

Magmatism at the Outer Rise and Impact of Subduction: SCORE/APL proposals for outer rise drilling

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The Pacific Plate in the NW Pacific includes a few hundred meters-thick pelagic sediment, representing a typical structure of an old oceanic plate. Recent seismic reflection studies, however, showed remarkable variation in the thickness of the sediment layer on the outer rise. The typical thickness of the sediment layer is roughly 300–400 m, whereas considerably wide areas have a sediment thickness of only 50 m or less while their surface topography is not clearly identified. Sedimentation rate of surface sediment in the region is ~5–25 cm/kyr, suggesting that all the sediments have been deposited within recent several million years. We hypothesize that the thin sediment cover is owing to basalt sill intrusions or sheet lava extrusions in and on previous thick pelagic sediment package, and that the intrusive and extrusive basalts might have been fed by petit-spot volcanism occurred around the outer rise. Considering the wide distribution of the acoustic thin sediment cover, we could have vastly underestimated the volume of petit-spot magmatism. If this is the case, the petit-spot magmatism may influence subduction zone seismicity, and therefore global geochemical cycle.

To test this hypothesis, we submitted drilling proposals of J-DESC SCORE (Chikyu Shallow Core Program) and IODP APL (Ancillary Project Letter), both of which we targeted at the outer rise of the Japan Trench. In this presentation, we present background and recent findings related in the two proposals.