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Earth Surface Dynamics Discussions

Interactive comment on "Late Holocene channel pattern change from laterally stable to meandering caused by climate and land use changes" *by* Jasper H. J. Candel et al.

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The paper on "Late Holocene channel pattern change [. . .]" by Candel et al. reports on the use of floodplain stratagr. records and chronologies to conduct a quantitative assessment of (paleo)hydrological channel planform change over the past 600 years in the NE NL. At a general level the manuscript is organised, the introductory sections provide background to the research, and give sufficient detail of the used methodology. The methodological approach and the subsequent evaluation of obtained results are based on a strong research effort, and the discussion puts the work in the context of previous work and addresses potential implications. All of which fits the journal's

scope.

All in all, the ms represented a valuable contribution to ESurfD, however, in its current form it requires restructuring and (partially) rewriting at the paragraph level. Regarding given standards a number of statements are misplaced. For example, the Results section includes discussions of the findings, which is why the actual Discussion mostly reverts to a sometimes narrative analysis. The weakest sections, thus, are the Discussion and the Conclusions wherein some thoughts brought up and connections that are sought to be made should be reconsidered with respect to whether they actually add to the paper's significance. In consequence, the abstract should be rewritten because it is not reflecting the actual paper content (and the balance of the featured aspects), and the highlighted findings are not supported by the employed methodology. At places abundant in-text citations in the Introduction can be perceived as a bit too excessive.

Key: rm - remove; rw - rewrite/reword;

p1: Title: Actually, the paper does not include hard information that allows for pointing to the actual causes of the described channel change. In the paper, a number of (truly) possible and plausible causes are mentioned but no conclusive evidence can be shown that helped to causally link channel change to either or both of the drivers. Why not highlighting the strength of the paper, the application of quantitative palaeohydrological approaches to answer the actual research question?

13 - The Abstract . . . "related to changes in climate and/or land"

15-18 - Results are reported before the actual scope of the paper is given. And the approach is only explained later on. Rearrange to present a logical flow.

18 - Actually, no potential causes have been investigated. This is misleading information. Only other people's work is cited in the Discussion when attempting to explain what possible causes have been around. The nature of that discussion, nevertheless, remains speculative.

28 -29 - 'reflecting relative . . .' this statement should be rephrased because it it ambiguous, and overall not intelligible when only reading the abstract.

31 - The last sentence is not specific to the paper content, rather will appear like a motherhood statement the the journal's audience. Remove and replace it by strong statements that stress the significance of the own findings. The reason for the weak end of the Abstract, my guess, is the underdeveloped Conclusions section (see below).

34 - 'Several . . .' Sentence can be deleted.

p2 5 - In a braided river system, isn't the temporary presence of laterally stable/migrating channels (runnels) just a matter of stage at a time?

7 - ' variables like potential . . .'

7 - rm: ', which is . . . slope'

8 - '2011), bank erodibility (. . .), cohesiveness (. . .), and by vegetation (...).'

9-10 - rm: 'which is . . . (Turowski, . . .)'; 'that can increase . . . '

6 vs 11 - Statements contradict each other

13 - rm: gradually

13-19 - shorten para

23 - rw: 'the exception is formed by human intervention'

23-34- This para does not fit in here. The surrounding text provides background information that should translate into the 'gap' and clearly formulated research goals, however, this para explains processes of channel change. Could be moved together with p2 10-18 to line 18 on p3.

33 - Excessive citing . . . Can the information be organised into a table?

p3 11 - It feels as if already here the paper's research question is addressed, but the

authors then return to reviewing literature.

19 - Shouldn't the information be part of the first para on p3?

20 - '.. stable channels poorly preserve except for . . .' rm all the rest between 21 and 25

31 - ' Huisink, 2000) while the meandering pattern has remained throughout . . .'

33 - rm: 'However'

p6 14-16 - This needs to be moved to the Intro. There, it was already used to justify the research effort. In general, most of the content of p6 should be part f the Intro because it is the background against which the present investigation can be justified. (I.e., it's potential value to inform restoration projects.) This is even more important as this point is picked up in the discussion s one of the more significant implications . . .

34 - In far can could the used features by local peculiarities due to their peculiar morphological context?

p7 7 - First sentences should not lead the Methods sections. Stating the paper goals belongs to the Intro.

7-21 - The whole para is a mix of review (again) and methods description. Needs to be rectified. Fig. 2, A - B - C designation is hardly readable.

p8 6 - r: ' (i.e. the full ..)'

11 - Estimating a statistical parameter for which others apply stacks of sieves by just visual(?!) means? That might work depending on what the information is used for. For me this is a point for of major concern. Actually, the D50 value is key to the calculations performed employing eq. 8, 10, 12, 15, and 16.

While in general the methodology also accounts for ranges or error, I am not convinced that the 5% uncertainty is fair for this error-prone guesstimate. How good (=reliable,

=reproducible!) can the far-reaching conclusions drawn be? (E.g., see fig. 10).

