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Comment

Interactive comment on “Column water vapor determination in night period with a lunar photometer prototype” by A. Barreto et al.

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This paper deals with the applicability of the new moon photometry to retrieve precipitable water vapor at night-time. The discussion about the capability of radiometric measurement at 938 nm bands is very good. The topic is sounds and the development of this technique is needed to fill the night-time gap. The work presented here is very useful to advance in the knowledge of atmospheric water vapor. I would recommend the publication after some revisions:

1.- The authors point very well the needed of study atmospheric water vapor. They stated quite well the current state of the art of satellite measurements and also some ground-based measurements like GPS or balloon-borne radiosondes. But there is a complete lack about the capabilities of microwave radiometry to compute precipitable

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water vapor and also atmospheric water vapor profiles. Moreover, they mention the ability of Raman lidar for water vapor profiles but some of the more recent references must be added. Finally, they stated quite well the necessity of night-time photometric measurements of precipitable water vapor. But particularly I also found a very recent work of precipitable water vapor radiometric measurements at night-time in Journal of Geophysical Research, D05202, doi:10.1029/2011JD016450 that present a similar day-to-night study. As Atmospheric Measurement Techniques claims to reference the last works on the topic relevant to the work you presented, I think you should include those works.

2.- Page 773 line 9: Why do not you use AERONET 2.0 data?

3.- Pages 776-778. To my understanding, in Barreto et al., (2013) you presented the calibration of the water vapor channel. I think that this paper should be more autonomous and a larger overview must be given. For example, I feel lost when you mention in line 9 of page 777 'instrument calibration'. What are you referring? Is an relative calibration in terms of $V_o(\lambda)$ or an absolute calibration in terms of $k\lambda$?

4.- Page 777. My question here is related to the previous question 4. If I understand well and you obtained $k\lambda$, is the model ROLO sensitive to the strong absorption bands of water vapor as you show in Figure 1? Would it affects to the accuracy of PWV of 10

5.- Figures 2 and 3: Those figures need more clarifications. What is the line observed in the plot? Is it the 1:1 line? It should be interested if you make linear fits and show the parameters. Particularly, for the comparison with 930 nm in Figure 3b it seems a bias between PWVLC and GPS that could be easier to see by those linear fits.

6.-Figures 4 and 5: I do not understand how you compute water vapor pressure with this fine temporal resolution. Please clarify. Please also unify criterions. In tables you refer to Filter1 and Filter2 while in Figures you refer to filter of 937 and 938 nm. From plots it seems that the filter at 938 nm has a bias versus GPS signal while from the table this bias appears in Filter1.

7. Page 779. I do not agree with the statement that the GPS is not able to retrieve PWV below 0.35 cm. There are many studies that did comparisons versus radiosondes or microwave radiometers that show good agreements. Also, many climatological studies of precipitable water vapor by GPS have been done. Do you suggest that all these studies needs corrections? The error for these low PWV can be larger for all the instrumentation. Moreover, sun-photometry and radiosondes also has problems in measuring PWV under dry conditions because they rely on radiative transfer codes for generating water vapor transmittance. As there is no a golden instrument to characterize PWV, I show my concern on this statement. This point needs clarification. In my opinion, the answer to referee 1 to this question has not been well addressed because I can also observe from Figure 4 good agreements with CIMEL-AERONET (in fact, I saw only two outliers)

8. Why you do not make a similar comparison between GPS and radiosondes? It could be helpful to establish a 'reference value' for your comparisons. I would also suggests to plot the histograms of the differences in PWV between the different methodologies to clarify the differences and agreements you found.

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