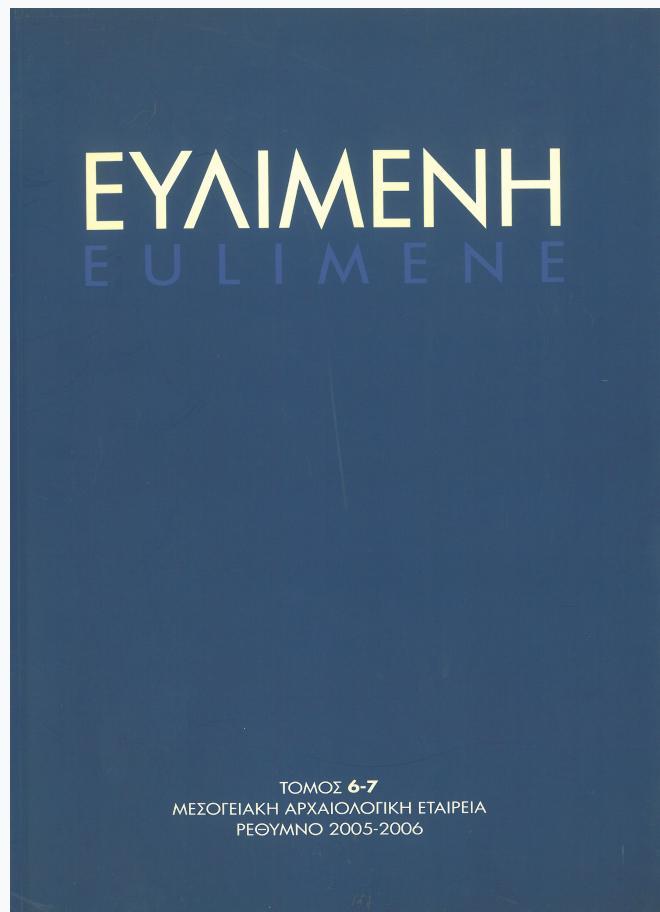


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**A Minoan shipwreck off Pseira Island, East Crete.  
Preliminary report**

*Elpida Hadjidaki, Philip Betancourt*

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# ΕΥΛΙΜΕΝΗ

ΜΕΛΕΤΕΣ ΣΤΗΝ ΚΛΑΣΙΚΗ ΑΡΧΑΙΟΛΟΓΙΑ,  
ΤΗΝ ΕΠΙΓΡΑΦΙΚΗ, ΤΗ ΝΟΜΙΣΜΑΤΙΚΗ ΚΑΙ ΤΗΝ ΠΑΠΥΡΟΛΟΓΙΑ

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## Περιλήψεις / Summaries / Zusammenfassungen / Sommaires / Riassunti

**Ευρυδίκη Κεφαλίδου**, Καταβάσεις και άνοδοι του Διονύσου: παραπηρήσεις στην αττική και κατωιταλιωτική αγγειογραφία, ΕΥΛΙΜΕΝΗ 6-7 (2005-2006), 13-44

*Dionysiac descents and anodoi in Attic and South-Italian Iconography.* This paper examines three groups of Dionysiac iconography:

- a) Depictions of Dionysos in the Underworld, such as on the well known south-italian crater by the Darius Painter
- b) Depictions of Dionysos' head emerging from the earth (mainly, but not exclusively, on Attic vases of the late 6th-early 5th c. B.C.), and
- c) Depictions of Dionysos in Eleusinian iconography, especially those cases (from the mid-4th c. B.C. onwards) where he is shown together with Herakles and the Dioskouroi, who were initiated into the Mysteries.

I suggest that in all cases Dionysos is shown as a prominent chthonic deity and that Dionysos, Herakles and the Dioskouroi had been connected with the Eleusinian Mysteries (each at a different time and possibly for a different reason) because they all went down to the Underworld, while still alive, and they successfully managed to come back.

**Γιάννος Κουράγιος – Σοφία Δετοράτου**, Κυβόλιθος, με παράσταση Απόλλωνα-Αρτέμιδος, ΕΥΛΙΜΕΝΗ 6-7 (2005-2006), 45-54

*Marble-block decorated with figures of Apollo and Artemis.* A fragment of an archaic marble-block has been found in the area of the Asklepios sanctuary in Paroikia, Paros near the sanctuary of Apollo Pythios. The block is decorated with two incised human figures in profile, one on the main side and the other on the narrow side. On the fragmentary representation of a standing female figure turned to the right. She holds a bow in her hands. Her hair is held together with a ribbon and her garment is probably a chiton. A pair of diagonal incisions shown across the chest might indicate the strap of a quiver. In this case the figure represents the goddess Artemis, the sister of Apollo. The hair, the profile, a rosette that decorates «Artemis» belt seem to copy contemporary «Melian» vases, which are attributed to a parian workshop. The two figures on the block bring to mind the figure of a parian stele (archaeological museum of Paros, A 760) as well as the stelae of Prinias, Crete dating to the 7<sup>th</sup> century. The block is one of the earliest examples of carved marble reliefs in Paros as well as in Cyclades.

**Δημήτρης Παλαιοθόδωρος**, Η παρουσία και η διάδοση της πρώιμης αττικής ερυθρόμορφης κεραμικής στη Μαύρη Θάλασσα (525-480 π.Χ.), ΕΥΛΙΜΕΝΗ 6-7 (2005-2006), 55-78

*The diffusion of early attic red-figured pottery in the Black Sea area (525-480 BC).* This study presents a detailed discussion on the pattern of diffusion of early attic red-figured vases in the Black Sea Area. 80 vases are collected, mostly from Northern Black Sea sites. A representative series of vases is analyzed according to shape and iconography, and classified by painter and workshop. The output of major painters and workshops in the Black Sea is discussed (Psiax, Oltos, Epiktetos, Euphronios, the Pithos Painter, the Nicosthenes and Kachrylion workshops, etc.). The overall pattern of diffusion of early red-figured vases in the Black Sea area and in Etruria corresponds quite closely. It is argued that Aeginetan and Ionian sailors are responsible for the fact that vases from same workshops appear both in the Black Sea area and Thasos, as in Etruria, although these vases are used locally in different ways. After 490-480, the scheme changes: the Black Sea Region now belongs to commercial routes that link Athens with Asia Minor and the Levant as well.

**Elpida Hadjidaki-Philip Betancourt**, A Minoan shipwreck off Pseira Island, East Crete. Preliminary report, ΕΥΛΙΜΕΝΗ 6-7 (2005-2006), 79-96

*Ένα Μινωικό νανάγιο ανοικτά της νήσου Ψείρας, ανατολική Κρήτη. Κατά τη διάρκεια υποβρύχιων αρχαιολογικών και γεωφυσικών ερευνών στην ανατολική Κρήτη, εντοπίστηκε διάσπαρτο φορτίο αρχαίου ναυαγίου που χρονολογείται στη Μεσαιωνική ΙΙ περίοδο (1900 – 1700 π.Χ.).*

Το πλοίο βυθίστηκε περίπου πριν από 4.000 χρόνια στον Όρμο Μιραμβέλλου, ανοικτά της νήσου Ψείρας του Νομού Λασιθίου Κρήτης, σε βάθος περίπου 50 μέτρων και αποτελεί ανέλιπτο λάφυρο για την ιστορία της Προϊστορικής ναυσιπλοΐας.

Τα μέχρι σήμερα τεκμήρια ύπαρξης των πλοίων της εποχής της Μινωικής θαλασσοκρατίας βρίσκονται κυρίως στην εικονογραφία, όπως απεικονίσεις σε σφραγίδωλους, σε αγγεία και σε τοιχογραφίες. Παρόλο που δια μέσου των αιώνων χιλιάδες πλοία νανάγησαν στις θάλασσες του Αιγαίου, του Κρητικού και του Λιβυκού Πελάγους, η απτή ύπαρξη ενός Μινωικού ναυαγίου, αποτελούσε μακρινό όνειρο για κάθε μελετητή της αρχαίας ναυσιπλοΐας.

