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Observations and analysis of UTLS aerosol detected over northern France

by Thierry Leblanc et al. et al.

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The paper describes the results and analysis for an outstanding field campaign to validate the performance of a number of ozone lidar systems from a continental-scale sounding network. The meticulous efforts are well described and verify a performance of the instruments meeting the requirements for high-quality ozone research. I recommend publication after minor corrections.

Details:

P. 2: I would somewhat emphasize (here or at the end) that TOLNet has the potential to become the first continental-scale high-quality ozone lidar network that could be operated over an extended period of time. In Europe something similar was established in the 1990s (TESLAS project, co-ordinated by J. Bösenberg). However, the network quickly broke apart. To my knowledge only two or three of these groups are still active in the field (recent publications: Ancellet et al., Atmospheric Environment **113** (2015) 78-89; Trickl et al., Atmos. Chem. Phys. **15** (2015), 9631-9649; Athens?).

Sec. 2: Although there is a table on the specifications I suggest to provide more complete information in the individual subsections. For example, in Sec. 2.1 the number of bits of the transient digitizer is missing, in Sec. 2.2 the laser pulse energy and the number of bits, and in Sec. 2.5 the pulse energy and the number of bits.

P. 9, line 21: Delete "ground"!

P. 10, line 12: "much less pronounced"?

P. 10, line 30: The high importance of sufficient co-location was demonstrated by Vogelmann et al. (Atmos. Meas. Technol. **4** (2011), 835-841; Atmos. Chem. Phys. **14** (2015), 3135-3148).

P. 12, line 3: I am wondering that there is so much structure left in the average profiles! Is there an explanation?

P. 12, line 7: "ozone sonde and lidar"

P. 14, line 21: "...exists. There was no major need for aerosol corrections anyway because....." (I think the choice of TMF was not motivated by the absence of particles!).

P. 15, line 10: Please, specify the uncertainties. I suggest to add J. Viallon, et al., Atmos. Meas. Technol. **8** (2015), 1245-1257: they find agreement of the Reims data within a few tens of a per cent in the relevant spectral region.

P. 16, Fig. 9: I see a single curve for all but one lidar, but several curves for TROPOS. Please, explain. There is a spike at about 13 km in the TOPAZ panels. Is this spike cause by calculating

$\frac{d}{dr}\ln y$ instead of $\frac{dy}{dr}/y$? The logarithm od noise is asymmetric!

P. 19, Sec. 7: Consider adding a statement on the retrievals.

P. 20, Sec. 8: Perspective for aerosol corrections?

Style:

General: I see both A.E. and B.E. spelling in the text; please, decide for one of both.

P. 1 line 23 (P. 2, line 14, P. 5, line 16): to understand better (split infinitive)

P. 2, line 18: I think "capability" is not precise enough. Something like "performance" would be better.

P. 2, line 30: "unprecedented" is ambiguous here. You certainly do not mean "within all validation efforts for TOLNeT".

P. 4. line 27 (and elsewhere): Using the tilde in this context is not good style; consider using "about".

P. 6, lines 2-3: "hydrogen", "deuterium"

P. 9, line 19: This phrase looks too congested. Perhaps better: "operating times of all lidars".

P. 11, line 2: Perhaps replace "obtained" by "carried out" or "achieved".

P. 11, line 4: Separate "hereafter" and "therefore", perhaps by starting the sentence with "Therefore, the results".

P. 11, line 17: "intervals, but"; also: "time response"

P. 12, lines 5-6: "including" instead of "using"?

P. 12, line 11: "Finally, we present Level 2 data validation results for SCOOP"

P. 12, line 23: "under these ....conditions" (see also P. 17, lines 13 and 16).

P. 14, line 14: Remove comma!

P. 14, line 31: "in the same way"

P. 15, line 21: "show"

P. 15, line 26: ", but, instead, to the data"

P. 17, line 5: ", but"

P. 18, line 25: Therefore, no data..."

P. 21, line 4: "authors of this paper"

P. 32: "SCOOP campaign"?