’ as they were called and called themselves, was not common; more than once it was explained to me that no one wanted to make trouble. One man explained, ‘The Hawaiian way is humility. We all in one canoe. You start a big fight, everybody gotta get involved because you in a canoe. You don’t start trouble, because trouble going follow you around’.

People who live in lower Puna often prefer to be left alone, either as individuals or as small social groups, and many have an anarchic attitude towards societal structures and stately leadership. This fragmented sociality is a challenge when collective emergency and disaster response from residents is necessary. Emergency response seems to be largely based on experience from similar situations in the past and are dependent on residents with experience knowing how to react and act. Even though neighbours may not know each other, residents in Puna who have experienced hurricanes, earthquakes and lava flows in the past will start acting on experience from these past situations, and others, who are not as experienced, will, eventually, follow their lead. Suddenly, when it really matters, leadership becomes important. While not witnessing any significant power struggles among Puna residents at any time during these situations in 2014, I saw that most residents gradually leaned towards accepting HVO and HCCD as the leading authorities in the handling of the situation, even the ones who clearly expressed disbelief in these authorities in the first few meetings. As the lava flow was slowly creeping towards the ocean, burning bush and trees on its way, the community meetings continued and became a hub for desired information from the two State agencies.

At the second community meeting, HVO informed the public about where the lava flow was active at the time and gave projections about its path and advancement pace. The lava flow was now slowly approaching a residential area southeast of Pāhoa. The flow was a typical pāhoehoe flow, and advanced ‘as a series of budding lava “toes” and lobes (small flows) that break out and spread, then stop and inflate with fresh, molten lava, before breaking out again as new toes and lobes’ (USGS 2014). The meeting room was completely full, and people were standing up, leaning against the walls, and even standing outside the room, listening through the entrances because there was no room to sit down. I was sitting in the far back with the same group of people I had been sitting with in the last meeting. They mostly remained quiet during the meeting, absorbing the information given by HCCD and HVO.

HCCD focused on the extra hazards that follow the advancement of a lava flow through this environment, warning people about brush fires and how pockets of methane, caused by the physical composition of the eruption, can cause explosions.

They also informed them that there was no brush fire threat at that moment, as there had been many rainy days lately, and the flow was located in a less bushy area. Further, they informed them that at the time there was no indication of the flow stopping. The Civil Defence Administrator emphasized how lucky Big Islanders are to have HVO on the island, as the scientists working at HVO are continuously studying the geological and seismological details of the eruption and share information and scientific discoveries about the volcanoes and their activity with the public. The meeting attendees made a collective buzzing noise, and many nodded and verbally agreed with this statement.

At this point in the meeting, the public was allowed to ask questions, and many took the opportunity to voice their concerns about current and upcoming challenges. Some asked questions that reflected their lack of knowledge about the volcanic environment in Puna, while others asked questions about the practicalities relating to evacuating from their properties. The social diversity I have previously argued exists in Puna became increasingly visible in the community meetings and ‘locals’ and Kānaka Maoli were arguably much more experienced and knowledgeable in this situation than other meeting attendees. They expressed a better understanding of what was happening, what is considered socially acceptable behaviour in such meetings and how to respond to the lava threat. The questions they asked were largely rooted in a basic knowledge of the movements of Kīlauea’s lava flows. They were not panicking, as many others were, and some shared experiences with people who understood less of what was happening.

Following Kapferer’s (2010, 2015) arguments about the generative potentials of events, as discussed in Chapter 3, in which the event itself can transform and create societal orders, I argue that Hurricane Iselle generated transformations of sociality in Puna, where neighbours came together in interpretations and meaning making of the event and helped each other instead of keeping to themselves. These transformations of sociality had generated a willingness to work together to manage impacts of the event, and when residents were informed about the new lava flow, these forms of cooperation and ‘togetherness’ were already in place. While Iselle was close in memory, Lower Puna residents were largely able to act collectively, and the social

differences that are usually communicated to maintain clear distinctions between social groups were blurred. People in Puna united in the efforts to rebuild their society during the aftermaths of Iselle. Neighbours, who had not known each other before Iselle, became friends, and families joined forces to get everyone through the crisis. This attitude and ‘community spirit’, as the HCCD called it, was particularly present in the first few weeks of the lava flow community meetings, where participants were discussing how they would also get through *this* situation, because they were strong and collected and could take on any challenge as long as they stood together. However, as the societal trauma of Iselle drifted further and further from people’s minds, sociality in Puna returned to the more fragmented state of smaller and more closed social groups I have previously suggested. During the next few months, the ‘community attitude’ that was a clear focus in the aftermaths of Iselle was dynamic and changed along with the changes in the lava flow situation. Subscribing to the idea that events are generative of social transformation, as argued by Kapferer (2010, 2015), I argue that the drawn-out event of the lava flow contained a series of generative moments that created shifts in social relationships. Evidence of these shifts, as well as social and personal challenges for residents in Puna, will be discussed in the following sections.

State of emergency and bracing for disaster

The community meetings organised by HCCD and HVO had become so popular by the first week of September that the location of the meetings was changed to the cafeteria of Pāhoa High and Intermediate School to make room for more people. Even there, in a much larger space than the room in the community centre, seats filled quickly. In the meeting on 4 September, the mayor of Hawai‘i County informed meeting participants that he had declared a ‘state of emergency’ in Puna, and together with the governor of the State of Hawai‘i, he was working on getting an emergency declaration from the US President. A formal declaration of this sort enables opportunities to get federal financial support and emergency aid, as well as possibilities to form new policies with a purpose of ensuring the safety of the people affected by the emergency. The ‘state of emergency’ declaration was based in the challenges brought on Puna by Hurricane Iselle, and, shortly after, the anticipation of possible destruction of infrastructure by the

approaching lava flow and was needed from the very top of the federal administration in order to release funds to start constructing an alternative road out from lower Puna. Highway 130, the main road in and out of the Puna region, would be covered by lava if the lava flow continued at the same pace and volume. This road previously connected Kaimū with the Chain of Craters Road located in Hawai'i Volcanoes National Park (HVNP), but the connection had been cut by the many lava flows from the Pu'u Ō'ō eruption that started in 1983. Construction of the alternative route would involve bulldozing a path through the lava fields between Kaimū and HVNP and restore the old connection between HVNP and lower Puna, ensuring a possibility for residents from lower Puna to reach other parts of the island.

In this meeting, participants were also informed that the lava flow was only 1.6 kilometres away from Kaohe Homesteads, a small residential area southwest of Pāhoā. The HCCD operates with an alert scale consisting of three levels – *watch*, *advisory* and *warning* – and Kaohe Homesteads was now at the highest level: warning. As I was having a quiet conversation with one of the meeting participants, I was reminded about how remote some of the places in Puna are. Not necessarily remote in terms of physical distance to more urban areas, but in terms of residents' connectedness, or, rather, disconnectedness, with the local, state, national and global world around them. The woman I was talking with was in her mid-40s, had moved from the mainland to Puna 'many years ago' and lived on a farm in the Black Sands subdivision. She lived 'off-grid', she told me, and had struggled with clearing about a dozen Albizia trees, which had fallen during Hurricane Iselle, from her property for the past month. She told me she had her hands full after the storm, and that she had not found the time to keep updated on the lava situation, but since her neighbourhood was not under immediate threat, she was not too concerned. 'It is very unlikely that the lava will pass through my home', she said, and added that this was the reason why she had not attended the meetings until now. Only earlier that week had she heard about the meetings from a neighbour and decided to come to Pāhoā to get the latest news. She told me that many people who live 'off-grid' in lower Puna probably had not yet heard about what was happening. Additionally, those who did not live entirely 'off-grid' in Puna lacked electricity for a long time after the hurricane severely damaged the power

infrastructure, and had too much to deal with at home to have time to ‘venture out and be updated on the news’, she told me. The flow of information was thus at this time rather dependent on ‘the coconut wireless’ (word of mouth) for many who lived in Puna.

The HCCD and the HVO have extensive experience with working together with the different subdivisions in Puna in emergencies and are aware of the challenges regarding communication and information flow. Thus, the woman from Black Sands told me, the HCCD had been in Kaohe Homesteads for the past few days, knocking on residents’ doors to inform them about the lava threat coming their way. At this time in the meeting, HCCD informed us that, starting 5 September, they would restrict and coordinate movement in and out of Kaohe Homesteads and set up barricades and provide security officers to stand guard. I asked the person sitting next to me why they needed to set up barricades and stand guard, and she told me that the lava flows usually attract many curious ‘lava-tourists’, travelling from neighbouring subdivisions, from other places on the island and from off-island destinations. As an act of respect for the residents and a way to ensure that they can deal with the possibly bleak circumstances in their own way, the HCCD wanted to keep people who did not live there out of the area. When I asked why people did not automatically respect residents’ privacy in such a situation, her answer was ‘there are a lot of stupid people in Puna’. While there might be cases of people not considering the consequences of their actions in Puna, I believe the spectacle of such a major force of nature as a lava flow is inherently attractive to people. In the search for the incredible experience of being close to a lava flow, people might easily forget to consider ethical issues, respectfulness and privacy concerns in relation to the residents of the area that the lava flows through. Several incidents in the coming months suggested similar challenges to acceptable social behaviour in emergencies in Puna.

At the same time as people in Puna braced for social misbehaviour, several initiatives were formed to improve togetherness and neighbourly cooperation. One of

these initiatives was set up as a website similar to Craigslist,⁶⁰ where people in Puna could register what help they needed during the aftermath of Hurricane Iselle and in preparation for the lava flow. The founders of the website informed community meeting participants on 4 September that the goal of the website was to include people from outside Puna, from Hilo, Hāmakua, Ka‘ū and the rest of the island, who could help residents in Puna through these difficult times. Challenges that lay ahead included moving farm animals from farm facilities and to place them elsewhere on the island. Another challenge was the emotional and logistical turmoil of residents leaving behind properties and houses where they had lived their entire lives. Finding new housing and moving furniture to new locations were popular entries in the aid forums on the website, and people from the entire island heard the call and offered to help residents in Puna.

Another issue discussed in the 4 September meeting was possible mitigation activities that could reduce the negative impacts the lava flow would have on lower Puna. At this point, Kānaka Maoli stood up in frustration and anger towards those who lacked knowledge about the social meanings of the lava flow (as discussed in Chapter 4), and the reaction seemed to take many of the meeting attendees by surprise. Kānaka Maoli had until then stayed in the background during the meetings and in the media, but the general discussion about mitigating actions caused several to speak up about Kānaka Maoli relationships with volcanic environments and considerations that should be made in this situation. As discussed in the previous chapter, lava is the physical manifestation of the volcano goddess, Pele. Kānaka Maoli consider lava flows to be the body of Pele and believe they should flow unhindered. A woman stood up and exclaimed:

If she feels she needs to clean her house, let her clean her house. Where do you think all the Native Hawaiians are tonight? We are at home, preparing for an important guest. We prepare and we keep our people safe. This is HER land. You might own your land legally, but it will never be truly yours. This is Pele’s land.

⁶⁰ Craigslist is an American classified advertisement site, with listing categories such as ‘housing’, ‘jobs’, ‘for sale’, ‘wanted’ and more.

Another woman said: ‘Pele goes where she goes.’ The two women additionally stressed that ‘local knowledge’ is needed in such a situation because most people do not understand all the scientific facts of volcanic activity. They both expressed that experience about how to handle these situations is a key factor when people are facing these types of challenges. A third Kānaka Maoli woman said: ‘The only way we can deal with this lava coming is to work together and show true *aloha*.’

The Office of Hawaiian Affairs (OHA), which is a public agency for indigenous Hawaiian matters, owns land in Puna, and the lava flow was moving through their property at that time. The HCCD remained in close conversation and collaboration with OHA throughout the entire situation, but what was experienced as a lack of action from ‘the state’ in dealing with the lava flow had started to frustrate others who did not follow, or were even aware of, Kānaka Maoli approaches to this environment. Thus, many of the questions raised in the meetings were about whether any type of mitigation, for example redirection of the flow, was possible. Several suggestions about how to mitigate the physical impacts of the flow came from people who had lived in Puna for a short time. They included suggestions of bombing the lava flow; building berms (stabilising mass); building bridges over the flow; and preparing alternative road routes in and out of lower Puna. Many of these suggestions were either completely shot down by other meeting participants or rejected by HCCD with an explanation as to why these would not be ideal solutions to the problem. Some of the suggestions were however considered, and the HCCD, in collaboration with the Department of Roadworks and the Mayor’s Office, started working on plans to prepare more alternative roads in and out of lower Puna.

After reactions and feedback on mitigation suggestions in this meeting from several meeting participants, including Kānaka Maoli, non-Hawaiian people and the HCCD, it seemed as if meeting participants reached a moment of clarity, in which Puna is, above all, a Hawaiian place, where Hawaiian beliefs, opinions and sociality should take precedence when ‘the state’ approaches these types of challenges. Simultaneously, governmental agencies on the Big Island, such as the HCCD, often employ local people, who have been born and raised in Hilo or Puna or have lived there for a long

time. Thus, even though governmental agencies in Hilo represent the US government, and, often, US policies, they have local employees who often have strong social relationships with Kānaka Maoli or people who are deeply engaged in indigenous rights issues. These social, and often personal, relationships strengthen local governmental knowledge about Kānaka Maoli approaches to ‘natural disasters’ and enable possibilities of considering indigenous approaches as solutions in challenging processes like preparation for possible large-scale destruction of urban infrastructure in lower Puna.

Spiritual guidance, infrastructural challenges and economic inequality

The next community meeting in Pāhoa was held just five days later, on 9 September. After the previous meeting, several meeting participants had commented to the organisers that every meeting should begin with a communal prayer (*pule*). One of the Kānaka Maoli women who had spoken in the previous meeting led the prayer in which she asked the ‘heavenly father’ (the Christian god) to help guide Pele down to the sea without destroying any houses or harming any people. As mentioned in Chapter 4, it is common to combine apparently disparate spiritual beliefs in Hawai‘i, and a belief in Pele does not hinder a belief in the Christian god. Following Mapunaleo’s comment in Chapter 4 (page 170), where she explained that she believes the Christian god created the Hawaiian gods and, as with the humans, gave them free will, it seemed as if some meeting participants believed the Christian god could possibly influence Pele to spare peoples’ properties and lives. Seemingly, while Pele would move through Puna in the way she wished, a communal prayer to the Christian god in an effort to influence Pele’s movements was fitting in this setting.

The woman had been chosen to open the meeting and lead the communal prayer because a video of her speech at the previous meeting had spread rapidly in social media and local and national news channels and sparked a debate about the role of Kānaka Maoli and indigenous rights politics in relation to the June 27th Lava Flow. Her frustration and anger had been communicated in her speech, and because she spoke up about topics many residents in Puna were frustrated about, she established a key position in the complex situation Puna was facing. Bringing Kānaka Maoli perspectives

to debates about lava diversion and social behaviour in relation to the lava flow, she became an important voice and driving force for indigenous knowledge and politics regarding the eruption. This meeting marked a change in organisation of this series of meetings in which Kānaka Maoli were increasingly involved as a form of authority.

After the first meeting that included a communal Hawaiian Christian⁶¹ prayer, the same woman opened the meetings with prayer for the remainder of those I attended in 2014. Additionally, after a few meetings were initiated with Hawaiian Christian prayer, the meeting organisers decided to add room for other spiritual leaders from different churches in Puna. The group I was sitting with at the meeting on 9 September, whispered amongst each other how unnecessary they felt the prayer was. I asked them why they felt it was unnecessary and they told me it was because they were atheist and did not think that spirituality should ‘be pushed on others’ in public settings. Others who told me they were ‘not spiritual’ expressed that beginning the meetings with a prayer ‘probably couldn’t hurt’. During the prayer, many bowed their heads, while others quietly looked around the room. While people seemed to have different opinions about giving space in the meeting schedule for a prayer as well as about the importance of asking for spiritual guidance in this situation, everyone remained respectfully quiet during the prayer.

After the communal prayer finished, the HCCD informed meeting participants that, if the flow continued in the same direction and at the same pace, it would reach Pāhoa in 16–18 days. If the flow continued after that, it would probably reach the ocean, as the downhill slope from Pāhoa to the ocean is steeper and the flow would thus move at a faster pace than it had so far. As the flow was still heading towards Kaohe Homesteads, the HCCD had hired a private security company to continuously guard the entrance to the subdivision and ensure that outsiders stayed away from the area. Another challenge mentioned in this meeting was the reorganisation of schoolchildren if the lava flow divided Highway 130 or otherwise forced the schools in lower Puna to close. Pāhoa High and Intermediate School is the only public school that offers

⁶¹ By Hawaiian Christian, I am referring to the mix of religious views discussed in Chapter 4, where you can believe in both the Christian god and the Hawaiian gods at the same time.

intermediate and high school education in lower Puna and had an enrolment of about 700 students in 2014. If the lava crossed the road, the high school students who lived on the Hilo side of the flow would have to change schools to Kea'au or one of the schools in Hilo. These students would have challenges travelling to and from school with regards to both transportation and commute time, they might have social challenges if they were separated from their classmates and friends at the old school, and they might have difficulties adapting to new teachers, learning facilities and social groups at their new school. This was a complicated challenge and alternative plans for the continued education of lower Puna's schoolchildren were in development.

Possible economic consequences of the lava flow were issues that emerged in conversations I had with meeting participants at this point. In these conversations it became clear that economic differences that are usually hidden would surface and divide people according to financial status or class if the lava flow took over residential areas. For example, many people in lower Puna would face the prospect of not being reimbursed by their insurance company if their house and property were damaged or covered by lava. According to several meeting attendees and homeowners in the area, most insurance companies are not willing to give people in the most extreme lava zones coverage for damage caused by lava, but they will cover damages caused by a 'fire peril'. If lava moves close enough to your house for the heat to cause your house to ignite, you might be covered under the category 'fire peril' in your insurance policy, but this requires documentation from the insurance claimant in the form of, for example, photographs of the incident (see Appendix C). Thus, on a small technicality, a homeowner could potentially not have any support from their insurance company should they lose their house. It is thus crucial to pay close attention to the process and take pictures as well as video as the lava ignites a house.

This was the topic of a conversation in the group of Puna homeowners I was sitting with in the community meeting on September 18. They discussed the importance of taking detailed and numerous photos of their houses and properties in an undamaged state in anticipation of the lava flow covering their homes. If the lava flow were to come close to their properties, it would be essential to be there to take pictures or video of lava approaching the property and building structures, to document that property and

structures were damaged by fire before they were potentially covered by lava. I asked them whether they had insurance that covered damage caused by lava and they told me that they did not and added that most people in lower Puna could not afford an insurance policy that would cover damages caused by lava, if an insurance company were even willing to take that risk. Following this up later with friends who lived in lower Puna revealed a rather stark difference in economic consequences should a lava flow cover their house. One of them told me that they had adequate insurance and thus would not fall into financial ruin should Kīlauea erupt in their backyard. Others told me they could not afford such insurance and would thus lose everything they own in the event of an eruption that destroyed their property or house.

Until discovering this, it had not dawned on me that the differences in financial consequences of an eruption would be this comprehensive in lower Puna. Although I had learned that people living in lower Puna had different financial means, I did not find the economic differences as apparent as, for example, Scheper-Hughes (2005) found in New Orleans in relation to the disastrous Hurricane Katrina in 2005. She argued that the wealthy residents of New Orleans would be much better off during and in the aftermath of the hurricane (2005, 2):

The affluent had access to early warnings via fax and internet. They could jump into their tank-like 4-wheel-drives and well-stocked recreation vehicles. They had access to fast cash with their high-end credit and debit cards, and they could mobilize extensive and well-equipped personal and public support systems. Finally, the wealthy residents of New Orleans hold insurance policies that will allow them to return and to rebuild if they so wish.

Until the discussions about insurance policies and the ability to either buy a new property and house or rebuild in the same location using insurance money, it seemed as if residents in lower Puna were almost, financially at least, 'in the same canoe'. An important difference to consider between Hurricane Katrina in New Orleans and eruptions from Kīlauea in lower Puna is that the low-lying areas of New Orleans will always be vulnerable to floods when hurricanes hit the city, but the eruption patterns of Kīlauea are a bit more unpredictable. As lava flows from the Pu'u 'Ō'ō vent have

been slow-moving effusive pāhoehoe flows, there are examples of neighbouring properties where one property is covered by lava and the next is not. This unpredictability has caused the entire area to have low property values and property taxes, attracting residents with low income and limited finances. Simultaneously, the dream of living a simple non-materialistic and off-grid life has attracted those with higher financial wealth. Thus, neighbours in lower Puna can have very different financial situations. Still, most people I spoke to about insurance told me they did not have policies that would cover damages caused by lava.

Scientific language and local understanding

The community meetings continued to be well attended in the following weeks and months. On 18 September, the organisers announced that there were about 500 people attending the meeting, and it had become a common gathering place for residents of lower Puna who wanted to chat with and get to know their neighbours and other fellow residents. In this meeting's communal prayer, held by the same Kanaka Maoli woman as in the previous meetings, the focus was on showing 'true *aloha*' in 'such stressful times'. The complex reciprocal responsibilities of *aloha*, as it is referred to by Kānaka Maoli and in other Pacific societies, is often lost in the way it is used by non-Hawaiians. The woman was trying to remind the audience that *aloha* is a relational concept, and, she explained, 'true *aloha*' refers to showing kindness to your fellow residents, giving space for differences of opinions, respecting stressed reactions of your neighbours and approaching people around you with understanding and empathy. The need for this reminder sprung from small conflicts and instances of polarisation between residents in Puna in the past week, most notably between those who were for and those who were opposed to measures of mitigation to redirect the lava flow. While these conflicts were manageable, there was a clear invitation in the communal prayer to participate in the improvement of communication between neighbours and fellow residents, as the stressful anticipation of lava flow movements started to affect peoples' patience and levels of anxiety.

Communication between residents and State agencies, particularly geologists from HVO, had been slightly challenging since the very first meeting, as the HVO

presented important information using scientific terms. In the first few meetings, meeting attendees had difficulty understanding the scientific nature of presentations about the lava flow, and the geologists had to change the form of their presentations and approach the residents of lower Puna with a more colloquial language. While gradually changing their presentation form, residents became increasingly aware of scientific terms, models and graphs shown both in the meetings and through other media, such as the HVO webpages.

As the weeks went by, communication between the HVO and residents improved greatly, and questions from meeting attendees to the geologists were of an increasingly informed form. In this meeting, on 18 September, the HVO focused on presenting how a lava flow moves, and they informed meeting attendees that a lava flow will continuously drill a lava tube when it is flowing down a hill. This lava tube feeds the front of the flow, and the movement of the flow is dependent on the amount of lava that is fed from the volcano crater to the front through the lava tube. With the amount of lava coming through the lava tube and the pace of the flow towards Pāhoā town, the HVO estimated that the flow would come though Pāhoā about two weeks after this meeting. When the HVO geologist said this, a collective gasp was heard from the crowd of meeting attendees, who suddenly seemed to realise that this was really happening: Pāhoā could be destroyed by lava. The HCCD assured those who owned property in the lava flow's path that they would give them a ten-day warning to evacuate their homes.

While slow motion and directional changes in the lava flow created uncertainty and frustration, it also provided people time to think about their options if their homes were to be taken by the flow. Everyone was given plenty of time to arrange for other places to live, but this did not necessarily mean that everyone had the option of living elsewhere. Coming to the community meetings was a comfort for some, while for others it was a painful reminder of what could potentially happen to their home. Many of the meeting participants were people who lived in subdivisions that were not directly threatened by the flow but would face many challenges if the flow crossed the highway and travelled all the way to the ocean. Many people were driven by curiosity and an eagerness to learn in coming to the meetings, while others came to talk to friends and

fellow residents. The number of attendees varied, and when the flow had been rather calm for a while, attendance went down. As the community meetings continued in Pāhoa, there were noticeable shifts in the ways attendees approached the situation. The different knowledges available to interpret and project what would happen to Puna if the lava flow did not stop seemed to be merged in order to be better prepared for what was coming. While the audience absorbed scientific data presented by the HVO in every meeting, there seemed to be a simultaneous increased interest in the Hawaiian interpretation of what was happening – especially in the belief that Pele has her own will and those who try to interfere with her path to the ocean will not be successful in their attempts. Increasingly, it seemed, people came to terms with having to move out of the way of the lava flow, and they talked about the flow with references to Pele. I will discuss this further in Chapter 6.

By the time of the community meeting on 25 September, the front of the lava flow had stalled, a new branch had broken out a little further up from the front and the forecasted arrival of the flow in Pāhoa had changed. The HCCD administrator emphasised that this was quite typical for the lava flows from Kīlauea and one of the reasons why the wait for the flow to arrive was so frustrating. The HCCD explained that there was less lava being fed into the lava tube from Pu‘u ‘Ō‘ō because the lava reservoir under Kīlauea was not feeding as much lava to either Halema‘uma‘u or Pu‘u ‘Ō‘ō. Thus, there was a pause in the development of the flow.

Other challenges had developed, however, as a heat wave had struck the entire east side of the Big Island, and residents of this side of the island were frustrated by the high temperatures and dry weather. A woman at a restaurant in Pāhoa told me that her water tank was almost empty, and she was beginning to find the heat wave ‘a little frightening’. Another woman, from one of the lower Puna subdivisions, told me that her property was located 305 metres above sea level, and the temperature at her house was 35 degrees Celsius, which she exclaimed was ‘abnormally high’ for where she lived. The heat wave had caused a drought in lower Puna and the lava flow caused brush fires that the Hawai‘i Fire Department was tirelessly working on controlling. Simultaneously, residents in the areas close to the flow had reported seeing tour activities at the flow front. The lava flow front was at this time located on private

property, so these reported tour activities were not legal. The HCCD informed the gathering that they were aware of these challenges and were working on finding the operators of these tours. They also informed meeting attendees that they would start holding meetings on a smaller scale in each of the subdivisions to make sure as many residents in Puna as possible would know what was happening with the lava flow.

Closing in

In the next community meeting, on 2 October, the new branch that had broken out from the main flow a bit further upslope from the flow front, had advanced approximately 100 metres and had passed the main flow front. The lava lake in Halema'uma'u had been deflating and inflating over the past few days, and there seemed to be a disconnection in the lava feed system between Halema'uma'u and Pu'u 'Ō'ō. However, lava was moving in the lava tube system from Pu'u 'Ō'ō to the flow front and ensured the advancement of the breakout branch. Brush fires were still happening around the flow, and the smell of fire and smoke conditions were noticeably worsening in the surrounding areas. Keonepoko Elementary School, located in Pāhoa, closed in the beginning of October, after 25 years as an institution for elementary education in Pāhoa, because of the smoke conditions and lava threat. All students and staff at the school were relocated to other schools in the area or to a temporary portable campus constructed in Kea'au.

