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TECTONIC FEATURES AROUND THE CORNER OF THE NEW BRITAIN TRENCH: EVIDENCE FOR CONTINUING EXTENSION

Sang-Mook Lee*, Deep-Sea Resource Research Center, KORDI, smlee@kordi.re.kr
Ray A. Binns, Division of Exploration and Minings, CSIRO

The Manus Basin behind the New Britain Trench is the site of a number of active seafloor hydrothermal vent fields which are considered to be modern day analogues of felsic volcanic-hosted polymetallic massive sulfide deposits abundant in the ancient geological record. Many of these deposits represent important economic resources, yet relatively little is known about the processes leading to their formation. Tectonic, magmatic and hydrothermal activity in the eastern Manus spreading center is unusual because it can not be explained by simple backarc spreading associated with subduction along the New Britain Trench. For instance, geochemical and isotopic analyses of submarine volcanoes in the eastern Manus Basin suggest a closer affinity to arc rather than backarc. Yet the volcanoes lie farther away from the Benioff-Wadati zone than typically obseved for arc volcanoes. One hypothesis is that the magmatic activity in the eastern Manus Basin results from tectonic process which is controlled by sharp inflection of the New Britain Trench. According to this hypothesis, the two major southeast-trending strike-slip faults in the eastern Manus Basin, Djaul and Weitin Faults, should extend farther south down to the corner of New Britain Trench. There they would form a trench-trench-transform triple junction with the New Britain and Solomon Trenches. To test this hypothesis, KORDI conducted multibeam swath bathymetry surveys around the corner of New Britain Trench in 1999 and 2000 onboard R/V *Onnuri*. Our results show that neither Djaul nor Weitin Faults extends down to the corner of New Britain Trench. Instead Weitin Fault runs into an edge of a large basin, the Queen Emma Basin, seaward of New Ireland. From the southern end of the Queen Emma Basin, pairs of long inward-facing grabens extend down to the corner of the trench. They are named as Queen Emma Grabens. Our survey also confirmed the presence of another basin northwest of the inflection in the trench, which we refer to as the Saint Georges Basin. The presence of seafloor basins and grabens together with evidence of extension on the nearby islands suggests that, in addition to shear stress resulting from oblique opening of the Manus Basin, extension has been a dominant mode of deformation around the corner of the New Britain Trench in the last few million years.