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Analysing the impact of solar radiation management on the terrestrial biosphere in CMIP6 models

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Solar radiation management (SRM) has the potential to artificially cool the Earth by increasing the reflection of incoming sunlight. One commonly researched SRM strategy is stratospheric aerosol injection (SAI), which involves the injection of sulphate aerosols into the stratosphere that scatter incoming solar radiation, thus cooling the planet. There are large uncertainties in the potential impact that solar radiation management could have on the biosphere, and further work is required to improve our understanding of the risks associated with this form of climate intervention. This presentation examines the impact of SRM on vegetation carbon, net primary productivity, and land carbon. We take results from five 6th generation climate models (CMIP6) which ran experiments as part of the geoengineering model intercomparison project (GeoMIP) and compare them with a high emissions scenario (ssp585). The GeoMIP experiments aim to investigate the global effects of using stratospheric aerosol injections and directly decreasing solar irradiance to reduce global temperatures to a 'middle of the road' scenario (ssp245), but without reducing the high greenhouse gas concentrations. Compared to ssp585, we find that ssp585 plus SRM tends to increases global NPP and land carbon storage. The global patterns of change in vegetation carbon storage vary between the ESMs, but there is a widespread agreement that SRM would have a positive impact on carbon storage and NPP in the Amazon rainforest.