

***Interactive comment on “Inter-comparison of stratospheric O<sub>3</sub> and NO<sub>2</sub> abundances retrieved from balloon borne direct sun observations and Envisat/SCIAMACHY limb measurements” by A. Butz et al.***

**H. Kelder (Editor)**

Hennie.Kelder@knmi.nl, kelder@knmi.nl, piters@knmi.nl

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Find below the belated comments from referee number 2, who didn't succeed in putting them on-line in time.

COMMENTS FROM REFEREE #2:

"Overall, I thought the paper was good to excellent. It was very well done and very thorough from when I first saw it. The quick review process was very successful in

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making the paper complete. However the paper became too long and I believe that very few people will read the entire paper, but many more could benefit from its results. Therefore I think the paper could be improved if there was a table summarizing the results. A table that gave biases and precision of differences between balloon and satellite for slant columns and as function of altitude for both O<sub>3</sub> and NO<sub>2</sub> vertical amounts.

Another table which would list the error contributions, such as cross section, pointing, fitting parameters, and the amount due remaining temporal and spatial differences in the tangent points would also be very instructive. This would illustrate whether our validation techniques are good enough, that is, do the component errors add up to the difference observed in the comparison data. The authors should quantify the corrections made to the spatial difference using the trajectory model and the time difference using the photochemical model. Did they help the comparison or not and how much? The authors point out that the modeling error is 10-20% while the modeling error for backward match is 30%. Therefore, are these models necessary for validation and how much value did they add to the comparison analysis?

This paper is a benchmark for validation because of detail analyses included by the authors. Therefore are the results presented here the best that might be expected for validation? Where can improvements be made?

Finally, a lot more value would be added to this paper if there were comments on the scientific impact of these results. I think validating ozone profiles to 10% is not good enough these days. We have seen comparisons with ground and satellite data approaching the 5% level (e.g. SAGE and sondes). 10% is not likely good enough for trend monitoring. But possibly good enough for model verification. Much less is known about NO<sub>2</sub> climatology that 20% might be good for developing a climatology and providing some constraints to a 3D photochemical model, although having only NO<sub>2</sub> may not be good enough. In this case the NO<sub>2</sub> data would compliment stratospheric profile data from Aura MLS and HIRDLS for model evaluation."

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Interactive comment on Atmos. Chem. Phys. Discuss., 5, 10747, 2005.

**ACPD**

5, S5099–S5101, 2005

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