

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

M. Bali et al.

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We really appreciate the anonymous reviewer for his thorough review, constructive suggestions, and inspiring comments. We truly believe the quality of the paper will reach a new level by integrating comments from all the reviews.

Comment 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

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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 emphasize more clearly. Answer: Changes have been made in the introduction and to show goals clearly. Addition text has been added Line 109 -127.

Comment 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.

Answer: All the inter-comparisons are in Brightness Temperature. There are only two places where we have presented in Radiance Units. These are 1. When we test the impact of shift of SRF in 12 micron AATSR. Since the convolution is in radiance space results of the convoluted radiance is presented in Radiance Space. 2. When corrected reference radiance is produced by comparing with ATSR2. The corrected radiance can be directly plugged into the AVHRR recalibration equation as it takes radiance as input not BT.

Figure 1 and 3 have been corrected.

Comment 3) It is not necessary to describe figures in the conclusions, please leave detailed description in the main text and only summarize major findings in the conclusions. Answer: Conclusion reformatted. Comment 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? Answer: Very important raised here by the reviewer. Following this comment . We have briefly touched upon this topic in

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lines 264 -283. At this point the inter-calibration community does not have a standardized method and procedure to declare a particular in-orbit instrument as a reference instrument from set of candidate instruments. However presently IASI is the (Global Space Based Inter-calibration System, gsics.wmo.int) GSICS community reference for Infrared and MODIS for Visible. Several factors have helped in zeroing in of IASI as a reference instrument. These are.

- 1) Stability, IASI is routinely evaluated using under flights or comparing with stable references
- 2) Monitoring of instrument health while it is in orbit
- 3) Its ability to match spectrally with other in-orbit instruments , for IR hyperspectral instruments radiances can be convolved to any broad band spectral radiances. For the VIS channels MODIS is generally used as a reference. However one needs to apply spectral band adjustment factors to exactly match the comparing frequencies of two slightly differing instruments. For eg MODIS Vs SEVIRI visible bands inter-comparison.
- 4) If instrument by design is highly accurate specifications of the instrument is

Comment. . . In the analysis, could there be a reason why both instruments agree well, but for the serendipitous reasons. Answer: Because of the robust calibration mechanism of AATSR and IASI they have been able to replicate to a large extent the design specifications.

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

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Answer: Suggestion implemented.

Comment 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))

Suggestion implemented.

- Page 9786, line 2: “Metop-A” not “MetTop-A” –[Done]

Page 9786, line 4: remove “by design” –[Done]

Page 9786, line 14: change “uses” to “using” – [Done]

Page 9786, line 26: change to “after the orbit” – [Done] Page 9786, line 28: I presume you mean AATSR, not AVHRR? –[We mean AVHRR as explained] Page 9787, line 26: change to “as the Global..” – [Done] Page 9788, line 1: AIRS, GOES and MSG are undefined for the casual reader) – [Done] Page 9788, line 4: first introduction of AVHRR, not defined. – [Done] Page 9788, line 28: “Illingworth” not “Illingsworth” – [Done]

Page 9789, line 14: change to “ changes in the spectral response function (SRF)” – [Done] Page 9789, line 19: inconsistency of 210-310K range with 200-300K range in abstract? - [Done] Page 9789, line 22: change “weather” to “whether” – [Done] Page 9790, line 8: communication with Envisat was lost in April 2012, not May 2012. [Done] Page 9790, line 14: change to “SST range” – [Done] Page 9790, line 23: very messy sentence and I do not know what the message is. – [Done] 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. – [Done]

Page 9792, line 21: another muddled sentence. I suggest changing to “The consistency of the algorithm was extensively tested”, or something similar. – [Done] Page

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9792, line 22: I'm not sure what this test is. Is it just to see that the algorithm is [Done] consistent with itself? Is this actually necessary? –

Page 9793, line 14: change to “Only those pixels where the . . .” –[Done] Page 9793: both of the terms “IASI Rep Rad” and “SRFVAL” are not defined. –[Done] Page 9794, line 27: change “would be seen” to “shown” –[Done] Page 9796, line 19: change to “an offset” – [Done] Page 9797, line 18: there is missing text after “At SST temperatures. . .” – [Done] Page 9798, line 1: in brackets you put “(not shown)” but it appears to me that the figure does shown –n shifts? –[Done] Page 9803, line 19: change to “For the 11 μm channel” – [Done] Page 9805, line 13: change to “SST range” [Done]

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 9785, 2015.

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