USGS HAWAIIAN VOLCANO OBSERVATORY

INFORMATION STATEMENT FOR TA‘Ū VOLCANO AND THE MANU‘A ISLANDS, AMERICAN SAMOA: August 16, 2022

Summary:

No significant changes over the past 24 hours. The earthquake swarm in the Manu‘a islands of American Samoa continues. Two microseismometers (earthquake-detecting devices) installed in Fiti‘uta village on Ta‘ū island on August 13 and Olosega village on August 14 are recording approximately 20 earthquakes per hour; most events are too small to be felt. Estimated magnitudes of the largest earthquakes, including the felt events, are between magnitude 2 and 3. Seismic data indicate that the source for these earthquakes is beneath the Manu‘a Islands, likely closer to Ta‘ū island rather than Ofu-Olosega, and is probably not related to Vailulu‘u seamount.

Observations and Reports:

- **There were no significant changes overnight and conditions remain the same as reported on Monday August 15, 2022.**
- Residents of the Manu‘a group of islands in American Samoa continue to feel earthquakes. Residents reported that earthquakes began about 3 weeks ago and this fits with a felt earthquake report from July 26th.
- The largest events recorded over the past 24 hours appear to be between magnitude 2 and 3. Approximately 20 earthquakes are occurring per hour, but most are too small to be felt.
- Reports from both Ta‘ū and Ofu-Olosega islands suggest that the earthquakes vary in intensity, but are generally short, sharp jolts. The earthquakes are more likely to be felt by people indoors at rest and along the coast, where buildings sit on sediment that amplifies shaking. These factors are probably responsible for the variability in reporting.
- Based on the analysis of earthquake data from a microseismometers installed on Ta‘ū and Oloseqa islands, and felt reports, the source of these earthquakes appears closer to Ta‘ū island rather than Ofu-Olosega and does not appear related to Vailulu‘u seamount.
- Scientists plan to install additional instruments to monitor earthquakes and other activity in the coming week.
- The US Geological Survey uses a Volcano Alert Level System to inform people about changes in volcanic activity (https://www.usgs.gov/programs/VHP/volcanic-alert-levels-characterize-conditions-us-volcanoes). To date, volcanoes in the Manu‘a islands have been categorized as unassigned. As the USGS establishes a volcano-monitoring network, the alert levels will be established through a Volcano Activity Notice (VAN), reflecting the level of activity. See the bottom of this document for directions on how to subscribe.

Analysis:

The earthquake activity detected by seismometers and reported to date suggests a local source close to Ta‘ū island. The original estimate of 30-60 earthquakes per hour based on the initial few hours of earthquake recording appears to have been too high. The current estimate is approximately 20 earthquakes per hour, with most too small to be felt.

Due to limited earthquake monitoring equipment, the exact location and depth of these earthquakes is currently unknown. The newly installed microseismometers in Fitiʻuta village on Taʻū and Olosega village on Olosega inidicate that the source of the earthquake activity is local to these islands and closer to Taʻū island.

Not all earthquake swarms on volcanoes result in eruptions. Current low-level earthquake activity may continue and vary in intensity for days to months or longer without an eruption. It is also possible that the swarm is an early precursor to an eventual eruption. At this time, we cannot determine which of these possibilities is more likely. A large explosive eruption similar to the Tonga eruption earlier this year is extremely unlikely.

Scientists are also investigating reports of other activity provided by local residents. We value and appreciate these observations as residents have the experience to recognize significant changes in their environment and provide significant contributions to our understanding of activity.

Reports of exposed coral along the coast in the Manuʻa islands were investigated on August 12 and have been correlated with a King Tide that affected American Samoa. King Tides are more extreme than normal tides and thus may expose areas along the coast that are not exposed during a typical tide. However, USGS and other scientists will continue to investigate this event to confirm its origin.

Several residents of Taʻū reported booming noises on August 10; a resident of Olosega village reported a boom at the same time they felt an earthquake the night of August 14. Booming noises could have a number of natural and man-made sources including rockfalls, ground cracking, volcanic noise, and human caused events. USGS HVO scientists will be deploying infra-sound microphones in the coming weeks to capture and analyze noises in the region.

Response:

Experts at the Pago Pago National Weather Service Office (NWS), USGS Volcano Hazards Program, NOAA Pacific Tsunami Warning Center, NOAA-IOC International Tsunami Information Center, and USGS National Earthquake Information Center are working together with the American Samoa EOC to understand the source of these earthquakes better. The Samoa Meteorological Service is also reporting increased seismicity south or east of Tutuila Island.

Dr. Natalia Deligne of the US Geological Survey Hawaiian Volcano Observatory (HVO) arrived on August 11 in Pago Pago and is consulting with local authorities on the situation. She traveled to the Manuʻa Islands with NWS staff and Samoan Government staff from August 13-15 to meet with residents and install microseismometers.Dr. Deligne is currently back on Tutuila working closely with NWS staff

USGS HVO staff member Dr. Drew Downs is arrived Pago Pago on Monday August 15 with additional microseismometers and other volcanoes-monitoring tools.

Additional HVO personnel and permanent seismometers for earthquake detection are expected to arrive in American Samoa later this week. These will allow HVO scientists to better locate where the earthquakes are occurring and identify the souce of the earthquakes.

