unesco

Intergovernmental Oceanographic Commission

TSP Indonesia Report

Yedi Dermadi
Vice Chair, WG-2

Directorate for Earthquake and Tsunami, BMKG
yedi.dermadi@bmkg.go.id

19th Meeting of ICG/IOTWMS Steering Group, Jakarta, 17-19 June 2025

Outline

1. TSP Indonesia Performance 2024-2025
2. TSP Indonesia Development Since Last ICG
3. TSP Indonesia Future Development and Plan

TSP Indonesia Performance 2024-2025

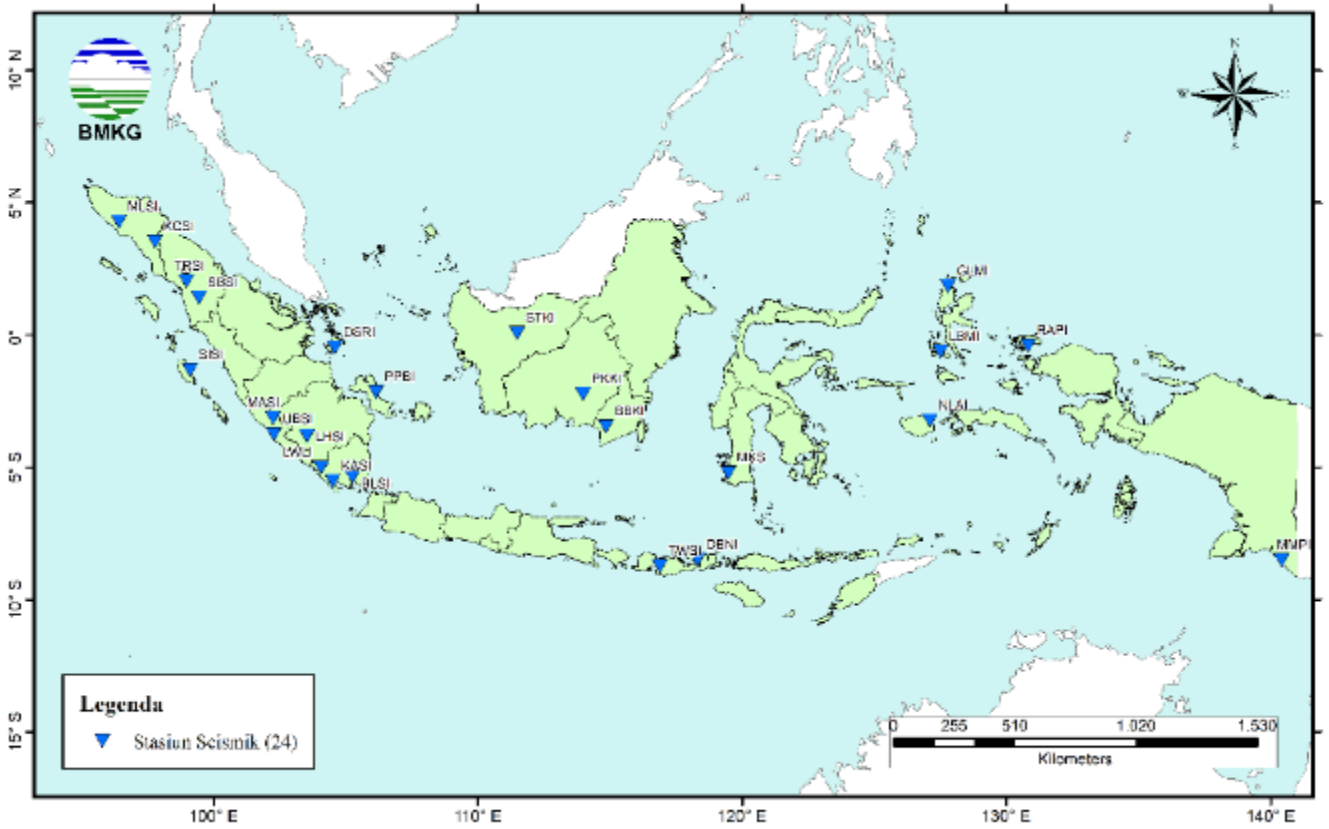
TSP Indonesia KPIs 2024 – June 2025 – M6.8+

	Service Level 1 EQ Bulletins (Change to report Mag 6.8 and above in all source zones)					Service Level 2 Threat / No Threat Bulletins			General
TSP	KPI 1 ET First EQ Bull Target: 10 mins (% met)	KPI 2 POD EQs 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	KPI 9 False / Incorrect Bulletins Issued Target: 0
Indonesia	9.4 (90 %)	84.2 %	0.23 (88 %)	20.76 (85 %)	27.76 (89 %)	n/a	n/a	n/a	n/a

