BMKG

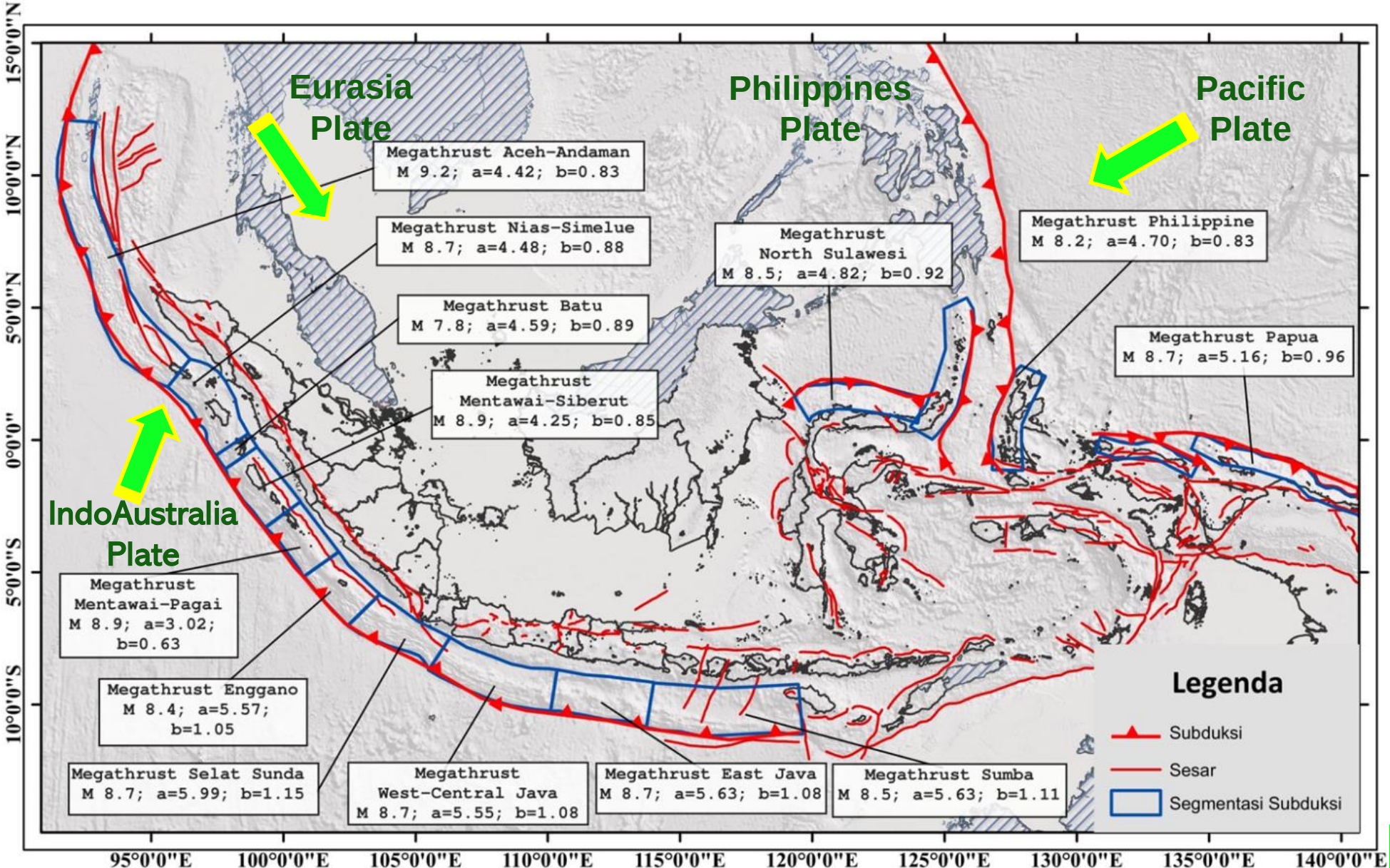
Eleventh Meeting of the ICG/PTWS Regional Working Group on Tsunami Warning and Mitigation System in the South China Sea Region (ICG/PTWS-WG/SCS-XI)

Guangzhou - China, 25 – 27 September 2023

BMKG

AGENCY FOR METEOROLOGY, CLIMATOLOGY, AND GEOPHYSICS OF REPUBLIC INDONESIA (BMKG)

SEISMOTECTONIC OF INDONESIA



- Located in the junction of four active tectonic plates, Indonesia is inevitably prone to earthquake tsunami
- 6 subduction zones with 13 megathrust segments
- There are about 295 seismic faults had been identified, still many more had not been identified
- Indonesia is seismically active, in one year:
  - Earthquake with a various magnitude : 5.000-6.000 times
  - Earthquake M>5,0: 250-350 times
  - Destructive earthquake 8-10 times

BMKG

BADAN METEOROLOGI KLIMATOLOGI DAN GEOFISIKA

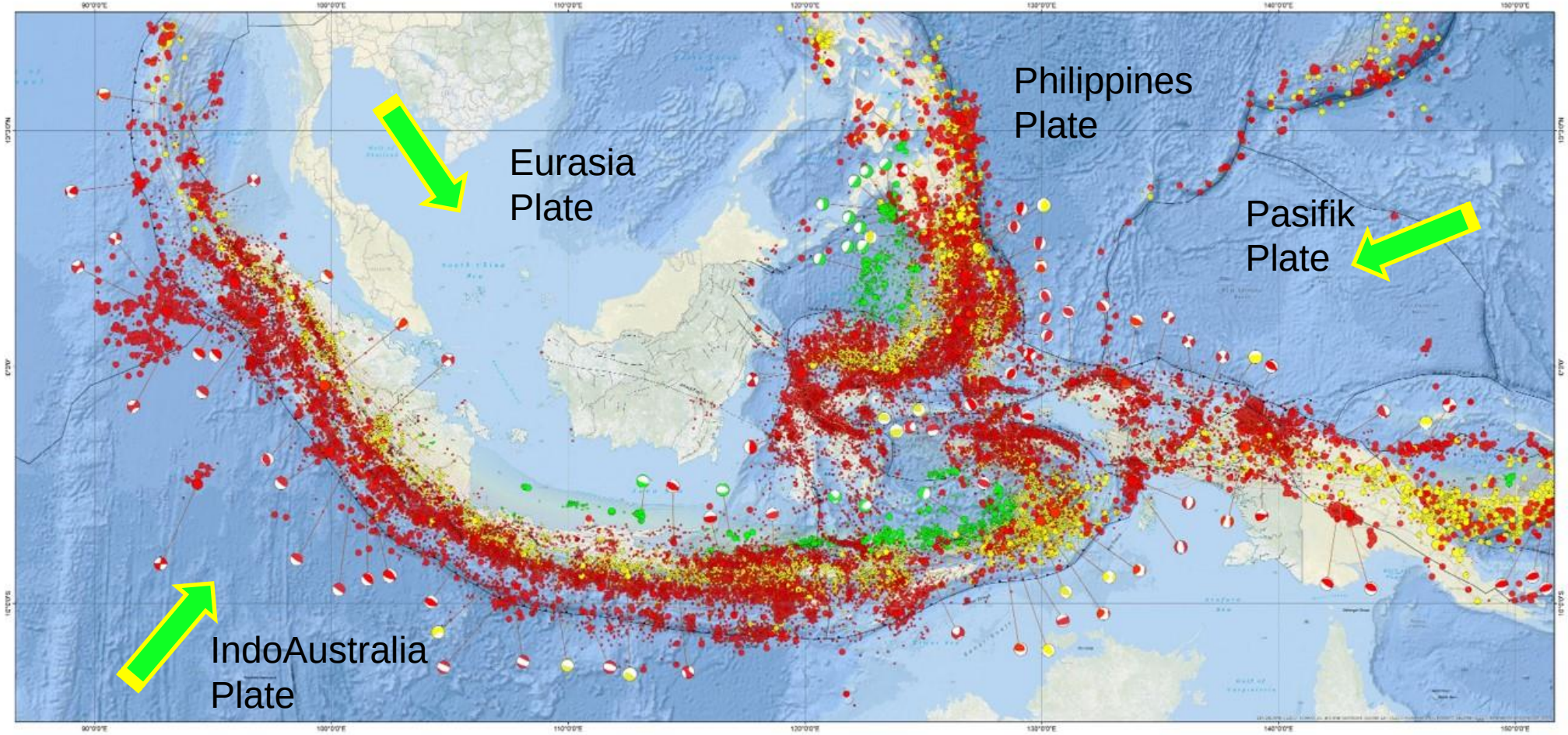
PETA SEISMISITAS INDONESIA

PERIODE TAHUN 2009 - 2021

SKALA :

0 600 1,200 2,400 Km

U



Legenda

KEDALAMAN / MAGNITUDO	DANGKAL (D≤ 100 Km)	MENENGAH (100<D≤300 Km)	DALAM (D>300 Km)
M < 5.0			
5.0 ≤ M < 7.0			
M ≥ 7.0			

Garis Pantai
Batas Provinsi
Kota
Negara lain

Keterangan :

Tunjaman
Sesar Geser
Sesar Naik
Sesar Normal

Kontur Kedalaman Slab (Km)

20 40 60 80 100 120 200 300 400 500 600

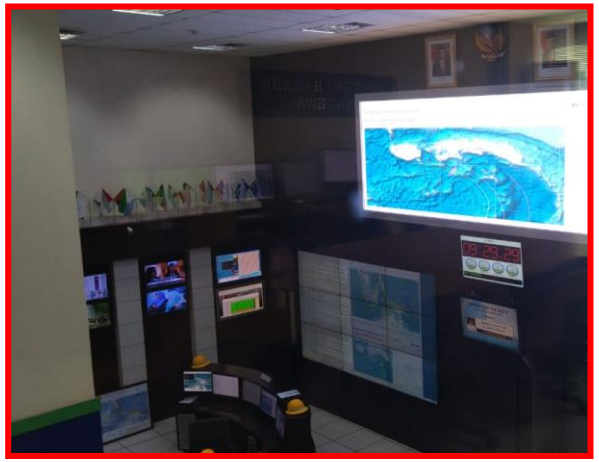
Dibuat Tahun 2022

Sumber Data

- Katalog Gempabumi Indonesia hasil relokasi, periode tahun 2009 - 2021, BMKG
- Batas Lempeng Tektonik Institute for Geophysics J.J. Pickle Research Campus, Bldg. 196 10100 Burnet Rd. (R2200) Austin, TX 78758-4445, Peter Bird, 2003, An updated digital model of plate boundaries, G3.
- Peta Tektonik (Hamilton, W., 1974,Tectonic of Indonesia; Kertapati, E. K. et.al., 1985, Seismotectonic Map of Indonesia)
- Tektonik Sumatra, Kerry Sieh, Danny Natawidjaja, 2000, Neotectonics of the Sumatran fault, Indonesia
- Data Patahan, Pusat Survey Geologi (PSG) Bandung
- Kontur Kedalaman Slab, Hayes, G., 2018, Slab2 - A Comprehensive Subduction Zone Geometry Model: U.S. Geological Survey
- Solusi Bidang Sesar, periode tahun 2009 - 2020, BMKG, Global CMT
- Peta Dasar, Esri, GEBCO, NOAA, National Geographic, DeLorme, HERE, Geonames.org

INATEWS OPERATIONAL BUILDING

EARTHQUAKE & TSUNAMI PROCESSING



- SeisComP
- TOAST
- Dissemination

INATEWS BACKUP SYSTEM - BALI

PRESIDENTIAL DECREE NO. 93 – 2019 ; STRENGTHENING AND DEVELOPMENT OF EARTHQUAKE INFORMATION AND TSUNAMI WARNING

BMKG

Earthquake Monitoring System

BMKG
ESDM (PVMBG)

Processing System

Earthquake Processing System	Tsunami Processing System

Products

Earthquake Information	Tsunami Warning

Dissemination System

Multi-Mode Dissemination

Sea Level Monitoring System

TIDE GAUGE
B I G

BUOY
BPPT

Structure Component:
Articles 4 and 5

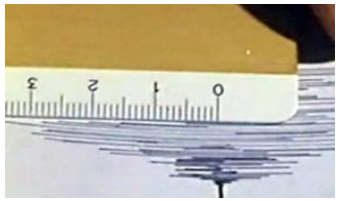
STAKEHOLDERS

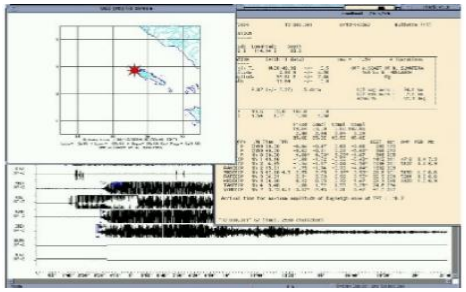
BNPB, BPBD, KEMENKOMINFO, KEMENDAGRI, KEMENKEU, KEMENDIKBUD, KEMENRISTEK, KEMENKES, KEMENSOS, KEMENPUPR, KEMENHUB, KEMENATR, KKP, BASARNAS, BAPPENAS, LIPI, LAPAN, TNI , POLRI , MEDIA

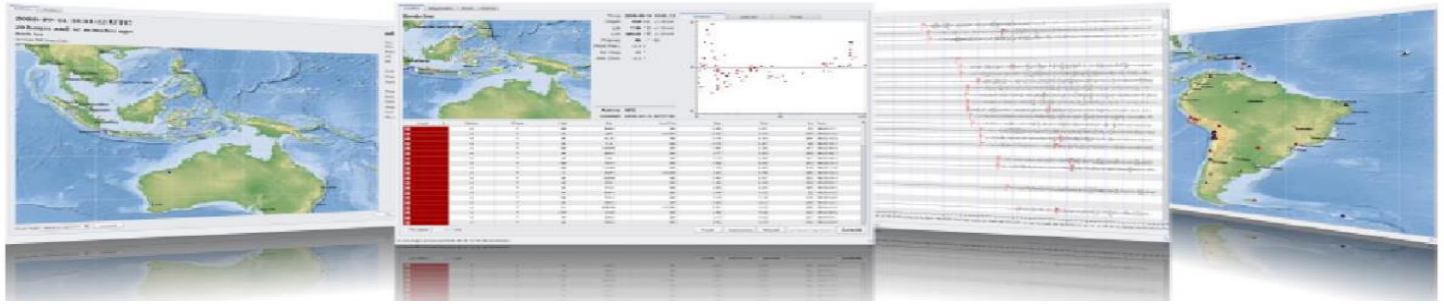
Culture Component:
Articles 15 and 20

Coastal and Affected Communities

MILESTONE OF MONITORING AND PROCESSING INATEWS







< 21 Sensors	21 Sensors	176 Sensors	370 - 521 Sensors	521 - 600 Sensors
< 1990 Analog Data, Manual Earthquake Processing	1991 - 2007 Digital Data, Manual Earthquake Processing (ONYX, JISNET, Jopen)	2008 - 2018 InaTEWS : automatic SeisComP, DSS, TOAST	2019 – 2023 Strengthening InaTEWS	2023 - Next Strengthening InaTEWS: "SisPro Merah Putih", Automation in Earthquake Processing and Dissemination
1- 2 Days	3 Hours	5 Minutes	3 - 5 Minutes	1 - 3 Minutes

