

Situating the Paximadi towers in the Classical and Roman landscapes

Rebecca M. SEIFRIED

Περίληψη

Προηγούμενες έρευνες στο ακρωτήριο της Παξιμάδας στη νότια Εύβοια έχουν αποκαλύψει περισσότερες από 150 θέσεις που κατοικούνταν από την Προϊστορική μέχρι τη Σύγχρονη Εποχή. Αυτό το άρθρο επικεντρώνεται κυρίως στην Κλασική, Ελληνιστική και Ρωμαϊκή περίοδο, χονδρικά μεταξύ του 480 π.Χ και 500 μ.Χ., όταν οι κάτοικοι χρησιμοποιούσαν περίπου είκοσι πύργους που βρίσκονταν διάσπαρτοι στο ακρωτήριο. Αναγνωρίζοντας το γεγονός ότι τα αρχαιολογικά στοιχεία δεν μπορούν να απομονωθούν, στόχος του παρόντος άρθρου είναι να στηριχτεί πάνω σε προηγούμενες έρευνες προκειμένου να ‘τοποθετήσει’ αυτούς τους πύργους στο ευρύτερο οικιστικό τους πλαίσιο. Χρησιμοποιήθηκαν εργαλεία διάφορων λογισμικών πακέτων Συστημάτων Γεωγραφικών Πληροφοριών (GIS) για να γίνουν μετρήσεις σε πιθανές φυσικές και ορατές συνδέσεις μεταξύ των πύργων της Παξιμάδας και άλλων θέσεων χωρίς πύργους. Σε αυτό το άρθρο παρουσιάζονται τα αποτελέσματα της μεθόδου διάδοσης σε ζεύξη οπτικής επαφής (line of sight [LOS] analysis) και αλγόριθμοι Ανάλυσης Συμφορτερής Διαδρομής (least cost path [LCP] analysis) προκειμένου να αποδειχτούν οι διασυνδέσεις που μπορεί να υπήρχαν από την Κλασική και Ρωμαϊκή περίοδο στο ακρωτήριο της Παξιμάδας. Τα αποτελέσματα πλαισιώνονται από μια συζήτηση για τις ευρύτερες αλληλεπιδράσεις ανάμεσα στις πόλεις της Καρύστου και της Αθήνας.

Introduction¹

The inspiration for this paper came while working with data first gathered by the Southern Euboea Exploration Project (SEEP) on the Paximadi Peninsula, just south-west of modern-day Karystos (Fig. 1). Between 1984 and 1988, SEEP completed an intensive, systematic survey of the Paximadi Peninsula, with team members walking in 10-metre transects to collect diagnostic artefacts. The team revisited all the sites that Donald Keller identified during his dissertation research from 1979 to 1981, and it surveyed the western part of the peninsula for the first time.² By the end of its last season, the team had identified 162 sites in an area of about 22 km².

Judging by the inventoried and catalogued artefacts, almost two-fifths of the recorded sites can be dated to the Classical period and a quarter to the Roman period, with a smaller number for all other

1. This project would not have been possible without the support and guidance of Don Keller and the SEEP team, Bill Parkinson, Wayne Lee and Chelsea Gardner. I would like to extend special thanks to Žarko Tankosić and the other members of the organizing committee for their invitation to participate in the dialogue about Euboea and its archaeological past.

2. For Keller's dissertation research, see Keller 1985. For more information on the SEEP survey, see Keller 1983; Keller and Schneider 2011; Keller and Wallace 1988; Talalay et al. 2005; Wallace et al. 2006.

periods between the Late Neolithic and Early Modern periods. The types of sites are varied, with 25 being classified as towers, nine as sanctuaries, six as blockhouses, 23 as farms and many more as buildings, quarries, military stations or simply artefact scatters (Fig. 2).

The Paximadi tower sites are an intriguing case-study on their own, as they illustrate the multi-functionality of sites located in rural and marginal environments.³ They differ from other Greek towers in several respects, the most notable of which is their smaller dimensions and poorly preserved schist architecture, which rarely reaches higher than three courses.⁴ They also have an unusually high density, despite being situated in a landscape of relatively unproductive agricultural land.⁵ With 18 towers dated to the Classical period, their density is almost 0.82 per km²—much higher than in other parts of Greece.⁶ Also interesting is the fact that they appear to have served many different functions: they were both defensive and agricultural in nature.⁷ Their thick walls, impressive views of the coast, location along ancient roads and the strong intervisibility network (particularly in the Classical period) would have provided important defensive advantages. At the same time, others are located near terraced fields or threshing floors, and they are associated with an agrarian, residential artefact profile, including millstones, storage vessels, drinking vessels and fine ware ceramics.

