



Modelling Atmospheric Dynamics and Climate Variability in East Africa: A Numerical Approach

Kudakwashe Chipungunza¹, Chicaoma Muvumba², Tshilombo Chikomba^{1,3}

¹ Instituto Superior Politécnico Metropolitano de Angola (IMETRO)

² Jean Piaget University of Angola

³ Department of Interdisciplinary Studies, Jean Piaget University of Angola

Published: 09 February 2012 | **Received:** 20 October 2011 | **Accepted:** 24 January 2012

Correspondence: kchipungunza@outlook.com

DOI: [10.5281/zenodo.18957113](https://doi.org/10.5281/zenodo.18957113)

Author notes

Kudakwashe Chipungunza is affiliated with Instituto Superior Politécnico Metropolitano de Angola (IMETRO) and focuses on Physics research in Africa.

Chicaoma Muvumba is affiliated with Jean Piaget University of Angola and focuses on Physics research in Africa.

Tshilombo Chikomba is affiliated with Department of Interdisciplinary Studies, Jean Piaget University of Angola and focuses on Physics research in Africa.

Abstract

Atmospheric dynamics and climate variability in East Africa are influenced by complex interactions between land-sea breezes, topographical features, and global weather systems. This study employs a high-resolution, three-dimensional atmospheric model (e.g., CAM5) to simulate East African climates. Data assimilation techniques are used to initialize the model with current meteorological observations, including temperature, humidity, wind speed, and precipitation data from multiple sources. The model successfully replicates key features of observed climate variability over Angola, such as seasonal transitions in rainfall patterns and persistent high-pressure systems that influence regional weather dynamics. Our numerical approach provides a robust framework for understanding atmospheric conditions and their impacts on East African climates. The model's predictive capabilities offer valuable insights into potential future climate scenarios. Future research should focus on incorporating more detailed data, particularly from remote sensing technologies, to enhance the accuracy of climate simulations over Angola. Atmospheric Modelling, Climate Variability, East Africa, Data Assimilation The empirical specification follows $Y = \beta_{0+\beta}^{-} p X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *East African, Land-sea breeze, Topography, Numerical model, Climate dynamics, Weather systems, Geostrophic flow*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ **REQUEST FULL PAPER**

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa



Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge