

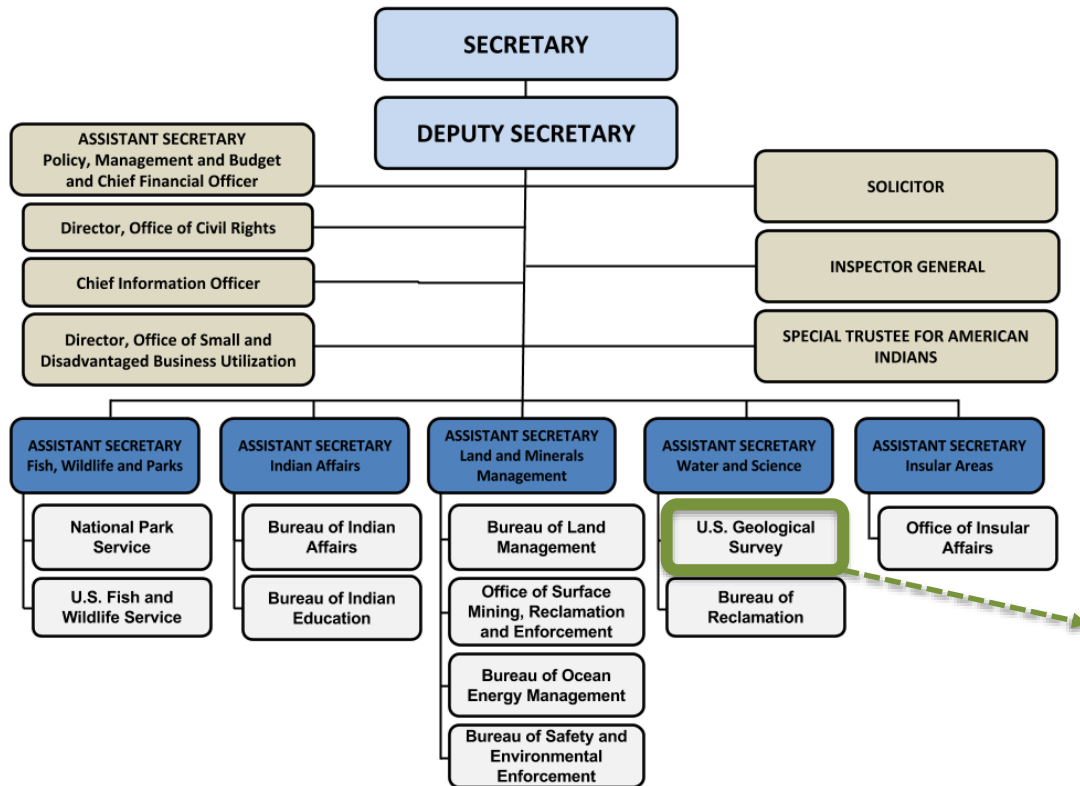
American Samoa's volcanoes (and earthquakes)

Presentation Overview

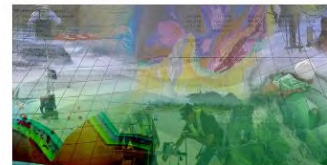
- ❖ **What is the USGS?**
Mission, role, what we do
- ❖ **USGS information products**
- ❖ **Volcanoes of American Samoa**
Ta'ū, Ofu-Olosega, Tutuila, (Vailulu'u)
- ❖ **Volcanic unrest, eruptions, and possible consequences**
- ❖ **Current situation at Ta'ū volcano**
- ❖ **(Brief) National Earthquake Information Center products**

U.S. Department of Interior

Note: NOAA is part of the U.S. Department of Commerce



Our Mission



The USGS monitors, analyzes, and predicts current and evolving Earth-system interactions and delivers actionable information at scales and timeframes relevant to decision makers. The USGS provides science about natural hazards, natural resources, ecosystems and environmental health, and the effects of climate and land-use change.

What We Do



As the Nation's largest water, earth, and biological science and civilian mapping agency, we collect, monitor, analyze, and provide science about natural resource conditions, issues, and problems. Our diverse expertise enables large-scale, multidisciplinary investigations and provides impartial scientific information to resource managers, planners, and our customers.

<https://www.usgs.gov/>



Volcano Science Center

- 5 volcano observatories, each assigned a geographic area of responsibility
- Operate real-time volcano monitoring networks
- Disseminate forecasts and notifications of significant activity
- Assess volcano hazards
- Conduct scientific research into volcanic processes
- Work with communities to prepare for volcanic eruptions

