Project title: Simulating the atmospheric dust cycle
Project lead: Kerstin Schepanski

Abstract
Mineral dust aerosol is a major contributor to the atmospheric aerosol loading. It is emitted from dry and barren soils by wind and can travel long distances within the atmospheric circulation. It is considered as a key component in the Earth's climate system: it interacts with radiation ultimately modulating the atmosphere's radiation budget and impacting the atmospheric dynamics. It further affects cloud and precipitation formation processes, and may deliver micro-nutrients to remote areas stimulating the biogeochemical cycle in many ways. Atmospheric dust loadings vary interannually in response to different meteorological (i.e. winds) and surface (i.e. vegetation, snow cover) conditions and so do dust-related feedback processes.

The spatio-temporal variability of atmospheric dust concentration is, in essence, determined by both the state of the atmosphere providing sufficient conditions for dust mobilisation and entrainment, and the state of the soil providing surface conditions susceptible for wind erosion. All contributing and depending components are required to be regarded accurately in order to successfully simulate the spatio-temporal distribution of mineral dust aerosol. We are planning to revisit the dust parameterisations currently implemented in the global atmosphere-aerosol model ECHAM-HAM.