

HSC018-P05

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Influence of rock properties of building stones on freeze-thaw weathering

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In order to investigate the role of micro-pores of rock on freeze-thaw weathering, four widely used building stones such as Oya tuff, Shirahama sandstone, Savonniere limestone and Nagatoro crystalline schist were tested. They were measured the initial rock properties of porosity, bulk density, pore size distribution, unconfined compressive strength and tensile strength. The specimens were cut into cylindrical shape of 5 cm in diameter and height. The experiment was also performed using saturated solution at 0 degrees Celsius of sodium sulfate, its 10% solution and distilled water as a control. Total and partial immersion techniques were adopted during the experiment. The immersion time was 6 hours at 20 degrees C. temperate room. Then the specimens were picked out from the solution, and were put into the freezer set at -10 degrees C. for 18 hours. This immersion and freeze-drying were repeated up to 12 cycles. Porosity and tensile strength are known important factors on freeze-thaw weathering. In this experiment, the Oya tuff was destroyed but limestone was not, even both of them have similar initial porosity. One of the reasons is that each rock had different pore size distribution. Thus, it is important to consider the ratio of micro-pores of building stones for rock weathering.

Keywords: rock weathering, freeze-thaw weathering, porosity, tensile strength, pore size distribution