

Seismic reflection profiling across the Median Tectonic Line (MTL) active fault system in Ehime and Tokushima Prefectures

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The Median Tectonic Line (MTL) is the most significant inland fault in SW Japan, which extends more than 1000 km and divides SW Japan into the inner and outer zone. The western part of the MTL shows late Quaternary right-lateral strike-slip movements at several mm/y (eg. Tsutsumi and Okada, 1996).

According to the seismic reflection profile, northward gently dipping character of the Median Tectonic Line has already been suggested in the eastern Shikoku (Ito et al., 1996) and eastern Kyushu (Yusa et al., 1992). For the deeper extension of MTL, north-dipping geometry was obtained by low-fold seismic reflection images in Shikoku island (Kawamura et al., 2003; Sato et al., 2005). For the MTL active fault system, the geometry of its deeper extension is poorly understood in Shikoku island. To reveal deeper geometry of fault surface, shallow to deep seismic reflection profiling was performed in Ehime and Tokushima Prefectures. This research was performed as a research program funded by the Ministry of Education, Culture, Sports, Science and Technology, Japan.

Three seismic lines were deployed perpendicular to the MTL and major geologic boundaries. The length of seismic lines is 11 km (Saijo area, Ehime), 4.8 km (Wakimachi area, Tokushima) and 6.4 km (Awa area, Tokushima). To obtain a high-resolution seismic image of the shallow part of MTL, a 10-m spacing receiver array was formed using offline recorders. The seismic source was vibroseis trucks. The sweep signals (5-100 Hz for high resolution reflection profiling, 5-40 Hz for refraction profiling) were recorded 10 Hz vertical geophones. The seismic data were processed using conventional CMP-reflection methods. The high-energy shot gathers at Saijo seismic line clearly demonstrate the reflectors at 1.5, 2-3, 4 sec. (Two-way travel time). The reflectors from 2-3 s (TWT) are interpreted as northward dipping Sambagawa Metamorphic belt. The seismic sections portray the seismic image down to 2 km in Wakimachi and Awa area. The reflectors are interpreted as northward dipping Sambagawa Metamorphic belt. These structural characters found in the seismic section may show that the deeper extension of MTL shows northward dipping in Shikoku.