BMKG Warning : TSUNAMI SIREN APPLICATION BASED ON ANDROID MOBILE PHONE

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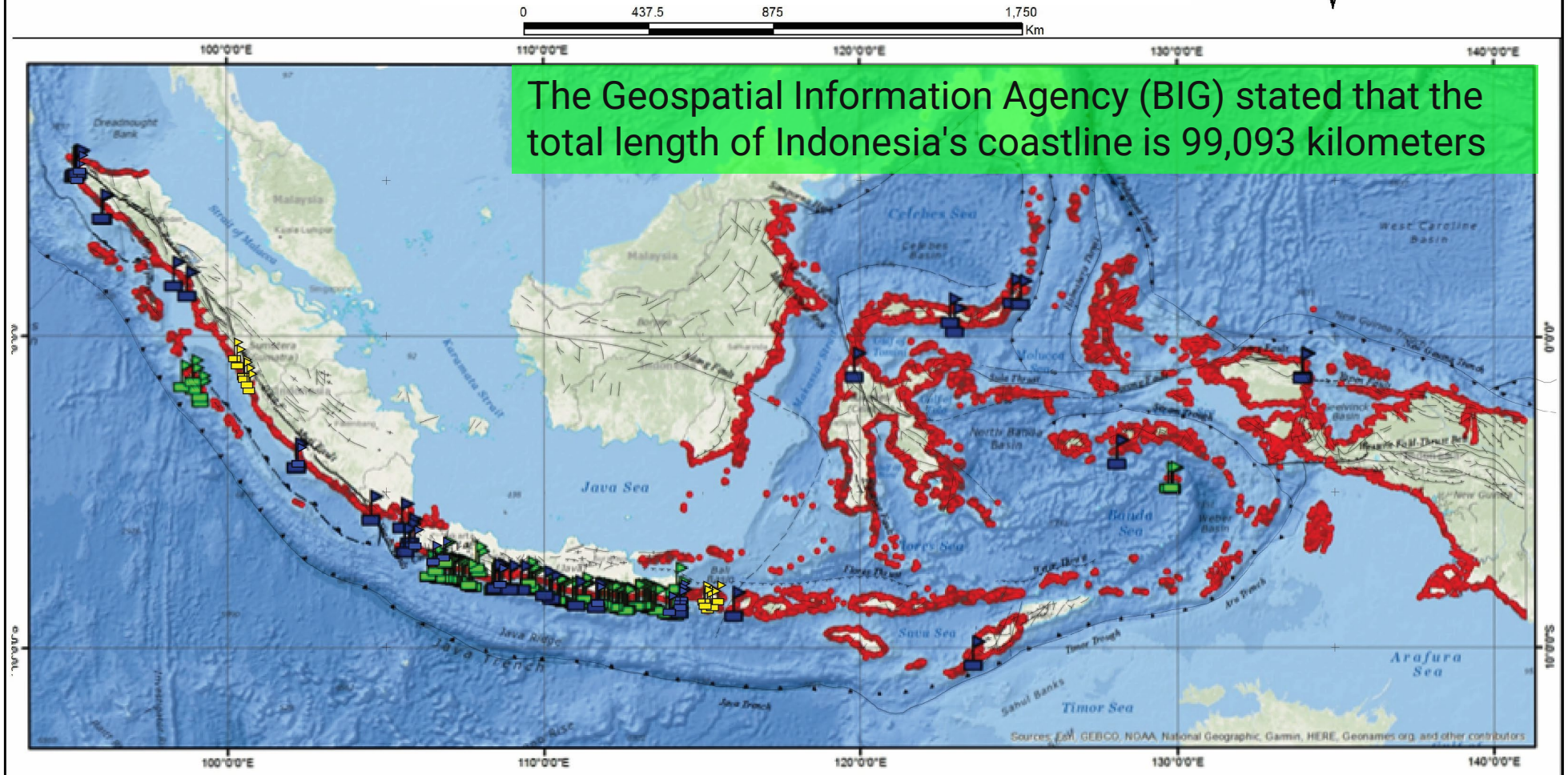
Map of Tsunami-prone Villages in Indonesia

BMKG

BADAN METEOROLOGI KLIMATOLOGI DAN GEOFISIKA



Legenda

: Sirine BMKG (58)

