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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Chemistry-climate model simulations of the Mt. Pinatubo eruption using CCMI and CMIP6 stratospheric aerosol data" *by* Laura Revell et al.

Anonymous Referee #2

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In this manuscript the authors compare the results of SOCOLv3 simulations performed using the SAGE-4\lambda and SAGE-3\lambda stratospheric aerosol datasets, used for the CCMI-1 and CMIP-6 model intercomparisons, respectively. In particular, the authors compare the temperatures and ozone concentrations during the post-Pinatubo period in the two simulation ensembles to each other and to the MERRA and ERA-Interim reanalysis.

I have found this an interesting paper, well-written and logically organized. It is a good paper that represent a necessary reference to document the differences between the two datasets. I have only some minor comments:

- page 3 line 13: "we investigate the impact of the Mt. Pinatubo eruption on climate and stratospheric chemistry". The authors only show changes in temperature and w*, too little to speak about changes in climate. I would explicitly write "we investigate the impact of the Mt. Pinatubo eruption on stratospheric temperatures and chemistry".

- section 2.3 is not very clear. Starting from the title, I would spell out the full names of the databases: "The SAGE-3\lambda and SAGE-4\lambda". Initially I wondered if the authors where introducing a third database that merges SAGE-3\lambda and SAGE-4\lambda. Secondarily, I do not understand the steps. Step 1 is the calculation of n, r, and \sigma from the different wavelengths. But what is step 2? Which correction is calculated? Or did you mean "correlation"? Also, what are the remaining two parameters, n and \sigma? But they have already been obtained in step 1.

- figure 4: The authors compare with MERRA and ERA-Interim to establish which one of the two databases lead to better simulations. However, reanalysis might not be the best tool to evaluate a model after a volcanic eruption, as they are driven by satellite data which might not be reliable after such strong perturbation. Additionally, they might not respond correctly to such a strong and sudden perturbation. I would suggest to add a comparison to measurements, many of which as cited in the introduction.

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