Accelerating Satellite Based data and Information for Disaster Management In Indonesia

Udrekh

Directorate Disaster Risk Mapping and Evaluation

Background

Disaster is a recurring event

The occurrence of the tropical cyclone, earthquake, flood, tsunamis and other are not the first one. However, there is insufficient knowledge for us to take action against it.

Disaster events are a sign of an opportunity to better understand the dynamics of nature and our mistakes in managing nature.

An important lesson we have learned is: greater attention to extreme weather warnings.

All of knowledge related to how we can observe earth dynamic. Satellite data has an important role

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1973 Flores cyclone

From Wikipedia, the free encyclopedia

The **1973 Flores cyclone** was the deadliest known tropical cyclone in the Southern Hemisphere, having killed 1,653 people in Indonesia in April 1973. The cyclone formed in the Banda Sea on 26 April as a tropical low. It intensified as it moved in a west-southwest direction, before shifting to the south. On 29 April, the cyclone struck the north coast of the island of Flores, dissipating the next day. The cyclone killed 1,500 fishermen on Palu'e island. The cyclone dropped heavy rainfall across Flores, causing deadly flash flooding that damaged buildings and roads.

Contents [hide]

Meteorological history [edit]

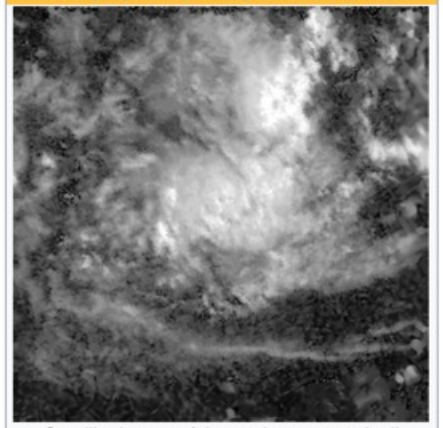
Map plotting the track and intensity of the

On 26 April, a tropical low formed in the Banda Sea in the waters of eastern Indonesia. According to Australia's Bureau of Meteorology BoM, the low moved to the west-southwest and intensified, although this was based on a later analysis. As the storm was outside of the agency's jurisdiction, the BoM did not issue warnings on the system at the time. The low attained gale-force winds late on 27 April as it moved into the Flores Sea. Late the next day, the storm turned southwestward.[1][2]

The BoM estimated that the storm reached peak intensity early on 29 April, assessing it as a Category 3 on the Australian tropical cyclone intensity scale, with maximum sustained winds of 150 km/h (90 mph). While near peak intensity, the small tropical cyclone had eye

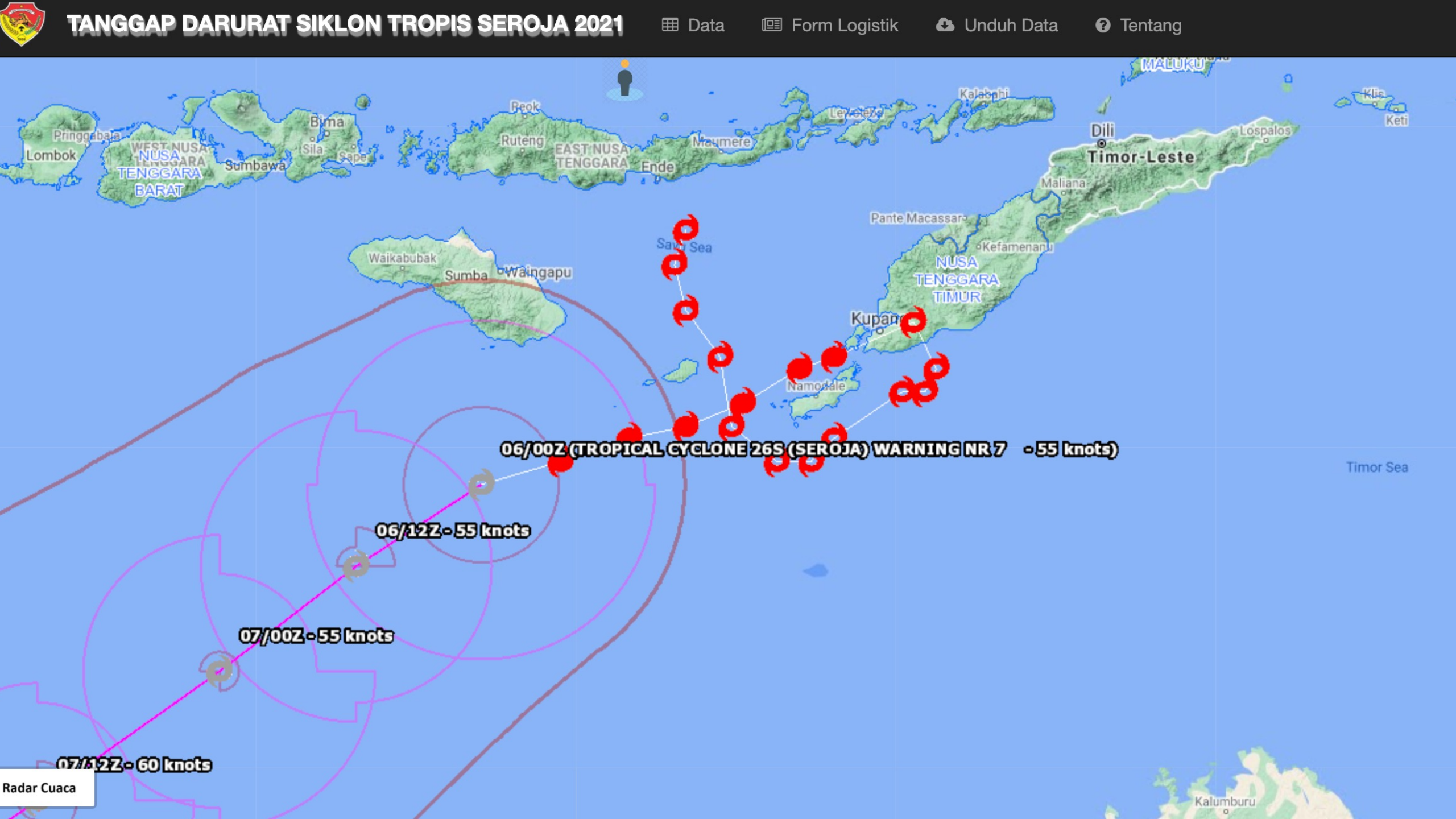
1973 Flores cyclone

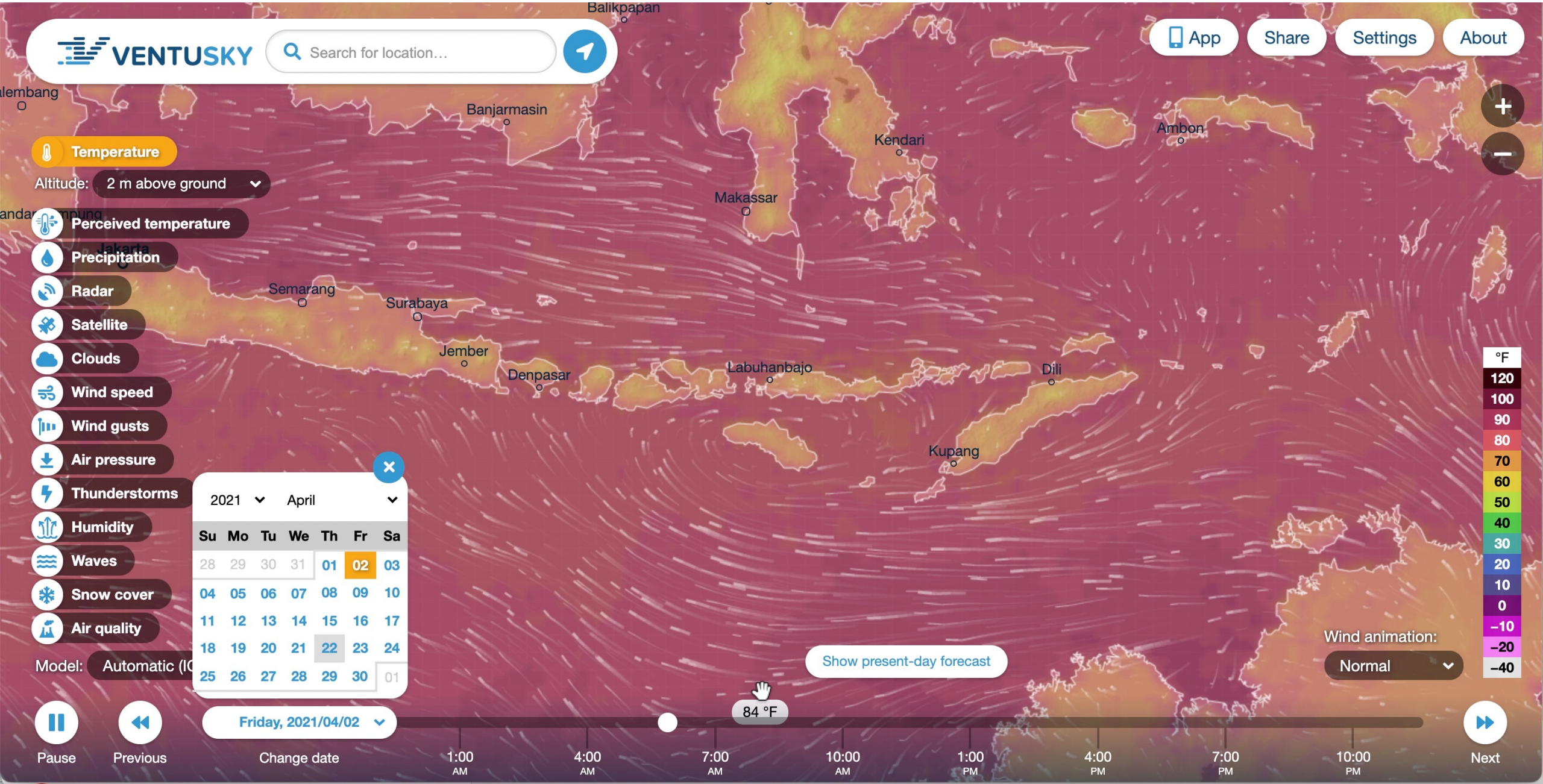
Category 3 severe tropical cyclone (Aus scale)
Category 3 tropical cyclone (SSHWS)

