Geophysical Research Abstracts
Vol. 14, EGU2012-10484-1, 2012
EGU General Assembly 2012

Short term morphological dynamics along a low impacted braided gravel-bed river

L. Picco (1), L. Mao (2), M. Cavalli (3), E. Buzzi (1), M.A. Lenzi (1), and F. Delai (1)

(1) University of Padova, Land and Agroforest Environment, Legnaro (PD), Italy, (2) Department of Ecosystems and Environment; Pontificia Universidad Catolica de Chile; Santiago, Chile, (3) CNR-IRPI, Padova, Italy

Braided rivers are dynamic and complex environments shaped by the balance of the flow and sediment regimes, and the influence of the riparian vegetation and disturbances such as floods. The aim of the present study is to analyze the short-term morphological dynamics and the processes of erosion and sediment deposition along a relatively un-impacted gravel-bed braided river (Tagliamento river, Northeast Italy) using a Terrestrial Laser Scanner (TLS). The device used in this study (Leica Scan Station 2) is a pulsed TLS able to collect up to 50000 points per second at a spatial resolution up to one point per mm2 at 100 m. The study area is around 23 ha, and has been surveyed before and after two significant floods of recurrence interval of approximately 15 years and 12 years, respectively, occurred between September 2010 and September 2011. The very high point clouds density allowed to derive three high-resolution Digital Elevation Models (DEMs) with 0.15m x 0.15m pixel size. Scan data cloud merging was achieved with a high degree of precision (sub-centimeter) and positional data were very accurate for exposed surfaces, being less dense and accurate only in the wet areas. Two DEMs of difference (DoD) were computed, revealing different and consistent episodes of erosion and deposition within the analyzed area, changes in morphology of channel and bars could also be detected, such as bar edge accretion and bank erosion demonstrating a strong dynamism of Tagliamento river. Moreover a very detailed estimation of the surface roughness in the study area has been carried out, permitting a large scale analysis of the roughness values distribution. The results of the analysis on the TLS collected data show that along a river with an high natural character (i.e. Tagliamento river), the dynamic processes are continuous and remarkable also during relatively low magnitude events.