

Change of whole-rock chemical and Sr isotopic compositions in the Soeda Granodiorite, northern Kyushu, Southwest Japan

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We investigated distributions of whole-rock chemical and Sr isotopic compositions in the Soeda Granodiorite, Cretaceous granitic rocks in northern Kyushu.

The Soeda Granodiorite is divided into main and hornblende porphyritic facies (Yuhara and Masaki, 2013). The main facies mainly consists of medium-grained massive hornblende biotite granodiorite. The hornblende porphyritic facies includes hornblende phenocrysts (up to 1cm) in medium-grained hornblende biotite tonalite to granodiorite matrix. The hornblende porphyritic facies is distributed around synplutonic mafic rocks. The hornblende porphyritic facies is formed by mixing of mafic magma and main facies granodioritic magma.

The main facies is divided into two groups, high Sr and low Sr groups, based on Sr content. There is resemblance of modal and chemical compositions between the two groups. The hornblende porphyritic facies plots within range of chemical compositions of the low Sr group. The low Sr group is distributed around synplutonic mafic rocks and hornblende porphyritic facies, and in southwestern area of the Soeda Granodiorite. The distribution and chemical composition suggest that the low Sr group also is formed by mixing of mafic and granodioritic magmas.

The distribution pattern of each major and trace element depends on pattern of SiO₂ contents and behavior to SiO₂ content. There is no relation between the patterns and distribution of rock facies and groups. The distribution pattern of Sr content reflects partly distribution of low Sr group. The modal Sr initial isotopic ratio (SrI) calculated by 105Ma, 110Ma and 115Ma are high in central and northern parts of the body, and low in distribution area of the low Sr group and hornblende porphyritic facies. Thus, the rocks in the high SrI regions are not influenced by mixing of mafic magma. The low Sr group and hornblende porphyritic facies are influenced by mixing of mafic magma having low SrI.

Keywords: Soeda Granodiorite, whole-rock chemical composition, Sr isotopic composition