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Palaeoceanography & Palaeoclimate during the penultimate Glacial-Interglacial transition in the Black Sea - Termination II

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The epicontinental Black Sea is very sensitive to environmental changes thus forming an ideal archive of regional climate change and teleconnective responses to the coupled North Atlantic ocean-atmosphere system. Here we focus on the climatic and hydrological evolution of the SE Black Sea during the glacial-interglacial transition of Termination II to the Eemian (∼134-122 ka BP) by using different geochemical and sedimentological proxies.
Long-term cold conditions during the ending penultimate glacial are provided by TEX86 derived summer sea-surface temperatures (SST) of around 9°C and are thus considerable lower than present values of about 23°C. Coastal ice formation during extreme winters accounted for huge discharge of ice rafted debris (IRD) until 130.5 ka BP. Milder more humid conditions during this period are indicated for instance by elevated Cr/Al values typical for an ultramafic Pontic Mountain source (Piper and Calvert, 2011) thereby suggesting an increased sediment load mainly from the east-Anatolian rivers Kizilirmak and Yesilirmak.
The abrupt disappearance of IRD along with increasing δ18O, Mg/Ca, and Sr/Ca of benthic ostracods (Candona spp.) resulted from slightly rising temperatures (SST 11°C) until 128.8 ka BP. Thereafter, SST rapidly increased within less than 500 years to about 25°C revealing a dramatic change from glacial to interglacial conditions.
First analyses of U/Ca-ratios of ostracods show sharply increasing values not before ∼128.3 ka BP, synchronous to the appearance of larval Mytilus galloprovincialis shells, due to the Mediterranean transgression into the Black Sea. The simultaneous increase of TOC and Mo/Al of the bulk sediment indicates the development of oxygen-deficient bottom waters and Eemian sapropel formation favoured by the establishment of a halocline shortly after the Mediterranean-Black Sea reconnection. About 500 years after the temperature maximum, the continental environment responded to the warming by elevated vegetation growth as seen in pronounced long-chain n-alkane abundances.

Reference:
Piper D. Z. and Calvert S. E. (2011) Holocene and late glacial palaeoceanography and palaeolimnology of the Black Sea: Changing sediment provenance and basin hydrography over the past 20,000 years. Geochim. Cosmochim. Acta 75, 5597-5624.