Identification of Ks5 tephra and similar tephras based on trace element composition of volcanic glass shards

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Some vitric ash tephras of the middle Pleistocene are similar in major element composition of glass shards and difficult to discriminate. In this study, we examined indices to distinguish them using the trace element composition of volcanic glass shards.

Nanayama and Nakazato(2018) focused the BT72 tephra which horizon was above MIS11 and the Ks5 tephra which horizon was under MIS11. Then they correlated these tephras and pyroclastic flow sediments in southern Kyushu. As a result, they found differences in the trace element composition of glasses of BT72, Wakimoto and Ks5, and showed that tephras similar to Ks5 were intercalated in three horizons.

In this study, we added the analysis of K1-175 and K1-223 tephras of the Higashinada core (Yoshikawa et al., 2000) which were the Ks5-like tephra, and the significance (5% level) of the difference in analysis mean values of trace components was analyzed by Tukey-Kramer test (Maruyama et al., 2017) and reconsidered the correlation of these tephras. LA-ICP-MS of volcanic glass shards was quantitated for 34 elements from Sc to U by the procedure of Furusawa et al. (2018) and investigated 32 elements except Cr and Ni with large variations. The ratio of the number of elements with no significant difference between BT72 and Wakimoto for Ks5 is 53%. And that of Wakimoto about BT 72 is 56%. Such an examination is considered to be an identification index of these tephras. On the other hand, the combinations of which the ratio of the number of elements with no significant difference is 75% or more are Hegawa pfd, Ogoyama tephra, and K1-223 for Ks5, Oda pfd for Wakimoto, K1-175 for BT72. These tephras are considered to show high similarity.

Since K1-223 is intercalated to low sea level horizon between marine clays of the Osaka Group, correlation with Wakimoto is predicted, but here it is correlated with Ks5. It is necessary to accumulate these analysis data in the future and to study the source pyroclastic flow deposit of BT72.
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