

JATWC SOPs for Volcanic Events

	0	1	2	3	4	5	6	7	8
General Description	Non-Explosive	Small	Moderate	Moderate-Large	Large	Very Large			
Volume of Tephra (m ³)		1x10 ⁴	1x10 ⁶	1x10 ⁷	1x10 ⁸	1x10 ⁹	1x10 ¹⁰	1x10 ¹¹	1x10 ¹²
Cloud Column Height (km) Above crater Above sea level	<0.1	0.1-1	1-5	3-15	10-25	>25			
Qualitative Description	"Gentle,"	"Effusive"	"Explosive"	"Cataclysmic," "Severe,"	"paroxysmal," "violent,"	"colossal" "terrific"			
Eruption Type	Hawaiian	Strombolian	Vulcanian	Plinian	Ultra-Plinian				
Duration (continuous blast)	<1 hour		1-6 hrs	6-12 hrs	>12 hrs				
CAVV max explosivity (most explosive activity listed in CAVW)	Lava flow Dome or mudflow	Phreatic	Explosion or Nuée ardente						
Tropospheric Injection	Negligible	Minor	Moderate	Substantial					
Stratospheric Injection	None	None	None	Possible	Definite	Significant			
Eruptions (total in file)	755	963	3631	924	307	106	46	4	0

(1) Issue no products and monitor for any potential tsunami: This action should be taken if there is little to no stratospheric injection and there is no evidence a tsunami has been generated.

(2) Create the event with a Severity of 1 hour: This action should be taken if there is little to no stratospheric injection and there is evidence that a small tsunami has been generated and the impacts are consistent with a low-level Marine Threat.

(3) Create the event with a Severity of 3 hours: This action should be taken if there is obvious stratospheric injection consistent with a VEI of 4 and/or there are reliable observations or reports that indicate a tsunami has been generated and the impacts are consistent with a high-level Marine Threat or low-level Land Threat.

(4) Create the event with a Severity of 6 hours: This action should be taken if there is significant stratospheric injection consistent with a VEI of 5+ and/or there are reliable observations or reports that indicate a catastrophic tsunami has been generated.

Severity	Action
Level 1	The threat area is defined to be within the 1 hour travel time isochrone
Level 3	The threat area is defined to be within the 3 hour travel time isochrone
Level 6	The expanding threat area is defined by the elapsed time since event + 6 hour travel time isochrone

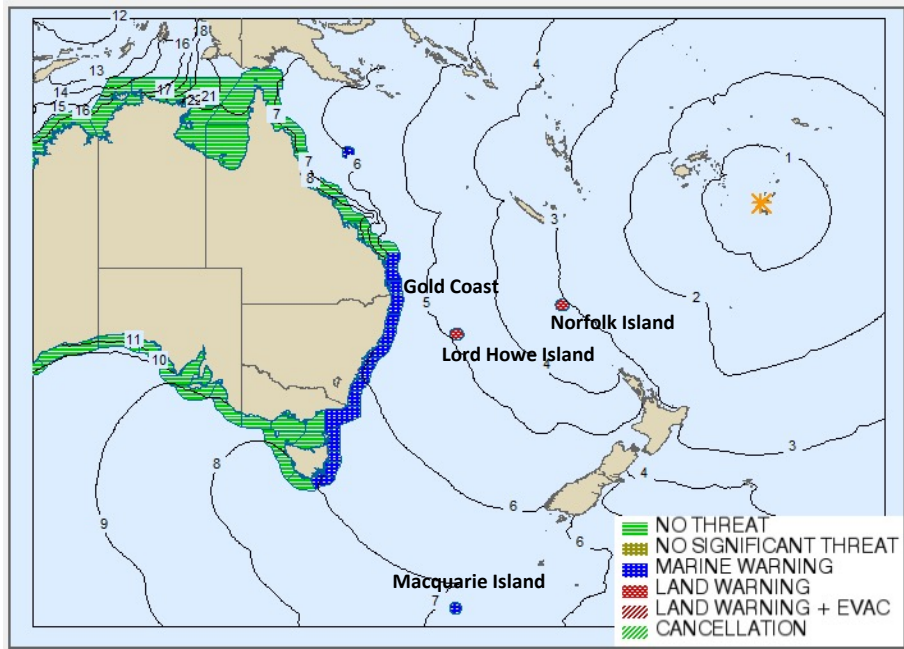
TSUNAMI – HUNGA TONGA-HUNGA HA'APAI VOLCANO

Time (AEDT)	Elapsed Time (hh:mm)	Key Event: 15 January 2022
15:10	00:00	Explosive volcanic eruption of the Hunga Tonga-Hunga Ha'apai volcano (Tonga)
15:30	00:20	Observations confirm a tsunami was generated at 3:30 PM AEDT at Nuku Alofa.
16:58	01:48	No Threat Bulletin issued with additional text to advise that a tsunami had been generated and that the JATWC would continue to monitor observations. Initial assessment based on 3 hours travel time.
19:36	04:26	Marine Warning for Norfolk Island issued after 50 cm wave observed at the tide gauge.
20:00	04:50	Marine Warning issued for Lord Howe Island based on tide gauge measurements increasing at Norfolk Island.
20:37	05:27	Significant observations in NSW and QLD: (40cm at Twofold Bay at 8:10 PM AEDT; 25 cm at Gold Coast at 7:40 PM AEDT) prompts the issuing of Marine Warnings.
20:58	05:48	Norfolk Island Warning upgraded to Land Threat after wave observations exceed 1.0 m at the tide gauge.
21:00	05:50	Marine Warnings extended to Victoria, Tasmania and Macquarie Island using a 7 hours travel time threat assessment.
21:18	06:08	Lord Howe Island Warning upgraded to Land Threat with evacuation order issued at 10:12 PM AEDT.
10:09 +1	18:59	Land warnings for Norfolk Island and Lord Howe Island downgraded to marine.
10:30 to 11:50 +1	19:20 to 20:40	QLD, Macquarie Island, Victoria and Tasmanian marine warnings cancelled.
19:56 to 21:59 +1	28:46 to 30:49	Lord Howe Island, Norfolk Island and NSW warnings cancelled.

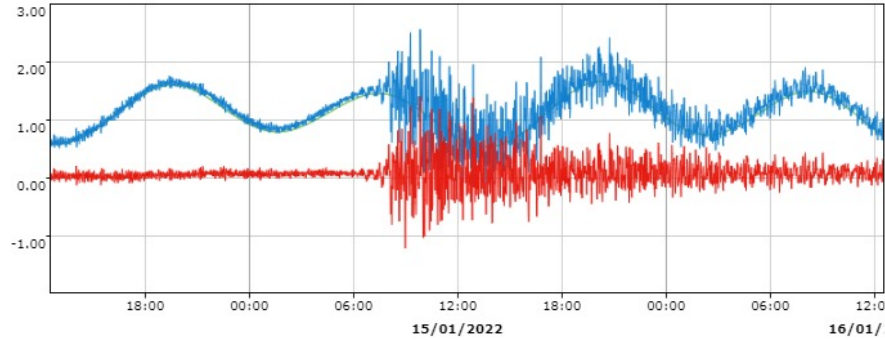
Key Challenges

- Initial detection of the volcanic eruption / tsunami and scale of eruption.
- Lack of event-specific tsunami modelling.
- Lack of a unified sea-level observing tool.

JATWC Tsunami Threat Assessment – Within 7 Hours Travel Time



Norfolk Island – 1.27 m



Gold Coast – 0.82 m

