

Unrest at Nevados de Chillán volcano; high-resolution photogrammetry, tri-stereo imaging, gas geochemistry and eruption forecasting

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From December 2015 to the time of writing (March 2019), Nevados de Chillan, one of Chile's most hazardous volcano, has been in a state of unrest with eruption frequency varying from one per month to several per day. After a two-year long phase of explosive activity, extrusion of a lava dome started in the centre of the newly-formed crater in December 2017. From this point to the time of writing the lava dome has grown at a very slow rate, eventually completely filling the previously formed depression but with continuing concurrent explosive activity. In this contribution we present: (i) gas geochemistry data acquired directly after the first explosion in January 2016, (ii) ultra-high-resolution digital elevation models of the lava dome growth constructed from 2017 to 2019 using structure from motion algorithms and tri-stereo Pleiades-1 satellite imagery, (iii) numerical simulations of the path and extent that pyroclastic density currents generated by a potential dome collapse would follow. We then discuss the information that these three approaches provided during the volcanic crisis.