The New Zealand Volcano Problem Communications

5th NZ Aviation Meteorology Symposium

Brad Scott

GeoNet

EQC
EARTHQUAKE COMMISSION
Kōmihana Rūwhenua

National Geohazards Monitoring Centre
Te Puna Mōrearea i te Rū

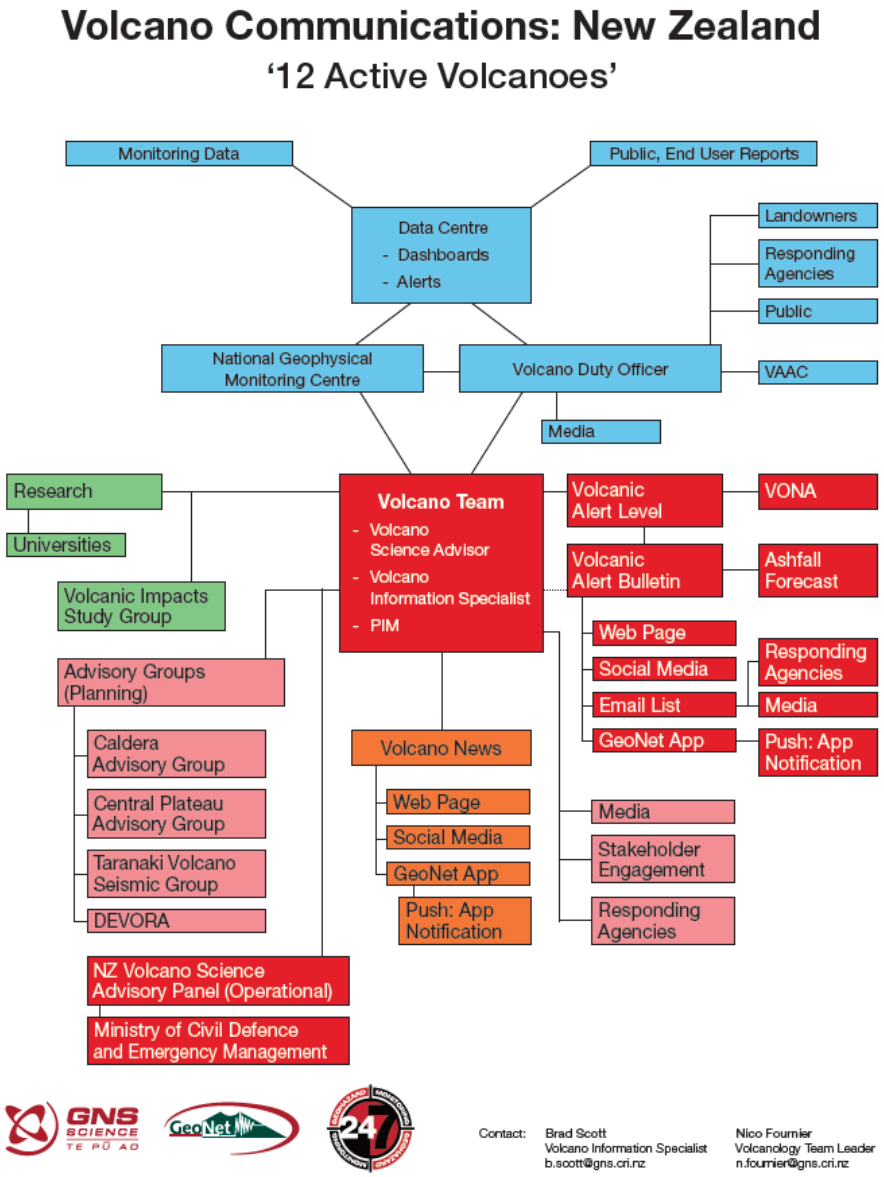
GNS SCIENCE
TE PŪ AO

The Volcano ~~Problem~~ Challenge

Based on 40+ years experience

