

Interactive comment on “Upgrade and automation of the JPL Table Mountain Facility tropospheric ozone lidar (TMTOL) for near-ground ozone profiling and satellite validation” by Fernando Chouza et al.

Anonymous Referee #2

Received and published: 30 November 2018

Chouza et al. gives an overview of the current state of the JPL tropospheric ozone lidar and reports about the automatization efforts as well as the implementation of a new very-near range receiver. The quality of the measurements are validated with other measurements and the long-term stability of the very-near range receiver is shown. Overall the manuscript is well written and gives reasonable explanation in regard to the technical developments.

General comments:

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- In section 2 “Instrument description”, the reader would benefit from a diagram of the transmitter and receiver layout of the lidar to better follow the instrument description.
- Through the manuscript, some acronyms are frequently used but not explained e.g. TROPOMI or TEMPO whereas other acronyms which are used only once are explained e.g. SRS.
- The authors use AGL and ASL in their altitude nomenclature. This might be confusing to the reader especially if the figure shows the ASL altitude, but the text is describing it in AGL altitude. The figures would need both labels and more consistency would improve the manuscript’ Ideally, only one of the two is used.
- Even though “satellite validation” is stated in the title, an example of at least one simultaneous measurement of the lidar and satellite is missing.

Specific comments:

P3L15: SRS is only used once, no need to add the acronym.

P3L24-25: FOV is only used once, no need to add the acronym. It is not clear how two fibers in the focal point of the telescope can have two FOVs and separate the atmospheric volume. Also, what are the size of the FOVs.

Table 1: Clarify if the observations were simultaneously and in the same volume with TROPOMI. If so, it would be very interesting to see at least one of the measurements.

P6L5: ABL is only used once, no need to add the acronym.

P7L16-19: This is a very long sentence and cloud be separated.

P7L22-23: Consider removing the indent and combine the two paragraphs since the second paragraph refers to the first one and gives another argument why this technique can’t be used.

P8L14-16: It is not clear why a pellicle beamsplitter is preferred since the other detector

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can be adjusted to have no differences in the overlap function. Clarify “overlap function” because the same term is used in P10L12.

P10L29-31: With the information of the typical concentration Figure 6 becomes meaningful. Consider adding it to the figure description or change the label to Error percentage.

P11L8-9: When conducting this test, I wonder how the different wavelengths dependence of the PMT from 288.9nm to 260nm influence the result.

P12L17: Clarify if the measurements are co-located / same volume measurements.

Figure 7: The Error becomes only meaningful if related to a value / expressed in percentage.

Figure 8. Indicate that the ASL altitude is used.

P14L7-8: In this sentence, the ASL and AGL altitude is used. A consistent use of one or the other would help the reader.

P15L4 and Figure 10: Please clarify what surface ozone measurements unit is used.

P16L1-2: Adding a subtraction plot would clearly show the good agreement.

P18L1-2: Figure 10 is in ASL altitude, but the text uses AGL altitude.

P18L3: Please clarify the sentence “As can be seen in Fig. 11b”.

P18L17: The time frame of the “Long-term stability” test is very short. Typically, with the change of the yearly seasons (e.g. temperature, humidity) the stability of an optical system might change. I would consider this test as a preliminary “Long-term stability” test.

P19L5: It is referred to other TMF lidars, what are they.

Technical comments:

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Please check through the manuscript if “collocated” or “co-located” is the right term.

P5L22: replace “S5P” with “ESA Sentinel-5 Precursor”

P7L5: add ...“of” the Raman cells. . .

P7L17: add ...“of” satellite-borne. . .

P10L7: “the the” should read “that the”

P10L8: remove ...“on” the receiver

P10L19: “use” should read “used”

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