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Characterization of bedload sediment transport in high slope rivers using hydraulic geometry theory (Conference Paper)

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Abstract

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In Ecuador, steep rough-bedded channels constitute the main component of mountainous drainage system. They provide sediment to milder- slope downstream channels. Thus, sediment transport represents a driving process in natural drainage system. Namely, it defines river morphology evolution. To quantify and to understand the magnitude and effect of this process in the surrounding environment, the understanding and knowledge of bedload transport must be improved. The study of sediment transport in steeper channels with coarser material is a complex process. The continuously changing environment results in a high uncertainty in the quantification of sediment transport rates. Some equations have been proposed to quantify the rates. However the lack of actual measured data does not allow proper quantification and verification. On the other hand, hydraulic geometry (HG) theory has been applied to generate elements for a consistent monitoring of rivers behavior. Dimensionless HG relations that replicate what is observed in rivers have been obtained. Parameters such as top width, mean flow depth, mean velocity, and suspended sediment load of several gravel-bed rivers have been related with liquid discharge. The present study proposes the characterization of bedload sediment transport of steep gravel-bed rivers in terms of dimensionless HG relations. Measurements in various reaches along a river of bedload transport rate are performed to determine the parameters (exponents and coefficients) of the HG relations. The results represent a contribution that allows the reduction of the lack of field-measured data as well as the application of a theory generally used to characterize hydraulic -geometric parameters to characterize bedload sediment transport . © ASCE.

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Carrillo-Serrano, V. , Pacheco-Tobar, E.
(2018) DYNA (Colombia)

Reconciling at-a-Station and at-Many-Stations Hydraulic Geometry Through River-Wide Geomorphology
Brinkerhoff, C.B. , Gleason, C.J. , Ostendorf, D.W.
(2019) Geophysical Research Letters

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