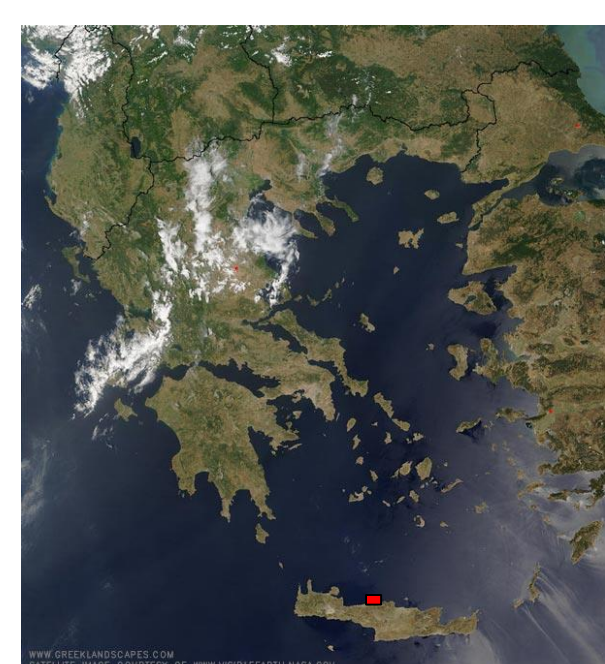


Interdisciplinary survey on the maritime installations of ancient Rithymna

Archaeological and Geoarchaeological investigations



Location of Rethymnon (ancient Rithymna), Crete, Greece

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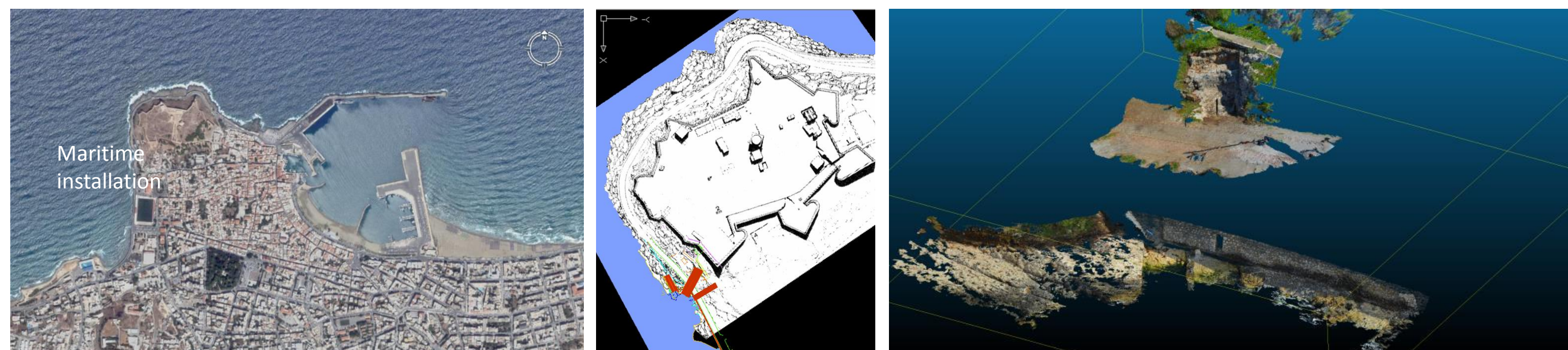
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I. HISTORICAL BACKGROUND

The city of ancient **Rhithymna** (today Rethymnon) is located in the central part of the northern coast of the island of Crete. It was an autonomous city-state already from the 4th c. BC, as evidenced from inscriptions and coins. Yet very scarce remains of the Classical and Hellenistic city have been yet revealed. The golden era of the city dates to the Venetian rule, when **Rettime** is one of the four main cities of the Venetian Kingdom of Crete. Important fortifications and maritime works date from this time, as the construction of the Fortezza.

The archaeological site and research issues

On the western part of Fortezza lies a maritime installation, consisting of a complex of rock-cut slipways. The slipways are hypothetically attributed to the Hellenistic city of Rithymna, whose extent and layout remains conjectural as only limited archaeological evidence have come to light. Part of this maritime infrastructure consists of rock-cut slipways disposed on different orientations and today partly covered by the modern coastal highway. The structures were archaeologically investigated in 1981 and 2005, but no geophysical prospections were ever carried out on the overbuilt section to comprehend their overall configuration.



