Climate-Floods relationship in the mountainous volcanic region of Morelia, Michoacan, Mexico.

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The present study provides an analysis of the water flows in the mountainous volcanic watershed of Cointzio, Michoacan (Mexico). Daily precipitations and river flows data, gathered over the period 1940-2007, were analysed to estimate the dynamic of superficial waters and its change over years.

Precipitation data pointed out the intensity of rains in this tropical region with 5% of the yearly precipitation occurring during a single day. It also reveals an unexpected feature with some extreme events occurring during the dry season. This obviously as some major consequences for the floods and sediment transport within the watershed.

For the studied period, the precipitation (mean annual and extreme values) did not reveal any major change while the water flows increased significantly. This specific behaviour is examined in terms of land use change through the evolution of an aridity index over years and literature data. Predictions from a global climate change model for the decades centred in the years 2030, 2060 and 2090 indicate (in comparison to a normalized period of years 1961 to 1990) an increment in mean annual temperature of 1.6, 2.5 and 4.4 °C and a decrease in precipitation of 15.4, 19.1 and 27.7 %, respectively. The consequent increment of aridity leads to expect a reduction of the vegetation coverage and an increment of the runoff with erosive effects.