Take advantage of high-resolution seismic survey in the submarine active fault

*Masatoshi Yagi[1], Izumi Sakamoto[1], Hiromichi Tanaka[1], Yuka Yokoyama[1], Omer Aydan[2], Mikio Fujimaki[3], Kenji Nemoto[1], Shintaro Abe[4]

1.Tokai University, 2.Ryukyu University, 3.Coastal Ocean Research Co. LTD, 4.AIST

[Background]
Trenching, bowling and geo-slicer has used to clarify the latest activity timing and interval of the active fault. In the sea area, there is a limit of survey methods unlike the land. So, we usually use seismic survey. On the other hand, sea area is sediment accumulated place, possibility that the history of the fault movement is preserved successively. Therefore, we can higher accuracy estimate of active faults with high-resolution seismic survey densely.
[Target area and study methods]
Hinagu Fault Zone extends from the Aso volcano to the Yatsuhiro-sea. In the Yatsushiro-sea, some seismic surveys were carried out so far, and clarified distribution of a number of submarine fault group.
In this study, we aim to reveal the subsurface deformation of fault using high-resolution seismic survey with 20-50 meters interval survey lines. Furthermore, we carried out core sampling to obtain the geological information.
[Analysis]
Results of high-resolution seismic survey, we obtained a good reflection profile of up to about depth 60m. We recognized some reflectors (R1~8 from the bottom) and some deposition sequences (A1,A2,A3,B1,B2,C,D layers from the top) based on their reflection patterns. We pick up the three-dimensional coordinate point data from each reflector and make surface models.
[Results]
1) Surface of R2
a) Vertical fault scarp was developed with NE-SW direction along master fault (A-FA1). b) In west side of A-FA1, we observed some faults which is extends to NE-SW direction and curves clockwise. This feature is similar to Negative flower structure. c) Bulge is developed along A-FA1. Three faults cut the bulge and oblique to A-FA1 with high angle. These features which are similar to R2 has recognized in surface of R3 and R4.
2) Surface of R5
Depressed formation like a funnel-shaped has developed along A-FA1 at central part of survey area. This feature is observed on seafloor also.
A number of studies for the model test of strike-slip faulting are conducted so far. And it is argued about growing process of fault. Therefore, it is a possibility to clarify the growing fault process and activity history of active faults in the sea area.

Keywords: Hinagu Fault Zone, High-resolution seismic survey, Seismic stratigraphy

©2016. Japan Geoscience Union. All Right Reserved.