Geophysical Research Abstracts, Vol. 9, 09440, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-09440

Surface faulting risk in Italy from capable faults and urban sprawl data

A.M. Blumetti, L. Guerrieri, E. Brustia, A.M. Caputo, S. Poddighe and E. Vittori

Agency for Environment Protection and for Technical Services-Geological Survey of Italy (APAT), via V. Brancati 48, 00144 Roma, ITALY

(eutizio.vittori@apat.it / Fax +39 064465159 / Phone +39 0650074478

The Italian territory is crossed by a great number of capable faults (i.e. active faults able to produce significant deformation at or near the ground surface - IAEA, 2003). In the last two decades, seismotectonic and paleoseismological studies have strongly improved the knowledge on the characteristics and distribution of these faults. The Geological Survey of Italy – APAT has compiled a database of Italian capable faults analyzed in terms of their seismic and environmental hazard potential (project ITHACA - Italy Hazard from Capable Faults).

It is well known that coseismic surface faulting events along capable faults are responsible for serious effects on built environment (buildings, roads, railways and lifelines). In recent time, as the urban sprawl has largely occupied areas crossed by capable faults, the risk associated to this phenomenon has strongly increased.

In order to estimate this risk, it is necessary to intersect the ITHACA database with data on urban sprawl. To this end, CLC90 and CLC2000 land cover databases (information on CORINE land cover for the whole Italian region respectively in 1990 and 2000) appear to be appropriate.

The intersection of ITHACA and CLC databases clearly shows where the expansion of urban areas near capable faults has been more intense. This can be done through specific indicators that take into account the urban dynamics within designated buffer areas around the capable faults.

Previous works (Guerrieri et al., 2006) have shown that, in the period 1990-2000, about 23 km^2 (2,7% of total urban sprawl) has occurred within 200 m from capable

faults. This national scale study is a preliminary step necessary to highlight urban areas nearby capable faults.

Of course not all capable faults pose the same hazard in terms of expected surface offset. For example, surface offsets per event associated to capable normal faults in the inner sector of Central-Southern Apennines (some tens of centimeters up to a few meters) are significantly higher than offsets expected from the active thrusts buried under the Po Plain (not larger than a few tens of centimeters). The vulnerability can be evaluated in terms of urbanization pattern and extension.

Considering both urban sprawl and hazard from capable faults, the zone with the highest risk resulted within the tectonic intermountain basins in the Apennines and in the Etna Region. Among the Apennine intermountain basins we analysed the huge urban sprawl occurred in the last decades at L'Aquila. This expansion occurred both across the master fault that borders the L'Aquila basin just north of the city, and across the many minor faults which characterize its hanging-wall.

Based on this analysis, it has been possible to contour zones where building restrictions or land use limitations should be required. For this case study, we suggest restrictions in the urban managements in areas within a distance of 100 meters in the footwall and 300 meters in the hanging-wall of normal faults.

Cited References

Guerrieri, L. Blumetti, A.M., Brustia, E. Caputo A.M., Poddighe S. & Vittori E. (2006) - L'espansione urbana in prossimità di faglie capaci: analisi a scala nazionale e su aree campione. III Rapporto Qualità dell'Ambiente Urbano, Volume APAT, 649-663.

IAEA (2003) – Evaluation of Seismic Hazards for Nuclear Power Plants. IAEA Safety Guide N° NS-G-3.3. 31 pp.

ITHACA: http://www.apat.gov.it/site/it-IT/Progetti/ITHACA/