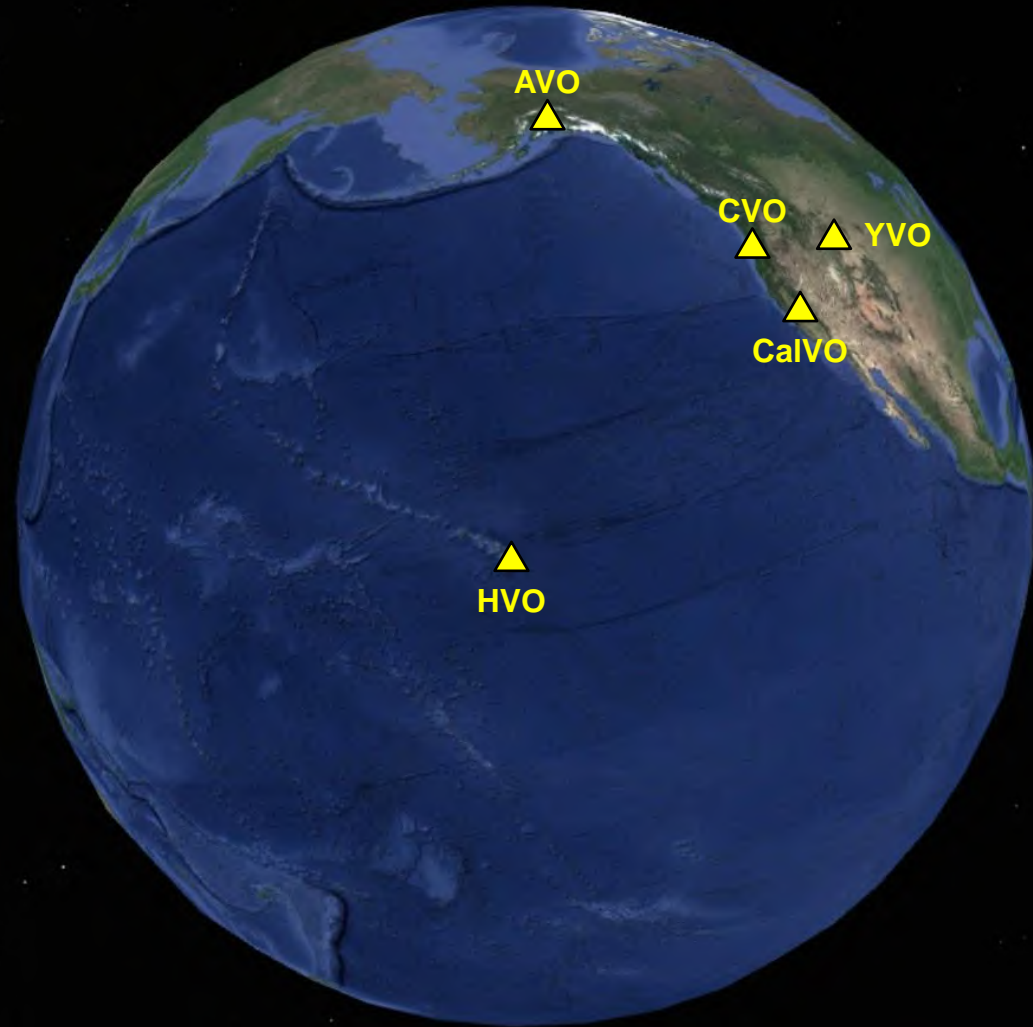
National Earthquake Information Center

- Determine the location and size of all significant earthquakes that occur worldwide
- National data center and archive for earthquake information
- Research program to improve its ability to locate earthquakes and to understand the earthquake mechanism

Will touch on earthquakes at very end of presentation

USGS Volcano Observatories

- ❖ **Hawaiian Volcano Observatory**
Hawaii, American Samoa
- ❖ **Alaska Volcano Observatory**
Alaska, CNMI
- ❖ **California Volcano Observatory**
California, Nevada
- ❖ **Cascades Volcano Observatory**
Washington, Oregon, Idaho
- ❖ **Yellowstone Volcano Observatory**
Montana, Wyoming, Colorado, Utah, New Mexico, Arizona



OFFICIAL USGS PRODUCTS

Name	Frequency	Description
Volcano Activity Notice (VAN)	When needed	Announces alert-level changes or significant volcanic activity within an alert level; covers all volcanic hazards—lahars (volcanic mudflows), lava flows, ashfall, airborne ash, pyroclastic flows.
Daily, Weekly, or Monthly Update	Regularly scheduled	Scheduled update providing steady situational awareness.
Status Report	When needed	Update about volcanic behavior or monitoring activities during ongoing incidents of unrest or eruption.
Volcano Observatory Notice for Aviation (VONA)	When needed	Aviation-sector specific (for pilots, dispatchers, air-traffic managers, meteorologists); focuses on ash emissions.
Information Statement	When needed	Topical information such as explanation of non-volcanic incidents at a volcano, changes in monitoring installations, long-term prognoses, etc.



Ta'ū volcano: ADVISORY/YELLOW

Ofu-Olosega volcano: NORMAL/GREEN

Tutuila volcano: UNASSIGNED/UNASSIGNED

Volcano Alert Levels Used by USGS Volcano Observatories

Alert Levels are intended to inform people on the ground about a volcano's status and are issued in conjunction with the Aviation Color Code. Notifications are issued for both increasing and decreasing volcanic activity and are accompanied by text with details (as known) about the nature of the unrest or eruption and about potential or current hazards and likely outcomes.

Term	Description
NORMAL	Volcano is in typical background, noneruptive state <i>or, after a change from a higher level,</i> volcanic activity has ceased and volcano has returned to noneruptive background state.
ADVISORY	Volcano is exhibiting signs of elevated unrest above known background level <i>or, after a change from a higher level,</i> volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase.
WATCH	Volcano is exhibiting heightened or escalating unrest with increased potential of eruption, timeframe uncertain, OR eruption is underway but poses limited hazards.
WARNING	Hazardous eruption is imminent, underway, or suspected.

▲ For people on the ground ▲

For airplanes▶

Translation in Samoan (thank you NOAA NWS):
<https://www.usgs.gov/media/files/volcano-aviation-codes-and-alert-levels-english-and-samoan>

Aviation Color Code Used by USGS Volcano Observatories	
Color	Description
GREEN	Volcano is in typical background, noneruptive state <i>or, after a change from a higher level,</i> volcanic activity has ceased and volcano has returned to noneruptive background state.
YELLOW	Volcano is exhibiting signs of elevated unrest above known background level <i>or, after a change from a higher level,</i> volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase.
ORANGE	Volcano is exhibiting heightened or escalating unrest with increased potential of eruption, timeframe uncertain, OR eruption is underway with no or minor volcanic-ash emissions [ash-plume height specified, if possible].
RED	Eruption is imminent with significant emission of volcanic ash into the atmosphere likely OR eruption is underway or suspected with significant emission of volcanic ash into the atmosphere [ash-plume height specified, if possible].



