SECTION C

826/C

Use of HEC-GeoHMS and HEC-HMS to perform a grid-based hydrologic analysis of a watershed

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There have been numerous advances in Geographic Information Systems (GIS) in recent years. It is believed that these advances will provide a more efficient and a more accurate alternative to traditional methods for studying watersheds. These studies lead to the accurate prediction of rainfall-runoff relationships, which is the final goal of hydrologic studies. Different hydrologic models have been developed towards this aim. HEC-GeoHMS and HEC-HMS developed by U.S. Army Corps of Engineers Hydrologic Center (HEC) are public domain softwares. This study was an effort to model Kalu-Ganga River catchment using weather data, GIS data, and the softwares, HEC-GeoHMS and HEC-HMS. The purpose of the study was to determine the practical applicability of the above software in modeling the upper catchment of the Kalu-Ganga River for forecasting floods. The upper catchment of the Kalu-Ganga River is an inland watershed with a drainage area of 622 km^2 with a fairly steep topography. Two models, a traditional lumped basin model and a distributed grid based basin model, were developed and resulting hydrographs were compared with the observed hydrograph of the Kalu-Ganga River basin at Ratnapura. The development of the model heavily relied on digital GIS data available on-line. The hydrographs were compared based on time to peak, peak discharge and the total runoff volume. Results indicated a reasonably close reproduction of observed time to peak, magnitude of peak discharge and total runoff volume. The study shows the usefulness of the software, HEC-GeoHMS and HEC-HMS in developing a hydrologic model for the basin. Further, similarity of the results obtained from the two models suggest the applicability of a much simpler lumped model to the basin compared to a distributed model, which needs more effort in modeling.

Key words: HEC-GeoHMS, HEC-HMS, Kalu-Ganga River, rainfall-runoff modeling

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