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ΑΡΧΑΙΟΛΟΓΙΚΟ ΕΡΓΟ ΚΡΗΤΗΣ 3

Πρακτικά της 3ης Συνάντησης Ρέθυμνο, 5-8 Δεκεμβρίου 2013

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ΠΑΥΛΙΝΑ ΚΑΡΑΝΑΣΤΑΣΗ
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Crete Project 2011: Underwater archaeological survey at the area off Heraklion and Dia Island.

A PRELIMINARY REPORT

THEOTOKIS THEODOULOU, BRENDAN FOLEY, DIONYSIS EVAGGELISTIS, GEORGE KOUTSOUFLAKIS, DIMITRIS SAKELLARIOU & ALEXANDROS TOURTAS

From September 22 to October 20, 2011 the Ephorate of Underwater Antiquities (EUA) and Woods Hole Oceanographic Institution (WHOI), along with Hellenic Center of Marine Research (HCMR) conducted an extended underwater archaeological survey at the area of the Gulf of Heraklion, limited to north by Dia Island. WHOI put in disposal of the project a Remus 100 AUV, operational to 100 m depth, equipped with a Side Scan Sonar DF 300/188 khz and a downward looking video camera. HCMR provided research vessel *Alkyon*, equipped with a multibeam, a sub-bottom profiler and a CTD, that was used as Remus 100 operational base. Thanks to the integrated operations of the above

means an area around thirty square kilometers was surveyed and mapped in detail (fig. 1) off Heraklion and the southern part of Dia. At the same time divers with SCUBA diving gear surveyed the southern, eastern and part of the western side of Dia, an area 11 km long. Beside SCUBA equipment divers were also using Pegasus thrusters as propulsion vehicles. Moreover, two archaeologists of EUA and three of WHOI personnel were trained during



Fig. 1: Map of the area surveyed off Heraklion and Dia Island during Crete Project 2011.

the project to the use of Closed Circuit Rebreather (CCR) diving¹ in order to use it in future projects. Underwater video cameras (SONY) and still digital cameras (Nikon D300) were used for recording antiquities located and operations.

Heraklion Port Organization put in the team's disposal a space at its installations at the Venetian Harbour, which was used as base, where equipment was kept during the project. Pancretan Union of Inflatable Vessel Owners also

¹ The training was in Sentinel CCR and was employed by Phil Short. T. Theodoulou, G. Koutsouflakis and D. Evaggelistis were trained from EUA, though D. Evaggelistis did not manage to conclude the training due to health issues with his waist. B. Foley, Ed O'Brian and P. Lohmann were trained from WHOI. A. Stergiou from EUA and volunteer archaeologist A. Tourtas were also participating as divers and G. Backard and M. Purcell operated successfully Remus 100. From HCMR apart of D. Sakellariou biologist S. Kalogirou and geologist G. Chatiris also took part in the project. To all of them and the crew of Alkyon we would like to express our sincere thanks for their professional work under difficult conditions.

offered a vessel with its pilot, Manolis Stefanakis, that was used for diving operations. CCR training took place at Divers Club Crete of Dimitris Drakos, in Hagia Pelagia bay. The samples recovered were stored in 23rd Ephorate's of Prehistoric and Classical Antiquities storerooms,² where desalination of them employed.

The weather was not always helpful despite the forecast based in previous years weather during the same time period. Thus, the team frequently faced northern winds. Nevertheless, diving could be carried out even during windy days at the southern protected bays of Dia.

Finally, eight shipwrecks were located, four unknown ancient ones, one known from 1976 Cousteau mission to Crete, and three modern ones. Apart from shipwrecks three anchorages were studied in Agrilia and Hagios Georgios bay at Dia, as well as Hagia Pelagia west of Heraklion. Shipwrecks were numbered by the order of location, studied, photographed in order for photomosaics to be produced and sampled for further study.

Shipwreck 1

The cargo of a Late Roman shipwreck was located on the rocky slope of the western cape of Kapari bay. The coast is a steep cliff from the surface down to the contour of 15 m. From then on there are sandy pockets on the rocky slope until around 40 m, where the sandy seafloor is met, inclining to the southeast. The cargo is dispersed on the slope from 18 to 25 m in an area 15-20 m long. Due to the rocky configuration of the seabed and the small depth the amphorae are all broken. It is possible that the ancient ship crashed on the coast and sank.

