[EE] Evening Poster | S (Solid Earth Sciences) | S-VC Volcanology

# [S-VC39]Pre-eruptive magmatic processes: petrologic analyses, experimental simulations and dynamics modeling

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Processes leading to volcanic eruptions are central and yet still enigmatic issues in volcanology. Recent advances in understanding thermo-mechanical and open-system behavior of magma reservoirs and mineral zoning stratigraphy allow us to take a step forward to reveal the complex incubation processes during volcanic dormancy and following magma chamber tapping. This session aims at putting together recent knowledge on magmatic processes including 1) magma chamber evolution through magma reintrusion, crystallization-induced volatile exolution, magma mixing and gas fluxing, 2) externally-driven eruption trigger mechanisms, and 3) conduit processes and controls on eruption styles such as outgassing, dehydration-induced crystallization, fragmentation and rheological transition of ascending magmas. We welcome contributions based on petrological, mineralogical and geochemical analyses of pyroclasts and volcanic gasses, experimental simulations of magma reservoir conditions and conduit flow dynamics, and numerical modeling to integrate the elementary processes.

# [SVC39-P16]STRATIGRAPHY RENEWAL, MAGMA CHAMBER STRATIFICATION, AND CONDUIT PROCESS OF 1815 TAMBORA ERUPTION

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Tambora eruption on April 1815 in Indonesia is one of the most catastrophic eruption in the last historical time in the world. Tambora produced 50km$^3$ DRE of tephra (Sigurdsson and Carey, 1989) and yield a caldera with 6x7 km in diameter size. Detailed stratigraphy was made by combining each stratigraphy from five different locations. Samples were collected on each layer using equal interval method. The interval for each sampling position depend on the thickness of each layer. In this paper, we focus on the relation between scoria rich pyroclastic density current with pyroclastic falls and pumice rich pyroclastic density current, crystallization dynamics, and what mechanism change from plinian eruption into caldera forming eruption. We conducted petrography by optical microscope, chemical analyses by XRF, SEM-EDS, EPMA, and textural analysis of BND.

Five pyroclastic falls were recognized as phreatomagmatic ashfall 1 (PF 1) – pumice fall 1 (PF 2) – phreatomagmatic ashfall 2 (PF 3) – pumice fall 2 (PF 4) – phreatomagmatic ashfall 3 (PF 5) and followed by two generation of pyroclastic density current (pumice rich as PDC 1, and scoria rich as PDC 2). Magma of Tambora 1815 has relatively homogenous composition with a narrow range of $SiO_2$

content (56.5-58.05 %, trachyandesite). Pyroclastic falls are characterized by relatively low crystal population and small average crystal size (0.44 - 0.52 mm) with higher silica content. In contrast, pyroclastic density currents are characterized by relatively higher crystal population and greater average crystal size (0.53 - 0.59 mm) with lower silica content. There is no evidence of magma mixing because no bimodal distribution in anorthite content and no reverse zoning pattern in plagioclase crystals. Large phenocrysts (>1 mm) have less varation than small phenocrysts (<1 mm) in chemistry. Core compositions of large phenocrysts are $An_{70}$-$_{90,}$ while those of small phenocrysts are $An_{40}$-$_{95}$. Sanidine only occurs as small phenocryst with <0.2 mm in size. These facts suggest the stratification of the magma chamber, which caused by differentiation and fractional crystallization process.

Pyroclastic fall products contain relatively larger number of bubbles with smaller size compared with pyroclastic density current products. This fact implys higher decompression rate for pyroclastic fall products and lower decompression rate for generating PDC during caldera formation.