TSP Indonesia Report on Service Updates

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Intersessional Meeting of ICG/IOTWMS-Working Group 2 on Tsunami Detection, Warning and Dissemination
7 August 2024

Outline:

1. TSP Indonesia Performance 2023 - 2024
2. TSP Indonesia development since last ICG
3. TSP Indonesia development and innovation plans

1. TSP Indonesia Performance 2023-2024

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TSP Indonesia KPIs 2023 and 2024 – M6.8+

	Service Level 1 EQ Bulletins					Service Level 2 Threat / No Threat Bulletins		
TSP	**KPI 1** **ET First EQ Bull** **Target: 10 mins (% met)**	**KPI 2** **POD EQs GE M6.8** **Target: 100%**	**KPI 3** **EQ Mag** **Target: 0.3 (% met)**	**KPI 4** **EQ Depth** **Target: 30 km (% met)**	**KPI 5** **EQ Location** **Target: 30 km (% met)**	**KPI 6** **ET First Threat Bull** **Target: 20 mins (% met)**	**KPI 7** **POD Tsunami Waves** **Target: 100%**	**KPI 8** **Tsunami Height Accuracy** **Target: Factor of 2**
Indonesia (2023)	**11.4 (86%)**	**(92%)**	**0.22 (76%)**	**27.91 (78%)**	**27.38 (78%)**	**16.0 (100%)**	**N/A**	**N/A**
Indonesia (Jan-July 2024)	**9.5 (83%)**	**(86%)**	**0.26 (67%)**	**25.88 (67%)**	**21.88 (83%)**	**N/A**	**N/A**	**N/A**

Meets Target	Near Target	Misses Target

2. TSP Indonesia development since last ICG

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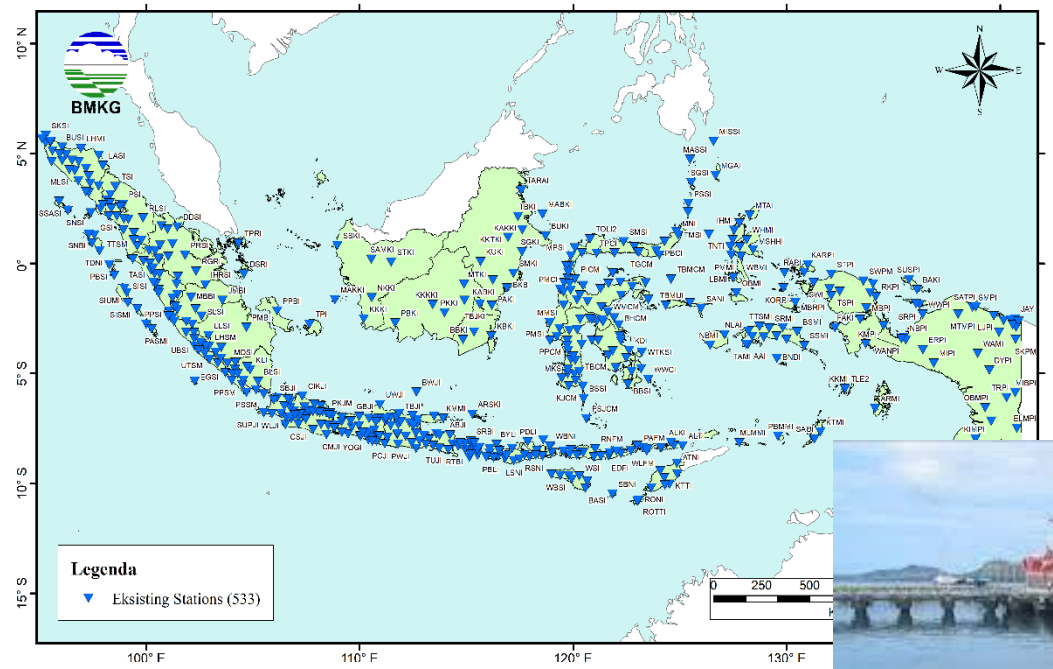
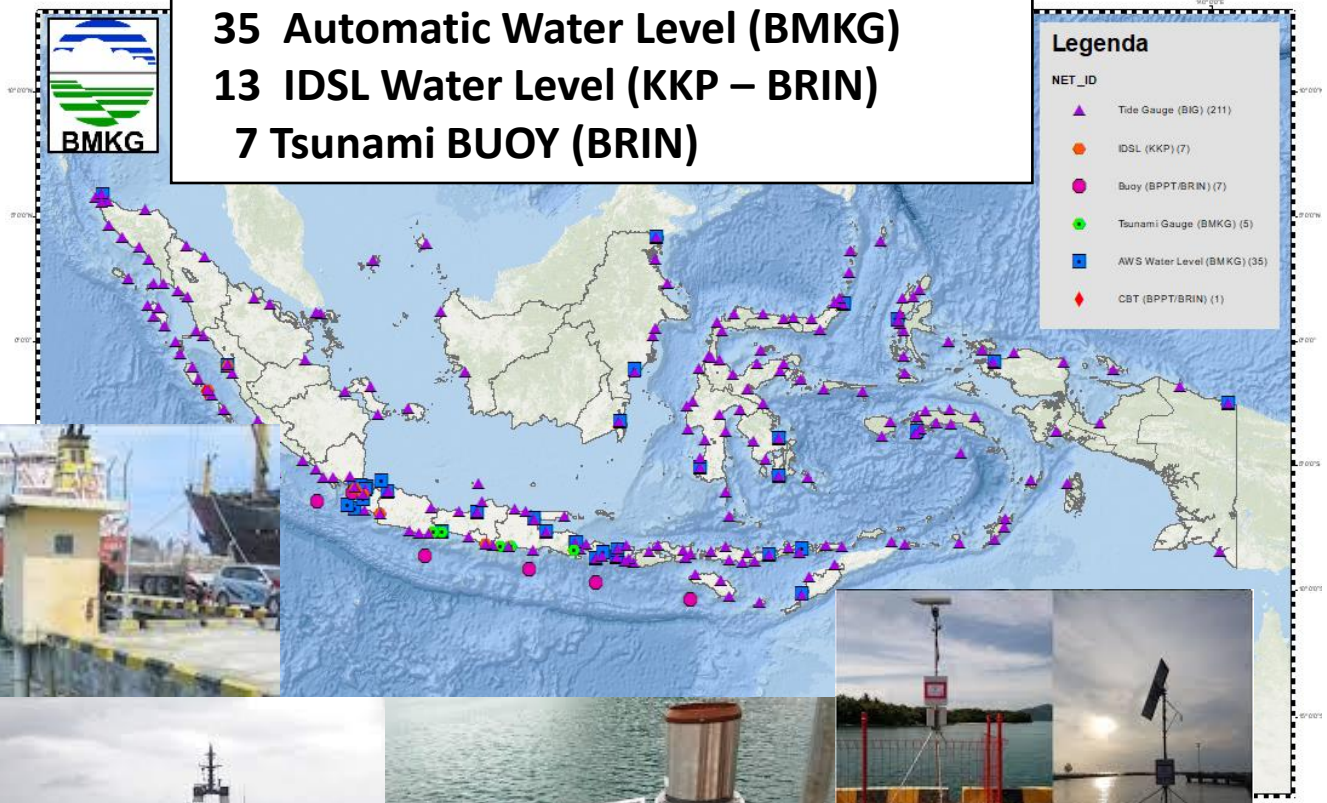
EARTHQUAKE AND TSUNAMI MONITORING SYSTEM

533 Seismic Sites for Earthquake Detection



211 Tide Gauge (BIG)
5 Tsunami Gauge (BMKG)
35 Automatic Water Level (BMKG)
13 IDSL Water Level (KKP – BRIN)
7 Tsunami BUOY (BRIN)



