

Interactive comment on “Application of φ -IASI to IASI: retrieval products evaluation and radiative transfer consistency” by G. Masiello et al.

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Dear Editor, Reviewers and potential readers of our paper, we need to inform you that in its present version, our paper (acp-2009-96), currently under open discussion, contains some erroneous calculations and, hence, conclusions because of a series of concomitants and fortuitous events. Because of these events we failed to fix a software bug that we had, nevertheless, discovered in our release of σ -IASI, derived from the version 11.3 of LBLRTM. We went back to revise the software after discussing our paper with Tony Clough and Mark Shephard, co-authors of the current version 11.3 of LBLRTM. During this last revision of the software, we discovered that the bug was still there, despite of our actions to remove it.

We have now definitely removed that bug and this comments is mostly to inform about

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the major changes, that we hope we may convey in a revised version of the paper.

Meanwhile, please consider that:

- the bug affects only the results concerning our release σ -IASI version L11.3;
- therefore, up to section 3.2.1 the paper and related figures there shown are OK (we mean that this part of the paper is not affected from the software bug);
- the bug seriously affects our results shown in section 3.2.2, which has to be rewritten in the light of the new computations.

The main changes and related conclusions, which are derived by the new correct computations, are:

1. conversely to what is stated in the ACPD on-line paper, the version L11.3 (that is the new implementation of σ -IASI, which incorporates the line mixing treatment by Hartmann's group) yields results which significantly improve the spectral residual everywhere in the ν_2 band of CO_2 ;
2. because of the above new results there is no need to tune or scale the CO_2 continuum, therefore our results about the scaled version of σ -IASI, that is the version, which is referred to as L11.3_s in the paper, are now surpassed and will be cancelled out in a further revision;
3. the version L11.3 also allows us to have a better retrieval performance for temperature.

The new results affect the figures, which at moment are on show within the ACPD open discussion, this way:

- Figures. 8 and 9: the two b) panels need to be updated to reflect the new results;

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- Figures 11, 12, 13 and 14: these figures will be removed in a further revision, since there is no need to implement a discuss a continuum scaling for the release 11.3;
- Fig. 15 to 18: they need to be updated to remove any reference to the version L11.3_s, and update results concerning L11.3.

The main results for the improvement in spectral residual and retrieval performance are exemplified in the two figures in this comment, which refer to the JAIVEx experiment.

Figure 1 shows spectral residual (in brightness temperature units) averaged over the 25 JAIVEx IASI soundings analyzed in this paper for the range 645 to 800 cm^{-1} and for the cases, L8.1 and L11.3. The physical inversion has been initialized with our EOF regression based First Guess.

Figure 2 shows the retrieval results for the JAIVEx experiment. Root mean square difference (r in figure) computed by contrasting IASI retrievals against radiosonde observations. Values have been averaged over the data set of 25 IASI soundings. a) temperature; b) water vapour. The two r -curves shown in figure correspond to the two versions of σ -IASI used in the analysis.

We are sorry if we have diffused wrong information about the performance of the new line coupling treatment by Hartmann's group, and we hope we are given the chance to give the right merit to this new treatment in a further revision.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 9647, 2009.

