



MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT



TSUNAMI NATIONAL DATA CENTER & TSUNAMI READY PROGRAM – SAMOA

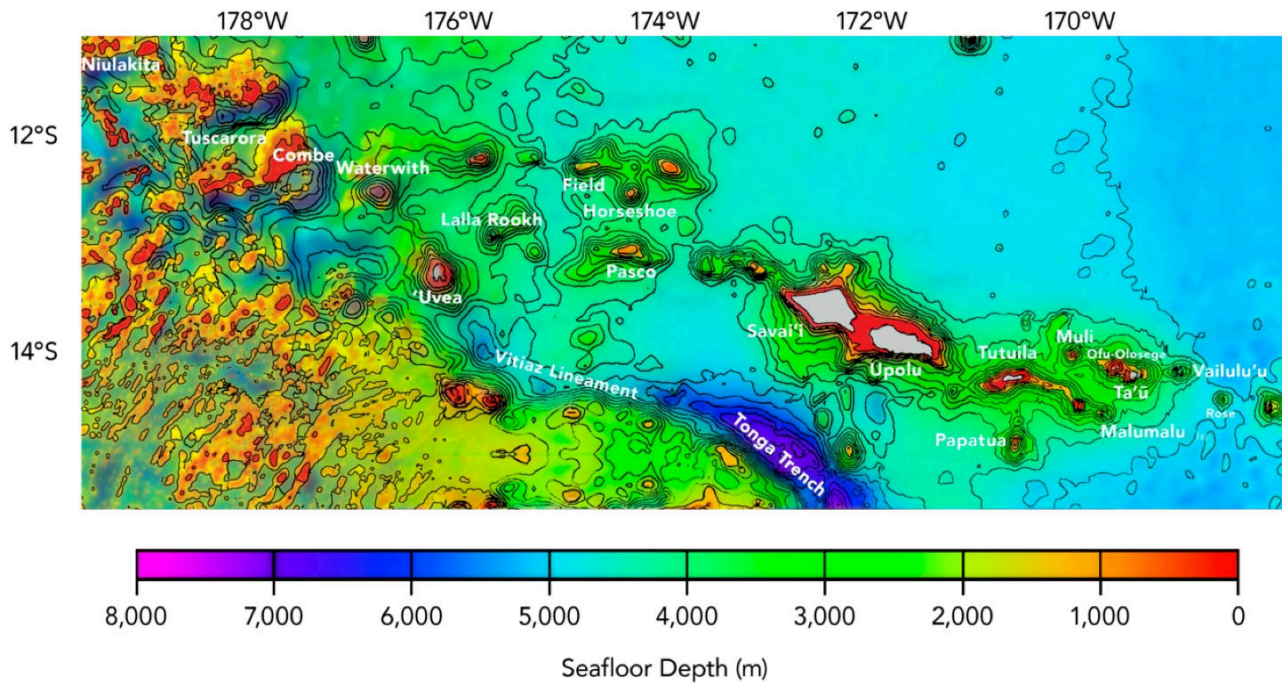
2024 International Tsunami Information Centre (ITIC) Training Programme (ITP-TEWS-Chile)

Darcy Naivins CKT

Tuesday 27th August 2024



Geophysical & Geological feature cont.,



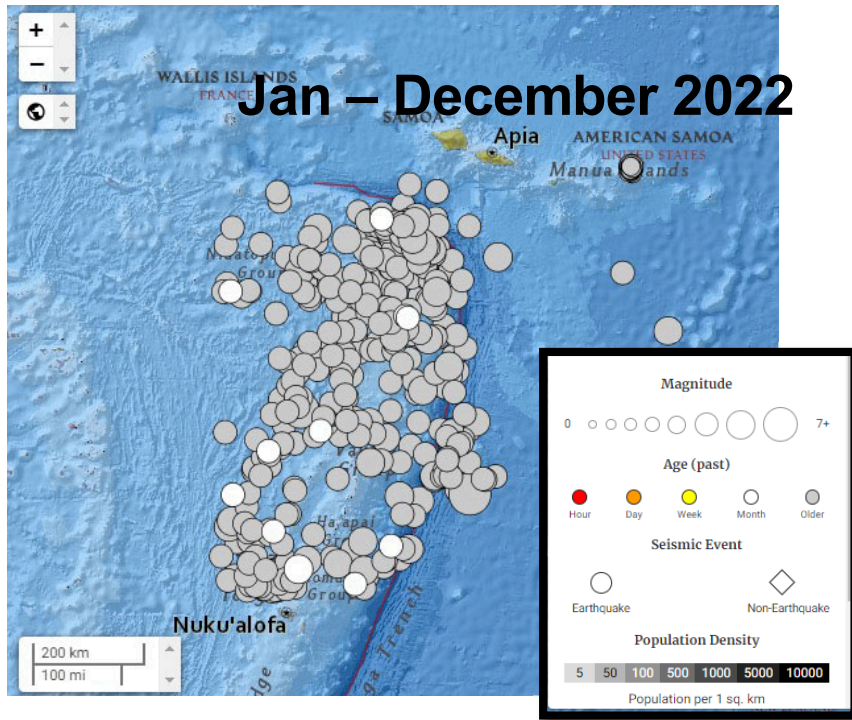
- Samoa archipelago chain consist of 16 islands and seamounts $2,123 \text{ km}^2$

