



## **Creation and destruction of grain clusters in an experimental channel subject to episodic sediment supply: implications for particle mobility and channel adjustment**

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In gravel-bed rivers, particle arrangement and clustering at the grain scale is known to be an important control on sediment mobility and therefore on channel morphodynamics and sediment transport. Yet, we lack comprehensive studies connecting quantification and evolution of local grain clusters with changes in particle mobility and channel morphology, as a function of changes in sediment supply.

Here we present results from an experimental campaign conducted in a 18-m long and 1-m wide flume located at the University of British Columbia, where a realistic gravel-bed composed of poorly sorted sediment between 0.5 and 64 mm was created and subject to different combinations of sediment supply for 280 hours. High-resolution DTMs combined with pictures scanning the bed surface allowed us to identify manually individual grain clusters and to map their evolution in time during the experiment.

Our results show that different sediment pulses had a large influence on the evolution of grain clusters, particle mobility and bed-surface grain-size but this influence vanished quite fast. We compared the cluster evolution obtained with the manual method against that obtained with an automated method based on previous studies. We found that the automated method performed quite poorly, not being able to trace the trend in cluster building and destruction as the manual one did: individual clusters were built and destroyed throughout the experiment, but at the end their number and location reached a rather stationary condition.