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Hydrology and Earth System Sciences Discussions

Interactive comment on "Study of frequency pattern of coherent turbulent flow over ripples using image processing with implication in river restoration" *by* A. Keshavarzi et al.

Anonymous Referee #1

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Study of frequency pattern of coherent turbulent flow over ripples A. Keshavarzi et al. 2011

Referee report (8, 7845–7871, 2011)

I have a few but major concerns on this work.

Originality: ADV experiments with fixed bedforms and quadrant analysis are common in the literature and I fail to capture the novelty of this specific contribution also in view of the following contributions by one of the author:

Mianaei and Keshavarzi

Study of near bed stochastic turbulence and sediment entrainment over the ripples at the bed of open channel using image processing technique, published in stochastic environmental research and risk assessment 24 (2010).

Boundary conditions : the incoming flow approaching the first ripple is different from the flow approaching the second ripple and as well different from the incoming flow with a uniform distribution of ripples (typical case in rivers). I am questioning if the two ripples case is relevant in general and for river restoration in particular.

Some minor comments: I assume the base of the ripple is fixed: please specify in the text. If this is the case, since the ripples modulate the shear stress distribution, how is it possible to ensure that there is always a layer of sediment covering the ripples? In the fixed bed configuration obviously there is no problem, but how about the movable bed? Is there a threshold on the number of entrained particles (fig 10) the ripple can sustain? In other words, the experiment allows only a limited erosion (or not?).

The Kolmogorov scale cannot be estimated properly by sampling at 50Hz. I am not sure how this scale was estimated. Please explain or remove from the table.

Fig 7 : please outline the ripple location on each panel

Image methods: under each particle that leaves the image there has to be another particle that "appears as new" in the next image , how do you distinguish between those that actually enter the observation volume from those that were just hidden underneath? A brief description of the image analysis method would be important.

Citation suggested: Colombini M. Stocchino A., Ripple and dune formation in rivers J. Fluid Mechanics Volume: 673 Pages: 121-131 (2011)

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 7845, 2011.