Bird, Peter, 2003

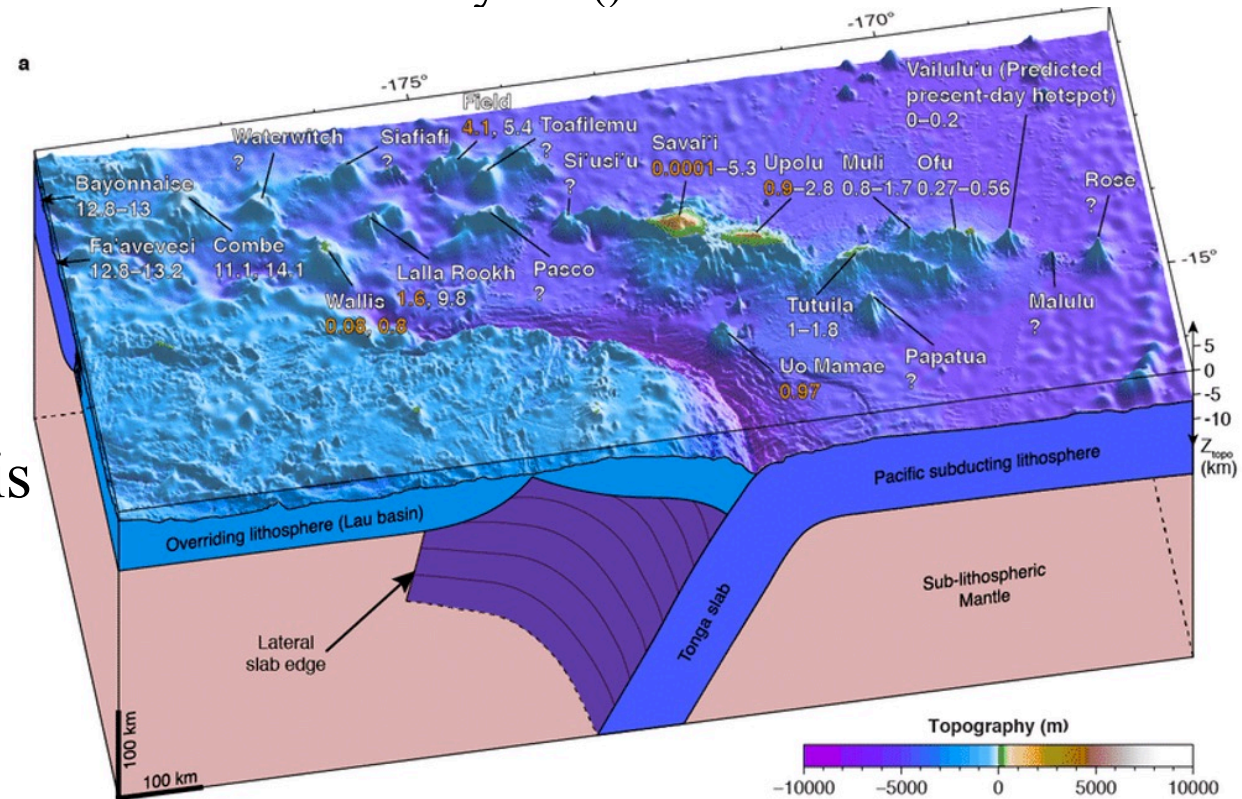


- Mt Matavanu, Savaii
 - Last Erupted August 4th 1902

Seismicity

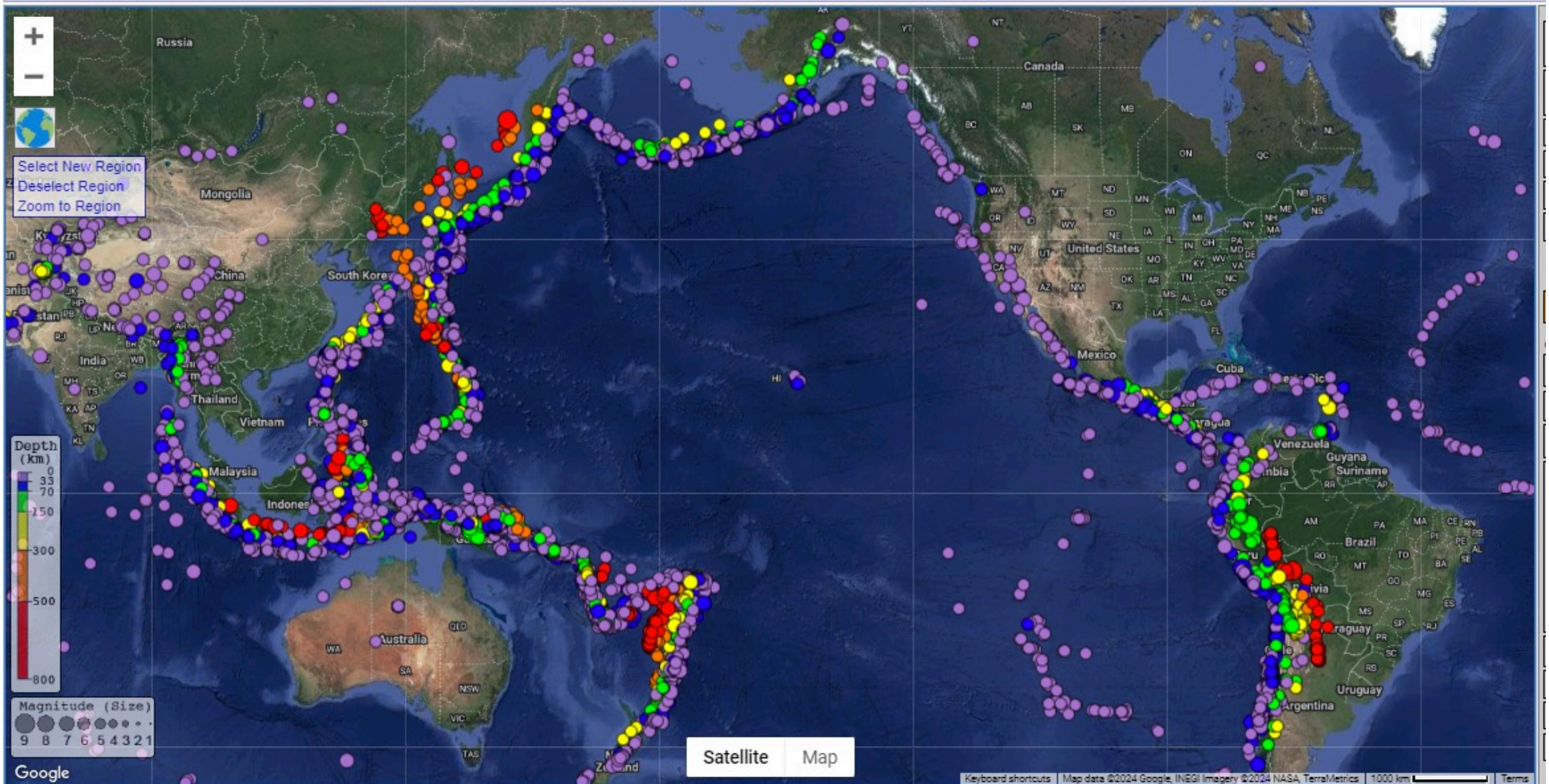


- 1746 M2+ recorded Samoa Tonga Trench 2022.
- Dominated by the convergence of the Pacific and Australia plates.
 - $\approx 7-10\text{mm/year.}$ (.)



- Approximately 180 km from the Tonga-Trench.
- Prone to Earthquakes and Tsunamis
 $\approx 15-20/\text{day.}$
 $\approx 100/\text{month}$

<https://earthquake.usgs.gov/earthquakes/map/>

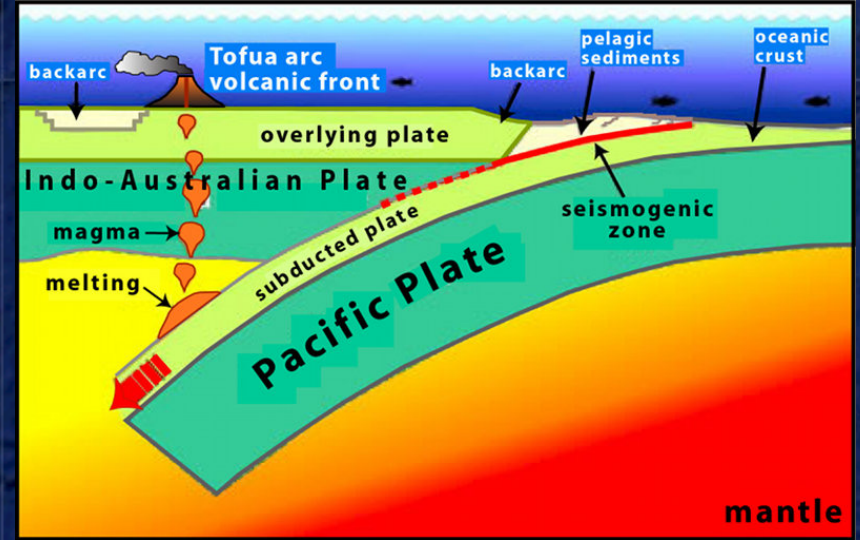
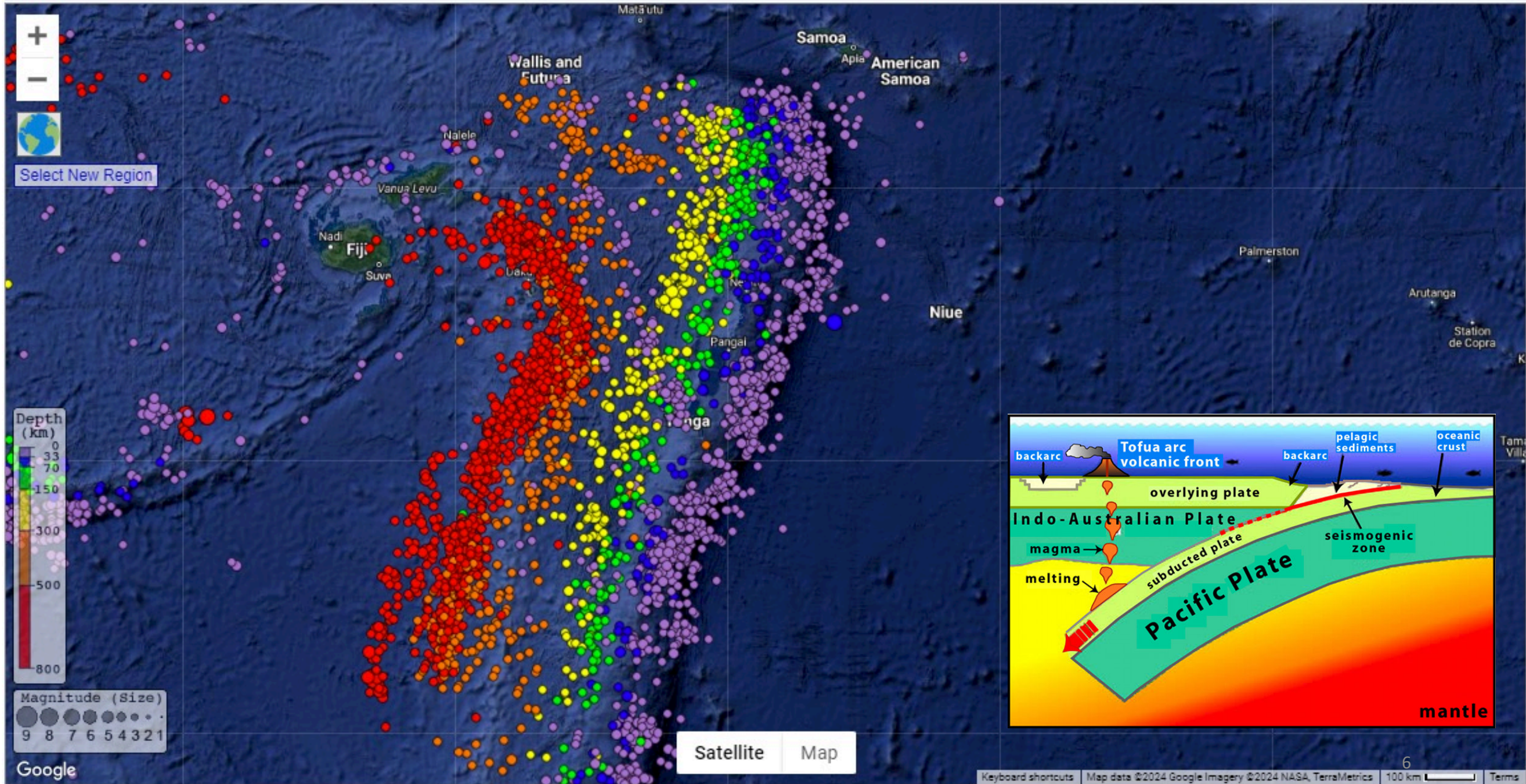


