Futures of resilience and mitigation: Combining stakeholder knowledge, statistical analysis and integrated modelling to better understand and reduce disaster risk

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Futures of resilience and mitigation: Combining stakeholder knowledge, statistical analysis and integrated modelling to better understand and reduce disaster risk

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\textbf{Abstract:} Characterising disaster risk involves a complex interaction of physical and social sciences, which makes planning for its reduction significantly challenging. The impact of disasters however make the need to deal with these complexities and uncertainties significant. A common approach to dealing with problems with great uncertainty and complexity is participatory development and application of exploratory scenarios which involve both qualitative and quantitative information. Scenarios developed for the Greater Adelaide region of South Australia, Australia, involved a diverse group of stakeholders involved in natural hazards planning and response. The development and use of exploratory scenarios to assist in decision making was selected due to the complexity of values and understanding, and the uncertainty in socio-economic developments in the region and impacts of reduction options over extended horizons, to 2050. The scenarios themselves were framed based on the challenges to a resilient society and the challenges to designing and implementing mitigation strategies, building on from the framing shown in the Shared Socio-economic Pathways, in an attempt to make what can be abstract scenarios more policy relevant. Five scenarios were qualitatively developed, based on various factors relevant to the framing axis such as institutional culture and perception, social cohesion, infrastructure, and risk/hazard understanding. Statistical analysis based on historical developments and projected trends were used to translate these creative timelines into drivers and system relationships for an integrated model. This spatial, integrated model allowed stakeholders and policy makers to see outputs of land use change and how disaster (flooding, earthquake, bushfire, coastal inundation) risk changed under different scenarios. This allowed for a greater understanding of future disaster risk reduction challenges and subsequently better planning responses.

\textbf{Keywords:} Exploratory scenarios; stakeholders; disaster risk; integrated modelling