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Reviewer Comments: PInc-PanTher estimates of Arctic permafrost soil carbon under the GeoMIP G6solar and G6sulfur experiments

Anonymous Referee #1

Referee comment on "PInc-PanTher estimates of Arctic permafrost soil carbon under the GeoMIP G6solar and G6sulfur experiments" by Aobo Liu et al., Earth Syst. Dynam. Discuss., https://doi.org/10.5194/esd-2022-44-RC1, 2022

The authors use the PInc-PanTher tool to analyze the simulated effects of solar geoengineering (SG) on permafrost carbon. The authors consider six different Earth system models (ESMs) and four different scenarios: moderate emissions (SSP2-4.5), high emissions (SSP5-8.5), high emissions with dimmed sunlight (G6solar) and high emissions with stratospheric aerosol injection, or SAI (G6sulfur). The authors quantify permafrost area, carbon stocks, and economic impacts in each case, and they find that all six ESMs show statistically significant impacts in both SG scenarios.

I thank the authors for the opportunity to review their work. The permafrost-carbon-climate feedback is a critical yet relatively ill-quantified consequence of global warming, and the possible impacts of SG on permafrost carbon are even less well understood. To my knowledge, there have been very few multi-model analyses of the potential effects of SG on permafrost, and this one is well-designed and well-written. My comments are relatively minor, and they largely address word choice, grammar, and clarity. I recommend the manuscript be accepted for publication with minor revisions, and I do not feel it necessary for me to review it again. Specific comments are included in the attached document.

Please also note the supplement to this comment:
https://esd.copernicus.org/preprints/esd-2022-44/esd-2022-44-RC1-supplement.pdf