# Upper crustal structure beneath the Itoigawa Shizuoka Tectonic Line, Central Japan by refraction/wide angle reflection analysis

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The 250-km long Itoigawa-Shizuoka Tectonic Line (ISTL), running with NS direction in Central Japan, is eastern ridge of Fossa Magna. The northern segment of the ISTL has been under a compressive stress regime since the late Neocene to form an active fault system with the largest slip rates (4-9 mm/yr). This part is recognized as an earthquake fault with the highest risk.

Several seismic reflection surveys were conducted across the ISTL under the national projects including 'Integrated Research Project for Active Fault System along Itoigawa-Shizuoka Tectonic Line'. The aim of these surveys is to elucidate the variation in fault geometry along this tectonic line.

In the northern part of the ISTL (north of the Suwa lake), the fault show a gentle eastward dipping geometry (10-30 degrees) dominated by the thin-skinned tectonics. On the other hand, the southern part of the ISTL has a westward dips of 15-30 degrees. According to shallow seismic reflection surveys in 2006, the ISTL shows geometrical change from an eastward to a westward dip around the Suwa Lake.

These results so far strongly suggest an existence of remarkable segment boundary near the Suwa Lake.

In 2007, an intensive reflection survey was carried out across the Suwa Lake (Ikeda et al., 2008) to reveal the detailed structure of the segment boundary of the ISTL. The length of this profile was about 22 km, on which 930 receivers were deployed to record 60 vibroseis, 444 airgun and 2 dynamite shots. This paper presents structure model of this profile based on refraction/wide-angle reflection analysis.

We selected record sections of 118 shots for travel-time analysis. Quality of the data is good, and first arrivals can be traced in almost the entire part of the profile. Rather strong later phase, probably reflection from the active fault of the ISTL, is recognized about 2 sec behind the first arrivals. We determined velocity structure by forward modeling using ray-tracing method and travel-time inversion analysis. The obtained model has following features.

(1) An active fault of the ISTL is traced from the eastern coast of the Suwa Lake as an interface dipping westward with high angle (about 70 degrees).

(2) West of the active fault, a basin structure is developed. This part consists of 0.7-1.8, 2.2-2.6, 2.7-2.9, 3.1-3.8, 4.3-4.8 and 5.2-5.7 km/s overlying 6.0 km/s body. The uppermost part with a velocity of 2.0-2.9km/s corresponds to Enrei Formation. Bellow Enrei Formation, an eastern dipping structure is developed.

(3)Velocities east of the active fault are higher than those in the western part.

(4)The shallowest part of the structure by preliminary tomographic analysis agrees with that by ray-tracing.