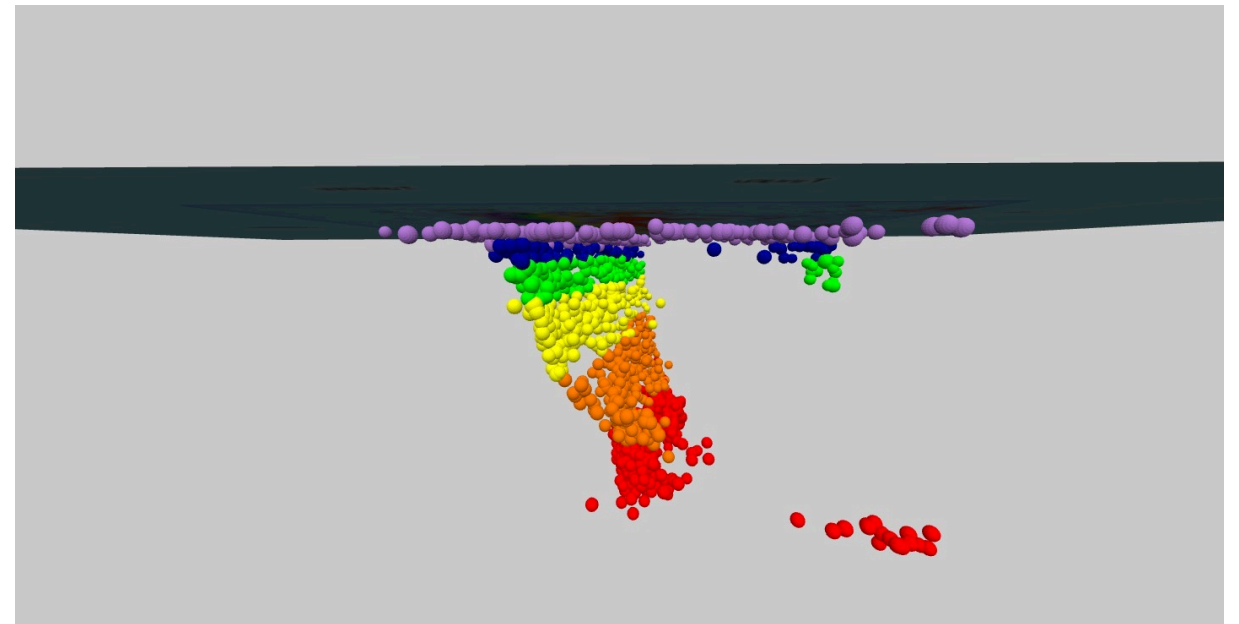
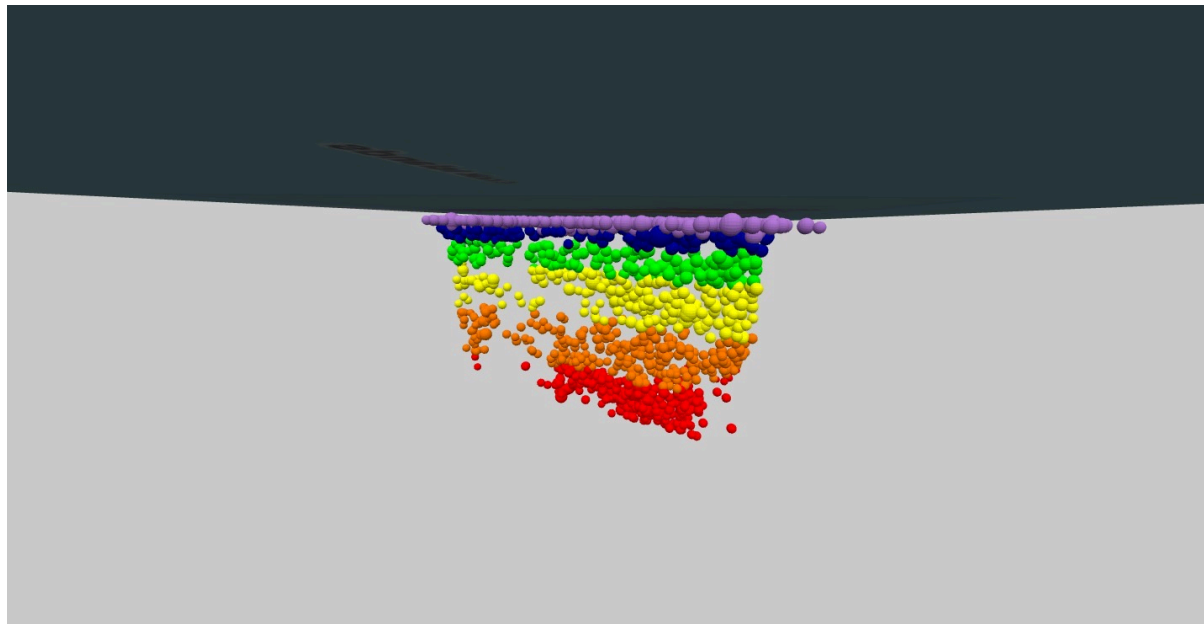
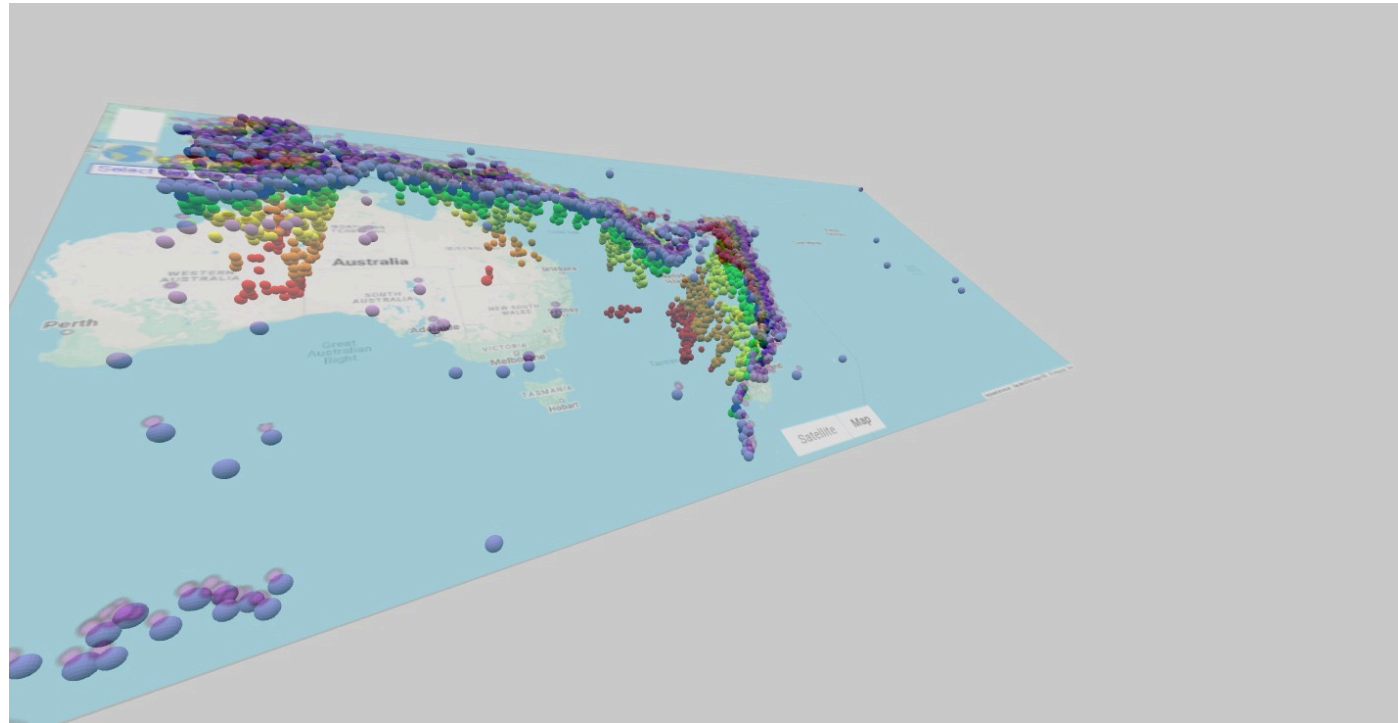