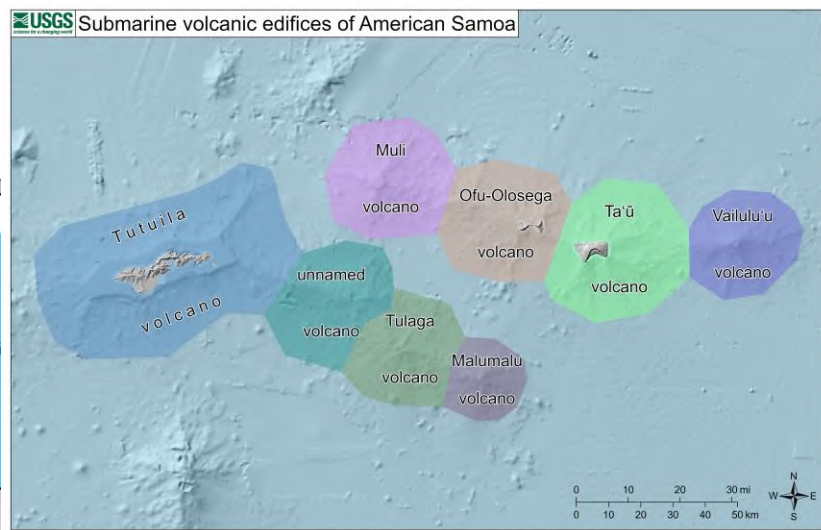
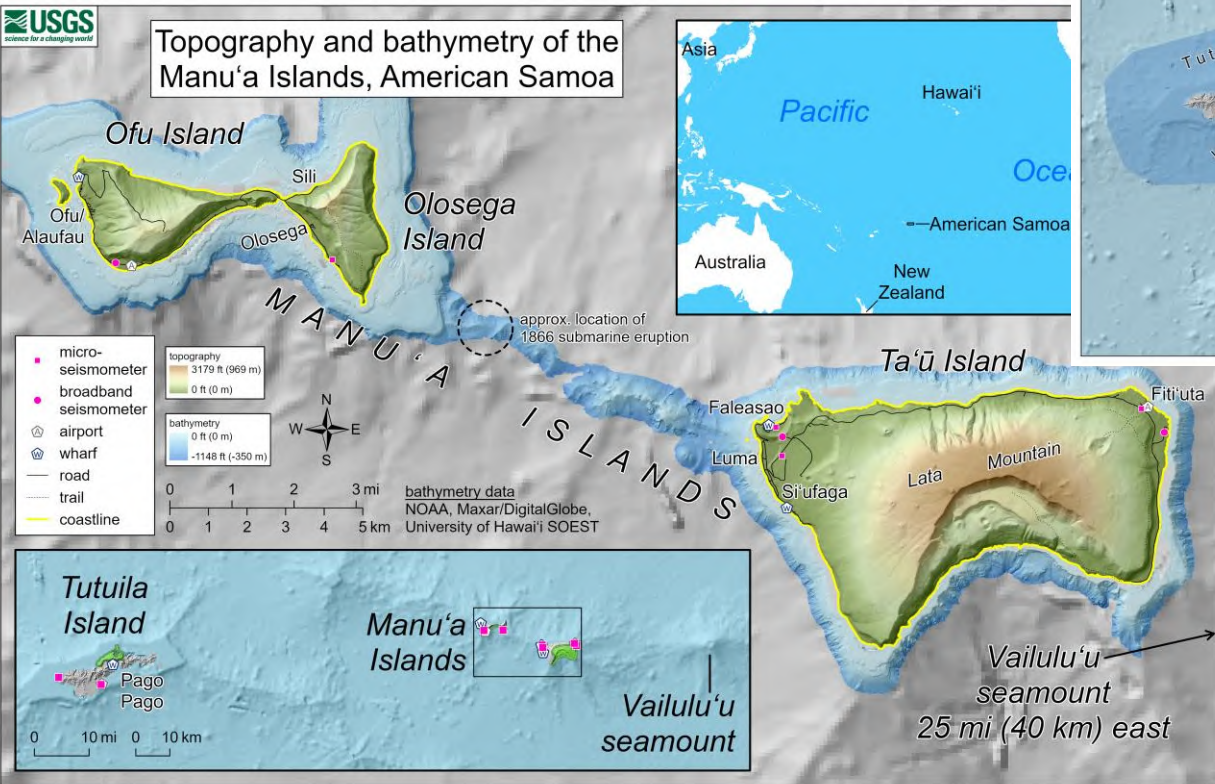
Ta'ū volcano: ADVISORY/YELLOW

Ofu-Olosega volcano: NORMAL/GREEN

Tutuila volcano: UNASSIGNED/UNASSIGNED

ALERT-LEVEL TERMS/UPU O TULAGA E MATA'ALA AI	
When the volcano alert-level is changed, a Volcano Activity Notice (VAN) is issued.	
A sui le tulaga e mata'ala ai o le mauga mu, e tu'uina atu se fa'asilasilaga e ta'ua o le Volcano Activity Notice (VAN).	
ALERT-LEVEL TERMS/UPU O TULAGA E MATA'ALA AI	DEFINITION/O LONA UIGA
NORMAL/TULAGA MASANI	Volcano is in typical background, noneruptive state <i>or, after a change from a higher level,</i> volcanic activity has ceased and volcano has returned to noneruptive background state. O lo'o i lona tulaga masani le mauga mu, o le tulaga e lē pā , <i>po'o ua iai se suiga mai le tulaga maualuga,</i> ua lē toe iai ni gaoioiga o le mauga mu ma ua toe fo'i i lona tulaga e lē pā .
ADVISORY/TULAGA O FAUTUAGA	Volcano is exhibiting signs of elevated unrest above known background level <i>or, after a change from a higher level,</i> volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase. Ua fa'aalia ni gaoioiga o le mauga mu mai lona tulaga masani, <i>po'o ua iai se suiga mai le tulaga maualuga,</i> ua fa'aitia gaoioiga o le mauga mu ae o lo'o va'avaia pea auā e mafai ona toe fa'ateteleina ona gaoioiga.
WATCH/TULAGA O NOFO VA'AVA'AIA	Volcano is exhibiting heightened or escalating unrest with increased potential of eruption, <i>timeframe uncertain,</i> OR eruption is underway but poses limited hazards. Ua matuā fa'aalia gaoioiga o le mauga mu ma e ono pā, <i>e lē o mauiua se taimi e pā ai,</i> PO'O ua fa'agasolo ona pā le mauga mu ae e fa'atapula'a lona lamatiaga.
WARNING/TULAGA O LAPATA'IGA	Hazardous eruption is imminent, underway, or suspected. E pā le maugā mu i se taimi lata mai, po'o ua fa'agasolo ona pā, po'o ua masalomia le pā o le mauga mu.

