Statistical modelling of suspended sediment load in small basin located at Colombian Andes

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In this study a statistical modelling for the estimate the sediment yield based on available observations of water discharge and suspended sediment concentration were done. A multivariate model was applicate to analyze the 33 years of daily suspended sediments load available at a La Garrucha gauging station. A regional analysis were conducted to find a non-dimensional sediment load duration curve. These curves were used to estimate flow and sediments regimen at other inner point at the basin where there are located the Calderas reservoir. The record of sedimentation in the reservoir were used to validate the estimate mean sediments load. A periodical flushing in the reservoir is necessary to maintain the reservoir at the best operating capacity. The non-dimensional sediment load duration curve obtaining was used to find a sediment concentration during high flow regimen (10% of time these values were met or exceeded).These sediment concentration of high flow regimen has been assumed as a concentration that allow an 'environmental flushing', because it try to reproduce the natural regimen of sediments at the river and it sends a sediment concentration that environment can withstand. The sediment transport capacity for these sediment load were verified with a 1D model in order to respect the environmental constraints downstream of the dam. Field data were collected to understand the physical phenomena involved in flushing dynamics in the reservoir and downstream of the dam. These model allow to define an operations rules for the flushing to minimize the environmental effects.