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# Source parameters of the 22-24 November 2017 Muğla earthquake sequence from seismology, GPS and InSAR

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The western Turkey region is characterized by an extensional regime driven mainly by the zone of active subduction in the Aegean Sea. Gökova Bay (southwest Turkey), is one of the basins formed by this extensional regime and is characterized by a complex system of normal faults. On July 21, 2017 a Mw 6.6 earthquake near Bodrum-Kos struck the west of Gökova Bay. Significant seismic activity occurred inland in southwest Turkey following this normal faulting earthquake. Here we focus on an activity near Ula, Muğla, where a sequence of earthquakes occurred 4 month after this event: the sequence started with a Mw 5.0 earthquake on November 22, 2017 which is followed by a Mw 5.3 event on November 24. Initial fault mechanism solutions indicate that events are associated with normal faulting at different depths. Remarkably, this activity characterized by two moderate earthquakes, generated enough surface deformation to be observed from the descending and ascending orbits of the Sentinel-1 satellites and a few GPS stations. Interferograms show that the earthquakes did not occur on the mapped southeastern branches of the nearby Muğla Fault as predicted earlier by the epicenters calculated by different seismological agencies but on a previously unknown fault(s) instead. In addition the seismologically reported magnitude and depth values of these two earthquakes do not generate sufficient deformation to explain the observed geodetic motion. In this study, in order to better assess the source parameters of these earthquakes, we remodel the source mechanism and obtain the best-fitting depths of the two events using waveform inversion and determine their contribution to displacements observed by InSAR and GPS. We also discuss whether aseismic deformation is also necessary or not to explain the observed surface deformation in the geodetic data.