17-19 - rm: 'GPR . . . 2011).'

29 - replace: over -> with

30 - What sort of laboratory prescriptions (= 'instructions')? Sounds like voodoo science, doesn't it?

33- rm: the

33 - rm: 2nd sentence

35 - 'The scroll bars' . . . can be removed, or reword, or ..

p9 18 - rm: first sentence

21-22 rm: whole sentence, it's just nomeclature

31 - Why 5%? Can you justify this? Still a rather optimistic estimate.

p10 Insert space between Fig. 3 and the text. The figure even may be left out.

p11, 12 Nice figures. However, would it work for people who printed it in B/W?

p14 29-32 - How was D16, D84 determined? Also visually? From the waterlogged sands that spread to either side when the sample material is pushed out of the Vander-Staay tube? I think this is a soft point of the methodology, in particulary with respect to the heavy mathwork that follows to nail physical, hydraulic parameters of in-channel water and sediment flow.

p15 15 - State what was actually used here. Rather an issue of the methodology than a result.

27 - New para.

p16 28-33 - rm: 2nd sentence

p18 All in all, the whole Methods section could be more concise, focused. It would be worth to focus on the most important aspects and move the remainder to the Appendix.

p19 6-11 - Reword.

10 - rm: 'Such a clear . . .Prathoek'

11 - rm: last sentence

20 - rw: abundant above

Whole section 4.1.: Commonly, the ordering of geol. units is from old to young.

p21 22-28 - 'Palaeochannel . . .' All this information interprets the findings. So it has to be moved to the Discussion.

p23 Are all the diagrams necessary? Criterion: To which extent are they covered by the text?

p24 11- p25, line 5 All this information interprets the findings. So it has to be moved to the Discussion.

p25 19 - Reword.

20 - rw: reached -> crossed?

Fig. 9 - Merge with Fig 8.

p26 6-11 - All this information interprets the findings. So it has to be moved to the Discussion.

16-20 - All this information interprets the findings. So it has to be moved to the Discussion.

p27 It is hard to read out information from figure 10c To much included into a single diagram. Simplify!

p28 I am not sure whether this is essential to the paper's scope . . . I see some potential

to shorten the paper by moving this to some Appendix.

p29 20 - rm: 'by a factor ..' Do not repeat results already reported on earlier. Instead, conduct a more clear-cut write-up of the obtained results.

21 - This gives a minimum age (only). And only for a strong phase that has never been stronger afterwards. That is, the meandering may have been triggered at an earlier point in time, but the pertinent strata was just cannibalised by the denoted activity.

22-23 - A strong statement. Still, is it actually supported by the calculated data given the inherent uncertainties? What if sediment transport rates (?quantity per unit time) was constant from an earlier time on? Isn't it possibly the same phenomenon as with terminal moraines? The most distal ones mark the last phase immediately before the 'dynamics' decreased. So they mark the onset of the decline. See the all the diagrams from 8 to 10, they all suggest a progressively declining meander activity.

p30 5-9 - Is perceived as speculative. Remove.

16-23 - Only speculation. Remove it, it is not connected to anything based on your methodology. Also, using climate data from the current climate normal carries a strong signal of climate change with characteristics being different from the pre-1980 period. The relationships that are constructed here are, therefore, very questionable.

Section 5.2.2 - Interesting, but how does it immediately relate to the methodology that was used? All the information is good for is to point out future avenues of research to clarify causes of what you observed on the floodplain (only). So this section should be shortened, dissolved, and merged with the hints that can be made regarding the role of post-Middle Ages climate fluctuations.

p32 14-26 - All of this only repeats content of the Introduction. Actually, there it was used to justify the research undertaken. But its occurrence in the context of the Discussion section means that is an outcome of the study? Delete the section.

27-33 - . . . and therefore this para should be part of the Intro. There it would add to

provide a logical flow of justifying the research question in view of previous research.

Section 5.5. River management and restoration This section mostly reiterates commonplaces about fluvial morphology and stream restoration works. If you would like to keep it, then thoroughly rewrite it by making connections between your own findings and what they'd mean for the management and/or restoration efferts mentioned in section 2 (case-based!). And include a the pertinent background to that in the Introduction. This topic is actually adding significance to the present research, even though the methodological approach as such is not necessarily novel. Try to link your research to the current debate on the meaning of 'natural rivers' and stream restoration goals (e.g., Brown et al., 2018, ESR).

p33 The 'Conclusions' - Are no true conclusions but yet another summary of the main findings. Moreover, what was discussed as possible causes and mechanisms in the previous section now is phrased as it was an evidence-based outcome of the study. Here, another complete rewrite was required.

Reduce # of in-text citations (adding too many citations does not add credibility): p2 - 8, 15, 17, 29, 33 p3 - 9 p6 - 15 p8 - 18 p30 - 32 p31 - 7, 15, 20 p32 - 19

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