



Comparative testing of rainfall-runoff models in different climate and landscape conditions of Austria and Russia

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Comparative testing of different rainfall-runoff models is important task in hydrology for developing new, universal and reliable, methods for hydrological engineering, suitable both for poor gauged and ungauged basins and for conditions of climate and landscape changes. For this purpose, the joint activity is carried out by group of Russian and Austrian researchers in framework of project “Extremal dynamics and sustainability of river systems under climatic and landscape changes”. Preliminary results of the researches are presented here.

Two different rainfall-runoff models were examined. One is so called flood cycle model (FC-model), which was developed special for rivers with rain floods prevalence in regime. There is wide and successful experience of applying the FC-model for flood prediction in Russian Far East region. It confirms conceptual validity of FC-model and reliability of its parameterization using the standard hydrometeorology data. FC-model is concentrated on the description of extraordinary rain floods and demonstrates strong non-linearity and threshold effects in runoff generation. Only daily-step version of FC-model has been applied so far as the region mentioned is very poor investigated and more detailed hydrological data are almost absent.

The second is well-known HBV-model, which is one of standard tool for runoff simulation in Europe. It was developed and improved for application in regions with complicated runoff regime, including snowmelt, ice-melt and rain impact in different combination. The model characteristics make it very suitable both for Austria and many

regions of Russia. To make the results uniform, the daily-step version of HBV-model was applied for the comparative testing.

The application was made with using datasets of 4 Austrian and 4 Russian basins. The general criteria for selecting the basins were: area of a few tens to -hundreds square kilometers, relatively small range of elevation and homogeneous landscapes, availability of long series of daily observations. Four Austrian basins are located in central and east part of Austria, ranging in area from 81.3 to 341 square kilometers with observation series of 29 years. Four Russian basins are located in the south part of Far East region, about 100 kilometers to the north of Vladivostok. Areas range from 69.5 to 395 square kilometers and observation series from 24 to 33 years.

The tests include individual years and long-term runoff simulations in every basin applying various calibration procedures. The correlation coefficient of Nash and Sutcliffe was used as evaluation measure with calibration. Preliminary analyses of the tests show quite successful and comparable results both for FC-model and HBV-model. The results of FC-model application seem to be more favorable for warm season in Russian basins. For Austrian basins the quality of FC-model simulation related to presence or absence of high floods in the basins or in particular year. This is because rain floods in the investigated region of Russia are much more intensive and more important in runoff regime than in Austria.