

Analysis of the long-offset reflection records of the 2005 Integrated Seismic Reflection/Refraction Survey in the Boso Peninsula

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There are two types of the earthquakes that strike the southern part of the Boso peninsula, the Taisho and the Genroku types (Matsuda, 1974; Shishikura, 2000). The Taisho type is defined by the Kanto earthquake in 1923 and the Genroku type by the Genroku earthquake in 1703. Although the Kanto earthquake was recorded both seismographically and geodetically, there is no instrumental data of the Genroku earthquake. Therefore the source fault model of the Genroku earthquake is obliged to be proposed only by the geomorphological study of coastal terraces (Shishikura, 2000). It is an urgent problem that we find a candidate of the source fault of the Genroku earthquake by seismic surveys of the crustal structure. Thus we conducted an integrated seismic reflection/refraction survey along the land/sea boundary zone in the southern part of the Boso Peninsula in March, 2005.

Receivers were arrayed 50 km long along the coast at about 50-m intervals. Air-gun shots were made at 50-m intervals along the 60-km-long seismic line 2 to 3 km off the coast. This specifications produce the following two kinds of difficulties: (1) Common mid-points are not concentrated along the narrow zone because the receiver line is 2 to 3 km far from the shot line, and (2) wide-angle reflection phases are often superposed on initial refraction phases because the long-offset reflection records are used. It is necessary to use new processing techniques in addition to the conventional seismic reflection method.

As we already discussed about the first difficulty (Tsumura et al., 2005; Komada et al., 2005), here we report how to conquer the second. The method to delete refraction phases is to find an adequate velocity filter and to apply it (See Fig.). The method is considerably effective to make clear wide-angle reflection phases which are very important to detect a deep reflector.

By use of velocity filters, a north-dipping reflector group emerges at TWT 3.2 to 5.0 sec in the southernmost part of the Boso Peninsula above the subducting Philippine Sea plate. As the group seems to be branching Philippine Sea plate, it may be a candidate of the source fault of the Genroku earthquake.

