



## **A middle Pleistocene eastern Mediterranean fish refuge: the Tsampika Bay (Rhodes, Greece)**

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Extensive sampling of the Tsampika marly diatomites reveals the presence of at least three very important fish species, *Bregmaceros* sp., *Sygnathus acus* and *Spratteloides* sp.. Previous records of *Bregmaceros* sp. in the Mediterranean have suggested that this characteristic Pliocene warm-water circumglobal pelagic fish disappeared from the Mediterranean basin due to the climatic deterioration, after the Gelasian age<sup>1,2,3,4</sup>. The Tsampika fish-bearing deposits, mainly marly diatomites, are younger than 268 Ka, based on the occurrence of *Emiliana huxleyi*. Consequently, this is so far the youngest record of *Bregmaceros* sp. in the Mediterranean, suggesting that typical Pliocene fish may have found refuge in selected localities, such as Tsampika Bay, at least until the Ionian. Evidence for its presence in the Mediterranean basin today is ambiguous. Isolated records of *Bregmaceros atlanticus* place it in the Sicily Strait<sup>5</sup>, and off the Israeli and south Turkish coasts<sup>6</sup>. Although it appears more likely that *Bregmaceros atlanticus* has been introduced to the modern Mediterranean from the Red Sea, through the Suez Canal, the possibility that it is part of a small population native to the Mediterranean can not be excluded based on present-day data<sup>6</sup>. Indeed the late Pleistocene Mediterranean fish record is obsolete, due to the lack of appropriate sampling on this subject. Furthermore, the majority of Pleistocene *Bregmaceros* samples pertain to otoliths, which cannot be unambiguously identified on the species level. As a result, the present findings pose the considerable possibility that the Pleistocene *Bregmaceros* records belong to two species, *B. albyi*, the well known post-Messinian Mediterranean fish, and *B. atlanticus*, which may have invaded the Mediterranean Sea from Gibraltar along with several other warm-water taxa during recurring interglacial periods. The specific identification of the Tsampika fish will undoubtedly shed light to this possibility, and enhance our knowledge on the resilience of fish populations to significant environmental perturbations.

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