

# ***Interactive comment on “Ship borne rotating shadow band radiometer observations for the determination of multi spectral irradiance components and direct sun products for aerosol” by Jonas Witthuhn et al.***

**Anonymous Referee #2**

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This manuscript by Witthuhn et al., "Ship borne rotating shadow band radiometer observations for the determination of multi spectral irradiance components and direct sun products for aerosol", describes an instrument (GUVIS-3511) suitable for ship-borne measurements of direct, diffuse and global spectral irradiance and of derived products, e.g. aerosol optical depth. I find the manuscript interesting and relevant to introduce an instrument suitable for these measurements in demanding conditions. This topic is also suitable to the scope of AMT. Much of the manuscript is devoted to the discussion of the uncertainties and that is how it certainly should be in this case. However, somehow this part does not convince, and the reader is left somehow confused or at least I

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was. I think this discussion should be more thorough and coherent.

Main comments:

Just couple of examples about those places in the text that contributed to this confusion regarding the uncertainties. In Page 18, Line 6 you said that "... causing negligible calibration uncertainty" and in the page 15, line 24 you said that "... the calibration uncertainty is the dominating contribution ...". So the dominating type of uncertainty is negligible? Is the accuracy indeed so perfect? You also compared to AERONET and said "that both random and systematic uncertainties are lower for the Cimel observations ..." than for GUVIS-3511. AERONET AOD has a typical uncertainty of 0.01–0.02 (Eck et al., 1999) and you give an estimate of 0.0032 at 510nm. I understand that you give a relative uncertainty and AERONET uncertainty is an absolute estimate, still it seemed that there was a some sort of inconsistency or contradiction here and your uncertainty estimate "too good to be true"? The discussion about uncertainties should be more thorough and clear.

You did not explicitly discuss the fraction of aureole irradiance that gets blocked as well or is it so that your 2.5cm band does not introduce a significant blocking angle?

Minor comments:

Page 2, line 18: "... measurements of aerosol optical properties and radiative fluxes ..." Confusing sentence, when the instrument measures radiative fluxes only and aerosol optical properties are derived.

Page 5, line 16: Acronym OD, optical depth, was never introduced.

This is likely not to be included in the scientific paper, but for my own curiosity: what is the price of this instrument?

Eck, T. F., Holben, B. N., Reid, J. S., Dubovik, O., Smirnov, A., O'Neill, N. T., Slutsker, I., and Kinne, S.: Wavelength dependence of the optical depth of biomass burning, urban, and desert dust aerosols, *J. Geophys. Res.*, 104, 31333–31349, 1999.

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