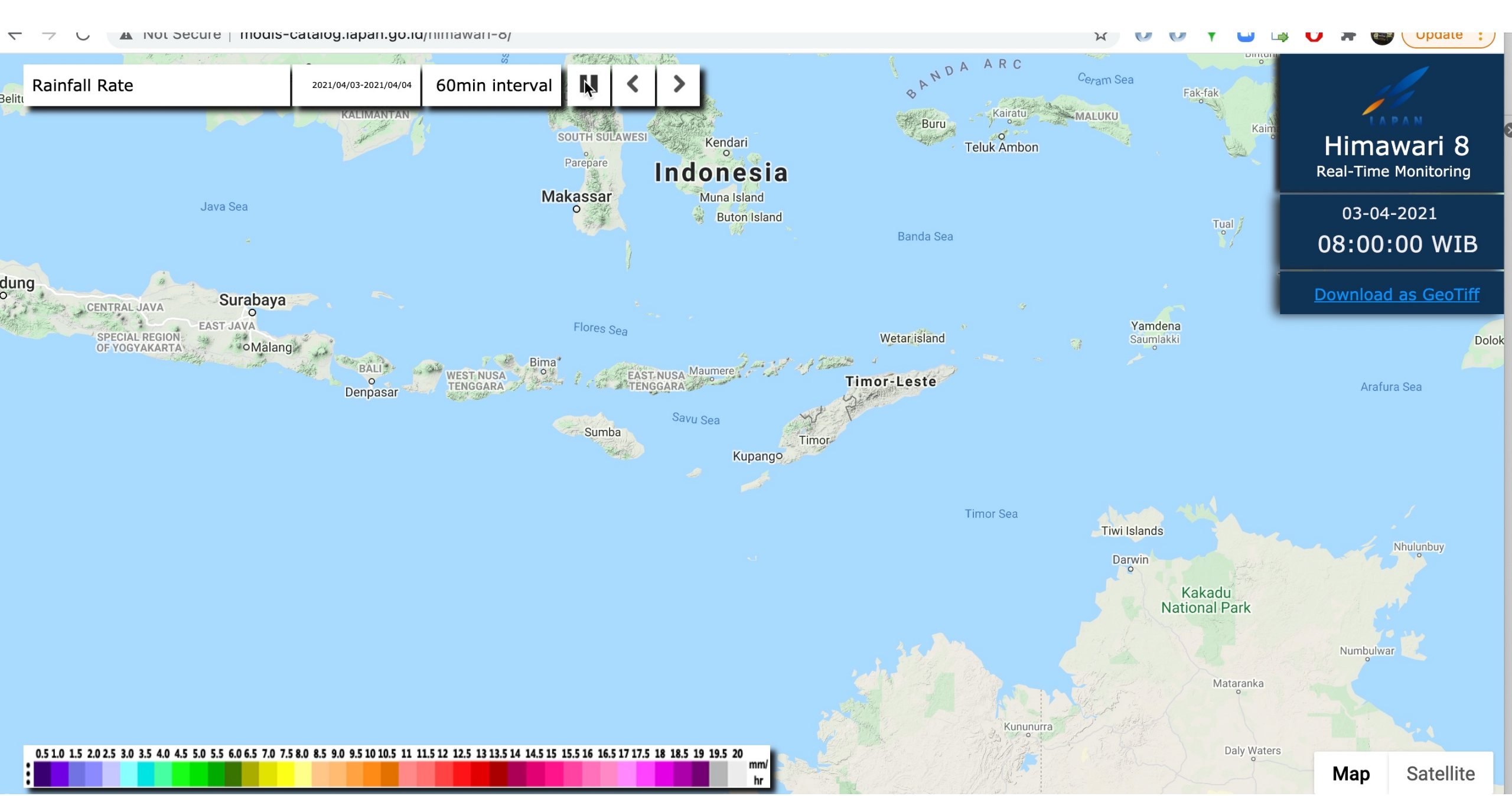


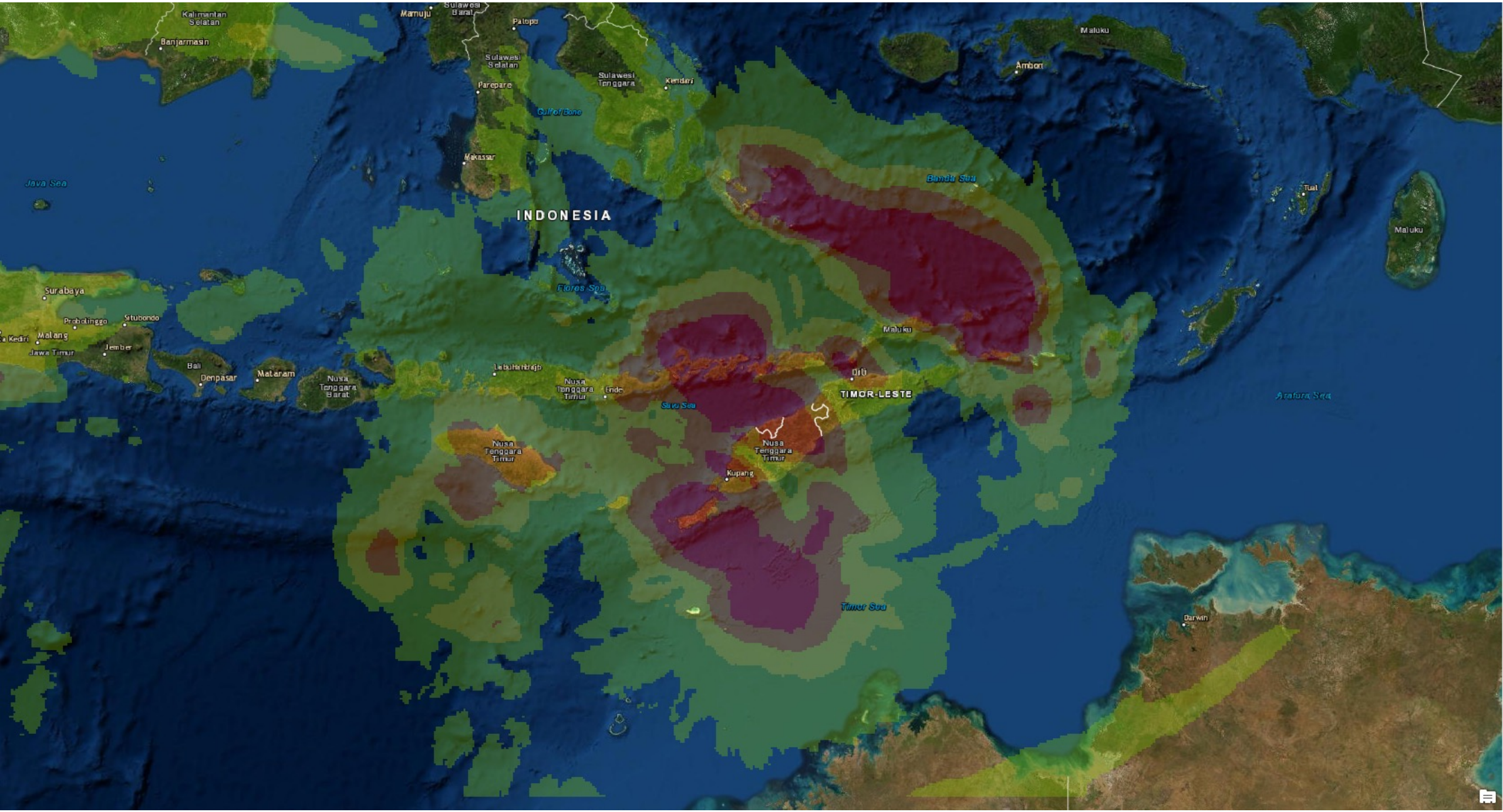
Satellite image of the cyclone on 28 April

Formed	26 April 1973
Dissipated	30 April 1973
Highest winds	10-minute sustained: 150 km/h (90 mph) 1-minute sustained: 185 km/h (115 mph)
Lowest pressure	950 hPa (mbar); 28.05 inHg
Fatalities	1,653 total (Deadliest tropical cyclone


TANGGAP DARURAT SIKLON TROPIS SEROJA 2021
Data
Form Logistik
Unduh Data
Tentang
Lombok
Pringgabaja
Bima
Sumbawa
Sape
Reok
Ruteng
Ende
Maumere
Kalabahi
Dili
Timor-Leste
Lospalos
Maliana
Waikabubak
Sumba
Waingapu
Sawu Sea
Pante Macassar
Kefamenanu
Kupang
Namodale
Timor Sea
Kalumburu
06/00Z (TROPICAL CYCLONE 26S (SEROJA) WARNING NR 7 - 55 knots)
06/12Z - 55 knots
07/00Z - 55 knots
07/12Z - 60 knots
Radar Cuaca


VENTUSKY
Search for location…
App
Share
Settings
About
Balikpapan
Banjarmasin
Kendari
Ambon
Makassar
Jakarta
Semarang
Surabaya
Jember
Denpasar
Labuhanbajo
Dili
Kupang
Temperature
Altitude: 2 m above ground
Perceived temperature
Precipitation
Radar
Satellite
Clouds
Wind speed
Wind gusts
Air pressure
Thunderstorms
Humidity
Waves
Snow cover
Air quality
Model: Automatic
2021
April
Su Mo Tu We Th Fr Sa
28 29 30 31 01 02 03
04 05 06 07 08 09 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30 01
°F
120
100
90
80
70
60
50
40
30
20
10
0
−10
−20
−40
Wind animation:
Normal
Show present-day forecast
84 °F
Friday, 2021/04/02
Pause
Previous
Change date
1:00 AM
4:00 AM
7:00 AM
10:00 AM
1:00 PM
4:00 PM
7:00 PM
10:00 PM
Next


