

## TREND SURFACE ANALYSIS APPLIED TO RAINFALL DATA FROM THE STATE OF PARAÍBA

Oseas Machado GOMES<sup>1</sup>  
Guilherme Rocha MOREIRA<sup>1</sup>  
Ricardo Alves de OLINDA<sup>2</sup>  
Carlos Antonio Costa dos SANTOS<sup>3</sup>

- **ABSTRACT:** *The lack of data and poor spatial distribution of weather stations has been a major challenge for researchers attempting to describe statistical models that can explain consistently the behavior of certain meteorological parameters such as precipitation, temperature, relative humidity among other as well as supply this lack of data for sites not sampled. The analysis of trend surface used in this work was of great importance to explain these parameters, some criteria, such as; Akaike Information Criterion (AIC), Analysis Of Variance (ANOVA) and the Adjusted Coefficient of Determination  $R^2_a$  were used to select these. According to these criteria it was observed that the surfaces that best fit the rainfall data State of Paraíba were cubic surfaces and 4th degree. Thus, it was noted, for some months, certain regions had higher precipitation, as is common during these periods the acting of some meteorological systems such as the Intertropical Convergence Zone (ITCZ) and Upper Tropospheric Cyclonic Vortex (UTCV), because it is the rainy season in this region. Estimates interpolated by the selected models were fairly representative with regard to the spatial distribution of precipitation in each location during the analyzed period. The maps of the residuals show exactly the places where the smallest and largest differences occurred, i.e., where the model had some difficulty to estimate values of precipitation, in other places the model results presented quite close to observed. The Analysis were performed using R software with the aid of spatial package.*
- **KEYWORDS:** *Trend surface; spatial variability; analysis of variance; climate change..*

---

<sup>1</sup> Universidade Federal Rural de Pernambuco - UFRPE, Programa de Pós-Graduação em Biometria e Estatística Aplicada, CEP: 52171-900, PE, Brasil. E-mail: [oseasmachado@gmail.com](mailto:oseasmachado@gmail.com), [guilhermern@deinfo.ufrpe.br](mailto:guilhermern@deinfo.ufrpe.br)

<sup>2</sup> Universidade Estadual da Paraíba - UEPB, Departamento de Estatística, CEP: 58109-790, Campina Grande, PB, Brasil. E-mail: [ricardo.estat@yahoo.com.br](mailto:ricardo.estat@yahoo.com.br)

<sup>3</sup> Universidade Federal de Campina Grande - UFCG, Unidade Acadêmica de Ciências Atmosféricas, CEP: 58109-970, Campina Grande, PB, Brasil. E-mail: [carlostorm@gmail.com](mailto:carlostorm@gmail.com)