Quantitative reconstruction of millennial-scale temperature variations in Central Europe

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Résumé

The amplitude of the environmental changes associated with the Last Deglaciation provides a useful test bench for the climatic and oceanic responses and their attendant feedbacks to major reorganizations of the atmospheric circulation and the surface hydrology. We present the first quantitative reconstruction of millennial-scale temperature variations in Central Europe during the last 40,000 years based on newly developed temperature proxies measured in a sediment core from the Black Sea (MD04-2790). Despite the shift from lacustrine to marine conditions (and therefore associated salinity changes) that affected the basin, the tetraether-based paleothermometer (TEX86) properly records the increase in surface water temperatures during the Last Deglaciation. To our knowledge, no quantitative temperature reconstruction has been published for the Black Sea area so far, a comparison of the amplitude of temperature changes reconstructed for the Last Glacial Maximum and the actual in the Mediterranean basin shows that the Black Sea values are consistent with that of the western basin and colder than the eastern basin [1]. Interestingly and in contrary to what is seen in nearby archives (pollen assemblages [2], [3] and speleothems [4]) Heinrich events deeply imprint our glacial temperature record, whereas the signature of Dansgaard-Oeschger interstadials are comparatively attenuated. The high-resolution record also provides snapshots of the basin responses to specific abrupt climatic events such as the Younger Dryas and the Bølling-Allerød. [1] Hayes et al. (2005) Quaternary Science Reviews 24, 999-1016. [2] Naughton et al. (2007) Marine Micropaleontology, 62, 91-114. [3] Fletcher et al. (2010) Quaternary Science Reviews, 29 (21-22), 2839-2864. [4] Fleitmann et al. (2009) Geophys. Res. Let., 36.

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