

Simulations for the Geoengineering Model Intercomparison Project

Valentina Aquila^{1,*}, Luke D. Oman¹, Peter R. Colarco¹

¹ NASA Goddard Space Flight Center, Code 614, Greenbelt, MD

*Correspondence to: valentina.aquila@nasa.gov

The tropospheric cooling following large volcanic eruptions has brought some scientists to suggest artificially increasing the stratospheric aerosol burden to counteract the effect of greenhouse gas warming. The efficacy and complications of such controversial geoengineering strategies are not well known. While cooling the surface, geoengineering aerosols would warm the stratosphere and potentially the tropopause, possibly changing the atmospheric dynamics and composition. The Geoengineering Model Intercomparison Project (GeoMIP) provides a framework to test the effects of geoengineering with several climate model by prescribing four sets of geoengineering simulations. At this moment, sixteen models are taking part in the projects.

We are participating in GeoMIP with the Goddard Earth Observation System Chemistry Climate Model (GEOSCCM), which includes the aerosol model GOCART and the stratospheric chemistry model StratChem. We will introduce GeoMIP and present the four prescribed experiments. In particular, we will focus on the experiment that we are currently performing (experiment G4), which prescribes an continuous injection of 5 Tg SO₂ per year in the tropical stratosphere from 2020 to 2070. We plan to analyze the response of the stratospheric dynamics and composition to this aerosol perturbation.