



Bedload progression in gravel bed rivers using iron slag as a tracer

G. Houbrechts* (1), Y. Levecq (1), J. Mols (1), F. Petit (1)

(1)University of Liège, Department of Geography, Laboratory of Hydrography and Geomorphology, Sart-Tilman, Belgium (G.Houbrechts@ulg.ac.be)

In fluvial dynamics studies, different methods are used to evaluate bedload transport and particle travel lengths. However, results are mostly based on a few transported elements and on a relatively short time scale. Consequently, it is difficult to extrapolate these results to whole bedload, because of the burying of particles into the subsurface layer or the trapping of elements in fluvial forms (point bars, riffles, ...), which can immobilise elements during long periods.

Bedload progression has been evaluated in Ardenne rivers using slag elements produced by the past factories established along rivers between the 14th and the 19th centuries. Important quantities of slag were dumped close to rivers or even directly into channels. For several centuries, slag elements were dispersed in the bedload and transported by floods of varying importance. Consequently, slag can be considered as a tracer to analyze bedload progression over several centuries. The size of slag elements has been studied in many Ardenne rivers. The longitudinal size trend of the largest slag particles allows us to determine the effective competence of rivers and to analyze the hydraulic sorting. Moreover, downstream of some metallurgic sites, we have constrained the presence of slag elements to the most downstream riffles. Because we know from historical studies the periods of activities of these sites, we may estimate the speed of bedload progression in several gravel bed rivers from the Ardenne Massif (2-3 km/century).