Geophysical Research Abstracts, Vol. 9, 09931, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-09931

Topographic techniques for evaluating ongoing fluvial erosion in river channel beds

D. Godone(1), F. Godone(2) and F. Maraga(2)

(1) University of Turin, Dept. Agricultural , Forest and Environmental Economics and Engineering, Italy, (2) National Research Council, Dept. Terra e Ambiente, Research Institute for geo-hydrological protection, Branch of Turin, Italy

The incision process has been and still is considerable along rivers in the Upper Po plain (north-western Italy) since the 1950s. In some gravel-bed rivers, incision has reached a prior sedimentary body of silty sand deposits which are more erodable than the overlying fluvial gravel. This prior body constitutes the base of the old fluvial deposition and indicates an original marsh environment. The incision process in the fine sediments would seem to be irreversible and has been such as to modify the local hydrosystem and the channel plan-form, from multi-thread to single-thread, thus affecting the longitudinal profile. Digital measurements by aerial photogrammetry and ground topography started in 2004 and are still on-going in order to evaluate the rate of channel incision, its progress over time and the velocity of the process.

This paper illustrates the results of a detailed field topographic survey using GPS in a representative reach of the Stura di Lanzo River, an alpine affluent of the Po River. In this reach the sedimentary body of pre-fluvial finer sediments is continuously exposed by channel erosion along a 5km stretch. The sector chosen for topographical survey is where channel bed incision is at its greatest and where the talweg cuts up to three metres into the finer sediments, revealing the remains of plant fossils.

The topography of the active channel has been surveyed from bank side to bank side at plain surface level, and is almost 500m long and 150 m wide with 610 measured points and three high precision GPS reference vertices, in order to carry out georeferentiation of the measured points. Accuracy at each elevation point is estimated to within $\pm$ 5cm. The topography of the river channel forms is described including the exposed parts of the pre-fluvial sedimentary body and the fossils relicts, such as rooted tree stumps

and layers of branches and leaves which act as markers in the river's evolution by incision. Numerical results are presented in graphic elaboration with the development of a Digital Elevation Model (DEM), with interpolated longitudinal and transversal channel sections.

Comparative analysis with older incision processes could be carried out using available aerial photos of the area that go back to 1929, while direct observation at the site continues to identify and measure any new forms of development in the evolutionary trend of fluvial erosion in the channel.

Acknowledgment

E. Beretta, aero photographs selection; M. Baldo, GPS data elaboration; G. Rivelli, topographic survey assistence; P. G. Trebò, images elaboration.

Supported by Ente di Gestione Parco La Mandria and MIUR PRIN prot. 2005044240 (N. Surian).