

The Phoenician Shipwreck off Gozo

2019 Season

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October 2019



Preamble

Research on the Phoenician shipwreck has been ongoing since 2007. It started with the discovery of the site during a systematic side-scan sonar survey of the approaches to Xlendi Bay in Gozo. This survey is part of a long term broader research project aimed at creating a comprehensive archaeological map of the seabed off the islands of Malta and Gozo. Such a map continues to contribute to the strategic approach to managing and protecting the underwater cultural heritage of the Maltese Islands.

Site Location & Description

Located approximately 900 meters off the south-west coast of Gozo the shipwreck lies on a relatively flat seabed of coarse sand at a depth of 110 meters. The visible part of the site rises no more than one meter off the seabed. Except for some minor damage caused by traditional bottom-fishing techniques practiced in the past the site is very well preserved and retains a distinguishable outline. The dimensions of the shipwreck are 12 meters long, by 5 meters wide, with a depth of 1.8 meters of archaeology buried under the sediments. The latter dimension was acquired during a sub-bottom profiler survey. In 2014, a Franco-Maltese team worked on the site using state-of-the-art technologies. The results of this project were the creation of a high-resolution 3D image of the shipwreck and the recovery of four objects. Since 2016, an international team of technical divers, led by the present author, has continued to conduct scientific research on the site with systematic recovery of objects conducted in 2017 and the first excavation by a team of divers executed in 2018.

Past Work on the Site

2007-2010: Various remote sensing surveys undertaken by high-resolution side-scan sonar, sub-bottom profiler and remotely operated vehicle.

2014: Site survey and object recovery through the use of a manned submersible.

2016: Site survey and object recovery by diving archaeologists.

2017: Preparation of site for subsequent seasons, site survey, samples and objects recovery.

2018: Start of excavation of a 4x2 meter test trench.

Aim of the 2019 Project

1. To execute a detailed and accurate survey of the control points laid in 2018.
2. To continue excavation of 4 x 2-meter test trench at one of the extremities of the site.
3. To set up excavation equipment based on a hydraulic submersible pump with two new steel dredges.
4. To continue surveying and recording the entire site and the excavation progress through the use of advanced 3D photogrammetry – including the use of new scales for the recording of XYZ data.
5. To recover a limited number of artifacts as the excavation of the trench progresses.
6. To continue post excavation inter-disciplinary studies in order to better understand the broader archaeological significance of the site.
7. To raise public awareness, locally and internationally, of the archaeological significance of the Phoenician shipwreck.

Fieldwork Procedures and Methods

The overall aims of the project were clearly disseminated in long and detailed meetings before the commencement of the project in the form as the Project Manual and the Diving Project Plan, which were made available to all participants. Specific project objectives and procedures were delivered at the initial project briefing. During the duration of a project the Project Director would brief all divers and support personnel on the day's objectives. This briefing was followed by a detailed briefing by the Dive Officer. The latter covered the dive plan, procedures and safety elements. At the end of every working day a debrief was held at the base (**Figure 1**). Divers arriving at different stages of the project would be briefed individually.



Fig 1. Debriefing being held at base (T. Gambin).

Prior to the commencement of diving operations in 2019, a number of tasks were carried out. These tasks were accomplished from the *RV Hercules* that was made available by the RPM Foundation and included the following:

1. Removal of Geotextile.
2. Lowering of grid to the seabed.
3. Lowering of two small mooring blocks for dredge system.

One of the first diving tasks was to connect the main mooring/shot line to the mooring block that was positioned close to the site in 2017. This line continues to provide the quickest and safest route for the divers to make it to and from the wreck and is essential due to the limited bottom time. Given the accurate and precise base model created in 2018 there was no need to deploy the right-angled scale. However, this season we deployed (for comparative purposes) two one-meter scales consisting of a weight and a float (**Figure 2**). Once the scales were set, divers conducted a series of systematic swims over the entire site including the control points and the new scales. The 2019 and 2018 models were compared with a maximum recorded error of 4mm.



Fig 2. One meter 'vertical scale' in situ. (T. Gambin).

