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Centennial-scale paleoceanography during sapropel S1 deposition in the NE Aegean (Mediterranean Sea)

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Combined micropaleontological and geochemical analyses in the high-sedimentation gravity core M-4G, provided new centennial scale paleoceanographic data for the sapropel S1 deposition in the NE Aegean Sea. Sapropel layer S1a (10.2-8.0 ka) is deposited in dysoxic to oxic bottom waters; sediments are characterized by the high abundance of benthic foraminifers Chilostomella mediterranensis and Globobulimina affinis that are able to tolerate surface sediment and/or pore water oxygen depletion and the presence of the oxic mesotrophic-eutrophic U. mediterranea. Adequate preservation of organic matter is proven by the high organic carbon and loliolide and isololiolide contents, whereas the biomarker record and the abundances of eutrophic planktonic foraminifera document enhanced productivity. Both alkenone-based SSTs and δO18 G. bulloides records indicate coolings at 8.2 ka (S1a) and at $\sim$7.8 ka (S1 interruption). Sapropelic layer S1b (7.7–6.4 ka) is characterized by rather oxic conditions marked by the prominent increase of U. mediterranea. The highly fluctuating SSTs demonstrate repeated coolings and associated dense water formation; major event at 7.4 ka, followed by cold spells at 7.0, 6.8, 6.5 ka. Besides, the increase of algal biomarkers, labile organic matter-feeding foraminifera and eutrophic planktonic species pinpoints rise in in situ marine productivity, which is enhanced by more efficient vertical convection due to repeated cold events. The associated contributions of labile marine organic matter (OM) along with fresher terrestrial OM inputs after $\sim$7.7 ka BP imply alternative/ additional than the north Aegean riverine borderland sources for the influx of organic matter at the south Limnos Basin, also related to the inflow of highly productive Marmara/Black Sea waters