

プロジェクト IBM 掘削 2014 Overview of IODP drilling in Izu-Bonin-Mariana arc

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What is raw and juvenile continental crust? Furthermore, how does it form and evolve into mature continental crust? The continental crust we observe on the surface of the earth has been deformed, metamorphosed, and otherwise processed perhaps several times from its creation in subduction zones to the present.

Although there are many examples of accreted arc crust on the margins of continents, during- and/or post-collision geochemical changes are widespread, and we do not have the ability to observe active crust-forming processes in modern arcs except by what we can infer from eruptions at the surface, and by remote sensing of arc interiors. ULTRA-DEEP DRILLING INTO ARC CRUST is the best way to sample unprocessed juvenile continental-type crust, to observe these active processes that produce the nuclei of new continental crust, and to examine the nature of juvenile continental crust as first generated at intra-oceanic arcs.

Key questions for comprehending arc crust formation are: (1) What is the nature of the crust and mantle in the region prior to the beginning of subduction? (2) How does subduction initiate and initial arc crust form? (3) What are the spatial changes of arc magma and crust composition of the entire arc? (4) How do the middle arc crust evolve? Possible strategies for answering these questions include drilling by IODP at the Izu-Bonin-Mariana (IBM) arc system. IODP has proposals to drill at the IBM, including three non-riser holes (IBM-1, IBM-2 and IBM-3) and one riser, ultra-deep hole (IBM-4), which answer these questions, respectively, and the four drillings result in comprehensive understanding of the arc evolution and continental crust formation. Drillings by Joides Resolution at three sites (IBM-1, IBM-2 and IBM-3) are scheduled in 2014. This presentation will give an overview of these 3 cruises and their perspectives.