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Mapping single hazards and multi-hazard interrelationships in Global South urban areas: A case study in Kathmandu, Nepal.

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Achieving a holistic approach to disaster risk reduction in urban areas remains challenging. This requires understanding the breadth of single hazards and multi-hazard interrelationships across various spatial and temporal scales that might impact a given urban area. Here we describe an approach to systematically map the single hazards and multi-hazard interrelationships that have a potential to impact Kathmandu, Nepal, one of the focus cities of the UK Global Challenges Research Fund (GCRF) Tomorrow's Cities research hub. Using an existing classification of 21 natural hazard types (across six hazard groups: geophysical, hydrological, atmospheric, biological, space), we first searched for evidence of each of these occurring in or affecting Kathmandu. We used systematic mapping to find and select evidence, applying a simple Boolean search with keywords and reviewing publications across all years available on online databases before selecting evidence from 2010 onwards where available. The spatial boundary around Kathmandu was not specified, rather we chose evidence based on recorded or potential impacts in the city. When searches returned many results (i.e., over 100), we skimmed titles and abstracts for spatial and temporal occurrence to select up to 5 sources. We examined and integrated evidence from diverse sources, including academic literature, grey literature, traditional media (e.g., English language Nepali newspapers), global and national disaster databases and social media. This evidence was then used to assess potential multi-hazard interrelationships that may occur in Kathmandu. Using this blended evidence, we found 21 single hazard types that might impact Kathmandu. We found case study evidence for 11 interrelationship types that have had previous impact in Kathmandu with many more that are theoretically possible. The results illustrate the complexity of the hazard landscape, with many single hazards and multi-hazard interrelationships potentially impacting Kathmandu. This knowledge can inform the development of dynamic risk scenarios, to use in planning and civil protection, thus strengthening multi-hazard approaches to disaster risk reduction in Kathmandu.