Η διάταξη του διασκορπισμένου φορτίου του ναυαγίου, το μεγάλο βάθος της θάλασσας στο οημείο αυτό, η μεγάλη απόσταση από την ακτή, καθώς και η εξαιρετική κατάσταση των αγγείων, που παρέμεναν χιλιάδες χρόνια στο βυθό, δίνουν ελπίδες για την ύπαρξη κάποιου τμήματος του σκελετού του πλοίου.

Μεταξύ των πρώτων επιφανειακών ευρημάτων του Μινωικού ναυαγίου συμπεριλαμβάνονται ακέραιοι αμφορείς, πιθαμφορείς, ραμφόστομες πρόχοι, κομφά τροπιδωτά αγγεία, μόνωτα κύπελλα κ.α.

Το ασύνηθες μεγάλο μέγεθος των αγγείων είναι εντυπωσιακό, δεδομένου ότι, για πρώτη φορά οι αρχαιολόγοι πληροφορούνται το είδος των δοχείων που χρησιμοποιούσαν οι Μινωίτες στις θαλάσσιες μεταφορές των εμπορευμάτων τους.

Όσον αφορά στον ξύλινο σκελετό του πλοίου, εάν διασώζεται, θα αποτελέσει εύρημα-σταθμό στην ιστορία της αρχαίας ναυπηγικής και θα αναδειχει τον πρωτοπόρο ρόλο της Κρήτης στην εξέλιξη της ναυτικής τέχνης και στη διάδοση του πολιτισμού.

**Νίκος Παναγιωτάκης**, A vaulted fountain house in the Pediada region in Central Crete, ΕΥΛΙΜΕΝΗ 6-7 (2005-2006), 97-118

*Μια αγριδωτή κρήνη στην επαρχία Πεδιάδος στην κεντρική Κρήτη.* Η επιφανειακή έρευνα που διενεργήθηκε από τον γράφοντα στην Επαρχία Πεδιάδος έφερε στο φως ικανό αριθμό κρηνών που ανήκουν, στην πλειοψηφία τους, στην ενετική περίοδο. Μία αφιδωτή κρήνη, όμως, που βρίσκεται σε σημαντικό αρχαιολογικό χώρο, στους βόρειους πρόποδες της Κεφάλας Αστριτσίου, μια άλλη επίσης σημαντική θέση, φαίνεται ότι ανήκει σε πολύ παλαιότερες εποχές.

Με βάση τα αρχαιευτικά στοιχεία της (ορθογώνια δεξαμενή και υδρομαστευτικές σήραγγες), η κρήνη θα μπορούσε να σχετίζεται με την αρχαϊκή ή την κλασική/ελληνιστική εγκατάσταση που απλωνόταν γύρω της. Στοιχεία, ωστόσο, όπως οι διακοσμητικές ταινίες από ερυθρά τουβλάκια και το πάτωμα από ερυθρές πλάκες, παραπέμπουν σε αντίστοιχες κρήνες και νυμφαία της ρωμαϊκής περιόδου.

Το αν ωστόσο η κρήνη κτίστηκε και κοσμήθηκε την ρωμαϊκή περίοδο από κάποιον ευγενή της περιοχής (υπάρχει επίσης στο χώρο εκτεταμένη ρωμαϊκή εγκατάσταση) ή απλά επισκευάστηκε και κοσμήθηκε κατά τα Ρωμαϊκά πρότυπα, παραμένει ανοιχτό.

**Παύλος Τριανταφυλλίδης**, Μετάλλινα αγγεία από την επανέκθεση του αρχαιολογικού μουσείου Ρόδου. ΕΥΛΙΜΕΝΗ 6-7 (2005-2006), 119-137

*Metal vessels in the new exhibition in the archaeological museum of Rhodes.* The article presents an overview of the metallurgy of Rhodes from the late 9<sup>th</sup> to the 5<sup>th</sup> c. BC, with the first presentation of some metal artifacts, especially luxury vessels, previously scarcely published.

The vessels examined are mostly from the Italian excavations at the cemeteries of Ialysos and Kameiros and from the votive deposits of the sanctuaries at Lindos, Ialysos and Kameiros.

The development of metal ware during early historical times on Rhodes can be traced in a series of luxury vessels, undecorated bronze bowls and basins, and a small number of decorated bronze and silver bowls, imported to Rhodes from the Near East, especially from Phrygia, north Syria and Mesopotamia, lands with a long tradition in the art of metallurgy.

Among these imported vessels from Rhodes are bronze and silver omphalos bowls of the 8<sup>th</sup> and 7<sup>th</sup> c. B.C. and silver phialai with relief decoration cast in moulds, typical of Achaemenid art of the late 6<sup>th</sup> and 5<sup>th</sup> c. B.C. in the Near East and the Black Sea.

Bronze cinerary urns and oinochoai of the 7<sup>th</sup>-5<sup>th</sup> c. BC. are among the artefacts which were probably made in the West, in Etruria and South Italy; some, however, were probably made locally in South East Aegean or in Rhodes.

**Felice Costabile**, Κατάδεσμοι από τον Κεραμεικό Αθηνών. Νέα στοιχεία στην ανάγνωση, ΕΥΛΙΜΕΝΗ 6-7 (2005-2006), 139-161

*Defixiones scoperte nel Ceramico di Atene. Nuove letture.* Si presenta una riedizione di due *defixiones* scoperte nel Ceramico di Atene e già più volte pubblicate. L'autopsia dei testi, corredata da macrofotografie che documentano le nuove letture, ha consentito all'autore di correggere diversi errori dei precedenti editori. Si recupera così il nuovo nome di *Eunomos* Peiraeus in una defixio della fine del IV secolo contro i generali macedoni e Demetrio Falereo, e diversi nuovi nomi (Menekles, Telestes, Pythodoros, Euthykleides, Timokrates, Epipeithes, Euthymos, Leptines) in un'altra defixio, databile alla fine del V sec. a.C., della quale si è –fra l'altro– recuperata la foto di un frammento mancante.

**Κατερίνα Παναγοπούλου**, Cross-reading images: iconographic «debates» between Antigonids and Ptolemies during the third and second centuries BC, ΕΥΛΙΜΕΝΗ 6-7 (2005-2006), 163-181