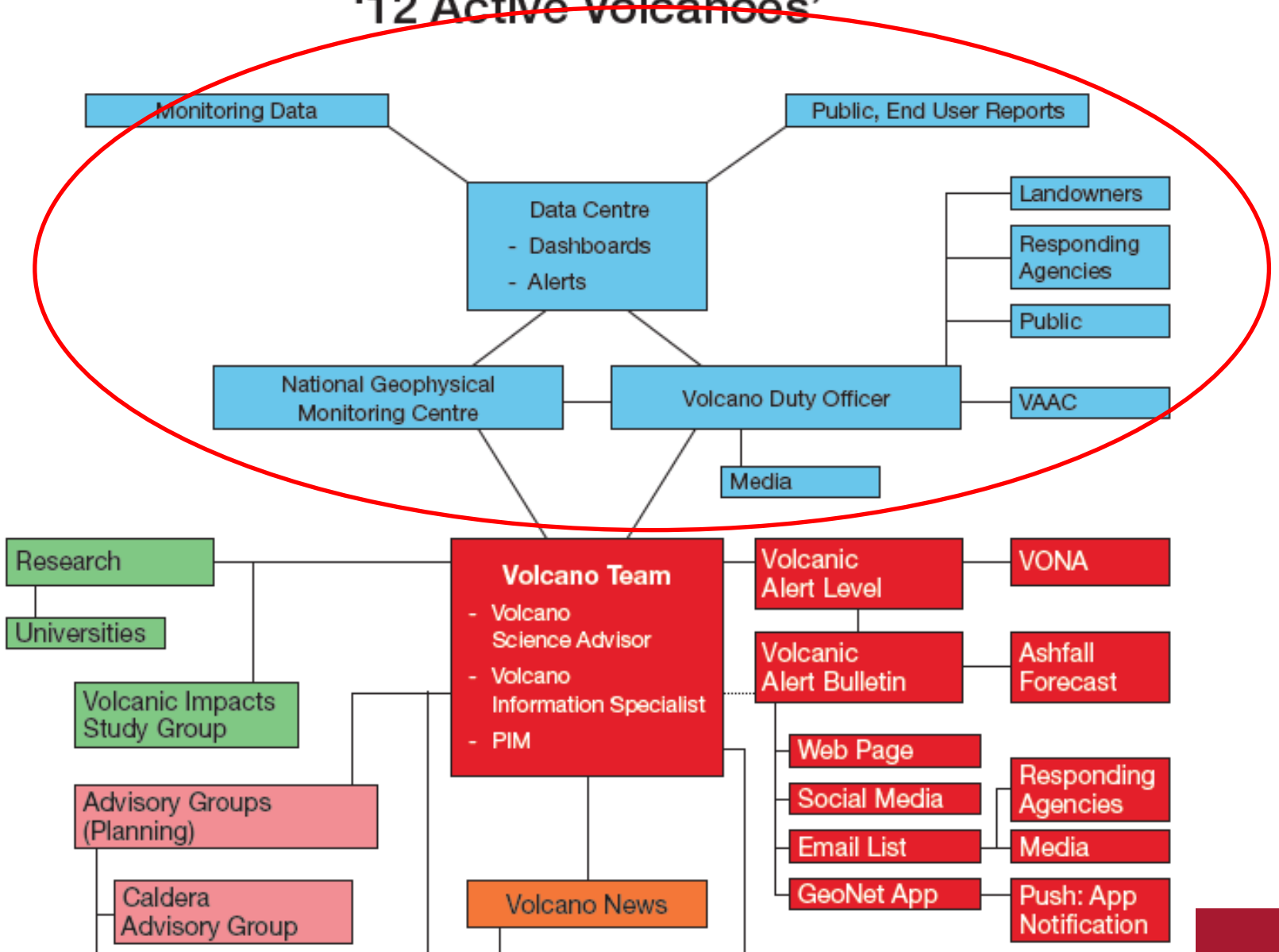
Developed a Communications Framework

- No sustained eruptions in 25 years
  - 8 single event eruptions
    - Whakaari/White Island
    - Ruapehu
    - Te Maari
    - Raoul Island



Volcano Communications: New Zealand

'12 Active Volcanoes'



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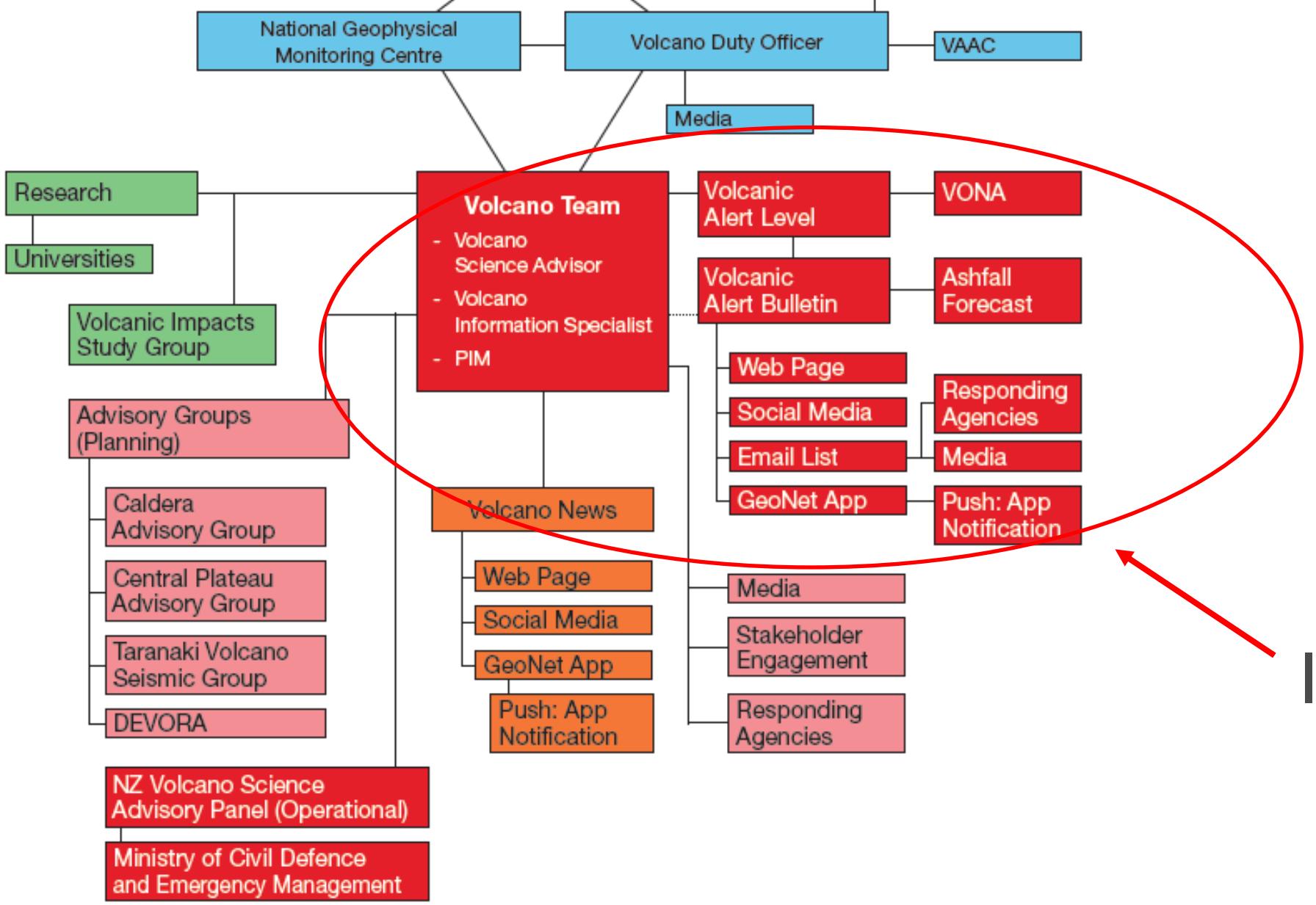

