

## Flood modelling: parameterisation and inflow uncertainty

### Abstract

This paper presents an analysis of uncertainty in hydraulic modelling of floods, focusing on the inaccuracy caused by inflow errors and parameter uncertainty. In particular, the study develops a method to propagate the uncertainty induced by, firstly, application of a stage-discharge rating curve and, secondly, parameterisation of a onedimensional hydraulic model by way of the power function and the conditioning of Manning's roughness coefficients. The proposed methodology was applied to a 98 km reach of the River Po, Italy. Model performance was evaluated using two independent sets of observed water levels in the river reach within a generalised likelihood uncertainty estimation framework. The inflow uncertainty was found to have a greater contribution to the overall uncertainty of the 1D model than the roughness parameters. Independent parameter conditioning and validation, as well as the uncertainty analysis, showed satisfactory model performance. When conditioned on one flood event, the model adequately simulated flood levels and high water marks for another (independent) event, as the observations were within 90% confidence interval of the simulation ensemble.

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