

Changes in long-term eruption dynamics at Santiaguito, Guatemala: Observations from seismic data

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Santiaguito (Guatemala) is an ideal laboratory for the study of the eruption dynamics of long-lived silicic eruptions. Here we present an overview of seismic observations of ash-and-gas explosions recorded between November 2014 and June 2016 during a multi-disciplinary experiment by the University of Liverpool. The instruments, deployed around the active dome complex between 0.5 to 7 km from the vent, included 5 broadband and 6 short-period seismometers, as well as 5 infrasound sensors. The geophysical data is complemented by thermal images, optical images from a UAV, and geochemical measurements of eruptive products.

Regular, small-to-moderate sized explosions from the El Caliente vent at Santiaguito have been common since at least the early 1970s (Harris et al., 2003; Rose, 1987). However, in 2015, a shift in character took place in terms of the regularity and magnitude of the explosions. Explosions became larger and less regular, and often accompanied by pyroclastic density currents. The larger explosions caused a major morphological change at the vent, as a rubble-filled vent was replaced with a crater of ~150 m depth. This shift in behaviour likely represents a change in the eruptive mechanism in the upper conduit beneath the Caliente vent, possibly triggered by processes at a greater depth in the volcanic system.

This experiment represents a unique opportunity to use multi-disciplinary research to help understand the long-term eruptive dynamics of lava dome eruptions. Our observations may have implications for hazard assessment not only at Santiaguito, but at many other active volcanic systems worldwide.

Harris, A.J.L., Rose, W.I., Flynn, L.P., 2003. Temporal trends in lava dome extrusion at Santiaguito 1922 – 2000. *Bull. Volcanol.* 65, 77–89.

Rose, W.I., 1987. Volcanic activity at Santiaguito Volcano 1976-1984. *Geol. Soc. Am. Spec. Pap.* 212 17–27.