



## **Changes and variability of extreme precipitation on the Eastern Altiplano of Colombia**

Juan Diego Giraldo-Osorio, David Enrique Trujillo-Osorio, and Oscar Manuel Báez-Villanueva  
Pontificia Universidad Javeriana, Facultad de Ingeniería, Departamento de Ingeniería Civil, Bogotá, Colombia  
(j.giraldoo@javeriana.edu.co)

Climate change is usually thought as higher temperatures in the future, because of the consensus about global warming. However, global warming will cause unexpected changes on precipitation patterns. Climate models have not yet reached a consensus about the future trend of precipitation average in different zones of the world. It is even more uncertain the future trend that will have the extreme values (including both extreme droughts and heavy events), since their observation is hard because they are unusual events. Colombia is permanently exposed to climatic extremes related to precipitation: during El Niño years the rain is drastically reduced (and, consequently, the rivers flow and the water resource availability); nevertheless, during La Niña years, the rain is excessive, which is a suitable condition that triggers floods and landslides, mainly in the mountainous area of the country. Given that the precipitation extremes are affected by both the long-term trends, and the inter-annual variability, represented by El Niño/La Niña years cycle, conduct this study is relevant. The selected study area has the maximum importance for Colombia (Eastern Cordillera's Altiplano, where Bogota city is settled) to construct the extreme rainfall indices. A satellite product was used to ensure a complete spatial coverage, and because it has a daily temporary resolution for building the selected Extreme Precipitation Indices (EPI). Statistical tests were carried out to verify the long-term trend/change of EPI. Also, the hydrological years were discriminated according to the ENSO, in order to perform a statistical test to probe the hypothesis that EPI, during these particular years (El Niño/La Niña), belong to probability distributions different from that distribution of EPI in years considered normal. On the Altiplano area, the study has found that the probability of days with heavy rains is increased because the long-term trend, add up with the inter-annual variability induced by La Niña years. According with the study findings, on the Altiplano the annual precipitation is not affected, but the number of wet days is reduced by the long-term trends, and due to La Niña years conditions. Then, the same precipitation depth is falling in fewer days.