

Holocene Marker Tephtras in the Coastal Lowlands of Kunashiri Island, Southern Kuril Islands

Yugo Nakamura[1]; Yuichi Nishimura[2]; Mitsuhiro Nakagawa[3]; Viktor M. Kaistrenko[4]; Alexander Ya. Iliev[4]

[1] ISV, Hokkaido Univ.; [2] Inst. Seismology and Volcanology, Hokkaido Univ.; [3] Natural History Sci., Hokkaido Univ.; [4] Russian Academy of Sciences Far Eastern Branch

A geological study of tephrostratigraphy and tsunami deposits was conducted in Kunashiri and Shikotan Islands, southern Kuril Islands, in May and November, 2007, in collaboration between Japanese and Russian researchers. The study areas are coastal lowlands on the central and southern parts of Kunashiri Island and the southern part of Shikotan Island. Some peat bogs were excavated to reveal stratigraphic profiles of tephtras and tsunami deposits and 58 tephtra samples were obtained. Tephtra layers were correlated on the basis of petrographic properties such as refractive indices, chemical compositions, particle sizes, etc. Refractive indices of tephtra glass were determined using the thermal immersion method, the Refractive Index Measuring System (RIMS86, the product of Kyoto Fission-Track Co.). For accurate analyses, the tephtra glass shards were dehydrated using the 400 degree-C 12-hour annealing procedure before refractive index measurements. Major element compositions of tephtra glass were determined using the energy dispersive X-ray spectrometer (EDS, JSM-5310, JEOL).

Five Holocene widespread tephtras from volcanoes in Hokkaido Island, i.e. Tarumae-a tephtra (Ta-a, AD1739), Komagatake-c2 tephtra (Ko-c2, AD1694), Mashu-b tephtra (Ma-b, 774-976 cal BP), Tarumae-c tephtra (Ta-c, 2500-2800 cal BP), and Mashu-d1 tephtra (Ma-d1, 3267-3368 cal BP) were identified on the basis of the refractive indices and major elements of tephtra glass. Ko-c2 and Ta-c were identified at many localities and were the most distinguishable ash fall deposits in these islands.

In addition, more than 12 tephtra layers were described and presumed to be the products of volcanoes in Kunashiri Island. Many of them contain glass shards showing relatively low refractive index ($n=1.480-1.490$) and high SiO_2 content (77-79%) in comparison with the widespread tephtras from Hokkaido Island. Tephtras with such characteristics have not been found in Hokkaido Island yet. These Kunashiri tephtras were classified into six types according to TiO_2 - K_2O contents of glass shards. However, four of these types have some characteristics in common. Thus, these tephtras were presumably supplied from at least three volcanoes in Kunashiri Island.

Marker tephtras reported here were identified in coastal lowlands and are valuable for correlating tsunami deposits. In particular, chronology of tsunami layers between the 17th century and 3000 yr BP can be arranged accurately in Kunashiri and Shikotan Islands as well as in Hokkaido Island.