

Interactive comment on “Sea-spray geoengineering in the HadGEM2-ES Earth-system model: radiative impact and climate response” by A. Jones and J. M. Haywood

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Received and published: 2 November 2012

Response to Anonymous Referee #2

We would like to thank the referee for their careful review. Our responses to the referee's Scientific Comments are as follows. We have used the page and line numbers used in the review to identify each comment, and indicate the location of the changes in the revised manuscript in parentheses at the end of each response.

1. (P.20720, L. 25): We have changed the text along the lines suggested (lines 78-79).
2. (P.20722, L. 21): The text has been rewritten in a clearer manner (lines 147-149).

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3. (P.20725, L. 4): The text has been changed as suggested (line 203).
4. (P.20725, L. 11): The cause of the Antarctic warming appears to be a dynamical response whereby a reduction in zonal winds around 50S leads to surface warming in the Antarctic. This is to some degree counteracted by the greater cooling in I-mask and I-mask-NSA, but not in the case of D-mask. We have added text to the end of this paragraph to discuss this response (lines 211-215).
5. (P.20725): We agree with the referee that a reference for changes in precipitation is desirable. We believe the most appropriate reference is the change in precipitation under the RCP4.5 scenario with respect to present-day (2040-2069 compared with 1990-2019, using CMIP5 Historical and RCP4.5 simulations). We have added an extra panel to figure 6 to show this change, and have added extra text to section 6.3 to discuss it (Figure 6 and lines 224-226, 228-230 & 247-252).
6. (P.20727): As requested, we have added the changes in surface temperature per unit sea-salt emission rate to Table 2 (column 7) and included some new text to discuss this (lines 306-309).
7. (P.20728, L. 9 and below): The changes in SWCF come from changes in the cloudy sky, i.e. from thinning/removal of cloud, thought to be due to a reduction in surface insolation. The text has been expanded to discuss the cloud feedback more extensively (lines 295-300).
8. (P.20728, L. 17): We have removed the comment regarding the efficiency or otherwise of the direct effect (line 306).
9. (P.20728, L. 28) and 10. (P.20729, L. 10): The text in these two paragraphs (lines 310 to 336) has been revised to indicate the differences in the I-mask-NSA case when compared with I-mask and the Jones et al. (2009) study, as pointed out by the reviewer. The main changes are lines 316-317 & 325-328.
11. (P.20730, L. 1): We have altered conclusion point (2) in line with the suggestion of

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the referee (lines 353-356).

12. (Abstract): We have changed the text of the Abstract to just report the results obtained and not comment on hypothetical strategies for geoengineering deployment (lines 8-9).

Technical corrections

1. (P.20727): Correction made ("increases" to "increase"; line 271).

2. (Figure 3): We have changed the colours as requested in what is now Fig. 4.

3. (Figures 5, 6 and 7): The captions to what are now figures 6, 7 and 8 have been changed as requested to identify the I-mask, D-mask and I-mask-NSA simulations.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 20717, 2012.