Geophysical Research Abstracts
Vol. 18, EGU2016-7551, 2016
EGU General Assembly 2016
© Author(s) 2016. CC Attribution 3.0 License.

Cobble deposits observed by drone in Vieux-Habitants River (Guadeloupe, France): consequences on bedload transport

Pascal Allemand (1), Eric Lajeunesse (2), Amélie Quiquerez (3), Vincent Langlois (1), Olivier Devauchelle (2), and Christophe Delacourt (4)

(1) Univ Lyon 1 & ENS-Lyon & CNRS, LGL - TPE, villeurbanne, France (allemand@univ-lyon1.fr), (2) IPGP, Sorbonne Paris Cité, CNRS, Eq. Dynamique des Fluides, Paris, France, (3) Univ. Bourgogne, CNRS, ARTeHis,Dijon, France, (4) Univ. Bretagne Occiendate, CNRS, Lab. Domaines Océaniques, Brest, France

The physics of bedload transport has been investigated in artificial rivers, in natural rivers and by numerical simulations. These approaches demonstrated that bedload transport depends on diameter of pebbles and of the shear stress that acts on the river bed above a threshold stress. These parameters are difficult to estimate in natural rivers where the granulometry is spread out several tenths of centimeters and where the basal shear stress is very difficult to estimate. Three hundred meters of the alluvial portion of the Vieux Habitants River (Guadeloupe Island, French Antilles) have been imaged by drone once a year during 7 years. The hydrograph of the river was measured upstream at 2 km of the study area. An ortho-image at a resolution around 3 cm was computed from the images of each mission. The cobbles that were deposited or transported away between two acquisitions were mapped in a GIS. The volumetric density of deposited cobbles by classes of 10 cm for a diameter of 0.1 to 1m was reported against the maximum water flow of the river that occurred between two acquisitions. This volumetric density reflects the flow of transported cobble during the flood. The dataset shows that the volumetric density of deposited cobbles is very low when water flow is lower than 35m3/s. Above this value, the volumetric density of deposited pebble increases with the flow. During the years of study, the hydrograph shows that the threshold for significant displacement was reached less than 0.03% of the time. Bedload transport occurs only during extreme meteorological events for cobbles with a diameter larger than 10 cm in a river such as Vieux-Habitants