Tide Gauge

Shelter

Sensors

Buoy

Water Level

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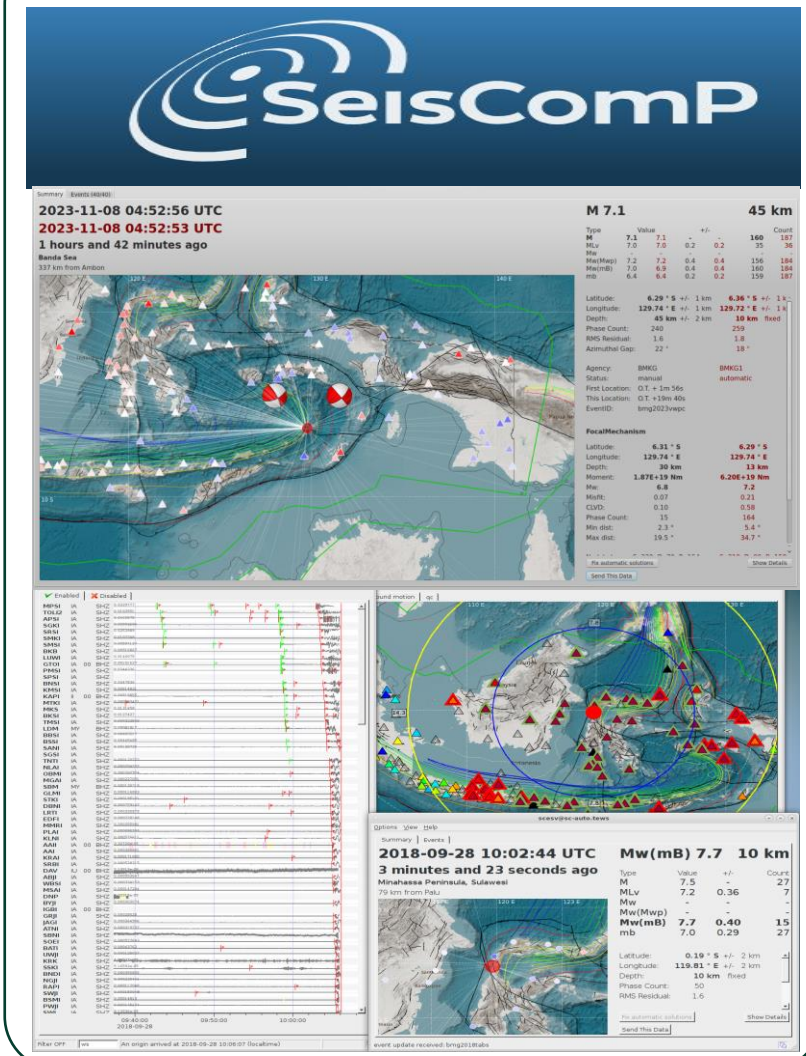
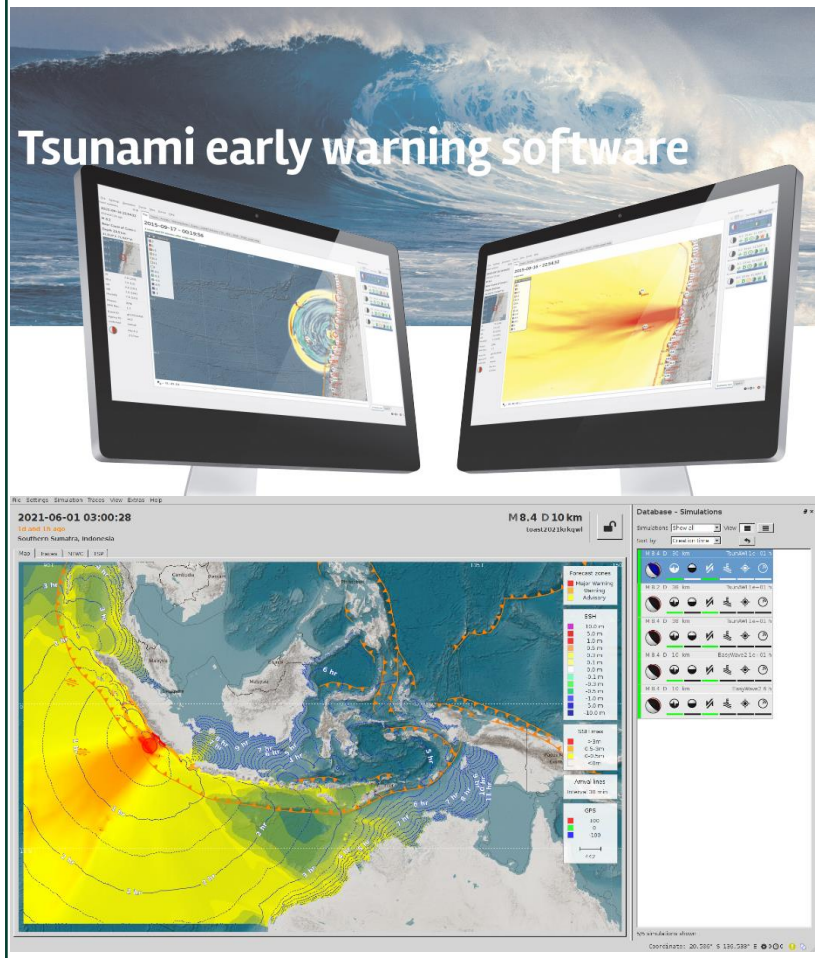
EARTHQUAKE AND TSUNAMI PROCESSING SYSTEM

