Disaster cases in Indonesia: Insights from 2024

Overview and key lessons from the Sentinel Asia Emergency Request

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Secretariat of Indonesian Space Agency (INASA)
National Research and Innovation Agency, Indonesia (BRIN)

Presented at JPTM 2024,Quezon City, 5 Nov 2024

Outline

1. Overview of National Disaster Statistics
2. Sentinel Asia's 2024 Emergency Observation in Indonesia"
3. Enhancing Disaster Management through Research and Innovation
4. Key Lessons and Insights

Indonesia Regional Support Office, UN-SPIDER

Dec 2006

The UN-SPIDER

Established

Feb 2013

The 15th RSO

Established in Indonesia (LAPAN)

Sep 2021

RSO Indonesia

INASA- BRIN Secretariat of National Space Agency, National Research and Innovation Agency

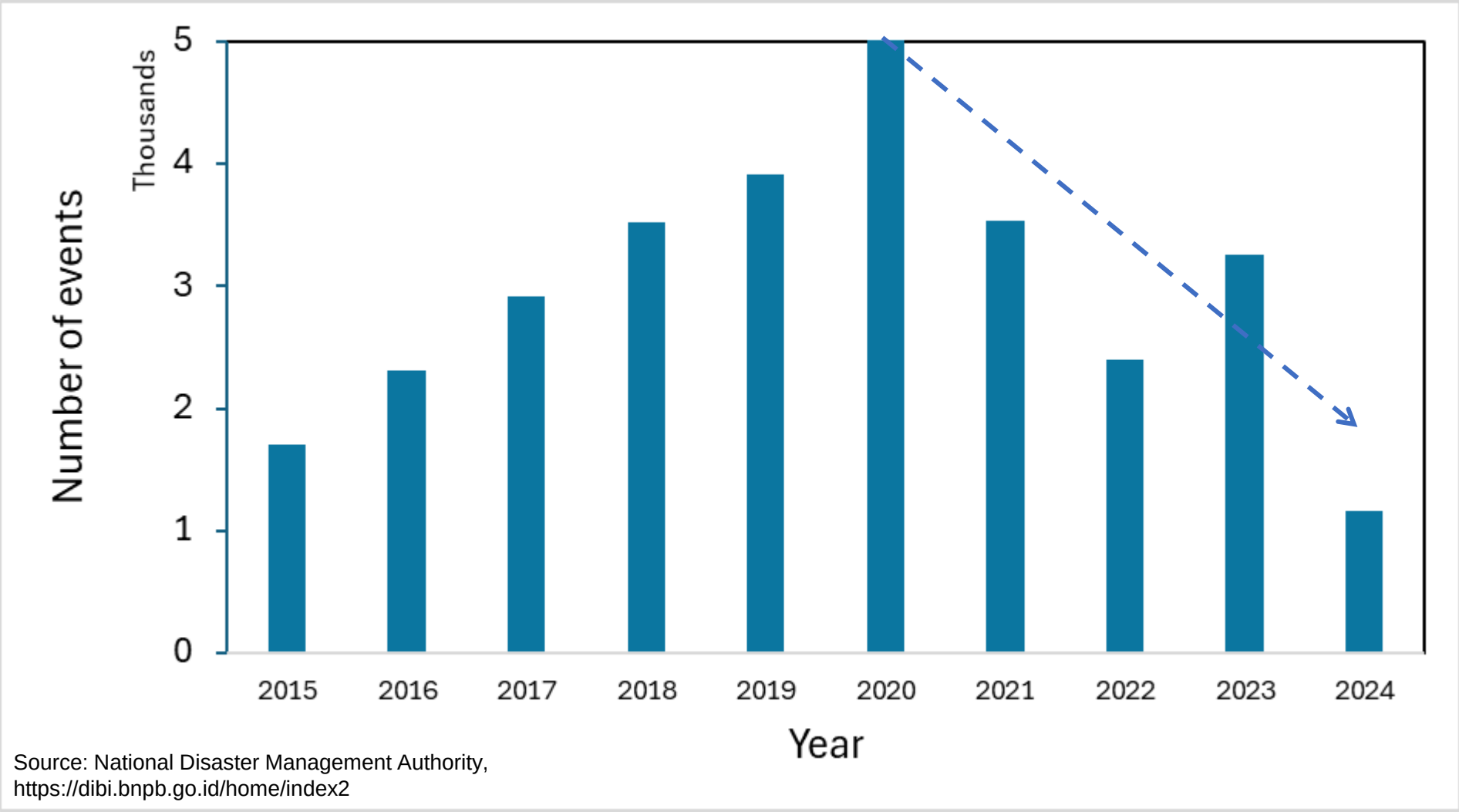
https://www.un-spider.org/network/regional-support-offices/indonesia-regional-support-office

