

Interactive comment on “Towards IASI-New Generation (IASI-NG): impact of improved spectral resolution and radiometric noise on the retrieval of thermodynamic, chemistry and climate variables” by C. Crevoisier et al.

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First, we would like to thank the referee for their constructive comments. The answers to their comments are listed below.

The manuscript addresses relevant scientific questions such as the impact of increased spectral resolution on the retrievals of atmospheric variables. I would suggest to accept the manuscript pending minor revisions. Please read below.

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Figure 2a is not completely clear. The 1K temperature perturbation in surface temperature appears superimposed by another larger signal also plotted in pink, perhaps as a dashed curve. The authors should check about a possible plotting error.

The pink dashed line has been removed from Fig. 2a.

In addition to figures a and b it would be advisable to add a figure c showing either the ratio or the difference of the curves plotted in figures a and b. No need to plot the noise curve differences in figure c. This additional plot could provide a better quantification of the signal improvement and eventually serve in support to the conclusive remark of paragraph between line 3 and 18 on page 11226, where the authors indicate that “it is possible to find IASI-NG channels for which temperature is decorrelated from H₂O and O₃”.

Both curves don't have the same number of samples: 8461 for IASI (spectral sampling of 0.25 cm⁻¹) and 16923 for IASI-NG (spectral sampling of 0.125 cm⁻¹). These numbers have been added to the caption. Therefore, it is not possible to plot a ratio or a difference between both curves. To support the comment stating ‘it is possible to find IASI-NG channels for which temperature is decorrelated from H₂O and O₃’, we have added a few examples of such channels in the text.

A definition of the a posteriori error would be generally helpful in describing figure 5.

Such a definition has been added in the text, Section 2.3.1.

Do the retrieval experiments for temperature and water vapor make use of the full channel bands or are they performed based on a channel selection?

Yes, the full channels are used for both temperature and water vapour. This precision has been added to the text.

What retrieval method was used for figures 5 and 7, OE or neural network? For

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clarity, the authors should specify it.

As stated in Section 3.1.2 where Fig. 5 is used and Section 3.2.2. where Fig. 7 is used: 'To evaluate the expected retrieval accuracy and vertical coverage of each scenario given in Table 1, we use the optimal estimation method described in Section 2.3.1 in the general framework of Numerical Weather Prediction (NWP) applications.' It has now been added to the captions.

About section 5.1, it would be useful to also reference a recent study (Gambacorta et al., 2014) that compared CrIS to IASI CO products upon switching to higher resolution.

The reference has been added.

Few additional notes:

1) In the introduction, line 14: quasi near real time is redundant. It should just be near real time.

Done.

2) section 2, line 6, 0.50 cm-1 for IASI.

Done.

3) Section 5.3.1 line 4 "for the each scenario" should be "for each scenario"

Done.

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