

Interactive comment on “The role of log jams and exceptional flood events in mobilizing coarse particulate organic matter in a steep headwater stream” by M. Jochner et al.

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Associate Editor review of Jochner et al., “The role of log jams and exceptional flood events in mobilizing coarse particulate organic matter in a steep headwater stream” for Earth Surface Dynamics

Bob Hilton, Durham UK

Based on my own review of the manuscript, I found this to be a potentially important contribution to our understanding of organic matter export from mountainous regions. My assessment agrees with the comments from the referees, who found it to be an interesting and useful piece of research. The paper uses a novel combination of: i)

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mapping existing log-jams and assessing the distribution of woody debris ages within jams using dendrochronology; ii) a wood tracer experiment run in the catchment over a period of several months, during which several moderate/large flows occurred. The findings were very interesting, with the distribution of wood ages appearing to link to previous exceptional discharges (Fig. 7) and the tracer analysis providing some detailed quantitative information on wood transport dynamics (Fig. 6). The authors place their findings in a wider context, and provide a conceptual model which expands on those formulated previously. Therefore, I recommend this paper for publication, and it should interest the wide readership across geomorphology at Earth Surface Dynamics.

However, the paper needs some work prior to publication. Both referees call for more attention to detail in several aspects of the experimental methods and results. They also call for more background, and broader range of literature to support the introduction.

I agree with their assessments (see comments below). Indeed, while I appreciate the succinct nature of the paper, more detail would be useful throughout the manuscript (including the abstract and results/Interpretation). With that in mind, I provide additional comments herein which should be considered along with the anonymous referees'. The authors will need to provide a detailed point-by-point response to the referees (and my own) set of comments and make a set of revisions to address these issues.

Other comments as they appear in the manuscript: Abstract: This needs a broader opening to make it clearer to the general reader what the issues are (why study CPOM)

174/4: Explain what techniques/measurements have been made to allow you to 'show...'

174/8: add '... in the Erlenbach' after 'transport'. Add 'appear to' after 'they'

174/12 Here the comments of referee 2 are relevant in terms of expanded literature

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sources needed.

174/16-17: I would prefer these be separate sentences, with a little more detail on the specifics of what the CPOM actually does. Plus, a mention of export as a carbon/nutrient export

175/2: Again, here references would be a useful addition.

175/12: can you explain more about these 'similarly strong relationships'

175/16-22: Here you need to explain what your study does differently, briefly mentioning the tracers and water discharge assessment, and the log-jam mapping (space and time). This will help the reader see what was done and highlight some of the novel aspects of this work.

176/8: Here, briefly explain what this previous work did (what was measured/quantified) and the questions which remain which this paper addresses.

176/16: It felt like it would be useful to have more 'To determine X, we mapped... etc' in this section.

176/20: Link to other methods used in published literature

177/2: Explain why these size fractions were chosen. I think it would be useful to compare these sizes to the measured distributions of wood exported by this channel (e.g. from Turowski et al., 2013).

177/7: Are the branches mentioned again?

177/8: As the referee notes, there needs to be more detail on this 'emission' strategy.

177/30: none of this chronology data is shown (apart from the residence time in the table). You need to at least provide some example of how this was done, and assessment of uncertainty in these chronologies.

178/6-9: While this does seem like a sensible conclusion, Smith et al., (2013) Earth

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and Planetary Science Letters, measure ^{14}C ages of wood in bank-landslide deposits of 1000 yrs and 4000 yrs. It would be useful to explain more cautiously and perhaps outline any implications of this assumption not being valid.

178/10-180/6: throughout this section I wondered if subheadings may be useful (e.g. 'Dynamics of log-jam recruitment', 'Dynamics of CPOM transport'. Also, the text jumps between the log-jam data and the tracer data, and I wonder if a clearer separation of these aspects (before bringing them back together) would be a better way to structure. (again subheadings could help here).

178/24-: It would be useful to explain some of these results quantitatively.

180/7: Have a 'Conceptual model' subheading here?

180/30: I think it would be useful and appropriate to comment on how these dynamics of OM transport correspond to clastic sediments. For instance, the processes described here could be analogous to coarse bed load vs finer particles which can be exported in the suspended load.

181/5-6: I think this is a bit strong worded. I would argue that this has not been fully assessed because we don't have the coupled data on wood transport and water discharge variability like you do in the Erlenbach. Please rephrase.

182/5: add 'derived from tree ring chronologies'

182/11-20: These management issues come out of thin air a little, no mention of them previously, and they are not well supported by literature from this field. Please reorganise.

Table 2: add a few words to the caption explaining that these events correspond to those over the tracer experiment (if I understand correctly)

Table 3: needs a (d) to explain that the final two columns come from dendrochronology. Given you use (a) as a notation, I would change the units to (yr) in the final two columns.

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Figure 1: why 'Upper' gauging station.

Figure 3: add a few words to the caption to explain what was emitted and what was surveyed.

Interactive comment on Earth Surf. Dynam. Discuss., 3, 173, 2015.