

1999 Fall Meeting

11:05h
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Long and Short Term Periodic Activity at Karymsky Volcano

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We propose a model that explains observed temporal patterns of activity in numerous volcanos exhibiting Strombolean explosions. These patterns include major events (explosions), that occur approximately every 10 minutes with subsequent seismic and acoustic activity exhibiting periods of the order of one second, followed by the intervals of complete rest. We explain these two periods by suggesting two distinct mechanisms of accumulating elastic energy: compressibility of the magma in the lower conduit and viscoelastic response of the nearly solid plug at the top. An explosion occurs when the stress in the plug exceeds the critical value. The release mechanism is the stick-slip dynamic phase transition near the walls of the conduit driven by the local shear stress. The intrinsic hysteresis caused by the first order nature of such phase transitions explain the long inactive period of the explosion cycle. Qualitative comparisons with acoustic and seismic activity of Karymsky volcano will be presented.

7280 Volcano seismology (8419)

8414 Eruption mechanisms

8429 Lava rheology and morphology

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