

Details

(1) Abstract, line 5: You should first introduce the need for validation and the other objectives before mentioning the campaign!

- The sentence has been changed: 'With the aim of evaluating the performances and the capabilities of the new system with a particular focus on UTLS measurements, and setting up and validating a calibration methodology, a MAido Lidar Calibration Campaign (MALICCA) was performed in April 2013.'

(2) System description: Add manufacturers of the components.

- The utilized optical components were produced, basically, by three companies: the Barr Associates (Raman band pass filters, BP-IFF in the text), the Rocky Mountain Instrument (polarization cubes), and the Andover Corporation (beam splitters and high pass filters, BS and HP-IFF, respectively). The manufacturers have been added in the text.

(3) P. 10371, line 9: "Raman Q branch"

- Done.

(4) P. 10371, lines 17-18: Fig. 1: Shift the introduction of the figure to the beginning of the system description (e.g., to P. 10370, around line 5).

- Done. Figure 1 is introduced at the beginning of the system description.

(5) P. 10374, lines 14-16: This sentence is a little bit confusing. One objective is announced, but several goals are mentioned. Do you mean "by improving"? Still, validating is an objective differing from optimizing.

- The sentence has been reformulated as follows: 'One of the objectives of MALICCA campaign has been to optimize the water vapor measurements acquired by the RMR-H₂O lidar new system, by improving its over-all efficiency'. Furthermore the title of the paragraph ' Measurement validation' has been changed with 'Measurement optimization'.

(6) P. 10375, line 23: I think you should address the overall "detection efficiency" here.

- Done.

(7) P. 10378, lines 2-3: A quantification of the biases does not necessarily imply an optimization of the system. Please, rephrase! For instance: " Due to the very low H₂O Raman signal received from the stratospheric a number of of known biases must be taken into consideration."

- Done.

(8) P. 10379, line 9: "the water vapour signal"

- Done.

(9) P. 10379, line 11: "to fluorescence of components"

- Done.

(10) P. 10379, line 15: Replace "Mie" by "particle".

- Done.

(11) P. 10379, line 23: I think the reader has some interest in learning who manufactured the filters resulting in these exceptional OD values!

- see the answer for question #2.

(12) P. 10380, line 9: Why is this noteworthy? You did it, and the results is obvious.

- Ok.

(13) P. 10381, line 26: Vertical resolution is defined rather differently by different groups. How is dz defined in your case? dz looks much like a range bin size.

- Yes, in our case we define the vertical resolution as the total number of sampling bins used in the smoothing filter. For the detailed description of the filtering method that has been added at the end of paragraph 3.3 see the last answer of the scientific comments to referee 2.

(14) P. 10382, line 14: I cannot find C in the formula! See also P. 10383, line 2.

- The term 'K' in the formula has been changed with 'C'.

(15) P. 10384, line 9: "work shows"

- Done.

(16) P. 10384, lines 11-12: Do you mean "a movable support that is shifted across the top ..."? "Removable" looks somehow trivial! Also: "and directly illuminates"

- Yes, the sentence has been corrected: ' An ORIEL model 6251NS 75 W Xenon lamp has been mounted on a movable support that is shifted across the top of the primary telescope and directly illuminates its surface.'

(17) P. 10384, line 19 I do not understand "we provide to substitute". Do you mean "we substituted"?

- Yes. The sentence has been corrected.

(18) P. 10389, lines 10-12: The role of the mountain-related circulation should be mentioned.

- A new sentence has been added: 'Furthermore, the role of the mountain-related circulation should be also taken into account.'

(19) P. 10394, lines 6-8: These objectives are not new. Here (in the Conclusion section), one would expect a statement on how well the goals were met. At least you should add such a statement, or reformulate the sentence.

- The sentence has been reformulated: 'The MALICCA campaign, held in April 2013, permitted to optimize the water vapor measurements of the new lidar, to set up a calibration methodology, and to evaluate its performances and capabilities with a particular focus on the UTLS domain.'

(20) P. 10394, line 17: You could emphasize "Most importantly, the absence".

- Done.

(21) P. 10396, line 9: Replace "error" by "uncertainty".

- Done.

(22) P. 10396, line 16: "could attest" suggests that you are not really sure about this! Better: "suggests".

- Done.

(23) Fig. 1: Is 1200 mm the diameter or the focal length?