Not Secure | modis-catalog.lapan.go.id/himawari-8/
Update
Rainfall Rate
2021/04/03-2021/04/04
60min interval
Himawari 8
Real-Time Monitoring
03-04-2021
08:00:00 WIB
Download as GeoTiff
Indonesia
KALIMANTAN
SOUTH SULAWESI
Kendari
Parepare
Makassar
Muna Island
Buton Island
Java Sea
Banda Sea
Flores Sea
Savu Sea
Timor Sea
Arafura Sea
BANDA ARC
Ceram Sea
Buru
Kairatu
MALUKU
Teluk Ambon
Fak-fak
Tual
Yamdena
Saumlakki
Wetar island
Timor-Leste
Timor
Kupang
Sumba
Bima
Maumere
BALI
Denpasar
WEST NUSA TENGGARA
EAST NUSA TENGGARA
CENTRAL JAVA
EAST JAVA
SPECIAL REGION OF YOGYAKARTA
Surabaya
Malang
Tiwi Islands
Darwin
Kakadu National Park
Nhulunbuy
Numbulwar
Mataranka
Kununurra
Daly Waters
0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10 10.5 11 11.5 12 12.5 13 13.5 14 14.5 15 15.5 16 16.5 17 17.5 18 18.5 19 19.5 20
mm/hr
Map
Satellite


Kalimantan Selatan
Banjarmasin
Mamuju
Sulawesi Barat
Palopo
Sulawesi Selatan
Parepare
Sulawesi Tenggara
Kendari
Gulf of Bone
Makassar
Maluku
Ambon
Java Sea
Banda Sea
INDONESIA
Tual
Maluku
Flores Sea
Surabaya
Probolinggo
Situbondo
Malang
Jember
Jawa Timur
Bali
Denpasar
Mataram
Nusa Tenggara Barat
Nusa Tenggara Timur
Ende
Sawu Sea
Maluku
Dili
TIMOR-LESTE
Arafura Sea
Nusa Tenggara Timur
Kupang
Timor Sea
Darwin

KEJADIAN BANJIR BANDANG DI KABUPATEN LEMBATA

Desa Waimatan

Desa Amakaka

Desa Tanjung Batu

Desa Waowala

Desa Lamawolo

Desa Jontona

Desa Dikesare

Titik Longsor Desa Waimuda

Legend

- Titik survei
- Area banjir bandang
- Garis pantai

Indeks bahaya gunungapi

High : 1

Low : 0

Sumber:
1. Foto Udara, BNPB dan PVMBG
2. Area banjir bandang, LAPAN
3. KRB, 2015
4. Batas administrasi, BPS

N

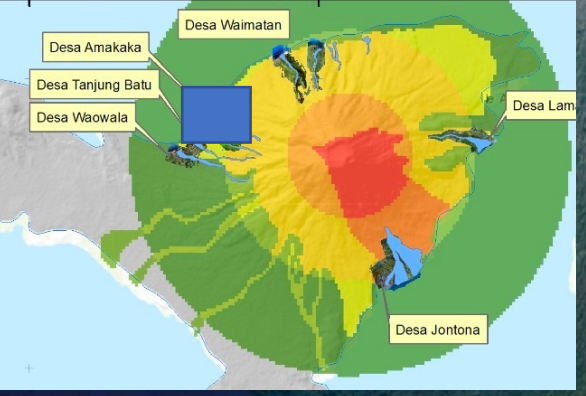
0 1,25 2,5 5
Kilometers

Sources: Esri, HERE, IGN, Kadaster NL, O... contributors, and the GIS User Community

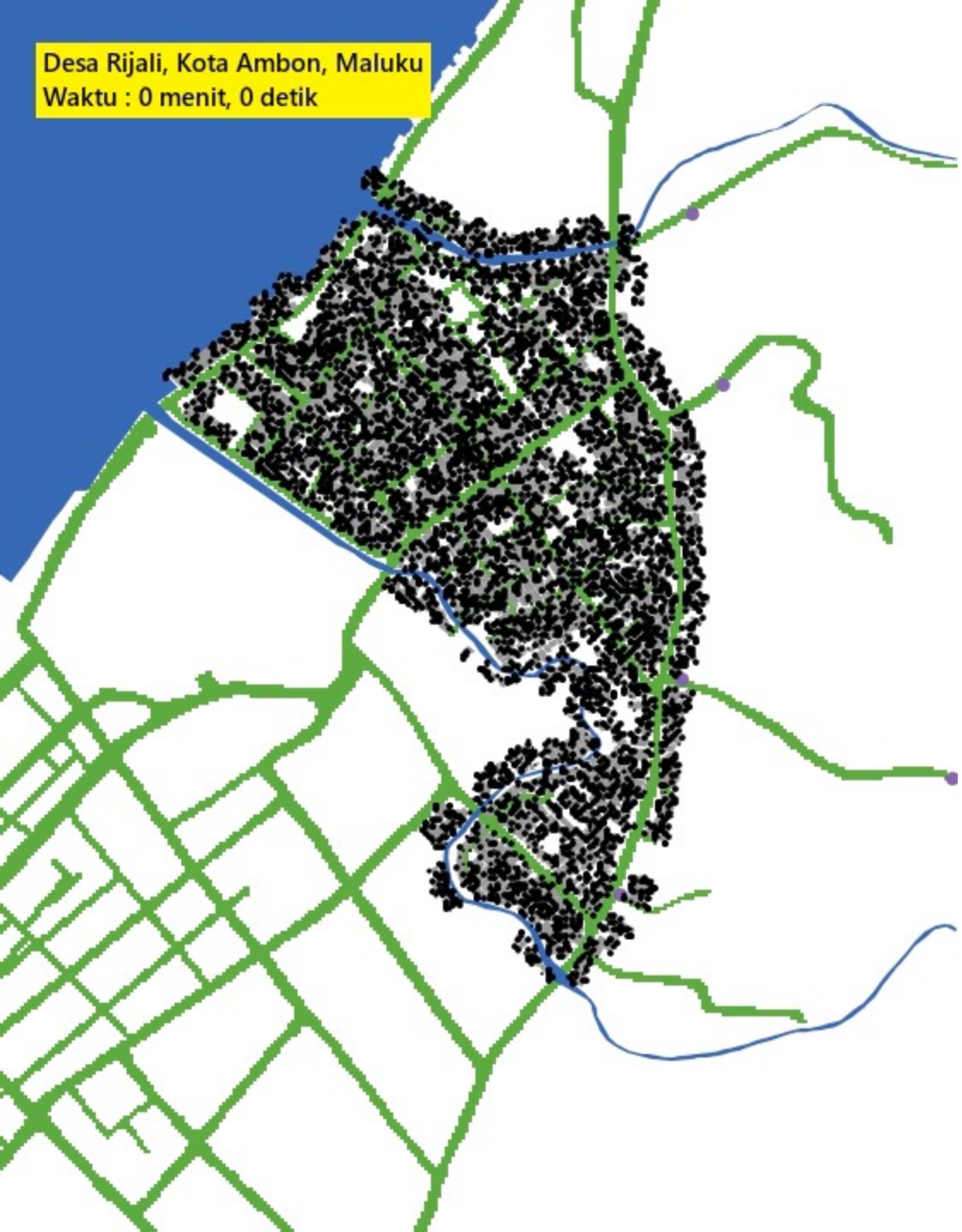
8°15'0"S
8°20'0"S
8°25'0"S
123°25'0"E
123°30'0"E
123°35'0"E
123°40'0"E

