



Determination of particle transport patterns in a high mountain river influenced by the construction of reservoirs, using particle tracking techniques and hydrodynamic modeling, case study: Río La Miel.

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Particle tracking is very important for the appropriate management of water resources. Morphological heterogeneities of rivers make the prediction of the particle motions difficult due to the complex numerical and physical variations in the mathematical formulation. Data availability in recent years have allowed to extend dimensionality of the problem and even use coupled models for a better understanding of those patterns. Aside from this, the hydrogeomorphic characteristics of Mountain Rivers are poorly studied around the world. In certain cases, like the river la Miel in Colombia, there are strong dynamic associated with external variables like the operation of a reservoir. The environmental conditions of the operation and the transport of particles are important to determine environmental impacts of the operation. In this research, a hydrodynamic modeling exercise coupled with particle tracking was developed to determine transport patterns. The development of this model was carried out using the Delft 3D software. Information about the hydrophysical recognition in "La Miel" river downstream of "La Miel" hydroelectric complex located in Caldas -Colombia was gathered in a campaign on 21 and 27 of July 2019. The bathymetries were collected using a ECHOMA 54v, and velocities of the river obtained with and ADCP River Ray, for a 10 km length. Data correction have been done so the digital elevation model was made and the topographic conditions for the construction of the two dimensional hydrodynamic modeling system fitted a logical representation. Permanent flow was assumed, because the variation of the areas and hydraulic conditions that are only influenced by the rules of Hydroelectric operation. Finally, the hydrodynamic model coupling was performed with the "following-up" model of particles to determine transport patterns. The main result of this research is still to follow in a project that aims to describe the movement and behavior of small marine species, the travel trajectory of a pollutant and other local uses such as forensic investigation in rivers. Results will also be used to study the dynamics of high mountain rivers.

