# Assessing a modelling framework for the simulation of the effects of natural flood management measures

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LANDWISE NFM

Context

The UK experienced major floods during the last decades.

The Swan at Pangbourne under flood waters 2014 ©Mapio.net
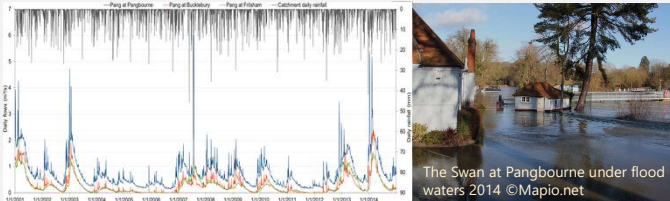
In recent years, natural flood management (NFM) has gained much interest. However, there is a lack of evidence of NFM effectiveness in large catchments. This study evaluates the applicability of existing hydrological models for NFM assessment; and configuration for the Pang, Loddon and Upper Thames catchments.

Study area and datasets

❑ Initial focus on the Pang catchment: 170.9 km² (see map below)

❑ Hydro-meteorological data:
- National River Flow Archive (NRFA) daily flow and rainfall,
- Environment Agency (EA) rainfall & groundwater levels
- Met Office weather data

❑ Soil data from SoilGrids & National Soil Map of England and Wales (NATMAP).

❑ Land cover map from the Centre of Ecology and Hydrology (CEH).

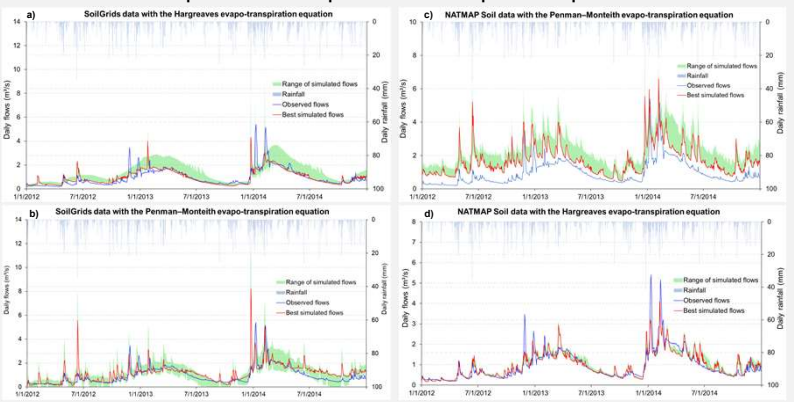❑ Geology layers from the British Geological Survey (BGS).
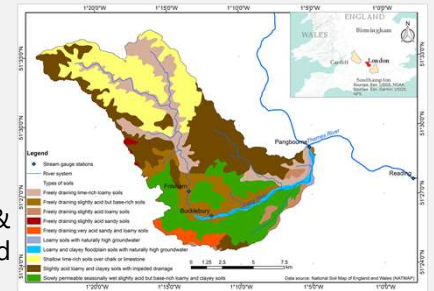
Assessment of the modelling framework and preliminary results

Workflow of the modeling framework assessment
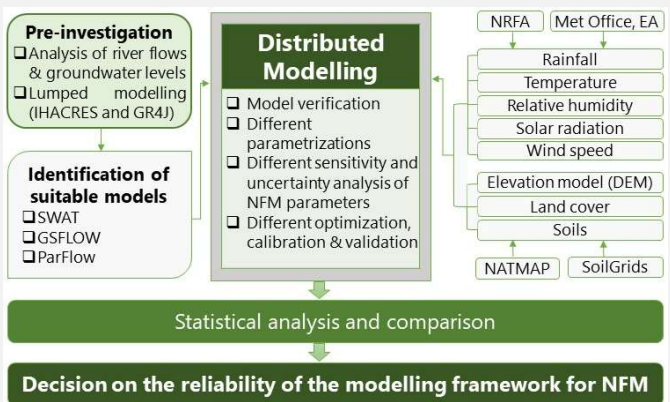
Different models realizations from different soil input datasets and different equations for potential evapotranspiration.

Simulation of river flows with different parametrizations: SoilGrids data (a,b) and different evapotranspiration methods with NATMAP soil data (c,d)

Approaches for modelling framework improvement

❑ Coupling land surface hydrological models with groundwater models to improve processes simulation.

❑ Applying different soil and vegetation model parameters in the context of NFM measures.

❑ Integrating remote sensing [WP3] and field surveys [WP2] data for model parametrization and validation.
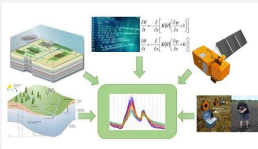
Conclusions and outlook

❑ Using data-gathering, pre-analysis and various modelling approaches the catchment hydrology is successfully reproduced.

❑ Results are promising for reliable assessment of the effectiveness of NFM measures.

❑ Further work is required to accurately translate NFM measures to changes in model parameters.

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