**Biogeosciences Discussions**

# *Interactive comment on* "Spatial and temporal resolution of carbon flux estimates for 1983–2002" *by* L. M. P. Bruhwiler et al.

**L. M. P. Bruhwiler et al.**

lori.bruhwiler@noaa.gov

Received and published: 7 October 2010

We thank the reviewer for his/her careful consideration of our paper, and helpful comments.

Regarding the presentation of the resolution kernel; we did try over to think of alternative ways to show this. Showing the resolution kernel row by row was the best way to do this because it allows one to see the relative sizes of the diagonal and off-diagonal elements. The drawback of this is that we also have to explain how the off-diagonal elements are ordered, and this can cause confusion. We did the best we could by providing multiple labels for the x-axis and detailed figure captions. Also, we note that showing the rows the resolution kernel is used in the literature that we are aware of.

Specific Comments -

We fixed the typos noted in the first four of the specific comments.

Chapter 4.1 - We added a short paragraph at the beginning of this section to motivate the discussion of the limiting cases. In short, consideration of limiting cases gives the reader and understanding of how resolution of parameters depends on uncertainty in prior knowledge and ability to predict the observations (i.e., the model-data mismatch error). Later in this section, we note where the real inverse problems lie between the ideal limiting cases.

Chapter 5 - By discussing the flux estimates an resolution results together, we had hoped that we could show how useful a diagnostic the resolution kernel is for evaluating and interpreting flux estimates.

Page 4714, line 3 and caption of Fig 3 - We added a sentence explaining that the resolution kernel for regions aggregated from smaller regions (such as the global land and ocean fluxes) are calculated by adding the appropriate rows/columns of the response function, prior uncertainty and model-data mismatch error matrices.

Table 1 - It was an oversight not to have referenced Table 1. We added a sentence explaining what Table 1 is to the end of the Observation Network section, and we changed the title of the last column of Table 1 to read "model-data mismatch error". We are not opposed to deleting Table 1; however, inversion results are very sensitive to the choice of network sites and model-data mismatch error. The information in Table 1 could be useful for other researchers comparing their own results with ours. Table 1 could be put into an appendix if recommended by reviewers and editors.

Page 4719, Table 3 - We decided to keep Table 3 because it shows our choices for aggregated source regions, but we did add a figure showing the TransCom 3 regions.

Figure 1 - We agreed with the reviewer that the station names were not necessary and removed them from the maps.

C2906