

Interactive comment on “The carbon budget of terrestrial ecosystems at country-scale – a European case study” by I. A. Janssens et al.

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1) *The C losses from drained peatlands are based on old assumptions.* I agree that there are a number of individual (often eddy flux-based) studies where a positive C balance is reported. However, the estimates we used are based on literature reviews that incorporated many studies, not individual sites. Until a new literature review provides updated estimates I don't think it is appropriate to change the estimates. Furthermore, Eddy flux-based C balances are incomplete in peatlands because a major fraction of the C losses occurs via DOC leaching and not via oxidation to CO₂. Because flux-based C-balances will detect the CO₂ uptake and not the DOC losses, there is a serious danger that the reported C balances are not really C balances but CO₂ balances and these tend to be positive.

2) *Current forest sink due to uneven age structure or to harvest ratio? This has been clarified in the paper.* In fact, the first is the reason why NPP is high and the second

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says that not all of the extra produced wood is harvested. So, the second is dominant but only because the first is true.

3) *The text following: "It is important to realize that forest management is a key for understanding the Carbon balance of the forest sector ..."*. I do not entirely understand Marcus Lindner's comments here. We clearly specified that C-oriented management is necessary, that the entire sector needs to be included, and that it is mainly because of substitution effects that managed forests are C sinks. To accommodate the reviewer here, we tried to further clarify this section of the text.

4) *3.7.1 Protection of large existing C sinks is not convincing under European circumstances*. This is an irrelevant comment because in that section we were not discussing large existing **sinks**, but large existing **reservoirs**. This is a world of difference. Hence, we did not take this comment into account.

5) *Last sentence of abstract asks for protection of large reservoirs. How is it possible to avoid disturbances?* Basically, the main reservoirs that need protection are not the woody biomass, but the organic matter in peat, dead logs and soils. These can easily be protected by not draining, not removing dead trees, or reduced soil disturbance.

6) *The conclusions of the authors of how improved C management should look like are not well substantiated for the forest sector*. The objective of this manuscript was to focus on C budgets at the national scale. How exactly these should be improved is not the central theme of the manuscript. Via the sponge analogy, we merely bring forward the main fronts at which net C sequestration can be tackled.

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