



Neural networks forecast in small catchments with transfer of network parameters

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This contribution deals with neural network approach for short term forecast on small catchments. The applied methodology is based on theory of multilayer perceptron (MLP), feed forward neural network with back propagation optimization procedure was tested in order to explore the possibilities to transfer parameters between different catchments. Supervised optimization of network parameters and structure was investigated. A software tool was created for these research and operative purposes.

The hourly discharges and rainfall data of real flood events served as an input to MLP. Seven catchments with areas, which range from 10 to 250 square kilometres and which are situated in the east part of the Czech Republic, were selected. The input data were normalized by parametric method.

Variable configuration of neural network was tested in number of modes represented by different combination of learning and testing data sets. The analysis focuses on ability of the model to forecast the flood event with different peak discharge magnitudes. This should be achieved in both application steps - MLP learning and testing within given catchment and in step of parameter transfer of well learned network to another catchment. The length of prediction ranged from one hour to six hours ahead.

The results showed that the model is capable to provide satisfying short term discharge forecast for the most of studied cases, including successful parameter transfer among different catchments. This was accomplished by using optimization of parameters which determine not only the structure and behaviour of applied network but also the transformation of input data.