



Development and use of an integrated modelling approach to simulate dynamic risk profiles and support risk reduction strategies

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Natural hazards pose a significant risk to societies across the world. This risk will likely increase in the future, due to climate change, urban development and changing demographics. Understanding the range of potential future conditions, and the associated key uncertainties, is essential in designing disaster risk management strategies that holistically account for these drivers.

For this purpose, we have developed a spatially explicit, dynamic, multi-hazard decision support system called UNHaRMED, which calculates dynamic risk profiles as a combination of hazard, exposure and vulnerability. The aim of UNHaRMED is to better understand current and future risk, and assess the impact of (a combination) of risk reduction options under various future conditions. In order to do so, UNHaRMED consists of coupled models integrated into a policy support system. It allows the user to understand the impact of climate change, socio-economic developments and risk reduction options on the future evolution of exposure, hazard and vulnerability and hence the resulting risk.

Use of the system will be illustrated through an application to a region in Australia for wildfire and flood risk, for which we simulated a range of futures using different climate and socio-economic scenarios. We found that in a rapidly growing area, the impact of socio-economic development exceeds the impact of climate change, and well thought out spatial planning strategies can substantially reduce future wildfire and flood risk.

The application of UNHaRMED showcases its potential in better understanding future uncertainties and leveraging this information to assess the impact of risk reduction options under a range of conditions. Lessons learned from this can then be incorporated in the design of robust and/or adaptive risk management strategies.