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Earth Surface Dynamics Discussions

Interactive comment on "Short Communication: Humans and the missing C-sink: erosion and burial of soil carbon through time" *by* T. Hoffmann et al.

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We thank J. M. Garcia-Ruiz his positive and helpful comments on our manuscript. Below, we address his main concerns on the script:

I only would like a more profound presentation and discussion of the effects of soil erosion on vegetation and their possibilities to sequester carbon. Mediterranean landscapes show how soil erosion has wasted most soil (and consequently the previous C content has been stored in alluvial plains, alluvial fans and sea sediment), but plant recovery is very slow and never reaches the volume than before the period of soil erosion. Could the authors explain how this problem affects the carbon cycle in the short

and the long term?

We fully agree with JMGR that this is an important point. In response to this comment, we added a paragraph on the effects of Mediterranean soil erosion on the OC-cycle in chapter 4. We basically state that soil erosion in Mediterranean landscapes is an irreversible process and often results in complete removal of the soil with massive consequences for biomass production. At the end of the paper we also address this problem stating that long-term sediment and OC-budgets are very limited and that more quantitative data on the impact of human land use on sediment and c-fluxes are missing. We added several references to support our statements.

Nevertheless, it would be possible to include a reference (and maybe a comment) to the following paper?: Lal, R., Pimentel, D. 2008. Soil erosion: A carbon sink or source. Science 319, 1040-1042. This paper considers, with solid arguments, that soil erosion is mainly a carbon source. Although its perspective is very partial and considers the problem mostly in the short term, I think a reference to it is necessary.

The suggested paper is mainly a very short comment on the paper of Van Oost et al. (2007). Lal's argument that soil erosion is mainly a carbon source is much more detailed in his 2005 paper in Soil and Tillage Research. Therefore, we referenced this paper instead of Lal and Pimentel (2008) in an earlier version of this script. However, to highlight the ongoing discussion we added Lal and Pimentel (2008) without any extra comments on line 15, page 2. We hope that this meets the suggested comment.

Technical questions

We checked the references to account for the technical errors in the reference list.

Interactive comment on Earth Surf. Dynam. Discuss., 1, 93, 2013.