Geophysical Research Abstracts
Vol. 20, EGU2018-14525, 2018
EGU General Assembly 2018

A Mineral Dust Setup for Comprehensive Transient Paleoclimate Model Simulations

Ute Merkel (1), Samuel Albani (2), Natalie Mahowald (3), and Michael Schulz (1)

(1) MARUM - Center for Marine Environmental Sciences, University of Bremen, Bremen, Germany, (2) Laboratoire des Sciences du Climat et de l'Environnement (LSCE/IPSL), CEA-CNRS-UVSQ, Gif-sur-Yvette, France, (3) Cornell University, Ithaca, NY, USA

Mineral dust represents an important component in the Earth system by both responding to and driving climate change. In recent years, much progress has been achieved in understanding mineral dust for past climate states from comprehensive model simulations and their combination with proxy evidence of dust deposition fluxes. However, most available modelling studies have been based on time-slice setups. The importance of dust-related climate responses and feedbacks operating on multi-decadal to millennial time-scales has been suggested by models of intermediate complexity. Further insight into the role of dust in paleo-climatic variations is therefore expected from transient simulations using comprehensive earth-system models including mineral dust modules.
Due to the computational load of including fully prognostic mineral dust into such transient model simulations covering the past deglaciation or entire glacial-interglacial cycles, we developed a strategy for the CESM1.2.2 earth system model to reduce computational costs by implementing a segment-wise setup which alternates between shorter model run segments including fully prognostic mineral dust and longer (computationally less expensive) model run segments which use prescribed dust fields derived from the previous fully prognostic model run segment. The setup takes into account both the atmospheric dust concentrations and the dust deposition fluxes. Sensitivities to the detailed technical realization of transitioning between segments will be discussed as well as dust responses and feedbacks in test simulations serving as a preparatory step for a CESM1.2.2 transient deglaciation run.