



Uncertainty in geohazard understanding and communicating hazards and risk between scientists and the UK Insurance industry.

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At BGS, expert elicitation has been used to evaluate the relative impacts arising from multiple geohazards that can affect UK housing stock. In turn this 'consensus' understanding has been developed into a tool to assist the UK insurance industry underwrite the domestic property market. BGS models six geohazards deemed relevant to UK Housing: Landslides, Shrink-swell (heave), Compressibles, Dissolution (Karst), collapsibles and running sand. The models are widely used and have been developed over 2 decades of research. However, stakeholders such as the insurance industry are not well equipped to managed geohazard models directly and need the information to be categorised in a meaningful way, appropriate to their business models. Creating terminologies to communicate the relative threats for each geohazard has been relatively straightforward, but communicating the impacts of multiple geohazards, or comparing the relative risks of one geohazard against another has proved more difficult. Expert elicitation has been used since 2010 to try and build a consensus model for geohazards and to help BGS communicate its knowledge to stakeholders.

Typically, the BGS geohazard models are provided with 5 levels of susceptibility: A (low or absent) ,B, C, D and E (high). Resolving individual models is relatively simple, but the insurance market is extremely dynamic and a need to simplify and convey the possible threats from all geohazards into a single 'rating' of susceptibility has emerged. This poses a problem when trying to convey the geological understanding behind the models. For example, how do you convey the combined (or comparative) susceptibility of a high susceptibility to Dissolution, with a moderate susceptibility to Landslides. This complexity is further hampered when needing to consider that stakeholders resolve spatial distributions via use of frameworks such as 'Postcode' sectors, and that the outputs of most geohazard models are sensitive to scope and scale of such frameworks.

The elicitation process (the first to be deployed by BGS) allowed a significant degree of structured knowledge-exchange between experts of differing geohazards backgrounds. Consensus over likely impacts arising from the geohazards was achieved (where previously there had been none). In the process of harmonising the models it became clear that further elicitation (within BGS and externally) could be used to refine the models on a more regular basis and provide a consistency relevant to other industries (such as construction). By establishing a consensus, it has been possible to provide improved understanding to the insurance industry with simpler metrics, whilst maintaining scope for also conveying the underlying complexity and natural variance in the models.

We will discuss our experience of the use of elicitation methodology and the implications of our results for further work at the BGS to convey uncertain and complex models to stakeholders and non-geologists.