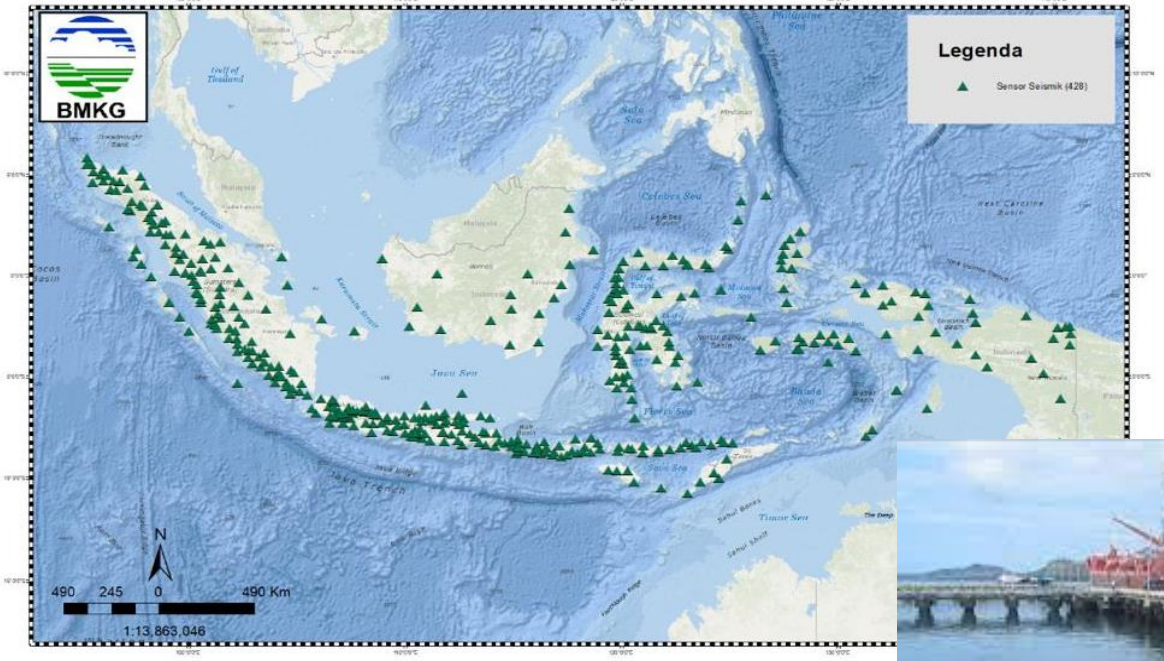
Analog Data, Manual Earthquake Processing

Digital Data, Manual Earthquake Processing

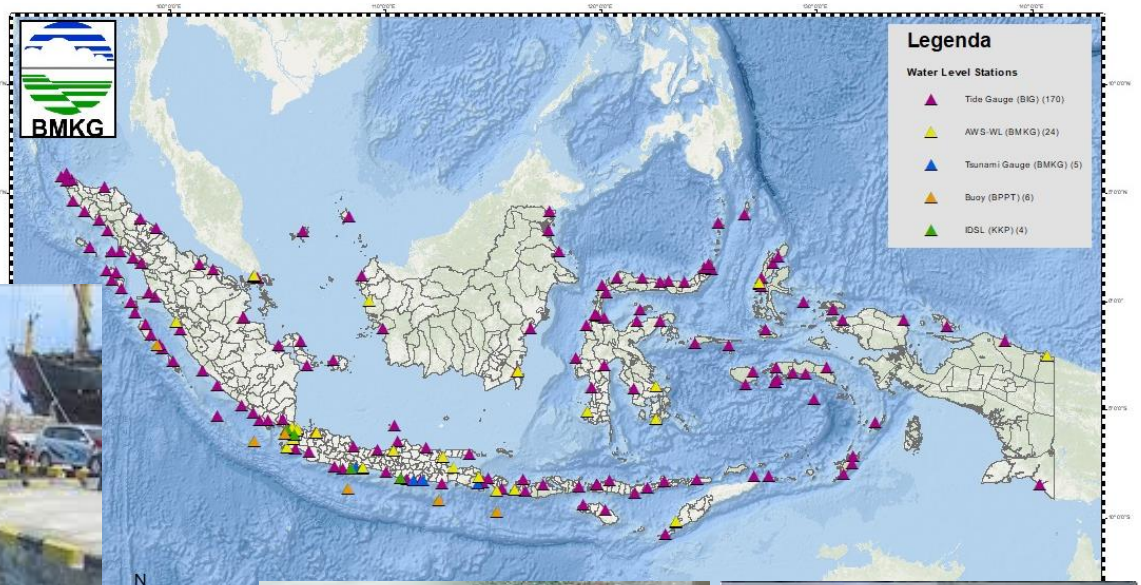
Automatic Earthquake Processing with Digital Data

CURRENT STATUS OF SEISMIC STATIONS AND SEA LEVEL MONITORING

521 Seismic Sites for Earthquake Detection

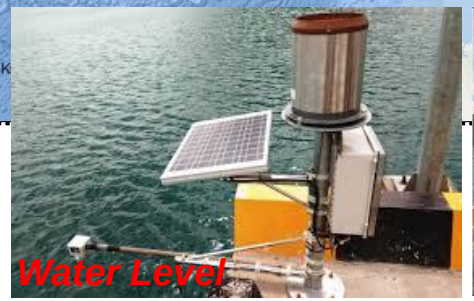


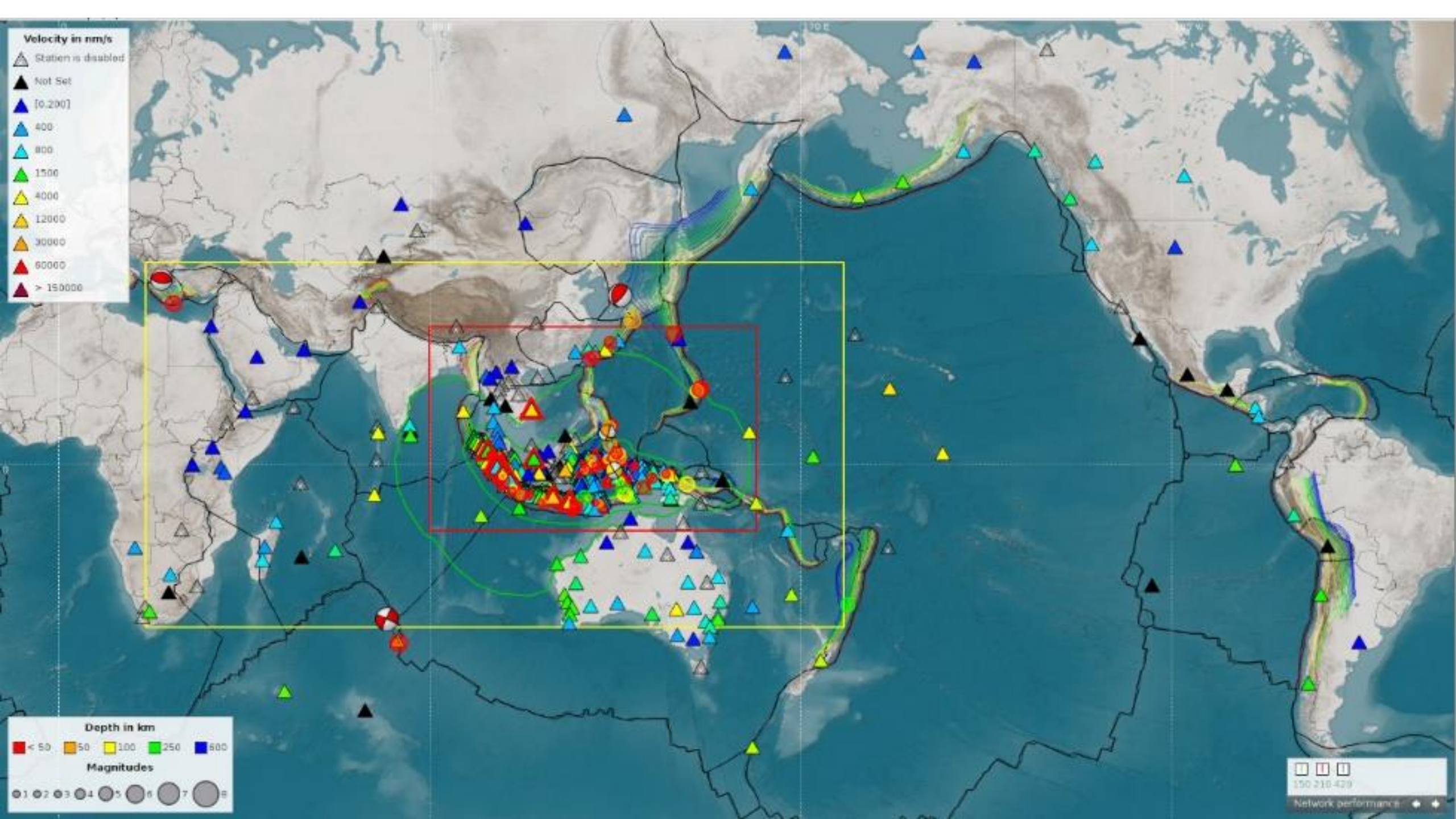
236 + 82 (RT) Tide Gauge (BIG)
36 Automatic Water Level (BMKG)
13 IDSL Water Level (KKP – BRIN)
7 Tsunami BUOY (BRIN)



