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Atmospheric Measurement Techniques Discussions

Interactive comment on "New retrieval of BrO from SCIAMACHY limb: an estimate of the stratospheric bromine loading during April 2008" *by* J. P. Parrella et al.

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Review of Parrella et al., "New Retrieval of BrO from SCIAMACHY limb; an estimate of the stratospheric bromine loading during April 2008"

This paper presents all of the detail associated with a new retrieval technique that has been used along with SCIAMACHY limb scattered sunlight measurements to infer vertical number density profiles of bromine monoxide. It includes a description of the two part retrieval where the slant column densities (SCDs) are retrieved and a radiative transfer model is used to retrieve the BrO profile from the SCDs. The paper gives

a detailed discussion of the error budget associated with the retrieval and presents four single profile comparisons to indicate the retrieval quality. This work concludes with a calculation of the zonally average Bry during April of 2008 as inferred from the SCIAMACHY BrO measurements and a photochemical box model.

General Comments

I always appreciate 'yet another retrieval paper' as I believe that the more groups around the world working to retrieve atmospheric parameters from spacecraft data the more likely we are to get it right. This paper represents work that is a variant of existing and already published work using data that has already been exploited for the purpose of BrO retrievals. However, in my opinion this in no way diminishes its importance. It is significantly different from existing retrievals to stand on its own.

As a retrieval technique paper this work is complete and well written. The method used for the retrieval and the associated expected errors are completely and clearly documented. Although the discussion in Section 5 related to the model error seems short it is complete and not more can be accomplished with an expanded discussion. The introductory sections and the parts of the paper related to the retrieval theory and error analysis can be published with little to no modification.

I understand that when doing profile by profile comparisons for retrievals it is difficult to find coincident measurements that are of sufficient quality to generate good statistics. Therefore, I also don't have any major concerns with Section 4 that aren't addressed with my next comment.

I think the paper is lacking some context with respect to the existing BrO retrievals that also use very similar, if not identical, SCIAMACHY data. Figure 2 and Section 4 would have benefitted from the inclusion of data retrieved by other methods from SCIAMACHY data. These profiles are of necessity coincident and should be readily available. Similarly the data shown in Figure 6 would tell a better story if data from the existing retrievals were placed alongside it to provide contrast or perhaps show a

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similar picture.

Minor issues

I can't figure out what Figure 7 is trying to tell me.

The authors mention DOFS in Figure 2 but I cannot find a discussion of them in the text that surrounds the figure.

Concluding Remarks

I like this paper and feel it should be published once my concerns with respect to existing SCIAMACHY data are addressed. I have selected the 'reconsidered after major revisions' option only because I want the authors to address my concern by either convincing me that the existing data is not necessary or by including it.

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 8017, 2012.