

Interactive comment on “A simulated observation database to assess the impact of IASI-NG hyperspectral infrared sounder” by Javier Andrey-Andrés et al.

Anonymous Referee #1

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Overview:

This paper documents the production of a set of databases designed to simulate IASI and IASI-NG radiances for future use in retrieval and data assimilation studies. It describes in detail how the origin of the "true" atmospheric states used in the calculations and the similarities and differences between the two radiative transfer models employed - RTTOV and 4A.

The paper achieves this goal well and (with some minor suggestions outlined below) can be accepted for publication based on that - although the amount of truly new science is limited.

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The final section presents a somewhat simplistic evaluation of the relative retrieval skill from IASI and IASI-NG. I am assuming it is being presented as an example of the sort of thing that could be done with the database, but I do not think it necessarily adds much to the paper.

Detailed comments:

p.2 lines 13-14: I don't think you should say that "some channels were unsuited" as the real issue is not the channels themselves but that the information is redundant. Maybe say "a subset of channels is preferred"

p.4 line 18: "an adequate refractive index" -> "an appropriate refractive index"

p.6 lines 4-6: Is the noise added diagonal or is the fact that noise is correlated between channels because of apodisation allowed for? In fact, apodisation is only briefly mentioned - you should state explicitly the apodisation being used.

p.9, lines 18-20: I think the details on how you do not have some cloud flags because of some processing quirk are confusing and not really relevant.

p.12, lines 4-6 and Table 5: I do not think that Table 5 is particularly useful as it aggregates the information in Figure 4 while hiding much of the detail. It is also misleading to say there are no differences in the standard deviations when it is clear from Figure 4 that they do indeed exist. So I would remove this table.

Figure 6: Why did you choose to plot this in radiance units when everything else is in brightness temperature? It makes it very difficult to compare with the other plots.

Section 5: I think you should make it clear from the start that the retrieval discussion is illustrative. The scene selections (totally clear columns), channel selection (limited to IASI 314); background error (arbitrarily set to 2x the NWPSAF supplied one); simple bias correction and simple assumption that IASI-NG noise is exactly 2x IASI are probably not close to how that data will be used in practice.

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p.15, lines 28-30: Please state explicitly that the 4A calculations are going to be referred to as "truth" for the rest of the section.

p.17, line 9: Is it really true that the IASI-NG noise is half of IASI noise for all channels?

p.20, lines 9-13: While the channel selection could well be improved, you should be clear that there is a fundamental issue with very low level retrievals in the infrared due to the lack of contrast with the surface.

p.21: It is unfortunate that the data base is limited to 314 channels. As you mention in the text it is very likely that IASI-NG will be using channels not in this set.

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