

## ***Interactive comment on “Chapter G2 Carbon emissions from land use and land-cover change” by R. A. Houghton et al.***

**Anonymous Referee #2**

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This is an interesting and relevant paper and I certainly enjoyed reading it. The novelties of the paper are for me the comparison of different approaches to LULCC emissions/removal estimation, the related discussion of current estimates and uncertainties, and the comprehensive way it describes known and unknown/remaining issues. There are not really any new data, but the synthesis and review is really the strength here. The paper has clear potential to be published but I have a few concerns that are described below.

The paper reads more like a book chapter. The overall structure is not so stringent and I had a bit of trouble following. Some sections (i.e. section 2) tend to be rather lengthy. Some are focused more on review and some more on actual synthesis. Maybe there should be one section on review (of data and approaches and estimates), one on the

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presentation of “open questions and missing issues” as done Sections 4-7, and one on synthesis and new/integrated analysis that actually generates new knowledge (i.e. as done in parts of section 1 and section 8 and should show how the authors got to the new data currently presented in the abstract). This could make it easier for the reader to follow.

Page 837, line 5-15 – needs references and the land/missing sink needs to be explained a bit more comprehensively because currently it appears like a loose statement.

Page 839, line 8 – this is a strong statement. Does it mean it will never be possible? Are the authors suggesting that all Kyoto LULUCF inventories are flawed?

Page 839 line 15 – definitions, of course always tricky but most important to be consistent. I personally have a problem with naming conversion from forest to cropland a land cover change, well in fact it is but it is also the classical example of a land use change. But OK, as long as it is used consistently. What I am missing is (in that context) a definition for land/forest management and versus forest degradation. It should be clear how they are separated since they play an important part in the later discussions.

Page 842, line 6- it would be good to add the reference to the recent FAO/JRC report on the global remote sensing survey that is described as was presented at UNFCCC COP 17 in Durban.

Section 1 and 8 and on the expert judgement on the overall uncertainty ( $\pm 0,5$  PgC/y). This is one of the key result but not very well explained well in the text (section 8 and table 2). I consider the authors as world-leading experts in the field so I am sure they can provide some additional reasoning for their assumption.

What about land/forest conversion to settlements, infrastructure (incl. hydropower), mining etc? – They can be quite significant in some parts of the world. Do we know anything about this in terms of magnitude and importance since emission factors and

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legacy effects can be quite different than for conversion to agriculture.

Figure 1 - if one shows figures they need to be explained. The “obvious” dynamics from the diagram is in 50's versus 60's versus 70's with magnitude much larger than for our recent more data rich times – this needs to be explained what is behind that – a natural or an anthropogenic phenomenon? Otherwise somebody may assume it is because FAO national statistics start in 1961?

Figure 2 – a) – e) should be explained in the figure caption (so far only 2c)

Conclusion – I think could be stronger in the following areas:

1) Highlighting the need for a data driven approach – this is somewhat done but we will see much more actual data coming in the next few years and these opportunities should be highlighted stronger since it is done in the manuscript itself

2) There needs to be a conclusion with respect to Table 2 – does this table help us to define priorities to be addressed – where are actual opportunities to do much better with more data and studies on the horizon? The authors do such a great job in sections 4-7 but the overall lessons learned from reviewing and analysing existing knowledge could be stronger.

3) Parts of the current abstract appears to be more as a missing part of the conclusion. I suggest to take a look into that and adjust.

Overall, I suggest that the paper can be published if revised. I hope my comments help to authors to develop an updated version of the manuscript.

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