

## Analysis of Storm Flood in Typical Sewer Networks in High Mountain Watersheds of Colombia Based on SWMM

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**Abstract :** Increasing urbanization has led to changes in the natural dynamics of watersheds, causing problems such as increases in volumes of runoff, peak flow rates, and flow rates so that the risk of storm flooding increases. Sewerage networks designed 30 - 40 years ago don't account for these increases in flow volumes and velocities. Besides, Andean cities with high slopes worsen the problem because velocities are even higher not allowing sewerage network work and causing cities less resilient to landscape changes and climatic change. In Latin America, especially Colombia, this is a major problem because urban population at late XX century was more than 70% is in urban areas increasing approximately in 790% in 1940-1990 period. Thus, it becomes very important to study how changes in hydrological behavior affect hydraulic capacity of sewerage networks in Andean Urban Watersheds. This research aims to determine the impact of urbanization in high-sloped urban watersheds in its hydrology. To this end it will be used as study area experimental urban watershed named Palogrande-San Luis watershed, located in the city of Manizales, Colombia. Manizales is a city in central western Colombia, located in Colombian Central Mountain Range (part of Los Andes Mountains) with an abrupt topography (average altitude is 2.153 m). The climate in Manizales is quite uniform, but due to its high altitude it presents high precipitations (1.545 mm/year average) with high humidity (83% average). Behavior of the current sewerage network will be reviewed by the hydraulic model SWMM (Storm Water Management Model). Based on SWMM the hydrological response of urban watershed selected will be evaluated under the design storm with different frequencies in the region, such as drainage effect and water-logging, overland flow on roads, etc. Cartographic information was obtained from a Geographic Information System (GIS) thematic maps of the Institute of Environmental Studies of the Universidad Nacional de Colombia and the utility Aguas de Manizales S.A. Rainfall and streamflow data is obtained from 4 rain gages and 1 stream gages. This information will allow determining critical issues on drainage systems design in urban watershed with very high slopes, and which practices will be discarded o recommended.

**Keywords :** land cover changes, storm sewer system, urban hydrology, urban planning

**Conference Title :** ICSRD 2020 : International Conference on Scientific Research and Development

**Conference Location :** Chicago, United States

**Conference Dates :** December 12-13, 2020