

GROUND RUPTURES AND SEISMIC FAULTING AT DEPTH: THE CASE OF THE KALAMATA, GREECE, 1986 EARTHQUAKES

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Abstract: The 1986, Ms=5.8 Kalamata (S. Greece) earthquake was one of the most destructive but least studied earthquakes in Greece in the last 30 years. Based on the limited available seismological data and certain discontinuous minor ground ruptures, this event was assigned to a normal fault cutting through to the surface and correlating with a major range-front fault.

A refinement of this fault model was attempted on the basis of an elastic dislocation analysis of pre-seismic and post-seismic leveling data. These data reveal that the 1986 earthquake reflects reactivation of a segmented, blind normal fault, part of a major broad left-stepping fault zone associated with several earthquakes during the last 200 years; a result consistent with seismological evidence (clustered aftershocks, absence of very shallow aftershocks and waveform complexities). Widespread minor surface ruptures associated with the 1986 earthquake are not regarded as tectonic, shear fractures, but as extensional (secondary) fractures produced by the very strong ground motion produced by this earthquake in intensively pre-fractured rocks, while seismic accelerations were amplified in high gradient slopes (topography effect).

Still, the differences between these models are small, and some years ago would have been dismissed as noise in the data used.

Key words: earthquake, Kalamata, fault model, levelling data, elastic dislocation analysis

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