

Interactive comment on “Projected effects of declining aerosols in RCP4.5: unmasking global warming?” by L. D. Rotstajn et al.

Anonymous Referee #2

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This study investigates the effect of declining aerosols in RCP4.5 on global and hemispheric scale temperature and precipitation, in comparison with the effect from the increasing of GHGs. Aerosol and GHG effective radiative forcing (ERF) at TOA and in the atmosphere in RCP4.5 and historical period is used to elucidate the different responses in temperature and precipitation by aerosols and GHGs. Their results are also compared with other CMIP5 models. They found that aerosols can have a strong asymmetric effect on the temperature and especially precipitation in NH and SH due to the dynamic effect on circulation. This is a nice contribution to the understanding of the declining aerosol effect, in comparison with the effect of GHGs. This work is relevant to the scope of Atmos. Chem. Phys. The manuscript is in generally well written although some clarifications are needed as indicated below in my specific comments.

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Specific Comments

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.
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?
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.
4. P18628. Line 11. How do you calculate the “anthropogenic AODs”?
5. P18628. Line 12. “earlier models”. Give references.
6. P18637. Line 18. “nominal forcing of 4.5 W m⁻²”. Where do you get this?
7. P18645. Last two paragraphs. The description on nitrate here is not very suitable, and better be moved to the beginning of section 5.
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.

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