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Spatio-temporal variability of bed load discharge

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Large Helley-Smith sampler measurements were performed over a period of seven years in the large Alpine Drau River, Austria. a hydrophone gauge with permanent data collecting was established upstream of Lienz. The results of these measurement devices reveal the high spatio-temporal variability of bed load discharge and a high variability within a cross section. Furthermore, the grain size distributions are varying in space and time. Commonly used bed load predictors do not describe measured transport rates well. The effect of temporal variation in bed load discharge is in part removed by considering longer time frames. The discrepancy is partially explained by cross sectional variation of bed load discharge. The wave-length of the periodicity and phenomenon's in reference to bed load transport processes where also aim of the work. An improvement is attained by relying on local hydraulic parameters, whereby regressions of bed load discharge against hydraulic parameters increase, particularly for verticals where most of the bed load occurs. Furthermore the variability of bed load transport introduces uncertainties in the modeling process. The incorporation of local cross sectional parameters demonstrates the utility of 2D bed load models and their greater predicting power over similar 1D modeling