

The ancient harbors of cap Bon (Tunisia): geomorphology, environment and recent discoveries

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Introduction

Ancient ports are navigation spaces subject to specific constraints, which were built to accommodate boats but also to facilitate loading, unloading and storage operations. During the past two decades, ancient ports have attracted the interest of the archaeological and the geological communities. The growing corpus of studied sites demonstrates that ancient ports are rich archives to understand past societies and their environments. They provide a picture of coastal changes (Morhange and Marriner, 2010). Ancient ports are therefore both natural and built landscapes.

Our study focuses on the ancient ports of the north coast of the Cap Bon in Tunisia (Fig.1).

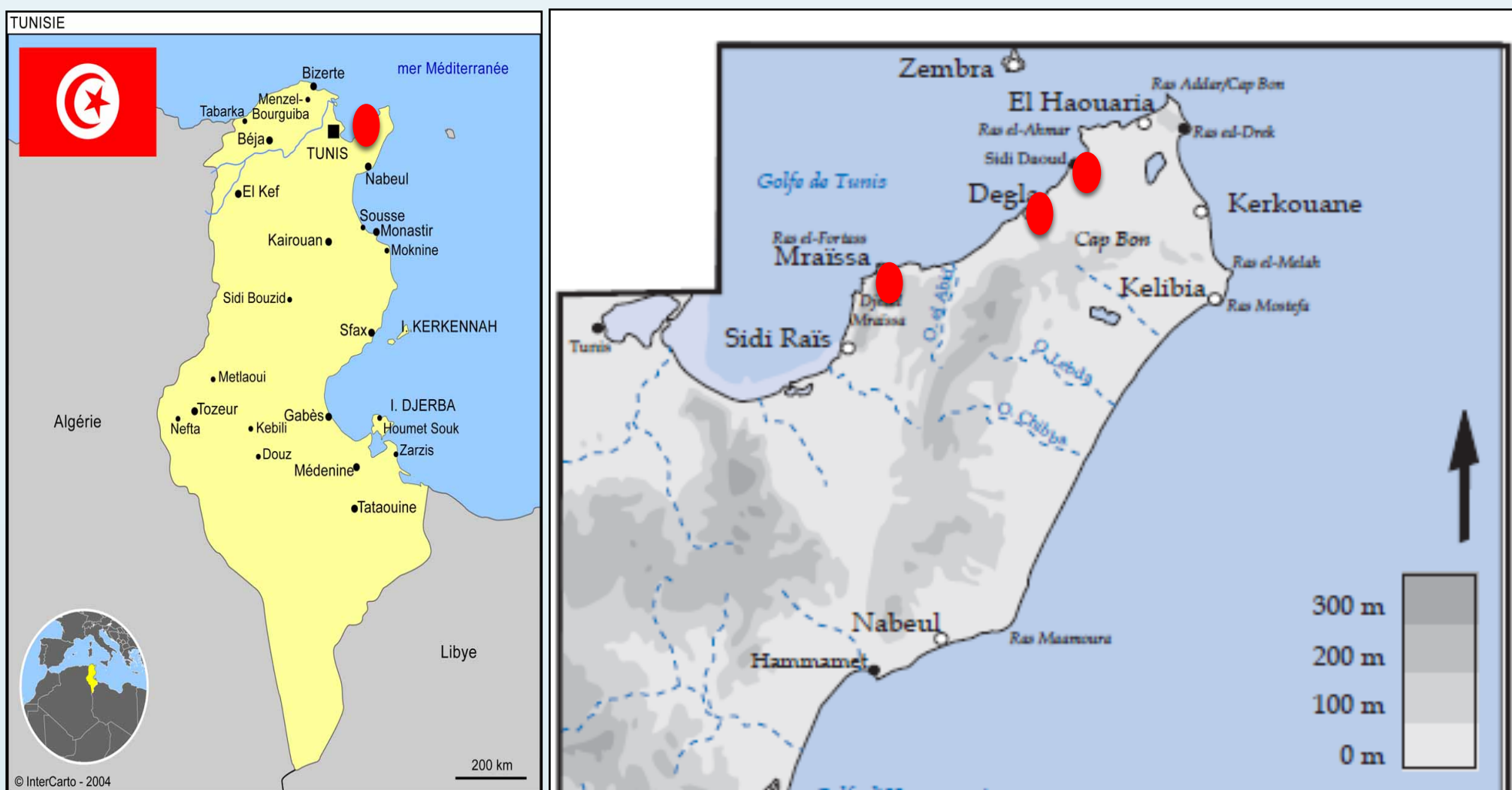


Figure 1 .Location Map of study area

Objectives

- ✓ Relocate the ancient ports of the north coast of Cap Bon (Sidi Daoud, Degla, Mraissa).
- ✓ Understand the evolution of coastal sites in antiquity and the maritime relationships between the different ports, in particular with Ostia.
- ✓ Analyse the archaeological material (ceramics, structures...), to date the ports and their evolution.
- ✓ Establish a general synthesis of the ancient ports of Cap Bon using textual, archaeological and geomorphological archives.

Methodology

- ✓ Surveying and geomorphological mapping: This stage leads to a first zoning of the most interesting archaeological sites as a function of the distribution of the landforms and sediment archives at different spatial scales. This research also relies on cartographic, iconographic and photographic collections available for the proposed study area.
- ✓ Coring campaigns: By means of several complementary techniques (hand auger, rotary mechanical coring, etc.), sedimentary columns were collected. The sampling and analysis of these cores allowed us to study the palaeoenvironments and the evolution of sedimentary processes. These deposits were compared to present sediments.
- ✓ Underwater surveys were undertaken to investigate various features: morphological (submerged notches...), biological (fixed fauna...), submerged archaeological artefacts (amphorae, anchors ...).

Recent discoveries

Submarine archaeological surveys and coring campaigns were undertaken in Sidi Daoud by a Tunisian-French team. Core surveys allowed us to investigate the chronostratigraphy of sediment archives in the study area. Stratigraphic layers provide essential information about palaeoenvironments. In total, four cores were made (7m depth with core sampling of 10-20 cm): two coring points in the southern part of Sidi Daoud in the coastal sebkha near the necropolis (SD I and SD II). Other coring points are located in the coastal lagoon near the modern port of Sidi Daoud (SD III, SD IV).

Microfauna density and species diversity provide information on the characteristics of the environment. A high species diversity may indicate a more open environment. The ostracods in our samples are not very diversified but are very numerous. The majority of the samples are characterized by monospecific populations of *Cyprideis torosa*, typical of lagoons. Sandy passes correspond to the input of lagoonal-marine ostracods (*Xestoleberis* sp., *Loxoconcha rhomboidea*).

The aim of this study was also to survey the coast of Sidi Daoud down to a depth of 10 m, on both rocky and sandy bottoms. We positioned underwater archaeological remains.

The sites revealed numerous archaeological artefacts: amphorae of various types and diverse structures.

