

Petrological characteristics of volcanic products from Aira caldera in southern Kyushu during 100-29ka

Yuko Sekiguchi[1]; Toshiaki Hasenaka[2]; Shinji Nagaoka[3]; Yasushi Mori[4]

[1] Science and Technology, Kumamoto Univ.; [2] Dept. Earth Sci. Kumamoto Univ.; [3] Dep. Geography, Fac. Education, Nagasaki University; [4] Kitakyushu Mus. Nat. Hist. Hum. Hist

Aira caldera in southern Kyushu had been active with many explosive and effusive eruptions between 100 and 30 ka after the long dormant period from 0.5 to 0.1Ma. Aira pyroclastic eruptions occurred at 29ka without long interval after this active period. A sequence of eruptions accompanied at 29 ka., i.e., Osumi pumice fall, Tsumaya pyroclastic flow, Kamewarizaka Breccia, and Ito pyroclastic flow, Aira-Tanzawa ash fall. We made petrological descriptions and whole-rock XRF analyses for the volcanic products from these units, which include Fukuyama pumice fall deposit, Shikine andesitic lava, Iwato tephra formation, Shimizu rhyolitic lava, Otsuka pumice fall deposit, Fukaminato tephra formation and Kenashino tephra formation, the Aira pyroclastic eruption (Osumi pumice fall deposit and Ito pyroclastic flow deposit).

Results of XRF analyses for a sequence of volcanic products from Aira caldera during 100 ka to 29 ka revealed that they are classified into four compositional types (A-D) by petrographical and chemical characteristics. Type A corresponds to Fukuyama pumice fall deposit ($\text{SiO}_2 = 66.76-70.32$ wt.%), Type B corresponds to Shikine andesitic lava ($\text{SiO}_2 = 56.28$ wt.%), Type C is made of Iwato tephra formation ($\text{SiO}_2 = 57.88-70.98$ wt.%) and the most acidic Type D contains Iwato tephra formation, Shimizu rhyolitic lava, Otsuka pumice fall deposit, Fukaminato tephra formation and Kenashino tephra formation, Osumi pumice fall deposit and Ito pyroclastic flow deposit ($\text{SiO}_2 = 72.52-77.67$ wt.%).

Two types of magmas (Type A and Type B) had been active for the period of 100-60ka. Magmas representing a wide compositional variation occurred at 60ka (type C and D: $\text{SiO}_2 = 58-78$ wt. %). This corresponds to Iwato tephra formation. It contains scoria, banded pumice, and white pumice. These compositions make a straight line in Harker diagrams with mafic end member of scoria and felsic end member made by white pumice. The occurrence of banded pumice containing both end members suggests magma mixing event at 60ka. However, after 60 ka, only felsic end member (Type D) has been active until the Aira pyroclastic eruption. This implies that magma composition similar to that of Aira pyroclastic materials appeared as early as 60 ka, and existed in magma reservoir until 20 ka.