The 4 x 2 meters grid (divided into two 2 x 2-meter units with 1 x 1-meter subunits), was once again positioned over the area of the test trench. The quadrants excavated in this test trench run from 7D to 7G and 8D to 8G (**Figure 3**).

The Phoenician Shipwreck Project - Xlendi 2019

University of Malta
Project Director: Professor Dr Timmy Gambin

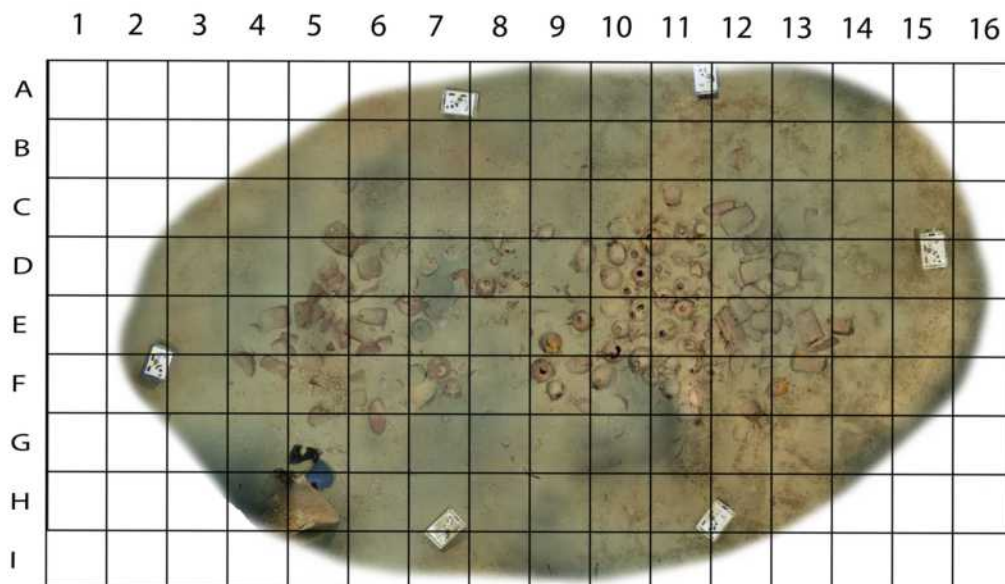


Fig 3. Site with complete grid reference. (D. Kovacevic).

As in 2018, we used a hydraulic-powered submersible pump with a hydraulic machine housed on the bow deck of the boat. One person was dedicated to its operation. The hydraulic hoses were lowered and secured along the shot line with the submersible pump positioned at 90 meters. This year we set up a ‘mooring system’ for the pump to be placed at the end of each diving day. By doing so we prevented the hose pipes from twisting around the mooring line, saving precious time and energy. Supply hoses connected the pumps to two dredges with long exhaust pipes. This year, new stainless-steel dredges were used, these are smaller and hence more maneuverable on the seabed. In order to ensure that no evidence was lost, the dredges were fitted with filters. The large underwater light was fitted onto an improved structure which the team nicknamed the ‘lamp post’. (**Figure 4**).



Fig 4. Lamp post (Screen grab from ROV).

Excavations were conducted by teams of three divers. Two divers operated a dredge each in separate 1x1 m subunits with the other acting as safety as safety diver. The hand-fanning technique was used to dislodge sediments (**Figure 5**) although the lower levels of the archaeological deposit necessitated the use of trowels. Systematic excavation ensured progress in a controlled manner with the gradual removal of sediments across all eight subunits. Sherds and other archaeological materials were placed in mesh bags that were marked and designated for each of the grid's subunits. This year we deployed a small ROV (**Figure 6**) at the start and ends of all diving operations for two reasons: 1) to ensure that all connections at depth were in place and surface pump could be deployed and 2) to film the trench at the end of the day's excavation. The latter helped plan the next day's strategy.

