

# CGD Seminar Series

## Impacts of varying climate intervention strategies utilizing stratospheric aerosols on stratospheric and tropospheric climate

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**Time:** 11am – 12pm

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For live stream information, visit the [CGD Seminar Webpage](#)

### ABSTRACT

Modeling studies of stratospheric aerosol injection (SAI) have shown SAI to be a promising method of climate intervention. However, such an intervention significantly impacts stratospheric and tropospheric dynamics and climate. In particular, sulfate aerosols produced after injection of sulfur dioxide into the stratosphere induce heating in the lower stratosphere which then impacts the tropical Quasi-Biennial Oscillation (QBO), the strength of the stratospheric polar vortices, and subsequently affects stratospheric-tropospheric coupling. Here we discuss changes in stratospheric dynamics and related impacts on surface climate in several sets of simulations carried out with the Community Earth System Model with the Whole Atmosphere Community Climate Model (CESM (WACCM)) with varying SAI implementation strategies. These include experiments with point injections of sulfur dioxide, as well as large ensembles of more complex simulations, including the Stratospheric Aerosol Geoengineering Large Ensemble Project (GLENS) and the Assessment of Responses and Impacts of Solar climate intervention on the Earth system with stratospheric aerosol injection (ARISE-SAI) simulations. We show how the differences in aerosol injection strategy translate into differences in impacts on stratospheric dynamics, primarily the QBO, interactions with the polar vortex, and interactions with surface climate through the North Atlantic Oscillation (NAO).

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