The affected subdivisions close to the flow were dealing with poor air quality caused by brush fires as well as an increase in tourism in their neighbourhood. A woman from 'Āinaloa, which is located right next to Pāhoa, told me that the flow went right past their house and that the smoke conditions were so bad that she thought her house was on fire. She also told me that people had been lining up to take pictures outside a house that was being evacuated, which she found this incredibly insensitive to the people who were leaving their lives behind. National media had at this point also started lingering in and outside Pāhoa, and residents were filmed, photographed and interviewed on a regular basis.

On the third weekend of October 2014, the lava flow was still approaching Pāhoa and closing in on the Pāhoa Transfer Station, a modern recycling facility of

which Puna residents were fond and proud. Additionally, people on the Big Island were expecting the fifth hurricane of the season, Hurricane Ana, which was projected to directly hit the Big Island. However, since residents of lower Puna had already dealt with Iselle earlier in the season, many expressed that they were less anxious about Ana. They were also still managing the threat of the lava flow, which had lasted two months, and seemed exhausted from continuously dealing with environmental volatility. However, the coming of the hurricane stirred up the previously mentioned, old Hawaiian myth of the rivalry between Pele and her sister, Nāmaka; a lower Puna resident in his mid-20s said to me, ‘we are caught in the latest fight between Pele and Nāmaka’. Many were jokingly saying that Hurricane Ana, representing Nāmaka, would wipe out the fire in Pele’s lava flow.

In the local newspaper, the *Hawai‘i Tribune-Herald*, stories and discussions about lava, weather and climate change were published almost every day (see Figure 5.2). Front-page pieces featured headlines such as ‘Slow motion torture’, ‘Man vs lava’, ‘Lava scars’ and ‘Going with the flow’. Every day there were news stories about the lava situation, often with interviews of lower Puna residents about how they were preparing for the seemingly inevitable arrival of the June 27th lava flow in Pāhoā. On 5 October 2014, the *Hawai‘i Tribune-Herald* published a story with the title *Cool under Pele’s pressure* in which they had interviewed ‘disaster experts’ Bruce Houghton, science director for the National Disaster Preparedness Training Center at the University of Hawai‘i at Mānoa, and Thomas Curtis, (now retired) professor of sociology at the University of Hawai‘i at Hilo. Houghton expressed:

Going to the community meetings at the high school, I am so impressed by how upbeat the community is and how positive the response is. [...] It’s difficult for everybody in these circumstances, but at the (lava information) meeting (Thursday) night (at Pāhoā High) I thought ‘This is as good as it gets’. People were working together. There’s a common, consistent message going out to the public, and the public is picking it up. The bulk of the people there were there 30 minutes before it started... they want to make their decisions in as informed a way as possible.

Stewart/*Hawai‘i Tribune-Herald*, 2014, front page and A3

Curtis commented that much of the public's reaction had to do with the fact that nothing catastrophic had happened yet:

This is different from most other disasters. Usually you only have a few days or, perhaps at most, weeks notice that something specific is impending. With many disasters, you have minutes or hours. With a tornado, it may be minutes. With most tsunamis, it's hours. None if it's an earthquake. But this is different from those.

Stewart/*Hawai'i Tribune-Herald*, 2014, A3

Curtis additionally argued that people who live in Puna – and on the world's most active volcano – must process that a lava flow is possible, especially as Kīlauea in 2014 had been in continuous eruption for the past 31 years. He also pointed out to the newspaper that there is a certain amount of preparedness in a society that by definition expects hurricanes, lava flows, tsunamis and earthquakes to happen. For example, contingency plans become visible in building codes, where, Curtis argued, homes on the coast in Puna had very different scales of damage after Hurricane Iselle considering when they were built and which building codes had been followed. He further argued that when a society is well prepared for these types of events, it helps lower peoples' stress levels when the actual event threatens. Referring to colleagues at UH Hilo, Curtis pointed out that those who had lived in lower Puna for a long time were not stressed about the situation, while newer members of the faculty, who had recently moved to lower Puna, showed more signs of stress. Curtis' observations were similar to the ones I had made throughout the weeks of the hurricane and lava flow threats, and the differences between the 'experienced' and the 'inexperienced' residents were highly noticeable. However, as Houghton pointed out, it seemed as if residents of Puna were working together to help each other understand the best possible way to deal with the circumstances.

Storms, lava and infrastructure – the situation continues

As Hurricane Ana approached the Big Island in mid-October, the ocean got rougher, and the waves that crashed in on the shoreline were larger than usual. Local newspapers started discussing the threat of the hurricane and the lava flow daily by turns. The lava flow had slowed down over the last few days, and the front was now located just under one kilometre away from the road that leads to the Pāhoā Transfer Station. Interviews with Puna residents in the media focused on the slowing of the flow combined with the coming hurricane, and several residents reported that they believed Pele had taken a break so that people could prepare for the storm.

Early in the lava flow event, the HCCD had established an emergency response centre in Pāhoā, where representatives from different State offices like the Department of Water and Department of Roadworks, HVO, Hawai‘i Electric Company, and aid organisations, including Helppuna.org and the Red Cross, each managed an information booth. If you had any questions regarding the pending threats from the hurricane or the lava, you could go there and get information about what would happen with, for example, your water supply and electricity if the lava flow should reach Pāhoā and cross Highway 130. You could also get an overview of the different organisations involved in aid work in the area, and who you could contact about different infrastructural or social challenges you were facing. Additionally, you could speak with scientists from HVO and representatives from HCCD and get a better understanding of what to expect if the lava flow continued to move downslope and find its way all the way to the ocean. The centre was open every day to anyone who needed information about the lava flow, and as Hurricane Ana was approaching, additional information about how to prepare for a hurricane in Puna was available. On the local radio stations, there were still updates about the lava flow, which now included additional information about the possible coming hurricane.

Throughout the autumn months of 2014 it was impressive to witness how the different agencies (HCCD, HVO, Department of Roadworks, HELCO, Department of Water, the Mayor’s Office, Hawai‘i County) cooperated with residents in lower Puna. They expressed a sincere interest, through the figure of the civil defence administrator, in supporting residents in their needs and concerns. Arrangements and support efforts

to make daily life function for lower Puna residents during this situation and in future were emphasised in contingency planning. Representatives from the HCCD listened carefully to all of the questions that were asked during the community meetings, and they tried to answer all questions and to solve all types of problems and challenges. Considering the many off-grid residential areas in Puna which were inhabited by people who do not necessarily want to be a part of larger society and in communication with 'the state', I found it fascinating that communication between these residents and HCCD ran so smoothly during these months. I can identify several possibilities as to how this close cooperation between 'the state', represented here through the Mayor's Office, Hawai'i County Civil Defence and several other State departments, and the residents of Puna was made possible. One possibility is that Puna is a small place: people know each other, and several Puna residents are employed within the different State agencies. For example, the Mayor of Hawai'i at the time was born in Kalapana, was a Puna resident, and thus had a personal interest in the area in addition to his role as a political leader. Another possibility is that, given the political climate during these months, politicians running in the Primary Election on 9 August and General Election on 4 November would invest more effort and energy in the situation in Puna in order to influence Puna residents' votes on Election Day. A third possibility could simply be that the authorities on Hawai'i Island are well trained in dealing with these types of issues and they know what works. Close cooperation with residents and the different subdivisions is the best way to handle this challenging environment.

I suggest that it is a combination of these three elements. It would be naïve to argue that the efforts and energy in Puna issues shown by politicians that were up for election was not at all politically driven, given the timing within an election year. Additionally, many of the employees in the different State agencies are Puna residents. Some of them born and raised there, and it is easy to understand their willingness to make an extra effort to help their friends, families and neighbours. The most important element, however, is that both residents and State agencies act on experience. Environments in Puna have offered these types of challenges for residents since humans first settled there, and the reaction patterns and contingency planning by both

residents and Hawai‘i County are based on years of experience with similar types of challenges, as also suggested by Curtis in *Hawaii Tribune-Herald*.

One of the reactions and plans in response to the ongoing lava event was the construction of alternative roads that would enable people to drive in and out of lower Puna even if the lava crossed the highway. During these activities, a powerful thunderstorm, which brought the first snow of the season to the top of Mauna Kea, caused a power outage in lower Puna in mid-October, just before Hurricane Ana was projected to arrive. During the storm, I took a drive around Puna to check the progress on roadwork that would secure an exit from lower Puna through Hawai‘i Volcanoes National Park by connecting Highway 130 and Chain of Craters Road. Seemingly unaffected by the thunderstorm, the road workers in Kalapana/Kaimū continued work on Chain of Craters Road as planned and had already made significant progress in building a two-lane road over the lava fields (see Figure 5.3). While driving back from Kaimū towards Pāhoa on Highway 130, I witnessed a streak of lightning hit a small electrical transformer located on one of the power poles on the side of the road. This caused power to be out for a while in some of the residential areas in lower Puna, but



FIGURE 5.3: Road workers are bulldozing a road through the lava fields between Kalapana and the Chain of Craters Road in Volcanoes National Park in 2014. Photo by NPS Photo/David Boyle.

as HELCO already had workers in the area, still managing the broken power grid after the damages caused by Iselle and preparing for new challenges with the lava flow, they managed to get the power back relatively quickly.

The road plans for the Highway 130 - Chain of Craters Road connection had been approved by the County the week before, and it seemed as if everyone I talked to were certain at this point that the lava would cross Highway 130. In this case, the new road, in addition to two other roads closer to the ocean that were being improved for heavier traffic, would be essential for the possibility to travel in and out from lower Puna. As the lava threat had been going on for so many weeks, it seemed as if people were acting calmer and were somewhat accepting of the situation. The initial panic and stress connected to uncertainty about what to do with living situations and organisation of people's lives in the event of a lava flow advancing through Pāhoā, had calmed. As the slow pace of the flow had given people plenty of time to plan and solve these challenges – the stress of finding solutions was no longer a part of their preparations. Even though everyone were still very afraid of losing their homes, property and ways of life, it seemed as if Puna residents had drawn new breath and braced bravely for the arrival of the lava flow.

Going through the stress of this situation together seemed to strengthen social relationships between residents of lower Puna, and some of the borderline racist undertones I had heard so many times in conversations before seemed toned down when I talked with my interlocutors, and with attendees at the community meetings. In conversations I had with meeting attendees, several of them told me that they thought neighbours seemed to know each other better and everyone seemed determined to help if someone needed assistance with something. A woman from Black Sands subdivision told me that a group of younger men from her street had decided to help as many as they could to manage the fallen trees on their properties, and had gathered tools like chain saws, machetes and axes, and travelled around the lower Puna district to help people. This sort of solidarity is something people from Puna have told me was much stronger in the past but is becoming less common.

It seemed as if the threat of the lava flow – as well as the damages and challenges caused by Hurricane Iselle – intensified this sort of solidarity in Puna. Most people from

Puna I had conversations with during these stressful months in 2014, both within and outside the context of the community meetings, told me that they would not want to live anywhere else on the planet than in Puna, because the togetherness and solidarity of the people living there assures you are not alone when you need help. When I asked if they had ever considered Hāmākua, Kohala or Waimea to be safer, they have answered me that, even though the environment is tougher to deal with in Puna, the social relationships are a lot stronger, more connected and kinder than in any other residential areas on the island. In this case, the natural disasters Puna residents had faced over a period of three months had brought them closer, and new social relationships were formed.

First slow, then fast, then stalled...

At the community meeting on 16 October 2014, the HVO informed the public that the lava flow had slowed down and the flow front remained stalled on that day. However, there was movement in the flow further up slope; it was widening and had several, scattered breakouts. While residents in Puna were still awaiting the arrival of Hurricane Ana, a brief pause in the events had made room for other concerns. One of these concerns regarded access to emergency response services in lower Puna. Should the lava flow cross Highway 130 where it was projected, lower Puna would be cut off from emergency response services. ‘The state’ had thus suggested a plan for building a new emergency response station on the south side of the lava flow, on the grounds of a park right by the Pāhoa Senior Center. In this park stood a couple of old trees, which were beautiful and provided good shade to people who enjoyed the park on sunny days. The trees were of great importance to residents in Pāhoa, and in this meeting, all attendees were given a sheet of paper by protesters, featuring a commentary and a poem that spoke against their removal. Several concerns about the trees were voiced during the meeting, and while the removal of a few trees might seem trivial during the challenging lava flow situation, I believe the reactions seen in the meeting and in protests outside of the meeting context were reflections of concerns lower Puna residents had about the possible changes in their daily lives. While small and, some argued, insignificant, the issue of the removal of the trees represented a first step towards building a ‘new’ lower

Puna, one separated from the rest of the island by a lava flow that had moved through Pāhoa and down to the ocean to the north. Those who were dependent on travelling to other places on the island via Highway 130 from Puna were facing a possible loss of a way of life. I believe the trees became so important because they represented a way of life in Pāhoa on the brink of destruction.

Further, people raised their concerns about the Puna Geothermal Venture (PGV), a geothermal plant located in lower Puna between Nanawale Estates and Leilani Estates, which has been the source of a comprehensive controversy since its establishment in the early 90s.⁶² According to Iwashita (2017), the Puna Geothermal Venture had an uncontrolled release of the chemical H₂S, hydrogen sulphide,⁶³ in the morning hours of 8 August 2014 due to damages caused by Hurricane Iselle, and residents in the areas surrounding the plant were worried about another release if Hurricane Ana hit as hard and directly as Iselle. The release of H₂S caused health problems for residents neighbouring the plant in August. Iwashita reported listening to the radio at 7:30 in the morning on 8 August, when the HCCD urged people who were feeling ill to evacuate the areas surrounding the plant (2017, 113). While staying up all night during Iselle myself, I had gone to bed by this time in the morning, and when I woke up, I got wrapped up in helping my neighbours with downed trees in their garden, and in the days following, did similar things for friends and acquaintances in Puna. I had thus missed the big news about the geothermal plant and did not know the seriousness of it until the concerns about whether this could happen again during Hurricane Ana were brought up in the community meetings in October. I was not the only one.

The state of lower Puna after the storm was, as described earlier, uprooted and chaotic. However, as the rest of the island and the other Hawaiian islands had not seen

⁶² See Iwashita (2017) for a comprehensive read on this controversy. See also Chapter 3 of this dissertation for more details on PGV.

⁶³ According to the National Institute for Occupational Safety and Health (NIOSH) (2019), which is part of the Centers for Disease Control and Prevention (CDC), 'Hydrogen sulfide (H₂S) is a colorless gas with a strong odor of rotten eggs. Exposure to hydrogen sulfide may cause irritation to the eyes and respiratory system. It can also cause apnea, coma, convulsions; dizziness, headache, weakness, irritability, insomnia; stomach upset, and if liquid: frostbite.'

these effects of the storm, lower Puna was somewhat forgotten in the media and in conversations across the islands about how lucky we had all been that the storm died down before hitting the islands. As Iwashita (2017, 114) wrote, '[e]arly City and County and news media reports missed all of this, initially – lower Puna, in other words, was off the map'.

As people in the residential areas surrounding the plant were facing downed trees and live power lines lying in pools of water in their gardens in the days after Iselle, they were also noticing changes in their general health. As Iwashita (2017, 114) notes: 'During the storm, people had experienced loss of consciousness, difficulty breathing, strange mucus discharge, skin rashes, headaches, and nausea. They described their experience as feeling close to death, feeling the collapse of their bodies.' Residents in these areas reported these types of health problems for several weeks after Iselle, but, according to Iwashita, neither the companies involved in the operation of the geothermal plant nor the State of Hawai'i admitted that the release of H₂S had caused any damage. The trauma that these residents were experiencing during and after Iselle were brought into debates about how to respond to the threat of yet another hurricane as well as to the lava threat detailed in the meeting on 16 October. As residents close to the geothermal plant have had a difficult relationship with several State agencies as well as the owners of the geothermal plant, who have repeatedly argued that the plant is harmless to the population, they were firm in their address to the HCCD during the meetings. However, their arguments did not seem to be taken seriously, as they were swiftly commented on by the authorities and brushed off by many of the meeting attendees with the comment, 'Oh, here we go again with the geothermal plant'. It seemed as if many attendees were trivialising the arguments made by the concerned residents, hinting that people who lived close to the geothermal plant were being paranoid. However, the HCCD assured the public that the PGV would take precautions in the event of this storm and shut down the plant before the storm arrived to prevent another episode. By saying this, I argue, the HCCD and PGV simultaneously admitted that what happened in August should not happen again.

Another concern voiced in relation to the coming hurricane was whether it would have any effect on the current lava situation. Some expressed that they hoped

the hurricane could stop the lava by bringing massive amounts of rain to cool it down. The HVO replied that the hurricane would have no impact on the lava flow and informed us that most questions directed at them over the phone this past week had been about exactly this issue. Another question was raised about whether the hurricane would limit helicopter surveillance and registration of movements in the lava flow, thus limiting the information about the now very close threat to Pāhoā town. Whether or not the hurricane would limit flyovers of the lava flow for a period long enough to prevent daily updates was difficult to predict, but the HCCD did not express any concern about this. They explained that they had spent the past week in off-grid residential areas, going door-to-door to inform residents about the coming hurricane. Mapping of people's needs, with a particular focus on those who could not manage a possible evacuation on their own, had been a priority, as experiences from Hurricane Iselle showed how many were unable to help themselves during the chaos in lower Puna in August.

Hurricane Ana moved just south of the Hawaiian Islands and brought heavy rain and rough seas, but little damage. While the lava flow had given breathing space for residents in Puna for a few days, it suddenly moved 425 metres closer to Pāhoā overnight from 22 to 23 October. Lava was now flowing rapidly towards Pāhoā, and residents in town were starting to panic. This sudden movement led people in Pāhoā to experiment with methods of mitigation to protect their properties. One family decided to build a berm to redirect the lava and possibly save their home, but as this action could direct the lava towards other people's homes instead, a heated discussion was sparked about respect for the land and for other people's properties and lives.

These types of mitigating actions are also, as mentioned earlier, a way of preventing Pele from going where she wants to go and are deeply disrespectful to Kānaka Maoli who practice indigenous Hawaiian relationships with Pele. People were turning against each other at this point, and racist comments and derogative terms were used frequently in discussions, especially in social media. Comments spanned from 'Why can't you just bomb it or use dynamite or something?' to 'Whether you believe in tūtū Pele or just the scientific facts, it's lava, you cannot stop it... it's mother nature... you cannot remove the moon because it is shining too bright'. A man I talked

with, who identified as Kānaka Maoli, said that people's lives and health should be prioritized over religious beliefs. If there was a possibility to redirect the lava to save people's homes and lives, this should be done.

There seemed to be many different opinions about what was 'the right thing to do' now that the threat was so near. These opinions had all been there in the beginning of the event, but as the months had passed and people in lower Puna had got to know each other better, my impression was that they had become more interested in understanding each other and cooperating to make the best out of the situation they were all facing. Now, however, it seemed as if a veil had masked the understanding and willingness to cooperate, and many expressed an 'every person for themselves' type of attitude.

During the larger discussion about 'the right thing to do', discussions about infrastructure also preoccupied many residents. The protests mentioned previously about the trees in the park that were threatened because of construction of a new emergency response centre had been successful, and several State agencies had made construction plans that avoided the destruction of the park. As the flow was moving rapidly, a stretch of Cemetery Road, located between the Pāhoa Transfer Station and Kaohe Homesteads, was closed. In the community meeting on 23 October, detailed discussions about infrastructure, including power, water, phone lines, internet, health services, police, fire department, access to food markets and postal service, gave indication to residents that plans and actions were already made to make sure lower Puna was not cut off. The projected path of the lava flow placed it right where the Pāhoa postal office was located, a postal office that served all lower Puna, and a retired couple I spoke with expressed their concern about future postal delivery in lower Puna as they could not afford to drive to Hilo more than once a month. Another topic of the meeting this evening was that the duration of this lava flow threat had begun to take a toll on people's psychological health. Churches and schools in the area were concerned about this development, especially with how the long-term stress of the lava flow affected children and offered workshops on how to manage the psychological burden of the situation. Meanwhile, the lava flow information messages from the HCCD on the radio started being broadcast more frequently than once per hour.

Social and personal challenges

On 28 October, I had a conversation with a Kānaka Maoli woman who lives in ‘Āinaloa, a subdivision located just north of Pāhoā, in which she told me that people seemed to hang around Pāhoā a lot these days and that residents did not really appreciate it. The drawn-out event of the lava flow was increasingly challenging for the Pāhoā population, and their patience for curious visitors was growing thin. She told me that her boyfriend is a fisherman who launches his boat from Pohoiki boat ramp in lower Puna, but if the lava flow would cross the highway, he would not be able to launch his boat from Pohoiki anymore. She told me that people had asked her why he could not just launch his boat from Hilo instead, but she explained to me, he had his launching permit at Pohoiki and his fishing rights from there, so it was not easy for him to move his business to Hilo. He was the main provider for their family, and she told me she would have to take a second job if he could not fish. I asked her how she felt about people who did not express an understanding about their difficult situation, and she told me that it seemed as if people do not really understand these things. She was upset about people not respecting the Hawaiian belief in this as Pele, ‘a *kupuna* who has come to visit’:

She does what she wants, she owns the land. If you come here and live here, you have to respect this belief system. You do not have to believe it yourself, but respect that this is the belief of the indigenous population of this place. People ask, ‘Where are these Hawaiians?’, ‘Why should we respect something that is not there?’ But it is there, if not in the blood of people, then in the hearts of people. Hawaiian culture prevails inside us all who practice it and live it every day. When you are born and raised here and have lived with this lava and volcano your whole life, you know that this is Pele. I am a Christian and I believe in God, but in Hawai‘i nature is alive, it is filled with our ancestors, and Pele is there, as we are reminded with this lava flow.

I asked her if she believes it is only indigenous Hawaiians who can understand this environment, and she answered me that it is not a matter of blood quantum or ancestry: ‘Anyone who practices Hawaiian culture can be ‘local’ in my eyes.’

What she said to me was something I had heard many times before, from Kānaka Maoli, ‘locals’, Whites, Asians and Pacific Islanders. I have previously argued that Hawaiian identity is performatively structured and rooted in practice (following Sahlins 1985, see Torgersen 2010). This means that persons of non-Hawaiian biological ancestry can be ascribed a Hawaiian identity if they practice and perform Hawaiian traditions, philosophy or approaches to life itself, or ‘how to be in the world’. An example of a person who is regarded as Hawaiian but has no biological Hawaiian ancestry is my *kumu* hula, who is born and raised in Hilo and is Japanese ‘by blood’ but Hawaiian in practice. *Kumu* Halia is well respected and highly regarded within the hula community and is ascribed a Hawaiian identity by both Kānaka Maoli and non-Hawaiians. When conversing with the woman from ‘Āinaloa, I was reminded that this inclusive attitude regarding identity exists in Hawaiian society. I also reflected upon how quickly a person can lose Hawaiian status if they do not have the biological component and make ‘errors’ in the practise of Hawaiian ways of life. These ‘errors’, such as disrespect for indigenous perspectives regarding who and what Pele is, cause tensions between social groups, which always lurk shallowly beneath the surface of social interaction in Puna. They also amplify differences between social groups in Puna with regards to social and economic status, and levels of education and access to knowledge.

An episode that happened about the same time as our conversation about how you can practice Hawaiian approaches to ‘life itself’ showed how badly people in Puna can misunderstand the environment and belief system connected to the lava flow, and how this creates tension between social groups. A couple from Puna had posted pictures of themselves on Facebook next to the lava flow, and of them sticking several items, including an eggbeater, into the lava. Firstly, the lava flow was closed off to the public and the couple were breaking the law by trespassing on government-controlled land. Secondly, and from the vantage point of Hawaiian approaches to Pele in which Pele is lava, the couple were poking and sticking items into her flesh. This episode created tension between Kānaka Maoli and non-Hawaiians in Puna, and a group of Kānaka Maoli addressed the incident with frustration at the community meeting on 6

November. The couple who had committed the crime were arrested and likely faced penalty for the thoughtless stunt.

Episodes like this, and other forms of disagreement, polarisation and inequality, led to an increase in racist comments, such as ‘fucking *haole*’ or ‘stupid white people’, especially in social media. A new group had been formed on Facebook, called *Pele’s Vent*,⁶⁴ which allowed people to vent their frustrations about these issues, as long as they did not mention names. There was a noticeable shift in attitudes at the meetings as well and, several Puna residents told me, in the streets of Pāhoa and Puna in general. Another complication that caused frustration was a new support programme for Kānaka Maoli, initialized by the Office of Hawaiian Affairs (OHA), in which \$500 were distributed to Kānaka Maoli who, due to the lava flow, were forced to move from lower Puna. This support programme included only Kānaka Maoli, which ‘the state’ defines as those who can prove they are at least 50 per cent Hawaiian by genealogy, or rather, genetics, often referred to as blood quantum. The support programme thus excluded anyone who was not at least 50 per cent of the ‘state defined’ ‘racial category’ ‘Native Hawaiian’. On the newly established Facebook page, members were in an uproar, claiming that if there were an organisation that was only interested in helping Whites, Chinese or Filipinos, they would not even have been able to propose such a programme before being shut down.

While these discussions and tensions were developing in and around Pāhoa and in matters concerning the current lava flow situation, the lava flow had stalled again for almost a week. These breaks the advance gave people in Pāhoa and lower Puna time to reflect over and prepare for what to do if the lava came through the town and covered the highway. On 12 November, I was in Pāhoa to talk with Andrew, a local business owner, and the previously mentioned Mapunaleo, who lived in Hawaiian Paradise Park and worked at two different businesses in Pāhoa. Andrew, whom I had got to know because of our identical work-out routines at the local gym in Hilo, had offered to show me around town and talk with me about the lava flow situation from the perspective of a local business owner. Andrew and his family owned one of the main business centres

⁶⁴ Later renamed *Pele’s Steaming Vent*.

in Pāhoa, a commercial centre, spread over four large buildings and housing several types of businesses. ‘The Local Clinic’, the main medical facility in lower Puna, occupied one of the buildings and provided dental and medical services to lower Puna residents. The local laundromat, also owned by Andrew and his family, was located in another building and was a meeting spot for everyone who do not have laundry facilities in their homes. This property was the closest business property to the lava flow on this day. Andrew told me that he and his family had been in close conversation with the HCCD for a long while, and they were continuously updated on the situation. Andrew and his family lived in Hilo, but lately he had been spending his nights in Pāhoa. He told me that he had not been sleeping very well lately. He had been interviewed by almost all of the TV-media which had come to the Big Island to report on the lava flow, including ABC, NBC, and CBS, and all of the journalists had tried to get him to say that he is terrified. ‘They are trying to make it more dramatic than it is’, Andrew told me and added, ‘I hate American reporters’.

