# Submerged remains of ancient port installations in the Bay of Passa Limani, Lavreotiki peninsula: A preliminary survey

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## Introduction[1]

The Lavreotiki peninsula, the southernmost tip of Attica, has been inhabited since the Palaeolithic (40,000 years B.P.).[2] As it is the nearest and most accessible point on the sea route from Greece mainland to Melos, the island of the obsidian, it may have become after the Mesolithic an area where this volcanic rock was first transported and from there distributed to other locations of the peninsula of Aenos.

But in historical times the Lavreotiki was mainly known for its argentiferous lead ore that was extracted and processed as early as the 3rd millennium B.C. However, the earliest ore exploited in that region since the 4th millennium B.C. was copper and must indicate surface finds used in its integral form, as metallurgic technology was then unknown.[3]

The importance of the *Lavrium* culminated in the Classical and Hellenistic times (5th-4th cent. B.C.) under the hegemony of Athens, whose wealth greatly depended on its mining activities at the Lavreotiki. The extraction from the mines continued, although gradually declining, until the early Byzantine times.[4]

The Lavreotiki coastline is deeply indented forming large bays, coves and rocky promontories. Although it is ideally located on the maritime trade routes leading from Asia Minor and the Aegean islands to the Bay of Athens, the Peloponnesus and the Western Mediterranean, there is no testimony of any ancient port of importance along the coasts of the peninsula.

This paper aims to provide a brief account on preliminary observations made during a short survey which took place in the summer of 2005 at the area of Lavreotiki and in particular within the Bay of Passa Limani (later Poseidonia). The survey was conducted by the Hellenic Institute for the Preservation of Nautical Tradition, under the direction of the author.

## Bays and coves of the Lavreotiki

Let us enumerate the bays and coves that are part of the Lavreotiki: Anavissos, Legrena, Sounion on the Saronic Gulf; Passalimani, Panormos, Lavrion, Thorikos, Aghios Nikolaos (Frangolimano), Tourkolimani overlooking the island of Makronissos (Fig. 1).

1 I would like to thank Dr. Katerina Dellaporta, then head of the Department of Underwater Antiquities for granting the permission for this survey; to the inspectors of the Department, Dr. Dimitris Kourkoumelis and Dr. Theotokis Theodoulou (archaeologists-divers), to the pioneer archaeologist and diver Charalambos Kritzas, as well as to George Nomikos (diver), Elia Nikitopoulou (archaeologist), Alexandros Karditsas and Efy Archontoulaki (architects) for their participation in the survey.

2 Lambert 1981.

3 Kakavoyannis 2005.

4 Conophagos 1980.

All these bays and coves must have been used as anchorages in ancient and medieval times by large and small vessels.

*Anavissos* is a large open bay, exposed to all winds except the north-east. Not far from the shores are the remains of large burial grounds dating to the Geometric times and several of the most important masterpieces of pre-classical sculpture including the famous *Kouros of Anavissos* and a *kore*, now in the Museum of Piraeus have been found in that region.

Deserted for many centuries Anavissos was populated again after the year 1922 by settlers from Phocaea, in Asia Minor, following the exchange of population with Turkey. It was renamed Nea Phokia and an active small port secured the communication of the new dwellers with Piraeus, by caiques via Aegina.

*Legrena* is another large open bay with some protection from north-east winds. It is believed that in ancient times this bay was much deeper and extended inland. Because of the large number of "mining laundries" that exist in the vicinity, tons of mud resulting from the washing of the ore has been transported over the centuries by rain and ended in the bay which gradually silted. The seabed of the bay is covered by a thick layer of that mud with residues of argentiferous ore.

In modern times, until the late 1950's (before the opening of the new coastal road) an intricate system of rails brought the ore from the galleries to a loading point of the bay where bulk carriers, stern-to berthing in a small quay, received their load.

*Sounion* known in the Middle Ages and modern times as Kavokolones,[5] because of the standing columns of the Temple of Poseidon, visible from the sea on its high promontory, is the only bay marked on maps and portolans of the 17th, 18th and 19th centuries. The bay is well protected from the north and north-east winds.