SAGE

Operated by EarthScope

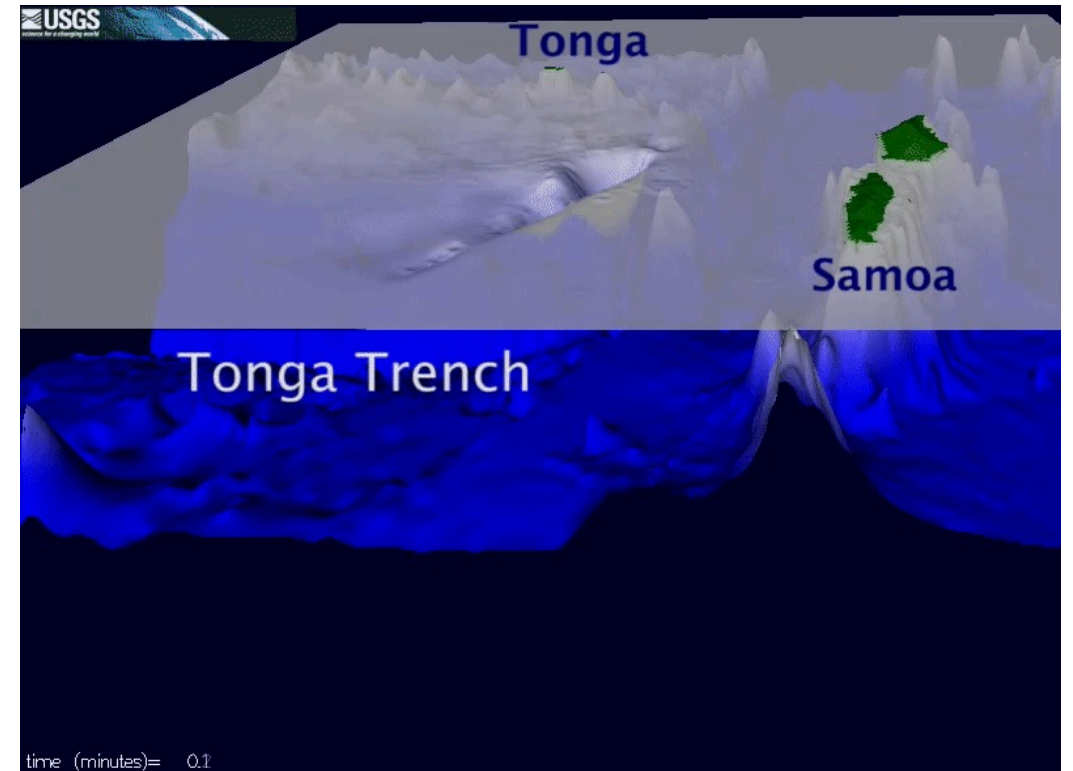
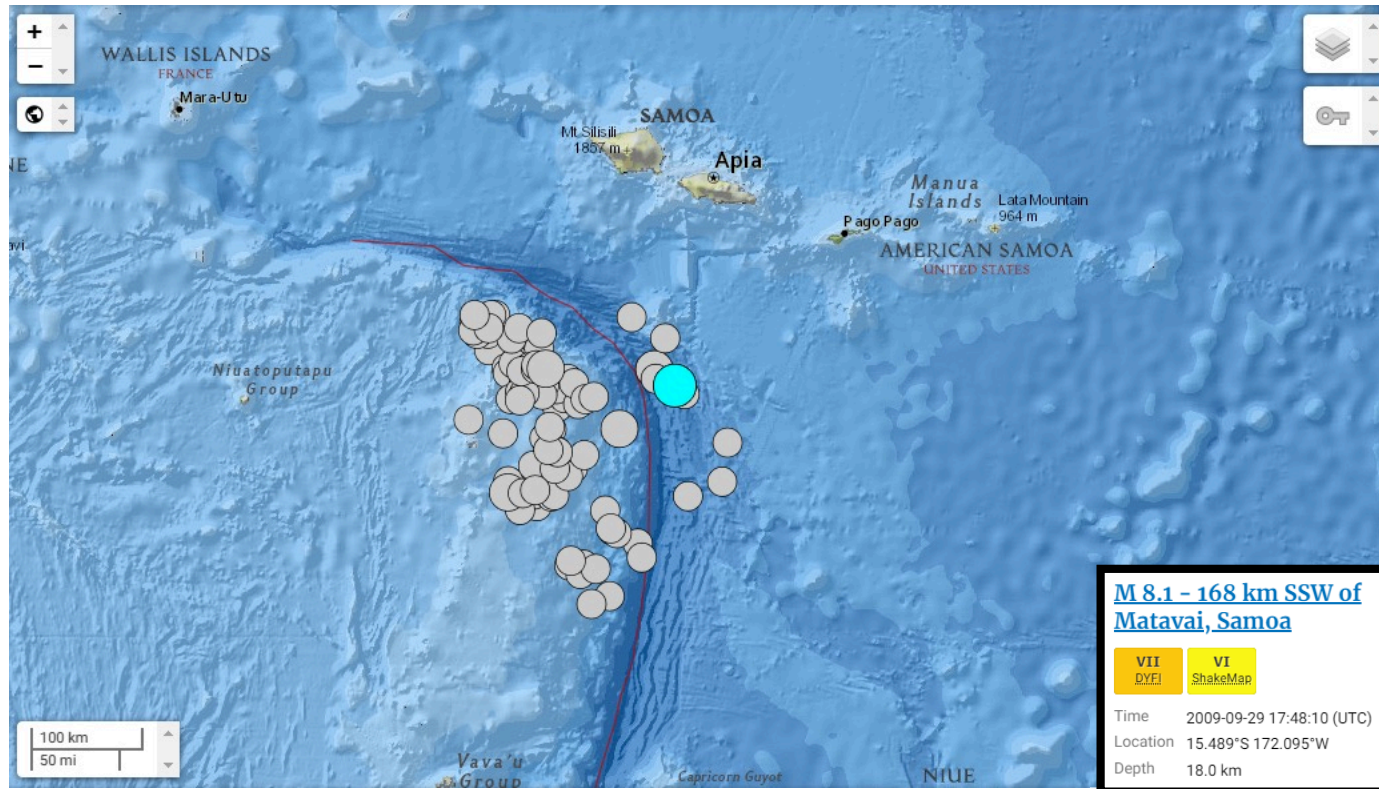
Interactive Earthquake Browser





<https://ds.iris.edu/ieb/index.html>

History of Disastrous Earthquakes



- On 2009/09/29 an 8.1 M earthquake generated tsunami waves of up to 22 meters.
- 40 Aftershocks 4M+
- Affected the Southern region.

- View point propagation looking west
- Wave travel time ≈ 10 min
- ≈ 190 km from Apia Samoa.

History of Disastrous Earthquakes

M 8.1 - 168 km SSW of
Matavai, Samoa

VII
DYFI

VI
ShakeMap

Time 2009-09-29 17:48:10 (UTC)
Location 15.489°S 172.095°W
Depth 18.0 km



- 149 casualties
- Over 200M in damage
- Established a 24/7 National Earthquake and Tsunami Warning Center.
- Upgraded its warning dissemination systems.
- Formed community-driven awareness's, evacuation maps and signage.

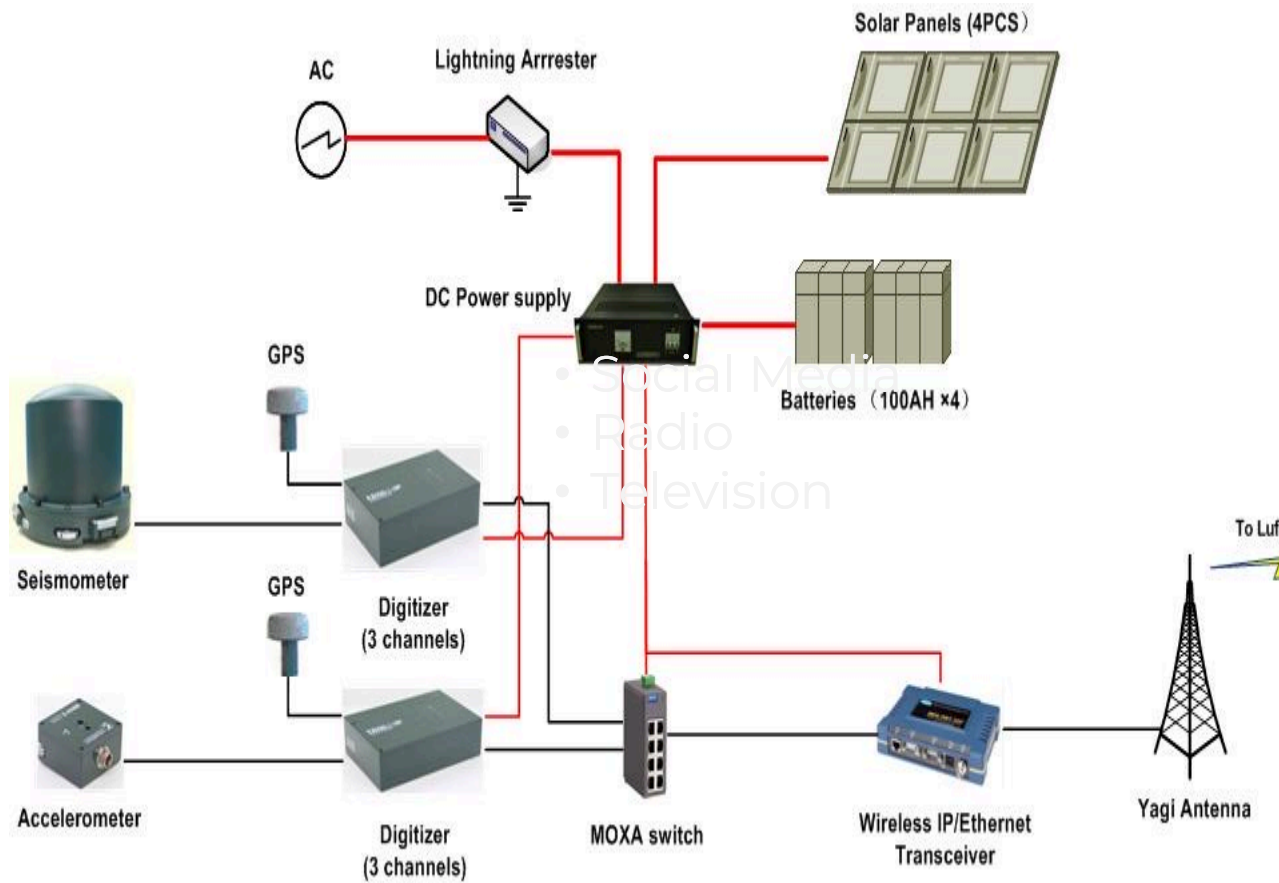


Kong, L., P. Dunbar, and N. Arcos (2015).

