



Analysis of satellite precipitation over East Africa during last decades

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Daily accumulated precipitation time series from satellite retrieval algorithms (e.g., ARC2 and TAMSAT) are exploited to extract the spatial and temporal variability of East Africa (EA – 5°S-20°N, 28°E-52°E) precipitation during last decades (1983-2013).

The Empirical Orthogonal Function (EOF) analysis is applied to precipitation time series to investigate the spatial and temporal variability in particular for October-November-December referred to as the short rain season. Moreover, the connection among EA's precipitation, sea surface temperature, and soil moisture is analyzed through the correlation with the dominant EOF modes of variability. Preliminary results concern the first two EOF's modes for the ARC2 data set. EOF1 is characterized by an inter-annual variability and a positive correlation between precipitation and El Niño, positive Indian Ocean Dipole mode, and soil moisture, while EOF2 shows a dipole structure of spatial variability associated with a longer scale temporal variability. This second dominant mode is mostly linked to sea surface temperature variations in the North Atlantic Ocean.

Further analyses are carried out by computing the time series of the joint CCI/CLIVAR/JCOMM Expert Team on Climate Change Detection and Indices (ETCCDI, <http://etccdi.pacificclimate.org/index.shtml>), i.e. RX1day, RX5day, CDD, CDD, CWD, SDII, PRCPTOT, R10, R20. The purpose is to identify the occurrences of extreme events (droughts and floods) and extract precipitation temporal variation by trend analysis (Mann-Kendall technique). Results for the ARC2 data set demonstrate the existence of a dipole spatial pattern in the linear trend of the time series of PRCPTOT (annual precipitation considering days with a rain rate > 1 mm) and SDII (average precipitation on wet days over a year). A negative trend is mainly present over West Ethiopia and Sudan, whereas a positive trend is exhibited over East Ethiopia and Somalia. CDD (maximum number of consecutive dry days) and CWD (maximum number of consecutive wet days) time series do not exhibit a similar behavior and trends are generally weaker with a lower significance level with respect to PRCPTOT and SDII.