S-wave Velocity Structure in the Kanto Basin from Inverting the HZ Ratios of Rayleigh Waves (2): Verification at the K-NET sites

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We are carrying out detailed modeling of the velocity structure in the Tokyo metropolitan area in order to upgrade strong ground motion prediction. The velocity structure model of Tanaka et al. (2005) was constructed mostly by joint inversion of refraction data from artificial explosions and gravity anomaly data in the whole Kanto basin. The model consists of three sedimentary layers (Shimosa, Kazusa, and Miura layers) and the basement. The depths of Kazusa/Miura and Miura/basement interfaces, and the basement velocity distribution are obtained to minimize the residuals of travel times and gravity data. Based on the above model, we applied the R/V spectral peak frequency atching method (Suzuki et. al., 2006) to obtain a better velocity structure model. We however found the method had some problems; 1) Extracted spectra contain waves other than the Rayleigh waves, 2) Spectra at some stations have no obvious peak or did not show good match with observed spectra, 3) Earthquakes which triggered K-NET instruments are unevenly distributed around the Kanto basin. We then applied the HZ ratio inversion method for Rayleigh waves (Tanimoto and Alvizuri, 2006), which is composed of the method of extracting Rayleigh waves from long-term microtremor data, and inversion of HZ ratios calculated from the spectra of extracted waves, for improving the S-wave velocity structure. We demonstrated advantages of this approach; 1) Correctly extracting Rayleigh waves with phase-shift characteristics, 2) Fitting the shape of Rayleigh wave HZ ratio with more information of spectra than the previous method.

We here report the application of the inversion of the HZ ratios of Rayleigh waves for the modeling of 1-D S-wave velocity structures at K-NET sites in the Kanto basin, for verifying its validity of as a method for the modeling of S-wave velocity structure.