

Interactive comment on “Long term assessment of the CALIPSO Imaging Infrared Radiometer (IIR) calibration and stability through comparisons with MODIS/Aqua and SEVIRI/Meteosat” by Anne Garnier et al.

Anonymous Referee #1

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General comments:

Quality of long-term satellite record is quite important in climate studies using satellite data to detect/investigate variations of clouds, trace gases, the surface, and other atmospheric components. Estimation of the quality of calibrated radiances of an instrument becomes more difficult after launch. This article designs two indirect approaches, “stand-alone” and “relative”, to estimate the bias, uncertainty, and trend of IIR observations. Very important conclusions are found by analyzing more than 9-year IIR data, together with collocated MODIS (and SEVIRI) IR observations and clear-sky model

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(4A/OP) simulations.

The authors have developed two solid methods to analysis the long-term IIR data quality. Some limitations can be found:

First, the analysis is limited to ocean. Considering that the land surface emissivity varies significantly with surface type and the land surface temperature has much stronger diurnal /seasonal variation than ocean, extend the current study to land surface is not an easy task. Do you have any plan to mitigate impacts from land surface in your future work? For example, how to estimate instant surface temperature from reanalysis data with 6-hour time interval? How to compare IIR with SEVIRI (or other instruments with different foot print sizes) if surface emissivity/temperature inhomogeneity cannot be ignored?

Second, analysis of “relative” approach is break down into different BT ranges, for example, “200 ~ 210 K” or “290 ~ 300 K”. Maybe cloud type is a more reasonable category. It is very interesting to see Figures 3-7 for different types of cloud. Is it possible to do that? If the authors believe the original BT range category is better or if the authors are planning to put cloud type analysis into further studies, please comment at appropriate place.

Other minor comments:

This is a well-written and well-organized paper. The methods are solid and corresponding conclusions are important. Therefore, I recommend acceptance once the paper can be further clarified on several points listed below:

1. Abstract: The authors should put the important finding “IIR band2 may be biased high by 0.5-1 K at cold scenes” in the abstract.
2. Section 3.2.1: Please give the reference of “widely accepted mean value of 52 degree”.
3. Section 5.1: Please change “ 5.10^3 ” to “ 5×10^3 ”, and the same for other science

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notations.

4. Figures 3-7: In comparison with IIR-MODIS BTDs in the tropics at cold scenes (Fig 3 bottom panel), IIR-MODIS BTDs for mid- and high-latitude regions at cold scenes have much stronger daily variations (Figs. 4-7 bottom panels). Do you have any speculation about this?

5. Figure 9: I suggest add MODIS Band29-Band31 and Band29-Band32 into this figure for comparison. Considering that this figure already includes a lot of symbols, please break it down into several panels for different latitudes.

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