

Response to Anonymous Referee #2

We appreciate the Referee's constructive comments on the manuscript, and respond to each point below.

1. P18625. Lines 27-29. Since the same method is used as Levy et al. 2013, some comparisons of results are needed in the conclusion section.

A short paragraph has been added to compare the global-mean results (which are rather similar in the two models).

2. Section 2.1. Please add the model resolution of CSIRO Mark 3.6 used in the experiments. Please add how the model treats the forcing from large eruptive volcanoes such as Pinatubo in the historical period?

Model resolutions for the atmospheric and oceanic components have been added. A short paragraph has been added for the treatment of eruptive volcanic forcing (which is based on Sato et al., 1993).

3. P18626. Line 19. What do you mean "anthropogenic species"? SO₄, OC, and BC? It is more accurate to use "species with anthropogenic sources" instead of anthropogenic species.

Agreed. Wording is changed to "species with anthropogenic sources (sulfate, OA and BC)".

4. P18628. Line 11. How do you calculate the "anthropogenic AODs"?

This was calculated as 2000 minus 1850, which is now clarified in the text.

5. P18628. Line 12. "earlier models". Give references.

References are now given for AeroCom (Kinne et al., 2006; Schulz et al., 2006).

6. P18637. Line 18. "nominal forcing of 4.5 W m⁻²". Where do you get this?

RCP4.5 is named as such, because (by construction) it is a scenario that stabilises radiative forcing at 4.5 W m⁻² in the year 2100. RCP4.5 was explained at the point where the simulations were introduced, but we inserted another reference to Thomson et al. (2011) on (the former) P18637 to remind the reader.

7. P18645. Last two paragraphs. The description on nitrate here is not very suitable, and better be moved to the beginning of section 5.

Thanks and agreed. The discussion of nitrate is moved to the beginning of section 5 as you suggest. We also added a paragraph about the relative roles of forcing from sulfate and carbonaceous aerosol, because a question on the discussion paper from a colleague reminded us that these differences can contribute to the scatter seen in the RCP4.5 results, and this point was not adequately explained.

8. P18671. Figure 8. It is not clear how you construct the stream function and how to interpret the change. More clear description is needed.

The streamfunction is now defined in the text in Section 4.2.