Geophysical Research Abstracts
Vol. 17, EGU2015-13906, 2015
EGU General Assembly 2015

Assessing the effect of riparian vegetation patterns on river bed and bank stability

Manousos Valyrakis (1), Da Liu (1), Nicholas James Mcgann (1), and Umut Turker (2)

(1) University of Glasgow, Infrastructure and Environment Research Division, Civil and Environmental Engineering, Glasgow, United Kingdom (manousos.valyrakis@glasgow.ac.uk), (2) Eastern Mediterranean University, Gazimagusa, North Cyprus, Turkey

Over the last two decades, the role of vegetation in the environmental and ecological restoration of surface water bodies has received much attention. Numerous studies have investigated the effects of vegetation on flow velocity at various locations ranging from the floodplain, river-bank and main channel. There is a general agreement amongst such studies, that the presence of vegetation may cause a decrease in flow velocity locally, followed by increased flows laterally, in non-vegetated regions. This experimental study attempts to present the findings of an elaborate set of flow measurements that aim at quantifying changes to the flow field at the main channel, at the bank within the vegetated region and at their interface, for increasing vegetation densities.

To this goal an inclined section is constructed with acrylic panels sloping at, in a 1.8m wide re-circulating flume, to simulate the stream-bank. The main-channel bed comprises of coarse sand of 1.5mm nominal diameter, while 6mm diameter acrylic rods are used to simulate the vegetated river-bank. Ten velocity and turbulent intensity profiles are developed across the test cross-section, for each vegetation density, via acoustic Doppler velocimetry. The experiments are run under uniform flow and stable bed conditions, for a range of six different vegetation densities changed by adding more vegetation elements in a staggered arrangement along the stream-bank. These detailed observations are further analyzed, with emphasis on the effects on the main channel and across the channel's boundary. Measurements near the bed with implications for sediment transport are further discussed, providing a link to potential mechanisms of soil and vegetation coevolution.