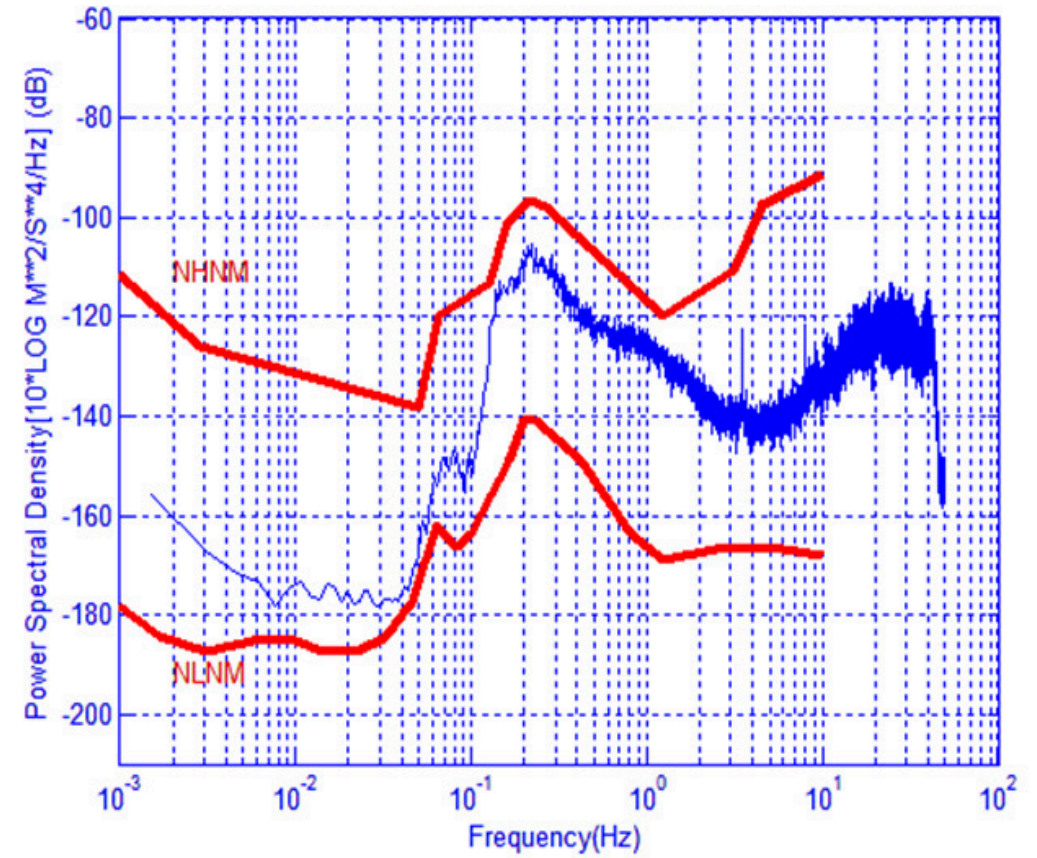
Seismic Network



Seismic Network



Asau BB Seismograph Station



Power Spectral Density for Afulilo Broadband

Geophysics - NDC

3 Major Steps for Earthquake & Tsunami Monitoring Operations

Step

1

RECIEVE

- Seismic Signal
 - Seismic Network, USGS, PTWC etc
- Public Calls



Step

2

ANALYZE

- Magnitude
- Location
- Depth
- Tide Gauges



Step

3

DISSEMINAT

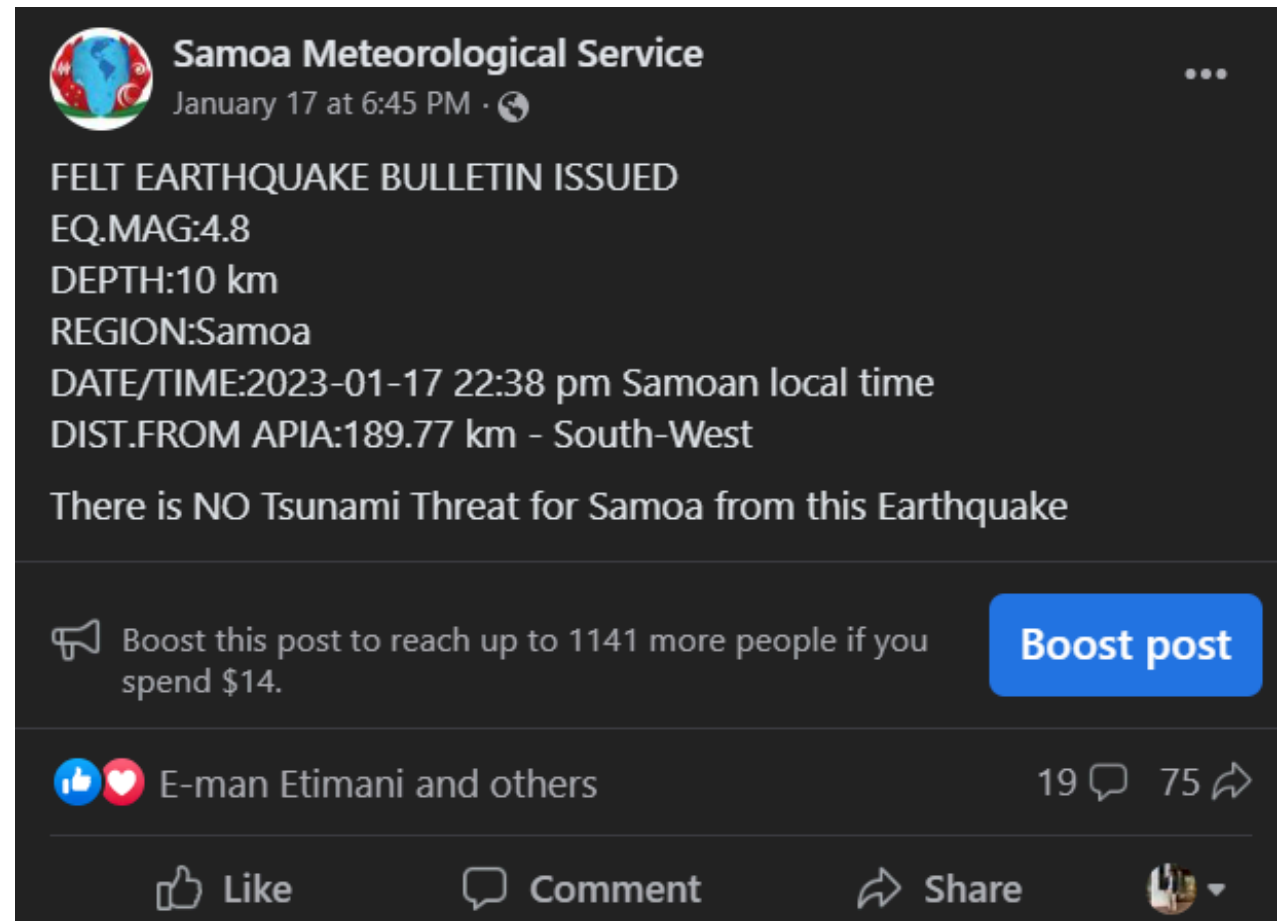
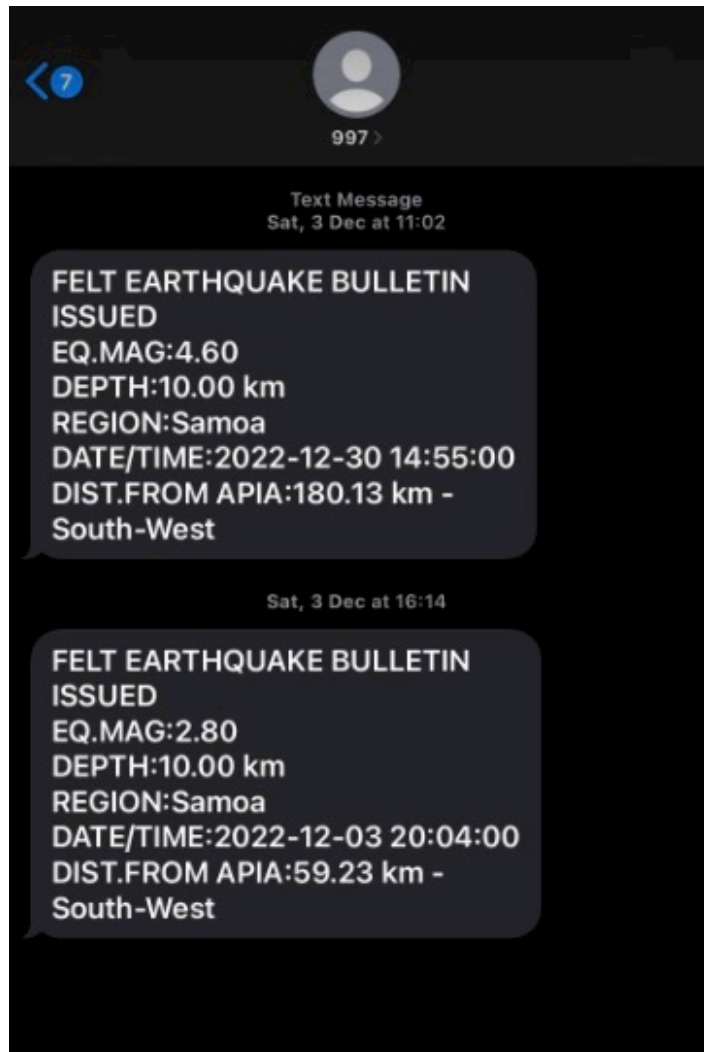
- Public **E**
- Social Media
- Radio
- Television



Actions Based on Allocations of Tsunami Scenarios.

