A Tool for rapid Flood Warning based on HEC-HMS Software

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In this paper we present a slightly modified version of the well-known HEC-HMS modelling system which is tailored (i) to adjust the "Basin Model" part of the system to allow for multi-component runoff response simulations, and (ii) to develop a simple tool to provide information for a rapid pre-assessment of flood warning situations in a small river basin (several hundred square kilometres) as part of an operational flood warning scheme.

A multi-component runoff model version is compiled by applying the "Subbasin" element of HEC-HMS to the "fast", "moderate", and "slow" runoff component in parallel. The loading of each component is formulated by assigning to the "flow ratio" element the functioning of a runoff coefficient with the magnitude of this parameter changing for each component differently with initial basin condition (wet, dry) and total precipitation amount. Analysing observed flood hydrographs a set ("catalogue") of parameter values is derived from which appropriate values can be drawn depending on the catchment state and the observed and/or predicted precipitation.

In the operational flood warning case, precipitation forecasts are used as an input to the "catalogue" to estimate the current loading of the three-component runoff model and to derive a rough estimate of the flood magnitude. For warning purposes information about the flood magnitude is needed in terms of the recurrence interval (5, 10, 30, 50, 100, more than 100 years).

The presentation describes an application of this approach to the Gail river basin in Southern Carinthia (Austria).