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Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "Atmospheric effects of volcanic eruptions as seen by famous artists and depicted in their paintings" *by* C. S. Zerefos et al.

**C. S. Zerefos et al.**

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Response to Referee #4

We would like to thank the reviewer for his kind words and valuable comments.

A paragraph has been added in the revised manuscript in the introduction which briefly summarizes the main principles that the other studies use to estimate AOD and/or DVI values for the past years. The sources of errors and uncertainties are completely different between our study and the ones discussed so it is difficult to conclude with accuracy on the existence of systematic biases etc. In addition there is not in the literature much information on the uncertainty of these estimates. In a new section 3.4 which has been added in the discussion, following also the suggestions from referee D. Stevenson, provides estimates of the uncertainty of our AOD calculations. As a



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summary we can claim that our AOD values have an error of less than 0.05 for low AOD values (around 0.1) and 0.15 for values greater than 0.5. So the differences found between our estimates and the ones from the other studies are within the uncertainty of our estimates.

In the conclusions a paragraph has been be added in the revised manuscript where the value of the retrieved AOD time series are discussed. The advantage of AOD compared to DVI values is that AOD can be directly used in models for RF calculations and can also be compared with current measurements of the AOD, since there are nowadays plenty of measurements of AOD. An estimate of the variability of background AOD during a period of 500 years can be useful to detect changes related to pollution over Europe's middle latitudes.

Concerning the potential sources of bias between modeled and measured R/G, as already mentioned, an appropriate paragraph has been added in section 3.4 following the remarks of D. Stevenson and B. Mayer (see our response to both).

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Interactive comment on Atmos. Chem. Phys. Discuss., 7, 5145, 2007.