V157-011 **Room: Ocean B** **Time: May 21 11:45-12:00**

Magma ascent process of Usu 1977 Plinian eruption: Implication from microlite texture

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The complicated processes of magma ascent in the volcanic conduit cause the variation of eruption styles. Recently, lots of modeling and experiment, which imitate the degassing process accompanied by the magma ascent, have been conducted to solve how it is. However, we still haven't understood the degassing process in nature in detail because we can't see it directly. It is necessary to understand magma ascent and degassing processes in order to assess the validity of the modeling and experiment. We investigate the microlite texture of pumice produced by Usu 1977 Plinian eruption to understand the magma ascent processes.

Usu 1977 eruptive activity started at 9:10 AM, August 7th, which was preceded by the earthquake swarms for about 32 hours (Katsui et al., 1978; Yokoyama et al., 1981). 4 Sub-Plinian eruptions characterize eruptive activity of first two days (we call them Big I, II, III, and IV in the order which each episode occurred) (Katsui et al., 1978). Big I, II, and III erupted from south-east side of Ko-Usu lava dome using a same vent, while Big IV erupted from north part of the caldera forming a new vent (Katsui et al., 1978).

Microlites in groundmass of pumice, which produced by explosive eruptions, are crystallized by an effective supercooling caused by an increase in liquidus temperature due to devolatilization of melt (e.g. Hammer and Rutherford, 2002). The vesicle texture of pumice is formed by the vesiculation and degassing just before the magma quenching i.e. fragmentation, while the microlite texture is formed by the devolatilization of melt at deeper point than magma fragmentation level (e.g. Suzuki et al., 2006).

Pumices from Usu 1977 Plinian eruptions are categorized into 3 types; white pumice, bright-gray one, and dark-gray one. They have microlites of plagioclase, Fe-Ti oxide, and clinopyroxene in the groundmass. We focus on the plagioclase microlites for textural analyses because we best know the textural evolution of plagioclase as a function of decompression condition (e.g. Couch et al., 2003). Almost all of the plagioclase microlites are skeletal and have no chemical zoning, and its length is about several um to over 10 um. Their CSDs are almost linear except for white pumice of Big IV, which means that they crystallized in one nucleation event. The crystallinity and crystal number density of them are 6-33 %, $4.35*10^5$-$8.94*10^6$ mm^{-3}, respectively. The crystallinity and crystal number density of whiter pumice are lower than grayer one. They also gradually increase as the eruption proceeds. However, white pumice from Big IV has lowest crystallinity and crystal number density among all white pumices. By the way, it is experimentally revealed that the higher degree of supercooling generated by higher amount and/or rate of decompression leads to the higher nucleation rate (e.g. Couch et al., 2003). We thus conclude that grayer pumice was produced by the magma which experienced higher amount and/or rate of decompression for crystallization, and longer stagnation at a certain level. We also suppose that the magma decompressed larger and/or more rapidly, and stagnated longer as the eruption proceeds. We also propose that new magma may be supplied from the reservoir just before Big IV, leading to formation of a new vent.