*Εικονογραφικές διαμάχες κατά τον τρίτο και δευτέρο αιώνα π.Χ.* Αντικείμενο της παρούσας μελέτης αποτελεί η παρουσίαση των διεθνών πολιτικών αντιπαραθέσεων μεταξύ των Ελληνιστικών ηγεμόνων του τρίτου και δευτέρου π.Χ. αιώνα μέσα από τη συγχρονική μελέτη της εικονογραφίας των βασιλικών νομισματικών κοπών της Ελληνιστικής περιόδου. Υποστηρίζεται ότι τα δύο κύρια ιδεολογήματα που απαντούν όχι μόνο στην Αντιγονιδική αλλά και στην Πτολεμαϊκή νομισματική εικονογραφία και σε άλλες μορφές τέχνης της εποχής, η σωτηρία των Ελλήνων από την Γαλατική εισβολή στη δεκαετία του 270 π.Χ. και η θαλασσοκρατία, αποκαλύπτουν ότι, παράλληλα προς την πρακτική χρησιμότητα των χρυσών και αργυρών νομισμάτων για τη διεξαγωγή χρηματικών συναλλαγών, η κυκλοφορία τους διαμόρφωνε ένα διεθνές δίκτυο διάδοσης πολιτικών μηνυμάτων στην Ελληνιστική Μεσόγειο. Η απεικόνιση του Πανός στο κέντρο Μακεδονικής ασπίδας στην εμπρόσθια όψη των αργυρών τετραδράχμων των Αντιγονιδών όχι μόνο παραπέμπει στην πανελλήνιας εμβέλειας νίκη των Ελλήνων επί των Περσών στον Μαραθώνα (490 π.Χ.) αλλά και υπογραμμίζει τη συμμετοχή των Μακεδόνων στην αντίσταση των Ελλήνων προς τους βαρβάρους εισβολείς κατά τη δεκαετία του 270 π.Χ. στους Δελφούς. Από την τελευταία απουσίαζαν οι Πτολεμαίοι, φερόμενοι ως προστάτες της ελευθερίας των Ελλήνων. Από την άλλη πλευρά, η Γαλατική ασπίδα που απαντά ως σύμβολο στην πίσω όψη των Πτολεμαϊκών αργυρών τετραδράχμων προφανώς παραπέμπει στην ανεπιτυχή ανταρσία των Γαλατών μισθοφόρων του Πτολεμαίου Β' το 275 π.Χ. Το σύμβολο αυτό, καθώς επίσης και η αναφορά ότι ο Πτολεμαίος Β' μαχόταν στο πλευρό του Απόλλωνα εναντίον των Γαλατών στον τέταριο ύμνο του Καλλιμάχου προς τη Δήλο, προδίδει ότι οι Πτολεμαίοι έσπευσαν να προβάλλουν (και ενδεχομένως να επινοήσουν) επεισόδια σχετιζόμενα με τις Γαλατικές εισβολές, προκειμένου να ανταποκριθούν στην πρόκληση των αντιπάλων τους. Με ανάλογους όρους, ο παραλληλισμός του Πτολεμαίου με τον Δία και του Γονατά με τον Ποσειδώνα, που επιχειρεί ο Σέξιος Εμπειρικός, αποτυπώνονται στις νομισματικές κοπές με την επιλογή του αετού ως συμβόλου στα Πτολεμαϊκά αργυρά τετράδραχμα και με την απεικόνιση της κεφαλής του Ποσειδώνα στην εμπρόσθια όψη του δευτερου τύπου τετραδράχμων που έθεσε σε κυκλοφορία ο Αντίγονος Γονατάς μετά τη ναυτική του νίκη επί των Πτολεμαίων κοντά στην Άνδρο (246 π.Χ.). Αργότερα ο Μακεδόνας βασιλιάς Περοέας, επωφελούμενος από την

παρακμή του Πτολεμαϊκού βασιλείου κατά τον δεύτερο π.Χ. αιώνα, τολμά να συνδεθεί με τον Δία, επιλέγοντας τον αετό ως νέο σύμβολο για την πίσω όψη των νομισματικών του εκδόσεων. Η ανανέωση των εικονογραφικών συμβόλων την εποχή αυτή αντικατοπτρίζει αποτελεσματικά την αναδιάρθρωση της διεθνούς ισορροπίας δυνάμεων, μέχρι την κατάληψη των Ελληνιστικών κρατών από τη Ρώμη.

Η ιδιαιτερη σημασία που φαίνεται ότι δόθηκε στις κοπές αυτές στα πλαίσια του διεθνούς πολιτικού ανταγωνισμού μπορεί ενδεχομένως να αποδοθεί στο ότι η νομισματική εικονογραφία συνέβαλλε ως ένα βαθμό στη διαμόρφωση της *opinionis communis* σε αυτές ακριβώς τις νευραλγικές περιοχές.

**Νικόλαος Χρ. Σταμπολίδης**, Από την Ελεύθερνα και το Ιδαίον: μια απόπειρα ερμηνείας χαμένων τελετουργιών, ΕΥΛΙΜΕΝΗ 6-7 (2005-2006), 183-205

*From Eleutherna and the Idaean Cave: an attempt to reconstruct lost rituals.* The material unearthed from the unplundered tomb A1/K1 in the necropolis of Orthi Petra at ancient Eleutherna which was in use between 880/60 and 680/60? B.C. offers a manifold contribution to the understanding of the Early Iron Age. Discussion here regards a bronze «shield» that was found inside the chamber of the tomb A1/K1 and its interpretation compared with other similar artifacts found in the Idaean Cave. To the find of Eleutherna is given a new interpretation as a “shield”-lid of an urn or primazely of a bronze cauldron which is also strengthened by the finds of similar cauldrons and shields from the Idaean Cave. Comparisons and interpretations of well known artifacts like the ceramic urnlids from Fortetsa and Ampelokipi as well as the mitra of Axos combined with the verses of the inscription of the Hymn to Zeus in Palaikastro may shed light to rituals at the Idaean Cave during the Early Iron Age.



## A MINOAN SHIPWRECK OFF PSEIRA ISLAND, EAST CRETE. PRELIMINARY REPORT

### INTRODUCTION

During underwater and geophysical surveys in East Crete in September of 2003 and June of 2004, a scattered cargo likely belonging to an ancient shipwreck of the Middle Minoan II period (1900-1700 B.C.) was discovered (fig.1). The ship was lost 4000 years ago off the islet of Pseira in the Bay of Mirambello, Lasithi Province, NE Crete, at a depth of around 50 m., and has a great significance for the study of Prehistoric seafaring. In this article we provide a brief history of Cretan seafaring and summarize what is known of Minoan ships so as to place this find in context. We describe the surveys that led to the discovery of the site, and provide a catalog of the most important finds.<sup>1</sup>

### OVERVIEW OF CRETAN SEAFARING

The history of Crete cannot be separated from the history of seafaring. As a prosperous and powerful island, it could have had neither economic nor military strength without the ability to transport goods and people by ship. Cretans were among the first to build ships and harbor installations, and Cretan harbors have been prize possessions for military powers from the beginning of history up through the present day.

Around 2000 B.C. the daring mariners of the Cycladic Islands in the Aegean Sea, were supplanted by their Cretan counterparts. The Minoans –called the Keftiu people according to the Egyptian records and the Bible<sup>2</sup>– learned the skills of shipping and navigation from the sailors of Syros, Melos, Naxos, Paros and the rest of the Cycladic Islands. Thucydides<sup>3</sup> refers to the legendary King of the island of Crete, Minos, as the first ruler of the seas, someone who created a great kingdom in the Mediterranean, rid the seas of pirates, and protected sea routes and trade.

Archaeological evidence attests that the Minoans were constructing their first palaces as they organized an impressive navy that expanded sea trade and commerce as far as Troy and Samothrace in the north Aegean, along the River Nile in the

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<sup>1</sup> The search for this Minoan ship would not have been possible without two grants from the Institute for Aegean Prehistory (INSTAP) and permits granted by the Central Archaeological Council, and Ministers of Culture Professor E. Venizelos and Dr. P. Tatoulis. We also thank the Mayor of Athens, Dora Bakoyanni, for assistance in obtaining permission for this project.

<sup>2</sup> Sakellarakis 1984, 197-203.

<sup>3</sup> *History of the Peloponnesian War*, 1.4

south, Miletos in Asia Minor, Byblos and Ugarit on the Syro-Palestine coast, and Mari in Mesopotamia.

A little after 1450 B.C. and after the eruption of the volcano at Santorini, the Minoan thalassocracy ended and the Mycenaeans from mainland Greece, who took over the island, came to dominate trade and commerce with the islands and the east.

The new Achaeans rulers adjusted themselves to the Cretan culture, so a new cosmopolitan era began, the Creto-Mycenaean civilization that lasted for roughly 250 years. Crete continued to play an important political and economic role in Mycenaean Greece, and even participated in the Trojan War with 80 ships. It remained an important center for trade with eastern Mediterranean and Egypt, although it had lost the grandeur of the past.

The shipwreck found at Cape Iria in the Gulf of Argolid dating to ca. 1200 B.C.<sup>4</sup> transported amidst Cypriot and Mycenaean cargo, eight stirrup jars from central Crete. A well known text from Ugarit reporting on the rich local merchantman Sinaranu traveling to Crete for business, as well as Minoan finds excavated in mainland Greece, Cyprus and the Syro-Palestinian coast, indicate the continuation of international trade relations during the Late Bronze Age, although at a lesser level.<sup>5</sup>

Furthermore, the presence of large stone anchors of eastern origin, either Cyprus or Ugarit found in Minoan ports on Crete, at Kommos<sup>6</sup> and in Chania<sup>7</sup> all dating to around 1300 B.C., provide additional direct evidence for large cargo ships on the north and south seas of the island.

