Co-seismic deformation, field observations and seismic fault model of the Oct. 30, 2020 Mw=7.0 Samos earthquake, Aegean Sea

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On 30 October 2020 11:51 UTC a large Mw = 7.0 earthquake occurred offshore of the island of Samos, Greece. In this contribution we present the characteristics of the seismic fault (location, geometry, geodetic moment) as inferred from the processing of geodetic data (InSAR and GNSS). We use the InSAR displacement data from Sentinel-1 interferograms (ascending orbit 29 and descending 36) and the GNSS offsets from eleven (11) permanent stations in Greece and Turkey to invert for the fault parameters. Our inversion modeling indicates the activation of a normal fault north of Samos with a length of 32 km, width of 17 km, average slip of 2.1 m, a moderate dip-angle (37°) and with a dip-direction towards North. The inferred fault is located adjacent to Samos northern coastline, with the top of the slip ~1 km below surface, and ~2 km off-shore at its closest to the island. The earthquake caused the permanent uplift of the island up to 10 cm with the exception of a coastal strip along the NE part of the northern shore (near Kokkari) that subsided 2-6 cm. The effects of the earthquake included liquefaction, rock falls, rock slides, road cracks and deep-seated landslides, all due to the strong ground motion and associated down-slope mobilization of soil cover and loose sediments.