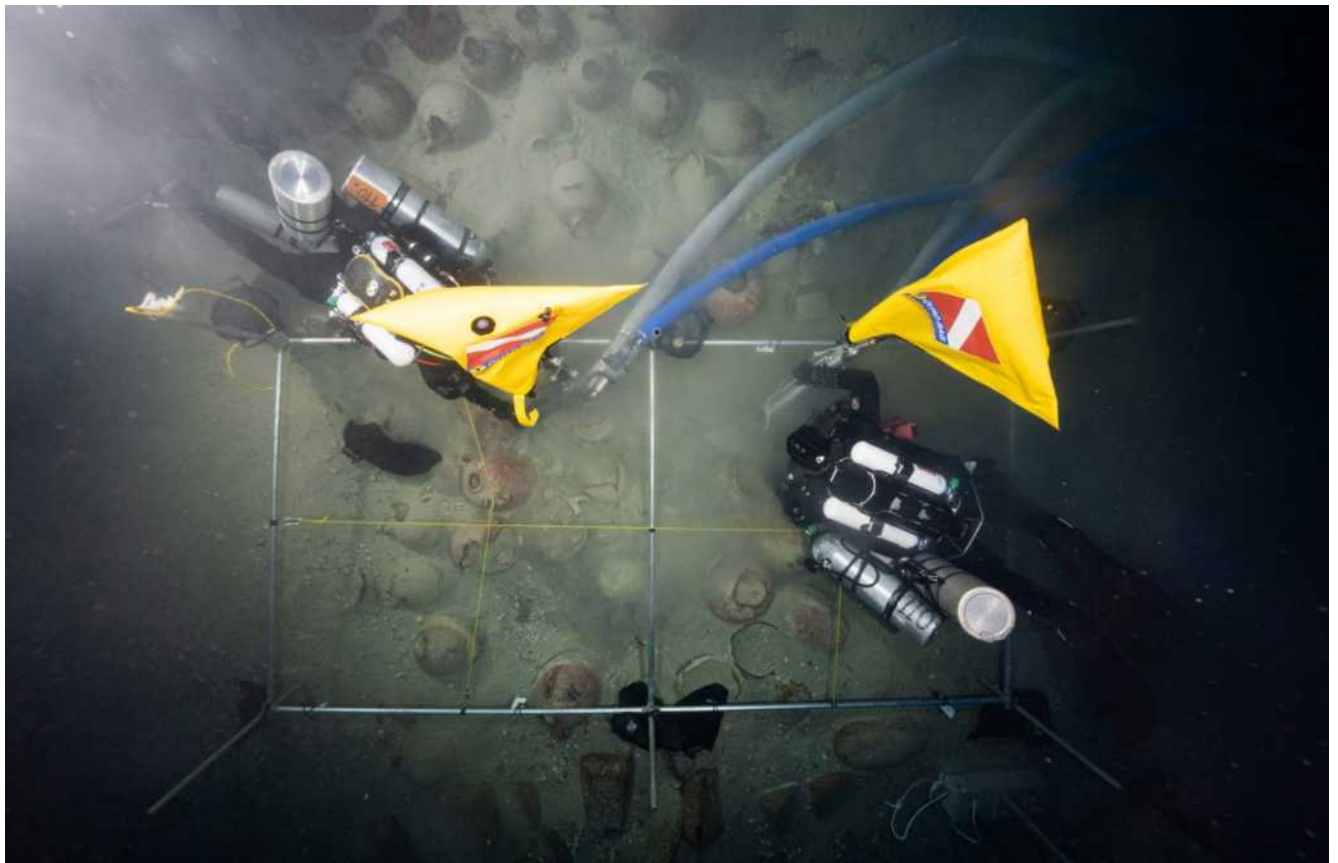


Fig 5. Divers excavating (J. Wood).



Fig 6. Divers being observed from surface (K. Vella).

As in 2018, the first dive of the day was dedicated to data acquisition with the 3D Team recording the trench as left at the end of the previous day's operations. Progress was recorded on a daily basis by comparing dense clouds produced from the 3D photogrammetry models, orthophotos and DEMs (**Figures 7 to 9**). All data, including measurements, were inputted and stored into the Site Recorder database started in 2018.

