Atmos. Chem. Phys. Discuss., 8, S6400–S6401, 2008
www.atmos-chem-phys-discuss.net/8/S6400/2008/


Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "Retrieval of stratospheric aerosol size information from OSIRIS limb scattered sunlight spectra" *by* A. E. Bourassa et al.

**A. E. Bourassa et al.**

Received and published: 27 August 2008

Thank you to the referee for the instructive and encouraging review. The main issue that the referee mentions is the lack of discussion of forward model parameter errors. We have addressed this concern in a revision of the paper. We have added references about assumed composition, including index of refraction. We have also pointed out that the retrieval of aerosol size information presented in this paper is an application and expansion of the aerosol extinction retrieval that has been previously published (Bourassa et al., JGR, 2007) and extensively referenced here. A lengthy discussion of these forward model parameter errors is part of this previous paper and it shows that they do not dramatically impact the result. These results apply directly to this work. However, we agree with the reviewer that the effect of these errors should be



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mentioned again in this paper with direct reference to the results from the study in the previous paper. This is reflected in the revision.

Other minor points:

The retrieval of effective radius is mathematically equivalent to mode radius for an assumed mode width when using a log-normal distribution and the conversion is straight forward. We prefer to use mode radius directly as it carries more physical meaning regarding the assumptions made for the radiative transfer modelling.

An extensive validation study of the OSIRIS aerosol results with multiple instruments and at several wavelengths is underway and will be published in an upcoming paper. For the purposes of this paper, we focus on the retrieval technique and use the SAGE II and III results simply as a proof of concept.

Volcanic conditions certainly present challenges, mostly due to the fact that the distribution and particle composition is not as easily characterized (multiple modes, changing index of refractions, etc). We have included a brief discussion of these issues in the revision.

The quoted uncertainty is derived from the test case. This has been clarified in the revision.

The errors bars on the OSIRIS profile represent the error derived from the final stage retrieval of the extinction. This is clarified in the revision.

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Interactive comment on Atmos. Chem. Phys. Discuss., 8, 4001, 2008.