It is known that the Bay of Sounion had some port installations besides the two ship sheds, whose ramps, carved in the rock, have been partially preserved. Not far from the Hotel Aegean, built in the early 1960's, remains of large structures were found protruding at only a few centimeters from the surface of the nearby beach. But no thorough archaeological survey was ever carried out on land or in the sea.

*Passa Limani*, recently renamed Poseidonia, is a deep bay, well protected from all winds except from the south-west. Its southern approach is marked by a reef called Ifalos tou Passa.

*Panormos* is a little cove also called Gaidouromandra. There are faint remains of an ancient mole on its northern side as well as several deep carvings on its rocky southern littoral. A Classical shipwreck (of late 5th cent. B.C.) has been found there and was partially surveyed in the 1970s by the Department of Underwater Antiquities.[6]

The large bay of *Lavrion*, known also as Ergastiria, shelters a modern port and a yacht marina.

During the second half of the 19th century, *Lavrium* was again inhabited mainly by miners-settlers from various parts of Greece and Spain, employed by the French and the Greek companies that obtained concessions for exploiting again the mines and mainly reprocessing the ancient slag. It was found that the slag rejected in antiquity which had formed mounds evaluated at 1.500.000 tons contained a 10% of lead.

The new port of Lavrion was rated, for the period of 1877 to 1977, as the first port of Greece for its bulk tonnage of exports.

The large and deep bay of *Thorikos* is scarcely marked on some maps of the early 19th century. It is also called Porto Mandri and is exposed mainly to the south winds. The remains of a large shipwreck of Roman

5 That numerous ships did anchor in the bay of Sounion during the 19th century is attested by the large number of nautical graffiti carved on the columns and other remains of the Temple of Poseidon (Tzalas 1998, 425-433).

6 Koutsouflakis 2018, 25-27.

times, loaded with roof tiles, have been traced on its seabed.[7]

The large and deep bay of *Aghios Nicolas* is also called Frangolimano. Two twin bays are separated by the promontory of Aghios Nicolas with a prehistoric settlement (It is a typical case of a double port of prehistoric times). Land excavations confirm that this is the earlier settlement of the area. The entire promontory is scattered with obsidian blades and flints.[8] On that same promontory there was a fortification of the Classical times (413 B.C.). However, the sea area has never been surveyed.

The northern of the bays of Aghios Nicolas was the only anchorage with fresh water provided from a spring and is adequately, also known as Vrissaki, "the small tap".

The straights between the Lavreotiki and the island of Makronissos are exactly on the course of the ships that in Medieval times, after doubling Cape Matapan, would continue to Constantinople. Anchoring at Vrissaki (Frangolimano, the port of the Franks) for water supply was an important stopover.[9]

The Lavreotiki is arid and in fact the main challenge that had to be overcome in the process of washing the ore was the scarcity of water; this necessitated the invention of an intricate recycling water system.

*Tourkolimani* or *Tourkolimano* is the last of the bays of the Lavreotiki overlooking the northern tip of Makronissos, it is well protected from the north and mainly west winds.

For many years the fishermen of Lavrion did get a variety of amphoras entangled in their nets which they gave to the owner of the Hotel Aegean. His large collection of amphoras varying from Prehistoric to late Byzantine times was confiscated in 1989 by the "Police Department for the prevention of illegal trafficking of Antiquities" and deposited at the storage facilities of the Department of Underwater Antiquities. These amphoras are another indication of the great maritime activity of the area and the loss of many ships.

