

Land use change effects on extreme flood in the Kelantan basin using hydrological model

ABSTRACT

Land use and land cover (LULC) change results in increased of flood frequency and severity. The increase of annual runoff which is caused by urban development, heavy deforestation, or other anthropogenic activities occurs within the catchment areas. Therefore, accurate and continuous LULC change information is vital in quantifying flood hydrograph for any given time. Many studies showed the effect of land use change on flood based on hydrological response (i.e., peak discharge and runoff volume). In this study, a distributed hydrological modeling and GIS approach were applied for the assessment of land use impact in the Kelantan Basin. The assessment focuses on the runoff contributions from different land use classes and the potential impact of land use changes on runoff generation. The results showed that the direct runoff from developmental area, agricultural area, and grassland region is dominant for a flood event compared with runoff from other land-covered areas in the study area. The urban areas or lower planting density areas tend to increase for runoff and for the monsoon season floods, whereas the inter-flow from forested and secondary jungle areas contributes to the normal flow.

Keyword: Kelantan River basin; Land use; Flood event; Hydrological model