Kementerian
Pekerjaan Umum Dan
Perumahan Rakyat

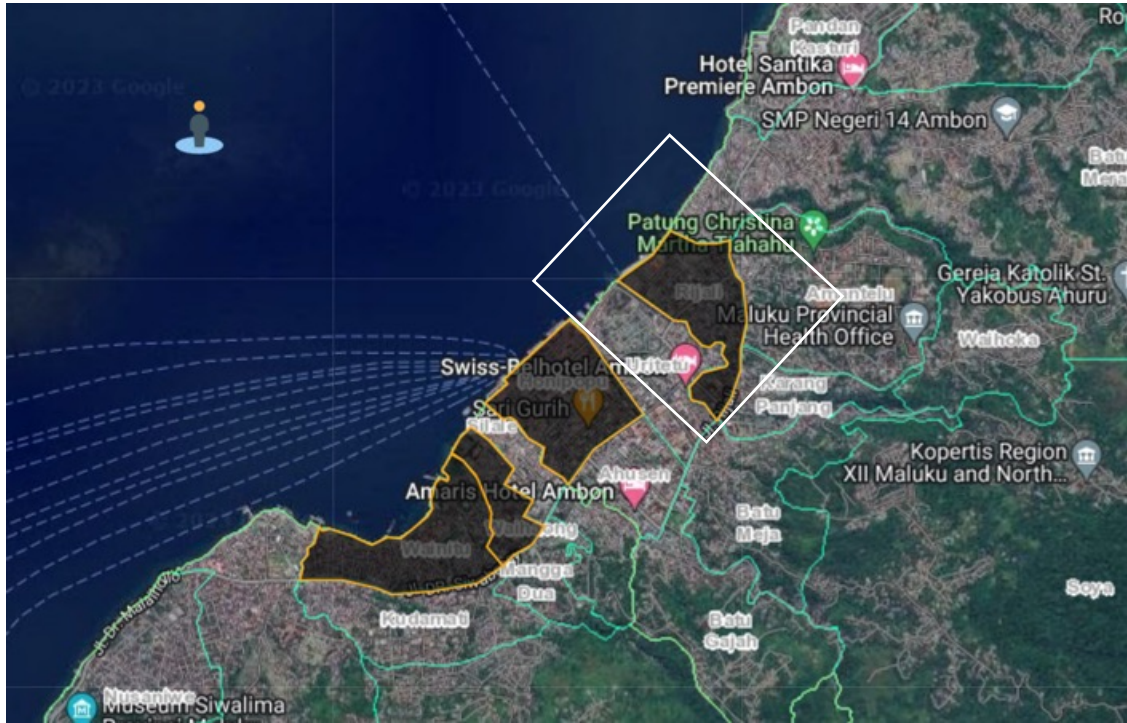
DESA AMAKAKA



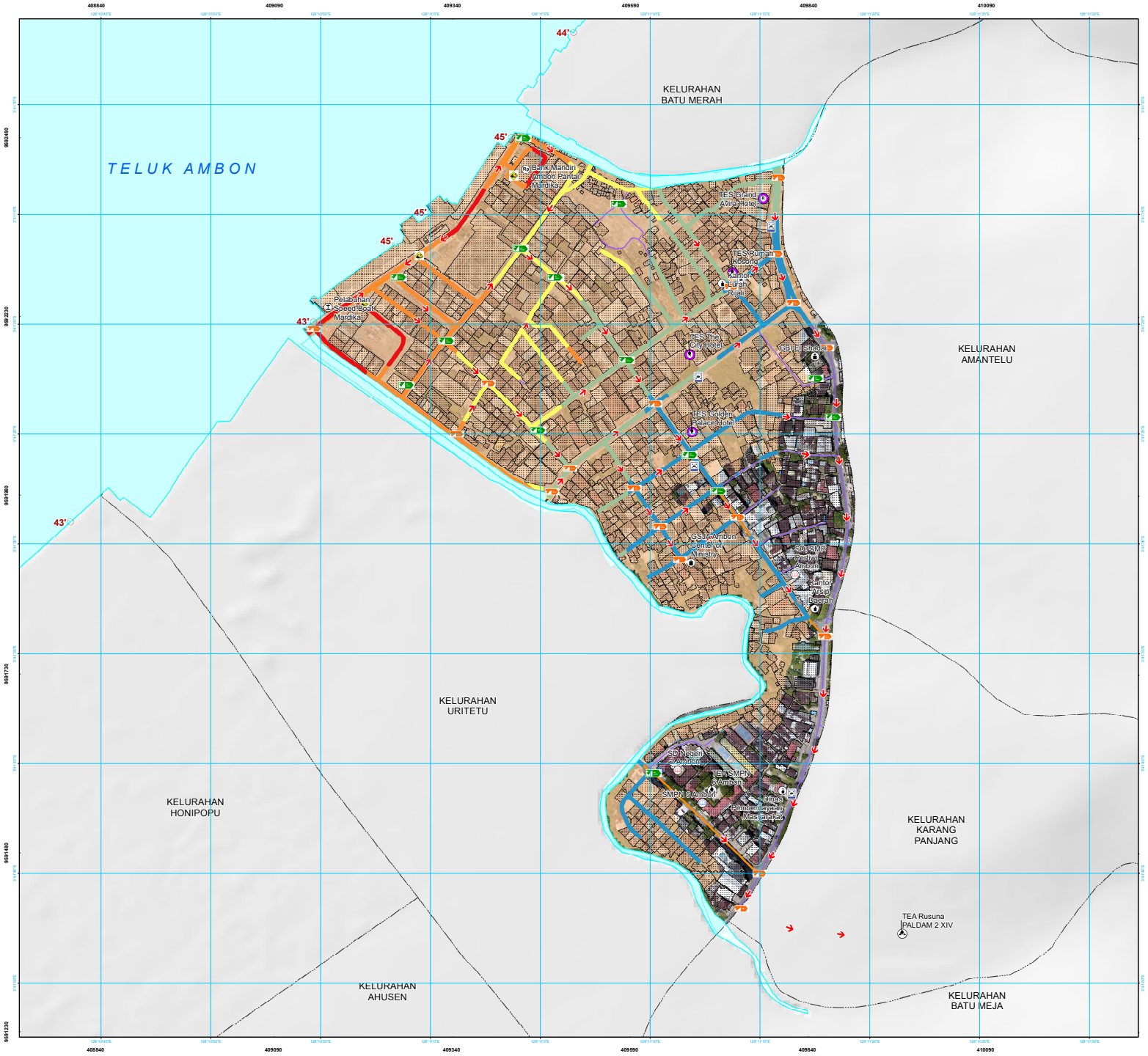
Desa Amakaka


Desa Rijali, Kota Ambon, Maluku
Waktu : 0 menit, 0 detik


Liang
Haruku
HITOELAMA
Ambon Island
HALONG
PASO
Lima
Teluk Ambon
Asilulu
RAHA
Kota Ambon
LATUHALAT
OMPUTTY


Hotel Santika Premiere Ambon
SMP Negeri 14 Ambon
Patung Christina Martha Tahahu
Gereja Katolik St. Yakobus Ahuru
Maluku Provincial Health Office
Swiss-Belhotel Ambon
Sari Gurih
Amaris Hotel Ambon
Kopertis Region XII Maluku and North...
Kudamati
Museum Siwalima


PASAR MARDIKA
Pelabuhan Speed Boat Mardika
Grand Avira
Patung Chri Martha Tia
The View
Jl. Pitu Ina
Red Bricks Cafe & Resto Ambon
Jl. Rijali
Gg. Singa
Halong Marikka
Victoria Fort
Pattimura Park
Fakfak - Makassar
Ambon - Ternate
Ambon - Kupang
Kupang
Jayapura
Pelabuhan Yos Soedarso Ambon
Swiss-Belhotel
Civil Registry Office
Puskesm Belakang
Jl. Sultan Hairun
Pizza Hut Restoran
Jembatan skip
Bengkel las ambon
Rumah Sakit Al Fa
Jl. Pattimura



PETA JALUR EVAKUASI TSUNAMI
KELURAHAN RIJALI

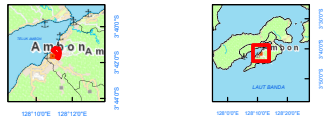
KEC. SIRIMAU KOTA AMBON
PROVINSI MALUKU

U

Skala 1:2.500

0 25 50 100 150 200 250 Meter

DIAGRAM LOKASI



Proyeksi	:	Transverse Mercator
Sistem grid	:	Grid Geografi
Datum horizontal	:	WGS 1984 - Zone 52S
ID Peta	:	Peta_Jalur_Evakuasi_Tsunami
Dibuat Tanggal	:	29 Mei 2023

Legenda

Batas Administrasi
- Batas Desa/Kelurahan

Perairan
- Garis pantai
- Sungai

Jaringan Jalan
- Jalan Arteri
- Jalan Kolektor
- Jalan Lokal
- Jalan Lingkungan

Gedung dan Bangunan
- Permukiman

Fasilitas Umum dan Sosial
- Bank
- Gereja
- Kantor Pemerintah
- Pelabuhan Antarpulau
- SD / Setingkat
- SMP / Setingkat

Keterangan
- Waktu Tiba Tsunami di Pantai
- Tempat Evakuasi Akhir (Rekomendasi)
- Tempat Evakuasi Sementara (Rekomendasi)
- Rambu Peringatan
- Rambu Titik Kumpul
- Rambu (Eksisting)
- Rambu (Rekomendasi)
- Arah Evakuasi
- Area Bahaya
- Area di Luar Daerah Pemetaan

Waktu Tempuh Penyelamatan Diri (menit)
- 0-5
- 5-10
- 10-15
- 15-20
- 20-25

Sumber Data dan Riwayat Peta:
-Data spasial LiDAR resolusi 5 m, Tahun 2023
-Data spasial BATNAS resolusi 185 m, Tahun 2018
-Data spasial DEMNAS resolusi 8.3 m, Tahun 2018
-Data spasial Penutup Lahan skala 1:5000, Tahun 2023

Gambar Latar:
-Hillshade hasil Pengolahan LiDAR dan DEMNAS BIG
-Orthophoto, Akuisisi Tahun 2023

Catatan:
Peta ini digunakan sebagai acuan dalam penyusunan rencana evakuasi, rencana mitigasi dan kegiatan tangguh bencana tingkat desa/kelurahan. Penggambaran batas administrasi dan nama geografi, tidak dapat digunakan sebagai referensi resmi mengenai batas sesungguhnya di lapangan, dan tidak menyiratkan pengesahan resmi dari BNPB. Peta dapat dilihat dengan jelas pada ukuran kertas A1.

Didukung Oleh :

BNPB PVMBG BMKG BADAN INFORMASI GEOSPASIAL THE WORLD BANK

Deskripsi Singkat:

