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The June 12, 2017 M6.3 Lesvos offshore earthquake sequence (Aegean Sea, Greece): fault model and ground deformation from seismic and geodetic observations

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We present seismic and geodetic data analysis of the shallow, normal-faulting earthquake sequence offshore Lesvos (Aegean Sea, Greece) that was initiated by the June 12, 2017 M6.3 earthquake. We use seismological data (relocated events and Moment Tensor solutions from NOA and KOERI catalogues) to identify the ESE-WNW striking seismic fault and to refine its geometry and kinematics using inversion techniques. The fault-dip direction is not retrievable from GPS/InSAR but a south-dip is inferred from the aftershocks distribution and sea-bottom geomorphology. The spatial distribution of relocated events shows the activation of one fault with a total length of about 20 km, at depths 5-15 km. Despite the large magnitude of the mainshock (M6.3), the surface deformation is not visible with InSAR because of the offshore occurrence of the earthquake, however, cm-size co-seismic horizontal offsets were recorded by the continuous GPS stations (of two private networks) operating at both Lesvos and Chios islands. In Sentinel co-seismic interferograms (c-band) we see no co-seismic displacements within $\pm$0.3-0.5 fringe ($\pm$10mm). This absence of visible signal is consistent with the slip-model predictions, based on the GPS models. There are two local displacement patterns close to Plomari, possibly attributed to slope instabilities, which require further investigation. Lack of signal coherence was detected in the area of village Vrissa, that was heavily damaged by the earthquake.