

Understanding the Utility of Scenarios in Volcano Communication for Aotearoa New Zealand

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Background

A review of volcano communication literature from Aotearoa New Zealand has highlighted that volcano scenarios have been used for many purposes, from planning during quiescence, to communicating unrest (e.g. 2022-3 Taupō unrest), through to decision-making and response during and post-eruption (e.g. 2012 Te Maari eruption).

However, the nature, format, use and very definition of these scenarios varies widely depending on the context and stage of volcanic activity. Given the diversity of scenarios, more work is required to better understand the different types, how they are communicated, and utility for decision-makers.

This project investigates such scenarios, to understand their potential application across different stages of volcanic activity, and contributes to developing a typology of volcanic scenarios.

Methodology

1. Identify New Zealand literature related to volcano scenarios. ✓
2. Separate scenario literature into different stages of volcanic activity, i.e. quiescence, unrest, eruption, directly after an eruption, recovery (Figure 2). ✓
3. Code literature to identify key items used in the scenarios (e.g. likelihoods, Volcano Alert Levels, hazards, risks, impacts, consequences, timelines, decision-making suggestions, etc). ✓
4. Analyse items across stages of activity to check for similarities/differences in use. ✓
5. Test a scenario (Mt Ruapehu, similar to 1995-96 eruptions) in focus groups to understand what types of information and communication is needed by decision-makers and the public across different stages of activity. ✓
6. Align this information with literature review results to provide recommendations for future scenarios and typology development. ✓

Complete ✓ Underway ✓ To do ✓

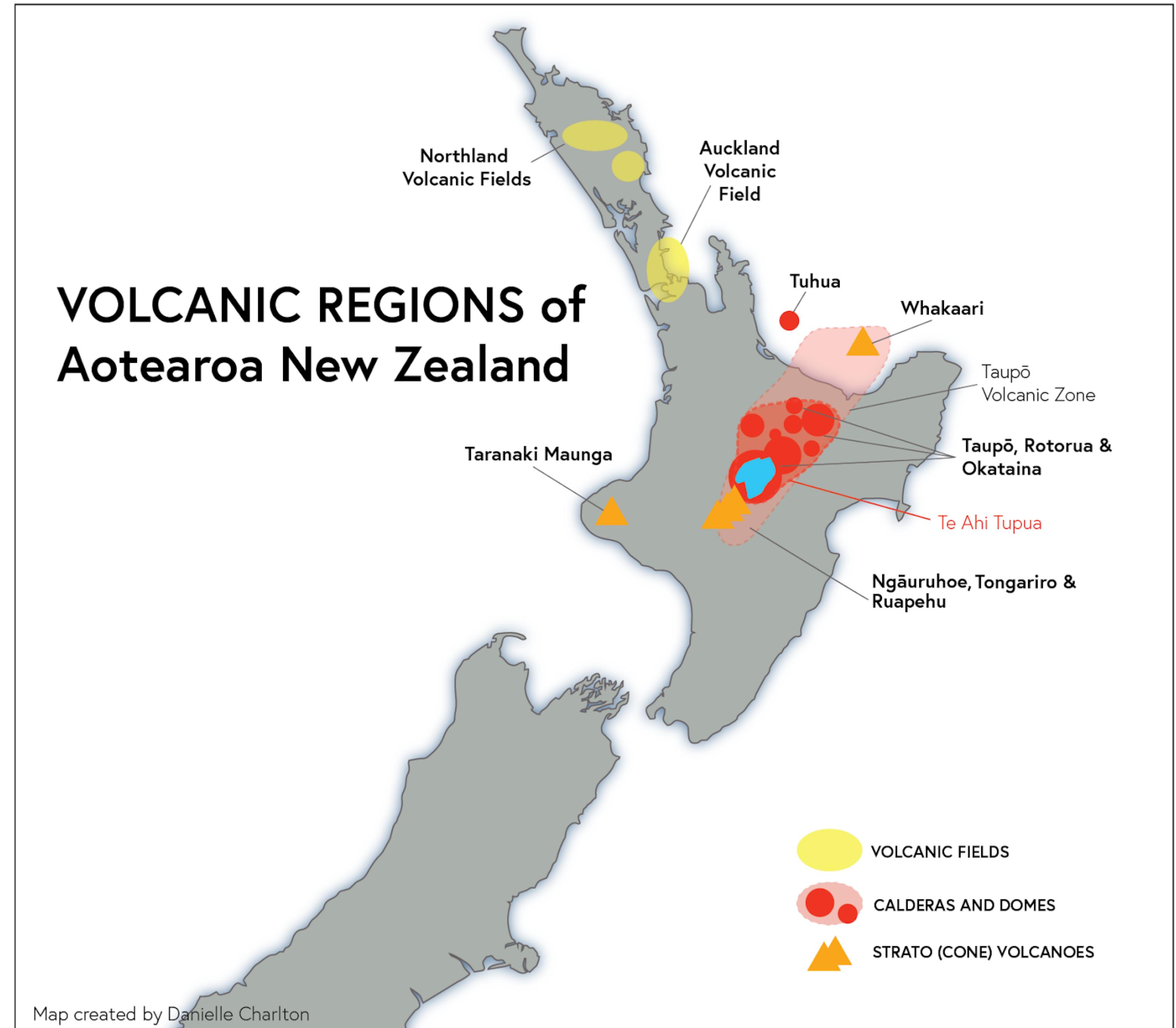


Figure 1. Location of New Zealand's volcanoes and volcanic centres or fields (map excludes Raoul Island, Macauley Island-Brimstone Island and the "Rumble" submarine volcanoes).

