



Geological-geophysical and historical-macro seismic data implemented in a geodatabase: a GIS integrated approach for seismic microzonation.

F. T. Gizzi, M. Lazzari, N. Masini, C. Zotta

CNR-IBAM, C/da S.Loja Zona Industriale Tito Scalco (PZ) 85050 Italy (contact
f.gizzi@ibam.cnr.it; m.lazzari@ibam.cnr.it fax-Nr *39/0971/427222

The microzonation concerns the identification and mapping at local or site scales of areas having different potentials for hazardous earthquake effects, such as ground-shaking intensity, liquefaction, or landslide potential. In order to obtain results for microzonation purpose it is necessary to record and to analyse the whole data set that derive from the site analysis. The traditional approach to microzonation, only based on geological and geophysical surveys, allows to select those urban sub-areas where potential high levels of damage may occur as a consequence of an earthquake. In contrast, the synergistic use of seismic data gathered from the analysis of the building damage due to more earthquakes enables us to identify the urban areas where relatively high levels of damage have already occurred in previous earthquakes. Starting from these point of view, a multidisciplinary and integrated approach has been applied to Potenza, the chief-town of Basilicata region (southern Italy), located in the axial zone of the southern Apennines, characterized by high seismic hazard. In fact, during about last two centuries this town has been damaged by several earthquakes some of which characterized by high magnitude and intensity (1694 Irpinia-Basilicata region $M_e=6.8$, $I_s=VIII$ MCS; 1857 Basilicata $M_e=7.0$, $I_s=VIII-IX$ MCS; 1826 Basilicata $M_e=5.9$, $I_s=VIII$ MCS; 1930 Irpinia $M_e=6.7$, $I_s=VI-VII$ MCS; 1980 Irpinia-Basilicata $M_e=6.7$, $I_s=VII$ MCS). In order to microzone the Potenza urban area, geological (field survey, drillings, stratigraphic sections), geotechnical (laboratory and site analysis), geophysical (downholes and seismic refraction measurements) and three historical seismic damage 'scenarios' (derived by the analysis of historical sources) have been implemented in a geodatabase on a GIS platform (ArcInfo) using the spatial analysis functions. This approach permitted to get thematic maps which

could be interpreted in perspective of a microzonation also according to the recent seismic Italian law (PCM n°3274 23/3/2003). Finally, it must be emphasised that the geodatabase is constantly and quickly up-to-date with regard to the latest investigations about the site and, therefore, new elaborations for microzonation applications can be obtained as a consequence of new knowledges.