

## **The material failure forecast method as a potential eruption forecasting tool: application to the 2012 unrest episode at White Island volcano, New Zealand**

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White Island volcano is one of the most active volcanoes in New Zealand, expressed historically as small-to-medium scale eruptive sequences and quiescent periods with continuous degassing, seismic activity and crater floor deformation. The presence of spectacular active geothermal features (hot springs, fumaroles, crater lake) also makes it one of the most attractive tourist destinations in the country.

After more than 10 years of relatively minor hydrothermal activity, some sustained periods of volcanic tremor started in June 2012 and marked the beginning of a new volcanic unrest episode, including ash eruptions, small scale geysering and a micro dome building episode. This volcanic tremor has been recorded by a continuously operating seismic station situated on the crater rim. The evolution of tremor intensity is monitored using the Real-time Seismic Amplitude Measurement (RSAM) which is often coupled to the surface changes such as the 5 August 2012 eruption and the January 2013 geysering events.

We present results from a test of the material Failure Forecast Method (FFM) in hindsight on the different volcanic tremor episodes using RSAM data and assess how the predicted failure times fit with observations made at the volcano. We then discuss how these results can allow a better understanding of the volcano unrest episode and the relevance of the FFM for future volcano monitoring at White Island.