

Recent seismic activity in Saronikos Gulf (Greece) and investigation of possible volcano-tectonic features

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The Saronikos Gulf is a feature of special interest due to the variety of origin and focus depth of the recorded seismicity. It is a well-known neotectonic basin, divided into two major and further smaller parts, mainly bounded by WNW-ESE trending fault zones. The islands that are situated in the Gulf such as Angistri, Aegina and Salamis intersect those basins forming a platform. The presence of several Plio-Quaternary volcanic centers makes the overall image of the distributed seismicity more complex and the exploration of the geophysical background more necessary.

The past seismic activity at the eastern coast of Aegina, both shallow along a NE-SW fault zone and intermediate depth into the Gulf intensifies the need of dense seismic network to monitor the spatiotemporal distribution of the earthquake activity in order to categorize the event type according to the waveform spectrum and its focal properties.

In the present study, a detailed manual analysis of more than 500 earthquakes that occurred during March-April 2016 took place, producing a detailed 1-D layered velocity model, using the mean travel-time residuals and location uncertainties (RMS, ERH, ERZ) minimization method. The main spatio-temporal clusters, which are highlighted, seem to be concentrated along Lauses (north) and Methana (south) E-W striking neotectonic fault zones. Moment tensor inversion using regional recordings was applied to determine the source parameters of the moderate events. Concerning shallow events, the obtained focal mechanisms revealed normal faulting, while intermediate depth earthquakes are related to reverse faulting with an important strike-slip component.

A Local Earthquake Tomography (LET) was performed, using body-wave (P and S) travel-time data from the Earthquake Catalogue of the Seismological Laboratory of the National and Kapodistrian University of Athens (SL-NKUA) for the time interval 2008-2016, in order to investigate some small to medium scale anomalies related to the local neotectonic and volcanic pattern. Some major superficial anomalies are identified South of Aegina island mainly related to the principal local stress orientation and fault zones such as the ones of Moni Angistri and Lauses, while slow body-wave velocities and high V_p/V_s ratio values indicate the presence of possible magmatic chambers which can be linked to the Plio-Quaternary NW edge of the Hellenic Volcanic Arc.