

Flash flood estimation for small Carpathian's basins.

In small ungauged mountainous catchments, like the higher Carpathians, surface runoff rather than streamflow plays the major role in discharge generation. Existing solutions are not very adequate for small basins dominated by sheet flow. In order to develop a model that forecasts flash flooding when a torrential rainfall occurs, in a first research approach for flash flood modeling the subsurface flow and the storage were neglected. In this case of a simplified model, the hydrograph without storage generated by quickflow is simulated on the basis of the unit hydrograph concept. This approach is implemented into a GIS based spatially distributed model, which consists of several components: the runoff depth is calculated by applying the SCS-CN method; runoff coefficient as the ratio of runoff depth to the total precipitation; linear runoff routing according to a flow velocity raster and a DEM as parameters; the discharge generated in each raster cell is calculated using the rational method and summed according to the travel time at the watershed outlet. The resulting hydrograph shows good correspondence with the measured peak flow, the rising limb is acceptable, too. But, the falling limb/volume is under-estimated because of the initial simplifications. As there are only very limited data available for ungauged basins application of a physical model is not possible in order to improve the results. In a second research approach for the modelling we propose to extract the geometrical features of the falling limb and its slope, by a regionalization procedure based on several measured hydrographs.