In the middle of the wreck site there is a huge part of vertical net stacked on the rocks indicating the fishing activity in the area.

The amphorae belong to the Late Roman 13 type (fig. 2), which are generally considered of Aegean provenance, products of late 6th/ early 7th c. AD (Riley 1979, 231-232; Peacock & Williams 1986, 208-209; Bass & van Doorninck 1982, 157-160; Demesticha 2005). Three samples were recovered from the site, a Late Roman 2 amphora upper part, lacking the base, the lower part of a flat base smaller vessel and part of a rim from a cooking pot with its handle attached. The two latter consist possibly crew utensils while the amphora represents the cargo of the ship.

² To all of them we also express our gratitude.



Fig. 2: Late Roman 13 amphora from the cargo of Shipwreck 1.

Shipwreck 2

The second shipwreck site was located at the area of Aginara, at the eastern side of Dia. The underwater configuration of the cape is rocky gradually inclining to the south with sandy pockets. From 10 to 28 m a large dispersion of broken small amphorae indicates a shipwreck site. The main concentration is very extended, covering several steps (terraces) of the rocky bottom in a large area more than 40 m in width at the contours between 17 and 25 m. That makes photomosaicking of the site a very difficult task. Isolated fragments can also be found from 7 to 35 m. The shipwreck site is heavily disturbed by divers with several amphorae relocated from their original position and posed on purpose on top of rocks. No intact vessels, nor ship and rigging components were located, though it is not impossible such elements to be found buried under the sand.

Among the cargo more than six variations of small amphorae were observed beside other pottery finds, like fragments of a pithos and fragments of table ware. The amphorae seem generally small, no taller than 0.5 m. They have small arched handles ending either on a short neck or directly under the rim on the shoulder (fig. 3). Necks do not exist in all variants. Rims are of ring type, banded or strait continuing the neck. Although there are no complete samples located or recovered, it seems that bases are hemispherical and the

bodies are either globular or oblong, or even oblong bodies in some cases. Not exact parallels were found during initial study, but the pottery of the cargo can be attributed to the chronological horizon of the end of the 1st millennium AD, bringing in mind Bakirtzis' (Μπακιρτζής 2003, fig. 17) 2nd variety of Byzantine amphorae (μαγαρικά), dated to 9th to 11th centuries. At the same time the handle - neck shapes of the amphorae may also remind Roman Cretan amphorae relevant shapes of types AC1, AC2, AC3 (Marangou-Lerat 1995). Given the fact they are in Crete, that could mean a local production.

At the same time intrusions of other periods were also located at the wrecksite, like a Knidian amphora (Grace 1979, fig. 36; Alpözen, Berkaya & Özdaş 1995, 89), a Forlimpopoli/Agora K 114 (Sciallano & Sibella 1991, 39), a Late Roman "pear" shaped body, etc.



Fig. 3: Two of the amphora necks of Shipwreck 2 *in situ*.

It is obvious that the area apart from a wreck site was also an area used as temporary refuge in case of western winds and these finds can be considered as jettisons.

Shipwreck 3

The third shipwreck was located at the eastern side of Panagia or Mesaios bay. This site was in fact firstly located and excavated during legendary Captain Cousteau and Ministry of Culture and Sciences mission in Crete in 1976. It was then, when Captain Cousteau was invited in Greece by the Greek Tourism Organization to explore underwater sites and promote the country through his documentaries. In this frame an excavation was conducted at Hagios Georgios bay under the supervision of archaeologist Charalabos Kritzas and six sites were named as shipwrecks sites although just four of them can really be attributed to shipwrecks. One of them was Shipwreck IV that was excavated under the supervision of archaeologist Lazaros Kolonas who kept a very detailed diary of the operations.3 All the surface objects, namely amphorae, were recovered, as well as those of the first pass under the surface. Cousteau's team stopped operations when they reached a stratum of concreted amphorae. All of the finds, 357 objects, are stored in Koules Venetian Castle at Heraklion Port. That was the reason that no more samples were recovered during 2011 mission. What was recovered in 1976 was mostly Rhodian amphorae and some samples of other types of amphorae, no more than ten.

