EGU25-20670, updated on 07 Jun 2025
https://doi.org/10.5194/egusphere-egu25-20670
EGU General Assembly 2025

Incorporating Multi hazard approach to disaster risk management and climate change adaptation

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The compounding effects of multiple hazards are increasingly recognised as critical for understanding risk and informing decision-making. However, hazards are often treated as discrete and independent entities. This conventional approach frequently overlooks the intricate interactions between hazards and their combined impacts on specific locations. Such limitations can lead to inaccurate risk estimates, undermining the effectiveness of preparedness and response strategies. As the shortcomings of single-hazard approaches become more apparent, there is growing recognition of the need for a comprehensive framework that integrates stakeholder perspectives and scientific insights. This integration can enhance multi-hazard risk management strategies, improving resilience and better aligning with the complexities of a changing climate and evolving hazard landscapes. Therefore, this paper examines multi-hazard information to local-level decision-making in Disaster Risk Management (DRM) and Climate Change Adaptation (CCA), with a focus on Essex as part of the MEDiate ('Multi-hazard and risk-informed system for enhanced local and regional disaster risk management') project, funded by the Horizon Europe. Essex, a low-lying county with a 905 km coastline and a high population density concentrated in southern coastal regions, is significantly susceptible to extreme wind and rainfall events, storm surges, and flooding. Through this case study, we demonstrate the generation of tailored multi-hazard information through policy reviews, analyses of spatially compounding extreme wind and rainfall events, and stakeholder engagement workshops. The results revealed that UK national policies acknowledge multi-hazard risks, DRM and CCA approaches largely remain single-hazard focused. The result of spatially compound event analysis indicate increases in wind speed and rainfall intensity by 2050, with coastal and southwestern Essex identified as high-exposure regions with a 100-year event, the mean daily maximum wind speed, recorded at 10.7 ms^{-1} during the baseline period, is anticipated to rise to 11 ms^{-1} by 2050. The stakeholder workshop highlighted the need for multi-hazard information to be compatible with existing systems, tailored to specific purposes, accessible, and integrative. This study developed a methodology to support multi-hazard risk-informed decision-making by generating practical and applicable insights for planning and managing risks, ultimately enhancing climate change adaptation.