

SVC052-04

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The nature of basement rocks in the Izu Peninsula and Izu-Bonin arc: constraint from zircon geochronology

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The Izu Peninsula, central Japan, is situated in a zone where the active intra-oceanic Izu-Bonin arc has been colliding with the Honshu arc for the past 15 million years. As a result of this arc-arc collision, parts of the Izu-Bonin upper crustal sequences have been accreted and uplifted to form the Izu Peninsula, exposing seafloor volcanoclastic deposits, associated lava flows, and coeval intrusive bodies. Parts of this sequence, the Yugashima Group, have been subjected to extensive hydrothermal alteration, and these altered rocks have previously been interpreted as representative of hypothetical widespread Middle Miocene basement that presumably underlay northern Izu-Bonin arc volcanoes. New zircon U-Pb ages presented here, however, show that both fresh and altered volcanic sequences exposed in Izu Peninsula are broadly contemporaneous and were products of the same Late Miocene to Pleistocene magmatism. Geochemical characteristics of these sequences show them to have formed in the Izu-Bonin rear-arc environment, providing an unusual opportunity to investigate in detail the growth and architecture of a rear-arc region in an active intra-oceanic arc. Moreover, zircon ages from altered basal units of Kozushima and Niijima, Quaternary volcanic islands in the northern Izu-Bonin rear-arc, show that these islands rest on units only slightly older (<1 Ma) than the main body of these subaerial edifices, not, as previously believed, part of a regional older Miocene basement, suggesting the near-continuum growth of these arc volcanoes and their underlying successions. The newly obtained ages and reinterpretation of the geochemical characteristic of the volcanic rocks revealed the nature of the upper crustal sequences that underlie the Izu-Bonin arc volcanoes, as well as providing key insights on the tectonic interpretation of the Quaternary volcanism in the Izu collision zone.