The present study is reaching a very crucial question about the quality of columnar Water Vapor retrieved from sunphotometers and how it is influenced by the selection of coefficients. The general method has been described in previous works by Campanelli et al. (2014). In this work, datasets from 3 station are validated against GPS and AERONET retrievals. The coefficients were recalculated very frequently and the idea of using different ones according to the values of W, is introduced. The approach adapted in the current paper could be applied to other photometers that could measure direct sun irradiance at water absorbing wavelengths. Thus the work is important for the scientific community and I suggest to accept this study for publication in Atmospheric Measurement Techniques journal, after minor revisions.

General comments:
  i)   It is very interesting the approach of having the coefficients recalculated every second day. I think it would be extremely interesting to have some results presented on the day to day variations or stability of them or even some link to other atmospheric variables if possible. At the end, how much is the final W retrieval is affected if a more infrequent schedule is adopted. It would be really valuable to conclude some guidelines on the operational use of the method on this prospective.
  ii)   All the statistics of the biases among GPS and POM retrievals are presented in a relative approach in the text. Only in table 3 and 4 are presented absolute values of biases. It would be really useful to add some absolute values and corresponding statistics in the discussion. For example figure 5, suggests that the spread of differences should be almost in the same order at all 3 classes and probably lower at the very low W class. There the absolute values of the biases would add more to the interpretation of the intercomparison.

Specific comments

p.1 line 30. RMSD is not a well know abbreviation. It should be written in full form here.
Section 2. At the description of the 3 sites I would suggest to add some more info regarding important aspects of the sunphotometric methods, such as statistics about hours of sunlight or cloud coverage or expected SZA range throughout seasons. Also, it should be added that Rome and Aosta are in Italy, as not all readers are not familiar with south Europe.
p. 4 line 9 Are there any differences in the 940nm channel between POM 1 and POM 2? If yes, report them and also report which was used in each of the 3 datasets.
p.4 section GNSS/GPS. Since GPS receivers are located up to 7km from the sunphotometers, it would be really useful to have some reference on the spatial variability of W, and how much it could affect the validation.
p.5 line18 ZTD some definition on ZTD is needed.
p.5 line 30 NWP abbreviation is not explained anywhere in the text.
p.6 line 23. And p.7 line 4
 A little attention in explaining T. The formula written here is only the transmittance due to the presence of W in the atmosphere. The way it is written is seems that there is no dependence on aerosols and Rayleigh scattering in this bandpass. Restate this sentence so that this is clear.

p.9 line 19-20. The uncertainty calculated here is just the relative deviation of GPS and POM retrievals. This is a statistical measure which shows very well how the biases are spread. But it is not the total uncertainty of the retrieval which should include instrumental uncertainties, errors introduced at different steps of the method and their spread, and any other systematic errors. It should be restated so that is clear that this is not the total uncertainty of W retrieval.

p10- line 16. Although it is not presented somewhere in the study, I assume that higher uncertainties are expected in sunphotometric methods at very high SZAs, which is usually the case in early morning and late afternoon. I suggest adding some information and discussion about that at this point.

Figure 3. the caption is note descriptive enough. It should be restated to be clear what are the data points in this plot.

Figure 7: It is not stated which station's dataset is used in these plots.