

Climate Change in the Islands and the Highlands

Melanesian Manifestations, Experiences and Actions

Edvard Hviding and Camilla Borrevik

Forthcoming (2019), as Chapter 31 in: *The Melanesian World*,
edited by Eric Hirsch and Will Rollason. London: Routledge.

CLIMATE CHANGE AND SEA-LEVEL RISE: GLOBAL INEQUALITY AND PACIFIC FUTURES

‘The inequality of it all’ is how Lipset (2011: 20) summarises the situation whereby sea-level rise – a consequence of global warming, which is caused by the carbon emissions of industrialised countries – is an anthropogenic tragedy that most severely hits those remote coastal and island dwellers who have had no role in its creation. Pacific Islanders have often been portrayed as ‘helpless victims’ in the popular media because they suffer the consequences of climate changes mainly caused by other, larger nations (Mortreux and Barnett 2008). The Pacific region contributes less than 0.03% of the greenhouse gas emissions that cause climate change (SPREP 2012), which exemplifies ‘one of the deepest global environmental injustices’ through which small countries which barely contribute to climate change are the ones experiencing its most immediate effects (Townsend 2009: 56).

It is a widely accepted prediction that in the era of the ‘Anthropocene’ (the proposed designation of the current geological epoch, in which the environment is substantially modified by human activity), sea level rise, droughts, extreme weather in unpredictable forms, cyclones of previously unknown magnitudes, and cyclical El Niño patterns gone wild, will make coastal areas across the world gradually uninhabitable, leading to migrations of displaced people, flooding of urban centres and economic and political upheaval (Nicholls and Cazenave 2010; Barnett and Adger 2003). A recent review for the inhabited islands of the Pacific concludes that the picture is a diverse one, to some degree also involving seismic uplift and subsidence and other factors, but that for some locations such as Tuvalu ‘... sea level rise – as felt by the population – is no longer the question. The question now is how well prepared the low-lying Pacific Islands will be in a world affected by these global changes’ (Becker et.al. 2011: 97). The latest assessment of the IPCC (Intergovernmental Panel on Climate Change) states generally that ‘... in the western Pacific Ocean, rates [of sea-level rise] were about three times greater than the global mean value of about 3 mm per year from 1993 to 2012 (Church et.al. 2013: 1143). The future in the Anthropocene is uncertain, to say the least.

In this context, even the region's high volcanic islands with substantial landmasses are vulnerable to damage by sea-level rise, as reefs, mangroves and beaches bordering and buffering their coasts are flooded and eroded. In addition, the future growth of coral reefs may be severely restricted by further warming and acidification of the ocean (Hoegh-Guldberg et.al. 2007), which threatens atolls and high island coasts alike. In terms of media attention and sheer urgency, however, it is predominantly Oceania's low-lying atolls that find themselves on the 'climate change frontline' (Barnett and Adger 2003; Lazrus 2012). For the atoll dwellers of the Pacific, there is no 'uncertain future' of local upheaval and human displacement caused by climate change (Hereniko 2014). For them, that future is here today.

Scenarios where entire nations risk flooding and complete loss of sovereign land have no precedents as such. For some parts of Oceania, however, the precarious 'future of today' echoes past colonial experiments with relocation and resettlement long before climate change became a concern – such as in the case of what is now Kiribati (Tabe 2016; Teaiwa 2015). Marshall Islanders likewise experienced the world's largest open-air blasts and radioactive fallout from nuclear tests by the United States in the 1950s and 60s, a past from which they still suffer (Robbins and Schneider 2000; Barker 2004). Today, this past of colonial violence, dispossession, evictions, nuclear testing, disease and forced migration with revoked citizenship, fuels dystopian (and utopian) images as rising seas wash away graves, undermine human habitation, and threaten sovereignty.

SETTING THE SCENE: CLIMATE CHANGE AND SCALE IN MELANESIA

Climate change is both a set of environmental phenomena, experienced local reality, and a global political discourse (Hulme 2009). In the pan-Pacific discursive and political formations of contemporary Oceania, small atoll nations have developed a prominent role on the global summits and scenes of climate change politics while the Melanesian countries have until recently lagged behind. Certain Melanesia-specific configurations of scale and environment do, however, provide for distinctive manifestations of, and interactions with, global processes of anthropogenic climate change. The economies of the Melanesian nations have a scale and diversity unmatched elsewhere in the Pacific. Affecting both rural and urban areas to create effects on a national scale, climate change is undermining the resilience and growth of these economies.

On 3 March 2016, the Papua New Guinea (PNG) Prime Minister, Peter O'Neill gave a speech in Canberra to the National Press Club of Australia. In giving '... an overview of Papua New Guinea's expanding role in the [Pacific] region', he devoted time also to a diversity of challenges:

In Papua New Guinea we have just witnessed the worst impacts of climate change. Rising sea levels and tidal surges in many parts of our country, we have a devastating drought and frost, as well as extreme storms. Already our people in some island villages are becoming refugees and are resettling on the mainland. Drought that has

destroyed crops has left many of our people without food but we have been able to manage those issues by ourselves. That is why there has not been much media attention of the worst drought ever to hit our people.