Location of the maritime installation of rock-cut slipways on the western part of the Fortezza (map modified after Google maps 2013). Location of the slipways in association with the Fortezza. Based on the Autocad plan 2005 and the plan of the Fortezza (from Steriotou 1992) Photogrammetric recording of the slipways' area and their sea-ward extremity

II. OBJECTIVES

The geoarchaeological investigations conducted on the site of the ancient slipways' area had as objective the study of the form, architectural design, functional layout, as well as the overall extension of the maritime infrastructure.

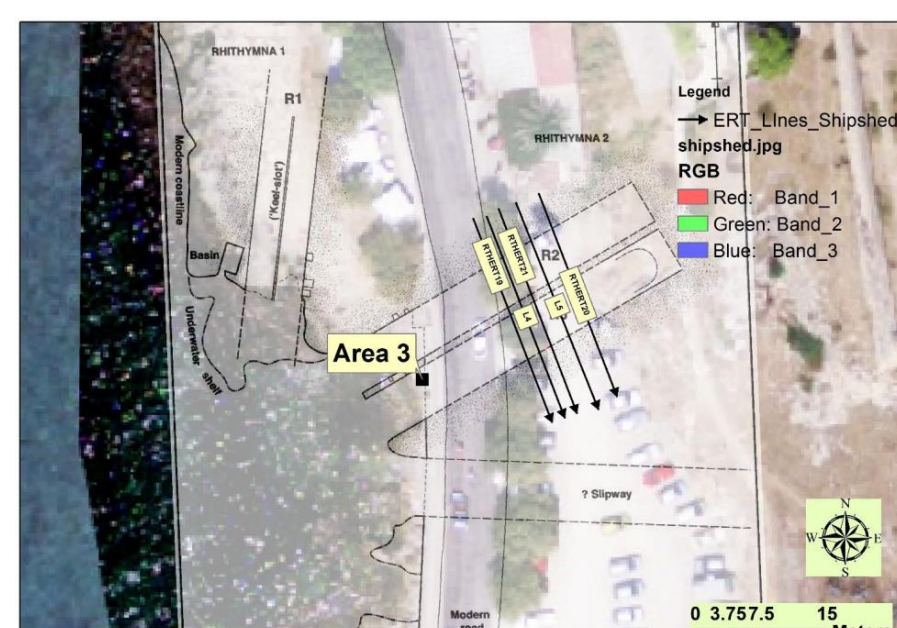
III. METHODOLOGY

A combination of totally non-destructive geophysical and remote-sensing methods were employed (see related Paper in this Conference). Measurements were compiled with 3D photogrammetric recording. The aim was the study of their topographical relationship with the Fortezza - most probably, the location of the ancient *acropolis*, the systematic recording of the visible remains, as well as photogrammetric covering of the area in a larger scale.

