Heterogeneous structure in and around the source region of the 2007 Niigataken-Chuetsu-oki Earthquake by onshore-offshore survey

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To obtain the heterogeneous seismic crustal structure in and around the source region of the 2007 Niigataken-Chuetsu-oki Earthquake, onshore-offshore seismic experiment was conducted across the source region. Along the offshore part of the seismic profile (100 km long), 18 ocean-bottom seismographs (OBSs) were deployed. For the wide-angle seismic profile, an air-gun array (12,000 cubic inch) was fired by JAMSTEC's R/V Kaire. 202 land stations were deployed with about 300 m spacing along the onshore part of the profile. Two explosive sources were shots at the western end (SP-W) and eastern end (SP-E) of the onshore profile. Charge sizes of the shots were 100 kg at SP-W and 300 kg at SP-E. Each seismograph system consisted of a 4.5 Hz, vertical component seismometer and a single channel data recorder. The recorder has 24-bit analogue-to-digital converter and recorded data at 500 Hz sampling rate. We obtained high signal-to-noise ratio data along the entire length of the profile. P-wave velocity structure derived by refraction method shows that the top of the 5.8 km/s layer is located at a depth of about 6 km beneath the coastline. The seismic reflection method was applied to these data to obtain a detailed and clear image of deeper structure. The stacked image shows several features of the deeper part of the crust including the eastward dipping reflector at 7-8 sec in two way travel time beneath the Niigata Basin.