It should also be noted that piracy was a frequent activity in the Aegean and that until a basic organization of the newly born Greek state took place in the 1840s, its waters were infested with regular and occasional pirate ships that ventured often even in the waters of the Saronic Gulf. The coves of the Lavreotiki were occasional havens for their ships.[10]

## The Bay of Passa Limani

During the summer of 1988, I did carry out a series of extensive sea-trials in the Bay of Passa Limani, with a papyrus raft, which I had built in Corfu, as part of a programme in experimental archaeology.[11] The bay is protected from all winds except from the south-west, which seldom blows in the summer, and is an ideal site for paddling. It was on the occasion of these sea-trials that I noticed, in the shallows of the bay, a complex pattern of submerged man-made remains of structures. There are walls as well as deep carvings in the innermost part of the bay, near a little sandy beach. The total distance of this bay from its western entrance to that sandy beach is of ca. 900 m, and the width of the bay at its entrance is of ca. 650 m. The depths in the middle of the bay vary from 7 m to 12 m.

Let us look at the historical and archaeological context of this bay.

The site of Passa Limani, a name acquired probably after the 15th century, was known in Classical and Hellenistic times for having the most important settlement of the region. A small agora, supposed to

7 Verbal information provided by the professional diver Alexis Papadopoulos in the 1980s.

8 Kakavoyannis 2005.

9 Kakavoyannis 1993.

10 For piracy in Greek waters see Pitcairn Jones 1934.

11 Tzalas 1995.

be the Agora of the Salaminians,[12] was excavated in the 1980s by the then B Ephorate of Prehistoric and Classical Antiquities. Important metallurgic activities were noted throughout the area of the bay and numerous kilns scattered all over the place, some set on the littoral at proximity of the sea, were excavated.

The settlement was abandoned in the early Byzantine period as was all the Lavreotiki. The land that extended from the shores of the inner bay turned into a swamp, which was dried-out and reclaimed in the early-1980 by dumping slag resulting from ancient and modern metallurgic activities of the region and a small sandy beach was formed.

Taking into consideration the general pattern of the rise of the waters of the Mediterranean Sea since the melting of the glaciers in ca. 10,000 B.P. by a meter every 1,000 years, we can say that the difference in level in the Bay of Passa Limani from the 5th cent. B.C. to nowadays is +/- 2.5 m. In consequence the ancient shoreline at Classical times should be placed at some 100 m from today's inner shore.

In 1991, I presented a paper suggesting that the Bay of Passa Limani could have been an important port – perhaps the most important of the Lavreotiki – equipped with port installations.[13] I also proposed, based on some fragments of lead-sheaths found on land between the Agora of the Salaminians and the sea, that a boatyard, specializing in the lead sheathing of ancient ships, would have stood there.

On a list of 23 ancient Mediterranean shipwrecks, Lionel Casson states that eight had lead-sheathing, seven had never been sheathed, while there were doubts about the remaining seven.[14] Since then, more evidence of lead-sheathing of ancient ships has been found.

Because of the abundance of lead in the area, the great weight that the sheathing of a vessel represents, would it not be normal that such specialized activity be carried out in the vicinity of the source of lead? By doing so one would avoid the transport of several tons of lead foil needed for lining the external part of a hull up to the floating line. And the *Lavrium* was by far the most important source of lead for all Greece and the Eastern Mediterranean.

In the summer of 2005, I requested permission from the Department of Underwater Antiquities to conduct an underwater survey in the Bay of Passa Limani. This permission was granted to the Hellenic Institute for the Preservation of Nautical Tradition.

The preliminary results are impressive and tend to justify my original assumption that there was a well-equipped, important port in this bay.

1. Near the eastern side of the bay, almost perpendicular to the small beach, in a North-South direction, at ca. 36 m and 50 m from today's shoreline and at a depth of 2 m, lie the remains of two walls extending respectively to some 86 m and 65.50 m. The walls protruding out of the sand are preserved at a height of ca. 1.30 m to 1.70 m.

These walls run nearly parallel to each other and have a thickness of 0.70 m, but each has a different structure. A distance of 23.50 m separates their southern extremity and 17 m the northern.

2. In between the walls there is what seems to be a deep carving extending for 13 m. The same deep carving is found westwards and has a length of 10 m. Both carvings have a width of 1.20 m.

3. Westwards of these walls there is a void of some 80 m with no apparent remains and then another submerged structure runs parallel to the walls. It ends on the side opposite to the shore by forming an uninterrupted apsidal curve. This structure is also different from the previously described walls.

