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THE IMPACT OF THE GREAT EARTHQUAKE OF C. 365 AD ON THE ANCIENT HARBOURS OF KYTHERA AND ANTIKYTHERA (GREECE).
(THE DISAPPEARANCE OF THE TEMPLE OF APHRODITE IN KYTHERA)

Aris Tsaravopoulos*, Gelly Fragou**

Keywords: Kythera, Antikythera, sanctuary of Aphrodite, earthquake, harbour, tombs.

Abstract: The impact of the geological and marine environment on the two islands is discussed along with its changes, based on the data obtained by the archaeological research and the geological history of both islands. As a conclusion a hypothesis on the site where the sanctuary of Aphrodite on Kythera must have been located is suggested.

Rezumat: Pornind de la datele obținute din cercetările arheologice și din istoria geologică se discută impactul pe care mediul geologic și maritim l-a avut asupra celor două insule și schimbările care au avut loc în urma lui. În concluzie se propune o ipoteză asupra localizarii sanctuarului Afroditei pe insula Kythira.

The islands of Kythera and Antikythera are located in the south-western region of the Greek maritime area (Fig. 1). Thus, they stand in a crucial, yet hazardous point in the Aegean Sea, where two sea routes intersect: the long coastal route that crosses the Aegean from E to W hugging the southern coast of mainland Greece, and the NS route crossing the Cretan Sea from Laconia in the N to Crete in the S (Fig. 2).[1]

Fig. 1. Kythera and Antikythera between Peloponnese and Crete.

The axis formed by Cape Maleas on the Peloponnesian coast, Kythera and Antikythera and Cape Grambousa and the north-western coast of Crete delimits the Aegean Sea to the south-western part and constitutes the point of contact with the south eastern Ionian Sea and the Western Mediterranean beyond. Along this axis in the Kythera Sea three narrow entrances are formed to and from the Aegean Sea: the Strait of Elafonesos, the Strait of Kythera and the Strait of Antikythera. These are three very significant maritime passages, through which the sea moves between the Aegean, the Ionian and the Western Mediterranean, which contributes to the formation of the maritime traffic in the Cretan Sea (Fig. 1).

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We feel obliged to thank warmly prof. Nick Sekunda (Gdansk University) for his advices.

[1] Mantzourani, Theodorou 1989; Papageorgiou 2002, pp. 23-85 and pp. 152-238; Ploigos 1971, 1976, 1987, 1991.

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Fig. 2. The marine currents at the SW corner of the Aegean *Sea*.

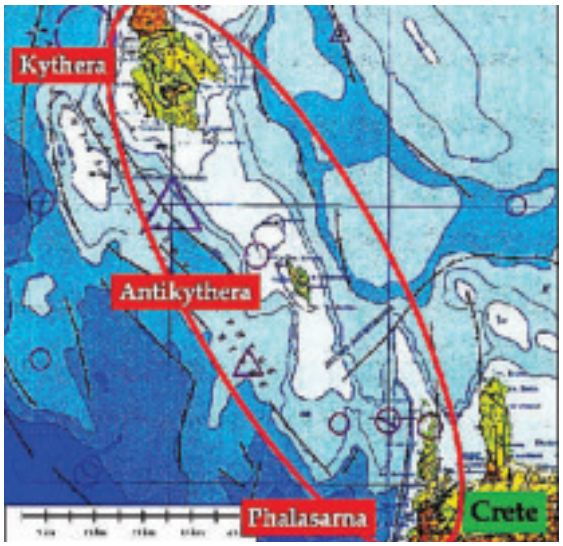

Fig. 3. Surface outcrops of the submarine Kythera-Antikythera ridge.

Along with Crete, Kythera and Antikythera are located in the middle of the Hellenic Arc[2] and for this reason they have been affected, over the last million years, by the tectonic movements caused by the collision of the tectonic plates in the zone of the Greek trench (Fig. 3).[3] The two islands, and the islets that surround them, are surface projections of a submarine ridge known as the Kythera - Antikythera ridge. This structure forms a continuation of the Peloponnese mountain range running towards the Cretan Mountains in the south. Despite the low altitude of both islands, and especially of the very small island of Antikythera, their shores are steep with narrow vertical canyons that lead to relatively small beaches. On both Kythera and Antikythera, down to the present day, it is difficult to find a place that allows safe mooring.

