



# Evaluation Rainfall Regime at the Hydroelectric Power Plant toward Climate Change

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## ARTICLE INFO:

### Article history:

Received 2 August 2017

Accepted 10 August 2017

Available online 12 October 2017

### Keywords:

Climate Change;

IPCC-AR5;

Precipitation.

## ABSTRACT

*The hydroelectric plants are first in the Brazilian energy matrix, so irregularities in the rainfall regime can affect the energy generation, thus evidencing the need to know the rainfall distribution in the studied area. This work aimed to evaluate possible analysis of the impacts of climate change on the rainfall regime in the Machadinho hydroelectric region. For the research development, the IPCC-AR5 pessimistic scenario was used, representing a scenario with a continuous population growth and high carbon dioxide emissions. From the historical series and organized projections, precipitation anomalies were calculated. Analyzing the difference between the average of the month and the climatological normal, it was inferred that the model used presented a positive trend for precipitation in the period from 2026 - 2100, projecting anomalies between 25 and 200 mm per month. A greater amplitude is observed in the precipitation of 2076-2100, indicating an increase in the occurrence of extreme events of precipitation, mainly in the spring period. Considering that the rains in the Machadinho hydroelectric region are increasing in the scenarios analyzed, the average water level in the reservoir of the plant tends to increase.*

CONTEMPORARY URBAN AFFAIRS (2017) 1(3), 62-65. Doi: 10.25034/ijcua.2018.3682

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## 1. Introduction

The global concern about climate change has been increasing, since the emission of gases from human activities contributes to the greenhouse effect in the atmosphere, indicating significant impacts to the planet in the coming years. The changes have been associated with the issue of energy, especially renewable energies, which are directly linked to climate variations. According to Moraes (2013) in 1988, the Intergovernmental Panel on Climate Change (IPCC) was created through an initiative of the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP).

The IPCC was established with the mission of evaluating research, interpreting it, and gathering all relevant information, both technical, scientific and socioeconomic, into comprehensive, easily understood and accessible reports by all in communities, including decision makers (Grimm, 2016; Moraes, 2013). According to Nimer (1989), rainfall

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