Author Comments on "A method for parameterising roughness and topographic sub-grid scale effects in hydraulic modelling from LiDAR data" by A. Casas et al.

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The reviewer notes the lack of validation data which would be extremely useful to prove the fit of the approach in absolute terms and would provide an insight into a spatially distributed calibration process. However, these data are not available. The research is still justified in terms of its contribution in relation to the spatial distribution of the effects of a subgrid scale parameterisation. Particularly in terms of spatial validation strategies, as the review also notes. The absolute impact of using a distributed approach is shown to be larger than that of using a constant one and different topographies, which prove the importance of a distributed approach in relation to, for instance, filtering procedures at a constant mesh resolution. This issue and the convenience of a future measurement and validation research would be included in text.

In relation to the moderate comments, changes would be made.

In page 2263, references have been diversified and the following would be added:

Bates, P. D., Marks, K. J. and Horritt, M. S.: Optimal use of high-resolution topographic data in flood inundation models, Hydrol. Process., 17, 537–557, 2003.

Carney, S. K., Bledsoe, B. P., Gessler, D.: Representing the bed roughness of coarse-grained streams in computational fluid dynamics, Earth Surf. Proc. Land., 31, 736-749, 2006.

Clifford, N. J., Robert, A., and Richards, K. S.: Estimation of flow resistance in gravel-bedded rivers: A physical explanation of the multiplier of roughness length, Earth Surf. Proc. Land., 17, 111-126, 1992.

Horritt, M. S., Bates, P. D., and Mattinson, M. J.: Effects of mesh resolution and topographic representation in 2D finite volume models of shallow water fluvial flow, J. Hydrol., 329, 306–314, 2006.

Hunter, N. M., Bates, P. D., Horritt, M. S., and Wilson, M. D.: Simple spatially-distributed models for predicting flood inundation: a review, Geomorphology, 90 (3-4), 208-225, 2007.

Nicholas, A. P.: Computational fluid dynamics modelling of boundary roughness in gravel-bed rivers: An investigation of the effects of random variability in bed elevation, Earth Surf. Proc. Land., 26, 345-362, 2001.

In page 2263, the authors want to note the fact that LiDAR filtering procedures present problems in rough terrain with vegetation (e.g. Sithole and Vosselman, 2004)

Sithole, G., Vosselman, G.: Experimental comparison of filter algorithms for bare-Earth extraction from airborne laser scanning point clouds, ISPRS JPRS, 59, 1-2, 2004.

2271, l.21: Authors assume boundary conditions useful for the initialisation of the hydraulic model.

2273, l.18: cellular-based approaches

In relation to the conclusions, the following conclusion would be added in line 23:

This work suggests that a spatially distributed roughness parameterisation provides a control in its impact upon the spatial distribution of model derived results, therefore, upon its scale. The straightforward benefit of this approach is the spatial assessment of the scale of the hydraulic model and its utility in the validation/verification scale strategy, given that the characteristic scale of the flow required by the application of model derived results can be used to calculate the required scale of collected validation data.