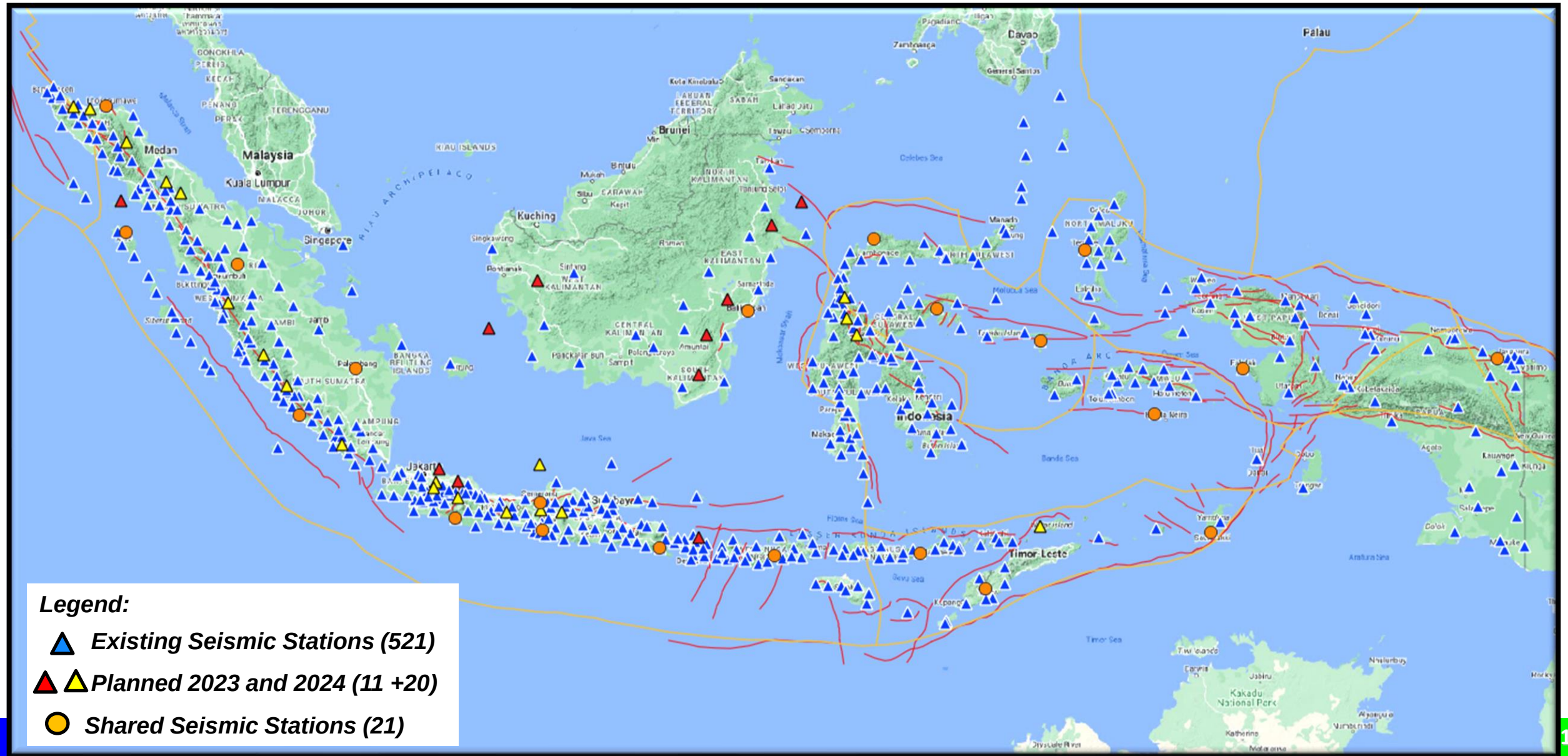
Shelter

Sensors

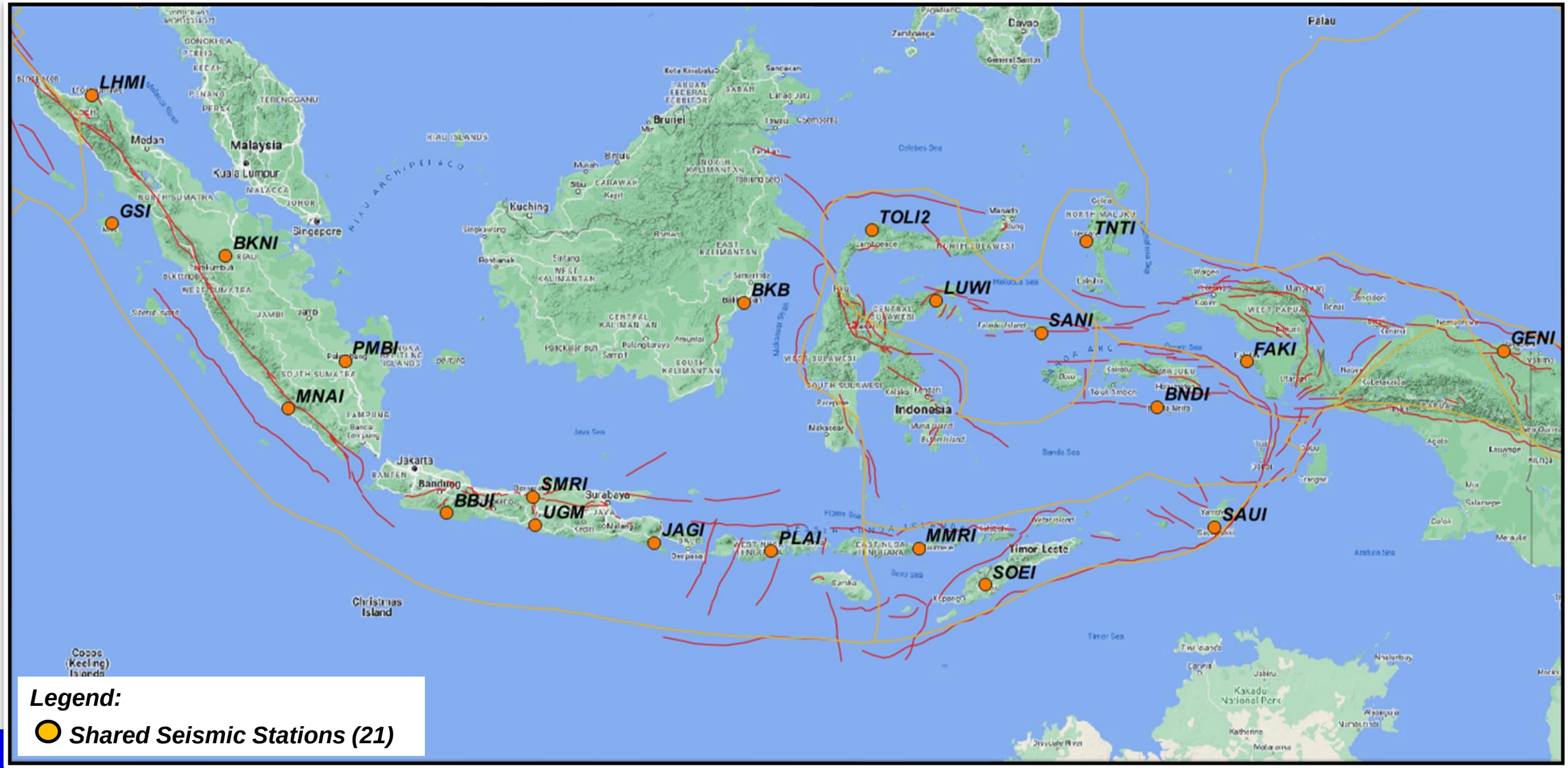



Velocity in nm/s
Station is disabled
Not Set
[0.200]
400
800
1500
4000
12000
30000
60000
> 150000
Depth in km
< 50
50
100
250
600
Magnitudes
1
2
3
4
5
6
7
8
150 210 429
Network performance

INDONESIAN SEISMIC NETWORKS FOR INATEWS



21 SEISMIC STATIONS FOR INTERNATIONAL SHARED REALTIME DATA



SEISMIC STATION EQUIPMENTS

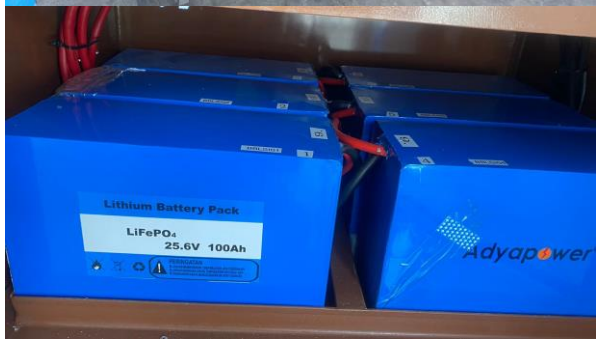
The list of items in the shelter location include :

A. Sensor System
- Seismometer
- Accelerometer

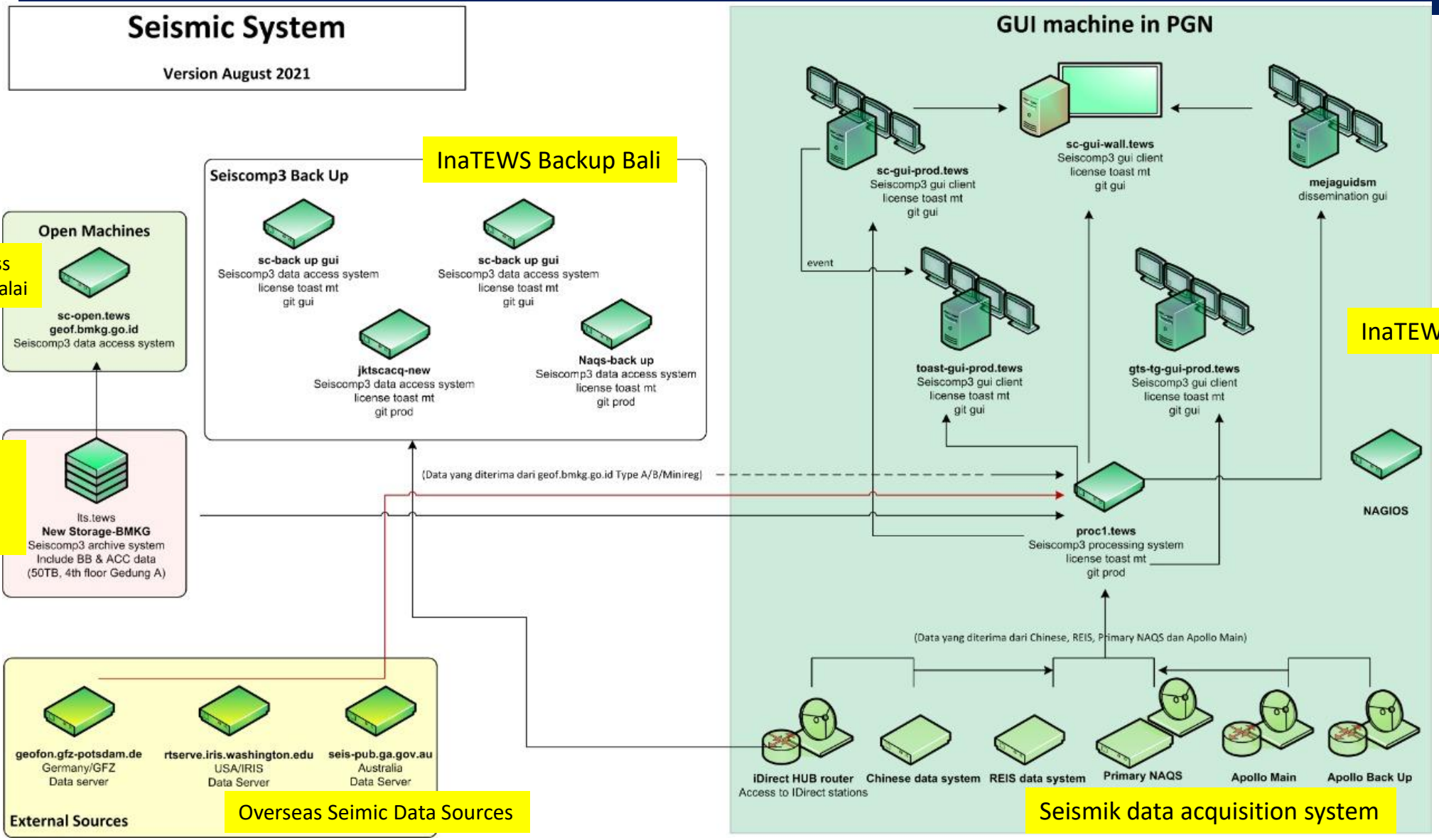
B. DAU (Data aquisition unit) System
- Digitizer

C. **Remote Site Communication System**
- Modem VSAT
- Antenna VSAT
- BUC (Block Up Converter)
- LNB (Low Noise Block)

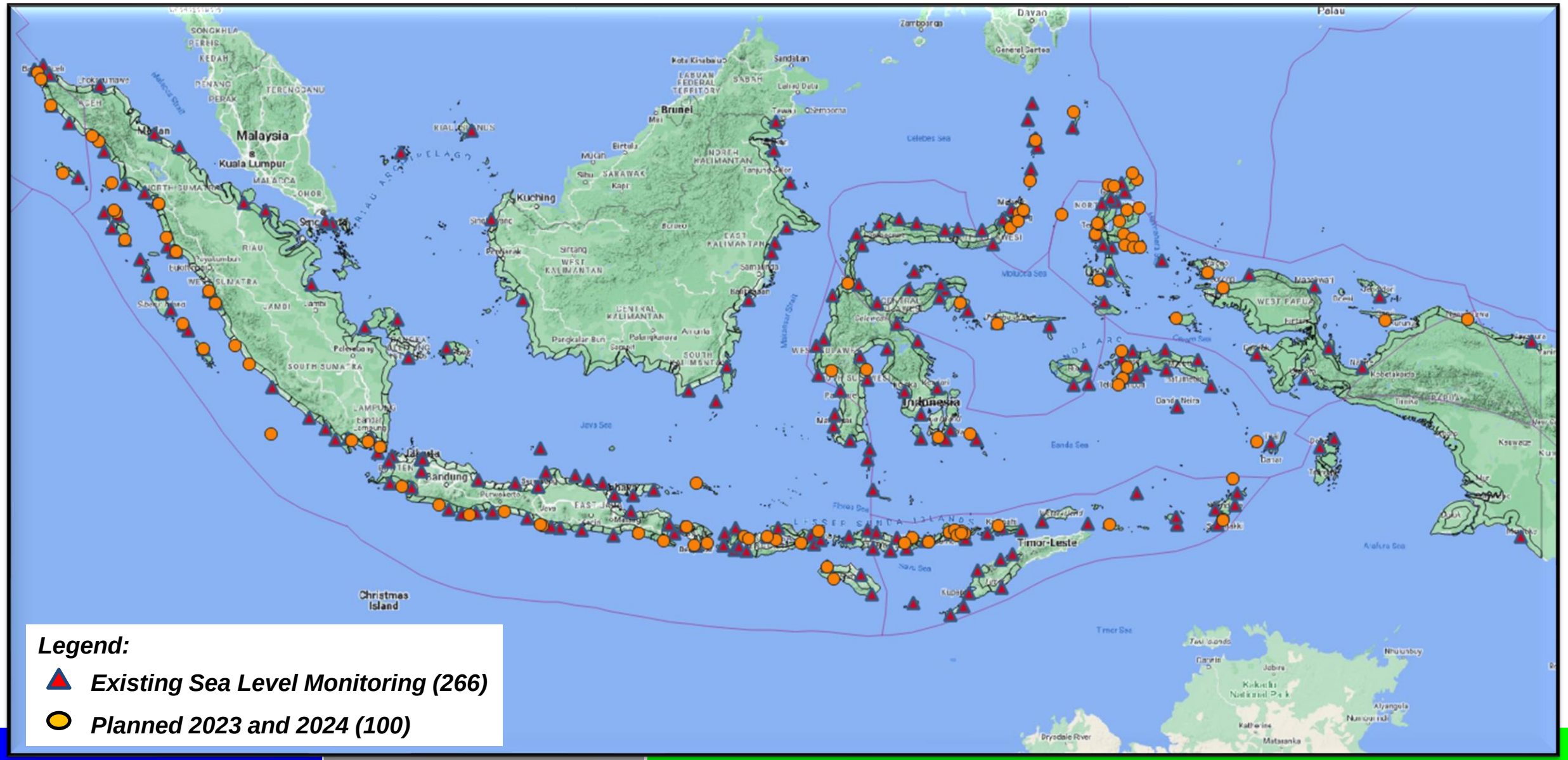
D. **Power Supply System**
- Solar Panel
- MPPT Solar Controller
- Grounding System
- Baterai Lithium
- Solar Combiner Box
- Cable set for power supply



TOPOLOGY OF THE SEISMIC SYSTEM AT BMKG



SEA LEVEL MONITORING FOR SUPPORTING INATEWS



SEA LEVEL MONITORING SENSORS

PGT - BMKG

TSUNAMI GAUGE

PUSMAR - BMKG

AWS – WATER LEVEL

KKP

IDSL – WATER LEVEL

BPPT/BRIN

TSUNAMI BUOY

BPPT/BRIN

Cable Based Tsunameter (CBT)

