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# The ShakeMap Atlas for the City of Naples, Italy

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Naples is one of the most vulnerable cities in the world because it is threatened by several natural and man-made hazards: earthquakes, volcanic eruptions, tsunamis, landslides, hydrogeological disasters, and morphologic alterations due to human interference. In addition, the risk is increased by the high density of population (Naples and the surrounding area are among the most populated in Italy), and by the type and condition of buildings and monuments. In light of this, it is crucial to assess the ground shaking suffered by the city.
We take into account and integrate data information from five Italian databases and catalogues (DBMI11; CPTI11; CAMAL11; MOLAL08; ITACA) to build a reliable ShakeMap atlas for the area and to recreate the seismic history of the city from historical to recent times (1293 to 1999). This large amount of data gives the opportunity to explore several sources of information, expanding the completeness of our data set in both time and magnitude.
84 earthquakes have been analyzed and for each event, a Shakemap set has been computed using an ad hoc implementation developed for this application: (1) specific ground-motion prediction equations (GMPEs) accounting for the different attenuation properties in volcanic areas compared with the tectonic ones, and (2) detailed local microzonation to include the site effects.
The ShakeMap atlas has two main applications:
a) it is an important instrument in seismic risk management. It quantifies the level of shaking suffered by a city during its history, and it could be implemented to the quantification of the number of people exposed to certain degrees of shaking. Intensity data provide the evaluation of the damage caused by earthquakes; the damage is closely linked with the ground shaking, building type, and vulnerability, and it is not possible to separate these contributions;
b) the Atlas can be used as starting point for Bayesian estimation of seismic hazard. This technique allows for the merging of the more standard approach adopted in the compilation of the national hazard map of Italy.
These Shakemaps are provided in terms of Mercalli–Cancani–Sieberg intensity (MCS hereinafter) and peak ground acceleration (PGA).