AVIATION COLOR CODES/LANU FA'AILO MO FEMALAGAINA O LE EA	
When the volcano color code changes, a Volcano Observatory Notification for Aviation (VONA) is issued. A sui le lanu fa'ailo o le tulaga o mauga mu, e tu'uina atu se fa'asilasilaga e ta'ua o le Volcano Observatory Notification for Aviation (VONA).	
GREEN/LANU MEAMATA	Volcano is in typical background, noneruptive state <i>or, after a change from a higher level,</i> volcanic activity has ceased and volcano has returned to noneruptive background state. O lo'o i lona tulaga masani le mauga mu, o le tulaga e lē pā , <i>po'o ua iai se suiga mai le tulaga maualuga,</i> ua lē toe iai ni gaoioiga o le mauga mu ma ua toe fo'i i lona tulaga e lē pā .
YELLOW/LANU SAMASAMA	Volcano is exhibiting signs of elevated unrest above known background level <i>or, after a change from a higher level,</i> volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase. Ua fa'aalia ni gaoioiga o le mauga mu mai lona tulaga masani, <i>po'o ua iai se suiga mai le tulaga maualuga,</i> ua fa'aitia gaoioiga o le mauga mu ae o lo'o va'avaia pea auā e mafai ona toe fa'ateteleina ona gaoioiga.
ORANGE/LANU MOLI	Volcano is exhibiting heightened or escalating unrest with increased potential of eruption, <i>timeframe uncertain,</i> OR eruption is with no or minor volcanic-ash emissions [ash-plume height specified, if possible]. Ua matuā fa'aalia gaoioiga o le mauga mu ma e ono pā, <i>e lē o mauiua se taimi e pā ai,</i> PO'O ua pā le mauga mu ma e ono iai ni lefulefu o mauga mu e oso mai ai [pe a mafai, e fa'ailoa atu le maualuga o lefulefu o mauga mu].
RED/LANU MUMU	Eruption is imminent with significant emission of volcanic ash into the atmosphere likely OR eruption is underway or suspected with significant emission of volcanic ash into the atmosphere [ash-plume height specified, if possible]. E pā le mauga mu i se taimi lata mai, ma e ono tele lefulefu o mauga mu i le ea, PO'O ua fa'agasolo ona pā le mauga mu po'o ua masalomia le pā o le mauga mu ma e tele lefulefu o mauga mu i le ea [pe a mafai, e fa'ailoa atu le maualuga o lefulefu o mauga mu].



Ta'ū volcano

Type: Shield volcano (like the Hawaiian volcanoes)

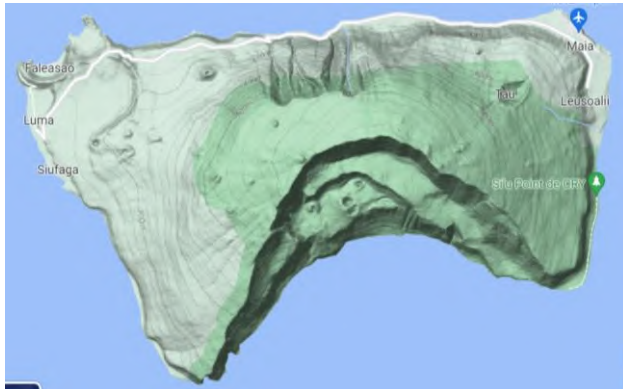
Last eruption: Unknown, thought to be within last 10 thousand years

Status: ADVISORY/YELLOW

Unrest hazards can include: earthquakes, ground cracking/deformation, volcanic gases

Eruption types can include: submarine eruptions, “wet” eruptions (phreatomagmatic), “dry” eruptions (magmatic)

Eruption hazards can include: unrest hazards plus pyroclastic surges, ash, lava flows, mudflows (lahars), ballistics, cone / tuff cone formation

A screenshot of the USGS Ta'ū volcano profile page. The page features a large photograph of a person sitting on a grassy slope overlooking a beach and the ocean. To the right of the photo is a metadata table. Below the photo are navigation tabs for various reports and galleries. At the bottom, there are two main sections: "Basic Data" and "Geological Summary".

Ta'ū	
Country	United States
Primary Volcano Type	Shield
Last Known Eruption	Unknown - Evidence Credible
Latitude	14.23°S
Longitude	169.454°W
Summit Elevation	931 m / 3054 ft
Volcano Number	244001

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Google Earth Placemark with Features | Cite Volcano Profile

Latest Activity Reports | Weekly Reports | Bulletin Reports | Synonyms & Subfeatures | General Information

Eruptive History | Deformation History | Emission History | Photo Gallery | Map Holdings | Sample Collection | External Sites

Basic Data

Volcano Number	244001
Last Known Eruption	Unknown - Evidence Credible
Elevation	931 m / 3054 ft

Geological Summary

The 10-km-wide Ta'ū Island, located at the E end of the Samoan islands, is ringed by sea cliffs. It is the emergent portion of the large Lata shield volcano. A major flank collapse event around 22 ka resulted in the steep scarps on the southern side of the island. Two smaller shields were constructed along rift zones at the NW and NE tips of the island. The NW corner of the island has a tuff-cone complex that ejected large dunite xenoliths and coral blocks. Numerous Holocene post-caldera cones occur at the summit and on the flanks.

