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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Extended observations of volcanic SO_2 and sulfate aerosol in the stratosphere" *by* S. A. Carn et al.

Anonymous Referee #1

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Review of "Extended observations of volcanic SO2 and sulfate aerosol in the stratosphere" by Carn et al.

General Comments

While this paper shows some interesting observations, it does not take advantage of those observations to answer important scientific questions. The authors claim that using the A-Train satellites is a powerful combination, but they do not demonstrate it. I would like to see a calculation of the rate of conversion from SO2 gas to sulfate aerosol. I would like to see a calculation of the radiative forcing from the gas and from the aerosols, to show how the radiative forcing from this cloud evolved. Then, we will really have a better idea of how important such eruptions are for climate change.

Specific Comments

Lines 24-25, first sentence of abstract “Sulfate aerosol produced after injection of sulfur dioxide (SO2) into the stratosphere by volcanic eruptions can trigger climate change.” But the cloud you study did not. You should modify this statement by saying how large the cloud has to be and what you mean by "trigger climate change."

Lines 43-44: Not correct. As explained by Newhall and Self (1982) and Robock (2000), stratospheric injection can be used to classify the VEI of an eruption, but it is the least important indication, and it does not work the other way. VEI is an index of explosiveness, not of stratospheric injections.

Line 46: Rather, for inferring climate change we need a direct index of sulfate loading, not a correction to an imperfect measure like VEI, which was never intended to be an index of the effects of volcanic eruptions on climate.

Line 111: Yang et al. is not an acceptable reference.

Lines 216-218: I don’t see how a detailed characterization of the clean stratosphere will be important as compared to massive pollution envisioned for geoengineering.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 2857, 2007.

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Interactive Comment