

***Byblos & the Sea* - an HFF funded Research project**
Summary Report: Auger coring campaign / Mission 3 - January 2014
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Following the geophysical survey conducted in October 2013 (mission 2) on the Armenian Orphanage lot at the foot of the antique city, *Byblos & the Sea* conducted an auger coring campaign (mission 3) in January 2014, to verify the results of the geophysical survey readings.

This auger coring mission was directed by sediment specialist, Nicolas Carayon (CNRS UMR 5140: Archéologie des sociétés méditerranéennes, Montpellier-Lattes, France). Other than completing a series of boreholes conducted in 2000 by H. Frost and C. Morhange in the framework of the *Projet CEDRE*, the main objective of this mission 3 was to verify the existence of a buried basin which had been located by geophysical readings in the underground of the lower Armenian Orphanage lot.

Twenty-nine auger coring drills were performed along lines perpendicular to the boundary between high and low resistivity areas, in the northern and the southern parts of the prospected area (Fig.1).

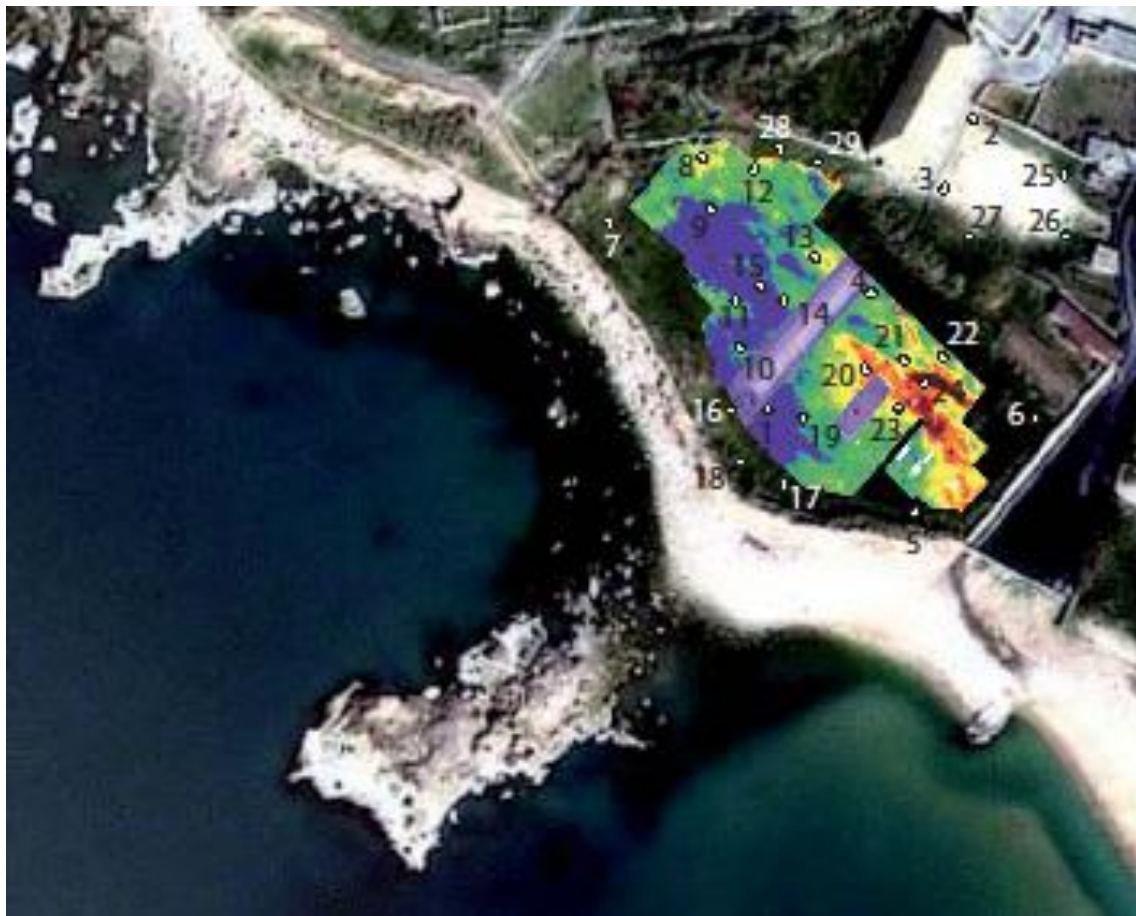


Figure 1. Map showing the location of twenty-nine auger coring drills performed during mission 3
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The field work ended with 291 sediments samples (80kg) extracted from 29 boreholes and analyzed at the laboratory of Lattes Montpellier in France; a few samples were sent for C14 dating to the Polish Laboratory of Cracow (Fig.2).



Figure 2. An example (left) of the 29 auger coring drills performed at 6m depth; sediment specialist N. Carayon (right) analyzing sediments extracted from coring; sample sediments (far right) sent for analyses & dating to laboratory (©Byblos & the Sea, 2014, Martine Francis-Allouche and Nicolas Grimal).

From the nature of such extracted sediments, one may understand the process of transformation from a “natural” coastal space to a “man-made” artificial installation. The process of the different phases can even be retraced, recreating the antique harbor space. Once artificial harbor structures are built to protect a natural environment from sea-currents, it transforms the nature of sediments from very coarse ones, exposed to strong currents, to very fine and silt sediments, which are trapped in the enclosed and protected area. Such changes appear very clearly and they portray a protected harbor area (Goiran, Morhange 2001).

In the case of Byblos, the nature of the sediments filling this harbor cove has been analyzed: the twenty-nine performed boreholes attested unanimously that the area at the foot of the antique city, was at a point in time (dates are still to be confirmed by archaeological data) a well-protected harbor basin. Thus, the sediment analyses confirmed the existence of a water plant; a silted-in harbor cove has been attested. Results are to be found in the scientific report by Nicolas Carayon: *Rapport préliminaire sur la campagne de carottage réalisée en janvier 2014 au sud du tell de Byblos*.

In summary, according to the different units (layers) found in the cores (Figs. 3-4), this basin was wide enough (approx. 8.000 to 12.000 M2; Fig. 5) and had deep enough waters (1.5 to 4m depth; Fig. 6) to accommodate a fleet of commercial boats, as stated in ancient Egyptian annals (Wenamoun account).

Concluding the auger coring campaign, several phases of seashore modification have been identified: two paleo-shorelines located, showing a progradation exceeding a 100 meters (Fig. 5) since the maximum rise in sea level (marine transgression), around 6000 BC. In the present case, silting could be the outcome of the abandonment of harbor structures, which served the purpose of protection from the swell and from major winds. Such abandonment may have caused rapid silting of the basin from the inland, leading to a quick progression of seashores as it has been the case of many antique seashores, totally integrated in the urban tissue such as: the Phoenician slipways of Minet el Hosn in Beirut (ca. 100m), the slipways of Kition-Bamboula in Larnaka (ca. 800m) and the harbor of Yenikapi in Istanbul (ca. 1500m).

More investigation was needed to grasp the extent of the silting in the area: following the auger coring campaign (mission 3), *Byblos & the Sea* undertook a bathymetric sea survey to study the seaward approaches to the silted-in harbor basin (mission 4).

Auger coring results are published in the Bulletin d'Archéologie et d'Architecture Libanaises (Francis-Allouche, M. and Grimal, N. *et al.* 2017. "Byblos maritime : une installation portuaire au piémont sud de la ville antique", BAAL 17, p. 133-196).