

Interactive comment on “North Atlantic Oscillation response in GeoMIP experiments G6solar and G6sulfur: why detailed modelling is needed for understanding regional implications of solar radiation management” by Andy Jones et al.

Anonymous Referee #2

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General comments: This paper uses data from GEOMIP, where they compare two different solar radiation management techniques. One is a decreasing solar constant (G6Solar) and one is injection so₂ in the stratosphere(G&Sulfur). In these experiments warming in the SSP5-8.5 scenario is reduce to SSP2-4.5. The author compares results from two climate models UKESM1 and WACCM6. The title of the paper is “North Atlantic Oscillationresponse in GeoMIP experiments G6solar andG6sulfur: why detailed modelling is needed for understanding regional implications of solar radiation management”, however the main results are not clearly connecting NAO to the observed

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changes. Main results are temperature, precipitation, and mean sea surface pressure response to different SRM techniques, and author does not show clearly how these responses are depending on the phase of NAO. This paper highlight the importance of atmospheric dynamical response to different SRM techniques and especially aerosols dynamical resposen.

Selected model are quite different from each other, UKESM1 goes up to 85km where WACCM6 goes to 140km. How this affects to the results? Also author should include what aerosol-cloud proses are included in these models.

This manuscript miss clear definition of NAO, Author should include the formula that they used to calculate NAO. Also author refer to different phase of NAO in the text, example in line 314. I recommend to included figures where the responses i.e for precipitation is shown separately for NAO positive and negative phase.

In the result sections line 146 definition of present day run is not clear, it has been stated that PD is mean of 2011 - 2030, however what ssp scenario is used here is unclear.

For reader it would be helpfull if all results are also showed respect to the present day

Specific comments:

Line 23 :In Abstract author should include model names

Line 25: In abstract when author refers regional warming, spesifiy witch regions.

Line 26: “These findings are broadly consistent with previous findings on the impact of stratospheric volcanic aerosol on the NAO” specify this. What are the previous findings

Line 36: author talks about aerosol-cloud interactions, author should specify the different interactions mechanisms.

Line 70: This sections deals of definitions of NAO. This should be in Method section.

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Line 85-90: Deals with model selections, this should also be in method sections and include some arguments are the model independent

Line 144: Define key variables

Line 151: Include the difference picture

Line 185: Include more

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-802>, 2020.

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