Cities on Volcanoes 9
November 20-25, 2016
Puerto Varas, Chile
*'Understanding volcanoes and society: the key for risk mitigation'*

# Block and ash flow production at Ruawahia lava dome, New Zealand

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Keywords: lava dome, block and ash flow, collapse, crystal growth, bubble growth

The eruption of large, rhyolitic lava domes is commonly accompanied by the production of block and ash flows, sourced from collapse of part of the dome. Eruption rate, lava dome structure, vent morphology, topography and the properties of the lava (e.g. crystallinity) all contribute to the likelihood of collapse. Here we present the initial findings of high temperature, high pressure experiments to replicate conditions inside a cooling lava dome, as well as unconfined compressive strength tests on a variety of dome samples. We compare these results to detailed field mapping of internal structures of the c.700 year old Ruawahia lava dome (New Zealand) in order to understand the behavior and collapse potential of the dome during its growth and cooling phases. Field mapping has revealed multiple and widespread block and ash flow deposits surround the flanks of the volcano; clasts within these deposits show evidence of post-collapse inflation, similar to lava found on the leading edge of the dome. Collapse textures are also found in the denser core of the dome, where lava was confined by a pyroclastic cone. Micro-crystallinity within the dome varies from fresh glass on the edges to microlite rich rhyolite in the core. Experimental results suggest that the inflated lava outcrops on the dome margins were formed during a prolonged (3-12 hours) collapse event when the dome was still hot and pressurised. The increased porosity suggests the lava is weaker, and prone to further collapse. Micro-crystal growth in lava occurs over a timescale of days, and drastically changes the lava properties. However, more experiments are required to quantify these changes fully, the evolution of which will impact the likelihood of collapse of the dome. A better understanding of the processes which lead to dome failure will help in collapse predictions at growing or cooling domes.