

Interactive comment on “Global temperature response to the major volcanic eruptions in multiple reanalysis datasets” by M. Fujiwara et al.

Anonymous Referee #1

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General Comments

This paper analyses the representation of changes to temperature in several reanalysis datasets to different recent and significant volcanic eruptions, mainly Mount Agung, El Chichon and Pinatubo. The temperature response to volcanoes is examined by removing signals from other sources of variability using linear regression. It is found that the reanalyzes have similar responses in the lower stratosphere and in the upper troposphere for a given eruption but there are differences in the response between individual eruptions.

In terms of the stated goal to evaluate the reanalyzes the paper does a good job in a clear and systematic manner. Below are a few comments.

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Specific Comments

page 13318, line 15: As pointed out here differences in the response of each reanalysis may be a product of issues with the observations, the model or a combination of both. Since this paper is focused on temperature, albeit a spatial distribution, it would be useful to have some indication of the diversity of the observations used by the reanalyzes. Is there some indication that the response seen in the paper is more affected by the observations or the model?

page 13320, line 5: Same question as above. Do all of the reanalyzes assimilate the datasets?

page 13320, line 7: It is mentioned here and elsewhere in the text that 20CR uses annual average volcanic aerosols. Is there a reference how this is done? It is not clear in Compo et al., 2011 or Saha et al., 2010. Could this affect your analysis applied to this reanalysis? For example, if we assume that an annual average is for the period January to December of a given year then for Pinatubo the model erupted in January rather than June of 1991. Given the method to determine the volcanic signal (Page 13321, line 25) won't the pre-eruption period be affected?

page 13323, line 10: Which aerosol dataset does 20CR use? It is not clear in Compo et al., 2011 and Saha et al., 2010.

Technical corrections

page 13323, line 25: "SD" is not defined in the paper.

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