

Abstract

This study investigates the contributions of Atlantic Ocean to June-August rainfall over Uganda and western Kenya (KU). The study utilized the following datasets: precipitation from the Global Precipitation Climatology Centre, North Atlantic Oscillation Index (NAOI), South Atlantic Ocean Dipole Index (SAODI), ERA-interim reanalysis, and the Atlantic Ocean sea surface temperature (SST). Singular value decomposition (SVD), composite analysis and correlation analysis methods are used to achieve the objective of the study. Results show that significant coupled modes of variability exist; the first mode explaining 32% whereas the second mode explains 16% of the total covariance. The first SVD mode captures the positive phase of the South Atlantic Ocean Dipole (SAOD). This is associated with positive anomaly of rainfall in most parts of KU, whereas the second SVD mode captures the negative phase of SAOD. NAOI exhibits a significant positive correlation of coefficient ≥ 0.3 with the mean JJA rainfall anomaly over most parts of KU at 95% confidence level. The correlation between the mean JJA rainfall over most parts of KU and NAOI is higher compared to that with SAODI. The dominant moisture sources in the region during JJA season are Atlantic Ocean and Congo rainforest. The findings from this study provide insight into the influence of Atlantic Ocean on the mean JJA rainfall over KU. More research is required on the utilization of NAOI and SAODI as predictors of the JJA seasonal rainfall over the study area.