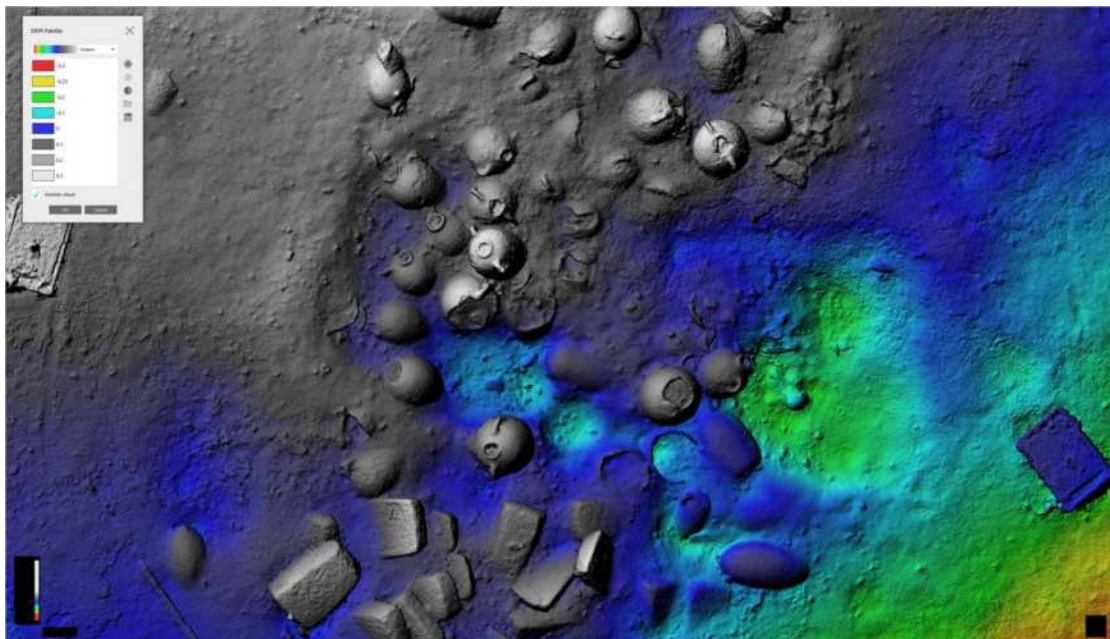


Fig 7. Levels prior to the commencement of works in 2019 (K. Hyttinen).

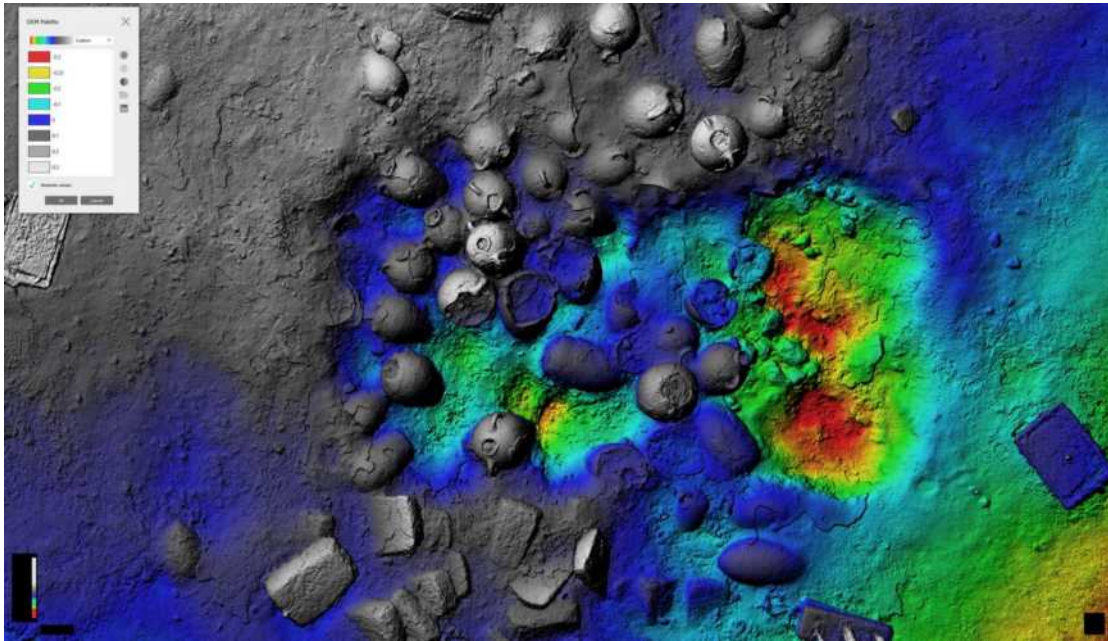


Fig 8. DEM showing levels in trench after conclusion of 2019 season (K. Hyttinen).

