



GAPQuake Romania - Development of a fully probabilistic earthquake loss estimation model for Romania.

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A reliable loss estimation model is today the key tool for earthquake hazard management. Disaster preparedness, urban planning, insurance and reinsurance industry are all based on pre-event evaluation of consequences after one or various earthquake scenarios. Unlike countries such as Japan or US where these models have been developed since mid-90s, the situation is different in most of the earthquake-prone developing countries. Various scientific research and initiatives have been carried out at local level, but risk assessment studies at national level are still not widely available.

An earthquake loss estimation model developed for Romania is presented here. Romania is a highly seismically active country where twelve earthquakes with magnitude greater than 6.5 occurred in the 20th century. In 1977, a magnitude 7.4 earthquake affected a large part of the country, causing death of more than 1400 people and producing more than 2 billion US dollars of direct losses at the time of event, which then represented around 5% of the GDP.

GAPQuake Romania is a fully probabilistic model, considering more than 60,000 synthetic earthquake events generated in 20,000 years, as well as more than 1000 years of real historic seismicity. Economic losses were estimated for each event, based on Romanian specific vulnerability curves calibrated with damage survey after 1977 earthquake. Inherent uncertainties in seismic hazard, intensity attenuation and vulnerability could be also considered and quantified through different input assumptions. The probabilistic approach allowed the calculation of standard measures used in insurance/reinsurance, such as Probable Maximum Loss (PML) for various return periods.

Economic losses due to various “as-if” scenarios based on historical earthquakes were also estimated at country level.