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Climatic implications of the continuous dust record (200kyr) from the EPICA-DML ice core, Antarctica

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The European Project for Ice Coring in Antarctica (EPICA) aims at reconstructing past climate and environmental conditions from two deep ice cores in Antarctica. The two cores are drilled at Dome C (EDC, 75˚06' S, 123˚ 21'E, 3233m a.s.l., Indo-Pacific sector of Antarctica) and in Dronning Maud Land (EDML, at 75˚00'S; 00˚04'E, 2892 m.a.s.l, Atlantic sector). We present the dust data from the EDML core, which so far has been analysed to 2564 m depth (approx. 200kyr) for concentration and size distribution of insoluble microparticles. The data is compared to the dust data from EDC.

Owing to highly synchronized time scales it can be seen that all mayor climatic changes lead to synchronous changes of dust flux for the two sites, which indicates a common source or a common variation of the respective sources. However, the ratio of dust concentration at EDML and EDC is found to be moderately variable (factor $\sim$3); this suggests that to a limited extent either different source areas exist for the two sites and vary independently in strength or that atmospheric transport efficiency from one source to the two sites varied in time.

During Termination I a regime shift at the onset of the ACR can be observed in both cores: The time before (older than) the ACR is characterized by a high correlation between dust concentration, mean particle size and isotopic temperature, while the period after shows no or weak correlations, respectively. This can be observed also

in other parts of the record, e.g. during MIS5. At DML, periods of weak correlations show frequent large particle events, which suggests that dust storms were able to penetrate directly into DML during these times. Most interestingly, these periods coincide with minimum sea ice in the Atlantic sector of the Southern Ocean as inferred from marine sediment cores. Thus, the sea ice extent in the Atlantic sector may have had an important influence on atmospheric transport patterns around Antarctica as well as on the connection of temperature with wind speed and aridity in the source areas.