

Geochemistry of the Granitic Rocks in the Barton and Weaver Peninsulas, King George Island, Antarctica

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The petrological and geochemical features of the Eocene granitic pluton distributed in the Barton and Weaver peninsulas, King George Island are reported, in order to understand the nature of granitic magma and the crustal structure of King George Island. The granitic pluton, formerly described as "quartz diorite", is mainly composed of granodiorite with small amounts of gabbro, diorite and aplitic dike. The gabbro of the Weaver Peninsula is enriched in pyroxene and depleted in quartz than the diorite of the Barton Peninsula, which is only distributed below 30 m level of the present surface. The main body of granodioritic composition was intruded by many aplitic dikes of centimeter scales.

The overall geochemical features of the pluton correspond to those of calc-alkaline, volcanic-arc granites. Although the variation diagrams of major and trace elements show good differentiation trends, the compositional gaps are recognized among subunits. In the chondrite-normalized REE diagrams, $(La/Yb)_{CN}$ ratios continuously increase from gabbro to granodiorite, suggesting that the major geochemical behavior of REE was governed by simple fractionation.

The granitic pluton is thus thought to be a vertically zoned pluton, and the intermittent compositional variation is considered to be a result of fractional crystallization operated dynamically in a magma chamber at emplacement level. The lower crust of King George Island, which is likely to be a source of granitic magma, is considered to have been hydrous gabbros or amphibolites formed by underplating of basaltic magma under subduction environment.