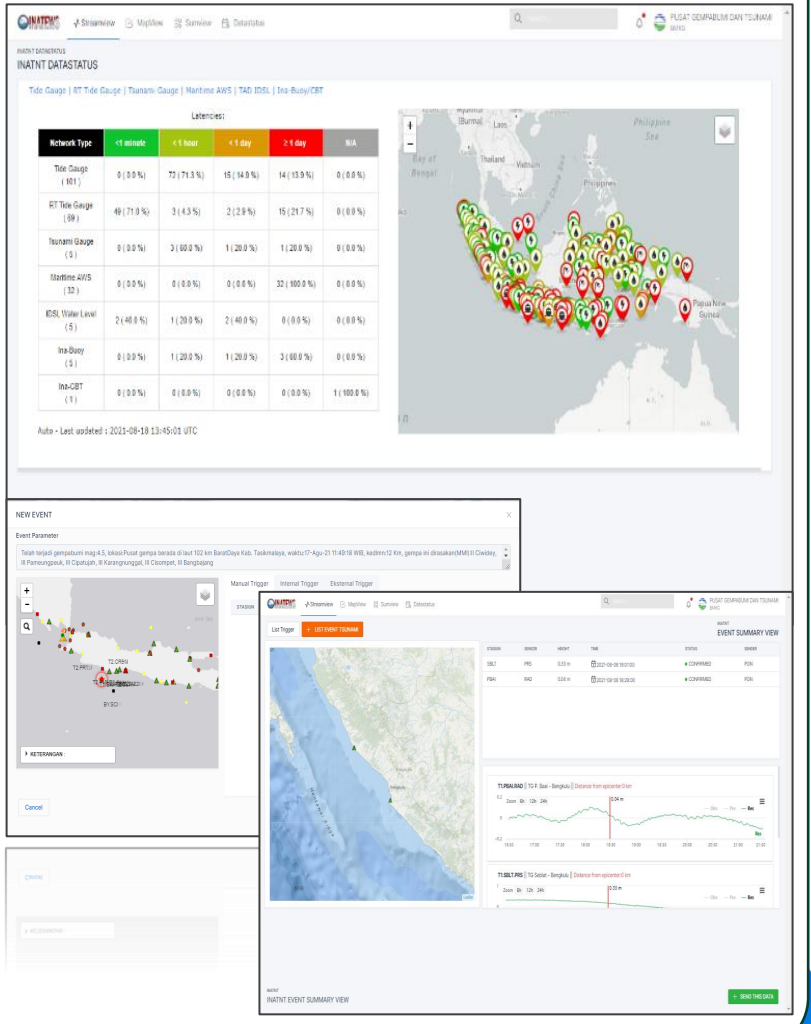
SEISCOMP



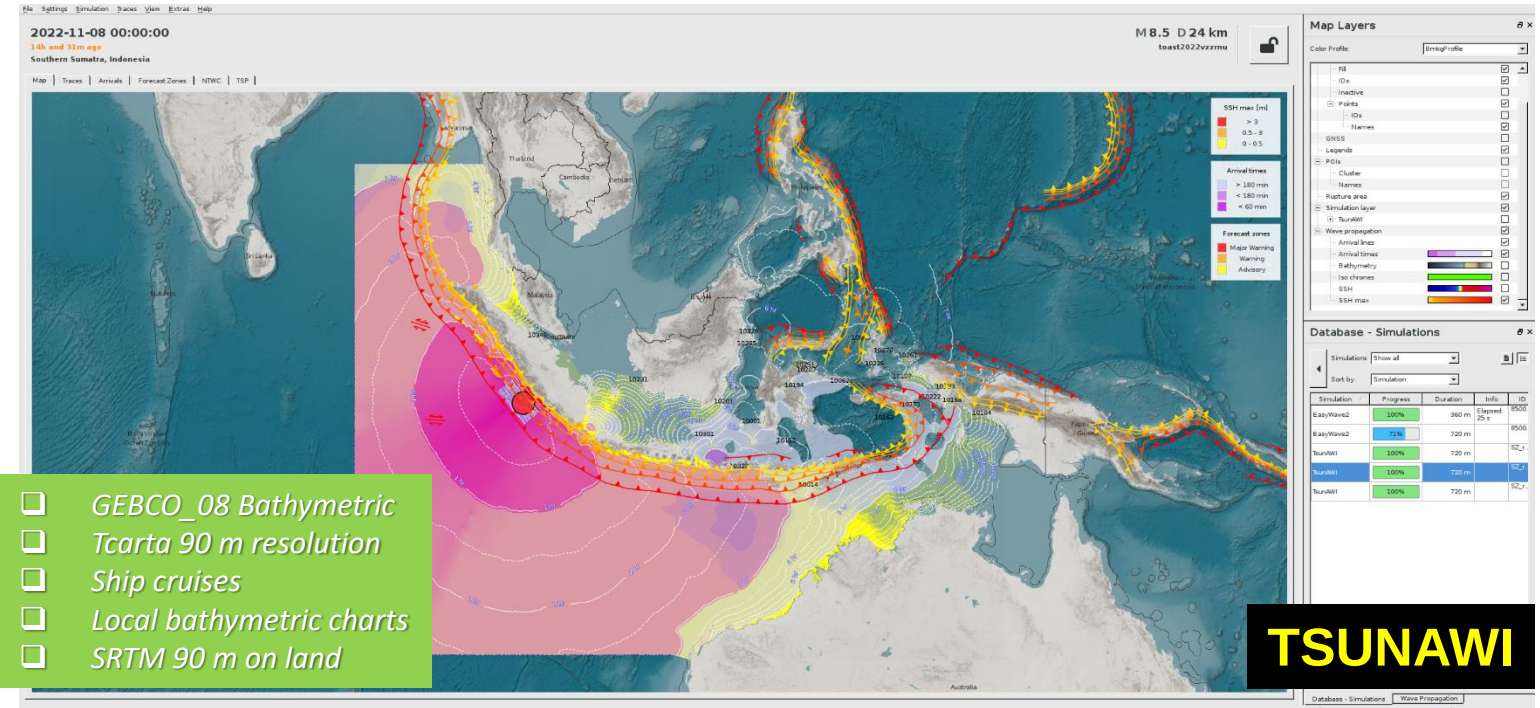
TOAST



InaTNT

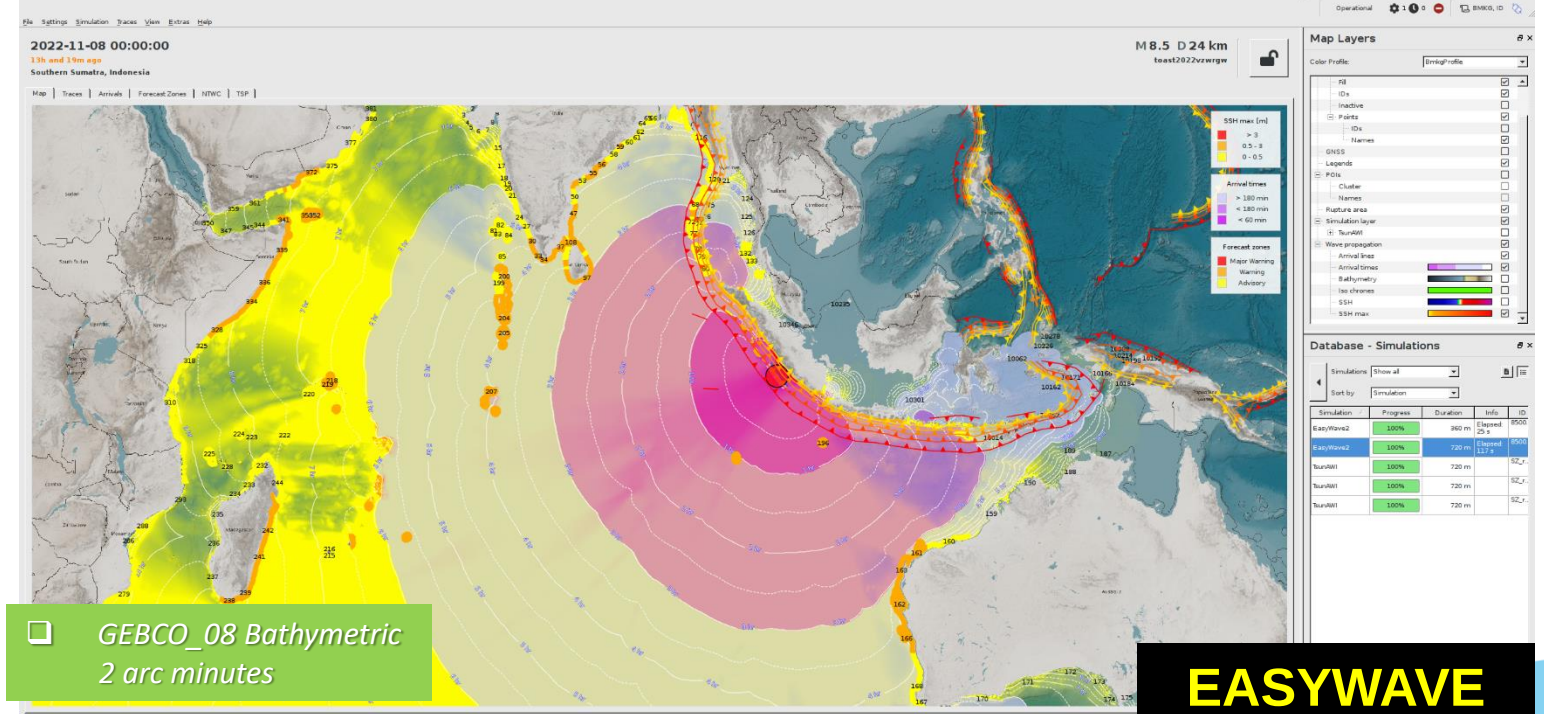


Integration of the new 4000 TsunAWI scenarios into **TOAST**



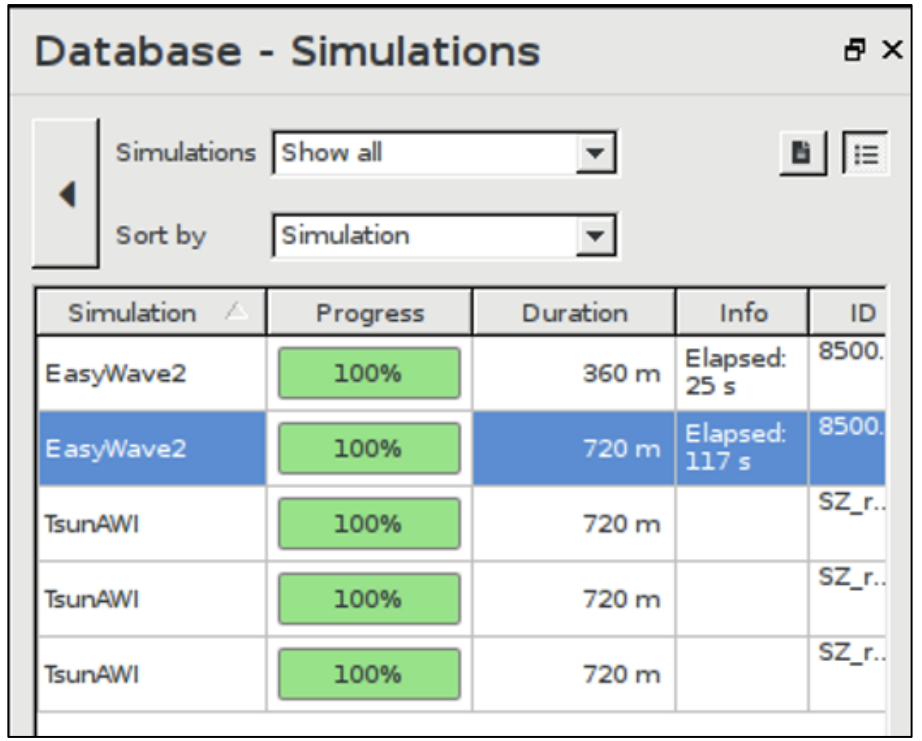
- *GEBCO_08 Bathymetric*
- *Tcarta 90 m resolution*
- *Ship cruises*
- *Local bathymetric charts*
- *SRTM 90 m on land*

TSUNAWI



- *GEBCO_08 Bathymetric 2 arc minutes*

EASYWAVE



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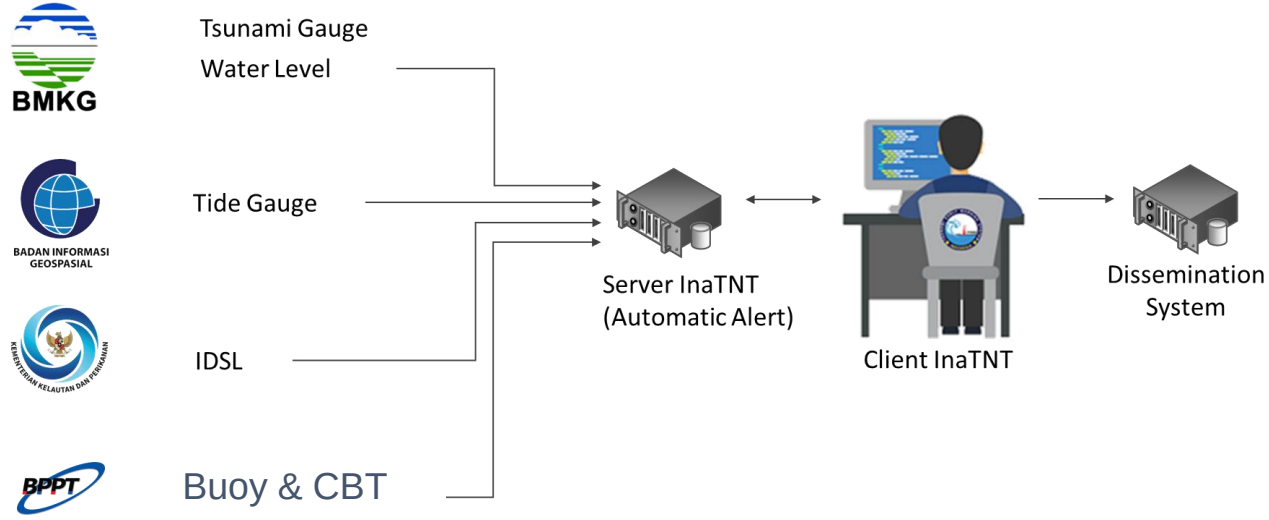
InaTNT (Indonesia Tsunami Non Tectonic) Application For Indian Ocean Region

InaTNT

INDONESIA TSUNAMI NON TEKTONIK

InaTNT is an integrated system that functions **to detect sea level change anomalies that indicate a tsunami is recorded by sea level observation sensors** owned by BMKG, BIG, BPPT and KKP. The presence of InaTNT will improve the performance of the InaTEWS System in detecting tsunamis caused by tectonic and non-tectonic sources.



