

SYSTEMS ASSOCIATED WITH ONSET AND CESSATION
OF MARCH TO MAY RAINFALL OVER THE NORTHERN
EAST COAST OF TANZANIA

BY

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RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL
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DECLARATION

This project is my *original work* and has not been submitted for a degree award by any one in any University.

Signature



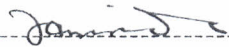
29/09/2009

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This project has been submitted for examination with our approval as University supervisors

Signature

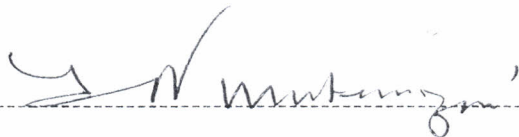


30/09/09

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ABSTRACT

This study has investigated two of the most important aspects of rainfall over the North eastern coast of Tanzania, namely onset and cessation dates (pentads) of the main long rainy season. These aspects have considerable impacts on the rain-fed agriculture that is a major contributor to the national economy and the well-being of the population farmers. Farmers depend on the start or onset of the rains, which is highly variable, to plant crops like maize for subsistence agriculture.

Thirty years (1978–2008) of daily rainfall data for north eastern coast of Tanzania were analyzed with the aim to characterize the systems associated with the onset and cessation of March to May rainfall of north eastern coast of Tanzania.

Several methodology were used in order to achieve the above objectives, including Simple correlation and regression analysis, cumulative pentad totals which were used to determine onset and cessation, graphical methods and other simple statistical methods.

Statistical packages used were **Instat plus**, **SYSTAT 8.0** and Microsoft **Excel**

The cumulative pentad totals curves drawn in this study, shows that **on averages** the onset start at pentad 15 and withdraw at pentad 31 in the Northern east coast of Tanzania. And on average the March to May rainfall duration is of the length of 16 pentads (31-15)

The study demonstrated that there is large interannual variability of the onset, ranging from pentad 13 to pentad 29 over the 30-yr period within the region, with a standard-deviation of 2.98. The withdrawal is less variable, ranging from pentad 29 to pentad 41 over the 30-year period within the region with standard deviation of 1.54.

The interannual variability of the onset and cessation time-series, as well as their fine spatial representativity, has enabled the search for relationships with large-scale atmospheric and oceanic fields on a seasonal time-scale like SST, ENSO, SOI, Low level wind (850mb) and means sea level pressure.

It was found that early onset during study period was in pentad **13** (2002) and early cessation in pentad **29** (2003) while late onset appeared in pentad **29** (1994) and late cessation in pentad **41** (1999).and all these events were well explained by low level wind(850mb) and mean sea level pressure pattern.

The study showed that the onset of the MAM season was due to ITCZ being in the region and advection of onshore maritime air masses, while the cessation of the MAM were due to the region of interest being under the influence of the Low level diffluent and curvature of the maritime air mass controlled by Heat low pressure system over Indian subcontinent.

Lastly, the study showed that SST parameters, regional and global atmospheric phenomena has indicates predicting potential over the region of interest. Hence one can use them to come up with the forecast of the future conditions of the area.