



Understanding the relationship between rainfall and river discharge: trends in an Amazonian watershed

Rodolfo Nóbrega (1), Alphonse Guzha (1), Paula Freire (2), Celso Santos (2), and Gerhard Gerold (1)

(1) Landscape Ecology Department, Institute of Geography, University of Goettingen, Göttingen, Germany, (2) Federal University of Paraíba, Department of Civil and Environmental Engineering, João Pessoa, Brazil

A research challenge in the Amazon rainforest is to understand different environmental patterns in a five million km² region which with poor and/or unavailable environmental data. Deforestation and degradation in this forest have motivated intense monitoring activities in order to understand its impact and support the formulation of sustainable environmental policies. Time series analysis of hydrologic data is often used as a tool to evaluate watershed responses to climatic and anthropogenic influences. In this study, trend analysis of stream discharge from a 35600 km² watershed (Curuá River), located in southern Amazon was performed using 31 years discharge and rainfall data (1976 [U+F02D] 2006). The Curuá River is a tributary of Xingu River, site of the controversial Belo Monte dam. The aim of this work was to investigate the temporal variability of discharge, in relation to associated rainfall variability in order to contribute to a better understanding of the hydrological status of the watershed. The Mann Kendall non parametric tests were performed on daily, seasonal and annual discharge data. Frequency analysis using wavelet transform was also done, and annual and seasonal rainfall data was analyzed and correlated to discharge. Results from this study indicate decreasing trends in discharge (intra- and inter-annual) but while there is no evidence of a decreasing trend in rainfall. Further interpretation of the data for possible causes of discharge changes is needed at the local study level, and implications of these results discussed in the context of climate change, deforestation and water resource management (including dam's constructions last decades). Results from this study do not confirm findings from other regional scale trend analyses, and therefore it is important to quantify the spatial extension of these decreasing stream flow trends in the Amazonia.