

Occurrence of the Take tephra distributed in the northern flank of Kitadake, Sakurajima Volcano, Japan

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Sakurajima Volcano, which is located in the southern part of Aira caldera, is one of the most active volcanoes in Japan. This volcano consists of two main edifices: Kitadake and Minamidake, which are composed of pyroclastic rocks and lava flows of pyroxene andesite and dacite. Four historic explosive eruptions in AD 764, 1471, 1779 and 1914 produced pumice fall deposits and lava flows, and damaged extensively its surrounding area.

The Take tephra distributed on the northern flank of Kitadake. The deposit is produced by the last summit eruption of Kitadake at 4900 ¹⁴C years BP. Two lithofacies were identified in the Take tephra: massive facies and stratified facies. The massive facies are composed of relatively large pyroclastic flow deposits, while the stratified facies are alternating beds of small pyroclastic flow deposits and pumice fall deposits. Some small pyroclastic flow deposits contain accretionary lapilli. The large pyroclastic flow deposits are divided into pumice flow deposits and block-and-ash deposits. Most pumice flow deposits are welded within 2.2 km from the summit crater of Kitadake. Based on the components, the Take tephra is divided into three types. Type 1 contains abundant pumice grains. Type 2 consists mostly of lithic fragments. Type 3 includes a large amount of crystal particles. Large pumice flow deposits are characterized by Type 1. Small pyroclastic flow deposits and pumice fall deposits are classified into Type 2 and 3.

These facts suggest that the pyroclastic flow is intra-plinian flows generated by successive partial collapses of the sustained plinian eruption column. Since some pumice flow deposits are fine grained and poorly sorted, and contain accretionary lapilli, they are interpreted to be formed as a consequence of an interaction of magma and water. It is suggested that a part of pumice flow deposits in the late stage are welded, and that a partial collapse of the welded pyroclastic rocks occurred.