Antikythera

Antikythera is a very small island with a NW-SE orientation. It is 10 km long, with a maximum width of 3 km and an altitude of 378 m (Fig. 4). Antikythera today has only one cove towards the north, where boats can be moored for more than a few hours during the calm seasons of the year. In the ancient period, as it will be shown below, the situation was very different (Fig. 5). As a result of the enormous earthquake in AD 365, Antikythera and the western part of Crete, and Kythera to a much lesser extent, experienced a sudden uplift. That was a very strong earthquake felt from Sicily to Palestine.[4]

The north-western part of Crete, in the region of Phalasarna, suffered an uplift of about 6 to 7 meters. Phalasarna is not only located on the Hellenic arc, but it is at the point where the arc changes direction from NW-SE to SW-NE. As a result of this uplift, the harbour of the Cretan city of Phalasarna was found on dry inland, over 100 m away from the seashore.[5] Thus, the mooring stones of the harbour are today located on dry land (Fig. 6). In Phalasarna, a series of vertical movements occurred at first: a series of ten sudden recessions of the ground surface which affected a large part of the lithosphere, and was followed, in the 4th century AD,

2 Rackham, Moody 1996, p. 13.
3 Flemming 1980, pp. 162-163.
4 Papadopoulos 2011, pp. 90-106.
5 Papadopoulos 2011, pp. 52-60, Hadjidaki 1988a; Hadjidaki 1988b, pp. 463-479; Hadjidaki 1990, pp. 355-361; Hadjidaki 1996, pp. 53-64.

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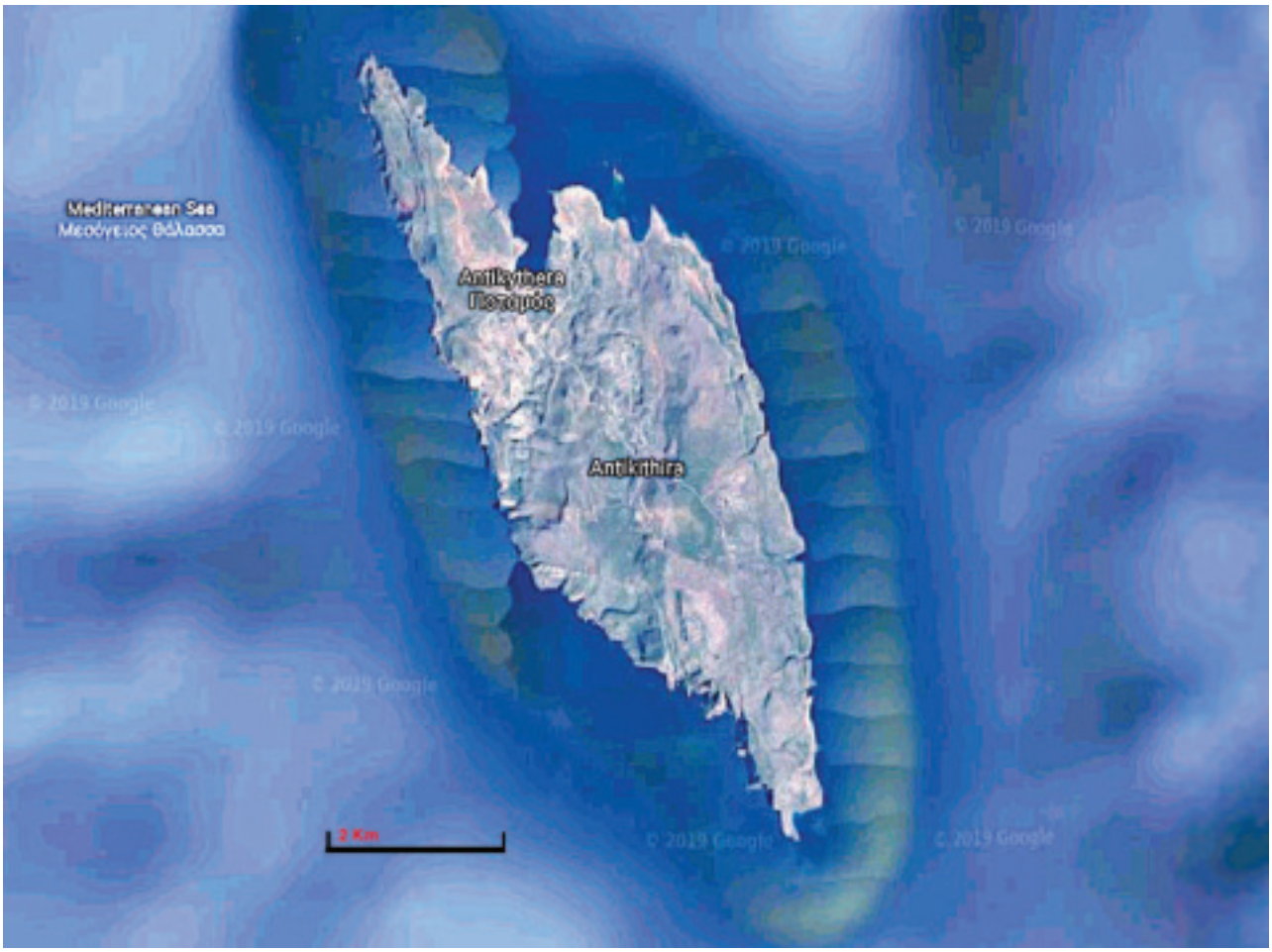