One of the questions inspired by the multi-functionality of the towers is the degree to which they were connected with other, contemporaneous sites. Could people living nearby use them to see any other sites? Could they easily travel between different sites and, if not, which routes would have been easier than others? More importantly, what significance do these patterns have for our interpretations of Euboean archaeology, and for the role of Euboea in the broader Aegean world?

This paper uses geospatial analysis to address these questions as they relate to the Classical, Hellenistic and Roman periods on Paximadi. The results indicate that the broader cultural landscape of the Karystia and Attica provides an important context for understanding the spatial patterns presented here. Although the results are preliminary, this paper demonstrates the importance of geospatial analysis for gaining new insights into archaeological survey data.

In order to contextualize the Paximadi towers within their broader cultural landscape, the SEEP pottery, various other finds and survey databases were first synthesized and used to assign standardized chronological dates to each of the sites, based on the number of tentative or securely dated artefacts recovered during survey.⁸ The proposed dates should not be considered definitive, but they are a step in the right direction. According to this system, 64 of the SEEP sites date to the Classical period, 21 to the Hellenistic period and 32 to the Roman period. When looking at the percentages, the site types do not change much throughout this 1000-year period. Approximately one-quarter of the settlements in each period are towers, and about one-tenth are sanctuaries. The most notable changes are a significant decline in the number of identified farms and the disuse of blockhouses in the Roman period (see Fig. 2).

3. See Seifried and Parkinson 2014.

4. Circular towers average 6.7 m in diameter, and quadrangular towers average 5 m per side.

5. Brock writes, for example, 'Agriculture does not seem likely to have been an important element in Karystian prosperity, for although her territory is quite extensive, much of it is mountainous, the cultivable areas are limited and the soil not usually deep' (Brock 1996, 362). According to Kayster and Thompson (1964, maps 103-104), the Karystia is drier than other parts of Greece, averaging between 400 and 600 mm of rainfall and less than 50 days of rainfall each year. Karystos also has a higher aridity index than other cities in modern Greece (Diamantopoulos et al. 1994, table 2).

6. See Cherry et al. 1991; Seifried and Parkinson 2014, n. 56; Young 1956a.

7. Seifried and Parkinson 2014.

8. Tentative dates were assigned to sites with only one securely dated artefact, or to those with multiple artefacts with questionable dates. These artefacts include those catalogued and analysed at the Karystos Archaeological Museum, as well as inventoried finds listed in the survey database that were not collected. Artefacts with overly broad date ranges were not taken into account.

Geospatial analyses

Two types of geospatial analysis—line of sight (LOS) and least cost path (LCP)—were conducted to assess the ease with which residents of the Paximadi Peninsula could communicate with one another visually and travel physically across the landscape.⁹ LOS analysis allows researchers to identify the potential visual interconnections between contemporaneous sites in the past or, in other words, to identify whether people standing in these locations could see one another. One of the variables that can be defined is the standing height of the observers at each site—an important factor since standing atop a multi-storey tower would grant a broader scope of view than would standing on the ground. However, the degradation of the Paximadi structures makes it impossible to estimate their former height, and so the observer height was defined as a standard 2 m for all sites.¹⁰

LCP analysis allows users to quantify the ease of moving through a particular landscape and visualize the easiest routes for pedestrians to use. In turn, these routes can be used to assess the likelihood that people actually did travel between sites on a regular basis. One of the potential issues with LCP is that any number of variables can be input as limiting factors. Soil type, vegetation class, wind direction and visibility can all be factored into the toolset. For this particular case-study, a leaner assessment based solely on slope was used, such that the easier slopes would be preferred.¹¹ This analysis also assumes that a shorter cost path is more desirable than a longer one. Finally, the results are somewhat dependent upon the source location (i.e. the point from which the routes are determined). When a settlement near modern-day Karystos is chosen, the least cost paths for the Classical period settlements follow the eastern coastline and are divided from those in the west; these routes also demonstrate how important boats would have been for travelling between sites (Fig. 3). When calculated from a starting point in the mountains, the paths appear more dendritic and connected. It is important, therefore, to consider these together. It certainly would have been possible for a traveller to walk over the mountains, following one of these latter cost paths, but the tool suggests it would have been easier to walk around the mountains to the north. The Paximadi is not large in area—at most 5 km across—but the mountains that run along its spine would certainly have posed a challenge to travellers on foot.

