Disaster-related economic losses are increasing globally; for example, in the 1st quarter of 2010 alone, earthquakes in Haiti and Chile and the European storm Xynthia together resulted in losses of US$16 billion. Catastrophe or 'CAT' models are stochastic event-set based computer models that have been used for the last 25 years by the insurance and reinsurance industry to assess risk by estimating likely losses from extreme events, whether natural or manmade (e.g. terrorism). Their key application is in the assessment of risk to a portfolio of exposures, which are then used (i) to inform an insurer's underwriting strategy (ii) to determine the premiums charged in hazard prone areas (iii) to assess the financial strength of insurers that take on catastrophe risk (iv)to price reinsurance treaties Most CAT models are 'black boxes' which have traditionally limited the level of user interaction. New European regulations (Solvency II) require firms to understand the assumptions made in any CAT model used as part of their solvency calculations, resulting in the industry pushing for greater transparency from the modelling community. One of the issues arising is that CAT models can, in certain circumstances, underestimate financial losses, for example by overestimating building resilience in relation to hurricane models. The insurance industry needs clarity on the assumptions included in CAT models; for example, which components are well understood and which are uncertain? Therefore the insurance industry needs the flexibility, for example, to pick and choose hazard vulnerability and economic loss models from multiple vendors. Crucially, they need to be able to critique similar CAT models and understand the impact that changing single components will have on the outputs, thus requiring the development of open-access 'plug and play' catastrophe models. The NERC PURE (Predicting Uncertainty and Risk in the Environment) Research and Knowledge Exchange programme (co-sponsored by EPSRC, EA and TSB) is developing an experimental zone with the aim of producing a web-enabled zone to give unrestricted access to publicly available risk and uncertainty tools. This will enable the development of open-access 'plug and play' catastrophe models. Users will gain access to the best available models, tools and algorithms, linked using OpenMI and will enable data and model linkage within both an open and secure environment. OpenMI provides a standard interface, allowing models to exchange data with each other and other tools at runtime, facilitating the modelling of process interactions. Crucially, it allows models from different suppliers that represent processes based on different concepts and different spatial and temporal resolutions, even with no spatial references, to be joined together. This talk discusses how the PURE programme is engaging with the insurance and reinsurance industry to develop a prototype for 'plug and play' catastrophe models using model fusion, and looks forward to the possible impact of open-access modelling. As a proof-of-concept, a linked series of components which calculates the cost of damage from groundwater flood events has been created using OpenMI. This is based on a groundwater model of Marlborough and the Berkshire Downs, converted to flood depth, and combined with an economic damage model to produce occurrence exceedance probability curves for typical UK housing types