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InaTNT : INTEGRATED SEA SURFACE MONITORING SENSORS FROM INATEWS INSTITUTIONS

PGT - BMKG

TSUNAMI GAUGE

BPPT/BRIN

IDSL – WATER LEVEL

BIG

TIDE GAUGE

BPPT/BRIN

TSUNAMI BUOY

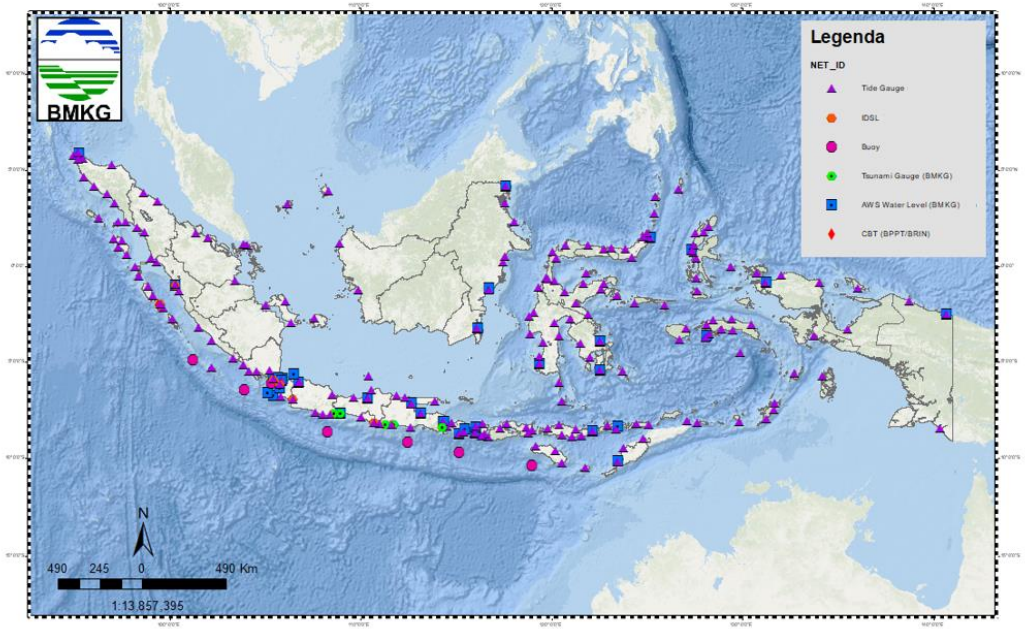
PUSMAR - BMKG

AWS – WATER LEVEL

BPPT/BRIN

Cable Based Tsunameter (CBT)

SENSOR MONITORING MUKA LAUT UNTUK PENDETEKSIAN TSUNAMI INATEWS



NO	NETWORK	TOTAL	OWNER
1	**AWS Water Level**	35	BMKG
2	**Tsunami Gauge**	5	BMKG
3	**Tide Gauge 1**	237	BIG
4	**Tide Gauge 2 (RT)**	26	BIG
5	**IDSL**	11	KKP/BRIN
6	**Buoy**	7	BPPT/BRIN
7	**CBT**	2	BPPT/BRIN

Number of Integrated Sea Level Monitoring Sensors : 298 Sensors

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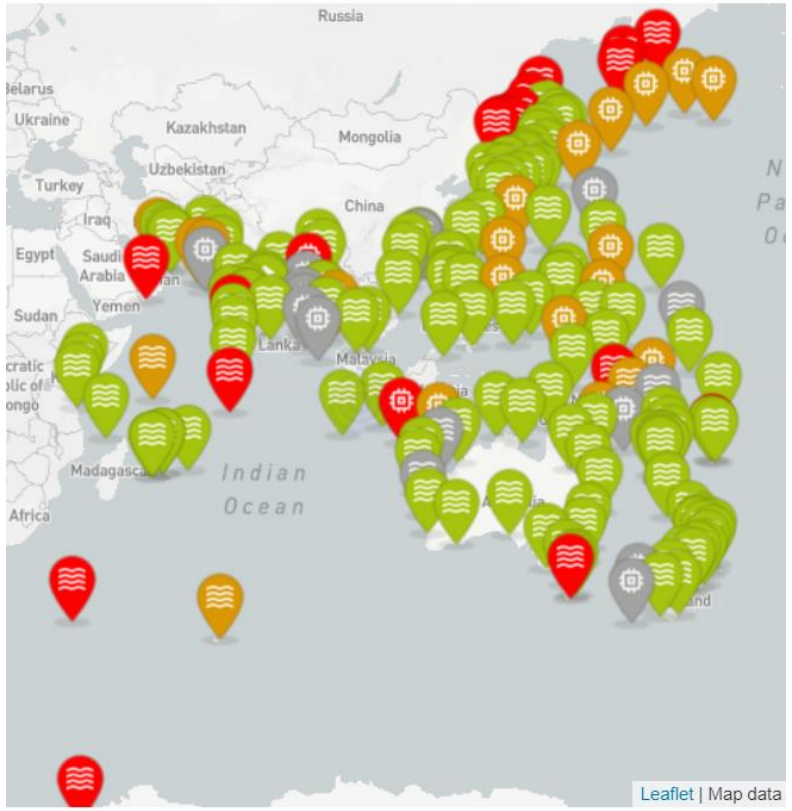
InaTNT : TELE-TSUNAMI OBSERVATION (INDIAN OCEAN)



NO	NETWORK	TOTAL	OWNER
1	**Dart Buoy NOAA**	33	NOAA
2	**Tide Gauge IOC**	165	IOC
3	**Tide Gauge INCOIS (India)**	7	INCOIS
	TOTAL	**205**	

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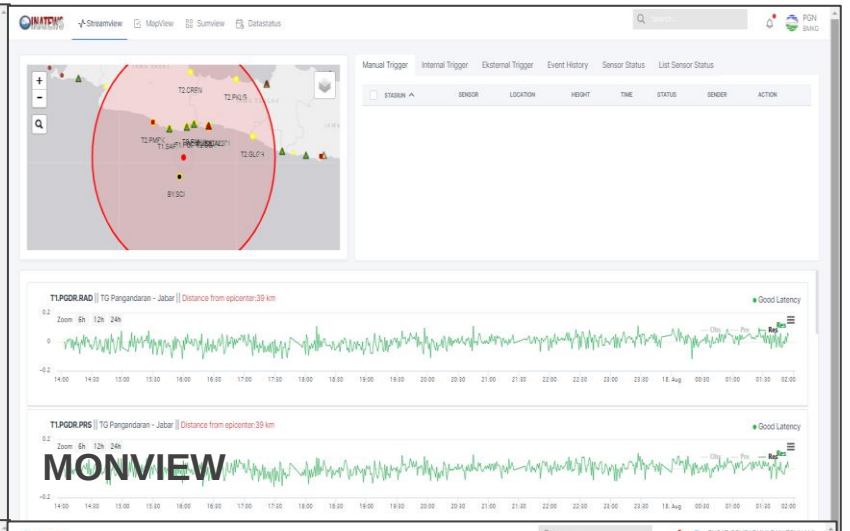
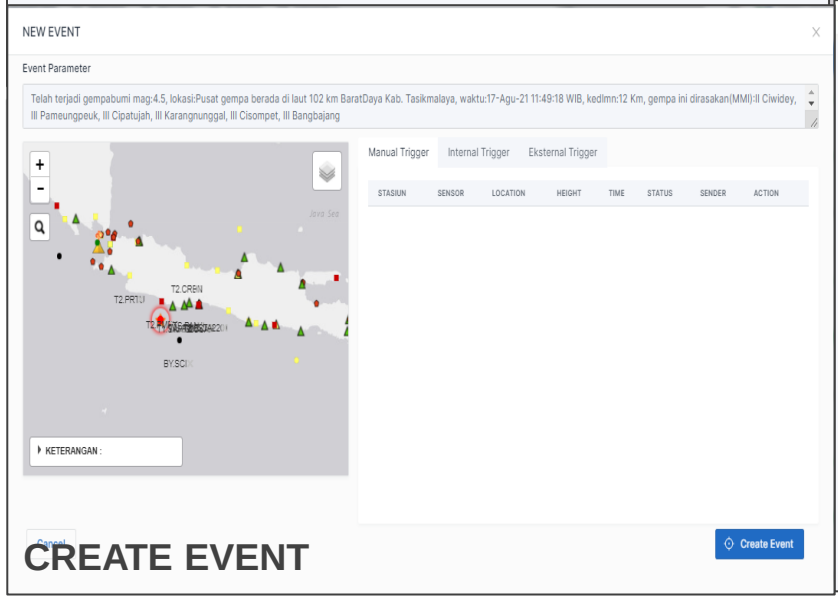
InaTNT (Indonesia Tsunami Non Tectonic) Application

