

MORPHOLOGY AND OPENING OF THE PARECE VELA BASIN

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ABSTRACT

To investigate morphology and its implications in the opening and formation of the Parece Vela Basin, sonographs were obtained by Swathmap (a long-range sidescan sonar system utilizing a hull-mounted transducer array). The Swathmap sonographs revealed seamounts on the West Mariana Ridge; seamounts and flat topography on the east side (arc side) of the Parece Vela Basin; extraordinarily rough topography on the Parece Vela Rift; lineated rough topography on the west side similar to that found on the flanks of mid-ocean ridges; and seamounts, faults and rugged morphology on the Palau-Kyushu Ridge. The formation of seamounts on the arc side of the Parece Vela Basin are probably related to tectonic deformation including tensional faulting and off-ridge igneous activity on the arc side, which may have been caused by migration of the spreading ridge during the period of ridge jump from the old Parece Vela Rift to the new spreading center of the West Mariana Ridge. The lineated topography on the west side of the Parece Vela Basin might reflect rough morphology of the basement which may have formed in the rift zone by tensional faulting and intrusion and extrusion of magma. The formation of faults and rugged morphology on the Palau-Kyushu Ridge might be related to the extensional tectonics of this region. The comparison of opening of the Parece Vela Basin with that of mid-ocean ridges suggests that the Parece Vela Basin may have opened in a fashion similar to that of a slow spreading mid-ocean ridge in terms of morphology and its formation mechanism. The Parece Vela Basin may have opened passively by a process of retreat of oceanic lithosphere.