

Under the city centre, the ancient harbour. Tyre and Sidon: heritages to preserve

Nick Marriner, Christophe Morhange *

CEREGE-CNRS UMR 6635, University of Aix-Marseille, 29, avenue R. Schuman, F-13621 Aix-en-Provence, France

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Abstract

The exact location and chronology of the ancient harbours of Phoenicia's two most important city-states, Tyre and Sidon, is a longstanding debate. New geoarchaeological research reveals that the early ports actually lie beneath the modern urban centres. During the Bronze Age, Tyre and Sidon were characterised by semi-open marine coves. After the first millennium BC, our bio-sedimentological data attest to early artificial harbour infrastructure, before the later apogees of the Roman and Byzantine periods. Post-1000 AD, silting-up and coastal progradation led to burial of the ancient basins, lost until now, beneath the city centres. The outstanding preservation properties of such fine-grained sedimentary contexts, coupled with the presence of the water table, means these two Levantine harbours are exceptionally preserved. This work has far-reaching implications for our understanding of Phoenician maritime archaeology and calls for the protection of these unique cultural heritages.

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1. Introduction

Since 1998, a multi-disciplinary team under the auspice of the British Museum, UNESCO World Heritage and the AIST/LBFNM has been undertaking research into the palaeoenvironmental history of Tyre and Sidon, two famous ancient cities of the Levantine coast (present-day Lebanon (Fig. 1)). These celebrated sites have long attracted the attention of early travellers and scholars, but paradoxically very little is known about their ancient harbours [1–7].

Geoarchaeological study of ancient Mediterranean harbours is a relatively new area of inquiry that has been developed and refined over the past decade [8–10]. In the absence of often expensive and technically difficult marine and coastal excavations, the multi-disciplinary study of sedimentary harbour sequences is important for a number of reasons: (1) it enables the chronology of ancient harbours to be established (2), it facilitates the spatial localisation of the basins and the reconstruction of their palaeogeographies, and (3) it is an inno-

vative archaeological tool for the protection and management of very sensitive coastal sites under urban pressure.

We have applied high-resolution palaeoenvironmental proxy techniques to the cities' harbour environments, drilling 25 bore-holes in Tyre and 15 in Sidon. Laboratory studies of the sediment cores have enabled us to rediscover the two cities' ancient harbours and reconstruct the former dimensions of the basins.

Natural down-wind basins are located on the northern sides of both the Tyrian and Sidonian promontories [11]. These are the most attractive locations for the berthing of boats. Cores have been essential in precisely reconstructing the palaeoenvironmental evolution, the maximum extension and shoreline mobility of the ancient basins. Here we discuss the exact spatial morphology and limits of the northern basins, and their potential for future archaeological excavations.

2. Palaeogeography of Tyre's ancient northern harbour

Since 7000 years, the Lebanese coast has been characterised by relative sea-level stability [12] except for small loca-

* Corresponding author.

E-mail addresses: nick.marriner@wanadoo.fr (N. Marriner), morhange@cerage.fr (C. Morhange).