UN-SPIDER= United Nations Platform for Space-based Information for Disaster Management and Emergency Response

Overview of National Disaster Statistics

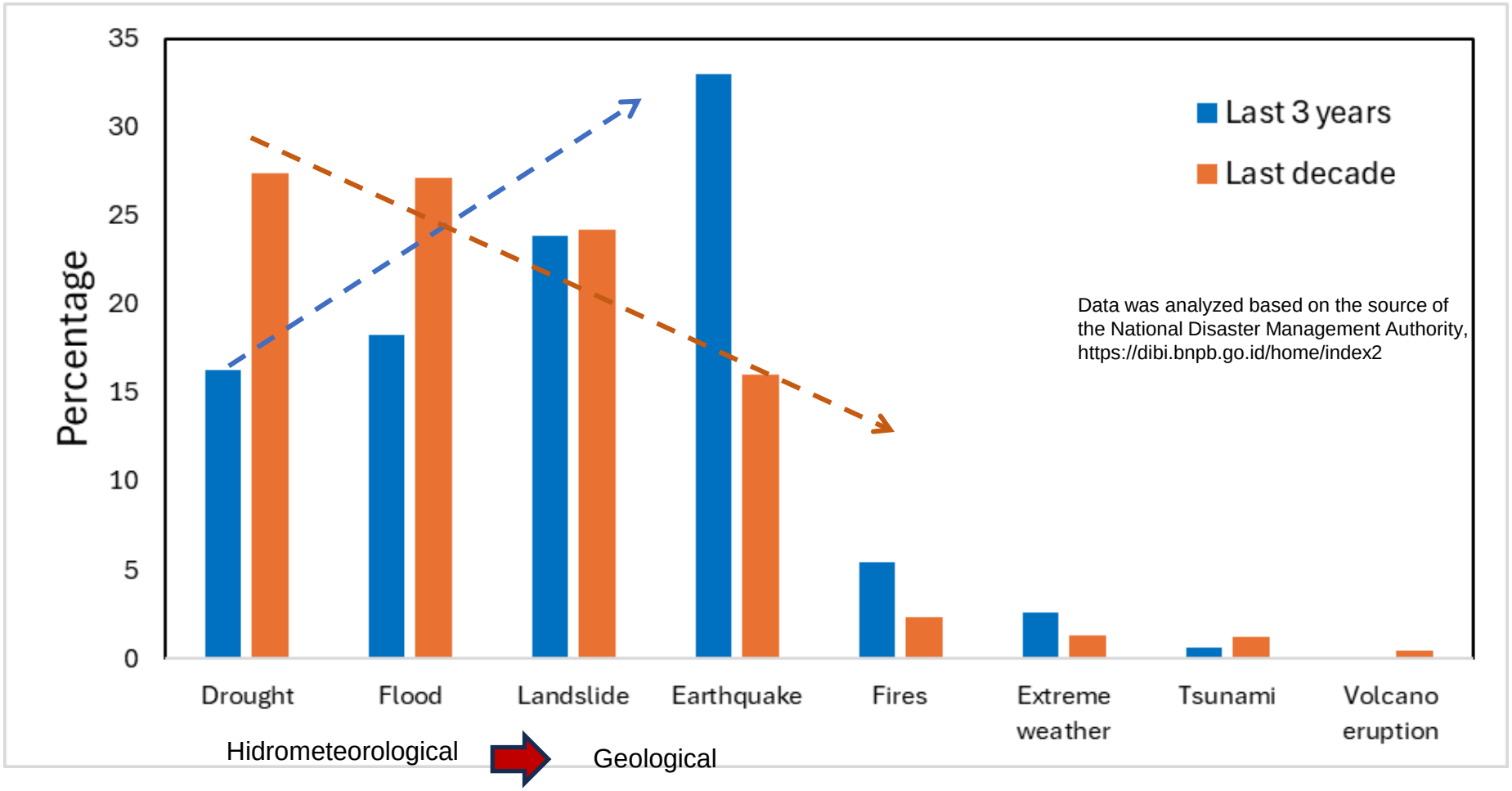
The last decade vs. three years ago

Number of disaster events since 2015



Source: National Disaster Management Authority, https://dibi.bnpb.go.id/home/index2

