

Humeitepe Harbour – geoarchaeological research in Miletus 2022

Introduction

Our geoarchaeological research in Miletus in September 2022 concentrated on the Humeitepe harbour. In 2011, Helga Bumke, University of Halle, had excavated the harbour gate of the Humeitepe harbour (Bumke & Tanriöver, 2017). Geomagnetic measurements within the harbour basin, carried out by Harald Stümpel and Ercan Erkul, University of Kiel, had revealed a structure which had been interpreted as a harbour quay. This interpretation was confirmed in 2021 by our team based on coring evidence.

It was the aim of this year's research to identify the sedimentology seaward of this quay in order to reconstruct the siltation process and find out for how long which types of ships could still use the harbour and when it had been given up. Therefore, two corings were done: one close to the presumed quay wall (coring Mil 513), and another one further to the east within the harbour basin (coring Mil 514). The geodetic measurements were done by Lisa Steinmann. The scientific approach follows the geoarchaeological research design outlined in Brückner et al. (2022). As for the geoarchaeology and palaeogeography of Miletus, see, e.g., Brückner, 2021; Brückner et al., 2006; 2017 (and references therein).

Coring Mil 514 within the harbour basin

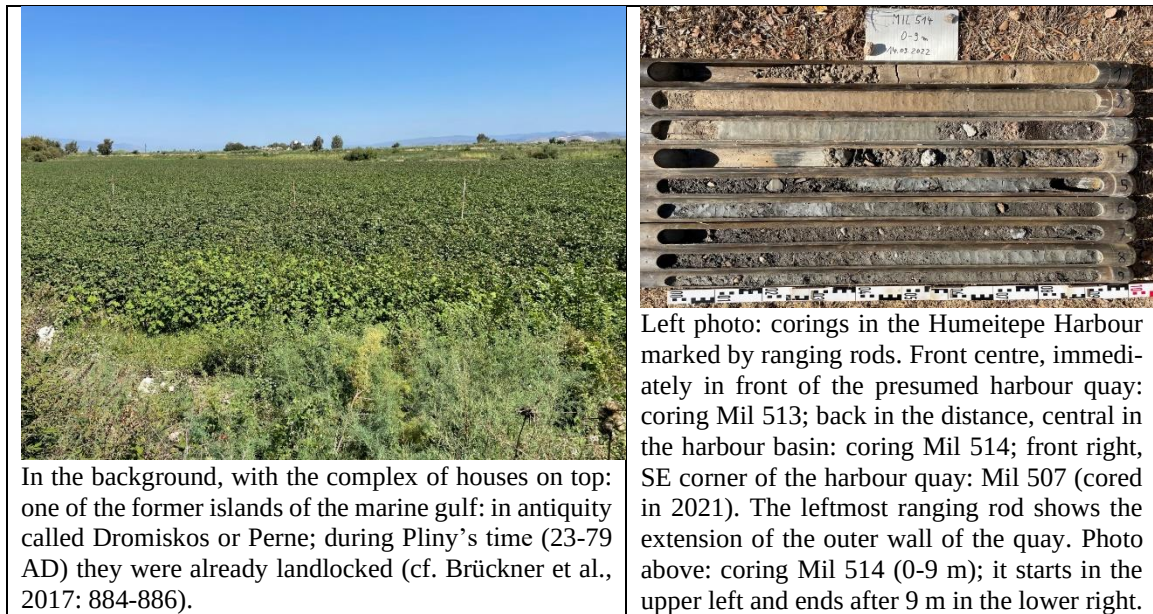


Fig. 1: Part of the Humeitepe Harbour. Corings are marked with ranging rods.

The embayment at the eastern flank of Humeitepe was filled with marine sediments in the course of the post-glacial marine transgression which reached the area of the embayment in the second half of the 5th millennium BC, with a relative maximum ca. 2500 BC.

