Statistical analysis of the precipitation trends in Rio Largo, Alagoas, Brazil

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Summary

Global climatic changes caused by the increase of the atmospheric greenhouse gases concentration had become evident in the last few decades (Marengo, 2010). The accumulation of greenhouse gases tends to modify the atmospheric radiation balance, causing temperature increase, changes in precipitation distribution standards and others climatic elements. One of the main consequences of climate changes could be related to changes in hydrological cycle (Santos et al., 2009). These changes has potential to affect almost all related aspects of life human being, agricultural productivity, energy use, flooding control, potable water supply, among others (Xu, 2000). Global climatic variations have been investigated in some studies that search to understand as temperature increase is contributing for the changes observed in climate and precipitation variability. So, the objective of this study is to identify possible trends in distribution of the precipitation for the city of Rio Largo, Alagoas, which is situated in eastside of Brazil´s northeast region. In this study was used average monthly precipitation data ranging between 1973 and 2008. For the data, analysis of regression, Student´s t-test and the non-parametric statistical test of Mann-Kendell had been carried through. The analysis of regression was used to indicate possible climatic alterations by means of the test of significance of the slope. The Student´s t-test consists of using the data of the sample to calculate statistics t and later compare it with distribution t to identify the probability of obtaining the observed result, if the null hypothesis is true. The test of Mann-Kendall considers that, in the hypothesis of stability of a time series, the succession of values occurs of independent form, and the probability distribution must always remain the same (simple random series) (Back, 2001). Goossens and Berger (1986) affirms that the test of Mann-Kendall is the method most appropriate to analyze climatic changes in climatology series and also allows to the detention and approximate location of the starting point of a certain trend. The results showed agreement in the indication of the trends obtained with the statistical tests used. The trend obtained showed a decrease in precipitation for almost all months of the year, with exceptions in January, June and August showed that

increased precipitation. Although the results indicate a reduction for the precipitation, there was no statistically significant trend for the tests.

Keywords: climate changes; precipitation variability; statistical tests

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