

THESIS

COMPARISON OF RUNOFF SIMULATIONS USING  
HEC-GeoHMS AND TOPMODEL



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## ABSTRACT

The study deals with the comparison of results for runoff simulations by using two different model formulations and observe that how different model formulation can have huge impact on the simulation results. So due to these variation in results, any design based on these results will have either the most cost or more risk. So it is very important to select the most appropriate model which can give the simulation results more closely to the observed values. The main objective of the research was to analyze that how different models used in runoff simulation can give different results.

Two hydrological models, HEC-GeoHMS and TOPMODEL, were used in the research. Five years of input data was used. The input data used in the research were, precipitation data, observed stream flow data, climate data, elevation data. Both models were first calibrated and the model parameters were optimized for maximum modeling efficiency. Then the calibrated models were validated. Results were compiled for both models. Comparisons were made between the observed and simulated flows for both models. Percentage errors were calculated between observed and simulated flows for both models.

The results of the simulation shows that the HEC-GeoHMS shows very good simulation results for low, medium and high flow simulation with very less percentage of errors for the observed and simulated flows. TOPMODEL shows good results for low and medium flow simulations while in case of high flows, TOPMODEL always shown under-estimated results.

Model formulations of both models were thoroughly studied and it was tried to find out the major reason for such a variation in results for TOPMODEL simulation. It was found in the research that TOPMODEL was unable to model the imperviousness of the catchment surface. While in case on HEC-GeoHMS there was a provision to assignee a suitable percentage of imperviousness of the surface area due to which it shown more accurate results as compared to the TOPMODEL.

On the basis of results of the study, it is suggested that HEC-GeoHMS is more suitable as compared to the TOPMODEL for the selected (Daraban Zam) type of catchment area.