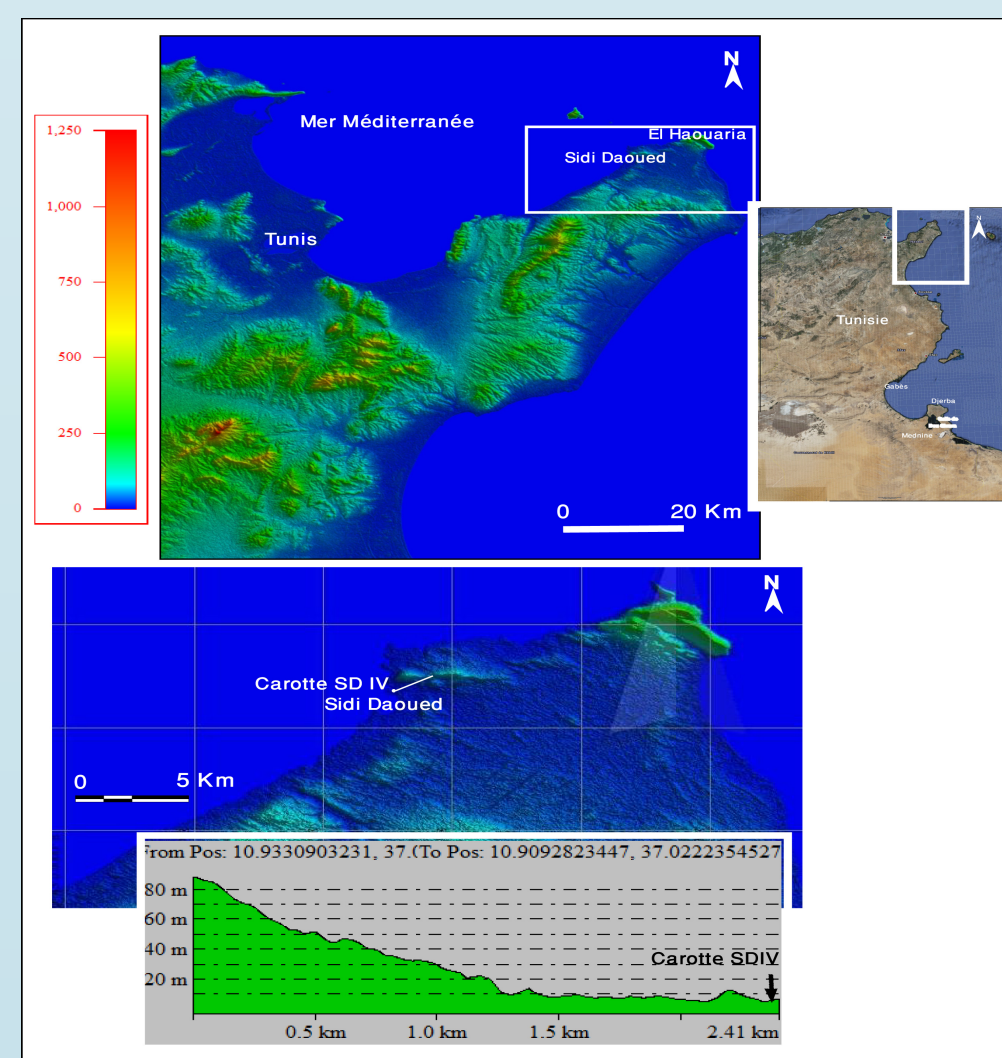


Figure 2. Location of coring site of Sidi Daoud IV

