

## 論文内容の要旨

論文題目 Rifting process of the northern Okinawa Trough

(北部沖縄トラフのリフティング過程の解明)

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The Okinawa Trough is an incipient continental back-arc basin. It has along-trough variation of geomorphology, fault systems, crustal thickness, volcanic and hydrothermal activities, gravity and magnetic anomalies and so on. Despite a number of studies, only a few studies focused on the cause of those along-trough differences. In this study, we conducted the seismic reflection survey, multibeam bathymetry survey, and the seafloor observation surveys in the northern Okinawa Trough, and reconstructed its sedimentary and tectonic evolutions in the area.

### **Reconstruction of the Goto Submarine Canyon**

Submarine canyon system efficiently transport sediment to the deep marine environment. Reconstructing the development of the Goto Submarine Canyon, the largest submarine canyon in the northern Okinawa Trough, is essential for understanding the terrigenous influx to the trough basin. Multibeam survey, seismic reflection surveys, and submarine observations revealed fault- and erosion-controlled development of the canyon geomorphology.

### **Reconstruction of the northern Okinawa Trough rifting**

Interpretation of seismic reflection survey revealed temporal change of fault system, which is interpreted as two-phased stepwise rifting of the northern Okinawa Trough. We correlated stress regimes of each phase to the geologic evidences in the surrounding land area to constrain their age. Then we reconstructed tectonic evolution of the northern Okinawa Trough. The phase 1 of the northern Okinawa Trough rifting started about 7 Ma with WNW-ESE trending extensional regime, and the phase 2 started 1-2 Ma with NEN-ESE trending extensional regime.

Based on results from these two studies, we conclude that development of the Goto Submarine Canyon was constrained by the northern Okinawa Trough rifting. Adversely, sedimentation of the northern Okinawa Trough was contributed to the Goto Submarine Canyon.

Then we propose a model of sedimentary and tectonic evolution of the northern Okinawa Trough. Our model is consistent with mantle flow and slab rollback estimated from previous studies. In addition, we compared our model to that of the southern Okinawa Trough, illuminating the difference of extensional mechanism between the southern and the northern portions. In conclusion, the Okinawa Trough has different tectonic setting between the southern and the northern portions, which would be the one of the main cause of the along-trough differences.