Andrew told me that he and his family had insurance which would cover all loss if the lava took their property and buildings. If the lava came close enough to become a threat to the property, he would evacuate all equipment at the laundromat, including solar panels on the roof, which would cost him \$7,000 to remove. He said they were worth saving because it would cost \$115,000 to set up new ones. He added that most of their power came from propane. I asked Andrew if he had been to any of the community meetings as I had not seen him there. He told me he had been to some of them in the beginning but had figured out that all the information could be found online, so he had stopped going. He also told me that HCCD and HVO had held separate meetings to prepare business owners in Pāhoa for possible scenarios and to evaluate and, if needed, improve evacuation routines for tenants, interior and equipment. Andrew told me,

The biggest problem we have had as business owners in Pāhoa so far is the loss of tenants, and the next biggest problem, except the property being taken by lava, is if Highway 130 is taken. If that happens the family must live in lower Puna in turns as the commute to Hilo via HVNP will be too far and take too much time.

I asked Andrew how he and his family felt about this possible outcome, and he told me, 'It is what it is, we will make it work one way or the other'. As we were walking around Pāhoa, I commented that the smoke conditions were bad there, and Andrew answered, 'I agree, but it's much better when it's raining', maintaining a positive tone.

At the local laundromat in Andrew's business centre I had an appointment with Mapunaleo to talk about some of the spiritual aspects related to the lava flow. Mapunaleo and I share a love for hula, and she has been dancing hula her entire life. When we were introduced by Andrew, we quickly discovered we had many common interests and reflections to talk about. She shared a story about her life to emphasize her connection to the island and her spiritual orientation: Mapunaleo is a middle-aged woman who was born and raised on the North Shore of Oahu. She is related to a well-respected Hawaiian hula family and came to the Big Island earlier in her life because she felt the island was calling her. She works at the local laundromat as well as at the Mexican restaurant in Pāhoa. She has 6 children, and she lost her husband in a drowning accident in 2007. Her family's *'aumakua* is the shark, and after her husband drowned, she saw a great white shark together with a flock of tiger sharks in the water, which she told me were there to guide her husband's soul home. She also told me that her husband knew when he was going to die and how it would happen, and he had shared this with her before it happened.

After Mapunaleo's husband died, his brother contacted her and told her it was his calling to come to the Big Island and take care of her and her children. He left his wife and travelled to the Big Island to step into the role of father to the children. He told her he had a dream where his brother had come to him and told him he had to go and take care of his sister-in-law and his nieces and nephews. Mapunaleo and her late husband's brother had been together for seven years in 2014, and she told me they had a very good life together. Mapunaleo was additionally working on a BA degree in Hawaiian studies at the University of Hawai'i at Hilo and was teaching her children Hawaiian. She was dancing hula under Edith Kanaka'ole's teachings, a branch of hula which is deeply connected to Pele. When I asked her about her relationship with Pele, she told me that she is a Christian by faith and believes in the 'all powerful father in

heaven, who created everything on earth, including Pele'. She told me she had been raised according to a 'Hawaiian way of life', very connected with land and natural environments. She explained to me that Pele is a mythical figure and that the Hawaiian language is full of metaphors, which makes it sound like they believe that Pele is a person. She told me that Hawaiians know very well that Pele is a mythical figure but that she represents a very vibrant part of the landscape and thus she becomes very much alive.

After conversing with Mapunaleo about her life and her connection to hula and to Pele, we started talking about the current lava flow situation in Pāhoā. She was very clear in her approach to lava flows: 'You have to move out of the way and take with you what you can. No one in Hawai'i can own land, the land belongs to Pele and she chooses how long you can live there.' Mapunaleo's family lives in Kapoho, and she has grown up knowing Pāhoā very well. She told me she now lived in Hawaiian Paradise Park a bit further towards Hilo and feared that the lava would go over the highway so that she would have difficulty getting to work in Pāhoā. Her children went to different schools in the area; some of them went to the Hawaiian immersion school while the oldest children were enrolled in the high school in Kea'au. Mapunaleo was considering moving her family to what could be the Kalapana side, or east side, of the flow, if it were to cover the highway, because she felt it would be very difficult to stay on what would be the Hilo side. I told her that in relation to many others I had talked to about moving because of the flow, this was a bit of a different approach, as most people had been anxious about being separated from Hilo, and not from Pāhoā. Mapunaleo told me that she could not imagine not having access to the beaches and parks in lower Puna as she had grown up with them and felt connected to the lower Puna area.

The woman from 'Āinaloa, Andrew and Mapunaleo had told me three different stories of how their lives were affected by the lava flow and had addressed complex issues in both social and personal challenges brought by the current situation. One of the greatest challenges for them all was the uncertainty of what would happen, and if what they feared the most happened, when would it happen? They all addressed this uncertainty in their stories, and although they had made plans for a possible change in

their everyday lives, the outcomes of these plans were not ideal and could dramatically change social and economic conditions in their lives.

The end

On Thursday, 13 November I was as per usual driving from Hilo to Pāhoa to attend what would be my last community meeting before leaving Hawai‘i to travel back to Norway. As I passed the gas station and Longs Drugs at the entrance into Pāhoa, I could smell the scent of burned forest, buildings and materials. Since the last community meeting I had participated in on 6 November, when the flow had stalled for six days, Pele had claimed her first home. The family who owned the house lived in California but had managed to remove everything in the house of sentimental and financial value before the flow burned it to the ground. A video of their burning house was posted on Facebook, and they commented that it was sad to see the house burn, but they were glad they had enough time to remove their things and be out of the way. In addition to their house, the lava buried a fishpond on the property. On its way down the slope, it had buried a Japanese cemetery and was currently moving closer to the Pāhoa Transfer Station. The US Army National Guard had been in Pāhoa for over two weeks already, and on this day, I saw that representatives from FEMA – the Federal Emergency Management Agency – had come to Pāhoa as well.

The meeting started with a prayer, as usual. Only this time, the entire prayer was in Hawaiian. The room was as full as it had been throughout the past months of these meetings and faces that had become very familiar smiled at me as I sat down in my usual spot. The Mayor of Hawai‘i County informed us that President Obama had declared a state of emergency for the Puna district, which would help residents and business owners gain financial support and approval of insurance claims. The always-present HCCD administrator assured the audience that they were there to keep people safe in collaboration with the US Army National Guard, the Hawai‘i State Fire Department, Hawai‘i Police Department and FEMA. Representatives from HVO informed the public that they had flown in colleagues from the mainland to assist them and residents in this crisis and to do research on new things that were happening with this flow. The message from HVO was clear: ‘The flow is very active and is expanding

and inflating even though the front has stalled.’ It felt like the wait was over, Pāhoa would be taken by lava.

After the meeting, I went to a favourite restaurant in Pāhoa. The place was very busy and the vibrant energy in the room suggested nothing about the possible grim future of this charming and quaint town, located on the northeast side of the world’s most active volcano. In the restaurant, I found local families, tourists and meeting attendees having their dinner, seemingly unaffected by the graveness of the lava threat lurking close behind the property. When sitting down at a table by one of the windows, I got to talk with some people I recognised from the meetings who were sitting at the table next to me. I told them how wonderful I thought it was to see people in Puna out like this, enjoying life even though a lava flow was right at their doorstep. They told me, ‘well, you know, it is what it is. Pele goes where she goes, we cannot do anything about it’.

I packed my bags and left for Oahu two weeks later, and the flow front was still stalled while activity remained through expansion and inflation of the flow as well as breakouts further up slope. Remarkably, the flow front remained stalled, and by March 2015, breakouts closer to the Pu‘u ‘Ō‘ō vent had shifted the energy of the lava flow and caused it to retreat to within 6 km of Pu‘u ‘Ō‘ō. The lava flow was no longer a threat to Pāhoa, and the HVO estimated that the June 27th Lava Flow ceased on 6 June 2016.

Summing up

This chapter has focused on two life-changing events for residents in lower Puna: Hurricane Iselle and the June 27th Lava Flow. The two events had different timelines. Hurricane Iselle was an abrupt event that flipped everyday life for lower Puna residents upside-down overnight. The June 27th Lava Flow was a slow moving, drawn-out event, which challenged social dynamics and resident’s psychological health. Detailed descriptions of social activities in Puna, mainly at community meetings organised by HCCD and HVO, have been the focus in this chapter. The longevity of the lava flow event is demonstrated in the timeline of the event and in the large variety of activities,

challenges, collaborations, conflicts and dynamic forms of socialites Puna residents faced in the autumn months of 2014.

I have argued that these events have generated transformations of sociality in Puna. Following Kapferer's (2010, 2015) arguments of events as generative of social transformation, I have argued that the drawn-out event of the lava flow contained a series of generative moments which created dynamic social situations in Puna throughout the event. Different social groups in Puna, which have been addressed throughout this dissertation, engaged with each other in new ways and learned from each other. At some points in the lava flow event, residents from different social groups seemed to become closer and more accepting towards each other. However, changes in activities of the lava flow, people's actions in the event and exposure of inequalities that are otherwise partially hidden – such as residents' different financial opportunities – created tension, hatred and racist undertones between the groups. Simultaneously, people in Puna gained knowledge about both established 'Western' academic forms and Hawaiian forms of seismological sciences. In the lava flow community meetings, lower Puna residents met each other and learned about sociality in Puna, and about how it is possible to sustain social life in this district, despite and because of the activities of the volcano.

In the next chapter, I will continue this discussion and focus explicitly on how different forms of knowledges are merged in the creation of new knowledges about life itself on Kīlauea volcano.

6

VERNACULAR SEISMOLOGY

Epistemological Dimensions in a Volatile Volcanic Environment

We all live lives full of raw and unexpected events, and we can grasp them only if we can interpret them – cast them in terms of our knowledge so that we can focus on them and meet them to some degree prepared and with appropriate measures. Thus a person's stock of knowledge structures that person's understood world and purposive ways of coping in it.

Fredrik Barth (2002, 1)

Throughout my three years of residing and working on the Big Island, a strong focus on the diversity of *knowledge* has been at the centre of everything I have experienced and learned. As mentioned in Chapter 1, my focus in this project is always anchored in my empirical material, and knowledge is a topic of great interest and concern to people in Hilo and Puna. It is frequently commented on in everyday conversations, at the core of discussions about identity, culture, social relationships, power and spirituality, and is a key ingredient in peoples' manoeuvring of these topics in everyday social life. Knowledge is used as a label of legitimacy in relation to respect and power and as currency for positioning in social hierarchies, which brings to mind Pierre Bourdieu's theories on cultural and social capital (1984/1986). In this chapter, I follow Fredrik

Barth's (2002, 1) definition of knowledge as 'what a person employs to interpret and act on the world [...] [including] feelings (attitudes) as well as information, embodied skills as well as verbal taxonomies and concepts: all the ways of understanding that we use to make up our experienced, grasped reality'. I approach the philosophical discipline of epistemology mainly as a study of how people know what they know and of discussions about how knowledges become valid, which I employ to discover differences and similarities in knowledges in Puna, and how they are used to form new knowledges to cope with volatile volcanic environments.

In this, I am inspired by philosopher Peter Winch's (1964) analysis of Evans-Pritchard's (1937) classic theories about Azande witchcraft. Evans-Pritchard argued that the Azande used ideas about witchcraft to manage social and spiritual life, but simultaneously more than implied that 'Western' science, to which he himself subscribed, could determine that witchcraft is not real. Winch (1964, 307) criticised Evans-Pritchard for this in his analysis, where he wrote:

Now although Evans-Pritchard goes a very great deal further than most of his predecessors in trying to present the sense of the institutions he is discussing as it presents itself to the Azande themselves, still, [...] there is more than one remark to the effect that 'obviously there are no witches'; and he writes of the difficulty he found, during his field work with the Azande, in shaking off the 'unreason' on which Zande life is based and returning to a clear view of how things really are.

Winch criticized Evans-Pritchard for the notion that 'Western' science could determine whether or not witchcraft existed or was real in Zandeland, and with his critique addressed the important epistemological question of 'what knowledge is valid for whom?' Even though Winch's analysis was published over half a century ago, the questions he addressed are still part of epistemological discourse, and discourse about the decolonisation of science, which in Hawai'i also is a political issue.

As demonstrated by several Hawaiian scholars (see, for example, Trask 1999, Silva 2004 Kauanui 2008), the importance of epistemology has been, and still is, a political issue in Hawai'i. The same questions are relevant here: how do people in

Hawai‘i know what they know, and what knowledge is valid for whom? Epistemology often takes centre stage in indigenous rights struggles and in discussions about cultural and political power. Hawaiian epistemology has been suppressed to the advantage of ‘Western’ epistemology during colonial rule. Epistemologist Manulani Aluli Meyer (2001, 125) emphasized how Hawaiian epistemology is fundamentally different from epistemology found in the American educational system, which, she argued, is typically ‘Western’:

The truth is, Hawaiians were never like the people who colonized us. If we wish to understand what is unique and special about who we are as cultural people, we will see that our building blocks of understanding, our epistemology, and thus our empirical relationship to experience is fundamentally different. We simply see, hear, feel, taste, and smell the world differently. [...] these differences are neither subtle nor imaginary, but large and enduring.

In Puna, these fundamental epistemological differences become highly relevant when different knowledges meet in residents’ efforts to understand volcanic events. In this chapter, I wish to examine how we can utilize such fundamental epistemological differences in a socially diverse place like Puna, in a quest for holistic forms of knowledges about living in volatile volcanic environments that are not culture specific, but, rather, place specific.

In the previous chapter, which told the story of a hurricane and a slow-moving lava flow that greatly challenged residents in lower Puna, there were several examples of peoples’ different approaches to and understandings of these events. As the weeks and months went by and residents in lower Puna waited for a potential destruction of Pāhoā and restructuring of their everyday lives, a dialogical field became visible between different knowledges. The continuous dialogical field between residents of Puna, geologists with the HVO and different State agencies (first and foremost HCCD) encouraged the emergence of *vernacular seismology* in Puna. The idea of vernacular seismology was formed in the early stages of this doctoral project. My earlier work with anthropological approaches to the Hawaiian hula dance and knowledge associated with Hawaiian cosmology (see Torgersen 2010), as well as impressions of who and

what Pele might be, enabled a hypothesis that culture and volcanic forces were uniquely connected in Hawai‘i, and, possibly, more generally in places where people live near active volcanoes. My definition of the term weaves well into the concept of vernacular knowledge, where vernacular is not only understood as a linguistic term but in relation to a localised approach, practice or place. I argue that vernacular seismology gathers within it unique forms of knowledges that are rooted in local, place-specific volcanic environments.

My ambition in this chapter is to explore how epistemological dimensions in Puna contribute to knowledge production, which leads to a form of resilience towards the negative effects and an embrace of the positive effects of volatile volcanic environments on social life. It is not my intention to engage in philosophical discussions about what knowledge is, but rather to explore defined knowledges in Puna and how they are used to interpret the environment and sustain social life. I look specifically at two forms of knowledges, Hawaiian seismology and ‘Western’ seismology, that are rooted in fundamentally different approaches to what is considered valid knowledge, but are combined by people in Puna in efforts to understand volcanic environments and social life. The combination of these knowledges can be interpreted as an example of vernacular seismology. I will address these questions in this chapter: What is vernacular seismology and how is it useful in the understanding of volcanic activity in Puna? How do Hawaiian myths and stories based on oral traditions play central roles in the interpretation of volcanic events? How can anthropology contribute to the understanding of what matters or becomes important when humans are faced with such powerful environmental agents as volcanoes? Why are knowledges and understandings based on ‘Western’ forms of geology and seismology not enough when interpreting how social life can endure volcanic eruptions in Puna? How can vernacular seismology contribute to global debates on environmental risk?

Approaching ‘the vernacular’

The terms used in anthropological discourse concerning approaches to knowledges as place or culture specific, have changed over the course of the last century. ‘Indigenous knowledge’, ‘ethno-science’, ‘local knowledge’ and ‘traditional knowledge’ are all

terms that are, or have been, used for different place or culture specific forms of knowledge, such as those I am addressing in this dissertation. I operate here with the identifier *vernacular* to attach the knowledges I discuss to Puna as a place rather than to specific social groups or individuals who live in Puna. Different forms of vernacular knowledge are in this sense accessible to anyone who lives in Puna.

As anthropologist Clifford Geertz (1974) demonstrated in his significant article, *'From the Native's Point of View': On the Nature of Anthropological Understanding*, anthropological analyses have been criticized from both within and outside of the discipline for the representation of culture specific forms of knowledge since the 1950s. Geertz (1974) noted that a debate that at the time had already existed in anthropology for ten to fifteen years escalated when a diary from anthropologist Bronislaw Malinowski's fieldwork in the Trobriand Islands was published in 1967, and the outcomes of the debate became a monumental critique of the discipline. Geertz (1974) argued that the issue of the diary, in which Malinowski expressed his dissatisfaction with living with the local population in the Trobriand Islands, was not a moral one but an epistemological one. It sparked discussions about the anthropological gaze, analytical concepts as experience-near or experience-distant, and our representation of the 'native's point of view'. In his book, *Local knowledge: Further Essays in Interpretive Anthropology* (1983), Geertz further argued that the anthropological gaze could serve as a contribution in comparative analysis of different forms of knowledges. He claimed that, to the ethnographer, knowledge would always be local:

To an ethnographer, sorting through the machinery of distant ideas, the shapes of knowledge are always ineluctably local, indivisible from their instruments and their encasements. One may veil this fact with ecumenical rhetoric or blur it with strenuous theory, but one cannot really make it go away. (Geertz 1983, 4)

In the mid-1990s, a debate mainly between anthropologists Gananath Obeyesekere and Marshall Sahlins started a wider discussion about anthropological approaches to understanding indigenous rationality (Borofsky 1997). Obeyesekere (1992/1997) criticized Sahlins for undermining indigenous rationality in *Islands of History* (1985)

and claimed that indigenous peoples rationalized in the same way as ‘Westerners’. Sahlins retaliated with the book *How ‘Natives Think: About Captain Cook, For Example* (1995), where he argued against Obeyesekere by claiming that every culture has different forms of rationalities, different forms of making sense sense-making of the world in which they live, and that to claim that all peoples rationalize in the same way is a form of eurocentrism. In his cultural relativist argument, Sahlins (1995) was concerned with legitimizing Hawaiian rationality as a different form of rationality and claimed that forcing a ‘Western’ form of rationality on ‘non-Western’ peoples would undermine the existence of different forms of rationality. Further disciplinal critiques concerning ‘the anthropological gaze’ eventually led to an analytical shift in anthropology referred to as *the ontological turn*, in which matters of difference in anthropological theory were further critiqued (see, for example, Latour 2004, Viveiros de Castro 2004, Henare et al. 2007, Holbraad and Pedersen 2009, Pedersen 2011, Scott 2013, Holbraad and Pedersen 2017). Anthropologists, such as Henare *et al.* (2007) and Holbraad and Pedersen (2009), argued that cultural relativism is not relativist enough, as it relativizes perspectives on the world but simultaneously exercises the premise that there is only one world. In this sense, the ontological turn questioned not only whether or not people have different forms of rationalities, but also different apprehensions of what rationality is.

Issues with hierarchies of knowledge as well as a simultaneous need for an ‘all-hands-on-deck’ approach to global environmental challenges in the twenty-first century, are changing scientific discourse. Keeping these debates in mind in the anthropological analysis of my empirical material, I aim to firmly plant my analysis in Geertz’s locale, or rather in Puna, where vernacular knowledge is continuously debated and always in the making. Global environmental change has triggered the need for different approaches to and rationale of the environment. Vernacular approaches to environmental volatility are valuable contributions to ongoing debates about how humanity will solve the global environmental crisis. It is my intention here to present an example of vernacular seismology as a legitimate form of knowledge constructed within Puna sociality, which contributes to shape seismological science. My analysis

promotes the idea of accepting a plurality of knowledges and in regarding knowledge and science as in the making.

Vernacular seismology

As mentioned previously, the Hawaiian language has provided global geological science with words describing geological variations: ‘*a‘ā*, *pāhoehoe*, and *kipuka* (see Chapter 1, pages 9-10), which indicates that the Hawaiian language has enabled a vernacularisation of a global geological language; an impressive feat for a small and threatened vernacular language. This is a strong argument for the importance Hawai‘i, particularly the volcanically active parts of the Big Island, holds in the development of global sciences concerning volcanic activity. While identifying and promoting vernacular approaches to global scientific discourses, the premise of this chapter is to give equal status to vernacular and global approaches to geological science in Hawai‘i with regard to sustaining human lives and activities on active volcanoes. An identification and promotion of vernacular seismology specifies the importance of the content of vernacular approaches to science in a global scientific debate. The form of vernacular seismology I am approaching in this dissertation, refers to the ways in which people who live on Kīlauea volcano relate to, understand and interpret volcanic environments and the volcano’s activities. It becomes an overarching approach to understanding epistemological dimensions in the situations and environments discussed in the previous chapters and emerges in the spaces between the established ‘Western’ academic discipline of seismology and Hawaiian seismology, the latter mainly rooted in Hawaiian cosmology and immanent approaches to spirituality and environment.

In addressing these epistemological dimensions, I am inspired by analytical approaches suggested by Fredrik Barth in his Sidney Mintz Lecture in 2000, ‘An Anthropology of Knowledge’, published in *Current Anthropology* in 2002. Barth encouraged anthropologists not to be ‘too clever’ when looking towards complicated philosophy and metaphysics in their search for definitions of what knowledge is, but instead ‘encourage our ethnographic discoveries’ in a search for variations of what ‘a person employs to interpret and act on the world’ (2002, 1). One of his main arguments

in this article is that anthropologists should find explanations as to what knowledge is in our ethnographies, instead of seeking answers through high-level metaphysical approaches. This is not because these disciplines cannot help us in *understanding what knowledge is*, but rather that our *contribution* to the debate about what knowledge is must lie in our ethnographic research, and that our methods can provide insights into what knowledge is that philosophy and metaphysics alone cannot. Barth (2002,1) also argued that ‘we can greatly advance our anthropological agenda by developing a comparative ethnographic analysis on how bodies of knowledge are produced in persons and populations in the context of the social relationships that they sustain’. It is within the ethnography of Puna one can find the elements that form my proposed concept of a vernacular seismology, a form of knowledge I argue is uniquely rooted within the social lives of people who live on active volcanoes.

Kirsten Hastrup (2004) argued that knowledge is a social phenomenon rather than simply a substance. She claimed that ‘knowledge has become – and must be – acknowledged (implicitly, at least) as relational, both in the sense that it attaches itself to relations between people or between people and objects and in the sense that it emerges within a dialogical field’ (Hastrup 2004, 456, parentheses in original). I follow Hastrup’s arguments and claim that vernacular seismology is relational and emerges within dialogical fields. Dialogues and social relationships between actors who embody different forms of knowledges in Puna enable a combination of these knowledges, which in turn enable the concept of a vernacular seismology. Following several arguments in Edvard Hviding’s article, ‘Between Knowledges: Pacific Studies and Academic Disciplines’ (2003), I suggest that one form of vernacular seismology can be found in a dialogical field between Hawaiian and ‘Western’ forms of seismology, and that it is interdisciplinary in form. While true interdisciplinarity, where all disciplines are equally weighted, might seem utopian, there are methods we can use to achieve this. Here, I turn to Hviding’s (2003, 57) arguments concerning how interdisciplinarity is about breaking down the barriers between knowledges and about decolonising epistemological privilege. As Hviding (2003, 57) argued, ‘one cannot reach an understanding of what people do in relation to [...] the environment, solely by relying on a comparison of indigenous knowledge with ‘Western’ science, giving

epistemological privilege to the latter'. In order to avoid this dilemma, it is necessary to distinguish between science, and what Ingold (in Ingold and Palsson 2013, 14) referred to as 'scientism':

Science and scientism are quite different. The former is a rich patchwork of knowledge which comes in an astonishing variety of different forms. The latter is a doctrine or a system of beliefs, founded on the assertion that scientific knowledge takes only one form and that this form has an unrivalled and universal claim to truth.

Science, according to Ingold, legitimately allows space for a plurality of knowledges that play on each other and contribute to science as *in the making*. In order to get to a place where we understand science as in the making, we need to accept a plurality of knowledges that together are shaping science.

Hviding (2003, 58) argued that true interdisciplinarity is about the 'creation of a new object, which belongs to no one'. Furthermore, this object 'emerges in the spaces between knowledges in encounters between practitioners who may be more or less surprised that they share some basic concerns and premises' (Hviding 2003, 58). In this regard, I suggest that practitioners of 'Western' and Hawaiian forms of seismology on the slopes of Kīlauea volcano have found themselves throughout history in common situations of volcanic activity that have required an understanding of volcanic phenomena. The common situations I am referring to are volcanic eruptions that have threatened residential and agricultural areas, as well as areas of profound historical or cultural significance, during which practitioners of both approaches have met and collaborated on solutions for securing human lives and property. These collaborations have enabled an approach to volcanic volatility that gives room for a close relation between knowledges, such as, for example, having a spiritual connection with Pele, while simultaneously subscribing to the ideas of 'Western' seismology. These forms of relationships between seismologies are especially common among residents on the Big Island where, due to high levels of seismic activity, seismological sciences are continuously in the making.

I argue that vernacular seismology here correlates with Hviding's object, which belongs to no one, but rather to the place, in this case to the volatile volcanic environments of Puna. My arguments about vernacular seismology are grounded in my ethnographic inquiries, largely presented in the previous chapters, and in the anthropological analysis of my observations and conversations in this place. I argue that, in the ever-changing volcanic landscapes in Puna, knowledges are intertwined and communicated in efforts to better understand and cope with hazards, crisis and disaster. I suggest a model in which anthropological theories are used to interpret the conjunction of knowledges that enable an understanding of Puna as a volatile environment and a place where seismological sciences are crucial for the existence and continuation of life itself. As Hviding (2003, 64) argued:

[...] an inclusive integration of knowledges has the potential for being a research approach more closely in tune with the world as experienced by the people who live in it – particularly if dialogue and interaction is achieved, and boundaries increasingly dissolved, between the understandings of insider and outsider, native and scholar.

