



Estimating future rainfalls for hydrological modelling

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As part of a study into the long-term sustainability of estuarine barrages (<http://www.silsoe.cranfield.ac.uk/iwe/projects/simba/>) it was necessary to estimate likely future flow and sediment inputs to the barrages. Sediment inputs increase in a highly non-linear fashion with flow, and the frequency of high flow events for future climate scenarios was thus of interest. Flows were modelled for historical conditions using a catchment scale model, and future rainfall and temperature series were required for future flows to be estimated. Using the relatively new Tees barrage as a case study, spatio-temporally distributed daily rainfall inputs were generated for a control (1990s) and a future (2050s) scenario using a stochastic rainfall generator.

Monthly rainfall statistics (daily mean, daily variance, probability of a dry day and inter-site daily correlation) of 16 historical rainfall data sets distributed across the catchment were calculated. This provided the control scenario. The future climate scenario was obtained by a combination of UKCIP (2002) temperature predictions and rainfall statistic perturbations derived during the EC WRINCLE project from the HADCM3 (A2 scenario) climate simulations. Perturbed monthly values of mean daily rainfall and probability of a dry day were then obtained for the future scenario.

The statistics of the control and future scenarios were used to calibrate the stochastic rainfall generator for the 16 gauges and then used to generate synthetic 50-year daily rainfall time series for input to the distributed hydrological model.