

River catchment rainfall series analysis using additive Holt–Winters method

ABSTRACT

Climate change is receiving more attention from researchers as the frequency of occurrence of severe natural disasters is getting higher. Tropical countries like Malaysia have no distinct four seasons; rainfall has become the popular parameter to assess climate change. Conventional ways that determine rainfall trends can only provide a general result in single direction for the whole study period. In this study, rainfall series were modelled using additive Holt–Winters method to examine the rainfall pattern in Langat River Basin, Malaysia. Nine homogeneous series of more than 25 years data and less than 10% missing data were selected. Goodness of fit of the forecasted models was measured. It was found that seasonal rainfall model forecasts are generally better than the monthly rainfall model forecasts. Three stations in the western region exhibited increasing trend. Rainfall in southern region showed fluctuation. Increasing trends were discovered at stations in the south-eastern region except the seasonal analysis at station 45253. Decreasing trend was found at station 2818110 in the east, while increasing trend was shown at station 44320 that represents the north-eastern region. The accuracies of both rainfall model forecasts were tested using the recorded data of years 2010–2012. Most of the forecasts are acceptable.

Keyword: Additive Holt-Winters; Climate change; Langat River Basin; Monthly rainfall series; Seasonal rainfall series