Only last week Fiji felt the full force and destruction caused by Cyclone Winston and not so long ago Cyclone Pam devastated Vanuatu. This is not normal weather [,] but weather made worse by climate change and global warming. Our communities in the Pacific are some of the most exposed in the world [,] who are most vulnerable to climate change. We attended the global climate change talks in Paris in December last year. The outcome was probably as good as we could have expected from that meeting but we should not be limiting ourselves to that agreement. We must be able to do more. Australia, New Zealand and Papua New Guinea have an obligation to the rest of the Pacific.¹

In line with many recent speeches by and interviews of leaders of the Melanesian countries, O'Neill highlighted dimensions that, on the one hand, apply to the Pacific region in general, and on the other, have particular bearings on the large island nations of Melanesia. For, although all independent states of the Pacific are part of the United Nations collectivity of PSIDS or 'Pacific Small Island Developing States' (Manoa 2016), the four independent countries at the western edge of the region, PNG, Solomon Islands, Vanuatu and Fiji,² are large in terms of land mass, population, and economy. When invoking 'the worst impacts of climate change', O'Neill referred to sea level rise, tidal flooding and extreme weather. These are conditions shared by all island nations of Oceania. However, O'Neill also pointed to how 'devastating drought and frost' have threatened food security; this challenge is specific to PNG's higher-altitude areas. Interestingly, O'Neill also noted how 'there has not been much media attention' given to the extreme droughts of recent times, and he attributed this to what he saw as an ability of PNG to manage such 'issues' on its own – a reference to the high degree of resilience often seen as a defining factor of the rural subsistence-based economies of the large islands of Melanesia.

TRANSECTS: FROM SEA-LEVEL RISE TO MOUNTAIN FROST

Following this example of Melanesian rhetoric at international level, we now draw together recent scholarly research and media reports that demonstrate how the threatening consequences of global climate change are experienced locally as present reality. This is a story of human suffering, social disruption and economic decay, leading to an erosion of rural resilience. Ravages of extreme weather, saltwater intrusion into agricultural land, coastal erosion, drought and – at higher altitudes in PNG – frost, are local effects of global climate

¹ <https://www.pacificclimatechange.net/news/transcript-speech-peter-o%E2%80%99neill-prime-minister-papua-new-guinea-delivered-national-press-club>

² Although Fiji lies outside of the regional scope of this volume, in the context of climate change politics it is necessary to include it, as will become apparent below.

change that threaten food security and upset fragile dynamics of demographic distribution and land tenure across Melanesia today.

So far, however, there is a scarcity of detailed anthropological studies of climate change in Melanesia. We shall refer to what published work there is, but also rely on information from diverse online media, and our account is one where trends and impressions are interspersed with more detailed ethnographic glimpses. At the time of writing, the only anthropological monograph fully focused on climate change in Oceania is Rudiak-Gould's study (2013) from the Marshall Islands in Micronesia. Our knowledge of the scholarly community, and the massive attendance at the 2016 'Anthropology, Weather and Climate Change' conference of the Royal Anthropological Institute, make it clear, however, that many colleagues representing research across Melanesia, some with long fieldwork records, are in the process of publishing on climate change. Anthropologists who work in Melanesia, whether in highlands or islands, now find themselves in a situation where direct local experiences of the effects of global climate change are integral to the fieldwork.

For the islands and islanders (and highlands and highlanders) of Melanesia, the climate change challenges of the present time are complex and many-sided. That is also why O'Neill's climate change 'diagnosis' for PNG was so broad-ranging. Uninformed observers might believe that in the large islands of Melanesia, sea-level rise poses less of a threat. PNG, Solomon Islands, Vanuatu and Fiji are countries which by objective standards seem to have low population densities, abundant fertile land, and mountainous terrain reaching heights of a thousand metres or more. From this perspective, Melanesians would seem less at risk of becoming climate change refugees, since they can always retreat to higher lands. And certainly, the geography and geology of the Melanesian archipelagos have distinctive qualities that seem to make for less immediate vulnerability to the local effects of global climate change – at least at the levels of national population and sovereign territory.

Beyond the large-scale inland human settlement in PNG, most Melanesians today live on the coast. They live in harbour towns and capital cities, in villages on the lagoon shores of high islands (e.g. Hviding 1996), in small-island archipelagos such as the anthropologically famous 'Massim' area of PNG's Milne Bay Province (e.g., Malinowski 1922; Leach and Leach 1983), or in atolls only remotely connected to the high islands (e.g. Rasmussen et.al. 2017). Common to all dwellers of the seashores of Melanesia is their propensity for long-distance inter-island travel and their considerable mobility (e.g. Hviding 2015a), but also the degree to which their coastal existence is vulnerable to sea-level rise and storms. Some of the first sustained anthropological analysis of climate change in a Melanesian context is a series of studies by Lipset (2011, 2013, 2014) of the Murik Lakes of New Guinea's north coast, where the people have had their share of suffering from tsunamis, storms and rising seas. Tsunamis are in fact integral to another key dimension of life in Melanesia: the archipelagos are mostly located in the 'Ring of Fire' of high seismic activity, with frequent earthquakes, unstable topographies and active volcanoes (e.g., Nunn 2009: chapter 2).

We have noted that the manifestations and effects of climate change in Melanesia are connected to dimensions of scale concerning island space and place, population and economy, and cultural and linguistic diversity. Melanesia is distinctive for the scale and ecological complexity of island environments that include coral reefs, coastal mangroves, lowland hills, rivers, mountain valleys and high plateaus within the same archipelago and state. But although high, mountainous islands of considerable size are the norm, small islands and low-lying atolls are also features of Melanesia's archipelagos. The Solomon Islands atolls of Ontong Java and Sikaiana, and PNG's Nissan, Carteret and Takuu have all been in the news in the last few years, and their vulnerabilities to sea-level rise are discussed in recent publications (Rasmussen et.al. 2017; Connell 2016). The climate change stories of atolls in Melanesia are not particularly different from those of the central Pacific atoll nations, except that their populations, if displaced, may have hopes of having a 'mainland' to migrate to.

