USGS HAWAIIAN VOLCANO OBSERVATORY
TA‘Ū ISLAND INFORMATION STATEMENT REGARDING FELT EARTHQUAKES IN AMERICAN SAMOA: August 14, 2022

Summary:

No significant changes over the past 24 hours. Earthquake swarm in the Manu‘a islands of American Samoa continues, with a source most likely closer to Ta’ū island than Vailulu‘u seamount. Five earthquakes were reported over the past 24 hours. A microseismometer (earthquake-detecting device) installed in Fiti‘uta village on Ta‘ū island yesterday is recording approximately 30-60 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.

Observations and Reports:

- **There were no significant changes overnight and conditions remain the same as reported on Saturday August 13, 2022.**
- Residents of the Manu‘a group of islands in American Samoa continue to feel earthquakes, with five felt earthquakes reported over the past 24 hours. This earliest report of this activity is from July 26th.
- The largest events recorded over the past 24 hours correlate with five felt reports and appear to be between magnitude 2 and 3. Approximately 30-60 earthquakes are occuring per hour, but most are too small to be felt.
- Reports 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 microseismometer installed yesterday on Ta‘ū island and felt reports, the source of these earthquakes is likely closer to Ta‘ū island rather than to Vailulu‘u.
- Scientists plan to install additional instruments to monitor earthquakes and other activity in the coming week.

Analysis:

The earthquake activity reported to date suggests a local source close to Ta‘ū island.

Due to limited earthquake monitoring equipment, the exact location of these earthquakes is currently unknown. A newly installed microseismometer in Fitiuta village on Ta‘ū island suggests that this activity is likely occuring closer to Ta‘ū island than the nearby submarine volcano Vailulu‘u.

Not all earthquake swarms on volcanoes result in eruptions. Current low-level earthquake activity may continue and vary in intensity for days to months 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.

Reports of exposed coral along the coast in the Manuʻa islands were investigated on August 12 and have been correlated with a King Tide currently affecting 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 loud booming noises on August 10; no other noises have been reported since. 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. Yesterday, August 13, she traveled to the Manuʻa islands with local authorities to meet with residents and install earthquake-monitoring instrument with the assistance of National Weather Service staff.

On August 13, the USGS Hawaiian Volcano Observatory installed a microseismometer to monitor earthquake activity in Fitiʻuta village on Taʻū island. Today, Dr. Deligne traveled to Ofu-Olosega with other authorities to talk with residents and install a second microseismometer. After the second microseismometer is installed, HVO scientists will be better able to monitor how far away the earthquakes are located and how frequently they are occuring.

Additional HVO personnel and eismometers for earthquake detection are expected to arrive in American Samoa next week. These will allow HVO scientists to better locate where the earthquakes are occuring and identify the souce of the earthquakes.

Dr. Charles McCreery, Director of the Pacific Tsunami Warning Center, will arrive Monday August 15 to advise about tsunami concerns.

Monitoring:

American Samoa's volcanoes are monitored for earthquakes by a microseismometer in Fitiʻuta on Taʻū island (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:

Ta‘ū 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 Ta‘ū and Ofu-Olosega islands.Vialulu‘u 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 Ta‘ū 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. An 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. Volcanic hazards associated with eruptions in American Samoa could 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 Manu‘a 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 Ta‘ū Island: https://volcano.si.edu/volcano.cfm?vn=244001
- Smithsonian Institution Global Volcanism Program webpage on Vailulu‘u: 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@usgsg.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.
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