Before its removal, the grid's position was marked by iron rods so as to facilitate its re-installation in 2020. A final 3D survey was conducted on the last day of operations prior to covering the excavated area with two layers of geotextile held down by sandbags.

Objects recovered in 2019:

1. A partial Phoenician fine ware ceramic bowl.
2. A small urn with four lugs.
3. Numerous miscellaneous ceramic sherds and fragments.
4. An object with metallic properties.
5. A large fragment of timber that was loose in the lower levels of the site.
6. A 'piece' of what is believed to be bitumen.

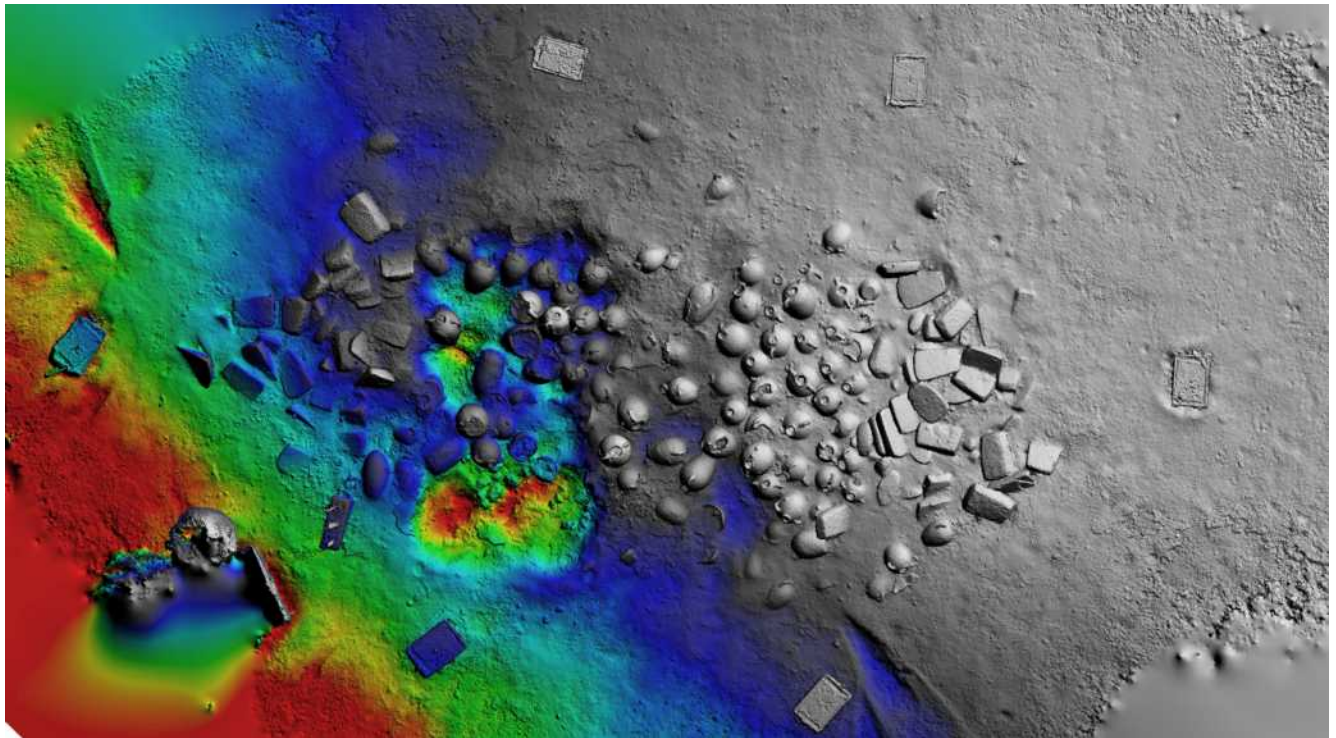


Fig 9. Final orthophoto of entire site produced in 2019 prior to laying the geotextile (K. Hyttinen).

