

Geochemistry of the Osumi Granodiorite, southwestern Japan

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The Osumi Granodiorite distributes in the south-eastern part of Osumi peninsula, Kyushu island, the outer zone of southwestern Japan. Most of the granitoids in the outer zone of southwestern Japan are known to have formed simultaneously within a short period of 13-15 Ma, and are unique in the history of igneous activity in the Japanese island arc. The cause of this is thought to be related to the large-scale magmatic activity caused by the subduction of Philippine Sea Plate into the southwest Japan Arc, which was separated from the continent by the Japan Sea Expansion, triggering siliciclastic igneous activity[1]. The Osumi granodiorite has the largest exposed area. This granitic body intrudes into sedimentary rocks of the Shimanto belt. Few geochemical studies have been done for the Osumi Granodiorite, especially those on trace elements and rare earth elements and isotopic analysis. In this study, we analyzed the chemical composition of the Osumi Granodiorite for major and trace elements and rare earth elements (REEs). The Rb-Sr isotopic analysis was also carried out to investigate the formation process of the Osumi Granodiorite. The linear trends on the Harker's diagram indicate that this granitic body may have one magmatic origin. Alumina saturation index (ASI) shows peraluminous in composition, and most of the samples are assigned to I type granite. The REE patterns show enrichment in light rare earth elements (LREE) and negative Eu anomalies are observed. The relatively large Eu anomaly suggests that this granodiorite was formed in a reducing environment. This may be due to the assimilation of surrounding sedimentary rocks of the Shimanto belt in the magma formation. The results of the Rb-Sr isotope analysis also suggest that the magma may have been formed by heterogeneous mixing of magma with the sedimentary rocks of the Shimanto belt.

Reference

[1] Nakajima, T. (2018), *Jour. Geol. Soc. Japan* 124, 603-625.