Editor Decision: Reconsider after minor revisions (Editor review) (09 Apr 2014) by Ralph Keeling

Comments to the Author:

I'm satisfied with all significant issues except one, which is the handling of the fluxes by ecosystem type, raised by Referee # 1, and as reflected in Table 4 and in the abstract. The discussion on pages 21-22 doesn't fully address the issue, because it mainly concerns the relationship to other studies or a few specific methodological issues. To my understanding, the posterior partitioning within regions is tied to the priors, and therefore independent of atmospheric data. If this is true it needs to be emphasized. What is especially missing is a discussion of the uncertainties in the partitioning that are intrinsic to the calculation itself. Another way to state this concern is that the fluxes by ecosystem type in Table 4 and the abstract lack error bars. I appreciate the value in showing the complete results, as in Table 4, but I am concerned with the lack of uncertainty analysis, and I am therefore also concerned that the fluxes for individual ecosystem types might be too uncertain to merit being highlighted in the abstract and discussion.

My guess would be that most of the fluxes by ecosystem type are, in fact, very uncertain, with perhaps a few exceptions. This leads to a suggestion, which is to add strong caveats in the text and Table 4, and then to specifically defend those few results which might have merit. The defense needs to be crafted in the context of the method itself (not other studies). Only results which can be defended should appear in the abstract or be discussed at length in the text.

Another minor point is that the dark blue points in Figure 2b,c,d still are not clearly labeled. These panels show four kinds of points, but only three are identified in the legend.

Response:

Thank you for your suggestion. We fully acknowledge that the split by ecosystem comes with large uncertainties, because the observational constraints across the ecosystem are sparse. This means the system relies on the prior model to set the ecosystem-by-ecosystem patterns as well remarked by the editor, and adjusts those according to large-scale constraints by the data. The only way to get a better separation is to add more sites in Asia, which we fully endorse. We add this caveat to the abstract (*see page 3 lines 14-22*) as well as the discussion in the text (see *page 14 line 24 to page 15 line 8*), and give the uncertainties on the ecosystem fluxes explicitly *in Table 5 in page 34*. Moreover, we calculate the correlations between ecoregions and indicate in the text which regions correlate strongest with others, and are thus not independently resolved (correlations s*ee Fiugre 5 in page 43 and associated text in page 14 line 24 to page 15 line 8*).

About the Figure 2, we're really sorry about that the figure is not plotted clearly. In fact, the label in Figure 2b,c,d is correct that we just have three kinds of points in the figure 2 b, c, d. There are so many points in the CONTRAIL CO_2 time that overlaid posterior CO2 points were possible looks to be the dark blue points. We have updated the fiugre 2 in our revision (see *Figure 2 in Page 41*).