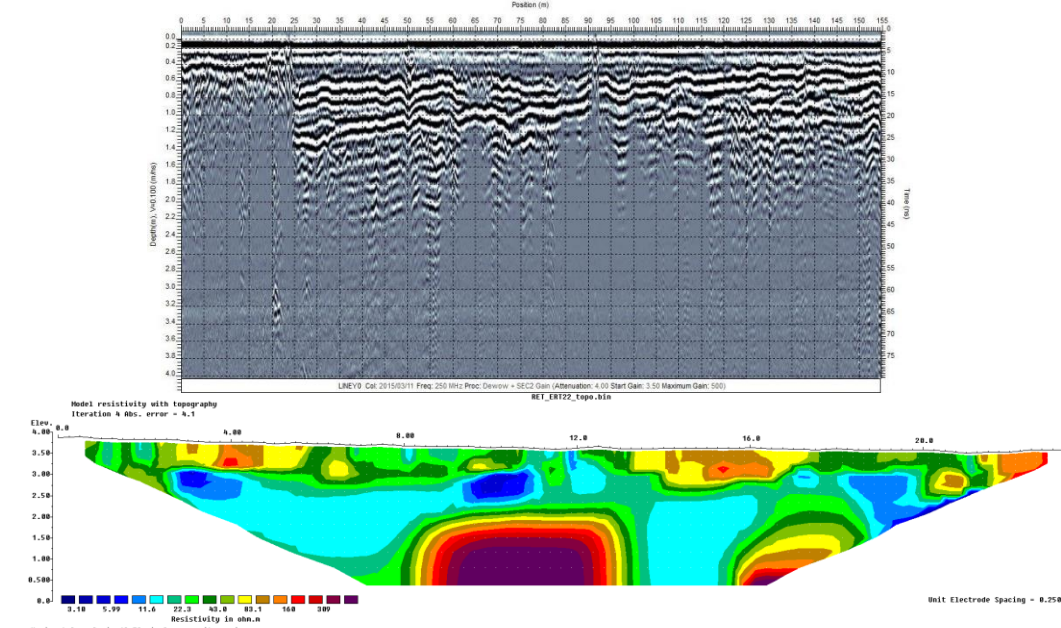
A. Geophysical prospections



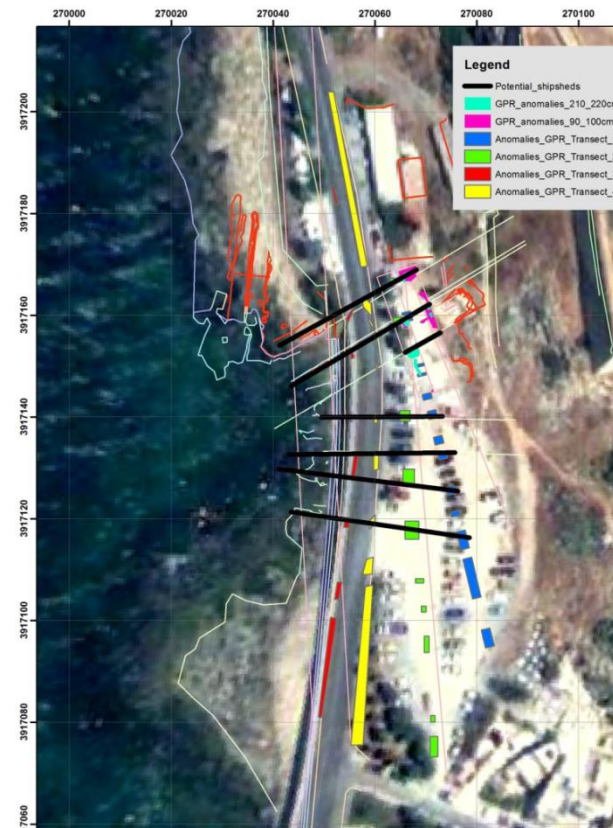
Photogrammetric recording of the area with drones for the study of the topographical relationship of the slipways complex with the Medieval Fortezza, corresponding probably to the ancient acropolis.



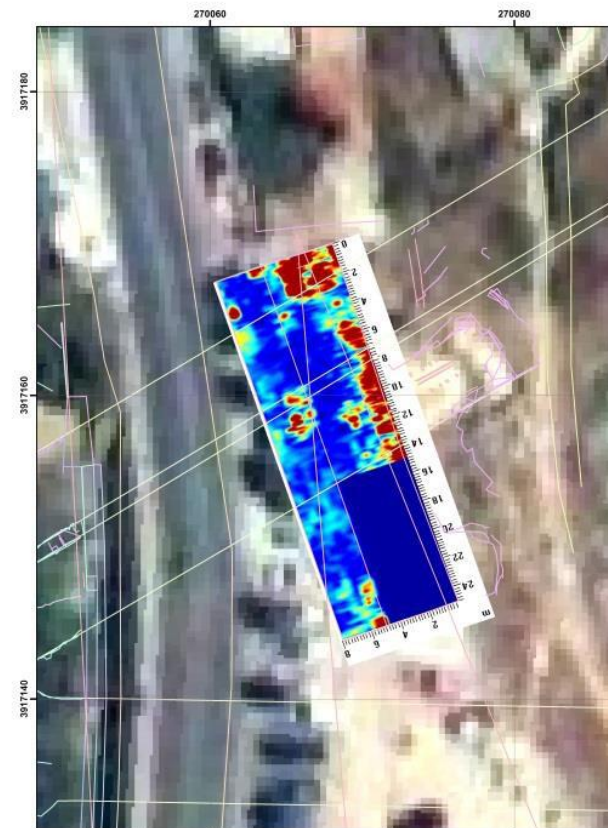
Location and orientation of the ERT lines that were laid out in Area 3 where the slipways are located.



