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Hydrology and Earth System Sciences Discussions

Interactive comment on "Heterogeneity of soil carbon pools and fluxes in a channelized and a restored floodplain section (Thur River, Switzerland)" *by* E. Samaritani et al.

Anonymous Referee #1

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General comments:

This is an interesting paper that examines a relatively neglected aspect of heterogeneous floodplain ecosystems: spatial and temporal variability of soil carbon. The paper contrasts a rehabilitated reach of the River Thur with an adjacent engineered reach as a control. The identification of broad Functional Process Zones was an interesting approach and is very appropriate within such a system. The research design and methods are robust and replication is satisfactory. The data seem sound and the analysis is appropriate and well-conducted. The manuscript consequently represents a substantial contribution in terms of the data presented, and the evidence that rehabilitation

methods such as those employed on the Thur can lead to an increase in functional heterogeneity. The paper is very well-structured and written. I would consider it to be a very good contribution and deserving of publication in HESS, and have only a few minor comments:

Specific comments:

âĂć I would have liked to see some hypotheses underpinning the paper – although there is not a great deal of research in the area, the development of broad hypotheses to be tested using the empirical data collected would have helped to direct the discussion. However, the paper works well without these so this is not an essential modification.

âĂć The discussion is good and covers all the major topics – however, given that the aim of the paper as stated (p. 1064) is within the context of ecosystem services, I would have expected some discussion of the significance of the findings for key services in the discussion.

âĂć It would have been interesting to see the PCA demonstrating 'completely different characteristics' of plant species composition in the 'dynamic' FPZs compared to the 'stable' ones. Was this left out only to save space? I think it would be a useful addition, with some brief discussion.

âĂć For Table 2, is it possible to statistically test whether the coefficients of variation differ significantly between the FPZs?

Technical corrections:

Page 1062, lines 6-10: This opening paragraph needs some references. They are general statements but still require some acknowledgement of the literature.

Page 1063 line 1: insert 'consequent' in front of 'rehabilitation'.

Page 1063 line 6: remove 'the' before 'embankments' and before 'flood levees'

Page 1063 line 10: ‘tightly linked to organic C dynamics in riparian soils’ – this statement needs a reference.

Page 1066 line 15: ‘the growing season 2008’ should be ‘the 2008 growing season’

Page 1066 line 18: ‘topsoil samplings were’ should be ‘topsoil sampling was’

Page 1071 line 5: insert ‘and’ before ‘those’

Page 1073: insert ‘us’ after ‘allow’

Page 1074 line 29: competitive species tend not to dominate in high degrees of disturbance, rather ruderals do, so this line should be clarified.

Page 1076 line 24: change ‘samplings’ to ‘samples’

Page 1076 line 9: ‘content of fine soil’ would be better as ‘fine soil content’

Page 1076 line 22: change ‘evidences’ to ‘observations’

Table 1: can you check the superscript letters, they don’t quite seem right to my viewing.

Table 3 caption: ‘samplings were’ should be ‘sampling was’ – ‘all samplings’ should also be ‘all sampling’

Fig 3 caption: ‘each are represented’ should be ‘each represented’

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 1059, 2011.