STREAMVIEW

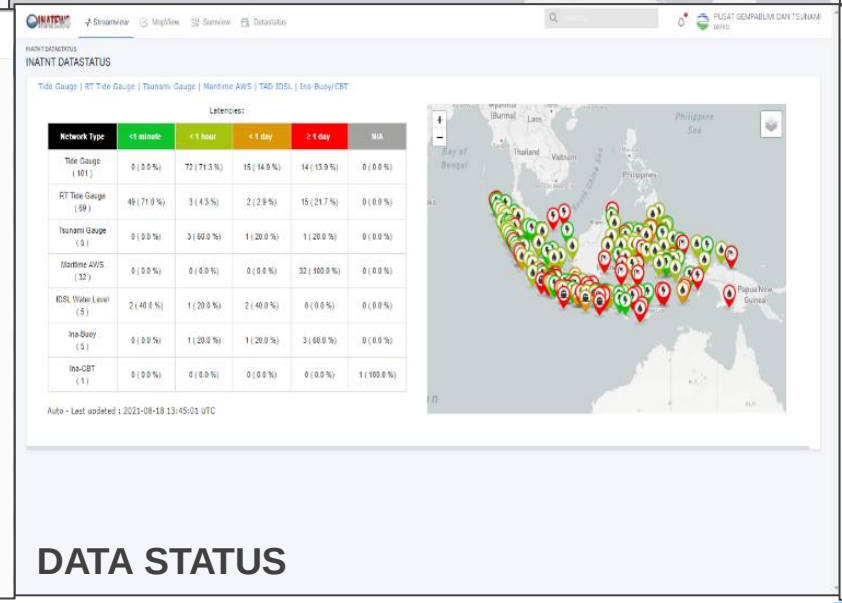
MAPVIEW



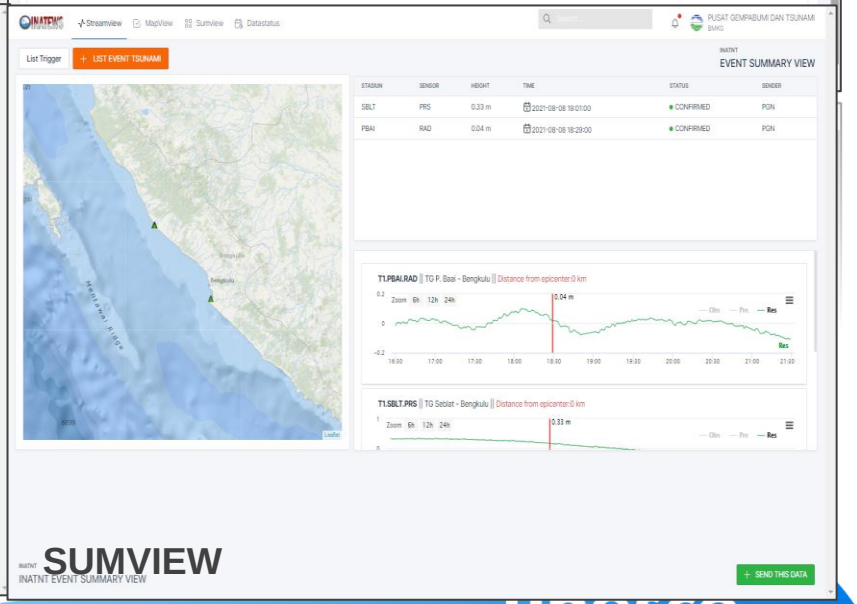
MONVIEW



CREATE EVENT



DATA STATUS



SUMVIEW

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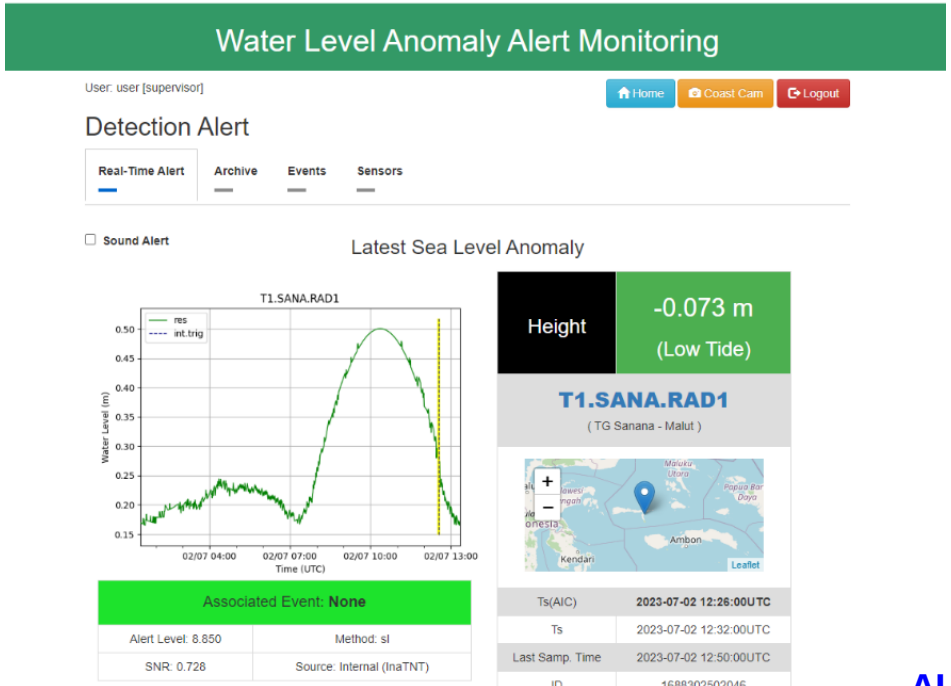
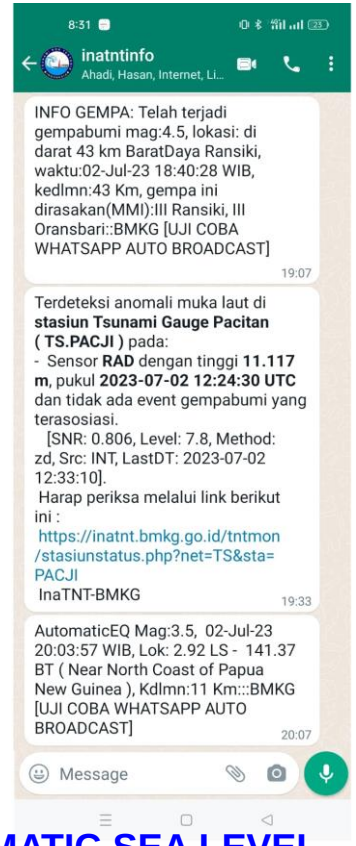
InaTNT : Automatic Sea Level Anomaly Monitoring

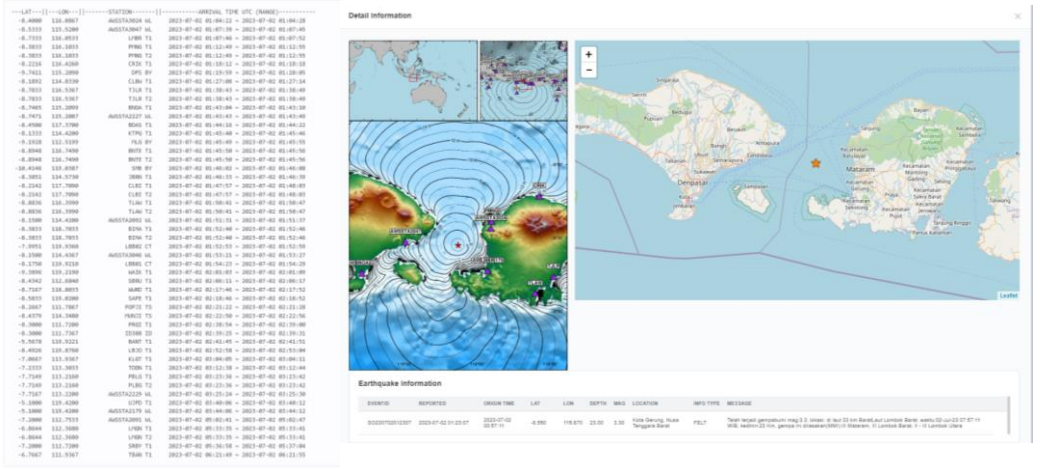
MONITORING GUI AUTOMATIC SEA LEVEL ANOMALY DETECTION





AUTOMATIC SEA LEVEL ANOMALY ALERT MESSAGE VIA WHATSAPP

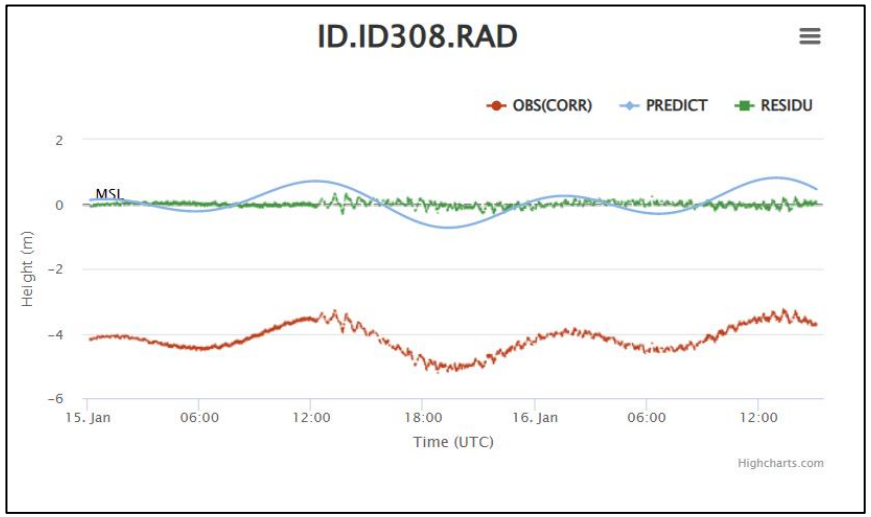
TSUNAMI TRAVEL AND ARRIVAL TIME PREDICTION FROM ALL EARTHQUAKE POSSIBILITIES



InaTNT displays the predicted time travel and arrival time of the tsunami at each water level station for all possible earthquake events.

Alert notifications will be activated on this GUI when any detected sea level anomaly occurs, displaying the tsunami height, arrival time, potential earthquake event associated with the anomaly, and the detection method used. Each anomaly alert meeting specific criteria will be forwarded via WhatsApp message to the InaTNTInfo group for internal use.

