

M.S. Defense Announcement
Ivy Glade
June 8, 2023, at 10:00 a.m.

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M.S. Defense

Thursday, June 8, 2023
10:00 a.m.

Defense
[CIRA Commons](#) or [Teams](#)

Post Defense Meeting
ATS Main Conference Room (209 ATS)

Committee:
Jim Hurrell (Adviser)
Kristen Rasmussen
Brooke Anderson (Environmental and Radiological Health Sciences)

Assessing the impact of stratospheric aerosol injection on convective weather environments in the United States

Continued climate warming, as well as the slow development and implementation of climate mitigation and adaptation approaches, has prompted increasing research into the potential of proposed solar climate intervention (SCI) methods, such as stratospheric aerosol injection (SAI). SAI would reflect a small amount of incoming solar radiation away from the Earth to reduce warming due to increasing greenhouse gas concentrations. Research into the possible risks and benefits of SAI relative to the risks from climate change is just emerging. There is not yet, however, a comprehensive understanding of how SAI might impact human and natural systems. To date little or no research has been done to examine how SAI might impact environmental conditions critical to the formation of severe convective weather over the United States, for instance. We use parallel ensembles of Earth system model simulations of future climate change with and without hypothetical SAI deployment to examine possible future changes in thermodynamic and kinematic parameters critical to the formation of severe weather during convectively active seasons over the U.S. Southeast and Midwest. We find that simulated forced changes in thermodynamic parameters are significantly reduced under SAI relative to a no-SAI world, while simulated changes in kinematic parameters are more difficult to distinguish. We also find that unforced internal climate variability may significantly modulate the projected forced climate changes over large regions of the U.S.