Main type of disasters in Indonesia

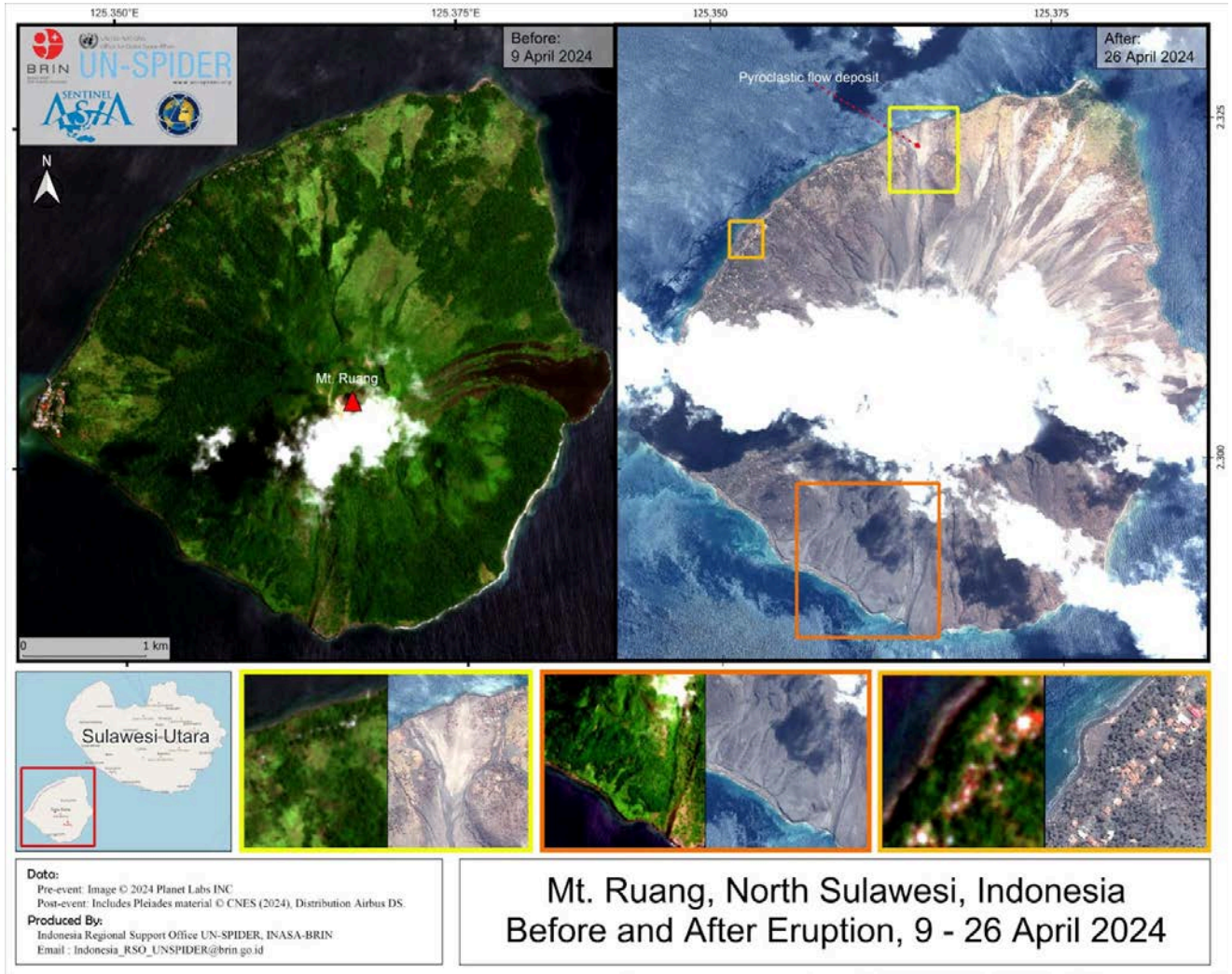


Sentinel Asia's 2024 Emergency Observation in Indonesia

Mainly focused on geological disasters

Three activations of the Disaster Charter with the Indonesian team as PM

