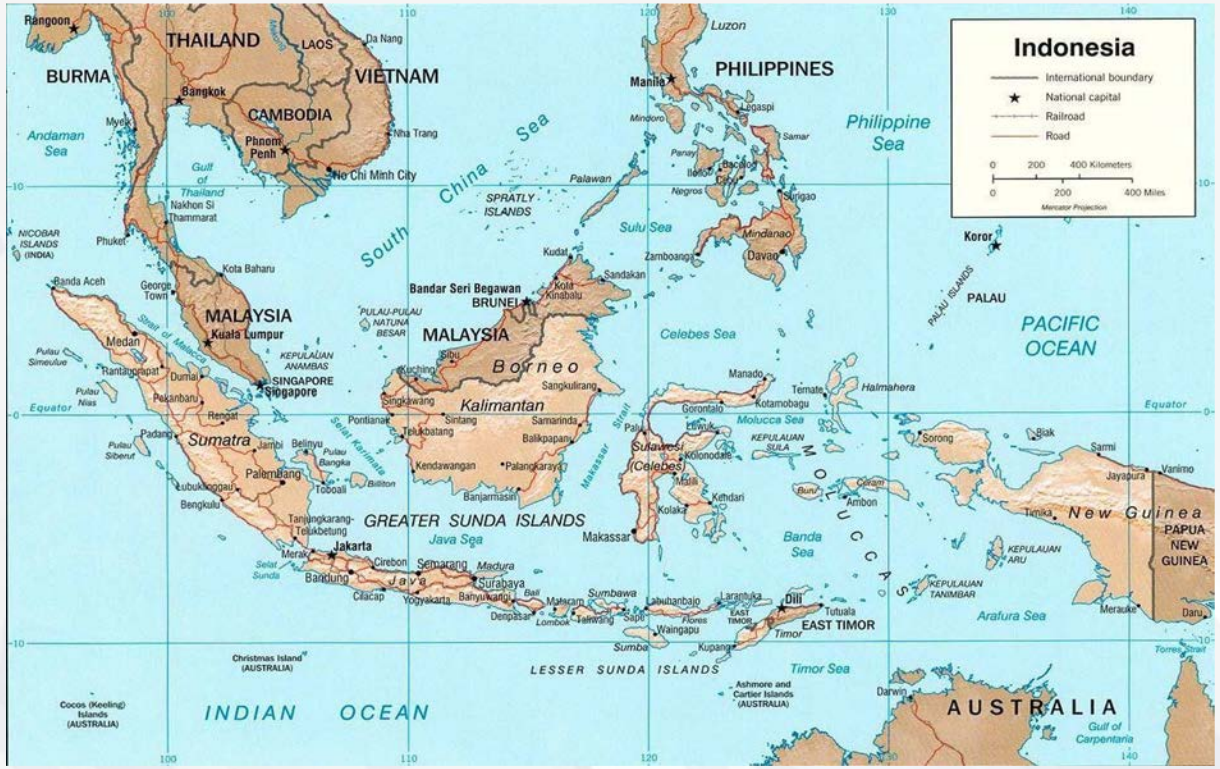
INCEPTION REPORT ON

INATEWS AND TSUNAMI DISASTER MITIGATION ACTIVITY IN INDONESIA