Fig. 4. Map of Antikythera island.

by one single event: the uplifting of the region's coasts.[6]

Not far to the north, the small island of Antikythera presents the same phenomenon of uplift, but this time smaller, between 3 and 3.5 m.[7] As is the case in Phalasarna the phenomenon is noticeable on the shores, where it is visible along their entire length. The landslides that preceded the uplift are visible too (Fig. 7). On Antikythera, similarly to Phalasarna, the ancient harbour was located inland. In antiquity it was a "hidden" harbour, sheltered by the rock mass on which the fortified city was located (Fig. 8). Another man-made structure on Antikythera, the unique

Fig. 5. Today's Harbor in Antikythera in a windy day.

[6] Pirazzoli *et alii* 1982, pp. 27-43; Pirazzoli 1987; Pirazzoli 1988, pp. 157-178; Papadopoulos 2011, 100.
[7] Fleming 1973, pp. 11-13.

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Fig. 6. The mole of the ancient harbor of Phalasarna.

Fig. 7. The 3m over the sea level black zone all around the island of Antikythera.

Fig. 8. The gulf of Xeropotamos where the anciet harbor was situated.

Fig. 9. The exit to the sea of the Antikythera shipshed.

ship-shed of the fortification, oriented towards the north, rose out of the water completely after the uplift (Fig. 9).

On Antikythera, despite it being located in a key position on the crossing from the Peloponnese to Crete, and to a lesser degree from the Aegean to the western Mediterranean, for about one thousand years, from the middle of the 2nd millennium BC, no traces of human presence appear until the end of the 4th c. BC. Then, shortly after the Asia Minor invasion of Alexander the Great, with financing from the Persian Empire, the construction of the fort of Aigilia began, as a base in the framework of a planned counterattack on the Macedonian army.[8] With the disappearance of the Persian Empire and the early death of Alexander, the powerful city of Phalasarna, with its fortifications and a fleet, became involved in state piracy, in a similar way to almost all the cities of Hellenistic Crete[9] that had received Persian financial aid.[10] Phalasarna had an advanced harbour, which together with that of Aigila-Antikythera,[11] which was in Phalasarnian territory, gave it a strategic advantage over other Cretan cities.

[8] Sekunda 2004-09, pp. 597-9; Tsaravopoulos, 2004-09, p. 331; Sekunda 2012, pp. 200-201; Tsaravopoulos 2012, pp. 208-9.

[9] On the piratical activity of Cretan cities, see Brulé 1978.

[10] See note 12.

[11] The most common ancient names of Antikythera are Aigila or Aigilia.

