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Imaging North Anatolian Fault Zone in the western Marmara region, Turkey, with a dense local seismic network

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Having a network across the fault is an efficient tool to gain a high resolution image of the fault at depth using several methods. These include imaging the velocity contrast across the fault using fault zone head waves, which arrive at a station before direct P arrivals in case the station is located on the slow side of the fault or using delay times of P arrivals from local events to identify damage asymmetry across the fault, which are of high importance due to their control on properties of earthquake ruptures.

The Ganos fault in the western Marmara region has been activated in a M7.4 event in 1912 and is believed to be a first-order linear and vertical fault that is currently locked down to ∼15 km depth. A 40-station dense seismic network was deployed in September 2017 at the northeastern part of the Ganos Fault to study the fault-zone geometry at depth. The station layout comprises a higher station density on top of the fault core/damage zone as well a larger inter-station distance away from the fault in different azimuths to ensure both high-resolution fault- zone imaging and good azimuthal coverage for locating local seismic events. Current results from GANOS network show variations in waveforms recorded at different stations, Fault Zone Head Waves and significant reflections, which are useful in identification of the properties of the fault zone as will be presented and discussed.