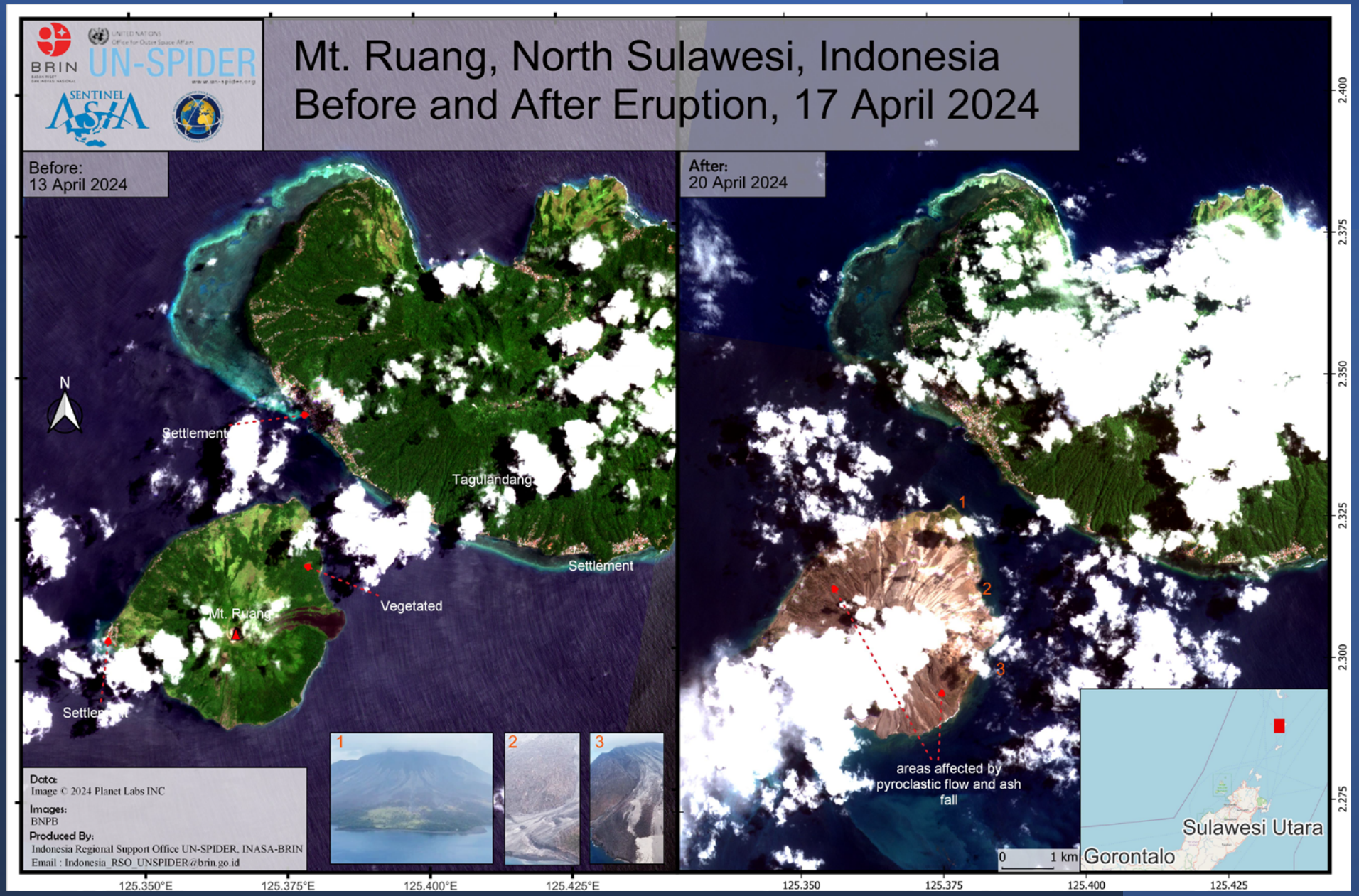
Appreciation to Sentinel Asia and its network



https://disasterscharter.org/web/guest/activations/-/article/volcano-in-indonesia-activation-873-

