Review on:

Climate System Response to Stratospheric Sulfate Aerosols: Sensitivity to Altitude of Aerosol Layer

Krishna-Pillai Sukumara-Pillai et al

The authors simulate the solar radiation method (SRM) of stratospheric sulfate aerosols by prescribing a uniform layer of sulfate aerosol concentration. Assuming different altitudes of this layer, they determine the impact on different variables like radiative forcing, surface temperature, and humidity and temperature in the stratosphere.

The paper is very well written and includes an impressive literature review. I recommend publication after the authors addressed the following comments.

General comments

I expressed my concern related to the prescribed aerosol layer in my first review. The authors have not performed a more realistic simulation, where the sulfate spreads over a larger vertical area. They want to keep this for another more detailed study. As they state this simplification know clearly in the text, I can accept this. However, I am not really satisfied with the motivation of the work. The results of Kleinschmitt et al (2017) are different to previous studies, as one can see also in the comparison to the second model in their paper. Tilmes et al (2017), English et al, Niemeier and Schmidt (2017) show an increase of the TOA imbalance when increasing the injection height. Thus, motivating the work with Kleinschmitt et al (2018) is difficult in my point of view.

Specific comments

Check the spelling of names in citations.

Page 3 Line 9 Why depends sedimentation on Brewer-Dobson Circulation (BDC)? Sedimentation is vertical and BDC mostly meridional transport, at least the deep branch as named in the text.

Page 10 Line 23 - 26: This needs to be sorted! Aquilla shows this for tropical jets of the QBO. You model has no QBO and strengthens the easterly jets in this area. You seem to mix tropical and high latitude jets here. Additionally, the largest negative response in in Vol_100hPa.

Fig. 8: Include the upper troposphere region in the plot.

Page 13 Line 10: This is not new and shown in many more previous studies.

results depend on the model, strong uncertainty, but also on injection strategy and model resolution. Resolving the QBO or not has an impact as well.

Page 14 Line 3-4: What about the easterlies. You never say that your westerlies are the polar night jet, not the tropical jets. A model without QBO gives easterlies in the tropics.