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Hydrology and Earth System Sciences Discussions

Interactive comment on "Delineating riparian zones for entire river networks using geomorphological criteria" *by* D. Fernández et al.

Anonymous Referee #2

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The paper presents an interesting research on riparian zone delineation. The authors proposed two different geomorphological approaches in comparison with flooded area covered by 50-year flood. The approaches consist in I) surface that intersects valley walls at a given number of bankfull depths above the channel, and II) surface defined by a threshold value indicating the relative cost of moving from the stream up to the valley, considering slope and elevation change. The analysis have been performed considering three different valley morphologies: open, shallow vee and deep vee valleys. The performances of the two methods have been tested using two criteria: a) exceeding areas, and b) similarity among total area values. In general, the results suggested that reach the same surface when considering the best match with the 50-year flood, with a slightly better performance of the approach (I).

I like the idea behind this paper, and introducing a new geomorphic criteria in delineation of riparian zones should deserve interest for the scientific community. Having said that, there are some critical issues that need to be clarified, and some section re-written in order to make the text clearer. The paper requires major reviews before be accepted.

Comments and suggestions

Three different valley morphologies considered in the analysis: are there any references or also previous analysis/research about such valley morphology classification? This is really a critical point that needs to be clarified since, as the authors at the end suggested, the "optimal threshold value for geomorphological criterion is valley-type dependent".

DEM: a 5 m DEM was considered in the analysis. Please motivate such resolution, the data used, and the vertical accuracy. Does this resolution represent a critical issue in the performance of the presented methods?

Drainage in low relief area: please clarify better how the authors enforce the drainage in low relief area. There are different works reported in literature about the treatment of DEM and sink filling for low relief areas. Did the authors consider these?

Bankfull depth and in general, the geomorphological attributes: the authors have to better clarify. At the beginning did the authors make an analysis with few field data? Is it possible to present some data in order to have an idea about the accuracy and consistencies of such analysis?

Methods: for a better reading and understanding is should be better re-organize this section, with a flow diagram (or also a table) showing a schematic illustration of the two methods proposed, and in general about the step-by-step analysis conducted. Right now, one has really some difficulties to follow all the steps considered for the analysis.

HEC-RAS, HEC-Geo RAS: very few information is reported about such modeling ap-

plication. It would be appreciated if the authors report some numbers related to the parameters used in such hydraulics modeling.

Line 24-25 ("from 50 to 350 using steps of 50"): why such numbers? Please clarify.

"BDF*1.25": what about "1.25"? These sentences are not so clear, again see my previous comment at "methods" section.

Eq. (2), line 20 (in the same page), Eq. (3): why 100?

Line 31 (beginning of the Results chapter): where the authors presented the cluster analysis? Or they presented just box plots related to the three valley types?

Discussion and conclusion: the authors underline that "However, attention should be paid when using DEMs with a spatial resolution different from that used in this study, as thresholds are suggested to be also dependent on this parameter". So the methods presented are grid-cell size dependent? If so, it should be appreciated making an analysis on different thresholds derived by using different grid cell sizes.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 4045, 2012.