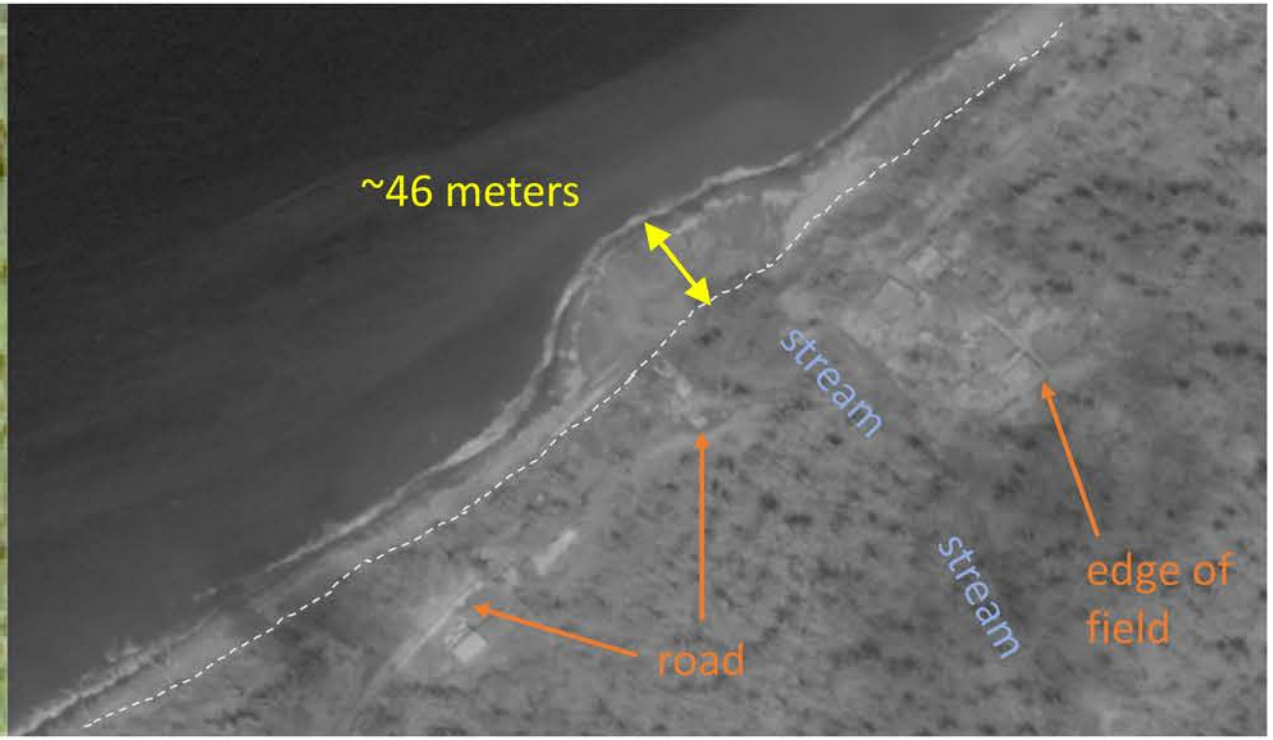
Location of Event:	Indonesia
Date of Charter Activation:	2024-04-19
Time of Charter Activation:	10:16
Time zone of Charter Activation:	UTC+09:00
Charter Requestor:	ADRC on behalf of National Research and Innovation Agency (BRIN)
Activation ID:	873
Project Management:	Virgilius Rivan Seran (National Research and Innovation Agency (BRIN))
Value Adding:	Julie Griswold (USGS) National Research and Innovation Agency (BRIN) National Agency for Disaster Countermeasure (BNPB) Shiro KAWAKITA (JAXA) Michael Budde (USGS)

- >800 villagers were displaced to another island
- Data sources: optical and radar images (PlanetScope, Pleiades, TerraSAR-X, BlackSky, ALOS PALSAR-2), Sentinel-1, and many more
- Multiple products generated through value-added processing (both Charter and Sentinel Asia)



https://disasterscharter.org/web/guest/activations/-/article/volcano-in-indonesia-activation-873-

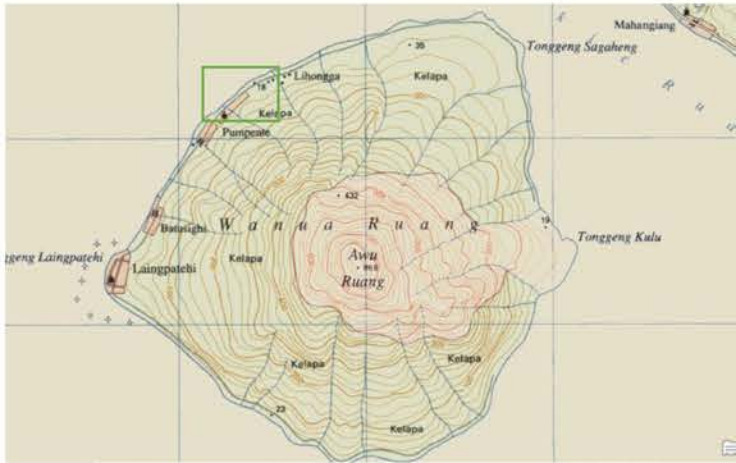
Conditions following the 16-17 April 2024 eruption of Gunung Ruang: new volcanic sediment deposition at mouth of streams



