

Earth Syst. Dynam. Discuss., referee comment RC1  
<https://doi.org/10.5194/esd-2022-17-RC1>, 2022  
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## Comment on esd-2022-17

Anonymous Referee #1

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Referee comment on "The deployment length of solar radiation modification: an interplay of mitigation, net-negative emissions and climate uncertainty" by Susanne Baur et al.,  
Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2022-17-RC1>, 2022

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The study investigates temperature overshoot in a novel "current commitments" scenario that achieves large-scale negative emissions (of 3 different levels) in the 22<sup>nd</sup> century and beyond. These scenarios would overshoot the 1.5C threshold for over 300 years. On top of these baseline scenarios the study implements SRM to keep temperatures to 1.5 C. They find, rather unsurprisingly, that in a scenario that exceeds 1.5C for centuries if SRM is deployed to keep temperatures below 1.5C then it would be deployed for centuries.

There is very little that this study would add to the literature. The study's core finding is obvious, and the specific numerical value arrived at is determined by the scenario assumptions made by the authors and the one model that is applied. Furthermore, beyond showing the scenario(s) that the authors have created, the study has only 2 results: the length of time that SRM is deployed and the time-evolution of the cumulative carbon flux due to SRM. In my judgment there is not a sufficient depth of analysis or novelty in this work for it to be publishable in its current form.

Beyond the limited depth of analysis and lack of novelty, the results of this study are determined by the scenario assumptions made by the authors and by the insufficiently described ensemble of MAGICC6 model variants. While the scenario is fairly well described and quite reasonable, it is only 1 scenario (with 3 different CDR endings). There would be much more to analyse and discuss if a wider range of more and less ambitious scenarios were presented. The ensemble of MAGICC6 variants determines the results but there is insufficient description of how this ensemble is generated, nor is the reader given a quantitative assessment of its ECS and carbon cycle characteristics relative to more complex models or expert judgments.

In my judgment there is not a sufficient depth of analysis or novelty in this work for it to be publishable in its current form.