

Mineral dust aerosols under the glacial period and anthropogenic global warming simulated by global models

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A global aerosol model SPRINTARS is incorporated into a Japanese atmosphere-ocean general circulation model MIROC and a global non-hydrostatic model NICAM to simulate climate change through the aerosol-radiation and aerosol-cloud interactions as well as transport processes for aerosols including mineral dust [1, 2]. A past study with the MIROC-SPRINTARS [2] calculated the concentration and radiative forcing of mineral dust in the Last Glacial Maximum and indicated a contribution to the cold climate during the glacial periods both through the direct and indirect effects. The MIROC-SPRINTARS is also used for global 7-day forecast for mineral dust as well as other aerosol species every day (<http://sprintars.net>) because the information is needed for the public life especially in East Asia.

In this presentation the some recent studies on mineral dust with the SPRINTARS will be shown. One is a long-term inverse modeling with the four-dimensional variation data assimilation to analyze interannual variations of emission, transport, deposition, and radiative forcing of mineral dust [3]. Simulated changes in temperature and precipitation due to mineral dust under the glacial, present, and future conditions by the coupled atmosphere-ocean model MIROC-SPRINTARS will be presented and discussed.

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