African Nuclear Physics (Pure Science)

Atmospheric Dynamics and Climate Variability Modelling Over East Africa: A Nigerian Perspective

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Abstract

The atmospheric dynamics over East Africa are influenced by complex interactions between regional climate systems and larger-scale global phenomena. The research employs a combination of statistical modelling techniques, including a Generalized Additive Model (GAM) for capturing non-linear relationships between variables, and Bayesian inference to account for uncertainties in observational data. A GAM model was applied to identify significant predictors of climate variability over East Africa, revealing that temperature anomalies were correlated with sea surface temperatures from the Atlantic Ocean. The study provides insights into how oceanic conditions influence local atmospheric dynamics and suggests potential strategies for regional climate prediction models. Future research should incorporate more comprehensive datasets to validate findings and explore interactions with other environmental factors such as vegetation cover and soil moisture. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *East Africa, Climate Modelling, Dynamical Systems, Atmospheric Circulation, Seasonal Variability, Regional Climate, Modelling Techniques*

ABSTRACT-ONLY PUBLICATION

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