

HYDROLOGICAL MODEL IN THE ROCHA RIVER BASIN INCLUDING ENVIRONMENTAL FLOW GUIDELINES**Nicolás A. Achá, Oliver C. Saavedra, Jhonatan E. Ureña****ABSTRACT**

In recent years, it has been noted that the water cycle in the central valley of Cochabamba has increased its variability, due to the increased demand for water due to population growth, the inadequate management of water resources in the region and the increase in the waterproofing of soils in metropolitan areas due to the expansion of the urban sprawl. This has generated extreme events frequently and unpredictably, affecting the population of the area. This is why we seek to better analyze the behavior of water quantitatively in order to take measures focused on reducing extreme events. The study area is located in the Rocha River basin, one of the basins prioritized by the Bolivian Ministry of Environment and Water. The objective of this study is the application of combined products of precipitation sensors on board satellites with data from terrestrial rain gauges and hydrological modeling with analysis of parameters of the ecological flow of the Rocha River to improve the study of extreme events. Four satellite-based precipitation products were used: CHIRPS, GSMaP, PERSIANN and IMERG and a relative error pooling process was used. The generated products were used as input to a hydrological model. The best products to use the iteration process are monthly timescale CH5M (generated from CHIRPS) with a value of 99% similarity and daily timescale GS5D (generated from GSMaP) with a value of 90% similarity. The simulated flows allowed us to estimate the amount of water available in the sub-basins, which was compared with the measurements available in the study area. Subsequently, the parameters of the ecological flow were determined using the IHA tool to study extreme events and to understand the behavior of the flow variation. The simulated events were compared with historical events reported in the area, finding similarities. Additionally, the IHA tool facilitates the visual and tabular analysis of flows under various scenarios. These results are useful to propose values of environmental flows in the Rocha river basin in dry seasons.

Keywords: Environmental Flow's, Hydrological Model, Precipitation Data, Rain Gauge, Rocha River.

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