: Sirine BNPB (135)

: Sirine PEMPROV (15)

Tsunami-prone village

Keterangan :

Garis Pantai
Batas Provinsi
Kota
Negara lain
Tunjaman
Sesar Geser
Sesar Naik
Sesar Normal

Dibuat Tahun 2020

Sumber Data

- Data desa rawan tsunami, BNPB
- Data sirine, BNPB
  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
- Seluruh Bidang Sesar, Periode 2009 - 2018, Global CMT
- Peta Dasar, Esri, GEBCO, NOAA, National Geographic, DeLorme, HERE, Geonames.org

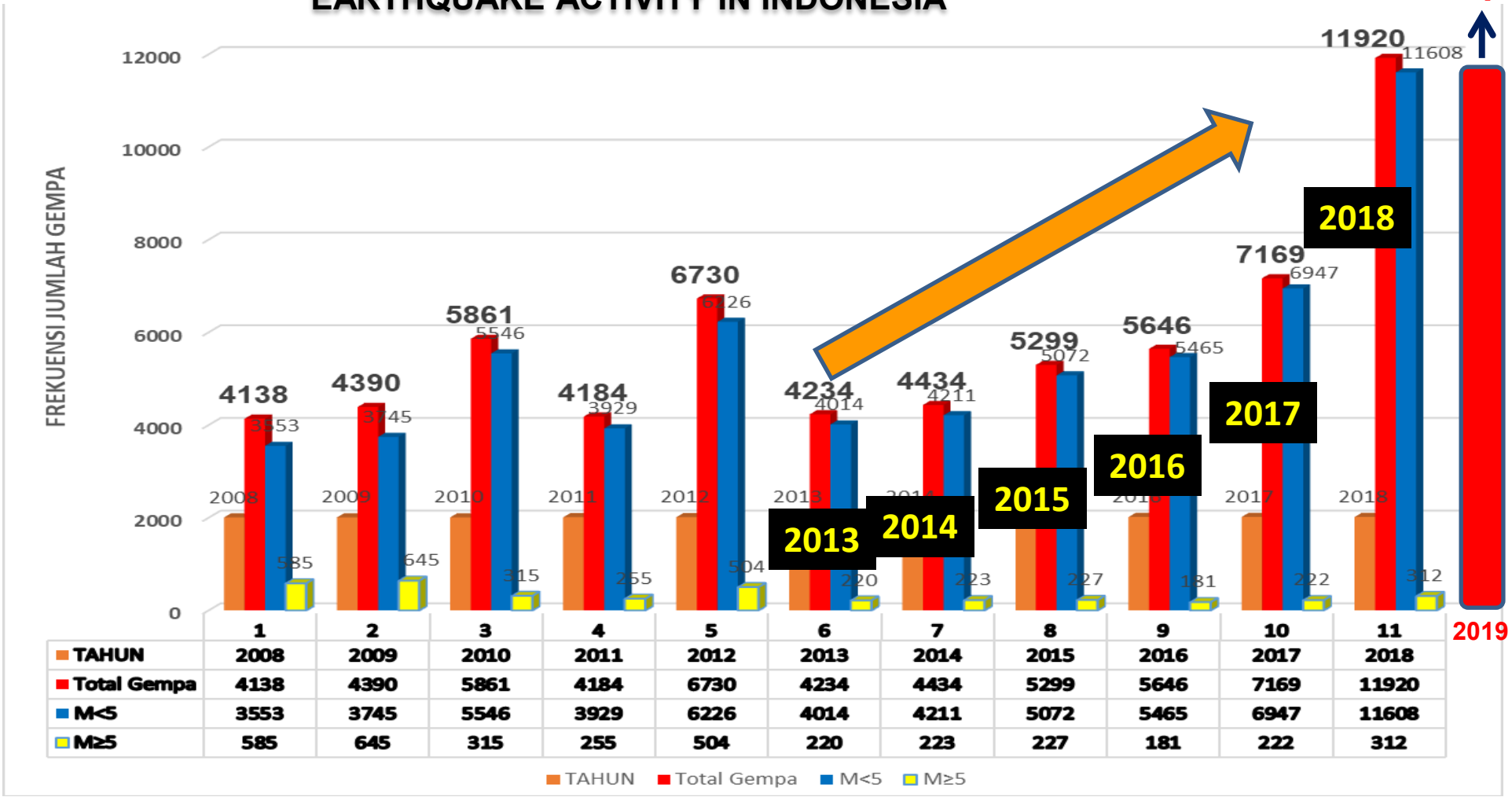
- The siren dissemination system as part of the end-to-end InaTEWS which acts as a tool for disseminating early warnings and evacuation orders;
- There are 5,732 villages in 26 provinces in Indonesia that have a high to moderate level of tsunami vulnerability;
- Availability of new existing equipment is 187 devices, most of which are in poor/damaged condition.

