

Interactive comment 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 authors present an interesting approach for sub-grid parameterisation of roughness and illustrate the effects in hydraulic modelling. They found that subscale parameterisation impacts depth and inundation extent derived results. Variations in flow results were found to be systematically related to variations in the roughness parameter. The subscale behaviour of the 2-D hydraulic model is not well-reflected through the topographic content of the DEM and subscale parameterisation must be modelled through a spatially distributed roughness parameterisation.

Generally, the paper is well written and follows a clear structure. Although I think this

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paper requires only moderate revision, I have one (major) concern that I would like the authors to comment on: the authors show significant differences in hydraulic behaviour as a result of sub-grid treatment; however there is no field data (which might be spatially distributed and might actually come from a reliable source) to verify whether the effects are positive in relation to fitting the data and whether they help increase our understanding of hydraulic variable behaviour. Therefore, I would like the authors to comment on this aspect and if possible include one or two sentences in the paper that this point would need to be addressed in the future. I believe their approach could actually be useful to cross-verify the accuracy of spatially distributed field data (water levels, flow velocity, etc) and point to how much and where we need to collect validation data, if it could be argued that the sub-grid parameterisation in the model is physically more meaningful and the effects and relative changes in hydraulic parameters observed are reliable. Other than that, I have only some moderate comments:

2262, line 25: ‘must’ is a little strong, please consider ‘should’

2263, line 9: please add ‘and capture these well enough’ after ‘same resolution’

2263: could the authors try to diversify references on this page please?

2263, line 17: please remove ‘the’ in ‘the flow’

2264, line 17-20: when the authors talk about difficulties of separating bare earth from the rest of measured data, are they referring to the differences in LiDAR erosion algorithms that exist? If so, could this be specified?

2265, line 12: please put ‘outside the scope’ and delete ‘it’

2265, line 16: does ‘cartographic’ refer to mapping?

2266, line 18: please put ‘centre’ instead of ‘middle’

2267, line 7: please put ‘greater height’ instead of ‘higher vertical’

2267, line 8: please put a reference for Geary’s C

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2270, line 26: please put topography driven'

2271, line 21: here the authors assume of course that the boundary conditions provided by HECRAS are accurate and reliable

2273, line 18: 'in this kind of', please be more specific here

2276, line 4: please put 'physically meaningful'

2278, line 16-19: maybe the authors could be more specific here, as the conclusions at present come a bit short of their actual findings

Figures: please increase the legends in Fig. 6 and Fig. 9 and also the title font and round the numbers to the nearest .10

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 2261, 2010.