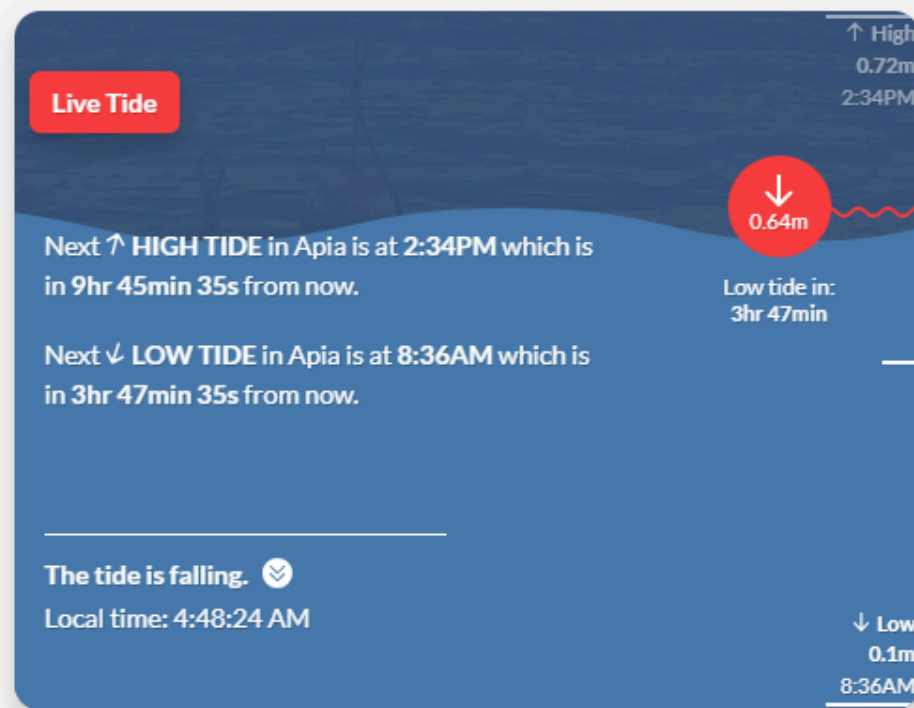
SITUATION	LOCATION & REGION	THRESHOLD	BULLETIN & APPROPRIATE ACTION
Tsunami Warning	Samoa – Tonga Region 1	Mag = 7.5> Depth = <50km MMI= X – XII	National Warning Bulletin. (Urgent Evacuation & Activate Sirens)
Tsunami Watch	Samoa – Tonga Region 1	Mag = 6.5 – 7.4 Depth = <50km MMI = VIII – IX	National Watch Bulletin
Tsunami Advisory	Samoa – Tonga Region 1	Mag = 6.0 – 6.4 Depth = <50km MMI = V – VII	National Advisory Bulletin.
Earthquake Information	Samoa – Tonga Region 1	Mag = <5.9 Depth = <50km MMI = I - V	Earthquake/Felt Information Bulletin

WARNING DISSEMINATION PRODUCTS



Today's tide times for Apia, Samoa Islands

The predicted tide times today on Wednesday 28 August 2024 for Apia are: first high tide at 1:47am, first low tide at 8:36am, second high tide at 2:34pm, second low tide at 8:44pm. Sunrise is at 6:34am and sunset is at 6:22pm.



Today's tide times for Apia: Wednesday 28 August 2024		
Tide 🌊	Time (+13) & Date	Height
High Tide	1:47 AM <i>(Wed 28 August)</i>	0.85 m <i>(2.8 ft)</i>
Low Tide	8:36 AM <i>(Wed 28 August)</i>	0.1 m <i>(0.32 ft)</i>
High Tide	2:34 PM <i>(Wed 28 August)</i>	0.72 m <i>(2.35 ft)</i>
Low Tide	8:44 PM <i>(Wed 28 August)</i>	0.16 m <i>(0.51 ft)</i>

Tide Datum: Mean Lower Low Water



Government of Samoa

MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT



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Apia, SAMOA.
Website: <http://www.mnre.gov.ws>

Telephone: (+685) 67200
Email: environment@mnre.gov.ws

Please address all correspondence to the
Chief Executive Officer, Private Bag, Apia,
Samoa.
Faamolemole faatuatusi uma mai fesootaiga
i le Ofisa Sili.

VERIFIED - FELT EARTHQUAKE REPORT COMPILED AND ISSUED BY THE SAMOA METEOROLOGY DIVISION

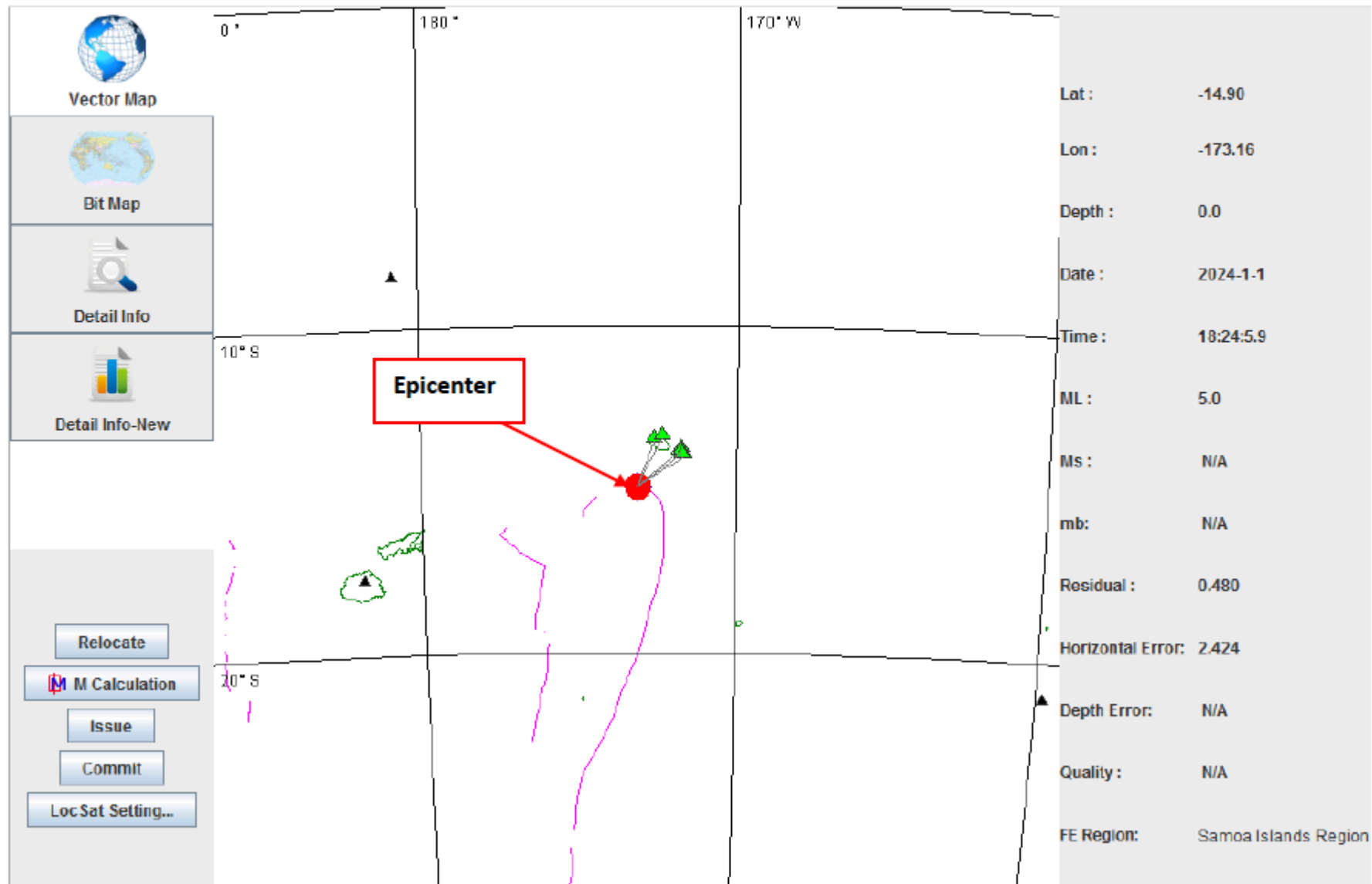
Date – Tuesday 02nd January 2024

An earthquake with magnitude **5.0** in the **Samoa Region** has occurred at **14.90°S, 173.16°W**, and depth of **10 kilometers** and the distance of **205 kilometers South West** of Apia Samoa. The earthquake occurred, **Tuesday 02nd January 2024 at 7:24 AM (Samoa local time)**

