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Geophysical methods for identification of active faults between the Sannio-Matese and Irpinia areas of the Southern Apennines.

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The Southern Apennines is one of the Italian most active areas from a geodynamic point of view since it is characterized by occurrence of intense and widely spread seismic activity. Most seismicity of the area is concentrated along the chain, affecting mainly the Irpinia and Sannio-Matese areas.
The seismogenetic sources responsible for the destructive events of 1456, 1688, 1694, 1702, 1732, 1805, 1930, 1962 and 1980 (Io = X-XI MCS) occurred mostly on NW–SE faults, and the relative hypocenters are concentrated within the upper 20 km of the crust.
Structural observations on the Pleistocene faults suggest normal to sinistral movements for the NW–SE trending faults and normal to dextral for the NE–SW trending structures. The available focal mechanisms of the largest events show normal solutions consistent with NE–SW extension of the chain.
After the 1980 Irpinia large earthquake, the release of seismic energy in the Southern Apennines has been characterized by occurrence of moderate energy sequences of main shock–aftershocks type and swarm-type activity with low magnitude sequences. Low-magnitude (Md<5) historical and recent earthquakes, generally clustered in swarms, have commonly occurred along the NE–SW faults.
This paper deals with integrated analysis of geological and geophysical data in GIS environment to identify surface, buried and hidden active faults and to characterize their geometry. In particular we have analyzed structural data, earthquake space distribution and gravimetric data. The main results of the combined analysis indicate good correlation between seismicity and Multiscale Derivative Analysis (MDA) lineaments from gravity data.
Furthermore 2D seismic hypocentral locations together with high-resolution analysis of gravity anomalies have been correlated to estimate the fault systems parameters (strike, dip direction and dip angle) through the application of the DEXP method (Depth from Extreme Points).