



## **Precise relative locations of the February 2017 swarm at Biga peninsula and 12 June 2017 Lesvos earthquake sequence: Insights into fault geometry and active tectonics**

Konstantinos Konstantinou

National Central University, Dept of Earth Sciences, Jhongli, Taiwan (kkonst@ncu.edu.tw)

During 2017 significant seismic activity occurred between the Greek island of Lesvos and the Turkish mainland. This activity started in February 2017 with a series of four moderate ( $M_w \sim 5.0-5.2$ ) earthquakes and their aftershocks at the Biga peninsula, north of Lesvos island. It was followed on 12 June 2017 by a large ( $M_w \sim 6.3$ ) earthquake to the south of Lesvos that caused damage, injuries, as well as one casualty. The seismic activity was recorded by weak-motion stations of the Hellenic Unified Seismic Network (HUSN) and strong-motion stations of the National Observatory of Athens that provide a good azimuthal coverage for earthquake location. Initial locations for these two sequences were first obtained and the resulting travel times were inverted using the VELEST algorithm in order to derive a minimum 1D velocity model with station corrections. All events in the two sequences were then located utilizing the newly derived model and by using the nonlinear probabilistic location algorithm NLLOC, while precise relative locations were obtained by using the double-difference method. Results suggest that the Biga peninsula swarm occurred along a listric normal fault that dips toward SW and this is also supported by the dip angle of the fault planes of the largest events. The early aftershocks of the 12 June earthquake define a rupture with a length of 20 km and width of about 10 km, oriented along NW-SE and dipping towards SW. Significant off-fault seismicity started occurring two days after the mainshock probably as a result of static stress triggering. These results highlight the importance of normal faulting in an area of transtensional deformation, where most attention has been focused on large strike-slip faults. However, it is now clear that normal faults in NE Aegean are capable of generating moderate to large events and this has to be taken into account in future evaluations of seismic hazard in the area.