

## ***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 were introducing a third database that merges SAGE-3 $\lambda$  and SAGE-4 $\lambda$ . Secondly, 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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Discussion paper

