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Evaluation of SAC-SMA and HSPF rainfall-runoff simulations in upper parts of Vltava basin.

R. Koskova, J. Buchtele, B. Volos

Institute of Hydrodynamics AS CR, Prague, Czech Republic, koskova@ih.cas.cz

The interconnection of individual models into one integrated system rationalizes data processing, implementation of models and their use in user-friendly standardized environment of GIS tools and make easier a gradual shift of primarily conceptual water balance models to semi-distributed modes. This stimulated a study for comparison of two hydrological rainfall-runoff models - SAC-SMA (Sacramento) and HSPF (Hydrological Simulation Program - Fortran). The SAC-SMA model was used as a classic conceptual water-balance model of a rainfall-runoff process without direct connection to GIS data. The HSPF model was implemented within WMS (Watershed Modeling System) - a multipurpose environmental analysis system for performing watershed- and water-quality based studies. The simulations with the HSPF model were performed in semi-distributed mode taking into account the land-use data. Both models and their results were mutually compared with respect to their ability to reproduce real conditions, sensitivity to parameter changes, model utilization, and prediction the extreme hydrologic events. The flow rates of surface, interflow and subsurface flows were computed and the results were compared. The differences and cumulative differences between the observed and simulated flows were chosen as a tool for identifying trends of changes in water regime.

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