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Flood forecasting at the Savinja River basin using M5 model trees method

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The Savinja River basin with drainage area of 1847.7 km^2 and length of its main watercourse of 98 km is one of the Slovenian areas that are highly endangered by the possibility of flooding. Altitudes in the basin area range from 200 up to 2000 m a.s.l.. The Savinja River is the main tributary of the most important Slovenian river Sava and can contribute up to 40% of Sava River's discharge at extreme meteorological events. Extreme flash floods with discharges up to 1500 m^3/s caused great economic loss in highly populated areas of the Savinja River basin in years 1990 and 1998. Forecasting models with different lead time (1, 3, 6, 9 and 12 hours) built by M5 machine learning method were applied to the Savinja River basin. Precipitation and hydrological data at the occurrence of high flows from time period 1998-1999 was used for calibration and high flow data from years 2000 and 2002 was used for verification of the M5 model tree models. Comparison of the models' performance was done by the means of testing the Nash - Sutcliffe efficiency criterion R^2, correlation coefficient r (r^2), mean absolute error, mean relative absolute error and visual inspection of the forecasted hydrographs.