



Modelling requirements for the simulation of first flush processes in temporary rivers.

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There are many existing models, defined at a variety of scales, which describe the surface transfer of water, sediment and chemical constituents through river basins. These have generally been developed for application in temperate zones with permanently flowing rivers. The focus of these models is therefore a description of the major processes in such rivers. However, the drying and rewetting processes which are a key feature of temporary rivers are typically not explicitly addressed.

We examine the capabilities of existing process descriptions and models to provide good simulations of the critical first flush in temporary rivers, and suggest approaches to rectifying any deficiencies. Our analysis focuses primarily on those models selected for inclusion in the tempQsim project, with particular reference to the tempQsim study catchments. The models include SWAT and HSPF which are well-known to the water quality user community, and a number of primarily research models which focus on particular processes or scales.

The analysis demonstrates the failure of many typical model assumptions under first flush conditions, and the need for well-designed measurement programmes both at many sites, and over many years, for first flush water quality processes to be quantified in any general sense. We suggest that such quantification must include some uncertainty component.