



Impact of the Mw 6.6, July 21, 2017 East Aegean earthquake on Kos Island (Greece)

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On July 21, 2017 (01:32 GMT), an Mw 6.6 earthquake occurred with focal depth of about 5 km and epicenter located offshore northeastern Kos Island. It was generated by an E-W striking and south dipping (38°) fault located east of Kos and constitutes the westward prolongation of the Akyaka-Gökova fault of the Muğla province in Asia Minor. This fault is 16 km long and coincides with the spatial distribution of the aftershock sequence. The earthquake claimed the life of 2 tourists and 10 injured.

The earthquake caused secondary environmental effects that comprised ground cracks, slope failures, liquefaction phenomena, coastal subsidence and tsunami and mainly affected the eastern part of Kos. The onshore slope movements included landslides and rockfalls resulting in damage to the road network and to coastal touristic facilities. Liquefaction phenomena were generated in the eastern coastal part of Kos in the form of mud volcanoes accompanied by coastal subsidence varying from 30 to 40 cm and resulting in inundation of the coastal zone. Soil spreading and subsidence was also observed in the port of Kos city located at the northeastern part of the island and caused damage to port facilities and related buildings. They underwent failures including longitudinal cracks of the jetties parallel to the seashore, detachments and displacements of the quay seawalls as well as significant subsidence. This damage is attributed to the dynamic consolidation along with near-surface liquefaction of the fill material.

The earthquake induced a moderate tsunami probably due to submarine coseismic landslides generated close to the earthquake epicenter. It mainly affected the northeastern part of Kos Island (SE Aegean Sea, Greece) and the southern coasts of Bodrum peninsula (Asia Minor, Turkey). In Kos Island and especially in Kos port, the flow depth varied from 0.50 to 1 m, while significant inundation took place with the maximum inundation distance reaching up to 20 m at some places. The tsunami impact also included effects on mobile objects, such as vessels, heavy objects and cars along the coastal zone close to Kos port (all small mobile objects affected, vessels washed ashore, floating/colliding cars).

Building damage was limited to Kos city. Several old unreinforced buildings with masonry load-bearing walls, more specifically monumental structures and archaeological sites, such as the historic castle of Kos, the Ottoman mosque and the Metropolitan Church of Agios Nikolaos, suffered heavy structural damage including partial collapse. Slight damage was observed to recent structures with reinforced-concrete frame and infill walls. Taking into account the earthquake magnitude and its small focal depth, it is concluded that the building damage was limited and the earthquake vulnerability of recent structures in Kos Island is very low.