Tectonic landform in the area around the southern segment of the Itoigawa-Shizuoka Tectonic Line, central Japan

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Tectonic landform around inland active fault is formed by fault accumulation displacement due to big earthquakes occurred repeatedly. Detail distribution of active fault and information on tectonic landform are necessarily to reveal structure progression developed by repeated active faulting. In this study, we focus on the area around Hakusyu fault, Shimotsuburai fault and Ichinose fault which compose the southern segment of the Itoigawa-Shizuoka Tectonic Line (ISTL) in central Japan where has highly activated recently.
In this study, to understand the relationship between tectonic landform and the active fault structure. we identify the active fault traces and tectonic landform using perspective maps made from the 5m-mesh digital elevation mode (DEM) data, stereo-examination of aerial photography, and conducted field investigations. Interpretations of perspective topographic maps, field investigations, and structural analysis of fault zones reveal that i) the active fault traces show more irregular, curved shape than previously studies; ii) trace of which dip-angle of thrust fault is low curves close to a contour line.
We classify the tectonic landform into 3 groups according to its shape. The first is the flexure scarp seen in the northern part of Hakusyu fault which have the highly relative elevation and which can't see the inclination of the inclination on the hanging wall side. The second is flexure scarp which has greatly monoclinal flexure near the fault, and seen geomorphic surface of reverse inclination on the hanging wall side (the west side) seen by the southern part of Hakusyu fault and an alluvial fan plateau leading edge department of eastern inclination in an area around the Ichinose gap. The third is flexure scarp with a fold scarp of low relative elevation and monoclinal flexure with the long wave length in the hanging wall side seen along Shimotsuburai fault.
To characterize these three types of tectonic landform, we establish fault scarp index (Fsi), which is defined by the length of the wing (L) of each flexure scarp divided by relative elevation (H). As a result, Fsi in Hakusyu fault plateau have relatively low values, Shimotsuburai fault has highest, and Ichinose fault has an intermediate. According to these results, fault dip is steep in Hakusyu fault which have low Fsi values. On the other hand, fault dip is almost horizontal in Shimotsuburai fault which have high Fsi values. This study indicates it is possible to presume the characteristics of the active fault from the feature of the tectonic landform and the fault scarp index (Fsi) is valid for assessing the property of active fault scarps.

Keywords: Itoigawa-Shizuoka Tectonic Line active fault system, active fault, Tectonic landform

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