

Geochronology and geochemistry of Neogene volcanic rocks from Hirado-Ikitsuki area, NW Kyushu

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Island chains off western Kyushu are the surface exposure in the northern margin of the Taiwan-Sinzi Folded Zone that spreads along the arc-trench system in the back-arc side from SW Japan to Taiwan. Igneous activities from Middle Miocene to Holocene intermittently occurred on these islands and widely covered or intruded sedimentary rocks of Early-Middle Miocene. Geochemistry of the volcanic rocks from the Hirado, Ikitsuki and Takushima islands believed to relate to the back-arc opening along the East China and Japan Seas shows a temporal change in source material. Submarine to sub-aerial volcanism occurred on the Hirado Island at 15 Ma during the final opening stage of the East China Sea produced tholeiitic basalt and associated andesite-dacite. They have low incompatible elements and high FeO^*/MgO ratios and are defined to have evolved following tholeiitic differentiation trend. High Sr and Pb and low Nd isotopic ratios suggest the involvement of EM2-like lithospheric mantle and crustal material in the formation of these syn-opening volcanic rocks. Post-opening alkali basalt volcanism occurred at 9-6 Ma on the islands is characterized by OIB-like higher large ionic lithophile (LIL) and high field strength (HFS) elements compared to 15 Ma basalts in this region and Quaternary basalts along the volcanic front. They have variable range of incompatible element concentrations and ratios along with variable Sr, Pb and Nd isotopic ratios suggesting the involvement of both lithospheric and asthenospheric sources at variable melting degrees (from 2 to less than 15%). The fact that isotopic composition of Quaternary alkali basalts existing south of the studied area is even more depleted suggesting increasing the involvement of the asthenospheric source increased with decreasing time.