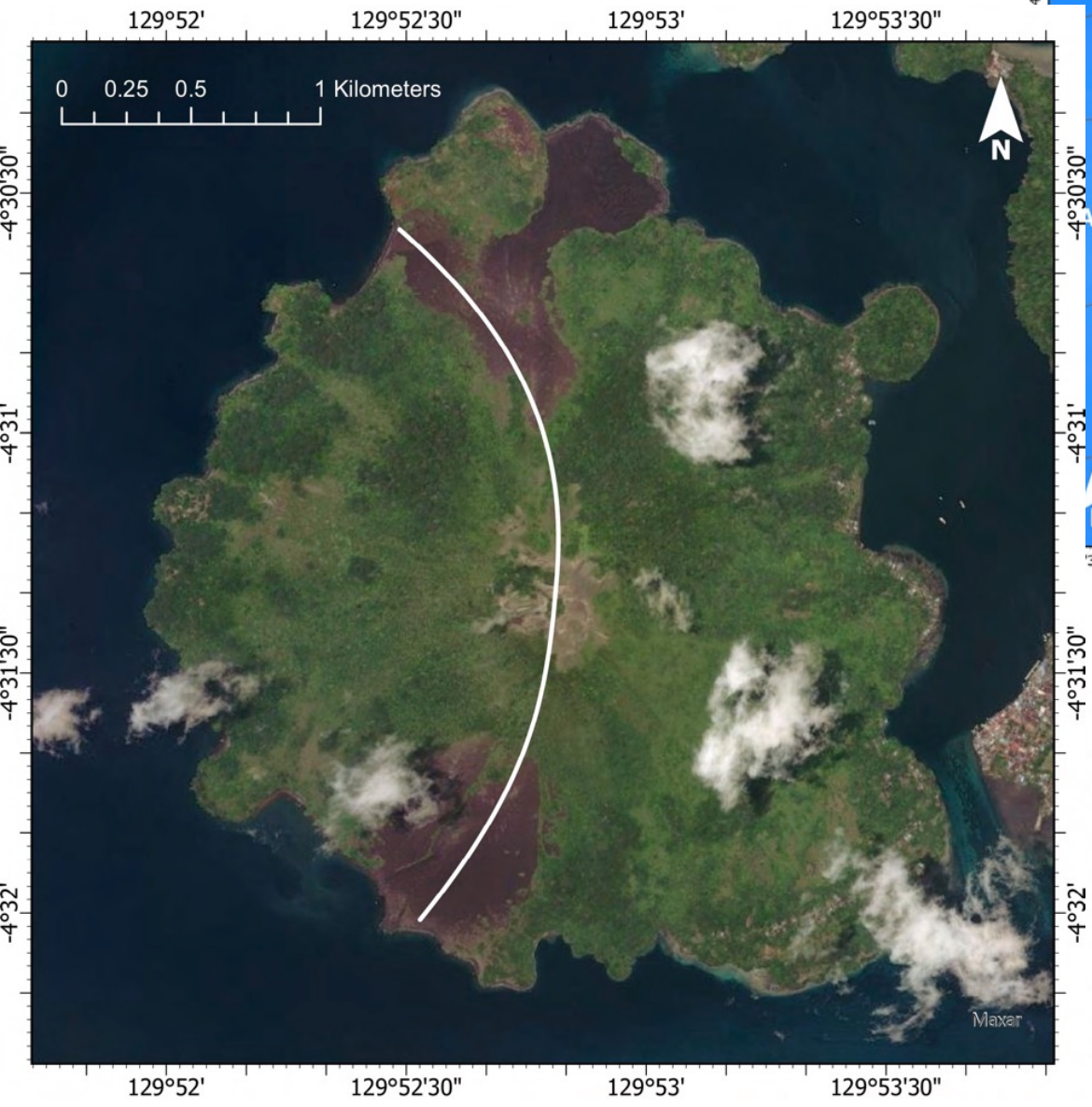
Peta jalur evakuasi tsunami ini dibuat dengan tools Network Analyst pada Software ArcMap dan Evacuation Analyst dari USGS dengan waktu kedatangan tsunami 36 menit dan kecepatan evakuasi 0.71 meter/detik.

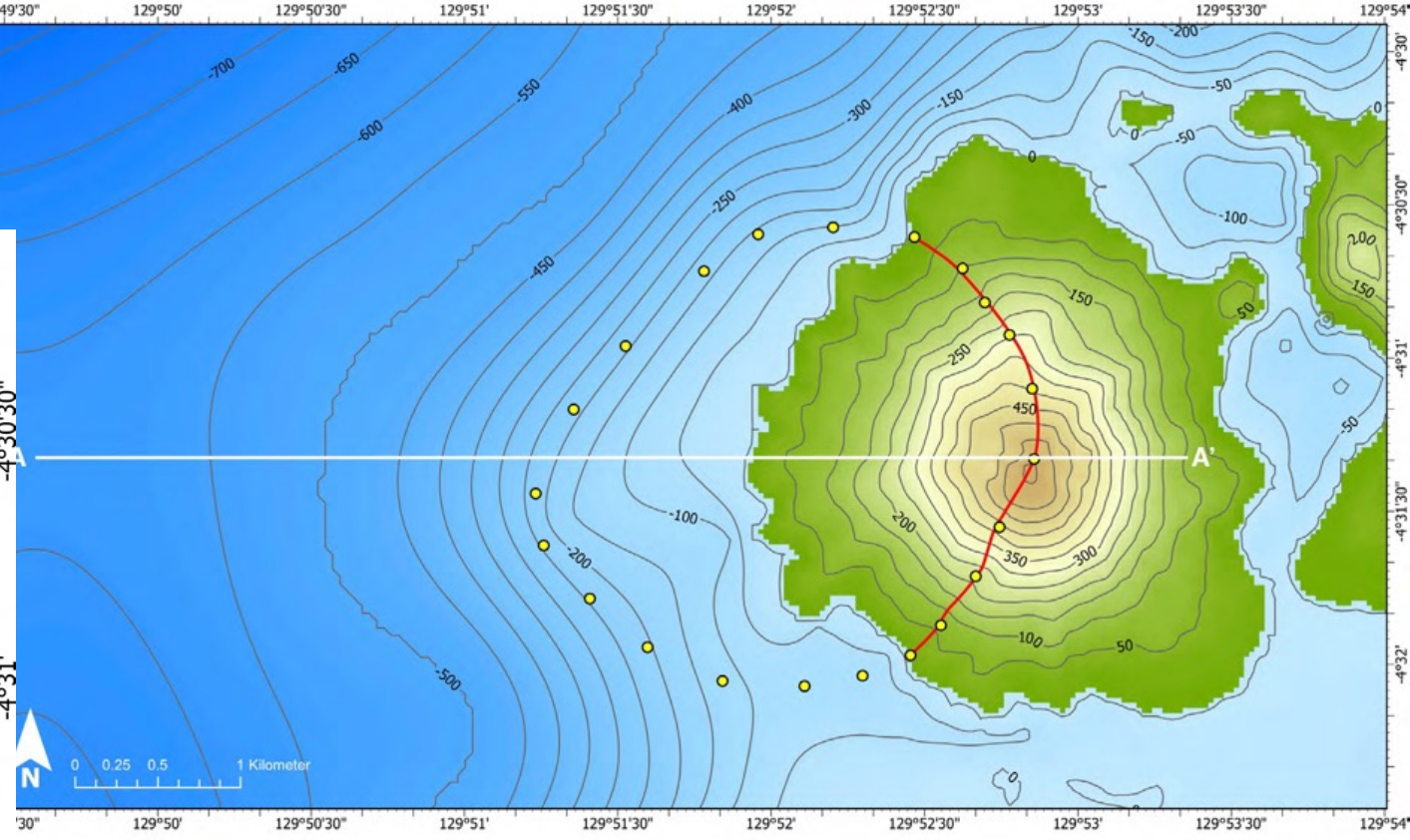
PENYUSUNAN DOKUMEN KAJIAN IDENTIFIKASI LOKUS PRIORITAS DAN ANALISIS RISIKO BENCANA TSUNAMI
PROGRAM IDRIP DIREKTORAT PERB TA 2022/2023

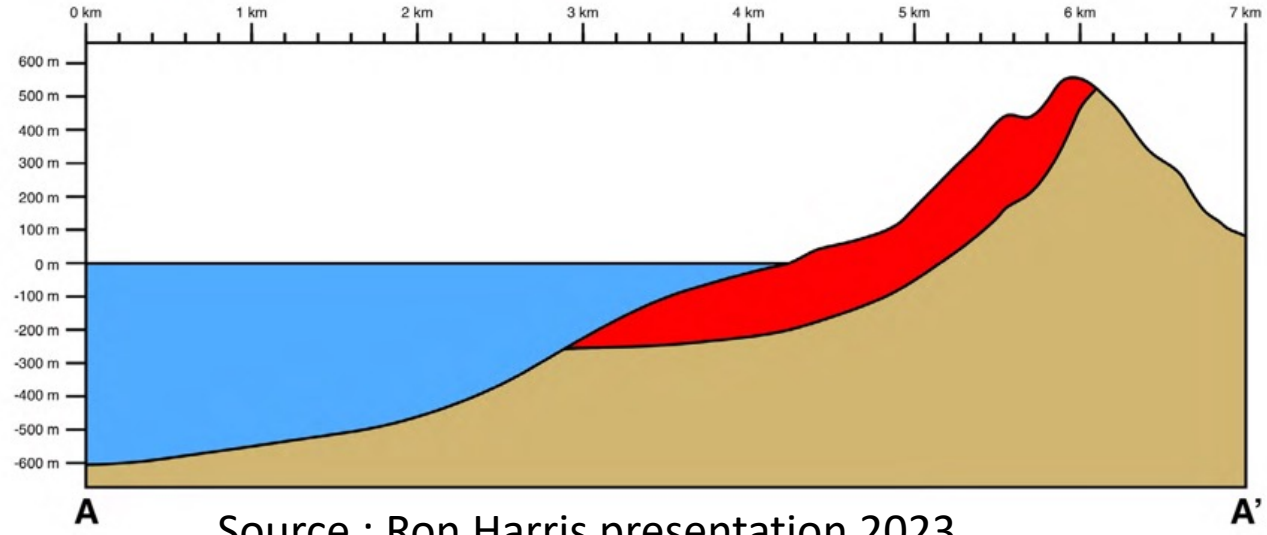
Catatan Tsunami di Pulau Banda?