The model I suggest (see Figure 6.1), is based on a triangulation of Hawaiian seismology, 'Western' seismology and anthropology, the latter in which ethnographic inquiries and analytical tools enable comparison and a convergence of the two forms of knowledges, which leads to an identification of a form of vernacular seismology:

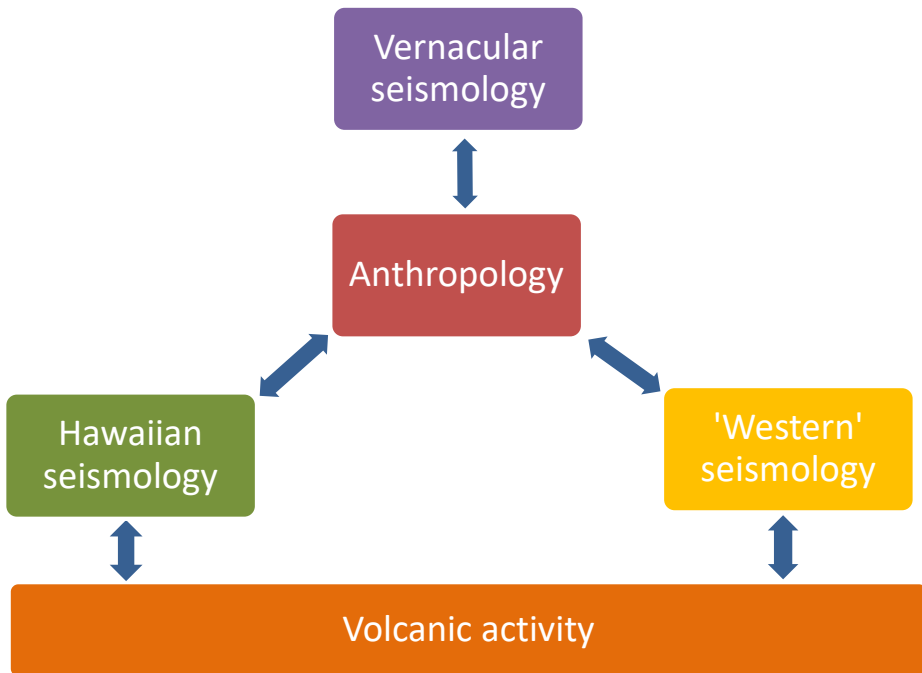


FIGURE 6.1: A visualisation of where and when vernacular seismology becomes visible. Figure by author.

Vernacular seismology exists regardless of anthropological analysis, but it is in this analysis that it becomes visible as a form of knowledge. By applying anthropological methods and analysis to the dialogical relationship between Hawaiian and ‘Western’ seismological sciences in Puna, examples of vernacular seismology are identified as fruitful and unique forms of knowledges, but also a coping mechanisms and forms of resilience applied by people who live on or close to active volcanoes. Following Ingold (2000), I argue that vernacular seismology is neither innate nor acquired, but rather grown, through immanent practice and experience with the volcanic environment. The movement, volatility and change associated with this volcanic environment ensures a continuous growth of knowledge and an understanding of vernacular seismology as always in the making.

To approach spaces in which vernacular seismology becomes visible, I wish to examine Hawaiian and ‘Western’ seismology more closely. When examining ‘Western’ seismology, it is useful to look at a formal definition, like the following by geophysicist Duncan C. Agnew and his co-authors (2002, 3): ‘[Seismology is] the study of seismic sources (mostly earthquakes), the [seismic] waves they produce, and the properties of the media through which these waves travel.’ According to geophysicist Bernard Chouet at the USGS (2003, 793), the field of seismology includes the more specific volcano seismology, which aims ‘to understand active magmatic systems, to characterize the configuration of such systems, and to determine the extent and evolution of source regions of magmatic energy’. Chouet (2003, 793) further argued, that ‘such understanding is critical to our assessment of eruptive behaviour and its hazardous impacts’. On the Big Island, the formal experts within this form of science are geologists and volcanologists, who work as permanent staff and researchers for HVO and the USGS, as well as scholars working on topics within the academic disciplines of geology and volcanology at the University of Hawai‘i in Hilo.

According to Agnew et al. (2002), scholarly approaches to seismology via natural sciences happened as early as in antiquity, when Aristotle (ca 350 BCE) described earthquakes as vibrations from winds blowing in underground tunnels. At roughly the same time, Chinese philosophers suggested that the blocking of a subtle essence, or *qi*, caused the shaking during earthquakes (Agnew et al. 2002, 4). Newer theories emerged with the fall of Aristotelian thought in early modern Europe, which described earthquakes as explosions caused by reactions of iron with sulphur, that again helped explain volcanic eruptions (Agnew et al. 2002). However, the greatest scientific leap in the early days of seismology happened when an earthquake in Lisbon shook most of Europe in 1755 (Agnew et al. 2002). At this time, several writers proposed the idea that earthquakes had a source in a specific location that could send waves of movement over vast distances.⁶⁵ It is not my intention, nor my place, to estimate which of the two seismological knowledges I explore in this chapter was the first to be

⁶⁵ For more about the development of ‘Western’ seismology as a scientific discipline, see Agnew et al. 2002, p. 4–11.

explored as a complex form of knowledge. However, I suggest that complex seismological knowledges already existed in Hawai‘i when ‘Western’ seismological knowledges disembarked with explorers and scientists from visiting ships in the mid-1800s.

Following Chouet (2003, 793), what is also critical to an assessment of hazardous impacts such as those of a seismic nature is to understand how people prepare, act and react in the event of a volcanic eruption. Here, I follow anthropologist Mark Nuttall (2009, 293) in his claim:

Indigenous and local observations deserve serious attention, especially when we seek to understand them with reference to the everyday life, and social and cultural meanings of local people. But such attention raises questions to do with epistemology and challenges us to ask how and why people know what they know (in the same way as science is scrutinized), and to demonstrate how we can distinguish between an observation about the weather and a claim that indigenous knowledge provides evidence of climate change.

Hawaiian seismology has existed as a specialized field of knowledge since the beginning of the migration periods to the Hawaiian Islands (as demonstrated by, for example, Beckwith 1970). Hawaiian seismology is a complex form of knowledge about seismic forms and sources in Hawai‘i and refers to the parts of Hawaiian cosmology that relate specifically to volcanic activity. Following Chouet’s (2003, 793) definition of volcano seismology (copied from above), Hawaiian seismology, in line with ‘Western’ seismology, strives ‘to understand active magmatic systems, to characterize the configuration of such systems, and to determine the extent and evolution of source regions of magmatic energy’. Understanding Hawaiian seismology is also critical to our assessment of ‘eruptive behaviour’ and ‘hazardous impacts’, following the quote from Chouet (2003, 793) above. Considering the role of Pele and her many family members, and their specific attributes and roles in the volcanic environment, it is clear that these ‘myths’ and ‘cosmological worlds’ are interpretations of volcanic activity in the Hawaiian Islands. Additionally, the myths about Pele place volcanic eruptions in a historical context, as argued in Chapter 4.

Hawaiian seismology represents seismic forms and movement very differently from the ‘Western’ form of seismology defined above, and most differently in the way it includes relationships between seismic forms and human lives. However, Hawaiian seismology is similar to the definition by Agnew et al. (2002, 3) of ‘Western’ seismology quoted above, in the way it addresses ‘[...] seismic sources (mostly earthquakes), the [seismic] waves they produce, and the properties of the media through which these waves travel’. In relation to this definition, I argue that while Hawaiian seismology addresses seismic sources, it also addresses seismic *forces*. Pele’s agency is, undoubtedly, additionally understood as a *force* when she controls, devours and creates land on which people reside, leaving residents unable to defend ‘their’ land, in addition to being a source for seismicity. In vernacular seismology, the experience of a seismic event is also often referred to in relation to its force. For example, a Puna resident who experienced an eruption in 2018⁶⁶ said, ‘It felt like a train was moving under my house’, adding that he knew instantly that the earthquake he felt was the movement of lava underground, beneath his house.

According to oral traditions recorded by for example Emerson (1907/1998), Beckwith (1970), Kamakau (1976) and Kanahale (2011), the fascination with and interpretation of seismic forces in Hawai‘i probably started as early as with the first settlers, who according to Kirch (2011), possibly arrived as early as 1000 AD. As I have suggested in Chapter 4, it is possible that the first settlers attributed volcanic activity to ‘Ailā‘au, who is described as a devourer of forests and thus, I suggest, represents surface lava flows or volcanic activity that is visible above ground. When attributing volcanic agency to Pele and her family, people developed a larger understanding of seismic complexity, as was communicated through oral tradition wherein Pele’s sisters and brothers took on complex seismic forms. To repeat from Chapter 4 and from Kanahale (2011, 5–7), some examples of these seismic forms include: the primary form of Pelehonuamea is ‘red-hot magma’; Kānekamohoali‘i, Pelehonuamea’s oldest brother, is the ‘heat in the earth and in the sky’ and initiator of eruptions; Kānemiloha‘i, also brother of Pelehonuamea, is ‘the movement of magma

⁶⁶ An event that will be further addressed in Chapter 7.

vertically from its source to the earth's surface, weaving and twisting its way up through many layers of earth'; Kūha'imoana represents 'the horizontal movement of magma under the ocean and through the earth'; 'Kauilanuimākēhāikalani and Kānehikili [...] are the lightning and thunder generated from the earth in conjunction with a volcanic eruption'; Nāmakaokaha'i is the cause of fault lines in the earth; and Hi'iakaikapoliopele 'is representative of all embryos whose existence is dependent on the land made by the outpour of Pelehonuamea'. This excerpt of seismic forms presented in Hawaiian cosmology clearly points to evidence that a complex system of seismological knowledge, formed through immanent human experiences with volcanic environments, existed before explorers and scientists from abroad came to the islands.

Vernacular approaches to a volcanic environment

How a person can acquire knowledge about 'Western' seismology and Hawaiian seismology in Hawai'i would involve two rather different approaches. 'Western' forms of epistemology and knowledge regarding 'Western' seismology are usually incorporated in American educational curricula, and a specified qualification in the field requires higher education at a university, following a 'Western' form of epistemological training. Acquiring knowledge about Hawaiian seismology, however, can be more complicated. Anyone, including those who identify as Kānaka Maoli, who wants to master Hawaiian seismology must learn it through for example education at Hawaiian schools such as Kamehameha Schools, which is accessible only to those who meet the 'state criteria' for being Kanaka Maoli; through *hālau hula* in which knowledge about Hawaiian seismology is central; or through engaging with *kupuna* who possess this form of knowledge. Hawaiian seismology is additionally usually not taught as 'Hawaiian seismology' but rather as Hawaiian history, culture, cosmology, spirituality and human-environment relations. As a student of hula throughout (and in between) my fieldwork periods, I was lucky to come closer to this form of knowledge. However, my time within this space for learning was limited. Additionally, my prerequisite was a person who had not grown up in the Big Island's environments and had not at an early age embodied knowledge about how one relates to and understands the environments there. My epistemological outset was also different from Hawaiian

forms of epistemology. Because of these main factors, I barely scratched the surface of the level of understanding my mentors in this realm of knowledge possessed.

Hawaiian seismology is experientially based, and the study of it largely involves the sensory body of the student. The connection between a hula dancer, for example, and the environment, is an embodied experience in which the dancer moves with the environment and the environment moves with the dancer, allowing environment and dancer to become one (Torgersen 2010). It is possible for an ‘outsider’ to learn this form of coexistence with and understanding of the environment, but it demands great dedication and time from the student. The journey a student of Hawaiian seismology embarks upon will require a mix of physical and psychological presence, in which knowing involves feeling. As Meyer (2003, viii–ix) argued, ‘Hawaiian epistemology is a radical remembering of our future as it highlights and honors all three domains of knowledge production: sensory, mental, and contemplative; body, mind, and spirit; gross, subtle, and causal’. Some, who have deep knowledge of Hawaiian seismology, have grown up in Hawaiian households and attended Hawaiian immersive education where Hawaiian forms of epistemology have been ingredients in everyday life. Others have not but have sought knowledge about Hawaiian seismology through participation in hula schools, through other forms of Hawaiian education, like university programmes, and through curious approaches to acquaintances and elders who possess these forms of knowledges.

Hawaiian seismology and ‘Western’ seismology are different in the ways they are taught, learnt and exercised. However, they address similar topics at different levels of detail. When residents in Puna gather in social arenas like the ‘community meetings’ addressed in Chapter 5, the two forms of seismologies meet through representatives embodying high levels of knowledge within each of them. Both forms of seismologies are somewhat unreachable for those who are not educated within them. However, Pele, simply and complexly, is a common denominator, a bridge that transversely offers understanding and a basis for a development of vernacular seismology. As argued above, vernacular seismology in Puna is neither innate nor acquired, but rather grown or developed, through immanent practice and experience with the volcanic environment (following Ingold 2000). As discussed in Chapter 4, people who live in

Puna (and on the Big Island in general) are encouraged by fellow residents and local narratives to form an opinion about Pele. To 'belong' in Puna's social life, residents at the very least must respect her as the powerful agent many people believe she is, and respect people who believe in her. Despite their different backgrounds and belief systems, residents seem to manage to place Pele, a goddess who belongs in Hawaiian cosmology, right in the middle of their lives and in combination with other beliefs.

Why this seems easy for people of different social backgrounds in Puna can be traced to the simple fact that the volcano is in their backyard. The physical dimensions of living on an active volcano include the ground shaking, the smell of sulphur dioxide in the air, steam rising from the ground, glass-like rock crushing under your feet and lava glowing along the mountain slopes in the dark night. If the lava flows down into the ocean, there is a cloud of steam coming from the entry point as well as rumbling from the subsurface area. On a social, philosophical, spiritual and existential level, the volcano *has* to be attributed a meaning as it is such a powerful agent in the landscape, making it impossible not to relate to in one way or another. Thus, adopting a vernacular and immanent belief in Pele becomes a logical solution to making sense of this powerful agent in Puna residents' understanding of the volcanic environment.

People in Puna show respect for Pele in different ways. Some have a deep spiritual relationship with her, some are able to place her in their genealogy and regard her as their ancestor, while some have more practical approaches to making sure she is not angered by their presence in Puna. The latter includes (but is not limited to) planting protective plants on their properties and give offerings of different sorts to Pele. According to Hawaiian seismology, the planting of *kī* in the corners of one's property will protect you from Pele's wrath and will guide lava around your property instead of flowing straight through it. *Kī* are seen in the corners of most properties in Puna and the rest of the windward side of the Big Island. Pele is unpredictable and it is difficult to plan where she will go or whose property she will cover with lava. However, it is believed that if you treat her with respect, plant *kī* in your garden and give her offerings, she will more likely spare your home. Another way to protect one's home is to have it blessed by a kahuna. I have been told several stories by my interlocutors, including Sophies's story in Chapter 4 (page 167), in which certain spiritual obstacles, for

example when spirits (often believed to be Pele) take occupancy in their homes, have required them to call on a kahuna to come and guide spirits away from their property.

I suggest that another possible reason why people in Puna incorporate a belief in Pele in their spiritual lives is the political situation Big Islanders in general find themselves in. This is a situation in which indigenous politics remind them of indigenous Hawaiian struggles in the past, present and future, and I believe many representatives of the White American population relate to colonial guilt. Believing in and respecting Pele has become politically correct behaviour and a way to try to fit in with the indigenous population and 'locals'. In these efforts, it is important to note that believing in Hawaiian seismology through a relationship with Pele does not rule out believing in 'Western' seismology, and vice versa. Those who believe in and follow the narratives of Hawaiian seismology, including Kānaka Maoli, simultaneously look to 'Western' geological models and seismological measurements when trying to understand the goings-on of the volcano. Similarly, as mentioned in Chapter 2, geologists with HVO have used narratives from Hawaiian seismology to verify and historically place volcanic eruptions in the past. Undoubtedly, the relationship between Hawaiian and 'Western' seismology on the Big Island is communicative, rather than hierarchical, and there is a continuous dialogue between the two in residents' management of situations such as the one described in the previous chapter. During the community meetings, there was a mix of actors conveying messages to the crowd, including scientists from HVO, representatives from several Hawai'i County departments, representatives of Kānaka Maoli, and representatives of different churches in Puna. Their communicative approach to each other, as well as approaches by the local media, encouraged the building of bridges between people with different epistemological backgrounds, often with Pele communicated as the common denominator for all who live in Puna.

In addition to Pele, *aloha* is conceptually used as a method to communicate between different epistemologies. The expression of *aloha* is continuously used as a bridge in the gap between different approaches to environment, and in blurring social distance between ethnic groups in Puna. *Aloha* is a complex concept, yet it is rather simple to relate to. As previously mentioned, *aloha* is a reciprocal social commitment,

shared between individuals or groups, where you embrace the responsibility of treating each other with kindness, love and veneration. On a deeper level, *aloha* is a commitment to embrace your natural and social environment with respect, love and responsibility, and strive for contributing positively to these environments. When individuals or social groups share *aloha*, it means they have a reciprocal relationship and commitment to each other. For instance, *aloha a hui hou*, an expression often heard when people are saying goodbye to one another or seen on posters in the airport departure lounge or at the exit point of a grocery store, means, according to what my *kumu hula* taught me, ‘may there be love, kindness and veneration between us until we meet again’. The word *aloha* has no equivalent in the English language. *Aloha* is found in equivalent forms in several Polynesian languages; however, the use of the Hawaiian version is much more globally commercialized than others.

As argued in Chapter 3, people who move to the Big Island from outside the Hawaiian Islands might initially use this expression with its limited commercialized meaning, but social interactions and learning over time make newcomers aware that *showing aloha* means caring for and respecting your fellow residents and the natural environments of the Big Island. In Puna, where environmental events like hurricanes and volcanic eruptions ‘force’ residents to relate to one another, *aloha* becomes an ingredient in the making of vernacular seismology.

During the events in 2014, the act of showing *aloha* was continuously repeated by State officials, spiritual leaders and members of the public in community meetings, newspaper articles, conversations on the street and in restaurants, as well as among friends and neighbours who were helping each other with challenges related to the events. *Aloha* very clearly became a ‘social glue’ and a common ground for understanding sociality within and between individuals and social groups in Puna. Residents repeated the importance of showing *aloha* almost daily, especially following incidents when people were not acting with respect for one another. The learning curve for ‘the true meaning of *aloha*’ was steep. As Meyer (2003, 14) argued,

The notion that cultivating aloha helps develop our human potential may sound like something out of a Hallmark card, but do not be put off by its simplicity. Developing

your sense of deep spirit and enduring affection for others will be one of the most difficult things you will do in your lifetime.

Still, many residents seemed willing to explore the concept of *aloha* with great interest and conformity, and, I argue, *aloha* helped residents relate to one another in the difficult times they were all facing. The need for togetherness sparked by the events brought about new social behaviours, driven by kindness and respect, which were learned in the making.

Vernacular approaches to living in the volcanic environments in Puna are usually displayed during volcanic events, such as those described in Chapter 5. For example, during the discussions I followed in and around the community meetings in 2014, I was reminded many times by meeting participants I talked with that ‘ancient’ Hawaiians in Puna and Ka‘u lived a much more nomadic life and were thus able to move when an eruption started. People did not live on small privately owned properties then, but in much larger land areas, under the *ahupua‘a* system, which enabled them to be mobile as well as to access resources elsewhere in the large section of land. This allowed them to stay away from an area that was affected by an eruption until it was possible to return. This could take a very long time as the eruptions could be long-lasting, and the land that was previously fertile for cultivation of foods was now buried in several metres of lava.

Transformation of hard rock to fertile soil is slow and meticulous. For an overview of this process, I turn to John Lockwood and Richard Hazlett, geologists who started working for HVO in the mid-70s, and their comprehensive book *Volcanoes* (2010). According to Lockwood and Hazlett (2010, 406), ‘[r]ock and rock fragments contain almost all of the nutrients that plants and animals need to thrive, but the nutrients are locked up in crystalline minerals or glasses inaccessible for biological exploitation’. For rock to decompose and become fertile soil it must go through a process of ‘chemical weathering’ (Lockwood and Hazlett 2010, 406). According to the *Oxford Dictionary of Earth Sciences* (Allaby 2008) chemical weathering is defined as ‘the action of a set of chemical processes operating at the atomic and molecular levels to break down and re-form rocks and minerals’. In other words, it refers to the process

by which rocks are exposed to environmental stimulants, including water, acidity and oxidation, and how the minerals and glasses within the rock react to these stimulants. The reaction releases nutrients, which increases fertility in the soil. Fertile soil develops from this process in three layers, dependent on the climate and rock type; the topmost layer may start to develop within a century after an eruption (Lockwood and Hazlett 2010). The second layer, which is also a source of fertile soil, develops within 100–500 years, and the complete sequence of layers is usually in place in after about a thousand years, ‘though development of a rich organic component in ash-soils [...] may take 4000–5000 years’ (Lockwood and Hazlett 2010, 406). Considering the large amount of time required for volcanic landscapes to become sustainable for human life, a nomadic lifestyle was necessary for humans to sustain a life on the active volcanos of the Big Island. This approach is still necessary but has become much more complicated after land was privatised in Puna.

In contemporary Hawai‘i, people live on smaller private properties, without any rights to move to another property should an eruption cover their land with lava. As mentioned previously, migrants to the most hazardous parts of Puna have often invested their entire retirement fund, or other savings, in buying or building a house and property which, from their perspective, is a paradise. Additionally, and as previously discussed, it is difficult to insure houses and properties which are located in Lava Zones 1 and 2. Thus, ideally, the system for handling property and property rights should have been much more in line with the pre-privatisation Hawaiian system where you are less permanently confined in your residential space. In the discussions I followed in Puna in 2014, it was clear that there was a difference between residents in the ways property is understood. In practice, and according to Kānaka Maoli views, considering Puna’s location on the world’s most active volcano, one can never really own land in Puna, one can only lease it until Pele decides to take it back.

In several of the community meetings, Kānaka Maoli stood up and asked the crowd whether they were wondering why there were so few Hawaiians in the meeting that evening: ‘Look around you, do you wonder where all the Hawaiians are tonight? We are at home, preparing for an important visit from an ancestor of high rank. Tūtū is coming, and we are getting ready to give her back her land.’ A non-Hawaiian couple

told me they had a discussion with their neighbours, who were a bit panicked about the possible outcomes of the eruption, where they explained that you should not build a fancy house if you want to live in Puna. ‘You must build a house which is basically a very inexpensive shack – a Puna house – and make sure your property and valuables are invested somewhere else than that plot of land’. If you base your knowledge about life in Puna on vernacular seismology, the strategy of building a simple ‘Puna house’ is a typical solution to sustaining a life there. When a lava flow is threatening residential areas, residents who practice a vernacular approach to the unfolding volcanic event will move, without overly dramatic reactions. Those who have not adopted vernacular approaches are much less willing to accept the fact that they must leave their homes and properties in the hands of Pele.

Knowledge, stakeholders and the role of vernacular advice in ‘disaster’ management

Social diversity, stakeholder interests and volcanic volatility are key ingredients in understanding how Puna ‘ticks’ when faced with challenging situations such as lava flows and destructive hurricanes. The role of ‘the state’ is an important factor in ‘disaster’ management in Puna, and in and around the events in 2014, residents’ attitudes towards ‘the state’ and its management shifted continuously between positive and negative depending on State actions and the way ‘it’ governed the events. In the aftermath of Hurricane Iselle, the damages in Puna were severe, and State agencies such as the HCCD, the Fire Department and Hawai‘i County offices in control of water supply, energy supply and road management were somewhat ‘drowned’ in the amount of work needed to ‘clean up’ after the storm. Residents who needed assistance felt ignored by ‘the state’ in their priorities and seemed unable to entertain the idea that there simply were not enough employees in the different departments to help everyone in the large affected area immediately. This attitude remained with some residents as they entered the long process of the June 27th Lava Flow threat, and in the first few weeks of the community meetings representatives from the HCCD and the Mayors Office were cornered with critical questions about their disaster management. However, it seemed as if the attitude changed only a few weeks into the event and

residents expressed trust in ‘the state’ and their work in mitigating the negative effects of the lava flow. As mentioned, Puna is a district where many live ‘off grid’ and prefer to be disconnected from greater society. Still, I argue that those who have lived there for long enough to experience events like those that took place in 1990 and 2014, seemed to have adopted a more cooperative and trusting attitude towards ‘the state’ and ‘its’ management of volcanic events. My argument lies again within the sociality of Puna and vernacular seismology, but before diving into that discussion, I will take a closer look at the relationship between ‘the state’ and public in a similar situation in another place.

As a comparative exercise, I look at the circumstances revolving a large and destructive earthquake that hit the region of Abruzzo and the city of L’Aquila in Italy in April 2009. The earthquake caused the deaths of 309 people as well as great material loss in the form of collapsed buildings and infrastructure in the region. Political scientist Bruna De Marchi (2014) discussed the legal proceedings that developed in the aftermaths of this event, where the roles of science and scientific advice fostered complex challenges.

The case is as follows: During four months in late 2008 and early 2009, the region of Abruzzo experienced a seismic ‘swarm’ which alarmed and stressed the residents of the region. Responding to this seismic activity, a technician, formerly employed by a laboratory at the National Research Council in Italy, developed a conviction, based on radon measurements he carried out with equipment in his own basement, that a major earthquake was about to strike the region. In collaboration with a selection of local authorities, a decision was made to alert the residents of L’Aquila about the possibility of earthquake, and by doing so, created a state of anxiety and panic within the population. The technician’s hypothesis and the anxiety it caused among the residents of L’Aquila outraged the head of the National Department of Civil Protection, who threatened to file a lawsuit against the technician, and called members of the Italian National Commission for the Forecast and Prevention of Major Risks into a meeting. This meeting, the head of the department claimed, was held in order ‘to provide the citizens of Abruzzo with all the information on the seismic activity in recent weeks that was available to the scientific community’ (De Marchi 2014, 91). However,

in a phone call that he made to the Abruzzo Region Councillor for Civil Protection, he stated that the meeting was a media operation in which seismology experts would come to L'Aquila, and that by giving the floor to them 'it would be immediately possible to "silence any imbecile and calm down rumours, preoccupations, etc"' (De Marchi 2014, 91).

The result of this public meeting was a thesis, originally formed by the head of the Department of Civil Protection, which stated that the increased seismic activity residents could feel in L'Aquila was positive as it discharged built-up energy in order to avoid a large earthquake. Seismology scientists supported this thesis and encouraged the population of L'Aquila to ease the stress and 'relax with the help of a glass of local wine' (De Marchi 2014, 91). Unfortunately, the population of L'Aquila listened to the scientific consensus and ignored vernacular knowledge passed down through generations, which encouraged them to spend some days and nights camping in an open space during this period of intensified seismic activity to protect themselves from potentially dangerous moving or falling buildings and structures during an earthquake. Only six days after the public meeting, a deadly earthquake measuring 6.3 on the Richter scale, shook the region of Abruzzo, killed 309 people and injured about 1,600 and left the city of L'Aquila in ruins.

In legal proceedings that followed this event, relatives of the deceased as well as injured residents filed a lawsuit against 'the state' due to wrongful information that led to this tragic outcome. This information was based on scientific knowledge produced by seismologists and geologists, and the complainants claimed that

their loved ones had died (in the former case) and that they themselves had been injured (in the latter) because they had trusted the official reassurance provided by the competent authorities and had consequently neglected the usual precautions (mainly leaving their houses) that they were used to take, out of habit and local knowledge passed on from one generation to the next.