TSP Indonesia Development Since Last ICG

Earthquake and Tsunami Monitoring System

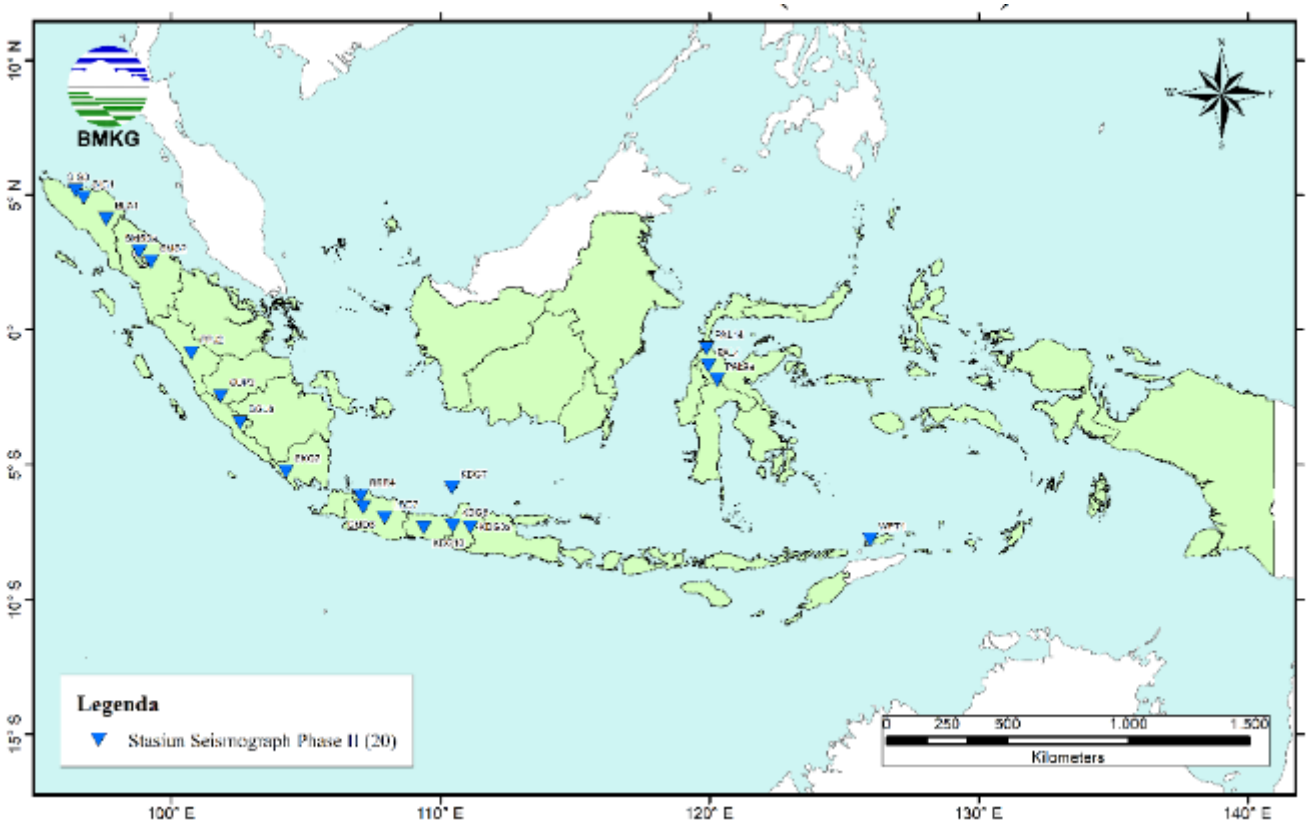
Replacement 24 Seismograph Stations (2024-2025)

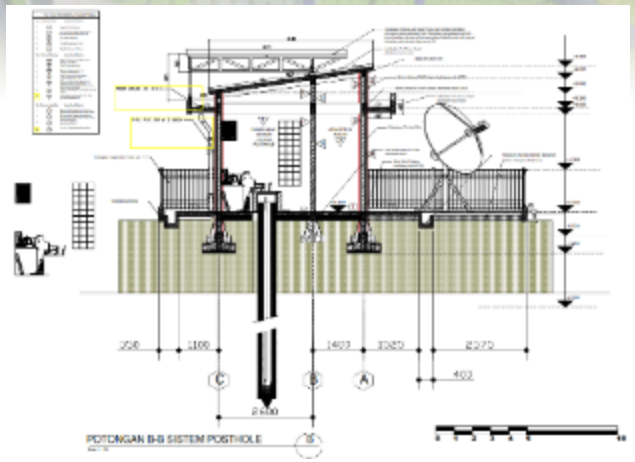


TSP Indonesia Development Since Last ICG

Earthquake and Tsunami Monitoring System

Deployment 20 Seismograph Stations (2024-2025)

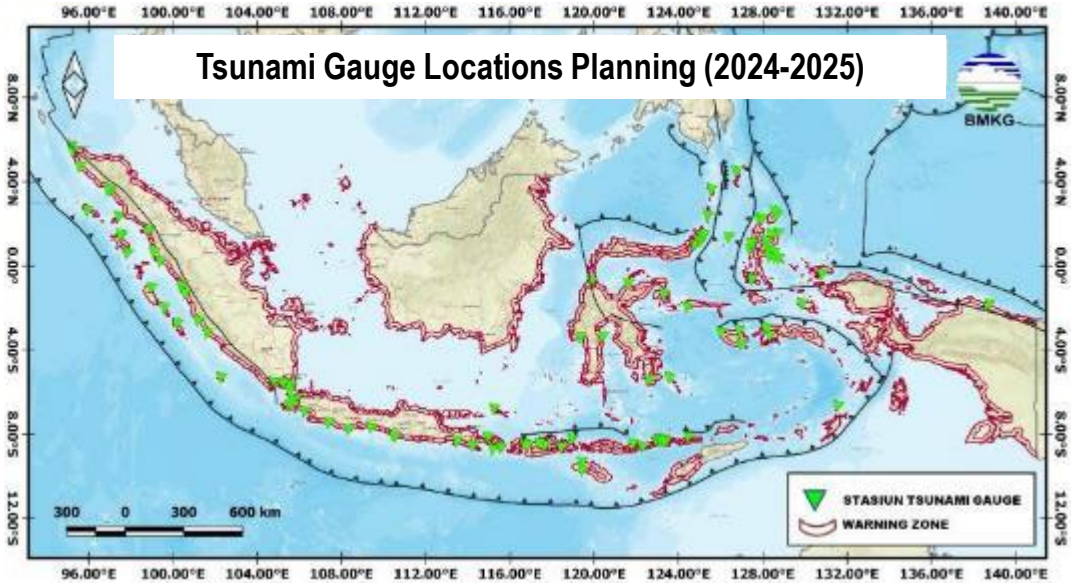




TSP Indonesia Development Since Last ICG

Earthquake and Tsunami Monitoring System

Deployment 100 Tsunami Gauge Stations (2024 - 2025)



MAIN SENSOR

Coastal Cam/CCTV

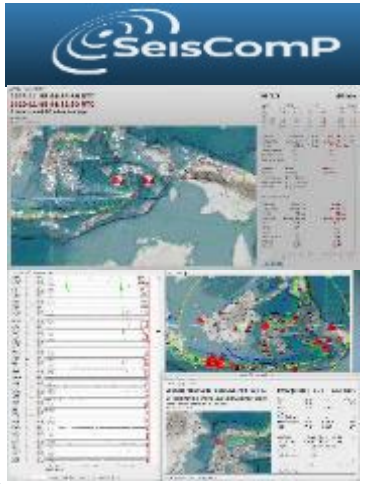
Barometric / Air Pressure Sensor

Meteotsunami shockwace detection

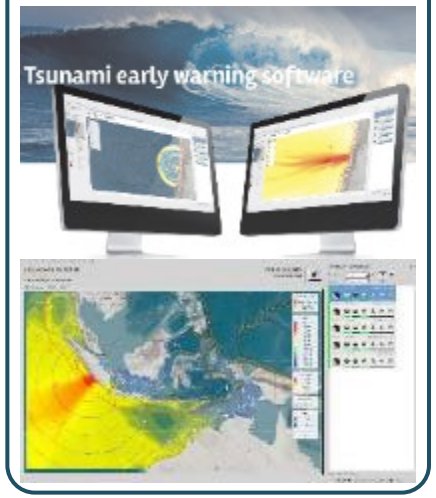
TSP Indonesia Development Since Last ICG

