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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Technical Note: a combined SBUV and SAGE zonal-mean ozone data set" *by* C. A. McLinden et al.

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Review of manuscript entitled "Techical Note: a combined SBUV and SAGE zonal-mean ozone data set" by C. A. McLinden, S. Tegmeier and V. Fioletov

This manuscript decribes a methodology for constructing a long-term ozone profile data set from a series of SBUV and SBUV/2 instruments between 1978 and 2005. The authors used intercomparisons with SAGE I and SAGE II to correct time-dependent errors in individual SBUV(/2) records, effectively adjusting the SBUV to the long-term SAGE calibration. Then individual records are combined to make a single consistently calibrated long term record.

Overall, this paper is very well written and the material is appropriate for ACP. I have

only a couple of comments.

When talking about the inherent veritical resolution of the SAGE and SBUV measurements, the authors note the much higher vertical resolution in the SAGE data as compared to SBUV. In my mind I see a difference between using the SAGE data to correct the SBUV (but maintaining an SBUV-like product) and imposing the SAGE resolution on the SBUV data, thus creating a truly hybrid data product. If the SAGE data were being used solely to correct the calibration and inter-instrument differences the SAGE data should be vertically sampled using the weighting functions of the SBUV instrument, or some smoothing closer to the SBUV vertical resolution. The authors did integrate the SAGE data over the $\sim$3 km SBUV layers, but as noted, the true SBUV resolution is lower. The authors note that using the SAGE data in this fashion has added value to the SBUV product. However, how much do the authors trust that the added vertical information is real and not noise, given the inconsistent sampling that goes into the SAGE monthly zonal means. I'm particularly thinking about the trend plot... is the 'jaggedness' in the vertical trend a true feature that is smoothed out by SBUV or is it noise from the SAGE sampling? One possible test would be to first smooth the SAGE data using a $\sim$6km vertical running average, then integrate in the 3km layers and plot the QBO (Fig. 1). This would be more equivalent to the SBUV plot, and would help to indicate rather the vertical consistency of the SAGE or the vertical resolution is the most important factor. That is, if the smoothed SAGE still shows a coherent, albeit smoother, QBO, this suggests it is the inconsistent SBUV data rather than it's resolution that is the problem.

The authors also note the potential effect of temperature trends on the conversion of SAGE data from altitude to pressure coordinates. This point may turn out to be important, especially above 10 hPa where no NCEP reanalysis data are available. The authors need to point out that Figure 11b are percent trends calculated on altitude and Figure 11c are percent trends calculated on pressure (see WMO (2007) Figure 3-7), and also note that at least some of the difference between the trends in the two figures

is due to temperature trends (WMO (2006), page 3.7). A discussion along the lines of what is in the WMO report to explain these differences would be helpful. Also, I do not see a reference for Randel (2009) in the references.

Minor Comments: pg 12390, line 12: What is the % difference at layer 7 (increases to 10% in layer 10) ? pg 12390, line 19: errors in the satellite ephemeris in January... all Januarys? pg. 12394, line 18: It might be worth noting here other recent comparisons with SBUV(/2) data that corroborate your results (

Technical Comments: pg 12390, line 22: repeat of word “lifetime” pg 12390 line 29 – pg. 12391, line 1: reword. “For all SBUV-SAGE II coincident pair measurements at each latitude . . . pg. 12395, line 3: 2000(?) and typo replace tro with top pg. 12396 line 14: et al.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 12385, 2009.