It is important to note that both of these analyses can be problematic if misapplied.¹² The fact that people can see or travel easily to another settlement does not necessarily mean that there was a real communicative network in place. Illustrating the complexity of real-life interaction, Tankosić writes: ‘proximity and distance are often not physical, but cultural categories ... the choice of one location over another can simply be a matter of aesthetic or other type of personal preference’.¹³ These caveats in mind, the results of these analyses nevertheless give insights into broader interaction patterns in Euboea, Attica and beyond.

9. The geospatial analyses were conducted using Esri’s ArcGIS 10.1 software and a 5-m digital elevation model, which was derived from 20-m contour lines provided by SEEP.

10. There is certainly a possibility that the towers were multi-storeyed, thereby increasing the amount of land within view of the site. However, because there are no standing towers on Paximadi, it is not possible to compare the relationship between tower height and wall width, and thereby extrapolate tower height based on wall fall (see Young 1956b, 135).

11. The ‘cost path’ toolset in ArcGIS allows users to quantify the ease of moving through a particular landscape, but the ‘path distance’ toolset takes the process one step further, using a digital elevation model to calculate the actual surface distance that one must travel when walking over hills and through valleys. For this case-study, the second toolset was used.

12. For limitations of LCP algorithms included in basic GIS software, see Conolly and Lake 2006, 252–257; Llobera et al. 2011, 849. For issues concerning LOS, see Llobera 2003, 29; Wheatley and Gillings 2000, 2–14.

13. Tankosić 2011, 99–100.

Paximadi in the Classical period

The SEEP survey identified approximately 64 sites dating to the Classical period, which is the period of densest inhabitation of the Paximadi. The LOS analysis clearly demonstrates a rich network of visual interconnection, with the potential to communicate quickly from one side of the peninsula to the other through several key points along the central ridge. Figure 4 illustrates the potential inter-visibility lines connecting both securely dated settlements and those that are only tentatively dated to the Classical period. The results of the LCP analysis also hint at a dense network of interconnection (see Fig. 3). Common routes connect several clusters of settlements in the west, such that it would have been relatively easy to transport goods or information to a number of sites with minimal effort. In the later Hellenistic and Roman periods, this network is severed, and the eastern and western halves are no longer connected to the same degree.

What is most interesting about the deterioration of this rich Classical period network is the context in which it was first established. Early in the Classical period, Attica and southern Euboea were plagued by military conflict, e.g. the battles at Marathon (490 BC) and Salamis (480 BC). Karystos itself was attacked in 490 BC by the Persian army, and its residents were forced to join the army and fight their fellow Greeks.¹⁴ This treachery was dearly repaid following Persian defeat, when Greeks laid waste to the city and forced it to pay an indemnity.¹⁵ Athens soon turned its attention to the Peloponnesian War (431-404 BC), which depleted its resources and probably left little funding and manpower to devote to defences at home along the Euboean Gulf. The strategic importance of this body of water cannot be understated. It was one of the main paths taken by the Persian fleet during its attacks on Attica, and if it avoided that stretch of water, the fleet followed the eastern coast of Euboea instead.

As these military contests continued, Athens quickly gained military and political power, expanding its sphere of influence to the island of Euboea. In contrast with other Euboean cities, Karystos appears to have maintained a close relationship with Athens throughout this period. Following its defeat in a war with Athens, it was forced to join the Delian League; it did not, however, defect from the league in 446 BC along with the other Euboean cleruchies.¹⁶ Karystos later participated in the Second Athenian League (378/377-355 BC), and it also supported Athens in the Lamian War (322 BC), a further indication of the close tie between the two cities.¹⁷ Some scholars have explained this relationship by suggesting that a cleruchy was founded in Karystos in the 5th century, along with Chalkis and other cities in the region; however, it should be kept in mind that this hypothesis has yet to be proven one way or another.¹⁸ These cleruchies were essential strategic establishments for Athens; by granting land to citizens in exchange for military service, Athens managed to reduce population pressure in the city itself while simultaneously increasing its economic and military power.

