Biogeosciences Discuss.,
doi:10.5194/bg-2016-244-RC2, 2016

Biogeosciences Discussions

Interactive comment on "Multi-gas and multi-source comparisons of six land use emission datasets and AFOLU estimates in the Fifth Assessment Report" *by* Rosa Maria Roman-Cuesta et al.

Anonymous Referee #2

Received and published: 18 August 2016

The main focus of this paper is to evaluate differences in estimates of emissions of greenhouse gases from Agriculture, Forestry, and other Land Use among a suite of data sets. The authors set out to explain the data sources, the intent (and scope) of the sources. This leads then to a nice description of the differences in total greenhouse gas emissions integrated over the tropics, regionalized emissions (across continents and for different country), analysis by source type as well as analysis among different greenhouse gas species (CO2, N2O, and CH4). Overall I thought this is a great contribution and helps readers to 'navigate' the different data sets. The following concerns are minor, but I hope they ultimately will help the reader to better understand

your analysis and your conclusions.

Estimations of country level emissions: this is not clear to me. For the 3 data sets this would results into a sample of n=3 for which you calculated the coefficient of variation. Did you then calculate the percentiles of the coefficients? Does this not imply a false sense of agreement/disagreement? Lets say country 1 results into emissions of 20, 21, and 19, while country 2 has emissions of 2,3 and 1. The coefficient of variation leads to much higher uncertainty in country 2, although the absolute emissions are exactly the same. Perhaps the author could discuss the possibility of other metrics such as the variability of per area emissions (per country) among data sets.

I have trouble to find where degradation fits in. It is not included in any of the graphs or tables, yet the authors spend a lot of time describing it in the methods. In other places it is put in the same bucket as fire and wood harvest. I suggest to refine either the result or the method section to put degradation into the correct context. Similarly, the figures show data for deforestation, and although this is intuitive to many readers, I think a good definition (and how it is being used in context with the data set and this analysis) is important.

Table 5 is not referenced in the text. But it seems an important table. A paragraph in the results/discusson or in the conclusion could really help summarizing in which category the datasets excel and where they are less reliable.

Minor comments and editorial suggestions

L37: Suggest "anthropogenic <greenhouse> gas emissions"

L39: "Global comparison. . ." This is a somewhat awkward sentence – rephrase

L41: suggest i.e. instead of e.g.

L52: instead of paranthesis you may use "with fire leading the difference"

L55: How much of the disagreement stems from incompleteness of the data

L58: I am not a big fan of using etc. . . - but this may be a personal opinion

L65: suggest “Modelling studies suggest that <in order> to keep . . .”

L74: Reading the Anderson, 2015 text, I am not sure whether Anderson made that claim (while he is sceptic about "optimism" in fossil fuel mitigation strategy - suggest reformulation.

L80: This may be the decision also for copy editing, but I think the abbreviation should be preceded by the full Agriculture, Forestry, and other Land Use, although it is explained in the abstract.

L80: unit PgCO2.e.yr-1: I am wondering whether the e for the equivalent should be clarified.

L81: Abbreviation GHG needs to be properly introduced.

L115: Is this PgC or PgCO2?

L119: The statement starting with “These datasets . . .” could benefit with a reference.

L138: I suggest to mention here why the focus in on tropics, instead of burying the rationale in the methods.

L142: In the beginning: Delete the lonely “)”

L149: The discussion about source and sink, net vs. gross can be tightened here. It appears that several statements are repeated.

L177: I think it may be worthwile to briefly (a couple of sentences) explain what the tiers are.

L183: I suggest to use “changes in biomass” and “changes in soil carbon” to highlight that the datasets report the deltas.

L216: The sentence starting with “Unlike other” is a repetition – check L 211

L261: “some of the datasets used”, please specify all the datasets that derive their emissions from remote sensing

L271: “To facilitate. . .” I have a hard time understanding this sentence – possible to rephrase?

L386: Please define CWD abbreviation (or just use coarse woody debris since it is only used once)

L566: Use <change> in SOC, also is the abbreviation properly explained?

L580: What are the units for the numbers?

L587: It is not clear what the FAOSTAT omissions are

L589: try to rephrase “excluding CO2 from aboveground biomass”. – “FAOSTAT does not include CO2 emissions from burned biomass” – is this FAOSTAT assumes that fire frequencies are constant through time, and thus the CO2 budget remains unaffected?

L618: “In detriment to sectorial comparisons” – is this a reference to analysis presented in this manuscript?

L629: Is it possible that the good agreement in places where emissions peak is an artefact of the analysis, since relative errors are used (see also my comment above)?

L640: I suggest to use “added” instead of “coming”

L640: Doesn’t the A in FRA is assessment? – suggest to delete assessments

L667: Missing reference

L706: direct data on forest degradation is missing (see also my comment above)

L708: Isn’t the lifetime of CO2 included in the CO2 equivalent calculation?

L712: What is meant with variability? Also the use of “most” may not be appropriate since there are only two non-CO2 greenhouse gases. Overall, I think this bullet point

should be rephrased

L717: I guess the authors mean that differences among the data sets are as big (or bigger) than the differences among sectors/categories

Figure 1: Why is there suddenly a reference to EDGAR JRC, while in the main text it is referred only to EDGAR. The figure also offers to explain the reader a bit more about the peculiarities if the data. Hotspot is the only data set that has error estimate. EPA has no FOLU emissions calculated while Houghton has not calculated Ag emissions.

Figure 2: why is the Baccini data included here, but not in figure 1 or 3?

Figure 4 caption: typo “peatland”

Figure 1-3 why are the AR5 data not included – I know they are gleaned from the report’s figure, but they could stack up against your summary data?

Table 2a is missing

Table 3: This seems to be an important table, but highly cryptic. I suggest to use the acronym of the datasets instead of the numbers

Table 4: “Other” is really only Forest Sinks – so perhaps use “Forest Sinks” as category.

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