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# *Interactive comment on* "Sources and export of particle-borne organic matter during a monsoon flood in a catchment of northern Laos" *by* E. Gourdin et al.

**Anonymous Referee #2**

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Gourdin et al. present a detailed characterization of riverine organic carbon composition during a storm event in a small catchment of Northern Laos. The authors use gauging data, water isotope and electric conductivity to characterize the hydrological response of the river system to the storm event. They then use riverine particulate organic carbon characterization (%C, %N, d13C, d15N) along with a characterization of soil organic matter at the plot scale to propose a model of organic carbon mobilization during the storm event. The combination of detailed characterization of hydrological/erosion processes and particulate organic carbon flux and composition assessments is interesting as it has the potential to provide a mechanistic understanding of particulate organic carbon mobilization during storms. In that regards the paper would



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deserve publication in Biogeosciences. That said, I am a bit disappointed by 1) the lack of in depth interpretation of the organic carbon composition (d13C, d15N, C/N) and, 2) the speculative nature of the last part of the discussion (i.e. comparison of the May 2012 organic carbon yields with previous estimates). As a result, I recommend that the paper be revised before publication. Detailed comments follow.

General comments:

1) The authors claim that carbonate minerals are absent (and thereby justify not performing any acid treatment prior to organic carbon characterization) yet they mention the existence of "limestone cliffs" in the catchment. Even trace quantities of carbonates can severely affect the measured d13C, therefore the authors must demonstrate the complete absence of carbonate minerals.

2) The authors claim that rock-derived organic carbon is not present in their samples, yet they do not demonstrate it. There is quickly growing body of literature dealing with the concentration, composition and dynamics of rock-derived organic carbon in rivers and as such the authors need to seriously consider this component of the organic carbon pool.

3) The authors did not make the most out of their organic matter characterization. They measured 3 conservative tracers (d13C, d15N and C/N) but haven't really exploited these data. For instance I would like to see cross plots such as d13C vs. N/C and d15C vs C/N. These should be very informative regarding the source/nature of the organic matter.

4) The discussion of the temporal variation of the specific yields (section 5.2.3) is speculative. While it is possible that land use change explains the higher yield for the May 23rd storm the authors do not demonstrate it and other explanations (e.g. specific characteristics of the storm) cannot be excluded. I recommend deleting this paragraph.

5) It appears to me that there is a large (relative to the size of the catchment) tributary



BGD
11, C5224–C5226, 2014





that flows into the Houay Xon just upstream of S10. Given that the vegetation and land use in this sub catchment is drastically different (mostly old protected forest, see fig 1) one can imagine that the signal at S10 is dominantly controlled by the mixing proportions between the Houay Xon and this tributary. Interpreting the organic carbon composition at S10 would then require to at least characterize the composition of the organic matter in the tributary.

Specific comments:

P9346 L21-23: any idea what the C concentration in the sandstones and greywackes is?

P9347 L1 (and throughout the ms): please use degrees for slopes, not %

P9348 L10: give sample volume

P9348 L11: what does 100 degrees C do to the organic matter? There is a possibility that the most labile compounds would degrade at this temperature.

P9349: Please provide propagated uncertainty (i.e. taking into account precision and accuracy) for samples. Precision better than 0.1‰ for d15N is not common, please provide data supporting that statement.

P9350 L17-19: why are d15N values lower for surface organic matter?

P9351 L8-9: “that match topsoil organic matter composition” true at the beginning of the event, not so much by the end.

P9351 L9-10: “likely results from the preferential export of vegetation debris” is this supported by high C/N ratios?

P9354 L26-27: “high contribution of OF at this station” this is not that obvious when looking at the d18O – EF plot.

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Interactive comment on Biogeosciences Discuss., 11, 9341, 2014.