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Atmospheric Chemistry and Physics Discussions

Interactive comment on "IASI-METOP and MIPAS-ENVISAT data fusion" *by* S. Ceccherini et al.

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The authors thank referee #1 for careful reading of the manuscript. Below we reply to the specific comments and the technical corrections of the reviewer.

Response to specific comments:

* Since the paper is focused on the results of the IASI-MIPAS data fusion and not on the description of the used method (that was already published in another paper), we decided not to include the algebraic formulas of the method. For the algebraic formulas the reader was referred to Ceccherini et al. (2009), which is published in an open access journal and, therefore, easily (and freely) accessible. However, since both referees suggest that reporting the algebraic formulas of the method would improve

the paper, in the revised version of the paper we will add an appendix with the basic algebraic formulas concerning the MSS and data fusion. We consider the appendix an appropriate solution because the formulas are not needed for the understanding of the paper, but may be useful for the reader who wants at the same time to visualize the mathematics involved.

* The correct way to handle systematic errors in the MSS calculation and subsequently in the fusion process is to replace the VCM Sy (VCM of the random errors of the observations) with the VCM of the residuals (differences between the observations and the forward model simulations). The VCM of the residuals includes both the random errors of the observations and the forward model errors. With this replacement the estimated errors on the fusion results will include all the error components, without any further change in the procedure. We will add this important consideration in the revised version of the paper.

* In both IASI and MIPAS retrievals the ozone mid-latitude climatological profile of July(Remedios et al., 2007) was used as initial guess. This information will be added in the revised version of the paper.

* We think that the knowledge of the ozone profile used for the simulations is of interest for the reader. Furthermore, Figs. 2 and 3 report the percentage errors, and Fig. 1 can be used to obtain information on the absolute values. For these reasons we prefer to keep Fig.1 in the paper.

* The width is not the only merit of an AK. Also the amplitude, the location and the discrimination relative to the other AKs are important. In this perspective the data fusion has improved the AKs of MIPAS also at 5km and the discussion of a single feature does not seem appropriate.

* We agree with the referee that the method could be a powerful tool to compare the performance of different experiments with respect to specific targets of interest. It provides useful indications about the complementarities and redundances of different

measurements and can be used for the selection of observation strategies for future experiments.

Response to technical corrections

L. 75 and throught the text "collocated" will be changed in "co-located" in the revised version of the paper.

L. 257 "significant" will be removed in the revised version of the paper.

Table 2 "UTC" will be specified when reporting time in the revised version of the paper.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 183, 2010.