Earthquake and Tsunami Processing System

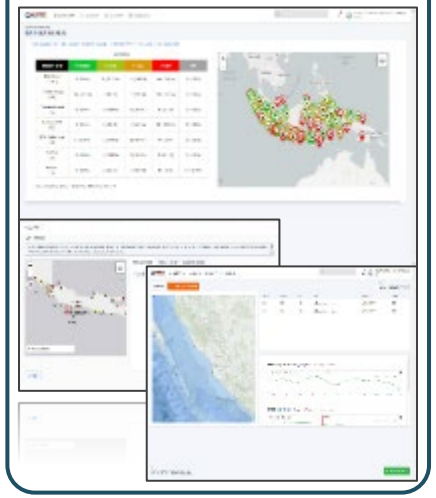
SEISCOMP



TOAST



InaTNT

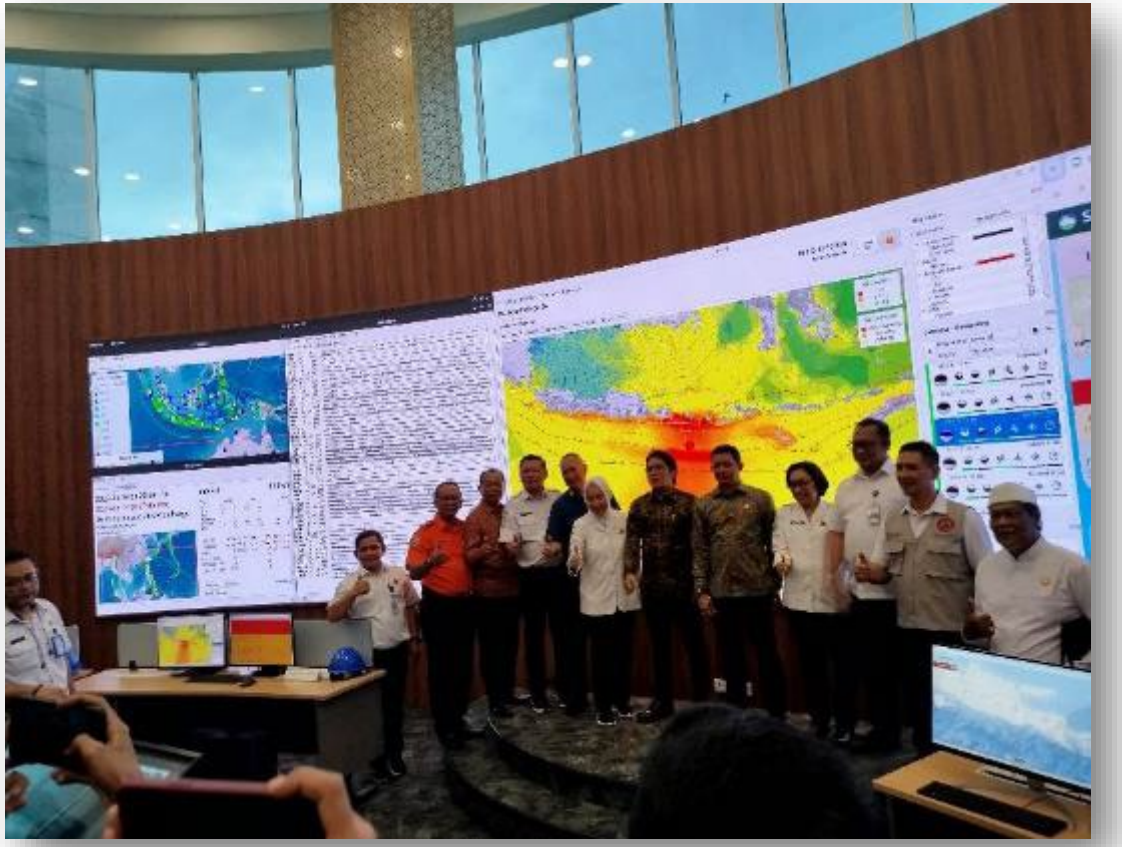


24/7 communication and coordination with the local BMKG directly as part of the confirmation process of earthquake events and the coordination with the InaTEWS operational system (Jakarta and Bali).

TSP Indonesia Development Since Last ICG

Command Center of InaTEWS

The new building of the Backup Operational Center of InaTEWS in Bali was **launched on June 14, 2025**.



BMKG has led the way in implementing earthquake-resistant building construction with the latest **Base Isolator Technology** in the InaTEWS Building located in Jakarta and Bali, aiming to protect structures from damage caused by earthquake shocks.

