

Application of the 3D geological structure analytical technique to sea section in the Hinagu Fault Zone

*Masatoshi Yagi¹, Izumi Sakamoto¹, Yuka Yokoyama¹, mikio fujimaki¹, Hiromichi Tanaka¹, Omer Aydan², Kenji Nemoto¹

1. Tokai University, 2. Ryukyu University

Hinagu Fault Zone extends from the Aso volcano to the Yatsushiro-sea. In the Yatsushiro-sea, some seismic surveys were carried out so far, and clarified distribution of a number of submarine fault group (the fault group called Yatsushiro-sea Submarine Fault Group). The Headquarters for Earthquake Research Promotion (2013) estimated the probability (0-16%) of the Yatsushiro-sea Submarine Fault Group triggering an M7.3 earthquake within the next 30 years. However, the activities and amount of displacement (vertical and horizontal) are not understood well. Tokai University conducted, as part of MEXT 2010 nearshore active fault survey project, a high-resolution single-channel seismic survey using parametric sub-bottom profiler for confirm a deformation structures and distribution of them. We continued investigating it continuously after the project. In this study, we tried 3D geological structure analytical technique for detecting not only vertical displacement but also horizontal displacement. We observed drag deformation which is suggests to the existence of strike-slip fault in seismic profile at Northeastern part of the fault group (tentatively as A area). We applied the technique using a lot of seismic profile (survey interval is 20-50m) to the A area. On surfaces which formed in about 20,000 y.B.P and about 13,000 y.B.P, we observed subsidence area located in Northwest side of main fault. The subsidence area is gradually slow down depth to the southeast like a stairs. The feature is similar to ground surface displacement which observed by GEONET and ALOS-2/PALSAR-2 interferometric SAR of the 2016 Kumamoto Earthquake. The scale is different but the feature similarity suggests Yatsushiro-sea Submarine Fault Group has strike-slip component. There are three valleys in the subsidence area extend NW to SE direction, and these are right laterally displaced. Based on the formation age of the surface, we estimate the mean laterally slip rate 2.1-4.5m/ky. However, the slip rate is higher than land fault (Hinagu Fault: slip rate 0.7m/ky). So, the slip rate is still under consideration

Keywords: Hinagu Fault Zone, Yatsushiro-sea Submarine Fault Group, Seismic Trenching, Strike-slip fault