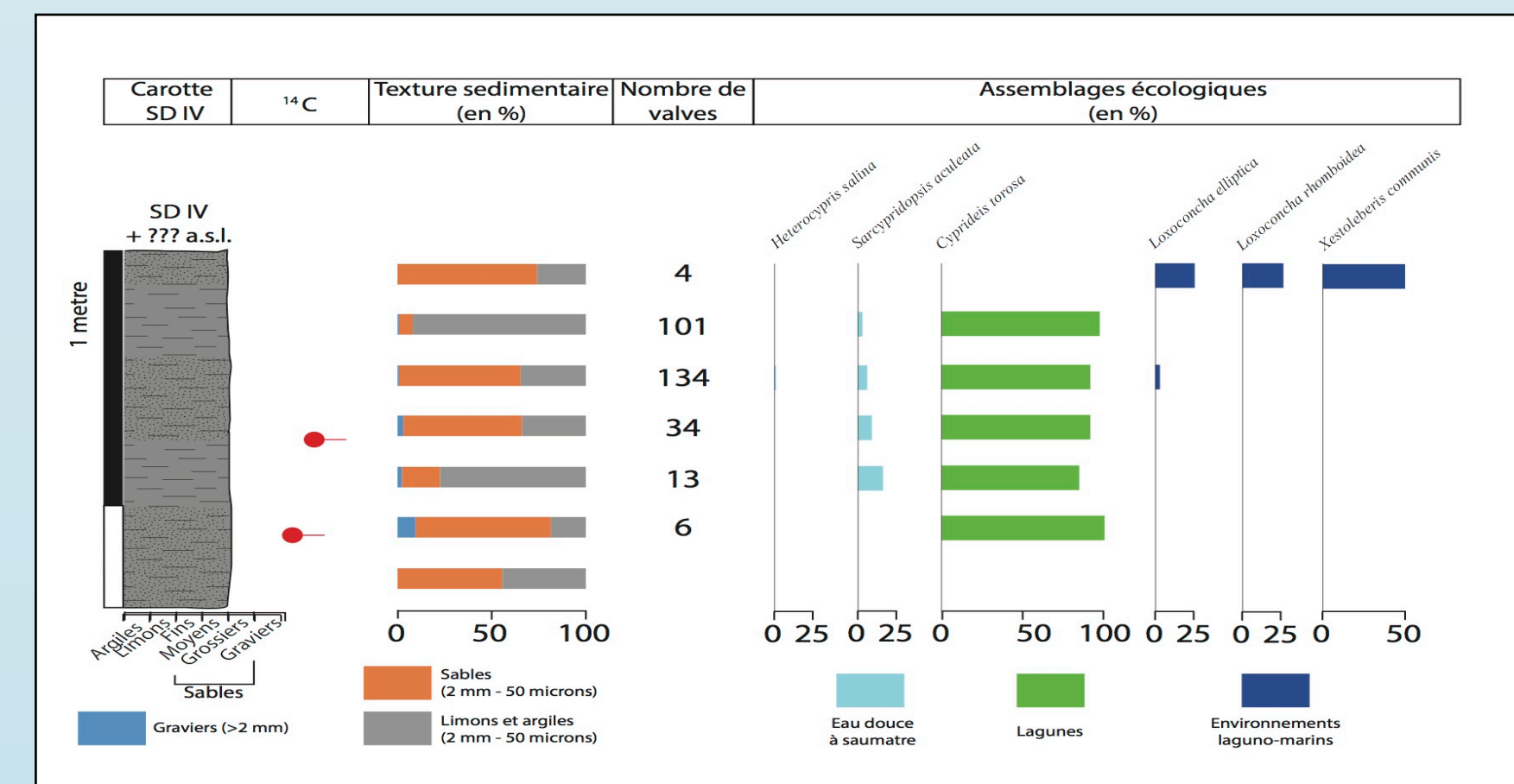


Figure 3 . Chronostratigraphy of sidi Daoud site (SDIV)



