

***Interactive comment on* “Long range transport and fate of a stratospheric volcanic cloud from Soufriere Hills volcano, Montserrat” by A. J. Prata et al.**

Anonymous Referee #3

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Review of “Long range transport and fate of a stratospheric volcanic cloud from Soufriere Hills volcano, Montserrat” by Prata et al.

General Comments

The paper presents potentially interesting observations of a volcanic eruption, but the results are hard to evaluate due to the poor graphics. Movies 2 and 3, meant to be compared, are plotted with different units on different projections, so cannot be compared. This needs to be fixed before the paper can be published.

The mention of geoengineering implicitly endorses the idea, with no mention of the

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many flaws in the suggestion. For example, as described by Morton (2007) and in many other places, if society could muster the resources and agreement to advertently modify the climate of the planet, surely we could produce the agreement and technology to reduce greenhouse gas emissions much more cheaply and safely. And even if we could modify the climate, whose hand would be on the thermostat? What about potential inadvertent consequences? Justifying observations of volcanic eruptions as a way to monitor future geoengineering is completely inappropriate, without further analysis.

Specific Comments

p. 4659, line 13: “a best estimate of 7.5-10.5 Tg(S) for volcanic sulfur” For what period?

If you want us to compare the observations in movie 2 with the model simulation in movie 3, they have to be plotted on the same scale with the same units. It is impossible to compare colors that mean different things on different projections. Make a movie with both observations and model in two panels in the same movie, with the same units and projection, and a third panel showing the differences. That way they can be evaluated.

However, as I see the two movies, it looks like the simulation is not very good, keeping the location of the cloud too far north as it goes across the Pacific. I cannot tell about the amount or the timing, due to the different ways they were plotted.

When models disagree with observations, you are presented with an opportunity to advance knowledge by figuring out the reasons for the disagreement, which will result in either better observations or better models or both. But you do not do this.

p. 4666, line 9: Surely you can find a better primary reference to radiative forcing than the erroneous Douglass and Knox (2005) paper, which gets the effects of volcanic eruptions on climate wrong (Robock, 2005; Wigley et al., 2005).

lines 17-18: “Applying linear scaling arguments based on the impact of Pinatubo on

surface temperatures, viz. 10 Tg(S) produced -0.6 K surface cooling,” is incorrect. The equilibrium response to volcanic forcing, which is the relevant parameter for continuous geoengineering loading, is much larger than the transient response to transient forcing from Pinatubo. This is something Douglass and Knox did not understand (Robock, 2005; Wigley et al., 2005).

Technical Comments

Title, p. 4658, line 8 and rest of paper: Soufrière is spelled with an accent grave.

p. 4658, line 22: El Chichón is spelled with an accent mark.

p. 4668: Rosenfeld and Tupper references are out of alphabetical order.

The links to the movies in the pdf file do not work, as the link is only the first part of each URL. How can you expect readers to have to cut and paste to see them? Furthermore, they should not be zip files but links that can just be clicked to be seen. They would not be much bigger files (compression was only 5-11%) and not dependent on proprietary software. It should not be so much trouble to watch the movies.

References

Morton, O.: Is this what it takes to save the world? *Nature*, 447, 132-136, 2007.

Robock, A.: Comment on “Climate forcing by the volcanic eruption of Mount Pinatubo” by David H. Douglass and Robert S. Knox. *Geophys. Res. Lett.*, 32, L20711, doi:10.1029/2005GL023287, 2005.

Wigley, T. M. L., Ammann, C. M., Santer, B. D., and Taylor K. E.: Comment on “Climate forcing by the volcanic eruption of Mount Pinatubo” by David H. Douglass and Robert S. Knox, *Geophys. Res. Lett.*, 32, L20709, doi:10.1029/2005GL023312, 2005.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 7, 4657, 2007.

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