

# Estimation of Subsurface Structure and Ground Motion Characteristics in the Damaged Areas of the 2016 Central Tottori Prefecture Earthquake

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On October 21, 2016, an earthquake with MJMA 6.6 occurred in the central part of Tottori Prefecture in Japan. Observed JMA seismic intensity were 6 lower at Kurayoshi city, Yurihama town and Hokuei town. Housing damage due to the earthquake was concentrated in limited areas. In this study, we carried out microtremor observations around damaged area to estimate subsurface structure and ground motion characteristics with the data by previous studies. We consider that the damages are affected by ground motion characteristics.

Low-velocity layer with S-wave velocity 80-180 m/s were estimated at all observation sites and the layers tend to be thicker to coastal plain and thinner to inland areas. The thickness of deeper subsurface structure with S-wave velocity more than 700 m/s was found to be different between Yurihama town and Hokuei Town from diffuse wavefield approach to H/V spectrum estimated from earthquake ground motion data. Many microtremor H/V with multiple peaks were observed at limited regions Yura and Nishizono, and most H/V with a single peak were observed at northern Kurayoshi Plain. It is suspected to reflect the difference in velocity structures of surface layers. The predominant period at Yura and Nishizono regions were 1.0-1.6 seconds, and at northern Kurayoshi Plain was 0.4-1.0 seconds. Comparing with housing damage, the layer thickness estimated from the quarter wavelength low, it was found that the damage occurred at the part where the layer thickness changed steeply. Comparing the ground amplification index such as ARV with housing damage, the relevance was found to be weak. Therefore, it is suspected with 2-D or 3-D effects that the damage caused by irregular subsurface structures.

Keywords: microtremor observation, H/V spectra, the 2016 Central Tottori Prefecture Earthquake, subsurface structure

