Geophysical Research Abstracts,
Vol. 10, EGU2008-A-07286, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-07286
EGU General Assembly 2008

Coupling an event based and continuous rainfall runoff model for rapid flood warning

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In this paper we present a flood forecasting tool for the Obere Drau catchment in Southern Austria with an area of approximately 5.500 km^2. The system combines an event based rainfall runoff model with a continuous soil moisture accounting scheme. The event based model provides information for a rapid pre-assessment of flood warning situations based on precipitation forecasts and snowmelt prediction from the continuous model.

The event based model is a slightly modified version of the well known HEC-HMS modelling system. The basic principle contains adjustments of the "basin model" to allow multi component runoff simulations. For each component the loading is determined by the "flow ratio" element, which can be defined as the runoff coefficient changing for each component with the initial basin condition (dry, wet) and the precipitation amount. The calculated parameters are reassembled in a "catalogue", which forms the basis for a rough estimate of the flood magnitude.

The continuous model consists of a snow accumulation and melt routine, a soil moisture accounting scheme and a flood routing component. The model parameters are the result of a multi objective calibration using observed hydrographs and information on snow coverage.

The study catchment is situated in a mountainous region and floods are often influenced by snowmelt, which is an essential input to provide reliable flood forecasts. Therefore the event based model uses precipitation and snowmelt data from the continuous rainfall runoff model. Furthermore information about the antecedent soil mois-

ture and an a-priori estimate of the event runoff coefficient are results of the continuous model which are used as an additional source of information for the pre-assessment of flood warning situations.

The main idea of this coupled approach is to provide a manageable and straight forward tool to support the operators of a flood warning system. The simple structure of the event based modelling system is preserved, while the information for the pre-assessment of the flood warning situations is extended by an a-priori evaluation of the initial conditions and the incorporation of snowmelt.