

***Interactive comment on “Global estimates of C  
stock changes in living forest biomass:  
EDGARv4.3 – 5FL1 time series from 1990 to 2010”  
by A. M. R. Petrescu et al.***

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Response to Anonymous Referee #2

General: We thank the Anonymous Referee #2 for his comments. To avoid confusion, the authors decided to remove from the title 5FL1 coding meaning Forest Land Remaining Forest Land according the IPCC 1996 guidelines. This code will be mentioned in a footnote as it remains used in the EDGAR database.

“The authors should better focus the scope of the paper. Is it the scope to show differences between the IPCC GPG for LULUCF and the 2006 IPCC Guidelines? Are those differences due to improvements between “old” and “new guidelines”? Should  
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those guidelines be further developed to be suitable for preparing estimates under any national circumstance?”

RESPONSE: The scope of this paper is to calculate the carbon (C) stock changes from forest living biomass using the two IPCC methodologies in order to choose the most suitable one for EDGAR. EDGAR has as prime objective to provide global coverage with a consistent methodology to ensure comparability between all world countries. This prime objective prevails over the accuracy for the carbon stock change in a single country, which can be obtained with higher Tier methods and country-specific parameters. For any sector, EDGAR prefers to use international statistics and IPCC methodology to the extent possible. Therefore, a careful analysis of the available international statistics and IPCC methodologies was needed, which implied a comparison of the IPCC GPG LULUCF and IPCC 2006 GL methods. We will make this clearer within the aim of the paper and write the following: “The aim of the current study is to calculate the carbon (C) stock changes from forest living biomass using the two IPCC methodologies IPCC GPG 2003 and the IPCC 2006 in order to choose the most suitable one for extending the EDGAR database. The most suitable for EDGAR is the methodology that provides consistently for all world countries at least Tier 1 estimates at a good level of detail”.

“The paper would benefit from an improvement of the language”

RESPONSE: We will ask an English native speaker to read it and check the language.

“Moreover, consistency in the use of words and symbols should be kept throughout the paper e.g. annex I countries vs Annex I Parties; wood fuel vs fire wood; H= annually extracted volume, roundwood + Wf, m<sup>3</sup> yr<sup>-1</sup> vs H= annually extracted volume, Rw + Wf, m<sup>3</sup> yr<sup>-1</sup>”

RESPONSE: We will carefully check and correct these inconsistencies by replacing “countries” with “Parties” and use same symbols and units in the supplementary material.

“The transparency of results would be improved by providing a table with results computed at national level for the years 1990 2000 2005 and 2010”

RESPONSE: We agree and we will add to the supplementary information a detailed table containing the regional C stock data. The full dataset with results computed at national levels will be included and free to download from the EDGAR website once the new version v4.3 will be released.

“moreover a section where providing information on method applied for calculating fire emissions is needed.

RESPONSE: The fire data was used as it is from the GFEDv3 database as stated in the 2.2 section. We will synthetically explain better from where the fire's emission data come and add a better reference to the method, also discuss its consistency with other datasets and methods used in EDGAR. We will also add a figure with fires emissions in the results section. In the newly added regional C stock data table (Supplementary Material) the emissions from fires will also be shown.

“In figure 2, 3 and 4 Russia appears twice, as single country and together with Europe. it is a double accounting?”

RESPONSE: Yes, indeed this may lead to misunderstandings. It is not a double counting and we only did this to exemplify how important Russia is compared to other regions. We will change into Russia and Europe - Russia.

“In figure 1 a generic reference to UNFCCC 2011 is provided for a series of data. Which lands have been included? which pools?”

RESPONSE: I think that this question refers to Table 1. If this is the case, UNFCCC 2011 includes only forest land remaining forest land in above forest biomass. We will add this explanation at the bottom of the table.

“The text refers the estimates to forest land remaining forest land category while it should be total forest land since net deforestation (deforestation + reforestation) is calculated.”

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culated.”

