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Palaeoenvironmental and archaeological records for the reconstruction of the ancient landscape of the Roman harbour of Narbonne (Aude, France)

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ABSTRACT

Analysis of sediment records and AMS radiocarbon dates are used to reconstruct Quaternary landscapes and palaeoenvironments of the ancient Roman harbour at Narbonne. Capital of the Roman Province *Gallia Narbonensis*, which extended from the Pyrenees to the Alps, Narbonne was one of the largest port cities in the northwest Mediterranean during the first millennium AD. Yet, the strategies deployed in managing the harbour, particularly the management of natural processes, are little understood. A synthesis of archaeological, geomorphological and geophysical data was made to assess the palaeoenvironmental constraints faced by residents of Narbonne, and what strategies they may have adopted in the management thereof. Harbour structures dating from the 1st–5th centuries AD discovered in Castélou and Mandirac were intended to canalize an Aude river branch allowing transfer and unloading of trade goods. These new insights about the harbour of Narbonne provide a valuable comparison for other ancient Mediterranean harbours such as Ostia (Italy), Tell About Hawam (Israel), Taposiris (Egypt).

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1. Introduction

Writing around the end of the 1st century BC, Strabo described Narbonne as “the [most important] emporium of all Gaul (IV, 1, 12)” because of the extent of its commercial activities. Capital of the Roman Province *Gallia Narbonensis*, which extended from the Pyrenees to the Alps, Narbonne was an important land and maritime crossroad at the mouth of the Aude valley in France (Fig. 1), offering strong potential as a major route inland and beyond to the Atlantic regions. The extent of Narbonne's economic and commercial activities has been well-attested by ancient authors (e.g. Pomponius Mela, Sidoine Apollinaire, Strabo), epigraphic sources and wrecks of ancient ships whose cargoes transited through the

port (Solier et al., 1981). Yet, the topography, environment and organisation of Narbonne's port are little known. Since 2005, a multidisciplinary research project, led by UMR 5140 CNRS “Archéologie des Sociétés Méditerranéennes” (Montpellier, France), has focused on the need to better understand those strategies deployed around Narbonne over several centuries to adapt to and rationally manage dynamic environmental constraints. Two large embankments have been revealed, which are the docks in Castélou/Mandirac, and canalized an ancient Aude's river branch (Caverio et al., 2010, 2012; Mathé et al., 2010; Sanchez et al., 2011, 2014; Sanchez and Jézégou, 2011).

The study of Roman ports and canals around the Mediterranean is an increasingly common focus of geoarchaeological research. The archaeological and geoarchaeological analyses of these port zones enable us to better understand how societies transform and adapt to changing coastal environments (Goiran and Morhange, 2003; Marriner and Morhange, 2007; Salomon et al., 2014a). Various types of port were examined, as defined by their locale (marine –

