Characteristics of Regional Seismic Coda

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The excitation mechanism of seismic coda has been long been conceived in the seismology. This seismic coda provides useful constraints to quantification of heterogeneities in the Earth. In addition, the coda attenuation rate is found to be highly correlated with the seismic hazards. However, the analysis of seismic coda is fairly limited due to its complex phase composition and difficulty in identifying the origins of scattered waves. Thus, it is highly demanded to understand the phase composition of seismic coda and to develop a new technique to identify the responsible scatterers. We investigate the constituent original phases of regional coda using a source-array analysis. Underground nuclear explosions provide a set of uniform sources that are difficult to be obtained from natural earthquakes, and allow us to apply a source-array analysis. Strong and coherent *Rg*-origin phase with variational azimuths is consistently observed in 700-s coda after *Rg* phase at low frequencies of 0.2-0.8 Hz. Indiffusive coherent scattered energy from regional phases composes about 20 % of the coda at the frequencies. The other 80 % of coda energy is in diffusive state. The *Rg* energy is the most influencing element that prevents the low frequency coda from diffusing. The coda energy at higher frequencies, 0.8-3.2 Hz, is in fully diffusive equilibrium. The observation of *Rg*-origin energy only at *Rg* coda suggests that the phase-coupled scattered energy from *Rg* is not significant compared to in-phase scattered energy of other regional phases. We also present a technique to image the regional heterogeneities that are responsible for excitation of the regional seismic coda. The illuminated heterogeneities are observed to be highly correlated with structural variations in the crust, such as surface topography, crustal thickness and sedimentary thickness.

주요어 : Regional, Seismic coda, phase composition

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