



## **Late Pleistocene to Holocene paleoceanographic and paleo-climatic changes in Gulf of Gemlik, Sea of Marmara, Turkey**

Betül Filikci (1,2), K. Kadir Eriş (1,2), M. Namık Çağatay (1,2), Luca Gasperini (3), Asen Sabuncu (2,4), Dursun Acar (1,2), Burak Yalamaz (1,2)

(1) Department of Geological Engineering, Istanbul Technical University, Istanbul, Turkey (betul.filikci@gmail.com), (2) Eastern Mediterranean Centre for Oceanography and Limnology, Istanbul Technical University, Istanbul, Turkey, (3) Istituto di Scienze Marine, CNR, U.O.S. Bologna, via Gobetti 101, 40129 Bologna, Italy, (4) Department of Geophysical Engineering, Istanbul Technical University, Istanbul, Turkey

Gulf of Gemlik is an east-west oriented marine inlet with a maximum depth of 113 m in the south-eastern part of the Sea of Marmara. It is located on the middle branch of the North Anatolian Fault Zone. While the Gulf of Gemlik is separated from the SoM by a bedrock sill at -50 m, there were presumably several disconnections during the Late Pleistocene to Holocene, but the timing of the youngest connection around the onset of the Holocene is still controversial. Here, we attempt to elucidate the paleoceanographic and paleoenvironmental changes during the late glacial-Holocene using the multi-proxy analysis of a core extending back to 13 ka BP. The multi-proxy data include physical and geochemical properties together with AMS <sup>14</sup>C ages.

The core sediments covering the time period of the last 13 ka BP consists of two main lithostratigraphic units. The lower Unit L2 represents the lacustrine phase of the gulf prior to 10.6 ka BP, while the upper Unit L1 is an overlying transgressive mud drape deposited during the main part of the Holocene. Unit L2 deposited prior 10.6 ka BP represents Bølling-Allerød and Younger Dryas climatic periods, when prograding shelf edge sediments were deposited in the form of well sorted medium sands with brackish water bivalve shells (*Dreissenapolyomorpha*). At the beginning of the Holocene, the rising sea level in the Sea of Marmara breached the -50 m sill at 10.6 ka BP, and therefore the Gulf of Gemlik was converted into a marine realm. Soon after, the water stratifications allowed to the formation of the previously studied two sapropels in the gulf, as shown by increased TOC contents.  $\mu$ -XRF Ca/Ti and Sr/Ca profiles of Unit L1 provide evidence of rapid climatic changes at 8.2 ka BP and 4.2 ka BP, representing cold and dry short climatic periods which are well correlated with previous marine and lake studies in İznik Lake south of the Sea of Marmara.

**Keywords:** Gemlik Gulf, core, paleoclimate, Late Pleistocene to Holocene