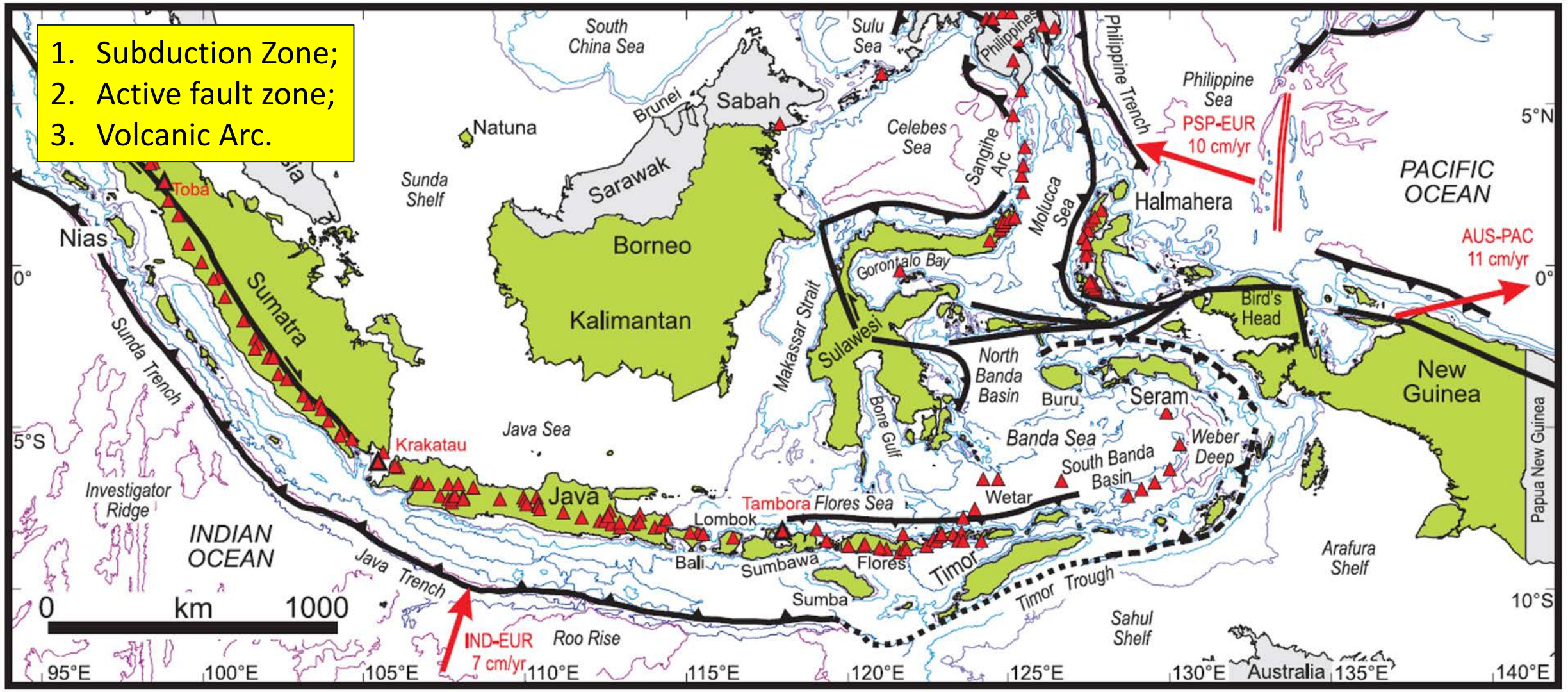
Earthquake and Tsunami Center
The Agency for Meteorology, Climatology, And Geophysics