De Marchi (2014, 91, parentheses in original)

A few hours before the large earthquake, the region was struck by a strong foreshock, which residents would normally interpret as a warning and leave their houses. Since the official narrative told the residents that these seismic activities were ‘normal’ and nothing to be worried about, the complainants argued that people who had remained at home would have potentially engaged in ‘life-saving behaviour’ had they not been reassured by the official advice (De Marchi 2014, 91).

In the L’Aquila case, ‘scientific truth’ and the official narrative of environmental volatility leading up to the big shock in April sprang from expert scientists within natural sciences. Vernacular knowledge was downplayed, or even dismissed, as State authorities were looking to avoid panic and anxiety within the population. In the attempt to calm the Abruzzo region’s residents, ‘the state’ lost sight of precautionary routines that the population had exercised through generations.

Comparing this case with the case of Puna’s volcanic volatility and the routines and precautions exercised by the population there, I argue that vernacular seismology in Puna, with its roots planted firmly within both Hawaiian and ‘Western’ seismology, is a more successful epistemological approach to coping with possible disastrous environmental events. In L’Aquila, one scientific knowledge took precedence over all other forms of knowledge, as a statement against the nonprofessional attempt at predicting an earthquake by the formerly mentioned technician, and against the population’s vernacular knowledge about how to act during earthquake swarms. This can be identified as ‘scientism’, following Ingold (in Ingold and Palsson 2013), as there was only one valid science and only one truth. One can argue, as did the complainants, that ‘the state’s’ determination to control anxiety within the population by providing an *absolute truth* about what was happening caused a greater loss than what allowing a space for vernacular knowledge and acts of precaution in the discourse would have done. Equipment that can correctly predict earthquakes has yet to be developed, and, thus, the Italian scientific community did not regard the technician and his claim to predict the earthquake with his self-developed equipment a scientific contribution. However, the population, who had experienced a ‘seismic swarm’ over the past four months leading up to the earthquake and were anxious about the meaning of these sporadic low magnitude tremors, initially found his predictions easy to believe (De

Marchi 2014, 90). The predictions matched the population's expected turn of events, based on the seismic activities in this period.

In the L'Aquila case, the ownership of knowledge and truth lies with one actor, and that actor holds power over defining events. According to Foucault (1980, 126):

For a long period, the 'left' intellectual spoke and was acknowledged the right of speaking in the capacity of master of truth and justice. He was heard, or purported to make himself heard, as the spokesman of the universal. To be an intellectual meant something like being the consciousness/conscience of us all.

In the L'Aquila case, Foucault's intellectuals were the scientists (i.e. the seismologists and geologists), who clearly had a stronger voice and enhanced power of definition than a member of the proletariat (i.e. the technician or general population). 'The state', which acknowledged the power of the scientific truth, strongly encouraged the public to adopt this truth, which, in turn, became the ultimate truth until the big earthquake hit. By advertising the scientific truth as the only truth and the only guideline to follow, 'the state' granted the scientists so much power, that is, the power of being 'the consciousness of us all' (quoted from Foucault above), that the population disregarded vernacular knowledge about how to manage life in this volatile environment.

When comparing this case to seismic and volcanic events that happen in Puna, I find similarities but also differences in how both the general population and 'the state' approach knowledge and truth. Whereas there seems to be a clear separation between the public and 'the state' in the L'Aquila case, the relationship is different in Puna. From the beginning of the events in Pāhoa in 2014, scientists and civil servants⁶⁷ asked the public questions, such as 'What can we do for you?', 'How can we communicate better and help you understand what is happening with the lava flow?', 'Can you please help us map out peoples' needs?' This, I argue, is a radically different approach to the one we see in the L'Aquila case, where 'the state' *tells* the public what to do and what to believe in. Why is the relationship between 'the state'/scientists and the public so

⁶⁷ Those employed in the public sector by a government department, like HCCD.

different in Puna? How is it possible for scientists and the general population to trust each other's advice, and work together to form a contingency plan for present and future lava threats? I argue that the answer lies within the societal structures of Puna, where, as already mentioned, employees of the State are also members of the public, scientists are also residents in the region and residents, civil servants and scientists at HVO are bound through familial and social ties. Additionally, the frequency of volcanic events in Puna allows for frequent arenas of meeting between State, scientists and the public. Lockwood and Hazlett (2013, 21) argued:

People's lives can best be protected in areas where eruptive activity is frequent (e.g. Java, Hawai'i). This is because in areas of relatively frequent eruptive activity, residents are better informed and are more likely to recognize early warning signs of impending activity, and volcanologists will be able to prepare more accurate predictions of future activity. Most important, local residents are more likely to accept the advice of public officials and comply with mitigation efforts such as evacuation.

As Kīlauea is one of the most active volcanoes on earth, frequent eruptions enable people who live on the volcano to develop and maintain vernacular knowledge about how to sustain life there.

Given that 'the state' in Puna often consists of representatives from the Puna population, residents take part in the way 'the state' manages volcanic events. Thus, there is a difference in the way 'the state' is organised in these comparative cases. Volcanic events in Puna are usually handled by the local State department, Hawai'i County, whereas in the L'Aquila case the management of the event was handled on a national level, which suggests a much more detached relationship between 'the state' and the public. Familial and other social relationships between representatives of 'the state' and representatives of the public in Puna are tightly bound and have a dialogical form. In the 2014 volcanic event in Puna, 'the state' acted as a communicator of knowledge between the public and the scientific community instead of as an authority of knowledge and keeper of the truth. Another crucial difference between the two cases is that, in Puna society, there are several types of valid knowledges, and the 'truth' is not limited to one of them. 'The state', represented by the HCCD and different other

State departments, offers a valuable experience-based knowledge about volcanic events in Puna, while the local and indigenous population and scientists with HVO represent the aforementioned two types of seismological knowledge. All knowledges are rooted in the volcano, and all knowledges are taken into consideration when lava is on the move. In this place, knowledges are combined to find the best possible solution to a life-threatening situation caused by environmental forces.

People in Puna live in a volatile physical environment, unwelcoming to human activities – or even human existence – and in a place where social and economic politics are deeply tinted by culture and traditions. According to Foucault (1980, 131) truth ‘is subject to constant economic and political incitement (the demand for truth as much for economic production as for political power)’. Social and economic politics in the Hawaiian Islands have been in a revitalising phase since the 1970s. In addition to American governmental practice, a strong and developing indigenous rights movement has increasing power in matters of policy-making for the people of Hawai‘i. Thus, most debates and discussions about social and economic politics involve representatives of ‘the state’, the indigenous rights movement and other stakeholders, including large-scale landholders and representatives of different types of industry. For example, OHA (Office of Hawaiian Affairs) continuously fights for the rights of indigenous Hawaiians and advocates cultural sensitivity in most socio-political matters, and OHA will always contribute with a strong voice in matters concerning the volcano. Kānaka Maoli will always have a say in the matter, as dealing with lava equals dealing with Pele, which again equals following a set of guidelines in relation to cultural norms.

In Puna, scientific ‘truth’ is a complex socio-political matter, where indigenous knowledge plays a significant role. Scientific ‘truth’ about the volcano in Hawai‘i cannot exist without a cultural aspect, because of the socio-political situation in Hawai‘i. Although indigenous politics have not been a focus in this dissertation, it is important to emphasise that Kānaka Maoli have endured and fought a long and difficult struggle for political power in the Hawaiian Islands (see, for example, Trask 1999, Silva 2004, Kame‘eleihiwa 1992, Osorio 2002, Kauanui 2008). The political climate is still immensely challenging and Kānaka Maoli throughout the Hawaiian Islands

struggle with homelessness, dispossession of land and property, identity issues, loss of a way of life and racism.

However, strong leaders and a powerful political movement have managed to reclaim authority in certain areas where it is impossible for any US state department, office or agency to make decisions without consulting Kānaka Maoli and where Hawaiian knowledge is authoritative. This includes government of property and land; for example, the Office of Hawaiian Affairs (OHA) governs their lands according to Hawaiian cultural preservation. In Puna in 2014, the lava flow from Pu‘u Ō‘ō travelled through a section of Wao Kele o Puna Forest Reserve, a large property owned by OHA and a sacred place for Kānaka Maoli, before entering the town. During its travel through the forest reserve, OHA controlled mitigating actions and all other approaches to the flow. Additionally, Hawaiian authority extended beyond the borders of landownership, and as the flow exited the OHA property and entered State and private property, the HCCD remained in close conversation with OHA and local Kānaka Maoli in terms of which mitigating actions they could take, if any. The authority of Hawaiian seismology and vernacular knowledge about relationships between people and *‘āina* is strong in Puna and evident in Puna residents’ vernacular approaches to lava flows and activities of the volcano.

Vernacular seismology and societal resilience to volcanic volatility

Both the United Nations and the European Union identify climate change and the impacts of environmental change as some of the greatest challenges of our time (United Nations 2021, European Environment Agency 2021). The emergent need of a problem-solving strategy affects the way ‘Western’ scientific paradigms and vernacular knowledges interact, and the value of both types of knowledges changes (Funtowicz and Ravetz 1994). Philosophers of science Silvio Funtowicz and Jerome Ravetz (1994, 1884) claimed that the puzzle solving exercises of Kuhn’s (1962) ‘normal’ science are not appropriate for the solution of global environmental problems. Traditional oppositions between disciplines are in a process of being broken up, the lines between natural sciences and social sciences has become more blurred and more multi-, inter-

and cross-disciplinary work can be seen as a result of efforts to face this new task.⁶⁸ Including vernacular knowledge as a valuable form of knowledge about environmental change in scientific discussions about global environmental risk not only gives a better ground for a scientific argument, but gives scientists and governing stakeholders a better idea of what it is people need, how they relate to their environments and what their actions are when handling environmental risks. Vernacular knowledge about environmental change can prove valuable across national borders as such change can often involve similar challenges in different societies.

Volcanologists Katharine Cashman and Shane Cronin (2008, 407) suggest in their analysis of societal trauma and psychological resilience to disasters that societies which include myth and spirituality in their interpretation of volcanic events are more resilient to volcanic hazards than societies which only include ‘Western’ scientific interpretation:

Volcanic eruptions can overwhelm all senses of observers in their violence, spectacle and sheer incredibility. When an eruption is catastrophic or unexpected, neither individuals nor communities can easily assimilate the event into their worldview. Psychological studies of disaster aftermaths have shown that trauma can shake the very foundations of a person's faith and trigger a search – supernatural, religious, or scientific – for answers. For this reason, the ability to rapidly comprehend a traumatic event by ‘accepting’ the catastrophe as part the observer's world represents an important component of community resilience to natural hazards. A relationship with the event may be constructed by adapting existing cosmological, ancestral, or scientific frameworks, as well as through creative and artistic expression.

In Polynesian societies, notably Hawai‘i and Aotearoa New Zealand, powerful agents of the natural environment, such as volcanoes, are included in peoples’ genealogies. This ontologically-anchored approach enables easy access to making sense of volcanic

⁶⁸ See, for example, the projects *ECOPAS* (<https://pacific.w.uib.no/about-ecopas/about/>) and *Island Lives, Ocean States (OCEANSTATES)* (<https://pacific.w.uib.no/projects/oceanstates-2/>), where anthropologists are collaborating with climate scientists and legal scientists in projects that explore the effects of climate change on peoples’ lives in Oceania.

events that abruptly and negatively affects people's personal lives. Following Cashman and Cronin (2008, 407), and as argued throughout this dissertation, people in Puna adopt 'existing cosmological, ancestral or scientific frameworks', or rather, combine them in vernacular seismology, in order to relate to and make sense of volcanic events. The ability to adopt such epistemologically diverse explanatory models enables people to accept loss and damage faster, and speeds up the recovery process after an eruptive event.

Within Oceania's Ring of Fire human societies are continuously subjected to volatile environmental hazards. Vernacular approaches to these hazards include mythological or spiritual models of explanation, but they also include practical approaches to sustaining life in hazardous environments. For example, in the days before Tropical Cyclone Pam struck the northern part of the Vanuatu archipelago in the South Pacific in 2015, people on the outer islands buried enough food, crops and water containers to last them for several months (see Handmer and Iveson 2017 and Le Dé et. al. 2018 for more details). These actions were based on vernacular knowledge and models about weather and food security as well as experience from previous events where islanders have been cut off from the rest of the country for weeks. This destructive cyclone destroyed crops that need several years to ripen and Vanuatu was severely impacted by the event; but by burying food, crops and water, the islanders helped minimize the disaster and ensured survival for the outer islands until interisland infrastructure was functioning again.

Also, within the myths and legends often found in vernacular epistemological approaches to natural environments, there are practical aspects of what to do when the environment subjects society to risk. For example, according to Hawaiian seismology, poking an active lava flow with sticks or other items is considered the same as poking through Pele's flesh and is thus strictly forbidden. As mentioned in Chapter 5, a couple were arrested for trespassing on private property as they had visited the lava flow and dipped an eggbeater in lava during the June 27th Lava Flow in Pāhoa. Kānaka Maoli and many non-Hawaiian Puna residents were appalled by this behaviour as, firstly, it is considered immensely disrespectful towards Pele to do such a thing, and secondly,

moving this close to active lava is very dangerous. When asking a Kānaka Maoli woman how she felt about this sort of behaviour she told me:

You know, we say it is *tūtū* Pele moving down the mountainside and you should make way for her, but believing in Pele does not rule out believing in lava. We are not stupid; we know it is actual lava coming down the mountain and you do not want to stand in the way of that.

Evidently, vernacular seismology has practical dimensions often hidden in spiritual guidelines as to how you should behave towards, for example, deities such as Pele. Simply put, you should not poke Pele's flesh because you will die if you fall into the lava flow.

Vernacular knowledge can contribute to a society's resilience to disaster. According to anthropologists Anthony Oliver-Smith and Susanna Hoffman (2002, 3), disaster is not an inevitable outcome of environmental change, as disaster is intimately linked with a society's vulnerability:

[T]he conjunction of a human population and a potentially destructive agent does not inevitably produce a disaster. A disaster becomes unavoidable in the context of a historically produced pattern of 'vulnerability', evidenced in the location, infrastructure, sociopolitical organization, production and distribution systems and ideology of a society. A society's pattern of vulnerability is a core element of a disaster.

Cashman and Cronin's (2008) argument focuses on how such vulnerability is determined by whether or not a society is equipped with strong social relationships and an inherited knowledge about hazards in the environment. Vernacular epistemological approaches to such hazards strengthens a society's resilience to disaster. Society in Puna is rather resilient towards volcanic disasters because of their vernacular approaches to the volcanic environment, which includes social relationships and responsibilities in forms of genealogical ties and *aloha*. Thus, volcanic events in Puna rarely cumulate societal disaster. Personal loss of property and financial and emotional

value are sometimes difficult to avoid in volcanic events in Puna, but acceptance and sense-making based on the vernacular models Puna society follows in relation to volcanic destruction, allows society to persist and social relationships to grow stronger. People in Puna, and their model of vernacular seismology, can thus offer important contributions to global discussions about societal resilience to environmental risk and hazards.

Summing up

Throughout this chapter, I have argued that a unique form of knowledge about volcanic activity exists in Puna. Vernacular seismology is a place-specific form of knowledge about the volatile volcanic environment in Puna and is grown or developed by Puna residents during seismological and volcanic events. It is a form of knowledge about seismological realities that feeds into the overarching *seismological science*. In order to understand and live with environmental change in the Puna District, residents develop vernacular seismology in the *spaces between* the established knowledges, ‘Western’ seismology and Hawaiian seismology. Vernacular seismology does not belong to any *one*, but rather to the place. Social interaction in relation to challenges concerning the volcanic environment, between people from different social groups, enables the development of vernacular seismology, which in turn enables sociality across social borders in Puna.

By presenting a comparative case of the L’Aquila earthquake in Italy 2009 (De Marchi 2014) I have discussed the roles of scientists, ‘the state’ and the public in volatile environmental events, and compared this case to Hurricane Iselle and the June 27th Lava Flow in Puna. I have concluded that the different approaches to governance in these events are based on social relationships and responsibilities in the two different places. Social relationships and responsibilities in Puna, often related to genealogy and performance of *aloha*, enable a communicative relationship between the public and ‘the state’. This relationship enables a more cooperative management of volcanic events by both governing bodies and the public. Epistemological as well as socio-political dimensions enable an authority in Hawaiian seismology, which is considered of equal importance in the interpretation of volcanic events. Finally, I argue that people

in Puna and their knowledge of vernacular seismology can contribute to global scientific discussions about environmental risk and disaster management and in problem solving on a global scale.

In the next chapter, I address another volcanic eruption that happened in Puna in 2018. While this event was different from the June 27th Lava Flow, people in Puna acted and reacted in similar ways when handling it. I draw lines between the two events and discuss differences between them.

7

HANA HOU

‘Here we go again...’

We are the ones who decided to live on the slope of an active volcano, and now we have to deal with the consequences!

Lower Puna resident (2014)

The serendipitous outcome of the eruption in 2014, where lava, after moving towards Pāhoa village for almost six months, stopped at the very edge of residential areas, sadly is not the story of every eruption. At the end of April 2018, Kīlauea stirred again. A sudden rise in the lava lake at Halema‘uma‘u crater was followed by a swarm of earthquakes beginning at Kīlauea’s summit and moving down along the East Rift Zone. In the morning of Friday 3 May 2018, a magnitude 5.4 earthquake caused a collapse in Pu‘u ‘Ō‘ō crater and a red ash cloud spewed out of the crater and high up into the sky. From afar, the explosion of ash, following the collapse of the crater walls into the lava reservoir, looked eerie and ominous to residents in Kalapana and others with a panoramic view of the crater.



FIGURE 7.1: Pu‘u ‘Ō‘ō Ash Cloud. Photo by USGS (Public domain).

In this last chapter of a dissertation that has described, discussed and analysed how people live on an active volcano, I will through empirical descriptions bring together the main concerns raised in the previous chapters, to illuminate and clarify analyses and discussions. This chapter will, again, emphasize the importance of Puna as a place for research on human relationships with volcanos, a fundamental argument throughout the previous chapters. It will include the practice of immanent spirituality and vernacular interpretations of events, and will further illustrate different forms of knowledges and understanding during a volcanic eruption. The theoretical framework for this chapter has been developed and argued throughout the dissertation, and the focus here will be to provide another case to further accentuate the analysis and discussions in the previous chapters.

As mentioned in Chapter 1, the empirical material for this chapter is collected mostly through digital and social media platforms, with an emphasis on certain discussion groups and personal profiles on Facebook. In order to successfully conduct

fieldwork through social media, I argue that a crucial qualification for the researcher is to have done previous fieldwork ‘on the ground’ and with people one can continue discussions with digitally after leaving the field. I would not have been able to conduct this additional digital fieldwork had I not resided and done research for about three years in Hilo and Puna previously. Building on relationships with interlocutors in Hilo and Puna, I was able to follow up comments posted by them on Facebook during the first few months of the eruption in 2018 with questions about what was happening. These dialogues, as well as dialogues between residents in Puna and Hilo in discussion groups, and news stories from local Big Island news agents, national and international media, form the empirical basis for this chapter.

I was surprised to discover that to me, doing fieldwork digitally, during such an upheaving eruption, was even more intense than being physically present in the field. This, I argue, was partly due to an increased fear of missing important information, as one is physically separated from what is happening in the field. Another reason was that on social media, a much larger group of people voiced their opinions and narratives, sometimes simultaneously, about what was happening than the much fewer interlocutors I am used to working with while in the field. I felt almost overloaded with information. In a short time, I gathered a multitude of stories about the eruption. While the eruption in 2014 for me and many of my interlocutors was dominated by narratives from HCCD, HVO and the Mayor’s Office, the eruption in 2018 was to me dominated by Puna residents’ narratives, as they used Facebook actively to communicate with each other about what was happening.

One could assume that this would change these types of narratives substantially, but, as I have argued in Chapter 6, people seemed to be guided by vernacular forms of seismology in their discussions and commented on ‘Western’ seismological theory and models as well as Hawaiian seismological interpretations of the eruption. Following these discussions, I was privileged to see vernacular seismology in practice, which strengthened my arguments about this form of knowledge. While this chapter will not bring up new discussions as such, the narratives that follow will serve as a larger evidence base to my arguments and will further describe social life in a volatile volcanic environment.

Unfortunately, a *hana hou*⁶⁹

Following the explosion on 3 May 2018, lava started draining out from Pu‘u ‘Ō‘ō and moving along the East Rift Zone. As magma pushed eastwards underground, lower Puna experienced at times continuous swarms of earthquakes, and residents reported they sometimes felt the trembling ground was caused by one large earthquake instead of the hundreds of smaller earthquakes that were in fact taking place. The ground was continuously shaking, and some residents said that the ground looked like jelly. This situation lasted for several weeks and on 14 May, Earthquaketrack.com (2018) reported that the Big Island had endured 2112 earthquakes of magnitude 1.5 and higher in the previous 30 days. On average, this means 70.4 earthquakes every day, although the frequency, along with intensity, varied greatly from day to day.

Lava was on the move, and the earthquakes caused cracks in roads and properties throughout the East Rift Zone. Early in this process, Mark, a friend of mine who lived in Leilani Estates, which is located almost directly on top of the East Rift Zone, posted photos on his Facebook page of cracks in the road close to his house. Other Facebook pages I have followed since my fieldwork in 2014 were soon filled with posts of photos showing cracks in roads and on properties throughout Leilani Estates. Comments, like ‘Watch it, Tūtū Pele is cleaning her island – again!’, were frequently posted on Facebook pages. About an hour after the 5.4 magnitude earthquake that caused the ash cloud at Pu‘u ‘Ō‘ō, a large 6.9 magnitude earthquake initiated a lava drainage from Pu‘u ‘Ō‘ō, and the lava lake at Halema‘uma‘u crater at the summit started to recede. The earlier 5.4 magnitude earthquake, and later this one of 6.9 which was felt throughout the islands all the way to Oahu, initiated eruptions from the cracks that had developed throughout Leilani Estates. Residents in this subdivision and the neighbouring Lanipuna Gardens were forced to evacuate by the HCCD at this time, leaving them with very little time or none at all to prepare the evacuation. On Saturday, 4 May, the first homes were claimed by lava.

⁶⁹ I use this term here in reference to a humorous comment a lower Puna resident made in the first community meeting during the 2014 eruption (see Chapter 5), where the expression was paired with ‘here we go again...’.



FIGURE 7.2: The eruption begins in Leilani Estates. Photo by USGS (Public domain).

While fissures⁷⁰ throughout the neighbourhood were developing fast and erupting with great force, mandatory evacuations forced residents to leave their houses, personal belongings, gardens, pets and livestock behind and ‘run for their lives’ as the levels of sulphur dioxide in the air were skyrocketing. At times, deadly levels of gas were reported by USGS scientists and residents were kept out of the area at all costs. Emergency shelters were set up in Pāhoa and Kea‘au where people would sleep and live in very close quarters, and different aid organisations that had responded to the emergency were working on providing people with emergency supplies, including but not limited to sanitary products, medicine, food items, mattresses, batteries and gas masks. Not far into the eruption, reports from the shelters painted a grim picture, where people were not given the aid they needed and where organisations were locking away

⁷⁰ According to the USGS Volcano Hazards Program Glossary a fissure on a volcano is ‘an elongate fracture or crack at the surface from which lava erupts’ (2013).

emergency supplies that were in high demand. Additionally, people felt unsafe in the shelters as some incidents of violence and theft caused unease among the evacuees.

These difficulties drove residents of lower Puna to act on their own and a locally administered emergency centre named *Pu'uhonua o Puna* was set up in Pāhoa originally as a safe space for residents, a meeting place where they could socialize and talk with fellow residents who were in the same situation. *Pu'uhonua o Puna* translates to 'a place of refuge in Puna', and it was later fondly referred to as *the Hub*, as it became the centre of sociality during the initial months of the eruption. The Hub was initiated by a Kanaka Maoli resident from one of lower Puna's subdivisions and run by volunteers, mostly from Puna but also from other places on the island and off-island. Local restaurants and other food providers volunteered to deliver several meals per day, and evacuees would come to 'the Hub' to share meals and 'talk story'⁷¹ about the eruption and other lower Puna matters. While international aid organisations like the Red Cross were present in lower Puna at this time, evacuees expressed distrust and dissatisfaction with them and praised their own initiative as 'more local': an initiative that better grasped the essence of evacuees' needs. Hoffman (1999, 138–139), argued that abrupt environmental events, like hurricanes, wildfires or volcanic eruptions, invoke a state of solitude and individuation for survivors, as social meeting arenas and what she refers to as 'the social fabric' are taken from them. This sensation of 'being socially lost' often encourages togetherness in forms of communal initiatives like the Hub, in efforts to share the burden of a lost everyday life.

Expressions of not being understood and prioritized by 'the state' and emergency aid organisations during this eruption led to more initiatives driven by volunteers from the Puna subdivisions and from other places on the island. Since 2014, the representatives of the State agencies often involved in emergency aid and disaster management in Puna had changed, and it seemed as if residents were less trusting of 'those in charge' at the beginning of this 2018 eruption. As so many had left their pets behind, a desperate situation was developing at the emergency shelters that had been

⁷¹ Hawaiian pidgin expression that refers to a storytelling session or social gathering where conversation is in focus.

set up in Pāhoa and in Kea'au. People were panicking because their furry family members were stuck in the evacuation zone with no way of protecting themselves from either erupting lava or the high levels of dangerous gases. Mark was working together with a small group of lower Puna residents from early morning to late at night, retrieving pets and helping people remove possessions from their houses, while braving the vigorous eruption to hike to evacuees' properties through dense forest and over hardened lava to check if houses were still standing. Being an initiator for a neighbourhood watch group in Leilani Estates some years earlier, he continued this job and tried to make sure houses and possessions of evacuated residents remained untouched by looters. Reports of looters in Leilani Estates and Lanipuna Gardens emerged early in the evacuation period and the State authorities (mainly HCCD and Hawai'i Police Department) were blamed for keeping residents out, while letting looters and thieves into the subdivisions. As a solution to this critique, representatives from the Civil Defence, the police and the fire department stood guard at checkpoints, where evacuees with evidence of residency could get in between certain hours of the day to retrieve belongings or pets. However, looters were still able to access homes in the evacuated zone, which caused frustration and anxiety for the evacuees.

