

Comparison of the back-arc basins of the South and the Central Ryukyus in the northwest Pacific

*Kohsaku Arai¹, Ayanori Misawa¹, Takahiko Inoue¹

1. Institute of Geology and Geoinformation, National Institute of Advanced Industrial and Technology

The Ryukyu Arc, which extend for over 1200 km along the east coast of Asia from Kyushu to Taiwan, and the associated Ryukyu Trench, are products of the subduction of the Philippine Sea Plate (PSP) beneath the Eurasian Plate. The PSP is subducting northwestward beneath the Eurasian Plate at a convergence rate of 4–9 cm/yr (Seno et al., 1993). The major islands of the Ryukyu Arc are considered the forearc highs.

The Okinawa Trough is a back-arc basin located beside of the Ryukyu Arc that was formed in the late Miocene (Gungor et al., 2012) or the late Pliocene–early Pleistocene (Sibuet et al., 1998). Formation of the Okinawa Trough was a key geological event associated with complex tectonics and changes in the topographic configuration of the Ryukyu Arc. Geological Survey of Japan (GSJ), AIST has started the marine geological mapping project around Ryukyu Arc since the 2008 FY. Multi-channel (16 ch or 32 ch) high-resolution seismic profiles were acquired during these cruises by the GI-gun (355cu. inch) systems. In our investigation into the deformation of the Ryukyu Arc using the high-density seismic profiles, we found that the normal faults parallel to the trench axis are well developed on the back-arc side of the arc. Slope of northern off the Southern Ryukyu (Miyako-jima and Ishigaki-jima) is simply downthrown to the axis of Okinawa Trough and reach to 2000 m in depth. In the other hand, the Central Ryukyu, northwestern off the Okinawa-jima is characterized by the small basin structure which accompanies with active normal faults. The faults show ENE-WSW strike and dip to the north with clear half graben structure. We present the tectonics of these structure compare the back-arc basins of the South Ryukyu with the Central Ryukyu.

Keywords: Ryukyu Arc, back-arc basin, Quaternary, seismic reflection survey, MCS