

## ***Interactive comment on “Ground-based assessment of the bias and long-term stability of fourteen limb and occultation ozone profile data records” by D. Hubert et al.***

**Anonymous Referee #1**

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This paper is an extensive review of the accuracy of 14 ozone profiling instruments that use either the occultation or limb scattering measurement techniques by comparison with ground based sonde and lidar data records. The paper is unusually well written with few typos, but at 56 pages of actual text with 33 co-authors, this assessment is excessively long. It would benefit greatly if it were shorter and more focused.

On the plus side, the limitations of the various instruments becomes clear in the detailed comparison plots. I particularly like the attention to the importance of the auxiliary data in doing such comparisons. The fact that this adds uncertainty is a point frequently neglected.

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The discussion section could be clearer as to which instruments have really useful data and which should probably not be used. Particularly the section on merging schemes should address which data sets are usable and which would need large corrections to be included.

The one serious problem I see with this paper is the use of lidar data for the comparisons in the middle and upper stratosphere. While the rationale for excluding a few sonde stations with limited sampling is reasonable, excluding 9 out of 13 possible lidar stations is problematic. In accepting only 4 stations are you using only the data that gives results that you expect? I am tempted to say either use all the lidar stations or none of them. This is a serious weakness.

minor comments: p 6667 line 21-22 “We report the general tendencies...” Need to reword this sentence.

p 6670 line 5 This is the first mention of the ERA-Interim reanalysis. Need a short description here.

p 6670 line 6 No instrument is truly “self calibrating”

p 6671 line 22 A bias of 8-10% is large in a paper claiming general agreement of +/-5% for most instruments in the 20-40 km region.

p 6672 need to note that SAGE III has data at high latitudes only

p 6677 “... optical” should be “... optimal”?

p 6678 line 17 to avoid confusion say: (altitudes below 1 hPa)

p 6682 what is the wavelength range used by the VIS spectrometer?

Fig. 1 this figure shows MLS down to the surface, yet the MLS section notes that it is useful for scientific use only down to 262 hPa. Are any of the data useful down to the surface??

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Fig. 2 What are the three different ground based instruments? Also, for both figures could you make the lidar points easier to distinguish from all the sonde points?

p 6707 line 16 "... measurements mostly agree..."

Section 8.2 You should mention the NASA SBUV v8.6 merged ozone data set, which is possibly the longest merged data set available. The Tummon paper provides some perspective relative to the occultation and limb data sets that are the subject of this paper.

p 6717 line 27 The performance of GOMOS is not as good as one might expect. Is it possible that GOMOS profile data derived using bright star data only might perform better?

all Have you considered using integrated profile total column ozone compared to ground based as an element of quality control?

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Interactive comment on Atmos. Meas. Tech. Discuss., 8, 6661, 2015.