Matthew, a man in his mid-30s who lived in Kona, volunteered tirelessly for several weeks, claiming vacation time from his daily job, to help Leilani evacuees retrieve their pets. Driving roundtrips between Kona and lower Puna every day, a well over two-hour drive across Saddle Road, he would move in and out of the evacuation zone in collaboration with several animal rescue organisations and shelters. Like many others, he expressed how he felt his efforts were 'the only right thing to do', as so many people were in desperate need of his help. The lower Puna resident who initiated the Hub devoted all his time to keep residents of lower Puna informed about what was happening during the eruption. Using his own public Facebook page, he posted videos with updates on what was going on 'on the ground' long before the HCCD or USGS had released any information. While working together with others, including Mark and Matthew, he became the public face of the eruption somewhat and soon started cooperating with local, national and international media, serving as a guide to the places and people of lower Puna. While getting access to and reporting from the

evacuated areas, by car, boat and helicopter, and figuring as a positive force in a time when many were struck by intense frustration and deep grief, he was soon ascribed the status of ‘local hero’ and a person people would look to for knowledge about the ongoing eruption. A few weeks into the eruption he was approached by lower Puna residents with questions of advancing towards a political career, including running for Mayor of Hawai‘i, as they felt the political figures on the Big Island did not understand or prioritize their needs. Again, Puna residents looked to their own to take leading positions in State agencies and higher authorities in order to find good solutions to their problems.

Multiple volcanic challenges and emergency fatigue

As the weeks went by after the initial eruptions, the seismic activity showed no sign of slowing down, and the lava lake at Halema‘uma‘u continued dropping and creating explosions of ash. Earthquakes were continuously rattling Puna subdivisions. Three weeks into the eruption, on Friday 25 May, 22 fissures had opened in Leilani Estates and Lanipuna Gardens, and 82 homes had been claimed by lava. In the beginning of June, Fissure 8, the most active one, produced a massive, fast-moving lava river flowing downhill towards the ocean (Figure 7.3).



FIGURE 7.3: Fissure 8 creating a lava river moving towards the ocean. Photo by Aloha Skies Aviation

The river was a spectacular sight, terrifying and beautiful at the same time. Media and local professional photographers were allowed into the evacuation zone to document the river and the activities of Fissure 8; the first photographers at the scene posted videos in the different Facebook groups instantly.

Mark, now an evacuee together with his two children, commented on a video, stating:

I would love to get that close to check it out. After that I would call it quits. Had my fill. We had what you call a dirty thunderstorm today. Actually had them on and off for weeks but today was a doozy. Dumping rain and SO₂ gas killing bugs and worms and vegetation. Shit's getting old. [...] The thunder had us nervous that a new fissure was opening up. Sure we weren't the only ones in the neighbourhood thinking that.

As implied by Mark, lower Puna was subjected to many different environmental impacts during this eruption. Not only did the ground in peoples' backyard open up as molten rock was pushed to the surface; Kīlauea continuously emitted gases that destroyed vegetation and animal life, as well as creating its own weather system. USGS Volcanoes published a photo on their Facebook page on 29 May showing a large cloud forming over the active fissures in Leilani Estates. According to USGS Volcanoes (2018, Facebook post), the cloud was identified as a 'pyrocumulus' cloud, also known as 'flammagenitus' or 'fire cloud', which is 'formed when intense heating of the air from the ground induces convection, which causes the air mass to rise to a point of stability, usually in the presence of moisture (which condenses and forms the cloud)'. These clouds can produce thunderstorms, which was the case for the clouds forming over Fissure 8 in Leilani Estates. Thunder, lightning and even small twisters were observed over the subdivision and residents reported to me that they were getting tired of the extremities they had to endure.

The combination of thunderstorms and rain with emissions of extreme levels of sulphur dioxide created a catastrophic situation for local flora and fauna. Before the eruption, Lower Puna was an incredibly green and lush region with a wide range of species of insects and animals. During the most intense weeks of the eruption, large areas surrounding the most active fissures turned completely yellow from gases and died from the amounts of sulphur dioxide in the rain. Residents in other regions further away from the eruption also reported changes in the flora as acidic rain was carried in clouds from the eruption site to other locations. Photos that were published in local and international media as well as on different Facebook pages portrayed a 'war-ridden' lower Puna, where all vegetation had died in 'the battle'. Extreme levels of sulphur dioxide made the conditions in the evacuated area incredibly hazardous, and everyone who went into this area had to wear breathing masks to protect themselves.

As lava flows from two of the fissures found their way to the ocean, a chemical reaction known as lava haze, or *laze*, occurred when lava poured into the water. Laze is steam clouds that form when hot lava boils seawater, creating tiny shards of volcanic glass and hydrochloric acid that get absorbed and carried in steam. At high concentrations laze can be deadly, and at lower concentrations, it irritates the skin and

eyes. As the lava was entering the ocean, lava tourism by boat increased, as tourists were eager to see the spectacular sight of real, live lava. During one of these tours, a large explosion at the ocean entry caused damage to a tour boat and injured 23 people on board. A ‘lava bomb’, which is a piece of molten rock formed when a volcano ejects fragments of lava during an eruption and cools before reaching the ground, landed on the roof and melted a hole through which hot lava rocks fell on the people in the boat. This incident halted the lava tourism business in lower Puna at this point, as the boat tours were considered to be unsafe.

HCCD uses a text message system as well as local radio stations in order to communicate warnings about emergencies on the Big Island. This system is automatic, in the way that it sends out warnings and information about emergencies to everyone who has signed up to receive such text messages. In 2014, the text message service was not overly active, and I did not find the messages bothering or too frequent. In 2018, however, receivers reported an enormous number of text messages triggered by the many hazardous situations on the island. Earthquakes, with or without a subsequent tsunami warning, seismic activity at the summit of Kīlauea, ash plumes, eruptions in lower Puna, sulphur dioxide levels, cracks in roads, vog conditions and brush fires – all were registered in the alert system and sent out to Big Island residents. Many were also registered to receive emergency alert messages from the Federal Communications Commission (FCC) and the Federal Emergency Management Agency (FEMA), over a national public warning system used by government agencies to send out emergency information. These services in combination exhausted their recipients, and residents in lower Puna reported that they suffered from ‘emergency fatigue’, which in practice meant that people eventually grew tired of the countless messages and started to ignore them. One resident said that he had started to ignore most of the messages and had turned off the FCC message feature on his cell phone, as he was tired of being woken up in the middle of the night when he felt nothing new had happened. Even though earthquakes were shaking the house he was sleeping in, they had become such a regularity that he did not feel the need for an emergency warning because of them.

Searching for information

As discussed in the previous chapters, people in Puna seek knowledge about volcanic eruptions by assembling pieces of information about Hawaiian seismology and ‘Western’ seismology, combining them with a spiritual orientation often involving a relationship with Pele, and on this basis, construct a vernacular seismology which enables them to make sense of disastrous seismic events. As discussed, Puna residents are often distrusting of State authorities unless they have social ties to representatives of ‘the state’, and they seek answers to questions about volcanic activity via multiple information channels. In the case of emergencies on the Big Island, HCCD is the main organisation that deals with public safety and is the first respondent in emergencies along with the police and the fire department.

During the eruption in 2014, the relationship between residents of lower Puna and the HCCD was rather good, as the HCCD was headed by a ‘local’, a well-liked administrator, who was present at all the community meetings held at the time. The 2014 eruption had a very different timeline and development than the eruption in 2018, and it seemed as if the relationship between ‘the state’ and Puna residents remained fairly positive throughout the event. The 2018 eruption, however, was entirely different from the 2014 eruption, where changes in the environment happened abruptly, and the lost and damaged properties of residents were key ingredients from early on in the event. The HCCD lost control over the situation and with it lost the trust of the people. The frustration with State authorities in 2018 had started as soon as residents from Leilani Estates and Lanipuna Gardens were evacuated by force, and the area was closed off while people were at work or other places and could not access any of their possessions or their animals. Distrust in State authorities escalated when looters were known to be stealing evacuees’ possessions while evacuees themselves were kept out of the area. Several similar incidents and conflicts, which happened on the ground between residents and representatives of ‘the state’ daily, led to a distrust in information published by the HCCD. Additionally, the HCCD was slower to report new developments in the eruption than a group of residents, who either had refused to evacuate or had managed to find a way into the evacuation zone, and actively used social media to publicly report on what was happening ‘on the ground’.

In this situation, Facebook became the number one platform for information about what was happening in Leilani Estates, Lanipuna Gardens and, later, in residential areas closer to the coast. Layperson information about seismic and geological processes were deemed equally (if not more) valuable to the information given out by USGS, as residents expressed the opinion that this information was much more on point, more rapidly distributed and ‘live’ from inside the evacuation zone. On one of the Facebook pages, the administrator of the page took on the responsibility of analysing USGS reports and HCCD messages to ‘translate’ the information into something that would be easier to grasp with more defined context. Having a practical approach to what was happening as well as accommodating discussions about spirituality, the Facebook pages became the main sources for knowledge and understanding about the eruption. The speed of the postings along with the live videos on Facebook were possibly the main reasons for peoples’ immediate trust in this platform as a source for information. Once evacuees realised that the Facebook pages offered live video updates of the conditions in their neighbourhoods which were posted by fellow lower Puna residents, they would pay close attention, with increasing distrust for other channels of information, like the HCCD.

In addition to delivering news about what was happening on the ground, the Facebook videos and discussions were presented in a local style with emotional input and empathetic statements. The pages also became platforms for organising local volunteer aid to evacuees, for reuniting pets with their owners and for offering support to displaced residents. The members of the Facebook pages discussed the spiritual elements of this eruption, taught each other about Hawaiian seismology, and referred to literary works where one could find more information about Pele. The Facebook pages soon became learning platforms, where increasing numbers of Facebook users engaged in the debates about what was going on. Members of different academic backgrounds jumped into the discussions, including geologists from other places in the world as well as residents from Puna who were currently (or had previously) working as guides or rangers in HVNP, or in other modes of cooperation with HVO, and who had university degrees within volcanology and geology. Most of the posts on the Facebook pages were attempts at interpreting the eruption and translating complex

scientific information from, for example, HVO to make it more accessible to residents in Puna.

Vulnerability and resilience

The overarching argument developed in this dissertation is that the diversity of Puna residents build resilience to the volcanic environments on Kīlauea through their own vernacular seismology. As argued in Chapter 4, people in Puna often (to varying degrees) adopt a Hawaiian worldview, where Pele owns and controls the land. If one accepts this belief and approach to the volcanic environments in Puna, it is easier to understand what type of life one can sustain there. For example, during the 2018 eruption, some lower Puna residents expressed less stress than others, because the house they had built on their property was a ‘house fit for Puna’, or a house they had not invested much in, as they knew Pele could come and take it whenever she wanted. Thus, not investing much in the structure or furnishing of a house is a good strategy for maintaining a continuous life in Puna.

Another prominent form of resilience to the volatility of Puna’s environments is the use of sarcasm and humour when facing, for example, the absurd reality of lava showing up in your backyard. I have experienced humour and sarcasm used in stressful situations many times during my stays on the Big Island, both individually and within and between social groups. As mentioned in Chapter 5, a group of people I was sitting with during a meeting in 2014 sarcastically exclaimed, ‘Let me hear a *hana hou!*’ while everybody around them laughed and resignedly threw their arms up in the air. Early in the eruption of 2018, a member of one of the Facebook groups created humorous pictures related to the eruption, starting with a spider that accidentally ‘photobombed’ a photo of the developments in Halema‘uma‘u. Following this, several pictures were published by lower Puna residents in the different groups I was following on Facebook, which for example, portrayed Godzilla⁷² crawling out from the crater. Humour is a vital part of sociality and many anthropologists, including Radcliffe-Brown (1940), have

⁷² Godzilla is a fictional prehistoric sea monster which first appeared in Japanese movies in the 1950s.

used it as an analytical vantage point for understanding social relationships. Radcliffe-Brown (1940, 195) argued that '[w]hat is meant by the term "joking relationship" is a relation between two persons in which one is by custom permitted, and in some instances required, to tease or make fun of the other, who in turn is required to take no offense'. He further argued that '[joking] behaviour is such that in any other social context it would express and arouse hostility; but it is not meant seriously and must not be taken seriously' (Radcliffe-Brown 1940, 195). When a Facebook group member commented that the photos were inappropriate because so many people were badly affected by the eruption, a discussion emerged about using humour as a mechanism for dealing with the seriousness of the event, which all commentators agreed was necessary.

Another form of resilience that was clearly visible during the 2018 eruption, and which I have argued for and highlighted throughout this dissertation, was looking to Hawaiian seismology for answers and explanations. As discussed in previous chapters, volcanic volatility in Puna is usually attributed to Pele. However, a discussion and 'local' theory that emerged about a month into the 2018 eruption had a somewhat surprising twist that confused and intrigued many. The first time I heard the theory was from a friend who had discussed it with his sister-in-law who worked at the Hub. She had conversed with a Hawaiian *kupuna* at the Hub about Pele's role in this eruption, and the *kupuna* had argued that this eruption was not the work of Pele, but of 'Ailā'au, the Forest Eater. As mentioned previously, 'Ailā'au was a fire god who resided on the island when Pele arrived to claim her home at Kīlauea, and Pele chased him away. During the eruption in 2018, the proponents of this theory claimed that he had returned and that the eruption was his doing. In the days following first hearing about this possible change in cosmological explanation, several discussions broke out in the different Facebook groups I was following. The argument was that this eruption was too vicious and too angry to be Pele.

The USGS scientists, who were sampling lava from the eruptions in Leilani Estates and Lanipuna Gardens, had stated that the lava that was surfacing now was old lava that had been stored underground since the 1955 eruption. 'Pele's lava', or the lava from Halema'uma'u or Pu'u Ō'ō, had disappeared into the ground and was, thus

far, unaccounted for. The discussion went on to include what types of mitigating actions one could take to ‘sweeten’ ‘Ailā‘au’s rage, and the same Hawaiian *kupuna* had argued that the offerings people were bringing in this eruption, especially artefacts like bottles of gin or other types of alcohol, were only making ‘Ailā‘au more angry. They suggested that as ‘Ailā‘au is a very old god, the best artefact one could bring as an offering was old, very productive soil from the oldest parts of the island in Hāmakua or Kohala.

A Facebook user, Kanaka Maoli and lower Puna resident I was following posted a picture of a piece of reticulite⁷³ (see Figure 7.4) that had been ejected from Fissure 8, and which he presented as ‘evidence’ that this eruption was different from Pele eruptions. The picture shows a small piece of rock with what can be interpreted as a figure holding an axe in the middle:

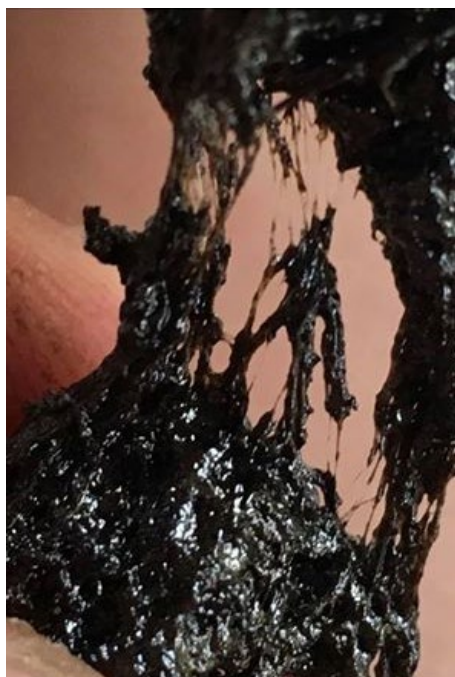


FIGURE 7.4: ‘Ailā‘au showing himself in a piece of lava rock that was flung out through Fissure 8. Photo and copyright by owner (anonymized lower Puna resident).

⁷³ Type of rock.

Attached to the photo was a disclaimer of what it portrays:

So this is a piece of Reticulite that came out of fissure 8 and flew into the sky and fell into Leilani. What a coincidence. Reticulite is like cinder or really light rock that the fissure pushes out. These type [sic] of rocks can travel in the air for long distances. Some of these rocks can travel almost a 1/2 mile or more from its source. This particular Reticulite is unique. The figure it had created seems to be 'Ailā'au and his binding axe in his right hand. That's the axe that he uses to break cracks in the east rift zone [sic]. Said in an ancient chant 'Kui ke Koi aweaweula' (the axe with the red binding is striking).

Lower Puna resident (2018)

Even when residents in Puna felt that this eruption was something other than what they knew and could, to some extent, be prepared for, they soon regained an understanding of what was happening when attributing this to a different deity. To be able to accept the harshness and destruction of this eruption, another god, who was older and much less familiar than Pele, was brought back, in an attempt to restore logic. Again, people were careful to emphasize that the eruption not only brought destruction but also creation, a positive and resilient attitude many Puna residents embrace.

As several favourite recreational spots were lost – including a marine sanctuary (Wai'ōpae), a beautiful coastline, a unique road (the red road) and a geothermally heated pond (Ahalanui) – people grieved but soon turned towards a positive attitude where the focus was on the new coastline formed by the eruption. Several new beaches and a new island emerged, and people were curious and excited to see them, all the while attempting to remain positive and not focus on what had been lost. One can argue that some of the positivity expressed by residents who had lost everything they owned was possibly due to a state of shock. However, as difficult as this eruption was for people in Puna, they remain remarkably resilient in their decisions not to give up on life in this deeply powerful but challenging place.

Rebuilding

Many residents in Leilani Estates and Lanipuna Gardens had been displaced because of the mandatory evacuation notice and the confirmed losses of house and property; furthermore, the emergency shelter situation was not ideal for many of the evacuees. Discussions focused on problem solving led to the idea of a Tiny House⁷⁴ project in Pāhoā, initiated by Habitat for Humanity, Hope Services, Sacred Heart Church and approximately 150 skilled and unskilled volunteer workers from Puna and other places on the Big Island (Richards 2018). The project volunteers erected 21 tiny homes, including a common area, bathrooms and showers, which were to function as transitional housing for evacuees who had lost their homes to the eruption. The importance of and need for togetherness had been seen throughout the eruption, especially after the Hub had provided a local gathering point where people came in search for social support. Thus, while focusing on providing a space where evacuees could close the door behind them and enjoy some privacy, the tiny house developers also focused on designing the areas around the houses as social spaces where people could come together and eat, play music and ‘talk story’.

As the eruption slowed down in early August, discussions emerged around the rebuilding of roads, the electrical grid, cell phone services, water and sewage. While I am not familiar with the different agencies’ planning processes and challenges around these issues, I noticed the discussions on the different Facebook groups mainly centred on dissatisfaction around how these processes were approached. Critiques about processes involved in road recovery, where the goal was to regain access to properties and homes that were still standing but were now surrounded by large lava fields on either side, often included a dissatisfied tone towards Hawai‘i County. Hawai‘i County was accused of not caring about Puna because not enough money nor energy was spent

⁷⁴ The Tiny House movement is an architectural social movement that focuses on minimalistic living. According to Mitchell (2018), the movement has been growing in the United States and internationally over recent years, and entails living a life that is downsized in terms of ‘stuff’ and ‘things’. The movement is about ‘decluttering’ your life and reducing the cost of living by living without the many ‘things’ we have in our lives in the modern world. Living in a tiny house is not required in order to be part of the movement, but it is preferred. As of 2018, there are no official size limits for how big or small a tiny house should be, but houses are usually between 100 and 400 square feet. The tiny life philosophy, minimalist and non-materialistic, resonates well with many residents in lower Puna.

on rebuilding the roads. Evacuees were becoming impatient after several months of displacement and felt that ‘the state’ did not meet their needs. Many houses were still standing after the eruption, but they were completely cut off from all forms of infrastructure. Residents who owned these houses and properties wanted to return to their lives there, but this was difficult as their properties were surrounded by lava.

In this situation, the evacuees would not be entitled to any insurance claims, as their houses and properties were still there. As mentioned in Chapter 5, insurance companies are hesitant to insure homes, properties and businesses in lower Puna because of the unpredictability of Kīlauea. If one manages to procure insurance in lava hazard zone 1, it is very expensive, and many people are not able to pay for it. People also live in lava hazard zone 1 without a residence permit; they live off-grid and unregistered. During the 2014 eruption, displacement of residents did not develop into a big issue as the lava flow stopped before entering large residential areas. In 2018 however, over 700 homes were lost and about 2000 people were displaced. Many of them did not have insurance, and thus lost everything they had in the eruption.

As mentioned previously, the documentation of loss and damage during an eruption is important in the process of making an insurance claim afterwards. The 2018 eruption was well documented by both local and global media, as well as many Puna-based photographers and local ‘heroes’ who ventured into the evacuation zone and documented the processes around houses and properties. However, many of the properties and houses were taken by lava without anyone there to document the process. Experience from insurance companies not being overly eager to be helpful in situations of loss and damage in Puna was another factor that played into evacuees’ worries about being forcefully evacuated and kept from their homes while lava was approaching their properties. While many knew what types of damage would be covered by their insurance plan, others were surprised to find that their insurance did not cover the damages inflicted on their property by a volcanic eruption. Those who were covered by insurance lost everything they had but would be able to rebuild in another place or on their properties if they wished to do so. This does not mean, however, that they have not experienced a serious trauma during the 2018 eruption. The way of life they knew is gone, and they might not be able to return to this type of

life at all. When facing volcanic eruptions in Puna, some choose not to. Some move away from Puna to another place on the Big Island, to another island, or to a place on the mainland. For some, lower Puna was the only place in the State of Hawai'i they could afford to live, and as their prospects of a good life there were taken away by the eruption, they moved to more affordable areas in another US state, where the Puna lifestyle is not possible.

In an emergency, FEMA (the Federal Emergency Management Agency) offers aid after the President of the United States has declared the emergency to be a disaster. As such a declaration was signed by the President for the eruption in Puna in 2018, FEMA could allow residents to apply for financial aid in the face of their loss. Residents without insurance who lose their houses or have properties that meet the FEMA criteria for having an unliveable home are usually eligible for such funding and can apply for aid to rebuild their house, relocate or repair damage done to their house during the eruption. As already described, during the 2018 eruption, cracks opened along the entire East Rift Zone, destroying roads, yards and houses throughout lower Puna. On some properties, cracks opened under the house and broke the foundation. On other properties, a crack would open on the side of the house, leaving the house untouched. These cracks were still emitting steam and toxic gases like SO₂ and H₂S in December 2018, and residents who own the properties and houses where these cracks remained, or the neighbouring properties that were equally affected, were not able to return because of the health hazards posed by the emissions. However, they were not eligible for FEMA funding, as their house met the FEMA criteria⁷⁵ for being habitable. These bureaucratic 'hurdles' are difficult to overcome, and after the traumatizing volcanic eruption they had endured, lower Puna residents were left struggling for funding to re-establish their lives.

⁷⁵ See Appendix B for a detailed list of FEMA criteria for habitability.

Returning

On 8 September 2018, most evacuees from Leilani Estates were allowed to return to what remained of their homes. After being kept out of the subdivision and other areas affected by the eruption by roadblocks and guards since the beginning of May, the return was bittersweet and unfortunately not possible for all. Many had lost their homes and entire properties. Where they had once resided, farmed and spent most of their time, thick layers of lava now lay, and the life they lived was completely changed. Some people had insurance when the eruption started and were able to start new lives in other places. Others could not. Some properties and streets in the subdivision were completely spared; many of these could be reached through the existing road infrastructure. Others had entire pieces of land covered by lava on all sides, turning the property into a *kīpuka*, access to which means a long hike over rugged lava rock. Age and health situations make it difficult for many to return to these properties, as the physical demands of the hike are too great. As nothing on their property was destroyed, they were most likely not eligible for insurance coverage for the loss of access. Nevertheless, many Leilani residents wanted to stay in their house on their property and continue life ‘almost’ as it was.

As the lava had taken large, highly treasured areas and large amounts of farmland between Leilani Estates and the sea, it was difficult for people in lower Puna to see a path to recovery. However, hope was ignited when the lava stopped just shy of a favourite local spot at Pohoiki, also known as Isaac Hale Beach Park. Pohoiki is the only place with an easily accessible boat ramp, as well as being the best surf spot in Puna. During the 2014 eruption, fishers and lava tour operators, who launched their boats from the Pohoiki boat ramp, were worried that lava would cross Highway 130 because if they lived on the Hilo side of the projected lava flow, this would cut off their access to the boat ramp. They would then have to travel to Hilo to launch their fishing boats, and this would take considerably much longer time than their usual workday. In 2014, this projected outcome never happened, and fishers, as well as other Puna residents, could continue using Pohoiki as they had before.

In 2018 however, Pohoiki was spared, but changed dramatically as black sand from the lava flow built a large new beach in the bay, closing in the boat ramp where a

new pond emerged. What the fishers do now, given that the boat ramp no longer offers access to the open ocean, is unknown to me. However, when the park reopened in December 2018, after County road workers had bulldozed an access road through the new lava field, hundreds of residents were there to partake in an opening ceremony and explore the ‘new’ beach park. According to Richardson (2018), reporter for *Hawai‘i News Now*, visitors felt a sense of loss because of the changes that had taken place, as well as a sense of relief because the place was still there. One visitor said: ‘This is really hard to see but it’s still beautiful. It’ll still be Pohoiki, but it’s changed. It will be forever changed.’ Another visitor said: ‘I think it’s beautiful. I think you can see for yourself how amazing the place is. [...] We still have the old along with the new.’ A Leilani Estates resident said that she and many others had been waiting a long time for this day.

An important issue that was discussed in local newspapers and social media both during and after the 2018 eruption was the possibility of returning to properties that were completely covered by lava. What does one do with a property that consists solely of rugged ‘a‘ā lava rock? A Leilani resident suggested that one way to make possible residency on the same property (that is, in the same geographical location) would be to build a Tiny Home on wheels, which he could transport out of the area if this type of eruption threatened the property again. While not suggesting an entirely nomadic life, he rather expressed an interest in the opportunity to ‘pack up his life’ and get out if he needed to. With reference to the old Hawaiian land tenure system in Puna, where people lived semi-nomadic lives and would move to safer areas if an eruption started nearby, he suggested that this – returning to an ancient nomadic lifestyle – is the only way you can live in lower Puna. However, at the time of writing, Hawai‘i County was not permitting mobile homes in Puna, as such structures would be far too vulnerable in an earthquake or hurricane and could be hazardous to live in. At the time of writing, residents in the most hazardous lava zones in Puna wanted this regulation against mobile homes re-evaluated.

Quite simply, if residents were to return to the same property, it would require a substantial amount of work and funding to make the property sustainable for human habitation. As mentioned, people in lower Puna often grow their own food on

properties that have not been subject to eruption activity for a very long time. This means that the properties have fertile soils, good for growing all sorts of vegetables and fruits. If this is the life people want to return to (which is often the case), they need to first bulldoze their property and fill it with soil from elsewhere, as well as most likely make some adjustments in the crops they grow as they have likely had fruit trees that take years to develop into producing crops. Additionally, the topography of the property has most likely changed. A property that used to be flat and low-lying might now be hilly and at a much higher elevation, as lava flows can inflate and create highly elevated terrain. A property that was earlier protected against harsh winds – and curious passers-by – by large trees and shrubbery, is now entirely exposed. Thus, the crops that one can grow need to be resistant to heavy winds and hard rain, and one must be willing to leave behind the privacy the former property provided. However, this challenge has been taken on by people in lower Puna before, and in the former Kalapana/Kaimū, new homes have been built on lava-covered properties. I am sure they will take on the challenge again.

