



## **Volcanic ash at Santiaguito dome complex, Guatemala**

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Dome-building volcanoes often suffer episodic explosions. Examination of eruptive activity at Santiaguito dome complex (Guatemala) reveals that gas-and-ash explosions are concordant with rapid inflation/ deflation cycles of the active dome. During these explosions strain is accommodated along marginal faults, where tensional fracture mechanisms and friction dominate, complicating the model of ash generation by bubble rupture in magma. Here, we describe textural features, morphology and petrology of ash collected before, during and after a dome collapse event at Santiaguito dome complex on the 28th November 2012. We use QEM-scan (on more than 35000 grains), laser diffraction granulometry and optical and scanning microscopy to characterise the samples.

The ash samples show a bimodal size distribution and a range of textures, crystal content and morphologies. The ash particles are angular to sub-angular and are relatively dense, so do not appear to comprise of pore walls. Instead the ash is generally blocky (>70%), similar to the products of shear magma failure. The ash samples show minor variation before, during and after dome collapse, specifically having a smaller grain size and a higher fraction of phenocrysts fragments before collapse. Textural analysis shows vestiges of chemically heterogeneous glass (melt) filaments originating from the crystals and crosscut by fragmentation during volcanic ash formation. High-velocity friction can induce melting of dome lavas, producing similar disequilibrium melting textures. This work shows the importance of deformation mechanisms in ash generation at lava domes and during Vulcanian activity.