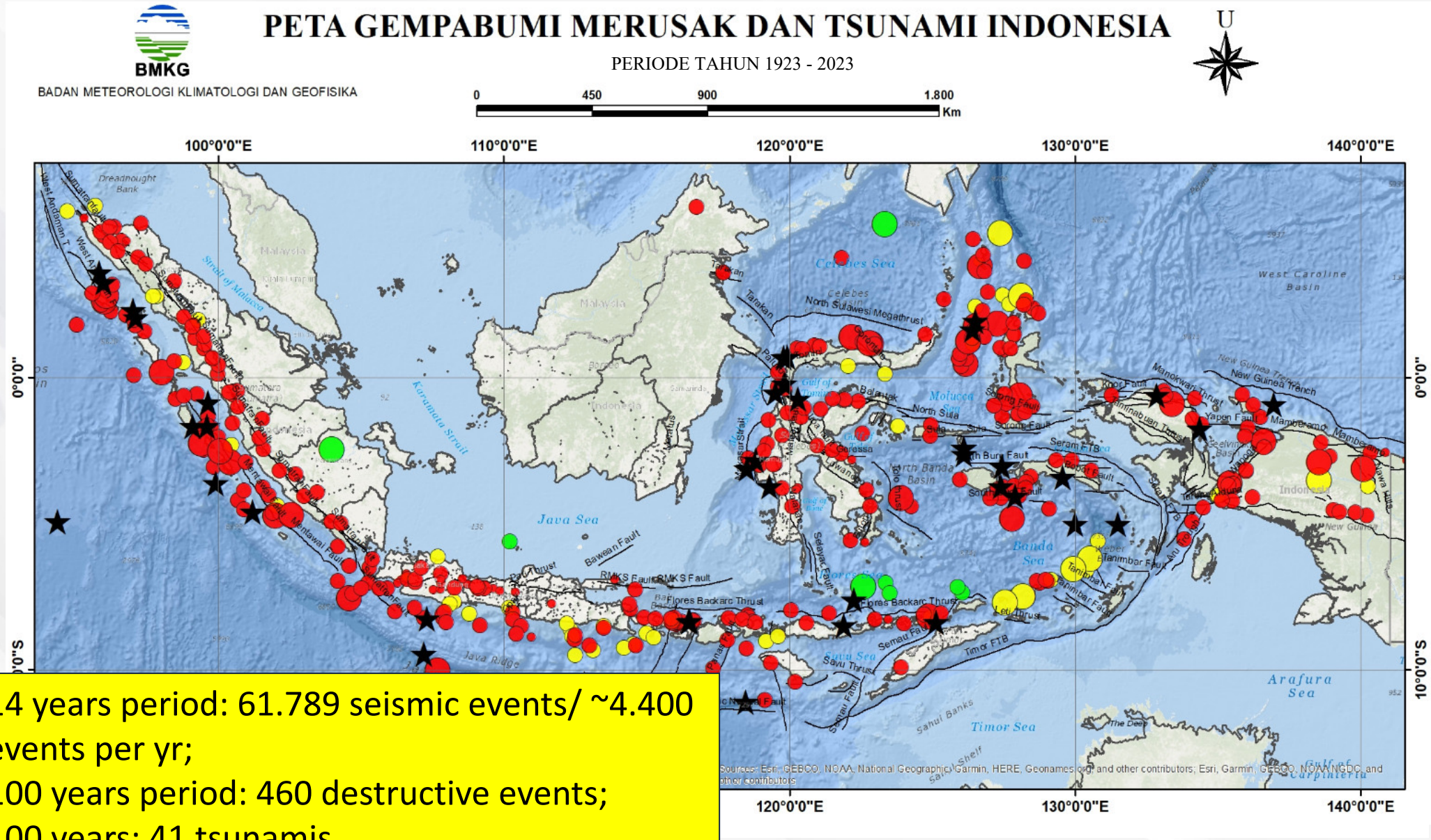
Indonesia is an archipelago nation in Southeast Asia region, consisting **more than 17,000 island**. The country shares borders with **Papua New Guinea, East Timor, and the eastern part of Malaysia, Singapore, Vietnam, Thailand, the Philippines, and Australia.** The country is located between **two big oceans (Pacific and Indian)**.



- Official Name : Republic Indonesia
- Capital City : Jakarta
- Population : ~277 million (4th most, as of 2022)
- Area : ~1.9 km^2

Tectonics of Indonesia (Hall, 2009)





1. 14 years period: 61.789 seismic events/ ~4.400 events per yr;
2. 100 years period: 460 destructive events;
3. 100 years: 41 tsunamis.

Tsunami with >100 casualties (1923-2023):

1. 1968 Tsunami Tambu (M7.2), 392 casualties
2. 1977 Tsunami Sumba (M8.3) , 316 casualties
3. 1979 Tsunami Lembata (vol. induced), 1239 casualties
4. 1992 Tsunami Flores (M7.8), 2000 casualties
5. 1994 Tsunami Banyuwangi (M7.8), 390 casualties
6. 1996 Tsunami Biak Papua (M8.2), 110 casualties
7. 2004 Tsunami Aceh (M9.2), >200.000 casualties
8. 2005 Tsunami Nias (M8.5), 300 casualties
9. 2006 Tsunami Pangandaran (M7.7), 668 casualties
10. 2010 Tsunami Mentawai (M7.8) 428 casualties
11. 2018 Tsunami Palu Donggala (M7.4), 2045 casualties
12. 2018 Tsunami Sunda Strait (Landslide induced), 426 casualties