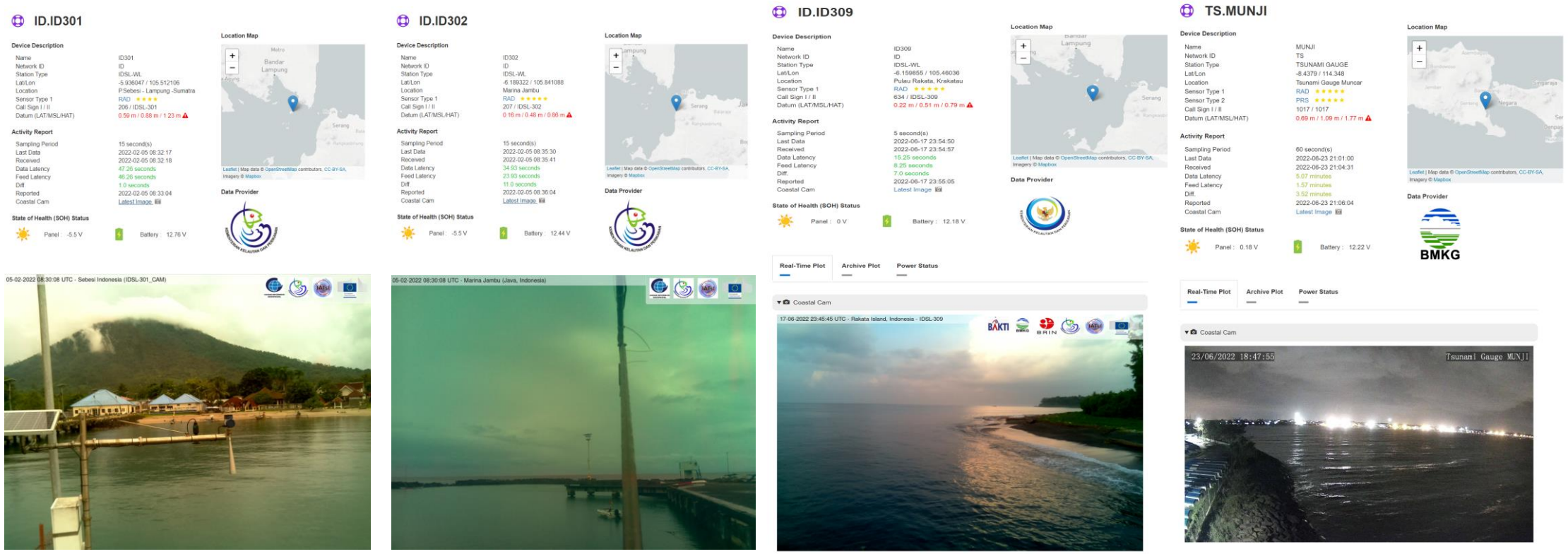
BIG

TIDE GAUGE

NO	NETWORK	TOTAL	OWNER	SAMPLING RATE	TRANSMIT RATE
1	**AWS Water Level**	35	BMKG	1 minute	1 minute
2	**Tsunami Gauge**	5	BMKG	1 minute	5 minutes
3	**Tide Gauge 1**	157	BIG	1 minute	5 minutes
4	**Tide Gauge 2 (RT)**	54	BIG	5 seconds	5 seconds
5	**IDSL**	7	KKP	11 seconds	11 seconds
6	**Buoy**	7	BPPT	15 minutes (normal mode) / 15 seconds (tsunami mode)	1 hour (normal model) / 1 minutes (tsunami mode)
7	**CBT**	1	BPPT	15 seconds	15 seconds

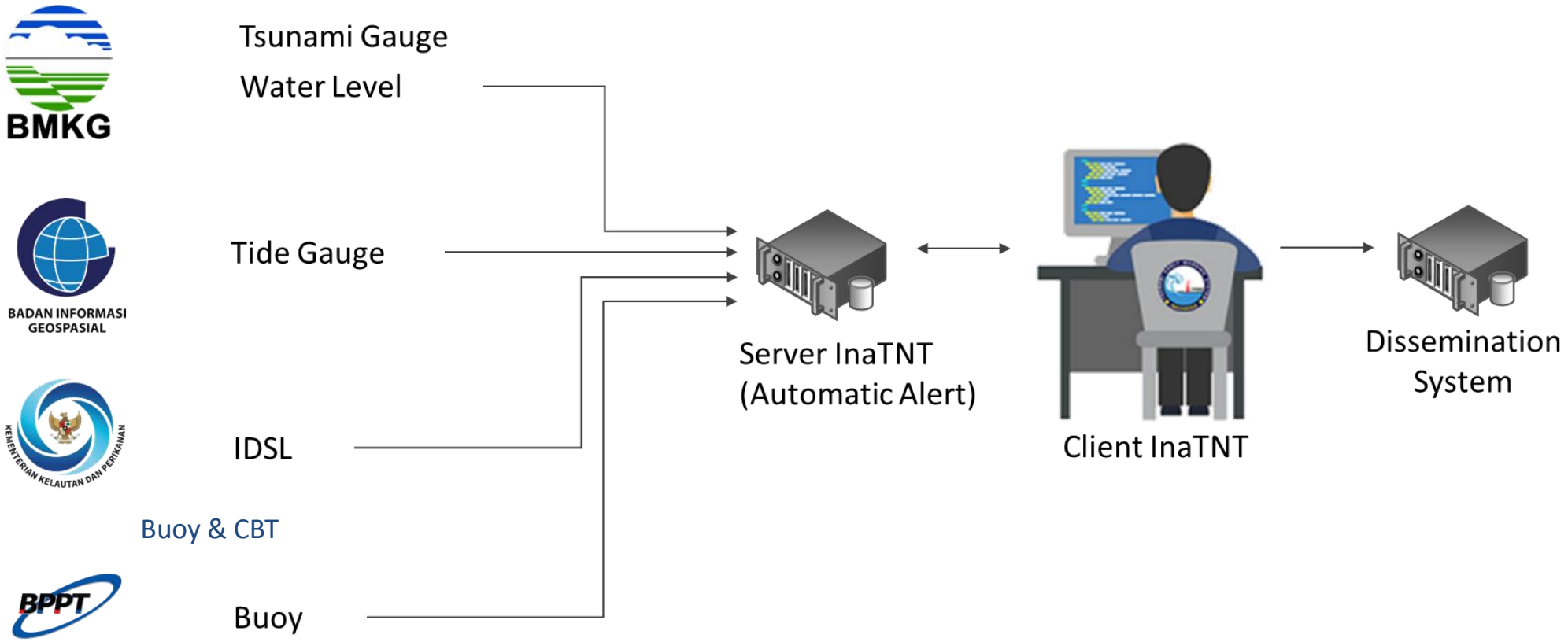
Number of Integrated Sea Level Monitoring Sensors : 266 Sensors

INEXPENSIVE DEVICE SEA LEVEL MEASUREMENT (IDSL) & TSUNAMI GAUGE SENSORS ARE EQUIPPED BY COASTAL CAM/CCTV TO VISUALLY CONFIRM TSUNAMI WAVE



INATNT (INDONESIA TSUNAMI NON TECTONIC) APPLICATION

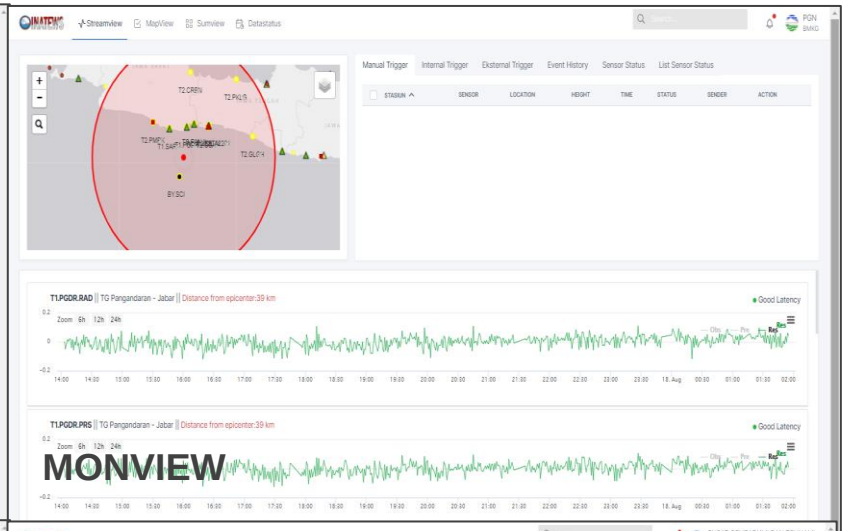
InaTNT is an integrated system that functions **to detect sea level change anomalies that indicate a tsunami is recorded by sea level observation sensors** owned by BMKG, BIG, BPPT and KKP. The presence of InaTNT will improve the performance of the InaTEWS System in detecting tsunamis caused by tectonic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



