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Monitoring sediment transport in a multiple channel river: sediment gauging and dune tracking on the Loire river (France)

Nicolas Claude (1), Stéphane Rodrigues (1), Jean-Gabriel Bréhéret (1), Philippe Jugé (2), Cécile Grosbois-Bacchi (1), Jean-jacques Macaire (1), Jean-Paul Bakyono (1), Isabelle Pene-Galland (1), and Yann Guerez (2)

(1) Université François-Rabelais de Tours, CNRS/INSU, Université d'Orléans, Institut des Sciences de la Terre d'Orléans - UMR 6113, Faculté des Sciences et Techniques, Parc Grandmont, 37200 Tours, France (nicolas.claude@etu.univ-tours.fr), (2) Université François-Rabelais de Tours, CETU Elmis, 11 quai Danton, 37500 Chinon, France

The understanding of hydraulic and sedimentary fluxes in fluvial systems represents a major issue for management and sustenance of rivers. In this context, a research program was developed to understand and quantify the sediment transport in an incised sandy-gravel multiple channel river: the Loire (France). The study of sediment transport is approached by a strategy which associates hydraulics, sediment gauging and dune tracking. Data were acquired using aDcp, single and multiple-beam echosouders and iso kinetic sediment traps (BTMA, Delft Bottle, USBM 54). Two sets of data corresponding to the falling limb of a five-year flood and a second performed during low flows are presented here.

The sediments gaugings offer a first direct estimation of the sediment fluxes concerning bedload and suspended load on the Loire. They also show a significant vertical change of the grain size in the water depth which always highlights the presence of bedload, even at low flows. Moreover, a transversal variability of the sediment transport displays bedload axes directly linked to the morphologic configuration of the channel and associated macroforms. In order to detail bedload fluxes and to compare the results acquired during gaugings, dune tracking was carried on mesoforms whose dimensions vary according to the hydraulic conditions and their location in the channel.