Information out …

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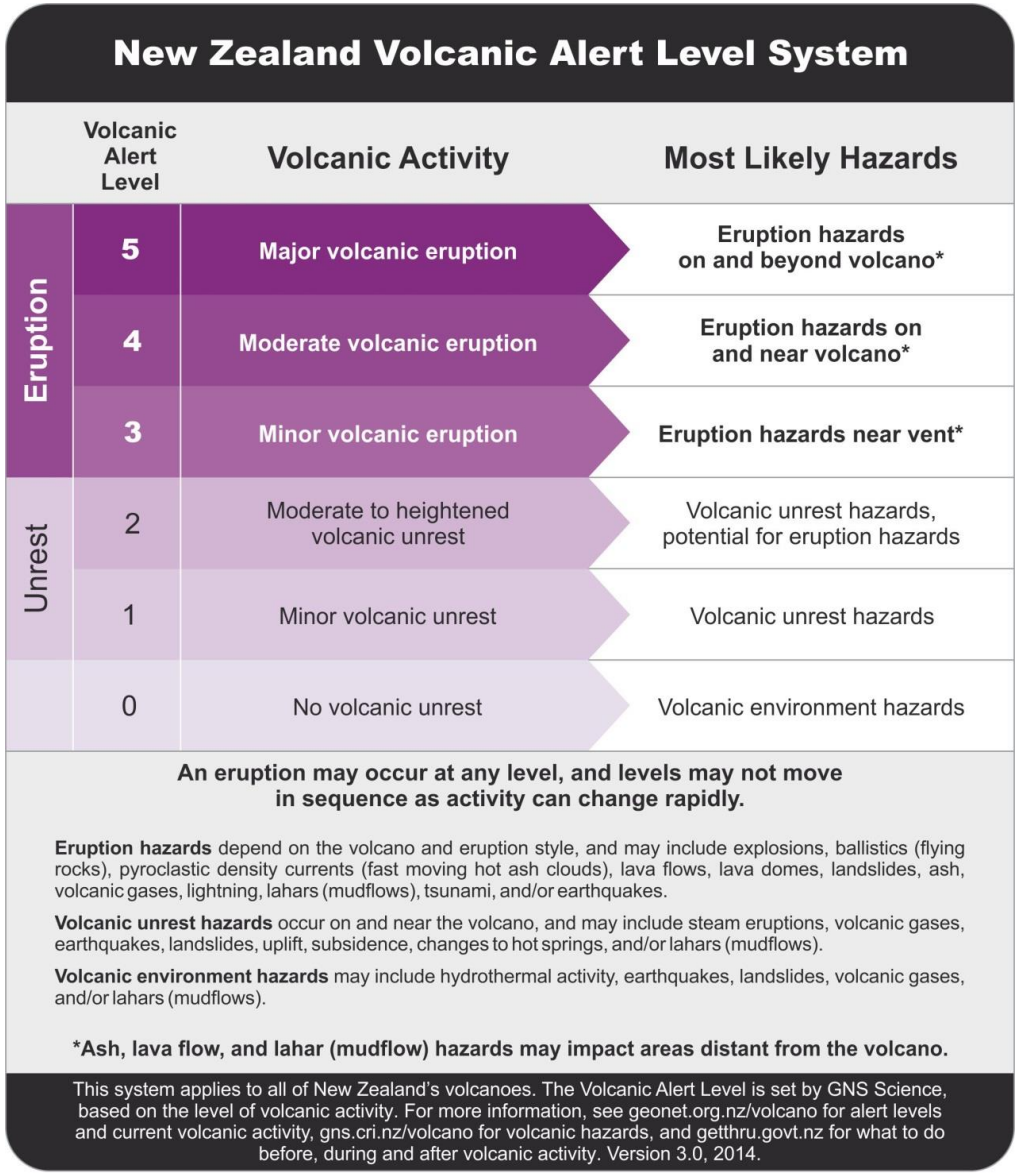
NZ Volcanic Alert Level System (VAL 2014)

