

SVC062-P10

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Southeastern Part of Adataro Volcano; Evolutionary Processes of the Co-existed Tholeiitic and Calc-alkaline Magma Series

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Development history of Adataro volcano is divided into 3 stages; stage 1 of 0.55-0.44 Ma, stage 2 of around 0.35 Ma, and stage 3 of less than 0.25 Ma (Fujinawa et al, 2001). In stages 1 and 3, only calc-alkaline magma erupted. In stage 2, both the tholeiitic and calc-alkaline magma erupted to form southeastern part of the volcanic edifice. Geological and stratigraphical reexamination revealed 22 tholeiitic and 19 calc-alkaline eruptives in the studied area. Major element chemical compositions for 113 samples were analyzed using XRF and 12 samples were selected to analyze rare earth elements (REE) with ICP.

At Mt. Maegatake located at the center of the studied area, nine successively deposited eruptives are recognized. It consists of both flow and fall units of the tholeiitic magma without intercalating soil or loess between the units. The evolutionary process for these tholeiitic units is investigated on the bases of those whole-rock chemistry and modal compositions. The REE pattern for these sample show very good parallelism, implying qualitatively a fractional crystallization as the main evolutionary process. However, whole-rock SiO₂ content dose not increase monotonously forward the upper eruptives. It suggests intermittent supply of the basaltic magma to the evolving chamber.

The calc-alkaline series eruptives characteristically heterogeneous lithofacies both at outcrop and hand specimen levels. This implies a magma mixing as effective evolutionary process for the examined calc-alkaline magma system. The mafic endmember might be represented by mafic inclusion or autolith contained in several calc-alkaline lavas. The inclusions show their SiO₂ contents >5wt% lower than those for their host lavas. An addition-subtraction calculation indicates that the calc-alkaline magma series was generated by mixing of mafic end-member and the felsic end-member magmas. A major element least-squares calculation shows that, mafic end-member magma cannot cause felsic end-member magma by the fractional crystallization.

Keywords: tholeiite, calc-alkali, fractional crystallization, magma mixing