

## NEW EVIDENCE FOR ABRUPT FLOODING OF THE BLACK SEA IN THE EARLY HOLOCENE

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### Abstract

Recent study of the distal continental shelf of the Black Sea off western Turkey obtained sediment cores where layers bearing shells of recent marine fauna were underlain by strata containing brackish water fauna. Preliminary, uncalibrated and apparent <sup>14</sup>C dating suggest that the age of the base of the marine layer is circa 7,000 years while the top of the brackish layer, some 2 cm below, is ca. 28,000 carbon years. It seems that when the marine invasion took place, the level of the Black Sea was approximately 100 m below its present level.

*Keywords* : *Black Sea, Sea Level, Sediments.*

Conflicting interpretations of geological, geochemical and geophysical data regarding the variable water composition of the Black Sea and its changing water level during the latest Pleistocene and the early Holocene were presented during the last 12 years in the scientific literature. While it is generally agreed that a fresh-brackish water lake existed in the Black Sea basin after the Last Glacial Maximum, when global sealevel was approximately 125 m lower than its present level, there is disagreement on the rate in which the Black Sea changed to obtain its present marine environment. In an effort to shed some light on the debate, a geological and geophysical marine investigation was carried out along the distal continental shelf off the northern edge of the Bosphorus Strait in the southern Black Sea in summer 2005 on board R/V Mediterranean Explorer. The study was carried out at depth of 100-120 m. at 3 areas of 4X6 km, and a network of high-resolution chirp profiling, spaced 150 m apart, were used to image the seafloor, the shallow unconformities and the geological structures. Based on these chirp profiles gravity cores were obtained in the studied areas. The chirp survey confirmed previous observations of a regional depositional unconformity in the upper part of the sedimentary sequence along the distal continental shelf. Earlier studies that encountered these features in their broadly-spaced profiles attributed them to coastal ridges. Aksu et al. [1] suggested that these coastal ridges indicate the slow ascent of the water level of the Euxenic Lake, the water body that preceded the present Black Sea.

Preliminary paleontological observations of the sediment cores displayed the unconformity encountered in the seismic profiles. The fossil fauna show evidence of brackish water fauna below the unconformity and marine shells above it. Uncalibrated measurements of <sup>14</sup>C attribute an apparent age of ca. 25,000 years to the layer right below the unconformity and ca. 7,000 years to the layer above it. These findings suggest that there was a depositional break before sediment deposition under marine conditions started, and that the unconformity indicates subaerial erosion. Since the present depth of the Bosphorus Strait is 33 m, the Mediterranean water breaching the Strait dropped to the brackish lake some 60 m below. Consequently we suggest that the glacial lake that prevailed in the Black Sea after the LGM desiccated in the early Holocene, like many other continental lakes, and when the Mediterranean water breached the Bosphorus Strait a large waterfall of more than 60 m was formed, and the Black Sea was filled abruptly. Such a violent event has probably left its mark on human mythology [2].

### References

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- 2 - Ryan, W., Pitman, W., 1998. *Noah's Flood*. Simon & Schuster, New York, NY, 319 p.