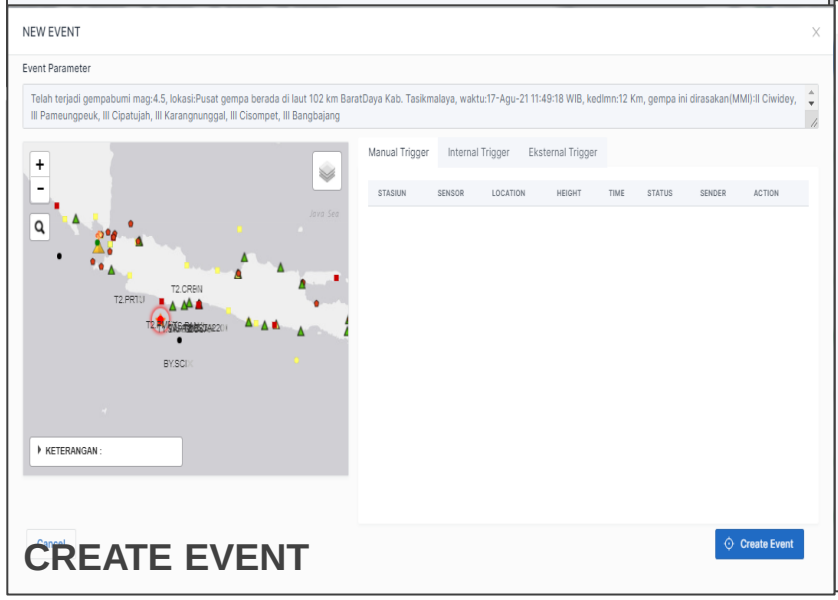
INATNT (INDONESIA TSUNAMI NON TECTONIC) APPLICATION

STREAMVIEW

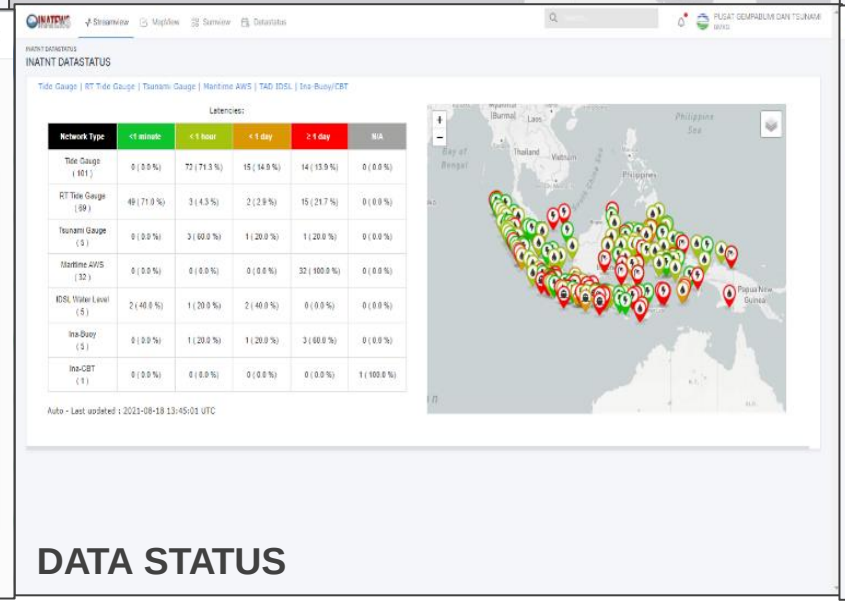
MAPVIEW



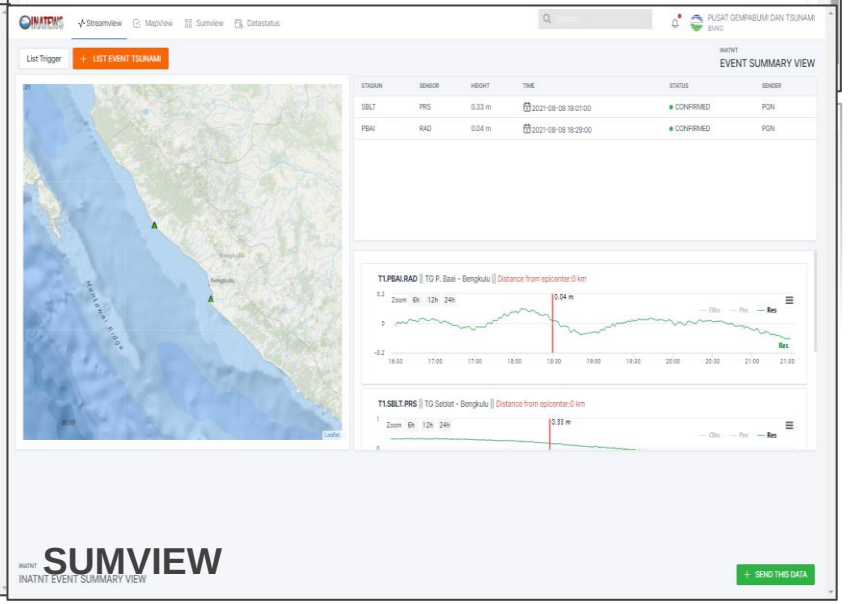
MONVIEW



CREATE EVENT

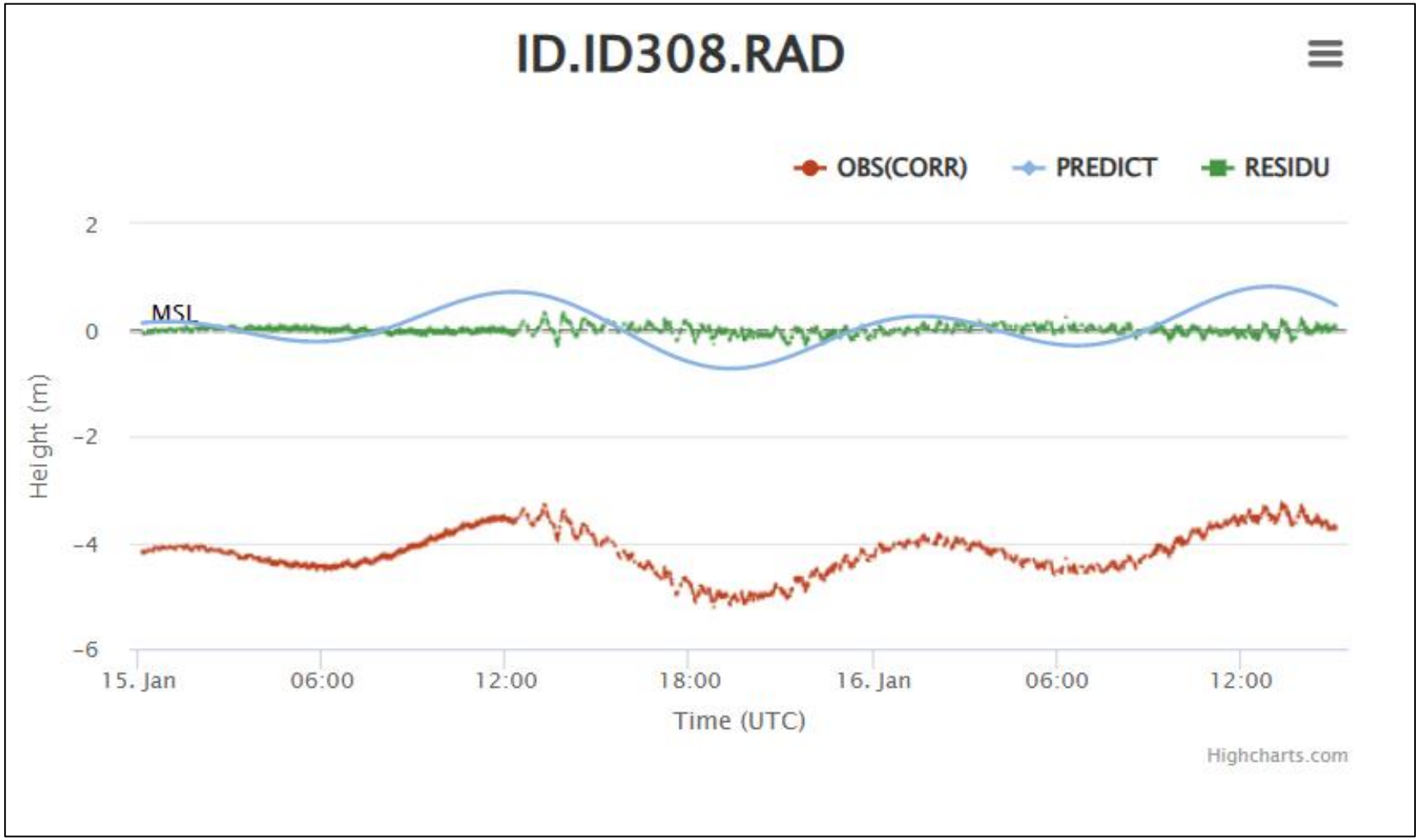


DATA STATUS



SUMVIEW

METEOTSUNAMI / RISSAGA PHENOMENON FROM 15 JANUARY 2022 HUNGA TONGA VOLCANIC ERUPTION BLAST THAT WAS DETECTED



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

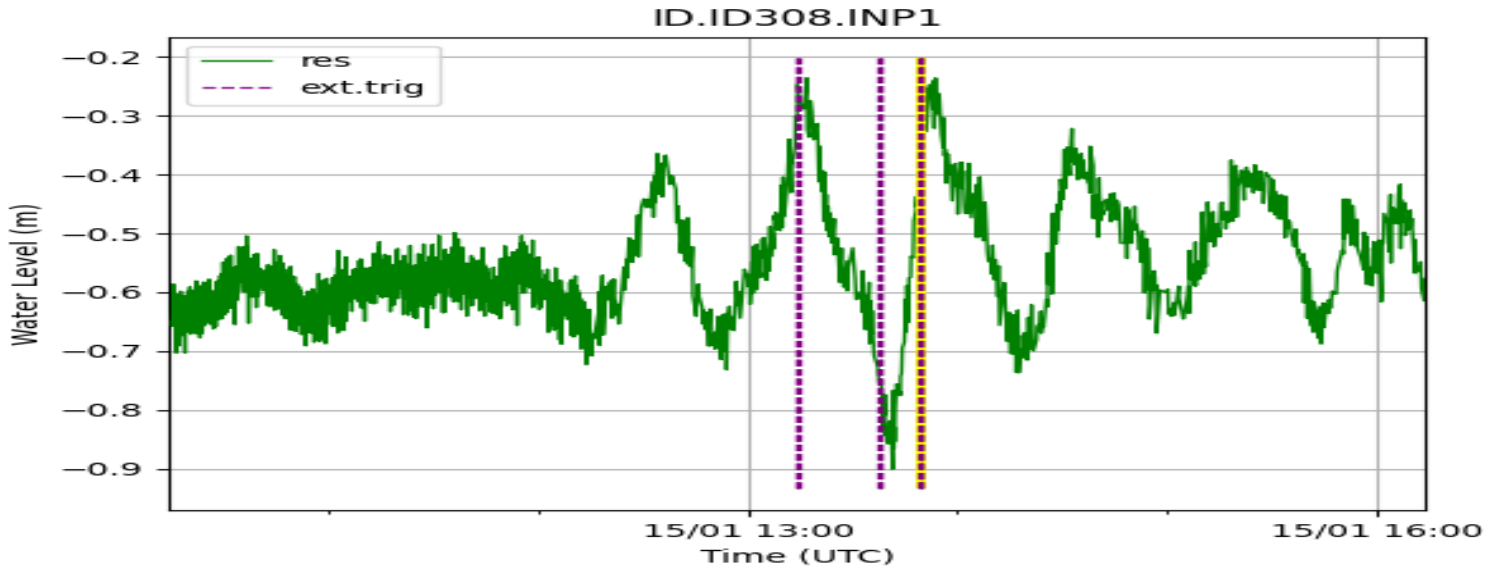
Activity Report

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

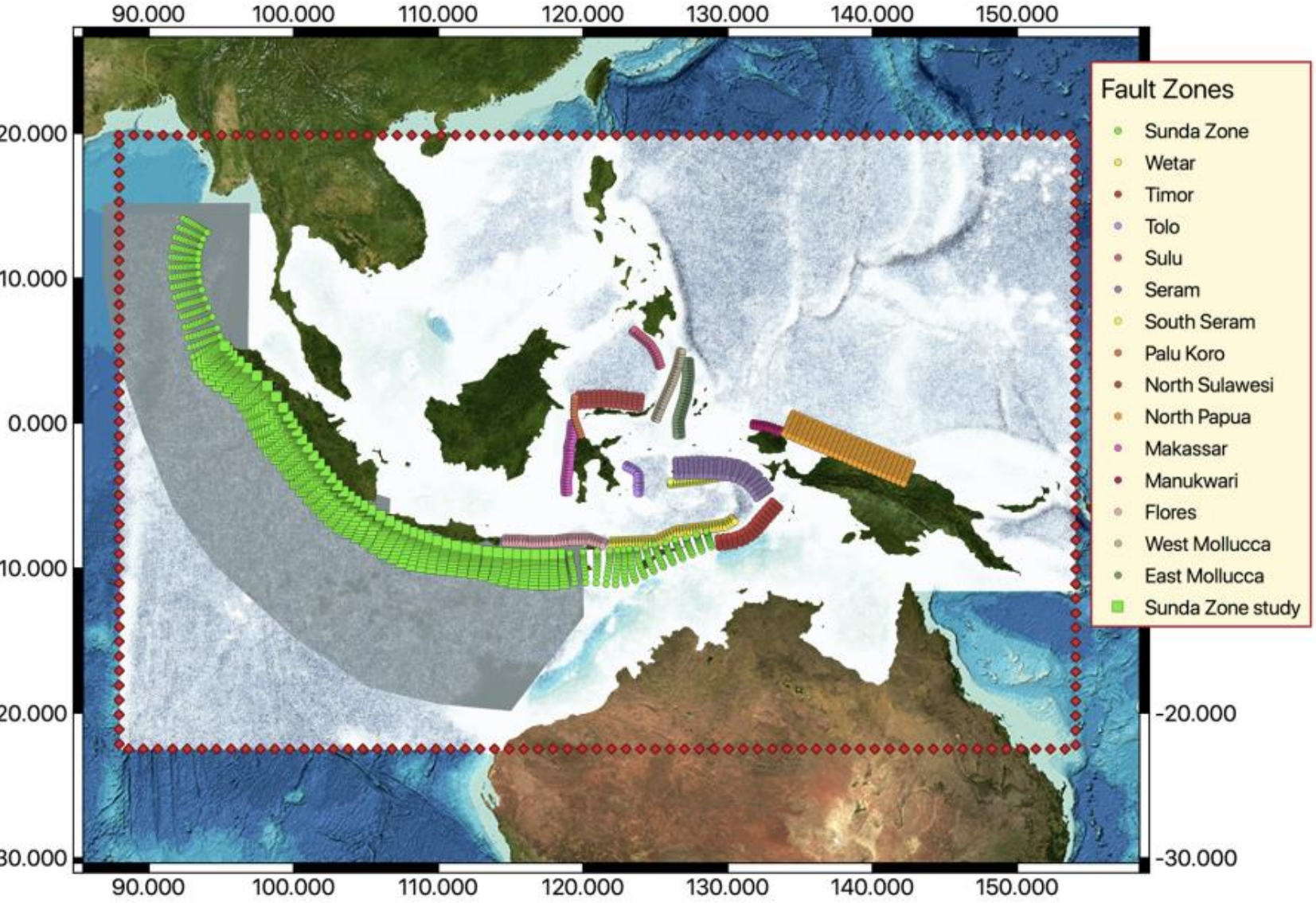
METEOTSUNAMI / RISSAGA PHENOMENON FROM 15 JANUARY 2022 HUNGA TONGA VOLCANIC ERUPTION BLAST THAT WAS DETECTED

Total rows loaded: 10

	TRIGTIME	CHANNEL	WH	STATUS	RCV_TIME
1	2022-01-15 13:14:02	ID.ID308.INP1	2.35289788246155	Anomaly alert at 2022-01-15 13:14:02 UTC with waveheight 2.35 m (Alert Level : 5.0), please check it	2022-01-18 02:52:16
2	2022-01-15 13:14:14	ID.ID308.INP1	2.41590595245361	Anomaly alert at 2022-01-15 13:14:14 UTC with waveheight 2.42 m (Alert Level : 7.0), please check it	2022-01-18 02:52:16
3	2022-01-15 13:14:50	ID.ID308.INP1	2.38521909713745	Anomaly alert at 2022-01-15 13:14:50 UTC with waveheight 2.39 m (Alert Level : 10.0), please check i	2022-01-18 02:52:16
4	2022-01-15 13:37:26	ID.ID308.INP1	1.85812497138977	Anomaly alert at 2022-01-15 13:37:26 UTC with waveheight 1.86 m (Alert Level : 2.0), please check it	2022-01-18 02:52:17
5	2022-01-15 13:37:44	ID.ID308.INP1	1.84495401382446	Anomaly alert at 2022-01-15 13:37:44 UTC with waveheight 1.84 m (Alert Level : 5.0), please check it	2022-01-18 02:52:17
6	2022-01-15 13:38:14	ID.ID308.INP1	1.85065996646881	Anomaly alert at 2022-01-15 13:38:14 UTC with waveheight 1.85 m (Alert Level : 10.0), please check i	2022-01-18 02:52:17
7	2022-01-15 13:49:02	ID.ID308.INP1	2.16072297096252	Anomaly alert at 2022-01-15 13:49:02 UTC with waveheight 2.16 m (Alert Level : 3.0), please check it	2022-01-18 02:52:18
8	2022-01-15 13:49:14	ID.ID308.INP1	2.16184091567993	Anomaly alert at 2022-01-15 13:49:14 UTC with waveheight 2.16 m (Alert Level : 5.0), please check it	2022-01-18 02:52:18
9	2022-01-15 13:49:32	ID.ID308.INP1	2.22066688537598	Anomaly alert at 2022-01-15 13:49:32 UTC with waveheight 2.22 m (Alert Level : 8.0), please check it	2022-01-18 02:52:18
10	2022-01-15 13:49:50	ID.ID308.INP1	2.21634793281555	Anomaly alert at 2022-01-15 13:49:50 UTC with waveheight 2.22 m (Alert Level : 10.0), please check i	2022-01-18 02:52:18



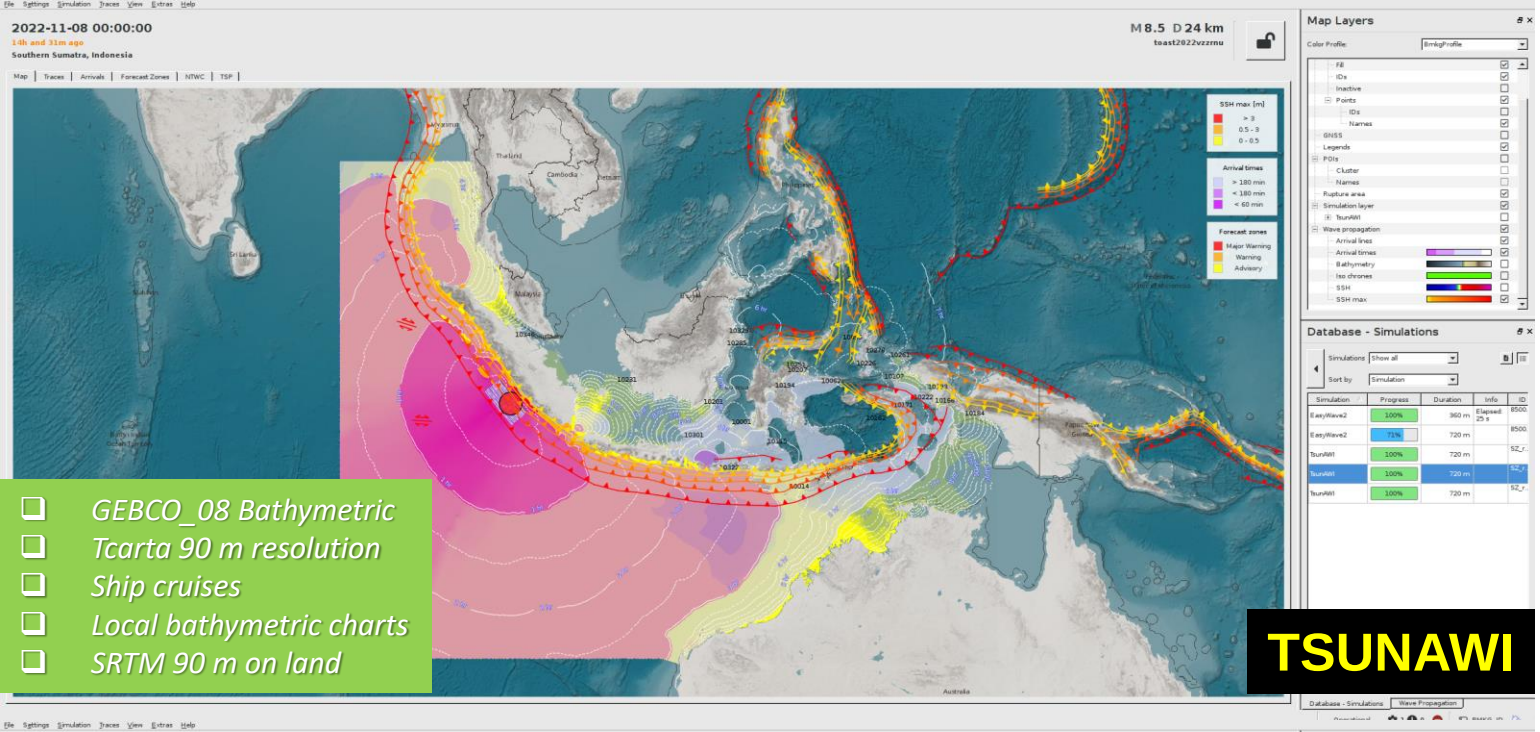
TSUNAMI PROCESSING (INATEWS)
TOAST (TSUNAMI OBSERVATION AND SIMULATION TERMINAL)