- One system for all of NZ's volcanoes
- Based on currently occurring phenomena
- Indicative hazards
- Two levels of unrest
- Simple wording
- Included sources of further information



New Zealand Volcanic Alert Level System

	Volcanic Alert Level	Volcanic Activity	Most Likely Hazards
Eruption	5	Major volcanic eruption	Eruption hazards on and beyond volcano*
Eruption	4	Moderate volcanic eruption	Eruption hazards on and near volcano*
Eruption	3	Minor volcanic eruption	Eruption hazards near vent*
Unrest	2	Moderate to heightened volcanic unrest	Volcanic unrest hazards, potential for eruption hazards
Unrest	1	Minor volcanic unrest	Volcanic unrest hazards
	0	No volcanic unrest	Volcanic environment hazards

An eruption may occur at any level, and levels may not move in sequence as activity can change rapidly.

Eruption hazards depend on the volcano and eruption style, and may include explosions, ballistics (flying rocks), pyroclastic density currents (fast moving hot ash clouds), lava flows, lava domes, landslides, ash, volcanic gases, lightning, lahars (mudflows), tsunami, and/or earthquakes.

Volcanic unrest hazards occur on and near the volcano, and may include steam eruptions, volcanic gases, earthquakes, landslides, uplift, subsidence, changes to hot springs, and/or lahars (mudflows).

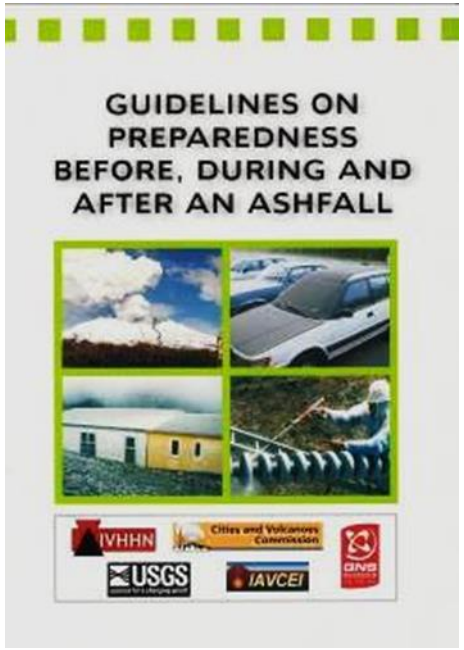
Volcanic environment hazards may include hydrothermal activity, earthquakes, landslides, volcanic gases, and/or lahars (mudflows).

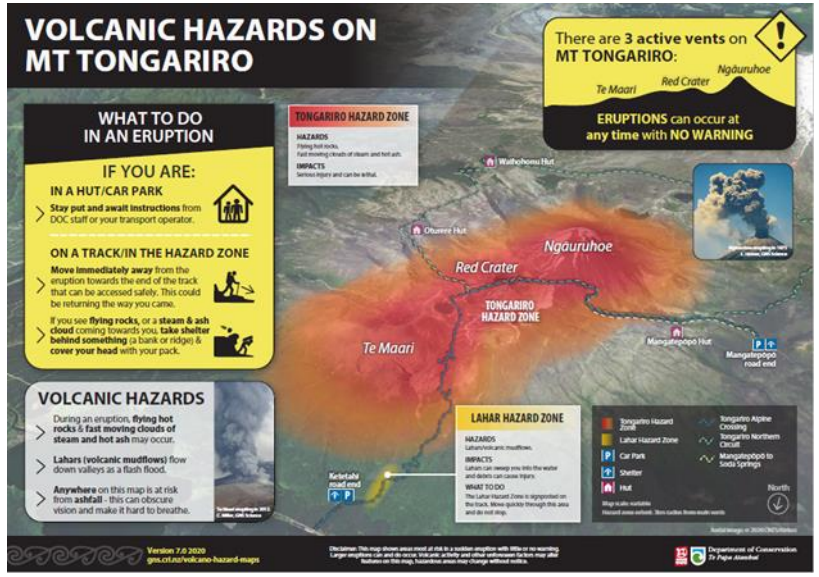
***Ash, lava flow, and lahar (mudflow) hazards may impact areas distant from the volcano.**

This system applies to all of New Zealand's volcanoes. The Volcanic Alert Level is set by GNS Science, based on the level of volcanic activity. For more information, see geonet.org.nz/volcano for alert levels and current volcanic activity, gns.cri.nz/volcano for volcanic hazards, and getthru.govt.nz for what to do before, during and after volcanic activity. Version 3.0, 2014.

