



Challenges associated with estimating the cost of European flooding through the development of a multi-country probabilistic model

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Assessing the potential costs of large-scale flooding within the insurance and reinsurance industry can be achieved using probabilistic catastrophe models that combine hazard map outputs from flood models with exposure information. Many detailed flood modelling methodologies are available, including both advanced hydrological approaches and detailed 2D hydraulic models. However, these approaches are typically developed and perfected for a relatively limited test area (e.g. a single catchment or region) enabling efficient calibration to be carried out. With single flood events crossing country borders, multiple concurrent floods occurring across catchments, and an increasing need for national and international scale risk and financial assessment, up-scaling these localised methodologies is essential.

The implementation of such techniques at national and international level pose a series of challenges to the model developer. Here, we discuss the challenges associated with the development of a multi-country probabilistic model designed to enable assessment of insurance exposures to river flooding in 12 countries across Europe on a return period basis. The underlying components of the model incorporate several components primarily developed for use in more limited areas, for example the 2D hydraulic modelling software JFlow+. Some of the challenges and their solutions that we will discuss include:

- Availability of different volumes, record lengths and qualities of gauge and digital terrain data between countries;
- Differing resolution and quality of property exposure information;
- The need for a significant amount of manual editing work across a very wide area;
- Different information available for validation in different regions;
- Lengthy data and model analysis times;
- The requirement for extremely fast computer processors.