



Low flow forecasting with data driven models that include and models that do not include hydrological knowledge – a comparison study

L. Stravs and M. Brilly

Faculty of Civil and Geodetic Engineering, University of Ljubljana., Slovenia (lstravs@fgg.uni-lj.si)

Good and accurate long-term low flow forecasting is important in the fields of sustainable water management, water rights, water supply management, industrial use of freshwater, optimization of the reservoir operations for the production of electric energy and other water-related disciplines. Today, low flow forecasting is usually performed as an integrated part of calibrated rainfall-runoff models, but in our research we developed two types of simple empirical 7-day ahead low flow forecasting models by using the M5 machine learning method for the generation of regression and model trees. Development of the first type of models was based solely on the application of the M5 machine learning method (1-, 2-, 3-, 4-, 5-, 6- and 7-day lead time low flow forecasting model trees were developed from using only past flow data and then combined to produce 7-day ahead forecast curve), while the development of the other type of models included the conceptual knowledge of linear reservoir recession functions AND application of the M5 machine learning method (we modelled the streamflow recession coefficient k as a function of the flow rate at which the 7-day low flow forecast is made and the decrease in the flow rate from the previous day). Both types of 7-day ahead low flow forecasting models were developed by using the same type and amount of data and were built for the Podhom gauging station on the Radovna River and the Medvode gauging station on the Sora River (both are Slovenian tributaries of the Sava River, which itself is a Danube River tributary). The results were compared and tested both visually and numerically.