The high density of Classical towers on Paximadi and the rich potential for a communication network may lend support to the hypothesis that Athens' military and political expansion involved the establishment of a cleruchy in the Karystia. Athens would have needed to defend the Euboean Gulf and the seaways around southern Euboea to protect its trade routes, despite having very limited resources available to devote to such an effort.¹⁹ The Karystia would have been an ideal location for establishing a population of soldier-farmers, and the Paximadi in particular was perfectly situated in order to spot

14. Hdt. 6.99.2 and 8.66.2. For more on the Persian attacks between 490-480 BC, see Keller 1985, 195-199.

15. Hdt. 8.112.2 and 8.121.1; Keller 1985, 199-200.

16. Hdt. 9.105 and Thuc. 1.114.2.

17. Diod. Sic. 18.11.2 and Paus. 1.25.4.

18. For further discussion of the possible cleruchy in the Karystia, see Brock 1996; Erxleben 1975; Figueira 1991; Keller 1985; Wallace 1972. Excavations undertaken in Paximadi to test this hypothesis proved inconclusive: see Keller and Schneider 2011, 100.

19. Keller 1985, 203.

enemy fleets advancing from around the eastern shore of Euboea. Messages could be relayed back to Karystos from the peninsula, across the bay to the eastern Bouros-Kastri Peninsula, or across the mountains to the western coast of Paximadi.²⁰ Settlements that served this purpose are known from elsewhere along the Euboean Gulf, including the fortified settlement of Ramnous. A similar role may have been fulfilled by Paximadi, particularly if visual contact could be made with the Attic mainland. Of course, there may be alternative explanations for the high density of Classical period towers on Paximadi, and further research is needed to explore this unusual case-study.²¹ In particular, it may prove useful to compare Paximadi to other parts of Euboea, such as the territory of Eretria.²²

Paximadi in the Hellenistic and Roman periods

In the Hellenistic and Roman periods, the key sites located atop the mountain ridge no longer appear to have been in use (Fig. 5), and as a result the visual network linking the eastern and western coastlines was severed. The results of the LCP analysis also demonstrate how isolated these settlements were. While it would have been possible to climb the mountains that separate the two halves, it also would have been more difficult to travel back and forth or to maintain visual contact than in the Classical period.

The settlement abandonment in the Hellenistic period may be tied to the disintegration of Athenian power following its defeat in the Lamian War (322 BC) and the series of occupations and invasions of Attica that followed. For several hundred years, this part of the world was relatively unimportant owing to its lack of natural resources and military power, and it continued to be politically powerless when Achaia became a Roman province—although Karystos itself was relatively prosperous during this time.²³ It seems that Attica's continued military losses and lack of power, resources and money are linked in some way with the dissolution of communicative networks and settlements on Paximadi during the Hellenistic period.

Although more settlements were in use during the Roman period—some of which were reused Classical period sites, and others which were new—the possibility of interconnection was still much weaker than in the Classical period. Peace and stability had returned to Attica and Euboea, and the defence of Athens was simply not a priority for the imperial administrators. More important for contextualizing these results is the reformation of the land tenure system that occurred throughout many parts of Greece during this period, with the consolidation of small farms into large estates, the intensification of agricultural production and the resulting population nucleation in urban centres.²⁴ What we see in the Karystia may reflect these changes, with fewer, but larger, settlements shifted to the Kampos rather than the hilly Paximadi Peninsula. The continued lack of dense settlement and the limited potential for quick or easy communication likely reflects the military and agricultural priorities of the Roman Empire.

Conclusion

In conclusion, geospatial analyses such as LOS and LCP are useful tools for analysing archaeological survey data, given their ability to reveal the interconnections that may have existed between settle-

20. Gardner and Seifried 2014.

21. For a broader study of this nature, see Gardner and Seifried 2016.

22. For more information on the Classical and Hellenistic towers in Eretria, see Fachard 2012.

23. See Keller 1985, 214-215.

24. e.g. Alcock 1989, 30-33.

ments in the past. In turn, these patterns can help us to understand changing spheres of power, routes taken (or not taken) by invading armies, the distribution of ancient *poleis* and even more—all of which are subjects for future research. The towers of Paximadi did not exist in a vacuum, and their use and abandonment are tied to the cultural landscape of the Karystia, as well as to Attica beyond its shores.