A total of 57 sirens in good condition and 130 sirens in bad condition

THE INCREASING TREND OF EARTHQUAKE ACTIVITY

SINCE 2013, THERE IS AN INCREASING TREND OF EARTHQUAKE ACTIVITY IN INDONESIA

2019
11.588 Earthquake



	1	2	3	4	5	6	7	8	9	10	11
TAHUN	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Gempa	4138	4390	5861	4184	6730	4234	4434	5299	5646	7169	11920
M<5	3553	3745	5546	3929	6226	4014	4211	5072	5465	6947	11608
M≥5	585	645	315	255	504	220	223	227	181	222	312

PRESIDENTIAL REGULATION NO. 93 OF 2019 ABOUT STRENGTHENING AND DEVELOPMENT OF EARTHQUAKE INFORMATION SYSTEMS AND TSUNAMI EARLY WARNING

Structure Component: Chapter 4 and Chapter 5

Under BMKG Coordination

EARTHQUAKE MONITORING SYSTEM

BMKG

ANALYSIS SYSTEM

EARTHQUAKE ANALYSIS SYSTEM | TSUNAMI ANALYSIS SYSTEM

SEA LEVEL MONITORING SYSTEM

PRODUCTS

EARTHQUAKE INFORMATION | TSUNAMI EARLY WARNING

DISSEMINATION SYSTEM

MULTIMODE DISSEMINATION

TIDE GAUGE B I G

BUOY (BPPT) (Not yet operational)

ESDM (BG,PVMBG) "Not yet operational"

STRUCTURE/UPSTREAM

Culture Component: Chapter 15, Chapter 20

STAKEHOLDERS

Under BNPB Coordination

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

CULTURE/DOWNSTREAM

Broken chain !

COASTAL COMMUNITY / RISK

BMKG'S EXISTING SIREN

- In 2006 BMKG built sirens in 52 locations. Currently 9 siren locations have been granted to the Bali Provincial Government and 6 sirens to the West Sumatra Provincial Government so that currently there are 37 siren sirens maintained by the BMKG.
- According to the siren protocol, routine activation is carried out every month on the 26th at 10.00 WIB to test the status or condition of the siren system equipment and build community preparedness for the tsunami hazard.
- There are 2 types of sirens, namely federal signal (27 locations) and sircom (25 locations).

Federal Siren type (signal/Donut)

Sirkom Siren

BNPB'S EXISTING SIREN

Example of BNPB Sirens
Location : Purworejo Regency

Specification:
Consists of 6 Speakers @ 50 Watt;
Tower monopole 16 meters;
Communication using radio network;
Can be integrated with speakers of houses of worship (mosque, church, etc.);
Sound radius +- 1 km.

INDONESIA TELECOMMUNICATION STATISTICS

Gambar 2.4.1 *Figure*

Persentase Penduduk yang Memiliki/Menguasai Telepon Selular menurut Klasifikasi Daerah, 2010—2018

Percentage of Population Owning/Using Cellular Phone by Area Classification, 2010—2018

