

BENTHIC AND PLANKTIC FORAMINIFERAL ASSEMBLAGES OF THE SEDIMENTS DEPOSITED DURING THE LAST 25 KY IN THE MARMARA SEA

Elmas Kirci-Elmas¹*, Oya Algan¹ and Izver Ozkar-Ongen²

¹ Istanbul University, Institute of Marine Sciences and Management, 34470 Vefa, Istanbul-TURKEY - kircie@istanbul.edu.tr

² Istanbul University, Engineering Faculty, Department of Geology, 34850 Avcilar, Istanbul-TURKEY

Abstract

Benthic and planktic foraminiferal fauna were identified in six cores from the deep basins of the Marmara Sea. We determined seven local biostratigraphic zones based on quantitative distribution patterns of foraminifers and species diversity. These zones reflect the changing environmental conditions in the Marmara Sea, from lacustrine to marine, during the last 25 ky BP.

Keywords : *Foraminifera, Sapropel, Sea Of Marmara.*

The Marmara Sea is a land-locked sea between the peninsulas Thrace and Anatolia and constitutes an oceanographical link between the two large semi-enclosed basins; the Mediterranean and Black Seas. It is connected to the brackish (18-22 ppt) Black Sea via the Istanbul Strait (Bosporus) and to the normal marine water (37.5-38.5 ppt) of the Mediterranean Sea via the Canakkale Strait (Dardanelles) with permanent two-layered water stratification [1] at about 25 m water depth.

The sea floor of the Marmara Sea presents a complicated morphological system, including shelves, slopes, ridges and deep basins [2]. The four basins, namely Cinarcik (1270 m), Silivri (820 m), Central (1268 m) and Tekirdag (1133 m) are separated by ridges, occurring at water depths between 360 and 650 m. During a cruise of the Research Vessel *Sismik-1* in 1998 and M44/1 cruise of the Research Vessel *Meteor* in 1999, six cores were collected from the Central and Cinarcik basins of the Marmara Sea, in changing water depths from 703 to 1203 m (Table 1).

References

- 1 - Unluata U., Oguz T., Latif M.A., Ozsoy E., 1990. On the physical oceanography of the Turkish straits. In: Pratt L.J. (ed.), The physical oceanography of sea straits. NATO/ASI series, Kluwer, Dordrecht, pp 25-60.
- 2 - Gazioglu C., Gokasan E., Algan O., Yucel Z., Tok B., Dogan E., 2002. Morphologic features of the Marmara Sea from multi-beam data. *Marine Geology* 190: 397-420.

Tab. 1. The locations, water depths and lengths of the studied cores.

Core number	Latitude (N)	Longitude (E)	Water depth (m)	Core length (cm)
32MC	40°45.612	27°44.942	711	48
DM18	40°49.845 2	27°52.626 2	895	424
DM22	40°48.621 2	27°58.371 2	1203	422
KL40	40°47.12 2	27°46.31 2	703	901
KL89	40°45.42	28°46.362	1156	622
KL97	40°51.21 2	28°46.53 2	1094	540

In this study, Micropaleontological and geochemical analyses were carried out in the cores. Benthic foraminiferal fauna observed in the cores displays high diversity compared to planktic fauna. A total of 99 species of benthic foraminifera and 11 species of planktic foraminifera were identified. Benthic foraminiferal species are represented by predominantly calcareous forms. Planktic foraminifera are abundant in spite of the low diversity. A sapropelic layer deposited at about 10.3-6.2 ky BP and having >1.5 % C_{org} contents were found in some of the cores. Micropaleontological examination of the cores provided to distinguish seven local biostratigraphical zones, reflecting distinct changes in paleoenvironmental conditions before, during and after the sapropelic deposition. These zones can be summarized into three main sections; Pre-sapropelic (Pr1-2 zones), Sapropelic (Sap1-2 zones), and Post-sapropelic (Po1-2-3 zones) sediments. The lake stage of the Marmara Sea, when it was isolated from both the Black and Mediterranean Seas, was determined at the basal section of the cores (Pr1 zone), and characterized by the absence of foraminifera. First colonization of benthic and planktic foraminifera at about 11-10.4 ky BP indicated the starting of marine conditions, after the entrance of Mediterranean waters through the Canakkale Strait (Pr2 zone). Benthic foraminiferal assemblages of the sapropelic sediments showed that the sapropelic deposition started under anoxic-close to anoxic bottom water conditions (Sap1 zone) and continued in dysoxic-suboxic conditions (Sap2 zone). Foraminiferal distribution allowed to determine three zones within the post-sapropelic sediments, possibly indicating relative changes in the Marmara Sea during the Late Holocene.

Acknowledgement - This work was supported by the Research Foundation of the Istanbul University (Project number: T-179/06032003).