		
855-845 cm b.s. Shallow marine or littoral low-energy environment, with marine shell debris, abundant occurrence of organic matter, fragments of ceramics (up to 0.5 cm), dominance of seagrass, piece of wood, mollusk shell debris (bivalves, gastropods, among others <i>Turritella</i>), <i>Murex</i> frgt., fish scale, no sand nor pebble.	740-735 cm b.s. Sieved material: abundant debris of mollusk shells, <i>Tellina</i> (three complete valves), <i>Pecten jacobaeus</i> (one valve, juvenile), <i>Dosinia</i>, gastropod frgts. (up to 1 cm), <i>Turritella</i> (many specimens), charcoal, olive stones, twig.	630-625 cm b.s. Sieved material: very rich in organic matter, shell debris, wood, charcoal, olive stones, grape seeds, marine gastropod (frgt.)
		
587-582 cm b.s. Sieved material: rich in organic matter; frgts of <i>Mytilus</i> (up to 2 cm), fish scales, <i>Turritella</i> (many specimens), charcoal (2 cm), wood, charred wood, no sand grains, <i>Cyclope neritea</i> (frgt.), few pieces of seagrass, vermetids	435-430 cm b.s. Sieved material: rich in organic matter, olive stones, grape seeds, sand grains, no pebbles, wood, ceramics (up to 2.5 cm), H₂S	397-389 cm b.s. Sieved material: sand and pebbles (up to 1.5 cm), olive stone (charred), tubular bone (sharp edged, 2 cm), plant remains, charcoal, <i>Ostrea</i> frgt., <i>C.g.</i> frgt. (1 cm), pebbles (limestone, quartz); ceramic frgts. (up to 2 cm, partly burnt; frgt. of lamp, 1st/2nd c. AD

Fig. 2a: Sieved material from different parts of coring Mil 514 (centre of the harbour basin). Here from 885 to 389 cm below surface (b.s.). Mesh width of the sieve: 1mm x 1mm.

The preliminary interpretation of coring Mil 514 within the harbour basin (see also Fig. 2a, b) shows that the siltation was at first slow, with the deposition of marine silts in a shallow marine environment (from core bottom up to ca. 7.50 m b.s.). A phase of higher wave energy follows as evidenced by an increase in the sand fraction (7.50 – 5.70 m b.s.). It is replaced by once again low-energy deposits (clayey silts until 4.40 m b.s.). All of these strata are of marine and/or littoral origin. The depositional changes may reflect different currents within the harbour basin, either due to changes of the natural conditions (e.g. formation of tombolos which landlocked the islands of Doriskos and Perne; mentioned by Pliny (23-79 AD) (cf. Brückner et al., 2017: 884-886) or to human impact (building of moles).

Ceramic fragments are present throughout the profile. The strong human impact is seen from 4.40 to 2.60 m b.s. (cf. Fig. 2a, b) with the high occurrence of artefacts (fragments of ceramics and tiles; in the lower part of the 3rd metre even with mortar). Medieval kitchen ware was found at 290-285 cm b.s. We even found Medieval ceramic fragments at a depth of 420 cm b.s. If it is an in-situ and not dragged through the process of drilling, it may indicate a dredging (= cleaning) of the harbour in late antiquity.

		
290-285 cm b.s. Sieved material: mortar (up to 1 cm), C.g. frgt (up to 1 cm), shell debris (up to 1 cm), vortex and bone (up to 2 cm), limestone (angular), sand and pebble (up to 1 cm), charcoal, mix of ceramic frgts. (kitchen ware, Medieval; two pieces of Terra Sigillata)	274-270 cm b.s. Sieved material: mortar (up to 3.5 cm) with ceramic and tile frgts.	270-264 cm b.s. Sieved material: pieces of ceramics (angular, up to 2 cm): among others kitchenware, 3 rd -5 th c. AD, mortar (up to 2 cm), limestone with mortar, sand and pebbles (up to 2 cm), <i>Turritella</i> (up to 1 cm), shell debris

Fig. 2b: Sieved material from different parts of coring Mil 514 (centre of the harbour basin). Here from 290 to 264 cm below surface (b.s.). Mesh width of the sieve: 1mm x 1mm.

We know that the harbour was still in full function in the 2nd century AD, since Bunke & Tanriöver had unearthed at the harbour gate the letter of emperor Hadrian from to the Milesian ship owners dated to AD 131 (Bunke & Tanriöver, 2017).

