

Bedform Effect on the Reorganization of Surface and Subsurface Grain Size Distribution in Gravel Bedded Channels

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A b s t r a c t

Quantification of river bedform variability and complexity is important for sediment transport modeling as well as for characterization of river morphology. Alluvial bedforms are shown to exhibit highly non-linear dynamics across a range of scales, affect local bed roughness, and vary with local hydraulic, hydrologic, and geomorphic properties. This paper examines sediment sorting on the crest and trough of gravel bedforms and relates it to bed elevation statistics. The data analysed here are the spatial and temporal series of bed elevation, grain size distribution of surface and subsurface bed materials, and sediment transport rates from flume experiments. We describe surface topography through bedform variability in height and wavelength and multiscale analysis of bed elevations as a function of discharge. We further relate bedform migration to preferential distribution of coarse and fine sediments on the troughs and crests, respectively, measuring directly surface and subsurface grain size distributions, and indirectly the small scale roughness variations as estimated from high resolution topographic scans.

Key words: bedforms, roughness, grain sorting, power spectral density, sediment transport.