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Unmeasured inflows determination in the context of the assessment of the water balance of irrigation reservoir

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Irrigation reservoirs are used to retain water during periods of surplus and to control its subsequent use for irrigation in drought periods. While designing a reservoir, it is essential to evaluate its function and assess its ability to provide the required amount of water for irrigation. It means an evaluation of the reservoir for the quantitative balance of water. The input data used in such computations include the water inflow into the reservoir, demand for water abstraction from the reservoir, data on the required outflow of water below the reservoir, and the evaporation and other losses of water from the reservoir. Smaller streams often supply irrigation reservoirs at the margins of river catchments. It is crucial, from the point of view of this work, that such smaller streams often do not have systematic measurements of their flow. Therefore determination of this quantity is often the main problem of water balance evaluation. This work proposes a method for the acquisition of such data. While identifying unknown stream flows required for such a calculation, authors suppose that historical climatic data for the given area and flows in some of the nearby river catchments are available (measured). Description of the method of selecting river catchments such that their measured flows can be used in the calculation of an unknown flow of a different stream will be presented. A case study from the Small Carpathians in Western Slovakia is reported in the presentation. This study compares the conceptual hydrologic model, linear regression with LASSO regularization, and various machine learning methods (CATboost, Random Forest, Support Vector Machines). Authors will evaluate the precision of flows determination by various statistical indicators.

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