However, even if climate change migration scenarios for Melanesia seem domestic in orientation, opportunities are limited. In Melanesia, 80-90% of land remains under customary tenure. A record of long-term anthropogenic transformation of rainforest environments attests to deep time-scales of inland settlement, conceptualised through kinship as inalienable ancestral territory (e.g. Bayliss-Smith et.al. 2003, Hviding 2015b for Solomon Islands; Kumar et.al. 2006 for Fiji).³ Fellow citizens from low-lying islands or eroded coasts are likely to have few options for obtaining new land for resettlement in higher locations – places that may well be safe from sea-level rise, but that are already occupied and controlled by other groups not necessarily inclined to give their land away. For those people who retain their land, these subsistence economies, probably the most resilient subsistence systems in the entire Pacific, if not the world, have absolved weak governments of many of their obligations to meet the needs of citizens (e.g., Hviding 2006, Veitayaki 2002). For climate change refugees, such as Carteret Islanders (see below), on the other hand, prospects can be bleak.

Over recent decades, Melanesians have witnessed extreme weather events that have surpassed all previous records in terms of intensity and severity. The Category 5 tropical cyclone Winston that ravaged Fiji in 2016 was the strongest cyclone ever recorded in the southern hemisphere. In 2015, Cyclone Pam (also Category 5) caused widespread destruction in Vanuatu. Both countries have seen their national economies suffer severely from the impact of the cyclones, and remote rural villages still suffer from a shortage of infrastructure since repairs and rebuilding are slow. It is in such hard-pressed situations that the resilient autonomy of Melanesian subsistence allows villagers to live directly off land and sea to compensate for the disappearance of store-bought goods – but the destruction of food crops and agricultural lands by cyclones also makes subsistence activities more difficult.

Already before Pam and Winston, the intensification of extreme weather was given high-level media coverage when UN Secretary-General Ban Ki-Moon visited several Pacific countries in

³ The latter also identifies long-term histories of land use in Fiji in terms of human responses to climate change around AD 1300.

2011. In Solomon Islands, he highlighted this danger through a dramatic statement: ‘On the frontlines of conflict, there are surging waves of fighters. Here, there are surging waves of the ocean. These ocean waves can be more dangerous than an army. They can wipe out whole islands’ (Ki-moon 2011).

Being ‘wiped out’, to use the UN Secretary-General’s expression, is in fact becoming a reality for some Melanesian islands. From Solomon Islands, there has been a recent profusion of media reports about five tiny unpopulated reef islands that have ‘disappeared’ from sea-level rise, although the scientific paper (Albert et.al. 2016) on which the media reports were based was more cautious, and identified diverse factors leading to the erosion and inundation of five out of the 33 reef islands surveyed for the period 1947-2014. In addition, it is relatively well known that the small township of Taro Island (0.44 km²), the capital of Choiseul Province in Solomon Islands, is in the process of an Australian-funded relocation to the mainland.⁴ But the most prominent case of the devastating effects of sea-level rise in Melanesia is that of the Carteret Islands (or Kilinailau Atoll), located about 90 kilometres off the large, mountainous island of Bougainville, PNG. The Carterets have a total land surface of about 0.7 km² and are currently home to about 1100 people, now labelled ‘the world’s first climate change refugees’ (Connell 2016; Connell and Lutkehaus 2017). This tiny, densely populated atoll has experienced a dramatic increase in the severity and frequency of storm surges, with sea-level rise contaminating fresh water and agricultural soil (Yamamoto and Esteban 2014: 52-53).

Through recommended ‘adaptation strategies’ such as planting mangroves as buffers against shoreline erosion, the Carteret islanders have attempted some measure of protection, but long-term solutions are limited as the sea keeps rising, increasingly sweeping across the land from ocean to lagoon during high tides. This situation is not altogether new. Already in 1984, the PNG government responded to food shortage caused by the flooding of taro pits, and moved a few Carteret households to Bougainville (Connell and Lutkehaus 2017: 86-88). This soon provoked conflicts between Carteret settlers and Bougainvilleans over garden lands and fishing grounds, and before long most of the initial ‘refugees’ had returned home to the atoll. The situation remained tense, not least because of the outbreak in 1989 of armed conflict on Bougainville, which lasted for ten years (see Allen, Firth, both this volume).

In the 21st century, the situation of the Carteret islanders has not improved, and much media attention has focused on them as climate change refugees. The problematic scenario of migration and resettlement for the Carteret islanders has been compared to the very different situation for the atoll dwellers of Sikaiana in Solomon Islands, who have established a long-term strategy where ‘migration [is] anticipated and normative’ (Connell 2016: 10, cf. Donner 2002). Unlike the Carteret islanders, the people of Sikaiana (and of the much larger atoll of Ontong Java) have substantial diasporic populations in the capital, Honiara, with the strength to absorb migrants from the atolls. It is clear, then, that prospective settlers who need to

⁴ <https://www.scientificamerican.com/article/township-in-solomon-islands-is-1st-in-pacific-to-relocate-due-to-climate-change/>

relocate from inundated atolls face diverse challenges in Melanesia. Connell and Lutkehaus (2017: 89) identify the phenomenon of ‘coastal squeeze’ – with such a large proportion of the populations already settled on the coasts, little land is actually available for resettlement. And even land that appears unoccupied is likely to be jealously guarded by customary owners.

The relationships between large-scale environmental transformation and climate change also need to be discussed for Melanesia, owing to the massive destruction of rainforest that has taken place in PNG and Solomon Islands through poorly regulated commercial logging, and to the vulnerability of forests in the PNG highlands to agricultural expansion and shifts in temperature (see Banks, Bourke, both this volume). As discussed for the Porgera Valley by Jacka (2009, 2016) the removal of forest cover may generate local effects such as increased temperature, undesired distributions of plant and animal species, extreme rainfall and severe drought. In Porgera, one consequence of local environmental transformation is the relocation of villages and gardens to higher altitudes, which may in turn increase exposure to frost with associated food crop destruction and famine – leading to a dependence on food aid from the state and non-governmental organisations (Jacka 2009). In the lower coastal hills of Solomon Islands, one consequence of large-scale logging is rapid, radical transformation of land use, involving a switch from food production to cash cropping and commercial tree plantations. In New Georgia, this has led to rapid changes in micro-climate where the rainforest has been removed. Over just a few years, areas where tree plantations now dominate have, according to local observations, experienced decreased rainfall, a drying-out of agricultural soils, and more erratic wind patterns (Hviding and Bayliss-Smith 2000; Hviding 2015b).

