



Probability of occurrence of extreme precipitation events and natural disasters in the city of Natal, Brazil

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ABSTRACT

This study aimed at estimating the probability of occurrence and return period of extreme daily precipitation events, associating them with natural disasters that occurred in the city of Natal, Northeast Brazil. For this purpose, generalized extreme value (GEV) distribution models were adjusted to the daily extreme precipitation data observed for a period of 31 years (1984–2014). The results indicated that the intensity of expected extreme precipitation depends on the month of its occurrence. October, November and December have low probabilities of rainfall, while April, May, June and July stand out as the period when the highest intensities of extreme precipitation are expected. On average, the daily accumulated precipitation of the days when natural disaster events occurred in Natal was 69.2 mm. The probability of rainfall greater than 60 mm/day varied between 37.7% and 74.8% between March and July. Furthermore, pluvial flooding was the type of natural disaster occurring most frequently in the city. This information can be useful to support the formulation of public policies in terms of planning, adaptation and mitigation of urban risks caused by extreme precipitation events.

1. Introduction

In Brazil in recent decades, there has been a significant increase of population concentration in metropolises, with important demographic and socioeconomic implications, without policies that seek to meet urban needs, reduce social inequalities and mitigate residential segregation (Brito and Souza, 2005; de Ribeiro, da Silva, and Rodrigues, 2011). On the evolution of urbanization in Brazil, the researchers Brito and Pinho (2015) revealed that this process reflects the speed of the various demographic changes experienced by Brazilian society. In 2010, about 84% of the country's households were located in urban areas, according to the latest census conducted

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