Fisher and Harris 2016

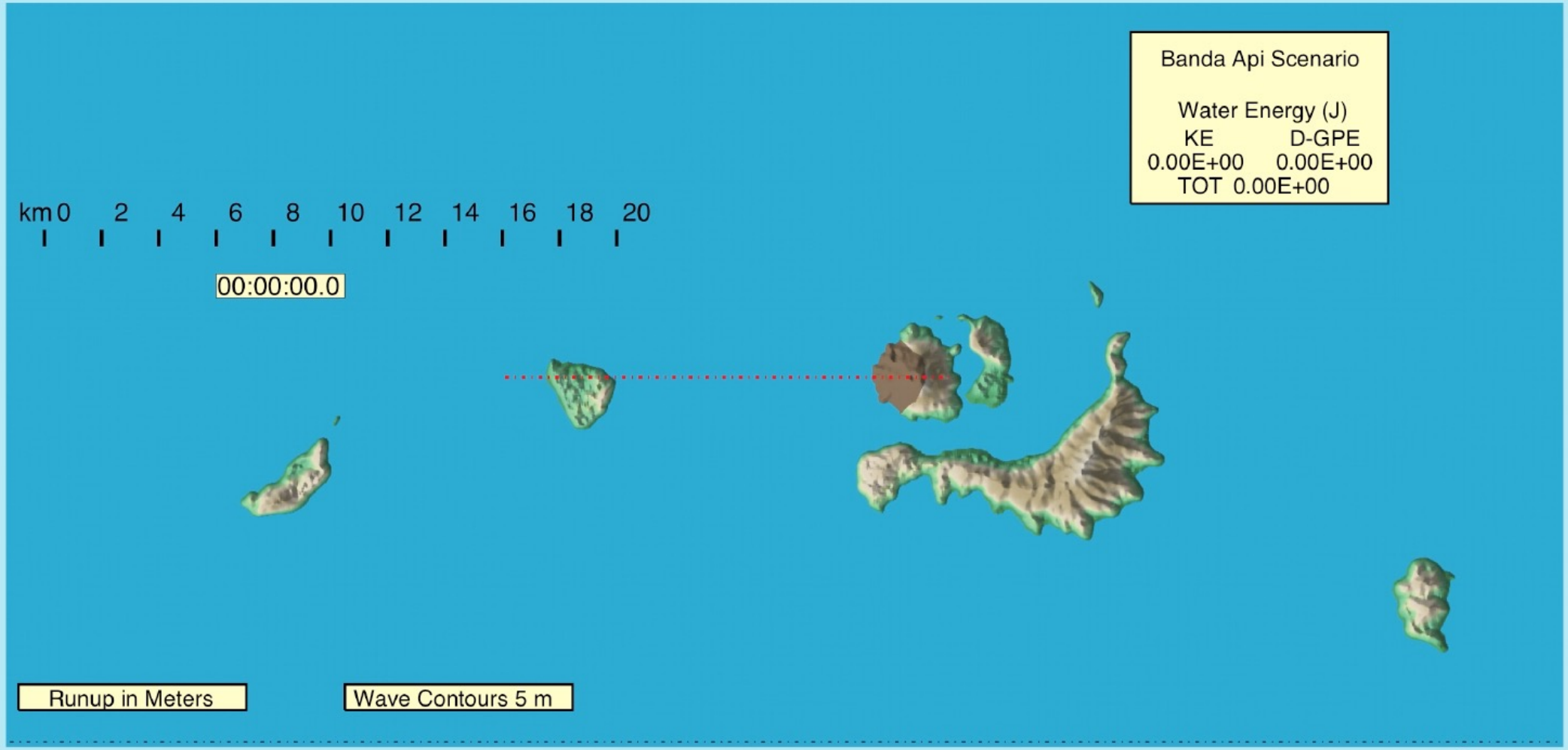
Volcano Collapse Tsunami?