On a larger regional scale, variations can be much more prominent and have greater severity. Existing natural cycles become erratic and extreme when affected by global warming in unprecedented ways. In particular, the highlands of PNG have seen repeated recent periods of drought and frost in association with what is known as El Niño. This meteorological phenomenon, known in full as the El Niño Southern Oscillation (ENSO) involves cyclical fluctuations in temperatures, winds and ocean currents across the Pacific Ocean, and impacts weather patterns worldwide (e.g., Trenberth 1997). An El Niño cycle starts when warm waters shift from the western tropical Pacific towards South America. In Melanesia, El Niño events are well-known on the local level in terms of how they increase risks of droughts, floods, and storms. Such El Niño-associated impacts have become stronger and more frequent over the last 30 years (ADB 2013: 8, 28-47). In the PNG highlands, where El Niño events have been traditionally associated with drought and frost, recent events have brought increased severity of those conditions, adding to the Asian Development Bank’s prediction that PNG will see the Pacific’s greatest loss in GDP (at least 15%) from effects of climate change, while El Niño frequencies may increase by more than 40% in the 21st century (ADB 2013: 31).

In the Porgera Valley, people draw on traditional knowledge and perceptions to understand the local effects of intensified El Niño cycles, interpreting the changes as moral and cosmological imbalances (Jacka 2009:202). During the 1997 El Niño event, Porgerans experienced severe droughts followed by longer periods of frost, resulting in crop loss and critical food shortage (Jacka 2016:187). Given the severity of El Niño events that may

increasingly affect millions of Melanesians, there is an urgent need to understand and convey complex local knowledge generated by actual experience. For Porgera, Jacka (2016) shows how local knowledge and perceptions of climate change can corroborate climatological models, representing ‘strong proxies for climate change research’ (Jacka 2016:197), and exemplifying an alternative body of indigenous climate models that must not be overlooked in an era of great uncertainty for the entire Pacific (Barnett 2001).

OSCILLATIONS: GLIMPSES OF THE LONG RUN OF ENVIRONMENT AND CLIMATE IN AND AROUND THE MAROVO LAGOON

An account of environmental observations and perceptions of climate change in the Marovo Lagoon of the western Solomon Islands follows, based on several years of fieldwork from 1986. The Marovo Lagoon is recognised for extraordinary biodiversity, as well as for its share of contested large-scale resource extraction operations, logging in particular (Hviding 1996, 2006, 2015b; Hviding and Bayliss-Smith 2000). In 1989, global messages about the ‘greenhouse effect’ were just beginning to reach the local level, via short-wave radio and limited contacts by a few Marovo villagers with higher education in Honiara and Suva.⁵ For a couple of years, a particular coastal village in the central lagoon had been experiencing unprecedented high-tide flooding and saltwater inundation of its natural freshwater spring. Much discussion developed about whether these unhappy circumstances could be consequences of a rising sea, or – in this seismically active location – of sinking land. The headmaster of the village school expressed his concerns over changing weather patterns as he explained his own views of continuity and change, as well as his attempts to make sense of the strange processes of saltwater intrusion unfolding in the middle of the village (Hviding 1996: 375):

The people of old told us how things are. They said that this wind will come at that time and finish after so many moons, and then the other wind will take over. All other things too, tides, rain, and all the fish in the sea, and whatever, follow this, they said. And so, all things have their time, and because the people of old knew how to mark those times, they told us about this, and we believed them, because we could see this with our eyes, too. But now, I don’t know. It seems that the weather is not straight any more. I still would like to trust what the people of old taught us, but one day I came to think that maybe they fooled us back then? Maybe things have never been so straight as they would want us to believe!

Like many other Pacific Islanders, the people of Marovo Lagoon take an empirical approach to their environments of land and sea, and environmental changes are dealt with through observation, interpretation, and healthy scepticism with regard to the veracity of tradition

⁵ Although 1989 may seem early for such local awareness of messages that connected the ‘greenhouse effect’ with sea-level rise, such perspectives, informed by United Nations assessments from a recently founded IPCC, were already taught at the regional University of the South Pacific. A conference in Suva in 1991 resulted in a pioneering volume on global warming, sea-level rise and food security in the Pacific (Aalbersberg et.al. 1993).

(Hviding 2003, 2006). Pacific perspectives on environmental processes tend to grasp both sudden and long-term transformations of island environments that are exposed to the forces of seismology and weather (Nunn 2009). Many Pacific folk tales contain information that amounts to local representations of seismology or paleo-climatology. A Marovo story explains how a giant ogre of the distant past created the lagoon, from an original state in which the high islands were directly exposed to the ocean. The ogre's wife could not sleep for the noise made by the crashing surf, so he took hold of the seashore and dragged it away from the island to form the raised barrier reef that has since been the defining topographical feature of Marovo Lagoon. Comparing this account with analysis by geologists and coral reef scientists (e.g. Stoddart 1969), the tale of the ogre's action is in fact an apt representation in compressed time of how seismic processes and coral reef building have combined to make the Marovo Lagoon. Like most Melanesians, the people of Marovo and of the New Georgia islands are familiar with strong seismic forces. The ground frequently shakes, and in the ocean south of Marovo the underwater volcano Kavachi is continuously active, at times forming a smoking island before disappearing again. New Georgians do not take for granted that topography, seashores, reefs and seaways remain the same from one generation to another.

