Geophysical Research Abstracts
Vol. 12, EGU2010-15505-3, 2010
EGU General Assembly 2010

Active fault systems and their significance for urban planning in Bucharest, Romania

Dumitru Ioane (1), Mihaela Stanciucu (1), Florina Chitea (1), and Mihail Diaconescu (2)
(1) University of Bucharest, Romania, d_ioane@yahoo.co.uk , (2) National Institute of C-D for Earth Physics, Romania

Active fault systems may have significant influences in slow ground displacements during neotectonic vertical or/and horizontal movements, or sudden ones, as a consequence of high magnitude earthquakes. In urban planning activities, besides a detailed seismic zonation, the areal distribution of active faults and particularly of fault crossing sectors may be valuable in numerous cases.

In large cities as Bucharest, Romania, built over quite thick sequences of Quaternary unconsolidated sediments, there were no possibilities of geologically mapping faults or fault systems, the geological structures being deeply buried. Due to their specific structure, the unconsolidated sediments do not preserve traces of active faulting, either due to neotectonic processes or seismic events. In the geotechnical and hydrogeological wells and in the subway tunnels such tectonic elements are not easily observed by specialists, the resulted geological cross sections representing many times only facies changes and no faults.

Geophysical measurements (reflection seismics, gravity, vertical electric soundings, magnetics) or seismological observations of seismic events with Richter magnitude greater than 2, may be of greater utility, even they were not generally carried out so far at appropriate detailed scales.

This preliminary study employed existing geophysical data and recordings on the local seismicity, correlated with geomorphological, geological and tectonic information related to a larger area that includes the city of Bucharest. The existing tectonic data related to fault systems refer to deeper ones, previously illustrated by 2D reflection seismic measurements performed for oil and gas accumulations.
The main fault systems crossing Bucharest are trending NW-SE and N-S, directions that are also imprinted in the hydrological network: Dambovita and Colentina rivers, and a Colentina tributary trending northward, respectively. The NE-SW trending system, characteristic to the Vrancea seismic zone where high magnitude intermediate earthquakes occur, is less obvious in this area in geophysical and seismological data.

Sectors where the two main fault systems are crossing each other within the city center correlate well with highest damages caused to important buildings by high magnitude earthquakes, especially the 1940 (M = 7,4) and 1977 (M = 7,2) seismic events.