USGS webpage: <https://www.usgs.gov/volcanoes/ta-u-island>

Global Volcanism Program entry:

<https://volcano.si.edu/volcano.cfm?vn=244001>

Ofu-Olosega volcano

Type: Shield volcano (like the Hawaiian volcanoes)

Last eruption: 1866 CE (submarine eruption)

Status: NORMAL/GREEN


Unrest hazards can include: earthquakes, ground cracking/deformation, volcanic gases

Eruption types can include: submarine eruptions, “wet” eruptions (phreatomagmatic), “dry” eruptions (magmatic)

Eruption hazards can include: unrest hazards plus pyroclastic surges, ash, lava flows, mudflows (lahars), ballistics, cone / tuff cone formation



Ofu-Olosega



Country	United States
Primary Volcano Type	Shield(s)
Last Known Eruption	1866 CE
Latitude	14.175°S
Longitude	169.618°W
Summit Elevation	639 m / 2096 ft
Volcano Number	244010

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Eruptive History | Deformation History | Emission History | Photo Gallery | Map Holdings | Sample Collection | External Sites

Basic Data

Volcano Number	244010
Last Known Eruption	1866 CE
Elevation	639 m / 2096 ft
Latitude	14.175°S
Longitude	169.618°W

Geological Summary

The two triangle-shaped islands of Ofu and Olosega in eastern Samoa, with a combined length of 6 km, are separated by a narrow strait. The islands are formed by two eroded, coalescing basaltic shield volcanoes whose slopes dip to the east and west. Steep cliffs up to 600-m high truncate the northern and southern sides of the islands. The narrow, steep-sided ridge forming the eastern tip of Ofu Island consists of a dike complex. The shield volcano on Ofu is cut on the north by the A'ofa caldera; bathymetry suggests that a caldera may also exist on the Sili shield volcano of Olosega. The Nu'utele tuff cone, forming a small crescent-shaped island immediately off the west end of Ofu Island, is Holocene in age. A submarine eruption took place in 1866 at the opposite end of the two islands, 3 km SE of Olosega, along the ridge connecting Olosega with Ta'u Island.

USGS webpage: <https://www.usgs.gov/volcanoes/ofu-olosega>

Global Volcanism Program entry:

<https://volcano.si.edu/volcano.cfm?vn=244010>

Tutuila volcano

Type: Shield volcano (like the Hawaiian volcanoes)

Last eruption: Unknown, but dated eruption at 440 ± 200 CE

Status: UNASSIGNED/UNASSIGNED

Unrest hazards can include: earthquakes, ground cracking/deformation, volcanic gases

Eruption types can include: submarine eruptions, “wet” eruptions (phreatomagmatic), “dry” eruptions (magmatic)

Eruption hazards can include: unrest hazards plus pyroclastic surges, ash, lava flows, mudflows (lahars), ballistics, cone / tuff cone formation



A screenshot of the USGS volcano webpage for Tutuila. The page features a large photograph of the island's coastline and a detailed information panel on the right. The information panel includes fields for Country (United States), Primary Volcano Type (Tuff cone(s)), Last Known Eruption (440 CE), Latitude (14.295°S), Longitude (170.7°W), Summit Elevation (653 m / 2142 ft), and Volcano Number (244020). Below the information panel are navigation tabs for Latest Activity Reports, Weekly Reports, Bulletin Reports, Synonyms & Subfeatures, and General Information. The General Information tab is selected, showing sections for Basic Data, Geological Summary, and Volcano Types. The Basic Data section lists the volcano number, last known eruption, elevation, latitude, and longitude. The Geological Summary section provides a detailed description of the volcano's history and characteristics. The Volcano Types section lists the volcano as a Tuff cone(s).

USGS webpage: <https://www.usgs.gov/volcanoes/tutuila-island>

Global Volcanism Program entry:

<https://volcano.si.edu/volcano.cfm?vn=244020>

Vialulu'u volcano

Type: Submarine shield volcano (like Kama'ehuakanaloa off coast of Hawai'i)

Last eruptions: 1973, 1995, 2003

Status: N/A


Unrest hazards can include: earthquakes

Eruption type: submarine eruption

Eruption hazards can include: earthquake, ocean disturbances, maybe pumice rafts (unlikely)



Vailulu'u



Country	United States
Primary Volcano Type	Submarine
Last Known Eruption	2003 CE
Latitude	14.215°S
Longitude	169.058°W
Summit Elevation	-592 m -1942 ft
Volcano Number	244000

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Latest Activity Reports | Weekly Reports | Bulletin Reports | Synonyms & Subfeatures | General Information

Eruptive History | Deformation History | Emission History | Photo Gallery | Map Holdings | Sample Collection | External Sites

Basic Data

Volcano Number	244000
Last Known Eruption	2003 CE
Elevation	-592 m / -1942 ft
Latitude	14.215°S
Longitude	169.058°W

Volcano Types

Submarine

Geological Summary

Vailulu'u, a massive basaltic seamount not discovered until 1975, rises 4,200 m from the sea floor to a depth of 590 m about one-third of the way between Ta'u and Rose islands at the E end of the American Samoas. It is considered to mark the current location of the Samoan hotspot. The summit contains an oval-shaped crater that is 2 km wide and 400 m deep. Two principal rift zones extend E and W from the summit, parallel to the trend of the hotspot; a third rift extends SE. The rift zones and escarpments produced by mass wasting phenomena give the seamount a star-shaped pattern. On 10 July 1973 explosions were recorded by SOFAR (hydrophone records of underwater acoustic signals). An earthquake swarm in 1995 may have been related to an eruption. Eruptive activity between April 2001 and April 2005 formed a cone almost 300 m high, named Nafanua. Repeated bathymetric mapping surveys showed depth changes, including height and width increases of Nafanua after 2005, that suggest at least intermittent activity during 1999-2017; a 2019 survey showed no further changes since 2017.

USGS webpage: <https://www.usgs.gov/volcanoes/ta-u-island/geology-and-history>

Global Volcanism Program entry:
<https://volcano.si.edu/volcano.cfm?vn=244000>

Volcanic unrest and eruption can cause:

- ❖ Considerable public anxiety
- ❖ Acute life-safety risk (often drives official evacuations)
- ❖ Health challenges (respiratory, skin, eyes, physical and mental trauma)
- ❖ Property destruction and damage
- ❖ Indefinitely displaced populations
- ❖ Considerable clean-up, restoration

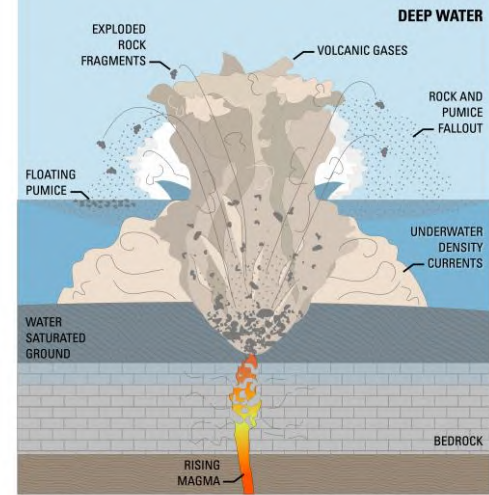
Some volcano challenges:

