

Date: January 28, 2022

Subject: The Hunga Tonga-Hunga Ha'apai Volcano and what is special about this eruption.

The short form of the story is this: The undersea volcano had been burbling since late December 2021, shaking the seas near Tonga with a series of outbursts. Things kicked into higher gear this month, with powerful blasts on Jan. 13 and Jan. 14 and then an even bigger eruption on Jan. 15 that sent ash and dust 25 miles (40 kilometers) into the Pacific sky. The initial explosion appears to be equal to an 18 megaton blast at the surface but obviously higher at the ocean floor. The studies are ongoing because this eruption is different in many ways from other eruptions. For perspective: The 1980 eruption of Mount Saint Helens in Washington released about 24 megatons of TNT equivalent, and the famous 1883 explosion of Indonesia's Krakatau is estimated to have unleashed 200 megatons or so. However the Tonga eruption also was tied to issues of cracks in the Pacific plate, and it is expected that there will be further activity without warning.

Another unusual thing was the fact that during the days of the eruptions, there were over 5,000 earthquakes per minute in the area. No one has ever seen this level of earth movement before during a volcanic eruption. At the same time there was intense activity on the ocean floor which is an indication of a rupture of some type in the Pacific plate. Such a rupture would clearly have future effects which could cause activity as far away as the Cascadia area of the west coast of North America. Such activity could be as intense as triggering a massive earthquake and several volcanic eruptions due to rapid shifting and twisting of the Pacific Plate into the subduction zone of the North American Plate. Measurements of the plate movement in the subduction zone of Cascadia indicate that there was more than an 18 megaton explosion which happened given the total plate movement and the total mass of the Pacific Plate being moved and twisted. There is ongoing study to determine in fact how much energy would be required to cause the level of activity which occurred in the Cascadia area.

Additionally it appears that because of all the ash and gases emitted during the eruptions, that the temperature of the earth may not yet be affected much, however all the science people looking at the situation fully expect further activities which could in fact have a significant global effect.

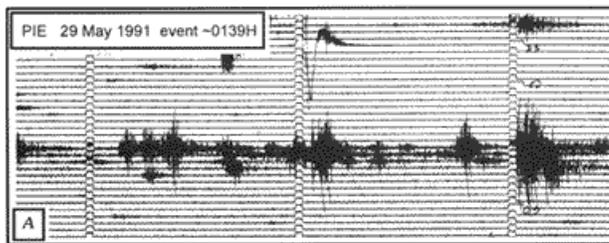
Why are the volcano's eruptions so highly explosive, given that sea water should cool the magma down? If magma rises into sea water slowly, even at temperatures of about 1200°C, a thin film of steam forms between the magma and water. This provides a layer of insulation to allow the outer surface of the magma to cool. But this process doesn't work when magma is blasted out of the ground full of volcanic gas. When magma enters the water rapidly, any steam layers are quickly disrupted, bringing hot magma in direct contact with cold water. Volcano researchers call this "fuel-coolant interaction" and it is akin to weapons-grade chemical explosions. Extremely violent blasts tear the magma apart. A chain reaction begins, with new magma fragments exposing fresh hot interior surfaces to water, and the explosions repeat, ultimately jetting out volcanic particles and causing blasts with supersonic speeds. This is why there was such a great explosion followed by the intense earthquake activity as well as the Tsunami that covered the Pacific ocean all the way to North and South America.

The blast from a South Pacific volcano at Tonga was strong enough to jiggle the atmosphere from the surface to the ionosphere, according to preliminary analyses by scientists scattered around the world. The Hunga Tonga-Hunga Ha'apai eruption, which killed at least three and inflicted widespread damage, may be one of the most powerful eruptions of the past 30 years. Atmospheric waves from the explosion shot across the globe in less than 24 hours. The waves even shifted local air pressure: In Seattle, the wave briefly lifted the city's fog, said the local National Weather Service office. The colossal detonation sent many types of waves through Earth's atmosphere: infrasound waves, Lamb waves, acoustic-gravity waves, and signals from tsunamis across the Pacific Ocean.

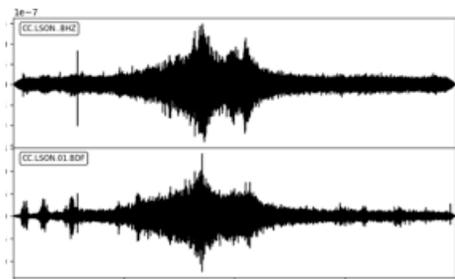
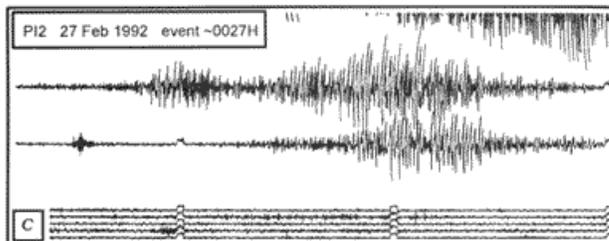
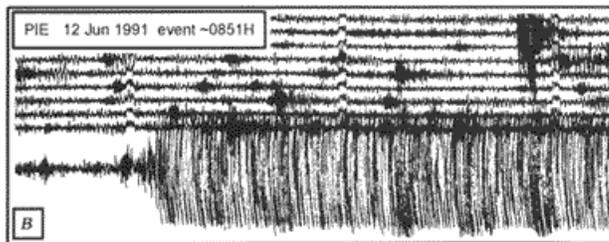
The Tonga eruption was so intense, it caused the atmosphere to ring like a bell though at a frequency too low to hear. While scientists have made huge strides in understanding waves from the

