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Comparison of the performance of hydrological flow routing methods used for flow forecasting on the Morava River in Slovakia

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Beside numerical hydraulic models, as a rational alternative to hydraulic routing, models belonging to the class of non-storage routing methods and conceptual hydrological models are still in operational use in Slovakia. In this contribution the forecasting performance of several hydrologic routing models was compared. First two alternatives to standard non-storage routing on the Morava River were tested.
In these both governing relationships (the relationship between the travel time of flood peaks and discharge and the relationship between upstream and downstream peak discharges) were modelled by empirical engineering estimates, multiple linear regression and artificial neural networks. The relationships between flood peak travel times and discharge were also used as indicators for the change of the travel time parameter of the Kalinin Miljukov flood routing model with discharge. In this model the model travel-time parameter vs. discharge relationship was also assessed by optimisation of the model performance with the help of a genetic algorithm. The performance of the models was compared against existing approaches used in practice near simulated environment. The results showed that the inclusion of empirical information on the variability of the travel-time with discharge into all models enabled the prediction of flood propagation with satisfactory accuracy.