

Insight on monogenetic eruption processes at Pelagatos volcano, Sierra Chichinautzin, Mexico: a combined melt inclusion and physical volcanology study

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The eruptive style and magma evolution of mafic monogenetic volcanoes are thought to be controlled by the rapid ascent of magma over a short period of time. Volatiles in magmas control the ascent velocity, and hence the eruption intensity. Complex feedbacks exist between the rate and extent of volatile exsolution at shallow levels and groundmass crystallization, affecting the magma rheology, extent of fragmentation, and resulting eruptive style. Melt inclusions record the volatile contents and compositions of melts at various stages during its evolution as it ascends providing insights into degassing-crystallization processes at shallow crustal levels. Here we present new data from olivine-hosted melt-inclusions from Pelagatos volcano, Mexico. These, combined with recent textural data allow us to propose a model of eruption for this volcano. Explosive phases at Pelagatos seem to be triggered by influx of deeper (~5 km), less evolved, more volatile-rich magma into a shallow (~1km) reservoir, where older, more evolved magma resides. Smaller new magma influx leads to eruptive products that contain nearly all evolved magma, whereas higher magma influx leads to eruption of a mixture of primitive and evolved magmas.