On 2 April 2007, the seas and islands of the western Solomons were hit by an earthquake of magnitude 8.1, which generated a tsunami that swept the populated coasts of several islands, including the provincial capital of Gizo. Material damage was massive, but a death toll of 52 for the entire area affected by the tsunami reflects not only the fact that the disaster happened at daybreak, but also islanders' degree of established knowledge of what may happen at sea after a major earthquake. Beyond the impact of the tsunami, a particular case of permanent environmental change was seen on the high island of Ranongga near Gizo, where the entire west coast was lifted by several metres. The people of western Ranongga lost their fringing reef, marine resources and fishing grounds – while the people of the neighbouring larger island of Vella Lavella experienced village sites submerged as their island apparently sank as much as Ranongga had risen, in a peculiar tectonic tilt of violent force (Albert et.al. 2007).

Further east in the Marovo Lagoon, changes in coastal environments were also visible. In some villages, children were paddling in small dug-out canoes between houses that had previously been separated by dry land, although it was not entirely clear whether this change would be permanent. The situation discussed back in 1989 (see above), when a particular village experienced localised flooding, had been developing for lagoon villages in general as the 21st century approached. Sea-levels were rising in 'slow but sneaking fashion', as some villagers commented. By the turn of the century the global trope of 'climate change' had become more entrenched as one of several local explanations, while trees and crops close to the sea withered, burrowing land crabs abandoned their holes on low-lying coastal land, and footpaths along village shores became submerged even at low tide. But it was also noted that on the morning of the earthquake, areas of low limestone land, including village shores, suddenly dropped by half a metre or more, hence the need for children to start paddling between houses at high tide. An old man with a lifetime of experience of seismic forces, and with relatives on Ranongga, argued: 'What is this climate change and sea-level rise anyway? I

believe it is slow. We can't worry too much about it here, for we know that all of a sudden an earthquake can make our land rise, or sink! We never know what comes next ...'

Oscillations of rising and sinking land in an era when anthropogenic sea level rise is taken for granted create complex local understandings that juxtapose sudden seismic catastrophe with long-term changes. This situation may be another defining feature of climate change in Melanesia. For Vanuatu, it has been noted that measurable sea-level rise must be seen in terms of long-term combinations of seismic uplift and subsidence, which amplify or diminish the effects of rising seas (Taylor et.al. 1987). In the Torres Islands of northern Vanuatu, it was shown that while the sea did rise by about 20mm over a ten-year period up to 2009, the islands subsided by up to 30mm, doubling the apparent sea-level rise in the period (Ballu et.al. 2011). Earlier earthquakes had in their time caused considerable uplift.

Significant and irreversible changes in the environment are nothing new, then, for the islanders of Melanesia, whether they live on seashores or inland. The slow but steady sea-level rise, and its association with global warming, appear to be universally recognised in the region today. But Melanesians have always had to deal with earthquakes, volcanic eruptions, tropical storms, tsunamis, droughts and flooding, and excessive heat and frost. While many of these impacts are sudden, some of them can in various ways be predicted, and others are known to be cyclical, seasonal or gradual. For Melanesians, as for other Pacific islanders, the effects of climate change are not something of near or far future, as noted above, but an immediate reality that they are trying to respond to. To this end, islanders may rely on their own repertoire of prediction and adaptation skills, developed over thousands of years of living in the Ring of Fire and on low-lying atolls, but so far rarely taken into consideration in climate change policies.

CLIMATE CHANGE IN MELANESIA: POLITICAL FOCUS AND ANTHROPOLOGICAL CONCERN

We finally discuss how Melanesian state agencies build and implement climate change policies regionally and globally. The regional hub for this field of politics is not Port Moresby, but Fiji's capital Suva, where 'Melanesian' concerns and policies are connected to those of 'Polynesia' and 'Micronesia', and where most of the prominent regional and United Nations agencies have their Pacific headquarters (Fry and Tarte 2016b: 6-9; Komai 2016). In the present era of climate change, Melanesia relates to Oceania-at-large, in the context of a shared challenge that forges relationships across the Pacific. The political and institutional context is complex; Melanesian participation in national, regional and global agencies takes many different forms, and stakes and ambitions are high.⁶

⁶ For detail on the organisational complexity of the contemporary Pacific region, we refer to a comprehensive review (Borrevik *et.al.* 2014) carried out during the programme period of the EU-funded project European Consortium for Pacific Studies (ECOPAS, www.ecopas.info). The review is available online and gives particular attention to the European-Pacific scene of cooperation on climate change and sustainable development. The edited volume of Fry and Tarte (2016a) provides a wealth of

This is increasingly apparent as the four independent Melanesian countries (see note 2) have moved onto the centre stage of global climate change politics – with Fiji ascending in 2016 to the presidency of the United Nations General Assembly as well as to the presidency of COP23 (the 23rd ‘Conference of the Parties’ of the United Nations Framework Convention on Climate Change [UNFCCC]), and diplomats, state leaders and the regional Melanesian Spearhead Group (MSG) taking increasingly powerful roles on the global stage (Cain 2016; Carter 2016; Marawa 2016). At an Australian Institute of International Affairs ‘dialogue event’ in March 2017, entitled ‘Food Security, Biosecurity and National Security in the Melanesian Arc’, diplomats of Fiji and Solomon Islands went straight for what they saw as the heart of the matter, urging for stronger action on climate change.⁷ Collin Beck, Solomon Islands High Commissioner to Australia and a veteran from climate change negotiations, stated pointedly: ‘Sometimes I feel that it’s genocide’, referring to the failure of the wider world, including Australia and other major donor nations (including Trump-era United States), to prioritise climate change, while Melanesian countries see rural populations and national and export economies ravaged by recurrent cyclones and other disasters, widely believed to be intensified by global warming. Yogesh Punja, Fiji’s High Commissioner to Australia, warned that ‘we have all heard of climate change refugees, and I can assure you they will be coming across the Pacific to Australia’.

