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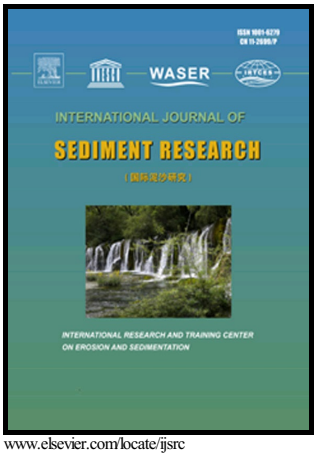

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Enhanced bed load sediment transport by unsteady flows in a degrading channel

Zhijing Li [a, b], Honglu Qian [a], Zhixian Cao [a,*], Huaihan Liu [c], Gareth Pender [d], Penghui Hu [a]

[a] State Key Laboratory of Water Resources and Hydropower Engineering Science, Wuhan University, Wuhan 430072, China

[b] Changjiang River Scientific Research Institute, Wuhan 430015, China

[c] Yangtze River Waterway Bureau, Wuhan 430010, China

[d] School of Energy, Geoscience, Infrastructure and Society, Heriot-Watt University, Edinburgh EH14 4AS, UK

* Corresponding author: Professor Zhixian Cao, Email: *zxcao@whu.edu.cn*

ABSTRACT

Laboratory flume experiments were done to investigate bed load sediment transport by both steady and unsteady flows in a degrading channel. The bed, respectively composed of uniform sand, uniform gravel, or sand-gravel mixtures, always undergoes bulk degradation. It is found that both uniform and non-uniform bed load transport is enhanced greatly by unsteady flows as compared to their volume-equivalent steady flows. This enhancement effect is evaluated by means of an enhancement factor, which is shown to be larger with a coarser bed and lower discharges. Also, the fractional transport rates of gravel and sand in non-uniform sand-gravel mixtures are compared with their uniform counterparts under both steady and unsteady flows. The sand is found to be able to greatly promote the transport of gravel, whilst the gravel considerably hinders the transport of sand. Particularly, the promoting and hindering impacts