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Fig. 10. Fossil shells in the limestone rock.

Fig. 11. Close up view on the beach of Palaiopolis where the ancient port of Skandeia was situated.

Fig. 12. The beach of Palaiopolis in front of the remains, as preserved today, of the Asprogas hill and the traces of its fallen parts in the sea. Foto Th. Koutrafouris.

Kythera

The island of Kythera itself and the surrounding islets emerged 200 million years ago, while 30 million years ago a second upward movement began that led to the completion of the orogenesis of the Greek Mountains and which was completed 13 million years ago. The final emergence of the Kythera region took place about 2 million years ago. Until then the rise and formation of Kythera were due to tectonic reasons, due to the movement of the tectonic plates, while afterwards, the present form was almost completed due to the change in sea level as a result of the melting of the glaciers.[12]

The emergence of Kythera is obvious everywhere on the island. Even on the highest mountain, the Mermygkari Mountain, fossil shells are visible that would justify to the ancients the connection of the island with the myth of Aphrodite (Fig. 10).

On Kythera, in antiquity, the bay of Palaeopolis was much deeper, and it had a relatively safe port, called Skandeia (Fig. 11).[13] Today, with the silting that accompanied the collapse of the Asproga's bulk the protective depth of the cove has been lost (Fig. 12).

In Kythera the phenomenon of the uplift as a result of the earthquake in 365 AD is not visible, but the earthquake has provoked precipitations (dislocations) that changed the shape of the island's eastern coast. This can be seen on the bulk of Asprogas.

[12] Bartsiokas 1998.
[13] Thuc. 4.54.1; Paus. 3.23.1.

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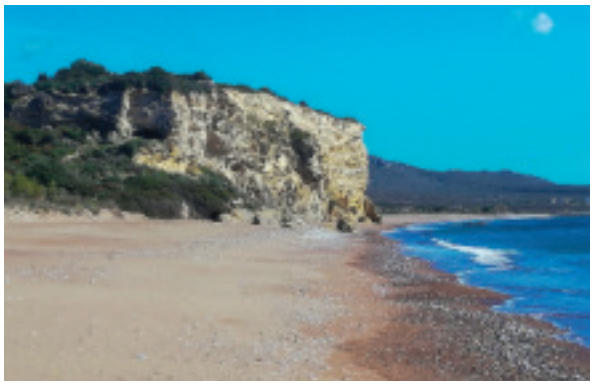

Fig. 13. The bulk of Asprogas viewed from the west.

Fig. 14. The two Hellenistic Roman shaft graves and, left, the remains of the chamber tomb at the ridge of the cliff of Asprogas. Foto Th. Koutrafouris.

Fig. 15. The remains of the collapsed Roman period chamber tomb at Asprogas. Foto Th. Koutrafouris.

Fig. 16. The two Asprogas' tombs viewed from the beach.

Fig. 17. The drum of a Doric column possibly from the sunk temple of Aphrodite.

A clear proof that the fall of the Asprogas hill occurred towards late antiquity, probably as a consequence of the great earthquake in 365 AD, is the shaft and chamber graves that are preserved on the ridge of the cliff (Figs. 13, 14, 15).[14] The existence of burial monuments on the edge of the cliff of Asprogas indicates that running alongside the graves, in the part which had collapsed and fallen into the sea, there would have been a road where visitors would pass-by. This road would lead to a significant monument that has probably collapsed, based on the dating of the graves, after the great earthquake of 365 AD (Fig. 16).

The question that rises is what would have been on the cape of this peninsula which must have attracted people to visit it? The drum of a Doric column which lies on the shore, collected possibly from the neighbouring sea (Fig. 17), part of a temple column, drives to the conclusion that in the sea, now, there must be the long-time searched remains of the famous temple or sanctuary of Aphrodite.[15]

[14] It is well known that from the Geometric to the Hellenistic/Roman periods the burials were located along the roads towards the settlements' exits or busy routes outside the cities. See Boardman, Kurtz 1971, chapter VI; Tsaravopoulos, Kroustalis, 2009, p. 208.

[15] Pausanias 3.23.1 mentions also the existence of an armed *xoanon* of the goddess.

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