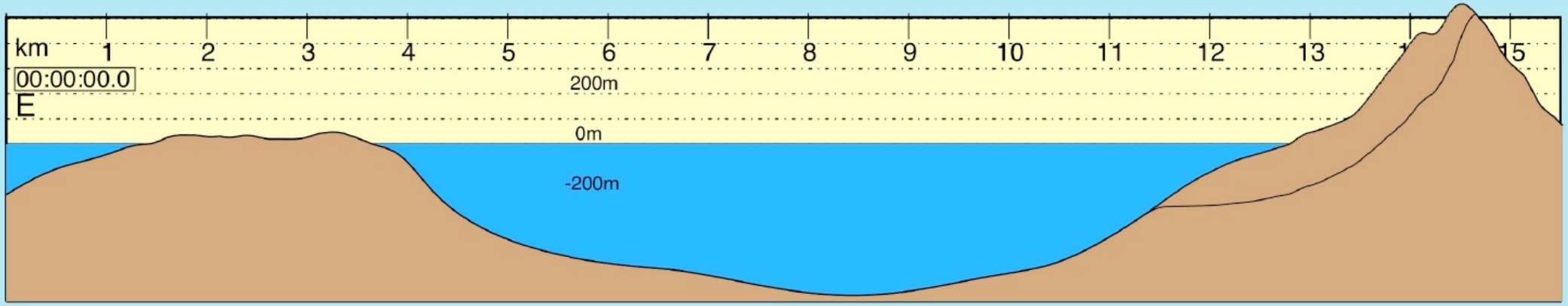


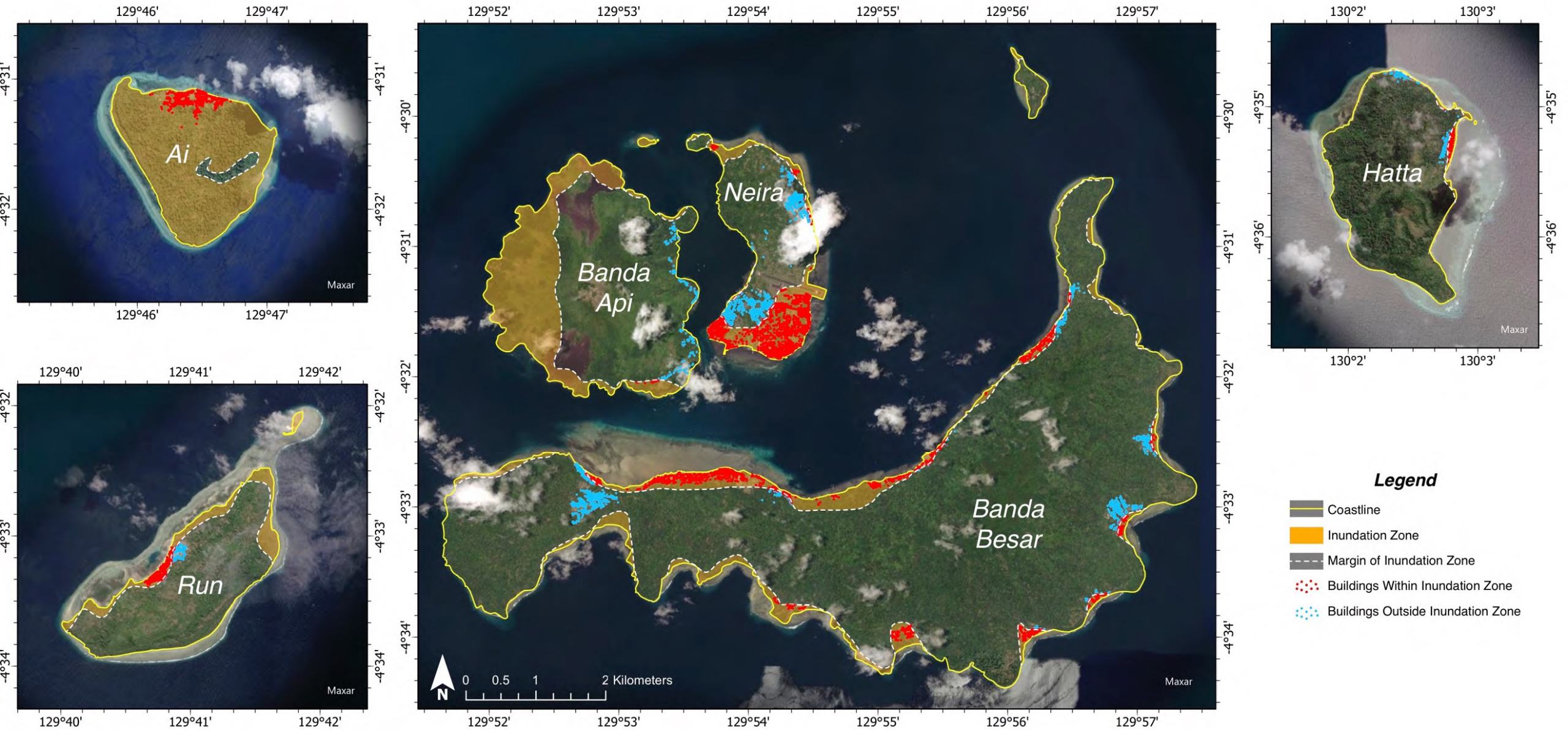


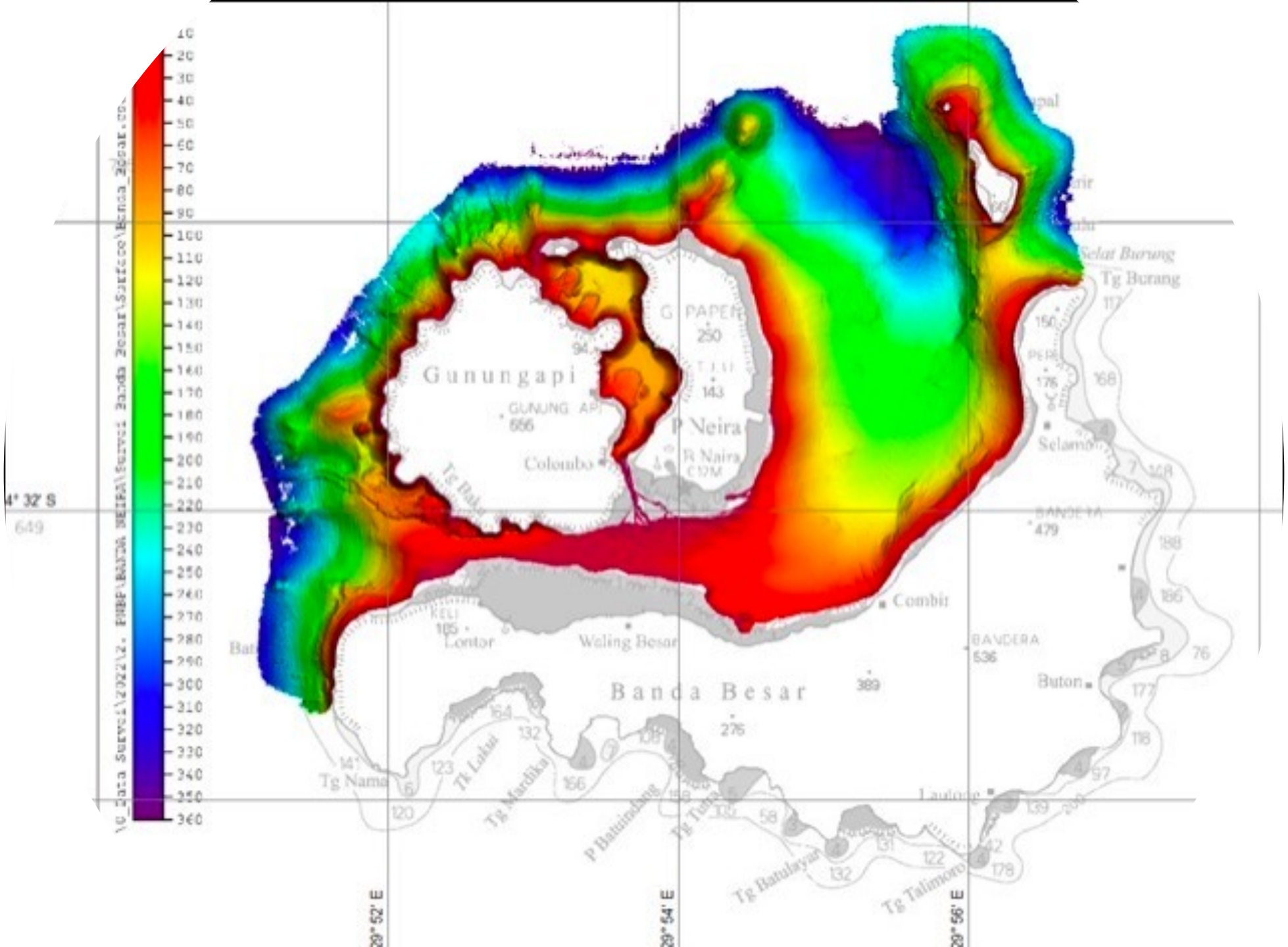


Source : Ron Harris presentation 2023


Banda Api Scenario
Water Energy (J)
KE D-GPE
0.00E+00 0.00E+00
TOT 0.00E+00
km 0 2 4 6 8 10 12 14 16 18 20
00:00:00.0
Runup in Meters
Wave Contours 5 m


km 1 2 3 4 5 6 7 8 9 10 11 12 13 15
00:00:00.0
E
200m
0m
-200m


Ai
Neira
Banda Api
Banda Besar
Run
Hatta
Maxar
0 0.5 1 2 Kilometers
N
Legend
Coastline
Inundation Zone
Margin of Inundation Zone
Buildings Within Inundation Zone
Buildings Outside Inundation Zone


Gunungapi
G PAPEN
250
P Neira
Colombo
Lontor
Weling Besar
Banda Besar
276
Combir
BANDERA
536
Buton
Laulonge
Tg Nama
Tk Lakur
Tg Mardika
P Batuimadat
Tg Batulayar
Tg Talimoro
Selat Burung
Tg Burang
Selamon
BANDETA
479
4° 32' S
649
29° 52' E
29° 54' E
29° 56' E

Potential Disaster Caused by Land slide in Ternate

EGU2020-893
https://doi.org/10.5194/egusphere-egu2020-893
EGU General Assembly 2020

The Mt. Gamalama Instability in Generating Landslides in Ternate Island, Indonesia

Saaduddin Saaduddin[1], Jurgen Neuberg[1], Mark Thomas[1], and Jon Hill[2]
[1]University of Leeds, Institute of Geophysics and Tectonic, School of Earth and Environment, Leeds, United Kingdom of Great Britain and Northern Ireland (eessa@leeds.ac.uk)
[2]University of York, Department of Environment and Geography, York, United Kingdom of Great Britain and Northern Ireland

Mt. Gamalama has a history of volcanic tsunamis that have occured in 1608 and 1840. Regarding its geomorphology, Mt. Gamalama has very steep flanks, and landslides entering the sea could be the potential mechanism of tsunami generation which could threaten the coastal population and submarine infrastructure in the vicinity of Mt. Gamalama.

The potential volumes and types of landslides are estimated by a study of the Mt. Gamalama instabilities using the Generalized Hoek-Brown failure criterion which is applied in *Slide2D*

INFOGRAFIS GEMPA BUMI MAGNITUDO 5.6 SKALA RICHTER KABUPATEN CIANJUR

WAKTU KEJADIAN SENIN 21 NOVEMBER 2022 PUKUL 13.21 WIB

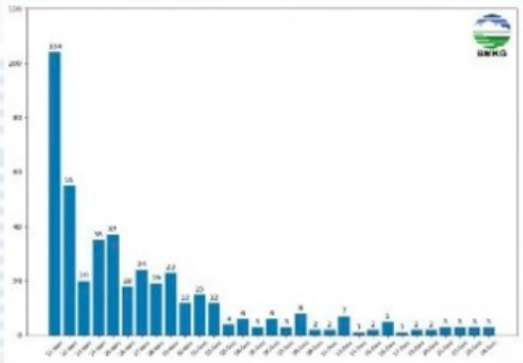
CUT OFF TIME 24 DESEMBER 2022 PUKUL 17.00 WIB

LOKASI TERDAMPAK

16 KECAMATAN TERDAMPAK

180 DESA TERDAMPAK

- KEC. CIANJUR
- KEC. KARANG TENGAH
- KEC. WARUNG KONDANG
- KEC. CILAKU
- KEC. GEKBRONG
- KEC. CUGENANG
- KEC. CIBEBER
- KEC. SUKALUYU
- KEC. SUKARESMI
- KEC. PACET
- KEC. BOJONG PICUNG
- KEC. CIKALONG KULON
- KEC. MANDE
- KEC. CIPANAS
- KEC. HAURWANGI
- KEC. CIRANJANG



UPDATE SAMPAI TANGGAL 24/12/22 PUKUL 15.00 WIB
TERJADI 440 KALI GEMPA BUMI SUSULAN (BMKG)

KERUGIAN MATERIAL

- **56.548** RUMAH RUSAK
- **26.856** RUSAK RINGAN
- **16.059** RUSAK SEDANG
- **13.633** RUSAK BERAT

Hasil validasi sementara s/d 24/12/2022 Pukul 15.00 WIB

- **18** FASILITAS KESEHATAN RUSAK
- **281** TEMPAT IBADAH RUSAK
- **701** FASILITAS PENDIDIKAN RUSAK
- **18** KANTOR & GEDUNG RUSAK

KORBAN JIWA

602 JIWA MENINGGAL DUNIA

Lonjakan angka korban meninggal bukan merupakan korban baru. Melainkan hasil verifikasi terhadap data di lapangan

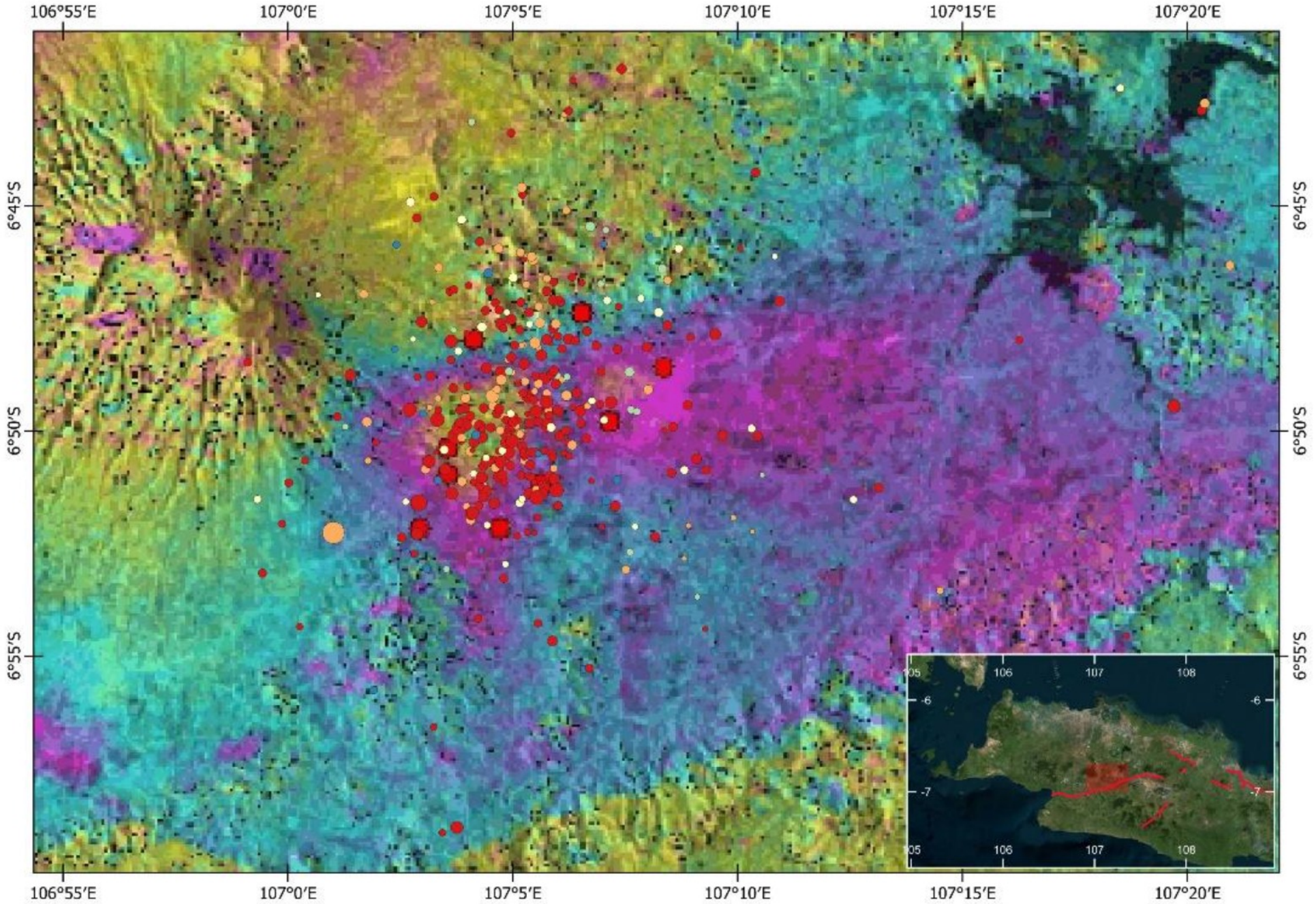
- **5** JIWA DALAM PENCARIAN
- **593** LUKA BERAT KUMULATIF
- **2** MASIHDIRAWAT DI RS CIANJUR
- **114.683** JIWA MENGUNGSI

