@article{Labe2023a,
  abstract = {Stratospheric aerosol injection is a proposed form of solar climate invention (SCI) that could potentially reduce the amount of future warming from externally-forced climate change. However, more research is needed, as there are significant uncertainties surrounding the possible impacts of SCI, including unforeseen effects on regional climate patterns. In this study, we consider a climate model simulation of the deployment of stratospheric aerosols to maintain the global mean surface temperature at 1.5°C above pre-industrial levels (ARISE-SAI-1.5). Leveraging two different machine learning methods, we evaluate when the effects of SCI would be detectable at regional scales. Specifically, we train a logistic regression model to classify whether an annual mean map of near-surface temperature or total precipitation is from future climate change under the influence of SCI or not. We then design an artificial neural network to predict how many years it has been since the deployment of SCI by inputting the regional maps from the climate intervention scenario. In both detection methods, we use feature attribution methods to spatially understand the forced climate patterns that are important for the machine learning model predictions. The differences in regional temperature signals are detectable in under a decade for most regions in the SCI scenario compared to greenhouse gas warming. However, the influence of SCI on regional precipitation patterns is more difficult to distinguish due to the presence of internal climate variability.},
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