

Tectonic landforms and late Quaternary slip rates along the middle part of the ISTL, central Japan

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We conducted a tectonic geomorphological survey along the middle part of the Itoigawa-Shizuoka Tectonic Line (ISTL) with support from the Ministry of Education, Culture, Sports, Science and Technology of Japan as one of the intensive survey on ISTL fault system. This survey aims to clarify the detailed distribution of the slip rates of this fault system, which provides the essential data set to predict the coseismic behavior and to estimate the strong ground motion simulation. In order to achieve this purpose, the active fault traces are newly mapped along the middle part of the ISTL, between Matsumoto city and Chino city, through interpretations of aerial photographs archived in the 1940s, 1960s, 1970s and 2000s at scales of 1:10,000 and 1:20,000, respectively. This aerial photo analysis was also supplemented and reinforced by field observations.

The landform deformations due to faulting were analyzed based on about 140 transections that were measured using the photogrammetric system and the LiDAR system. We calculated the slip rates of the faults based on the estimated ages of terraces (H: 120 kyrs and over, M1: 90-100 kyrs, M2: 40-65 kyrs, L1a: 20 kyrs, L1b: 10 kyrs, L2: 4-7 kyrs, L3: 1-2 kyrs) at many points. The study area can be divided into two parts, the southern part of Matsumoto Basin in north and the Suwa Basin in south. The active faults in the northern part of the study area have a left lateral sense of movement. The left lateral slip rates of the faults located in this area are estimated to 8 +/- 1.0 mm/yr. In the southern part of the study area, geomorphological evidence shows that the most active faults in this area are considered to be normal faults due to left lateral strike-slip faulting. The vertical slip rates distributed in this area show less than 0.5 mm/yr at most points. In some points of this area the vertical slip rates show 1.0 mm/yr or more.