Originally published as:

29th General Assembly European Seismological Commission (Potsdam 2004).
European Seismological Commission
XXIX General Assembly

International Union of Geodesy and Geophysics (IUGG)
International Association of Seismology and Physics of the Earth’s Interior (IASPEI)

ABSTRACTS

University and GFZ Potsdam, Germany
September 12 - 17, 2004
classical European and Italian relationships. The results consists of a map displaying the median values of 16 weighted branches in terms of PGA with 10% exceedance probability in 50 years, related to very stiff soil conditions. Although in many steps we made conservative choices, the resulting PGA distribution exhibits lower maximum values with respect to previous country-scale hazard maps. This is mainly due to: a) magnitude re-assessment; b) larger size of the source zones; c) more realistic completeness time-intervals; d) use of different depth in the source zones. The map was compiled under the review of an international board and will serve as input for updating the seismic zonation related to the newly implemented seismic code.

PROBABILISTIC SEISMIC HAZARD ASSESSMENT FOR VANUATU

J. Suckale1, G. Grünthal1, M. Regnier2, Ch. Bosse1, D. Stromeyer1
1GFZ Potsdam, Germany, jenny.suckale@gmx.net; 2Inst. de recherche pour le Développement, Unité mixte de recherche Géosciences Azur, Valbonne, France

This study assesses the seismic hazard in Vanuatu probabilistically. The region, also known as New Hebrides, lies in the centre of a chain of islands which marks the present-day boundary between the Australian plate and the microplate of the North Fiji Basin. The archipelago extends about 1100 km along a NNW-SSE trend between latitudes 11°S and 22°S from the Solomon arc in the north to the Matthew-Hunter ridge in the south. The high seismic activity is dominated by an east-dipping subduction zone with considerably varying convergence rates. The revised earthquake catalogues for the region is based on local data recorded and located by the Institut de recherche pour le Développement from 1994 to 2002 and complemented with the Engdahl and the United States Geological Service (USGS/NEIC) global catalogues. The homogenisation of the cata-logue required the conversion of different magnitude scales to moment magnitude through a maximum likelihood approximation. It can be regarded as complete for $M_w$ 5.5 since 1964. The original catalogue was declustered and reduced to a set of assumed mainshocks, which were proved to be Poisson-distributed. The methodology of probabilistic hazard assessment using the logic tree approach was then applied to this subset. An important focus was to evaluate the uncertainty of the input parameters. These are the three-dimensional source region model, the attenuation relation, and the seismicity parameters (maximum expected magnitude, focal depth distribution and frequency-magnitude relations). The utilized logic tree approach allows to take the different possibilities adequately into account.

EVALUATION OF HAZARD FROM EARTHQUAKE-INDUCED TSUNAMIS: AN APPLICATION TO THE TYRRHENIAN CALABRIA AND THE NORTH-EAST SICILY COASTS, ITALY (poster)

S. Tinti1, A. Armiglittö, A. Maramai1, L. Graziani1, R. Tonini2
1Dip. di Fisica, Settore di Geofisica, Univ. di Bologna, Italy, steve@ibogfs.dfn.unibo.it; 2Dip. di Fisica, Settore di Geofisica, Univ. di Bologna, Italy, l.tinti@ingv.it, Rome, Italy

Italy is one of the countries of the Mediterranean sea most affected by tsunamis. Catalogues of Italian tsunamis show that Italian coasts were attacked by large tsunamis in the past that had catastrophic effects, causing thousands of victims and severe damage. Though the cases of tsunamis associated with volcanic activity and submarine slides cannot be neglected, most tsunamis were the results of coastal and submarine earthquakes. Therefore, assessing the occurrence probability of tsunamigenic earthquakes is an important contribution to the global evaluation of tsunami hazard. Improving a methodology originally used for a preliminary evaluation of tsunami hazard in Italy more than one decade ago (Tinti, 1991), this paper applies probabilistic seismic hazard techniques focussing on Calabria and Sicily, that are among the most active seismic regions in Italy. The main steps of the procedure are: 1) estimating the occurrence rate of tsunamigenic earthquake; 2) assessing the initial disturbance of the sea, with the aid of appropriate relation-ships between the earthquake size and the ensuing tsunami size; 3) evaluating the expected maximum tsunami height on the coast, on the basis of the known propagation properties of tsunamis.

