

Mafic minerals compositions as a useful tool for the identification of source volcano of weathered fallout deposits - a case study of the middle Pleistocene tephra beds in central Japan -

Yoshihiro Takeshita

Shinshu University, Japan

E-mail: takey@shinshu-u.ac.jp

The middle Pleistocene in the Chubu-Kanto district, central Japan; such as the Matsumoto, Ina basins, the Boso peninsula and so on, intercalate numerous fallout tephra beds. And a lot of Quaternary volcanoes are situated at the Chubu mountain range, central Japan. But it was difficult to identify source volcano of the middle Pleistocene tephra beds in the Chubu-Kanto district except a part of those tephra beds for their weathering and successive limitation. Therefore, this study try to identify their source volcano based on chemical compositions of mafic minerals as follow as hornblende and pyroxenes. Because of these minerals commonly occur in the Japanese middle Pleistocene tephra beds and are more strongly for weathering than volcanic glass in terrestrial deposits.

The middle Pleistocene tephra beds in the Chubu-Kanto district are described about their lithofacies and mafic mineral assemblage and analyzed chemical compositions of their mafic minerals. Chemical analyses for the mafic minerals from these tephra beds reveal that the hornblende and orthopyroxene compositions are distinguished depending to their source vents, i.e., the Older Ontake volcano (0.78-0.39Ma), Kurofuji volcano (1.00-0.50Ma), Tateyama volcano (0.22Ma-present), Suiendani source vent (0.40-0.33Ma) and so on. The activity of the Older Ontake volcano was divided into Tephra Stage (0.78-0.64Ma) and the Lava Stage (0.64-0.39 Ma) based on the mode of eruption. The tephra Stage is further subdivided into the three substrates namely H (around 0.78Ma), PH (0.78-0.70Ma), OP Substage (0.70-0.64Ma) on the basis of the assemblage of dominant mafic minerals in the air fall tephra. Age of each Stage and Substage were inferred from the stratigraphic relations with numerous dated lavas. Each Stages and Substages is distinguishable based on not only the mafic mineral assemblage but also the chemical compositions of hornblende phenocrysts in fallout tephra beds and lava flows. Conclusively, it was confirmed that the chemical compositions of these minerals, especially hornblende can be a useful criteria for identification of source volcano of the middle Pleistocene tephra beds, even in the highly weathered samples.