The political background for the rise of Melanesian ambition and influence on the global climate change scene is firmly connected to various arenas provided by the United Nations. But the UN climate change ‘system’ has not always taken the plight of islanders into proper account. The IPCC was formed by the UN in 1988 to provide scientific information to support political decision making. Initial IPCC ambitions included ‘immediate assistance for ... in-depth studies on the potential impact of expected climatic changes on the natural environment and the socio-economic structures’ with a particular reference to the Pacific islands region (UNEP 1991:19). IPCC reports and policy outcomes (2001, 2007) have, however, been criticised for lacking ethnographically grounded research and in-depth knowledge of socio-economic dynamics in ‘affected local communities’ (Boehmer-Christiansen 1994; Barnett 2001). More recently the IPCC’s Fifth Assessment Report (AR5) from 2014 argued for greater emphasis on local environmental knowledge, but was criticised for failing to grasp factors affecting local vulnerability and ‘adaptive capacity’, and ignoring indigenous knowledge systems present on the frontlines, such as those we have discussed here for Melanesia (Ford et.al. 2016). The generality of UN strategies for dealing with climate change in the Pacific are partly connected to a scarcity of ethnographic research, but also to a low response rate among Pacific Island nations in providing climate change scientists with the information they require for the IPCC assessments (e.g. Becken 2005), and low levels of dialogue between anthropologists and climate scientists.

information on today’s diplomatic scene as seen from the Pacific and in terms of the region’s global relationships.

⁷ <https://www.devex.com/news/melanesian-nations-question-global-responses-to-climate-change-89763>

On that note, let us finally return to the relationship between Melanesianist anthropology and the pressing situations described and discussed in this chapter. In Vanuatu, Fiji and elsewhere, much debate developed after cyclones Pam and Winston as to whether the disasters were caused by climate change. The presidents of both countries were quick to express the view that such intensification of extreme weather must to a large degree be blamed on global warming. Already in 2005 it was argued that the southwest Pacific would see increased intensity, and possibly also frequency, of tropical cyclones, caused by increasing sea surface temperatures (Webster et.al. 2005; see also Walsh et.al. 2012). The extent of damage by cyclones puts increasing pressure on national governments to provide emergency assistance and long-term support. Sudden impacts of this magnitude, and Pacific political initiatives to seek assistance in responding to the impacts, are expected to increase in the coming years, as is the need for local-level understandings of impacts from sea-level rise and erratic El Niño events.

Anthropologists are here in a unique position to contribute with their knowledge, sometimes based on life-long research involvement, in many of the locations most affected. In addition, solid ethnographic grounding in a particular Pacific location, still so common for anthropologists who work in Melanesia, also involves much direct experience of cultural and social diversity on local and national levels, and increasingly appears to have powerful methodological potentials for a reconceptualised multi-scale regional anthropology of climate change in Melanesia and the Pacific generally (see Hviding 2015c, 2016; cf. Barnes et.al. 2013). It is also increasingly clear that anthropology is in a unique position to offer ‘methods to access the social, cultural and political processes that shape climate change debates’ (Barnes et.al. 2013: 543). Building ethnographically grounded studies from the very frontline of climate change and outwards into the global, as events, transformations, disasters, dialogues and debates unfold, cannot be anything else but relevant and pertinent, far beyond the inner circles of Melanesianist anthropology.

REFERENCES

- Aalbersberg, W., P.D. Nunn and A. Ravuvu (eds) 1993. *Climate & Agriculture in the Pacific Islands*. Suva: Institute of Pacific Studies, University of the South Pacific.
- ADB (Asian Development Bank) 2013. *Economics of Climate Change in the Pacific*. Publication Stock No. ARM135979-3. August 2013
- Albert, S., G. Baines and D. McDougall 2007. Dramatic tectonic uplift of fringing reefs on Ranongga Is., Solomon Islands. *Coral Reefs*, 26: 983.
- Albert, S. J.X. Leon, A.R. Grinham, J.A. Church, B.R. Gibbes and C.D. Woodroffe 2016. Interactions between sea-level rise and wave exposure on reef island dynamics in the Solomon Islands. *Environmental Research Letters*, 11: 1-9.
<http://dx.doi.org/10.1088/1748-9326/11/5/054011>
- Ballu, V., M.-N. Bouin, P. Siméoni, W.C. Crawford, S. Calmant, J.-M- Boré, T. Kanas and B. Pelletier 2011. Comparing the role of absolute sea-level rise and vertical tectonic motions in coastal flooding, Torres Islands (Vanuatu). *Proceedings of the National Academy of Sciences*, 108: 13019-22.

