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Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "Validation of Ozone Monitoring Instrument (OMI) ozone profiles and stratospheric ozone columns with Microwave Limb Sounder (MLS) measurements" *by* X. Liu et al.

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**Response to referees 1 and 3's comments about whether this paper should be published on ACP or AMT**

As already stated by the other referees, this is strictly not a paper to be published in ACP(D), as it presents no new scientific findings concerning the atmosphere, not even novel methodological approaches. Nevertheless, the manuscript under consideration



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presents an accurate and diligent exercise of validation (which is exactly the appropriate approach to perform this kind of task). Referee #1 argues that it would not be fair to block the publication process in ACP at the current stage, and I tend to agree to this view (but find it difficult to rate the scientific significance of this paper in the framework of the prescribed terms "substantial new concepts, ideas, methods, or data").

**Response:** The editor's decision before publish on ACP(D) was to let us choose between ACP(D) and AMT(D). We choose ACP(D) first because it is a follow-up paper of our algorithm paper (also published on ACPD). Most importantly, the motivation of writing this standard-alone validation of stratospheric ozone profiles and stratospheric ozone columns paper is to emphasize the high quality (thus scientific values) of retrieved ozone profiles from backscattered UV measurements (which is not well recognized) through comparison with highly spatiotemporal coincident and high quality MLS data:

1. In the last two decades, numerous methods have been tried to derive tropospheric ozone column from satellite measurements. It is generally held that we need to subtract stratospheric ozone measured by limb measurements from total ozone to derive accurate tropospheric ozone column, and using BUV technique cannot accurately separate stratospheric ozone column from tropospheric ozone column due to coarse vertical resolution. People are still very skeptical about this after we have published our GOME algorithm and demonstrated this through very good comparison of tropospheric ozone column against ozonesonde measurements. The major question is how you can derive accurate stratospheric ozone column with such a coarse vertical resolution (7-10 km in the stratosphere). By comparing with MLS data, we demonstrate convincingly this new concept that stratospheric ozone column (thus tropospheric ozone column) can be derived accurately from BUV measurements alone with errors comparable or smaller than current limb measurements.



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9, C11214–C11216, 2010

2. Our error analysis shows that despite coarse vertical resolution, ozone profiles can be retrieved from nadir-viewing OMI measurements with retrieval errors (combing random-noise and smoothing errors) of 1-6% in the middle stratosphere (1-50 hPa) on a retrieval grid of ˜2.5 km, which is also comparable or better than some limb measurements. The validation with MLS data also demonstrates this clearly and supports that OMI ozone profiles (with daily global coverage) can be very useful for studying the spatiotemporal variation of ozone distribution in the stratosphere and for validation of other stratospheric ozone measurements.

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 24913, 2009.