Mentawai 25 Oct. 2010

Aceh 26 Dec. 2004

Banyuwangi 3 Jun. 1994

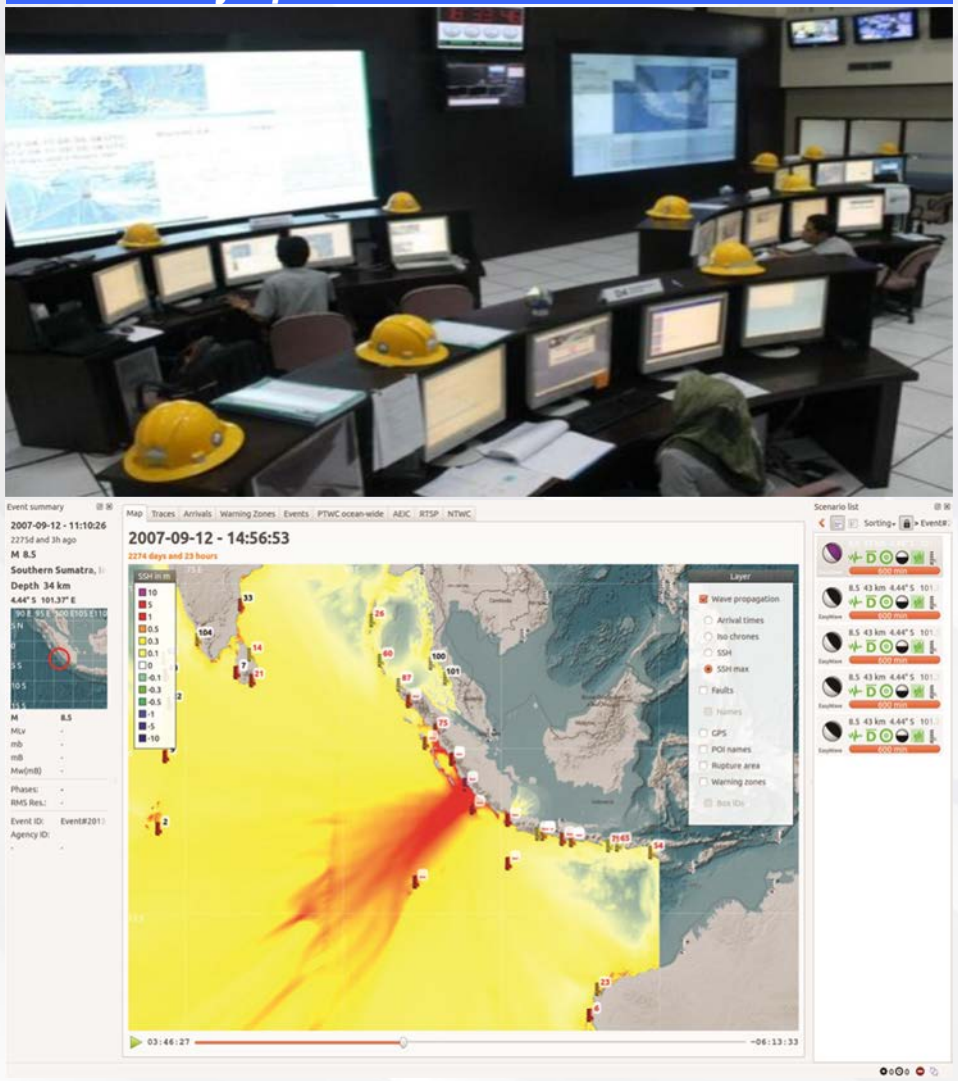
Pangandaran 17 Jul. 2006

Palu 28 Sep. 2018

Sunda Strait 22 Dec. 2018

INDONESIA TSUNAMI EARLY WARNING SYSTEM (INATEWS)

