

Abstract

There has been a critical problem of the devastating natural hazard (hydrological drought) which greatly affects a significant proportion of the large population particularly those living in arid and semi-arid areas. The flow regime of the Malewa River is reducing due to the river fluctuation, increasing scarcity of water during dry periods. The purpose of this research was to assess spatial and temporal hydrological drought using Surface Water Supply Index (SWSI) at Malewa River catchment. The data were based on hydro-meteorological data which included rainfall, level of water at Lake Naivasha, and streamflow of Malewa River for the years 1980- 2018. They were obtained from Water Resources Authority (WRA) in Naivasha and Kenya Meteorological Department (KMD) in Nairobi, Kenya. The field data were first normalized to have all input attributes temporary variables with their distribution having zero means and a standard deviation of 1. Later the normalized data were calculated using basin-calibrated algorithm of SWSI to determine the hydrological condition. In SWSI, the highest percentage of classification for the stations were near the average of -0.9 to 1.0, with 34% for the Malewa area and 30% for the Turasha area. In spatial distribution analyses, hydrological drought severity was highest along the southern part of the catchment and lowest along with Eastern and North-Eastern areas. Therefore, hydrological drought severity was experienced in the catchment in terms of temporal and spatial analyses and increased along the flow path of the river. Hydrological drought assessment shows a technical manner for a comprehensive understanding of drought offering proper mitigation strategies and plan to control this natural disaster.