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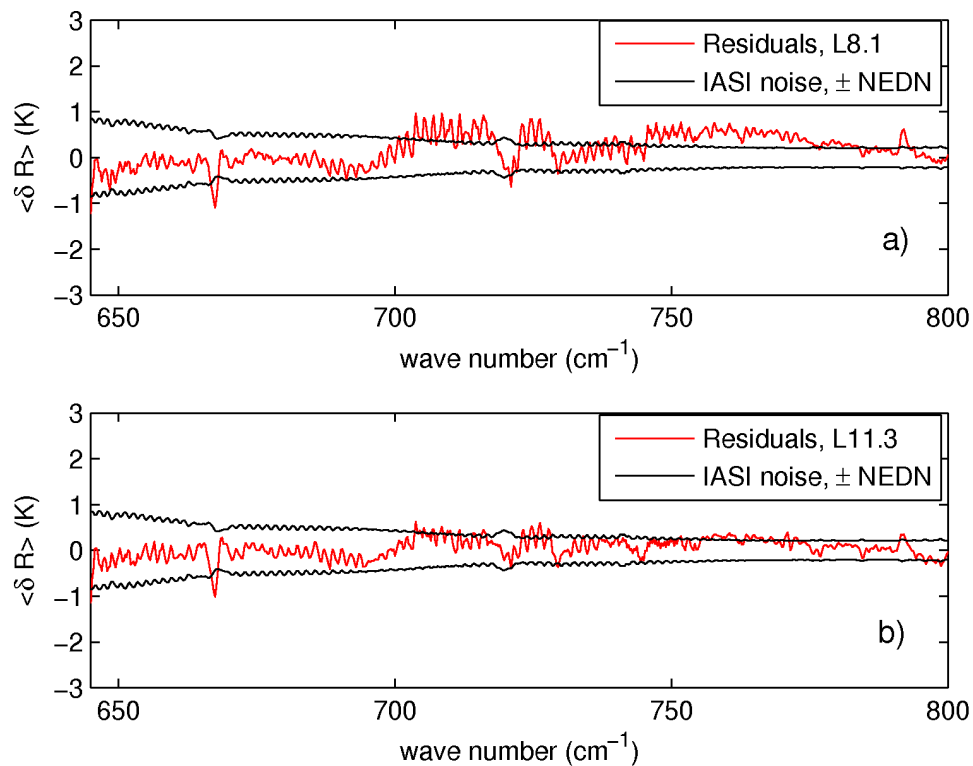
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Fig. 1. Spectral residual averaged over the 25 JAIVEx IASI soundings analyzed in this paper for the range 645 to 800 cm^{-1} and for the cases, L8.1 and L11.3.

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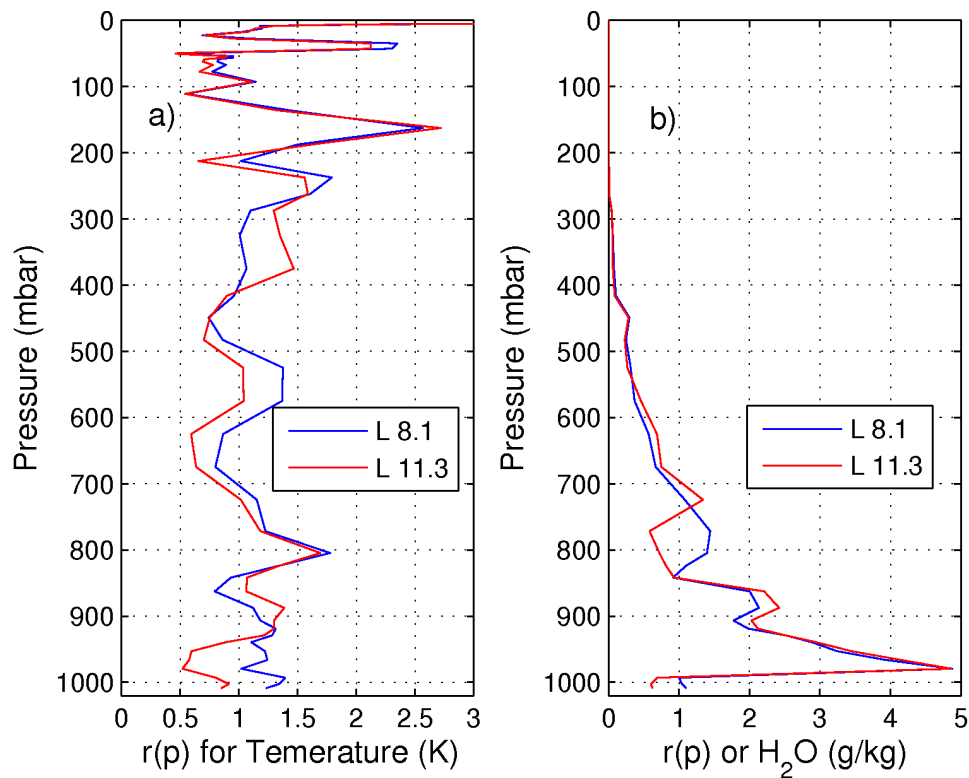
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Fig. 2. JAIVEx experiment. Root mean square difference computed by contrasting IASI retrievals against radiosonde observations.

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