

Topography and Sediments Distribution at the Large Off-axis Lava Flow Field from the southern East Pacific Rise at 14degS

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To understand the mechanism of off-axis thickening of layer 2A and its petrological-geochemical characteristics of the evolution of oceanic crust and the magma plumbing system of fast-spreading ridges, NIRAI-KANAI Cruise, Leg 1, was carried out using R/V Yokosuka and Shinkai 6500 submersible of JAMSTEC. Successful 7 Shinkai dives out of 15 planned dives have resolved our primary objectives of the cruise. These are; 1) Complete mappings of 8S and 14S large off-axial flow fields by the SeaBeam of R/V Yokosuka, which showed the 14S flow field has 342 km² and 19 km³, the world largest among the known submarine lava flows; 2) Complete mapping of 'Sojourn Ridge', an unusual volcanic ridge with a total volume up to 700-km³ centered at 14S, 115W, which shows the transition from spreading axis through a seamount chain to the E-W-striking sub-continuous volcanic ridges; 3) A side-scan sonar system and a sub-bottom profiler equipped on Shinkai depicted detail volcanotectonic structures, sedimentary and lava flow morphologies of the axial and off-axial flow fields, and enabled us to estimate ages of the 14S flow ranging from 34 to 18 kyr; 4) Four dives on the 14S off-axial flow field, two dives on the nearby ridge axis and one dive on an off-axis seamount at 16S provided the first direct observations of a large off-axis lava flow field and seamount and detailed insight into volcanotectonic features of the ridge axis. Eastern half of the 14S flow was first mapped by TAMU2 12-kHz side scan sonar imagery and bathymetry in 1995 during the Ridge Flux Project. During this cruise, we have completed mapping of the entire flow field using the SeaBeam 2112 multibeam sonar system on R/V Yokosuka. These mappings show that 14S flow extends from 13-41'S, 112-26'W to 14-07'S, 112-38'W and approximately in an area of 49 km X 16 km. Total area covered by the flow field amounts to 342 km². Further analysis of the Seabeam bathymetry revealed the tilting of the off-axis seafloor, which is recognized from the dipping of almost all off-ridge caldera cones. We speculate this feature as a post eruption subsidence of the seafloor. Thickness of the sediments on the no off-axial eruptive area was measured to be 2-2.5m by the sub-bottom seismic profiler attached to Shinkai on dive834. Based on the spreading rate at 14S known to be 7.5 cm/yr, the age of the non-eruptive seafloor can be estimated as 113,700 yr. With this sedimentation rate of 1.76-2.20 cm/kyr (200-250 cm/113.7 kyr), the ages of the flow field were estimated to be 34.1-18.2kyr (for average sediment thickness of 40-60cm). Detailed SBP profiles of all tracks will be shown and discussed at the poster or oral session.