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Figures

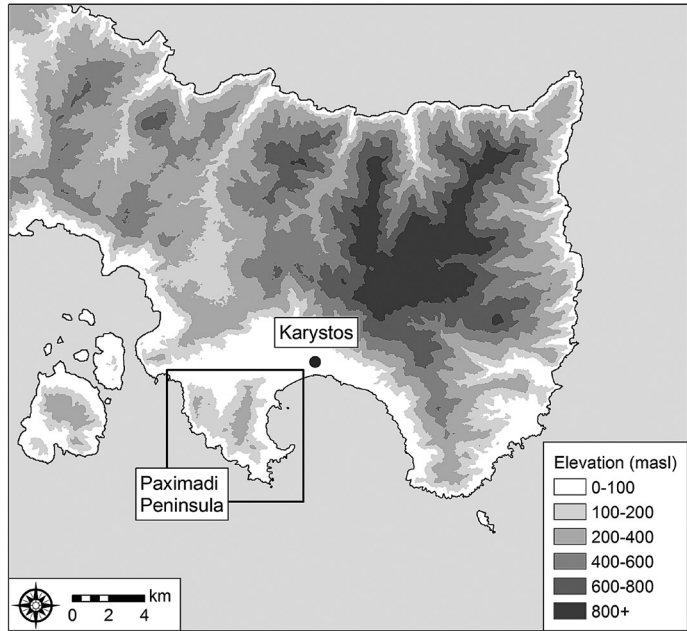


Figure 1:
Southern Euboea and the Paximadi Peninsula. Elevation data from ASTER GDEM (courtesy METI and NASA).

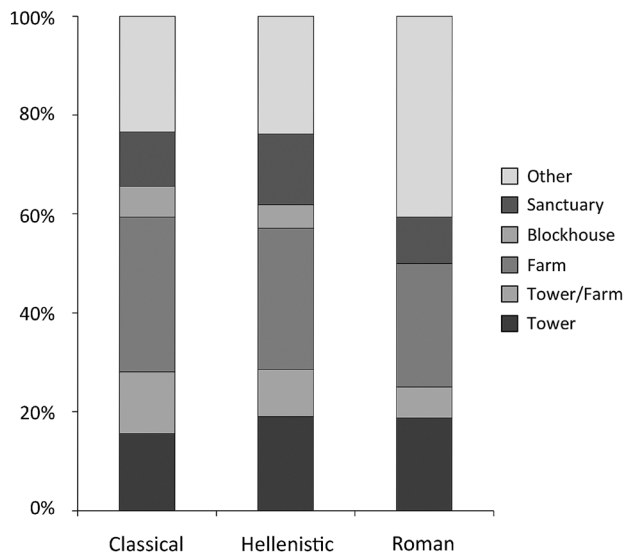
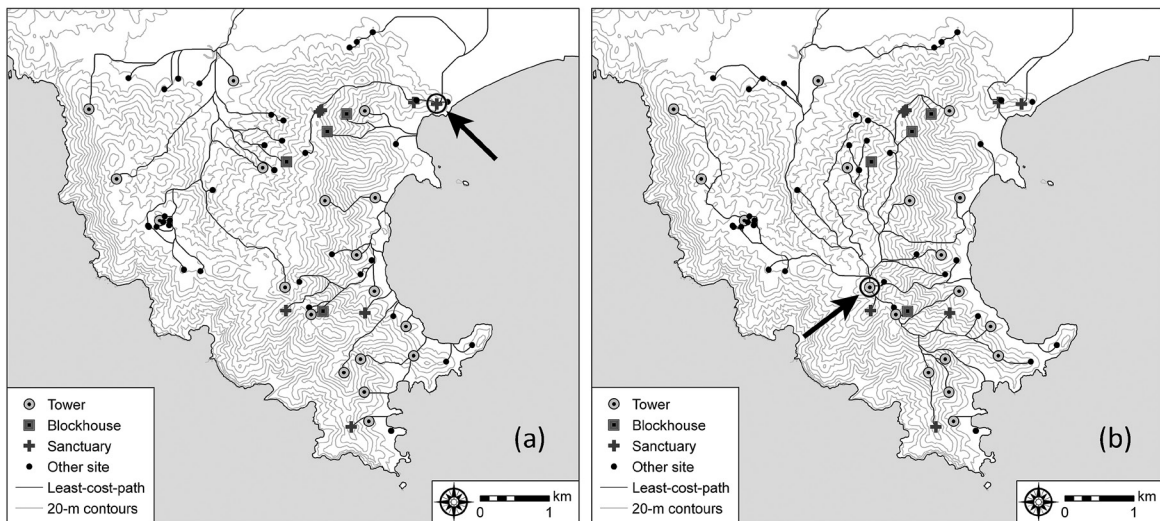


Figure 2:
Percentage of site types identified by SEEP which date to the Classical, Hellenistic and Roman periods.

