

## **A flow-duration curve strategy for gauging ungauged catchments.**

A few discharge measurements may contain a lot of the information that is needed to calibrate a hydrological model. Taking a few measurements could therefore be a good strategy for reducing model predictive uncertainties in ungauged catchments. Guidance is needed regarding how these measurements are best made, and how uncertainties in the measured data can be accounted for in model calibration.

In this study we investigate how far a few discharge measurements together with the installation of a water-level recorder can reduce the simulated uncertainty at an ungauged site. We used observed water-level and discharge measurements from the Brue catchment in England together with simulated discharge at an hourly time step from TOPMODEL. The discharge measurements and the water-level data were used to estimate the flow-duration curve for the period of water-level record, which was then used to calibrate the model in GLUE accounting for observational uncertainties in discharge. We investigated how the simulated uncertainty was constrained depending on both the number of discharge measurements within different flow intervals and the length of the water-level record. With an appropriate choice of flow intervals, the simulation reliability was often comparable to when using the complete discharge record for calibration. A few discharge measurements were associated with large errors, and when these were used the reliability of the calibration was significantly degraded, which emphasises the importance of high-quality discharge data.