



Construction of flood frequency curves in the lower Limpopo River basin of Mozambique using Bayesian and Markov chain Monte Carlo methods

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Abstract

In this paper we discuss the disastrous extreme floods that have recently become a common feature in the economically challenged Southern African Development Community (SADC) member state of Mozambique. The year 2000 floods and recent 2013 floods killed a combined total of over 800 people, caused economic damages worth over USD550 million and led at least 3 women to give birth on rooftops and treetops in Chokwe district in lower Limpopo River basin of the country. We use the Markov chain Monte Carlo (MCMC) Bayesian method to estimate the parameters of the generalised extreme value distribution at a regional level in an attempt to develop the long term forecasts of the return periods of extreme floods in the vulnerable basin. We construct the flood frequency curves for the region which can be used to predict the return periods and their corresponding return levels in the region. It is hoped that these long term forecasts will complement the short term flood forecasting and early warning systems in the basin in reducing the associated risk and mitigating the deleterious impacts of these floods on humans and property.

Keywords: Bayesian inference; economic damages; roof births; flood frequency curves.