

Origin of Cretaceous magmatism in North Kyushu: Evidence from metamorphosed intrusive rocks in the Sefuri Mountains, Southwest Japan

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The Asian continent was formed by continental collision during the Late Paleozoic. Japanese island was situated along the active continental margin of the Asian continent before opening into the Sea of Japan. The Cretaceous intrusive rocks are widely exposed in the Southwest Japan, and sparsely contain the low-pressure type metamorphic rocks in the northern part of Kyushu. The timing of metamorphism can be recognized as the same geological event in the Cretaceous magmatism. The metamorphosed intrusive rocks would, therefore, be considered as an initial-stage magmatism of the voluminous intrusive rocks from the northern part of Kyushu during the Early Cretaceous. The petrological studies of initial-stage intrusive rocks are important to understand the generation of the later-stage voluminous ones because the geochemical characteristics of initial-stage magma are expected to affect those of later one. The early stage metamorphosed intrusive rocks can be divided into metagabbro, metadiorite and metaronalite. The former two lithologies geochemically resemble basalt and high-Mg andesite, respectively, in the Miocene Setouchi volcanic rocks. Sr-Nd isotopic compositions of the voluminous granitic rocks in Kyushu are identical with those of the metamorphosed intrusive rocks. The Setouchi volcanic rocks were derived from metasomatized wedge mantle under the high-temperature conditions at the subduction zone. Considering the isotopic compositions and geochemical signatures of the metamorphosed intrusive rocks, the Cretaceous magmatism in Kyushu can be correlated with magmatism of the Setouchi volcanic activity with episodic thermal-anomaly.