

Review of Kazadzis et al. 'results from the 4<sup>th</sup> WMO filter radiometer comparison for AOD measurements', submitted for publication in ACP.

The authors describe the results from an intercomparison campaign in Davos, in which the results from AOD measurements in very clear conditions, with very low AOD, are compared. The intercomparison included 30 instruments of different design, from 12 countries. The evaluation of the different instruments and procedures used to measure AOD at different wavelengths, and thus the Angstrom Exponents, contributes to better understanding the results in different AOD networks and eventually to achieve world-wide homogenization of the networks.

The MS is well written and I recommend publication in ACP after minor revision. Below are some comments for the consideration of the authors. One general comment is that the quality of the figures needs improvements: fonts are too small and I cannot see the different data sets from their colours because symbols are very small, certainly in the legends. On screen is even worse than in my print version. This may be the reason why I do not understand all features in the figures.

- 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.
- 3, 67:    may be good to define 'air mass'? What is 'relative air mass'?
- 4, 114: methods for
- 5, 126: figure caption: not sure whether WORCC triad is common knowledge: suggest to refer to the text for explanation
- 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 on-site 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?.
- 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?).
- 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/global-climate-observing-system>).
- 9, 223: has instead of have?
- 9, 233: remove comma after method,
- 9, 251: insert comma after USA
- 10, 267:        This comparison, what does 'this' refer to?;
- 10, 268:        separated in groups of different instrument types? (add groups of?)
- 10, 274:        the shorter wavelengths are not shown (unless I miss them, see my general comment on figure quality)

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

10, 283: on other days (add 'on')

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?

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?

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

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

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

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 its 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 this in the text?

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

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?

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

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?

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