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Interactive comment on "The MSG-SEVIRI based cloud property data record CLAAS-2" *by* Nikos Benas et al.

Anonymous Referee #1

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This manuscript presents an evaluation of the CLAAS-2's level 2 and 3 cloud product, with reference data from lidar, microwave and passive imager measurements. This evaluation is useful for the CLAAS-2 data users. The article is generally well written. The algorithm/data presented are convincing. This reviewer recommend this manuscript be published after minor revision.

1. page 3, between Line 20 and 25, "The intercalibration revealed offsets in the operational SEVIRI calibration of about -8%, -6% (-4% for MSG-3) and +3% in channels 1 (0.6 μm), 2 (0.8 μm), and 3 (1.6 μm), respectively." This statement is not clear, needs to be reworded.

2. page 5, between Line 1 and 5, "CPP is based on look-up tables (LUTs) of top-of-atmosphere (TOA) reflectances simulated by the Doubling Adding KNMI (DAK) radia-

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tive transfer model (Stammes, 2001)." Why using DAK, any better than DISORT?

3. page 9, between line 25 and 30, "On the other hand, cloud fraction in the tropics is underestimated by CLAAS-2, probably due to the frequent presence of cirrus clouds in this area, 30 which are more likely to be detected by CALIOP." For this statement, it is appropriate to cite:

Wenbo Sun, Gorden Videen, Seiji Kato, Bing Lin, Constantine Lukashin, and Yongxiang Hu, "A study of subvisual clouds and their radiation effect with a synergy of CERES, MODIS, CALIPSO and AIRS data," J. Geophy. Res., 116, doi: 10.1029/2011JD016422 (2011).

Wenbo Sun, Bing Lin, Yongxiang Hu, Constantine Lukashin, Seiji Kato, and Zhaoyan Liu, "On the consistency of CERES longwave flux and AIRS temperature and humidity profiles," J. Geophy. Res., 116, D17101, doi: 10.1029/2011JD016153(2011).

4. page 10, between line 1 and 5, "It should be noted that the CLAAS-2 histogram extensions above 0 °C for ice clouds and below -40 °C for liquid clouds should be attributed to the fact that CTT in this figure comes from CALIOP. If CLAAS-2 CTT was used instead, such cases would not be allowed by the retrieval 5 algorithm." This statement is not clear, needs to be reworded.

5. page 10, between line 10 and 15, "In contrast to binary variables like cloud mask and cloud phase, cloud top variables are continuous so that a correlation analysis can be performed.." This statement is not clear, needs to be reworded.

6. Section 4.2 is not well expressed, need to be revised.

7. page 11, between line 9 and 17, "For ice clouds, CLAAS-2 acquires overall lower REF, which is most probably related to the choice of ice particle habits: i.e. severely roughened monodisperse hexagonal columns for CLAAS-2 versus severely roughened aggregated columns with a gamma size distribution (Yang et al., 2013) for MODIS C6. Consistent with the results of the REF intercomparison, the agreement for LWP is

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better than for IWP." Are severely roughened hexagonal columns true for ice clouds? This must be checked by other particle shapes.

8. Between page 11 and 12, "CFC overestimation of SEVIRI at high VZAs, negative values below 40° could be attributed to a similar, local-scale effect from SYNOP observations." What effect? Reason?

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