- Barker, H.M. 2004. *Bravo for the Marshallese: Regaining Control in a Post-Nuclear, Post Colonial World*. Belmont, CA: Wandsworth.
- Barnes, J. M. Dove, M. Lahsen, A. Mathews, P. McElwee, R. McIntosh, F. Moore, J. O'Reilly, B. Orlove, R. Puri, H. Weiss and K. Yager 2013. Contribution of anthropology to the study of climate change. *Nature Climate Change*, 3: 541-544.
- Barnett, J. 2001. Adapting to Climate Change in Pacific Island Countries: The Problem of Uncertainty. *World Development*, 29(6): 977-993.
- Barnett, J. and W. Neil Adger 2003. Climate Dangers and Atoll Countries. *Climatic Change* 61: 321-337.
- Bayliss-Smith, T., E. Hviding and T.C. Whitmore 2003. Rainforest composition and histories of human disturbance in Solomon Islands. *Ambio*, 32: 346-352.
- Becken, S. 2005. Harmonising climate change adaptation and mitigation: The case of tourist resorts in Fiji. *Global Environmental Change*, 15: 381-393.
- Becker, M., B. Meyssignac, C. Letretrel, W. Llovel, A. Cazenave, T. Delcroix 2011. Sea level variations at tropical Pacific islands since 1950. *Global & Planetary Change*, 80-81: 85-98.
- Boehmer-Christiansen, S. 1994. Global climate protection policy: the limits of scientific advice Part 1. *Global Environmental Change*, 4(2): 140-159.
- Borrevik, C., T. Crook, E. Hviding and C. Lind 2014. *European Union Development Strategy in the Pacific*. Brussels: European Parliament and Directorate- General for the External Policies of the Union. DOI: 10.2861/6397
- Cain, T.N. 2016. The renaissance of the Melanesian Spearhead Group. In *The New Pacific Diplomacy*, G. Fry and S. Tarte (eds), 151-160. Canberra: Australian National University Press.
- Carter, G. 2016. Establishing a Pacific voice in the climate change negotiations. In *The New Pacific Diplomacy*, G. Fry and S. Tarte (eds), 205-220. Canberra: Australian National University Press.
- Church, J.A., P.U. Clark, A. Cazenave, J.M. Gregory, S. Jevrejeva, A. Levermann, M.A. Merrifield, G.A. Milne, R.S. Nerem, P.D. Nunn, A.J. Payne, W.T. Pfeffer, D. Stammer and A.S. Unnikrishnan 2013. Sea Level Change. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds)]. Cambridge, UK and New York, USA: Cambridge University Press.
- Connell, J. 2016. Last days in the Carteret Islands? Climate change, livelihoods and migration on coral atolls. *Asia Pacific Viewpoint*, 57(1): 3-15.
- Connell, J. and N. Lutkehaus 2017. Environmental refugees? A tale of two resettlement projects in coastal Papua New Guinea. *Australian Geographer*, 48(1): 79-95.
- Donner, W. 2002. Rice and tea, fish and taro: Sikaiana migration to Honiara. *Pacific Studies*, 25(1-2): 23-44.
- Ford, J.D., L. Cameron, J. Rubis, M. Maillet, D. Nakashima, A.C. Willox and T. Pearce 2016. Including indigenous knowledge and experience in IPCC assessment reports. *Nature Climate Change*, 6: 349-353.
- Fry, G. and S. Tarte (eds) 2016a. *The New Pacific Diplomacy*. Canberra: Australian National University Press.

- Fry, G. and S. Tarte (eds) 2016b. The 'New Pacific Diplomacy': an introduction. In *The New Pacific Diplomacy*, G. Fry and S. Tarte (eds), 3-19. Canberra: Australian National University Press.
- Hereniko, V. 2014. The Human Face of Climate Change Notes from Rotuma and Tuvalu. In *Pacific Futures: Projects, Politics and Interests*, W. Rollason (ed), 226-236. Oxford and New York: Berghahn Books.
- Hoegh-Guldberg, O. et.al. 2007. Coral reefs under rapid climate change and ocean acidification. *Science*, 318: 1737-1742.
- Hulme, M. 2009. *Why we disagree about climate change: understanding controversy, inaction and opportunity*. Cambridge: Cambridge University Press.
- Hviding, E. 1996. *Guardians of Marovo Lagoon: Practice, Place, and Politics in Maritime Melanesia*. Pacific Islands Monograph Series, 14. Honolulu: University of Hawai'i Press.
- Hviding, E. 2003. Both Sides of the Beach: Knowledges of Nature in Oceania. In *Nature Across Cultures: Non-Western Views of the Environment and Nature*, Helaine Selin (ed), 243-275. Dordrecht: Kluwer Academic Publishers.
- Hviding, E. 2006. Knowing and managing biodiversity in the Pacific Islands: challenges of conservation in the Marovo Lagoon. *International Social Science Journal*, 58: 69-85.
- Hviding, E. 2015a. The Western Solomons and the Sea: Maritime Cultural Heritage in Sociality, Province, and State. In *Pacific Alternatives: Cultural Politics in Contemporary Oceania*, E. Hviding and G. White (eds), 118-144. Canon Pyon, Herts.: Sean Kingston Publishing.
- Hviding, E. 2015b. Non-pristine forests: A long-term history of land transformation in the Western Solomons. In *Forests of Oceania: Anthropological Perspectives*, J. Bell, P. West and C. Filer (eds), 51-74. Canberra: Australian National University Press.
- Hviding, E. 2015c. European anthropology in the contemporary Pacific. *Social Anthropology*, 23: 363-364.
- Hviding, E. 2016. Europe and the Pacific: Engaging Anthropology in EU Policy-Making and Development Cooperation. In *Engaged Anthropology: Views from Scandinavia*, Tone Bringa & Synnøve N. Bendixsen (eds), 147-166. New York: Palgrave-MacMillan.
- Hviding, E. and Tim Bayliss-Smith 2000, *Islands of Rainforest: Agroforestry, Logging and Ecotourism in Solomon Islands*. Aldershot: Ashgate.
- IPCC (International Panel on Climate Change) 2001. Third Assessment Report: Climate Change 2001 (TAR). Available at: <<https://www.ipcc.ch/ipccreports/tar/>>
- IPCC (International Panel on Climate Change) 2007. *Fourth Assessment Report: Climate Change 2007 (AR4)*. Geneva: IPCC. Available at: <http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml>
- IPCC (International Panel on Climate Change) 2014. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds)]. IPCC, Geneva, Switzerland, 151 pp. Available at: <<https://www.ipcc.ch/report/ar5/>>

