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Integrating physical vulnerability models in a holistic framework-a tool for practitioners

Maria Papathoma-Koehle and Roxana Liliana Ciurean
Department of Geography and Regional Research, University of Vienna, Vienna, Austria (maria.papathoma@univie.ac.at)

The cost of hydro-meteorological hazards is increasing globally not only due to the influence of climate change upon the intensity and frequency of various natural processes but also due to worldwide socio-economic changes that alter the spatial and temporal patterns of vulnerability to natural hazards. During the past decades, much more information has become available on the role of vulnerability assessment in decreasing risk levels. However, few attempts have been made to develop and implement a standardised procedure for assessing physical vulnerability to hydro-meteorological hazards which considers integrating different qualitative and quantitative models in a complementary manner. Moreover, to date, it is not clear to which extent the transferability of different models to different spatio-temporal contexts is feasible, and how practitioners and decision-makers can use these models in a dynamic environment.
The objective of this research is to develop a physical vulnerability assessment framework that integrates different vulnerability models (vulnerability indicators, functions and matrices) and scenario analysis in order to investigate the temporal evolution of physical vulnerability of elements at risk to hydro-meteorological hazards. This study will first analyse and discuss the role of vulnerability assessment in reducing risk levels, in particular, how different methods of physical vulnerability modelling are currently applied in various stages of disaster risk management; what are their benefits and limitations; and, to which extent they can be used complementary in an integrated framework. The conceptual framework will make use of two case study areas to enable validation and comparison of results in two different socio-economic contexts. The resulting framework will contribute to the improvement of the risk assessment process and the development of risk reduction strategies.