Fully operational since Nov. 2008

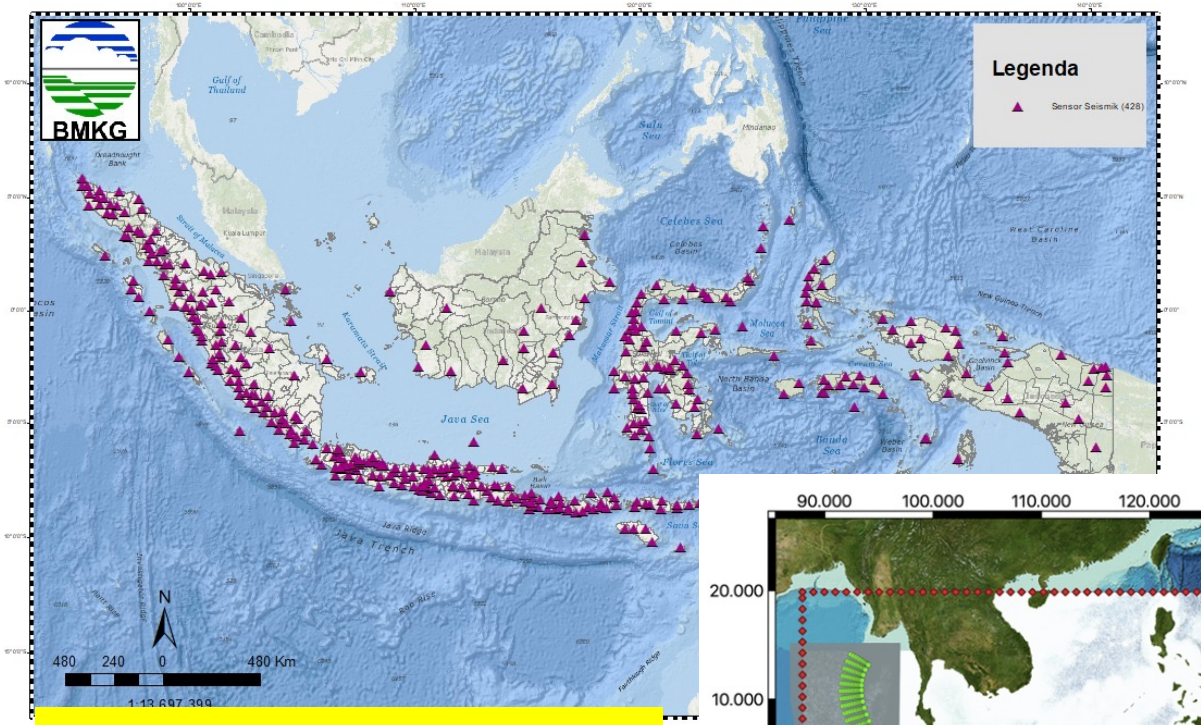


InaTEWS as operated by the BMKG, has rensponsibilities to:

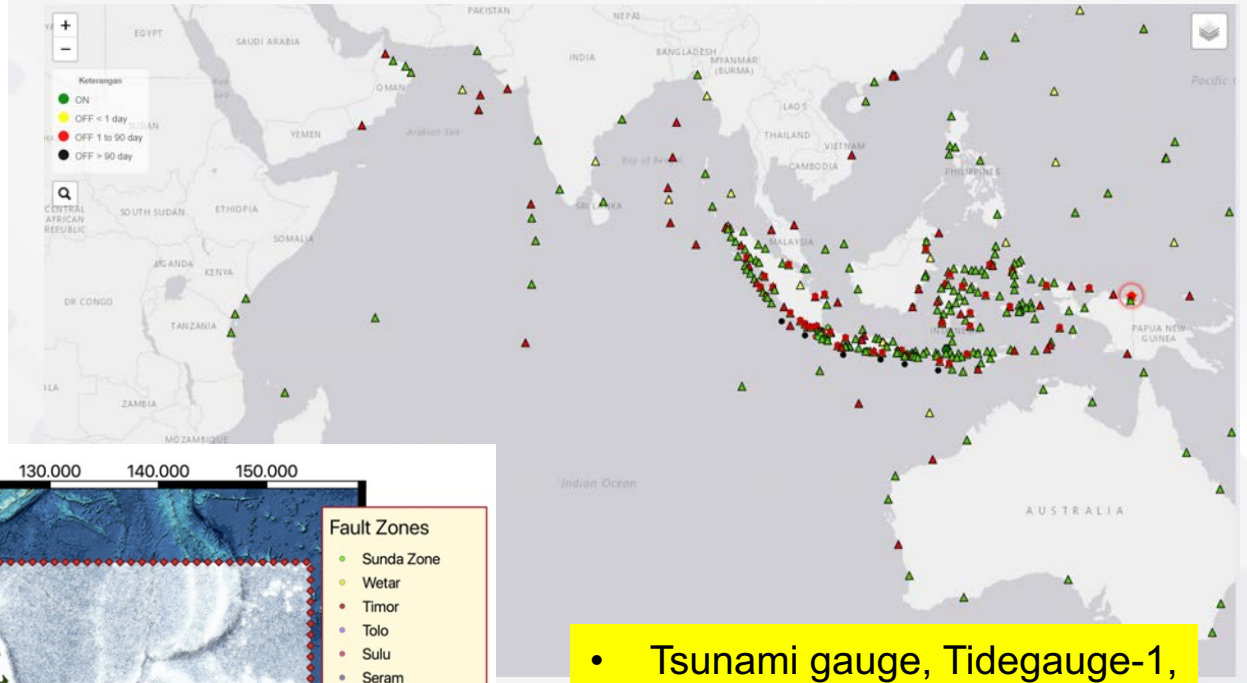
- **Monitors** seismic activity and sea surface level;
- **Produces** earthquake information and tsunami early warning;
- **Disseminates** information and warning to the general public and stakeholders (NDMO/LDMO/Army/Police Forces/Ministry/Media).