BEFORE
15 September 2022
WorldView-2

AFTER
20 April 2024
WorldView-1

Northwest side of Gunung Ruang, Sangihe Islands, Sulawesi, Indonesia

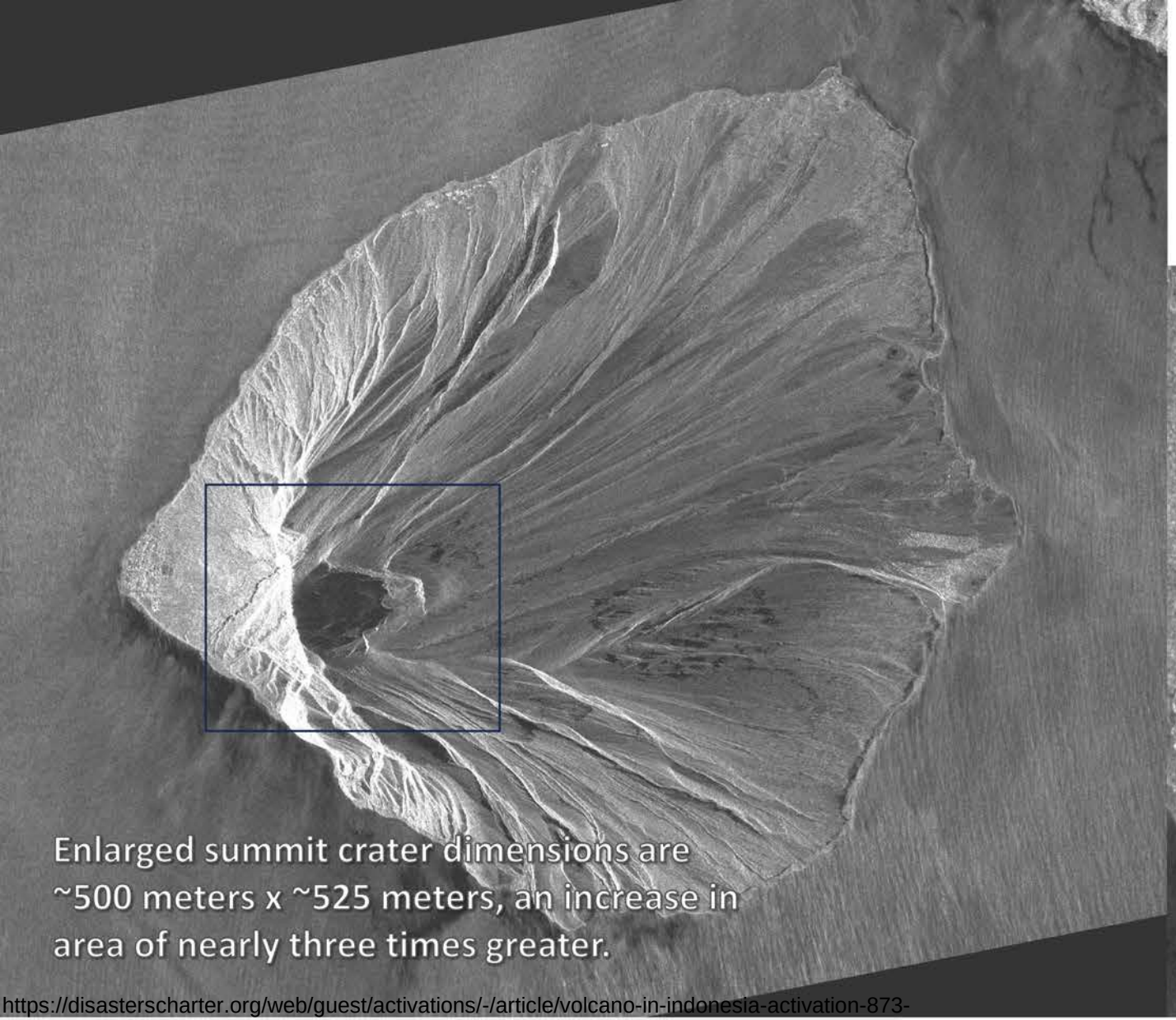


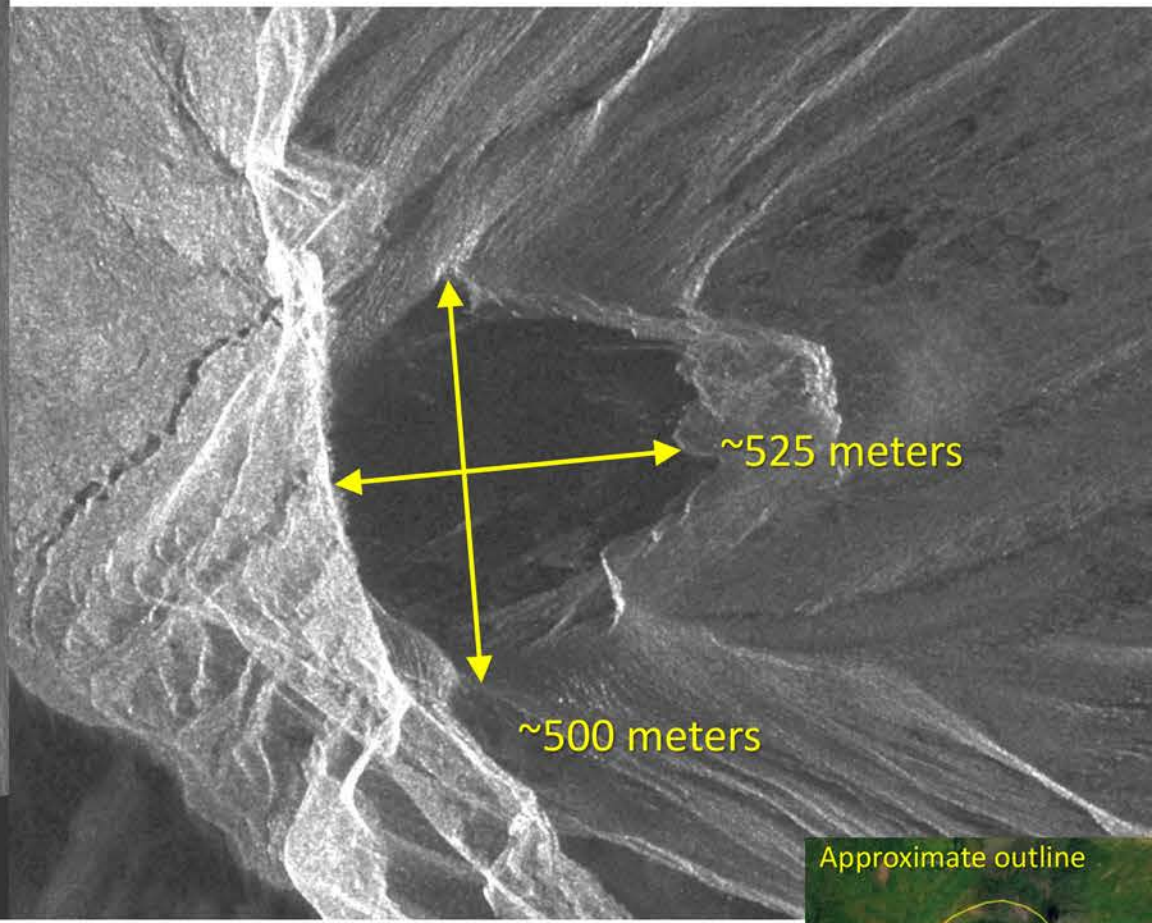
BUHIAS peta rupabumi 1991
Lembar 2418-24 1:50.000

https://disasterscharter.org/web/guest/activations/-/article/volcano-in-indonesia-activation-873-

