



Fish otoliths and depth variations in the Plio-Pleistocene of Rhodes island, Aegean Sea

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Fossil fish otoliths which are commonly found in a wide range of sedimentary environments, and are usually the only remains of Teleost species, are considered as a valuable palaeoecologic and palaeobathymetric tool. Furthermore, they contribute significantly to palaeobiologic and palaeoclimatic studies. Although they have not thoroughly been studied, it seems that their presence in the geologic record is extremely significant for some of the most intriguing modern problems of geoscience.

Rhodes is a Dodecanese island in the Aegean Sea that belongs to the eastern end of the tectonically active Hellenic arc-trench subduction system marking the African-Eurasian plate boundary. The Plio-Pleistocene section of Cape Vagia hosts an otolith fauna. This section mainly consists of clays and silts that belong to the Lindos Bay Clay Member.

Seven species of otoliths have been determined, six of them for the first time in Greece: *Ceratoscopelus maderensis* (LOWE, 1839), *Diaphus holti* (TAANING, 1918), *Lampanyctus photonotus* PARR, 1928, *Myctophum punctatum* RAFINESQUE, 1810, *Notoscopelus resplendens* (RICHARDSON, 1845), *Merluccius* sp. and *Lesueurigobius fresii* (MALM, 1874).

In this work the otolith assemblages are used in order to reconstruct the palaeobathymetric evolution of the studied succession. A methodology described by Nolf & Brzhobohaty (1994) is applied. The total depth range of the examined species was divided into 20m intervals. The 20m interval was chosen arbitrarily, based on the depth ranges of the species used for this analysis. The total number of possible presences for

each depth range was expressed as a percentage of the total number of species present in the sample. Depth of deposition was then approximated at the highest-percentage depth intervals. It must be noted that according to this methodology, only the whole taxonomic assemblage is considered, while the relative abundance and dominance do not affect the calculations (Girone, 2005).

The otolith assemblages analysis indicates a bathymetry of about 700-1000 m for the middle part of these deposits. Also, the accompanying mollusc fauna is in accordance with these bathymetrical results as it is documented by the presence of the deep water bivalve association *Batharca pectunculoides*, *Modiolula phaseolinum*, *Kelliella miliaris* and *Notolimea crassa* and of pteropod species, as well as the absence of shallow environment index molluscs association.

In addition, a shallowing upward is indicated by the presence of specific otoliths recovered from these deposits.

These results are in accordance with those suggested by Moissette and Spjeldnaes (1995), and Hanken *et al.* (1996) who inferred a maximum transgressive event in the middle part of the Lindos Bay Clay.

Girone, A. (2005) – Response of otolith assemblages to sea-level fluctuations at the Lower Pleistocene Montalbano Jonico Section (southern Italy). *Bolletino della Societa Paleontologica Italiana*, 44 (1): 35-45, Modena.

Hanken, N. M., Bromley, R.G., and Miller, J., 1996. Plio-Pleistocene sedimentation in coastal grabens, north-east Rhodes, Greece: *Geological Journal*, 31, 271-296.

Moissette, P. and Spjeldnaes, N., 1995. Plio-Pleistocene deep water bryozoans from Rhodes, Greece. *Palaeontology*, 38, 771-799.

Nolf, D., Brzobohaty, R. (1994) – Fish otoliths as paleobathymetric indicators. *Paleontologia i evolutcio*, 24-25: 255-264.