Communication products

- An Alert Level system +
- Volcano Alert Bulletins
- VONA
- Ash fall predictions
- Hazard maps, information
- Media releases
- Web Pages
- Social Media

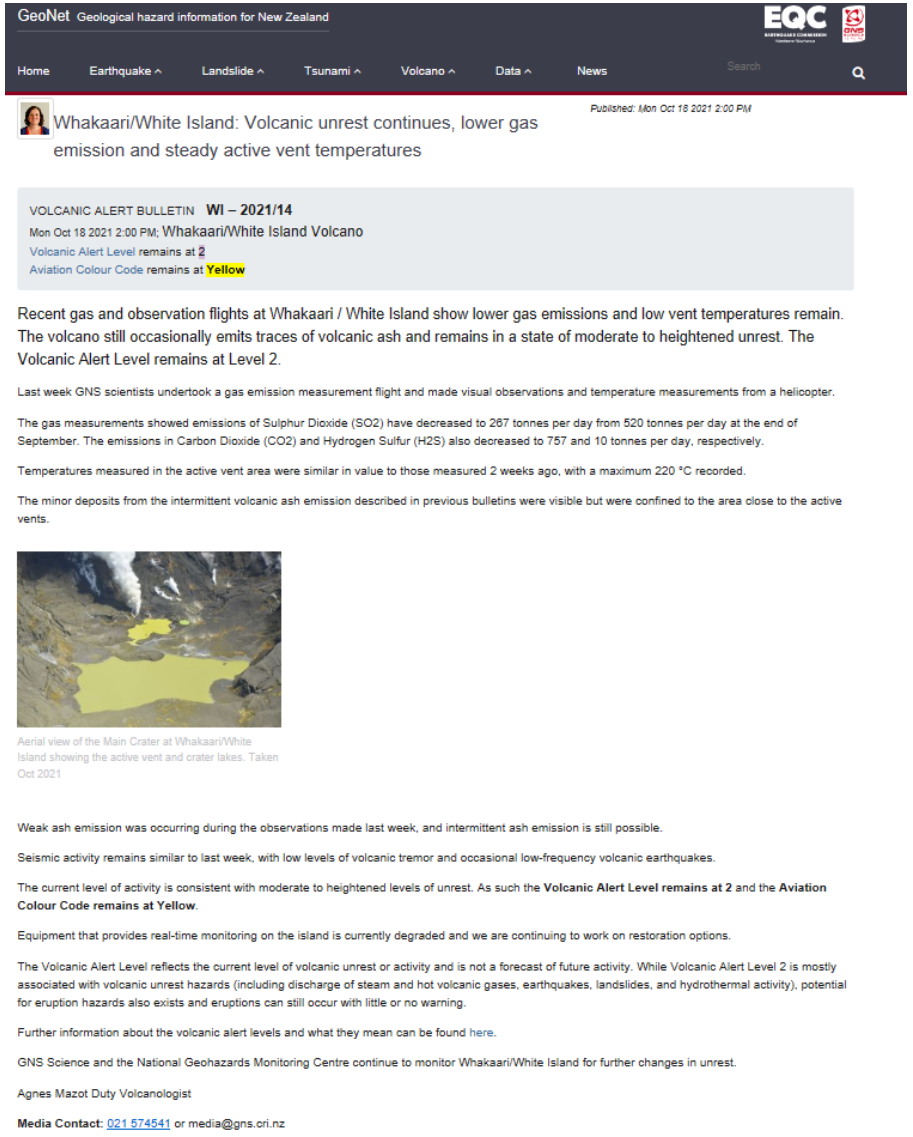




Volcano Alert (Activity) Bulletins

- Issued on an as appropriate basis
- List current VAL and ACC
- Summarise volcano status, recent events
- Indicate if activity is Increasing-Decreasing-Steady
- Contain predictions (if issued)
- Highlight current, developing or expected problems
  - Acid rain
  - Remobilisation

- Distributed by email list (free subscription)
- Published to Web page
- Notified to Twitter, FaceBook,
- GeoNet App notification



GeoNet Geological hazard information for New Zealand

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Published: Mon Oct 18 2021 2:00 PM

Whakaari/White Island: Volcanic unrest continues, lower gas emission and steady active vent temperatures

VOLCANIC ALERT BULLETIN **WI – 2021/14**
Mon Oct 18 2021 2:00 PM; Whakaari/White Island Volcano
Volcanic Alert Level remains at **2**
Aviation Colour Code remains at **Yellow**

Recent gas and observation flights at Whakaari / White Island show lower gas emissions and low vent temperatures remain. The volcano still occasionally emits traces of volcanic ash and remains in a state of moderate to heightened unrest. The Volcanic Alert Level remains at Level 2.

Last week GNS scientists undertook a gas emission measurement flight and made visual observations and temperature measurements from a helicopter.

The gas measurements showed emissions of Sulphur Dioxide (SO2) have decreased to 267 tonnes per day from 520 tonnes per day at the end of September. The emissions in Carbon Dioxide (CO2) and Hydrogen Sulfur (H2S) also decreased to 757 and 10 tonnes per day, respectively.

Temperatures measured in the active vent area were similar in value to those measured 2 weeks ago, with a maximum 220 °C recorded.

The minor deposits from the intermittent volcanic ash emission described in previous bulletins were visible but were confined to the area close to the active vents.

Aerial view of the Main Crater at Whakaari/White Island showing the active vent and crater lakes. Taken Oct 2021

Weak ash emission was occurring during the observations made last week, and intermittent ash emission is still possible.

Seismic activity remains similar to last week, with low levels of volcanic tremor and occasional low-frequency volcanic earthquakes.

