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Integrating participation and modelling to support natural hazard mitigation planning

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Integrating participation and modelling to support natural hazard mitigation planning

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Abstract: Natural hazard mitigation planning is a multi-faceted problem. Besides understanding the risk of various hazards at present, one also needs to understand how the probability of occurrence and the consequences change over time, what the impact of potential mitigation measures is on reducing the risks, and what the side effects of hazard mitigation options are on adjoining disciplines. Consequently, dealing with hazard mitigation encompasses various aspects that require different support techniques. In order to ensure consistency and complementarity these techniques should be used as a closely linked tool set. This paper proposes such a tool set or framework. It uses a combination of qualitative and quantitative information, integrates participation with modelling and allows for combining simulation and optimisation models in order to combine scientific and stakeholder knowledge in supporting natural hazard mitigation planning. Key elements included in the approach are exploratory scenarios developed in a participatory process with stakeholders to enhance the understanding of future uncertainties, a Decision Support System that incorporates an integrated modelling framework able to assess the impacts of climate change, socio-economic developments and mitigation options on risk and an optimization routine to facilitate the selection of near-to-optimal mitigation portfolios. The framework includes the DSS development and use as separate, but closely interconnected and interdependent processes. The importance of including potential use of the system during its development is that it provides direction to the development through scoping and the evaluation and improvement of prototypes. Moreover, involving users from the start of the development process creates support in the user group for using the system. The presentation will focus on the application of the framework to Greater Adelaide and places emphasis on the overall framework and the generic DSS as part of it.

Keywords: Natural hazard mitigation; disaster risk reduction; integrated modelling; exploratory scenario development; participatory scenario development; decision support system development and use.