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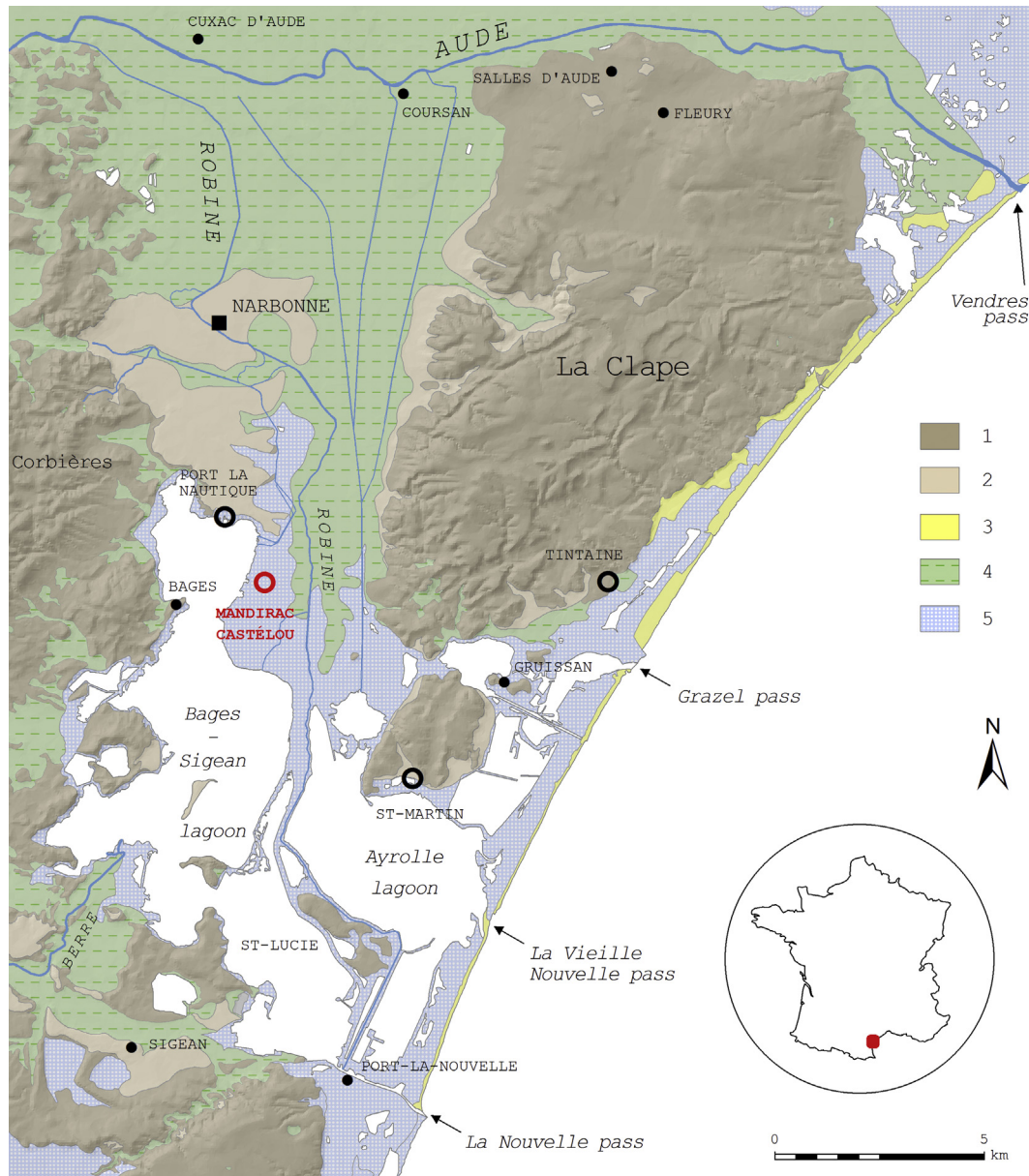


Fig. 1. General location map of Narbonne and geographical setting; simplified geology of Narbonne lagoonal system after Jaffrezo (1982). 1: Mesozoic and Cenozoic (marls, limestones, conglomerates). 2: Pleistocene (alluviums, colluviums). 3: Sandy barrier. 4: Holocene (alluviums, colluviums). 5: Wetlands. The arrows indicate current passes. The red point localises the archaeological site.

harbour of Alexandria by example (Goiran et al., 2005); lagoonal – Morhange et al., 2015; fluvial – harbour of Avaris in Egypt (Tronchère et al., 2012)) as well as their structures (basins – Goiran and Morhange, 2003; quays with the example of Avaris in Egypt – Tronchère et al., 2012), and also the presence or absence of canal systems linking rivers to the sea, port or city (Keay and Paroli, 2011; Keay et al., 2014), two rivers (Kort and Raczynski-Henk, 2014) or two estuaries (Zielhofer et al., 2014). Archaeology and geophysical surveys are important tools in these kinds of research, and together with sedimentology provide important data for the reconstruction of anthropized environments, and understand Roman palaeo-engineering of ancient harbours and canals (Morhange et al., 2015; Salomon et al., 2014a).

In this study, we present a reconstruction of the landscape when the site was occupied, and evaluate the advantages and constraints of settling in such a place. The geophysical surveys, archaeological

excavations, sedimentological and geomorphological observations, and historical documents enable us to better understand the development of these harbour structures, how they were adapted to the environmental dynamics, and to place the harbour in a broader context.

Based on an interdisciplinary study of the evolution of the fluvio-lagoonal system, the palaeoenvironmental reconstruction can inform why a colony and one of the most important ports in Antiquity was established there.

2. The archaeological site of Castelou/Mandirac

2.1. Geological and geomorphological contexts

Since the 1960s, various research have produced environmental reconstructions of the Narbonne region (Verdeil, 1967, 1970; André

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