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Atmospheric
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Discussions

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

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We thank the reviewer #2 for the positive comments. Listed below are our responses to the three discussion points.

1. Concerning Figure 3 a) and b) it is stated that points are good correlated, and that "correlation coefiňĄcients are similar to those obtained in daytime". This is not really true being for July 0.97 and 0.90 and for August 0.92 and 0.98, for daytime and night time respectively. Mostly in July, it is visible that more than half of the points at around PWV_LC=0.9 have a behavior whose slope is completely reverse to the general slope. This behavior is in contrast with the obtained result provided by the statistical analysis showed in Table III, where comparing GPS and Filter # 2 a mean difference of 0.01 $\pm$0.14 was found. Why this ensemble of points shows this different behavior?

The authors agree with the referee's comment. Regression coefficients are slightly higher for July (0.97) in case CA/GPS comparison than for LC/GPS (0.90). In August test cases these values are slightly better for LC/GPS comparison (0.98) than for CA/GPS (0.92). However, this result is not in contrast with those showed in Table 3, where is observed a high dispersion in standard deviation and RSME in case of July data (sigma=0.18 cm and 0.14 cm, respectively for both LC Filters).

Regarding the reverse slope in figure 3 for July data, we have found it is consequence of GPS's PWV uncertainties on 14 July, as we show hereafter. We used in this study ultra-rapid GPS orbits because this information presents a higher temporal resolution (15-min) compared to 1-hour temporal resolution from precise orbits. According with our experience, the difference between PWV retrieved using ultra-rapid and precise orbits is not relevant. However, we have found that in some days this difference can be significant. This is the case of July 14. During this night, at 23:30h UTC, the ZTD signal from ultra-rapid orbits was 1837 mm. The ZTD signal, at the same time, from precise orbits was 1811 mm. These differences result in a discrepancy of 26 mm in ZWD which, in turn, introduce a difference of 4 mm in PWV. These higher uncertainties could explain the reverse behavior of the slope in the correlation.

We have included in the discussion section some of these arguments.

2. A large nighttime discrepancy is found between GPS and Filter#2 or RDS measurements on July 14. Since PWV was not below the GPS detection limit of 0.35 cm, what do you think the reason is?

Answered in question #1.

3. Could the author also explain the reason why aerosol optical dept (AOD) at about 940 nm has been retrieved by extrapolation of AOD at 440 and 870 nm and they didn't use for example 675 and 1020 nm?

We used of the extrapolated AOD for 940 nm channel following the AERONET version

2 protocol. The reason for selecting the extrapolation of 440-870 channels rather than the interpolation of 675-1020 channels is the temperature dependence and water vapor absorption in 1020 nm filters. Thus, interpolated AOD-940 nm using 675-1020 nm channels introduces more uncertainty than using the extrapolated AOD by means of 440 nm and 870 nm channels.

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 767, 2013.