Two case studies of compiling urban multi-hazard assessments for Africa in a data-poor environment

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Towns and cities across the Global South represent a unique challenge in terms of assessing urban risk. Here we present a methodology for urban multi-hazard assessments in data-poor cities, using as case studies two African cities, Nairobi (Kenya) and Karonga (Malawi). For each city, we perform a systematic search of published literature (54 sources) and Africa-wide datasets (77 sources) using a set of keywords plus a grey literature search to identify spatio-temporal information about the potential occurrence of 21 different natural hazards including geophysical, climate, biophysical, space and shallow earth hazards (single-hazard assessments). We then use existing frameworks to identify potential interactions between those hazards. The resultant report for each city is designed for city-level stakeholders and communicated in simple language, including a background of the hazard, potential for its occurrence in that city, maps and time series and indications of potential hazard interactions. The reports for each city indicate a range of well-understood single hazards (e.g., rainy season floods) but also reveal potential hazard interactions that may not be considered in current urban risk assessments (e.g., interactions between earthquakes, landslides and floods). For Nairobi we identify approximately 81 potential hazard interactions and for Karonga approximately 112 hazard interactions. This includes both hazards triggered by the primary hazard, and hazards that could trigger the primary hazard. We also discuss some of the challenges of working on multi-hazards at the urban scale in a data-poor scenario and our experience of working with local government in urban Africa. In addition to providing a general methodology for assessing multi-hazard risk, the work aims to provide city-level stakeholders with an initial coarse-scale assessment of the potential for 21 different natural hazards and their interactions in Nairobi and Karonga.