Abstract

The study investigated the dominant atmospheric circulation patterns associated with abnormal rainfall over Rwanda during the March–May (MAM) rainfall season in 1981–2010. The data sets used in this study include: rainfall, wind, sea surface temperature (SST), and humidity. Correlation and composite analysis and Percent of Normal Index (PNI) were deployed in this study. In the wet years (1987, 1988, and 1998), the country was dominated by moisture convergence, which is in line with wind anomalies that exhibits strong westerly winds from the Atlantic Ocean and southeasterly winds originated from the Indian Ocean. These winds carry moist air mass passing over Congo to the study area, leading to wet events. On the other hand, easterly winds were noted over the study area during the dry years (1984, 2000, 2007, and 2008).The observed wet years coincided with the El Niño events, while the dry years are noted during the La Niña episodes. The dry years exhibited a wide spread of moisture divergence anomaly at the low level and were characterized by the sinking motion as opposed to the wet years with the rising motion. The anomalies of velocity potential/divergence further showed that the wet (dry) years were characterized by convergence (divergence) at the low level. The results also show that there exists a low positive correlation between mean MAM rainfall and SST over the Indian Ocean, which shows minimum influence of the Ocean. On the other hand, it was noted that rainfall amounts is significantly correlated at 95% confidence level with the elevation (altitude) of a given station. This study improves the understanding of the occurrence of wet and dry events in Rwanda, which is helpful in future monitoring of these events.