

Interactive comment on “The mobile Water vapor Aerosol Raman Lidar and its implication in the frame of the HyMeX and ChArMEx programs: application to a dust transport process” by P. Chazette et al.

Anonymous Referee #3

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Review of “The mobile water vapor aerosol Raman lidar and its implication in the frame of the HyMeX and ChArMEx programs: application to a dust transport process” by Chazette et al.

Major comment: This paper report the implementation of the mobile Raman lidar for measuring the vertical distribution of the water vapor and aerosol properties. It describes the instrumentation of the lidar, method for deriving the water vapor mixing ratio and aerosol optical properties from the observed signals, and shows the result of

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the case study of the measurements of desert dust event transported over the Mediterranean area. The technical section has been well written and the data present in the paper is original. Thus, I think the paper is potentially acceptable for the publication in AMT. However, there are some points that are not clear and should be corrected before acceptance. The minor comments are given below.

Minor comments:

- 1) L43: I think that the references of Melfi et al.(1989) and Kulmala et al. (1993) are not suitable because they did not directly study the influence of water vapor to the energy balance of the atmosphere. Please cite more suitable papers.
- 2) L79: I don't understand what the “natural” evolution of the lidar is. Please explain it.
- 3) L102: Is the word “than” grammatically correct?
- 4) L115: Do you use 3 receiving telescope? Please make clear the explanation (also Fig. 2).
- 5) L119: compactedness → compactness
- 6) L127: Do you mean that you use the separate HV supply unit for the Raman nitrogen and water vapor channels? Please correct the sentence.
- 7) L145: The word “other” might be necessary before “than” (please check grammar).
- 8) L163: Add the explanation of the lidar ratio (i.e. particle extinction-to-backscatter ratio).
- 9) L170: What value of A you used in the study?
- 10) L175: “total” should be “unity”.
- 11) L195: Which altitude is correct of full overlap, 500 m, 700 m (L175) or 200-300 m (L120 and Table 1)?
- 12) L198: How do you correct the spectral dependency of the aerosol extinction be-

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tween the two Raman wavelengths?

13) L204: What is the reference altitude you used in this study?

14) L208: What value is used for $\beta_E(z_0)$ in Eq. (6).

15) Is the word “raowindsounding” well accepted in the community of the atmospheric science? Please check it.

16) L259: Please explain the method for determining the overlap factor ratio.

17) L262: What height range or point did you compare the water vapor mixing ratio between the lidar and radiosonde to obtain the calibration constant and how did you compare the ratios (e.g. least square method)? Please explain.

18) L344: Please give a comment on the uncertainty of the overlap function and its influence on the derived water vapor mixing ratio.

19) L439: “southwest” → “southwesterly”?

20) L462: “stronger” should be “higher”. Please correct the same word in L476 and L480.

21) L470. Please explain how the dust plumes destabilized the air masses in more detail.

22) L518: The paper of Smullin and Fiocco (1962) is not cited in the reference list.

23) Fig. 3: The photograph of the lidar-van is not clear. It would be better if it is replaced with the close-up of the van.

24) Fig. 8 The “S355” in the legend should be “PR355”.

25) Caption of Fig. 12: Add the explanation of a)-f). Are they corresponds to the time periods of Table 2?

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 10653, 2013.

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