

## ***Interactive comment on “Inter-comparison of IASI and AATSR over an extended period” by M. Bali et al.***

### **Anonymous Referee #3**

Received and published: 23 October 2015

The authors have compared measurements between two highly accurate satellite instruments, the AATSR onboard Envisat and the IASI onboard Metop-A, investigating the bias between them. The authors conclude that both AATSR (nadir view) and IASI can act as good reference instruments. Highly accurate, well-calibrated satellite instruments are vital for the production of climate data records such sea-surface temperature. Although not mentioned by the authors, this type of study can also provide useful “gap-filling” information when a mission unexpectedly fails, such as Envisat, where there would otherwise be a gap in the long-term data record (i.e. until the launch of SLSTR on Sentinel-3). Although the results are important, at times the paper is not very well written and the main thread of the narrative is difficult to follow. The paper would benefit from a more thorough proof-reading and improved structure. The science, however, is

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good so I only feel like minor revisions should be needed before publication, although the structural work may take a little extra work.

General comments: 1) The authors present a large number of comparisons between AATSR-IASI but it isn't always clear to me what the main thread of the paper is. Lots of topics are discussed (i.e. using results for re-calibration of AVHRR, AIRS/IASI comparisons), but this is sometimes lost in the text. For example, the conclusions start describing how the comparison can be used as a reference for AVHRR re-calibration. There is no description of AVHRR in the instrument description part and why this is important to do? If this is the most important conclusion from the work then more emphasis needs to be put on this in the abstract/introduction/results. To improve this aspect, I suggest the authors rank the messages they want to get across and decide what they want to emphasise more clearly.

2) The plotting could be improved significantly. Firstly, please be consistent with units. The plots currently vary between radiance units and K. It is difficult for the average reader to quickly convert between the two. Please stick with one unit for consistency, I suggest K. The plot text size varies significantly between figures. The text in Fig. 3 looks stretched. Please keep figure text size consistent and no larger than the article text. The horizontal arrow in figure 1 look to be in the wrong place.

3) It is not necessary to describe figures in the conclusions, please leave detailed description in the main text and only summarise major findings in the conclusions.

4) I'm always a little concerned when talking about satellite instruments as a "reference". It may be out of the scope of the paper, but how do the authors decide on which instrument acts as the "reference"? How is this defined? In the analysis, could there be a reason why both instruments agree well, but for the serendipitous reasons?

5) The temperature range over which the analysis is performed is quoted inconsistently. In the abstract it is 200-300 K, the first line of section 3.2.1 it is stated as 200-300K, but then in the second sentence of section 3.2.1 the range changes to 210-300K. The

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same applies for section 3.3 where  $<230\text{ K}$  and  $> 240\text{ K}$  are used, but then in 3.3.1  $> 230\text{K}$  is used. Please be meticulous or else the reader will not understand what you are trying to show.

6) There are many instances where acronyms are not defined. I will outline some in my specific comments, but please pay particular attention to the abstract (i.e. no definition of AATSR or IASI, climate CDR's should read climate data records (CDRs))

Specific comments: I will try to outline here where there are obvious grammatical and spelling errors:

- Page 9786, line 2: "Metop-A" not "MetTop-A"
- Page 9786, line 4: remove "by design"
- Page 9786, line 14: change "uses" to "using"
- Page 9786, line 26: change to "after the orbit"
- Page 9786, line 28: I presume you mean AATSR, not AVHRR?
- Page 9787, line 26: change to "as the Global.."
- Page 9788, line 1: AIRS, GOES and MSG are undefined for the casual reader)
- Page 9788, line 4: first introduction of AVHRR, not defined.
- Page 9788, line 28: "Illingworth" not "Illingsworth"
- Page 9789, line 14: change to "changes in the spectral response function (SRF)"
- Page 9789, line 19: inconsistency of 210-310K range with 200-300K range in abstract?
- Page 9789, line 22: change "weather" to "whether"
- Page 9790, line 8: communication with Envisat was lost in April 2012, not May 2012.

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- Page 9790, line 14: change to “SST range”
- Page 9790, line 23: very messy sentence and I do not know what the message is.
- Page 9791, line 3: It is important to note in the text, either here or in collocation method, the different equator crossing times for Metop-A, Envisat. The time matchup criteria is mentioned in table 1, but it would again help the casual reader.
- Page 9792, line 21: another muddled sentence. I suggest changing to “The consistency of the algorithm was extensively tested”, or something similar.
- Page 9792, line 22: I’m not sure what this test is. Is it just to see that the algorithm is consistent with itself? Is this actually necessary?
- Page 9793, line 14: change to “Only those pixels where the . . .”
- Page 9793: both of the terms “IASI Rep Rad” and “SRFVAL” are not defined.
- Page 9794, line 27: change “would be seen” to “shown”
- Page 9796, line 19: change to “an offset”
- Page 9797, line 18: there is missing text after “At SST temperatures. . .”
- Page 9798, line 1: in brackets you put “(not shown)” but it appears to me that the figure does shown –n shifts?
- Page 9803, line 19: change to “For the 11  $\mu\text{m}$  channel”
- Page 9805, line 13: change to “SST range”
- Throughout the text I’m not always clear if you are looking at sea surface temperature or including land surface temperature in the analysis. This is particularly the case for the Greenland results in 3.3.2

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