THE EUROPEAN PROJECT UPSTRAT-MAFA
“Urban Disaster Prevention Strategies Using Macroseismic Fields and Fault Sources”

G. Zonno1, R. Rotondi1, C.S. Oliveira2, A. Carvalho2, M. Garcia-Fernandez2, R. Sigbjornsson2 and UPStrat-MAFA Working Group


Abstract

In the framework of the EU research project “Urban Disaster Prevention Strategies Using Macroseismic Fields and Fault Sources” (Grant Agreement A320301/2011/166984/ESKDK) innovative approaches are proposed to improve critical points in the procedures for assessing probabilistic hazard and seismic risk; they are tested in particular locations – Mt. Etna, Vejarque and Campi Flegrei areas (Italy), Azores Islands and areas hit by offshore activity (Portugal), Almaty-Nurana area (Kazakhstan), Spitsbergen and South Island (Chile) including Reykjavik surrounding urban area (Iceland).

A unique probabilistic procedure has been used for seismic hazard evaluation processing both macroseismic fields and characteristics of fault sources. The direct application of probabilistic methodologies to observed and/or synthetic macroseismic fields allows us to carry out a more complete treatment of the uncertainties in the cases of both point-wise and linear properties of a fault. An improvement of the urban scale fields allows us to carry out a more complete treatment of the uncertainties in the cases of both point-wise and linear properties of a fault. An improvement of the urban scale fields and characteristics of fault sources. The direct application of probabilistic methodologies to observed and/or synthetic macroseismic fields allows us to carry out a more complete treatment of the uncertainties in the cases of both point-wise and linear properties of a fault.

Test Area 1: Distribution of the epicentres (blue circles) of the earthquakes with epicentral intensity 10 ≤ VI, occurred from 1832-2008. Grey dots represent the localities included in the database of observations; seismogenic faults are in red. The rectangle identifies test area 3 (Alcante-Murcia region)

Test Area 2: On the top, Azores Islands with the epicentral map of Azores archipelago for the period 1860-1998 (Nunes et al., 2003) and, on the right, mainland Portugal Lower Tagus Valley and Algarve (Portugal).

Test Area 3: Larger (1-EM958 > VIII) historical earthquakes in the Iberian Peninsula overlaid on the regional hazard map of PGA with 10% probability of exceedance in 50 years (modified from Jimenez et al., 2003). The rectangle identifies test area 3 (Alcante-Murcia region)

UPStrat-MAFA: the 5 main activities with 10 related tasks

- Forecast of damage scenarios
- Evaluation of the seismic hazard at site
- Task G: Probability Hazard Assessment
- Task D: Probability Hazard Assessment
- Task A: Data collection, instrumental, macroseismic fields ...
- Task B: Probabilistic Analysis of Macroseismic Data
- Task C: Calibration of the input source parameters for simulation
- Task I: Probability Hazard Assessment

The main points of the project

1. An innovative approach is performed in which a unique probabilistic procedure processes macroseismic fields (historical information) and characteristics of fault sources

2. The new concept of global disruption measures (Disruption Index) is introduced with the objective to provide a systematic way to measure earthquake impact in urban areas

3. Disaster prevention strategies based on an education information system is developed with comparative study of how the education information system is addressed in the different EU-countries participating in the project.