



Investigating the utility of simple hydrochemical sampling data for hydrological model calibration

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Applications of catchment modelling require varying degrees of process representation to successfully fulfil the objectives of the modelling. In some cases acceptable prediction of stream flow dynamics is adequate, but in other situations different characteristics of the hydrological behaviour also need to be identified. One common requirement for water quality modelling is to separate the hydrograph into key runoff generation flow paths, in order to identify sources and estimate transport rates of various pollutants. The utility of a simple hydrochemical sampling procedure has been investigated as a means of providing tracer data to assist with the calibration of a hydrological model. The hydrochemical data were used to estimate runoff proportions originating from different flow paths, at different times, by means of a simple mixing analysis. This process knowledge was integrated in the hydrological model calibration procedure to ensure that the hydrological model gave a good prediction of the hydrograph separation as well as the total stream flow. The results of the analysis are presented and the utility of the hydrochemical data are discussed. The issue of uncertainty remains problematic with examples of uncertainty in the model structure, input data and parameterisation, and calibration / validation data all demonstrated by the application. However, the results obtained by integrating the hydrochemical data are believed to be more reliable than would have been the case without the additional process knowledge. Finally, some recommendations for future sampling strategies are presented.