Seismic hazard assessment of the Murcia Region (Spain). RISMUR Project

M. B. Benito (1), J. M. Gaspar-Escribano (1), **J. García-Mayordomo** (1), M. E. Jiménez Peña (1), M. J. García-Rodríguez (1)

(1) ETSI Topografía, Geodesia y Cartografía, Universidad Politécnica de Madrid, jgaspar@topografia.upm.es

The first part of the RISMUR project (Seismic Risk Assessment of the Murcia Region) is a probabilistic seismic hazard assessment for the whole region. This study is carried out using a seismic catalogue homogenized to moment magnitude and considering attenuation models in terms of peak ground acceleration (PGA) and spectral ordinates (SA). In order to constrain epistemic uncertainty, the logic tree methodology is followed. Three different attenuation models -Sabetta and Pugliese, 1996, Ambraseys et al, 1996, and Berge-Thierry et al, 2003- and three different seismic zonifications -NCSE-02, 2002, López-Casado et al, 1995, and García-Mayordomo, 2005- are included. Major active faults in the area (Alhama de Murcia, Carrascoy, Bajo Segura and San Miguel de Salinas) are incorporated in the zonification of García-Mayordomo, 2005. Hazard results are expressed as maps showing mean expected PGA and SA for periods 0.1, 0.2, 0.5, 1.0 y 2.0 s on rock conditions associated to a 10% probability of exceedance in 50 and 100 years. In each map, the coefficient of variation (COV) is calculated to highlight areas where results show more variability. The most hazardous areas in the Murcia Region are located along the alienation of the Guadalentín, Sangonera and Segura valleys, where PGAs from 0.11 to 0.13g, and 0.15 to 0.18g, area attained for the 475- and 975-year return periods, respectively. In addition, Uniform Hazard Spectra (UHS) at main cities of the region (Murcia, Lorca and Cartagena) are constructed. Hazard deaggregation for target motions corresponding to 475-year return period is also performed at these sites, and the corresponding control earthquakes together with their specific response spectra (SRS) are defined. The control earthquakes deduced for these towns are characterized by a magnitude 4.5-5.0 and a mean distance of 0-10 km. These parameters closely resemble the characteristics of the last

three damaging earthquakes recorded in the area (Mula, 1999; SW Bullas, 2002; and La Paca, 2005). For each site analyzed, UHS and SRS spectra are very similar, specially for the low-period range. The comparison of the UHS and the SRS spectra with the corresponding design spectra provided in the Spanish Building Code NCSE-02 shows much higher amplitudes of the UHS and SRS spectra than the NCSE-02 spectra for short-periods (<0.5s). For the long period range the opposite is found. Based on the similarities between the UHS and SRS spectra, and the characteristics of the last three damaging earthquakes recorded in the area, we conclude that the NCSE-02 spectra under- and overestimates spectral accelerations for the short- and long-period ranges, respectively.