

Precise structure and evolution process of Atlantis Bank, Southwest Indian Ridge based on marine geophysical observation

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Atlantis bank located on the eastern edge of the Atlantis-II Fracture Zone in the Southwest Indian Ridge was precisely surveyed by a research submersible SHINKAI6500 in 1998 (MODE'98 Leg4) and in 2002 (ABCDE Cruise). The precise magmatic/tectonic structure of the bank was identified by the results from the seafloor gravity measurement during the dives and underway geophysical survey after the dives and on the submersible maintenance days in addition to the precise geological studies. The new precise topographic map of the bank shows clearly that detachment faults of the E-W direction (parallel to the spreading axis) which cuts off the bank completely are distributed over the northernmost and southernmost areas of the bank, and that two transform-parallel normal faults on the east side slope of the bank. Furthermore, small volcanic ridges, parallel to the spreading axis and apparently derived from the volcanism of the spreading segment are mostly distributed north of 32°45'S (ca. 12Ma as identified from magnetic anomaly) off the east side of the bank. Mantle Bouguer anomaly also suggests a drastic change of volcanic activity at this age and before that the segment was 'amagmatic.'