The current level of activity is consistent with moderate to heightened levels of unrest. As such the **Volcanic Alert Level remains at 2** and the **Aviation Colour Code remains at Yellow**.

Equipment that provides real-time monitoring on the island is currently degraded and we are continuing to work on restoration options.

The Volcanic Alert Level reflects the current level of volcanic unrest or activity and is not a forecast of future activity. While Volcanic Alert Level 2 is mostly associated with volcanic unrest hazards (including discharge of steam and hot volcanic gases, earthquakes, landslides, and hydrothermal activity), potential for eruption hazards also exists and eruptions can still occur with little or no warning.

Further information about the volcanic alert levels and what they mean can be found here.

GNS Science and the National Geohazards Monitoring Centre continue to monitor Whakaari/White Island for further changes in unrest.

Agnes Mazot Duty Volcanologist

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Volcano Alert Bulletins (VAB)

Ashfall Predictions

(what falls on the ground)

Volcanic Alert Bulletins

Volcano Alert Bulletins (VABs) are New Zealand's official source of volcano status information including the current Volcanic Alert Level (VAL). They are issued on an as needed basis summarising the volcano status and recent events. They can indicate if activity is increasing, decreasing, or in a steady state. They may contain forecasts, highlight developing, or expected problems.
If you'd like to be notified as soon as we issue a new bulletin, our social media channels and the GeoNet app will keep you up-to-date.

Volcano: All ▼ | Keyword | Search | Reset | More filters

Whakaari/White Island: Volcanic unrest continues, lower gas emission and steady active vent temperatures — *3 days ago*

Recent gas and observation flights at Whakaari / White Island show lower gas emissions and low vent temperatures remain. The volcano still occasionally emits traces of volcanic ash and remains in a state of moderate to heightened unrest. The Volcanic Alert Level remains at Level 2.

Mt Ruapehu status update: Crater Lake (Te Wai ā-moe) now cooling — *3 weeks ago*

Another heating phase has passed at Mt Ruapehu. Over the last two months the temperature of Crater Lake (Te Wai ā-moe) rose from 20 °C to 39.5 °C, peaking on 4 September 2021, and has now cooled to 28 °C. The Volcanic Alert Level at Mt Ruapehu remains at Level 1.

Whakaari/White Island: Notable cooling of vent area — *3 weeks ago*

A recent observation flight measured a sharp decline in vent temperatures; however, gas emissions stay high. The volcano is still in a state of moderate to heightened unrest and the Volcanic Alert Level remains at Level 2.

Whakaari/White Island: Intermittent weak ash emissions continue — *Last month*

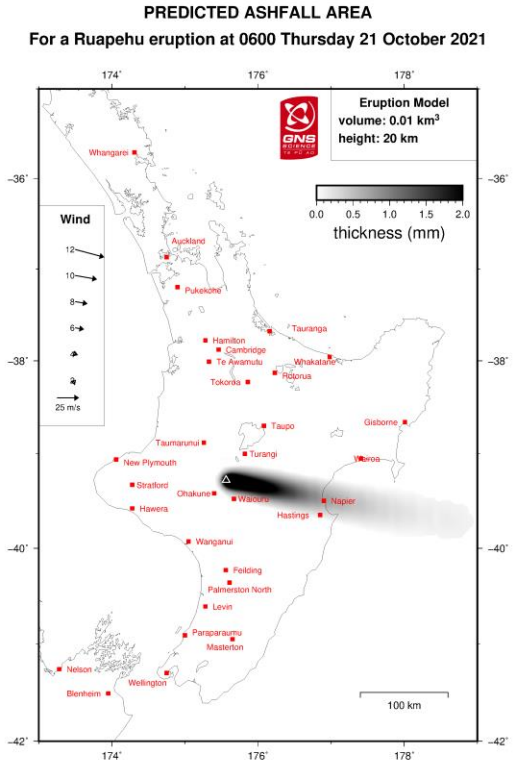
Intermittent ash emissions continued last week, and further occasional emissions are expected to occur in the coming weeks. Small amounts of ash were carried by the vigorous degassing a few hundred metres into the atmosphere near the volcano, and further activity of this type is unlikely to affect the mainland. The volcano remains in a state of moderate to heightened unrest and the Volcanic Alert Level remains at Level 2.

Whakaari/White Island: Ash emissions reduced, night glow continues — *Last month*

