Imaging of P-wave scatterer near the aftershock area of the Tottori-Ken Seibu Earthquake, Japan.

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Scattering of seismic wave is expected to provide significant information in subsurface inhomogeneities. Still now there is, however, very poor knowledge of substances of scatterers. On October 6, 2000, a Mw-6.6 earthquake occurred in western Tottori in Japan. We deployed an on-line seismic reflection line across a focal area and off-line recorders in and around the area to investigate inhomogeneous structure of the crust. The 5-km-long seismic reflection line was deployed in southwest-northeast direction. A receiver interval of the on-line seismic line was 50 m. The off-line recorders were deployed with a spacing of from 1 to 2 km in the focal area, and that of from 10 to 20 km around the area. Four vibrators were operated as controlled seismic sources. An interval of the shot position was approximately 1 km near the aftershock area, and that of the offset shots, which were performed at four points around the focal area, was approximately 10 km. In this study, we assumed an isotropic scattering model, and followed Kurashimo(1998)'s method. We applied a cross-correlation analysis to estimate the distribution of seismic scatterers. The cross-correlation coefficient at a particular point in the profile is related to the magnitude of scattering there. A high cross-correlation coefficient implies effective excitation of scattered waves. According to this study, there are three regions (A, B and C) with high cross-correlation coefficients. Region A corresponds to an area with large slip at mainshock of the 2000 Tottori-ken Seibu Earthquake and with low seismic activity. Region B corresponds to areas with high seismic activity of aftershocks. Region C is located below Conrad discontinuities. According to profiles, low cross-correlation coefficient regions coincide with many aftershock clusters. Therefore, P-wave scatterers must be depending on the aftershock distribution and the geological settings.