

Interactive comment on “Water Vapor Retrieval using the Precision Solar Spectroradiometer” by Panagiotis-loannis Raptis et al.

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Authors would like to thank all reviewers for their time and their useful comments which enhanced the quality of the manuscript. Answers to all the specifics comments can be found above.

Referee1

Page 1, L23: The full name of AERONET in abstract should be provided when the word first appeared. What's more, Page 2, L18, the same change should be addressed in IWV.

Abbreviations are now explained in the text.

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Page 3, L7-L9, some references should be provided.

References added

Page 4, L13, It is better to describe structure of this paper in the end of introduction.

A sentence has been added to describe the structure.

Page 4, L19, It would be better if you could provide an in-situ figure about PSR, which would give the reader more information

A photo of the instrument at Lindenberg, Germany has been added.

Page 4, L28, an > and

Corrected

Page 5, L1-L6, some references should be provided.

Reference added and a more detailed publication is being prepared by the authors and will be submitted in 2018.

Page 5, L8, sensors > sensor

Corrected

Page 5, L11-L12, Is there any reference to the calibration of the instrument? If so, please provide.

The calibration details are mentioned in the lines 14-17 page 5. Co-authors of this study are preparing a manuscript concerning the PSR instrument including all details of calibration procedures, characterization and measurements that is scheduled to be submitted during 2018.

Page 5, L16, what is the resolution of this instrument? How long is the interval between two consecutive observations?

A sentence has been added to clarify the measuring routine of PSR. PSR can mea-

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sure multiple spectras per minute (a usual Direct sun measurement is set around 500ms). The routine used during the measuring period, saved an averaged spectrum per minute, using 5 Direct sun measurements and eliminating 5 averaged dark current recordings.

Page 5, L32, eight bandpass should be nine bandpass

This sentence has been restated

Page 5, L29, The two words (calculation in) are linked together

Corrected

Page 6, L3, the author mentioned that the photometer changed two times during the two years of observations, and whether the different numbering instruments would have a certain effect on the real water vapor retrievals?

Calibration procedures of AERONET protocol ensure the quality of the retrievals and the stability among instruments. During our study, we have separate plots for the period of each different CIMEL used, against the other instruments and statistics of the differences were the same. So, for this particular study we are confident that there are no errors related to that change, although some future study could investigate the behaviour of instruments in various AERONET stations to quantify the stability and the uncertainty introduced by the current protocol to IWV retrievals.

Page 7, L27, What version of MODTRAN used in the paper? The version number should be marked throughout the paper.

“MODTRAN 5.2.1” Is now used everywhere in the text

Page 8, L19, Section 3.2

Corrected

Page 9, L12, The references should been provided about Beer-lambert law.

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Reference added

Page 9, L14, Get rid of this extra arrow

Corrected

Page 10, L10, Why author selected the mid-latitude built?

Preset atmospheres in MODTRAN 5.2.1 include Tropical, Midlatitude, Sub-Arctic and 1976 Standard US. Since no info about the vertical structure of the atmosphere could be used to have an estimation for the selection, we used the Midaltitude built among those. Ingold et al. (2000) demonstrate a $\sim 0.05\%$ change of the coefficients used according to the selection of the preset atmosphere, but still they found a more important variation due to changes in altitude. A future enhancement of the method could include some input info about atmospherical structure and a following selection of the set of coefficients.

Page 11, L15-L18, These sentences repeat with the previous text, please check

The first sentence has been deleted

Page 13, L16,L19, Figure 4 > Figure 5

Figure numbers have been updated an corrected.

Page 14, L12, Figure 6, MW > MWP

corrected

Page 15,L19, comparing results > comparison results

Corrected

Page 16, L3,L6, Equation (3) should be Equation (9)

Equation (3) is repeated here, to help the reader follow the uncertainty analysis. If it is against the journal policy to repeat the same equation, it could be deleted.

Page 18, L17, $0.02\text{cm} > 0.01\text{ cm}$? Please check

Corrected

Page 18, L18, $0.16 > 0.17$? Please check

Corrected

Page 18, L19, $3\text{cm} > 3$

Corrected

Page 18, L32, some relevant statistical variables should been defined in table

Table 1 shows the effect described in this sentence by the larger values of the standard deviation and the 10-90 percentiles for the radiosonde-PSR compare to the other instrument vs PSR comparisons.

Page 19, L6, Figure 8 > Figure 9

Figure numbers have been updated and corrected.

Page 19, L11-L12, Some explanations or references are needed.

The sentence has been restated to be clear that at higher AOD values, the uncertainty of the extrapolated value is larger thus higher deviations could be sourced to this fact.

Page 19, L17, below 2cm ?

Since the quantity of IWV (GPS-PSR)/ PSR is illustrated, negative points are the ones that PSR is overestimating. The ones of overestimation higher than 0.2 are mainly found when $\text{IWV} > 0.2\text{cm}$.

Page 20,22, Figure 9, Figure 11, numver > number.

Corrected

Page 22, L1, redundant sentence, please remove it.

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The sentence has been removed

Page 23, L7, other instruments (CIMEL, MWP, GPS, and radiosonde) have been

The sentence has been restated

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-370, 2017.

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