



## **Morphological and structural characteristics of the shallow crust in the rifting center of the southern Okinawa Trough**

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The Southern Okinawa Trough (SOT) situated offshore northeastern Taiwan is a back-arc rifting basin behind the Ryukyu trench-arc system caused by the subduction of the Philippine Sea Plate (PSP) beneath the Eurasia Plate (EP). Rifted crustal structures, magmatic and hydrothermal activities are widely observed. To investigate the hydrothermal activities in relation to extensional structures and magmatism in the rift center area, we here integrate the high-resolution bathymetry with our 2D and 3D seismic reflection data analyses. It is especially worth to mention that the 3D seismic volume is constructed from densely spaced 2D seismic lines by taking the advantage of the strong streamer feathering effect due to the strong Kuroshio Current. Comparing to the results of conventional 2D profiles, this 3D seismic block provides continuous inline images, crossline images and horizontal time slices that reveal the 3D geometry of rifting induced faults, igneous intrusions and volcanic extrusions in this study area. Seismic attribute analyses have been performed to enhance the images of some specific geological features that can be displayed in top view or perspective view. Our results show that the normal faults develop symmetrically and cut through the rifting center with local magmatic intrusions/extrusions. The offsets between the hanging and footwall walls increase from the rifting center to the basin slope. Many fluid-related features are identified both in rift center and in fault zones where gas plumes are observed in sonar images of water column, indicating that SOT is a highly geothermal active region. We suggest that large faults may allow the fluid migration along the fault planes to the seafloor and form hydrothermal vents. They may provide an excellent source for generating hydrothermal minerals.