Atmos. Chem. Phys. Discuss.,
doi:10.5194/acp-2017-470-RC1, 2017

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Changing transport processes in the stratosphere by radiative heating of sulfate aerosols" *by* Ulrike Niemeier and Hauke Schmidt

Anonymous Referee #1

Received and published: 31 May 2017

This manuscript investigates the effect of stratospheric sulphate aerosols on stratospheric transport, and, importantly, the effect of correct simulation of these transport processes to the climate effects of geoengineering using these aerosols. The manuscript provides further explanation as to why the radiative forcing of sulphate aerosols does not increase linearly with injection rate, and explains why the efficiency of the forcing per unit injection rate may decrease even more sharply than previously estimates. The manuscript is well-organised and mostly clearly written. Some of the figures could be improved and there are some issues with the clarity of the text to correct (see below). On the whole these constitute minor revisions to the manuscript, after which I recommend the manuscript be accepted.

Printer-friendly version

Discussion paper

Main points:

1. One area I would like to see a little more discussion of is the choice of the criteria for the QBO composites. They seem somewhat arbitrary. I would like to see some more justification of the choices the author made and some discussion of the importance of these choices. Key questions for me include: How were they arrived at? Were a range of other values for the criteria tested? Are the results sensitive to these choices?

2. It would be useful to have a table summarising the forcing efficiencies of the different simulations. This is all discussed in the text but it would be helpful to the reader to have some of the key statistics drawn out in the form of a table, especially since the authors rightly highlight the efficiencies as a key implication of the study.

Clarity of language:

L73 - are the terms 'tropical' and 'equatorial' jets being used interchangeably here?

L84 - related **to**

L131 - I think 'imagine' would be a better choice of word than 'assume' here

L176 - month –> months

L185 - 'causes a prolongation' –> 'prolongs'

L222 - 'the vertical extension of the jet' - which jet is being referred to here? The equatorial jet, I presume?

L430 - 'thought' –> 'through'

L455 - missing the units of temperature

Figures:

1. Figure 1 is missing units on the axes.

2. Figure 2 is missing a title and units on the 'pressure' axis. The font size could also be increased to make it easier to read.

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2017-470, 2017.