



Multi-Hazard Interactions in Guatemala

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In this paper, we combine physical and social science approaches to develop a multi-scale regional framework for natural hazard interactions in Guatemala. The identification and characterisation of natural hazard interactions is an important input for comprehensive multi-hazard approaches to disaster risk reduction at a regional level. We use five transdisciplinary evidence sources to organise and populate our framework: (i) internationally-accessible literature; (ii) civil protection bulletins; (iii) field observations; (iv) stakeholder interviews (hazard and civil protection professionals); and (v) stakeholder workshop results. These five evidence sources are synthesised to determine an appropriate natural hazard classification scheme for Guatemala (6 hazard groups, 19 hazard types, and 37 hazard sub-types). For a national spatial extent (Guatemala), we construct and populate a "21×21" hazard interaction matrix, identifying 49 possible interactions between 21 hazard types. For a sub-national spatial extent (Southern Highlands, Guatemala), we construct and populate a "33×33" hazard interaction matrix, identifying 112 possible interactions between 33 hazard sub-types. Evidence sources are also used to constrain anthropogenic processes that could trigger natural hazards in Guatemala, and characterise possible networks of natural hazard interactions (cascades). The outcomes of this approach are among the most comprehensive interaction frameworks for national and sub-national spatial scales in the published literature. These can be used to support disaster risk reduction and civil protection professionals in better understanding natural hazards and potential disasters at a regional scale.