Monitoring:

American Samoa's volcanoes are monitored for earthquakes by a microseismometer in Fitiʻuta on Taʻū island (RS DataView BETA (raspberryshake.org)), a microseismometer in Olosega(RS DataView BETA (raspberryshake.org)), and a more distant global seismic station in Apia, Samoa (Station AFI USGS TELEMETRY DATA). The sparse monitoring stations may not allow for advanced warning of new activity. The USGS, NWS, PTWC, and other agencies are working together to improve this network so earthquake locations and magnitudes can be more precisely determined. USGS HVO scientists plan to install additional earthquake monitoring instruments in the coming weeks.

Remote sensing satellite data is also being used to monitor American Samoa for events potentially related to volcanic activity, such as thermal anomalies, volcanic plumes, or volcanic gases. This monitoring is being done by USGS Alaskan Volcano Observatory (AVO) scientists and the Wellington Volcano Ash Advisory Center (VAAC).

Residents can assist these monitoring efforts by noting and reporting accurate times that they feel earthquake shaking, hear unusual noises, or see changes that might be volcanically related to either the National Weather Service Office (https://www.weather.gov/ppg/wsopagooffice) or American Samoa EOC in Pago Pago (684-699-3800). Questions for USGS HVO scientists can be sent to AskHVO@usgs.gov.

Background:

Taʻū is a shield volcano with rift zones to the northeast and northwest. Ofu and Olosega are two islands formed from two shield volcanoes. In 1866, as a submarine eruption formed a cone between Taʻū and Ofu-Olosega islands. Vailuluʻu is a submarine volcano with a summit about 2000 feet (600 m) below the ocean surface. It is located about 25 miles (40 km) to the east of Taʻū island and has erupted multiple times over the past 50 years.

Volcanoes in American Samoa are similar to those in Hawaii. If activity escalates to an eruption, it will most likely include slow-moving lava flows or low-level explosions of lava that are localized to a small area. This can still be disruptive for residents of the Manuʻa islands. A very large eruption like Hunga Tonga–Hunga Ha'apai in Tonga earlier this year is extremely unlikely as it is a different type of volcano. Volcanoes in Tonga erupt much more explosively than ones in American Samoa and Hawaii.

Hazards:

It is unclear if this unrest will escalate to a volcanic eruption. An eruption could pose significant hazards to residents of American Samoa; these hazards include volcanic gases, low-level explosions of lava localized to a small area, lava flows, earthquake shaking, and tsunami.

Information about these hazards, which are similar to those in Hawaii, can be found at this HVO website: https://www.usgs.gov/observatories/hvo/hazards.

A submarine volcanic eruption or landslide can generate a tsunami. The Pacific Tsunami Warning Center will issue a warning if they detect earthquake activity that is likely to cause a tsunami. However, volcanic eruptions do not usually generate large enough earthquakes to warrant a tsunami warning. If there is a tsunami from a nearby volcanic eruption, residents of the Manuʻa islands and elsewhere in American Samoa are more likely to experience natural warning signs before receiving an official tsunami warning.

If you are at the coast, heed the natural tsunami warning signs. If you feel a strong or long-duration earthquake, see a sudden rise or fall of the ocean, hear a loud roar from the ocean, or see a large aerial plume from an eruption, a tsunami may follow, and you should immediately move to higher ground.

Here is information on what you can do to protect yourself and your family if you see a tsunami or receive a warning: https://www.weather.gov/safety/tsunami-during.
Additional information will be provided as it becomes available.

More information:

- Subscribe to USGS Volcano Notification Service: https://volcanoes.usgs.gov/vns2/
- National Park of American Samoa: https://www.nps.gov/npsa/index.htm
- Protecting yourself and your family from earthquakes: https://www.usgs.gov/node/277816
- Smithsonian Institution Global Volcanism Program webpage on Taʻū Island: https://volcano.si.edu/volcano.cfm?vn=244001
- Smithsonian Institution Global Volcanism Program webpage on Vailuluʻu: https://volcano.si.edu/volcano.cfm?vn=244000

Tsunami information:

- Subscribe to U.S. Tsunami Warning Center: https://www.tsunami.gov/?page=productRetrieval
- National Weather Service Pago Pago Office: https://www.weather.gov/ppg/wsopagooffice
- Pacific Tsunami Warning Center: https://tsunami.gov/
- International Tsunami Information Center and American Samoa Tsunami Awareness Information: http://www.tsunamiwave.org
- Protecting yourself and your family from tsunami: https://www.weather.gov/safety/tsunami

How you can help scientists:

Contact askHVO@usgs.gov if you have information or observations to share, such as times and types of earthquake shaking, steaming ground, discolored or steaming water, unusual changes to the ground surface, ocean, or new large areas of dead vegetation or wildlife. These are most useful if you include time and location of the observation plus a photo or video with scale, if possible, that shows what you see. A person, boat, house, or tree can provide scale. Only take a photo or video if it is safe to do so.

Stay informed:

The U.S. Geological Survey (USGS) Hawaiian Volcano Observatory will be sharing information about unrest in American Samoa via the USGS Volcano Notification Service (VNS) in addition to the existing website.. This free service sends notices via email about volcanic activity in the US.

To receive Volcano Activity Notices (VANs),subscribe to the VNS at https://volcanoes.usgs.gov/vns2/. For emails about American Samoa unrest, select Ofu-Olosega, Ta'u Island, and Tutuila Island from the list of available volcanoes. Alternatively, select "Hawaiian Volcano Observatory - Add All Volcanoes" from the list of available volcano observatories to receive notices about volcanoes in Hawaii and American Samoa.

For more information about the different types of VNS notifications, please see: https://volcanoes.usgs.gov/vhp/notifications.html

If you have questions, please contact: askHVO@usgs.gov