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火山噴出物中に含まれる非マグマ性物質の物質科学的特徴：北海道十勝岳火山の例
Mineralogical study of non-juvenile material in volcanic products at Tokachidake volcano, Japan

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Temperatures, depths, and fluid chemistry of sub-volcanic hydrothermal system were estimated based on mineralogical analysis of eruptive products of the 1926 and the 4.7-3.3ka eruptions at Tokachidake volcano, Japan. The deposit of the 1926 eruption can be divided into three layers according to volcanic phenomena; the lower debris avalanche deposit, the middle hydrothermal surge deposit and the upper debris avalanche deposit. The deposits of the 4.7-3.3 ka eruption can be divided into four pyroclastic flow deposits layers; one from the 4.7 ka eruption and other three from the 3.3 ka eruption. Every deposit contains abundant hydrothermally-altered lithic fragments. Three layers of the 1926 eruption exclusively consist of altered lithic fragments without any juvenile fragments. Minerals identified in the bulk sample of the 1926 eruption deposit are cristobalite, smectite, sericite, kaolinite, alunite, gypsum and pyrite, and those in the deposits of the 4.7-3.3ka eruptions are cristbalite, tridymite, quartz, sericite, pyrophyllite, alunite, plagioclase and hyperthene. Mineral assemblages of individual fragments were also determined with combination of SEM-EDS and XRD. The 1926 eruption product is characterized by the coexistence of cristobalite, alunite and/or smectite in the fragments, whereas the 4.7-3.3 ka eruption product is characterized by the coexistence of pyrophyllite and quartz. The mineralogical contrast implies difference in hydrothermal condition between the 4.7-3.3 ka and the 1926 eruptions. The former eruptions were derived from hotter (>230 C) and deep (1-2 km) hydrothermal systems and the latter from a colder (<100 C) and shallow (near-surface) hydrothermal system, although both volcanic products are characterized by sulfuric acid fluid which is typical in hydrothermal systems at volcanic centres.

キーワード: 火山熱水系, 熱水変質岩片, 十勝岳火山, 1926 年噴火噴出物, 4700―3300 年前噴火火砕流堆積物
Keywords: sub-volcanic hydrothermal system, hydrothermally-altered lithic fragment, Tokachidake volcano, eruption products in 1926, pyoroclastic flow deposits in 4.7-3.3 ka