**A simplified approach for urban multi-hazard hotspot identification: a case study of heatwave and earthquake risks**

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**Abstract** Assessing multiple risks in urban environments is a complex task, given the intricate interplay among infrastructure systems, geological and geomorphological conditions, and socioeconomic factors. The coexistence or simultaneous occurrence of multiple hazards can amplify overall risk levels, making their assessment even more challenging. Within this context, index-based methodologies are widely used as simplified yet effective tools for investigating multi-hazard risk and supporting risk-informed decision-making.

This study introduces a multi-risk index designed to integrate multiple hazards along with physical and social dimensions of vulnerability and exposure. The proposed index is a mathematical aggregation of normalized indicators representing hazard intensity, physical vulnerability, social vulnerability, and exposure, with the aim of identifying urban multi-hazard hotspots, i.e., areas where the combined impact of different hazards is potentially high. Recognizing these hotspots is crucial for disaster risk reduction, as it enables targeted mitigation, efficient resource allocation, and informed land-use planning. By highlighting zones where hazards converge and interact with vulnerable populations and infrastructure, authorities can prioritize actions to enhance resilience and reduce losses.

An application of the methodology is presented for the municipality of Naples, focusing on seismic and heatwave risks. Residential buildings and the local population are considered as the exposed elements. For each census tract, hazard intensity and physical vulnerability are combined to assess individual potential risk levels, which are then integrated with social vulnerability and exposure data to derive a composite multi-hazard risk index. The results highlight areas where the impacts of both hazards could be particularly severe, due to a combination of high hazard levels, dense exposure, and significant physical and social vulnerability. These findings are especially relevant for identifying locations where integrated seismic and climate proof retrofitting interventions would be most effective. The proposed index-based approach may be also extended to include the effects of risk mitigation measures, by adjusting the contributing indicators accordingly. As such, it also serves as a practical tool for evaluating the potential benefits of policies aimed at reducing urban multi-hazard risk.