The steep side of the cliff of the western cape of Panagia bay continues underwater down to the contour of 25-30 m. From then on there is the sandy seafloor with large "steps" towards the east. On the first couple of these "steps", inclining from 25 to 33 m an assemblage of broken amphorae exists. It covers an area around 15×20 m. It is obvious that what was left in 1976 has been disturbed. Big parts of broken amphorae show the divers' effort to detach them from the concreted cargo (fig. 4).

Main and possibly only cargo of the ship was Rhodian amphorae (fig. 5), with a simple rounded rim, cylindrical neck and distinctive long single rod handles which rise to a sharp peak, while the body tapers to end in a solid spike. This type of amphora developed from late Hellenistic prototypes by the end of 1st c. BC and lasted until the early 2nd c. AD. The type is occurred all over Aegean, Cyrenaica, Italy, France, Germany and Britain and is considered as a container of Rhodian wine (Panella 1973; Riley 1979; Peacock & Williams 1986; Peacock 1977). The strongly curved shape of the handles and the presence among the cargo of: [a] a Late Roman 7 amphora, in circulation from 1st to 4th c. AD (Peacock & Williams 1986, 204-205), [b] a Mana C2c type amphora, in circulation from 1st BC to 1st AD (Peacock & Williams 1986, 151-152), [c] a Pseudo-Koan, in circulation from 1st BC to 2nd AD (Peacock & Williams 1986, 107-108), and [d] a North Peloponnesian/Greek Brindisian (Lawall *et al.*

³ The information given derives from L. Kolonas Diaries (two volumes), kept at the Archives of the Ephorate of Underwater Antiquities.



Fig. 4: View of Shipwreck 3 (Cousteau IV) underwater site. Divers in CCR diving gear.



Fig. 5 : Amphorae from Shipwreck 3 (Cousteau IV) in Koules Venetian Castle storerooms.

2010, 396) or Sykionian A (Trainor 2012) type amphora, in circulation from 2nd to 1st c. BC may indicate the late 1st or even early 2nd c. AD for the chronology of the shipwreck.

Shipwreck 4

The forth shipwreck was located south of Cape Korakia at the eastern side of the western cape of Hagios Georgios bay. The cliffs there are almost vertical down to 39 m. From then on the sandy flat bottom extents to the west interrupted by areas with large rocks. Near the cliff at the two sides of a rocky patch a bigger and a smaller heap of mainly broken amphorae indicate a wreck site (fig. 6). Big shards and oblong pointed amphorae bodies are also dispersed around



Fig. 6: View of a channel at the northern side of the submerged breakwater in Hagios Georgios bay, possibly for ship launching.

almost intact, just lacking handles or necks. Local diver Theodoros Sphantos, who informed the team about the presence of the shipwreck somewhere at the eastern site of the cape, remarked that he remembers also intact amphorae laying on the seabed. He may mean those bodies or others that have been looted. The main assemblage, measuring 7-8 m by 2-3 m seems like the place where the ship landed after she probably hit the rock of the cape in an attempt to find shelter inside the bay (?). The general picture of the wreckage gives the impression that part of the cargo is still buried under the sand.

The two amphorae neck samples recovered (fig. 7) from the diving team during the only one dive that took place at the site could be attributed to the Rhodian type with the distinctive long single rod handles rising to a sharp peak, similar to the ones of Shipwreck 3 (see above). However, there are differences at the handle which is thicker, more curving and with sharpen peak on top. These features are quite similar to Cretan type amphorae AC4 (Maragou-Lerat

1995, fig. 81; Sciallano & Sibella 1991, 94 Crétoise 4/Dressel 43). The amphorae bodies on the seabed look also more similar in shape to the Cretan ones. Nevertheless, their exact identification cannot be defined yet, given that the vessels have not been cleaned from the surface encrustation and that more diving at the site is needed. What more can be said is that this was the only type of vessel apparent on the surface layer. This type of Cretan amphorae is in use from the 1st to the middle of the 2nd century AD.



Fig. 7: Neck of amphora from Shipwreck 4.