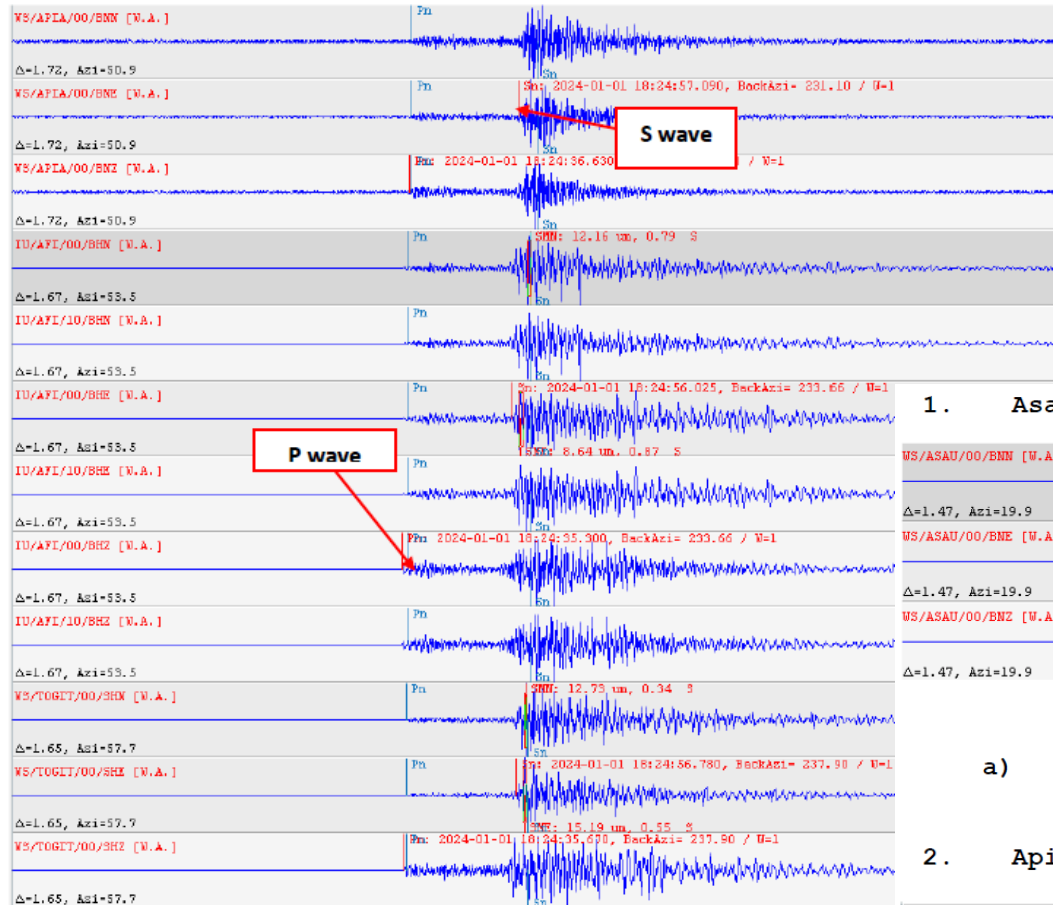
SUMMARY

Magnitude NDC	5
Instrumental Intensity Perceived Shaking	III Weak
Region	Samoa Islands Region
Coordinate Location	14.90°S, 173.16°W
Depth	10 kilometers
Distance	205 km South West of Apia
Felt (YES)	Reported by Met staff(John, Tali), Afa'ese
Tsunami (YES / NO)	No Tsunami threat for Samoa

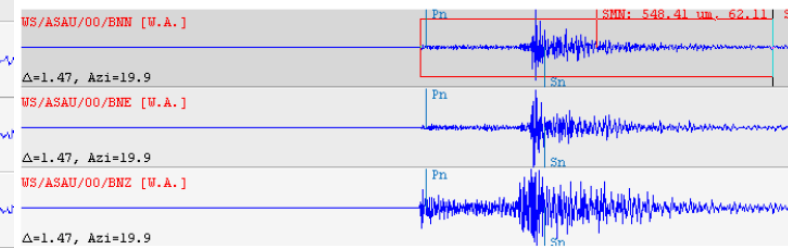
Location Display (NDC)



Waveform Analysis

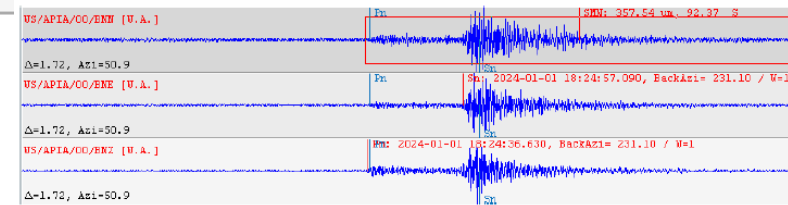


1. Asau Strong Motion



a) Peak Ground Acceleration of Lepiu 0.548 %gal

2. Apia Strong Motion



a) Peak Ground Acceleration of Apia 0.357%gal

National Organisation related to Early Warning



Ministry of Natural Resources & Environment

Samoa Meteorology

Geo-Science



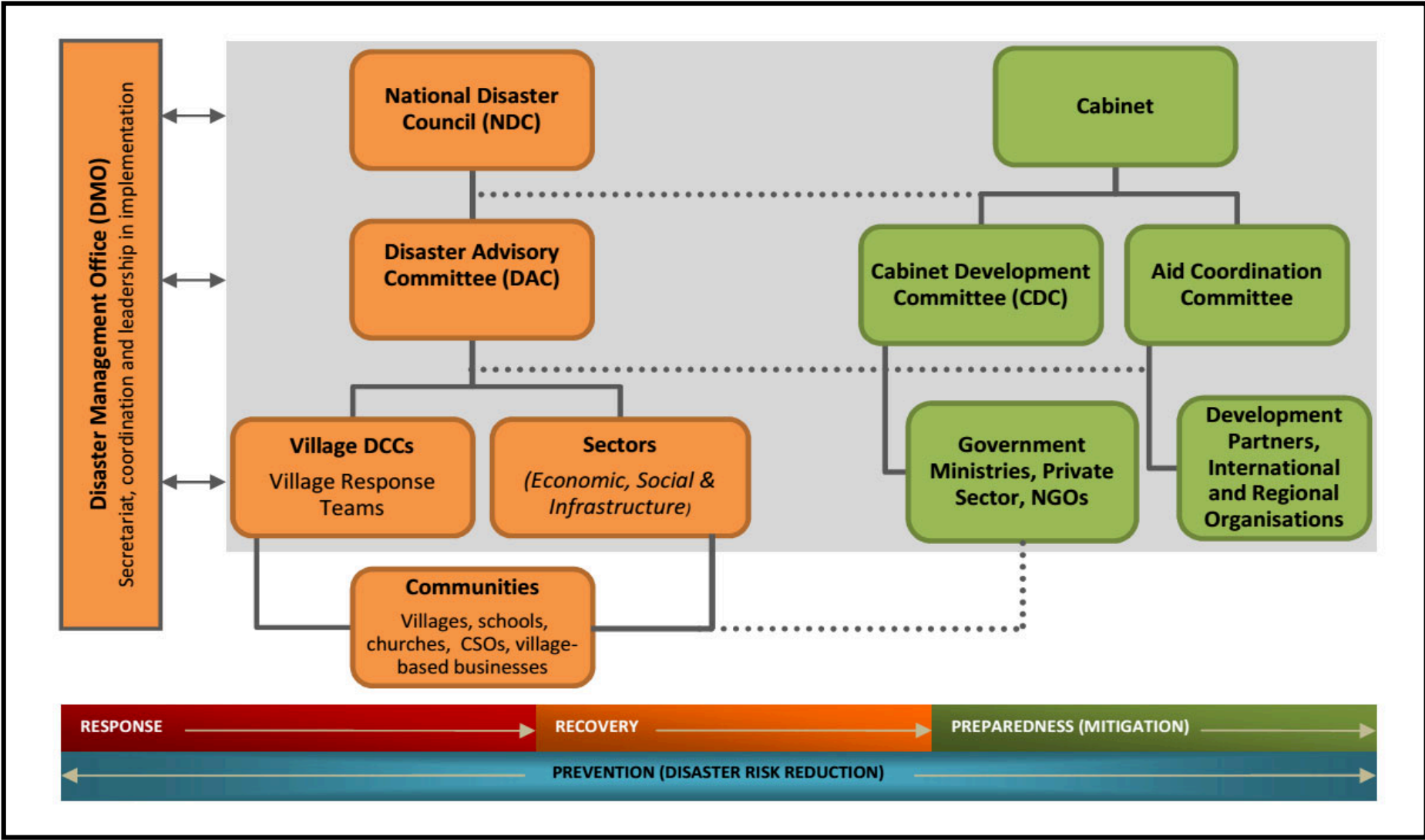
National Emergency Operation Centre
(Disaster Management Office)