- ❖ New experience for officials and residents (scientists too – each volcano and every unrest or eruption situation is unique)
- ❖ High uncertainty – before, during, and at end of eruption
- ❖ Difficult in moment to know when unrest or eruption is over
- ❖ Can have many different hazards at once
- ❖ Can be slow-motion disaster

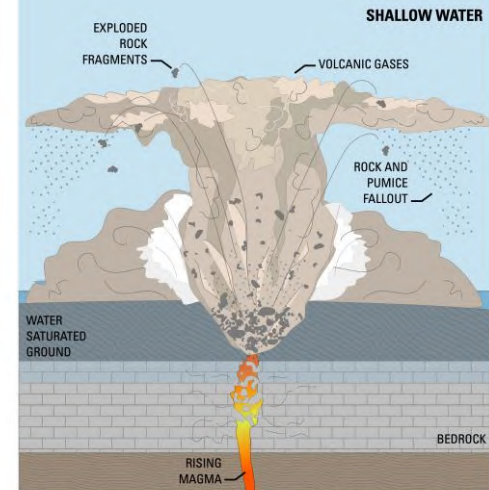
Types of eruptions in American Samoa

- ❖ Submarine eruption (material can reach ocean surface, or be completely contained by the ocean) →
- ❖ “Dry eruption” on land, in area with not much groundwater
- ❖ *[Worst-case scenario]* “Wet eruption”, which is a coastal eruption (near shore either on land or in ocean, or shore) or place with a lot of groundwater →

Can also have unrest without an eruption



PHREATOMAGMATIC ERUPTION
Explosive eruption when magma encounters water.



PHREATOMAGMATIC ERUPTION
Explosive eruption when magma encounters water.



Ta'ū Volcano is at ADVISORY/YELLOW
Ofu-Olosega Volcano is at NORMAL/GREEN

The next slides show examples of volcanic unrest and volcanic eruptive hazards that could occur in American Samoa

Examples of
**ground
deformation**
(2018 Kīlauea
Lower East Rift
Zone, Hawai'i)

Ground deformation
does not always lead
to an eruption (but
generally indicates
magma is quite
shallow)



Example of
scoria cone
formation
(2018 Kīlauea
Lower East Rift
Zone, Hawai'i)



Examples of
lava flows
(Mauna Loa
and Kīlauea,
Hawai'i)



Examples of
**explosions from
lava entering
ocean** (Kīlauea,
Hawai'i)



Examples of
“LAZE” (lava
haze – when
seawater and
lava met)
(2018 Kīlauea
Lower East Rift
Zone, Hawai‘i)



Examples of
volcanic gas
(2018 Kīlauea
Lower East Rift
Zone, Hawai‘i)



Examples of
volcanic ash
(2018 Kīlauea
Lower East Rift
Zone, Hawai‘i)



Examples of
**ballistics (“blocks
and bombs”)**
(2009 Pacaya,
Guatemala, 2014
Ontake, Japan)

Not USGS photos, do not
know copyright

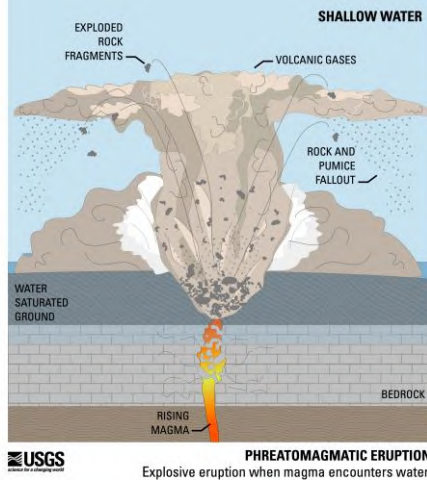


▲ Pacaya, Guatemala ▲

◀ Ontake, Japan

Examples of
pyroclastic surge (2019
Whakaari /
White Island,
New Zealand)

Not a USGS photo, do
not know copyright

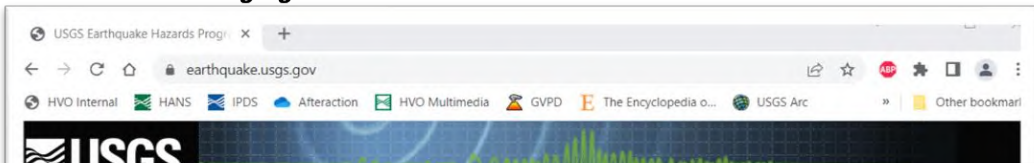


Situation

- ❖ Earthquakes at Ta'ū volcano began over 2 months ago (first report July 26). The swarm continues, although the number of earthquakes has been low since first week of September.
- ❖ The current best estimate of the Ta'ū volcano earthquakes location is approximately 5-15 km (3-9 mi) north of Ta'ū at about 10-15 km below the surface. Ocean water depths north of the island are greater than 1 km at 5 km offshore and 3 km at 15 km offshore
- ❖ The source of the earthquakes has not moved within the earth since monitoring began in mid-August – the source position has remained constant
- ❖ The USGS monitoring networks includes seismometers (data immediately available for analysis) and GNSS stations (it will be a few weeks before have enough data to start interpreting)
- ❖ We thank residents of the Manu'a Islands for reporting when they feel earthquakes, and reports of unusual activity—it is very helpful

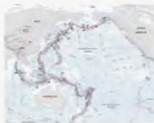
USGS activities

- ❖ Continue monitoring Ta'ū volcano, primarily with American Samoa seismic network, and providing regular information on the status of the volcano (currently weekly updates every Thursday)
- ❖ Evaluating options for hardening the monitoring network, given logistics, budgets, and personnel availability
 - ❖ Some stations require servicing soon, and some stations will need to be moved in the medium to long term
 - ❖ Short-term aim is to harden stations – so that they keep providing data for a year or two
 - ❖ Long term aim is to permanentize stations (this involves material we did not bring with us in this initial deployment), with budget for routine servicing



Earthquake Hazards Program

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Significant Earthquakes

- [Significant Earthquakes Archive](#)
- [What makes an earthquake significant?](#)



USGS Magnitude 2.5+ Earthquakes, Past Day

50 earthquakes.