Tongan eruption, some aftereffects are still inexplicable. “People, also heard this eruption in Alaska at almost 10,000 kilometers away, which is remarkable,” said one of the scientists. “I do not think we have a good understanding of how audible sound is generated at such long distances from the source.” The eruption reached an explosive crescendo on Jan. 15, 2022. Its rapid release of energy powered an ocean tsunami that caused damage as far away as the U.S. West Coast, but it also generated pressure waves in the atmosphere that quickly spread around the world. The atmospheric wave pattern close to the eruption was quite complicated, but thousands of miles away it appeared as an isolated wave front traveling horizontally at over 650 miles an hour as it spread outward. The pulse registered as perturbations in the atmospheric pressure lasting several minutes as it moved over North America, India, Europe and many other places around the globe. Online, people followed the progress of the pulse in real time as observers posted their barometric observations to social media. The wave propagated around the whole world and back in about 35 hours.

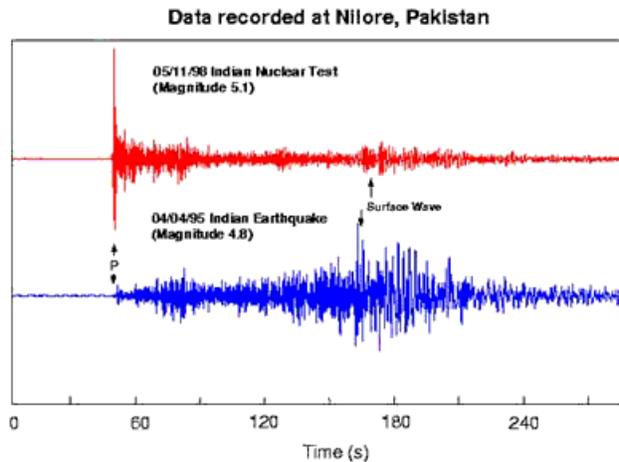
Now to explain some of the unusual things about the Tonga eruption: First let us look at the seismograph data from the Mt. Pinatubo eruption in 1991:



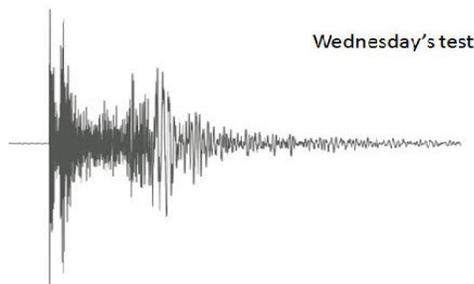
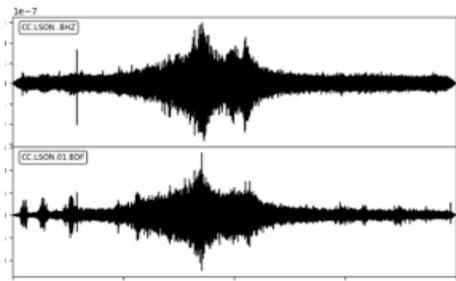
The center waveform shows the classic constant high activity during the time of the eruption and the top and bottom graphs show the pre and post eruption earthquake activities at the caldera.



This is the Tonga main event with the explosion as the high peaks. These are from 2 different seismographs which show the intensity of the explosion.



This information is presented to show the very distinctive pattern of a nuclear explosion (shown in red at the top) compared to an earthquake (shown in blue at the bottom)



If you look at the Tonga event in the top trace you notice an odd spike followed by a smaller spike. This was absent from the Mt Pinatubo eruption as seen in the first chart above. Then the chart labeled Wednesday's test is a nuclear explosion which has the same trailing outline as the Tonga event. This means that this was what is called an "augmented eruption" which is an eruption which was aided in its starting intensity with an explosion then followed by the normal highly explosive type of eruption. Another very important detail is that this all occurred near a plate boundary and the nuclear explosion added to the rupturing at the plate boundary. Some people might debate such an analysis but if they do then they must show what caused the plate rupture at that exact time. Some of the initial studies allude to the plate rupture having increased greatly the sonic explosion which traveled 2 times around the earth.

It is very important to remember that Russia is the only country on the planet which has 25 megaton, 50 megaton, 100 megaton, and 300 megaton bombs all of which are useful to "have a war" without it being obvious. When the Soviet Union decided in the 1950's to begin work on the super bombs, they did all the theoretical work as well as building a test device. After the test was completed it was decided that at the moment the delivery technology was not capable of reliable delivery of such large weapons. However with the creation of the Posiden nuclear powered underwater drone, the big devices had a new use as tsunami creators or causing large underwater events of from a hypersonic cruise missile a true deep bunker buster bomb. The seismic signature is the same as one would expect if it was triggered at the correct time in the sequence of earthquake events.

From all the different sensors and studies (some done in real time as it was happening) show us how little we know about the earth we live on even with hundreds of years of study. We are also shown how an event 1/2 a world away can suddenly change your life forever. This means we need to pay attention to the world around us and ask for God's wisdom at all times.

