

Seismic reflection profiling across the ISTL active fault system in the eastern part of the Matsumoto Basin, central Japan

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The structure and surface deformation of the Itoigawa-Shizuoka Tectonic Line (ISTL) active fault system shows different features at around the Matsumoto area. An isolated depression is on the hanging wall of this portion of the ISTL inferred by Bouguer anomaly profile's pattern. north of the Matsumoto basin, an active fault (Matsumoto-Toen fault) is a thrust, whereas south of this basin an active fault (Gofukuji fault) is a strike-slip fault. At the central of this basin, the features of active faults are well not understood. To reveal the geometry and connectivity of the ISTL active fault system in Matsumoto basin, we performed the seismic reflection profiling across the extension of these faults. The seismic line is located between Nagataa and Yamabe trending EW direction. The specifications for the experiment are as follows: experimental line, 4.8km in length; vibrator, Y-2400 (IVI Inc.); sweep length, 20sec.; sweep frequency, 6 to 30, 40 or 50Hz; the number of stack, 20 stacks at each shot point; interval between shot points, 100m; total number of shots, 99 shots; recording system, GDAPS-4 (JGI Inc.); interval between receiver points, 25m or 12.5m, recording length, 5sec.; sampling rate, 4msec.; the number of channels, 280-661 channels. The data processing is standard CMP-method, including automatic gain control, band-pass filtering, deconvolution, refraction analysis, static correction, velocity analysis and CMP stack. From the result of the refraction analysis, the velocity of the basement is ranging from 4000m/sec in the mountainside to 2500m/sec in the basin.

Gently east-dipping strong reflection at 1.5 sec TWT descend down from the western end of the survey line. These reflections, compared with geology, are interpreted as the boundary between the pre-Tertiary rocks and basin-fill sediments. A gently east reflection at 1.5 sec TWT descends down from the survey line to the center. This reflection is interpreted as the Itoigawa-Shizuoka tectonic line. This profile suggests that the ISTL is more gently at shallow depth (TWT 0.8s). These sediments on it are deformed due to the faulting of the ISTL. A deformation area is on a line between the reverse fault and the Akagiya anticline, which is isolated on the alluvial fan 1-2 km west of the strike-slip fault. Therefore, south of the isolated depression, an active fault is a thrust as well as north of it. The seismic reflection profile shows that the ISTL active fault system is a gently east-dipping in Matsumoto basin.