

***Interactive comment on “Intercomparison of stratospheric ozone and temperature measurements at the Observatoire de Haute Provence during the OTOIC NDSC validation campaign from 1–18 July 1997” by G. O. Braathen et al.***

**Anonymous Referee #1**

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The authors present a comprehensive approach to the validation of ozone and temperature lidar observations. Validation and error analysis are important tasks from numerous reasons and they should be obligatory in quality assurance, not only in observing networks. Therefore the authors can be congratulated on their efforts and to the publication of the results. But there are some major and minor topics that should be addressed by the authors:

Major comment: In large parts of the paper the authors compare the ozone and tem-

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perature profiles on a statistical basis. In the interpretation, especially of the figures 4, 8, 12, and 14, the standard deviation of the means of the data sets is associated with an observational error. In section 3.1 and 3.3 the standard deviation of the means is compared with the experimental error e.g. from photon statistics. But the authors mention only in side notes that in addition to the instrument error this number also includes every kind of real variation within the 13-day data set. At least for the temperature the natural variability from night to night and within a single night is comparatively high as can be seen from lots of publications e.g. from the OHP group. Therefore the authors should take the natural variability of the data more carefully into account for the interpretation of deviations between the instruments and between different nights.

For the comparison and validation of the instruments another calculation is strongly recommended instead: The differences between the GSFC and CNRS profiles of a single night, the mean value and standard deviation of these differences should to be more informative and better associated with the instrumental error.

Minor comments: The minor comments partly reflect the above mentioned major topic.

Page 5304 / line 2-9: Some major results of the intercomparison should also be mentioned in the abstract.

5308/7-8: The model for temperature initialisation should be named because it is a major source for differences above 70 km (as admitted later by the authors).

5311/26-27: Is there an influx of the MSIS-temperature on the calculated temperature and temperature variability by this method of SIN-reduction? The climatological MSIS-T may differ by some ten Kelvin from the true temperature.

5315/12-13: The statistical error contributes only partly to the standard deviation as calculated here. The natural variability (day to day) should also be mentioned.

5316/9-12: What kind of temperature has been used for the comparison of section 3.1: CNRS-lidar or NMC?

5316/24: For non-specialists on ozone retrieval from lidar data it would be nice to quantify the dependence of the ozone concentration on the temperature.

5318/4: The term “real error” should be avoided. “Total variability” may fit better to the meaning of the red curve. The authors are right if they attribute the large differences between red and green curve below 20 km to the atmospheric variability. They should do the same above 20 km, where the atmospheric variability may represent up to 50% of the total variability.

5319/17-19: It is not expected that the error-caused deviation is as large as the total standard deviation, because there is a large natural variation (see above). Therefore the authors should formulate positive, that the statistical error is much smaller than the total variability, especially for the GSFC lidar.

5320/22: Are there any temperature results from the radiosondes and can they be used for the comparison at and below 30 km?

5328/Table 2: If possible, the individual periods of observation should be mentioned to get an impression on the length of the sounding and on the time distance between the ozone soundings.

Section 5, general: Has there been any progress in data analysis or instrument design since the measurements in 1997?

Typing errors:

5305/12-13: In the reference list the year of the publication “Hansen et al.” is 1997

5305/14: “(Schulz et al., 2001)” should read “(Schulz et al., 2001).”

5305/26-27: In the reference list there is no “McDermid et al., 1999”. The year of the publication “McPeters et al.” is 1999

5306/20-21: In the reference list there is no “McGee et al., 1995” but 1995a and 1995b

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5308/4: In the reference list there is no “McGee et al., 1995” but 1995a and 1995b

5308/14-15: “Godin et al., 1989” is missed in the reference list

5309/24: “shows” should read “shown”

5310/4: “Nd:Yag pulse Laser” should read “Nd:YAG pulse laser”

5310/15: “by a cooled” should read “by cooled”

5313/21/22: “Jülich, Germany.” should read “Jülich (Germany).” or “Jülich, Germany.”

5314/22: Is the profile from 8 July or 6 July as mentioned in the figure caption?

5316/19: Is the profile from 8 July or 6 July as mentioned in the figure caption?

5321/19-20: In the reference list the year of the publication is 1999

5326/26: “Sing” should read “Singh”

5327, Table 1, Effective tel. area, low channel, GSFC: 0.38 should be aligned properly

5342, figure caption: “Fig. 11” should read “Fig. 12”

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