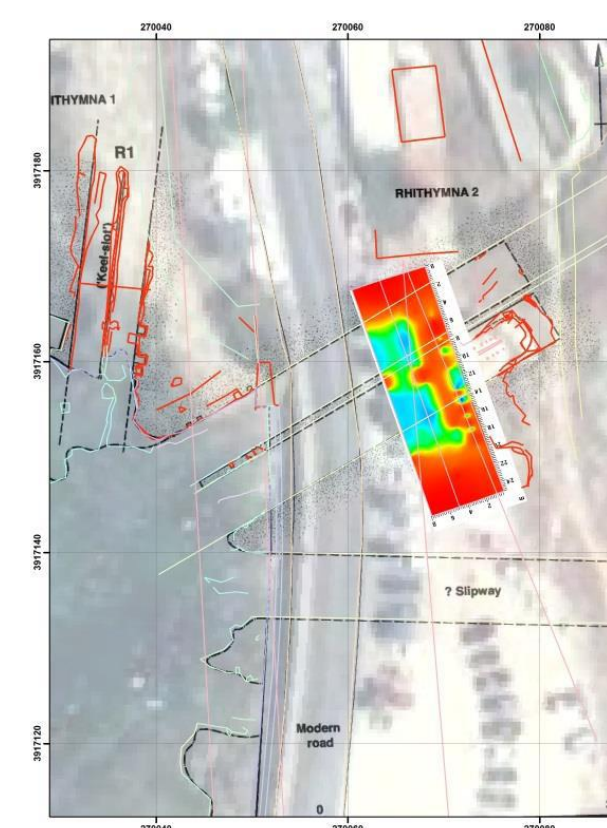
GPR results and ERT lines- Possible continuation of the slipways' complex towards the south.



Details of the GPR strong reflectors and suggested slipways



Rectified GPR depth slices for 90-110cm below the surface



Rectification of the subsurface terrain model as extracted by the ERT survey (for the 100 Ohm-m) that shows the elevation variation of the bedrock

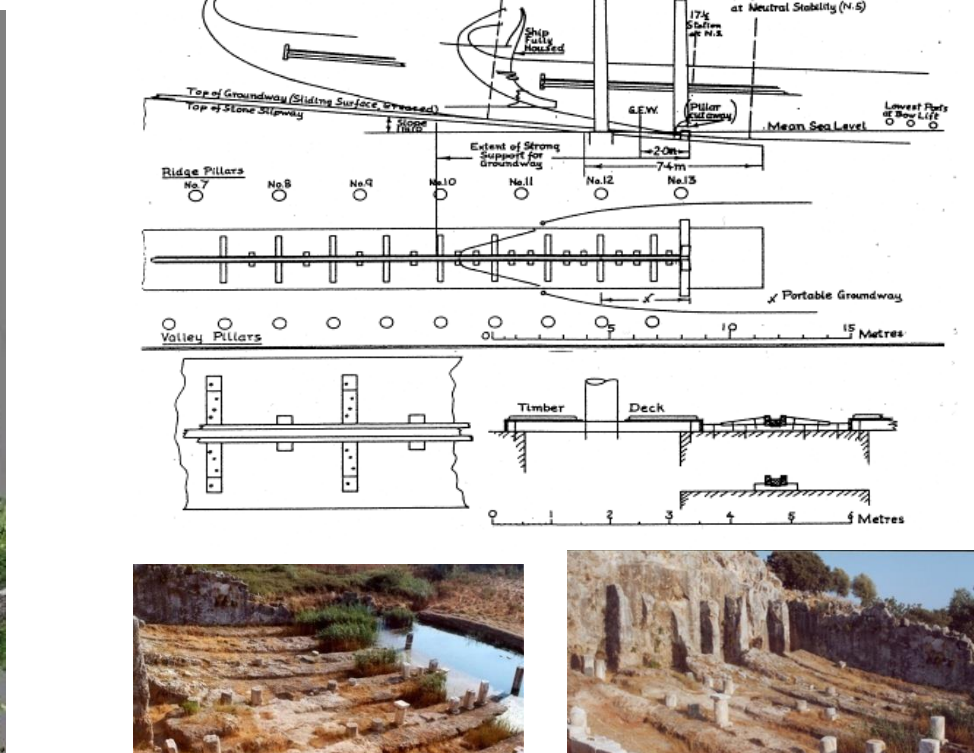
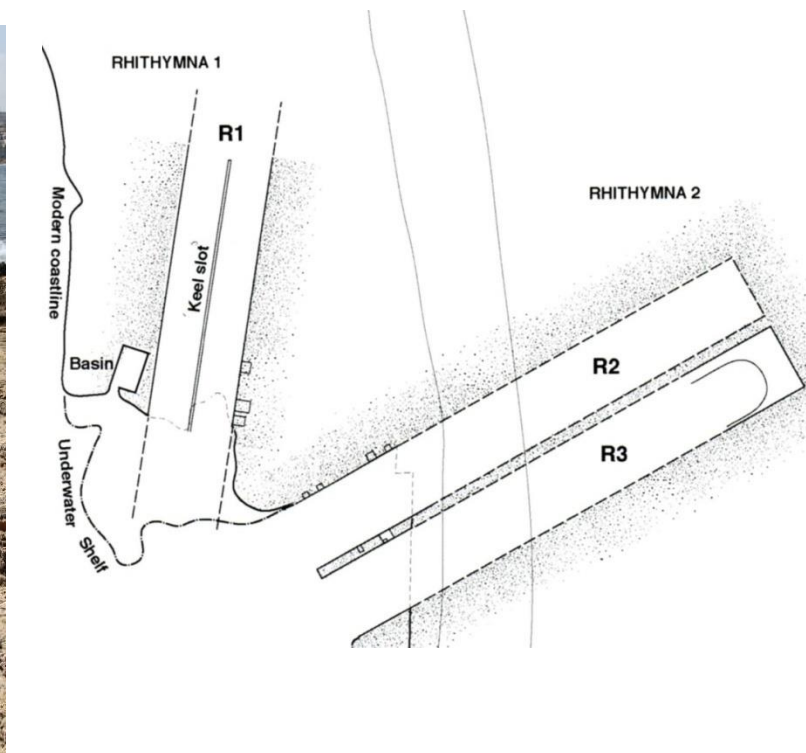
The **geophysical study** employed Electrical Resistivity Tomography measurements (ERTs) and Ground Penetrating Radar in order to examine the geological stratigraphy of the slipways area and reveal the overall configuration of the built-over rock-cut ramps. Data also gave positive results as far as the location of the continuation of the complex is concerned towards the south. The correlated geophysical data were particularly revealing for calculating the inclination of slipway R3 and reconstructing the form and functional details on the ramps R2 and R3 configuration.