Diving Appraisal

All updated diving and emergency procedures as well as diving logistics and description of the environment were handed out to participants in a Diving Project Plan document before the start of the 2019 season. Due to the extreme depth of the shipwreck, dives are physically and mentally taxing and require divers to be not only experienced but also highly disciplined. All feasible safety precautions were in place so as to ensure diver safety. Individual diver checks were executed on a daily basis by a member of the surface support team (**Figure 10**). Back-up cylinders were secured along the shot line and at the bottom in the vicinity of the site. Further back-up cylinders were carried by divers in case their rebreathers failed. A fast RIB was placed on standby (for possible emergency evacuations) and was always close to the deco trapeze and the shot line (**Figure 11**). Furthermore, the project dive protocol covered emergency procedures for a variety of situations. Staff members from the hyperbaric chambers of Gozo and Malta were briefed and informed at the start of diving operations. Besides being made aware of our operations and dive profiles, they were also on standby for any emergency that may have occurred.



Fig 10. Surface support carrying out individual diver safety check



Fig. 11. Safety boat on standby close to the ‘decompression trapeze’.

Project Outcomes

The 2019 season may once again be considered as highly successful. The main objective of the season was to continue archaeological excavations of the test trench started in 2018. Lessons learned in 2018 were taken into consideration and certain changes were brought in to ensure that the project was executed more efficiently and safely. The rest of the objectives were reached and these include the following achievements:

- 1) Photogrammetric surveys of the excavation trench were accomplished daily with data processed on the same day as data acquisition. In this way, 3D models, orthophotos and DEMs were used for daily planning and refinement of excavation strategies.
- 2) Digital records of excavation depths were produced to millimetric accuracy.
- 3) Lower levels of site were reached with ballast layer and some timbers being observed.
- 4) Archaeological objects were recovered.
- 5) A large (and loose) fragment of wood was discovered in the lower levels of the sediment. This was recovered and will be sent to a laboratory in France for testing.
- 6) The site was covered with two layers of geo-textile.
- 7) Participation of Maritime Archaeology students in support roles.
- 8) An outreach event was organised in collaboration with the Munxar Local Council in Xlendi square. This event was well attended and enabled the team to share its work with the local community as to the progress of the project. **(Figure 12)**.
- 9) The Phoenician Shipwreck Project was presented to the general public through the Science in the City event organised in Valletta on 27th September 2019.



Photo - MGOZ - Terry Camilleri

Figure 12. Outreach stand set up in the square of Xlendi.



Figure 13. Outreach at Science in the City, Valletta (D. Kovacevic).

Concluding Remarks

As expected, lessons learned, and experience garnered in 2018 served to make the 2019 season more efficient. The excavation area was set up quicker and excavation days more numerous than in 2018. Although fewer artefacts were raised, a significant amount of sediment of sediment was systematically removed from around the main archaeological deposit. This is enabling the team to be better understand the ‘layering’ of the cargo and its vertical extent. We also believe that the part of the southern extremity of the site has now been reached (**Figure 14**). This statement is based on the fact that no other elements of the cargo and/or ballast are visible beyond this area. The plan for 2020 is to continue the removal of sediments so as acquire a detailed and high-resolution record of this section of the cargo. Following this the plan is to recover cargo elements so as to expose and record the ballast in-situ.

