

Interactive comment on “Morphology of the Kosi megafan channels” by K. Gaurav et al.

K. Gaurav et al.

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Referee comments in black text

[Authors's response in blue color text](#)

General comments: In this paper channel geometry in the Kosi megafan is analyzed. A very interesting topic is addressed, specifically the morphology of channels in the braided network of the present Kosi River and that of single-thread channels found in other sectors of the fan and in the downstream sector of the Kosi River. The work is to the point, but some sections would need significant improvements, for instance it would be useful to separate "Results" from "Discussion". I have some concerns about some key assumptions that may affect the whole dataset and, therefore, results and conclusions.

(1)P. 1026, L. 7-8. “these channels appear in the remnants of the Kosi River past

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courses”: is it correct to consider these channels as “single-thread” or they are just old branches of a braided network? I think this is a crucial point because the general aim is to “...to compare single-thread channels with braided threads...” (P. 1025, L. 8-9): if all the seepage channels (see Table A2) are branches of an old braided network, are these channels still an appropriate sample for the comparison?

[The reviewers is right. One potential issue is whether the morphology of fan channels, that are today single thread, is inherited from its probably braided origin or if it corresponds to present day conditions. One simple answer was to add a picture of a sapping channel that exhibits high meander loops. To our knowledge such morphologies are the typical signature of a meandering river that has totally reshaped the channel bed. Second the channel sinuosity can help us assess this issue. We discuss this issue in the results section.](#)

(2) Definition of channel width in the braided network. This is another crucial point for the whole work. The authors recognize that this is “...a somewhat arbitrary procedure” (P. 1028. L. 10). I think that it should be better justified the choice of considering as bar the area where water depth is less than 10% of maximum channel depth. I do not understand if this definition is stage dependent (i.e. maximum channel depth at time of measurements) or not (i.e. considering the top of the bars). In any case, this procedure produces large channels and small bars: I am wondering how channel geometry, specifically aspect ratio, would change using different procedures. Besides justifying better the choice of the procedure adopted, it would be useful to test if other procedures for channel definition would lead to the same results.

[We agree with the reviewers' point. We developed an objective automated method to select bars and channels as suggested based on a given percentage of the maximum channel depth. We tested thresholds between 10 and 20% of channel depth and found that a selection threshold between 15 and 20 % was capturing all the bars and threads](#)

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that were seen on the field. Above this threshold the size of selected channels is altered and significantly departs from the size that can be measured manually whereas below this threshold some threads were not captured as many of the bars were submerged during the measurement period. The use of an automated procedure ensures minimization of biases inevitably induced by manual selection of threads.

Specific Comments: P. 1026, L. 9. When referring to two or more works, it would be better to use a chronological order; this comments applies also to other citations in the manuscript. Tables A1 and A2. It is not clear to what point in the cross-sections latitude and longitude refer to. P. 1027, L. 19-22. It should be justified better why the distance of 7 km or more was selected to estimate channel slope. It seems to me a large distance. I am not sure the in Table A3 "start point" and "end point" are really needed: maybe just one point for grain size sampling could be sufficient.

P. 1026, L. 9. We changed references accordingly.

P. 1027, L. 19-22. The along stream slopes of the channels are very small this is why we measured them on a long distance profiles. Doing this on smaller distance would have led to large uncertainties in the values of slope.

Table A3: We have modified the table.

Technical corrections:

P. 1024. L. 25. “. . .within the same channel”: not clear P. 1026, L. 22. "pulses" instead of "pusles"

We explained in more details the difference between channels and threads in the introduction. We corrected the typological error.

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