

Interactive comment on “Evaluation of the New NDACC Ozone and Temperature Lidar at Hohenpeißenberg and Comparison of Results with Previous NDACC Campaigns” by Robin Wing et al.

Anonymous Referee #1

Received and published: 29 December 2020

This paper is the second of two manuscripts describing recent intercomparisons of the NDAAC ozone and temperature lidars. The paper is generally sound and clear, but is fairly long with lots of figures and some repetition. Since the co-submitted manuscripts will be of interest to the same set of readers, more effort could be made to reduce the overlap between the two manuscripts. Section 6 (and Figures 14-17) of this paper could also be moved to a supplement to reduce the length of the main text.

Some specific comments.

The intercomparison described here has been formalized with a name: “The Hohenpeißenberg Ozone Profiling Study (HOPS)”, but the name is not mentioned in either

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the title or abstract and doesn't even appear in the text until page 3. It should appear in both.

P2, L35. What do LAVANDE and HOPE stand for? Spell it out somewhere.

P2, L36. The last half of this sentence is awkward.

P2, L45. "The previous NDACC campaign..." should be "A previous NDACC campaign..."

P3, L54. "During the recent NDACC validation campaign by Wing et al. ..." should read "During the more recent LAVANDE campaign (Wing et al., 2020)..."

P3, L59. "SABER" is defined in the abstract, but not the text.

P3, L66 and L79. Repetitive.

P3, L77. Replace "...35 km 2)..." with "...35 km, and 2)..."

P4, L82. This is the first appearance of "HOPS".

P4, L107. "...scattering cross-sections..." should read "...absorption cross-sections..."

P4, L108. Sentence could be shortened to "The first wavelength is generated using a 308 nm XeCl excimer laser."

P4, L114. "...ozone scattering targets..." should read "...ozone molecules..."

P4, L116. Awkward. Perhaps rephrase "Generating lidar temperature profiles is accomplished..." to "Lidar temperature profiles are derived..."

P4, L117. "...proton..." should read "...photon..."

P5, L123. Remove Table 4 callout, or re-order tables.

P5, L140. Repeats lines 122-123.

P6, L170. "...alos..." should be "...also..."

P6, L177. SABER should be defined before first usage (see comment for P3, L159).

P7, L190. "...principle..." should be "...principal..."

P7, L208. Superfluous comma.

P9, L225. Perhaps insert "(not shown)" after "both wavelengths"

P10, L241-2. Replace "An example of both..." with "Examples of ..." and insert ", respectively" after "...Figs. 3 and 4."

P12, L267+. I don't see the "tight clustering" at 40 km referred to in the text. The NASA and OMPS-uv measurements are consistently low at this altitude. At 30 km, the OMPS-vis measurements are consistently low so I don't think you can blame these differences on the temporal offset-particularly since the OMPS-uv measurements look OK. Any comment on the 21 Mar HOHO measurements at 20 km? This appears to be even larger outlier than the BM measurement at 30 km that the authors do single out. What happened to the NASA-STROZ measurements on this day?

P12, L286. Fig. 8 or Fig. 6?

P16, L294. Rephrase "The spread in of values..." as "The spread in the values..."

P16, L294+. The scatter plots in Figure 7 are hard to read and should be replotted with larger and different symbols (and axis labels). Perhaps use closed circles for the lidar data and open circles for the satellites? The statement about the MLS measurements being high at low values in the 15-20 km panel is not obvious from the plot. The most striking feature of this panel are the very low values measured by SABER, yet there is no mention of this in the text. As far as the scatter in the satellite measurements in the 20-30 km panel, why would fewer nights of observations necessarily lead to more scatter? Including the BM measurements in the 30-50 km panel seems inappropriate since the balloons rarely ascend past 35 km. Also, why would the wind displacements

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cause these points to be consistently high-particularly since these displacements are still much smaller than most of the satellite paths? Isn't the BM pump a more likely culprit as you note below?

P18, L325. As before, where are the NASA-STROZ measurements for 21 Mar? Were there clouds that might have affected the HOH lidar measurements leading to the low O₃ at 20 km and high T at 30 km?

P21, L360. What exactly is meant by “due to the combination of HOH lidar data with the radiosonde mentioned in Sect. 2.2.”

P28, L453. “lidras” should be “lidars”.

Figure 1 caption. DD-MM or MM-DD?

Figure 6. I assume the red trace labelled “HOH” is actually NASA-STROZ? In my opinion, ALL of the comparisons should be shown relative to the NASA-STROZ lidar and NOT the HOH lidar since it is the official NDAAC “traveling standard”.

Figures 7 and 11. The different measurement sets are hard to discern in all of the scatter plots. The data should be replotted with different symbols and the axes labelled. I assume that the HOH measurements were used as the reference in Figures 6/7 and 11/12 because of the missing NASA data on 21 Mar. To me, the missing NASA measurements and outlying HOH ozone and temperature measurements on this day are something of a red flag, particularly since there is no explanation for either.

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