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Hydrology and Earth System Sciences Discussions

Interactive comment on "Fluvial organic carbon flux from an eroding peatland catchment, southern Pennines, UK" *by* R. R. Pawson et al.

Anonymous Referee #2

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General comments: I believe this manuscript falls within the remit of the journal. This paper can be of broad international interest. The work is significant at this time with concerns over peatland degradation and losses of soil from the carbon pool. The manuscript is well written and concise. Overall, this paper contains informative carbon flux results from these degrading peatlands, particularly in terms of the magnitude of POC and DOC losses during storm events. However, the prediction of annual fluxes from the limited winter/spring dataset is more problematic and may require major re-interpretation, particularly as there are numerous flux estimations in the literature from studies that cover the whole annual cycle, although not necessarily from heavily eroding peatlands.

Specific comments: I feel the field sampling and data for short term variability are

the strongest parts of this paper and has generated some interesting results, particularly in terms of POC concentrations and short-term temporal changes during storm events. However, the annual flux calculation is limited by the winter/spring sampling field sampling protocol. It is known that during the summer months, DOC concentrations increase at a certain discharge compared with a similar discharge in the winter. It is possible the pH-DOC relationship could also change seasonally as well, hence limiting the calculation accuracy of the annual fluxes. In addition there is large variability for samples below pH4, which could bias the data as this is when higher concntrations of DOC tend to occur.

Two separate filters were used in the laboratory methods for separating carbon fractions: a suspended sediment fraction $>$1.2 um and a DOC fraction $<$0.45 um. What happened to the C fraction (possibly containing colloidal and particulate carbon) between these two filter sizes?

It is stated in the methods section that water samples were extracted using a range of methods throughout 2004-2005 and yet Table 1 refers to 2006. In addition, I assume the quasi-continuous field dataset was every 15 mins as referred to later but this should be explained more clearly (p724, line 2).

Enhanced carbon flux from eroding catchments may extend beyond particulate export to DOC (p731- lines 20-23). However, literature values of DOC fluxes from small headwater catchments in NE Scotland have shown values between 122-215 kg C ha-1 y-1 (Dawson et al., 2004 Biogeochemistry 70: 71-92, 2004). These are similar to the proposed values obtained in this paper (199 kg C ha-1 y-1).

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 719, 2007.