



Seismic hazard assessment of Vrancea area by GPS, satellite and in-situ monitoring data

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As one of the most seismically active area in Europe, Vrancea region in Romania presents a relatively high potential of seismic hazard mainly due to the subcrustal earthquakes located at the sharp bend of the Southeast Carpathians. Is assumed to be placed at conjunction of four tectonic blocks which lie on the edge of the Eurasian plate. Integrated satellite (IKONOS; LANDSAT MSS,TM and ETM, SAR-ERS 1/2, ASTER), GPS and field data of Vrancea area provide a better monitoring of different geophysical parameters and long-term deformation in relation with earthquake activity. Multispectral and multitemporal satellite images over a period 1975-2005 have been analyzed for recognizing the continuity and regional relationships of active faults as well as for geologic and seismic hazard mapping. GPS measurements can serve as a reference to these results. In spite of providing the best constraints on the rate of strain accumulation on active faults (coseismic, postseismic, and interseismic deformation; plate motion and crustal deformation at plate boundaries), GPS measurements have a low spatial resolution, and deformation in the vertical direction can not be determined very accurately. GPS Romanian network stations data revealed a displacement of about 5 or 6 millimeters per year in horizontal direction relative motion, and a few millimeters per year in vertical direction. As Vrancea area is characterized by a significant regional tectonic activity, evidenced by neotectonic deformation and seismicity, future use of long-term InSAR data will be a useful tool in active tectonic investigation for this region. The joint analysis of geodetic, seismological and geological information on the spatial distribution of crustal deformations as well as the analysis of some earthquake precursors is revealing new insights in the field of hazard and risk approach for Vrancea area.