Tracing of a back-arc margin of an oceanic island arc

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The Izu-Bonin arc is known to have voluminous volcanism in its back-arc region. In the central part of the arc back-arc volcanoes form across-arc seamount chains. They were active between 17 and 3 Ma, i.e., a period between the cessation of the spreading of the Shikoku Basin and initiation of currently active back-arc rifting just behind the Quaternary volcanic front. This volcanism has clear so-called arc signature such as enrichment in fluid-mobile elements and depletion in HFSE relative to MORB, implying significant contribution of slab-derived material. In this context these volcanoes can be regarded as a manifestation of arc magmatism.

An area between the western end of the back-arc seamount chains and Kinan Seamount Chain, which traces along the extinct spreading center of the Shikoku Basin is of particular interest to the Japan's legal continental shelf survey. There are a number of seamounts of variable size in this area, and their chemical characteristics and age of active volcanism had not been investigated. Benthic multi-coring system recovered relatively fresh volcanic rocks from several seamounts in this area. Preliminary data indicates that lavas from these volcanoes show variable enrichment in LILE and depletion in HFSE, and distinct from MORB-like lavas from the Shikoku Basin. The ages of these lavas generally range from 15 to 12 Ma, indicating volcanism after cessation of spreading of the Shikoku Basin. These lavas are distinct from the Kinan Seamount chain lavas by showing high fluid-mobile - immobile element ratios such as Ba/Yb and Th enrichment relative to MORB, although period of active volcanism is similar to each other. These preliminary observations imply that arc magmatism occurred as far as 270km west of the current volcanic front immediately after the Shikoku Basin ceased its spreading.