TSP Indonesia Development Since Last ICG

Integration of the New 4000 TsunAWI Scenarios Into TOAST

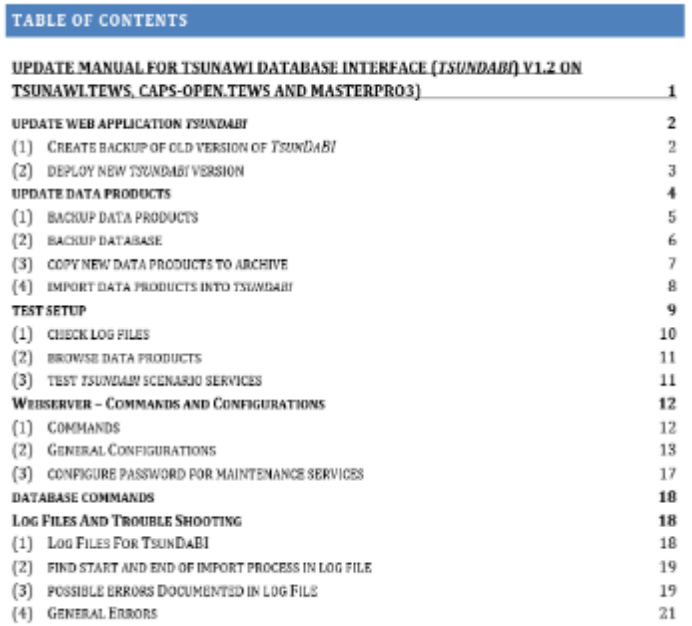
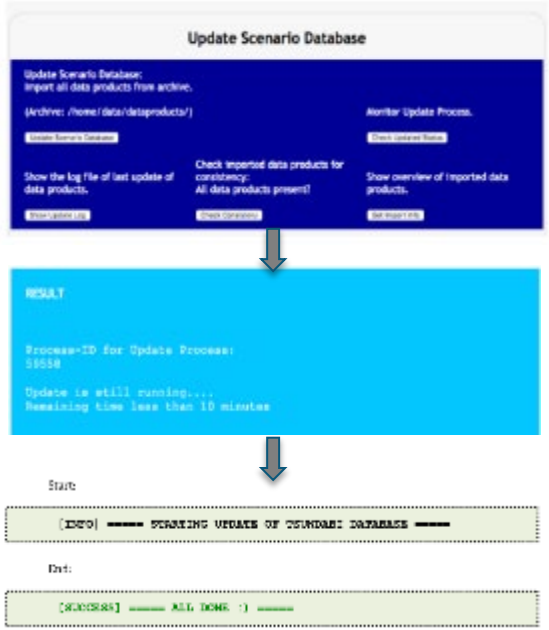
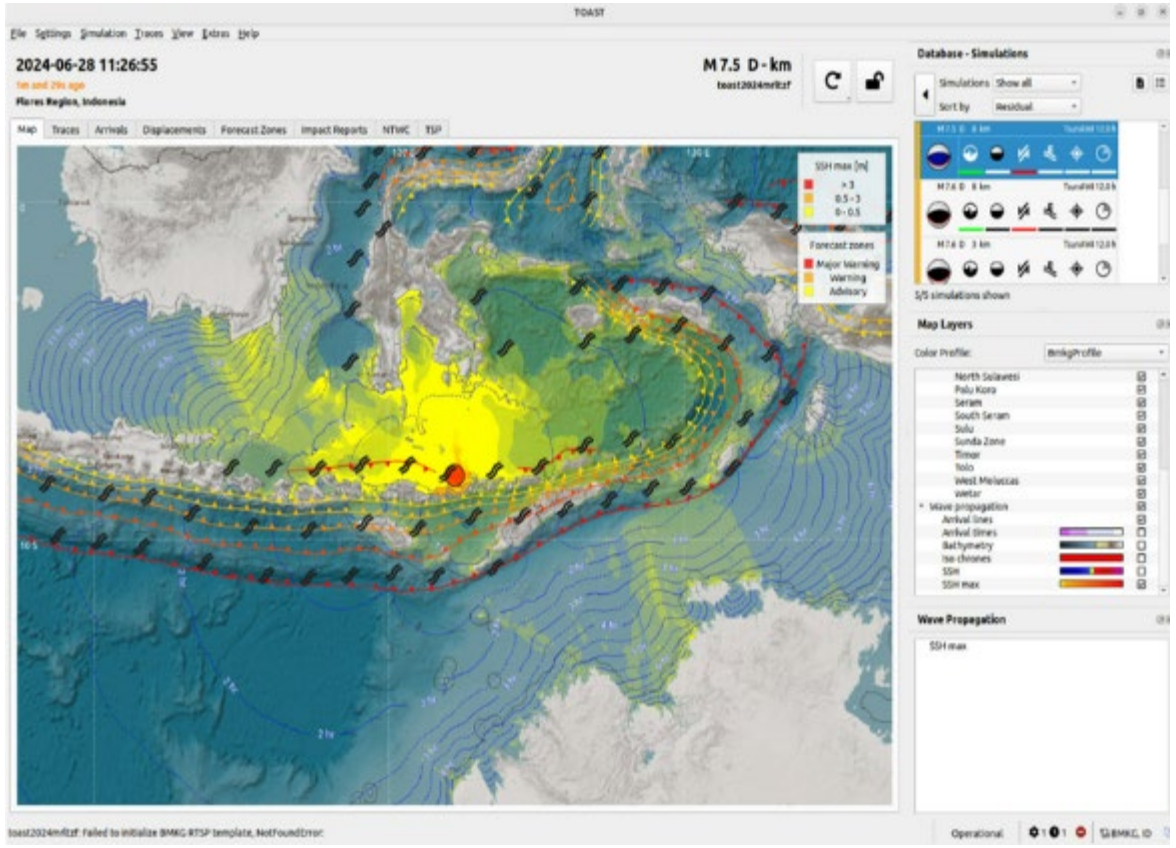


TABLE OF CONTENTS





Integration Pre-Calculated Tsunami Database Scheme

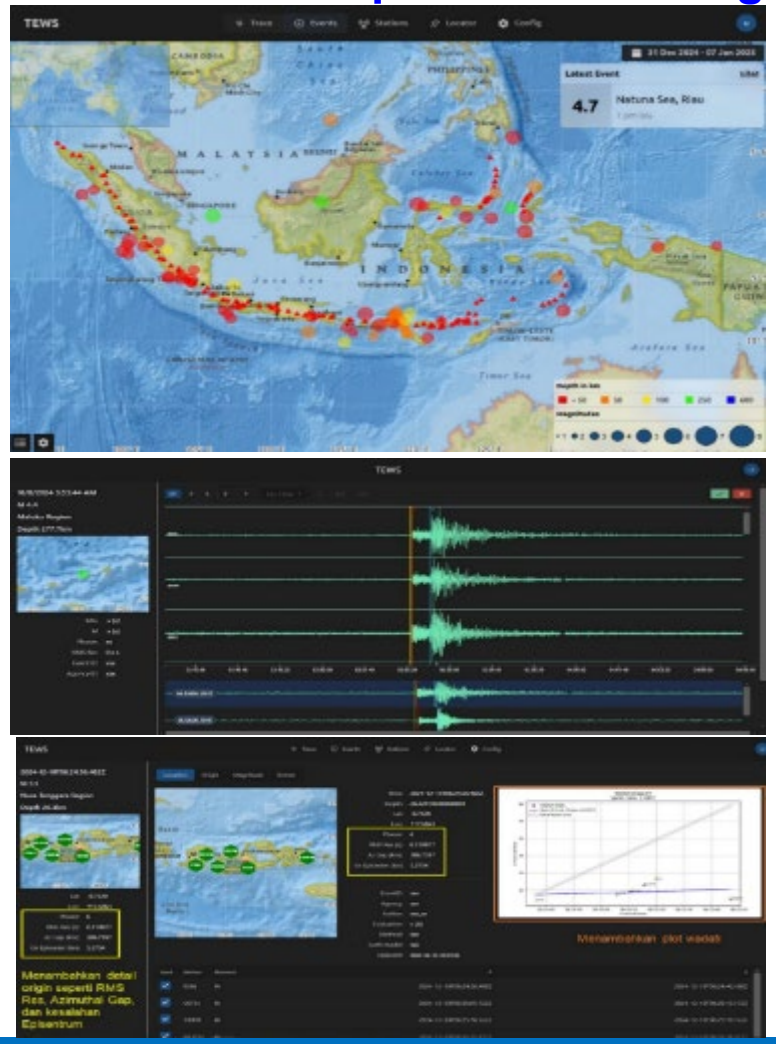
Existing : “Even” Magnitude Scenarios (Eq. 7.0, 7.2, 7.3 to 9.0)
New : “Odd” Magnitude Scenarios (Eq. 7.1, 7.3, 7.5 to 8.9)