Shipwreck 5

The last ancient shipwreck was located at the southwest side of the cape dividing Hagios Georgios and Kapari bay. The rocky slope ends in big sandy steps at the depth of 27 m. On the foot of one of them a condensed dispersion of broken amphorae indicates a shipwreck site. Big fragments of two types of amphorae seem to comprise the cargo of the ship (fig. 8).

According to their initial study they can be attributed to Late Roman 1 and Late Roman 13 amphorae types. Two samples were recovered. The first one



Fig. 8: Late Roman 1 semi-amphora and Late Roman 2 or 13 amphora from shipwreck 5.

is a small (~0.5 m height) intact semi-amphora of Late Roman 1 variant, also known as Bii (Thomas 1959, 92), Egloff 164-169 (Egloff 1977, 112-113), and Keay LIII (Keay 1984, 268-269). It has thick grooved handles, cylindrical neck with simple rim, hemispherical base and ridged oblong body that is widening slightly on the shoulders. Late Roman 1 amphorae were produced all over the eastern Mediterranean and the Aegean and they are dated from 5th to beginning of 7th c. AD.

The second amphora retrieved which lacks its lower part can possibly be attributed to a Late Roman 2 amphora type (see Shipwreck 1 for certain type), though it could also belong to Late Roman 13 type. Late Roman 13 amphorae are considered of Aegean provenance and they are in circulation during mainly 7th century AD (Riley 1979, 231-232; Opait 1980, 298, 320). The amphora has combed decoration on the shoulders, a conical neck with everted rim, and vertical arched handles. Base is missing.

Modern Shipwrecks

Beside the ancient shipwrecks two modern iron shipwrecks and a shipwreck of possibly a fishing boat had also been located. The first one lays 25 m deep, on the foot and the last part of the rocky slope at the northwestern side of Dia, southwestern of the Petalidhi reef. The ship was possibly a cargo vessel. She preserves big part of its superstructure at the area of the bridge. The second shipwreck is located in about the middle of the eastern side of Agrilia bay, 10 m deep. She looks like a barge. What is still *in situ* is the flat hull with the sides almost vertical, preserved in a height of 1-1.5 m.

The boat wreck was located by the AUV's side scan sonar north of the airport, at 96 m. It is about 20 m long and can be both of iron or wooden structure.

Anchorages

The four southern bays of Dia, as well as Aginara bay at the eastern side of the islet, were obviously used as anchorages during centuries as ample isolated pottery of several areas and eras can be witnessed on their seafloor.

The one that was mostly used was probably Hagios Georgios bay, where access to the land was quite easier than the other ones and where installations possibly existed. Foundations of these harbor installations and pottery ware observed all over the neighboring area (Κριτζάς 1988a and 1988b; Κόπακα 2012). Except for the pottery of all eras back to Minoan times that was recovered during the underwater excavation at the bay under Ch. Kritzas supervision in 1976 and the three shipwrecks that Cousteau team located in the same bay, the 2011 team discovered two more shipwrecks, one at the eastern cape (Shipwreck 5) and another out of the western cape (Shipwreck 4). Isolated pottery and anchors, lead and iron ones, have also been found, especially at the western entrance of the bay. Most clear evidence for the use of the bay as anchorage is the submerged breakwater that protects part of the bay from the southern wind. It measures about 100 x 60 m. It is build of rubble and reaches the depth of 20 m at its tip. On top of the rubble larger stones may be evidence of a quay that is now destroyed. At its northern side a channel might have been used for hauling ships out of the water (fig. 6). Most pottery on top of the rubble can be dated back to middle Byzantine times, which is obviously the terminus for its construction.

The second anchorage investigated is Agrilia bay. At its western side in an area more than 150 m long, from 5 to 15 m depth, fragments of mainly table ware (plates, bowls, jugs, etc.) were found. The big distribution of the pottery does not give the impression of a certain shipwreck despite the relevant homogeneity. Amphorae shards of other periods are also present. The interpretation of the table ware assemblage is strange if the assumption is that it is not a certain cargo. Exact parallels of some of the bowls were found in La Therèse shipwreck (1669). It is worth to be noted that at the neighboring bay of Kapari Cousteau's team also recovered a number of metal plates and bowls, as well as a scoop, some with Ottoman monograms.

