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# *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.

**Anonymous Referee #2**

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The manuscript "Late Holocene channel pattern change from laterally stable to meandering caused by climate and land use changes" aims to identify river channel pattern changes using sedimentary and geochronological data and to identify causes for these changes. The manuscript is well written, the topic is relevant and in the scope of the journal, and the concepts and ideas are sufficiently novel. The methods are consistent and well described. There are some minor to moderate shortcomings, listed below. When these shortcomings are resolved, I consider this manuscript as a valuable contribution to Esurf.

- Some sections are written too extensively, and not all information is needed to answer



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Discussion paper

the research questions. For instance, the details on river restoration in section 2 are not needed and can be limited to a minimum. Also section 5.4 and 5.5 can be shortened.

- Section 2 (study area): P6, L29-37: A lot of assumption are made in this part. I suggest to move this part to section 4.2 (results). And then in section 4.2, you have to provide all available arguments to state that channel X is predating the meandering phase. Show data to support your statements (eg show the GPR profile). You have to provide good arguments to state that channel X is from a laterally stable phase, since this is an important point for the rest of the story.

- Section 3.1 is not needed to my opinion. Aims are already explained in section 1 (Introduction); methods will be described in detail in the next paragraphs (3.2 and next sections).

- P9, line 29: How did you define the knick-point on the bank? What will be the effect on bankfull depth and discharge when using a different knick-point on the bank? You can try a sensitivity analysis to check the effect of the definition of the bankfull depth.

- P9, line 31: Why a standard deviation of 5%? Which arguments do you have? This is an important point, since large parts of your interpretations are based on this standard deviation. If you assume a standard deviation of 10 or 20%, it is possible that your differences explained in figure 8 are not so clear anymore. Can you provide a consistent method to define the standard deviation? Also here, you can try a sensitivity analysis to check the effect of the standard deviation.

- Same question for P10, line 9.

- Section 4.1: You can summarize this section in a table showing the most important characteristics of the different lithogenetic units. The table can then be followed by a short paragraph on defining the scroll bars and scroll bar dimensions.

- Section 4.4: L11: Use statistical tests to check if the reconstructed discharge differs significantly. Given the uncertainty range it is possible that you can not reject the null

hypothesis (Q does not differ). The same for L13: 'Q drops relatively fast at 1800 AD': Given the uncertainties, it is possible that Q is not significantly different. Use statistical tests to support your statements.

- P 29, L20: It is also likely that the discharge does not differ significantly, given the uncertainties. See my previous comment.

- Section 5.2: This section mainly brings together results of previous studies and it is not based on new data. So this section should be shortened and should link better to your own data and findings. Try to better link quantitative data on climate change and land use changes with your findings.

- Section 5.2.2: Is there an observed increasing in urbanization in your catchment? Urbanization can cause higher peak discharge, which have been described in catchments in The Netherlands.

- P31, L6 and L11: 27% of the catchment was covered with peat + yearly average discharges can increase by 40% => ca. 11% increase in average discharge for the entire catchment. How does this compare to your reconstructed increase in discharge?

- P 31, L 29-31: "Our data strongly suggest": not correct. As you stated in section 5.2 it is likely that the increasing discharge caused the change; you have some good suggestions but no hard evidence. "The most likely identified causes": actually these are the only factors checked. You did not checked other contributing factors.

- Figure 4: Indicate the location of the datings on Figure 4e.

- Figure 10c: this figure is not entirely clear. The dashed lines do not help. Try to simplify this graph to make it more clear.

- References: For some references, correct volume, issue and pages are missing: P36, L5-6; P36, L24-26; P36, L56-57; P37, L40-41 (I may have missed more).

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