4. In the shallows near the beach there is an unidentified pattern of structures greatly disfigured because

12 Ferguson 1938, 3, 10, 17. Young 1941, 163.

13 Tzalas 1994.

14 Casson 1971. The two ships of Lake Nemi where lead sheathed.

of being covered by a layer of beach rock formation. The depths vary from 0.50 m to 1.30 m.

A great number of well quarried stone blocks found isolated or grouped are scattered on the seabed.

This was only a limited preliminary survey, which aimed to confirm the presence of submerged ancient remains. All what can be advanced at this stage is that we are in the presence of ancient structures made of local stones. These structures are in contact at their southern side with the ancient shoreline that is now at a depth of ca. 2 m. The use of a hydro-lift will be necessary to remove the sand and ascertain the preserved height of the revealed structures, as well as search for additional remains that may be lying under the sand.

It is certainly premature to try and interpret the use of these constructions, but it is probable that buildings close to the sea had formed part of harbour facilities.

The large submerged central area, with a smooth slope, constituting a void deprived of ancient remains may represent the flat land necessary for hauling out the ships. Is this the site of a boatyard? There is no evidence and it is premature to propose such a theory.

The anchoring of commercial ships at different periods, in the Bay of Passa Limani, is attested by a large number of broken amphoras and pottery sherds scattered everywhere and at different depths. At the entrance of the bay there is a reef, mentioned on the charts as *Ifalos Passa*. Although its depth in antiquity must have exceeded 2 m, broken pottery concreted on its top testifies to the hazard that it presented to navigation.

No systematic underwater survey of that large bay has ever been attempted. Remains of possible shipwrecks marked by broken amphoras have been repeatedly looted over the last 30 years when the shores of the bay have developed into summer resorts and gave access to thousands of swimmers and occasional snorkel-divers.

In conclusion, I would like to stress that the well protected Bay of Passa Limani, located on an important sea route, certainly holds interesting ancient remains of port installations and maritime activities.

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# Βυθισμένα υπολείμματα αρχαίων λιμενικών εγκαταστάσεων στον Κόλπο Λιμάνι Πασά της Λαυρεωτικής: Προκαταρτική έρευνα

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## Περίληψη

Υπάρχουν ενδείξεις ότι η Λαυρεωτική, το νοτιότερο τμήμα της Αττικής χερσονήσου, κατοικήθηκε πριν από περίπου 40.000 χρόνια. Η πρώιμη δραστηριότητα συνδέεται με την μεταφορά και επεξεργασία του οψιανού της Μήλου. Κατά την 4η χιλιετία γινόταν επεξεργασία επιφανειακών κοιτασμάτων χαλκού, ενώ από την 3η χιλιετία άρχισε η εξόρυξη και επεξεργασία του αργυρούχου μόλυβδου. Η δραστηριότητα αυτή συνεχίστηκε μέχρι τα πρώιμα Βυζαντινά χρόνια, οπότε όλη η περιοχή εγκαταλείφθηκε.

Το άρθρο περιγράφει την περιορισμένη ενάλια έρευνα που πραγματοποιήθηκε το καλοκαίρι του 2005 από το Ελληνικό Ινστιτούτο Προστασίας Ναυτικής Παράδοσης στον όρμο Λιμάνι Πασά, σημερινή Ποσειδωνία, όπου εντοπίστηκαν στα αβαθή υπολείμματα λιμενικών εγκαταστάσεων. Σε μεγαλύτερα βάθη, συσσώρευση αμφορέων μαρτυρούν για την παρουσία αρχαίων ναυαγίων.

Περιγράφονται επίσης, εν συντομία, οι όρμοι της Αναβύσσου, των Λεγραινών και του Σουνίου στον Σαρωνικό, καθώς και αυτοί στον Πάνορμο, στο Λαύριο, στον Θορικό, στον Άγιο Νικόλαο (Φραγκολίμανο) και στο Τουρκολίμανο που αντικρίζουν την Μακρόνησο.

