



# **1 The problem of estimating bed-load transport: a comparison between field measures and equations for two sand-bed Italian rivers.**

E. Salemi (1), E. Preciso (2), P. Billi (1)

(1) Earth Science Department, University of Ferrara, Italy, (2) Research Institute for Hydrogeological Protection – Padova, Italy (emanuele.preciso@irpi.cnr.it; office number: (0039) 049 829 58 20; fax number (0039) 049 829 58 27)

Measuring bed-load transport in rivers is difficult both for the specific nature of the phenomena (bed-load rate is highly variable in space and time), and for the difficulty to measure sediment transport during floods. This is particularly true for Italian rivers which present a strong human impact that affects the natural dynamic of the sediment fluxes. In this work we present the first results of a bed-load transport field campaign we carried out during 3 years in two sand-bed rivers (Reno River and Fiumi Uniti in Emilia Romagna, Northern Italy). Using a cable-suspended Helley-Smith from two selected bridges, we took several bed-load samples during floods to compute the bed-load discharge of the rivers, and after that we estimated bed-load for the same discharges with some equations both from literature and those implemented in the Hec-Ras hydraulic model, in order to compare the field data and calculations.

Bedload transport rate resulted very low in the Reno River for all the floods measured and the equations overestimate by far the sediment transport, whereas in the Fiumi Uniti we found out an high sediment transport rate and good correlation between field measures and estimates from formulas. The first results confirm the extremely high variability of bedload transport rate in fluvial systems, and furthermore the uncertainty

involved in indirect estimations of bedload transport process.