When the area was given up, alluvium of the Maeander river (Büyük Menders) was accumulated; these strata from 260 cm b.s. upwards are void of any artefacts.

Coring Mil 513 at the quay of the harbour

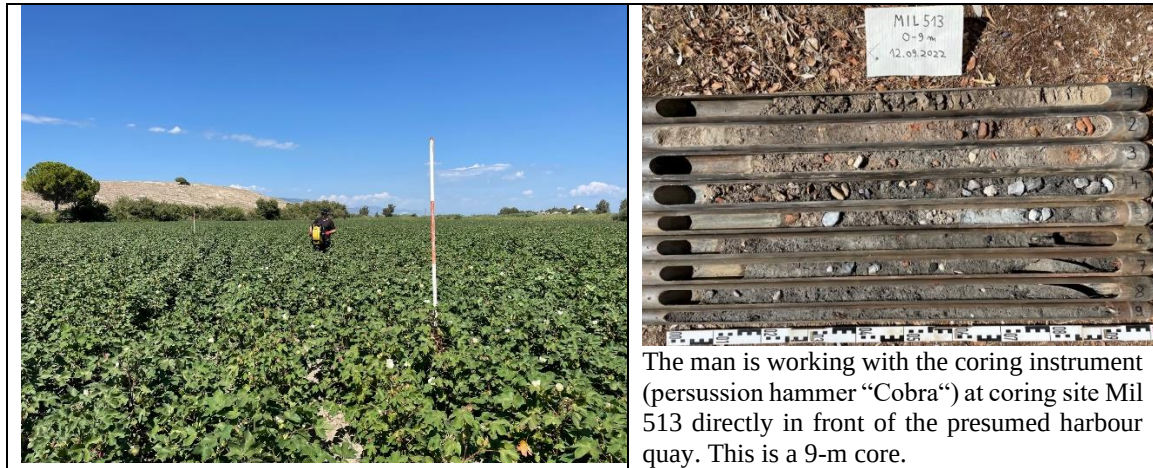


Fig. 3: Part of the Humeitepe Harbour. Coring site Mil 513 immediately in front of the presumed harbour quay (man at work). The ranging rod in front marks coring the SE corner of the harbour quay (Mil 507, cored in 2021). The leftmost ranging rod shows the extension of the outer wall of the quay. Photo above: coring Mil 513 (0-9 m); it starts in the upper left and ends after 9 m in the lower right.

Coring 513 confirms and supplements coring Mil 514. However, the human impact is much more evident which is easily understood by the proximity to the quay wall. It is especially evident from ca. 5 to 1.50 m b.s.

From coring Mil 513, the following ceramic finds were determinable. That there is sometimes an age inversion is not surprising in a harbour basin since the ground is often stirred up due to human activities, e.g., by the setting and levelling of anchors.

175-180 cm b.s.	ceramic fragments from 1 st – 2 nd century AD
288 cm b.s.	African red slip, late Antiquity 4 th – 6 th century AD
320-330 cm b.s.	kitchenware, Ionian style, Imperial times, 1 st – 3 rd century AD
836 cm b.s.	regional ceramics from Ephesos, Late Antiquity, 4 th – 6 th c. AD (possibly dragged through the process of drilling)

Concluding remarks

The interpretation of the corings given above have to be regarded as preliminary only. The sieved material supports the interpretation. But in order to precisely define the milieus of deposition, a microfaunistic study (ostracods, foraminifers) is necessary. Plus, to support and complete the ceramic stratigraphy, ¹⁴C dating of the organic matter (olive stones, grape seeds, wood etc.) needs to be done.

Acknowledgements

We express our gratitude to the Turkish authorities for granting us the working permits, the Miletus Museum and its director Baran Aydın, as well as the government representative (*temsilci*) Arife Aslan (Miletus Museum) for the good cooperation. We also thank the Miletus excavation, especially Prof. Dr. Christof Berns, University of Hamburg, and Prof. Dr.

Christine Bruns-Özgan, Mimar Sinan University in Istanbul, for the friendly welcome at the excavation house and for all support of our research. We acknowledge the geodetic measurements by Dr. Lisa Steinmann, and the preliminary classification of the ceramic finds by Dr. Sabine Huy.

