



## Vulnerability to Geological Hazards in the UK: A Spatial Data Perspective

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Although (fortunately) unlikely to ever cause the same levels of devastation as catastrophic geohazards such as the 2010 earthquake in Haiti or the 2009 major landslide in Guatemala City, geohazards represent a significant, but often unrecognized, threat to people and property in the UK. In 2005, the British Geological Survey (BGS) completed a programme to model 'Geohazard' potential for 6 geohazards in Great Britain: shrink-swell clays, running sand, compressible deposits, slope instability (landslides), collapsible ground and dissolution. This created a national hazard potential dataset known as GeoSure. Although the methodologies and underlying base data have subsequently been refined, BGS has only recently explored the potential for incorporating vulnerability into its spatial datasets i.e. what is the risk to society of a geohazard being realised? Decision-makers use risk rather than hazard potential to develop mitigation strategies and prioritisation effort. Although a location may have a high geohazard potential rating, it is unlikely to be a huge risk to society if the hazard is located far from elements at risk (population, buildings, and economic activities). Conversely, a geohazard with a relatively low hazard rating may actually have a huge impact on society if the hazard was realised and located, for example, near to a school, railway station or office block. It is both the hazard potential and the vulnerability element which controls the risk level.

Although losses from natural hazards are in principle avoidable (e.g. through enforcement of total bans on occupation of hazard-prone areas) this modus-operandi does not come without cost; for example loss of income, loss of and disruption to life, restriction to freedom and personal choice. Evaluating this trade-off is in essence what decision-makers, whether they are insurers, government departments, utilities, developers etc, have to be able to achieve. Bridging the gap between scientists conducting hazard assessments and risk assessors is therefore key to enable more informed and effective decision-making. Risk assessors need to know what factors increase hazard likelihood and what lessens it and, how confident the scientists are in their assessment of the hazard susceptibility. They also require an assessment of assets (physical, social, environmental, personal, political, economic) vulnerable to the hazard. These vulnerability assessments will vary (in type and complexity) depending on the interests of the stakeholder. Whilst it is not necessarily the role of those involved in hazard assessment to conduct vulnerability assessments (which will often require social scientists), those involved in hazard assessment could work with vulnerability assessors to help prioritise their research to improve understanding of hazards in places where hazard susceptibility is high, but also where vulnerability to the hazard is high.

This research explores possible approaches to, and the challenges associated with, developing a national scale dataset to indicate vulnerability to a number of different geohazards in the UK. It is envisaged that such data could help prioritise research effort (thus ensuring that knowledge is acquired in places where it is likely to be most needed) but also help improve communication of hazard susceptibility and potential impact thus leading to a more prepared and resilient society. Two very different geohazards present in the UK will be examined: Shrinking and Swelling of the ground, which has cost the UK economy an estimated £ billion over the past decade; and Landslides, for which hazard assessments are particularly difficult to conduct particularly at a medium to small scale. It is hoped that this research poster will encourage discussion and collaboration, and in turn help to bridge the gap between scientists and policy makers.