InaTNT : Detected Events



Device Description

Name	ID308
Network ID	ID
Station Type	IDSL-WL
Lat/Lon	-8.291638 / 111.731428
Location	Prigi - Jatim
Sensor Type 1	RAD
Call Sign I / II	486 / IDSL-308
Datum (LAT/MSL/HAT)	0 m / 0 m / 0 m

Activity Report

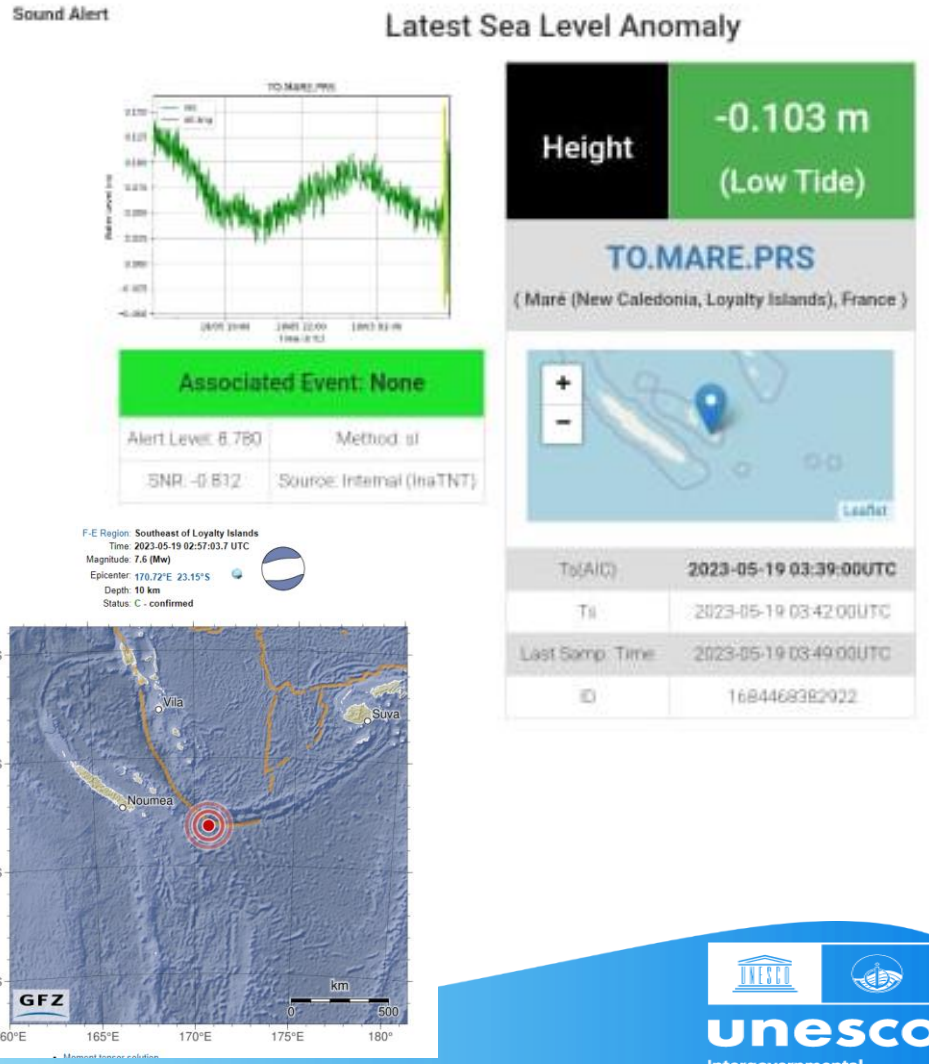
Sampling Period	5 second(s)
Last Data	2023-09-25 01:42:50
Received	2023-09-25 01:43:02
Data Latency	5.2 minutes
Feed Latency	5.0 minutes
Diff.	12.0 seconds
Reported	2023-09-25 01:48:02
Coastal Cam	Latest Image

STATUS

Anomaly alert at 2022-01-15 13:14:02 UTC with waveheight 2.35 m (Alert Level : 5.0), please check it
Anomaly alert at 2022-01-15 13:14:14 UTC with waveheight 2.42 m (Alert Level : 7.0), please check it
Anomaly alert at 2022-01-15 13:14:50 UTC with waveheight 2.39 m (Alert Level : 10.0), please check i
Anomaly alert at 2022-01-15 13:37:26 UTC with waveheight 1.86 m (Alert Level : 2.0), please check it
Anomaly alert at 2022-01-15 13:37:44 UTC with waveheight 1.84 m (Alert Level : 5.0), please check it
Anomaly alert at 2022-01-15 13:38:14 UTC with waveheight 1.85 m (Alert Level : 10.0), please check i
Anomaly alert at 2022-01-15 13:49:02 UTC with waveheight 2.16 m (Alert Level : 3.0), please check it
Anomaly alert at 2022-01-15 13:49:14 UTC with waveheight 2.16 m (Alert Level : 5.0), please check it
Anomaly alert at 2022-01-15 13:49:32 UTC with waveheight 2.22 m (Alert Level : 8.0), please check it
Anomaly alert at 2022-01-15 13:49:50 UTC with waveheight 2.22 m (Alert Level : 10.0), please check i

Meteotsunami / Rissaga Phenomenon From 15 January 2022 Hunga Tonga Volcanic Eruption Blast That Was Detected

DETECTED TSUNAMI TRIGGERED BY EARTHQUAKE MAGNITUDE 7.7 QUAKE OFF NEW CALEDONIA ON 29 MAY 2023



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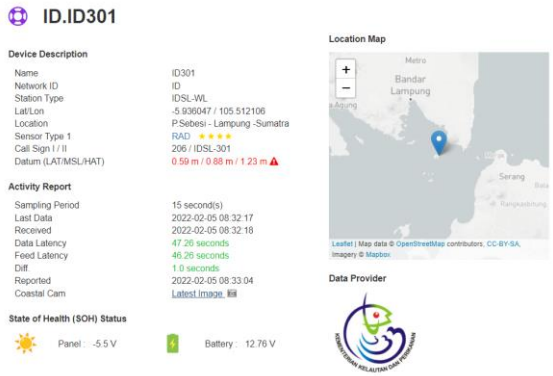
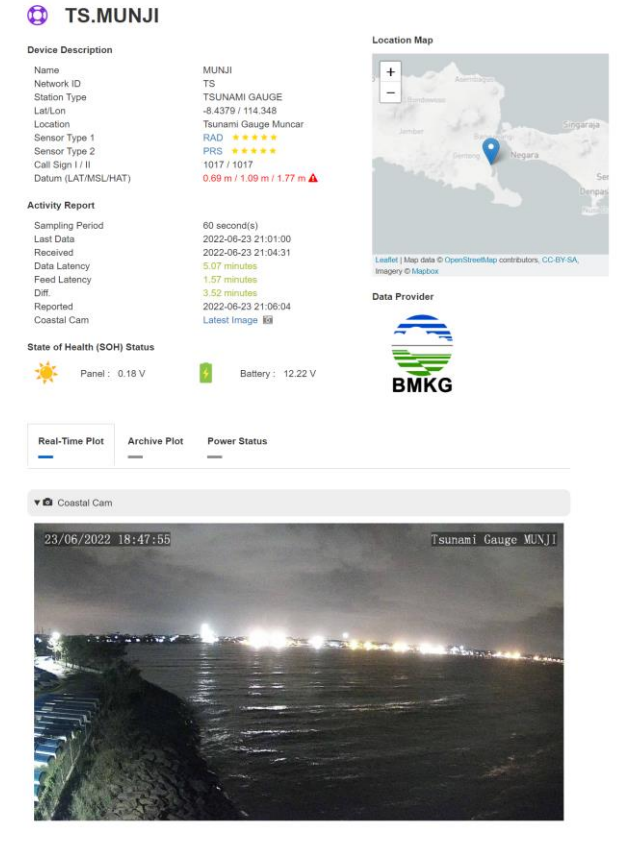
InaTNT : IDSL & Tsunami Gauge Sensors Are Equipped By Coastal Cam To Visually Confirm Tsunami Wave





