

# ***Interactive comment on “Validation of INSAT-3D sounder data with in-situ measurements and other similar satellite observations over Indian region” by M. Venkat Ratnam et al.***

**M. Venkat Ratnam et al.**

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Replies to Reviewer#2 comments/suggestions

This paper provides a good summary of validation testing done of INSAT-3D sounder products. The authors clearly describe comparisons they have made and indicate validity of the product for weather applications. They also forthrightly discuss limitations of the product in some spatial and vertical regions. There is one obvious error in either the comparison product used from AIRS or in the description of it. There are also some errors in the formatting of the references, and a few other technical corrections. I recommend publication of this paper after these minor issues are addressed. The abstract and introduction are well-written and comparisons with satellite data sets and

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radiosondes are well described. We always want more validation, but as report of validation to date this paper is entirely adequate. The conclusions seem supported by the data presented.

Reply: First of all we wish to thank the reviewer for going through the manuscript carefully and appreciating actual content of the manuscript and recommending few corrections for the betterment of the manuscript.

The one obvious error is in Figure 2(c) and 2(h). This image is described as the AIRS Level 3 daily gridded product for May 2, 2015. This cannot be correct as the AIRS daily gridded product will have orbit gaps at this latitude. (On this date, the orbit gap crosses Sri Lanka and central India.) Perhaps this is an 8-day or monthly gridded product instead, or has somehow been filled? If it is not the daily product, that would explain why it differs most from the other products shown. The authors should either replace this image with the correct daily gridded product or explain what product they actually used. This will not affect the substance of the paper.

Reply: We have replaced AIRS Level-3 daily gridded data is used in figure 2.

The authors could strengthen their argument for INSAT-3D in the introduction by pointing out incomplete coverage of AIRS and MLS because of orbit gaps in tropical regions where geostationary sounder has complete coverage.

Reply: Thanks for this suggestion. We have included above mentioned sentence in the revised manuscript as suggested.

Two questions come to mind for further research, which the authors do NOT need to address in this paper:

If temperature bias correction is made as suggested, how much improvement is made in relative humidity?

Reply: Thanks for raising this important issue. In the revised manuscript we have used mixing ratio while comparing INSAT-3D with mixing ratios obtained from AIRS, MLS,

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ERA-Interim and NCEP re-analysis data instead of RH. But, the mixing ratio of INSAT-3D is converted to RH so as to compare with SAPHIR as this data is available in RH only.

AIRS and MLS data could be better used by using actual time of level 2 observation to compare with INSAT sounding closest in time, since INSAT is available every hour and AIRS and MLS vary by up to 2 hours in local observation time because of looking to side.

Reply: Thanks for the suggestion and we will try to implement this point in future works.

Technical corrections to figures: Figure 5 label (a) and (b)

Reply: Corrected.

Figure 6 is labeled (a b c c) should be (a b c d)

Reply: Corrected.

Technical corrections to references: Aumann has names incorrect Mitra has names in wrong format TIAN is incomplete and in the middle of Suskind

Reply: Corrected.

Spelling corrections in text: line 18, tropics not topics; line 282, quantify not quantity; line 294, overcast not over; line 299, provide not provided

Reply: Corrected.

We once again thank the reviewer for his/her constructive comments/suggestions which made us to improve the manuscript content significantly.

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