Figure 4. Laboratory work

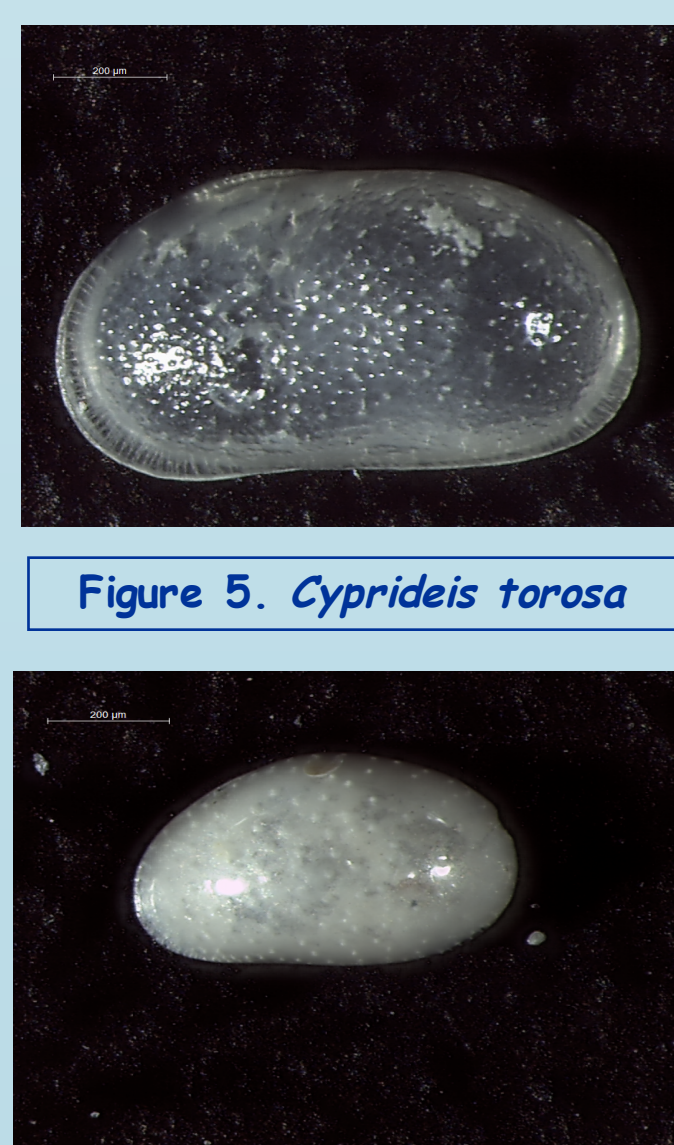


Figure 5. *Cyprideis torosa*

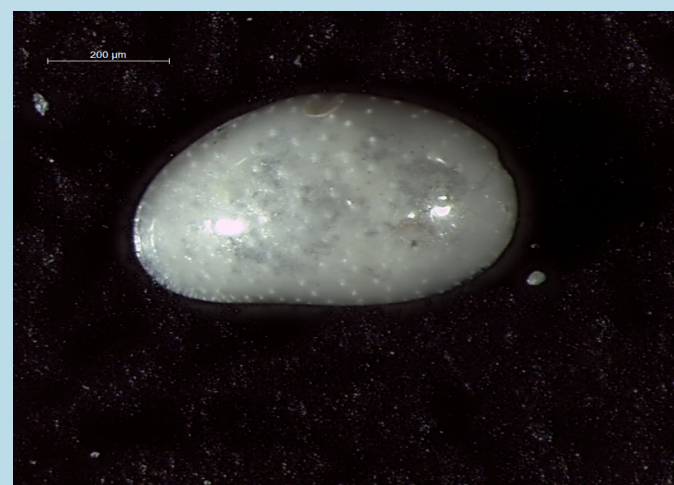


Figure 6. *Xestoleberis* sp.



