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Biogeosciences Discussions

Interactive comment on "Estimation of land-use change using a Bayesian data assimilation approach" *by* Peter Levy et al.

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We thank the referee for their thorough reading of the manuscript. We address their points (*shown in italics*) below.

Figure 4 should be improved. In the current figure the CI dominate the signal making it uninformative to show the prior and observations. If that is the message of this figure, then search for a more elegant way to show it (could be a table). The current presentation already uses different ranges of the Y-axis but even then for some rows of subplots the range is not completely used.
We tried several ways of presenting these data, and we're not sure there is a better

alternative. Firstly, it is helpful to have the figures consistent, and currently Figure 3-6 all have the same form (axes and colour scheme). Each row can have a different y scale, but it becomes messy to re-scale each individual plot. So the scale is set by whatever is largest in a row - either observastions or confidence intervals. The figure does correctly show the relative uncertainties in a form consistent with the other figures, even if some are too small (relatively) to be seen in detail. A table version would be very large and not visually helpful, though this could go in supplementary material.

Add a chart showing the flow of the method and linking the flow to the different sections on the text.
We agree this would be a useful addition, and will add this in a revised version.

I strongly suggest to change the title. The novelty is not in estimating land-use change (actually this study did not estimate land use change at all. It makes use of existing estimates), the novelty is in combining different sources in a reproducible and more objective way. The title should mention the following elements: (1) gross land use changes, (2) combining different data sources into a single product, and (3) uncertainty intervals on the product. If there is some space left you could mention that the approach was Bayesian.

Our preference would be to leave the title as it is, but we're open to suggestions.

1. We can add the word "gross", but not sure it is really necessary.
2. The term "data assimilation" pretty much captures the idea of *combining different data sources into a single product*.
3. The word "Bayesian" conveys that we are dealing with uncertainty, though perhaps only to the cognisant.

"Estimation of gross land-use change and its uncertainty using a Bayesian data assimilation approach" would be a reasonable compromise.

Specific comments: - L 318 replace "sample sample" by "sample"
We will correct this.

Fig 2 and 11 change the units of latitude and longitude to degrees, minutes, seconds.
The maps are in British National Grid, so the units are metres east and north of a defined origin. We will clarify this in the caption.

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