

Geomorphological map of the Itoigawa-Shizuoka Tectonic Line Active Fault System, Part 2: Characteristics and a segmentation model

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1. Introduction

We have produced the detailed geomorphological map of Itoigawa-Shizuoka Tectonic Line active fault system (ISTL). Our team in CRIEPI had started a five years project for investigating the fault system in 1998. Purpose of the project is to reveal an adequate segmentation model of the ISTL, where the potential hazard of inland earthquake is the largest in Japan. Our project consisted of the following surveys: the geomorphologic and the geologic surveys, the drilling, the trench excavation and the seismic reflection. As result, we obtained new and many relevant data of the ISTL.

2. Behavioural segmentation in the central and the southern areas of ISTL

The ISTL is one of the largest active faults in Japan extending to 150 km in length, and is mainly composed of reverse thrust faults, where the ratio to strike-slip faults is 2:1. The two largest discontinuities in fault traces (up to 7 km in surface distance) occur in the central and southern part of the fault system. Our paleoseismic data on the ISTL suggest that such a discontinuity likely governs behavioural segmentation on the paleo-earthquake of ISTL. On the other hand, the behaviour of earthquake occurrence was likely different in each discontinuity.

The Shiojiritoge gap, is one of the discontinuities of 7 km, occurs in the strike-slip regime of ISTL (A gap between the Gofukuji and Okaya faults). Changes in timing of the paleoseismic event, in the recurrence interval and in the average slip rate, occur beyond this discontinuity. This finding suggests that the gap is a segment boundary of seismogenic fault by Matsuda (1990) in the strike-slip regime of ISTL.

The Omukawa step is a step over discontinuities of 7 km wide and occurs in the reverse fault regime at the southern part. The step is composed of the Shimotsuburai fault that is a westward-dipping thrust fault at the eastern side and the Houohzan fault that is a steeply dipping strike-slip fault at the western side. Fault traces of the Omukawa step is like to the segment boundary of seismogenic fault. Changes in the recurrence interval and the average slip rate occurred beyond the step, whereas the timing of seismic event was synchronous over the step in Holocene. We cannot reveal whether each earthquake was coupled beyond the step and became large or was contemporaneous but distinct in certain period. The step is up to 7 km wide at surface, whereas it is probable that an earthquake over the step can be readily produced than the Shiojiritoge gap. This is probably because at the deeper part, the step width becomes narrow than at the surface. The westward-dipping thrust fault must have become close to the steeply dipping strike-slip fault, at a certain depth preferred to generate an inland earthquake. Thus, the Omukawa step can be considered as the segment boundary weaker than the Shiojiritoge gap.

Overview on the map is introduced in another oral presentation (Miyakoshi et al., this meeting).