

Seismic reflection profiling across the Itoigawa-Shizuoka Tectonic Line, central Japan: the Tatsuno-Suwa line

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The Itoigawa-Shizuoka Tectonic Line (ISTL) in Central Japan is a fault zone with a very high slip rate in Pliocene-Quaternary time. The structure and behavior of the ISTL is highly variable along strike, with a possible segment boundary at or near Suwa Lake. In order to reveal the overall structure of the ISTL, a multidisciplinary research project started in 2005. In 2007 as part of this project, we carried out seismic reflection profiling along a 20-km line across the central part of the ISTL from Tatsuno to Suwa. The seismic line crosses Suwa Lake, where we used hydrophone cables and an airgun. Four vibroseis trucks and were used as signal source on land. Receiver intervals were 12.5-25 meters. We also made gravity survey along the seismic line in order to constrain geologic interpretation of seismic profile. Following results were obtained from tentatively processed seismic and gravity data: We observed a gently west-dipping, very strong reflector to a TWT-depth about 4 seconds. This reflector projects updip to the eastern margin of the Suwa graben. Late Cenozoic strata west of the graben dips toward the east, without being cut by significant normal faults. These suggest that the west-dipping reflector represents the master fault that is responsible for the formation of the so-called Suwa graben, and the deformation of Late Cenozoic strata on the west is caused by rollover folding on the hanging wall side of the master fault.