

## The dacite to basalt zoned Nantai-Ogawa Tephra of Nantai volcano (Part I): componentry and whole-rock compositions

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Nantai volcano, located on the volcanic front of NE Japan, has been characterized by intermittent explosive behavior since its birth, and the numerous tephra were dispersed toward the east (Yamasaki, 1957; Akutsu, 1979; Muramoto, 1992; Suzuki et al., 1994). The Nantai-Ogawa tephra (Nt-Og) is the oldest plinian-fall deposit of the volcano (Muramoto, 1992), and is chemically zoned from dacite at its base through andesite towards basalt at the top of the deposit. Componentry and major and trace element data on 37 juvenile pyroclasts and their petrography have been used to obtain detailed information about processes taking place in the conduit and the crustal magma chamber associated with explosive volcanism. Petrological examinations revealed that a variety of juvenile pyroclasts was ejected during the eruption. Amphibole-bearing, highly vesicular dacitic pumice (AmPm: 61.8-63.7 wt.% SiO<sub>2</sub>) is a minor component of this eruption and expelled during the initial eruption phase. This suggests that water-rich dacitic magma have accumulated beneath the pre-eruptive chamber roof just before the Nt-Os eruption. Phenocryst-poor, highly to moderately vesicular gray scoria (GrSc: 51.6-62.7 wt.% SiO<sub>2</sub>) is the dominant type of pyroclast expelled during the early eruption phase. In contrast, euhedral-phenocryst-rich, moderately to poorly vesicular black scoria (BlSc: 46.7-51.7 wt.% SiO<sub>2</sub>) with characteristic cauliflower-like surface was the dominant type of pyroclast expelled during the later eruption phase. Partially melted granitic xenolith and their crystal fragments are observed in the juvenile pyroclasts, suggesting that assimilation of the granitic rocks played major role in the compositional variation of the juvenile pyroclasts. Trends of major and trace elements are consistent with crystal-liquid-fractionation of the observed phenocryst assemblages and minor crustal assimilation processes, and rule out syn-eruptive mixing processes between the compositionally diverse magmas. The vesiculation of the H<sub>2</sub>O-rich AmPm magma beneath the chamber roof may have triggered the Nt-Os eruption. In addition, the existence of dense cauliflower-like BlSc suggests that the interaction of the magma with the external water also played important role in the Nt-Og eruption.

Keywords: Nantai volcano, Nantai-Ogawa tephra, Plinian eruption, magma chamber