

Ian G. Littlewood and Barry F.W. Croke

## **Effects of data time-step on the accuracy of calibrated rainfall-streamflow model parameters: practical aspects of uncertainty reduction**

The effects of data time-step on the accuracy of calibrated parameters in a discrete-time conceptual rainfall-streamflow model are reviewed and further investigated. A quick-flow decay time constant of 19.9 hours, calibrated for the 10.6 km<sup>2</sup> Wye at Cefn Brwyn using daily data, massively overestimates a reference value of 3.76 hours calibrated using hourly data (an inaccuracy of 16.1 hours or 429%). About 42% and 58% of the inaccuracy are accounted for by loss of information in the effective rainfall and streamflow data, respectively. A slow-flow decay time constant is inaccurate by about +111%, of which about 94 and 17 percentage points (85% and 15% of the absolute inaccuracy) are due to loss of information in the effective rainfall and streamflow data respectively. Discrete-time rainfall-streamflow model parameter inaccuracy caused by data time-step effects is discussed in terms of its implications for parameter regionalisation (including database aspects) and catchment-scale process studies.