

Abstract

This study diagnoses the circulation anomalies associated with the 2010 December–February (DJF) flood in comparison with the 1992 DJF drought over Zambia. Monthly precipitation data for 39 meteorological stations were sourced from Zambia Meteorological Department, the Climate Research Unit precipitation data, and reanalysis datasets are used. Composite analysis was employed to understand the circulation anomalies during the period under review. Results show that the average precipitation over Zambia was above normal; however, some parts of the country received normal rainfall. The climatology of zonal wind is characterized by easterly flow except at low level. During the flood year, this flow was enhanced as observed in the anomalous vertical cross section of the zonal wind; a reversed flow was observed during the drought year. The region was characterized by rising motion during the flood year, which is associated with convergence at low level and divergence at upper level, as opposed to the drought year which exhibited sinking motion. Convergence at low level leads to vertical stretching, whereas divergence at low level leads to vertical shrinking, which suppresses convection due to subsidence. The observed atmospheric circulations can be monitored in the update of seasonal weather forecast to avert the losses associated with floods in future.