Hydrology and Earth System Sciences Discussions

Interactive comment on "Reading the bed morphology of a mountain stream: a geomorphometric study on high-resolution topographic data" *by* S. Trevisani et al.

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General Comments: The authors address a difficult and important subject in their paper related to the unbiased classification of long reaches of river into different morphological classes. The article describes a robust method to utilize large datasets collected via LiDAR surveys as general input into a directional variogram analysis. The paper is well referenced with major works acknowledged. The proposed method has some minor drawbacks, but has potential to provide a widely-applicable method to classify large lengths of channel.

Specific comments: I am slightly concerned about the ability of the method to distinguish individual large boulders. For example, three points on figure 4 were interpreted by hand as returns from the canopy and expunged from the dataset. These returns were relatively close in elevation to the channel bed and could easily be large boulders. Furthermore, although the density of points was relatively high, it is still relatively easy to imagine returns off the sides of boulders that would minimize the true elevation difference of the terrain.

It is not entirely clear how this method would work in many mountainous environments were much of the topographic relief of the channel is due to the presence of large woody debris (LWD). In these systems, the majority of steps can be formed from logs and loading of wood involves trees in various states of collapse. Therefore, it would seem to be extremely difficult to distinguish between the canopy and the channel bed. It is even possible that some roughness elements were accidently removed from this dataset that could be associated with LWD loading.

It would be helpful to have more details on the specific definitions used to define the morphologic units. The authors point to a well-known paper on the topic, but given the importance of the classification to this paper, it seems warranted to include the definitions used.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 7287, 2009.