

Tectonics of volcanic and hydrothermal area, north/west of Kumejima Island: Preliminary results of KS-17-14 cruise

*Kyoko Okino¹, Masakazu Fujii², Ryuichi Shinjo³, Kei Okamura⁴, Takuroh Noguchi⁴, Chiori Tamura¹, Chih-Chieh Su⁵, Ho-Han Hsu⁵, Jih-Hsin Chang¹, Yoshie Uno³, Natsumi Masuda³

1. Atmosphere and Ocean Research Institute, The University of Tokyo, 2. National Institute of Polar Research, 3. University of Ryukyus, 4. Kochi University, 5. Institute of Oceanography, National Taiwan University

Kumejima Island is located in the Central Ryukyu Arc, about 100 km west of Okinawa Island. The area is just east of the Kerama Gap and close to the Okinawa Trough backarc rift valley. North of the island, the southern boundary of the rift valley consists of topographic highs, that are highly faulted. The axial valley floor is mostly sediment-covered, but is characterized by a couple of small volcanic cones. To the west, the east-west trending rift axis is segmented and left-lateral offset, and a group of volcanic edifices, that forms a ring-shaped structure is located near the segment boundary, just west of Kumejima Island. The volcanic knolls are deformed by rift-parallel faults, but the degree of deformation differs among knolls. There are several known hydrothermal vents in this area. The Daisan-Kume Knoll, a felsic submarine edifice, composes above mentioned ring-shaped volcanic structure. In the western foot of the knoll, numerous hydrothermal mounds and spires were distributed over 1600m-wide area, and is called Gondou Site (Minami and Ohara, 2017). Another active hydrothermal vent was reported at the top caldera of the same knoll. West of the Daisan-Kume Knoll, acoustic anomaly was detected near the Daini-Ryukyu knoll, but the vent system has not been confirmed. Close to the rift axis, two new vent sites were discovered northeast of Gima Hill (APA site, Kawagucci et al., 2016) and around the Nakadomari Hill. We conducted geophysical mapping, rock samplings and sea trials of newly developed survey instruments in north and west of Kumejima Island, during KS-17-14 Shinsei-maru cruise. Underway geophysical mapping was conducted along 850 miles. Multibeam bathymetry, total and vector magnetic fields, and gravity data were acquired. The volcanic area west of Kumejima Island was fully covered. Magnetic anomaly distribution shows the different magnetic character among volcanic knolls. It may suggest the difference of last eruption age or hydrothermal alteration. Four profiles of sub-bottom profiler were collected across the Okinawa Trough backarc rift zone. The data clearly reveal the detailed sedimentary facies of the trough floor and likely detect fluid or volcanic intrusions. Total 7 dredge hauls were carried out. Basalt samples were recovered from two sites along axial rift zone and rhyolite samples are dominant in Daisan- and Daiyon-Kume knolls. Samples from other three sites likely reflects the lithology of Ryukyu arc basement.

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