

Interactive comment on “Mechanisms of vegetation uprooting by flow in alluvial non-cohesive sediment” by K. Edmaier et al.

Anonymous Referee #1

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I appreciate very much the work by Edmaier, Burlando and Perona for three reasons. Firstly, it deals with a relevant topic in the river eco-hydraulics and river engineering. Vegetation plays in fact a crucial role in all the fluvial aspects, from the friction evaluation to morphodynamics, from the sediment transport to diffusion-dispersion processes. Therefore, any study aiming to understand and (possibly) evaluate the bio-physical processes is very welcomed.

The second reason of my interest concerns the second part of the work, where two types of uprooting are conceptually elucidated. In spite of they seem easy to guess, the Authors have the merit to focus the two key points: (i) the timescales involved in relation to the hydrological ones, and (ii) the role of stochasticity. The comprehension of the key scales is fundamental in eco-hydraulics where typically many timescales occur

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but only a few of them are the main ones and are decisive for the modeling. On the other hand, stochasticity is one of the essential ingredients to explain several riparian features and the paper by Edmaier et al. stresses correctly this point.

The third reason of my positive judgment is the experimental work. It is preliminary, but it has to be encouraged. These type of experiments are very complex and, often, frustrating: many spatial and temporal scales are involved, bio-mechanical similitude is precluded, many practical difficulties with biotic elements occur, etc... However, in spite of these troubles, laboratory experiments are irreplaceable to isolate and to understand the single processes that compose the whole picture. In this sense, they are complementary to the field studies, where all processes coexist and interact at the right scales and rates but where it is very difficult to understand their hierarchy.

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