

# SUBMERGED LANDSCAPE ARCHAEOLOGICAL FEATURES OF THE CARIA REGION

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## Abstract

Submerged ancient harbours and coastal installations were researched along the coast of Caria during underwater surveys undertaken between 2006 and 2010. The current positions of the submerged remains have been measured and compared with eustatic –isostatic sea level data. The results indicate that the primary cause of relative sea level changes is the vertical tectonic movement of Caria coasts.

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Caria is one of the most important regions of the ancient world due, in part, to the geographic relationship of sea trade between east and west (Figure 1a). Several important coastal settlements have been located in Caria demonstrating maritime activity from the Hellenistic to Byzantine periods. A number of coastal settlements can be listed; Iassos, Myndos, Halicarnassus, Cedrai, Cnidus, Caunos, Tymnus, Thyssanos, Lydai, and Crya, which contain, among other features, breakwaters, moles, quays, and public buildings. Some features of these sites are presently submerged as a result of the combination of tectonic subsidence, and eustatic sea level change.

A detailed marine geophysical and archaeological survey was performed during 2006 in the harbour of ancient Halicarnassus, located in southwestern Anatolia (Figure 1a, b). A bathymetric survey was also carried out in order to reveal the current situation of ancient remains (Figure 1c). High resolution seismic data were collected for the harbour in order to determine the level of original seafloor below the ancient remains and the thickness of Holocene deposits. After the acoustic survey, underwater images and mortar samples from remains were taken by SCUBA divers.

rubble stone were used to build the mole.

Eustatic–isostatic sea-level change has not exceeded 0.5 m during the last 2000 years [1, 2]. However, over the same period, ongoing tectonic activity has affected the coasts of the southeast Aegean Sea [3]. Frequent earthquakes occurred around the middle of the 6<sup>th</sup> century, giving rise to vertical tectonic movements of the coastal plain, which make the harbour constructions currently useless. After the harbours were submerged and lost their function, many coastal settlements in the Caria region would not have been used as harbour cities.

## References

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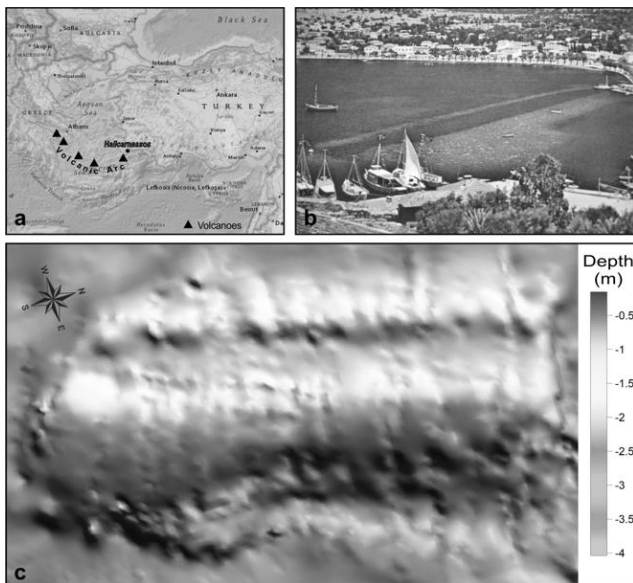


Fig. 1. Submerged harbour remains of Halicarnassus. (a) Location map; (b) a photo from 60°s; (c) multibeam bathymetric map of submerged remains.

A submerged ancient mole, located in Halicarnassus harbour, has two separate parts, lying in a nearly north to south orientation. The highest level of the mole lies only 0.3 m below the present sea level. The maximum water depth is 4 m, near the mole. The larger part of the remain is approximately 120 m in length, 27 m in width, at southern end tapering to 13–14 m width at the northern part. Several local volcanic green stones, cut to rectangular shape, were located at the southern tip of the remain. Hydraulic mortar mixed with ceramic sherds and