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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Results from the 4th WMO Filter Radiometer Comparison for aerosol optical depth measurements" *by* Stelios Kazadzis et al.

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We thank the reviewer for his/her comments.

2, 49 (page, line): what is meant with 'the least common denominator' in this context? I think it is very common to use AOD in such comparisons.

Sentence corrected.

3, 67: may be good to define 'air mass'? What is 'relative air mass'?

Defined

Printer-friendly version

Discussion paper

4, 114: methods for

Corrected

5, 126: figure caption: not sure whether WORCC triad is common knowledge: suggest to refer to the text for explanation

Corrected to: Three reference PFR instruments (WORCC WORCC triad)

6, last para: In the routine handling of instruments in operational networks, also the maintenance and transport and installation are important factors which may influence the results. Are onâĂŘsite procedures to check the instruments after installation part of the routine? Are traveling standards used and site visits to check on procedures and maintenance? See also what is written on manual adjustment on 10, 285: is this done at the operational sites too?.

A text was added: “It has to be noted that most of the instruments have been installed, maintained and checked from the initial instrument operators that have been participated in the campaign. With the exception of two CIMEL instruments that PMOD WRC stuff has installed and maintained during the campaign. “

So each individual group has installed and maintained their instruments with the exception of two CIMEL instruments, which were sent and followed on line by the operators. The installation of the instruments has been performed by PMOD WRC stuff. This is more or less an easy task as there is a CIMEL already running at the site and PMOD stuff has experience on installing, maintaining the instrument using the experience of various international campaigns that has participated outside the home site using CIMEL instrumentation.

7, 184: instrumentation characteristics, calibration strategies and processing algorithms: is this info available for each network, and if so, would it be possible to provide a table where the most recent info can be obtained (may be the networks websites?).

We added relevant hyperlinks in the supplement related table.

7, 195: Chylek seems to be a rather old and may be a randomly selected reference, I believe that the most recent version of the GCOS requirements is more relevant for satellite measurements (https://public.wmo.int/en/programmes/globalâĂŘclimateâĂŘobservingâĂŘsystem).

References have been corrected Levy, 2013, Sayer et al., 2012; Kahn et al., 2005; Li et al., 2014 Toledano et al., 2011

9, 223: has instead of have?

Corrected

9, 233: remove comma after method,

Corrected

9, 251: Insert comma after USA

Corrected

10, 267: This comparison, what does 'this' refer to?;

Corrected

10, 268: separated in groups of different instrument types? (add groups of?)

Corrected

10, 274: the shorter wavelengths are not shown (unless I miss them, see my general comment on figure quality).

Yes they are not shown in this figure. Added (not shown here). And figure quality has been improved.

10 279: why does 'this prove the high level of the quality of reference instruments'?

Corrected to: "These results demonstrate the high level of the quality of reference instruments belonging to the GAW-PFR. . ."

10, 283: on other days (add ‘on’)

Corrected

Figure 2: I cannot discriminate well between the colours but it seems to me that the 3 PFRs mentioned at the top of each legend are the same in each of the 6 plots, as well as the triad. Are these 3 PFRs together the triad? Is that why they are shown each time? And if so, why is the triad shown as a separate item?

Yes they were the triad and have been removed from the new figure version

15, 365: the lower the wavelength, the lower the reliability: is there an explanation for this? May be the increased Rayleigh scattering at lower wavelengths? Or molecular absorption?

It is difficult to generalize for all instruments. But in principle the increase in Rayleigh scattering (both in measurements and calibration related procedures), the lower irradiance signal are two possible reasons for this. However, each instrument has difference in its characteristics and characterization procedures so it is not correct to state something like this.

16, 381: As an example, for AODs . . .

Corrected

17, 389: suggest: differences using measurements form a three . . ..

corrected

17, 391: could lead to large deviations: what do you mean with that? Do you mean that you’d miss the higher AOD cases?

Changed to: “The use of such algorithms can lead to significant differences, while the selection of threshold values to filter out the retrievals could lead to large deviations comparing AOD retrievals from instruments with different cloud flagging algorithms.”

Yes there are cases that very strict cloud flagging algorithms would miss higher AOD cases and also when very tolerant ones that lead to the inclusion of cloud "contaminated" (calculating high AOD) measurements.

18, 427 and 19, 452: not every minute? On 6, 157 (bullet c) is mentioned that CIMEL measures within a few seconds. Was CIMEL Used in it's routine operational mode, i.e. every 15 min? Or was it adjusted to continuous measurements to match the other instruments in the intercomparison? May be a few words should be said about his in the text?

The CIMEL instruments participated in the campaign have been measuring with a frequency of one measurement every three minutes. This information was added to the document.

Fig. 7, caption: four cloudless days? How does that compare with 5, 129?

Corrected

19, 443: what do you mean with 'artificial AOD time series' (also in legend of Fig. 8)? In the caption of Fig. 8 you call them mean AOD, which looking at the Fig. seems a better term?

In the text it is defined as : "This was constructed by spline-interpolating the mean AOD of all the remaining (three) instruments (excluding the CIMEL that has a lower temporal measurement frequency than the rest of the instruments), at the time intervals where the fourth instrument (SPO in this example) provides cloud free data." So for figure 7 is a mix of mean AOD and spline – interpolated AOD. For figure 8 is what it is defined the mean of three instruments.

Fig. 9: what is plotted along the horizontal axis? Time?

Yes. Corrected.

23, 539: the occurrence of clouds was not mentioned in Sect. 3.2: which day was it?

Was this the reason that Fig.7 shows only 4 cloudless days?

The reason for using 4 instead of 5 days in this figure was the fact that one out of five days used for the comparison was 100% cloudless with no hint of cirrus or any other cloud type, where all instruments mostly did not detect any clouds. Figure 8 shows only one day where cirrus clouds were present in certain times during the day which is tough test for all cloud flagging algorithms shown here.

23, 564: homogeneity: do you mean harmonization of procedures, recommendations for cloud screening, trace gas corrections, calibration procedures, etc?

Yes that is a much better statement, corrected to: "..starting point for global AOD harmonization of procedures, recommendations for cloud screening, trace gas corrections, calibration procedures."

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