

北海道奥尻島, 勝瀨山火山から噴出した
ガラス質流紋岩溶岩の産状と水和

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Mode of Occurrence and Hydration of Glassy Rhyolite Lava from Katsuma-Yama Volcano,
Okushiri Island, Hokkaido, Northern Japan

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Katsuma-Yama volcano is located on the Okushiri Island 15 km west of Oshima Peninsula, southwest Hokkaido. Effused from the Katsuma-Yama crater of the volcano at about 20 ka or a little bit older time, Katsuma-Yama rhyolite lava entered the Horonai-Gawa caldera lake and intruded into the lake deposits. The rhyolite lava is almost entirely glassy but hydrated to form perlitic rocks with a water content up to 2~3 wt.%. Relatively fresh, dark and dense part of the lava remains in the inner part of the source area and is replaced with a light grey glassy rock mainly along the flow layers or flow-parallel minor fractures. Dark dense glass locally fills fractures of a light grey glassy part, and curvilinear cracks are developed normal to the columnar joints and further normal to the resulting cracks. In addition to these thermal contraction cracks, more curved and more closely spaced cracks are developed in light grey rocks, likely produced by volumetric change with glass hydration. Thermal contraction cracks were presumably developed in the relatively fresh part immediately below the glass transition temperature with a rapid volume change. Hydration likely proceeded with water-permeation through the cooling cracks and cracking proceeded further with volume expansion of hydrated domains. The glass transition temperature is estimated empirically to be about 700°C with a minimum water-content, 0.3 wt.% in a relatively fresh dark glassy rock. Hydration is likely to have almost ceased at about 400°C as the rate of water diffusion becomes too small to across crack-to-crack distance before the lava entirely cooled below 400°C.

Key words: Katsuma-Yama volcano, glassy rhyolite, perlitic, hydration, perlitic crack

1. はじめに

パーライトまたは真珠岩は、真珠状割れ目で特徴付けられるガラス質流紋岩である。パーライトの成因については、これまでに1) 常温での断続的な水和と膨張、破断 (Ross and Smith, 1955; Friedman and Smith, 1958; Friedman *et al.*, 1966), 2) 高温ガラスの冷却収縮・破断と水和 (Marshall, 1961; Davis and McPhie, 1996) の二つの説が提示されている。いずれの説も、ガラスが二次的に水和し

たとする点では一致しているが、ガラスの水和と破断の過程については両者で異なる。最近では、水冷火山岩にパーライトを特徴付ける真珠状割れ目が認められる多数の事例 (Cas and Wright, 1987; Yamagishi and Goto, 1992; Kano *et al.*, 1994; Davis and McPhie, 1996; Tuffen and Castro, 2008) が報告されており、2) の説を採るのが一般的である。北海道奥尻島の勝瀨山火山のガラス質流紋岩 (勝瀨山溶岩) も、勝瀨山火山口から噴出して幌内カルデラ

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