

Interactive comment on “Spatial variability in channel and slope morphology within the Ardennes Massif, and its link with tectonics” by N. Sougnez and V. Vanacker

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The manuscript provides an interesting study on morphometric indices to characterize the landscape response to tectonic activities. The study quantifies and analyses several morphometric parameters on 10 watershed DEMs at 10m of resolution.

The paper is interesting as well as the special issue “Quantitative analysis of DEMs for hydrology and Earth system science” in which it is included.

As for other manuscripts submitted to this special issue, I would like to make a comment concerning the importance of DEM pre-processing that seems here underestimated.

C2438

It is clear from the recent literature (among others: [1],[2],[3]) that the drainage network automatic extraction is a sensitive problem and that the common procedures available in commercial software could provide errors difficult to quantify.

For hydrological application an updated procedure for DEM pre-processing could be the following [4]:

- 1) application of PEM4PIT method [5],[6] (or other advanced procedures) for artificial depressions and flat areas removal;
- 2) estimation of the flow directions using the D8-LTD algorithm [7];
- 3) stream network automatic extraction using the curvature-based scheme [8], in conjunction with the automated constant drop analysis algorithm for the identification of the channel initiation threshold [9];

Obviously this list could vary adopting one method instead of an other ones, but it is widely recognized that using the standard “pit filling” procedure + D8 flowdirection method available in ArcGIS the obtained blue line is affected by the following common and well known problems ([3]):

- a) straight and parallel lines;
- b) slope = 0 in the channel profile and in the hillslope areas

While it is clear that the standard procedures could affect the results of hydrological model application, I do not have enough experience to say that in Geomorphological analysis an accurate pre-processing should be taken into account (indeed the identification of knickpoints could be affected by advanced flat area removal procedure). In any case this manuscript, since it is submitted to a Special Issue on DEM analysis, should absolutely emphasize this point. At the contrary the paper spent only five lines to explain which is the procedure adopted. Considering only the reference “Schauble (2000)” - that is written in German - it means to underestimate this topic and to exclude the recent literature on that. The same comment is concerning the use of “Flowaccu-

C2439

mulation” ArcGIS function. So my suggestion is consider the problem and, also if the authors decides to use the classical and old approach, they should justify it without forgetting the recent active literature on this interesting topic.

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C2440

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C2441