A novel approach to machine learning-based error correction for hydrological models

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The use of machine learning error corrector schemes have been proven useful in hydrological modelling due to the capacity of these algorithms to cope with regression problems. Typically these schemes are generated after the model is built which may not result in the best predictor. For this reason, in this research we propose that the model parameterisation to be considered together with an error corrector scheme do not aim to directly minimise an error metric, but to maximise the predictability of the error for a target lead time. This will lead the hydrological models to fit the "most random" part of the series, disregarding most of the more predictable errors, which are going to be addressed by the error corrector. Following this, the synergy between models and error corrector will improve, leaving models to explain the unpredictable part of the error, while post-processors will take care of the most predictable part of it. This is illustrated in a study case in the UK, showing that this approach is particularly useful in real time flow forecasting systems.