

Where does the water come from, and when? Spatio-temporal analyses of the runoff generation processes in páramo catchments.

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The purpose of the research presented herein was to develop and test a comprehensive methodology enabling the characterization of the spatial-temporal analysis of runoff in páramo catchments. The methodology encompassed monitoring the hydrochemographs of creeks and rivers, the isotope composition and the more classical hydrological data, and the analysis of the collected information using cluster and end member mixing analysis (EMMA). The methodology was tested in a nested catchment system using the equipment infrastructure installed in the Zhurucay River Ecohydrological Observatory (7.53 km²), located in the Andean mountain range, southern Ecuador. From April 2012 to April 2014, multivariate tracers in conjunction with hydrometric data were collected. Streamwater was clustered on the basis of the hydrochemographs enabling to judge the dominant source areas and EMMA analysis enabled identification of the dominant flow components. In a last step of the research the discharge controlling factors were investigated with respect to catchment variability involving correlation and multivariate regression analysis base on catchment properties, meteorological characteristics, end member contributions, and dominant cluster. This analysis was conducted for three typical flow conditions, respectively low, moderate and high flows.