

Study of Long-term Effect of Stratospheric Geoengineering on Climate Characteristics

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The long-term changes of climate characteristics forced by stratospheric geoengineering, to the great extent, are controlled by the responses of ocean temperature and circulation. From the observations and model simulations [Stenchikov et. al., 2009] we know that stratospheric aerosols associated with explosive volcanic eruptions could affect sea surface temperature (SST), deep ocean temperature, ocean overturning circulation, hydrological cycle, and sea ice extent that are crucial for assessing biospheric and economic consequences of geoengineering.

Strong explosive volcanic eruptions could produce global stratospheric aerosol clouds that last for 2-3 years reflecting solar radiation and cooling the earth's surface. The climate response to volcanic impact forms as a result of interaction of associated thermal and dynamic perturbations with the major modes of climate variability. The paleo proxy data even suggest that strong tropical eruptions could increase the likelihood of El Ni