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Improved seismic risk assessment based on probabilistic multi-source information integration

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Earthquakes threat millions of people all over the world. Assessing seismic risk, defined as the probability of occurrence of economical and social losses as consequence of an earthquake, both at *regional* and at *local* scale is a challenging, multi-disciplinary task. In order to provide reliable estimates, diverse information must be gathered by seismologists, geologists, engineers and civil authorities and carefully integrated, keeping into account the different uncertainties and the inherent spatio-temporal variability. An efficient and reliable assessment of the assets exposed to seismic hazard and the structural and social components of vulnerability are of particular importance, in order to undertake proper mitigation actions and to promptly and efficiently react to a possibly catastrophic natural event. An original approach is presented to assess seismic vulnerability and risk based on integration of information coming from several heterogeneous sources: remotely-sensed and ground-based panoramic images, manual digitization, already available information and expert knowledge. A Bayesian approach has been introduced to keep into account collected information while preserving priors and subjective judgment. In the broad perspective of GEM (Global Earthquake Model) and more specifically within EMCA (Earthquake Model Central Asia) project, an integrated, sound approach to seismic risk in countries with limited resources is an important but rewarding challenge. Improved vulnerability and risk models for the capital cities of Kyrgyzstan and Tajikistan, and their application in earthquake scenarios will be discussed.