

Title: Integrated study of active and seismogenic faults in selected areas of the Southern Apennines

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Research Program

Active tectonics in southern Italy is mostly accommodated by a set of normal faults running along the axis of the Apennines. These faults are thought to extend down to ~10–15 km depth and to be responsible for large ($M \sim 7$) historical and instrumental earthquakes. The nucleation depth of these earthquakes indicate that the faults are rooted in the Apulia carbonate platform underlying the southern Apennines thrust belt. In the eastern domain encompassing the foothills of the Apennines and the Apulia foreland, strike-slip earthquakes with deeper (~15–35 km) focal depths are often associated with blind faults in the Apulia platform crystalline basement.

Despite that many of the largest earthquakes have been associated to a causative fault, large uncertainties still exist regarding definition of source geometric, kinematic and energetic parameters. Similarly, uncertainties still exist for the association between seismogenic sources at depth and surface faults considered to be active and capable of producing surface ruptures. This represents a severe drawback for the growing practice of seismic hazard estimation based on tectonic information for individual seismogenic sources, and on the estimation of the local fault displacement hazard due to active and capable faults.

The definition of such parameters relies on a seismotectonic model, where the relations between active faults and the crustal structure of the orogen plays a prominent role.

The active tectonics group at DiSTAR has been long working on active and capable faults and on their seismotectonic and crustal parameters together with national and international institutions, and plan to expand observation and modelling strategies in the near future.

PhD project proposal

The Department of Earth Science, Environment and Resources (DiSTAR) of the University of Naples Federico II seeks candidates for a PhD project on the analysis of active crustal deformation in selected parts of the Southern Apennines. The focus of the research will be on field (structural-geological and paleoseismological investigations) and remote (DTM, GNSS) analyses combined with interpretation of seismic reflection profiles, in order to reconstruct the spatial architecture and the parameters of active and capable faults and of the seismogenic sources in selected areas of the Southern Apennines (Matese-Sannio, Irpinia).

The research project will be carried out in collaboration with other institutions (INGV-Rome, University of Chieti, University of Catania), where the successful candidate will carry part of his research tasks.

The expenses of the PhD candidate related to the project activities will be covered by funds from DiSTAR, INGV and ISPRA. The candidate is expected to own solid basis of structural geology/tectonics and a general knowledge of methodologies for interpretation and elaboration

of seismic profiles and geodetic data.