Figure 3:
Least cost path results for the Classical period: (a) from findspot 80C19, (b) from findspot 80C41.



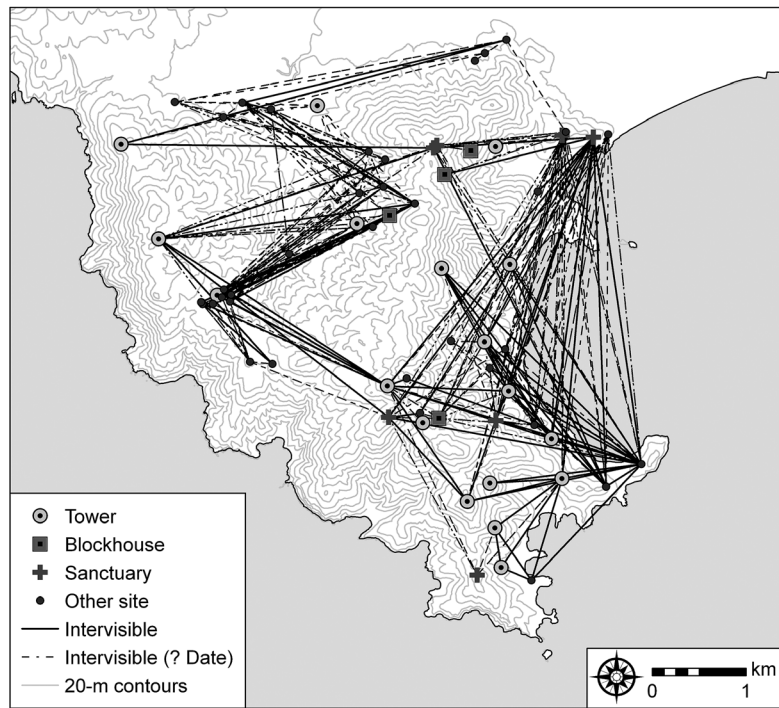


Figure 4: Line of sight results for the Classical period.

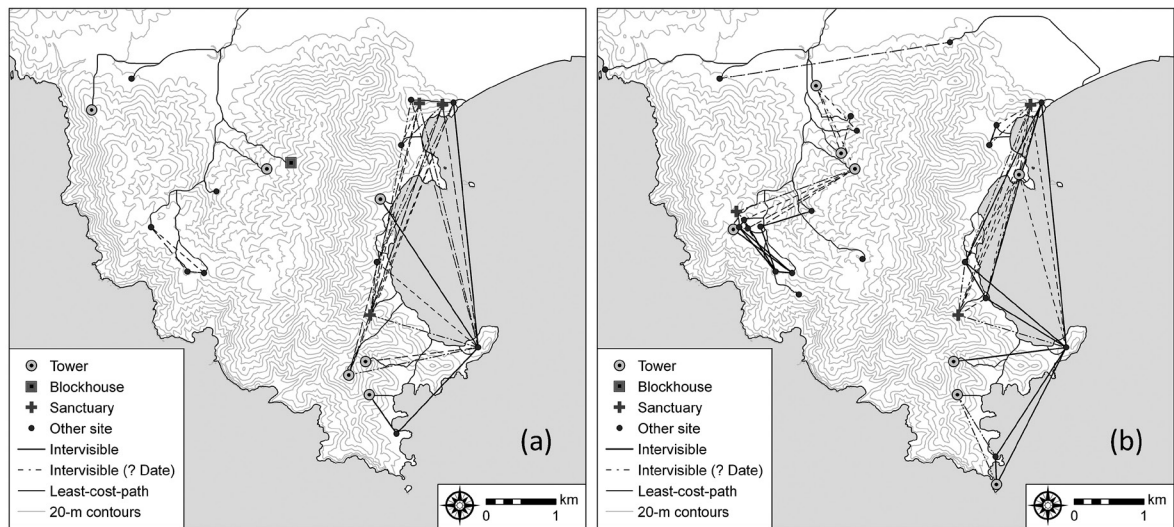


Figure 5: Least cost path and line of sight results for the (a) Hellenistic and (b) Roman periods.