

An initial evaluation of geoengineering by Al₂O₃ injection

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This poster will present initial results of the efficacy and consequences of geoengineering by injection of alumina into the stratosphere. Alumina particles are much more efficient scatterers than sulfuric acid droplets, increasing the likelihood that a geoengineering scheme could cool the planet by an adequate amount to counteract a doubling of CO₂. However, the microphysical properties of alumina are not well known, so unique risks to atmospheric composition might be presented. Our approach will be to explore scenarios that bound the expected impacts. We compare the impacts of Al₂O₃ injection to those of geoengineering by sulfuric acid injection for similar radiative forcings. Our methodology utilizes three models at different spatial and temporal scales: the microphysical plume model at Dalhousie University for the initial dispersion, the 2-D aerosol model at AER for global microphysics, and the 3-D chemistry-climate model SOCOL at ETH for changes in stratospheric temperature and ozone.