

The 2013 eruption of Chaparrastique (San Miguel) volcano, El Salvador: Effects of magma storage, mixing, and decompression

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Chaparrastique (San Miguel) is a stratovolcano located in central-eastern El Salvador, ~15 km southwest of the city of San Miguel.

After 12 years of inactivity, Chaparrastique erupted on December 29, 2013, at 10:30 local time (16.30 GMT) prompting the evacuation of more than ~5,000 people. This event was an isolated, single vulcanian-type explosion that lasted 2.5 hours.

The INGV (Istituto Nazionale di Geofisica e Vulcanologia, Italy) organized a task force that worked in close collaboration with volcanologists from MARN (Ministerio de Medio Ambiente y Recursos Naturales, El Salvador) January 2014. A campaign survey was conducted to install a monitoring network on the flanks of the volcano and a suite of twelve eruptive products was collected in correspondence of the seismic monitoring stations.

To understand the Chaparrastique's eruptive process, textural and compositional details preserved in phenocrysts from the sampled products were investigated and integrated with geochemical and isotopic information from bulk rocks. Results indicate that the eruption was triggered by an input of hotter, basaltic magma from depth into a colder, basaltic andesitic reservoir residing at shallow crustal levels. Magma then rapidly decompressed during ascent to the surface. Trace element and isotope data excluded crustal contamination, suggesting magma origin by partial melting of an enriched MORB-like mantle wedge, prevalently metasomatized by slab-derived aqueous fluids.