The third bay that was used as an anchorage, as it is obvious from the pottery on the seabed, it is the one of Hagia Pelagia, west of Heraklion. In fact it was not systematically surveyed. However, the rebreather training took place at a diving center there. Thus, during the training dives from the shore to 25 m depth, at the entrance of the bay, the team had the opportunity to observe several amphorae fragments most of which can be attributed to types of late Roman - early Byzantine era. Earlier and later pottery was also recognized. The main area with pottery is located at the contour of 11-12 m. From the western side of the bay the team recovered a clay fishing weight - a similar one was retrieved in 2010 from Hagioi Theodoroi area (Θεοδούλου under publication) - and a fragment of a rim with a handle of a Late Minoan cup. A pyramidal stone anchor with a single hole was also located at 6 m among modern ones. Inland excavations at Hagia Pelagia (Αλεξίου 1972; Ιωαννίδου-Καρέτσου 1978) proved the occupation of the site from Minoan to Byzantine times, a fact that is absolutely connected to the protected bay. Recent excavations and study of the area attributes the remains to ancient Apollonia.

Conclusions

The broader area of Heraklion Gulf was selected for survey because of three reasons. Firstly, in this area it was the capital of the Crete the last four millennia, with just a break during Roman times when it was moved to Gortys, at the southern coast of Crete. In both cases the capital position had to do with navigational crossroads. Secondly, the area has never had a natural protected bay to operate as a port and was always exposed in severe north winds. Even the surviving Venetian Harbour has always been exposed, silted and seeking continuous conservation in order to be operational. The role of the natural anchorage for the capital was played by the southern bays of Dia that was operating as a navigational hub. Dia had proved to be a place with underwater archaeological interest because of the results of Cousteau's expedition in 1976. That was the third reason to choose the area for underwater survey with new means, literally to testify new survey methods in an area that was previously investigated.

Both coastal navigation along northern Crete and open water navigation from and to the Aegean islands had the need of the serene bays of Dia so that the ships could wait for the appropriate weather conditions to sail into Knossos / Heraklion / Khantaq / Chandax / Candia / Candiye / Heraklion dangerous harbour. On the other hand the protected from northern wind bays could easily be a trap for anchored ships with the equally strong southern winds. The team faced such a phenomenon during the project. This explains the eight shipwrecks located during 1976 and 2011 expeditions. Six of them were found in the foot of capes of the bays that were absolutely protected from north wind. At the same time two of the shipwreck sites, at capes Korakia and Aginara, show the effort of the ships to get into the southern lee side of Dia. The fact that a lot more ships had found finally safe refuge in Dia southern

bays is testified by the amounts of isolated pottery fragments from every time and place found on their seabed.

Those fragments along with the results of the two missions and those of the survey of prof. Katerina Kopaka's team during 2010 and 2012 on the island demonstrate the use of Dia as maybe one of the most if not the most important navigational stepping stone of northern Crete from early Prehistory to pre-modern times. The finds also confirm the dense navigation during Roman and early Byzantine times. The table of shipwrecks found is clearly indicative. Out of the eight shipwrecks two (2011 Shipwreck 4 and 3 [=1976 Shipwreck IV]) are dated to 1st - 2nd c., two (2011 Shipwreck 1 and 5) are dated to 5th -7th c., two (1976 Shipwreck II, 2011 Shipwreck 2) are dated to 9th - 11th c., one (1976 Shipwreck III) is dated to 16th - 17th c., one (1976 Shipwreck V) is dated to 17th - 18th c. and the two iron ones are dated to 20th c.

The five ancient shipwrecks and the two modern ones of the 2011 Project have been found around Dia by divers' survey. Only a boat shipwreck was found in the straits between Heraklion and Dia, where indeed more had been expected. Two are the possible reasons for that. The one is trawl fishing that is carried out in the area despite the forbidding law sweeping everything from the seafloor. During the project the team was able to witness the process. At the same time the trawl marks were depicted on sonographs even in the relatively shallow bays of Dia. The second reason is probably the fact that the seabed is very dynamic in the area causing mass movements of sediment. This can be attributed to both northern and southern rigorous winds and the consequent currents, the gradually inclining soft coasts of Heraklion area and the silting due to the rivers flowing into the sea of the area (Almyros, Yofiros, Kairatos, Karteros and Aposelemis). As a prove of the seabed dynamism is the fact that the team was not able to find even with metal detectors a Venetian shipwreck site where cannons and even the bell of the ship were preserved according to pictures taken by a local who led the team members to the exact point. It had obviously been covered deeply under sand though it had been on seabed surface two winters ago.