Fault zone	Source type	Sense	Calculated scenarios	Total number (calc. and redundant)
East Mollucca	Crustal	Thrust	247	1350
Flores	Crustal	Thrust	173	1314
Makassar	Crustal	Thrust	105	800
Manokwari	Crustal	Thrust	38	240
North Papua	Subduction	Thrust	674	1896
North Sulawesi	Subduction	Thrust	164	535
Palu Koro	Crustal	Strike-slip	28	180
Seram	Subduction	Thrust	384	1392
South Seram	Crustal	Normal	86	576
Sulu	Crustal	Thrust	67	420
Timor	Crustal	Thrust	174	720
Tolo	Crustal	Thrust	49	336
West Mollucca	Crustal	Thrust	126	768
Wetar	Crustal	Thrust	226	1602
Sunda Zone	Subduction	Thrust	6117	6117
Sum			8658	18,246

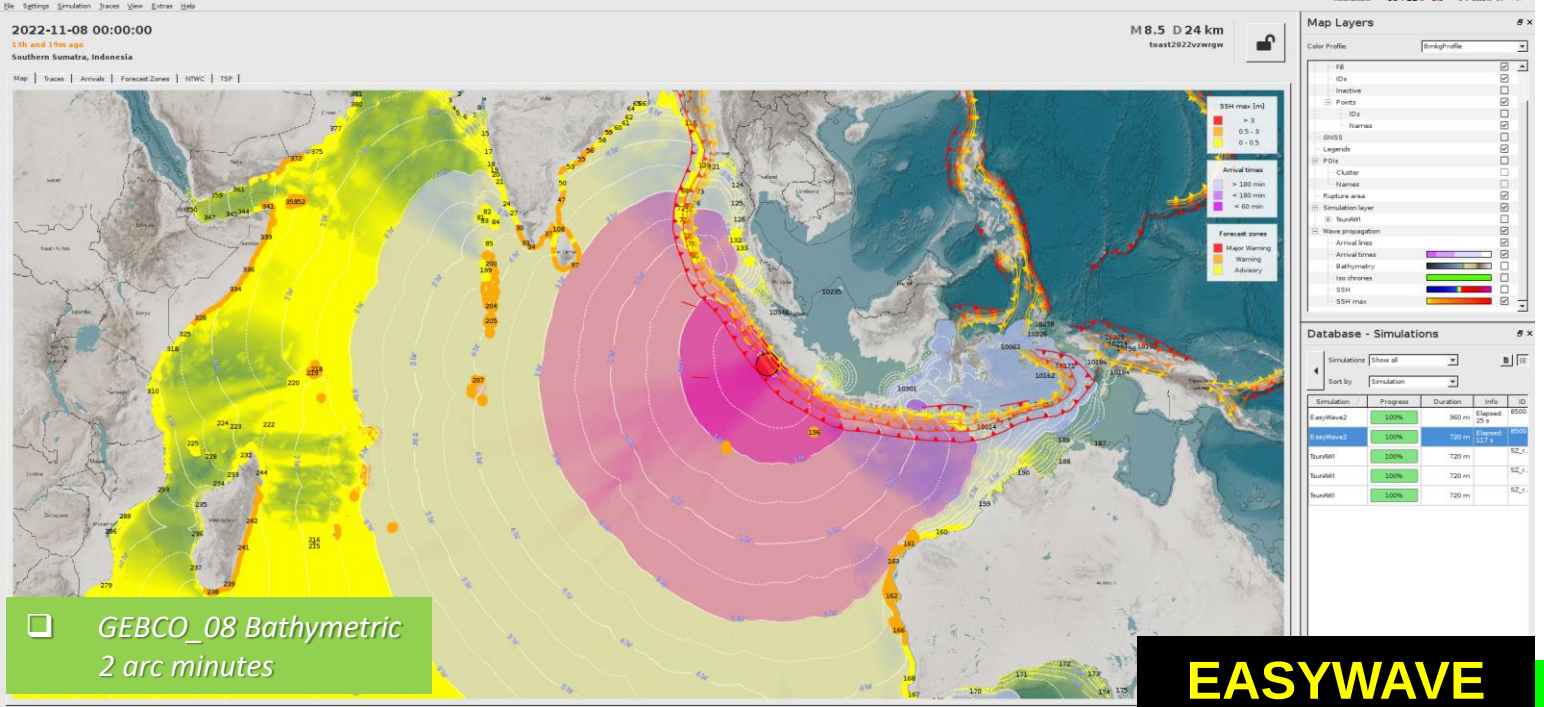
2021 > 18.000 scenario
2022 :: 20.000 scenario
2023 :: 22.000 scenario

TOAST PRESPECTIVE VIEW AREA MODELING (TSUNAWI – EASY WAVE)



- *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

Database - Simulations

Simulations: Show all

Sort by: Simulation

Simulation	Progress	Duration	Info	ID
EasyWave2	100%	360 m	Elapsed: 25 s	8500.
EasyWave2	100%	720 m	Elapsed: 117 s	8500.
TsunAWI	100%	720 m		SZ_r..
TsunAWI	100%	720 m		SZ_r..
TsunAWI	100%	720 m		SZ_r..

TOAST TSUNAMI BULLETINS

NTWC

File Settings Simulation Traces View Extras Help

2018-04-18 13:02:48 M 8.8 D 10 km

1d and 5h ago

South of Java, Indonesia

Map | Traces | Arrivals | Forcast Zones | NTWC | TSP | AEIC |

```
::::BMKG:::::::::::::BMKG:::::::::::::::BMKG:::::::::::::::BMKG:::::::::::::::BMKG:::
Kekuatan      : 8.8 SR
Tanggal       : 04/18/2018
Jam           : 20:02:48 WIB
Lintang       : 9.72 S
Bujur         : 110.91 E
Kedalaman     : 10 Km

Lokasi        : South of Java, Indonesia

Evaluasi:

BERPOTENSI TERJADI TSUNAMI DI WILAYAH:
```

ETA	Status	Lokasi
2018-04-18 20:08:03	Awas	JATENG WONOGIRI
2018-04-18 20:09:18	Awas	DIY GUNUNG-KIDUL
2018-04-18 20:08:43	Awas	JATIM PACITAN
2018-04-18 20:08:07	Awas	JATIM BLITAR
2018-04-18 20:07:03	Awas	JATIM MALANG
2018-04-18 20:12:13	Awas	DIY BANTUL
2018-04-18 20:06:48	Awas	JATIM TRENGGALEK
2018-04-18 20:13:13	Awas	DIY KULON-PROGO
2018-04-18 20:15:33	Awas	JATENG PURWOREJO
2018-04-18 20:08:22	Awas	JATIM TULUNGAGUNG
2018-04-18 20:11:22	Awas	JATIM JEMBER
2018-04-18 20:17:48	Awas	JATENG KEBUMEN
2018-04-18 20:14:22	Awas	JATIM LUMAJANG
2018-04-18 20:07:58	Awas	JATIM JEMBER PULAU NUSABARUNG
2018-04-18 20:11:28	Awas	JATIM BANYUWANGI BAGIAN SELATAN
2018-04-18 20:15:07	Awas	JABAR CIAMIS
2018-04-18 20:14:22	Awas	JABAR TASIKMALAYA
2018-04-18 20:21:43	Awas	JATENG CILACAP
2018-04-18 20:24:28	Awas	JABAR SUKABUMI UJUNG-GENTENG
2018-04-18 20:27:28	Awas	NTB LOMBOK-TENGAH
2018-04-18 20:18:13	Awas	BALI BADUNG PANTAI-KUTA
2018-04-18 20:16:03	Awas	JABAR GARUT
2018-04-18 20:19:33	Awas	JABAR CIANJUR SINDANGBARANG
2018-04-18 20:30:18	Awas	NTB LOMBOK-TIMUR BAGIAN SELATAN
2018-04-18 20:52:43	Awas	NTT SUMBA BAGIAN BARAT
2018-04-18 20:29:03	Awas	BALI GIANYAR
2018-04-18 20:35:43	Awas	BANTEN PANDEGLANG BAGIAN SELATAN
2018-04-18 20:23:37	Awas	BALI KLUNGKUNG PULAU NUSAPENIDA
2018-04-18 20:34:37	Siaga	BANTEN LEBAK
2018-04-18 20:27:18	Siaga	BALI DENPASAR PANTAI-SANUR
2018-04-18 20:33:28	Siaga	JABAR SUKABUMI PELABUHAN-RATU
2018-04-18 20:28:43	Siaga	BALI TABANAN
2018-04-18 20:34:37	Siaga	NTB SUMBAWA BAGIAN SELATAN
2018-04-18 20:37:48	Siaga	NTB KOTA-MATARAM
2018-04-18 20:28:22	Siaga	BALI KLUNGKUNG
2018-04-18 20:59:18	Siaga	NTT SUMBA BAGIAN TIMUR
2018-04-18 20:24:43	Siaga	NTB LOMBOK-BARAT BAGIAN SELATAN
2018-04-18 20:30:18	Siaga	NTB SUMBAWA BAGIAN BARAT
2018-04-18 20:50:18	Siaga	NTB DOMPU BAGIAN SELATAN
2018-04-18 20:39:13	Siaga	NTB LOMBOK-TIMUR BAGIAN TIMUR

AEIC

File Settings Simulation Traces View Extras Help

2018-04-18 13:02:48 M 8.8 D 10 km

1d and 5h ago

South of Java, Indonesia

Map | Traces | Arrivals | Forcast Zones | NTWC | TSP | AEIC |

```
::::BMKG:::::::::::::BMKG:::::::::::::::BMKG:::::::::::::::BMKG:::::::::::::::BMKG:::
Magnitude     : 8.8 SR
Date          : 04/18/2018
Time          : 13:02:48 UTC
Latitude      : 9.72 S
Longitude     : 110.91 E
Depth         : 10 Km

Location      : South of Java, Indonesia

Evaluation:

THERE IS THE POSSIBILITY OF A TSUNAMI IN THE FOLLOWING AREAS:
```

ETA	Height	Country	Location
2018-04-18 13:08:03	23.35	INDONESIA	WONOGIRI
2018-04-18 13:09:18	20.36	INDONESIA	GUNUNG-KIDUL
2018-04-18 13:08:43	17.00	INDONESIA	PACITAN
2018-04-18 13:08:07	16.56	INDONESIA	BLITAR
2018-04-18 13:07:03	15.97	INDONESIA	MALANG
2018-04-18 13:12:13	15.96	INDONESIA	BANTUL
2018-04-18 13:06:48	15.34	INDONESIA	TRENGGALEK
2018-04-18 13:13:13	15.03	INDONESIA	KULON-PROGO
2018-04-18 13:15:33	13.75	INDONESIA	PURWOREJO
2018-04-18 13:08:22	12.88	INDONESIA	TULUNGAGUNG
2018-04-18 13:11:22	10.03	INDONESIA	JEMBER
2018-04-18 13:17:48	9.32	INDONESIA	KEBUMEN
2018-04-18 13:14:22	8.85	INDONESIA	LUMAJANG
2018-04-18 13:07:58	8.15	INDONESIA	JEMBER PULAU NUSABARUNG
2018-04-18 13:11:28	8.13	INDONESIA	BANYUWANGI BAGIAN SELATAN
2018-04-18 13:15:07	7.11	INDONESIA	CIAMIS
2018-04-18 13:14:22	6.80	INDONESIA	TASIKMALAYA
2018-04-18 13:21:43	5.88	INDONESIA	CILACAP
2018-04-18 13:24:28	4.88	INDONESIA	SUKABUMI UJUNG-GENTENG
2018-04-18 13:27:28	4.48	INDONESIA	LOMBOK-TENGAH
2018-04-18 13:18:13	4.25	INDONESIA	BADUNG PANTAI-KUTA
2018-04-18 13:16:03	4.11	INDONESIA	GARUT
2018-04-18 13:19:33	3.98	INDONESIA	CIANJUR SINDANGBARANG
2018-04-18 13:30:18	3.52	INDONESIA	LOMBOK-TIMUR BAGIAN SELATAN
2018-04-18 13:52:43	3.42	INDONESIA	SUMBA BAGIAN BARAT
2018-04-18 13:29:03	3.38	INDONESIA	GIANYAR
2018-04-18 13:35:43	3.36	INDONESIA	PANDEGLANG BAGIAN SELATAN
2018-04-18 13:23:37	3.05	INDONESIA	KLUNGKUNG PULAU NUSAPENIDA
2018-04-18 13:34:37	2.98	INDONESIA	LEBAK
2018-04-18 13:27:18	2.95	INDONESIA	DENPASAR PANTAI-SANUR
2018-04-18 13:33:28	2.93	INDONESIA	SUKABUMI PELABUHAN-RATU
2018-04-18 13:28:43	2.83	INDONESIA	TABANAN
2018-04-18 13:34:37	2.76	INDONESIA	SUMBAWA BAGIAN SELATAN
2018-04-18 13:37:48	2.65	INDONESIA	KOTA-MATARAM
2018-04-18 13:28:22	2.62	INDONESIA	KLUNGKUNG
2018-04-18 13:59:18	2.49	INDONESIA	SUMBA BAGIAN TIMUR
2018-04-18 13:24:43	2.48	INDONESIA	LOMBOK-BARAT BAGIAN SELATAN
2018-04-18 13:30:18	2.39	INDONESIA	SUMBAWA BAGIAN BARAT
2018-04-18 13:50:18	2.33	INDONESIA	DOMPU BAGIAN SELATAN
2018-04-18 13:39:13	2.29	INDONESIA	LOMBOK-TIMUR BAGIAN TIMUR

