Geophysical Research Abstracts
Vol. 14, EGU2012-4369, 2012
EGU General Assembly 2012

The morphodynamic impact of vegetation and large wood on fluvial systems

L. Mao (1), W. Bertoldi (2), F. Comiti (3), A.M. Gurnell (4), S.J. McLelland (5), N. Osei (4), D. Ravazzolo (6), M. Tal (7), M. Welber (2), and S. Zanella (2)

(1) Departamento de Ecosistemas y Medio Ambiente, Pontificia Universidad Católica de Chile, Chile, (2) University of Trento, Civil and Environmental Engineering, Trento, Italy, (3) Faculty of Science and Technology, Free University of Bolzano, Italy, (4) School of Geography, Queen Mary University of London, UK, (5) Department of Geography, University of Hull, UK, (6) Dipartimento Territorio e Sistemi Agro-forestali, University of Padova, Italy, (7) Centre Européen de Recherche et d'Enseignement des Géosciences de l'Environnement, Aix-en-Provence, France

We present preliminary results from a set of recent experiments conducted in the Total Environment Simulator flume at the University of Hull in the framework of the Hydralab IV EU project. The aim of these experiments is to identify and assess the effects of riparian vegetation and large wood on the morphodynamics of braided river channels. The type and size of riparian vegetation is known to play a crucial role in shaping rivers, acting as a proper riparian engineer. Riparian vegetation influences bank stability, increases mean channel depth and can affect planform pattern by reducing the number of active branches. However, the geomorphic effect of plants can continue well after their erosion from banks. As dead or living pieces of large wood are transported through the fluvial network, they can exert a tremendous influence on river erosion and sedimentation processes, channel morphology, channel hydraulics, and ecological diversity of river channels. Our experiments consisted of different scenarios of presence / absence of riparian vegetation (simulated using alfalfa sprouts) and large wood density (simulated using wooden dowels). The experiments were designed to assess both the individual effects of woody debris and bank vegetation, as well as their combined effects. Each experiment has been characterised in terms of planform configuration (the number of active branches per cross-section) and bed topography (surveyed by a terrestrial laser scanner). Detailed DEM differencing was used to investigate sediment transport patterns and dynamics for the different vegetation-wood scenarios. The results of this work will help improve the ability to predict the response of river systems to different disturbances and management strategies.