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The first indicators for permafrost at the beginning of the glacial maximum in sediment cores from Eifel dry maars.

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We present lithological indicators in combination with pollen data to show the changes in climatic conditions in central Europe at the later part of marine isotope stage 3 and the beginning of the glacial maximum. The stratigraphy of the ELSA (Eifel Laminated Sediment Archive) cores over the last 140.000 years is based on a framework of lithological features, pollen analyses, event markers, ^{210}Pb, ^{137}Cs, AMS ^{14}C data, IR-RF data, magnetic field intensity, greyscale tuning, core-to-core correlation and floating varve counts. The lithology of the ELSA cores shows a clear stadial/interstadial succession (SCHABER & SIROCKO, 2005) over the last glacial cycle which is highly similar to the Greenland ice core NorthGRIP (SIROCKO ET AL., 2005). Greyscale variations (mainly changes in organic carbon content) reflect this succession and therefore, in addition to the above absolute dating, allow precise tuning to the δ^{18}O record of NorthGRIP to obtain a high resolution stratigraphy. Event markers, lithological features and pollen analysis were used to correlate the cores.

The sea surface temperatures in the North Atlantic during Dansgaard-Oeschger interstadials in the later part of MIS3 remain more or less on a constant level (VAN KREVELD ET AL., 2000). On the European continent, in contrast, we observe during the above mentioned time a significant change in the lithology of Eifel maar sediments from clay dominated over alternating layers of clay and silt to wind born sand and loess layers. The amplitude of greyscale variations diminishes continuously from about 44.000 to 32.000 years BP and drops to an absolute minimum range after 30.000 years BP. Pollen analyses show a trend in vegetation from deciduous trees to mainly

birch and pine after D/O 12 to non arboreal pollen after D/O 8 and finally pollen sterile sediments after D/O 5. Hence climate on the European continent during the later period of MIS3 seems to be influenced not only by the SSTs of the North Atlantic but also by advancing continental ice sheets.

References:

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