Plutarch says that Theseus' ship had 15 oars on each side, and underwater archaeology suggests that their size was in the region of 15 m. long.<sup>8</sup>

Although Minoan ships might often be beached, and although most evidence has been destroyed by geological disturbances or overbuilding of Greek, Roman, Venetian, and modern harbors, some signs of Minoan proto-harbor installations remain. Rocky promontories and natural reefs projecting into the sea were flattened and lines of large boulders were constructed on top, in order to accommodate one port on either side. On the north coast of Crete, these are at Agia Pelagia, Nirou Hani, Mallia, Mochlos, Palaikastro and Pacheia Ammos, while on the south shores of the island facing the Libyan sea, there are signs of harbors at Kapetaniana, Trypeti, Makri Yialos and Koufonisia.

Following the invasion of the Dorian Greeks on the island of Crete and the invasion of the aggressive «Sea People» along Anatolia, Cyprus and the Levant, a complete collapse of the Creto-Mycenaean civilization occurred around 1100 B.C.

Crete returned as naval power during the Hellenistic era in the form of independent City-States. Harbors from this period are found at Phalasarna, Kisamos, Kydonia, Gavdos, Chersonesus, Olous, Itanos, Palaikastro, to mention only a few of the 30 harbor sites located so far by the authors on the island of Crete, including 25 coastal towns and 15 submerged sites. The one most extensively excavated is at

<sup>4</sup> Phelps, Lолос and Vichos 1999.

<sup>5</sup> Stambolidis, Karetou and Kanta 1998. For Sinaranu see Heltzer 1988, 7-13.

<sup>6</sup> Shaw 1995, 279-291.

<sup>7</sup> Hadjidaki 2004, 53- 60.

<sup>8</sup> Pulak 1998, 188-224, and Pulak 1999, 209- 238.

Phalasarna, on West Crete, which has been preserved due to the uplift of this part of Crete by 6.6 m above the sea in 365 A.D.<sup>9</sup> The harbor of Phalasarna is unique for it resembles a «cothon», an artificially excavated basin connected to the sea by a channel, an engineering traditionally attributed to the Phoenicians.

On the other hand, the uncovered port fortification towers and their adjacent walls<sup>10</sup> are in fact extensions of the city's defenses, thus fitting the description of ancient geographer Scylax, who called it a «limen kleistos.»<sup>11</sup>

Hellenistic Crete was not a center of great innovation or power, but it played a significant role in history. Cretans were particularly known as pirates and mercenaries, and they took part in most major naval battles between the descendants of Alexander the Great, although they chose not to participate in the Persian Wars.

However, the most significant activity of Cretans during this time was their participation in piracy. Together with the Cilicians, they were the most feared raiders in the Mediterranean. Crete's downfall came when in 88 B.C., pirates attacked Roman proquestor L. Licinius Lucullus as he sailed from Crete to Alexandria.<sup>12</sup> Simultaneously, Cretan pirates allied themselves with Mithridates VI, king of Pontus, in his war against Rome. The consequence was a series of military campaigns by Rome against Crete. The first, in 72 B.C., was a Cretan victory, but the second, in 67 B.C., resulted in the complete subjugation of the island. Crete remained under foreign occupation for 2000 years, until the revolution of 1905.

### SEARCH FOR MINOAN SHIPS

Although ships on Crete were probably never more significant than during the Minoan period, evidence for the size and construction of Minoan ships is very scarce. The most important representations are ships engraved on Minoan seals or depicted on frescoes, shown with a mast and square sail, 15 oars on each side, and an estimated length of up to 15 m. There is also a terracotta ship model of the MM II period in the Mitsotakis collection, and one made from alabaster of the LM period found at Agia Triada.<sup>13</sup>

A few prehistoric anchors have been found. H. Frost located what is probably a small anchor for use on sand at Mochlos.<sup>14</sup> Two large stone anchors were found on land at Mallia<sup>15</sup> and six more were excavated by J. Shaw at Kommos.<sup>16</sup> Three more large stone anchors were located in 1999<sup>17</sup> near Chania. The small size of most of these anchors is consistent with ships no more than 10-15 m. in length, but the final three anchors weight around 130 kg, and are consistent with larger vessels.

<sup>9</sup> Pirazzoli et al. 1992, 371-392.

<sup>10</sup> For a full account on the excavations at Phalasarna and possible comparisons with other ports see: Hadjidaki 1988, 463-479; Frost 1989, 15-17; Frost and Hadjidaki 1990, 513-527; Hadjidaki 1996, 53-64; Hadjidaki and Iniotakis 2000, 54-73; Hadjidaki 2001, 155-166.

<sup>11</sup> Skylax, 47 in GGM I, pp. 42; Dionysios Kalliphontis, 120, GGM I, pp. 242.

<sup>12</sup> Appian *Mithr.* 33; Plut. *Luc.* 2

<sup>13</sup> Δαφέρας 1984, 55-95, pl. 6α-β, fig. 1; also MGC, 107-108.

<sup>14</sup> Frost 1963, 38.

<sup>15</sup> Frost 1963, 46, pl. 8.

<sup>16</sup> Shaw 1995, 279-291; Shaw and Shaw 1995, 8-14; Wachsmann 1998, 279-283.

<sup>17</sup> Hadjidaki 2004, footnote 6, 60.

Otherwise, no direct archaeological evidence of Minoan ships has previously been found.

### GEOPHYSICAL SURVEY IN 2003

In 2003, we initiated a search for prehistoric shipwrecks, aiming to conduct a preliminary evaluation of their condition, and to plan future excavation on the most promising site. Thus a deep underwater archaeological and geophysical survey was carried out in the region of the Gulf of Mirambello, around the islands of Pseira, Dionisades, Paximadi and the sea across from Sitia, during the month of September 2003. This is only a preliminary survey for which we have a permit and it is far from complete.

The sea in these areas is typically deeper than 100 m., but the sedimentation rate is, according to geologists, as low as 2 cm every 1000 years. For this reason, shipwrecks were expected to be preserved, as wave action would not have affected them. Furthermore, they would not be so deeply buried as to become impossible to find.

The investigation began with geophysical investigations in cooperation with Professor George Anastasakis and a team from the Department of Geology at the University of Athens. They employed a side scan sonar that had an acoustic sensor of 200 m. sweep width. This tow fish scanned the seafloor as it ran up and down along its computer-controlled track lines. We also had a record of the size and depth of the objects. A Multi Sea Beam unit allowed us to obtain accurate sea bottom profiles.

Over 20 targets were located in the vicinity of the islands and the waters of the Lasithi region at depths up to 120 m. Three of them turned out to be airplanes, probably from the Second World War. The sea floor in most areas was sandy or muddy, and frequently we could see gouges left by nets of deep-sea trawlers. The destruction of the sea floor from this type of fishing is unbelievable.

It is very unlikely that all the targets located were shipwrecks, although a certain number of them may be so. In the limited time of three weeks available in 2003, it was impossible to investigate all of them. That is a project for the near future.

Therefore, in a second phase of investigation, we turned to a team of deep-sea divers.<sup>18</sup> We chose 6 probable targets that had given very strong signals, and which seemed most promising to our team. Five of them proved to be mounds of sunken stones or geological formations. One corresponded to a shipwreck, which had a chain and iron anchor, and which we dated to recent times, probably after 1800. The shipwreck is found in the crossing between Pseira Island and the shore of north-east Crete at the depth of 47 m. (fig. 2).

