



## **Effects of rock properties on salt weathering of Oya-tuff building stone**

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Oya-tuff is one of the famous Japanese building stone used for many kinds of architectures. The most splendid building is the Imperial Hotel designed by F. L. Wright, in 1922. Oya-tuff is a rhyolitic volcanic ash deposited under the deep sea in Miocene. It is categorized into mainly two grades from the building stone quality; fine and coarse types. Oya-tuff was once sampled from open cuts but now from underground quarries. An abandoned undermine of Oya-tuff has much salt efflorescence in dry winter but less in humid summer. Field survey was performed seasonally and salts were collected from the 5 sites of the undermine. Thenardite and gypsum are detected using XRD as main salts as well as zeolites often contained in fresh Oya-tuff. Moisture contents are relatively steady due to underground environment. To know the influence of rock properties on salt weathering, two kinds of Oya-tuff were used for these experiments. They were conducted using square pillar specimens with  $5 \times 5 \times 15$  cm whose bottoms are sunk into  $\text{Na}_2\text{SO}_4$  saturated solution and distilled water as a comparison. Dry conditions were performed for 24 hours in an oven set  $40^\circ\text{C}$ , and wet conditions were then carried out for 24 hours left in a room of *ca.*  $20^\circ\text{C}$ . This wet-dry cycle was repeated by 10 cycles and the both Oya-tuff was collapsed. Fine type Oya-tuff was faster damaged. Through this experiment, it is concluded that the Oya-tuff specimens with fine pores are more severely and faster damaged.