

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

Anonymous Referee #2

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General Comments

I strongly support this paper by Edmaier, Burlando and Perona, which makes an original and useful contribution to understanding vegetation uprooting. As the authors acknowledge, mortality of young riparian vegetation is high and is intrinsically linked to the flow regime; despite this, the mechanisms for uprooting vegetation are not well understood. The authors make important conceptual and experimental advances this area, which furthers understanding of vegetation-hydrology-geomorphology interactions and will provide a useful framework for further research.

Specific Comments

The paper includes a comprehensive and multidisciplinary literature review, which pro-

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vides a useful background for later conceptual discussions. The active role of vegetation is briefly acknowledged, but there are a number of studies which the authors may also wish to include in the discussion, as they demonstrate the anchoring effects of root biomass and its importance in sediment stability at the landform-scale, which would support the argument well (e.g. Tooth and Nanson, 2000; Gurnell et al. 2001).

The concepts in the paper are well presented and very interesting. The paper identifies two types of vegetation uprooting and considers their relative roles in relation to time and flow magnitude. This is an important distinction which forms a useful conceptual basis for further work; for example, this typology may be relevant for understanding the relative establishment, growth and survival of sexual (likely to be subject to Type 1 uprooting) and asexual (Type 2) propagules in riparian zones. These concepts are well supported from preliminary findings from flume experimental work, which shows much potential for further investigative work.

Technical Corrections

The figures illustrate the concepts well and complement the text. However, some of these require more descriptive captions and need further explanation in the text; for example, not all arrows in Figures 1 & 2 are explained and the parameters in Figure 4 need further description. Figure 5 and 6 are fine, but could be omitted if space is an issue in the final paper

The paper is generally well written and clearly presents the argument. There are some minor English corrections, which the authors may wish to address in the final version:

- Page 1369, line 28: comma needed between environments and nutrients
- Page 1370, line 9: “one” should be deleted
- Page 1375, line 4: “an” should be deleted
- Page 1382, line 1: seed germination rather than “seedsgermination”

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-Page 1382, line 13: space between “identifyingtwo”

-Page 1382, line 22: “The role of Type 1 of erosion” – delete “of”

-Page 1382, line 23: “worth of testing” delete “of”

References

Gurnell, A.M., Petts, G.E., Hannah, D.M., Smith B.P.G., Edwards, P.J., Kollmann, J., Ward, J.V. and Tockner, K. (2001) Riparian vegetation and island formation along the gravel-bed Fiume Tagliamento, Italy. *Earth Surface Processes and Landforms*, 26, 31-62

Tooth, S. and Nanson, G.C. (2000) The role of vegetation in the formation of anabranching channels in an ephemeral river, Northern plains, arid central Australia. *Hydrological Processes*, 14, 3099-3117

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