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Geodetic and Seismological analysis of the 2017 Kos-Bodrum Mw 6.5 earthquake (SE Aegean Sea) provides evidence for the evolution of normal faulting in Gökova graben

Vasso Saltogianni (1,6), Tuncay Taymaz (2), Seda Yolsal-Çevikbilen (2), Tuna Eken (2), Michael Gianniou (3), Taylan Öcalan (4), Stella Pytharouli (5), and Stathis Stiros (6)

(1) GFZ German Research Centre for Geosciences, Helmholtz Centre Potsdam, Potsdam, Germany (salto@gfz-potsdam.de), (2) Department of Geophysical Engineering, İstanbul Technical University, İstanbul, Turkey, (3) National Cadastre and Mapping Agency SA, Athens, Greece, (4) Department of Geomatic Engineering, Yildiz Technical University, İstanbul, Turkey, (5) Department of Civil and Environmental Engineering, University of Strathclyde, Glasgow, U.K., (6) Department of Civil Engineering, University of Patras, Patras, Greece

The epicentral area of the 2017, Mw 6.5 destructive Kos-Bodrum normal faulting earthquake, associated with a small tsunami in a touristic region, is located within the active Gökova graben and represents a case of a previously unrecognized, shallow normal fault without clear geomorphological signature.
Analysis of teleseismic body-waveform data and geodetic data, both in the near- and far- field, indicate a well-constrained 25km long and 10km deep south-dipping normal fault which produced small uplift in the Bodrum peninsula. Modeled fault marks the NW edge of the actively extending part of the Gökova graben and was associated with two clusters of aftershocks, while only its eastern part correlates with known active faults.
The 2017 earthquake seems to reflect an immature normal fault between Kos Island and the Anatolia mainland, and expansion of the Gökova graben, perhaps through echelon fractures, as is observed in seismic profiles farther east.
Activation of normal faults with modest, if any geomorphic signature, hence not easily recognized before the earthquakes seems not unusual in the Aegean area, and represents a major issue for earthquake hazard analysis.