Appropriate response from the affected community ***to minimize impact***

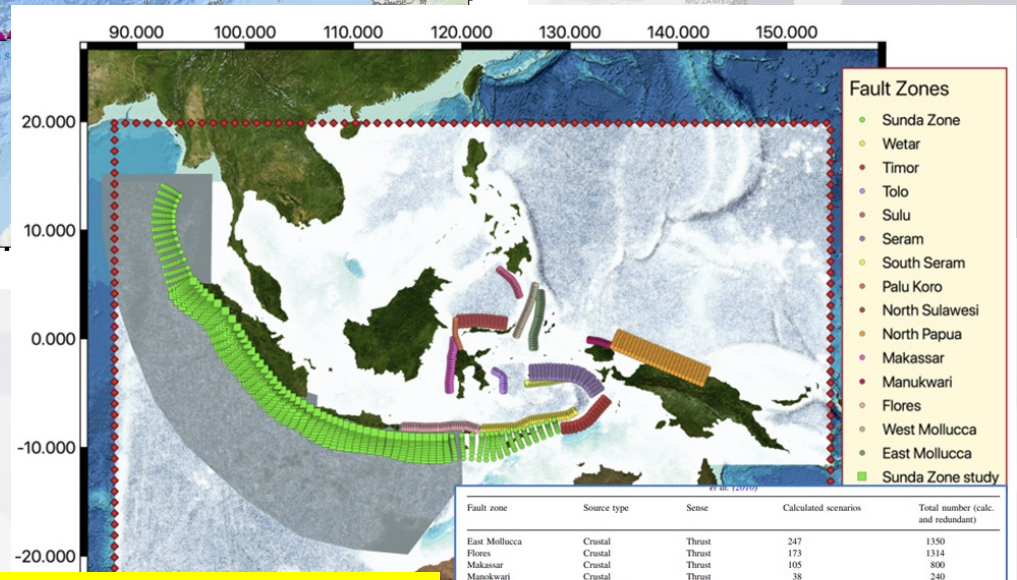
INDONESIA TSUNAMI EARLY WARNING SYSTEM (INATEWS)



- Seismometer (broadband + short-period) (428 units);
- Accelerometer (522 units).



- Tsunami gauge, Tidegauge-1, Tideguage-2, Tidegauge-IO, Tidegauge-INCOIS (423 units);
- CBT & NOAA-DartBuoy (35 units);
- Water level & IDSL (Radar) (47 units).



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 scenarios
- 2023 :: 22.000 scenarios
- 2024 :: up to 24.000 scenarios

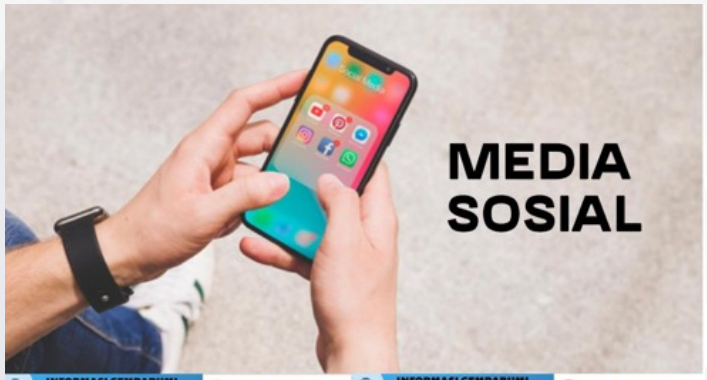
INDONESIA TSUNAMI EARLY WARNING SYSTEM (INATEWS)

WRS

WRS TV dan Radio

WRS DVB & Two Way

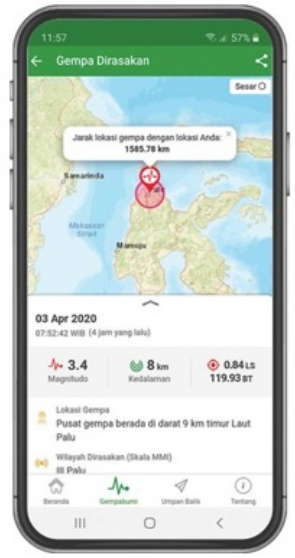
WRS New Generation



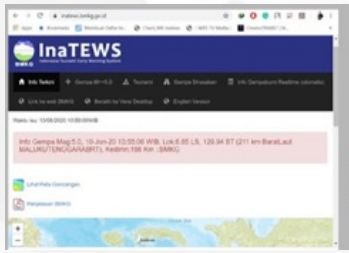
InfoBMKG

APLIKASI SMARTPHONE

Info BMKG



WRS - BMKG



WEBSITE

https://inatews.bmkg.go.id
https://www.bmkg.go.id

- Dissemination modes

SOPs – EARTHQUAKE INFORMATION

Timeline

< 2 minutes

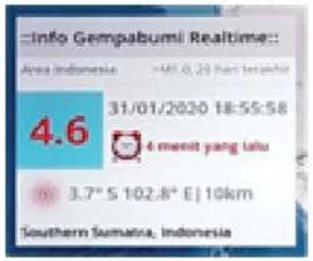
< 5 minutes

Earthquake Occured

Automatic Detection by Algorithm

Manual re-analysis by seismologist

Real-Time EQ Information (Preliminary)



