

An attempt of correlation between tephtras and lavas occurred during an eruptive event using refractive indices of phenocrysts

Masayuki Oishi[1]; Takehiko Suzuki[1]

[1] Dept. of Geography, Tokyo Metropolitan Univ.

In tephrochronological study using tephtras as time markers, it is required that characteristic properties are precisely determined. Correlation of tephtras is mainly performed on the basis of the distribution pattern, mineral composition, refractive index of volcanic glass and heavy mineral, component of major elements and trace elements of volcanic glass shards, and so on. While, when the tephtras are used as a tool for the reconstruction of the history of volcanic activity, stratigraphic relations of tephtras at distal area with lavas and pyroclastic flow deposits distributed on the proximal area of the craters are clarified. However, there are few studies for correlation of lavas and tephtras because it is difficult to measure the refractive indices of volcanic glass in lavas.

The authors attempt to correlate between tephtras and lavas using the lithological and petrographical characteristics of orthopyroxene and hornblende. In this presentation, the results of correlation using the refractive indices of orthopyroxene and hornblende are shown.

First, we compared refractive indices of orthopyroxene and hornblende contained in the essential ejecta of pumice with those collected from lava simultaneously effused. The samples prepared for the comparison are as follows: As-A plinian fall deposits and Onioshidashi lava produced by the eruption of Asama Volcano in 1783 A.D., Kawagodaira plinian fall and flow deposits and Kawagodaira lava produced by the eruption of Izu-Tobu Volcano Group at about 3 ka, and Hr-FP pyroclastic fall deposit and Futatsudake lava by the eruption of Haruna Volcano in the middle of the 6th century. Results of measuring the refractive indices of orthopyroxene and hornblende contained in these samples show that the indices of orthopyroxene and hornblende in pumice grains and lavas simultaneously produced are very similar.

Next, we attempt the correlation between Yatsugatake Younger Tephra Beds (Oishi and Suzuki, 2004) and lavas distributed on the summit area of the Yatsugatake Volcanic Chain, central Japan to reveal the source craters of these tephtras. Refractive indices of orthopyroxene collected from lavas around Tengudake Volcano which have produced many ejecta range about 1.695-1.706, while those of lavas from monogenetic lava domes, Nakayama, Maruyama, Maruyama Kitamine, and Chausuyama, range about 1.700-1.710. The sources of Yatsugatake Younger Tephra Beds, except for Yt-Pm4, most likely to be around the Tengudake Volcano, because indices of orthopyroxene collected from these tephtras are about 1.696-1.705.