

## Associate Editor Comment Responses

I have reviewed the revised manuscript and the reports provided by three reviewers. I find that the authors addressed many of the concerns raised by the reviewers, but the following points require additional thought and modifications by the authors.

1. Please provide more information in the manuscript on channel mapping and image acquisition. Reviewer #1 (Dr. Shaw) asked for more information on how channels were mapped and for you to provide the shapefiles in your dataset. The information provided is insufficient to understand how this extraction/mapping was done and what its limitations are. What is the resolution of your imagery? What is the lower limit of channel widths you mapped? How were land-water boundaries identified to determine channel widths? These are just some examples of the details needed here. Related, in response to a later comment by reviewer #2, you note that imagery on large systems is often mosaicked. I agree, but in this case we have no information on the imagery you actually used, so no way of knowing if it was mosaicked or composited or not. You need to specify your image source and its details in the manuscript and justify this choice for this application. If the authors simply used a basemap, this requires careful justification, as one of your key metrics involves channel width that is highly dependent on river stage. I would also strongly encourage the authors to include the channel network shapefiles in their dataset to ensure their work is replicable.

We have added additional information on channel mapping methodologies and image acquisition in the Methods section. The ESRI World Imagery basemap, with a spatial resolution of up to 0.5 meters per pixel, was used to map delta and fluvial fan channel networks (Methods 3.5). This resolution allows mapping of very narrow channels, with the narrowest observed channels being 1-m on fluvial fans and 2-m in deltas (Methods 3.2). We recognize potential confusion regarding land–water boundaries and have expanded on this in Methods 3.2; Figure 4d has also been updated to illustrate an angle measurement between an active and a paleo-channel, clarifying our measurement methodology. We additionally included limitations of our data collection methods, such as uncertainty in measuring narrow channel widths and potential inconsistencies in channel paths when manually tracing long, narrow, or highly sinuous channels. To support replicability, we have included some shapefiles of channel networks on GitHub. Unfortunately, many of the earlier files are spread across multiple computer systems, and some were lost after an undergraduate student-researcher graduated. We will continue to recover and add available shapefiles to the repository during the review process to ensure that the review and publication timeline is not slowed.

2. Please provide additional information in the manuscript to distinguish the processes that form fluvial fans vs deltas and how this was determined a priori in picking sites for this work. Reviewer #2 (Dr. Chamberlin) asked for this clarification, but the description in the text is quite brief. More information is required to convince a reader of these distinct landforms and the processes that form them before your analysis.

We have expanded Section 2.2 to provide additional detail on the processes that form fluvial fans. In Section 3.4, we now include the original criteria from Hartley et al. (2010) to distinguish coastal fluvial fans from deltas. We also added clarification that, in this study, we require visual confirmation that the channel network represents a paleo-channel system, in contrast to deltas, which display active discharge in satellite imagery. Finally, we test the robustness of our classification by comparing the morphometrics of fluvial fans with lake and ocean terminations against those with terrestrial terminations.

3. Please reconsider specifying 'mouth bar bifurcations' instead of just 'bifurcations,' as suggested by Dr. Chamberlin. If you just look at your networks on their own, all of them have bifurcations. A bifurcation is purely a geometry or a part of the topology. All of the bifurcations did not necessarily form via avulsion, but they are all bifurcations, so the terms you have chosen to distinguish these are not equivalent. I find this choice confusing and it distracts from your story.

Thank you for this suggestion. We acknowledge the potential for confusion, which likely arises from differences in how these terms are used across disciplines (e.g., sedimentology vs. geomorphology). To address this, we now specify “mouth-bar-driven bifurcations” instead of simply “bifurcations” where the term is used as a process rather than geometry. We removed the previous process-based definition for “bifurcations”.

4. I appreciate your changes to Figure 8, but it now has typos in the caption. Please also label the columns in the actual figure to specify that the left column of plots is for deltas and the right is for fans. I also suggest moving the legends to avoid confusion, as they are currently aligned with the rows.

We have addressed the typos in the Figure 8 caption. We have also labeled the columns to specify that the plots on the left are “Deltas” and “Fluvial Fans” are on the right. We also moved the “Deltas” and “Fluvial Fans” legends below the corresponding columns.

5. Please revise your network maps. Reviewer #3 asked for some changes to figures to improve clarity. I understand that the network maps have both a color and a line thickness scaling with channel order, but the line thickness changes are far too subtle. I did not notice them until you pointed it out, and this information is not in the figure captions. I suggest making the thickness changes more drastic and also including a color scale to show the changes in channel order. It does not have to be quantitative, it can simply scale from red to purple and go from lower order to higher order.

We have significantly increased the line thicknesses in higher order channels for the channel network maps in Figures 1 and 2 in order to make the contrast with higher order channels more drastic. In addition, we have added a legend below each figure that shows the color corresponding to each channel order as well as the relative line thicknesses. These changes improve the clarity of the maps and make both the color

and thickness scaling of channel order more apparent to the reader. We have also increased the line thicknesses on Figure 4 as well.

### **Other Editor Comments**

1. Regarding figure S4: copyright statement is unreadable. Take care of a clear, high-quality image before publishing.

We have removed the illegible watermark and left the citation in the figure caption consistent with the other figures and in alignment with ESRI citation policies.

2. When revising your manuscript, please add a section "Author contribution", see also: <https://www.earth-surface-dynamics.net/submission.html#manuscriptcomposition>

We have now included a "Author Contribution" section to the manuscript.