

## ***Interactive comment on “CALIPSO IIR Version 2 Level 1b calibrated radiances: analysis and reduction of residual biases in the Northern Hemisphere” by Anne Garnier et al.***

### **Anonymous Referee #1**

Received and published: 18 February 2018

The paper “CALIPSO IIR Version 2 Level 1b calibrated radiances: analysis and reduction of residual biases in the Northern Hemisphere” presents and discusses the L1b calibrated radiances of the Imaging Infrared Radiometer (IIR) onboard CALIPSO and the improvements of the new Version (Version 2). Two calibration biases revealed in Version 1 initially are addressed: a striping effect of IIR inter-channel BT and the seasonal warm biases nighttime IIR BT. These technical issues are of critical importance for the quality of the IIR since the biases systematic contaminate the IIR channels. The paper is not only limited to addressing the issue. The paper discusses the developed methodology, the developed semi-empirical approach to deal with the discussed biases and an extended to compare between the two versions, Version 1 and Version 2,

C1

is presented. The study falls within the scope of AMT. The authors have done a thorough job and have a rigorous approach. The manuscript is well-written/structured, the presentation clear, the language fluent and the quality of the figures high. The results support the conclusions. I recommend publication in AMT, however I recommend the following minor revisions before it can proceed to be published.

Comments:

1) Regarding references, a very brief list of references is provided. I would suggest the authors to expand the list of references in order to strengthen the manuscript and at the same in order to give credit to related work. For example in the very first paragraph, at the end of line 7 (page 2) and at line 12 (page 2) suitable references should be made.

2) Page 2, line 8: please provide a more detailed description of the wavelength bandwidths used in IIR1, IIR2 and IIR3.

3) Page 2, line 23: At this point the striping effect is introduced for the first time the manuscript. Although the striping effect is well established and properly explained and presented, this is done later on in the manuscript, leaving a reader to wonder in the early stages of the manuscript. In that case it would be beneficial for the manuscript to provide at least a brief description of this crucial problem at an earlier stage of the manuscript, maybe through simple referencing to Figure 1.

4) The biases of the IIR are revealed mainly in the geographical domain between 30° N and 60° N. Although the biases, the developed methodology and the improvements are extensively discussed it is not clear the geographical reasons why the IIR channels are contaminated in this domain. I wonder whether the authors can provide an explanation regarding the underlying biases, the causes of the geographical preference in the biases.

5) Page 3, line 1: The authors state that “the analyses revealed that this phenomenon originates from IIR and is due to warm biases in Version 1 nighttime IIR brightness

C2

temperatures in this latitude range". Please provide some more information regarding the analysis and how did the authors reach the conclusion that it is due to the warm biases in V1.

6) Page 4, line 21: The authors state "by averaging digital counts from the eight or nine surrounding DS views". If it is possible provide a more detailed description when and why sometimes the number is 8 and when 9, along with references.

7) Page 8, line 31: The hysteresis effect is very interesting, though it needs further explanation.

8) Page 9, line 22: The authors state that  $XBB(i) - \text{offset}BB$  always differ by less than 1.5%. Is the 1.5% a critical value used as boundary limit?

9) Page 9, line 25: What do the authors mean through the term over-correction? Please quantify.

10) Page 10, line 22: What do the authors mean through the term "parasitic contribution"? Please quantify.

11) Page 13, line 5. The authors state that overall, the latitudinal variations of the differences between the IIR and MODIS residuals are reduced using IIR V2. Please quantify.

12) Figure 1a and Figure 10a. The authors should consider to implement the CALIOP official backscatter colormap.

---

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-448, 2018.