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30 October 2020 Samos-Sigacik Earthquake: On Strong Ground Motion and Local Site Amplification

Eser Çakti, Karin Sesetyan, Ufuk Hancilar, Merve Caglar, Emrullah Dar, Hakan Suleyman, Fatma Sevil Malcioglu, and Tugce Tetik

Boğaziçi University, Kandilli Observatory and Earthquake Research Institute, Earthquake Engineering, Istanbul, Turkey
(eser.cakti@boun.edu.tr)

The Mw 6.9 earthquake that took place offshore between the Greek island of Samos and Turkey's Izmir province on 30 October 2020 came hardly as a surprise. Due to the extensional tectonic regime of the Aegean and high deformation rates, earthquakes of similar size frequently occur in the Aegean Sea on fault segments close to the shores of Turkey, affecting the settlements on mainland Turkey and on the Greek Islands. Samos-Sigacik earthquake had a normal faulting mechanism. It was recorded by the strong motion networks in Turkey and Greece. Although expected, the earthquake was an outstanding event in the sense of highly localized, significant levels of building damage as a result of amplified ground motion levels. This presentation is an overview of strong ground motion characteristics of this important event both regionally and locally. Mainshock records suggest that local site effects, enhanced by basin effects could be responsible for structural damage in central Izmir, the third largest city of Turkey located at 60-70 km epicentral distance. We installed a seven-station network in Bayraklı and Karşıyaka districts of Izmir within three days of the mainshock in search of site and basin effects. Through analysis of recorded aftershocks we explore the amplification characteristics of soils in the two aforementioned districts and try to understand the role basin effects might have played in the resulting ground motion levels and consequently damage.