RECONSTRUCTION OF THE SUBMERGED LANDSCAPE OF VATIKA BAY, PELOPONNESE, GREECE

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Abstract
Vatika Bay, in SE Peloponnese, Greece, has been the subject of a marine geophysical-geological survey with the aim to reconstruct the submerged prehistoric landscapes. Subsidence of the prehistoric city of Pavlopetri is in mark contrast to the long-term uplift of the area, as postulated the uplifted Late Quaternary terraces. Our scope is to understand the geological processes which led to the drowning off the city within a long-term upliftin region. Preliminary interpretation of the obtained data reveal a complicate tectonic deformation with relative subsiding and uplifting areas controlled by active faulting.

Keywords: Active margins, Tectonics, Seismics, Sea level, Hellenic Arc

Introduction
Vatika Bay, in SE Peloponese, Greece, has been the subject of a marine geological geophysical survey with the aim to reconstruct the submerged prehistoric landscapes. The area belongs to the seismically active Hellenic Arc and is characterized by long term uplift [1]. A series of Late Quaternary marine terraces occur around the Vatika Bay, reaching altitudes of several hundreds of meters. At the northwestern coast of the Bay, the ancient/prehistoric city of Pavlopetri has subsided by about 3-4 m below the present seafloor [2], [3]. Local subsidence is likewise indicated by beachrock formations submerged by 3-4 m. Our scope is to understand the geological processes which led to the drowning off the city within a long- term uplifting region and reconstruct the submerged, Late Quaternary landscape.

Material and Methods
The survey has been conducted on board the 14m RV Alkyon of the HCMR. Single beam and swath bathymetry data, high resolution seismic profiling (3,5kHz Pinger, Boomer, Chirp) and side scan sonar imaging revealed a valley-like morphology, with smooth relief in the northern and eastern part of the gulf while the western part close to Elafonisos island is characterized by steep slopes and terraces.

Results
The interpretation of the seismic profiles indicates a series of submerged riverbeds running off the northern shore of the Bay and buried below the recent, Holocene sediments. Holocene sediment deposition on the shallow seafloor of the Bay is fairly limited, with sediment thickness not exceeding a few meters. In the deeper part and close to the axial valley of the Bay, at about 85-100 m depth, we observe a fairly well developed prodelta prograding sequence, which may have formed in respect to a previous, low sea level. Two prominent, erosional terraces have been mapped systematically on the seafloor of the Bay at depths of 99-107m and 93-108 m. Two more, morphological terraces, at 65-70 and 51-56m depth, have been mapped locally.

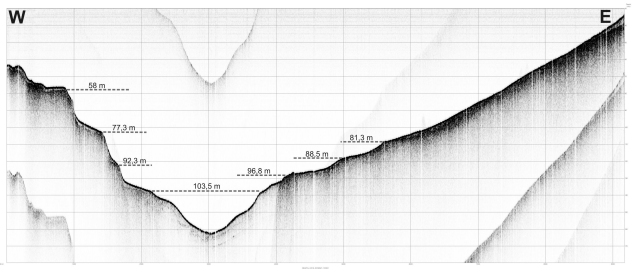

Fig. 1. Dustlines indicate marine terraces. In both western and eastern slope, the terraces seem to exist in different depths.

High resolution seismic profiles across the western steep slope of the Bay provide evidence of E-facing, NW- SE trending, normal faulting, separating the uplifted Elafonisos Island from the subsiding Vatika Bay. The eastern slope of the Bay displays marked differences: it dips smoothly westwards, while the observed submarine terraces do not match with the ones mapped along the western slope.

Conclusions
Preliminary results of the present research indicate that active faulting separates the long-term uplifting parts of the surveyed area from the relative subsiding seafloor of Vatika Bay. The submerged ancient city of Pavlopetri is located on the subsiding, hanging wall of the dominant fault. Submerged, Early Holocene riverbeds have been mapped on the shallow shelf of the Bay. Differential vertical tectonics has led to the occurrence of low sea-level terraces at different depths across the Vatika Bay.

References
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