

## Slope Control of The Submarine Lava Morphology Revealed by The Transect Across The Southern East Pacific Rise at 14 deg S

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Two Shinkai 6500 submersible dive transects across the southern East Pacific Rise at Latitude 14deg10m S and 14deg13m S was conducted in July, 2004 during the NIRAI-KANAI Cruise of the Japan Marine Science and Technology. Both submersible dives started from the foot of the rise 2750 m in depth and went up slopes onto the rise summit 2640-2630 m in depth and repeatedly traversed the rise axis along zigzag tracks. These dive observations show that the rise slope and axis entirely consist of variety of lava flows accompanied by rubble of disrupted lava crust. Live chimneys are present on the western rim of the rise crest at 14.217deg S and 112.540deg W, effusing grey and shimmering water. A colony of dead calyptogena and tube worms and live anemone are distributed within 40 m from the chimneys. Two clusters of dead chimneys are found further north on the rise summit at 14.176deg S and 112.530deg W and at 14.205deg S and 112.534deg W.

Lava morphology systematically changes with the slope of the basement. Steep slopes steeper than 5 degrees are dominated by tube-like pillows decorated with numerous protrusions of small pillow buds (knobby pillows) elongating downslope. Bulbous and dome-like pillows appear on the rise edge, resting on pahoehoe-lobate sheets, presumably fed during the waning stage of an eruption.

The rise summit less than 5 degrees is overlain by lobate sheet flows fringed with superposed pahoehoe lobes. Four- to six-storied collapse pits are present in the lobe sheets, indicating a complex history of emplacement and drainage of lava. Coalescence of flow lobes into a single lobe can be seen on the pit walls. Sheet flows with folded surface crust are not very common and occur only in the collapse pits, indicating rapid drainage of lava within the inflated lobate sheets. Pahoehoe lobes have no collapse pits and hollow lobes are not common. In plan view, lobes are hemispherical and not very elongated. Some lobes are oriented and have lobate fringes, giving an appearance of a thick naan or Neapolitan pizza.

The systematic change in lava morphology with the slope and the position in the ridge topography is consistent with the observations from the Hole 1256D into the superfast-spread crust formed at the East Pacific Rise [1] and the previous submersible and ROV observations of the submarine volcanoes off Hawaii Islands [2].

### References

- [1] Tominaga, M., et al., AGU 2007 Fall Meeting, OS51A-0178 (2007)
- [2] Umino, S. et al. AGU Monograph, 128, 85-101 (2002)