



Changes in the phase lag of dust concentration and size in the EPICA-DML ice core between different climatic stages

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Mineral dust measured in the EPICA ice core from Dronning Maud Land (EDML), Antarctica, provides unique information about climate variability up to the penultimate interglacial stage. During cold stages the dust concentration in the atmosphere as reflected in the dust flux in the EDML ice core is about 2 orders of magnitude higher than during warm stages, which is explained by higher aridity and storminess. Dust size distribution data provide the possibility to separate dust changes in ice cores related to variations in the source strength from those attributed to the transport intensity. Since dust size spectra, obtained from samples which cover several years, are dominated by the size spectrum occurring during high dust input, a changed phase lag of annual dust concentration maximum and dust size maximum may bias the result of such studies.

Here we present dust concentration and size data in sub-annual resolution from 14 selected depth intervals ranging from the last glacial maximum to the Holocene. We find a clear seasonality of the dust size during the last glacial maximum, which is in phase with the maximum of the dust concentration. During warm stages the seasonality of the dust size decreases and loses a clear phase lag with the concentration.