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INTERCOMPARISON OF FORECASTING METHODS FOR FLOOD WARNING IN THE RIVER CAM CATCHMENT

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EXTENDED ABSTRACT

Currently flood warning in the catchment of the River Cam in Cambridgeshire relies on the issuing of alerts when the river level at the monitoring station at Byron's Pool, just upstream of Cambridge, reaches certain pre-determined levels. Warnings are shown to be fairly accurate, but there is very little lead time between the trigger being exceeded and the commencement of flooding. At present there is no method used that can forecast in advance when the trigger is likely to be reached.

Three conceptually different methods of forecasting if and when the trigger at Byron's Pool will be exceeded are presented. The first of these is a simple additive model, in which flows from the three tributaries that are gauged are summed to give a combined flow. The second method involves the derivation and application of two transfer function models capable of transforming river levels on the upstream tributaries to a level at the trigger site. These models are applied both with and without real time updating techniques. The third method involves the calibration and application of a lumped rainfall-runoff model of the whole catchment to Byron's Pool. Two different calibration periods are used, and the results compared.

The results indicate that the simple additive model, while being better than no model at all, is very inaccurate, and fails to replicate the hydrograph shape and timing, most likely because of the influence of an ungauged tributary. The transfer function models perform well, especially when real time updating is used. The rainfall runoff models perform less well, struggling to reproduce the hydrograph shape.

The main conclusions are that for this site a hierarchy of models may be appropriate, with rainfall runoff models providing an early indication of flooding, and transfer function routing models with updating providing a more accurate forecast, with the additive model as a back up. The importance of obtaining more data, including validation of ratings, and the future gauging of the ungauged tributary, is noted throughout this investigation.

Key words: Flood warning, forecasting, Additive model, Transfer Functions, NAM model