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Late Quaternary paleoceanographic evolution of the Black Sea: evidence from calcareous microfossils

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The Black Sea is a semi-enclosed basin connected with the Marmara Sea and the Mediterranean Sea, respectively by the Bosporus and Dardanelles straits. The modern water mass below about 200 m is devoid of dissolved oxygen making the Black Sea the largest anoxic body of water in the world. Despite its relatively large surface area and water volume, only a thin surface layer (about 10% of the average total depth) of the Black Sea supports eukaryotic life. This anoxic situation started about at 7800 years BP, when the onset of anoxic condition at the sea bottom allows the sapropel deposition. Several authors proposed that the onset of sapropel deposition was rapid and synchronous across the basin and water depths greater than 200 meters. For this reason the benthic environment is considered totally inhospitable for the benthic organisms since 7800 years BP, and consequently sediment collected in sites deeper than 200 meters are barren of benthic microfauna. In the framework of the EU project ASSEMBLAGE (ASSEssMent of the BLAck Sea sedimentary system since the last Glacial Extreme) benthic foraminifera and calcareous nannofossils were analysed in several sedimentary cores collected in the Black Sea during the oceanographic cruise BLASON 2 and ASSEMBLAGE 1. On the basis of the calcareous nannofossils results, we identified three biostratigraphic units, used together with 14C AMS dating to correlate the shallower cores with the deepest cores. The older unit in the cores corresponds to the deposition of sediment indicating a fresh/brackish water environment characterised by the absence of foraminifera and calcareous nannofossils. The onset of the sapropel deposition is testified by finely laminated olive black sediments and by the first appearance of Emiliania huxleyi in the basin and in shelf cores by

the occurrence of brackish benthic organisms. The youngest unit is characterized by the invasion of Emiliania huxleyi that testified of the more eutrophic condition of the surface waters of the Black Sea. The results obtained by the microfaunal analysis in the shelf cores suggests that anoxia in the Black Sea was not continuous but short influxes of well-oxygenated waters at the sea bottom influenced the benthic ecosystem, whereas the deep basin was constantly anoxic until recent time.