沖縄南西沖における断層分布
Fault distribution on the southwest offshore area of Okinawa Island

*佐藤 伸明[1]、清水 祥四郎[1]、及川 信孝[1]、安藤 五郎[1]、新井 麗[1]、勝山 美奈子[1]、田中 恵介[1]、高橋 成実[1]、金田 義行[2]
*Nobuaki Sato[1], Shoshiro Shimizu[1], Nobutaka Oikawa[1], Goro Ando[1], Rei Arai[1], Minako Katsuyama[1], Shigeyoshi Tanaka[1], Narumi Takahashi[1], Yoshiyuki Kaneda[2]

1.国立研究開発法人海洋研究開発機構、2.名古屋大学減災連携研究センター
1.Japan Agency for Marine-Earth Science and Technology, 2.Disaster Mitigation Research Center

This is a part of the project “Comprehensive evaluation of faults information on offshore Japan”, by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). The project consists of three themes, 1) Collecting seismic survey data and building a database of offshore faults, 2) Interpreting distribution of active faults using seismic data collected, and conducting the seismic re-processing by leading-edge seismic technology for the seismic data obtained in previous decades, 3) Building the fault models for a simulation of strong motion and tsunami disaster, based on the interpreted faults. Our purpose of study is to reveal the detailed structural characters of active faults in the southwest offshore of Okinawa Island by 3D seismic interpretation.
3D reflection seismic data provide us the ability to map structural features in detail up to a resolution of a few tens of meters over thousands of square kilometers. Landscapes of seismic attributes such as amplitude, dip and coherence (discontinuity) attributes are often revealed to detect great detail of geological structures. We carried out the interpretation of fault distribution with the seismic attribute to highlight faults such as seismic discontinuities, using 3D seismic data which were acquired by JOGMEC.
The Ryukyu island arc system is located at a convergent plate margin where the Philippine Sea Plate is subducting under the Eurasia Plate. In the southwestern Ryukyu arc, the subduction is oblique to the trench, while in the northeastern Ryukyu arc, the Philippine is subducting perpendicular to the trench. The Oblique subduction causes compressive or extensional stresses in the forearc depending on the sense of arc curvature and the relative motion of the plates.
Discontinuity attribute shows slightly-swing lineaments with northeast-trending on the seabed surface where is located on a continental slope of the Ryukyu trench side. Based on that geometry features, numerous normal faults with 5 to 30 km length, and NNE-trending, were recognized in the study area. Those faults trend to converge toward the Kerama Gap which is considered to be left-lateral fault and the one of two major structural boundaries of the Ryukyu Arc, which indicates those faults have been developed when the Kerama Gap was formed. Although the fault density is high and the fault traces are crooked in this area, the time-slice of the discontinuity attribute shows clear the spatial relationships between those faults. In contrast, it is hard to identify clearly fault segments which are interpreted on seismic section by only 2D seismic data due to a sparse data density and a limitation of 2D seismic survey itself. Seismic attributes help us to identify subtle faults and can lead to better understanding in the description and analyses of fault system geometry such as trace-length, fault-displacement and connectivity of fault.

キーワード：活断層、慶良間海裂、三次元反射法地震探査
Keywords: active fault, Kerama Gap, 3D seismic reflection survey