20 April 2024
TerraSAR-X

Note: the summit crater exhibits extreme east-west "layover" of the volcanic crater rim due to the nature of the summit area structures, the high topography and SAR reflections.





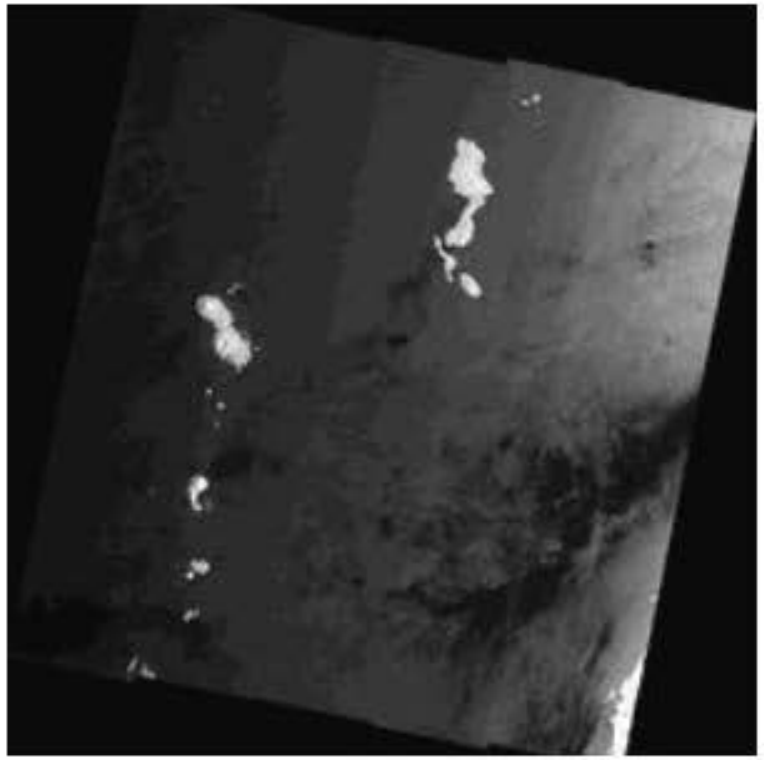
https://disasterscharter.org/web/guest/activations/-/article/volcano-in-indonesia-activation-873-

