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3D Vs ambient noise tomography in the source region of the 2016 Mw6.4 Meinong earthquake in Taiwan

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Mw6.4 Meinong earthquake occurred on 6th February in 2016 in southern Taiwan and resulted in more than one hundred casualties and several building collapsed. The aftershocks mostly occurred at mid-to-lower crustal depths (10-30 km), which is related to a blind fault system. However, at the surface several centimeters of cosesimic uplift within the Liushuang, Erhchungli, and GutingKeng Formations, which is mainly composed of mudstone, have been recorded from the InSAR results. The uplifted pattern is similar to that of GPS and leveling data from 2000 to 2010, which indicates the deformation is accomplished by creeping due to the mudstone of the shallow structure related to mud diapir. Previous studies have shown limited information about the shallow structure in this region due to few seismic stations deployed. In this study, we deployed 36 temporary seismic stations (∼5 km spacing) for around one month after the main shock to obtain a 3-D shear wave shallow crustal velocity structure using ambient noise tomography. The reliable periods of group and phase velocities from Rayleigh wave are 0.6 to 5 seconds, which correspond to around 0-5 km at depths. As a result, the pattern of low S-wave speeds at 0-4 km depths corresponds to the uplift region from both of InSAR data for coseismic period and GPS and leveling data for interseismic period. Also, the results from this study are compatible with the reflected seismic profile. The results show that with dense seismic array deployment we can obtain a high resolution of subsurface image to link the relationship between the surface observations to the subsurface structures.