Small-aperture array observations of artificial explosions around the northern Itoigawa-Shizuoka tectonic line

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Small-aperture array observations were performed to reveals seismic scatterer distribution around the northern Itoigawa-Shizuoka tectonic line at depths especially from 10 km to 20 km. We deployed 4 small-aperture seismic arrays about 20 km east of the East Matsumoto basin faults (EMB fault), northern Itoigawa-Shizuoka tectonic line. We observed seismic scattered wave from 4 dynamite sources of a charge 100 kg detonated during a 60 km long seismic reflection survey, which was performed about 10 km north of our present arrays to obtain a 2-D reflection image of the EMB fault. The locations of 4 explosives are along the reflection survey line with a spacing of about 20 km. The observation arrays were composed of 2 Hz, 4.5 Hz or 10 Hz three components seismometers with a spacing of 10 m or 20 m. The seismometers were distributed two-dimensionally to detect scattered and reflected waves coming from various directions. The sampling frequency was 500 Hz. The observed array records show several coherent phases among the seismometers. Arrival times of the coherent phases are different among the three components of the seismometers each other, indicating that PS converted waves are dominant in the horizontal components. Propagation directions of most coherent phases are almost the same as a direction of an initial P waves, while those of some phases are different from the initial P wave. The most notable phase is found in a radial component in an array (namely, C array) for the shot SP1 locating 5 km west of the EMB fault. Amplitude of this phase is almost equal to that of the initial P wave in a vertical component. An arrival time of the phase is just at the middle between the Initial P and the direct S waves. These observations indicate that this notable phase is S wave converted from P wave at a middle position between the locations of SP1 and of the C array. This converted position seems to be strongly related the deep extension of the EMB fault. It should be noted that PS converted waves expected from the same converted location is not distinguishable in the other arrays than the C array. This suggests a non-uniformity of the place for the PS conversion.