

Interactive comment on “Six years of total ozone column measurements from SCIAMACHY nadir observations” by C. Lerot et al.

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General Comments:

The paper presents validation and evaluation of total ozone products retrieved from six years of SCIAMACHY nadir measurements. It gives a good description of the DOAS algorithms workings, and provides very timely discussions of ozone absorption cross section data sets (Section 3) and cloud algorithm concerns for total ozone retrievals from BUUV measurements.

Specific Comments:

The analysis shows a trend in the differences for SGP 3.01 with other instruments' records. This is followed in the Conclusions Section by hypotheses that the source is

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uncorrected instrument degradation or level 0 to 1 calibration. Since one of the purposes in using a closure polynomial is to remove broad scale calibration inaccuracies, it would be interesting to see if there was a trend in this component over the six-year period. Perhaps the authors could conduct a simple experiment where the Earth-view radiances for one orbit of SCIA data are changed by a 5% adjustment and report on the effect on the polynomial and on the ozone retrievals from the DOAS algorithm. This would allow calculation of an estimate of how large calibration drifts would be needed to create the observed trends in differences. Information on the time dependence (or lack thereof) of the DOAS goodness of fit and number of iterations would be useful.

The results for the comparison to the ground-based total ozone estimates show large variability in Figure 6. The individual stations in Figure 9 have different biases and gaps in their coverage. It is difficult to determine how these were combined to produce the single curve in Figure 6. One approach is to remove the individual station differences (each station's average bias) before combining them. There is no information in the bias of the combined result (This can be computed separately.) but the effects of data gaps would be reduced. While considerably more work, it would also be interesting to learn whether the other satellite data sets showed consistent differences in their overpass comparisons with the ground stations as expected from their differences with SGP 3.01.

The comparisons for the OMI record used the TOMS-heritage algorithm results. There is also a DOAS total ozone product from KNMI for the OMI. It may not be necessary to bring it in for direct comparison as there are existing comparisons of the two available. I will let the authors determine whether they are using the collection 2 or collection 3 OMI-TOMS data set and how the results in Slide 6 of

Kroon, M., "Absolute quality of the EOS Aura Ozone Monitoring Instrument total ozone columns and vertical ozone profiles," EOS Aura 2008 Science Team Meeting <http://avdc.gsfc.nasa.gov/index.php?site=1072744097#validation>

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and in Figure 9 of

Kroon, M., et al., (2008), Comparing OMI-TOMS and OMI-DOAS total ozone column data, J. Geophys. Res., 113, D16S28, doi:10.1029/2007JD008798.

would transfer to their comparisons. Depending on the data set used, there could be ± 0.5 differences in the trend over the 2004-2008 time period between the OMI-TOMS and OMI-DOAS global records that would either intensify or diminish the reported OMISCIA differences.

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