This research was made possible by a research scholarship of the Ernst-Kirsten-Gesellschaft granted to Felix Reize, as well as by funds from the University of Cologne.

Appendix:

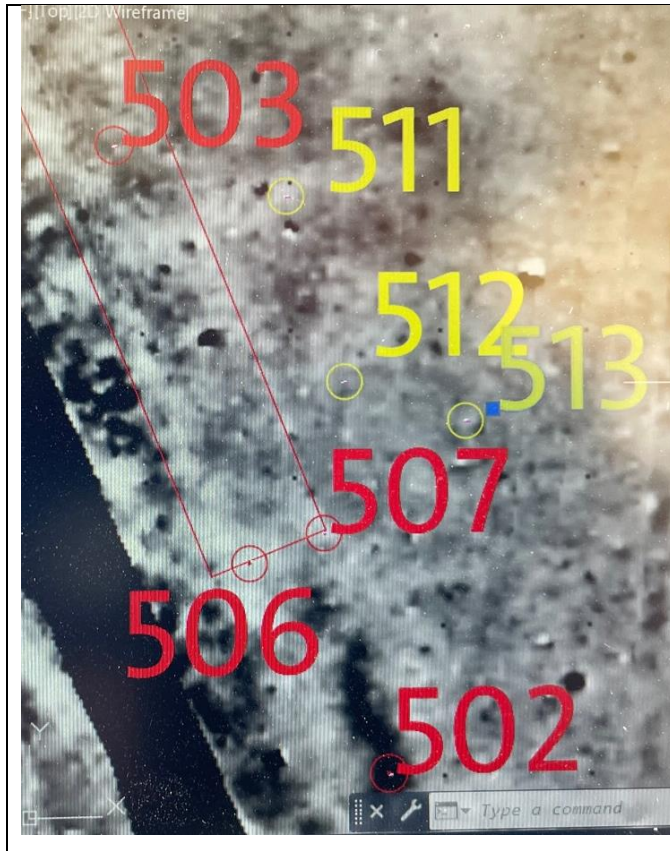


Fig. 4:

Corings in the Humeitepe Harbour

Geomagnetic image of part of the Humeitepe Harbour with coring sites and presumed harbour quay (red rectangle).

Corings from 2021 in red: Mil 503 in the centre of the harbour quay, Mil 507 on the SE corner, Mil 506 near the SW corner, Mil 502 on an anomaly of the geophysical prospecting).

In 2022, coring Mil 513 was carried out. Coring Mil 514 (not shown here) is in the centre of the harbour basin (further to the east of Mil 513).

Surveying by Lisa Steinmann, Hamburg University.

References

Brückner, H. (2021): Life Cycles of Islands and Harbours. The Case Study of the Maiandros River and the City of Miletos. – In: Berns, C. & S. Huy (Eds.), *The Impact of Rivers on Ancient Economies*, Panel 2.2, *Archaeology and Economy in the Ancient World 4* (Heidelberg, Propylaeum 2021), 33–36. DOI: <https://doi.org/10.11588/propylaeum>.

Brückner, H., Müllenhoff, M., Gehrels, R., Herda, A., Knipping, M. & A. Vött (2006), From archipelago to floodplain – geographical and ecological changes in Miletos and its environs during the past six millennia (Western Anatolia, Turkey). – *Zeitschrift f. Geomorphologie N. F.*, Suppl.-Vol. 142, Berlin, Stuttgart, pp. 63–83.

Brückner, H., Herda, A., Kerschner, M., Müllenhoff, M. & F. Stock (2017), Life cycle of estuarine islands – From the formation to the landlocking of former islands in the environs of Miletos and Ephesos in western Asia Minor (Turkey). – *Journal of Archaeological Science: Reports* 12, pp. 876–894.

Brückner, H., Miller, Ch. & Ch. Stolz (2021): Was ist Geoarchäologie? Eine Einführung. – In: Stolz, C., Miller, C. (eds.): Geoarchäologie, pp. 4-12. Springer.

Bumke, H. & A. Tanriöver (2017): Der Hafen am Humeitepe in Milet. Ergebnisse der Ausgrabungen 2011. – Archäologischer Anzeiger 2/2017, 123–177.