

## Cruise Summary

NT09-05 Leg-1

R/V Natsushima

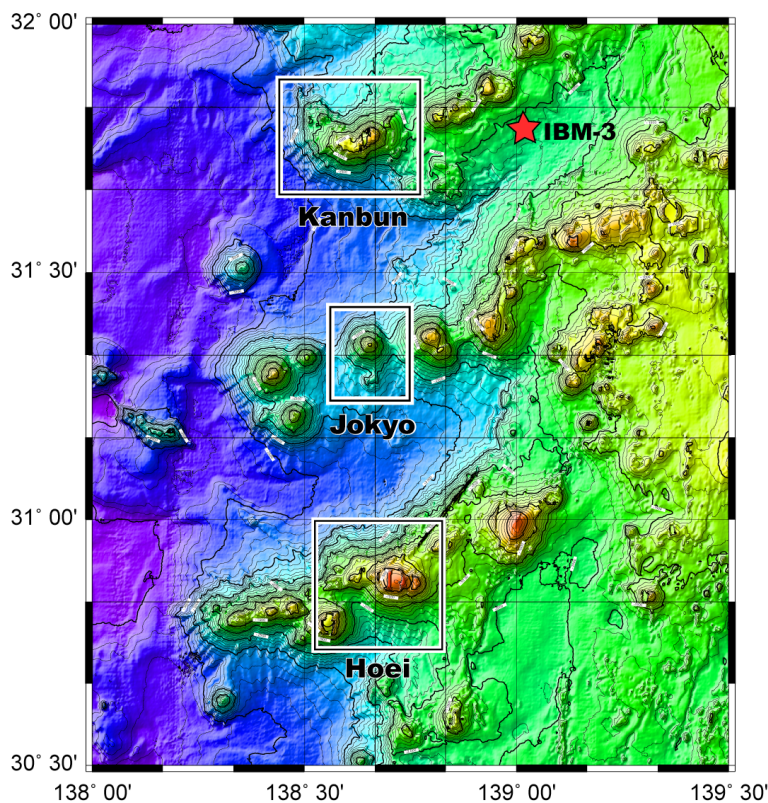
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Studies of rear-arc volcanism and crustal structure in the northern Izu Arc

April 2 to April 10, 2009

(JAMSTEC to Hachijo-jima)

## Izu Rear Arc



*Rear-arc volcanoes of interest to this study (Kanbun, Jokyo and Hoei).*

## Overview of Observation

The volcanoes of interest to this study (Kanbun, Jokyo and Hoei) occupy a small segment of the rear-arc seamount chains of Manji, Enpo and Genroku, respectively. All three volcanoes are now submarine but vary in volume from Jokyo, Kanbun to Hoei in volumetric order. The Kanbun and Hoei are flat-topped rear-arc volcanoes, suggesting that their summits reached sea level. There is a positive and linear correlation between the age and depth of

flat-topped volcanoes, suggesting that rear-arc volcanoes submerge at a constant rate ( $\sim 100$  m/Ma) (Ishizuka 2008). Thus rear-arc volcanoes deeper than flat-topped volcanoes of similar age were probably always submarine, and we can expect volcanoclastic sediments from both subaerial and submarine eruptions from the IBM-3 drilling.

Kodaira *et al.* (2008) showed that there is no relationship between the Miocene rear-arc seamount chains and the crustal structure. Instead, the seamount chains directly reflect the 3D character of convection within the mantle wedge (hot fingers) (Tamura *et al.*, 2002). Consequently, volcanic rocks will provide detailed information about the evolution of the mantle wedge after the cessation of back-arc spreading and during the re-establishment of the arc volcanic front. This mantle history is a critical aspect of how the mantle wedge melts and, therefore, how arc crust is formed.

Moreover, Kodaira *et al.* (2008) shows that the crustal thickness is different at the three rear-arc volcanoes studied in this cruise: at Kanbun 16 km, at Jokyo 13 km, and at Hoei 25 km. Most of the thick crust in the rear-arc could have been produced during the Eo-Oligocene (Kodaira *et al.*, 2008). Anatexis and assimilation may even occur in oceanic arcs and backarcs (Tamura *et al.* 2009). If so, then, the way in which the Eo-Oligocene crust has been affected may be different among the three rear-arc volcanoes. We expect that detailed comparative studies between these three volcanoes will reveal the assimilation of Eo-Oligocene crust and the characteristics of the materials underlying these Miocene volcanoes.

## **Results**

R/V Natsushima completed additional Seabat (Figs. 5.1.1, 5.1.2 and 5.1.3) surveys in Kanbun, Jokyo and Hoei volcanoes around the dive sites. These data will be merged with existing multibeam data to produce final maps of each study area.

Seventy nine rock samples and 5 sediment push cores were successfully recovered.