## **Supplementary material**

## Hydrological model calibration with uncertain discharge data

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At Payerne, the model had the worst performance for all hydrograph aspects apart from base flows, for which the model performed best among all three catchments (Figure S1).

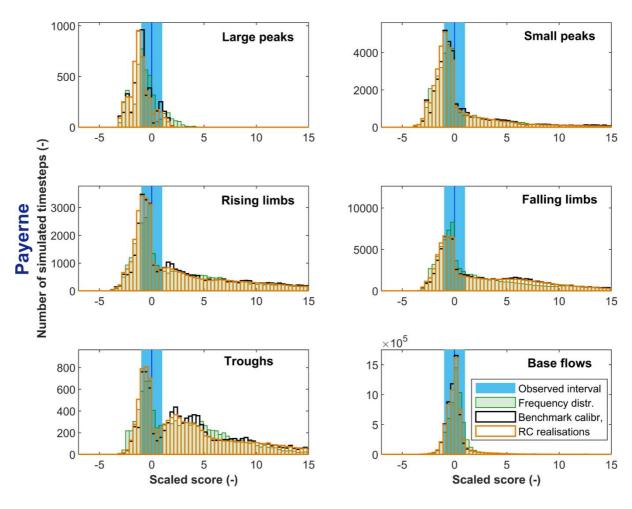


Figure S1. Histograms of scaled scores for six different aspects of the hydrograph for the Payerne catchment. A scaled score within  $\pm 1$  means that the simulation is inside the observed discharge uncertainty, and a scaled score of 0 represents an exact match to the best-estimate discharge.