EARTHQUAKE SOURCE AND SEISMIC STRAIN RATE: PORTUGAL IN THE CONTEXT OF THE WESTERN PART OF THE EURASIA - AFRICA PLATE BOUNDARY

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Fault plane solutions, stress-pattern and deformation rate along the Western part of the Eurasia-Africa Plate Boundary, particularly between Azores triple junction and Gibraltar are analyzed. A selection of shallow depth seismic events (1.9 = M = 8.0) occurred in the period 1900-2003 have been carefully checked and analysed. The distribution of the focal mechanisms have been analysed by means of different techniques, projections and graphic representations. Seismic moment tensors, moment rate, slip velocity and b values have been estimated. Based on these results, we propose the following: 1) Between the Azores triple junction and Terceira island predominates strike-slip motion with nodal planes trending NNW-SSE and ENW-SSE; between the Terceira island and the beginning of the of Gloria fault the normal mechanisms predominate with nodal plans in the direction of islands. Deformation rate in both regions is 7.4 and 2.4 cm/year respectively. 2) In the continuation of the plate boundary, along the Gloria Fault until the Iberian continental margin we clearly have right-lateral motion in the E-W direction with a deformation rate of 1.8 cm/year. 3) The Eastern part of the Plate boundary, in Portugal continental, is very complex, however we identify some important patterns in the following regions: western Iberian margin (strike-slip), Lisboa and Vale do Tejo (dip-slip), Évora and vicinity (strike-slip), region of Algarve (strike-slip) and inter-plates boundary zone (inverse). These regions are affected by compression oriented and a deformation rate of 0,55 cm/year.

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On April 14th 2004, a Mb=5.6 earthquake stroke along the Jan Mayen fracture zone. The event was located on the north-eastern segment of the fracture zone, offshore the Jan Mayen island. The location of the event falls in an area where the slowly spreading Mohns ridge intersects with the Jan Mayen fracture zone. The Norwegian National Seismic Network (NNSN) operates four seismic stations on the Jan Mayen island, which have recorded a large number of aftershocks.
Using data from the NNSN, both recorded locally and on mainland Norway, the event is studied with respect to exact location, magnitude and fault plane solution. Relative locations for the aftershocks are obtained using a master event technique in order to determine the extent and orientation of the fault plane. The fault plane solution indicates almost pure strike-slip motion and is compatible with the general orientation of the fracture zone as well as the local lineaments.
The location of the event is similar to the previous significant earthquake in December 1988 (Mb=5.7).
Volcanic activity from the Beerenberg volcano is an integrated part of the lithospheric processes in this area, as was observed during the last eruption in January 1985. The recent event, based on its location and signal characteristics, has a typical tectonic origin.

ERSE (REALISTIC SCENARIOS OF SEISMIC RISK IN SPAIN) PROJECT

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In this project we propose to carry out a realistic evaluation of damage in two zones: one urban, (Malaga city, S. Spain) and another rural, (Cerdanya SE Spain) as consequence of the occurrence of a moderate magnitude earthquake (6.5 > Mw > 5). A detailed study of the generation and occurrence of earthquakes (magnitude Mw=5-6) using seismological and geodetic observations will be carried out in order to obtain a detailed knowledge of the state stress, deformation and seismotectonics. The main goals of the project can be summarised as follows: 1. Definition of seismic scenarios. Revaluation of earthquakes in Spain producing moderate damage (Io=VII-VIII). 2. Study of the fracture processes at the focus from the analysis of broad-band seismological data. 3. Modelling of larger earthquakes from empirical Green functions derived from smaller shocks. 4. Estimation of displacement vectors from geodetic GPS measurements. 5. Study of microzonation, classification of soils and evaluation of transfer functions at selected sites. 6. Evaluation of possible damage from a future earthquake at Malaga and La Cerdanya (Gerona) and comparison with the real damages caused in the Gerona (1428) and Malaga (1680) earthquakes.
Different response spectra for each scenario will be proposed from the obtained results, with the identification of the risk elements for each area and the urban system. Spectral values obtained in the study of the hazards scenarios will be used for the vulnerability analysis.

CALIBRATION OF LOCAL AND DURATION MAGNITUDES FOR PORTUGAL. MAINLAND AND ADJACENT REGION

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In previous works, a local magnitude (M_L) calibration study was performed using records of the Instituto de Meteorologia database for the period 1995-1997. The calibration was done taking into consideration the classical Richter formulation, following the more recent approach developed by Bakun & Joyner (1984) and Hutton & Boore (1987), where the geometrical spreading and anelastic attenuation are considered separately.
In the present study, we included data from the period January 1995-July 2003, complemented with a few amplitude values from the accelerometric network. The attenuation coefficients and the station corrections were determined using a constrained linear least squares method.
Also, considering the need to correlate the older events, for which only analog records do exist, new coefficients were estimated for the coda magnitude (M_D) by fitting the observations to the new computed local magnitudes.
For both cases of M_L and M_D, the obtained results are very close to the previous ones, but the fitting to the observations is much better.

A REPRESENTATION, USING GIS MAPS, OF SEISMIC DATA IN THE CALABRIAN ARC AREA, SOUTHERN ITALY

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The southern Tyrrhenian basin is one of the most interesting regions of the Mediterranean Sea for its geodynamical activity. The presence of a Benioff zone led many investigators to hypothesize a variety of models to explain the tectonics of the region.
The short term aim of this work is a scenic creation which can show the geophysical parameters of seismic events related to the Calabrian Arc zone. This could be possible due to the functionality of analyses in space and time through a Territorial Informative System.
Inside the seismogenetic zone of interest it is possible to value the seismic risk according to a model of seismic zonation , suggested by Scandone et al. (1992). On the basis of this