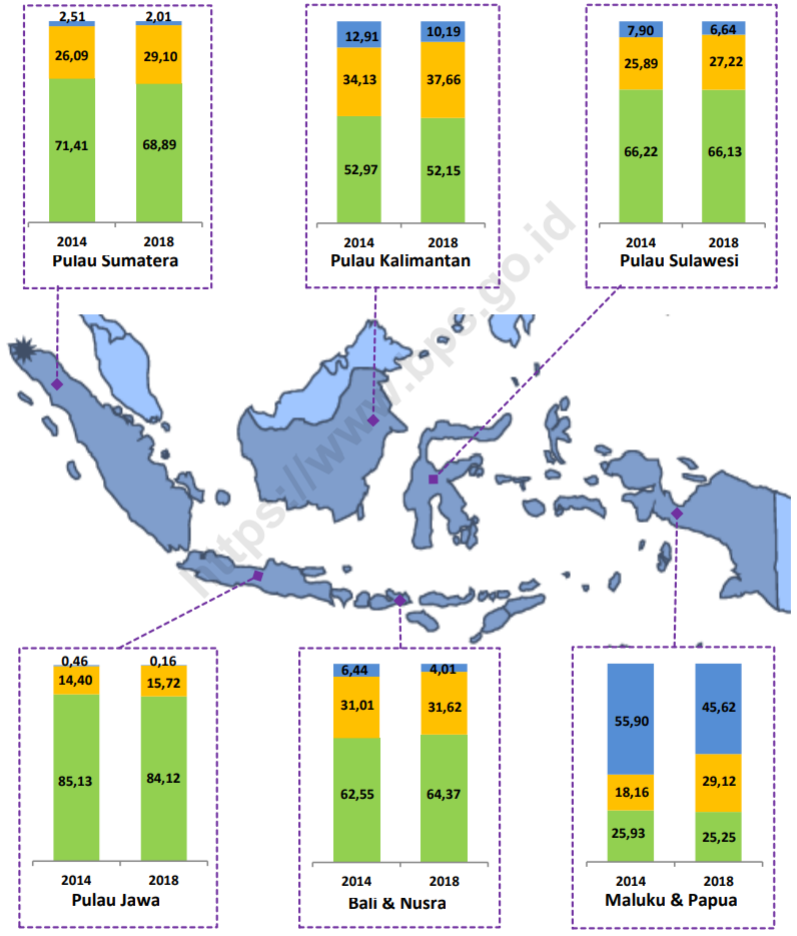
	Perkotaan/*Urban*	Perdesaan/*Rural*	Perkotaan+Perdesaan *Urban+Rural*
2018	69,66	53,61	62,41
2017	67,77	50,33	59,59
2016	67,03	49,04	58,30
2015	66,26	47,38	56,92
2014	61,08	41,83	51,49
2013	60,75	41,06	50,94
2012	58,30	37,64	47,99
2011	48,15	30,30	39,19
2010	49,43	26,77	38,05

Sumber/*Source*: BPS, Survei Sosial Ekonomi Nasional/*BPS-Statistics Indonesia, National Socio-Economic Survey*

Gambar 2.4.2 *Figure*

Proporsi Desa/Kelurahan yang Mendapatkan Sinyal Telepon Selular menurut Pulau dan Kekuatan Penerimaan Sinyal, 2014 dan 2018

Proportion of Villages that Can Receive Cellular Telephone Signal by Island and Strength of Signal Reception, 2014 and 2018



Keterangan/*Note:*

Sinyal Kuat/Strong Signal Sinyal Lemah/Low Signal Tidak Ada Sinyal/No Signal

Sumber/Source: BPS, Pendataan Potensi Desa/BPS-Statistics Indonesia, Village Potential Data Collection

https://www.bps.go.id

TOPOLOGY OF THE BMKG WARNING

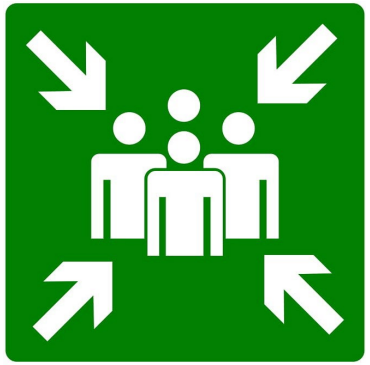
Internet

USER

Internet

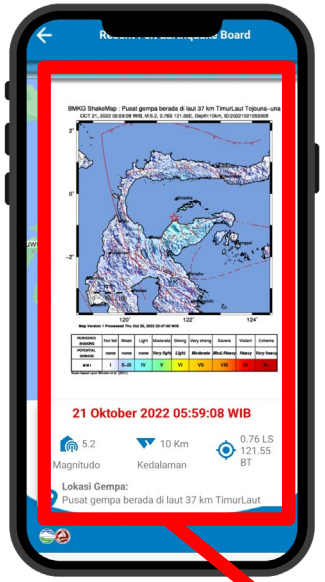
BPBD presses the siren activation button on the SIRITA application