While the geophysical team was analyzing its results, we decided to make use of archaeological experience, and dive in a deep-water bay between Pseira Island and the northern shore of east Crete, where side-scan sonar could not operate effectively due to the rocky sea bottom. Along the steep rocky shores of this bay, a maritime

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<sup>18</sup> These were led by Giorgos Klontzas, with divers Kostas Kirsanof, Nikos Koutoulakis, and Nikos Golfis, working from a 20-metre wooden sponge-diving boat, AGIOS GEORGIOS equipped with gas compressors, decompression chamber, and other equipment.

settlement of the Minoan period had been excavated by R. Seager,<sup>19</sup> P. Betancourt, and K. Davaras.<sup>20</sup>

Pseira Island was first inhabited in the Final Neolithic period, and by the Middle Bronze Age it had a substantial town. Houses were on a peninsula that overlooked a small but sheltered harbor. It is likely that the residents were seafarers as well as farmers because many of the items needed by the community were not produced on the island itself; the Pseirans must have traveled back and forth regularly to the many towns along the northern coast of Crete. The inhabitants of Pseira probably did not make any of their own pottery because the island had no clay, and water and fuel were probably scarce. Most of the pottery found in the Pseiran buildings was imported from nearby parts of Crete, especially the large town at Gournia. Only tiny amounts were brought in from farther away.

One of the objects located during the 1991 land excavations of Pseira, was a small seal, one of whose sides depicts a ship.<sup>21</sup> The seal indicates a ship with a single mast connected to the vessel through ropes at both ends, but depicts no oars. It has a high bifurcated stern and a beak-shaped prow, which might indicate a special beak-and-ram- like fitting.

These observations offered assurance that Pseira Island had been visited frequently by trade vessels in Minoan times, and provided the impetus to conduct a careful search in the nearby waters.

North of Pseira towards the Cretan Sea, there is an underwater fissure reaching a depth of 270 m., although otherwise the depth of the sea in the crossing is between 70-90 m. After several days of investigation, we located a high density of Minoan pottery, too far from the shore to have fallen from the site. We resolved to return in 2004, and thanks to continued funding we were able to do so.

## SURVEY IN 2004

We came back to Pseira in May/June of 2004 with a new set of technologies, and the aim of locating and mapping the most probable site of a Minoan ship.<sup>22</sup>

In the first phase of our investigation, we employed a Remote Operated Vehicle (ROV, **Fig. 3**), connected to the surface by a tether, and collected video images along a number of transits (**Fig. 4**). Careful examination of the video revealed a number of Minoan vases at the sea floor. However, the ROV was available for only four days due to budgetary constraints, and the great bulk of the survey work was performed by divers.

The team of divers led by Mr. Klontzas returned in 2004. His divers are accustomed to diving in depths of up to 120 m. using helium and other gases rather than ordinary atmospheric air. Such dives last up to 5 hours, including decompression time. Following the 4 days in which we had use of the ROV, we spent another 3 weeks

<sup>19</sup> Seager 1910.

<sup>20</sup> Betancourt and Davaras 1995-2005 [I-IX].

<sup>21</sup> Betancourt and Davaras 1995-2005 [III], pl. 15.

<sup>22</sup> The scientific team consisted of 4 diving archaeologists (M. Kanta, G. Frangou, Y. Garantonakis, & E. Hadjidaki), a Professor of Physics (M. Marder), a Marine Biologist (Dr. Kostas Frangoulis), and a diving photographer (Yiorgos Tzanakis). Engineer Marinos Pittas operated the ROV.

exploring the site with our divers and diving archaeologists. Our goal was to have a thorough visual inspection and to provide a first map with locations of artifacts. In order to produce a map, we used a simple system that will be sufficient to find the location of each object again. The divers were equipped with a voice communication system and a balloon (**Fig. 5**). When they reached an object, they read out an object label-number and placed the balloon directly overhead. A surface team on a small boat marked the spot with a GPS unit. There are two sources of inaccuracy in this procedure: First, balloons did not always rise exactly straight up due to the sea currents. Second, ordinary GPS is only accurate within around  $\pm 3$  m.

Nevertheless, the resulting map is accurate enough that we are able to locate objects again, which is the primary consideration (**Fig. 6**).

#### **FINDS IN 2003 AND 2004**

We located a total of over 60 vases during 2003 and 2004. Of these, 21 were removed in 2003 and 9 in 2004 for protection and further investigation. Considering the damage that is being done to the seabed by trawling in this part of the Aegean, raising and preserving vases considered to be at risk is an important contribution of the current project.

The pottery found underwater near Pseira is similar to vases excavated from the large Minoan town on the island. Most of the pottery from under the sea is Middle Minoan from this part of Eastern Crete. The best parallels for most pieces come from the MM towns that were situated along the northern coast at the Isthmus of Ierapetra and along the eastern shores of the Gulf of Mirabello.

The pottery found under the sea comes from two contexts, one close to the island and the other farther away from shore. Because the two deposits are separated by a 30-40 m. wide undersea ridge that has no pottery on it (**Fig. 7**) and that would have prevented anything from the town from eroding to the more distant location, the two deposits must have different explanations. The deposit close to Pseira Island may represent material that collapsed into the sea from the land (**figs. 8-9**), but the vases found beyond the ridge are almost certainly from a shipwreck.

#### **POTTERY VESSELS FROM THE SHIPWRECK**

The vases from the shipwreck form a concentration of whole vessels on the seabed. Their surfaces are missing because of the reaction with the seawater, but the shapes compare closely with Minoan vessels from the Gulf of Mirabello region, (**Fig. 10**) illustrates vases from the shipwreck in comparison with vases from nearby Gournia. The two hole-mouthed jars compare closely with a MM IIB to LM IA example excavated from the town on Gournia. For transport, the four small handles would be used to hold the string that tied on a leather cover. Two jugs from the shipwreck are local, East Cretan vases that could be used both for storage and transport because they have circular necks that could be easily sealed by inserting cylindrical wooden stoppers made from tree limbs into the vessels' narrow mouths. Their date is MM IIB or slightly later.

## CATALOGUE

03/22. Hole-mouthed jar, almost complete. Height 47.8 cm. Short raised rim; piriform shape with large base; two horizontal and two vertical handles on upper shoulder. Medium coarse clay. Surface mostly missing (**fig. 10** and **fig. 11**).

*Comments:* Hole-mouthed jars are storage vessels. A fabric or leather cover would have been placed over the mouth, and it would have been tied on firmly with cord by using the handles. Examples are known from Pseira,<sup>23</sup> and Kato Zakros.<sup>24</sup> The vases were used from MM II until LM I.

03/23. Hole-mouthed jar, almost complete (handle missing). Height 42.6 cm. Short raised rim; piriform shape with large base; two horizontal and two vertical handles on upper shoulder. Medium coarse clay. Surface mostly missing (**fig. 10** and **fig. 11**).

03/15. Jug, complete except for tip of spout. Height 19.2 cm. Low spout; piriform body. Medium coarse clay. Surface completely missing (**fig. 10**).

*Comments:* Jugs of this type with wide bases, piriform bodies, and low spouts are known from the local ceramic production of MM IIB in the region of the Gulf of Mirambello. Similar examples come from Gournia.<sup>25</sup>

03/12. Jug, almost complete. Height 18.7 cm. Low raised spout; globular body. Medium coarse clay. Surface completely missing (**fig. 12** and **fig. 13**).

*Comments:* This jug has a higher and more pointed spout than no. 03/15. A similar shape is known from Gournia.<sup>26</sup> The date is from MM IIB to LM IA.

## POTTERY VESSELS FROM NEAR THE ISLAND

The underwater deposit of pottery from near the Pseiran peninsula with the Minoan town has been recorded previously. In the mid-1950s, a synergasia between Sinclair Hood, Nicolas Platon, and John Leatham raised several whole vessels from this deposit.<sup>27</sup> In 1976 Jacques Cousteau dived on the site in collaboration with Dr. Lazaros Kolonas, raising additional vases.<sup>28</sup> Leatham and Hood regarded the pottery as material that fell into the sea from the town and eroded down the slope under the sea, while Cousteau thought the vases near Pseira were from a shipwreck sunk by a tsunami caused by the eruption of Thera. A few stone blocks in the underwater deposit contribute to the conclusion that the vases came from houses in the town that collapsed into the sea.<sup>29</sup>

The pottery pieces mostly consist of whole vessels, with a few fragments as well. Most of the vases have very little of their original surfaces preserved, and their dates must be based on shapes and fabrics.