Figure 7. Breakwater I

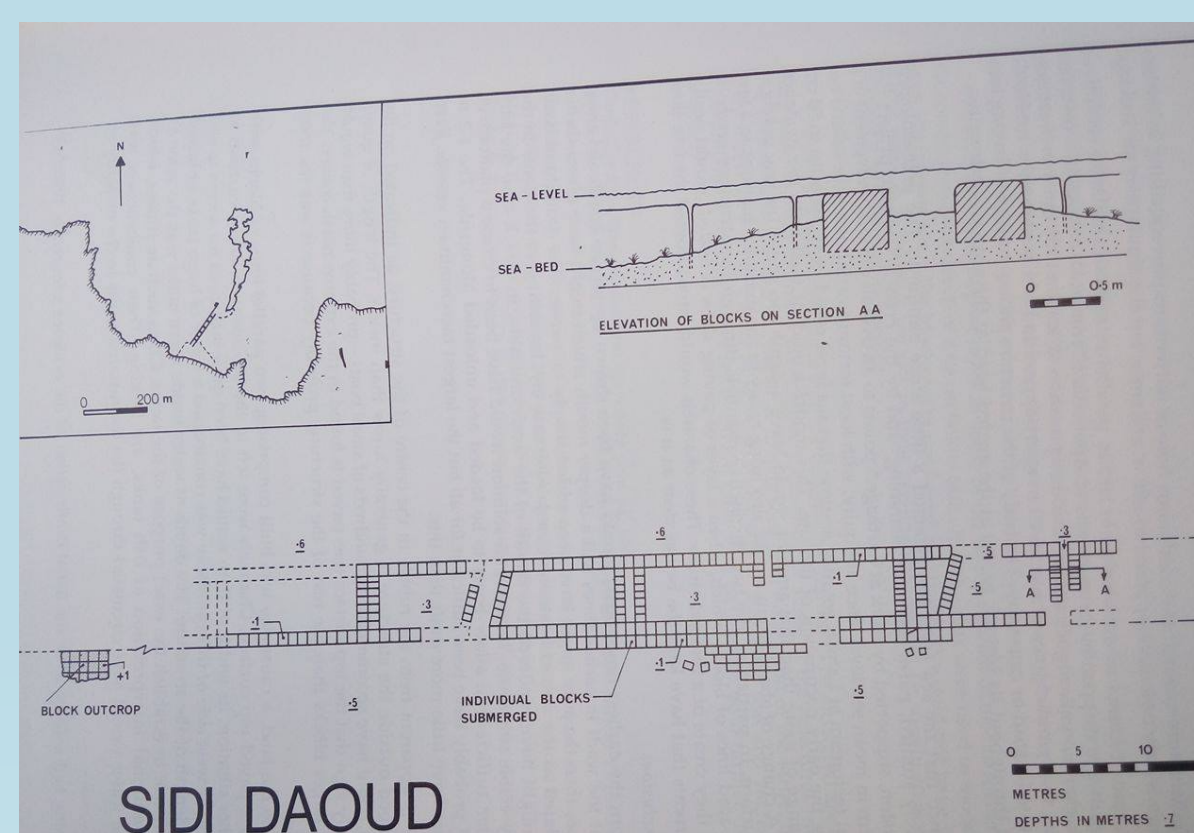


Figure 9. Plan of breakwater I (Davidson, 1999, p. 164)

