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# Are chilled basaltic magmas more susceptible to earthquake triggering? Evidence from the 2015 Ambrym, Vanuatu, dyke intrusion

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## Abstract

Despite the growing number of observations which indicate a correlation between the occurrence of volcanic eruptions and moderate to large earthquakes, the reason why only some volcanoes seem affected remains an enigma. Here we use synthetic aperture radar data to analyze the deformation associated with a previously unreported 3-m-wide dike intrusion at Ambrym Volcano, Vanuatu, in 2015 which was preceded two days earlier by a Mw 6.4 earthquake. Modelling suggests that the stress change induced in the source region was likely too small to account for the expected overpressure in the dike. To generate a sufficient volume to feed the eruption, decompression models indicate that the magma must be both H<sub>2</sub>O-saturated and cooler than a typical basaltic melt. These observations suggest that fresh basaltic material intruded into shallow magmatic systems may be too hot to generate significant volume increases for low pressure drops implying that partially cooled and crystallized basalts are more susceptible to eruption triggering.

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