



Characterization of sediment sources, sediment budget estimations, consequences and implications for populations in the Jatún Mayu watershed (Cochabamba, Bolivia)

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Natural and human-induced erosive processes shape landscape by transferring masses from the mountain to downstream areas. They also impact population both located in the source areas of sediments as well as urban areas settle on the depositional area. Mountain areas in Bolivia present high surface dynamics and high rates of rural migrations, causing e.g. a significant increase of population in Cochabamba city in the last 20 years. This work aims to estimate the sediment production on the Jatún Mayu (Pankuruma) watershed in Cochabamba department taking into account the different origins of sediments. The population of this region is predominantly rural and quechua speaking.

The region of study consists in a mountain area situated in the Andes with altitudes ranging from 2500 to 4600m. Field work on July 2014 and high resolution satellite image interpretation (2004 & 2009) allowed us to map and measure landslides and gullies. Almost a hundred of landslides are recorded mostly around the river channel in the middle and the lower part of the valley and provide a moving surface estimated at 3,15km². Most of the gullies are situated in the upper part of the valley where the vegetation is less abundant on low-sloping agricultural lands.

Photogrammetric reconstructions using camera and drone were the main method used to characterise some strategic points along the river in order to get dimensions of landslides, gullies, as well as the riverbed roughness, as the final goal was to model the flooding prone area at the mouth of the watershed, where migrants have been settling for the last years. A total of 9 points of interests along the river bed were surveyed and for each of them a square surface equal to 25m² was analysed. Approximately 250 pictures by area were needed to estimate roughness along the channel. A flood model has been performed, by using the Riverflo-2D software, to produce a susceptibility map of the downstream region.