

## Rifting structure in the northern and middle Okinawa Trough deduced from seismic reflection and refraction data

\*Azusa Nishizawa<sup>1</sup>, Kentaro Kaneda<sup>1</sup>, Mitsuhiro Oikawa<sup>1</sup>, Daishi Horiuchi<sup>1</sup>, Yukari Fujioka<sup>1</sup>, Chiaki Okada<sup>1</sup>

1. Hydrographic and Oceanographic Department, Japan Coast Guard

The Okinawa Trough is an active backarc basin as the Ryukyu (Nansei-Shoto) arc-trench system, to southwest of Kyusyu, Japan. The length and width of the trough are around 1,000 km and 100-200 km, respectively, and its rifting stage varies from north to south. Previous seismic surveys demonstrated that the crust beneath the trough has continental characteristics and the Moho depth shallows southward from about 25 km at the north to around 15 km at the south. However, the number of the seismic explorations in the Okinawa Trough was not so many to obtain detailed rifting structure considering the large dimension of the trough. We, Japan Coast Guard, have conducted extensive seismic reflection and refraction surveys in the Nansei-Shoto region since 2008 and we compiled the seismic structure in the northern and middle Okinawa Trough. We will show the results from seven seismic lines in this presentation: we carried out two lines along the trough strike and five lines perpendicular to the trough. The two of the five across-trough lines are positioned to the north of the Tokara Gap, the distinctive topographic depression between the north and middle trough. The other three lines are designed in the middle trough from the Tokara Gap to the Kerama Gap. These across-trough seismic lines intersect the along-trough lines at around the center of the trough.

The seafloor topography and multi-channel seismic (MCS) reflection records largely vary in the direction of the across-trough, in spite of a common feature that many normal faults were observed beneath all the MCS lines in the Okinawa Trough. The western part of the trough shows a flat topography and the several intrusions recorded in the MCS profiles do not reach to the seafloor. In contrast, the seafloor in the eastern part of the trough is characterized by many small-scale lineament structures. The strike of most of the lineaments is almost parallel to the volcanic front especially in the northern trough. The MCS records reveal many volcanic intrusions penetrate the seafloor.

The P-wave velocity models beneath the northern and middle Okinawa Trough generally show an extended arc crust of the Ryukyu Islands which consists of upper, middle, and lower crusts. We estimated crustal thicknesses below the trough mainly from Moho reflection (PmP) travel times. The along-trough seismic line in the middle trough demonstrates that the crustal thickness becomes thinner from north to south due to the decrease in thickness of the lower crust. However, such systematic decrease is not observed in the northern trough because of very inhomogeneous distribution of the middle and lower crusts along the seismic line. The across-trough seismic lines show that the crust below the trough is significantly thinner than the crusts beneath the Ryukyu Islands and the continental shelf of the East China Sea. The position of the shallowest Moho along the line is not necessary corresponding to the areas with the deepest water depth.

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