Integration Results for “Odd” Magnitude Pre-Calculated Tsunami Database

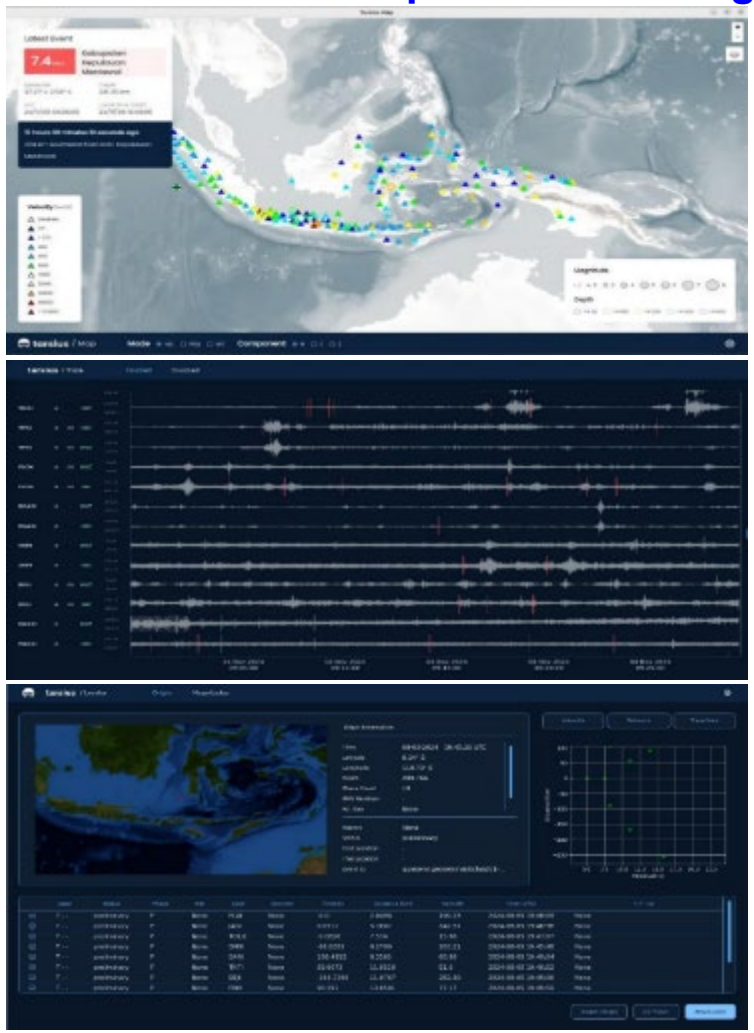
TSP Indonesia Development Since Last ICG

System Processing Development of InaTEWS Merah Putih

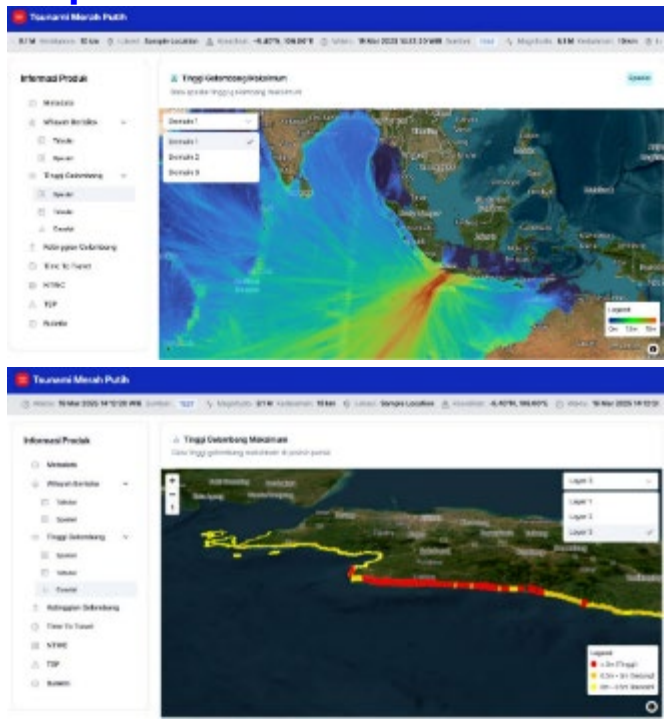
AI-Based Earthquake Processing



Conventional Earthquake Processing



Comprehensive Tsunami Processing



New Tsunami model,
~10.000 scenarios.

TSP Indonesia Development Since Last ICG

Strengthening and Development of Earthquake Early Warning

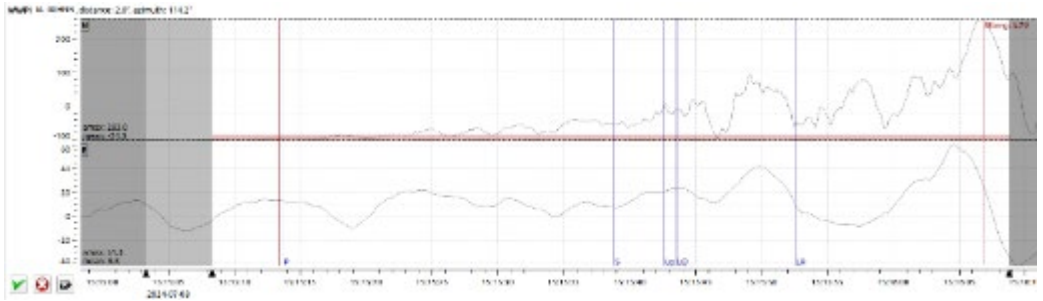
Strengthening and developing the Earthquake Early Warning System for the safety of urban communities and multi-sector business continuity (transportation, industry, etc.)