- 1200mm is the diameter as described in the text (e.g. Pg 10370, line 9)

(24) Fig. 3: "vertical resolution" is not properly defined. I think you mean the number of bins used.

- See the answer of point #13.

Style

(1) P. 10364, line 3: Replace "is devoted to" by "will".

- Done.

(2) P. 10365, line 5: "thus, "

- Done.

(3) P. 10365, lines 9 and 12: Replace the first "to measure accurately" by (e.g.) "to quantify".

- Done.

(4) P. 10365, line 12: "the UTLS"

- Done.

(5) P. 10365 line 16: "suffer from the abundance"

- The sentence has been re-written: 'Spaceborne passive remote sensors are limited by the abundance of cirrus clouds, as well as their coarse resolution...'

(6) P. 10365, line 18, "the lidar technique"

- Done.

(7) P. 10366, line 1: "The acceptance of the Raman lidar approach within NDACC"

- Done.

(8) P. 10366, line 5: "insures"

- Done.

(9) P. 10366, line 6: "Other work, in part based"; not all these systems have been fully approved by NDACC!

- Done.

(10) P. 10367, line 21: Either "by the Network for the Detection of Atmospheric Composition Change" or "by NDACC" (without "the").

- Ok.

(11) P. 10369, line 25: I think you did synchronize the pulse! Better: "were synchronized".

- Done.

(12) P. 10369: "to ensure"

- Done.

(13) P. 10370, line 1: What does "wavelength-dedicated" mean? "wavelength-specific", "wavelength-separating", "two-wavelength",?

- Wavelength-specific.

(14) P. 10370, line 20: "The spectral separation of the backscattered radiation"; "firstly": where is "secondly"?

- The sentence has been re-formulated: 'Figure 1 indicates that backscattered radiation is first separated into the visible separation unit (VSU) and the UV separation unit (USU) by BS1. These permanently-installed units split the Raman from the Rayleigh-Mie signals and have the same configuration in terms of optical path and equivalent optic elements.'

(15) P. 10371, line 12: "in front of the photocathode".

- Done.

(16) P. 10371, line 22: "The data-acquisition electronics consist"

- Done.

(17) P. 10373, line 10: "the Saastamoinen"; "is, thus, converted".

- Done.

(18) P. 10373, line 25: "1200 g"

-Done.

(19) P. 10374, line 17: I would prefer to see "signal-to-noise" ratio although I am aware that detailed hyphenation has become rather rare, which is also the case throughout this paper.

- Done.

(20) P. 10374, line 18: "parasitic"

- Done.

(21) P. 10375: line 26: "columns"

- Done.

(22) P. 10376, line 11: "to increasing or decreasing"?

- Done.

(23) P. 10376, line 14: Replace "the two" by "both".

- Done.

(24) P. 10376, line 15: Into what are the two lasers coupled?

- The two laser beams are coupled into a unique beam. The sentence has been rewritten: 'The performance of the system can be increased by coupling the two Quanta Ray Nd:Yag laser beams into a unique beam through a system of polarization cubes'.

(25) P. 10377, line 25: "nitrogen"

- Done.

(26) P. 10379: line 20: The abbreviation OD must be explained.

- Done.

(27) P. 10379, line 25: "let us consider Fig. 2".

- Done.

(28) P. 10384, line 17: "ratios"

- Done.

(29) P. 10384, line 22: "3 April, respectively"

- Done.

(30) P. 10385, line 23: "However, in the future"

- Done.

(31) P. 10385, line 25: Do mean "measurement"?

- Done.

(32) P. 10385, line 1: "Furthermore, the"

- Done.

(33) P. 10387, line 20: It is easier to read this sentence if you add "on 3 April" again.

- Done.

(34) P. 10388, line 22: " between 15:00 UTC on 11 April and 0:00 UTC on 12 April"

- Done.

(35) P. 10389, line 9: I could not find (Vogelmann et al., 2011) in the list of references.

- Done.

(36) P. 10389, line 21: Remove "far".

- Done.

(37) P. 10389, lines 25-26: "In Fig. 10"

- Done.

(38) P. 10391, line 15: "signal-to-noise"

- Done.

(39) P. 10396, line 20: "In particular, the"

- Done.

(40) P. 10396, line 25, line 28: "testing"

- Done.

(41) P. 10398, line 9: "Van Baelen"?

- Done.