

Interactive comment on “Deriving principle channel metrics from bank and long-profile geometry with the R-package cmgo” by Antonius Golly and Jens M. Turowski

Anonymous Referee #1

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The manuscript submitted by Golly and Turowski presents a very useful tool to extract river metrics, such as channel width. This parameter is required for many studies, as pointed by the authors. Therefore, the topic is of interest and might fit with the journal scopes. There are already other tools available to extract the same metrics, and the authors reviewed some of them, but it could be very interesting to actually test the tool developed by the authors (showing some validation data) and also compare it with the other available tools. As this is a scientific manuscript submitted to a scientific journal I think that the evaluation of the performance of the tool, and the comparison with existing tools would be more interesting for the readers than all the details about the coding. Technical details are provided in the tool user guide, or

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accompanying documentation, and can be also provided as a supplementary material, but in my opinion, it should not be the main core of the manuscript. Instead, authors may provide some details about potential applications, etc. I would recommend replacing the Codeboxes by figures illustrating some of the issues presented and discussed in the manuscript. Although readers might be familiar with the term, GIS should be defined before using the acronym (e.g., line 35). Lines 50-51: give some references here with some examples or relevant works illustrating these efforts. Line 60: what do the authors mean by “without providing spatially resolved information”? Please explain what type of information is missing. Line 67: what type of manual post process is required? Line 68: details are poorly documented? In general lines 67-69 are very strong statements, I would recommend to smooth them a bit and maybe explain better what the problems with this tool are. I personally have used most of the tools mentioned in this manuscript, and I have realized that they usually need some additional verification or manual correction, but I would not say that the assessment of the data quality is limited. The verification of the output can only be done with field measurements or comparing the automatic result with manually digitalized data. When this data is available, verification or assessment of data quality is possible. Did the authors actually test their tool? If so, they should provide the validation data, if not, I would recommend to do that. In general, as I said, I miss some comparison between the tools. Maybe one example can be shown in which the authors test all tools and give some values of computational times, input data needs, and some comparison between the outcomes. A table can summarize the results of this comparison exercise. More importantly, authors have missed some important tools in their short review: the fluvial corridor toolbox, the Stream Restoration Toolbox (NCED), RivMap and the River Bathymetry Toolkit (RBT). I strongly recommend the authors to check these tools and the documentation and add some text about them. Again, it would be very interesting to add also these tools to the comparison exercise. A Table with the summary of all the available tools would be very useful for the readers. Here some useful links and references: Schwenk, J., A. Khandelwal, M.

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Fratkin, V. Kumar, and E. Foufoula-Georgiou (2017), High spatiotemporal resolution of river planform dynamics from Landsat: The RivMAP toolbox and results from the Ucayali River, *Earth and Space Science*, 4,46–75, doi:10.1002/2016EA000196. <https://ch.mathworks.com/matlabcentral/fileexchange/58264-rivmap-river-morphodynamics-from-analysis-of-planforms> Roux, C., Alber, A., Bertrand, M., Vaudor, L., Piégay, H., 2015. "FluvialCorridor": A new ArcGIS toolbox package for multiscale riverscape exploration. *Geomorphology*. doi:10.1016/j.geomorph.2014.04.018 <http://umrevs-isig.fr>. www.sedalp.eu/download/tools.shtml https://repository.nced.umn.edu/browser.php?current=keyword&keyword=5&dataset_id=15 <http://essa.com/tools/river-bathymetry-toolkit-rbt/> <https://www.fs.fed.us/rm/boise/AWAE/proje>

Why not using a tool extension for an open source GIS? Besides the limitation of using a commercial GIS, it is not very clear why the authors chose a statistical tool. Nowadays, there are open source GIS that can also fit with the requirements of independency, transparency and functionality. Some explanations or at least discussion about this could be useful. Line 83: I would suggest that authors explain a bit better what are the limitations of these tools. Especially the description of the limitations in lines 87-92 would require some additional explanations and data or examples to support the authors judgements. Some information about the type of input data could very useful, such as the number of points or resolution (distance between them for example) that is required or desirable to interpolate correctly the polygon from the bank points. This is only partially mentioned in lines 339-341, but no details or suggestions are provided. Why using bank points and not bank lines? If the input data is obtained by aerial picture interpretation for example, instead of by GPS survey in the field, the resulted data would be a line to represent each bank, or even a polygon representing the channel. Are these input data format allowed as inputs to the tool? Figure 1: instead of using a, b, c. . .g, the steps could be indicated (as in Table 1). The spatial scale is not needed in all maps. Line 97: again the claim that other tools are not transparent or objective should be used with caution. I guess all these tools were also developed to be useful, reliable and they are still used by many researchers. Line 123: how is the centreline

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smoothed? What is the difference between smoothed and non-smoothed centreline? Some more explanations here would be beneficial. I think smoothed line is needed here because the initial input data are points, and therefore the conversion from these points to lines creates bank lines with sharp edges. This would not happen if the initial input is the digitalized bank for example, or would be reduced if the number of points is large enough. This aspect should be discussed more in detail. Line 129 (and also before), how are the Knick points defined by the authors and identified by the tool? And what about the abundance of species? There is not explanation about these aspects, authors may provide examples to illustrate them. This paragraph is again repeated in lines 226-227, but again no explanations are provided. Lines 206 and 224: how are these values selected? Some guidance would be useful. Regarding the smooth see also my previous comment for Line 123. Lines 235-241: Is it not possible to select the distance between transects, instead of using the centreline points? I think this would be very useful. This could be done simplifying the centreline to one single feature line and then drawing the transects to a selected constant distance, or maybe defining the total number of transects. Lines 241-248: I am not so sure about the assumption that the right bank is the right one with respect to the centreline, this would depend on the river orientation. This should be identify for each case, for example using the elevation values stored in the bank points, or selecting the point upstream and downstream. Otherwise, would be confusing to use the terminology right and left, as for rivers this is given always in the downstream direction. Section 4.3: some of the described outputs could be illustrated in a figure here. Line 305: I think the sentence in blue and in German should be removed. Figure 4: a legend is missing in the figure, although is explained in the caption could be useful to add it also in the graph. Moreover, it is not very clear to me how the tool computes the time series. I understand that it needs a reference centreline, but then I would say that it uses the centreline for each survey and computes the differences between them, right? I would suggest to better explain for which applications the implemented method is suitable (river widening? Meandering migration?) and also compare it with other tools (e.g., channel migration toolbox). Dis-

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cussion, implications and limitations are missing in the current manuscript. Section 8 is mainly a technical note describing the tool environment (i.e., R), access and download link, but not conclusions are addressed here. It would be very beneficial for the readers to end the manuscript with some general conclusions about the utility and benefits of this tool, based on the comparison with already existing tools.

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