Simulating the mineral dust cycle on glacial and interglacial timescales

Abstract:
Mineral dust aerosol emitted from dry and barren soils is a large contributor to the atmospheric aerosol composition and a key component in the Earth's climate system. Dust aerosol influences atmospheric dynamics, cloud formation processes, the Earth radiation budget, and biogeochemical cycle in many ways. Atmospheric dust loads change interannually in response to different meteorological (i.e. winds) and surface (i.e. vegetation, snow cover) conditions. They are impacted on by climate modes and atmospheric teleconnections with response to different glacial climate forcing.
In the frame of the BMBF project 'PalMod - From the Last Interglacial to the Anthropocene: Modeling a Complete Glacial Cycle', interactive simulations of the atmospheric dust life-cycle during the last deglaciation are planned. In particular, it is planned to test different dust source parameterizations and to investigate atmospheric processes controlling dust emission using the atmosphere-aerosol model ECHAM-HAM. For the sake of validation, simulations are planned for both modern climate scenarios and climate scenarios during the last deglaciation.