B. Archaeological investigations

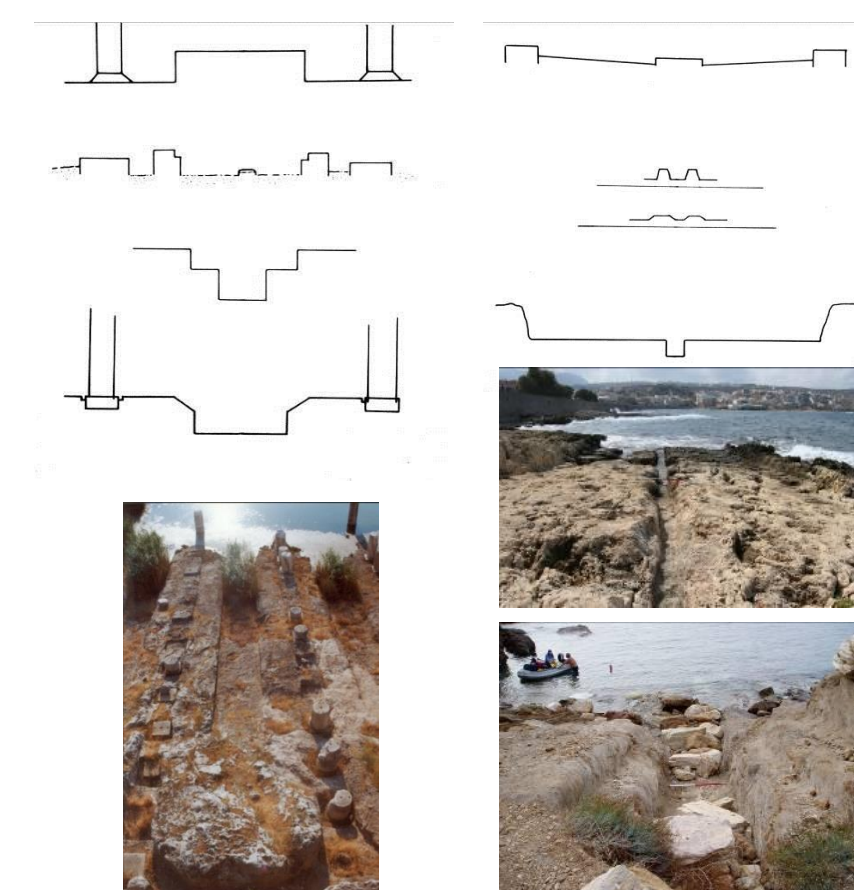
New data from the prospections and the detailed photogrammetric recording of the slipway R3, were studied in the light of a series of archaeological parallels of rock-cut slipways known from Crete and around the Mediterranean. They are all distinguished by their diverse typology as naval bases with geostrategic location. Architectural details, such as the central runner, are revealing of their wooden infrastructure and functionality.