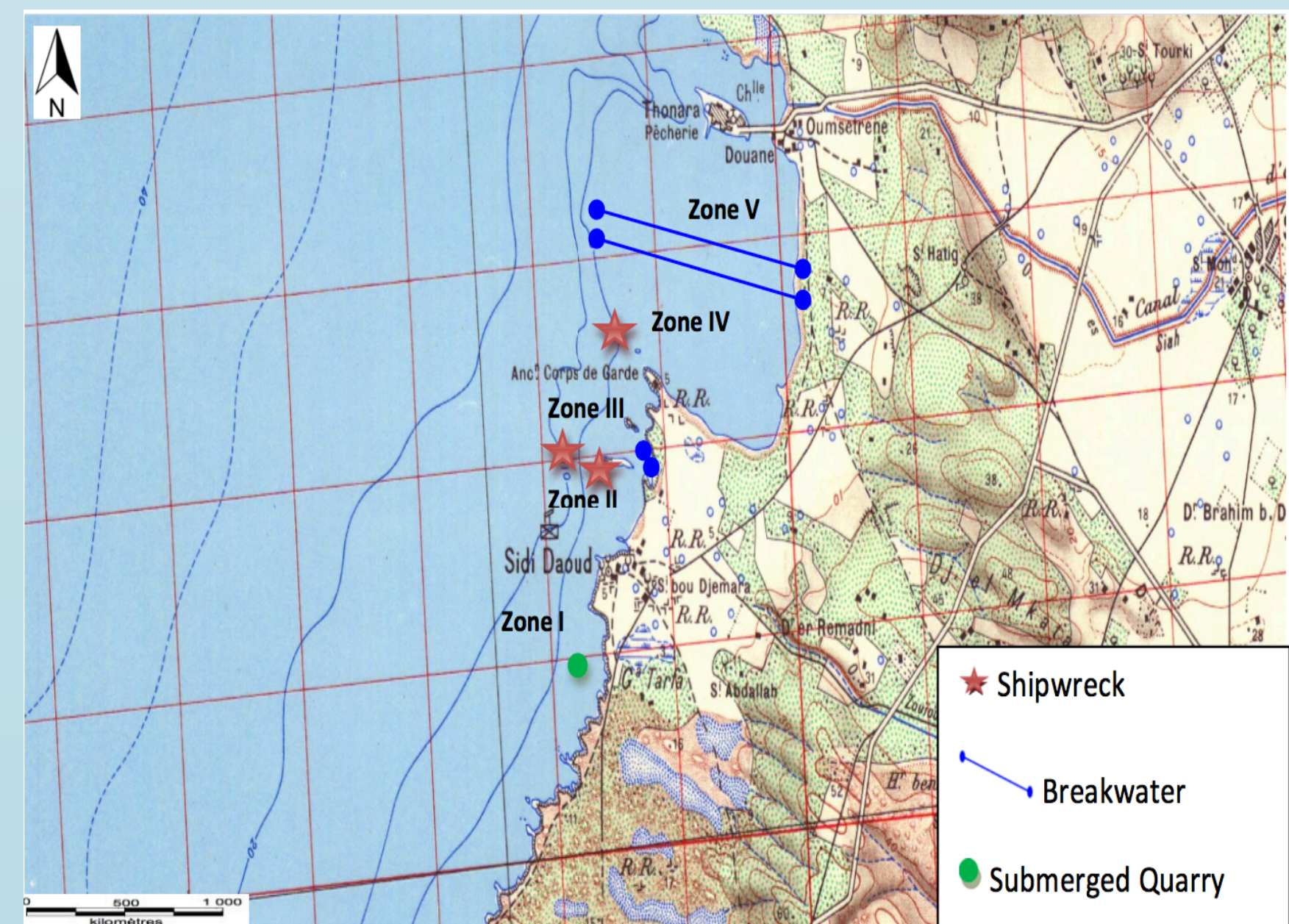


Figure 8. Map of the structures of sidi Daoud



Figure 11. Breakwater III

In zone II, in the southern part of Missua Bay, a possible breakwater is visible at a distance of roughly 100 m from the beach (Fig. 7 & 8). This structure, at a shallow depth of 1-2 m, is 10 m in width and comprises two parallel rows of blocks (Fig. 9).

Shipwreck I was discovered in zone II (Sidi Daoud) at a depth of 6 m and a distance