



Large-scale comparison of machine learning regression algorithms for probabilistic hydrological modelling via post-processing of point predictions

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Quantification of predictive uncertainty in hydrological modelling is often made by post-processing point hydrological predictions using regression models. We perform an extensive comparison of machine learning algorithms in obtaining quantile predictions of daily streamflow under this specific approach. The comparison is performed using a large amount of real-world data retrieved from the Catchment Attributes and MEteorology for Large-sample Studies (CAMELS) dataset. Various climate types are well-represented by the examined catchments. The point predictions are obtained using the GR4J model, a lumped conceptual hydrological model comprising of four parameters, while their post-processing is made by predicting conditional quantiles of the hydrological model's errors. The latter are transformed to conditional quantiles of daily streamflow and finally assessed by using various performance metrics. The machine learning regression algorithms are also benchmarked against the quantile regression algorithm.