Estimation of monthly evapotranspiration in Hakkâri with wavelet transform and machine learning models

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This study aimed to estimate monthly evapotranspiration (ET) values in Hakkâri province by combining support vector regression, bagged tree, and boosted tree methods with wavelet transform. For this purpose, precipitation, runoff, surface net solar radiation, air temperatures, and previous ET values were divided into sub-signals with various mother wavelets such as Daubechies 4, Meyer, and Symlet 2 and presented as input to machine learning (ML) algorithms. While establishing the models, the data were divided into 80% (413 data) training and 20% (103 data) testing. The models' performances were made according to the widely used root mean square error, mean average error, determination coefficient, and Taylor diagrams. As a result of the study, it was revealed that the hybrid wavelet ML, which is established with input combinations separated into subcomponents by wavelet transform, generally produces more successful predictions than the stand-alone ML model. In addition, it was revealed that the optimum ET forecasting model was obtained with the wavelet bagged tree algorithm with Symlet 2 mother wavelet.