



Seismic risk in the Region of Murcia. RISMUR Project

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The main objective of the RISMUR Project is to provide a general seismic risk assessment of the Murcia Region associated with expected ground motions for a return period of 475 years. In the first phase of the project, seismic hazard at generic rock site is calculated for a grid covering the entire region. Results are represented in maps of peak ground acceleration (PGA) and spectral acceleration (SA) of periods 0.1, 0.2, 0.5, 1 and 2 seconds, for the prescribed return period of 475 years. A geotechnical characterization of the Region, mainly inferred from geological maps and refined with on-site observations at specific locations, is the basis for a soil classification that represents ground response to seismic shaking. Subsequently, amplification factors for each soil class are derived. These amplification factors are integrated with rock acceleration estimates in order to compose hazard maps that incorporate local soil effects. The highest hazard for a return period of 475 years results in the lower Segura River basin, where some of the most populated cities of the Region are located (including Murcia City). Other areas with high hazard include the zone of La Manga del Mar Menor. In parallel, a vulnerability assessment of the Murcian building stock that distinguishes between rural and urban environments is carried out, based fundamentally on the age of construction. In the definition of the vulnerability classes and damage degrees, the EMS-98 criteria are followed. The towns presenting large overall vulnerability are mainly located in rural areas. It is remarkable that the Murcian building stock predominately presents medium-to-high overall vulnerability. Taking into account the expected ground motions and building vulnerabilities, the distribution of expected damage is estimated by application of probability damage matrixes derived from the 1980 Irpinia earthquake. Several damage indexes are defined, and relative and total damage estimates at each location are derived. With these data, a suite of maps representing seismic risk in terms of damage parameters for the entire Region

of Murcia are traced. These maps allow the identification of sites with large potential risk, where specific studies of damage scenarios, associated to earthquakes presenting large hazard contribution, should be carried out.