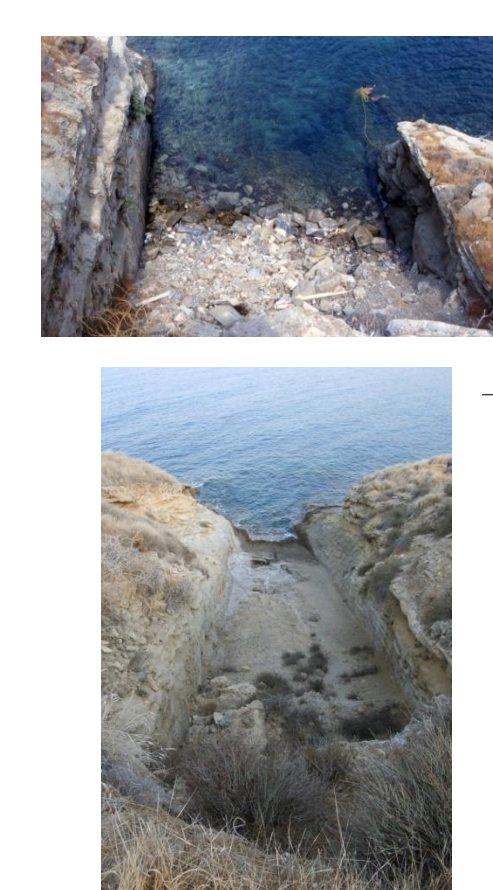
Slipway R1 with central runner. Photogrammetric recording of the slipway R3.



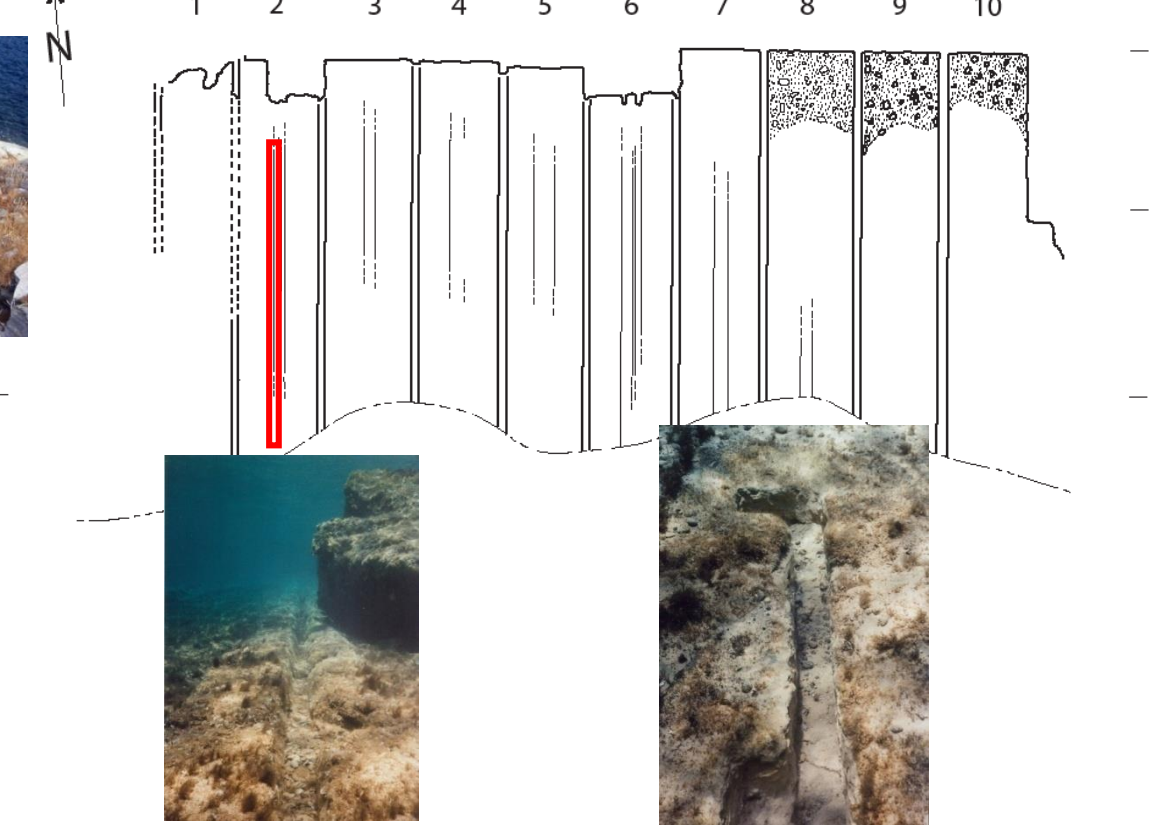
Study of the function of a slipway's superstructure with a central runner. J. Coates 1986 - Ramps in Oiniadae



