



In-situ image data capturing and spatio-temporal data management in the context of a multi-hazard risk assessment

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Monitoring of the spatio-temporal variability of exposure and vulnerability indicators for risk assessments is dependent not only on the amount and quality of the data upon which the assessment is made, but also on the tools and methodologies employed to capture, store, manage and analyse the information. Spatio-temporal changes need to be properly integrated into a sound, comprehensive conceptual and methodological framework, which is able to deal with multi-dimensional data coming from different sources, at varying scales and changing over time.

Commonly used approaches to capture data about an exposed building stock with respect to its physical characteristics and vulnerability usually entail a detailed (inside and outside) screening of buildings by structural engineers. These approaches are often not suitable for the rapidly changing spatio-temporal conditions in many present-day cities, and moreover do not often scale well with end-user's limited resource allocation. Also purely satellite-based approaches, which are used as time- and cost-effective alternative, show limitations in that they are only capable of providing information about vulnerability-related characteristics that can be assessed from the top view.

This work, therefore, introduces a methodological and technical framework to combine remote sensing with in-situ image data capturing to overcome the limitations of previous approaches. A novel mobile mapping system and Remote Rapid Visual Screening (RRVS) technique based on omnidirectional imaging is presented. A key objective of this work is, moreover, to present a prototype spatio-temporal database system that functions as basis for the storage and management of data from different sources, at varying scales and changing over time. Examples from our study sites in Central Asia and Germany will be presented to highlight the application of the proposed approach.