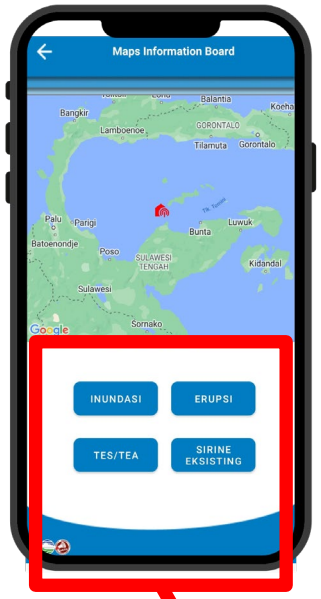
EVACUATION GUIDELINES

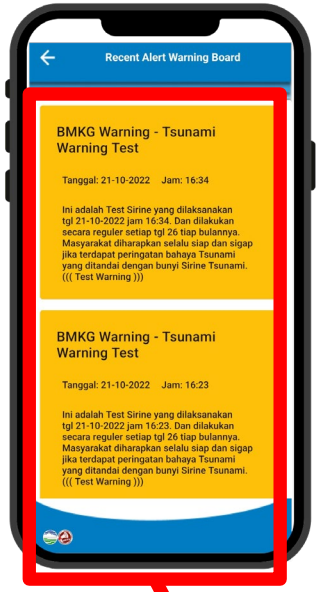


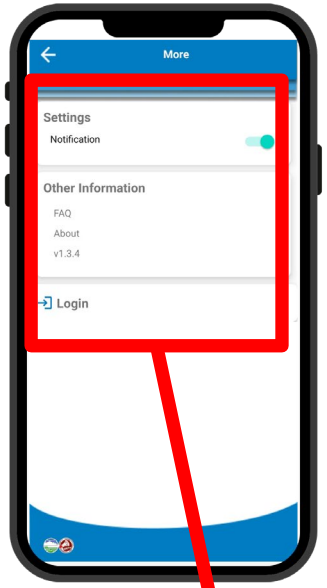
TES/TEA

BMKG WARNING INTERFACE









Automatic latest earthquake info (shakemap, epicenter map)

5 menus for specific functions/info

4 information menus (Inundation, TES/TEA, Eruption, Siren Existing

Display of warning logs that have been issued

Settings and login page for registered users

WHY BMKG WARNING?

Pros

- Low cost
- Low maintenance
- Right on target
- Active in all cellular phone profiles (normal/silent)
- Already included BMKG tsunami modeling data as a reference for affected areas

Cons

- Depends on the quality of the internet network (Wi-Fi / mobile phone data service)
- Only supports smartphone with a minimum OS of Android Pie (9)

D. I. YOGYAKARTA INATEWS SIREN ACTIVATION TEST EVERY MONTH ON THE 26TH

InaTEWS Siren in D. I. Yogyakarta Regency

Glagah Beach, Kulonprogo, DIY

Parangtritis Beach, Bantul, DIY

BMKG Warning Test

SATLINMAS, DIY

Sleman Geophysics Station

DISSEMINATION OF THE TSUNAMI HAZARD MAP AND BMKG WARNING CREDENTIAL TO LOCAL GOVERNMENTS

GLAGAH VILLAGE, KULONPROGO

KEMADANG VILLAGE, GUNUNGKIDUL

BPBD BANTUL

BPBD KULONPROGO

CONCLUSIONS

- The android mobile phone-based tsunami siren application is a practical and targeted solution in conveying evacuation orders from local governments.
- The tsunami siren application has included inundation data from the BMKG tsunami modeling as a warning threshold to the user.
- The siren application utilizes IoT technology and low operational/maintenance costs.
- Given the increasing trend of smartphone utilization, it is necessary to develop the range area of tsunami siren applications for areas outside Java.

INFOGRAPHICS AND VIDEO OF TSUNAMI SIREN APP BASED ON ANDROID MOBILE PHONES

BMKG

Thank You