The authors would like to thank Referee #2 for the review of the manuscript. We appreciate the specific and technical comments that we have addressed below.

Referee's comment: Generally, the paper is clear and well written. Tables and figures are sufficient.

Authors' response: We thank Referee #2 for the positive comments and assessment on edition aspects.

Referee's comment: Apparently, KCICLO method is a feasible way to correct the data when the current instrument calibration is for some reason over or down estimated. I would like to read more careful justification why the method is applicable specifically under conditions where the instrument window is contaminated.

Authors' response: The KCICLO method is used to detect, evaluate and correct possible calibration problems, after discarding a real atmospheric effect or instrument malfunctions (Cachorro et al., 2004, 2008). Particularly, the obstruction in the optical path, due to dirtiness on the sun photometer front windows, leads to a distinct diurnal cycle pattern that can be corrected using the KCICLO method. This fictitious diurnal cycle is due to the systematic absolute error in the AOD measurements as a consequence of the calibration errors: the magnitude of this absolute error is greatest at midday because varies as the inverse of the solar air mass (Cachorro et al., 2008). Equivalent effects, such as moderate filter degradation can be also corrected (Cachorro et al., 2008).
However, only certain stations fulfil a set of weather requirements to apply this ''in situ'' correction-calibration procedure: a sufficient number of clear-sky and stable days are needed for a given period to be corrected. In the context of measurements affected by a calibration problem, stable days mean that the retrieved AOD should show an ideal cosine convex or concave shape of the diurnal cycle (Cachorro et al., 2004, 2008).
Furthermore, the selected days must fulfil another set of requirements about air mass range (higher than 0.4 and typically between 1.7 and 6), turbidity (AOD (440 nm) < 0.12 and variability lower than 5% in the specified air mass range), number of data points (at least 12 per day), and standard deviation of the fit to quantify the calibration factor error (lower than 0.01) (Cachorro et al., 2008).
Therefore, the successfully application of the KCICLO method over a given period is associated with a sufficient number of days (5–10%) fulfilling all the above mentioned requirements. As a consequence, the application of the method it is not always feasible at all stations or at all periods of time.
At Tamanrasset, a sufficient number of days from 18 November 2007 to 20 June 2008 were available to properly apply the KCICLO method. Only two different corrections were performed, i.e. only two different types of contamination (amount of dirtiness and lenses affected) were detected.
This point will be also further clarified into the text.

Referee's comment: As said by the other referee, the used time series should be longer to get a more realistic picture of the local aerosol climatology.

Authors' response: We have addressed this question in the response to Referee #1 that we have transcribed below:

We fully agree with the Referee. However, obtaining long AOD data series with the minimum required quality is a very difficult task in remote stations, as Tamanrasset, in which the annual exchange of instruments is difficult (this annual exchange is recommended by AERONET for calibration and maintenance of each instrument). Moreover, intense dust storms dirty the optics sometimes very quickly, sometimes progressively. This and other instrumental issues make some data sets not to achieve AERONET level 2.0.
This is the case of Tamanrasset in which, from February 2009 to October 2011 (983 days), the same sun photometer was installed. Socio-political problems prevent the exchange of the instrument on time. Moreover, the SUN and the SKY channels of the photometer contained variable amounts of dirtiness at different times, which is very difficult to correct for a very long time series (please, see the KCICLO method requirements in the previous authors' response).
Moreover, the sun photometer installed from October 2011 to October 2012 had severe electronic troubles due to a battery power failure. This situation leads to a lack of measurements (due to robot or filter errors) or to wrong measurements (no counts or saturated counts). A new battery was installed in May 2012 after solving many problems in the customs clearance. However, the quality of the data series was already compromised.
As a consequence, data for the period February 2009-October 2012 will be likely never promoted to AERONET Level 2.0, and what is worse, Level 1.5 data in this period do not have the sufficient quality to be properly corrected even with KCICLO method. It should be taken into account the requirements that should be fulfilled to successfully apply this method (please, see the KCICLO method requirements in the previous authors' response).
Finally, the sun photometer installed from November 2012 to December 2013 is now under evaluation and post-calibration.
Hopefully, data after November 2012 will achieve AERONET level 2.0 and might be incorporated in the future to perform relatively long term analysis, but there is no chance for the moment.
In any case, the time series analysed in the paper has been long enough to characterise the main features of the station such as the seasonal variation, the relation to the Convective Boundary Layer thermodynamic features, and the identification of the dust sources potentially impacting Tamanrasset.
A brief explanation about the lack of a longer time series will be incorporated into the text.

Referee's comment: 3.1.1 It was not obvious from the text that the used data are single measurements, not averages.

Authors' response: We are sorry about this shortcoming. In section 3.1.1 we have analysed daily, monthly, and/ or seasonal averages of AOD, AE, PWV, and FMF. All of the averages have been calculated from the corresponding single measurements.
We will revise the text and clarify that we are using averages from single measurements.

Referee's comment: 4, row 26: a dot is missing between sentences.

Authors' response: In the final version of the manuscript published in ACPD, we have not found any missing dot in Section 4.

Response References

Cachorro, V. E., Romero, P. M., Toledano, C., Cuevas, E., and de Frutos, A. M.: The fictitious diurnal cycle of aerosol optical depth: a new approach for in situ calibration and correction of AOD data series, Geophys. Res. Lett., 31, L12106, doi:10.1029/2004GL019651, 2004.

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