

## ***Interactive comment on “River flooding as a driver of polygon dynamics: modern vegetation data and a millennial peat record from the Anabar River lowlands (Arctic Siberia)” by R. Zibulski et al.***

**Anonymous Referee #2**

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The manuscript presents a study of polygon development in the floodplain of the Anabar river in northern Yakutia, Siberia. The authors analysed multiple proxies in C14-dated sediment cores along a transect across the polygon, including pollen, diatoms, macrofossil remains, and several geochemical parameters. The present day pond vegetation was also analysed in a botanical survey. Overall, this is an interesting and novel piece of research, which aims to fill in the gaps of knowledge over polygon dynamics in the past, its main driving forces and vegetation composition. Although several palaeoecological studies from this area have been recently published elsewhere, Yakutia floodplain polygons have yet not received scientific attention, which they, by no means, deserve. The manuscript is generally well-written barring a few awkward

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sentences, which require changes – I have highlighted these in the text.

However, my main concern with this study is the overall suitability of the presented sediment cores for palaeoenvironmental investigation. The sedimentation process in the polygon might have been disturbed by at least two processes. Firstly, it is severe river flooding events (the evidence of which is discussed by the authors); secondly, it is the ice, which certainly touches the sediment surface in winter and therefore disturbs it. In addition, there is a high possibility that thermokarst processes have also affected sediment formation. The <sup>14</sup>C dates are clearly not accurate, so there is no confidence at all that the process of sediment formation in this shallow pond has been undisturbed. The authors need to be able to prove first that the sediment stratigraphy is reliable before proceeding with the discussion of the results.

I do not think that the manuscript may be published before the sediment sequences' suitability as palaeoenvironmental archive is reliably proved.

Generally, it is well established that <sup>14</sup>C dating is not entirely suitable within the last 500-1000 years. Since humans started burning coal, the older carbon became incorporated in the younger sediment layers that has obviously lead to the occurrence of older dates in younger sediments; that phenomenon was also clearly shown in this study. It is therefore advisable to apply other dating techniques, for instance, <sup>210</sup>Pb analysis, to date recent sediment sequences. I strongly suggest that the authors attempt to date the upper part of their sequence using <sup>210</sup>Pb. There are also several minor comments, please see below and the attached copy of the manuscript.

Methods: a section on statistical procedures used, e.g. NMDS analysis, is required. p. 4072, line 10. Reference is required to Braun-Blanquet classes and floristic approach

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/10/C1421/2013/bgd-10-C1421-2013-supplement.pdf>

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