

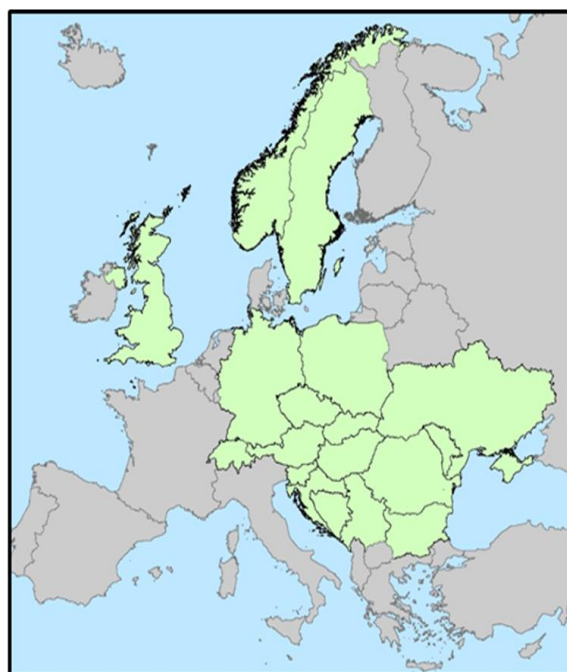
HYDRO-GIS LTD

Flood Catastrophe Modelling

A major component of the consultancy work undertaken by Hydro-GIS Ltd over the past six years has been the development of flood catastrophe models for the re-insurance sector. These models are used as pricing tools for brokering contracts between re-insurance and insurance companies and are based on the following components:

- A detailed understanding of the hydrology of the study area including the characteristics of flooding and historical flood events;
- The analysis of high quality hydrological data or obtained from published sources and state hydrological services;
- A large number of synthetic flood events with a specific return period for each event;
- Explicit modelling of the effect of flood defences using a probabilistic breaching routine;
- Flood depth and extent maps produced using 2-dimensional cell based modelling with GIS.

Since 2004 Hydro-GIS Ltd has developed regional river flood catastrophe models for Central and Eastern Europe, including the countries of Austria, Hungary, Czech Republic Slovakia and Poland; river and coastal flood catastrophe models for Scandinavia (Sweden river flooding, Norway river and coastal flooding); river flood catastrophe models for South-eastern Europe covering Romania and Bulgaria, Slovenia, Serbia, Croatia, Bosnia-Herzegovina, Montenegro, and the parts of Moldova and Ukraine located within the Danube River Basin. Hydro-GIS Ltd has also contributed to the development of a German Storm Surge Model for the North Sea and Baltic sea coasts for use by the GDV (German Insurance Association).



Flood catastrophe model coverage (green shading)

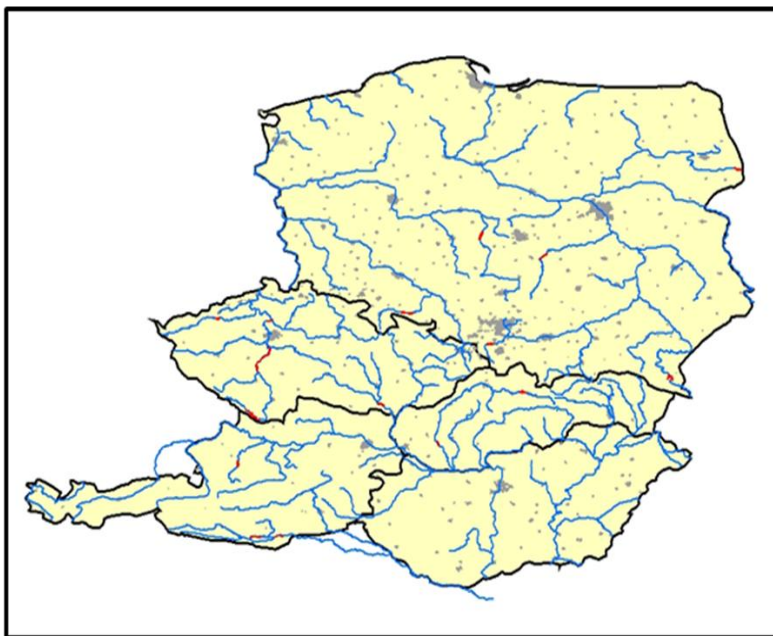
Dr Harvey Rodda, Director of Hydrology at Hydro-GIS Ltd also led the conceptual development of the first RMS UK flood model and developed flood risk models for the Czech Republic and Slovakia following the 2002 Central European floods.

Not only are Hydro-GIS staff able to develop flood risk models but are well placed to provide independent assessments of commercial flood catastrophe modelling software where little detail of the structure of the hazard model is provided by the vendors.

Central and Eastern European Flood Catastrophe Model

The Central and Eastern European (CEE) model was developed by Hydro-GIS Ltd for Aon, initially in 2004/5 but included updates in 2007 and 2008. The model covered the risk of flooding from major rivers in Austria, Hungary, the Czech Republic, Slovakia and Poland, and had the following features:

- Modelled a total of 173 river reaches including on-line lakes and reservoirs (see below);
- Based on hydrological data from 62 historical flood events;
- Flood depth and extents mapped for over 2000 synthetic events;
- Mapping generated at 25m grid cell resolution for the Czech Republic, 100m grid cell resolution for other countries;
- Included rainfall, snowmelt and ice jam flood events with all with defence failure scenarios;
- Flood depth provided for each event on a post-code basis.



The CEE flood model study area and river network