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Fish geographic distribution range shifts as recorded in the eastern Mediterranean during the last 5 Ma

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Marine fish species geographic distribution is known to reflect the individuals' response to changes in oceanic circulation, temperature, salinity, local geography, other species presence and/or abundance, food availability and other biotic and abiotic factors1. New and published records on the eastern Mediterranean fish, from the end of the Messinian salinity crisis to the present, are here examined, in correlation with palaeoenvironmental data, in order to draw conclusions regarding the abiotic parameters most affecting the fish distribution during the last 5 Ma in this area. This investigation shows that the environmental variables do not affect the fish fauna in a uniform way. Rather, three faunal components may be separated, each occupying a different depth range in the water column. Pelagic fish dwell for the most part on the uppermost 200 m, and their distribution seems to be affected mainly by climatic variability. Mesopelagic fish occupy mostly intermediate depths and their distribution is regulated by the prevailing water circulation patterns. Benthic and benthopelagic fish, which live close or in contact with the sea bottom, are mostly affected by the nature and depth of the substratum. Furthermore, examples from the Ionian2,3 and the Aegean Sea indicate that, during the last 5 Ma, large-scale range shifts, similar to those occurring today, frequently took place in this area. This observation significantly alters previously views on the stability of fish assemblages and the processes occurring today.

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