SEISMIC HAZARD DUE TO SMALL SHALLOW INDUCED EARTHQUAKES

T. van Eck, F. Goutbeek, H. Haak, B. Dost
Seismo. Div., KNMI, De Bilt, The Netherlands. Email: vaneck@knmi.nl

The new Dutch legislation (2003) with regard to mining activities requires for each concession, among others, a hazard assessment and an earthquake- and subsidence-monitoring plan. This initiated our study to quantitatively the probable seismic hazard associated with mining activity. We present the basic methodology for a Probabilistic Seismic Hazard Analysis (PSHA) applied to small and shallow earth- quakes, i.e. 1.55 < M < 3.9 and depth < 4 km, in The Netherlands. Such small shallow earthquakes occur as induced events due to gas exploitation, mainly in the north of The Netherlands. Few studies have applied a PSHA for small and shallow events and we indicate some specific complications. Most important is that relatively high Peak Ground Accelerations (PGA) are predicted and observed. PGA above 0.2g is not unusual, but damage is mostly restricted to cracks in masonry. The Peak Ground Velocity (PGV) appears to be a more appropriate hazard parameter. Observed response spectra show a fairly stable peak around 10 Hz and are, consequently, used in the specified velocity hazard parameter. We predict that, for response spectra with 50% damping, peak values up to 20 and 30 mm/sec may be exceeded with an annual probability of 0.1 and 0.01 respectively above the Groningen field. In some small areas (about 3-4 km$^2$) above the Roswinkel and Bergermeer field values around 35 and 60 mm/sec may be exceeded with an annual probability of 0.1 and 0.01 respectively. For response spectra with 5% damping, the corresponding peak values may reach 50 and 80 mm/sec, and 85 and 140 mm/sec. These values, which do not include possible site-specific effects, can be related to the existing vibration guidelines in use in The Netherlands.

DATABASE OF POTENTIAL SOURCES FOR EARTHQUAKES LARGER THAN M 5.5 IN ITALY, AND SURROUNDING AREAS, VERSION 3.0 (DISS 3.0)

P. Vannoli, DISS Working Group
INGV, Roma (Italy), vannoli@ingv.it

We present the state of advancement of a new version of the Database of Potential Sources for Earthquakes larger than M 5.5 in Italy (Valensise e Pantosti, 2001, Annali di Geofisica, Suppl. to vol. 44, 4, 180 pp., with CD-ROM).

The main object of the database is the seismogenic source, intended as a simplified and georeferenced 3D representation of a fault plane. The seismogenic source is identified through geological and geophysical investigations and is assumed to be capable of primary slip during a large earthquake. Seismogenic sources for which geological and seismological data are insufficient are derived from quantitative treatment of historical earthquake data. The Database is implemented on a GIS platform and is open to additions and improvements. We devoted the last three years to improve specific information on previously identified seismogenic sources and to implement new ones. The updated Database contains 100 seismogenic sources based on geological/geophysical data (40 more than the previous version). These sources cover the whole Italian territory and some conterminous regions. They also show the fundamental architecture of major active fault systems, thus highlighting areas of limited seismic release and potential seismic gaps.

The Database also includes:
1) about 1,700 selected references to scientific literature (1,256 in the previous version) specifically pertinent to the identified seismogenic sources;
2) new pictures selected from the literature, such as geological maps, cross-sections, and photographs;
3) an improvement of the section dedicated to basic georeferenced geological/geophysical data.

As a result of these improvements the end users will benefit from a better definition of already outlined seismogenic fault systems and the identification of new ones, along with a more reliable documentation supporting the database content. DISS 3.0 will hopefully stimulate innovative seismic hazard assessment approaches based on the use of individual seismogenic sources.