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Interactive comment on “Measurement of aerosol optical depth and sub-visual cloud detection using the optical depth sensor (ODS)” by D. Toledo et al.

Anonymous Referee #2

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The manuscript "*Measurement of aerosol optical depth and sub-visual cloud detection using the optical depth sensor (ODS)*" of D. Toledo deals with the first year of measurement of new instrument to characterize the Aerosol Optical Depth (AOD) by using just a pair of channels, the ODS sensor. Besides, ODS can also retrieve AOD measurements during night time and can detect sub-visual cirrus (SVC). In this work, data from a campaign developed in Ouagadougou at 2004-2005 are presented. The main scenarios at Ouagadougou were Dust intrusions, aerosols coming from biomass burning events, clean "aerosols-free" periods and the presence of SVC.

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Overall comments

- *Page 9619, lines 14-15* Additional comments about the comparison between the 3D Monte-Carlo model and SHDOM model are needed, include a reference about that if it exists
- *Pages 9623-9624* Move AERONET description, first paragraph of section 4, to the end of section 2
- *Page 9624, around line 25* It seems like there are two regions with different behaviour in figure 14b: A linear region close to the straight line 1:1 for AODs below 0.8, and a second region above 0.8 where the linear behaviour is more separated from the 1:1 line. Could you go deeper in the analysis of the meteorological situations corresponding to the points with an AOD above 0.8?
- *Page 9627, line 7-9* When speaking about night time retrievals. Could you explicit the reasons of departures between CIMEL AOD and ODS night AOD. For example, there is a big step in the data around the day 331 of figure 16. AOD from ODS is increased from 0.8 up to 1.4 but there is no increment in the CIMEL AOD.
- *Page 9628, lines 16-19* The sentence "*Results also demonstrate the capability of ODS to retrieve the AOD during the night when moon crosses the FOV of ODS, allowing the investigation of AOD for the whole day. However, we remark here the need to compare these measurements with a lidar to further analyze the reliability and robustness of the retrieval procedure during night-time.*" . At least 25% of the night time AOD points shown in figure 16 present big differences with CIMEL AOD evolution. I think that it is require more work than just a comparison with a LIDAR as the authors say.

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