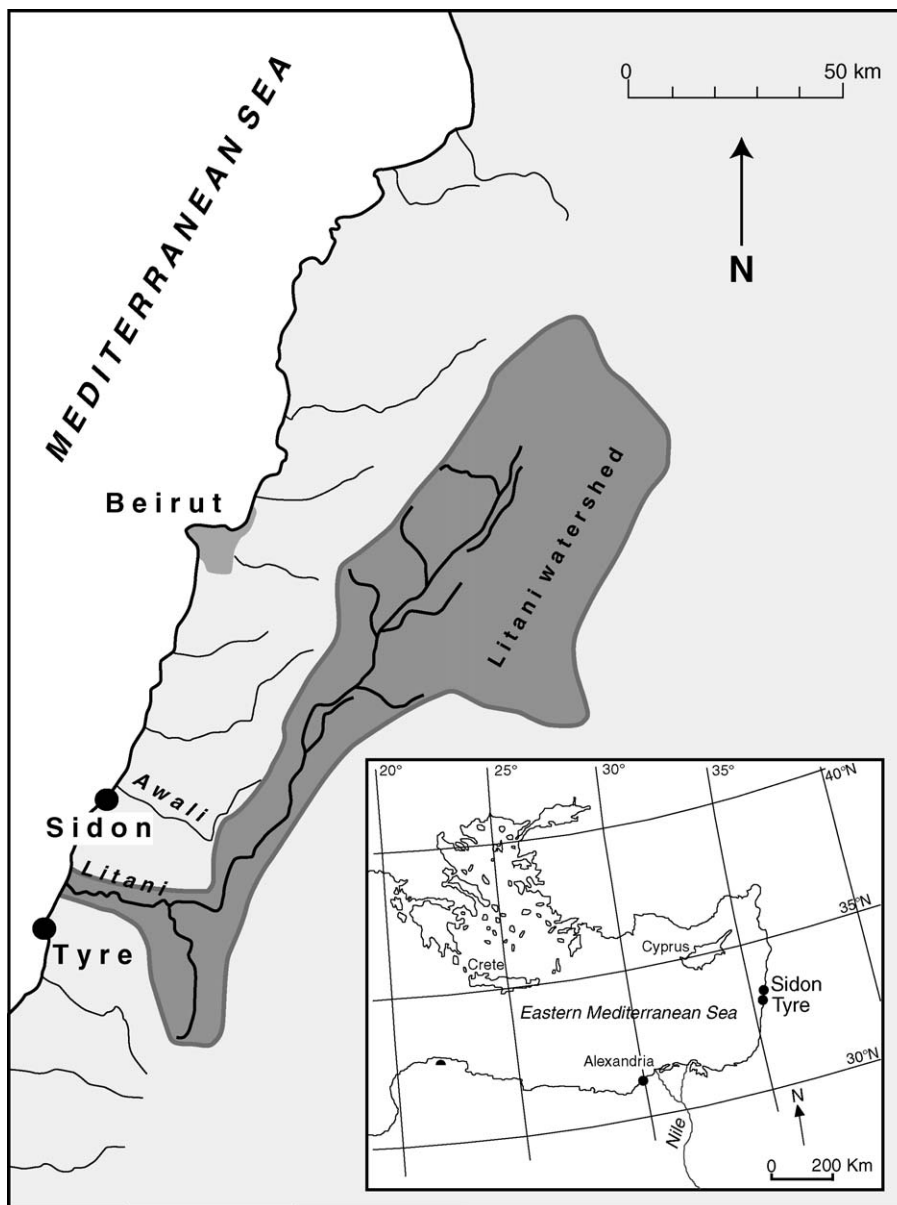


Fig. 1. Location of the studied sites.

lised tectonic movements, as, for example, in the Tyre sector [13]. In Tyre, ca. 7000 years ago, relative sea-level was around -6 m below present and the ancient shoreline of the island was therefore very different to nowadays. Quaternary aeolianite ridges were exposed, protecting the later Bronze Age harbour cove [14] (Fig. 2). This natural protection explains the location of the city and its harbour on the northern leeward façade of the island. Bio-sedimentological proxies demonstrate the presence of a relatively shallow, low-energy environment, newly transgressed by the end of the post-glacial sea-level rise. The palaeo-bathymetry indicates that the sub-aerial extension of the sandstone ridge, forming Tyre island, had a much greater northerly and southerly extent, sheltering the leeward cove from the dominant onshore south-westerly winds and swell.

Around 3500 BP, when the Middle Bronze Age (MBA) harbour was founded, the environment was relatively less pro-

ected because of the marine transgression and erosion of these natural sandstone ridges (Fig. 3). The litho- and biostratigraphies indicate the beginning of strong anthropogenic modification of the natural environment [15]. Geochemical analyses of the harbour sediments attest to human occupation and palaeo-metallurgy from the MBA onwards. From this period, the harbour shoreline was characterised by rapid progradation linked to a positive sedimentary budget.

During the Roman and the Byzantine periods, the basin was characterised by very rapid silting. The environment was marked by a low energy, fine muddy-sand facies, indicative of a sheltered harbour existing up until ca. 1000 AD. During the Byzantine period, proxies suggest the presence of a sheltered leaky lagoon, concomitant with a very well-protected harbour during the harbour's apogee. This was the case in other Phoenician harbours, such as Beirut and Akko.

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