Geophysical Research Abstracts
Vol. 14, EGU2012-8506, 2012
EGU General Assembly 2012

A comparison between riverbank erosion models with an evaluation of the risk

L. Nardi and L. Campo
University of Florence, Civil and Environmental Engineering, Florence, Italy (lcampo1@dicea.unifi.it)

The riverbank erosion constitutes one of the main morphological phenomena that shape natural channels with particular reference to the river planform. The quantification of the riverbank retreat requires the knowledge of both local hydrodynamic and erodibility characteristics. Several models exist in literature that allow the estimation of the riverbank shear stress, that is the fundamental parameter in evaluating the retreat given the discharge flow and the geometry of the river channel. In this study two hydrodynamic models were selected, specifically the 1-D model HEC-RAS and the 2-D model River-2D. Both models were then combined with three shear stress models (Simon and Senturk, 1977, Steffler and Blackburn, 2002 and Kean and Smith, 2006) in order to obtain an estimation of the retreat on a study case on the Cecina river in Tuscany, Central Italy. A calibration of the models was performed basing on observations from aerial photos of the region over a period of ten years (1994-2004) and on observed discharge flows time series in the same period. The results of the different combinations of the models were discussed and compared. A framework was also developed for the risk analysis of land loss due to bank erosion, and an application to the study case was provided by using the results of the fluvial erosion modelling.