

Interactive comment on “Observations of water vapor mixing ratio and flux in Tibetan Plateau” by S. Wu et al.

Anonymous Referee #1

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This paper describes measurements of water vapor using Raman lidar in Tibetan Plateau. It also reports estimation of vertical flux of water vapor using simultaneous coherent Doppler lidar measurement. The content of the paper is suitable for AMT. However, the manuscript is not very well written and requires revisions. Some of the descriptions are not accurate or clear. Also, English must be polished. Planetary boundary layer (PBL) structure in Tibetan Plateau is a very interesting subject. Although it is mentioned in abstract, no discussion is provided in the text on PBL. It will be useful if a time-height indication of aerosol is also presented. The period of vertical wind profile measurement presented in the manuscript is very short. It will be better to show vertical wind profile for a longer period, at least one day, even if the water vapor measurement is limited in the nighttime. References should be given for the coherent

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Doppler wind lidar system used in the observation.

Specific comments 1. p.2 ,l.22- p.3, l. 4: The description on the role of water on radiation and energy transfer is not well organized. “Water vapor influences the radiative budget directly and indirectly” sounds strange. The water cycle should be described more consistently, and the importance of measuring water vapor, especially in Tibetan Plateau, should be explained. 2. p.4, l.12- : The first paragraph of Methodology section is not well organized. 3. p.4, l.23: The paper describing the detailed design of the Raman lidar system should be cited. 4. p.6, l.6: “atomic fine structure and atomic physics” and “the transitions of the atoms” are not correct. It is the molecular rotational structure. 5. Table 2: Shift of wave number for $\Delta J = \pm 2$ should be also indicated in Table 2. Also, the difference in intensity should be discussed. 6. p.6, l.3: “OD” is not defined in the manuscript. 7. p.6. l.19, Table 3: “Licel” should be “Data acquisition system”. Name of manufacturer should be in the Specification column. Manufacturer and type of the photomultiplier tubes should be provided in the table. 8. p.6, l.21, Eq.(1): “P_{BG} and O(z) are not defined. 9. p.9, l.8: “Oxygen” must be wrong. It should be water vapor. 10. p.10,l.18- and Fig. 6: The decreasing trend is not seen in the radiosonde data. How can it be explained? Change is seen rather in the vertical profile. 11. p.11, l.4: “calculated by Eq.(9)” should be “calculated by Eq.(11)” 12. p12, l.6: “calculated by Eq.(12)” should be “calculated by Eq.(14)”

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