[EJ] Evening Poster | S (Solid Earth Sciences) | S-SS Seismology

[S-SS08]Active faults and paleoseismology

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Geologic and historic information on seismic cycles and on the magnitude and source faults of past earthquakes is essential information to understand future large earthquakes. The study of past faulting and seismicity is an important issue for an interdisciplinary community of seismologists, geologists, geomorphologists, archaeologists, and historians.

[SSS08-P06]Active faults around the Shimokita Hills and their tectonic implication, eastern part of the Shimokita Peninsula, northeast Japan

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1. Introduction

The Shimokita Hills is located in the east part of the Shimokita Peninsula, northeastern Japan, and is narrow hilly land trending north-south with width of about 10 km and length of about 35 km. The southern part of the Shimokita Hills is relatively rugged mountainous area with about 500 m high, whereas the northern part is low relief hilly area with about 100 m high. Drainage divide of the Hills is slightly biased to the east, and eastern slope of the Hills is relatively steeper than western slope. Geology of the Shimokita Hills is mainly consist of sedimentary and volcanic rocks of Miocene to Pliocene (e.g. Tsushima, 1963). Along the eastern and western margin of the Shimokita Hills, two active faults (Detoseiho Fault and Yokohama Fault; Research Group for Active Fault, 1991) are precisely mapped by Tohoku Electric Power (2016). The Rokkasho Flexure (Watanabe, 2008; 2009) which deforms the last interglacial marine terraces is distributed to the south of the Detoseiho Fault. Many active faults are newly mapped in this study by interpretation of 1/10000 air photographs and stereoscopic image created from 5-10 m DEM of GSI. In this presentation, we report the distribution and characteristics of these faults, and consider their tectonic implications briefly.

2. The Detoseiho Fault

Tohoku Electric Power (2016) reported the fault traces only in the section of about 5 km from the Oibegawa area to the Karesawagawa area. We newly mapped fault traces in the further northern area to near the Tomari. These faults are distributed along the margin of the Shimokita Hills, and west-side-up fault scarps and flexures are recognized intermittently. However, most of these faults are inferred active faults, because topography of these fault scarps/flexures are ambiguous. Some east-side-up faults and anticlinal deformation of marine terraces are recognizes near Tomari. Fault traces extend to the coastline and are likely to extend further to the northern sea floor. The flexure scarp of the Rokkasho Flexure became ambiguous to southern ward. We can trace the flexure scarp to the Lake Tamokinuma. The Detoseiho Fault is considered as secondary fault of the Rokkasho Flexure (Watanabe, 2016). If these are integrated, the total length of the Rokkasho Flexure may be about 27 km. Considering the extension to the sea area, it may have a longer length.

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3. The Yokohama Fault
Tohoku Electric Power (2016) mapped the west-side-up faults intermittently in the section of about 10 km from Yokohama to Hamada area. In this study, we newly mapped more continuous fault traces in the same area. On the western side of the previously mapped Yokohama Fault, the east-side-up flexure scarps are newly mapped, and at the northern extension of the Yokohama Fault, west-side-up fault scarps, east-side-up flexure scarps, and anticlinal deformations of marine terraces are newly mapped. In the Hibaridaira area, at the southern extension of the Yokohama Fault, distribution of the fault/flexure traces became intermittent. We mapped 1-2 km long flexure traces and anticlinal deformation in this area. As these new traces are recognized, the length of the Yokohama Fault became about 27 km, more than twice of the previously reported length. Faults and flexures in this area consist of east-side-up ones and west-side-up ones. Although the cause of these distribution is unclear, west-side-up deformations may be primary, considering more sharp scarps of west-side-up faults and west-dipping fault plain shown in the seismic reflection profile. We considered that anticlinal deformations are caused by faulting in the shallow part, because those wavelength is as short as 100 to several 100 m.
4. Tectonic implications
Ikeda (2012) pointed out the possibility that the Rokkasho Flexure continues to the Tairikudana-gaien Fault (continental-shelf margin fault; Research Group for Active Faults, 1991). And activity of the Tairikudana-gaien Fault has been at hot issue. The Detoseiho Fault, a secondary fault of the Rokkasho Flexure and Tairikudana-gaien Fault, are extended to the Tomari area in this study, so we can show the possibility that the Rokkasho Flexure and Tairikudana-gaien Fault has been active in the area from Tamokinuma to Tomari. We can also point out that the Rokkasho Flexure is the main fault and the Yokohama Fault is the secondary fault in this area, because 1) slip rate of the Rokkasho Flexure (more than 0.2 mm/yr.; Watanabe, 2016) is significantly higher than that of the Yokohama Fault (less than 0.01 mm/yr.; Tohoku Electric Power, 2016), 2) the drainage divided of the Shimokita Hills is biased to the east and the block of the Shimokita Hills seems to tilt to the west.

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