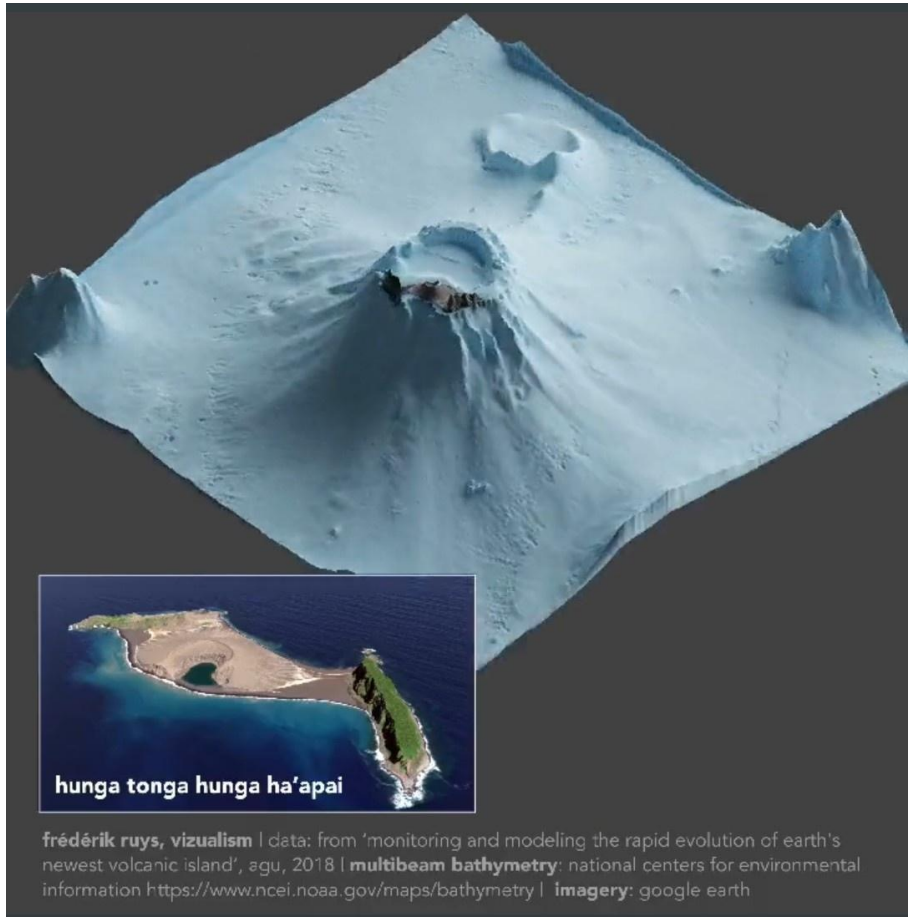
Summary of Hunga Tonga – Hunga Ha’apai eruption

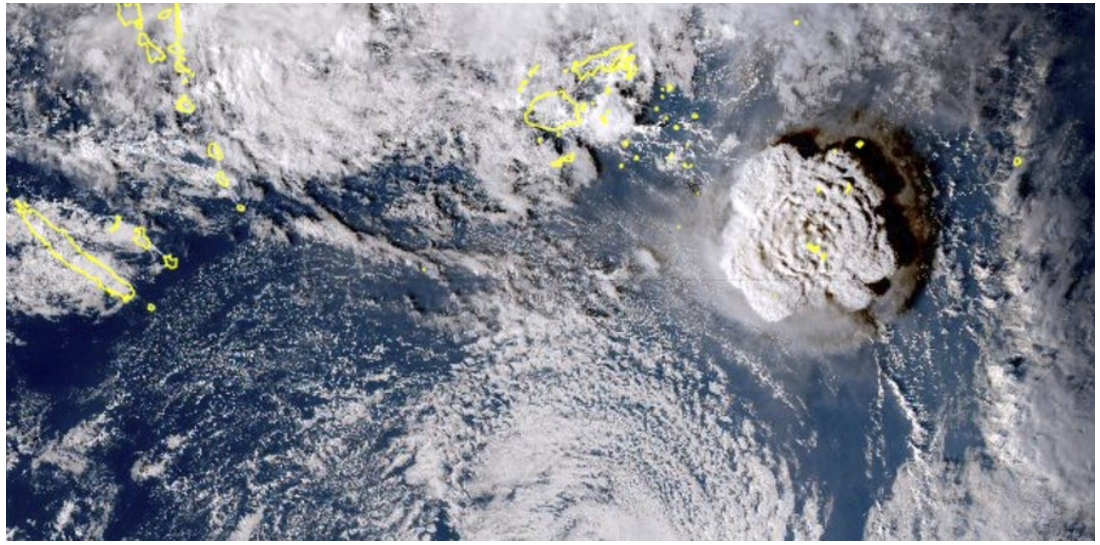
GNS Science

Quick background



- Islands are part of largely submerged volcanic edifice
- Most of the crater is ~150 m below sea level
- Activity as part of this broader period began in 2009, 2014/2015
- Current period began on Dec 20 2021
- Eruption on 13th January excavated central scoria cone
- Submerged vent prior to Jan. 15

Sequence of events



- 15th January ~1710 (could be a few minutes beforehand) eruption began
- Plume ascended very quickly and punctured the stratosphere ~30 km asl
- Shockwave around the globe at least 3x
- Tsunamigenic event

Aspects of this eruption

- Very high plume
- Quite low erupted volume (~0.5 km3 of magma)
- Very short duration

- Enhanced explosivity likely related to a near perfect mix between magma and water (too much of either dampens explosivity) so this suggests a vent covered by 10’s but not 100’s m of sea water
- Possible detonation near sea surface-atmosphere boundary to generate shockwave

What will happen next?

- Without near real time monitoring, this is very difficult to assess
- After large eruptions, large-scale recovery of the magma system will likely lead to small events that begin to build up a new cone to form a new island in the coming weeks to months
- Flank stability is likely compromised and we cannot rule out partial edifice collapse in the short-term
- Less likely is a much larger event to follow as a result of ‘un-roofing’ of the overlying rock during this eruption

Post-eruption seismic activity