[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-P17]Duration-amplitude distribution of volcanic tremor at Erebus volcano, Antarctica

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Most phenomena in nature show a relationship between their numbers and their sizes and this relationship can be used to identify their source processes. In this respect, we investigated duration-amplitude distribution for 233 tremor episodes during May 2002-December 2003 recorded at Erebus volcano, Antarctica. We computed reduced displacement (D_R) to normalize the data, then generated duration-amplitude plots. A total of 225 tremor episodes fit with an exponential law and eight tremor episodes fit with a power law model. For these eight tremor episodes, power law behavior can be explained in three ways: (a)they were generated by iceberg activity around the volcano, (b)their source processes were not scale bounded, and (c)they were corrupted by noise. Further, we only examined 225 tremor episodes which were following an exponential law. From these tremors, we found three tremor groups : (1)harmonic tremor, (2)broadband tremor, and (3)mixed between harmonic and broadband tremor. In particular, all of the tremor groups showed similar characteristic amplitude value from 0.04-42 cm^2. We presumed that these tremors were generated by fluid-flow oscillations inside the conduit during the magma movement to the surface. Therefore, we performed minimization of the difference between observed and theoretical reduced displacement to obtain tremor source depths and overpressure. Volcanic tremor consists of surface waves, hence we used surface wave expression to derived theoretical D_R. The result showed that tremor depths spread from 334-4892 m with overpressure range from 0.02-7.5 MPa.