<sup>23</sup> Banou 1995, 33-41, no. ADC 14; for Gournia, see Betancourt and Silverman 1991, no. 617.

<sup>24</sup> Πλότον 1965, 187-224, pl. 241B

<sup>25</sup> Betancourt and Silverman 1991, nos. 644-645.

<sup>26</sup> Betancourt and Silverman 1991, no. 382.

<sup>27</sup> Hood 1955, 35; Leatham and Hood 1958-1959, 275-278; Frost 1963, 103-104; Δαβάρας 1976, 373-382, pl. 297.

<sup>28</sup> Cousteau 1978. We are obliged to Dr. Kolonas for allowing us to read the diaries kept during the survey.

<sup>29</sup> For additional discussion of this earlier work, see Betancourt 2004, 73-75.

The pottery from this deposit consists of carinated cups, jugs, jars, amphoras, and a few other shapes. The vessel shapes suggest the pieces are mostly from MM IIB to MM III, with a few earlier vessels. The earliest vase is an example of Vasiliki Ware from Early Minoan IIB. The latest piece is an amphora from MM III.

#### CATALOGUE

03/20. Carinated cup, complete except for handle. Height 7 cm. Cylindrical upper part with horizontal grooves and conical lower part. Fine, pale clay; black slip, inside and out (**fig. 12** and **fig. 13**)

*Comments:* Carinated cups with grooves on the upper parts are characteristic of the deposits buried in the destructions at the end of MM IIB in eastern Crete. The date is established by examples from House A at Vasiliki.<sup>30</sup>

03/21. Carinated cup, complete except for part of handle. Height 5.4 cm. Cylindrical upper part without grooves and conical lower part. Fine, pale clay; black slip, inside and out (**fig. 12** and **fig. 13**)

*Comments:* Carinated cups are used from MM IB to MM IIB.<sup>31</sup>

03/6. Jug, upper part. Preserved height 18 cm. High, raised spout; clay pellets on sides of spout. Typical Mirabello Fabric with fragments of stone in the granodiorite-diorite series. Traces of mottled slip; Vasiliki Ware (**fig. 12** and **fig. 13**).

*Comments:* The beak-spouted jug with mottled red to brown to black slip is one of the definitive vases for EM IIB Vasiliki Ware. Many examples exist from the sites around the Gulf of Mirabello.<sup>32</sup>

03/7. Jug, mostly complete. Height 20.2 cm. Low, almost horizontal spout; wide mouth; globular body. Medium coarse clay (**fig. 14** and **fig. 15**)

03/9. Jug, intact. Height 27 cm. Low spout; narrow mouth; piriform body. Medium coarse clay (**fig. 14** and **fig. 15**)

03/10. Jug, intact. Height 10.5 cm. Low, small spout; piriform body. Medium coarse clay (**fig. 14**)

03/1. Oval-mouthing amphora, upper part. Preserved height 33.2 cm. Elliptical rim; two handles; piriform shape. Medium coarse clay. Surface mostly missing (**fig. 14** and **fig. 15**)

*Comments:* Oval-mouthing amphoras are common storage and shipping containers in MM Crete.

03/4. Oval-mouthing amphora, complete. Height 36.3 cm. Elliptical rim; two handles; tall, slim shape. Medium coarse clay (**fig. 14** and **fig. 15**)

*Comments:* Slim amphoras of this type are most common in Central Crete<sup>33</sup>. Their date is MM III.

<sup>30</sup> Seager 1906-1907, 123-126.

<sup>31</sup> Walberg 1976, Form 4; Walberg 1983, Forms 234-241.

<sup>32</sup> Betancourt 1979.

<sup>33</sup> For Knossos, see Evans 1921-1935 [II], fig. 176d-e; for Phaistos, see Levi 1976, pl. 188, a-d; for Kommos, see Betancourt 1990, no. 610.

## CONCLUSIONS

Despite the fact that through the centuries thousands of ships have sunk in the Aegean, Cretan and Libyan Seas, the location of even a single Minoan ship remained no more than a dream for researchers in archaeology and ship construction.

Therefore, the location of the scattered cargo we have described here, in very good condition despite remaining for thousands of years underwater, marks an important moment, and gives hope that some part of the ship itself may remain. We note that all the vessels recovered from the shipwreck site are consistent with a single date (MMIIB), as one should expect from a single cargo. We look forward to continuation of this project, and expect that with excavation of this site much more can be learned about Minoan cargoes and ship construction.

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Fig. 1 Diver with hole-mouthed jar 22.



Fig. 2 Ancient maritime settlement on Pseira Island.

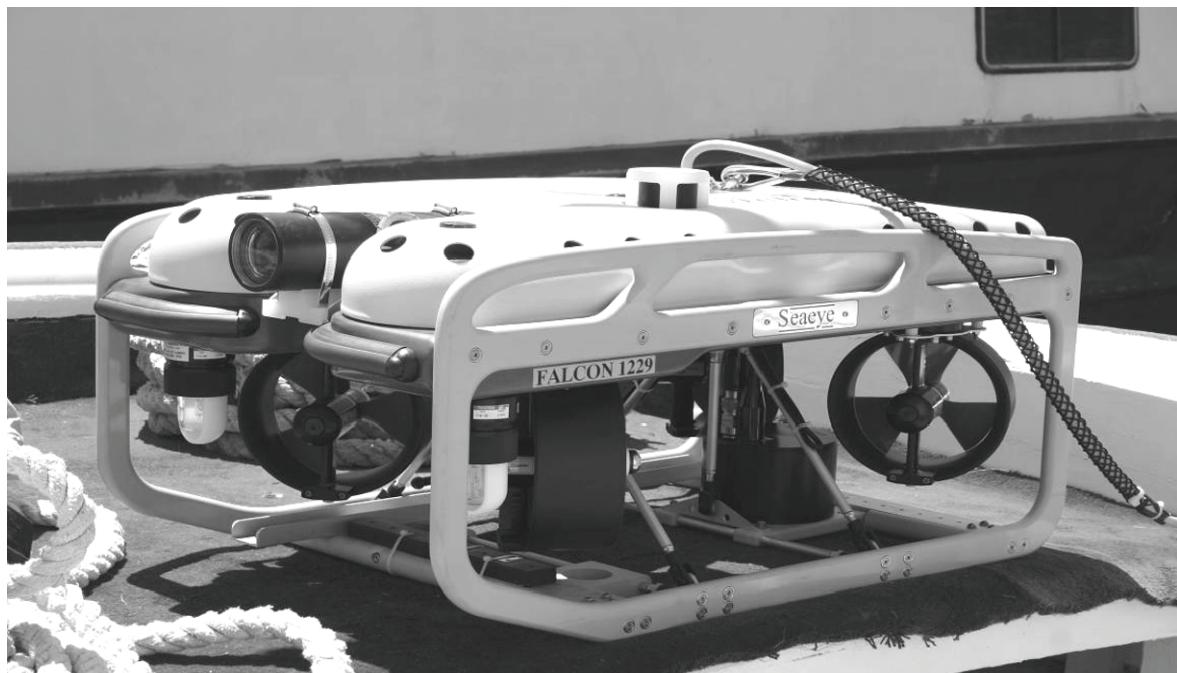


Fig. 3 Remote Operated Vehicle used in 2004 survey.