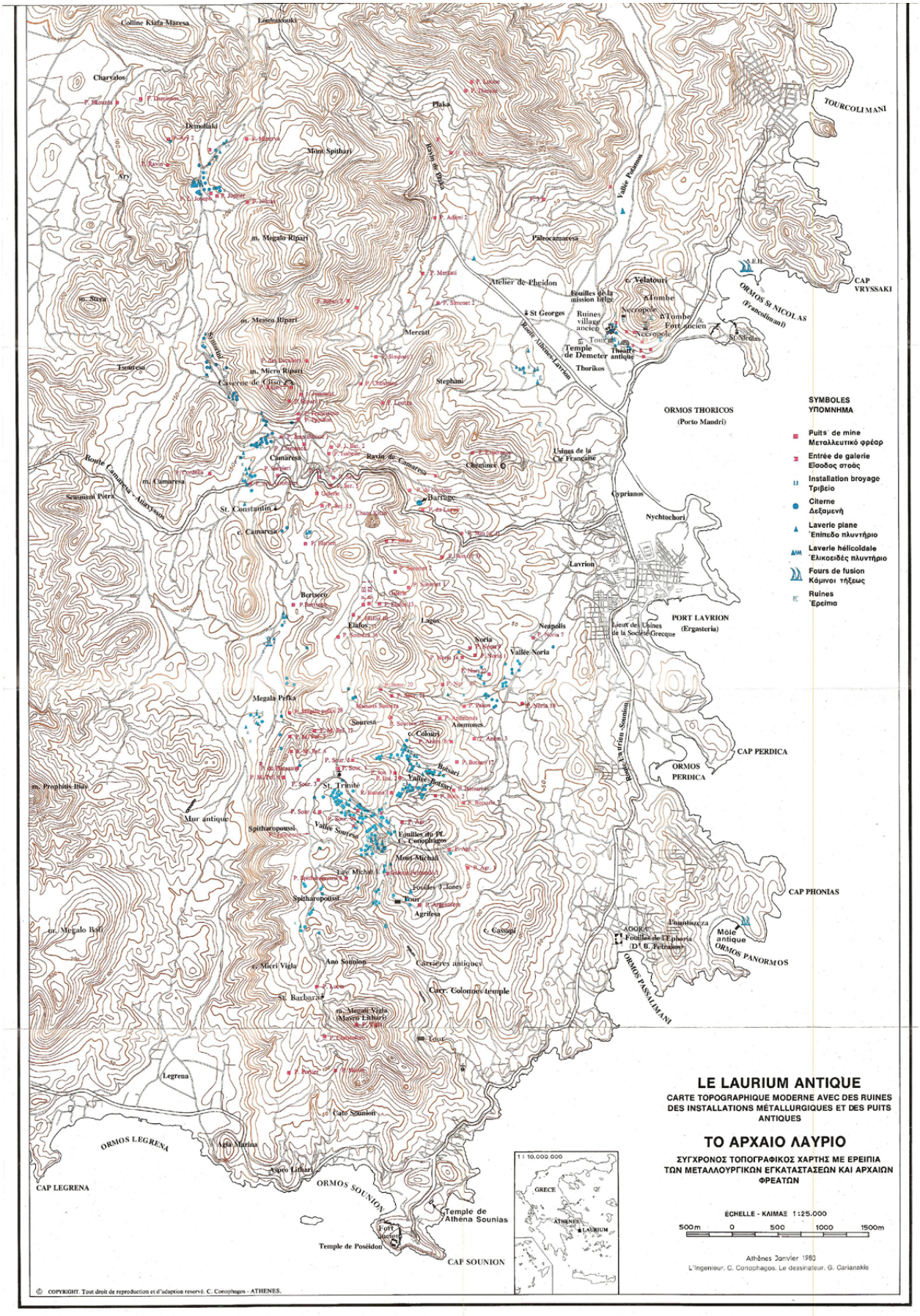



Fig. 1. Detailed map of the Lavreotic (Conophagos 1980).