European Geosciences Union General Assembly 2006

Session TS4.4

"3000 years of earthquake ground effects reports in Europe:
geological analysis of active faults and benefits for hazard assessment"

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Co-Sponsorship: INQUA, Subcommission on Paleoseismicity

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MINUTES OF THE INQUA SCALE PROJECT MEETING RELATED TO SESSION TS4.4

1. Programme

The Oral Session included the following six oral contributions:

1) Michetti, A.M.; The INQUA Scale Project The INQUA Scale Project: linking pre-historical and historical records of earthquake ground effects.
2) Blais-Stevens, A; Clague, J.J.; Rogers, G.C. A 4000-year record of earthquakes in late Holocene sediments from Saanich Inlet, British Columbia Canada (solicited).
3) Peters, G.; Buchmann, T.J.; van Balen, R.T. Interplay of Quaternary tectonic activity and fluvial processes inferred from paleoseismology and geomorphology (northern Upper Rhine Graben, Germany).
4) Silva Barroso, P.G.; Reicherter, K.; Bardají , T.; Lario, J.; Peltzer, M.; Grützner , C.; Becker-Heidmann, P.; Goy, J.L.; Zazo, C.; Borja, F. The Baelo Claudia earthquake problem, Southern Spain (solicited).
5) Azuma, T.; Ota, Y. Comparison between seismic ground effects and instrumental seismic intensity--an example from a study on the 2004 Chuetsu earthquake in Central Japan-- (solicited).
6) Papanikolaou, I.D.; Roberts, G.P. Slip-rate variability along strike active faults: Implications for seismic hazard assessment and mapping.

Furthermore, the following ten contributions were presented as posters:

1) Silva, P.G.; Reicherter, K.R.; Bardají, T.; Lario, J.; Peltzer, M.; Grützner, Ch.; Becker-Heidmann, P.; Goy, J.L.; Zazo, C.; Borja, F. Surface and subsurface paleoseismic record of the Baelo Claudia area (Gibraltar Arc area, southern Spain) – first results (solicited).
2) Reicherter, K.R.; Silva, P.G.; Goy, J.L.; Schlegel, U.; Schöneich, S.; Zazo, C. Active faults and paleostress history of the Gibraltar Arc area (southern Spain) – first results.
3) Pavlides, S.; Chatzipetros, A.; Zervopoulou, A.; Kurcer, A.; Triantafyllos, D. Post-Roman seismic activity in Mikri Doxipara – Zoni archaeological excavation (NE Greece).
4) Lee, H.; Im, C. B.; Shim, T. M.; Choi, H. S.; Noh, M.; Jeong, J. H. Technical backgrounds of active fault definitions used for nuclear facility siting: a review.
5) Pace, B.; Peruzza, L.; Lavecchia, G.; Boncio, P.; Visini, F. Active faults, regional seismotectonic zonation and seismic hazard assessment in central Italy. A multidisciplinary approach.
6) Papanikolaou, I.D.; Papanikolaou, D.I.; Lekkas, E.L. Epicentral-near field and far field effects from recent earthquakes in Greece. Implications for the recently introduced INQUA Scale.
7) Schenk, V.; Pichl, R.; Schenková, Z.; Kalogeras, I. Isoseismal map drawing by kriging default option.
8) Guerrieri, L.; Esposito, E.; Porfido, S.; Vittori, E. The application of INQUA Scale to the 1805 Molise earthquake.
9) Giardina, F.; Carcano, C.; Livio, F.; Michetti, A.M.; Mueller, K.; Rogledi, S.; Serva, L.; Sileo, G.; Vittori, E. Active compressional tectonics and Quaternary capable faults in the Western Southern Alps.
10) Kastelic, V.; Cunningham, D. Multi-Disciplinary Investigation of Active Strike-Slip Fault Propagation in the Julian Alps: The Ravne Fault, NW Slovenia.

2. Main remarks for the INQUA Scale Project

The session TS4.4 co-sponsored by INQUA Subcommission on Paleoseismicity was focused on the earthquake geological effects, and especially those taking advantage from the extraordinary wealth of historical information available in Europe and surrounding areas. Thus, the Session was intended to bring together researchers with a marked multidisciplinary approach, including paleoseismology, seismotectonics, structural geology, geomorphology, historical seismicity, and seismic hazards.

In the introductory presentation Michetti et al. illustrated the background of the INQUA Scale project. He showed how the systematic study of earthquake surface faulting, coseismic liquefaction, tsunami deposits and other primary and secondary ground effects (Earthquake Environmental Effects, EEE) can be integrated with "traditional" seismological and tectonic information to provide a better understanding of the seismicity level of an area, and the associated hazards.
Within these objectives, some applications of the INQUA Scale macroseismic intensity to historical and recent earthquakes have been presented during the oral and poster session (see abstracts in Annex 1).
Azuma & Ota illustrated an application of the INQUA Scale to the 2004 Chuetsu earthquake (Mj 6.8) in Central Japan. According to the INQUA Scale it was possible to assess local intensities (grids of 1 km) in the area affected by the earthquake on the basis of landslides and liquefactions occurrence and size. The resulting INQUA intensities were compared with the distribution of JMA intensities.
Papanikolau et al. showed some examples of applications to recent earthquakes in Greece. Preliminary results from recent earthquakes in Greece show that the newly introduced INQUA scale appears to record the intensity degree in the epicentral area and the near field effects in an accurate and satisfactory way, even for deep earthquakes, such as the recent 2006 event (Mw=6.9) at Kythira island (focal depth 70 km).
Guerrieri et al. reinterpreted the contemporary descriptions of ground effects triggered by the 26.07.1805 Molise earthquake (M=6.8). Even if two centuries later, it was possible to evaluate EEE epicentral and local intensities. The resulting EEE macroseismic field appears to be consistent with the energy associated to the seismic event, as described by the “traditional” historic damage-based information.
Fokaefs et al. showed the application of the INQUA scale to three Greek earthquakes (Kyllini, 16.10.1988, Ms = 5.8; Athens, 07.091999, Ms = 5.9; Lefkada island, Ionian Sea, 14.08.2003 Ms = 6.3). An inventory of macroseismic effects as well as of conventional intensities has been created for each one of the studied earthquakes. A comparison between the conventional and new intensities has been made and the results are evaluated as regards the efficiency and possible future improvement of the new INQUA scale.

Although not focused directly on the application of the INQUA Scale, all the other contributions of this session have clearly evidenced the power of paleoseismological analyses in different geological settings, since they have the potential of bridging the gap between a) historical and instrumental information on past earthquakes. and b) the geological study of active tectonic structures.

In order to divulgate and the INQUA scale project within the scientific community the Italian Geological Survey, APAT prepared a special brochure (Annex 2). This brochure had been a very helpful tool for the promotion of the Scale since it was largely distributed not only within this session but during the whole EGU General Assembly.