Official Earthquake Information

SOPs – TSUNAMI EARLY WARNING

< 2 minutes

< 5 minutes

< 10 minutes

Earthquake Occured

BULLETIN-1

Earthquake parameters & tsunami potential, warning level

MAJOR WARNING | WARNING | ADVISORY

Local Authority :

Receive warning, makin decision for evauation or no evacuation, and give proper instruction to affected community

community: response the information given by BMKG and local authority

BULLETIN-2

Updating Earthquake parameter, warning level, and estimation of tsunami arrival tim

MAJOR WARNING | WARNING | ADVISORY

30-60 minutes

< 120 minutes

BULLETIN-3.1

confirmation of tsunami arrival in from tide gauge recording, update warning level

BULLETIN-3.2-3.n

Confirmation of tsunami arrival in other areas

BULLETIN-4

Official declaration for ending the tsunami warning

Or based on consideration done by Heads of BMKG

MAJOR WARNING

> 3 m

WARNING

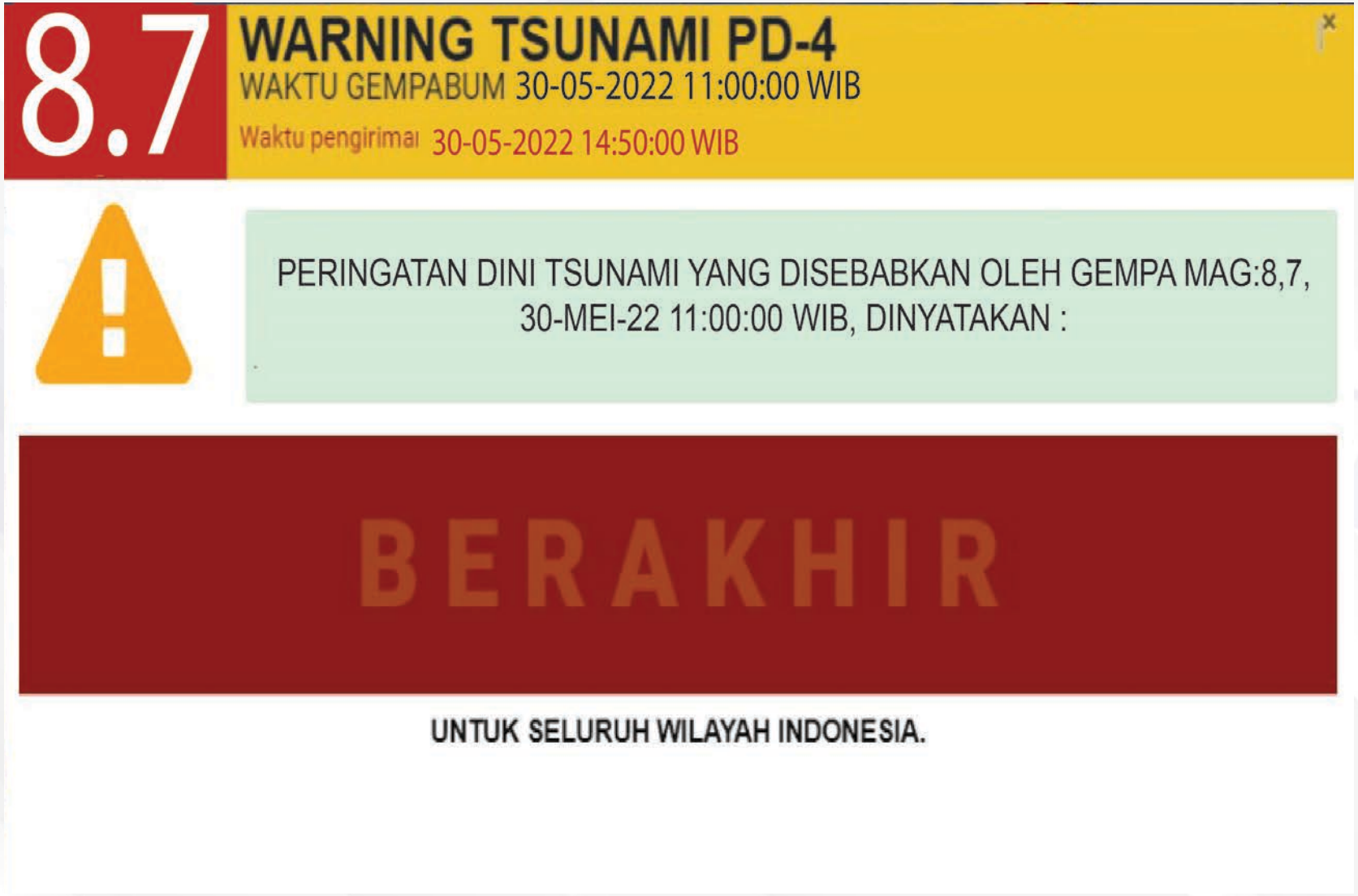
0.5 - 3 m

ADVISORY

< 0.5 m

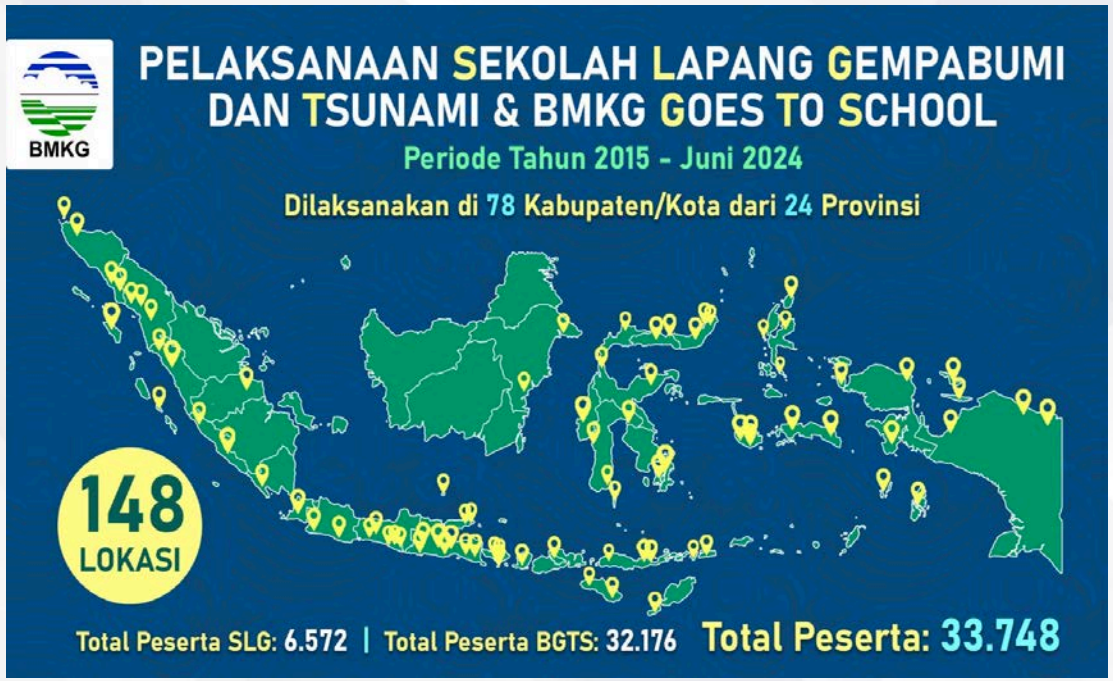
FORMATS – EARTHQUAKE INFORMATION

FORMATS – TSUNAMI EARLY WARNING



COMMUNITY BASED TSUNAMI MITIGATION – EQ & TSUNAMI FIELD SCHOOL

BMKG conducts **capacity-building** activities for **Disaster Management Stakholders and communities** in regional / municipality government level. The main goals is **to improve** their **knowledge and preparedness**.



Hazard map development

Preparing evacuation route

Table-top exercise

Response training

COMMUNITY BASED TSUNAMI MITIGATION – TSUNAMI READY PROGRAM

- BMKG has successfully facilitated 10 communities in 10 regencies to receive recognition;
- 9 other communities are currently being assisted to receive the recognition this year.

TERIMA KASIH

Kedeputian Bidang Geofisika
Badan Meteorologi Klimatologi
dan Geofisika

Bidang Mitigasi Gempabumi & Tsunami