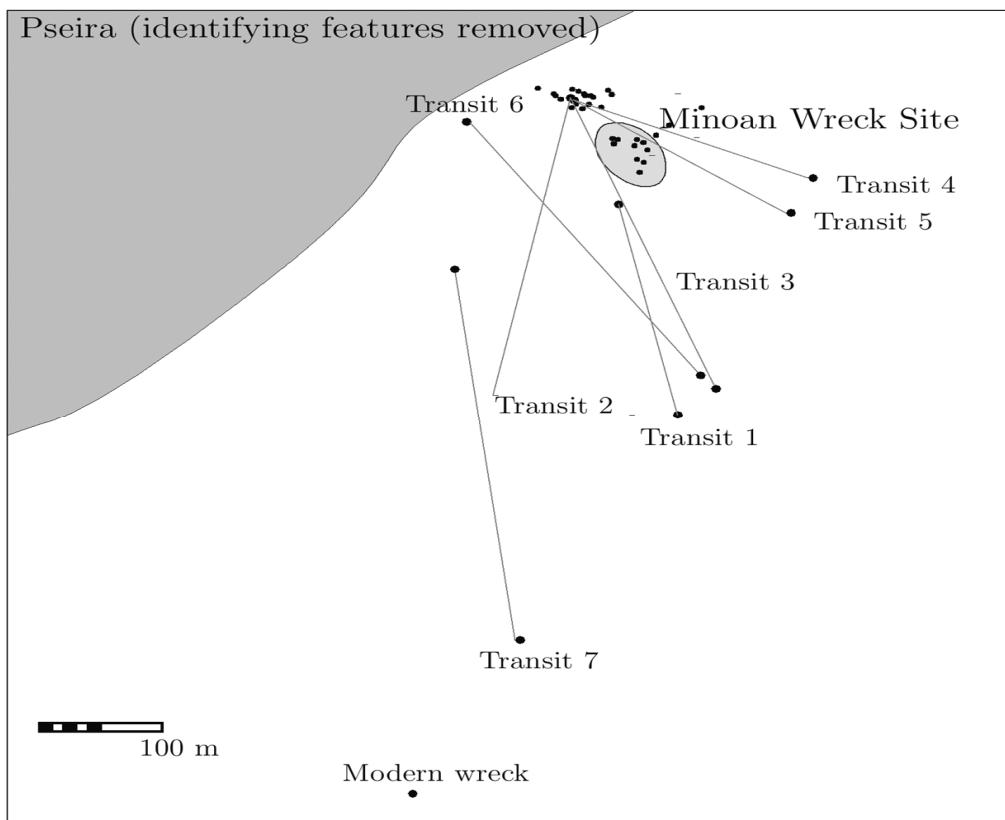


Fig. 4 Overview of ROV transits in 2004 and Minoan wreck site. The distance to Pseira and shape of Pseira are not correctly indicated.



Fig. 5 Diver with voice communication system and video camera.

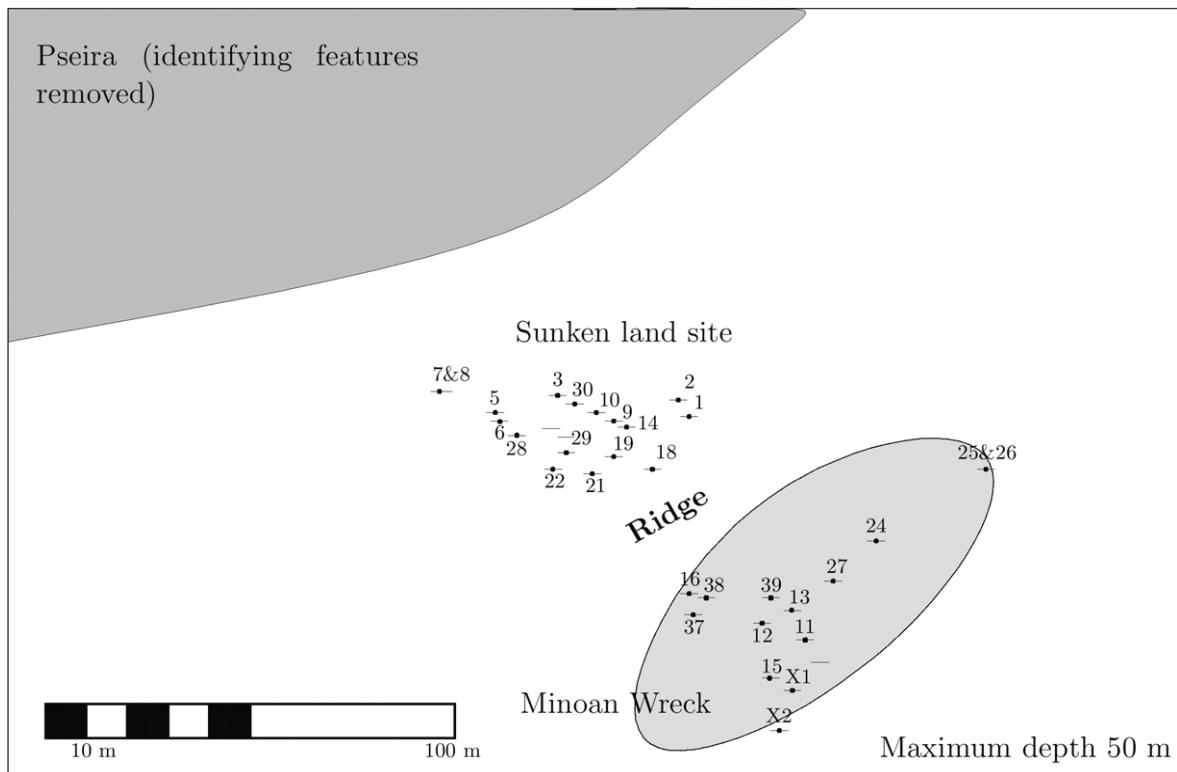


Fig. 6 Map of underwater features and Minoan wreck.



Fig. 7 Portion of ridge, free of pottery, that separates items fallen from land and shipwreck site.



Fig. 8 Vessel found near land, and fallen from land site.

