



Influence of rainfall excess on modeled hydrograph

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Influence of the pattern of rainfall excess on modeled hydrograph was investigated in the study. Model was made in the U.S. Army Corps of Engineers hydrograph package HEC-HMS 3.2 and calibrated on measured hydrograph of Glinscica watershed. First of all, six different models of rainfall loss (Infiltration index model, Horton model, Initial and uniform method, SCS method, Green Ampt method and Smith Parlange method) were applied and their effect on modeled hydrograph was evaluated. Peak discharge, time of peak discharge and runoff volume were compared. The best results with lowest RMSE in our case gave the SCS loss method.

Also synthetic hyetographs of different probability and duration were used. The rainfall durations were chosen in such a way that they were equal to, less than and more than the time of concentration of the watershed. Next the location of maximum precipitation of synthetic hyetograph was changed. Generally, the location of the maximum intensity of rainfall is taken in the middle of the rainfall duration. Three positions of the maximum rainfall intensity at 25, 50 and 75 % of the rainfall duration were applied in the study. The results showed considerable differences in time to peak of resulted hydrographs and also differences in peak discharge. The differences in time to peak increases considerable with the increasing of the rainfall duration.

Finally, the constant intensity of rainfall of different durations was applied. The results were compared with those obtained with typical rainfall distribution with the position of the maximum intensity at 50 %. There was no significant influence on runoff hydrograph by short rainfall durations, but extending of the rainfall duration caused the increasing of the difference in peak discharge and time to peak. For example, peak discharge by 24-h constant rainfall intensity was underestimated by more than 100 %.