

A preliminary report on exotic hornblende tephtras in Hakone region

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Hakone Volcano is an active volcano located on the central part of Japan. Recent studies based on geological survey and isotope dating reveal the complex history of the volcano in detail. Tephrochronology of the volcano is well-established based on studies in Oiso hills, more than ten kilometers west of the volcano. However, since the tephtras found in the volcanic edifice is so fragmentary that correlation based on tephtra is still problematic in ability and accuracy. This problem inhibits to determine ages of some important deposits including caldera fills, which indicates the age of subsidence.

We are focusing on hornblend bearing tephtras as key tephtras, since they are rare in this region (13 events in this 300ka) and hornblend phenocrysts have wide varieties of composition and refractive indice. Here we report preliminary results of refractive index (RI) and chemical composition analyses.

RI of hornblend phenocrysts are analyzed using RIMS86 installed at Hot Springs Research Institute of Kanagawa Prefecture. The hornblend RIs ranges 1.662 to 1.692 for the thirteen tephtras. The modal RIs differs among the tephtras; 1.670 (Go1, Kg), 1.675 (TAm-6), 1.680(TAI-1, TCu-4) and 1.685 (TB-3, TB-5). For some tephtras, the shapes of RI frequency distribution of tephtras are characteristic. Thus the tephtra can be identified from the RI frequency distribution using statistic technique such as the Kolmogorov-Smirnov (K-S) test.

Chemical compositions of hornblend phenocrysts are analyzed using JXA-8900 microprobe analyzer installed at Hot Springs Research Institute. The hornblend conditions can be identical on the plot of Ti vs Si. On the plot, several trends are recognized and each tephtras can be distinguished; low-Ti (TB-9, TAI-1), mid-Ti (TCu-4, TB-5), high-Ti (Kg, KIP-16) and mixture of mid and high Ti (TB-2). Most tephtras shows wide variation in Si content, however, a few tephtras shows very restricted Si content (KIP-16, KIP-4).

At present, we consider that the hornblend tephtras can be identified using both of RI and chemical composition. However, more data is needed since hornblend can have broad range of RI and chemical composition even in a single event.

In the presentation, we will show some example of application to the unknown hornblend bearing tephtras found in the caldera and on the slope of the edifice.