TSP

File Settings Simulation Traces View Extras Help

2018-04-18 13:02:48 M 8.8 D 10 km

1d and 5h ago

South of Java, Indonesia

Map | Traces | Arrivals | Forcast Zones | NTWC | TSP | AEIC |

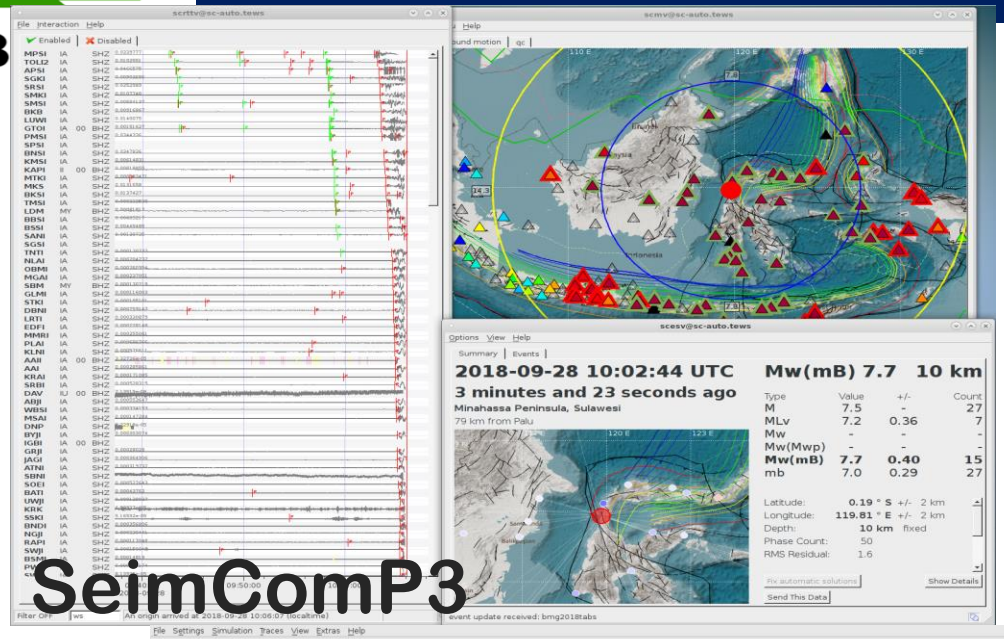
```
::::BMKG:::::::::::::BMKG:::::::::::::::BMKG:::::::::::::::BMKG:::::::::::::::BMKG:::
Magnitude     : 8.8 SR
Date          : 04/18/2018
Time          : 13:02:48 UTC
Latitude      : 9.72 S
Longitude     : 110.91 E
Depth         : 10 Km
Eventid       : toast2018hpkqxs M

Location      : South of Java, Indonesia

Evaluation:

THERE IS THE POSSIBILITY OF A TSUNAMI IN THE FOLLOWING AREAS:
```

T2	T1	T3	T4	Status	Height	Country	Location
2018-04-18 13:31:18	2018-04-18 13:08:03	2018-04-18 13:35:18	2018-04-18 18:51:48	Threat	23.35	INDONESIA	WONOGIRI
2018-04-18 13:31:48	2018-04-18 13:09:18	2018-04-18 13:35:48	2018-04-18 19:01:48	Threat	20.36	INDONESIA	GUNUNG-KIDUL
2018-04-18 13:33:18	2018-04-18 13:08:43	2018-04-18 15:46:48	2018-04-18 19:01:48	Threat	17.00	INDONESIA	PACITAN
2018-04-18 13:30:18	2018-04-18 13:08:07	2018-04-18 13:34:48	2018-04-18 19:02:48	Threat	16.56	INDONESIA	BLITAR
2018-04-18 13:24:18	2018-04-18 13:07:03	2018-04-18 13:54:48	2018-04-18 19:02:48	Threat	15.97	INDONESIA	MALANG
2018-04-18 13:33:48	2018-04-18 13:12:13	2018-04-18 13:50:18	2018-04-18 19:02:48	Threat	15.96	INDONESIA	BANTUL
2018-04-18 13:28:48	2018-04-18 13:06:48	2018-04-18 16:40:18	2018-04-18 18:53:18	Threat	15.34	INDONESIA	TRENGGALEK
2018-04-18 13:35:48	2018-04-18 13:13:13	2018-04-18 13:55:48	2018-04-18 19:02:48	Threat	15.03	INDONESIA	KULON-PROGO
2018-04-18 13:40:48	2018-04-18 13:15:33	2018-04-18 16:31:18	2018-04-18 19:02:48	Threat	13.75	INDONESIA	PURWOREJO
2018-04-18 13:28:18	2018-04-18 13:08:22	2018-04-18 13:43:18	2018-04-18 19:02:48	Threat	12.88	INDONESIA	TULUNGAGUNG
2018-04-18 13:26:48	2018-04-18 13:11:22	2018-04-18 15:17:48	2018-04-18 19:02:48	Threat	10.03	INDONESIA	JEMBER
2018-04-18 13:40:48	2018-04-18 13:17:48	2018-04-18 18:55:18	2018-04-18 19:00:48	Threat	9.32	INDONESIA	KEBUMEN
2018-04-18 13:35:48	2018-04-18 13:14:22	2018-04-18 14:49:48	2018-04-18 19:02:48	Threat	8.85	INDONESIA	LUMAJANG
2018-04-18 13:31:18	2018-04-18 13:07:58	2018-04-18 13:55:18	2018-04-18 19:02:48	Threat	8.15	INDONESIA	JEMBER PULAU NUSABARUNG
2018-04-18 13:27:18	2018-04-18 13:11:28	2018-04-18 14:27:48	2018-04-18 18:54:48	Threat	8.13	INDONESIA	BANYUWANGI BAGIAN SELATAN
2018-04-18 13:35:48	2018-04-18 13:15:07	2018-04-18 16:48:18	2018-04-18 19:00:48	Threat	7.11	INDONESIA	CIAMIS
2018-04-18 13:35:18	2018-04-18 13:14:22	2018-04-18 17:20:48	2018-04-18 19:02:48	Threat	6.80	INDONESIA	TASIKMALAYA
2018-04-18 15:12:48	2018-04-18 15:04:37	2018-04-18 15:48:18	2018-04-18 19:02:48	Threat	6.47	AUSTRALIA	NINGALOO COAST
2018-04-18 13:49:48	2018-04-18 13:21:43	2018-04-18 16:02:48	2018-04-18 19:02:48	Threat	5.88	INDONESIA	CILACAP
2018-04-18 13:46:48	2018-04-18 13:24:28	2018-04-18 18:39:18	2018-04-18 19:02:48	Threat	4.88	INDONESIA	SUKABUMI UJUNG-GENTENG
2018-04-18 13:44:18	2018-04-18 13:27:28	2018-04-18 18:47:18	2018-04-18 18:50:48	Threat	4.48	INDONESIA	LOMBOK-TENGAH
2018-04-18 13:50:48	2018-04-18 13:18:13	2018-04-18 18:35:48	2018-04-18 19:02:48	Threat	4.25	INDONESIA	BADUNG PANTAI-KUTA
2018-04-18 13:37:48	2018-04-18 13:16:03	2018-04-18 18:20:48	2018-04-18 18:55:18	Threat	4.11	INDONESIA	GARUT
2018-04-18 13:36:48	2018-04-18 13:19:33	2018-04-18 18:43:48	2018-04-18 19:00:18	Threat	3.98	INDONESIA	CIANJUR SINDANGBARANG
2018-04-18 13:50:48	2018-04-18 13:30:18	2018-04-18 18:52:48	2018-04-18 19:02:48	Threat	3.52	INDONESIA	LOMBOK-TIMUR BAGIAN SELATAN
2018-04-18 14:18:18	2018-04-18 13:52:43	2018-04-18 15:53:48	2018-04-18 18:51:48	Threat	3.42	INDONESIA	SUMBA BAGIAN BARAT
2018-04-18 13:50:18	2018-04-18 13:29:03	2018-04-18 18:35:18	2018-04-18 18:56:48	Threat	3.38	INDONESIA	GIANYAR
2018-04-18 14:07:18	2018-04-18 13:35:43	2018-04-18 18:57:18	2018-04-18 19:02:48	Threat	3.36	INDONESIA	PANDEGLANG BAGIAN SELATAN
2018-04-18 15:58:18	2018-04-18 15:14:33	2018-04-18 17:50:48	2018-04-18 19:02:48	Threat	3.23	AUSTRALIA	PILBARA COAST WEST
2018-04-18 13:39:18	2018-04-18 13:23:37	2018-04-18 13:42:48	2018-04-18 18:45:18	Threat	3.05	INDONESIA	KLUNGKUNG PULAU NUSAPENIDA
2018-04-18 13:54:18	2018-04-18 13:34:37	2018-04-18 15:42:48	2018-04-18 19:02:48	Threat	2.98	INDONESIA	LEBAK
2018-04-18 13:48:48	2018-04-18 13:27:18	2018-04-18 15:30:18	2018-04-18 18:49:48	Threat	2.95	INDONESIA	DENPASAR PANTAI-SANUR
2018-04-18 13:56:48	2018-04-18 13:33:28	2018-04-18 15:39:48	2018-04-18 19:02:48	Threat	2.93	INDONESIA	SUKABUMI PELABUHAN-RATU
2018-04-18 13:52:48	2018-04-18 13:28:43	2018-04-18 18:52:18	2018-04-18 18:56:18	Threat	2.83	INDONESIA	TABANAN
2018-04-18 16:00:18	2018-04-18 15:48:58	2018-04-18 17:01:48	2018-04-18 19:02:48	Threat	2.80	AUSTRALIA	GASCOYNE COAST
2018-04-18 14:11:18	2018-04-18 13:34:37	2018-04-18 15:27:18	2018-04-18 19:02:48	Threat	2.76	INDONESIA	SUMBAWA BAGIAN SELATAN
2018-04-18 13:57:48	2018-04-18 13:37:48	2018-04-18 18:59:18	2018-04-18 19:02:18	Threat	2.65	INDONESIA	KOTA-MATARAM

Disseminate

PALU-DONGGALA, 28 SEPTEMBER 2018

B



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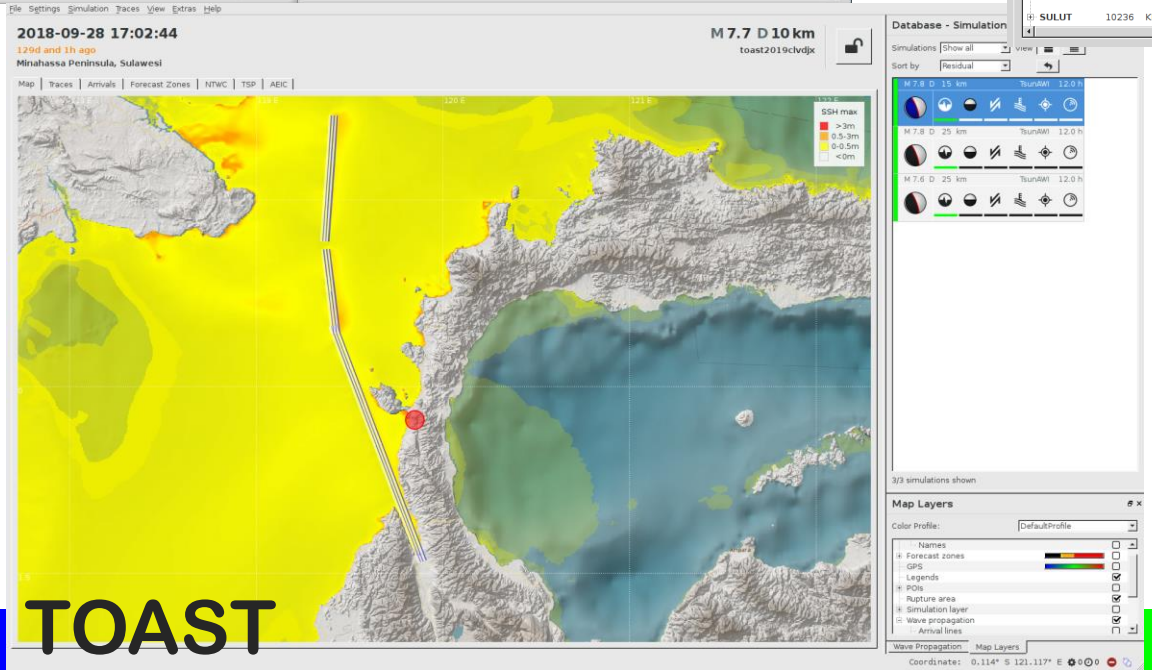
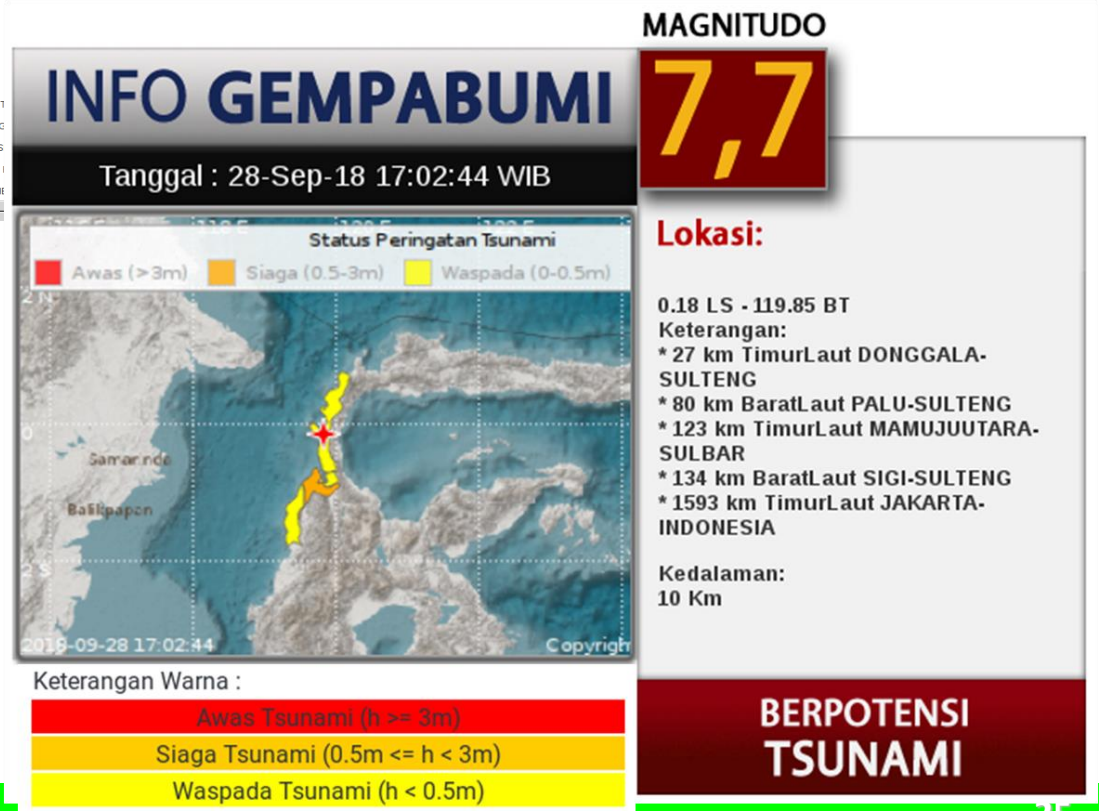


TOAST



TSUNAMI WARNING TIMELINE

Realtime Earthquake Information

Earthquake Occurrence

≤ 5 Menit

BULLETIN - 1

Earthquake Parameter & Tsunami Potential, when status of warning available

Major Warning	Warning	Advisory

Pemerintah Daerah:

Menerima peringatan, pengambilan keputusan untuk evakuasi atau tidak, dan memberi arahan kepada masyarakat berisiko

Masyarakat : Reaksi terhadap peringatan dari BMKG & arahan dari Pemerintah Daerah

≤ 10 Menit

BULLETIN - 2

Earthquake Parameter Updating & Estimate Tsunami Arrival and Status of Warning,

Major Warning	Warning	Advisory

30 - 60 Menit

BULLETIN - 3

Sea Level Observation (Tide Gauge etc) and Updating Status of Tsunami

BULLETIN – 3.n

Tide Gauge Observation Updating (if available)

≤ 120 Menit

BULLETIN - 4

Final Tsunami Bulletin

based on Top Level directive

BMKG DISSEMINATION MODES DEVELOPMENT

< 2006
- Telephone
- Faximile

2006
- Telephone
- Faximile
- **Ranet**
- **SMS**

.