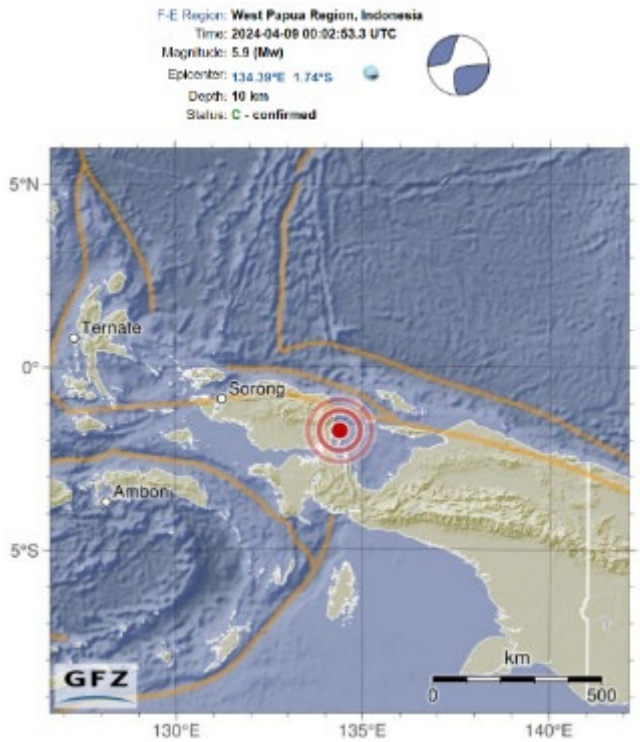
Earthquake Early Warning System

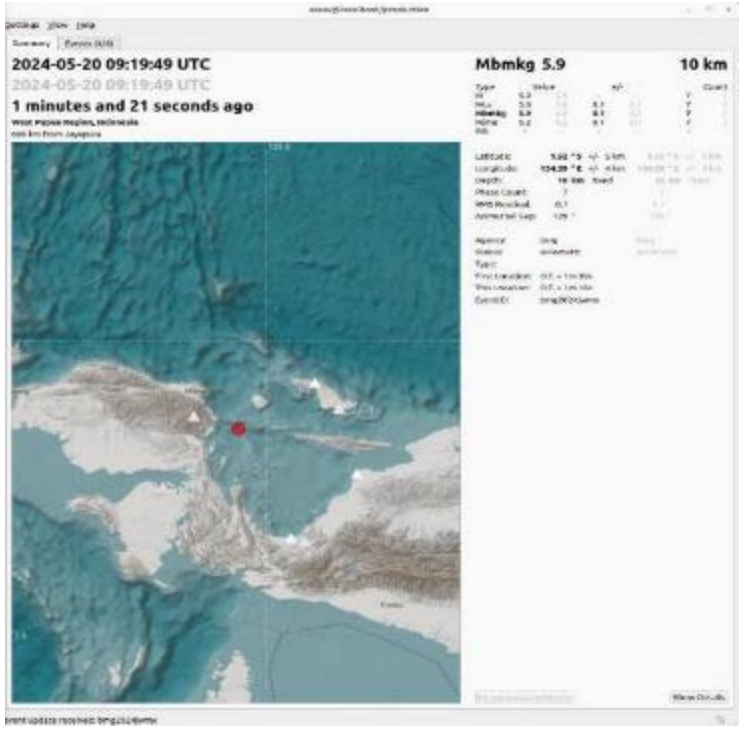
TSP Indonesia Development Since Last ICG

Develop a New Magnitude Formula Mbmkg

Develop a new magnitude formula suitable for local and regional tsunami strong motion data.







Mbmkg Formula:

$$Mbmkg = \log(Amax) + 1.342 * \log(R) + 0.0002305 * R - 1.353$$

TSP Indonesia Development Since Last ICG

On the Job Training For the Indian Ocean Member State OMAN and Timor Leste – 2024

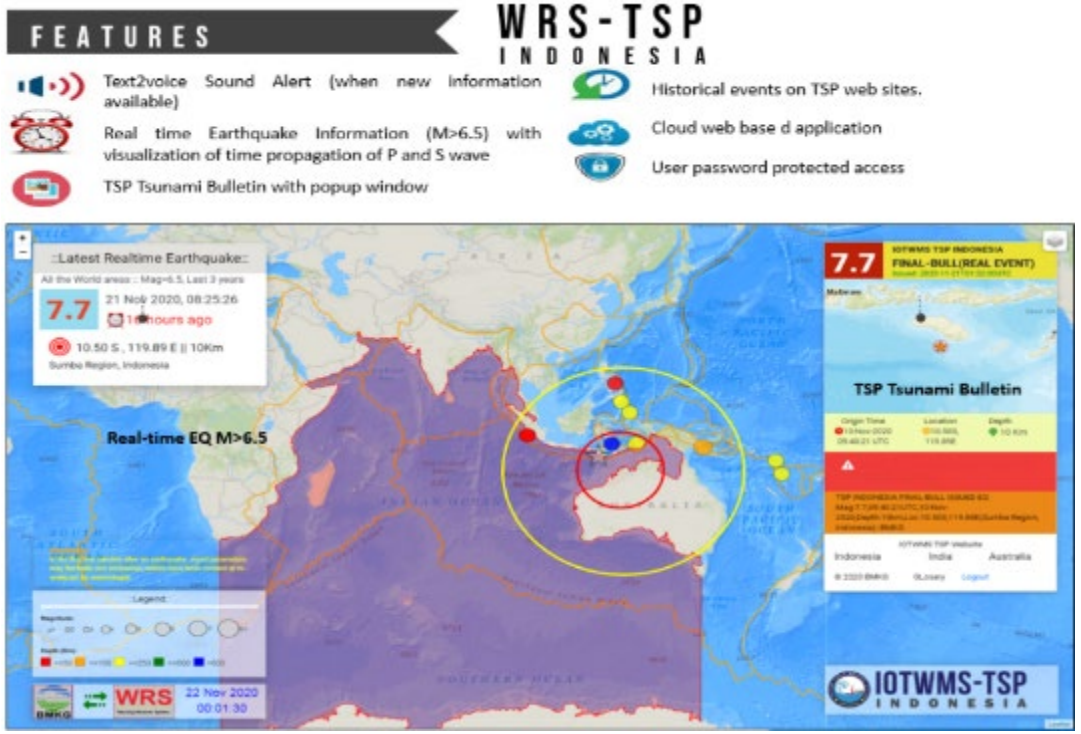
TSP Indonesia Future Development and Plan

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.

