Geophysical Research Abstracts
Vol. 19, EGU2017-7383, 2017
EGU General Assembly 2017

Quantification of river hydraulics, morphology, and vegetation interactions in flume experiments: A deeper look at vegetation encroachment management.

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The interdisciplinary knowledge and ability for river managers to effectively predict flood risks, restore rivers, and assess future alterations are currently restricted to the limited understanding of how river hydraulics, morphology, and vegetation alter a river's planform, effect sediment mobility, and control the surrounding habitats. To improve this knowledge, flume experiments of a 24 m x 1.6 m wide channel with 1 mm sediment and a 1% slope were ran to develop a braided river. Once developed, the flume was seeded with Rucola Coltivata (eruca sativa) at a density of 1.5 seeds/cm2 and grown until an approximate height of 1.1 cm. Experiments evaluated low-, medium-, and large-flood events and documented morphological changes and impacts to vegetation at four intervals during the experiments with high resolution imagery that was utilized to produce accurate Structure-from-Motion derived topography (average errors 2 mm).

The aim of this research is to evaluate and quantify how rivers naturally control vegetation encroachment through morphodynamics and the impacts of both naturally occurring and manipulated avulsion. Through such quantification of river hydraulics, morphology, and vegetation removal, anticipated results will provide evidence leading to the ability to better retain bare sediment areas, locality of most/least commonly cleared areas, and the effects of manipulation to maximize flood impacts.

Marie Sklodowska-Curie Individual Fellowship: River-HMV, 656917