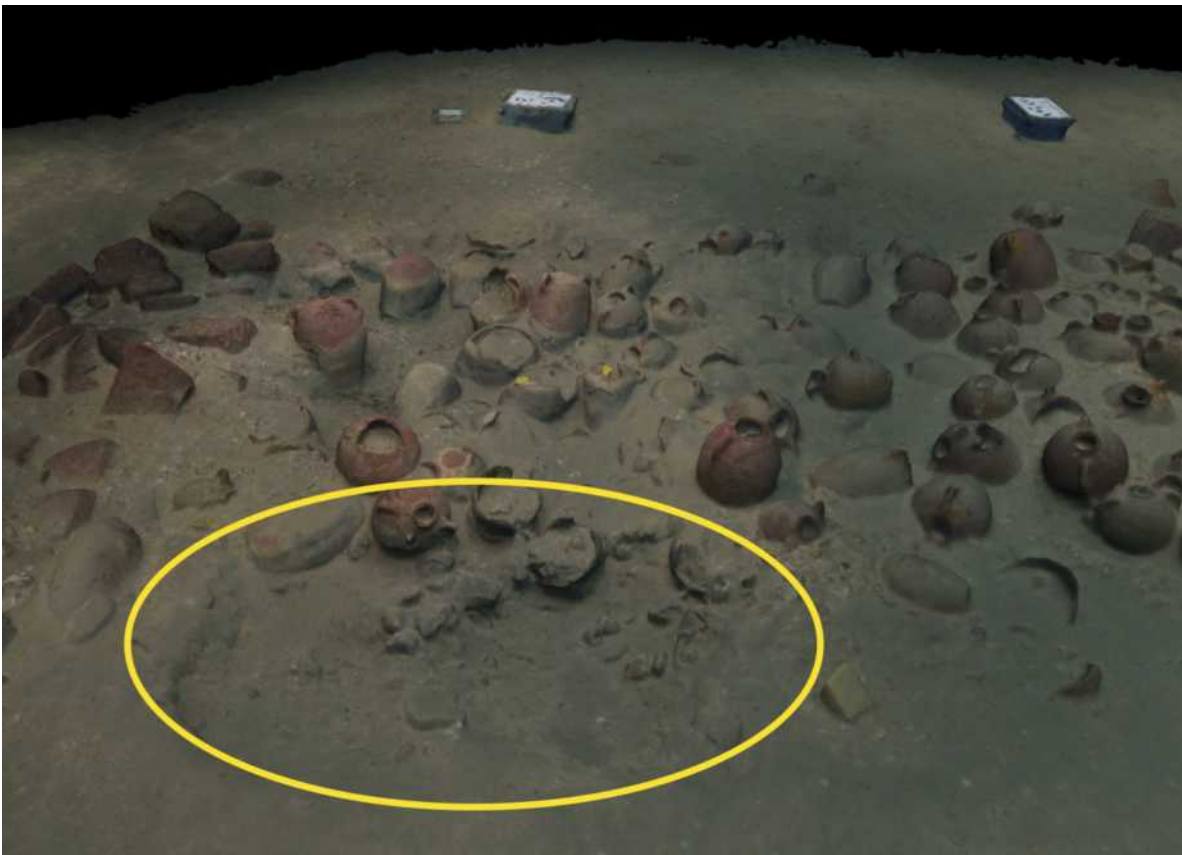


Figure 14. Southern limit of site (circled) in subunits 7G and 8G (K. Hyttinen).

Appendix A

Collaborative Institutions

University of Malta

Heritage Malta

Superintendence of Cultural Heritage

Universitaire Aix Marseille

Centre national de la recherche scientifique (CNRS) - Marseille

University of Urbino

University of Tuibingen

Mediterranean Institute of Biodiversity and Marine and Continental Ecology (IMBE)

Appendix B

International Outreach related to Phoenician Shipwreck

December 2018

Talk delivered at the EUROTEK Tech Diving conference, Birmingham, UK.

January 2019

Talk delivered at Lindenwood University, St Charles, USA.

December 2019

Talk to be delivered as the 8th Annual Lecture organized by the Honor Frost Foundation, London, UK.

Appendix C

2019 Dive Statistics

Over a 21-day period a total of 160 dives to 110m were completed.

Time in water:

24,500 minutes (408.33 hours). Less than 10% of this total were spent at 110m.

Open circuit divers completed over 252 dives to ensure the safety of the deep divers during decompression stops. These dives were also essential for the smooth running of the operations.

Gases used:

- 222,572L of oxygen
- 113,633L of Helium
- 269,683L of Air

A total of 450kg of 797 Sofnolime were consumed

Acknowledgements

This project is made possible through the generous support of the University of Malta, Ministry for Gozo, Malta Tourism Authority, Malta International Airport, Honor Frost Foundation and Heritage Malta.