



Trends and variability in East African rainfall and temperature observations

Larisa Seregina (1), Volker Ermert (1), Andreas H. Fink (2), Joaquim G. Pinto (1,3)

(1) Institute for Geophysics and Meteorology, University of Cologne, Germany (lseregin@uni-koeln.de), (2) Institute for Meteorology and Climate Research, Karlsruhe Institute of Technology, Germany, (3) Department of Meteorology, University of Reading, United Kingdom

The economy of East Africa is highly dependent on agriculture, leading to a strong vulnerability of local society to fluctuations in seasonal rainfall amounts, including extreme events. Hence, the knowledge about the evolution of seasonal rainfall under future climate conditions is crucial. Rainfall regimes over East Africa are influenced by multiple factors, including two monsoon systems, several convergence zones and the Rift Valley lakes. In addition, local conditions, like topography, modulate the large-scale rainfall pattern. East African rainfall variability is also influenced by various teleconnections like the Indian Ocean Zonal Mode and El Niño Southern Oscillation. Regarding future climate projections, regional and global climate models partly disagree on the increase or decrease of East African rainfall.

The specific aim of the present study is the acquirement of historic data from weather stations in East Africa (Kenya, Tanzania, Ruanda and Uganda), the use of gridded satellite (rainfall) products (ARC2 and TRMM), and three-dimensional atmospheric reanalysis (e.g., ERA-Interim) to quantify climate variability in the recent past and to understand its causes. Climate variability and trends, including changes in extreme events, are evaluated using ETCCDI climate change and standardized precipitation indices. These climate indices are determined in order to investigate the variability of temperature and rainfall and their trends with the focus on most recent decades.

In the follow-up, statistical and dynamical analyses are conducted to quantify the local impact of pertinent large-scale modes of climate variability (Indian Ocean Zonal Mode, El Niño Southern Oscillation, Sea Surface Temperature of the Indian Ocean).