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Atmospheric Measurement Techniques Discussions

Interactive comment on "GOME-2 total ozone columns from MetOp-A/MetOp-B and assimilation in the MACC system" *by* N. Hao et al.

Anonymous Referee #1

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This paper does a good job of showing the consistency of the GOME-2 instruments on MetOp-A and MetOp-B satellites. Since the GOME instruments are the source of important global ozone data the details presented in this paper are scientifically important for the users of the GOME data. The paper includes validation against ground based Brewer/Dobson network for the 6 months of overlap of the two instruments. There is also a good discussion of the ozone cross section issue for this processing.

comments:

Abstract - in line 15 you state that "GDP 4.9 slightly overestimates Dobson observations ..." The word "overestimate" contains the implicit assumption that the Dobson or Brewer are correct and that GOME is too high. It is equally likely that the GOME measurement

is the more correct and that Dobson is too low. After all, Dobson and Brewer do not agree with each other. I would use a more neutral term and say that "GDP 4.9 ozone is slightly higher than Dobson observations..."

p 2268 line 26 - A left/right asymmetry could be caused by even a very small pointing error such that nadir is not actually nadir. This can be caused by inaccurate spacecraft attitude knowledge or by the instrument not being mounted on the spacecraft precisely. Such an error can be accurately corrected, leaving a smaller error for empirical correction. Was this considered? The approach to doing the empirical correction looks good.

You mention in the introduction that GOME ozone shows very little bias compared to OMI/TOMS data. A plot showing the difference between each GOME instrument and OMI/TOMS (and possibly OMI/DOAS) would be very useful in helping understand the performance of GOME relative to another major satellite ozone monitoring system.

Figure 13 - the seasonal difference of GOME relative to northern hemisphere Brewer or Dobson ozone is fairly large, as much as 3% peak to peak. While no two instruments agree on seasonal variation, this is larger than that seen for SBUV/2 or for OMI/TOMS, where the peak to peak variation is more like 1 to 1.5%. Could this be an issue of using only a few selected ground stations in the average? Could this be a characteristic of a DOAS retrieval? This is really not discussed in the text and needs to be explained. The bias is much less of an issue.

Minor edits and comments:

p2261 line 2 - say "and should" rather than "which will"

p2261 line 8 - "orbits"

p2261 line 13 - "relatively"

p2262 line 25 - "freely"

p2264 line 1 - "an NO2 absorption..."

p2264 line 19 - say "stops when" rather than "stops until"

p2267 line 9 - "Differences"

p2270 line 7 - "similar to those for GOME 2A"

Figure 8 - hard to distinguish the symbols for the different dates

Figure 9 - this figure is not very effective. Could you use a different color scheme such that differences less than 1% versus greater than 1% would be clear?

p2271 line 24 - "The relatively larger differences ..."

p2272 line 19 - "activities have been carried out..."

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 2259, 2014.