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Interactive comment on “Aerosol characterization at the Saharan AERONET site Tamanrasset” by C. Guirado et al.

Anonymous Referee #1

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General comments: This manuscript reports an extended analysis of sun photometer measurements taken during more than two years at a single location, Tamanrasset, in the Sahara desert. The manuscript is a follow-up on a previous paper (Guirado et al., 2011) by the same authors, where essentially the same observations were analyzed, except for a significant gap in quality assured data. Besides presenting an improved time-series, the paper gives results of a study trying to locate source regions affecting Tamanrasset through clustering of back-trajectories, and finds

The current paper describes how the KCICLO method of calibration correction was successfully applied to rescue these additional data that failed to pass AERONET quality assurance due to sensor contamination or degradation. Several other applications of the KCICLO method were already published before (e.g. Cachorro et al., 2004, 2008a,

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2008b). Nevertheless, this is an important result for the Tamanrasset station as no more quality assured data are available since early 2009, although the measurements are continued up to now. The paper could become scientifically more relevant when the more than 5 years of data, KCICLO corrected, were included in the time series. The detailed discussion of AOD statistics and aerosol characteristics presented in Chapter 3.1 is mostly a repetition and confirmation of results already given in the 2011 work by Guirado et al. The observational basis (No days 25 to 90) for statistical analysis in terms of monthly and seasonal means remains rather poor and the addition of KCICLO corrected data since February 2009 would make it much more robust and informative. Most other AOD climatologies are based on much longer time series because of the large annual and inter-annual variations of aerosol concentrations.

The scientific goal behind this analysis of this time series remains somewhat vague. I would like to learn about the long-term AOD climatology at this Saharan site, or about how the successful recovery of degraded observations did modify the previous 2011 results.

It remains unclear to me how the CWT method is applicable to vertically resolved trajectories when the observed weight at the receptor site is represented by a column integrated observation? My ignorance about CWT apart, the paper should more clearly point out any new findings from this study. I got the impression that both dust sources were already identified by d'Almeida and later works cited in text. The results presented here could then, e.g. be used to argument that the main source regions did not change over 30 years.

Specific comments: This paper is well written and was apparently subjected to skilled proof reading and language editing. All figures are clearly labelled and described in captions, so are the tables. Their number is adequate to support the analysis presented in text. I appreciate the explicit omission of additional figures 'for the sake of brevity'. Most of the many acronyms are properly introduced, but some, as e.g. KCICLO or NMMB/BSC are apparently too common within the group of authors. They are however

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Sect. 3.1.1 Line 18: absorption should probably read *extinction*

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 16641, 2014.

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