**Atmospheric
Chemistry
and Physics
Discussions**

Interactive
Comment

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

A. Fortems-Cheiney et al.

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General comment about the revision

We wish to thank both referees for their helpful comments. We address all the issues they have raised in the following. The full reviews are copied hereafter and our responses are inserted where appropriate.

The questions posed by Reviewer #1 about the consistency of the MOPITT and IASI L2 products made us revise our full processing chain. The results have slightly changed for IASI and much more for MOPITT. Indeed we found that we did not use the MOPITT L2 products at the pressure level (700 hPa) that we thought we were using. The new

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results show consistent behaviour of the IASI-based inversion and of the MOPITT-based one. We updated the text accordingly. We are both sorry for this and grateful to the reviewer for having encouraged us to investigate the previously-found differences.

Referee #2

This is a well-written and informative paper, illustrating the quantitative value of the IASI CO retrievals in optimizing surface emissions. The components of the inverse modeling system (satellite retrievals and model), and the inverse modeling methodology are described well. Comparison with the MOPITT retrievals is also a valuable component of this paper. I recommend publication in ACP after addressing the comments below.

p.7508, l.9: give chemical formula for MCF

We did it.

p.7508, l.19: might be clearer as: ... errors in the fluxes from errors in initial concentrations for the first couple of weeks.

We did it.

p.7509, l.3-4: rewrite as: Our approach for determining the posterior uncertainty consists of ...

We did it.

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p.7509, l.15: syllable missing: simplification

We changed that.

p.7510, l.12: constraint to

We changed that.

p.7511, l.16: The current MOPITT product is Version 3 (V3). The label L2V5 doesn't seem right.

We changed that.

p.7511, l.25: Neither reference cited says that there is a bias in nighttime MOPITT retrievals. There are differences between day and night retrievals (due to surface temperature changes); that can be the reason given for not using the night data.

We changed the sentence by "Nightime MOPITT observations significantly differ from the daytime ones (due to surface temperature changes and have been left out."

p.7512, l.7: It would be much clearer and simpler to just compare to the total number of model grid boxes instead of revering to them as "super-observations".

The term "super-observation" implies some averaging procedure and we think that it conveys the correct message in our case. We left it.

     p.7512, l.13: identify A as the averaging kernel

We did it.

     p.7512, l.16: leave out at NASA and LATMOS respectively

We removed it.

     .7514, l.4: lower-sounding is quite vague - perhaps say the averaging kernels peak at a lower altitude, or that MOPITT is more sensitive at lower altitudes.

We did it and changed the sentence by :"... giving an advantage to MOPITT, whose averaging kernels peak at lower altitude".

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

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