DONASI

TERKUMPUL	Rp. 30.034.767.438,-
PENGELUARAN	Rp. 3.039.685.000,-
SALDO	Rp. 26.995.082.438,-

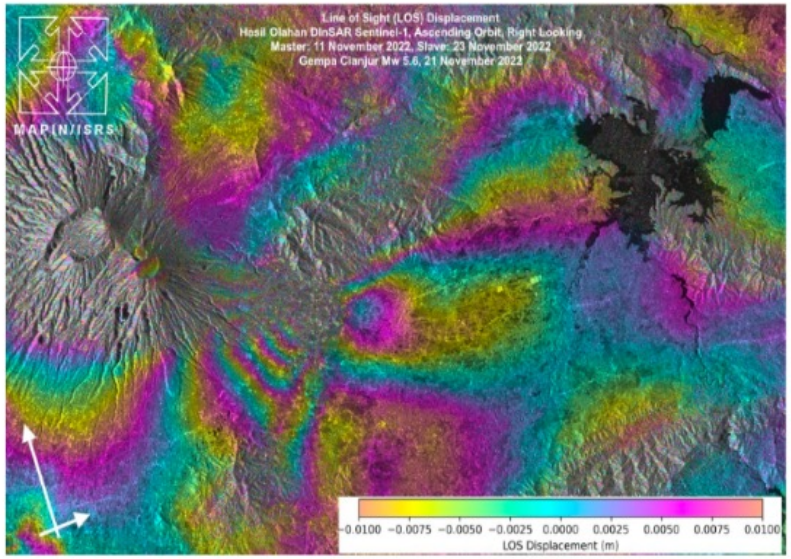
CALL CENTER
0821 2606 0291
0821 2606 0292
0821 2606 0293

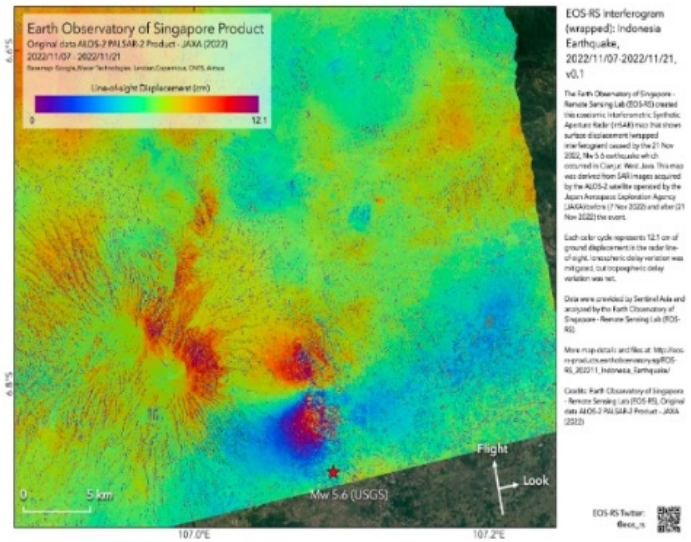
INSAR analysis using SENTINEL-1



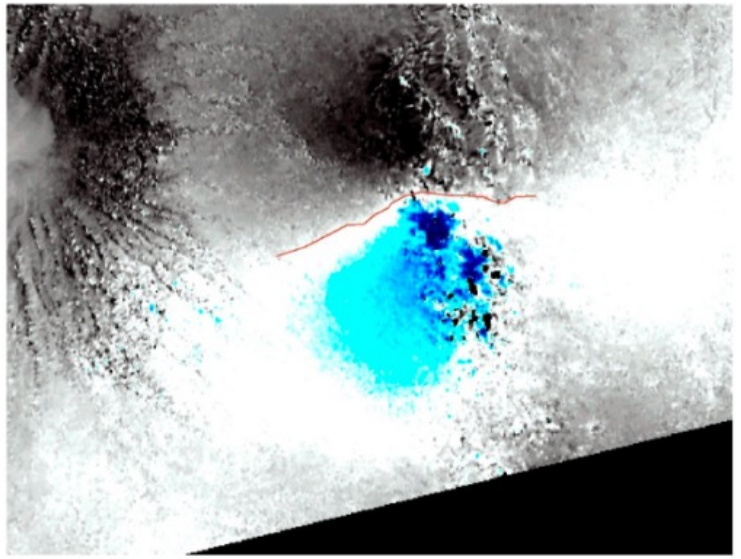
Source : Buku Gempa Cianjur

Deformation Assessment from ALOS-Palsar satellite





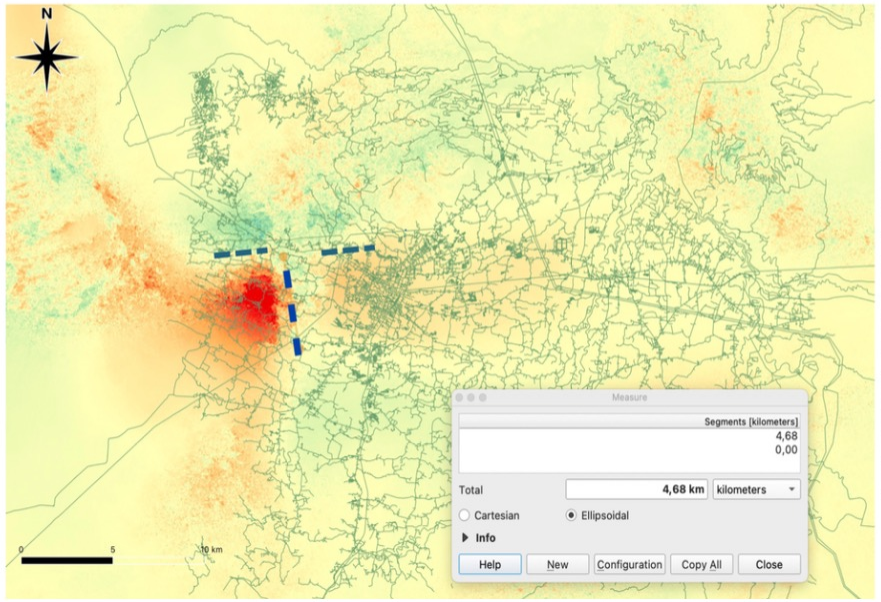
EOS-RS interferogram (wrapped): Indonesia Earthquake, 2022/11/07-2022/11/21, v0.1



Source buku gempa Cianjur

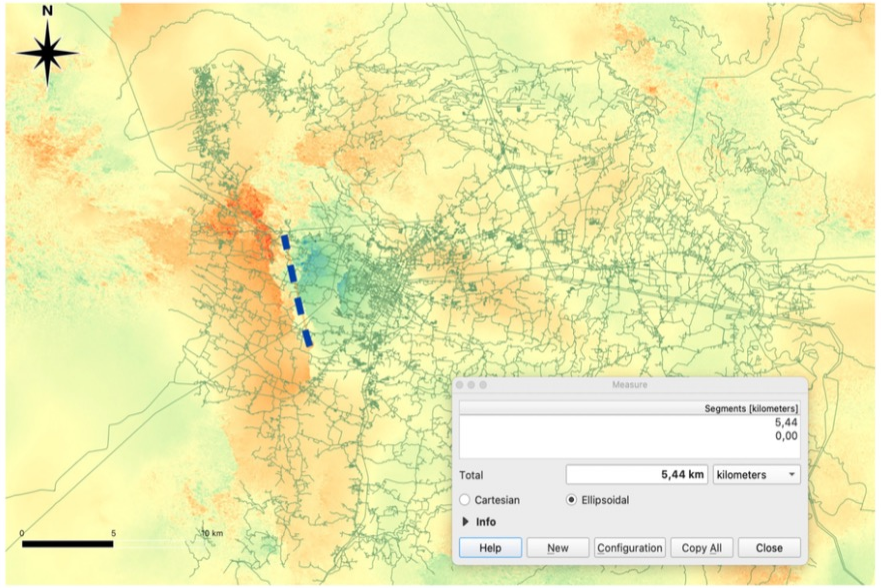
Fault interpretation using Alos Palsar

Interpretasi Patahan Orbit Ascending (11/11 – 23/11)



Line of Sight (LOS) displacement dikonversi ke format geotiff dan ditumpangsusunkan ke data jaringan jalan. Terlihat daerah yang warna merah dapat diinterpretasi mengalami deformasi uplift dengan nilai maksimum 5cm, dan daerah warna biru mengalami subsidence maksimum 2 cm, dengan indikasi patahan (garis biru putus-putus) sepanjang sekitar 4.68 km.

Interpretasi Patahan Orbit Descending (20/11 – 02/12)



Line of Sight (LOS) displacement dikonversi ke format geotiff dan ditumpangsusunkan ke data jaringan jalan. Terlihat daerah yang warna merah dapat diinterpretasi mengalami deformasi uplift dengan nilai maksimum 5 cm, dan daerah warna biru mengalami subsidence maksimum 4 cm, dengan indikasi patahan (garis biru putus-putus) sepanjang sekitar 5.44 km.

Source : Buku Gempa Cianjur

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Recommendation

1. Information about available data source for various disasters.
2. Accessible.
3. Data repository (data series).
4. High resolution data and availability (especially for emergency response).
5. Disaster Knowledge Management System. Data –Information – Knowledge – Policy - Action

Thank you very much