- Jacka, J. 2009. Global Averages, local extremes: The subtleties and complexities of Climate Change in Papua New Guinea. In *Anthropology and Climate Change: From Encounters to Actions*, S. Crate and M. Nuttall (eds), 197-208. Walnut Creek, CA: Left Coast Press.
- Jacka, J. 2016. Correlating Local Knowledge with Climatic Data: Porgeran Experiences of Climate Change in Papua New Guinea. In *Anthropology and Climate Change: From Actions to Transformations* (2nd Edition), S. Crate and M. Nuttall (eds), 186-199. New York and London: Routledge.
- Ki-Moon, B. 2011. Opening remarks to the press with the Prime Minister of the Solomon Islands. [online] Honiara (Solomon Islands), 04 September 2011. Available at: http://www.un.org/apps/news/infocus/sgspeeches/statments_full.asp?statID=1283
- Kumar, R., P.D. Nunn, J.S. Field and A. de Biran 2006. Human responses to climate change around AD 1300: A case study of the Sigatoka Valley, Viti Levu Island, Fiji. *Quaternary International*, 151: 133-143.
- Komai, M. 2016. Fiji's foreign policy and the New Pacific Diplomacy. In *The New Pacific Diplomacy*, G. Fry and S. Tarte (eds), 111-121. Canberra: Australian National University Press.
- Lazrus, H. 2012. Sea Change: Island Communities and Climate Change. *Annual Review of Anthropology*, 41: 285- 301.
- Leach, J.W. and E.R. Leach (eds) 1983. *The Kula: New Perspectives on Massim Exchange*. Cambridge: Cambridge University Press.
- Lipset, D. 2011. The tides: masculinity and climate change in coastal Papua New Guinea. *Journal of the Royal Anthropological Institute*, 17: 20-43.
- Lipset, D. 2013. The New state of nature: rising sea-levels, climate justice, and community-based adaptation in Papua New Guinea (2003-2011). *Conservation and Society*, 11(2): 144-157.
- Lipset, D. 2014. Place in the Anthropocene: A mangrove lagoon in Papua New Guinea in the time of rising sea-levels. *HAU: Journal of Ethnographic Theory*, 4(3): 215-243.
- Malinowski, B. 1922. *Argonauts of the Western Pacific*. London: Routledge and Kegan Paul.
- Manoa, F. 2016. The new Pacific diplomacy at the United Nations: The rise of the PSIDS. In *The New Pacific Diplomacy*, G. Fry and S. Tarte (eds), 89-98. Canberra: Australian National University Press.
- Marawa, S. 2016. Negotiating the Melanesian free trade area. In *The New Pacific Diplomacy*, G. Fry and S. Tarte (eds), 161-174. Canberra: Australian National University Press.
- Mortreux, C. and J. Barnett 2008. Climate change, migration and adaptation in Funafuti, Tuvalu. *Global Environmental Change*, 19(1): 105-112.
- Nicholls, R. J. and A. Cazenave 2010. Sea-Level Rise and Its Impact on Coastal Zones. *Science*, 328: 1517-1520.
- Nunn, P.D. 2009. *Vanished Islands and Hidden Continents of the Pacific*. Honolulu: University of Hawai'i Press.
- Rasmussen, K., W. May, T. Birk, M. Mataka, O. Mertz and D. Yee 2009. Climate change on three Polynesian outliers in the Solomon Islands: Impacts, vulnerability and adaptation. *Geografisk Tidsskrift – Danish Journal of Geography*, 109(1): 1-13.

- Robbins, J. and A.B. Schneider 2000. Thyroid cancer following exposure to radioactive iodine. *Reviews in Endocrine and Metabolic Disorders*, 1:197-203.
- Rudiak-Gould, P. 2013. *Climate change and tradition in a small island state: The rising tide*. New York and London: Routledge.
- SPREP (Secretariat of the Pacific Regional Environment Programme) 2012. Climate Change Overview. Available at: <<http://www.sprep.org/Climate-Change/climate-change-overview>>
- Stoddart, D.R. 1969. Geomorphology of the Marovo elevated barrier reef, New Georgia. *Phil. Trans. Roy. Soc.*, B 255: 388-402.
- Tabé, T. 2016. *Ngaira Kain Tari – ‘We are People of the Sea’*: A study of the Gilbertese Resettlement to Solomon Islands. PhD Dissertation, Department of Social Anthropology, University of Bergen.
- Taylor, F.W., C. Frohlich, J. Lecolle and M. Strecker 1987. Analysis of partially emerged corals and reef terraces in the central Vanuatu Arc: Comparison of contemporary coseismic and nonseismic with quaternary vertical movements. *Journal of Geophysical Research*, 92(B6): 4905-33.
- Teaiwa, K.M. 2015. *Consuming Ocean Island: Stories of People and Phosphate from Banaba*. Bloomington: Indiana University Press.
- Townsend, P. 2009. *Environmental Anthropology: From Pigs to Policies*. Longrove, IL: Waveland Press, Inc.
- Trenberth, K.E. 1997. The Definition of El Niño. *Bulletin of the American Meteorological Society*, 78(12): 2771-77.
- UNEP (United Nations Environment Programme) 1991. *UNEP-Sponsored programme for the oceans and coastal areas*. UNEP Regional Seas Reports and Studies No. 135. UNEP. Available at: <<http://iwlearn.net/publications/regional-seas-reports/unep-regional-seas-reports-and-studies-no-135>>
- Veitayaki, J. 2002. Taking advantage of indigenous knowledge: The Fiji case. *International Social Science Journal*, 54: 395-402.
- Walsh, K.J.E., K.L. McInnes and J.L. McBride 2012. Climate change impacts on tropical cyclones and extreme sea levels in the South Pacific — A regional assessment. *Global and Planetary Change*, 80-81: 149-164.
- Webster, P.J., G.J. Holland, J.A. Curry and H.-R. Chang 2005. Changes in tropical cyclone number, duration, and intensity in a warming environment. *Science*, 309: 1844-46.
- Yamamoto, L. and M. Esteban 2014. *Atoll Island States and International Law*. Berlin and Heidelberg: Springer-Verlag.