

Estimation of cumulative volume of magma by GPS observation around Sakurajima volcano and Aira caldera

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Sakurajima is an andesitic volcano located in the southern rim of Aira Caldera, South Kyushu, Japan. The eruptive activity at the summit crater has continued since 1955. Precise leveling survey revealed that major and minor magma reservoirs, which caused deformation of Sakurajima, are located at depth of 10 km beneath Aira caldera and 5km beneath the summit crater, respectively. Daily GPS observation (Leica SR299E and 399E) at 7 stations has been continued at Sakurajima volcano since October 1994. (1) During the period from 1995 to 1999, changes in slope distance and relative elevation among the stations show extension of the ground and uplift of the northern part of Sakurajima volcano. (2) The inflation stages were observed during the periods from August 1995 to March 1996 and after December 1997. Inflation of ground suspended from April 1996 to November 1997. (3) The location of pressure sources causing deformation of Sakurajima was estimated to be at depths of 10 km beneath the center of Aira caldera. (4) The precise leveling surveys repeated in the time interval of 1 to several years since 1957 showed uplift and subsidence of the ground corresponded to dormant and active periods of eruption, respectively, and revealed constant magma supply. In contrast, daily GPS observation revealed fluctuation of magma supply in short time interval. The inflation after August 1995 corresponded to rather active period of eruptivity and inflation suspended in dormant periods. This fact suggests magma was intermittently supplied in the active periods and magma was not migrated to shallower part than 10 km depth in the dormant period.