Comparative study of Mediterranean rock-cut ramps cross-sections



Kea and Trypitos (Seteia) rock-cut slipways.



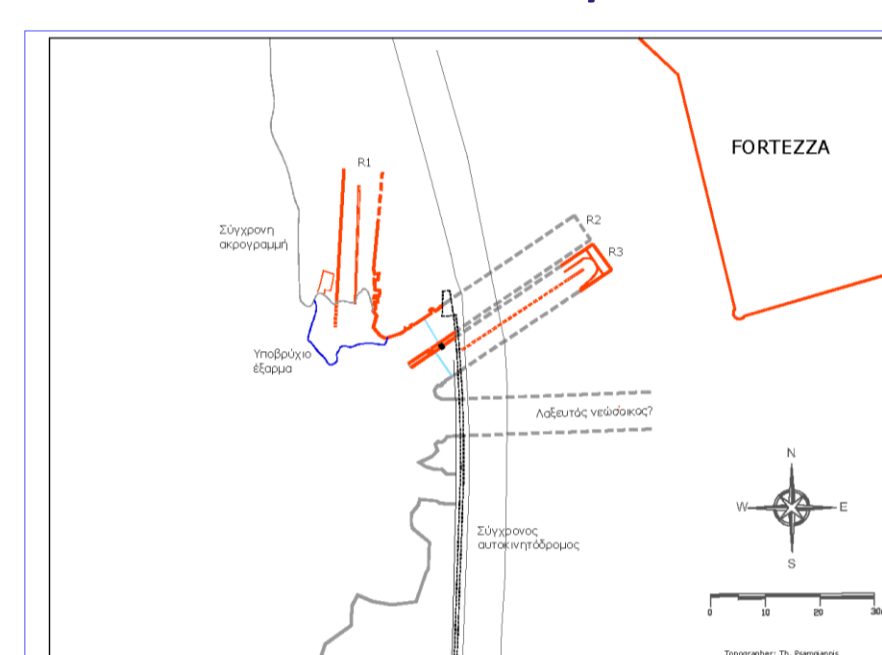
Apolonia Cyrenaica submerged rock-cut slipways with central runners. Photos Courtesy Jean-Paul Misson

IV. PRELIMINARY RESULTS AND PERSPECTIVES

- The geophysical prospections gave positive evidence for the existence of a possible continuation of the slipways complex to the south.
- Structurally, newly recorded architectural details on the ramps instructive of the (today lost) wooden infrastructure used on the hauling and launching operations of ancient oared warships enrich the existing record.
- There is more evidence to pursue the study on the naval craft that was accommodated on the slipways, especially ratios of width : length of medium-sized oared warships.
- We are now able to propose a reconstructed plan of a complex consisting of rock-cut slipways of different widths, a complex that shows certain similarities with archaeological parallels in the Aegean and the Mediterranean.

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Plan and reconstruction of the Rithymna complex. Model of a 5th c. BC trireme in an Athenian shipshed at Zea - J. Coates 1986