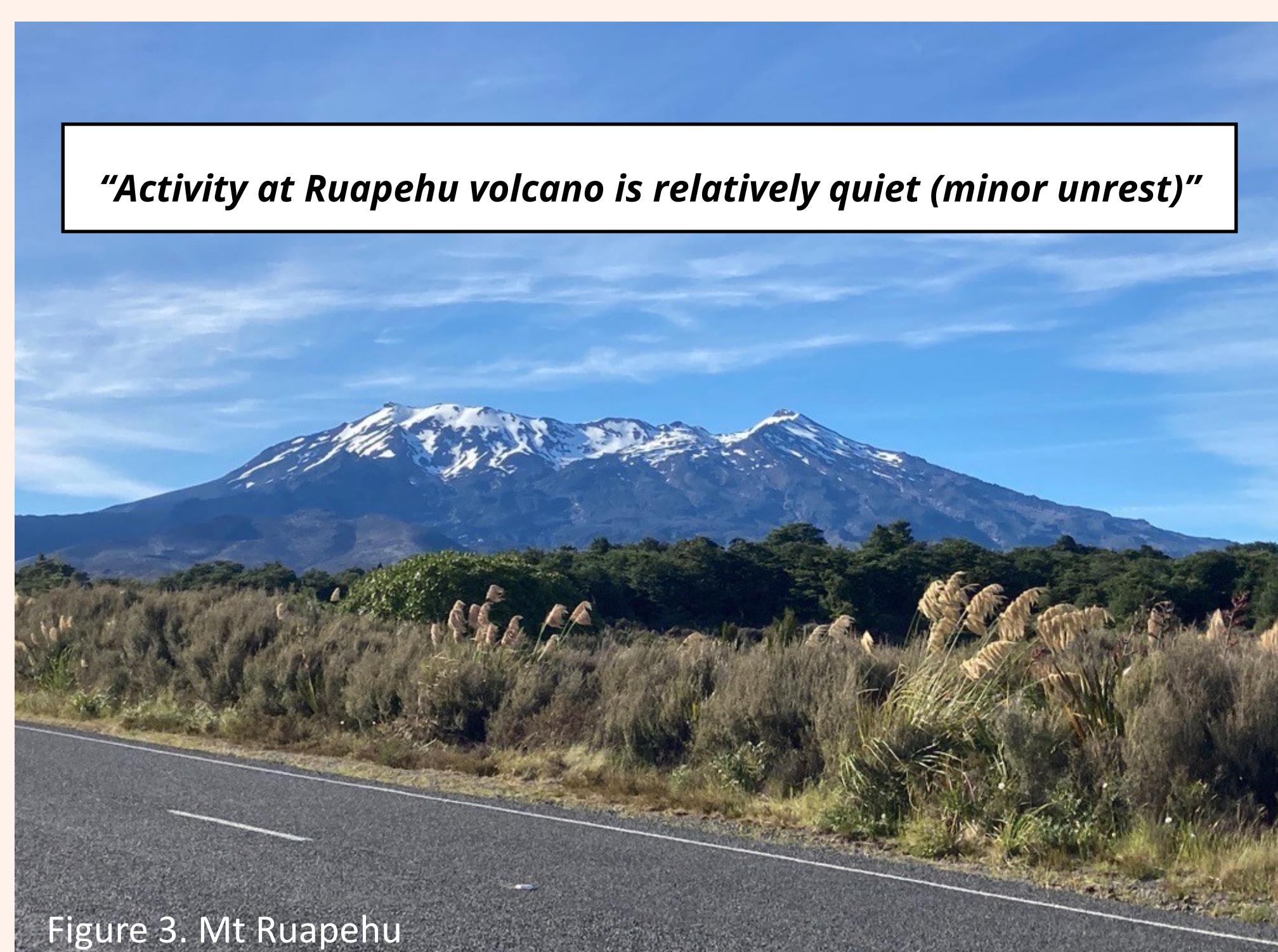


Figure 3. Mt Ruapehu

Preliminary Findings: Literature Review

- Quiescence: Scenarios are future focussed for planning purposes (short and long term), and include hazards, likelihood, extent. Often scenarios are mapped.
- Unrest: Scenarios are future-focussed (shorter term) and include analogies, hazards, likelihood, and supplementary information.
- Eruption: No formal literature, but scenarios trialled after Whakaari 2019 eruption —likelihood of one scenario occurring and risk maps for stakeholders.
- After eruption: Basic scenarios occasionally used for specific issues e.g. modelling/forecasts.
- Recovery: Longer term scenarios used in quiescence phase to understand future recovery.

Volcano event scenarios and stages

Volcanic eruption (unrest, ongoing eruption)

Some eruptions can continue for long time and can be preceded by unrest

Quiescence During event Immediately before During event Directly after Recovery

(1) (2) (3) (4) (5)

Volcanic eruption (sudden short lived)

Some eruptions can only last a short periods of time and occur without unrest

Quiescence During event Directly after Recovery

(1) (2) (3) (4) (5)

Volcanic unrest (no eruption)

Some unrest can continue without eruption

Quiescence During event Directly after Recovery

(1) (2) (3) (4) (5)

Figure 2. Volcano activity stages for different contexts, as applied in the literature review and scenario-based focus groups.

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