Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

SVC48-P01 Room:Convention Hall Time:May 19 18:15-19:30

Petrological study of main stratocone eruption products in the western field of Akita-Komagatake volcano

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Akita-Komagatake volacano is located in the Sengan geothermal field of the frontal area in the northeren part of Northeast Japan arc, and consists of amain stratocone, with a caldera in the south, and several parasitic cones at its summit. Development history of this volcano is divided into two stages by caldera collapse event occurred at about 13 ka. This volcano is characterized by predominant low-K thokeiitic magma with minor medium-K calc-alkaline magma. The low-K tholeiitic magma that formed the main stratocone show complex compositional variation trends(ex.Kobatake et al.,2012).

The aim of this study is to reveal the mechanisms which gave rise to the various temporal compositional change of the tholeiitic magmas erupted in this stage, by examining the detailed stratigraphy and petrology for the eruption products of the main stratocone.

Many tongue-shaped flow lobes of fluidal lavas are observed near the foot of the stratocone and stratified lava piles were well observed on the caldera wall at the summit area. On the bases of lithology, petrology and petrography, 24 eruption units were identified, and their stratigraphic relations were also investigated. A dormancy was inferred from a thick secondary deposit intercalated between the lava flows in the middle stratigraphic horizon.

21 of the 24 eruption products were the low-K tholeiitic series, 2 were medium-K calc-alkaline series, and the rest 1 comes just boundary between the two magma series. The tholeiitic series varies from 51 to 61 wt.%silica, and the olivine-bearing basaltic lavas with the primitive compositions of 52 and 50 to 52wt.%silica have been erupted respectively, during middle and upper horizons of the stratigraphy.

Three series of magmatic evolution sequence are definable by cyclic eruption episodes of primitive basalt magmas with subsequent eruptions of evolved magmas.

The earlier 2 sequence show typical tholeiitic trends of iron-enrichment with increasing silica, whereas the variation trend for the last sequence shows a rapid increase K2O relative to the early 2 sequence. The former is probably reconciled with the fractional crystallization from basaltic parents, whereas the latter should be strongly affected either by magma mixing K2O-rich felsic endmenber or assimilation of wall rocks.

Keywords: Akita-Komagatake volcano, tholeiitic magma, bulk-rock geochemistry, pre-caldera volcanism