2008
- Telephone
- Faximile
- SMS
- **WRS-DVB**
- **GTS**
- **Email**
- **Web**

2009
- Telephone
- Faximile
- SMS
- WRS-DVB
- GTS
- Email
- Web
- **WRS2WAY**
- **WRS Media**

2013
- Telephone
- Faximile
- SMS
- WRS-DVB
- GTS
- Email
- Web
- WRS2WAY
- WRS Media
- **Social Media (FB, Twitter)**

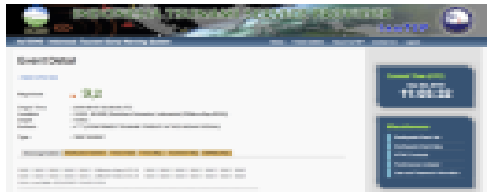
2018
- Telephone
- Faximile
- SMS
- WRS-DVB
- GTS
- Email
- Web
- WRS2WAY
- WRS Media
- Social Media (FB, Twitter)
- **WRS Mobile**

2020
- Telephone
- Faximile
- SMS
- WRS-DVB
- GTS
- Email
- Web
- WRS2WAY
- WRS Media
- Social Media (FB, Twitter)
- WRS Mobile
- **WRS New Gen**
- **Telegram Channel**
- **Radio Broadcaster**

DISSEMINATION MODES

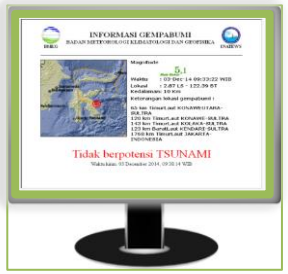
SMS

Fax



Email

Web

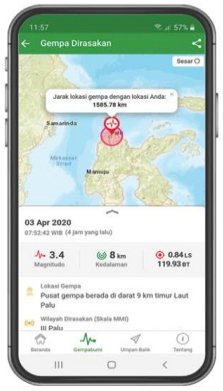


Warning Receiver System

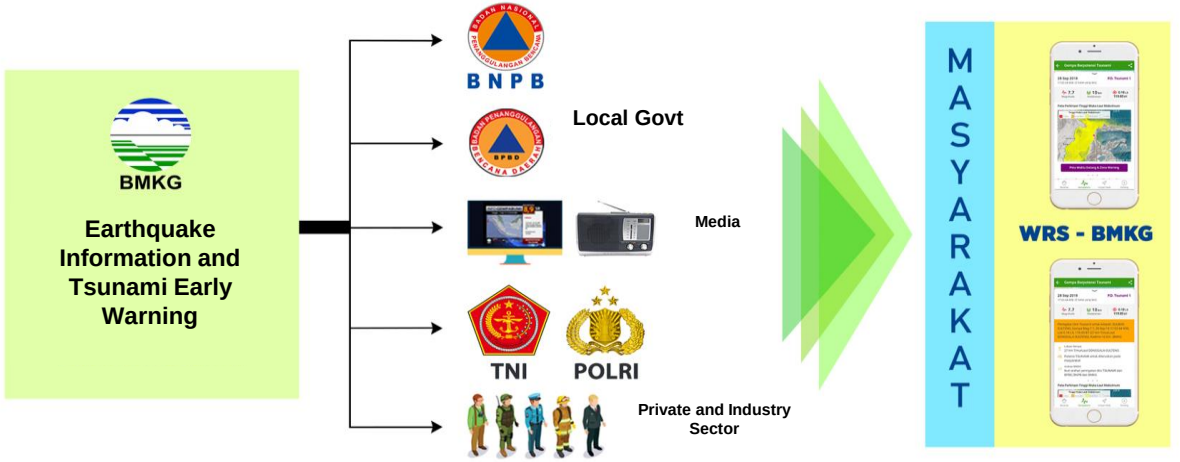
Warning Receiver System New Generation

Smartphone Apps

Info BMKG



WRS - BMKG



Dissemination Flow

MITIGATION FOR EARTHQUAKE AND TSUNAMI

SEKOLAH LAPANG GEMPABUMI-*TSUNAMI READY* (SLG-TR)
(UNTUK MEMAHAMI RESPON INFO. GEMPA DAN WARNING TSUNAMI UNTUK PEMDA/MASY)

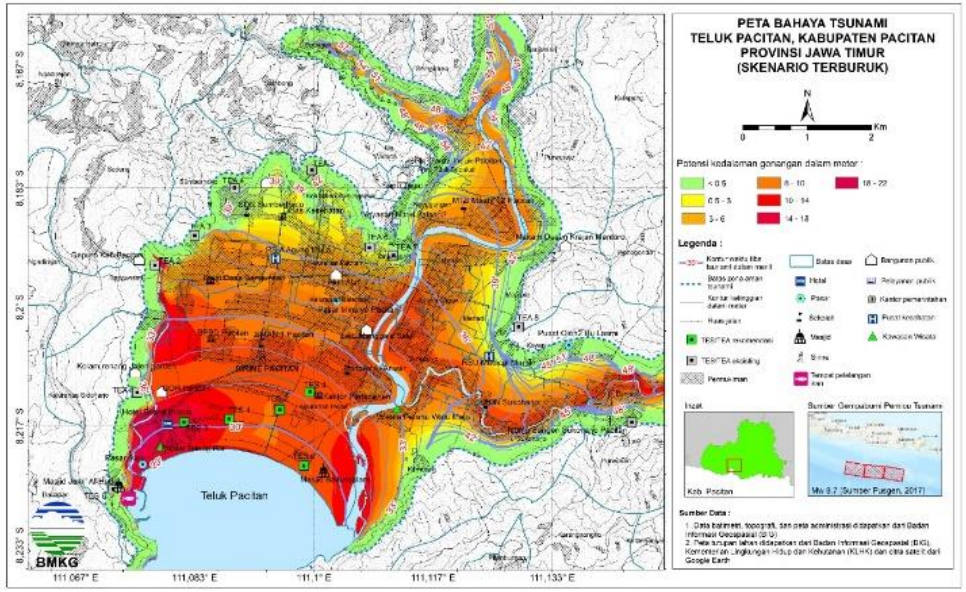
Sejak tahun 2015 BMKG telah melakukan kegiatan peningkatan kapasitas Pemerintah Daerah dan Masyarakat di Wilayah Rawan Gempa dan Tsunami melalui program **Sekolah Lapang Gempabumi.**

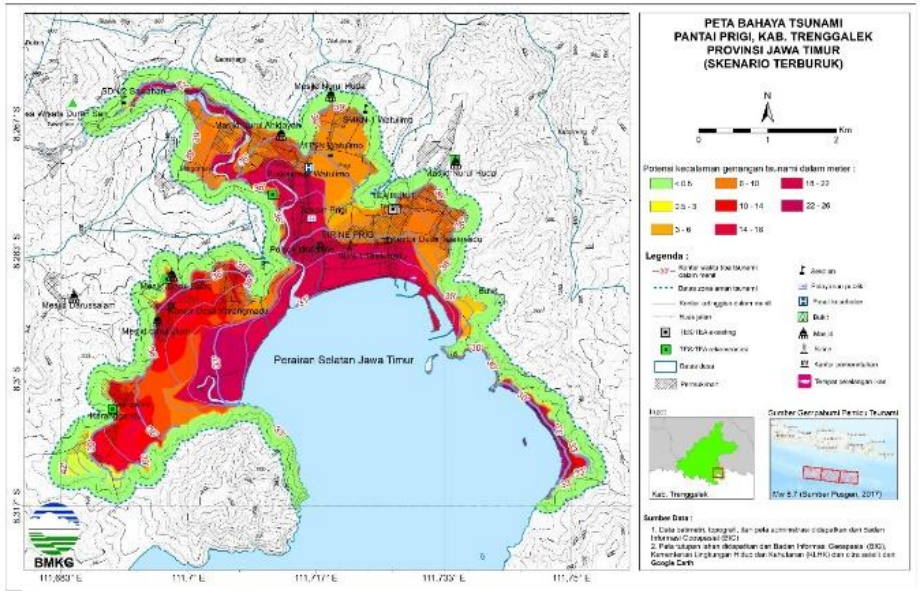
Sekolah Lapang Gempabumi *Tsunami Ready* Tahun 2021

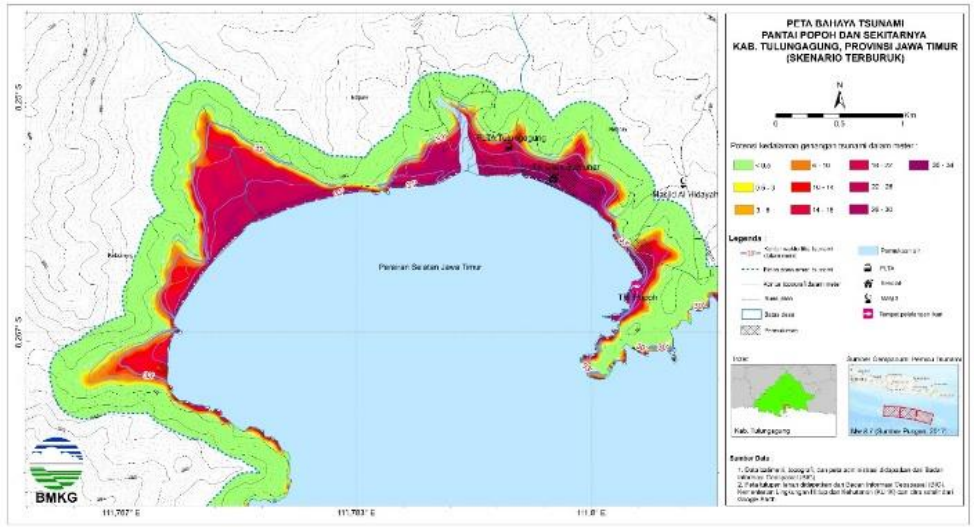
INSPECTION FOR TSUNAMI EVACUATION ROUTE

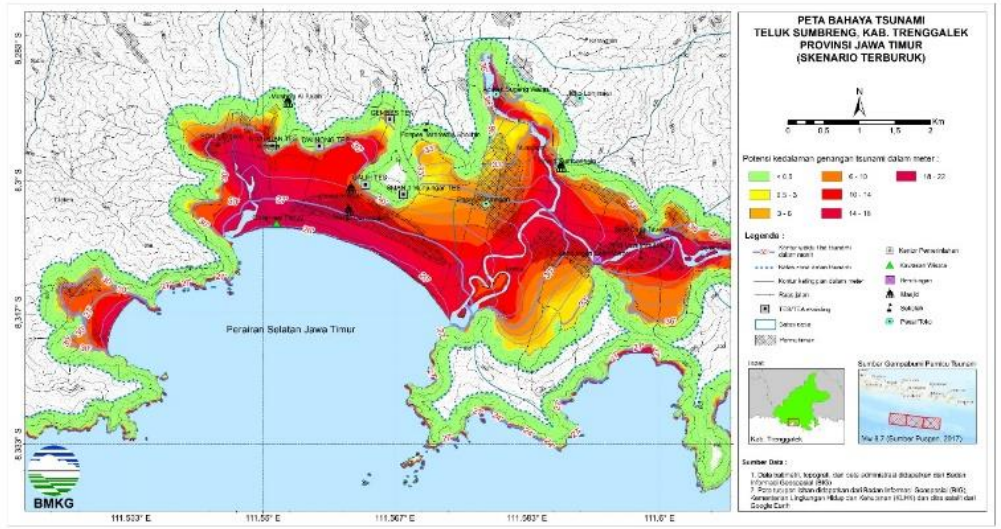
For enhancing Earthquake and Tsunami Mitigation, Head of BMKG had conducted Inspection for Tsunami Evacuation Route in Maumere

MAPPING FOR TSUNAMI HAZARD









BMKG GOES TO SCHOOL

PILOTING THE INTERNATIONAL RECOGNITION OF INDONESIAN TSUNAMI READY

Indonesia Piloting UNESCO IOC Tsunami Ready Recognition of 7 (seven) communities.
BMKG starts to advocate the implementation the 12 indicators of Tsunami Ready indicators

Advocacy of the compliance of the 12 indicators

Discussion on the development of community emergency response team

BMKG

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twitter facebook android iOS

Jl. Angkasa 1 No.2 Kemayoran Jakarta Pusat, Indonesia

www.bmkg.go.id

THANK YOU