of 200 m from the coast. The shipwreck contained mainly African II A and B amphorae (Bonifay, 2007; Fig.10). In zone V, in the northern part of the Missua site, two jetty-like structures were found.

These immersed structures (10 m in width) are made up of two parallel rows of blocks arranged like the faces of a jetty (Fig. 11).

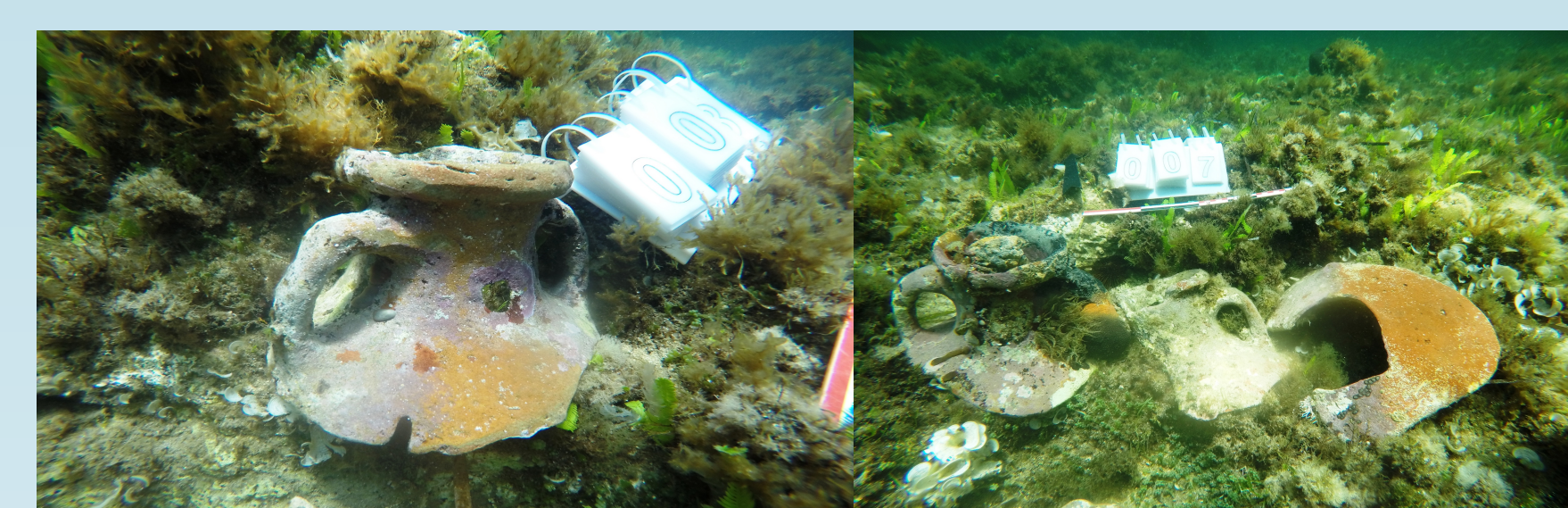


Figure 10 . Some amphorae

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