

Flood hazard maps in Matucana village under climate change scenarios

JUAN W. CABRERA CABRERA & LEONARDO F. CASTILLO NAVARRO

Facultad de Ingeniería Civil, Universidad Nacional de Ingeniería, Lima25, Peru
juancabrera@uni.edu.pe

Abstract Possible effects of climate change on floods magnitude and effects are discussed in this document based on existing data and projected changes in precipitation until 2099. This methodology is applied to Matucana Village, which suffers the effects of floods and debris flows. First, historical peak precipitation, fitted to Gumbel distribution, was used. After that, percentage projected changes of precipitation were used to obtain the new mean precipitation to each period 2010–2039, 2040–2069 and 2070–2099; these mean precipitations define a new Gumbel distribution for every time period. Then, projected maximal precipitations to 100 years of return period are estimated and the corresponding peak flow hydrographs were built. Finally, hazard maps are plotted. This application is possible because Matucana is located in a climatologically homogeneous basin. The final results suggest an important increase in magnitude and affected area by floods in the next 90 years under the A1FI emission scenario.

Key words AOGCM; climate change; flood; hazard map; IPCC scenarios; debris flow; Matucana, Peru