

Interactive comment on “Clouds over the summertime Sahara: An evaluation of Met Office Meteosat retrievals using airborne remote sensing” by John C. Kealy et al.

Anonymous Referee #2

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The manuscript "Clouds over the summertime Sahara: an evaluation of the Met Office Meteosat retrievals using airborne remote sensing" of J.C. Kealy et al., submitted to Atmospheric Chemistry and Physics, presents a comparison between the Met Office MSG cloud retrievals and aircraft cloud retrievals (cloud fraction and cloud top height). Comparing satellite observations with aircraft observations is a complicated task since the temporal and spatial scale are very different. But these exercises are very important to highlight the weaknesses of satellite retrieval. Overall, the manuscript is well written and well structured. The authors provide important results and interesting perspectives of this work. Finally, I do recommend this manuscript for publication in ACP but after a minor revision that will answer my comments.

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General comments:

- 1) In the title, it should be mentioned that the Meteosat Second Generation retrieval have been evaluated and not the Meteosat only.
- 2) It is never mentioned in the manuscript the problem of multi layered clouds for cloud retrieval (especially for cloud top height). I think authors should mention this at least in the minimum residual method weakness.
- 3) As multi-layered cloud, nothing is provided about surface emissivity. What model did you used in the simulations? what are the error in the CTH retrieval? Surface temperature error is clearly an important source of error but surface emissivity is also important.
- 4) The Figure 3 is very difficult to read. I suggest authors to find an other way to present the result. 5) The aircraft cloud retrieval is based on different thresholds (i.e., 3K for the radiometer, 7 W.m-2.s-1 for the BBR). What is the sensitivity of the retrievals to those thresholds ? A discussion on that should be added.

Specific comments:

Page 3 Line 30: What is the RTTOV version ?

Page 3 Line 35: the reference to Eyre and Menzel is missing in the references list.

Page 3 Line 41: It should be explain what “error-weighted” means ?

Page 3 Line 59: I am not an English native speaker but it sounds to me that there one “by” in excess.

Page 4 Line 33: what is the spectral resolution and the absolute calibration error of the Heimann radiometer ?

Page 4 Line 55: what is the accuracy of the CTH ?

Page 5 Line 45: It is not clear to me how did you use the MODIS albedo data ? The

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part need more description.

Page 5 Line 50: It has been shown by EUMETSAT that MSG Level 1.5 data has a constant geo-referencing offset towards the North and the West direction of 1.5 km. How did you take into account this ? Some words about that should be included.

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-884, 2016.