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## Multi-criteria calibration of a conceptual runoff model using a genetic algorithm

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**Abstract.** Abstract: Calibration of a model against more than one output variable is important for reliable simulations of internal processes. In this study, a genetic algorithm combined with local optimisation was proposed for automatic single- and multi-criteria calibration of the HBV model, a conceptual runoff model. The model and the optimisation algorithm were applied in two catchments with different geology where, in addition to observed runoff, time series of groundwater level data were available. For a theoretical, error-free test case with synthetic data, the optimisation algorithm was usually able to find the true parameter values. For the real-world case, parameter values varied considerably when calibrating against runoff only. However, parameter values were constrained significantly when calibrating against both runoff and groundwater levels. Furthermore, for one of the catchments, the results of the multi-criteria calibration motivated a modification of the model structure.

**Keywords:** Multi-criteria calibration; genetic algorithm; parameter uncertainty; conceptual runoff models; HBV model; groundwater levels

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