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Effective method for continuous measurement of bedload transport rates by means of RBT in a small glacial High Arctic gravel-bed river

Waldemar KOCIUBA¹

¹ Faculty of Earth Sciences and Spatial Management
Maria Curie-Skłodowska University in Lublin, Poland
e-mail: waldemar.kociuba@umcs.pl

ABSTRACT

The determination of the threshold values and parameters of bedload transport in river beds is necessary for undertaking effective hydrotechnical works, including anti-flood, retention, energy engineering measures, etc. This paper presents a new device for the continuous measurement of movable bed-surface particles, namely the “River Bedload Trap – RBT” [European patent No. EP 2333161]. The article discusses the methodological difficulties in the effective estimation of bedload transport rate. It presents an innovative measurement strategy and device with the potential to satisfy the stringent requirements set by fluvial geomorphology and hydrotechnical analyses. The applied technical solution based on direct continuous measurement and anchored RBT sets is analysed in detail and compared to the existing measurement systems. The study confirmed the high effectiveness of the implemented measurement strategy and technical solution for quantitative bedload transport rates and flux. The application of RBT for continuous monitoring of bedload flux in the conditions of High Arctic gravel-bed rivers was evidenced to permit obtaining high efficiency and credible results.