



Runoff simulation using simple conceptual HBV model in chindwin river basin

Win Win Zin

University of Karlsruhe, Germany (ge80@iwk.uni-karlsruhe.de)

This research presents the development of explicit moisture accounting rainfall-runoff model to simulate the hydrological response of three catchments from the Chindwin river basin in Myanmar. This study is concentrated to deterministic conceptual model on a daily basis. The basin is considered to be a lumped system and model equations are formulated on the physical process.

The lumped type Hydrologiska Byrans Vattenbalansavdelning (HBV) model is tested in this study. The model uses three main storage components: soil moisture, upper zone and lower zone. The upper zone conceptually represents the quick runoff components such as overland flow and interflow. The lower zone conceptually represents the groundwater and lake storage that contributes to base flow in the catchment. The structure of the HBV model consists three main parts such as the soil moisture accounting part, the response function part and transformation part. Fifteen years of daily rainfall and daily flow are taken for calibration as well as verification.

The HBV model has altogether nine free parameters. The calibration of the model is made by a manual trial and error technique, during which relevant parameter values are changed until an acceptable agreement with observations is obtained. The numerical verification criteria used in model calibration are: model efficiency, coefficient of variation of the residual of error, ratio of relative error to the mean and ratio of absolute error to the mean.

Model calibration is done by fitting base flow first, and then adjustment for higher flow is made later by adjusting the parameters concerned. The optimization is made for one parameter at a time, while keeping the others constant. Optimum parameters

for Chindwin river basin are determined. It is found that model results are quite satisfactory in Hkamti, Mawlaik and Monywa stations. Daily flows are simulated and the results are useful in water resources appraisal, planning and management. This study can be taken as general reference for runoff simulating using HBV model in other basins of Myanmar.