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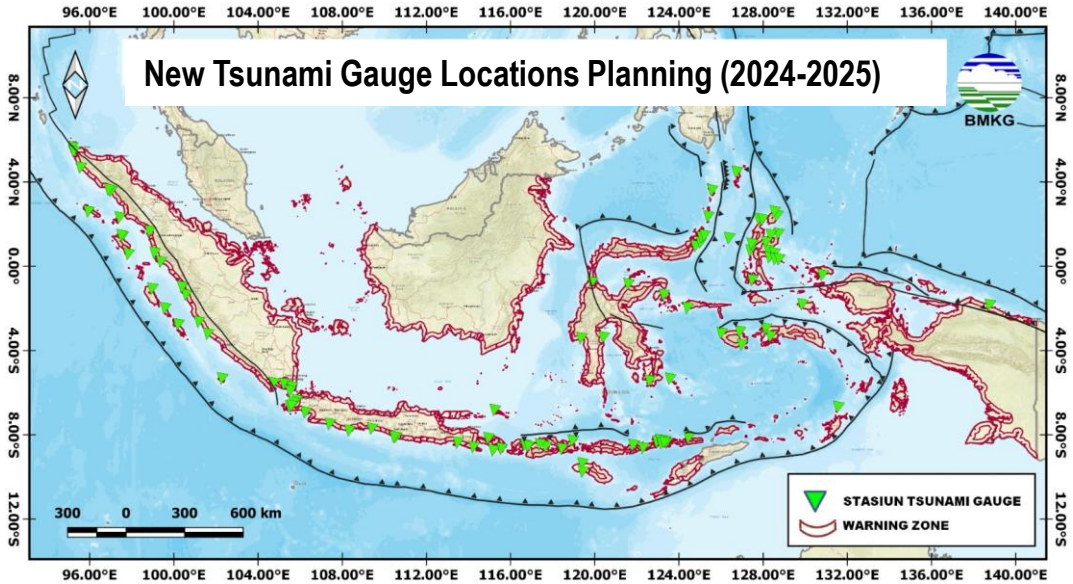
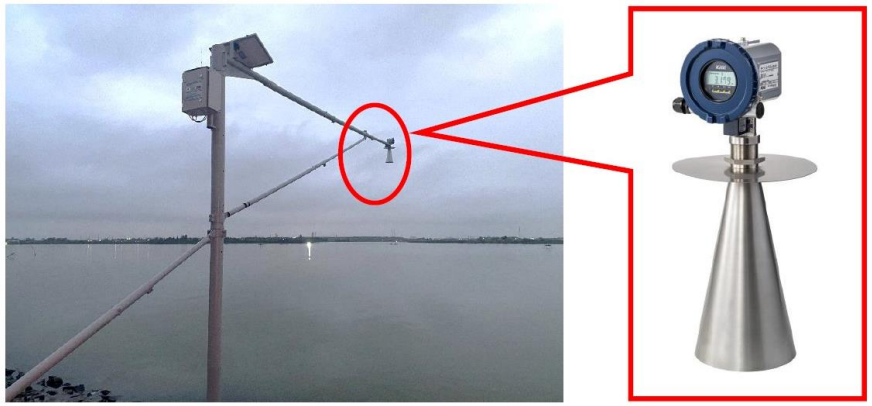
Future Plan : New Tsunami Gauge 2024

BMKG will install New Tsunami Gauge in 100 locations throughout Indonesia



MAIN SENSOR



ADDITIONAL SENSORS

Coastal Cam/CCTV

Tsunami visual validation and confirmation

Barometric / Air Pressure Sensor

Meteotsunami shockwace detection

THE COMMUNITY EDUCATION ACTIVITIES OF SEKOLAH LAPANG GEMPA (SLG) ON CONTRIBUTING TO THE DEVELOPMENT OF TSUNAMI READY COMMUNITY

- The SLG (Earthquake Field School) is a capacity building activity to enhance local government and community awareness and response
- Create Champions from LDMO, Community, Army, stakeholders related to the disaster management and response, School, community, private sector are involved.
- The scope of the SLG:
  1. Field Survey and advocating the implementation of the 12 indicators of Tsunami Ready
  2. TOT Workshop of the SLG
  3. School Exercise
- The Tsunami Ready based on the systematic indicators
- Community should have knowledge of their potential hazard including tsunami, tropical cyclone, coastal flood in order to develop the capacity of preparedness and response

	TSUNAMI READY INDICATORS	
		Understanding the Hazard and Risk
I	**ASSESSMENT (ASSESS)**	
1	**ASSESS-1**. Tsunami hazard zones are mapped and designated	
2	**ASSESS-2**. The number of people at risk in the tsunami hazard zone is estimated	
3	**ASSESS-3**. Economic, infrastructural, political, and social resources are identified	
II	**PREPAREDNESS (PREP)**	Community Awareness
4	**PREP-1**. Easily understood tsunami evacuation maps are approved.	
5	**PREP-2**. Tsunami information including signage is publicly displayed.	
6	**PREP-3**. Outreach and public awareness and education resources are available and distributed.	
7	**PREP-4**. Outreach or educational activities are held at least 3 times a year.	
8	**PREP-5**: A community tsunami exercise is conducted at least every two years	
III	**RESPONSE (RESP)**	Planning and Capacity
9	**RESP-1**. A community tsunami emergency response plan is approved.	
10	**RESP-2**. The capacity to manage emergency response operations during a tsunami is in place.	
11	**RESP-3**. Redundant and reliable means to timely receive 24-hour official tsunami alerts are in place.	
12	**RESP-4**. Redundant and reliable means to timely disseminate 24-hour official tsunami alerts to the public are in place.	

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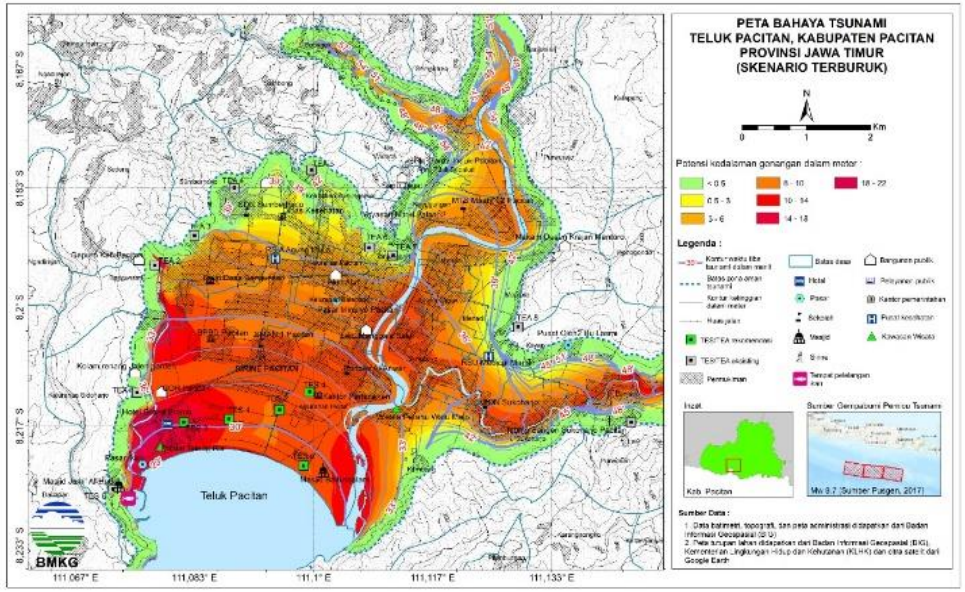
VERIFICATION FOR TSUNAMI EVACUATION ROUTE

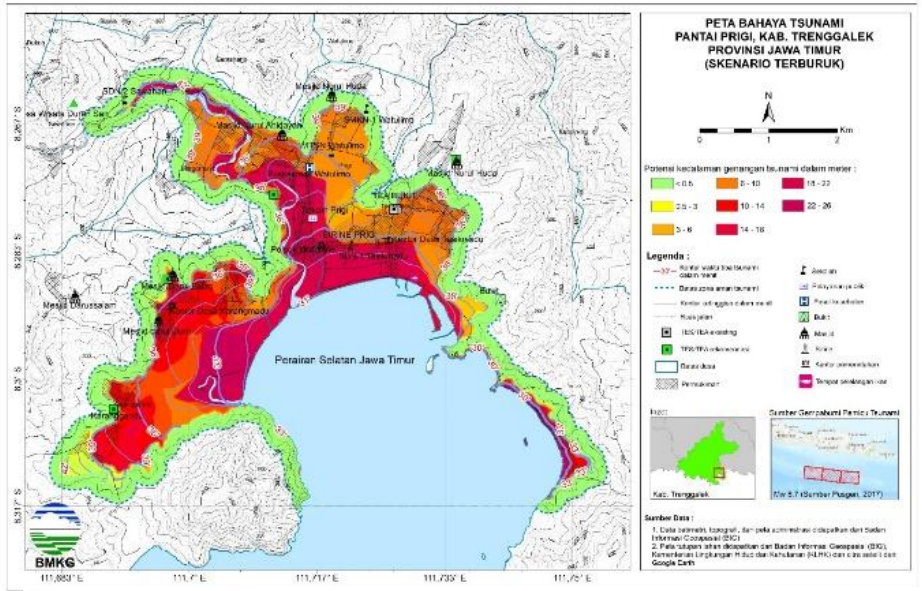
For enhancing Earthquake and Tsunami Mitigation, Head of BMKG had conducted Inspection for Tsunami Evacuation Route in Maumere

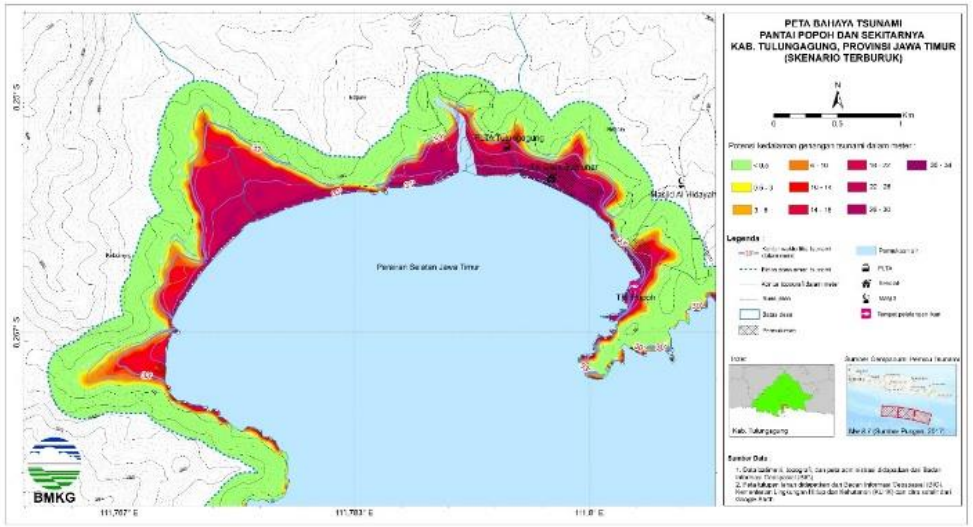
United Nations Educational, Scientific and Cultural Organization

