Atmos. Chem. Phys. Discuss., 9, C2097–C2100, 2009
www.atmos-chem-phys-discuss.net/9/C2097/2009/

Atmospheric Chemistry and Physics Discussions

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

G. Masiello

guido.masiello@unibas.it

Received and published: 22 June 2009

1 General

We thank both the referees for the valuable comments, for their understanding and to give us the chance to correct for the serious error we experienced with our first release of the improved σ-IASI software. We are now quickly preparing a revised version of the paper according to the referees suggestions and remarks, which will incorporate our comment published in the interactive discussion on May 22, 2009.

Below the referees can find our item-by-item-to their remarks and suggestions and the way we have handled them in the revised version. Furthermore, in the new version we

have added, at the very beginning of the introduction section, a brief historical account of the IASI instrument.

2 Item-by-item reply to Referee 1

1. Page 9649, line 3: Well ECMWF is assumed to be the truth, our IASI retrievals have been obtained independently of ECMWF profiles, which are used for comparison. We have a bit adjusted the sentence to be clearer.

2. Page 9653, line 15. Yes, we agree with the fact that most of the text in between lines 15 and 19 is redundant with respect to what said in the introduction section. In the revised version, we have dropped the text from line 14 to 19.

3. Page 9655, Eq.n 5: Yes, "f" can be changed and made dependent on the wave number, as well. A time-space dependency is the easiest to incorporate. Yes, the referee is right we could further decompose the matrix $\mathbf{O}$ in order to explicit the role of spectroscopy uncertainty, a task that we shall consider for further work.

4. Page 9657, line 3: Well, Masuda's model takes into account for the dependence on the scan angle. We have made explicit this dependence in the new version.

5. Page 9657, line 17-22. OK, we have re-arranged text and figures in order not to jump from figure 2 to 5. Now in the revised version we first present the analysis based on the root-mean-square error, and then that based on the bias.

6. Page 9658, line. OK we have inserted the correct units of g/kg.

7. Page 9658 line 3. We use the Chevalier data set to train and validate the First Guess EOF regression scheme, the error-regression covariance matrix is then used to build up the a-priori covariance matrix used in the physical inversion

scheme. The scheme has been described at a length in Ref. Grieco et al 2007. We have made a proper reference to that paper in the new version.

8. Page 9658, line 28. Details about the index i_D can be found also in the paper submitted for the same IASI special issue, ACPD Atmos. Chem. Phys. Discuss., 9, 7589-7613, 2009 available online at http://www.atmos-chem-phys-discuss.net/9/7589/2009/. We have made a proper reference to this work, in the new version, when dealing with the index i_D, so that the reader can have an online access to its detailed description. We have not yet applied this index to AIRS.

9. Page 9692, lines 15-18. Well the radiometric noise is defined in terms of the square root of the covariance matrix. Then, $(1 + f^2)^{1/2} = (1 + 0.96)^{1/2} = 1.40 = 1 + 0.4$, with the second term of 0.4 giving the excess of radiometric noise we assign to forward modeling.

10. Page 9664, line 5. The section 3.2.2 has been completely rewritten, thus that sentence will no more appear in the new version.

11. Page 9664, line 12 See point 10.

12. Page 9664, line 17. See point 10.

13. Page 9666, line 1. OK, done.

14. Overall. Yes the section 3.2.2 to describe the σ-IASI v11.3 has been completely rewritten. Proper reference to the work of J.-M. Hartmann was already included. Reference to the L. Strow/DeSouza-Machado CO_2 data base has been done in the conclusion section, where we have put in perspective a possible comparison with the results obtained by using the database by L. Strow/DeSouza-Machado

3 Item-by-item reply to Referee 2

We followed your suggestion that we should contact LBLRTM people to compare results. We did it and hopefully we have now all the right things in place and some good results to show.

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