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Hydrology and Earth System Sciences Discussions

Interactive comment on "Robust extraction of thalwegs network from DTM: application on badlands" *by* N. Thommeret et al.

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The authors thank the reviewer for his valuable remarks and citations. The answers to the remarks are denoted below.

Major remarks:

1) For the English problems, the manuscript will be reviewed by the "American Journal Expert".

2) Concerning the title, we finally thought it was better to remove the word "robust". Indeed, by robust we first meant that the method takes the DTM noise as a main parameter. Although we agree this is not the common sense of the term "robust". We decided to keep a simple title without mentioning the convergence index because the

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paper deals with the comparison of two morphological indices. The convergence index potential is shown by the results. We propose a new title: “On the extraction of thalweg network from DTM: application to badlands”.

3) Toward the future work on the topological indices and the 3-D geometry of the network, we agree this should not be included in this paper. Then, we tried to clarify our intentions in the reviewed manuscript. The indices we used are in a first step the classical ditree morphometric indices like Horton-Strahler rations, Tokunaga indices and in a second step, fractal indices (like fractal dimensions). It has been showed that ditree morphometric indices, especially the topological ones, can be sensitive to noise: this is the case for Horton-Strahler and Tokunaga’s ratios (see Dodds and Rothman, 2001), especially for ditrees with few branches. One of the motivations for this work was to compute networks at several scales; these networks can be directly compared with each other using the mentioned indices. Therefore, we needed a method to extract a network that sticks to the DTM landform. Moreover, the variability of drainage density brings important information on the terrain morphology.

Citation: Dodds, P.S. and Rothman, D.H.: Geometry of River Networks II: Distributions of Component Size and Number, Physical Review E., 63, 2001.

Specific remarks:

Concerning the first two remarks (p. 884 and p.887), we agree and rectified the manuscript.

Page 888: The choice we have made (first connect and then thin stream segments) is guided by our morphologically based scheme of gully network. By definition, the thalweg is the line joining the lowest points of the gully. We assume that this line can also be defined as the central line of the gully floor network. Then, to obtain a continuous thalweg line, the gully floors have to be connected to form a continuous shape. Besides, the thalweg positioning seems less arbitrary as it is ruled by the same operation along the network.

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We have mentioned Yokoyama et al's reference in the introduction as you suggested it. Indeed, this reference is interesting and the comparison with the convergence index should be done. However, we don't develop this new parameter specification in this paper in order to keep an only guide-line.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 879, 2010.