



## **Middle East and North Africa earthquake catastrophe model**

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Catastrophe models are widely used tools by (re)insurance companies, governmental and non-governmental stakeholders to quantify the impact of natural disasters on the built environment from a loss perspective and can serve numerous purposes. For instance, they provide a key role in defining mitigation measures and within the disaster management phase, thus improving resilience. The Middle East and North Africa Earthquake (MENA) Model has been developed by Willis Re to provide loss quantification for the region which has historically not been covered comprehensively by catastrophe models. A set of stochastic events was developed according to a unified historical catalogue and a seismic source zonation for the region. In addition, vulnerability curves have been developed for each country, considering different building classes and lines of business, according to a bespoke methodology to derive vulnerability curves in countries with limited empirical data available. The model was implemented on the Willis Re in-house loss platform to take into account (re)insurance structures and calculate different loss metrics. The developed tool is capable of deriving exceedance probability curves, which express the probability of a building portfolio exceeding a loss value due to earthquake damage. We show that our model enables us to capture how seismic risk is spatially distributed and present a technique termed seismic loss disaggregation – in reference to its similarity with seismic hazard disaggregation – to identify the earthquake sources that mostly contribute to the seismic loss at a given site.