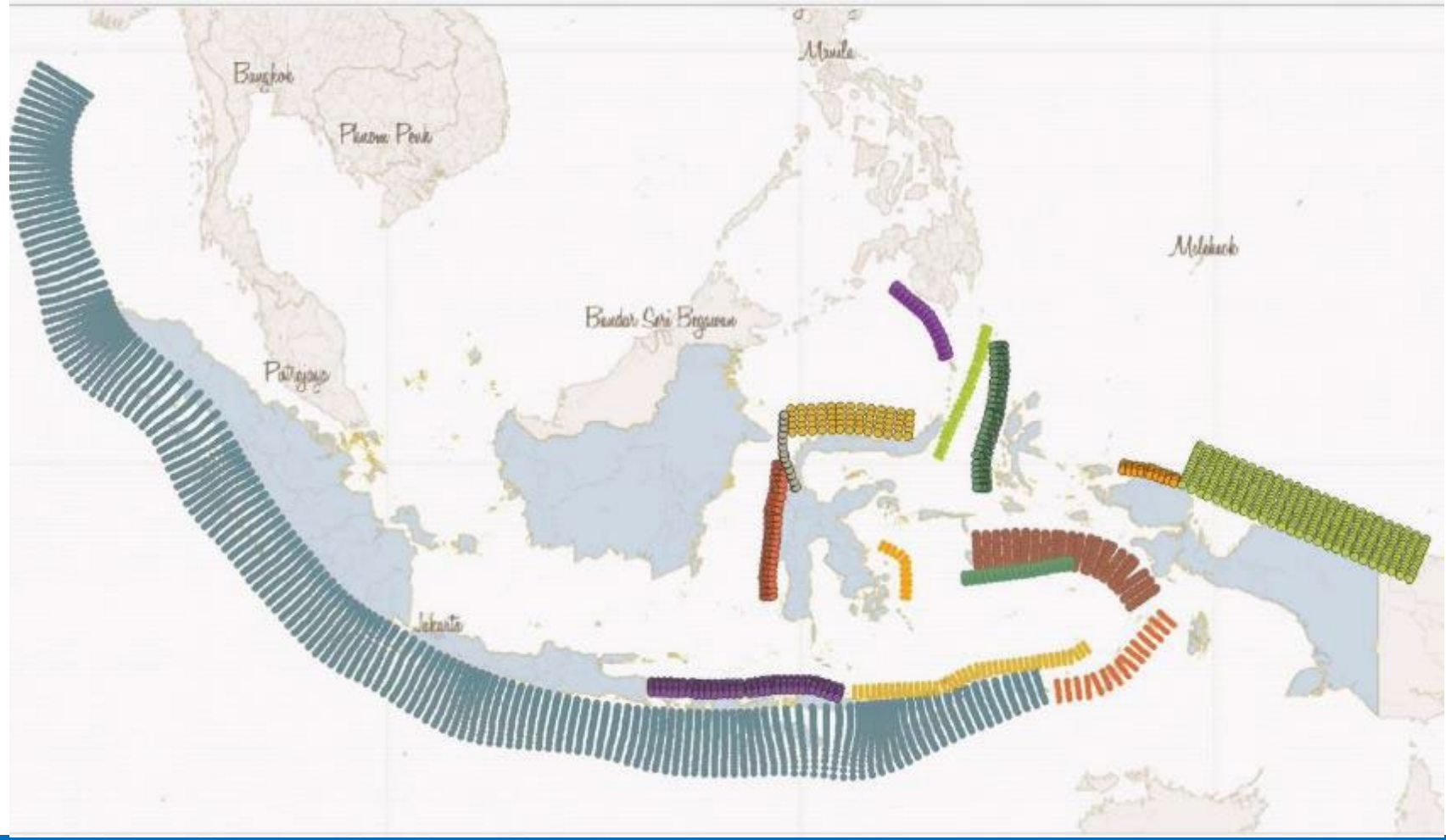
NTWCs could immediately take further essential actions right after they received the tsunami bulletin.

TSP Indonesia Future Development and Plan

Expanding Pre-Calculated Tsunami Database

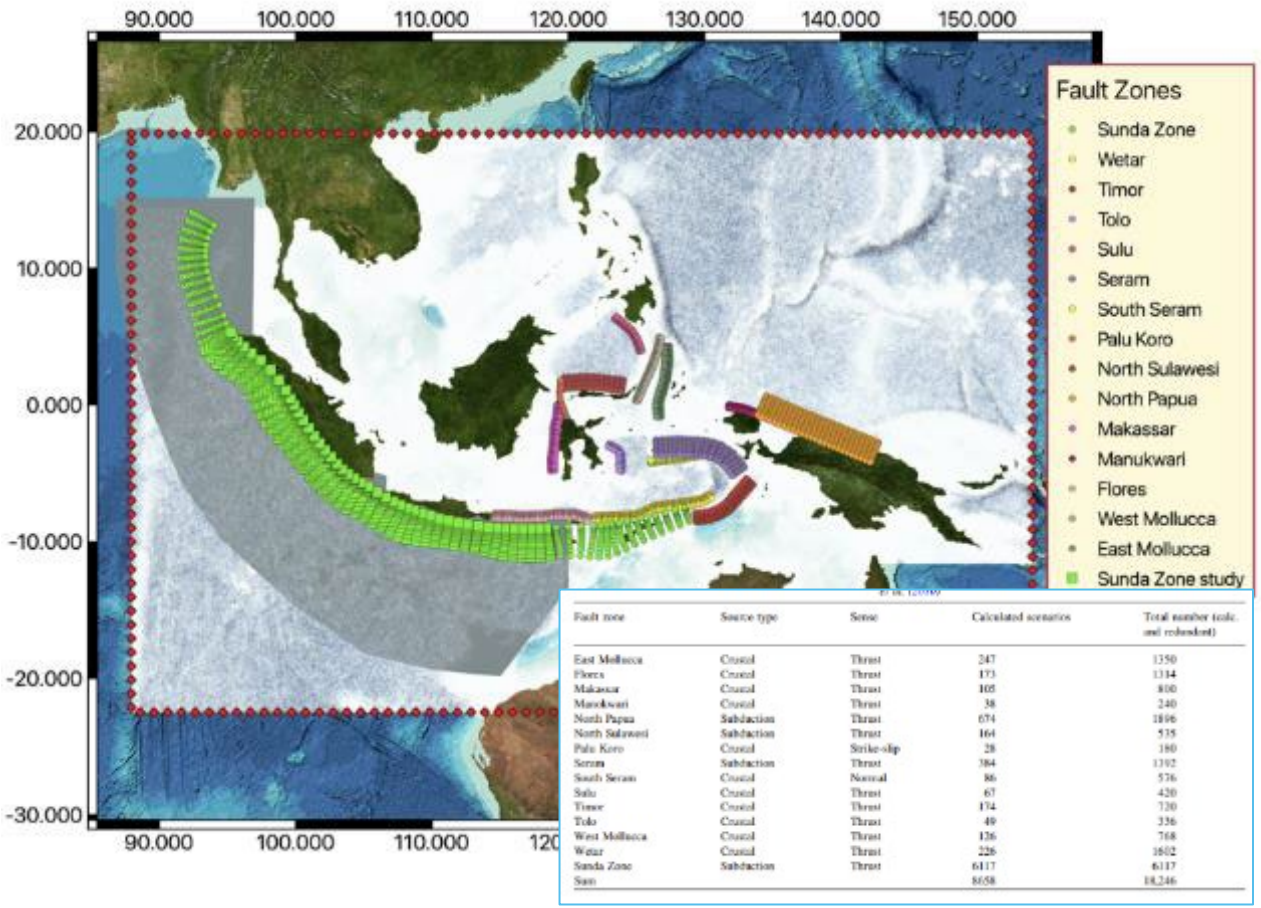
Goals :

