**Atmospheric
Chemistry
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Discussions**

Interactive
Comment

Interactive comment on "On the capability of IASI measurements to inform about CO surface emissions" *by* A. Fortems-Cheiney et al.

Anonymous Referee #1

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Fortems-Cheiney et al. use IASI and MOPITT CO retrievals in an inverse modelling framework to investigate the capability of IASI (relative to MOPITT) to draw conclusions about CO surface emissions. As CO is an important atmospheric constituent and because IASI measurements will be available for many years, it is important to assess the performance of IASI with respect to the information which can be derived from IASI concerning CO emissions. The authors cover an important topic, appropriate for ACP. The manuscript is well written and a comprehensive overview about the existing literature on this topic is included. I recommend its publication in ACP after the few minor comments listed below have been considered by the authors.

Section 2 Method and data

Page 7508, line 9: I recommend to put MCF in brackets.

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Interactive Discussion

Discussion Paper

Page 7509, lines 5-7: Is my understanding correct: The method requires to perturb the emissions and the observations (!) in order to get an error estimate. Or are error estimates also available without perturbing the observations. Please add more information on this.

Page 7511, line 5: The layer closest to 700 hPa has been used for this study. Neither IASI nor MOPITT enable the retrieval at 700 hPa but only an average over a large altitude range. In addition, the vertical sensitivities of IASI and MOPITT are different. Therefore one may expect that the results of the study differ depending on which layer has been used. Is this selection critical for this study ?

Equation (2): Please add what units have been used for the state vector elements (mixing ratios for MOPITT and layer columns for IASI ?).

Section 3 Results

Page 7514, line 26: IASI and MOPITT are broadly consistent in terms of correlation but not in terms of there absolute values as there are clear biases. I recommend to rephase the sentence to consider this. At the end of the paragraph is is mentioned that IASI CO is higher compared to MOPITT. As the IASI averaging kernels peak higher in the atmosphere one might have expected an opposite finding (lower CO from IASI compared to MOPITT). Please comment on this. In addition, please add information on validation of both MOPITT and IASI. Are the differences due to a significant high bias of the IASI retrievals ? If yes, what might cause this bias ?

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 7505, 2009.