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Biogeosciences Discussions

Interactive comment on "Assessing variability and long-term trends in burned area by merging multiple satellite fire products" *by* L. Giglio et al.

Anonymous Referee #2

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Review to

L. Giglio, J. T. Randerson, G. R. van der Werf, P. S. Kasibhatla, G. J. Collatz, D. C. Morton, and R. S. DeFries

Assessing variability and long-term trends in burned area by merging multiple satellite fire products

The authors describe the derivation and the new GFED 3 burned area data set. The previous version enabled users in many different fields of biogeochemistry modelling to use certain aspects of the data due to the good availability and the wide range variables from gas exchange to burned area provided. Though the GFED 2 as well as GFED 3 does not provide novel data in the sense that the data would not be available from the

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Interactive Discussion

Discussion Paper

original sources, it combines different types of raw data which is hard to use for modelers which are only interested in certain aspects of it and whos focus and expertise is not on the field of remote sensing in a way that allows the straight incorporation into biogeochemical models due to the spatial and temporal resolution and the consistency within the dataset. The new burned area data is not merely a extended version of the GFED 2 burned area, but a complete new approach since in the previous version the burned area was not mapped from burn scars but from active fire data which and subsequently transformed via regional regression trees. Since several other products have are providing burn scar related burned area estimates it was necessary to update the GFED approach. Though only the burned area data is presented here this is one of the foundations for the estimates of the emissions and hence the most advanced algorithm should be applied in order to generate reliable estimates. Since my interests are more related to the application of the data set than to the generation I will mainly comment issues related to that. However, having said this it would be nice to have a short paragraph stating the main differences between the burned area products presented with respect to the algorithm and data sources used to estimate burned area and maybe regional differences in performance, at a level which could guide the user rather than the developer in their choice of the product and maybe would also allow a better interpretation of the differences found and discussed (Discussion, Results also figure 16 and 17).

The authors use the much better data availability for the recent product compared to the previous version to quadruple their spatial resolution. However, though a monthly resolution might be sufficient for many applications, for others one would like to also increase the temporal resolution. Looking at the time resolution of the MODIS data it should at least be possible to go down to a half monthly dataset. The authors should discuss their reasoning and if there are other issues that preventing this. Though basically presenting a new dataset, the authors still use some procedures already applied in generating the GFED 2 dataset, especially in cases where there are no observations for the fire scars available. Here a relationship between active fire counts and the tree

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and herb cover is used to relate active fire counts to burned area. The used vegetation continuous field VCF data only displays a single year of data - 2001. Several studies did show the importance of tree and herb cover for wildfire occurrence, however, since this data set represents a point in time nearly a decade ago, one might think whether this driving data can not be replaced by a time continuous dataset. This might especially be problematic for the pre-MODIS area, for which the current approach is not questioned but similarly to the use of different sensors for different time periods, an integration of a continuous dataset for the regression tree should be possible and especially for data for the recent past enhance the accuracy. The authors discuss how large the proportion of burned area estimates that rely on the vegetation data set (i.e. on the regression tree) is and how this varies with respect to the regions, which is absolute essential, and display it in Figure 6. It would however also be good to have this kind of information as a layer in the dataset available on a monthly pixel basis. It would also be useful to have a discussion about the feasibility to replace this dataset. Especially with respect to de-forested regions (which are a common research object) where the deforestation occurred after 2001 I can imagine a strong influence. Though the approach to use pre-MODIS active fire to extend the dataset, I am missing an evaluation of the performance of this burned area generation. Would it be possible to compare for some small regions with estimates based on Landsat scenes, or other independent estimates from the literature and not only to MODIS data like in fig 5? I would also be interested in what source of data lies behind the NIFS data which is used to evaluate the performance (satellite data too, if yes which sensor? manual mapping of aerial photos?). This information is essential to evaluate the good fit between this data and the GFED 3 burned area. Figure 1 giving the distribution of the regions could be removed since this one is identical to the one used in previous publications of GFED and the regions are actually self explanatory to certain degree, alternatively it could be superimposed on one of the other figures. In the final print a good readability has to be assured especially for Figure 10 and Figure 6 which even expanded to a full page are hardly readable with the given font size. Figure 16 reports as a unit kha per year

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which I guess relates to the cell size of 0.5 degree (?), however since this cell size in terms of total area varies considerably over the globe I would suggest a relative instead of an absolute unit to report differences between the different products. The panels in Figure 17 could be labeled more clearly since all x axes in one row and all y-axes in one column have the same label, a single label would be sufficient and would allow a larger font size, a similar better way of axes labeling in Figure 6 would allow a larger font size there too.

This work is an important contribution to the field of biogeochemical modeling and though also strongly related to remote sensing it should be published in this journal since it more addresses the user of this data set and hence the reader of this journal. It would strongly benefit from some mainly minor extended explanations as stated before.

Interactive comment on Biogeosciences Discuss., 6, 11577, 2009.