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Mineral Dust Variability in the Southern Ocean
MISO

Polar ice cores represent the only direct archive for the deposition of aeolian dust particles in the past, with mineral dust being transported over long-distances from desert regions to the polar ice sheets. While the total dust deposition is a first order measure of dust mobilization, hence climate conditions in the dust source regions, particle size distributions allow for a quantification of transport efficiency. Here we will combine latest Antarctic dust records from the EPICA ice core from Dronning Maud land and a coupled state-of-the art Global Climate model (ECHAM5) with an implicit aerosol scheme (HAM) to quantify paleoclimatic changes in dust mobilization, transport and deposition. High-resolution ice core dust analysis on atmospheric dust concentration and particle size distribution will be performed for selected time slices in the Holocene, MIS 5.5 and during the transition into the warm periods in parallel to time slice model runs. Appropriate boundary conditions for the high simulation atmosphere only simulations will be taken from long simulations with an earth system model. In return the effect of dust on past climate changes will be assessed. The time scales addressed by both model and ice core data range from seasonal changes, interannual variability to long-term changes in dust mobilization and transport, constraining potential dust source regions and their temporal changes as well as spatiotemporal variability in Circumantarctic circulation patterns.