Pele rests, again

Lower Puna, located on top of the East Rift Zone of one of the world's most active volcanoes, Kīlauea, is a hazardous place for people to build their lives. Still, they do, because it is a wonderfully dynamic place, with the possibility of building a beautiful and comfortable life. People who live there have much love and respect for the place they call home and many of them would rather live there, with the risk it entails, than anywhere else in the world. Because people continue to live on Kīlauea, different forms of vernacular seismology are always in the making in Puna, making this place a highly valuable example of how people cope with ever-changing, volatile environments. People in Puna possess valuable knowledge about how humans can manage crisis, maintain and adjust social relationships and create a world in which 'life itself' is made possible. After the recent eruptions, Leilani Estates, Lanipuna Gardens, Kapoho and Vacationland will never be the same, as Kalapana was never the same after the eruptions in the early 1990s, but it seems that residents in Puna are insisting on it becoming something else. It will not cease to exist: it will change. As so many of the

important places residents once used recreationally and enjoyed every day are gone, especially along the coastline, a shift in people's perception of and relationship to their immediate environment is paramount for the preservation of lower Puna sociality. Pele is a powerful agent that defines lower Puna as a genuinely dynamic place. As long as the volcano remains active, people cannot linger, but must always be willing to move and to continuously re-create vernacular seismology in order to sustain an understanding and a practical grasp of the volatile life on the volcano. As a lower Puna resident so eloquently put it on 15 August 2018:

So this is it. She worked so hard for so long and built this.

Quite honestly... I'm confused.

Either way, she leaves me awestruck every time.

My muse sleeps. She may not return in my lifetime. Or maybe she will. Sleep well, we could all use a break.

Appendix A: Glossary of Hawaiian words and expressions

All translations are based on empirical material and the *Hawaiian Dictionary* by Pukui and Elbert (1986). Please see the *Hawaiian Dictionary* for detailed translations.

‘A‘ā	A rugged type of lava flow
‘Aha‘aina	Feast, dinner party, banquet
A hui hou	Until we meet again
Ahupua‘a	A section of land/district in the traditional Hawaiian land division system
‘Ai	To eat, devour
‘Aiha‘a	A style of hula
‘Aikapu	The kapu system. A religiopolitical system of social and environmental laws and regulations in the old Hawaiian society
‘Āina	Land, to eat
Akua	God, goddess, spirit, ghost, devil, image, idol, corpse; divine, supernatural, godly
‘Āleuleu	Old, worn-out, as tapa, mats, clothing; worn-out tapa, clothing; objects of inferior quality; ragamuffin
Ali‘i	Ruling chief
Ali‘i nui	High chief, monarch
Aloha	Love, affection, compassion, mercy, sympathy, pity, kindness, sentiment, grace, charity; greeting, salutation, regards; sweetheart, lover, loved one; beloved, loving, kind, compassionate, charitable, lovable; to love, be fond of; to show kindness, mercy, pity, charity, affection; to venerate; to remember with affection; to greet, hail
Ao	Light, day, daylight, dawn
‘Aumakua (sing.)/ ‘aumākua (pl.)	Ancestral spirit(s)
‘Awa	Kava. A plant native to Pacific islands. The root is the ingredient of an intoxicating drink with the same name
‘Āweoweo	Species of Hawaiian red fish. The red colour of the fish is believed to be analogous to volcanic fire

Hālau	Long house, meeting house
Hālau hula	Hula school
Hana hou	To do again, repeat, encore, da capo
Haole	White person, American, Englishman, Caucasian. Formerly, any foreigner; foreign, introduced, of foreign origin
Hāpu‘u	Native fern
Haumāna	Student
Heiau	Hawaiian temple
Honu	Green turtle
Honu ea	Hawksbill turtle
Hula	Hawaiian dance and cultural tradition
Iki	Small, little
‘Ili	Section of land
Ilina	Burial site
‘Io	Hawaiian hawk
Kahuna (sing.)/Kāhuna (plu.)	Hawaiian priest, sorcerer, magician, wizard, minister
Kanaka Maoli (sing.)/ Kānaka Maoli (plu.)	“Full-blooded Hawaiian person” (Pukui and Elbert 1986)
Kanaka ‘Ōiwi	Native, native son, of the ancestral bone
Kāne	Man, male
Kapu	Taboo, prohibition, sacred
Kea	White
Kī/Tī	Evergreen plant of cultural and ritual importance in the Pacific islands
Kīpuka	A section of land, which has higher elevation than a lava flow, and remains as a (often) vegetated island in the middle of a hardened lava flow
Koa	Endemic species of tree in Hawai‘i
Kūkū / Tūtū	Grandparent
Kuleana	Right, privilege, concern, responsibility
Kumu	Teacher, mentor; source, origins
Kumulipo	Origin, genesis, source of life, mystery; name of the Hawaiian creation chant
Kupuna (sing.)/Kūpuna (plu.)	Elder(s)
Lā‘au	Tree, forest

Lānai	Porch
Lehua	Blossom of the 'Ōhi'a tree
Lei	Garland, wreath
Lū'au	Hawaiian feast
Maka'āinana	Commoner, worker of the land
Mālama	To care for, protect, preserve
Mana	Supernatural or divine power
Mauna	Mountain
Mele	Song
Moku	District, section
Moku'āina	District, section of land
Mokupuni	Island kingdom
Mo'o	Lizard-like creature; small section of land
'Ōhi'a	Endemic tree
Oli	Chant
Pāhoehoe	Smooth, unbroken type of lava
Pā hula	Hula platform
Pā'ina	Meal, dinner, small party with dinner
Pakalolo	Marijuana
Pali	Cliff, steep hill
Paniolo	Hawaiian cowboy
Pele / Lua pele	Lava flow, eruption, volcano / Volcano
Piko	Belly button, navel, umbilical cord
Pō	Night, darkness, obscurity; the realm of the gods; pertaining to or of the gods, chaos, or hell; dark, obscure, benighted
Pulu	The hairy fibres of the hapu'u fern
Pu'uhonua	Place of refuge, sanctuary, asylum, place of peace and safety
Wahi pana	Sacred and significant places
Wauke	Plant which bark is used to make tapa for clothing etc.

Appendix B: FEMA Definition of Habitability



FEMA

Fact Sheet

How FEMA Determines Habitability

The Individuals and Households Program Unified Guidance (IHPUG) references habitability as an eligibility factor for the following types of IHP Assistance:

- Lodging Expense Reimbursement,
- Rental Assistance,
- Home Repair Assistance,
- Replacement Assistance,
- Direct Housing Assistance, and
- Other Needs Assistance: Moving and Storage Assistance

FEMA may provide assistance “to respond to the disaster-related housing needs of individuals and households who are displaced from their pre-disaster primary residences or whose pre-disaster primary residences are rendered uninhabitable, or with respect to individuals with disabilities, rendered inaccessible or uninhabitable, as a result of damage caused by a major disaster.”¹ FEMA may provide assistance when the primary residence has been destroyed, is uninhabitable, or is inaccessible.

Defining Habitability

A habitable home is one that is safe, sanitary, functional, and presents no disaster-caused hazards to the occupants.² FEMA regulations define safe as secure from disaster-related hazards or threats to occupants; sanitary as free of disaster-related health hazards; and functional as an item or home capable of being used for its intended purpose.³

A FEMA inspection determines if the repair of the component of a home is necessary to ensure the safety or health of the occupant or to make the component or residence functional. FEMA considers the following factors when determining habitability and awarding repair assistance:⁴

- (1) The exterior is structurally sound, to include windows, doors, and roof;
- (2) The electricity, gas, heat, plumbing, etc., are functional;
- (3) The interior is structurally sound, to include floors, walls, and ceiling;
- (4) There is safe access to and from the home;
- (5) The septic and sewer systems are functioning properly; and
- (6) The water supply or well (if applicable) is functional.

¹ 42 U.S.C. 5174(b)(1)

² Uninhabitable means the dwelling is not safe, sanitary or fit to occupy (44 C.F.R. 206.111).

³ 44 C.F.R. 206.111

⁴ 44 CFR 206.117(b)(2)(ii); Individuals and Households Program Unified Guidance, Chapter 4.

Federal Emergency Management Agency

Disaster-caused damage may exist while the habitability of the home may not be affected. Although minimal damage may cause some inconvenience, it is expected that individuals or households will address those losses without federal assistance.

Determining Habitability

FEMA utilizes multiple methods for verifying habitability, to include on-site inspections and use of technology, such as satellite imagery, combined with applicant self-assessments. The most common method of verification is an on-site inspection.

On-site Inspection

FEMA provides specific guidelines that inspectors must follow during the on-site inspection to assess a home's habitability. FEMA inspectors record the damage viewed and information provided by the applicant, but they do not determine the applicant's eligibility for disaster assistance.

A FEMA inspector will visit the damaged home and assess disaster-caused damage to the applicant's pre-disaster residence and personal property such as furniture, appliances, vehicles, and essential equipment for daily household needs. The FEMA inspector may also photograph damage to help document disaster-caused losses that render the applicant's residence uninhabitable, unsafe, or inaccessible; however, FEMA inspectors will not physically inspect areas that are unsafe for them to access.

For homeowners, inspectors determine habitability based on all disaster-caused damage. For renters, the habitability determination is based on the disaster-caused damage that has not yet been repaired at the time of the inspection. Renters are not responsible for repairs to the damaged dwelling, so if repairs have been made, the inspector will note that the home is habitable.

For additional information, visit: <https://www.fema.gov/ihp-unified-guidance>.

###

FEMA's Mission: "Helping people before, during, and after disasters."

Last update: May 2018

Appendix C: Home Insurance and Lava Flow FAQ

Home Insurance & Lava Flow FAQs

Q: What can I do if I do not have homeowners insurance?

A: Mitigate the amount of damage by removing all belongings from your home. Start making a plan for where you can stay and store your belongings until you find a permanent solution.

Q: Will my homeowners policy cover damage from lava?

A: Each company's policy is different and homeowners should contact their insurer immediately to review their policy coverage.

If heat generated by a lava flow caused a fire that damaged your home or structure, then those damages may be covered as a fire peril under your policy.

Here are a few tips if your home or business is in the path of the flow:

- Keep your insurance policy in a safe place. If you need to evacuate be sure to take it with you.
- Homeowners should inventory their belongings using pictures, video, or the National Association of Insurance Commissioners' MyHome Scr.APP.book app. Proof of belongings and structures that were damaged before the lava flow reaches their property will help make the claims process easier.
- Residents are advised to remove as much as possible from their homes to mitigate the amount of damage. Even if a home is not damaged, the lava flow may cut off access to homes, businesses and belongings.

Q: How long will it take to get paid?

A: This depends on the extent of the damage, and whether or not an adjuster can visit the site immediately to do an assessment and determine applicable coverage.

Q: If my house sustains damage or is burned down because of the lava flow, what should I do before and after I file a claim?

A: Homeowners should consider the following steps before and after a claim is filed:

- Once it is safe, check for damage.
- Secure your property to prevent further damage and keep receipts for any materials used.
- Report damage to your insurance company or agent (make a claim).
- If your home or condo is uninhabitable ask if your policy covers the cost of temporary or alternative housing.
- Submit proof of loss forms or other claim forms if requested by your insurance company.
- Set aside and secure, if possible, damaged items for later review or inspection by your adjuster.
- Do not begin permanent repairs until damage is inspected by an adjuster or told to do so by your insurer.
- Work with your adjuster and a licensed contractor to estimate the cost of repairs.
- Begin repairs after receipt of settlement checks.

Do not access your property until an all clear has been given. If you are not able to assess the damage, let your insurer know and stay in touch with them until you are able to access the property with an adjuster.

Q: How does the claims process work?

A: Once a claim is filed, the insurance company will assign a claims adjuster to assess the damage and determine applicable coverage. Homeowners are encouraged to maintain a written log of any conversations with their insurance agent and/or adjuster, noting dates and a summary of discussions.

If there are disagreements, review the policy and findings with the insurance company and negotiate a settlement. If an agreement is not reached, consumers may contact the Insurance Division.

Contact the Hawaii Insurance Division if you need assistance

cca.hawaii.gov/ins
(808) 586-2790

Toll Free from the Big Island: 974-4000 x62790#



List of References

- Abramson, A. and M. Holbraad. (Eds.). 2014. *Framing Cosmologies: The Anthropology of Worlds*. Manchester University Press.
- Adger, W. N. 2000. 'Social and Ecological Resilience: Are They Related?' In *Progress in Human Geography*, 24 (3), 347–364.
- Agnew, D. C., W. H. K. Lee, H. Kanamori, P. C. Jennings, and C. Kisslinger. 2002. 'History of Seismology'. *International handbook of earthquake and engineering seismology*, 81 (A), 3–11.
- Albert, S., J. Udy, G. Baines and D. McDougall. 2007. 'Dramatic Tectonic Uplift of Fringing Reefs on Ranongga Is., Solomon Islands'. In *Coral Reefs*, 26 (4), 983–983.
- All European Academies (ALLEA). 2017. *The European Code of Conduct for Research Integrity, Revised Edition*. ALLEA, Berlin. Accessed online on 12 September 2021, from <https://www.allea.org/wp-content/uploads/2017/05/ALLEA-European-Code-of-Conduct-for-Research-Integrity-2017.pdf>
- Allaby, M. (Ed.). 2013. *A Dictionary of Geology and Earth Sciences*. Oxford University Press.
- Alpers, A. 1987. *The World of the Polynesians: Seen Through Their Myths and Legends, Poetry, and Art*. Oxford University Press.
- American Anthropological Association, 1997. *American Anthropological Association Response to OMB Directive 15: Race and Ethnic Standards for Federal Statistics and Administrative Reporting*. Accessed online on 10 November 2021, through http://s3.amazonaws.com/rdcms-aaa/files/production/public/FileDownloads/pdfs/cmtes/minority/upload/AAA_Response_OMB1997.pdf
- American Community Survey. 2019a. 'Keau CDP, Hawai'i'. *2019 American Community Survey 5-Year Estimates*. U.S. Census Bureau. Accessed online on 16 May 2021, through <https://data.census.gov/cedsci/profile?g=1600000US1532900>.
- . 2019b. 'Hawaiian Paradise Park CDP, Hawai'i'. *2019 American Community Survey 5-Year Estimates*. U.S. Census Bureau. Accessed online on 16 May 2021,

through <https://data.census.gov/cedsci/profile?g=1600000US1512600>.

———. 2019c. ‘Pāhoa CDP, Hawai‘i’. *2019 American Community Survey 5-Year Estimates*. U.S. Census Bureau. Accessed online on 23 May 2021, through <https://data.census.gov/cedsci/profile?g=1600000US1559900>.

———. 2019d. ‘Leilani Estates CDP, Hawai‘i’. *2019 American Community Survey 5-Year Estimates*. U.S. Census Bureau. Accessed online on 20 June 2021, through <https://data.census.gov/cedsci/profile?g=1600000US1544562>.

Armand, G.W. 2018. *Welcome to lava land*. Facebook publication retrieved on May 6, 2018, used with permission from the author. <https://www.facebook.com/photo.php?fbid=10216280539545006&set=a.1171274200888.26372.1198988707&type=3>

Baer, H. A. and M. Singer. 2018. *The Anthropology of Climate Change: An Integrated Critical Perspective*. Routledge.

Barth, F. 2002. ‘An Anthropology of Knowledge’. *Current Anthropology*, 43 (1), 1–18.

Basso, K. 1984. “‘Stalking with Stories’”: Names, Places, and Moral Narratives among the Western Apache’. In *Text, Play and Story: The Construction and Reconstruction of Self and Society*, 19–55. E. M. Bruner (Ed.). American Ethnological Society, Washington, DC, USA.

Bausch, C. 1978. ‘Po and Ao, Analysis of an Ideological Conflict in Polynesia’. *Journal de la Société des Océanistes*, 34 (61), 169–185.

Beckwith, M. W. 1951. *The Kumulipo: A Hawaiian Creation Chant*. University of Hawai‘i Press, Honolulu, USA.

———. 1970. *Hawaiian Mythology*. University of Hawai‘i Press, Honolulu, USA.

Bender, B. (Ed.) 1993. *Landscape: Politics and Perspectives*. Berg Publishers, Oxford, United Kingdom.

Bird, I. 1875. *The Hawaiian Archipelago: Six months Among the Palm Groves, Coral Reefs and Volcanoes of the Sandwich Islands*. John Murray, London. Accessed online through <https://purl.dlib.indiana.edu/iudl/vwwp/VAB7074>.

Borofsky, R. 1997. 'Cook, Lono, Obeyesekere, and Sahlins: CA* Forum on Theory in Anthropology'. *Current Anthropology*, 38 (2), 255–282.

Bourdieu, P. 1984/1986. 'The Forms of Capital'. In *Handbook of Theory and Research for the Sociology of Education*, 241–258. Richardson, J. (Ed). New York, Greenwood.

———. 1987. *Distinction: A Social Critique of the Judgement of Taste*. Harvard University Press. USA.

Bradshaw, T. K. 2008. 'The Post-Place Community: Contributions to the Debate about the Definition of Community'. In *Community Development*, 39 (1), 5–16.

Burtchard, G. C. and P. Moblo. 1994. *Archaeology in the Kilauea East Rift Zone: Part I, Land-use model and research design, Kapoho, Kamaili and Kilauea Geothermal Subzones, Puna District, Hawaii Island*. United States.
<https://doi.org/10.2172/214259>. Accessed online on 13 May 2021, through <https://www.osti.gov/servlets/purl/214259>.

Cashman, K. V. and S. J. Cronin 2008. 'Welcoming a Monster to the World: Myths, Oral Tradition, and Modern Societal Response to Volcanic Disasters'. In *Journal of Volcanology and Geothermal Research*, 176 (3), 407–418.

Cashman, K. V. and G. Giordano. 2008. 'Volcanoes and Human History'. In *Journal of Volcanology and Geothermal Research*, 176 (3), 325–329.

Chinen, J. J. 1958. *The Great Mahele*. University of Hawaii Press. Honolulu, USA.

Chouet, B. 2003. 'Volcano Seismology'. In *Pure and Applied Geophysics*, 160 (3–4), 739–788.

Chryssides, G. D. 2007. 'Defining the New Age'. In *Handbook of New Age*. Kemp, D. and J. R. Lewis (Eds.). Brill, ProQuest Ebook Central.

College of Tropical Agriculture and Human Resources, University of Hawai'i at Mānoa. 2017. *Rapid 'Ōhi'a Death*. Accessed online through <https://cms.ctahr.hawaii.edu/rod/>.

Connell, J. and N. Lutkehaus. 2017. 'Escaping Zaria's Fire? The Volcano

Resettlement Problem of Manam Island, Papua New Guinea'. In *Asia Pacific Viewpoint*, 58 (1), 14–26.

Cooper, G. and G. Daws. 1990. *Land and Power in Hawaii: The Democratic Years*. University of Hawai'i Press, Honolulu, USA.

Cosgrove, D. 1989. 'Geography is Everywhere: Culture and Symbolism in Human Landscapes'. In *Horizons in Human Geography*. D. Gregory and R. Walford (Eds.). Macmillan, 118–135. Basingstoke.

Crate, S. A. 2011. 'Climate and Culture: Anthropology in the Era of Contemporary Climate Change'. In *Annual Review of Anthropology*, 40, 175–194.

Crate, S. A. and M. Nuttall. 2009. 'Epilogue: Anthropology, Science, and Climate Change Policy'. In *Anthropology and Climate Change: From Encounters to Actions*, 394–400.

Daws, G. 1968. *Shoal of Time: A History of the Hawaiian Islands* (No. 996.9 D272s). University of Hawaii Press.

Dawrs, S. 2010. 'Pele's Ph.D'. In *Hana Hou! Magazine*, 12 (6). Accessed online on 6 January 2019, through <https://hanahou.com/12.6/peles-ph-d>.

de Coppet, D. and A. Iteanu. 1995. *Cosmos and Society in Oceania*. Berg Publishers.

Deleuze, G. 1997. 'Immanence: A Life...' In *Theory, Culture and Society*, 14 (2), 3–7.

Deleuze, G. and F. Guattari. 1987. *A Thousand Plateaus*. Continuum, London.

De Marchi B. 2014. 'Scientific Advice and the Case of the L'Aquila Earthquake'. In *Technikfolgenabschätzung – Theorie und Praxis* 23 (3), November 2014.

Descola, P. and G. Pálsson. 1996. *Nature and Society: Anthropological Perspectives*. European Association of Social Anthropologists. Routledge, United Kingdom.

Dove, M. R. (Ed.). 2013. *The Anthropology of Climate Change: An Historical Reader*. John Wiley and Sons.

Dove, M. R. and C. Carpenter (Eds.). 2008. *Environmental Anthropology: A*

Historical Reader. Blackwell Publishing Ltd, Utopia Press Pte Ltd, Singapore.

Earthquaketrack. 2018. *Recent Earthquakes Near Hawai 'i, Hawai 'i*. Accessed online on 14 May 2018, through <https://www.earthquaketrack.com/r/hawaii-hawaii/recent>.

Edith Kanaka'ole Foundation. 2017. *About Us*. Accessed online on 27 December 2021 through <https://edithkanakaolefoundation.org/aboutUs.php>.

Ellis, W. 1827/1917. *A Narrative of a Tour through Hawaii, or Owhyhee: With Remarks on the History, Traditions, Manners, Customs, and Language of the Inhabitants of the Sandwich Islands*, 2. Hawaiian Gazette Company.

Emerson, N.B. 1907/1998. *Unwritten Literature of Hawai 'i: The Sacred Songs of the Hula*. Mutual Publishing, Honolulu, Hawai 'i, USA.

———. 2005. *Pele and Hiiaka: A Myth from Hawaii*. Edith Kanaka'ole Foundation, Hilo, USA.

European Environmental Agency. 2021. *Climate Change is One of the Biggest Challenges of Our Time*. Accessed online through <https://www.eea.europa.eu/themes/climate/climate-change-is-one-of>.

Evans-Pritchard, E. E. 1937. *Witchcraft, Oracles and Magic among the Azande* (Vol. 12). Oxford: Clarendon Press.

Foucault, M. 1972/2002. *The Archaeology of Knowledge*. Routledge: New York.

———. 1980. *Power/Knowledge: Selected Interviews and Other Writings 1972–1977*. C. Gordon (Ed.). The Harvester Press Limited. Great Britain.

Friedman, J. 1993. 'Will the Real Hawaiian Please Stand; Anthropologists and Natives in the Global Struggle for Identity'. In *Bijdragen tot de Taal-, Land- en Volkenkunde, Politics, tradition and change in the Pacific* 149 (4), 737–767. Leiden.

Funtowicz S. O. and J. R. Ravetz. 1994. 'Uncertainty, Complexity and Post-Normal Science'. In *Environmental Toxicology and Chemistry*, 13 (12), 1881–1885.

Gell, A. 1995. 'Closure and Multiplication: An Essay on Polynesian Cosmology and Ritual'. In *Cosmos and Society in Oceania*, 21–56. de Coppet, D. and A. Iteanu (Eds.). Berg Publishers Limited, UK.

Geertz, C. 1974. "From the Native's Point of View": On the Nature of Anthropological Understanding'. *Bulletin of the American Academy of Arts and Sciences*, 28 (1), 26–45. doi:10.2307/3822971

———. 1983. *Local Knowledge: Further Essays on Interpretive Anthropology*. Basic Books, USA.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid and D.M. Delparte. 2013. 'Online Rainfall Atlas of Hawai'i'. In *Bulletin of the American Meteorological Society*. 94, 313–316, doi: 10.1175/BAMS-D-11-00228.1.

Gluckman, M. 1961. 'Ethnographic Data in British Social Anthropology'. In *Sociological Review* 9, 5–17.

———. 2006. 'Ethnographic Data in British Social Anthropology'. The Manchester School. In *Practice and Ethnographic Praxis in Anthropology*, 13–22.

Gregg, C. E., B.F. Houghton, D. Paton, D. A. Swanson, R. Lachman, and W. J. Bonk. 2008. 'Hawaiian cultural influences on support for lava flow hazard mitigation measures during the January 1960 eruption of Kīlauea volcano, Kapoho, Hawai'i'. *Journal of Volcanology and Geothermal Research*, 172 (3–4), 300–307. Elsevier B.V.

Haas, M. (Ed.) 1998. *Multicultural Hawai'i: the Fabric of a Multiethnic Society*. Garland Publishing Inc., New York and London.

Handmer, J. and H. Iveson. 2017. 'Cyclone Pam in Vanuatu: Learning from the low death toll'. In *The Australian Journal of Emergency Management*, 32 (2), 60–65.

Hastrup, K. 2004. 'Getting it Right: Knowledge and Evidence in Anthropology.' *Anthropological Theory*, 4 (4), 455–472.

Hau'ofa, E. 1993. 'Our Sea of Islands'. In *A New Oceania: Rediscovering Our Sea of Islands*. E. Hau'ofa, E. Waddell and V. Naidu (Eds.). School of Social and Economic Development, The University of the South Pacific.

———. 1994. 'Our Sea of Islands'. In *The Contemporary Pacific*, 6 (1), 148–161.

———. 2008. *We are the ocean*. University of Hawaii Press.

Hawai'i Volcanoes Observatory (HVO). 2017a. *Active Volcanoes of Hawai'i*. Accessed online on 10 October 2017, through https://volcanoes.usgs.gov/observatories/hvo/hvo_volcanoes.html

———. 2017b. *About HVO*. Accessed online on 20 November 2017, through https://volcanoes.usgs.gov/observatories/hvo/hvo_about.html

Henare, A., M. Holbraad and S. Wastell. (Eds.). 2007. *Thinking Through Things: Theorising Artefacts Ethnographically*. Routledge.

Hirsch, E. 2008. 'God or Tidibe? Melanesian Christianity and the Problem of Wholes'. In *Ethnos*, 73 (2), 141–162. DOI:10.1080/00141840802180330.

Hirsch, E. and M. O'Hanlon (Eds.) 1995. *The Anthropology of Landscape: Perspectives on Place and Space*. Oxford University Press, New York.

Hirsch, E. and C. Stewart. 2005. 'Introduction: Ethnographies of Historicity'. In *History and Anthropology*, 16 (3), 261–274. Routledge.