Samoa Police , Fire Emergency Services,
Samoa Red Cross & Society

PUBLIC



NATIONAL DISASTER MANAGEMENT FRAMEWORK FOR SAMOA

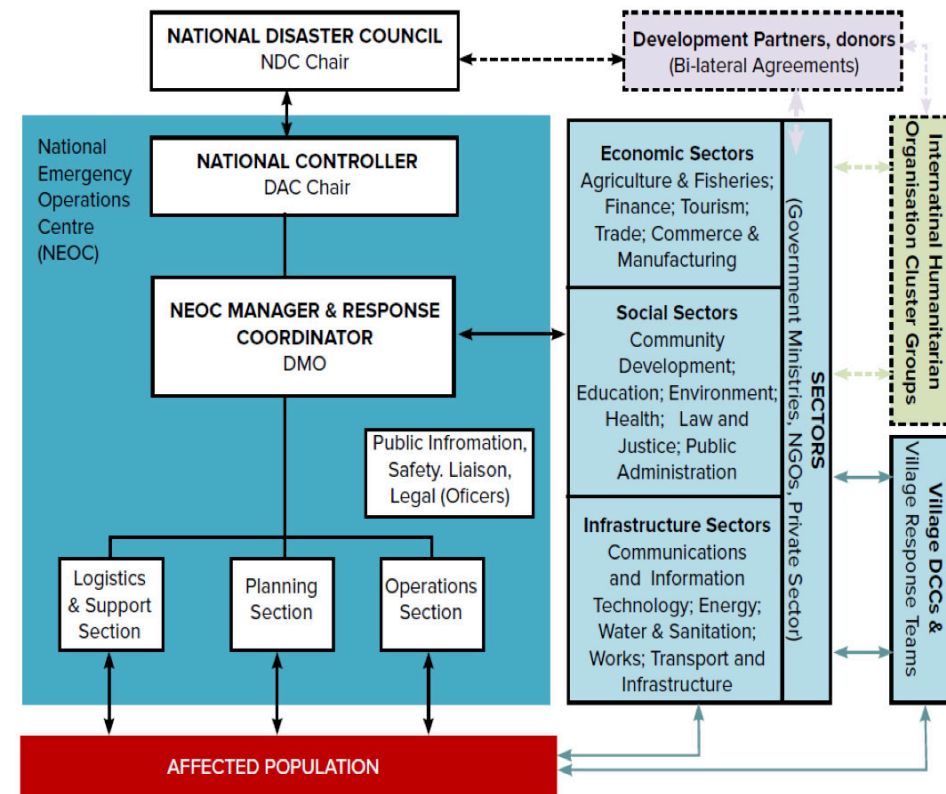


Lead Agency in DRM in Samoa

Disaster Risk Management and Coordination is lead by the Disaster Management Division of the MNRE



PEACE TIME



NATIONAL EMERGENCY OPERATION CENTRE (NEOC) ACTIVATE

Pilot Tsunami Ready Program

1. Recognized as a tsunami ready community in 2017

❖ Savaia, Lefaga Community

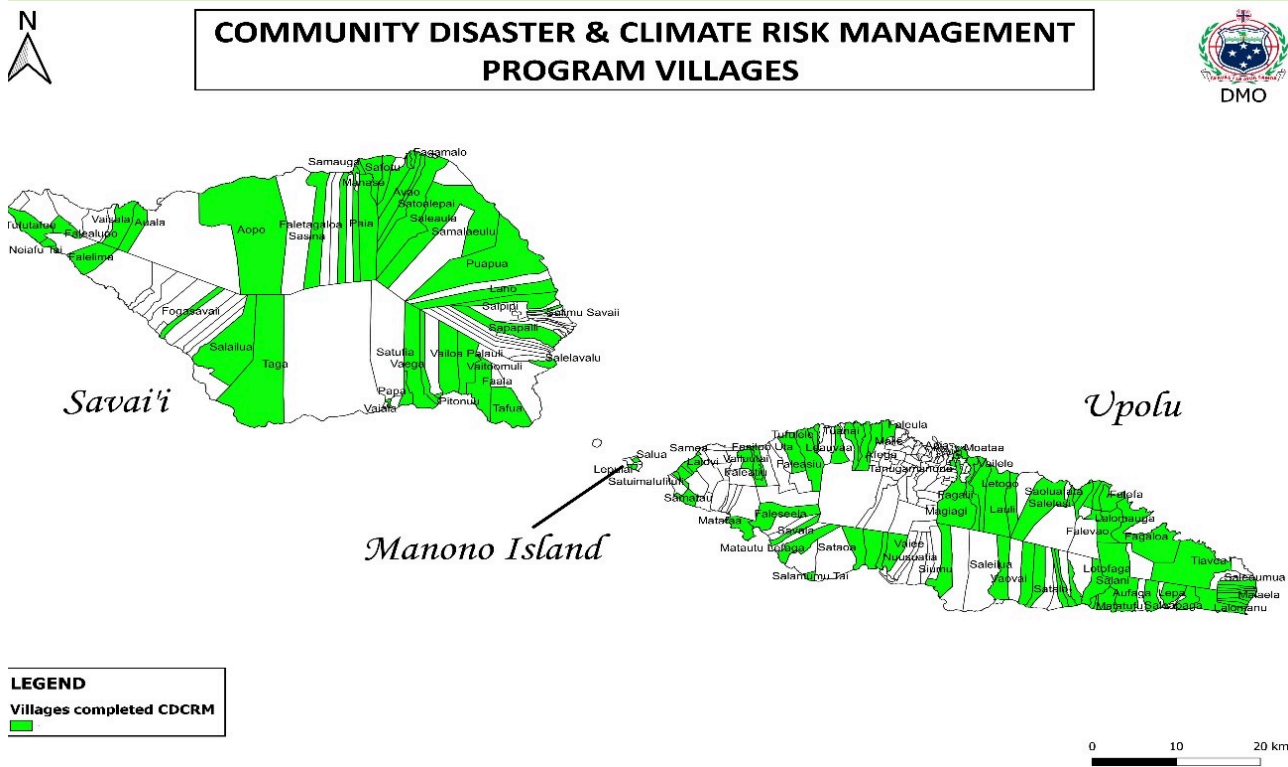
- ✓ hazard assessment,
- ✓ tsunami signage,
- ✓ evacuation mapping and planning
- ✓ education and outreach (24hrs x 7days)
communications
- ✓ response planning.



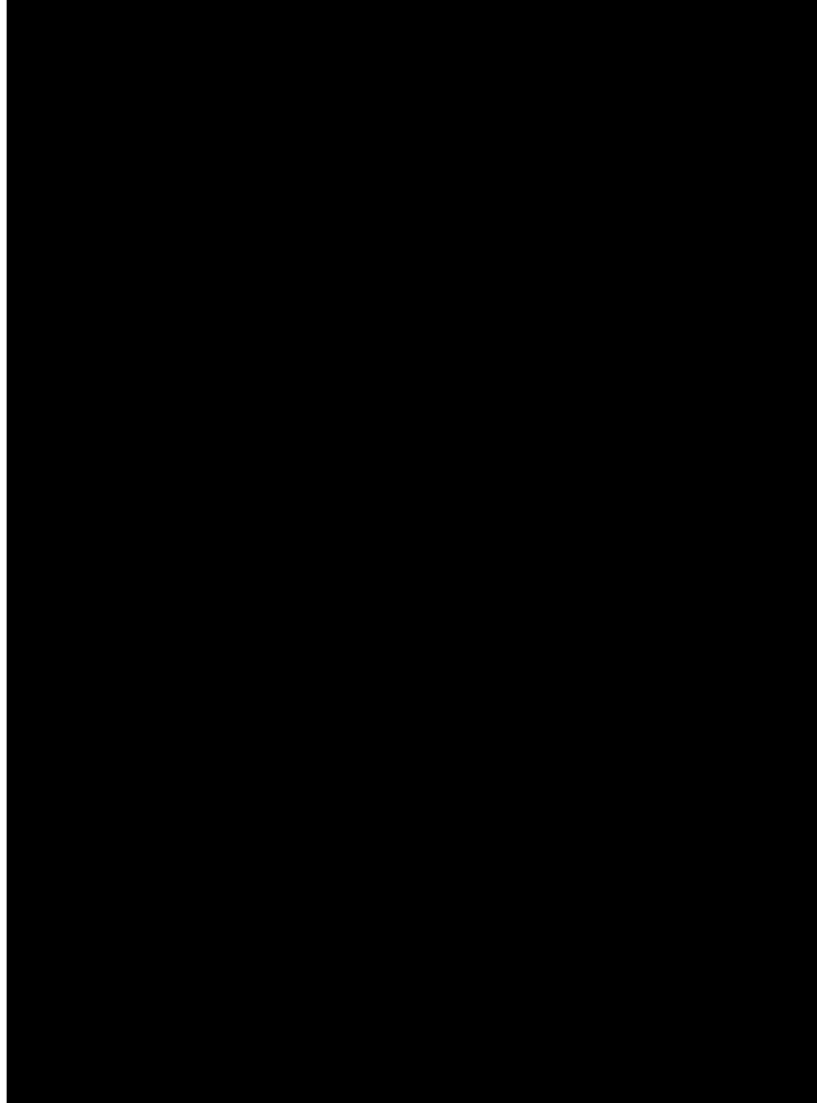
SCHOOL AWARENESS PROGRAMS



Community Disaster and Climate Risk Management Program (CDCRM)



- National/Government programme designed mainly to address and mainstream Disaster Risk Management and Climate Change Adaptation at a community level. Disaster Management Office as the leading agencies, SFESA, SRCS and ADRA as Implementing Agencies
- Established in 2012, with funding support from UNESCO, the CDCRM toolkit was developed to train, equip and build the capacity of communities to better respond to disasters, contributing to overall resilience building.
- As of 16th July 2024, 129 of 362 villages in Samoa have been covered by the CDCRM program



EMERGENCY SIREN NETWORK



23 sirens

Tested every first Monday of Monthly at 3pm

Can be activated from NEOC or manually in the villages.

MAP OF THE TOWN AREA OF APIA & SIREN LOCATIONS



LEGEND
● Sirens locations

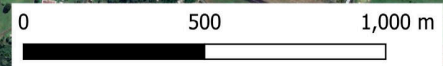
Lalovaea

Malifa

Apia Park

Maagiagi

Tanugamanono





MUCHAS GRACIAS !!!

**Ministry of Natural Resources and Environment
Samoa Meteorology Division || Disaster Management Office**