Only List Earthquakes Shown on Map

Format: Magnitude
Sort: Newest First

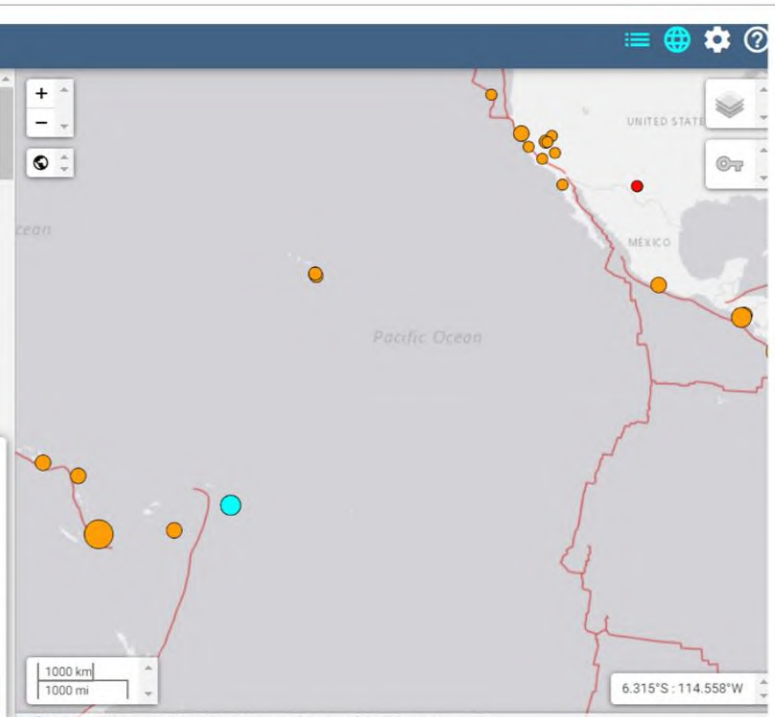
2.8 55 km S of Whites City, New ...
2022-09-14 07:30:55 (UTC-10:00) 6.8 km

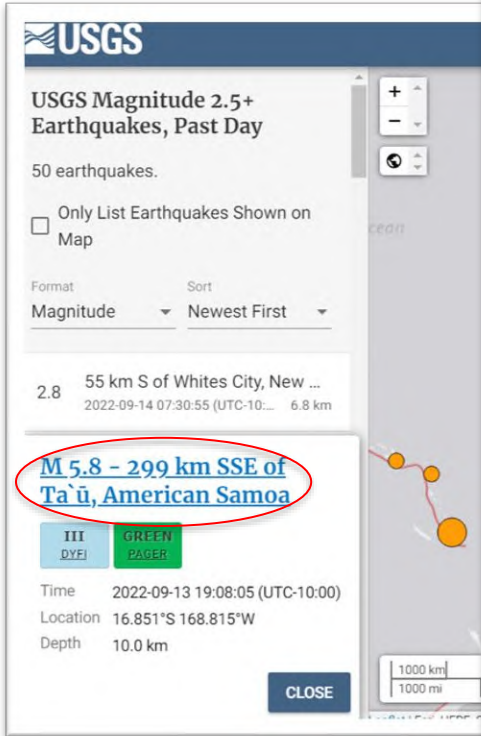
M 5.8 - 299 km SSE of Ta'u, American Samoa

III DYE GREEN PAGER

Time 2022-09-13 19:08:05 (UTC-10:00)
Location 16.851°S 168.815°W
Depth 10.0 km

CLOSE





USGS

USGS Magnitude 2.5+ Earthquakes, Past Day

50 earthquakes.

Only List Earthquakes Shown on Map

Format: Magnitude | Sort: Newest First

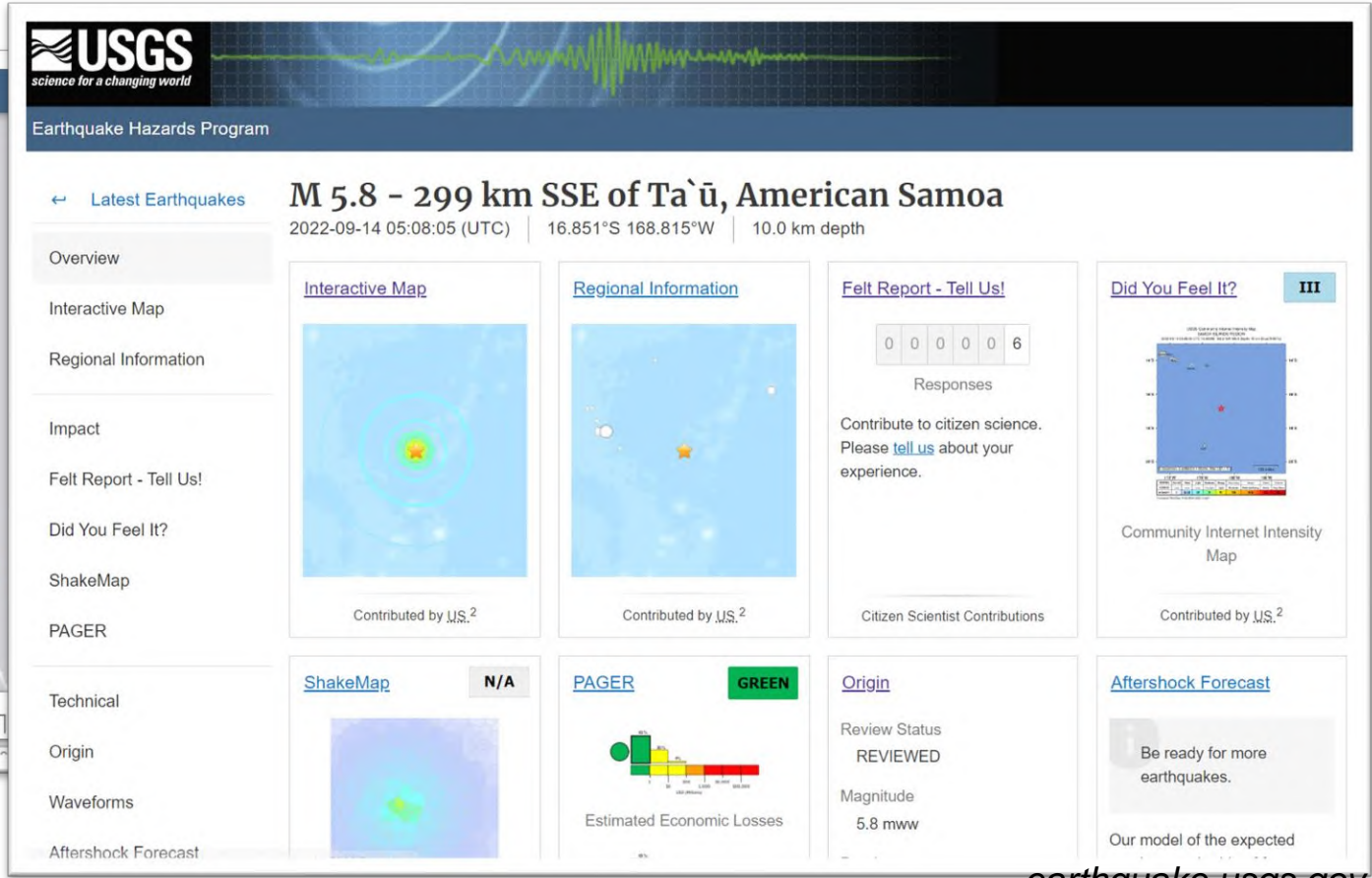
2.8 55 km S of Whites City, New ...
2022-09-14 07:30:55 (UTC-10:00) 6.8 km