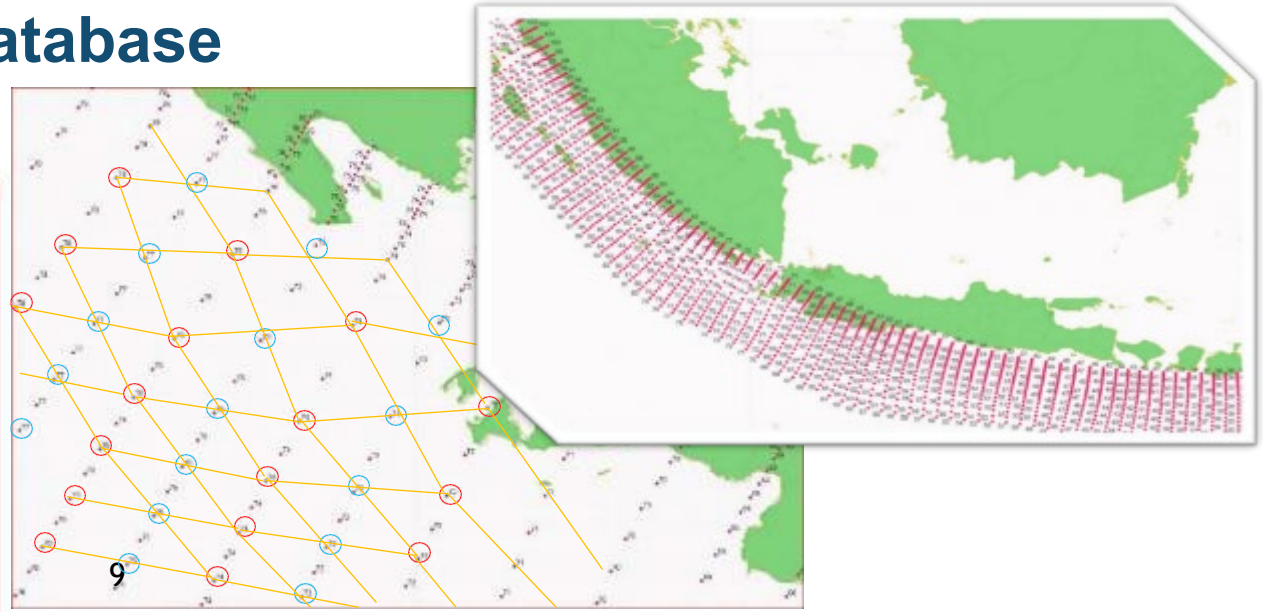
- Expanding the existed **pre-calculated tsunami scenario database** with '**odd**' magnitudes in the **Sunda Zone** (West Sumatra-South Java-Bali and Sumbawa subduction).
- Developing **1800 pre-calculated tsunami scenarios (Sunda Zone)** with magnitude ranging from Mw 7.1 to M 7.3



TSP Indonesia Future Development and Plan

Expanding Pre-Calculated Tsunami Database





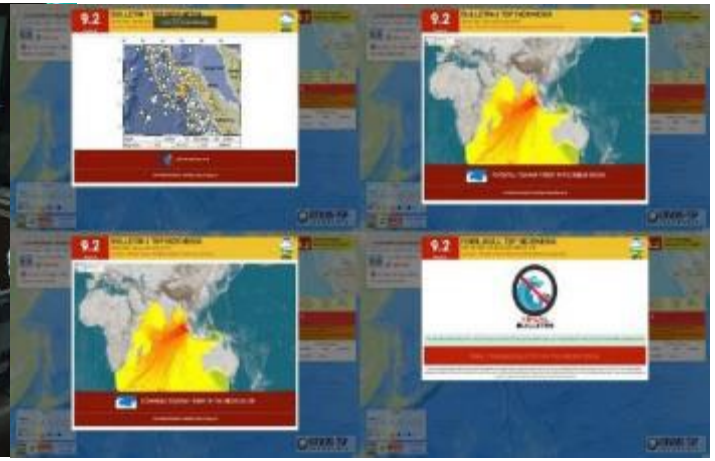
Year	Magnitude Ranges	Number of Tsunami Scenarios
2024	M 7.1 to M 7.3	11.800
2025	M 7.5 to M 8.1	42.700
2026	M 8.3 to M 8.9	1425
		55.925

TSP Indonesia Future Development and Plan

Participation on the Regular IOTWMS Communication Test and IOWAVE Exercise

Preparation

Coordination



Execution

2009 IOWave09

2011 IOWave11

2014 IOWave14

2016 IOWave16

2018 IOWave18

2020 IOWave20

2023 IOWave23

Upcoming

2025 IOWave25

TSP Indonesia Future Development and Plan

- Continue to do the research on non-seismic tsunami and SOP.
- Continue to work on developing maritime product for NAVAREAs.
- Continue to support on job training for the IO member states.
- Continue to establish of the National Consortium of the earthquake and tsunami experts.

unesco
Intergovernmental
Oceanographic
Commission

THANK YOU