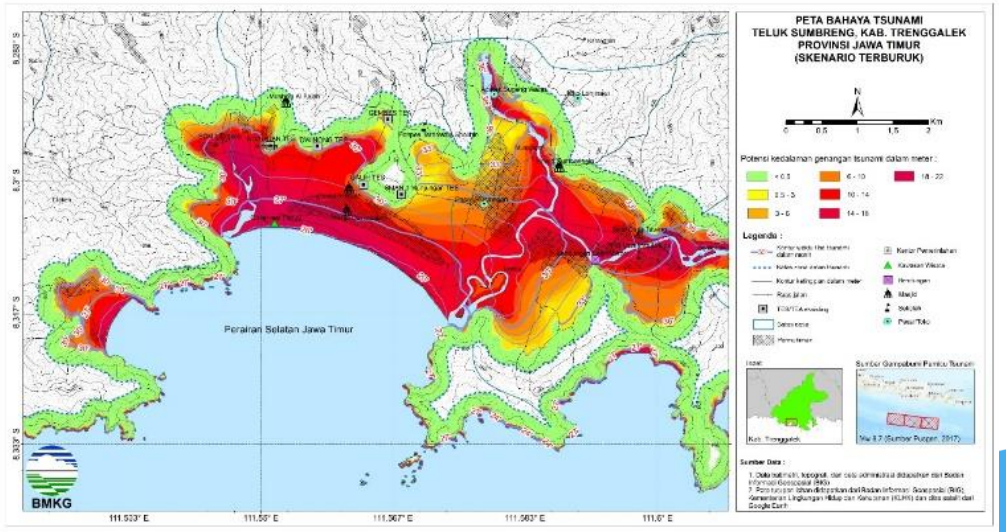
Intergovernmental Oceanographic Commission

MAPPING FOR TSUNAMI HAZARD









United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

12 IOC-UNESCO Tsunami Ready Communities in the Indian Ocean

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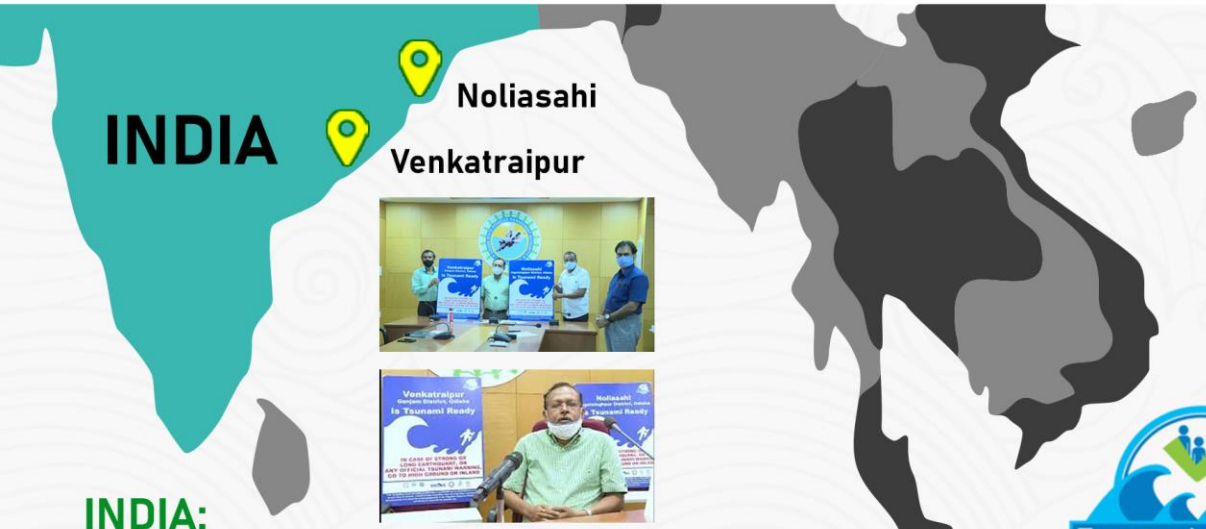
BMKG

INCOIS



INDIA:

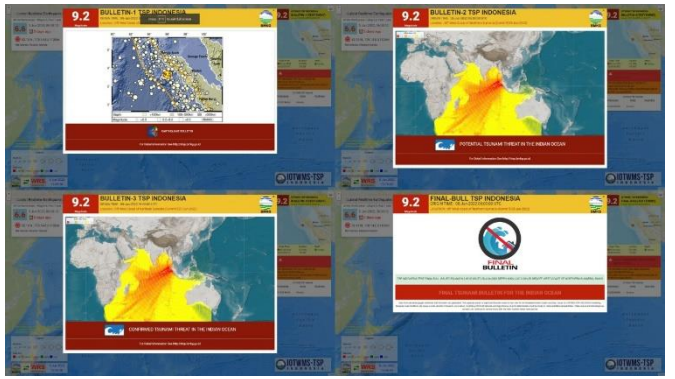
1. Venkatraipur (August, 7th 2020)
2. Noliasahi (August, 7th 2020)

INDONESIA:

1. Tanjung Benoa Village (May, 28th 2022)
2. Glagah Village (December, 26th 2022)
3. Kemadang Village (November, 26th 2022)
4. Pangandaran Village (December, 26th 2022)
5. Panggarangan Village (November, 26th 2022)
6. Desa Tambakrejo (November, 26th 2022)
7. Kuta Mandalika Village (December, 26th 2022)
8. Purus Village (December, 26th 2022)
9. Lolong Belanti Village (December, 26th 2022)
10. Tapakih Village (December, 20th 2023)

Participation on the Regular IOTWMS Communication Test 2023 and 2024

Preparation Coordination Execution



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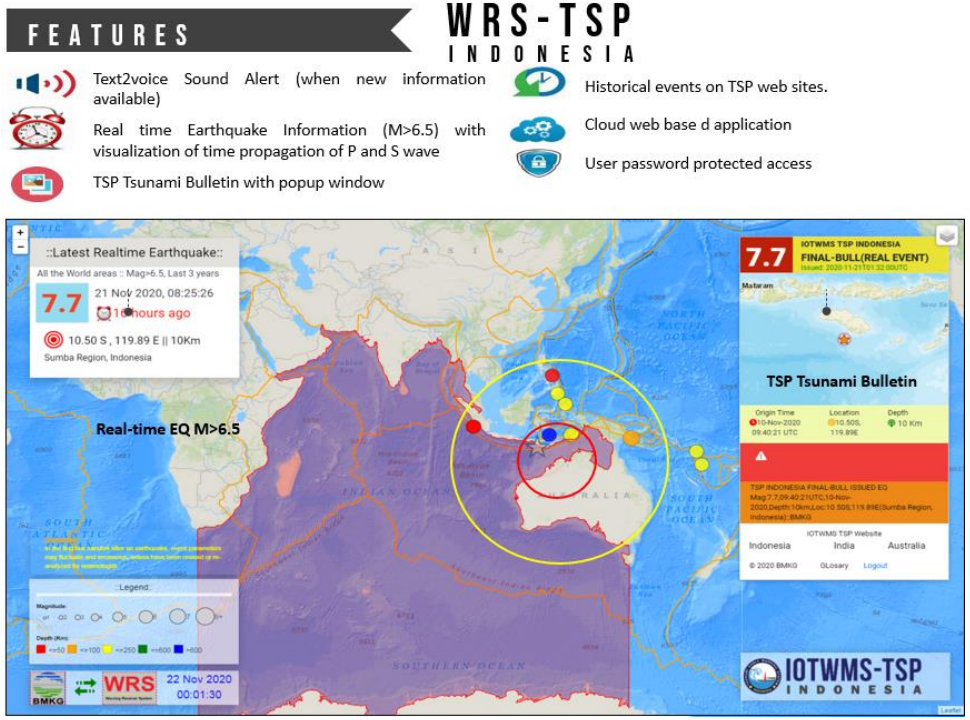
Continuing the contribution of WRS-TSP Indonesia as a real-time system to alert NTWCs.

WRS-TSP Indonesia can be accessed by any web browser.

WRS is directly connected to the processing and dissemination system of TSP Indonesia (located at BMKG headquarters in Jakarta).

The user guide is available at https://oceanexpert.org/document/30448.



WRS-TSP Indonesia (stands for Warning Receiver System of TSP Indonesia) is the real-time system to receive tsunami bulletin using a recommended set of hardware such as a large or **smart display**. WRS-TSP connected online to the processing and dissemination system of TSP Indonesia at BMKG head quarter Jakarta.

WRS-TSP ensures NTWCs of the Indian Ocean Countries **keep informed tsunami bulletin** timely and properly.

NTWCs could immediately take further essential actions right after they received the tsunami bulletin.

WRS-TSP
INDONESIA

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On-job Training for the IO Member state (OMAN) – May 2024

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3. TSP Indonesia Development Plans

- Deployment 100 Tsunami Gauge Stations (2024-2025).
- Utilization of GNSS data into the Earthquake Processing System (test phase).
- Continue work on developing products for tsunamis generated by non-seismic and complex sources.
- Continue work on developing maritime product for NAVAREAs.`

THANK YOU

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