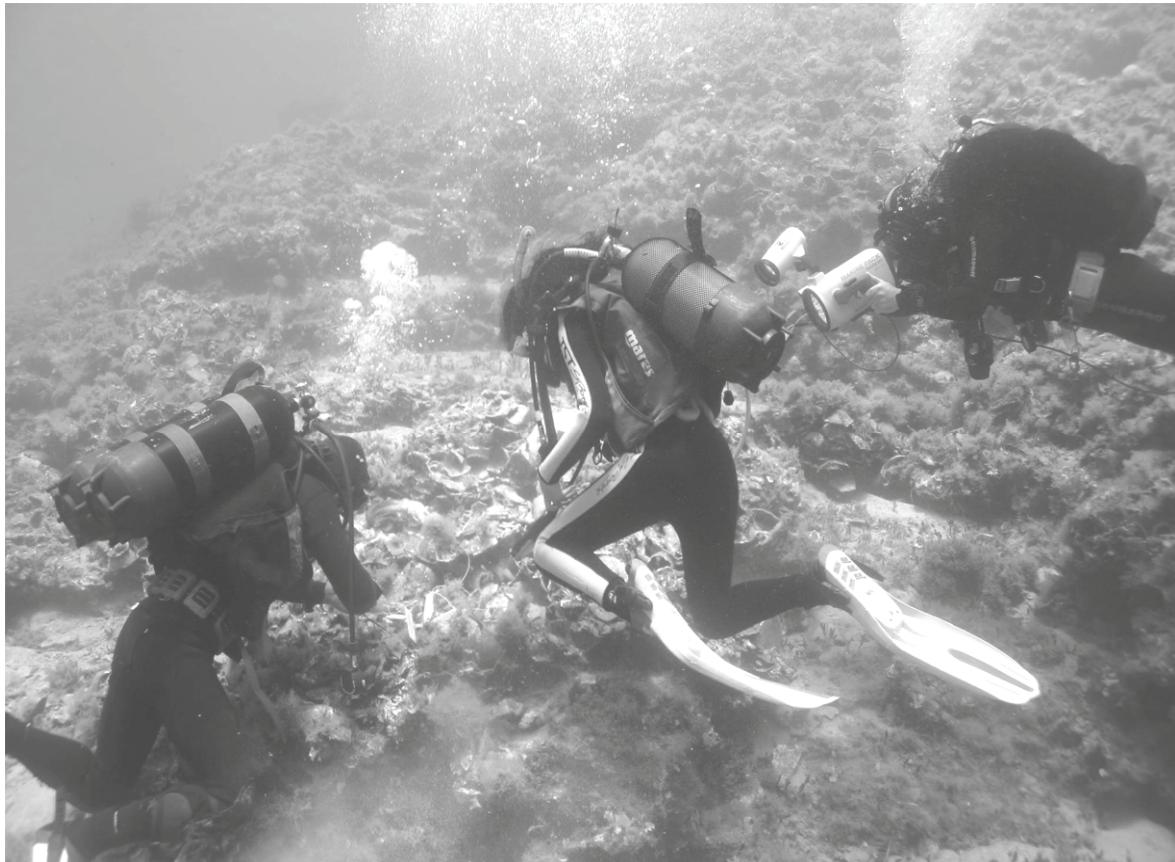


Fig. 9 Divers in vicinity of sunken land site

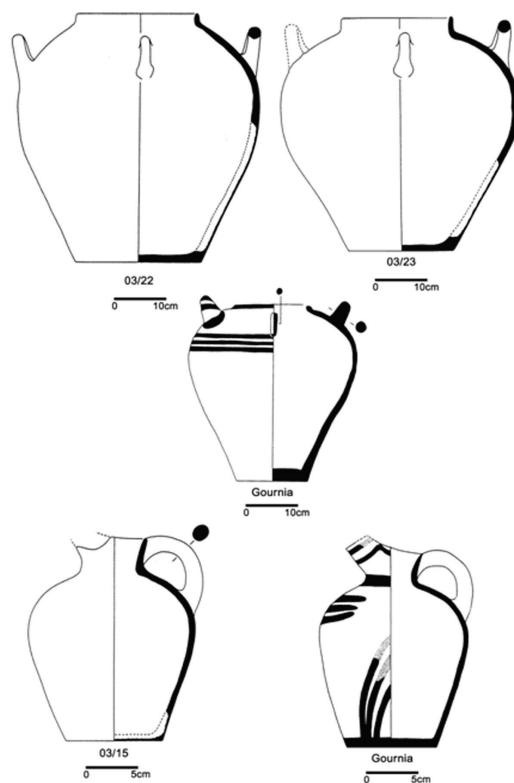


Fig. 10 Hole-mouthed jars 03/22 and 03/23. Hole mouthed jar from Gournia, after Betancourt and Silverman 1981, no. 617. Jug no. 03/15. Jug from Gournia, after Betancourt and Silverman 1981, no. 382.



Fig. 11 Hole-mouthed jars 03/22 and 03/23.

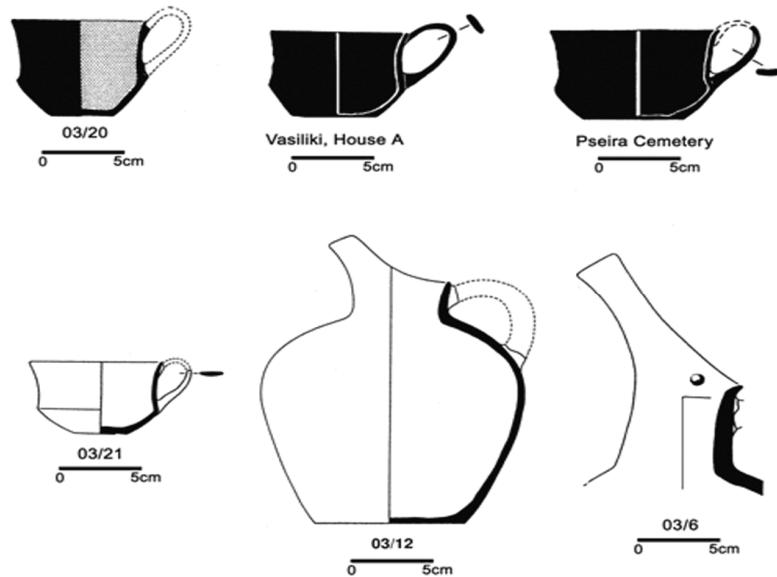


Fig. 12 Carinated cup no. 03/20. Carinated cup from Vasiliki, after Betancourt and Davaras, eds., 2002, p. 36. Carinated cup from Pseira, after Betancourt and Davaras, eds, 2002, no. 264.  
 Carinated cup no. 03/21. Jug no. 03/12. Jug no. 03/6.



Fig. 13 Carinated cup nos. 03/20 and 03/21. Jug no. 03/12. Jug no. 03/6.

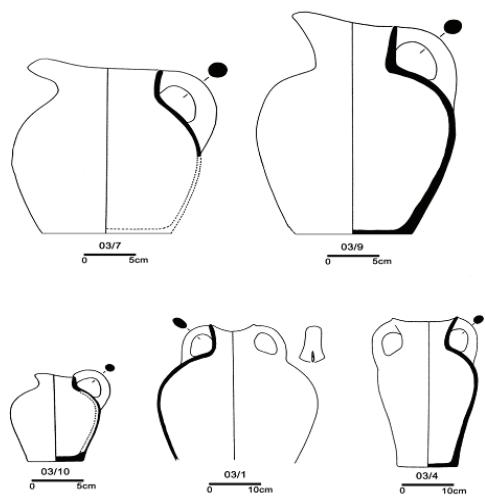


Fig. 14 Jug no. 03/7. Jug no. 03/9. Jug no. 03/10. Amphora no. 03/1. Slim amphora no. 03/4.

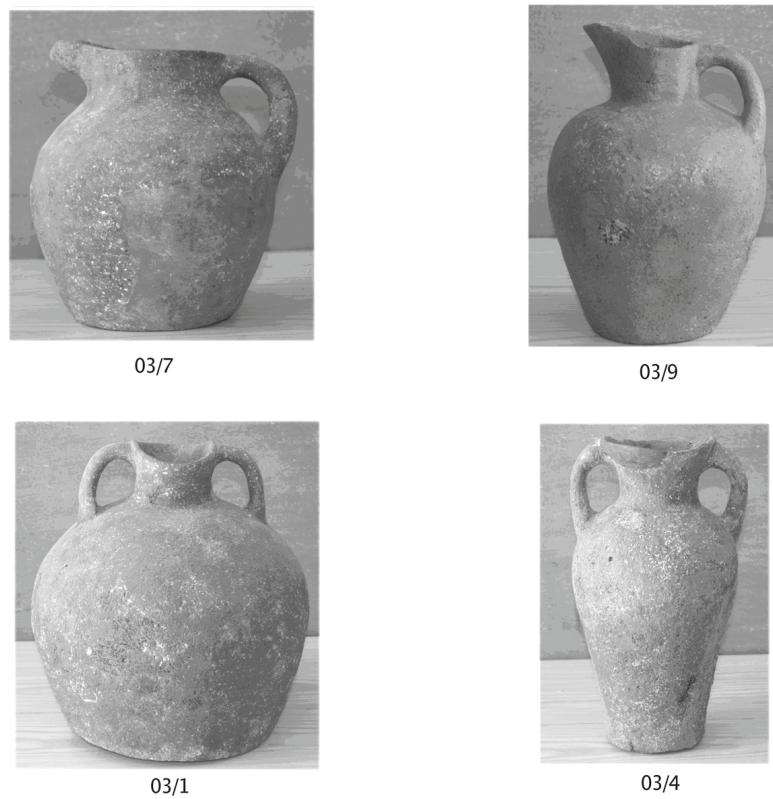


Fig. 15 Jug no. 03/7. Jug no. 03/9. Amphora no. 03/1. Slim amphora no. 03/4.