M 5.8 - 299 km SSE of Ta'ū, American Samoa

III DYFI | GREEN PAGER

Time: 2022-09-13 19:08:05 (UTC-10:00)
Location: 16.851°S 168.815°W
Depth: 10.0 km

CLOSE



USGS science for a changing world

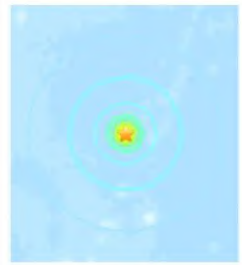
Earthquake Hazards Program

M 5.8 - 299 km SSE of Ta'ū, American Samoa
2022-09-14 05:08:05 (UTC) | 16.851°S 168.815°W | 10.0 km depth

← Latest Earthquakes


- Overview
- Interactive Map
- Regional Information
- Impact
- Felt Report - Tell Us!
- Did You Feel It?
- ShakeMap
- PAGER
- Technical
- Origin
- Waveforms
- Aftershock Forecast

[Interactive Map](#)



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[Regional Information](#)



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[Felt Report - Tell Us!](#)

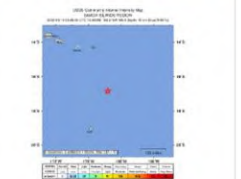
0 0 0 0 0 6

Responses

Contribute to citizen science. Please [tell us](#) about your experience.

Citizen Scientist Contributions

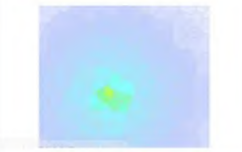
[Did You Feel It?](#) III



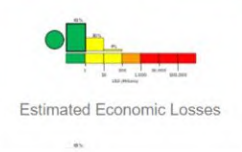
Community Internet Intensity Map

Contributed by [US²](#)

[ShakeMap](#) N/A



[PAGER](#) GREEN



Estimated Economic Losses

[Origin](#)

Review Status: REVIEWED

Magnitude: 5.8 mww

[Aftershock Forecast](#)

Be ready for more earthquakes.

Our model of the expected

IMPORTANT NOTE

- **Sometime soon (timeframe unknown) the National Earthquake Information Center (NEIC) will start publishing preliminary locations of the largest earthquakes in the swarm**
- There has been no change in the challenge with locating the earthquakes (caused by network geometry, forced by the east-west location of the islands)
- These preliminary locations should not be taken as definitive – view it more as a record that this was a large earthquake, but the location and depth have HUGE errors
- The NEIC uses standard methods for earthquake locations. For example, NEIC’s default depth for earthquakes with poor depth control is 10 km
- The Hawaiian Volcano Observatory is working on locations with a more nuanced understanding of activity in the Manu’a Islands. It will take time to get more reliable locations (some earthquakes will not be able to have reliable location).

What to prepare for:

- ❖ **It is human nature to view dots published on a map as definitive information. In this instance, take it more as indication there have been earthquakes, resist viewing the dots as the real location.**
- ❖ Volcano seismologists are in agreement that the earthquakes are to north of Ta’ū Island, and that the locations have been steady. The preliminary earthquake locations will show variable in location, with some to the south of Ta’ū Island.
- ❖ The locations of the dots will move when locations are improved
- ❖ All the earthquakes will be marked as “Reviewed” (even when preliminary)

Good news: This will open up ability to use “Did You Feel It” platform to for people to report how they felt specific earthquakes

RECAP

- ❖ **USGS is federal agency charged with volcano, earthquake, and other natural hazard monitoring**
 - ❖ USGS Hawaiian Volcano Observatory charged with monitoring volcanoes of American Samoa (Ta'ū, Ofu-Olosega, Tutuila)
 - ❖ USGS-HVO monitors, set volcano alert levels, and issues official information products for American Samoa
- ❖ **Volcanic unrest and eruptions can result in a variety of hazards, some of which threaten life and/or property**
- ❖ **Ta'ū volcano in unrest, although unrest seems to be winding down** (but... situation can change rapidly)

CONTACT INFORMATION:

- ❖ **USGS-HVO** for regular reporting and questions, askHVO@usgs.gov
- ❖ **Dr Ken Hon**, USGS-HVO Scientist in Charge, khon@usgs.gov
- ❖ **Dr Natalia Deligne**, USGS-HVO American Samoa Lead Responding Scientist, ndeligne@usgs.gov