Hoëm I. 2000. 'Mørk opprinnelse: Hawaii'. *I begynnelsen: skapelsesmyter fra hele verden*, 194–197. T. Å. Bringsværd (Ed.). De Norske Bokklubbene.

Hoffman, S.M. 1999. 'The Worst of Times, the Best of Times: Toward a Model of Cultural Response to Disaster'. In *The Angry Earth: Disaster in Anthropological Perspective*, A. Oliver-Smith and S. M. Hoffman (Eds.). Routledge, New York and London.

Hoffman, S. M. and A. Oliver-Smith. 2002. 'Why Anthropologists Should Study Disasters'. In *Catastrophe and Culture, The Anthropology of Disaster*, A. Oliver-Smith and S. M. Hoffman (Eds.). School of American Research Press. USA.

Holbraad, M. and M. A. Pedersen. 2009. 'Planet M: The Intense Abstraction of Marilyn Strathern'. In *Anthropological Theory* 9 (4), 371–394.

———. 2017. *The Ontological Turn: An Anthropological Exposition*. Cambridge University Press.

Holt, J. D. 1964/1995. *On Being Hawaiian*. Ku Pa'a Publishing Incorporated.

Honolulu, Hawai‘i.

Houghton, B. F., W. A. Cockshell, C. E. Gregg, B. H. Walker, K. Kim, C. M. Tisdale and E. Yamashita. 2021. ‘Land, Lava, and Disaster Create a Social Dilemma After the 2018 Eruption of Kīlauea Volcano’. *Nature Communications*, 12 (1), 1–4.

Hovstein, A. S. 2016. *‘We Are Doers!’ – The Social Life of Silence: Risk Awareness and Risk Perception at the Foot of Katla, Iceland*. M.A. thesis, University of Oslo.

Hulme, M. 2009. *Why We Disagree About Climate Change: Understanding Controversy, Inaction and Opportunity*. Cambridge University Press.

Humphrey, C. 1995. ‘Chiefly and Shamanist Landscapes in Mongolia’. In *The Anthropology of Landscape: Perspectives on Place and Space*. E. Hirsch and M. O’Hanlon (Eds.). Oxford University Press, New York.

Hviding, E. 1996. *Guardians of Marovo Lagoon: Practice, Place, and Politics in Maritime Melanesia*. Pacific Islands Monograph Series 14, University of Hawai‘i Press, Honolulu.

———. 2003. ‘Between Knowledges: Pacific Studies and Academic Disciplines’. *The Contemporary Pacific*, 43–73.

HVNP 2021. ‘Places’. *Hawai‘i Volcanoes National Park: Learn about the Park*. Accessed online on 13 May 2021, through <https://www.nps.gov/havo/learn/historyculture/places.htm>

Ingold, T. 1993. ‘The Temporality of the Landscape’. In *World Archaeology*, 25 (2), 152–174.

———. 2000. *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill*. Psychology Press.

———. 2002. *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill*. Routledge.

———. 2004. ‘Culture on the Ground: The World Perceived through the Feet’. In *Journal of Material Culture*, 9 (3), 315–340.

———. 2011. *Being alive: Essays on Movement, Knowledge and Description*.

Routledge.

Ingold, T. and G. Palsson. 2013. *Biosocial Becomings: Integrating Social and Biological Anthropology*. Cambridge University Press.

Institute for Astronomy, University of Hawaii. 2016. *About Mauna Kea Observatories*. Accessed online on 13 November 2017, through https://www.ifa.hawaii.edu/mko/about_maunakea.shtml.

Iwashita, A. M. 2017. *Geothermal Potentials in Puna, Hawai'i: How Pele Teaches the Spaces Between*. Ph.D. Dissertation, Columbia University.

Kalākaua, D. 1888. *The Legends and Myths of Hawaii: The Fables and Folk-lore of a Strange People*. Charles L Webster and Co.

Kamakau, S. M. 1961/1992. *Ruling Chiefs of Hawai'i*. Kamehameha Schools Press, Honolulu, USA.

———. 1976. *The Works of the People of Old: Na Hana a ka Po'e Kahiko*. Bishop Museum, Honolulu, USA.

Kame'eleihiwa, L. 1992. *Native Land and Foreign Desires*. Bishop Museum Press.

Kanahele, G. S. 1979. 'Haw'n Renaissance Grips, Changes Island History'. In *Ha'ilono Mele*, 5 (7). The Hawaiian Music Foundation.

Kanahele, P. K. 2011. *Ka Honua Ola, 'Eli'eli Kau Mai*. Kamehameha Publishing, Hawai'i, USA.

Kāne, H. K. 1987/2013. *Pele: Goddess of Hawai'i's Volcanoes*. The Kawainui Press, Korea.

Kant, I. 1998. *Critique of Pure Reason*. Cambridge University Press.

Kauanui, J. K. 2008. *Hawaiian Blood: Colonialism and the Politics of Sovereignty and Indigeneity*. Duke University Press.

———. 2018. *Paradoxes of Hawaiian Sovereignty*. Duke University Press.

Kapferer, B. 2007. 'Anthropology and the Dialectic of the Enlightenment: A

Discourse on the Definition and Ideals of a Threatened Discipline'. In *The Australian Journal of Anthropology*, 18 (1), 72–96.

———. 2010. 'Introduction: In the Event – Toward an Anthropology of Generic Moments'. In *Social Analysis*, 54 (3), 1–27.

———. 2015. 'Introduction: In the event: Toward an Anthropology of Generic Moments'. In *In the Event: Toward an Anthropology of Generic Moments*. L. Meinert and B. Kapferer (Eds.). Berghahn Books.

Keesing, R. M. 1989. 'Creating the Past: Custom and Identity in the Contemporary Pacific'. In *The Contemporary Pacific*, 19–42. Honolulu, USA.

Kirch, P.V. 2011. 'When did the Polynesians Settle Hawai'i? A Review of 150 Years of Scholarly Inquiry and a Tentative Answer'. In *Hawaiian Archaeology*, 12. Society for Hawaiian Archaeology. Honolulu, USA.

Kirch, P. V. and M. Sahlins. 1994. *Anahulu: The Anthropology of History in the Kingdom of Hawaii, Volume 1: Historical Ethnography* (Vol. 1). University of Chicago Press.

Kuhn, T. S. 1962. *The Structure of Scientific Revolutions*. University of Chicago Press, Chicago, IL.

Ladefoged, T. A., M. W. Graves and I. Lilley. 2006. 'The formation of Hawaiian territories'. In *Archaeology of Oceania: Australia and the Pacific Islands*, 259–283. John Wiley and Sons.

Langlas, C. M. 2016. *Under the Volcano: The People of Kalapana, 1823 to 2010*. Pili Productions, Hilo, Hawai'i.

Latour, B. 2004. 'Whose Cosmos, Which Cosmopolitics? Comments on the Peace Terms of Ulrich Beck'. *Common knowledge*, 10 (3), 450–462.

Latukefu, S. 1968. 'Oral Traditions: An Appraisal of Their Value in Historical Research in Tonga'. In *The Journal of Pacific History*, 3 (1), 135–143. Taylor and Francis Ltd. UK.

Lauer, N. C. 2017. 'Protest Outside PTA as Military Training Heats Up'. In *West*

Hawai'i Today. Published online on 30 March 2017. Accessed online on 1 November 2017, through <http://westhawaii.com/news/local-news/protest-outside-pta-military-training-heats>.

Le Dé, L., T. Rey, F. Leone and D. Gilbert. 2018. 'Sustainable Livelihoods and Effectiveness of Disaster Responses: A Case Study of Tropical Cyclone Pam in Vanuatu'. In *Natural hazards*, 91 (3), 1203-1221.

Linnekin, J. 1983. 'Defining Tradition: Variations on the Hawaiian Identity'. In *American Ethnologist*, 10 (2), 241–252. American Anthropological Association, Blackwell Publishing.

Lockwood, J. P. and R. W. Hazlett. 2010. *Volcanoes: Global Perspectives*. John Wiley and Sons.

Lutkehaus, N. 1995. *Zaria's Fire: Engendered Moments in Manam Ethnography*. Carolina Academic Press.

Maly, K. and O. Maly. 2005. *Mauna Kea—Ka piko kaulana o ka 'āina' (Mauna Kea—the Famous Summit of the Land) A Collection of Native Traditions, Historical Accounts, and Oral History Interviews for: Mauna Kea, the Lands of Ka'ōhe, Humu'ula and the 'Āina Mauna on the Island of Hawai'i*. Kumu Pono Associates LLC. Hilo, Hawai'i, USA.

Maly, K. and B. A. Wilcox. 2000. 'A Short History of Cattle and Range Management in Hawai'i'. In *Rangelands*, 22 (5), 21–23. Society for Range Management.

McCormick, M. 2001. *Immanuel Kant: Metaphysics*. Internet Encyclopedia of Philosophy.

McGregor, D. P. 2007. *Nā kua 'āina: Living Hawaiian Culture*. University of Hawai'i Press, Honolulu, USA.

McLennan, C. A. 2014. *Sovereign Sugar: Industry and Environment in Hawaii*. University of Hawaii Press.

Meyer, M. A. 2001. 'Our Own Liberation: Reflections on Hawaiian Epistemology'. *The Contemporary Pacific*, 13 (1), 124–148.

———. 2003. *Ho'oulu: Our Time of Becoming: Hawaiian Epistemology and Early*

Writings. ‘Ai Pōhaku Press.

Meyer, R., 2018. ‘A Beginner’s Guide to Hawaii’s Otherworldly Lava’, in *The Atlantic*. Accessed online on 11 May 2018, through https://www.theatlantic.com/science/archive/2018/05/how-to-look-at-hawaiis-lava/559988/?utm_source=fbb

Milton, K. (Ed.). 1993. *Environmentalism: the view from anthropology*, 32. Psychology Press.

Mitchell, J. C. 1956a. *The Kalela Dance*. Rhodes-Livingstone Paper, 27. Manchester, Manchester University Press for the Rhodes-Livingstone Institute.

———. 1956b. *The Yao Village: A Study in the Social Structure of a Nyasaland Tribe*. Manchester, Manchester University Press.

———. 1969. *Social Networks in Urban Situations*. (Ed.) Manchester: Manchester University Press.

———. 1974. ‘Social Networks’. In *Annual Review of Anthropology* 3 (4), 279–299.

Mitchell, R. 2018. ‘What is the Tiny House Movement?’ In *The Tiny Life*. Accessed online on 16 December 2018, through <https://thetinylife.com/what-is-the-tiny-house-movement/>.

Moore, J. G. and D. A. Clague. 1992. ‘Volcano Growth and Evolution of the Island of Hawaii’. In *GSA Bulletin*, 104 (11), 1471–1484. DOI: [https://doi.org/10.1130/0016-7606\(1992\)104<1471:VGAEOT>2.3.CO;2](https://doi.org/10.1130/0016-7606(1992)104<1471:VGAEOT>2.3.CO;2)

Munekiyo and Hiraga, Inc. 2014. *Tourism Market Study BANYAN DRIVE, HILO, HAWAII*. Prepared for: State of Hawaii Department of Land and Natural Resources. Accessed online on 9 May 2021, through <https://dlnr.hawaii.gov/ld/files/2020/08/CC-Tourism-Market-Study-for-Hilo-Hawaii.pdf>.

Nakamura, J. J. M. 2016. ‘Fire on the Rim: The Creation of Hawai‘i National Park’. In *Hawai‘i Volcanoes National Park Occasional Papers*, 1 (1). National Park Service, US Department of the Interior.

National Institute for Occupational Safety and Health (NIOSH). 2019. *Hydrogen*

Sulfide. Accessed online on 25 November 2020, through <https://www.cdc.gov/niosh/topics/hydrogensulfide/default.html>

National Oceanic and Atmospheric Administration (NOAA). 2015. *State of the Climate: Hurricanes and Tropical Storms for Annual 2014*. Accessed online 3 April 2018, through <https://www.ncdc.noaa.gov/sotc/tropical-cyclones/201413>.

Nelson, D. R., W. N. Adger and K. Brown. 2007. 'Adaptation to Environmental Change: Contributions of a Resilience Framework'. *Annual Review of Environment and Resources*, 32, 395–419.

Nunn, P. D. 2009. *Vanished Islands and Hidden Continents of the Pacific*. University of Hawaii Press.

Nuttall, M. 2009. 'Living in a World of Movement: Human Resilience to Environmental Instability in Greenland'. In *Anthropology and Climate Change: From Encounters to Actions*. S. A. Crate and M. Nuttal (Eds). Left Coast Press, Inc. California, USA.

Obeyesekere, G. 1992/1997. *The Apotheosis of Captain Cook: European Mythmaking in the Pacific*. Princeton University Press.

OHA. 2017. 'OHA Files Lawsuit Against State for Mismanagement of Mauna Kea'. 'Āina Press Release. Accessed online through <https://www.oha.org/news/oha-files-lawsuit-state-mismanagement-mauna-kea/>.

———. 2021. *About*. Office of Hawaiian Affairs. Accessed online on 26 October 2021, through <https://www.oha.org/about/>

Oliver-Smith, A. 1996. 'Anthropological Research on Hazards and Disasters'. In *Annual Review of Anthropology*, 25 (1), 303–328.

Oliver-Smith, A. and S. A. Hoffman (Eds.) 1999. *The Angry Earth: Disaster in Anthropological Perspective*. Routledge, New York and London.

———. 2002. *Catastrophe and Culture: The Anthropology of Disaster*. School of American Research Press. USA.

Osorio, J. K. 2001. "'What Kine Hawaiian Are You?' A Mo'olelo About Nationhood, Race, History, and the Contemporary Sovereignty Movement in

Hawai'i'. In *The Contemporary Pacific*, 13 (2), 359–379.

———. 2002. *Dismembering Lahui: A History of the Hawaiian Nation to 1887*. University of Hawaii Press.

———. 2014. *I Ulu I Ka Aina: Land*. University of Hawai'i Press.

Pedersen, M. A. 2011. *Not Quite Shamans. Spirit Worlds and Political Lives in Northern Mongolia*. Cornell University Press.

Pukui, M. K. and S. H. Elbert. 1986. *Hawaiian Dictionary: Hawaiian-English English-Hawaiian Revised and Enlarged Edition*. University of Hawaii Press.

Pukui, M. K., S. H. Elbert and E. T. Mookini. 1966/2021. *Place Names of Hawaii*. University of Hawaii Press.

Radcliffe-Brown, A. R. 1940. 'On joking relationships'. *Africa*, 13 (3), 195–210.

Reese, W. L. 1998. 'Pantheism'. In *Encyclopædia Britannica*, accessed electronically on 12 February 2019, through <https://www.britannica.com/topic/pantheism#ref420609>.

Richards, C. 2018. 'Community Comes Together to Build Tiny Homes for Puna Evacuees'. In *Big Island Now*. Accessed online on 16 December 2018, through <http://bigislandnow.com/2018/06/09/community-comes-together-to-build-tiny-homes-for-puna-evacuees/>.

Richardson, M. 2018. 'Months After Lava Swallowed Pohoiki, Hundreds Flock to Reopening of Isaac Hale Beach Park'. In *Hawai'i News Now*. Accessed online on 11 December 2018, through <http://www.hawaiinewsnow.com/2018/12/07/month-after-lava-swallowed-pohoiki-hundreds-flock-reopening-isaac-hale-beach-park/>.

Riker, M. 2015. 'What Does It Mean to Be Local in Hawaii?' *Huffington Post*, 2 October. Accessed online on 2 December 2016, through http://www.huffingtonpost.com/2015/02/10/hawaii-local-census_n_6655808.html.

Rice, W. H. 1923. *Hawaiian Legends*. Honolulu: Bernice Pauahi Bishop Museum. (Bernice Pauahi Bishop Museum Bulletin).

Robbins, Joel. 2004. *Becoming Sinners: Christianity and Moral Torment in a Papua*

New Guinea Society. University of California Press, Berkeley. Accessed 23 June 2020. ProQuest Ebook Central.

Röllli, M. 2004. 'Immanence and Transcendence'. *Bulletin de la Société Américaine de Philosophie de Langue Française*, 14 (2), 50–74.

Sahlins, M. 1981. *Historical Metaphors and Mythical Realities: Structure in the Early History of the Sandwich Islands Kingdom*. ASAO Special Publications 1, Association for Social Anthropology in Oceania, the University of Michigan Press, Ann Arbor, USA.

———. 1985. *Islands of History*. University of Chicago Press. Chicago.

———. 1995. *How "Natives" Think: About Captain Cook, for Example*. University of Chicago Press.

Sands, R. R. 2002. *Sport Ethnography*. Human Kinetics.

Scheper-Hughes, Nancy. 2005. 'Katrina: The Disaster and Its Doubles'. In *Anthropology Today*, 21 (6), 2–4.

Scott, M. W. 2013. 'The Anthropology of Ontology (Religious Science?)'. In *The Journal of the Royal Anthropological Institute*, 19 (4), 859–872.

Siebert, L., T. Simkin and P. Kimberly. 2011. *Volcanoes of the World*. University of California Press, USA.

Silva, N. K. 2004. *Aloha Betrayed: Native Hawaiian Resistance to American Colonialism*. Duke University Press.

Stannard, D. E. 1990. 'Disease and Infertility: A New Look at the Demographic Collapse of Native Populations in the Wake of Western Contact'. In *Journal of American Studies*, 24 (3), 325-350.

State of Hawai'i Department of Human Services. 2018. *Supplemental Nutrition Assistance Programme (SNAP)*. Accessed online on 1 March 2018, through <http://humanservices.hawaii.gov/bessd/snap/>.

Stewart, C. M. 2014. 'Cool under Pele's Pressure'. In *Hawaii Tribune-Herald*, 5 October 2014.

-
- Strathern, M. 1985. 'Parts and Wholes: Refiguring Relationships in a Post-plural World'. In *Conceptualizing Society*, Kuper, A (Ed.). London: Routledge, 75–104.
- Swanson, D. A. 2008. 'Hawaiian Oral Tradition Describes 400 Years of Volcanic Activity at Kīlauea'. In *Journal of Volcanology and Geothermal Research*, 176 (3), 427–431.
- Szvetecz, A. 2001. 'Geothermal Energy in Hawai'i: An Analysis of Promotion and Regulation'. *Graduate Student Theses, Dissertations, & Professional Papers*. 8258. University of Montana. USA.
- Takaki, R. 1984. *Pau Hana: Plantation Life and Labor in Hawaii, 1835â 1920*. University of Hawaii Press.
- Taylor, P. W. 1995. 'Myths, Legends and Volcanic Activity: An example from Northern Tonga'. In *The Journal of the Polynesian Society*, 104 (3), 323–346. The Polynesian Society, New Zealand.
- Tengan, T. P. K. 2008. *Native Men Remade: Gender and Nation in Contemporary Hawai'i*. Duke University Press.
- Tilley, C. 1994. *A Phenomenology of Landscape: Places, Paths and Monuments*. Berg Publishers, Oxford, United Kingdom.
- Tolkien, J.R.R. 1994/1999. *The Lord of the Rings: The Return of the King*. HarperCollinsPublishers, London.
- Tomlinson, M. 2020. *God is Samoan*. University of Hawaii Press.
- Torgersen, E. H. 2010. *The Social Meanings of Hula – Hawaiian Traditions and Politicized Identities in Hilo*. M.A. thesis, The University of Bergen.
- . 2018. 'Waters of Destruction: Mythical Creatures, Boiling Pots and Tourist Encounters at Wailuku River in Hilo, Hawai'i'. In *Island Rivers: Fresh Water and Place in Oceania*, ANU Press, Canberra, 165-186.
- Trask, H.K. 1999. *From a Native Daughter: Colonialism and Sovereignty in Hawai'i*. (Revised edition). University of Hawaii Press.

———. 2000. 'Natives and Anthropologists: The Colonial Struggle'. In *Voyaging through the Contemporary Pacific*. D. L. Hanlon and G. M. White (Eds.). Pacific Formations. Rowman and Littlefield Publishers Inc, USA.

Trenberth, K. E. 1997. 'The Definition of El Niño'. *Bulletin of the American Meteorological Society*, 78 (12), 2771–2778. [https://doi.org/10.1175/1520-0477\(1997\)078<2771:TDOENO>2.0.CO;2](https://doi.org/10.1175/1520-0477(1997)078<2771:TDOENO>2.0.CO;2).

Turner, V. W. 1957. *Schism and Continuity in an African Society*. Manchester, Manchester University Press.

———. 1968. *The Drums of Affliction: A Study of Religious Processes among the Ndembu of Zambia*. Oxford, Clarendon Press.

Twain, M. 1990. *Mark Twain in Hawai'i. Roughing It in the Sandwich Islands – Hawai'i in the 1860s*. Mutual Publishing, Honolulu, Hawai'i, USA.

UHH. 2020. *UH Hilo at a Glance*. Accessed online on 27 May 2021, through <https://hilo.hawaii.edu/prospective/glance.php>.

United Nations. 2015. *Transforming our World: The 2030 Agenda for Sustainable Development*. Accessed online on 19 December 2021, through <https://sdgs.un.org/publications/transforming-our-world-2030-agenda-sustainable-development-17981>

———. 2021. *Climate Change*. Accessed online through <https://www.un.org/en/sections/issues-depth/climate-change/>.

U.S. Census Bureau. 2019. *QuickFacts: Hilo CDP, Hawai'i*. Accessed online on 9 May 2021, through <https://www.census.gov/quickfacts/hilocdphawaii#qf-flag-X>

United States Geological Survey (USGS): 1999. "*Hotspots*": *Mantle Thermal Plumes*. Accessed online on 10 October 2017, through <https://pubs.usgs.gov/publications/text/hotspots.html>

———. 2013. *Volcano Hazards Program: Glossary*. Accessed online through <https://volcanoes.usgs.gov/vsc/glossary/>

———. 2014. *Volcano Watch — Pāhoehoe Lava Makes for Fitful Advance of the June 27th Lava Flow*. Accessed online through <https://www.usgs.gov/center->

[news/volcano-watch-p-hoehoe-lava-makes-fitful-advance-june-27th-lava-flow.](#)

———. 2016. *Mauna Kea - A Postshield-Stage Volcano that Once Hosted Glaciers*. Accessed online on 13 November 2017, through

https://volcanoes.usgs.gov/volcanoes/mauna_kea/geo_hist_summary.html

———. 2016a. 'Preliminary Analysis of the April 2007 Solomon Islands Tsunami, South-West Pacific Ocean'. In *Tsunamis and Earthquakes*. Accessed online on 2 January 2018, through <https://walrus.wr.usgs.gov/tsunami/solomon07/index.html>

———. 2017. *Active Volcanoes of Hawai'i*. Accessed online on 16 November 2017, through https://volcanoes.usgs.gov/observatories/hvo/hvo_volcanoes.html

———. 2017a. *Mauna Kea*. Accessed online on 13 November 2017, through https://volcanoes.usgs.gov/volcanoes/mauna_kea/

———. 2017b. *Hualālai*. Accessed online on 15 November 2017, through <https://volcanoes.usgs.gov/volcanoes/hualalai/>

———. 2017c. *Hualālai*. Accessed online on 15 November 2017, through <https://volcanoes.usgs.gov/volcanoes/hualalai/elevated.html>

———. 2017d. *Mauna Loa*. Accessed online on 15 November 2017, through https://volcanoes.usgs.gov/volcanoes/mauna_loa/geo_hist_summary.html

———. 2017e. *U.S. Volcanoes and Current Activity Alerts*. Accessed online on 16 November 2017, through <https://volcanoes.usgs.gov/index.html>

———. 2017f. *Kīlauea*. Accessed online on 21 November 2017, through https://volcanoes.usgs.gov/volcanoes/kilauea/geo_hist_summary.html

———. 2017g. *Evolution of Hawaiian Volcanoes*. Accessed online on 16 November 2017, through https://volcanoes.usgs.gov/observatories/hvo/hawaiian_volcanoes.html

———. 2017h. *Earthquake Glossary*. Accessed online on 30 October 2017, through <https://earthquake.usgs.gov/learn/glossary/?alpha=ALL>

———. 2021. *Mauna Loa - Volcano Updates*. Accessed online on 29 November 2021, through <https://www.usgs.gov/volcanoes/mauna-loa/volcano-updates>

USGS Volcanoes Facebook Page. 2018. Accessed online through <https://www.facebook.com/USGSVolcanoes/photos/a.984262971602264/2045227485505802/?type=3&theater>.

Valentine, K. M. 2014. *Hilo*. Arcadia Publishing, Charleston, South Carolina, USA.

van Velsen, J. 1964. *The Politics of Kinship: A Study in Social Manipulation among the Lakeside Tonga of Nyasaland*. Manchester, Manchester University Press.

———. 1967. 'The Extended-Case Method and Situational Analysis'. In *The Craft of Social Anthropology*, 129–149. A. L. Epstein (Ed.) London, Tavistock.

Viveiros de Castro, E. 2004. 'Perspectival anthropology and the method of controlled equivocation'. In *Tipiti: Journal of the Society for the Anthropology of Lowland South America*, 2 (1), 1.

Volcano House. 2017. *Our History: A Step Back in Time*. Accessed online on 20 November 2017, through <https://www.hawaiivolcanohouse.com/our-hotel/history/>

Walker, B., C. S. Holling, S. R. Carpenter and A. Kinzig. 2004. 'Resilience, Adaptability and Transformability in Social-Ecological Systems'. In *Ecology and Society*, 9 (2). Resilience Alliance Inc.

Westervelt, W. D. 1916. *Hawaiian Legends of Volcanoes: (Mythology) Collected and Translated from the Hawaiian*. Ellis Press.

———. 1923/2011. *Hawaiian Historical Legends*. Tuttle Publishing.

Wilcox, C. 1996. *Sugar Water: Hawaii's Plantation Ditches*. Honolulu: University of Hawai'i Press.

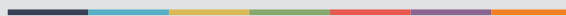
Winch, P. 1964. 'Understanding a Primitive Society'. *American Philosophical Quarterly*, 1 (4), 307-324.

Wright, T. L., J. Y. F. Chun, J. Exposito, C. Heliker, J. Hodge, J. P. Lockwood, and S. M. Vogt. 1992. *Map Showing Lava-flow Hazard Zones*. Island of Hawaii: U.S. Geological Survey Miscellaneous Field Studies Map MF-2193, scale 1:250,000. Accessed online on May 13 2021 through <https://pubs.usgs.gov/mf/1992/2193/>

Young, J. L. 1898. 'The Origin of the Name Tahiti: as Related by Marerenui, a Native of Faaiti Island'. In *Journal of the Polynesian Society*, 7 (2), 109–110.



Graphic design: Communication Division, UIB / Print: Skjipes Kommunikasjon AS



uib.no

ISBN: 9788230852644 (print)
9788230850671 (PDF)