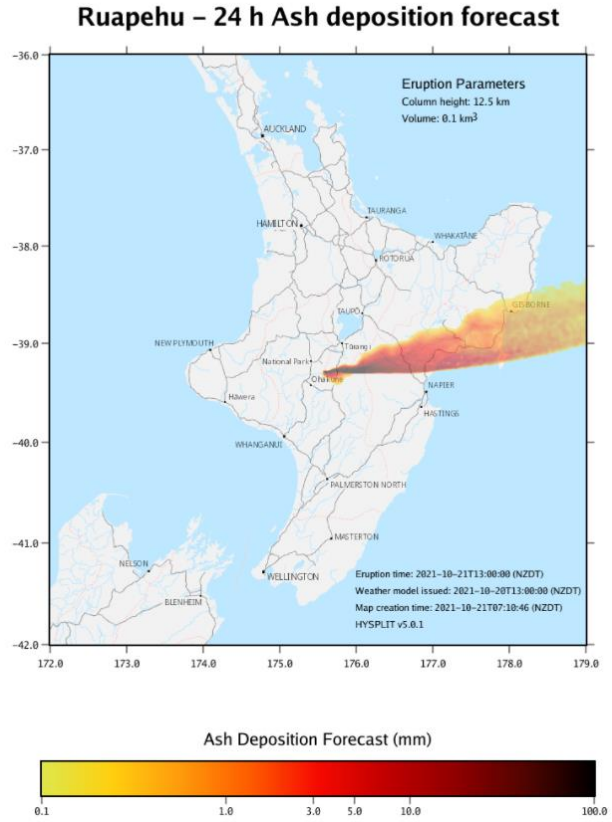
While intermittent ash emissions have reduced since last week, the volcano remains in a moderate to heightened state of unrest. The Volcanic Alert Level remains at Level 2.

Persistent low-level ash emission from Whakaari/White Island. Volcanic Alert Level remains at 2. — *Last month*

Minor-weak ash emission has been occurring at Whakaari/White Island since early this morning. The Volcanic Alert Level remains at 2.



Current tool



Tool in development

ACC and VONA

- **The GeoNet Volcano Monitoring Group set the ACC (Aviation Colour Code) for ICAO for New Zealand's active volcanoes**
- **Changes in the ACC and the level of volcanic activity (Alert level changes and/or ash emissions) are notified by VONA** (Volcano Observatory Notices For Aviation)

ICAO COLOUR CODE	STATUS OF ACTIVITY OF VOLCANO
GREEN	Volcano is in normal, non-eruptive state. *or, after a change from a higher level*: Volcanic activity considered to have ceased, and volcano reverted to its normal, non-eruptive state.
YELLOW	Volcano is experiencing signs of elevated unrest above known background levels. *or, after a change from higher alert level* : Volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase.
ORANGE	Volcano is exhibiting heightened unrest with increased likelihood of eruption. *or*, Volcanic eruption is underway with no or minor ash emission. *[specify ash-plume height if possible]*.
RED	Eruption is forecasted to be imminent with significant emission of ash into the atmosphere likely. *or*, Eruption is underway with significant emission of ash into the atmosphere. *[specify ash-plume height if possible]*.

