

## Background Love waves from 10 to 100 mHz observed by Hi-net tiltmeters(2)

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From 2 to 20 mHz, Earth's background Rayleigh waves are confirmed firmly even on seismically quiet days. Their observed features show that they are excited by random atmospheric disturbance and/or oceanic disturbance. From 0.05 to 0.2 Hz random excited Rayleigh waves, known as microseisms, are excited by oceanic disturbances through nonlinear interaction. In order to investigate their excitation mechanism, we calculated frequency-slowness spectra using Hi-net tiltmeters.

We first removed transients such as earthquakes from the whole records of Hi-net tiltmeters (679 stations) in a time period from June 2004 to December 2004. We calculated frequency-slowness spectra of their transverse components and radial components every 7 days, and deconvolved their array response functions from the spectra using Lucy-Richardson algorithm (Lucy, 1974).

Regardless of either atmospheric or oceanic origin, the phenomenon has been so far interpreted as the Earth response to pressure disturbance acting vertically on the Earth's surface, which can little excite Love waves. To our surprise, however, we detected clear background Love waves from 0.01 to 0.1 Hz. The ratio of kinetic energy of Love to Rayleigh waves is about 1 through the entire frequency range and through the whole time period. The predominant incident azimuths are common to both Rayleigh and Love waves, the strongest along the trench-arc systems and next from deep seafloor regions, the weakest from continental regions.

These observations indicate that background Rayleigh and Love waves in the low frequency range below 0.03Hz are largely generated by the same mechanisms other than vertical pressure disturbance and that the most likely excitation source is shear traction acting effectively on the sea-bottom horizon that arises by linear coupling of infragravity waves with seafloor topography. This mechanism may not be applicable to the higher frequency range including the single frequency of microseisms, where infragravity waves are too strongly attenuated to couple with deep seafloor topography. We must consider other mechanisms such as scattering of oceanic Rayleigh waves along trenches and/or coastal regions in further studies.