

Calibrated radar-derived rainfall data for rainfall-runoff modeling.

Abstract

This study focuses on a technique to improve runoff modeling based on radar-derived rainfall and hydrological model for the whole watershed. GIS tools were used to provide the model parameters for the Upper Bernam River Basin (1090 km²), Malaysia. Virtual rainfall stations are created throughout the UBRB watershed. The rainfall data for these stations are estimated from raw weather radar data using newly developed program called RaDeR ver1.0. For this study, estimated radar rainfall data from Subang weather radar stations were compared and calibrated with actual rain gauge data. Radar-derived rainfall calibration model developed for Subang radar station was $y=0.8772x$. According to the model developed, the radar rainfall calibration factor (RCf) can be identified as 0.8772. The original estimated radar derived rainfall data should be adjusted before using the calibration factor (RCf). The model gives better correlation when adjusted radar values were used instead of the original radar rainfall values. The model calibration factor increased from 0.464 with R² of 0.2759** to 0.8772 with R² of 0.3655***. Finally, the virtual rainfall stations created throughout the river basin produced a more representative rainfall distribution. It is believed that watershed river flow can be better estimated by using radar-derived rainfall data.

Keyword: GIS; Malaysia; Radar rainfall calibration; Radar-derived rainfall; Virtual rainfall stations.