

We thank the editor for catching errors and improving the manuscript. We have accepted all suggestions. We present our responses in the following order: 23, 39, 43, and the rest.

23. Section 4.1, page 10, line 22; Replace "within the" with "within this" and it would be useful to give global annual totals for both here.

Response) We have provided the global annual emissions for each models now.

"DMS emission rates from ModelE2-TOMAS (**16.1 Tg S yr⁻¹**; see Table 3) and ModelE2-OMA (**28.7 Tg S yr⁻¹**; see Table 3) are **within this** range."

39. Section 5.2, page 17, lines 28/29: "while the ACCMIP models use GFEDv2 inventory for 2000". This is not strictly correct. What was provided for the year 2000 emissions was in fact a time mean over the years 1997-2006. See Lamarque et al. (2010).

Response) Thanks for catching this error. The sentence has been modified as follows.

"...while the ACCMIP models use GFEDv2 inventory **averaged from 1997 to 2006**"

43. As suggested by one of the executive editors, a section on code availability has yet to be included in your revised manuscript. Although you note the difficulties in running model codes on different platforms, this request is about making the code itself available and should even be included in cases where the code cannot be made available. See Dan Lunt's comments for further details.

Response) I included the following in the manuscript now.

Code Availability

Currently, we do not have a publicly available version of either NASA GISS ModelE2-TOMAS or ModelE2 itself. The ModelE2-TOMAS code may be provided upon the request. However, it may be quite challenging to compile and run ModelE2-TOMAS in a new computer environment as the model has been developed in a NASA NCCS supercomputer (http://www.nccs.nasa.gov/discover_front.html) and a user manual has not been developed.

It is worth noting that the public version of ModelE2 (the TOMAS model is not a part of standard version of ModelE2) will be available in the next few years, and the NASA GISS ModelE (which has been used for IPCC AR4 simulations) is publicly available: see details in <http://www.giss.nasa.gov/tools/modelE/>."

1. Introduction, page 1, line 40: Replace "such as via" with "by"

2. Introduction, page 3, line 12: Replace "between the surface to the 10 hPa" with "between the surface and the 10 hPa"

3. Introduction, page 3, lines 29-31: Remove "into the host model"

4. Introduction, page 4: lines 12-14: Change "Section 2 provides the description of ModelE2-OMA, and Section 3, the description of the TOMAS aerosol microphysics model." to "Sections 2 and 3 provide descriptions of ModelE2-OMA and ModelE2-

TOMAS, respectively."

5. Section 2.1, page 5, line 23: Replace "the model boundary layer process" with "the model's boundary layer scheme"
6. Section 2.1, page 6, line 1: Replace "aqueous oxidations" with "aqueous oxidation"
7. Section 3, page 6, lines 23 and 25: Replace "aerosol ammonium" with "ammonium aerosol"
8. Section 3, page 6, line 26: Replace "for purposes" with "for the purpose"
9. Section 3, page 6, line 30: Replace "vapors" with "vapours"
10. Section 3, page 7, line 7: Replace "for purpose" with "for the purpose"
11. Section 3, page 7, line 8: Replace "Detailed descriptions" with "A detailed description"
12. Section 3, page 7, line 13: Replace "(~up to 900 mbar" with "(~up to 900 hPa" for consistency with the use of hPa elsewhere in the manuscript
13. Section 3, page 7, line 24: Replace "predicts" with "predicting"
14. Section 3, page 7, line 31: Replace "The TOMAS15 version becomes a default model configuration for ModelE2-TOMAS, so we will be continuously refereed to as ModelE2-TOMAS throughout this paper." with "The TOMAS15 version has become the default model configuration for ModelE2-TOMAS, so we will refer to it as simply ModelE2-TOMAS throughout this paper."
15. Section 3, page 8, line 27: Replace "treats a" with "considers"
16. Section 4.1, page 9, line 23: Replace "Sea-salt emission is" with "Sea-salt emissions are"
17. Section 4.1, page 9, line 25: Replace "Dust emission is" with "Dust emissions are"
18. Section 4.1, page 9, line 26: Replace "and is" with "and are"
19. Section 4.1, page 9, lines 27-29: Replace "Subgrid-variation of the wind speed in a GCM grid box, which is created by boundary-layer turbulence and dry/wet convection, is accounted for the modeled dust emissions" with "Subgrid-scale variation of the wind speed in a GCM grid box, which is created by boundary-layer turbulence and dry/wet convection, is accounted for in the modelled dust emissions"
20. Section 4.1, page 9, line 30: Replace "DMS emission is" with "DMS emissions are"
21. Section 4.1, page 10, line 1: Replace "DMS emissions, The ModelE2-TOMAS" with "DMS emissions, the ModelE2-TOMAS"
22. Section 4.1, page 10, line 7: Replace "DMS emission is" with "DMS emissions are"
24. Section 4.2, page 10, line 28; Replace "Primary emission of particulate sulphate is" with "Primary emissions of particulate sulphate are"
25. Section 4.2, page 10, line 31: Replace "Primary sulphate emission is" with "Primary sulphate emissions are"
26. Section 4.2, page 11, line 4: Replace "aerosol emissions is" with "aerosol emissions are"
27. Section 4.2, page 11, line 10; Replace "in ModelE2-TOMAS run we assumes" with "in the ModelE2-TOMAS run, we assume"
28. Section 4.3, page 12, lines 22/23: Replace "because Koch et al. (2006) prefers the newer DMS emissions to improve a sulphate prediction in the remote marine locations" with "because Koch et al. (2006) argues that the newer DMS emissions improve sulphate predictions in remote marine locations"
29. Section 4.3, page 12, line 26: When you say "10 μm in ModelE2-TOMAS", does this

refer to both sea salt and dust? Please clarify.

30. Section 4.3, page 13, line 1: correct spelling of "wer"

31. Section 5, page 13: Use "evaluation" rather than "evaluations"

32. Section 5.1, page 13, line 27: Replace "In case of" with "In the case of"

33. Section 5.1, page 14, line 14: Replace "can decrease 32%, and global sulphate burden can increase 3%." with "can decrease by 32%, and the global sulphate burden can increase by 3%."

34. Section 5.1, page 14, line 16: Replace "hydroxide (OH)" with "hydroxyl (OH)"

35. Section 5.1, page 14, line 28; Replace "Global burden" with "The global burden"

36. Section 5.1, page 17, lines 11/12: Replace "might be due to too weak wet scavenging (including aqueous chemistry) of SO₂" with "might be due to wet scavenging (including aqueous chemistry) of SO₂ being too weak"

37. Section 5.1, page 17, line 19: Replace "which does not capture in the model" with "which is not captured in the model"

38. Section 5.2, page 17, line 27: Replace "scenario, Note" with "scenario. Note"

40. Section 5.2, page 18, line 9: change "modeling" to "modelling"

41. Section 5.6, page 33, line 17: Replace "satisfying" with "satisfactory"

42. Section 6, page 34, line 7; Replace "the evaluations have" with "the evaluation has"

[Response](#)) We have accepted all the suggestions above.