

THE MODELLING SYSTEM J2000

P. Krause

Friedrich-Schiller-University Jena, Department of Geoinformatics, Hydrology and Modelling, Loebdergraben 32, D-07743 Jena, Germany.

c0krpe@geogr.uni-jena.de/Fax: ++49 +3641 948 852

A new modelling system for the distributed, physically based simulation of the water balance in large river catchments should be presented. In addition to the methods for simulation of the hydrological processes, which are relevant in upper meso- and macro scale, the modelling system contains routines for the regionalization of climate and precipitation measurements from point sources. The model was developed to be applicable for the modelling of catchments with areas of more than 1000 km², it was designed to be driven with data sources which are available on a national scale.

The subdivision of the catchment is made on the strength of the individual process levels (regionalization, runoff generation, runoff concentration) of the hydrological cycle. Because these process levels show different spatial and temporal dynamics, three different aggregation levels (HRUs, Discrete Areas, sub-catchments) were introduced into the modelling system to simulate the different processes most precise but also effectively in a spatial distributed way.

The total modelled runoff results as sum of the individual runoff components, which are calculated separately during the modelling. The modelling system distinguishes four different components according to their descent. Besides the characteristics of the topography, soil parameters, as e.g. the hydraulic conductivity of the single soil layers, have major influence on this process. The concentrations times of the different flow components are calculated using the hydraulic conditions of the vertical layers (surface, soil zone etc.), in which the components are routed. Additional characteristics, such as the saturation of the soils at a given time step, are also taken into account during these calculations. The modelling system calculates the evapotranspiration spatially distributed according to Penman-Monteith. Not only the seasonal dynamics of phenological parameters of different vegetation types are considered during the modelling, also the impact of actual soil moisture is taken into account. Due to the physically based and spatial distributed concept the model can be considered as a valuable toolset for the quantification of the impact of landuse-changes on the water balance of large catchments.

In the presentation the modelling system J2000 should be introduced and results of different meso- to macroscale catchments should be presented to proof the model's eligibility.