At last, 2011 Crete Project proved that even areas, where underwater survey had been conducted before, can give new results. Seabed is dynamic by nature. But, also better equipment and, more importantly, systematic survey always answers questions and poses new ones. Nevertheless, new technology yields a big advantage particularly on searching deep water. Insufficient results as far as locating archaeological remains in deep water throughout 2011 Crete Project was not due to technological failure. Even plastic water bottles were depicted in sonographs. In any case, it is now known that the area surveyed withholds no ancient remnants visible on seabed surface and it is 3D mapped in detail. On the other hand, in shallower waters, near the coast, systematic survey and experienced teams of divers / archaeologists proved to be really productive. It is actually generally accepted that most of the shipwrecks happened in this zone.

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Υποβρυχία αρχαιολογική έρευνα στην περιοχή Ηρακλείου

και Nτιας (2011). Προκαταρτικά απότελες ματά

ΘΕΟΤΟΚΗΣ ΘΕΟΔΟΥΛΟΥ, BRENDAN FOLEY, ΔΙΟΝΎΣΗΣ ΕΥΑΓΓΕΛΙΣΤΉΣ, ΓΙΩΡΓΌΣ ΚΟΥΤΣΟΥΦΛΑΚΉΣ, ΔΗΜΗΤΡΉΣ ΣΑΚΕΛΛΑΡΙΟΎ & ΑΛΕΞΑΝΔΡΌΣ ΤΟΥΡΤΑΣ

Στο διάστημα από 22 Σεπτεμβρίου μέχρι 20 Οκτωβρίου 2011 η Εφορεία Εναλίων Αρχαιοτήτων και το Αμερικανικό Woods Hole Oceanographic Institution, σε συνεργασία με το Ελληνικό Κέντρο Θαλασσίων Ερευνών, πραγματοποίησαν εκτεταμένη υποβρύχια αρχαιολογική έρευνα στη θαλάσσια περιοχή μεταξύ του Ηρακλείου και της νησίδας Ντίας. Χαρτογραφήθηκαν με αυτόνομα υποβρύχια οχήματα (AUV) περί τα 30 τετραγωνικά χιλιόμετρα του θαλάσσιου πυθμένα με εξαιρετική ακρίβεια και ερευνήθηκαν με αυτόνομη κατάδυση η νότια, η ανατολική και τμήμα της δυτικής ακτής της Ντίας, ενώ στο πλαίσιο εκπαίδευσης των δυτών (με CCR) στον όρμο Αγ. Πελαγίας διερευνήθηκε μερικώς και η περιοχή αυτή. Εντοπίστηκαν: τέσσερα άγνωστα αρχαία ναυάγια και ένα γνωστό από τις έρευνες του πλοιάρχου Cousteau - ΥΠΠΕ (1976), δύο σύγχρονα μεταλλικά ναυάγια, στην περιοχή της Ντίας, καθώς και το ναυάγιο βάρκας στα ανοικτά του αεροδρομίου. Επισημάνθηκαν επίσης τρεις τουλάχιστον θέσεις αγκυροβολίας, στον όρμο Αγ. Πελαγίας και στους όρμους Παναγιάς και Αγ. Γεωργίου στη Ντία, όπου υφίσταται βυθισμένη λιμενική κατασκευή. Στο κείμενο επιχειρείται η συνοπτική παρουσίαση των πρώτων αποτελεσμάτων.

ΤΟΜΟΣ Α΄: ΕΙΣΗΓΉΣΕΙΣ ΦΟΡΈΩΝ - ΗΡΑΚΛΕΙΟ ΓΕΝΙΚΑ ΘΕΜΑΤΑ ΑΡΧΑΙΟΛΟΓΙΚΟ ΕΡΓΟ ΚΡΗΤΗΣ 3

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