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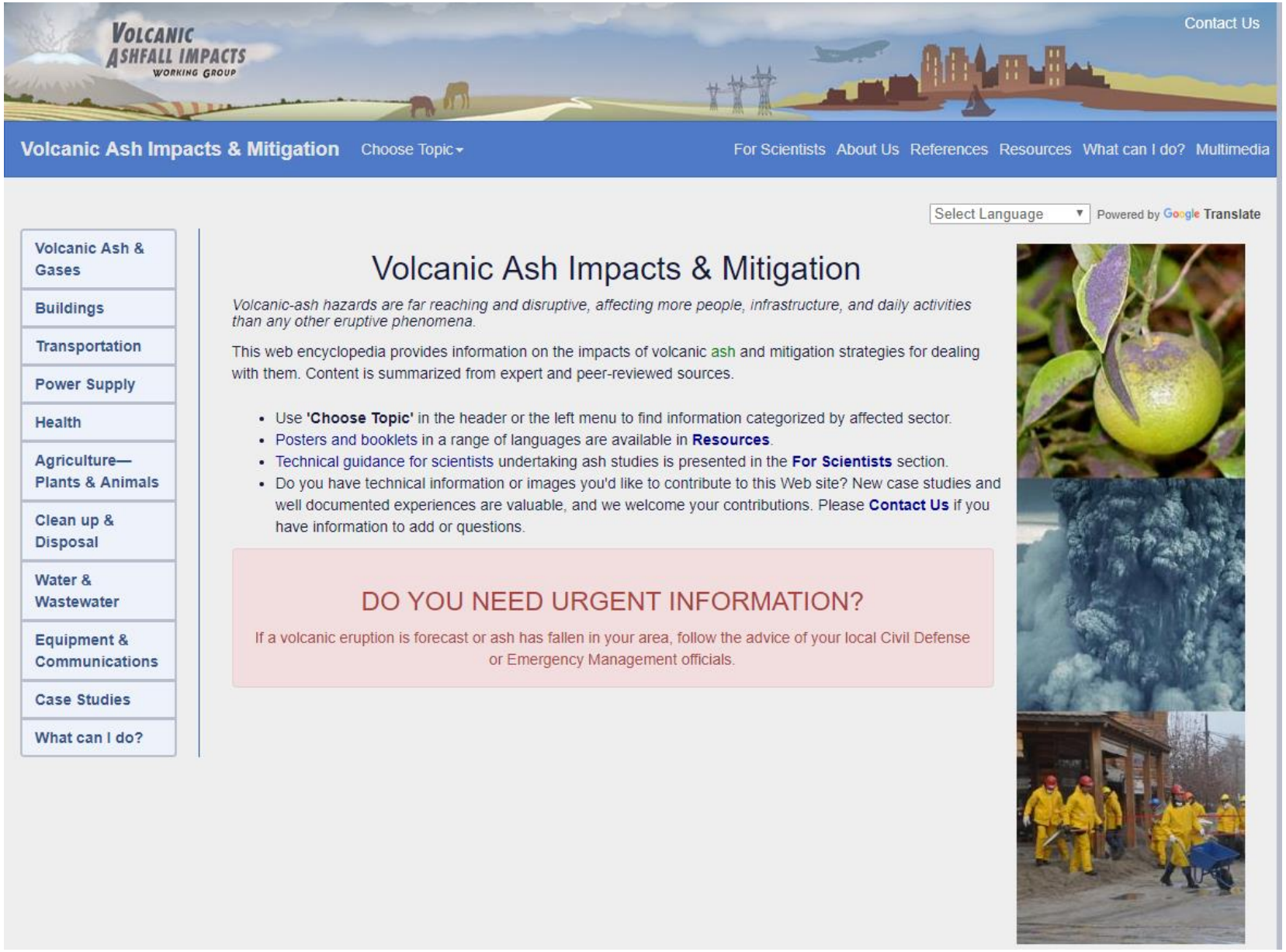
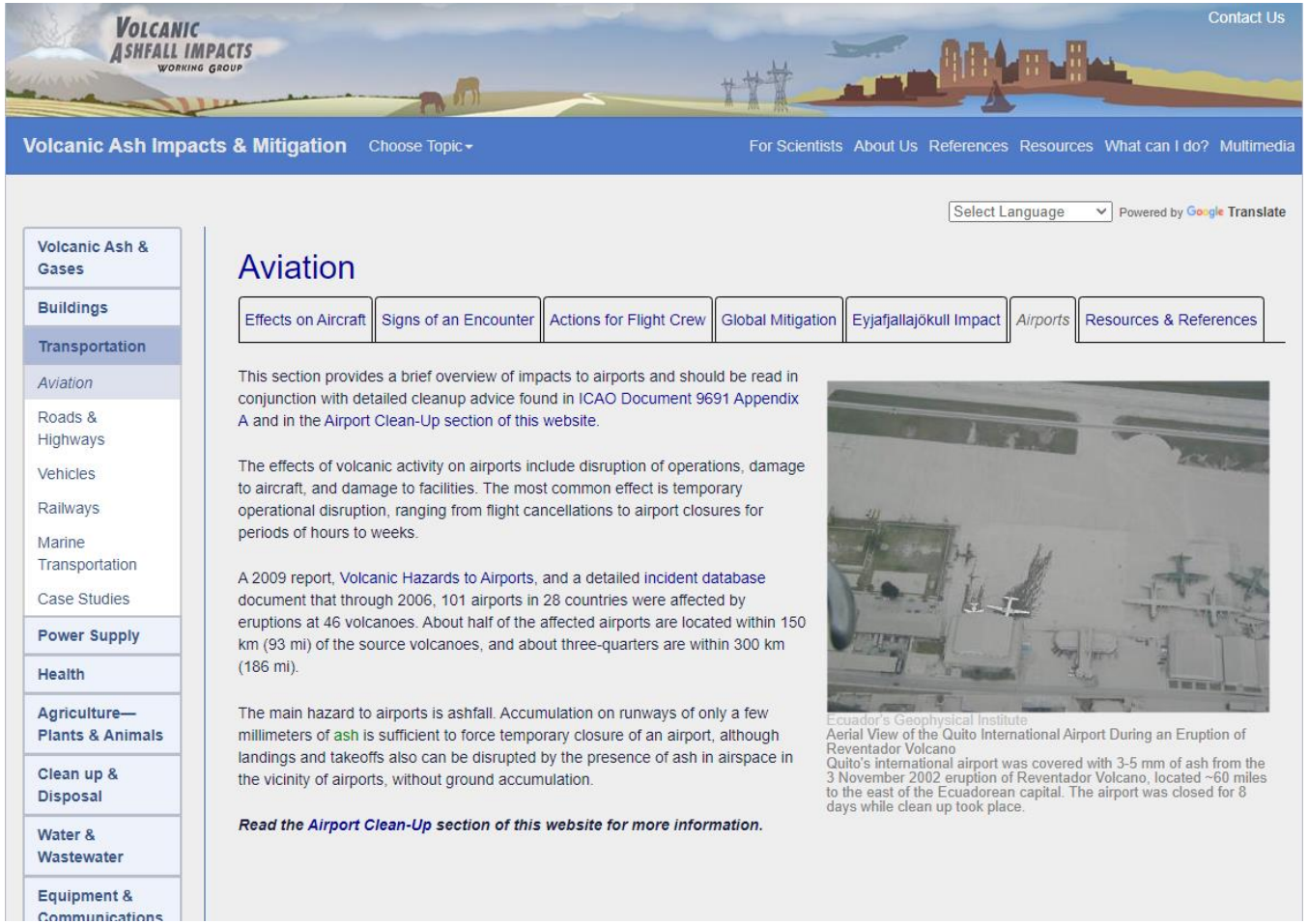
Global Volcanic Ash Impacts web page;

https://volcanoes.usgs.gov/volcanic_ash/



Aviation



https://www.gns.cri.nz/Home/Learning/Science-Topics/Volcanoes/Global-Ash-Impact-Posters

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www.geonet.org.nz