Expert opinion on landslide susceptibility elicted by probabilistic inversion from scenario rankings

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For many natural hazards the opinion of experts, with experience in assessing susceptibility under different circumstances, is a valuable source of information on which to base risk assessments. This is particularly important where incomplete process understanding, and limited data, limit the scope to predict susceptibility by mechanistic or statistical modelling.

The expert has a tacit model of a system, based on their understanding of processes and their field experience. This model may vary in quality, depending on the experience of the expert. There is considerable interest in how one may elicit expert understanding by a process which is transparent and robust, to provide a basis for decision support. One approach is to provide experts with a set of scenarios, and then to ask them to rank small overlapping subsets of these with respect to susceptibility. Methods of probabilistic inversion have been used to compute susceptibility scores for each scenario, implicit in the expert ranking. It is also possible to model these scores as functions of measurable properties of the scenarios. This approach has been used to assess susceptibility of animal populations to invasive diseases, to assess risk to vulnerable marine environments and to assess the risk in hypothetical novel technologies for food production.

We will present the results of a study in which a group of geologists with varying degrees of expertise in assessing landslide hazards were asked to rank sets of hypothetical simplified scenarios with respect to land slide susceptibility. We examine the consistency of their rankings and the importance of different properties of the scenarios in the tacit susceptibility model that their rankings implied. Our results suggest that this is a promising approach to the problem of how experts can communicate their tacit model of uncertain systems to those who want to make use of their expertise.