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Geotechnical characteristics of rocks around the King Sejong Station in Antarctica by Freeze-Thawing test

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The purpose of this study is to evaluate the rock in the extreme regions by conducting a field study and laboratory tests on three rocks of diorite, andesite, grano-diorite around Sejong Station in Antarctica. The King George Island, the research area, is mostly covered by glaciers and partially exposed bedrock along the coast. Around the coastal area and Sejong-bong, andesites, diorites, grano-diorites are distributed and were measured rebound values using Silver Schmidt hammer. This hammer, unlike conventional Schmidt value's R, calculates Q values using input and output energy. As a result of field study, the average Q value of diorite was estimated 76, which is high compared others, and andesite was estimated 67, which is low compared others, grano-diorite was estimated 72, which is widely scattered. Freeze-Thawing test was performed based on ASTM C-666, KS F 2456. The temperature range of freeze-thawing test is from -20 °C to 20 °C referred to the published papers, and all rocks are completely saturated without humidity. The temperature holding time was set to 2 hours for temperature inside rock to -20 °C when the atmosphere temperature is -20 °C. The freeze-thawing test was carried out every 20 cycles for porosity, absorption, and slaking durability. The laboratory tests were performed 200 times in total. As a result, up to 100 cycles, the porosity and absorption were not significantly different. Since then, they increased slightly. However, the slaking tended to increase gradually from the 0 cycle. In order to accurately assess the weathering of the three rocks, continuous freeze-thawing tests should be conducted.

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