RESPONSE: We only applied the methodology for forest land remaining forest land to forest area seen by satellites in the year 2000. This method allows determining the forest area at a certain moment in time (i.e. the assessment years) based on land cover approach, which is best proxy for total area of “forest remaining forest land” and any potential “expansion of forest or reforestation/afforestation” and estimation of the sink or annual CO<sub>2</sub> removal /emissions from living forest biomass in that specific year, which is EDGAR's purpose. Obviously there is an area of regrowth (after wood harvesting) and afforestation/reforestation but this cannot be easily detected by our static method of accounting. If we assume that deforestation is a land cover change from forest to non-forest then our method is likely to provide conservative estimates of emissions because of including area of early stages of regrowth (after harvesting) whose actual fate is not yet known.

“About net deforestation, did the author consider to add to the net deforestation the data on forest expansion provided by the FRA FAO reports? This would make the net deforestation “less net” giving a more realistic picture of the emissions produced.”

RESPONSE: The forest area in this study was calculated based on satellite maps only for the year 2000. Based on FRA FAO reports 2010 we calculated the increase/decrease in area for the other years. We preferred not to apply any such correction because we: 1) consider there is always an adjustment of area with previous harvested areas (e.g cut 10-15 years before under regrowth) within a delay given by the detection thresholds, and 2) this allows to not underestimate the emission from deforestation (under not truly known deforestation trend). On the other hand, deforestation area is not overestimated since we use 5 year data estimation intervals.

“When applying the IPCC 2003 method the authors: - added belowground biomass to gains and did not consider losses from belowground biomass due to fire and harvesting; - did not apply the same carbon fraction when estimating fire emissions; -

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Considering that it is assumed that the whole biomass of an harvested tree is either transformed in roundwood or fuelwood the biomass expansion factor should not apply unless there is not enough fuelwood to account for wood losses due to roundwood production (in this case the BEF should only be applied to the portion of roundwood in excess).

RESPONSE: This is one of the inconsistencies we identified between IPCC 2006 and IPCC 2003, and the explanation is the likeliness that below ground biomass remains as part of the dead organic matter and decomposes slowly (unlike above ground biomass that has potential to decompose immediately). According to IPCC 2003, for Tier 1 approach, no change of below-ground biomass is assumed. About fires, we considered it more realistic to take the data from GFED v3 since a lot of gaps are present in the FRA 2010 FAO report. Then, computing separately the two types of losses: roundwood and firewood reflect better the case of developing countries (non-Annex I Parties). Thus, we considered that applying BEF2 to each of them is conservative as the risk to underestimate emissions is minimal. This may not be the case for developed countries where wood is more efficiently used (part of the tree go to industry other part to fire), for which our computation may overestimate the emissions for developed countries (nevertheless, for these there are available national GHG inventories that provide better estimates). Again, we underline that EDGAR's aim is to provide consistent global picture of emissions.

"Twice the authors refer to Pan et al. (2011) reporting that they calculated "the gross deforestation for the tropical regions and included into Gains the deforestation for boreal and temperate regions" I guess they would say that Pan et al. included as gains the forest expansion that is occurring in boreal and temperate regions."

RESPONSE: Yes, the reviewer is right, there is a misunderstanding and we will correct this sentence accordingly.

"In the section on methods for calculating the harvest the authors reported: "The grow-

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ing stock was taken from the FRA 2010 country reports, estimated for the year 2005 (FAO, 2010)." For which year estimate? the 2005? how 1990, 2000 and 2010 have been estimated? Why does this information is reported in the harvest section instead of in the deforestation one?"

RESPONSE: Data for growing stock was obtained from FRA 2010 as this is the most updated source (it is suggested in IPCC 2006, Table 4.5, Note to use FRA growing stock). Assuming that a country's growing stock value is quite constant in time the average growing stock value for 2005 taken from FRA 2010 was also assimilated to 1990, 2000 and 2010. Because of this, this information appears in the harvest section and not in the deforestation one. On the other hand, deforestation in each country was calculated multiplying loss of forest area in one year by weight average carbon stock in living forest biomass.

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