USAID FROM THE AMERICAN PEOPLE
VDAP Volcano Disaster Assistance Program
USGS science for a changing world
20 YEARS
DLR

After Disaster

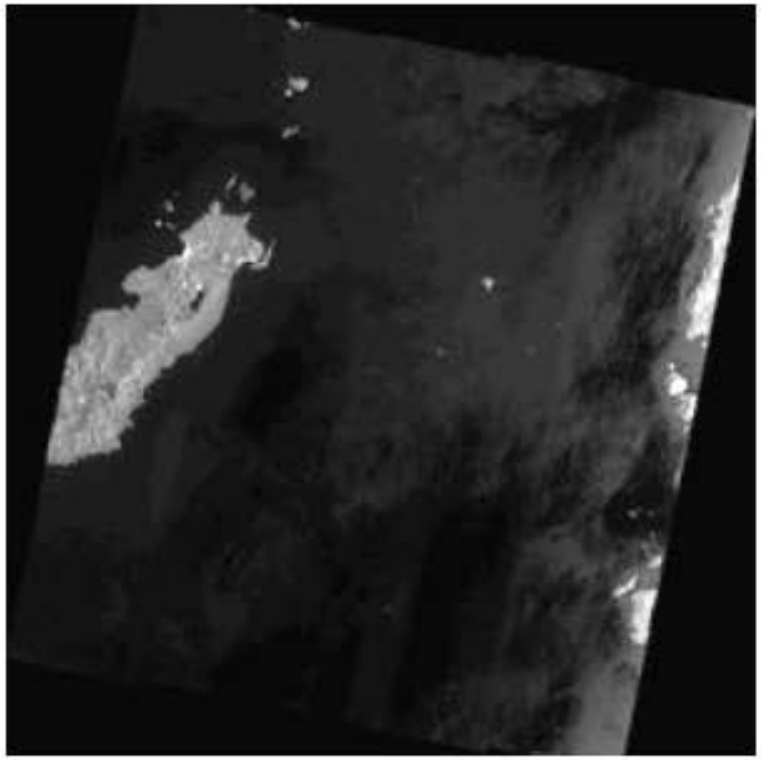
JAXA

https://sentinel-asia.org/EO/2024/article20240416ID.html



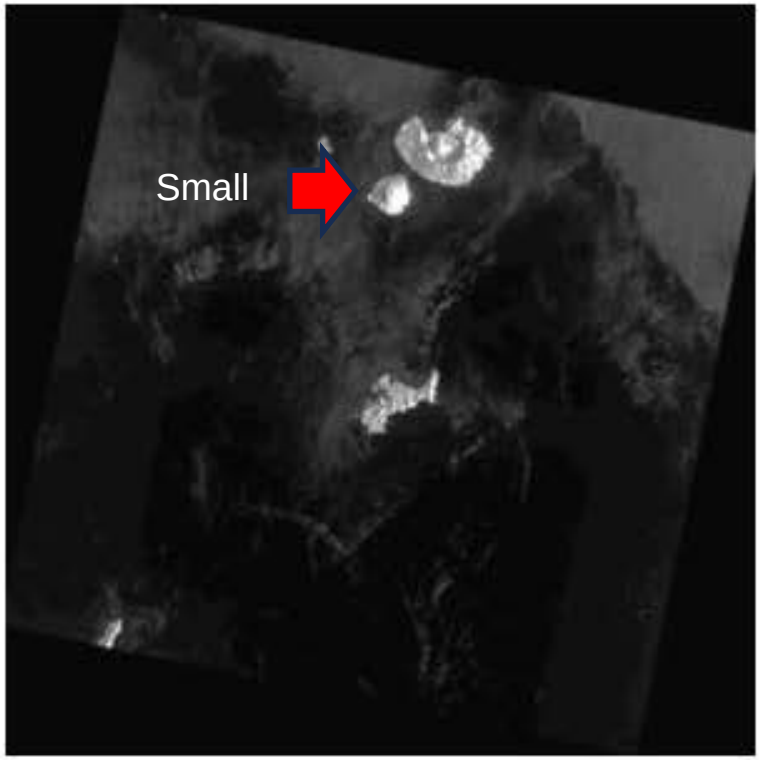
2024-04-17

ALOS-2 Level2.1
IMG HH ALOS2



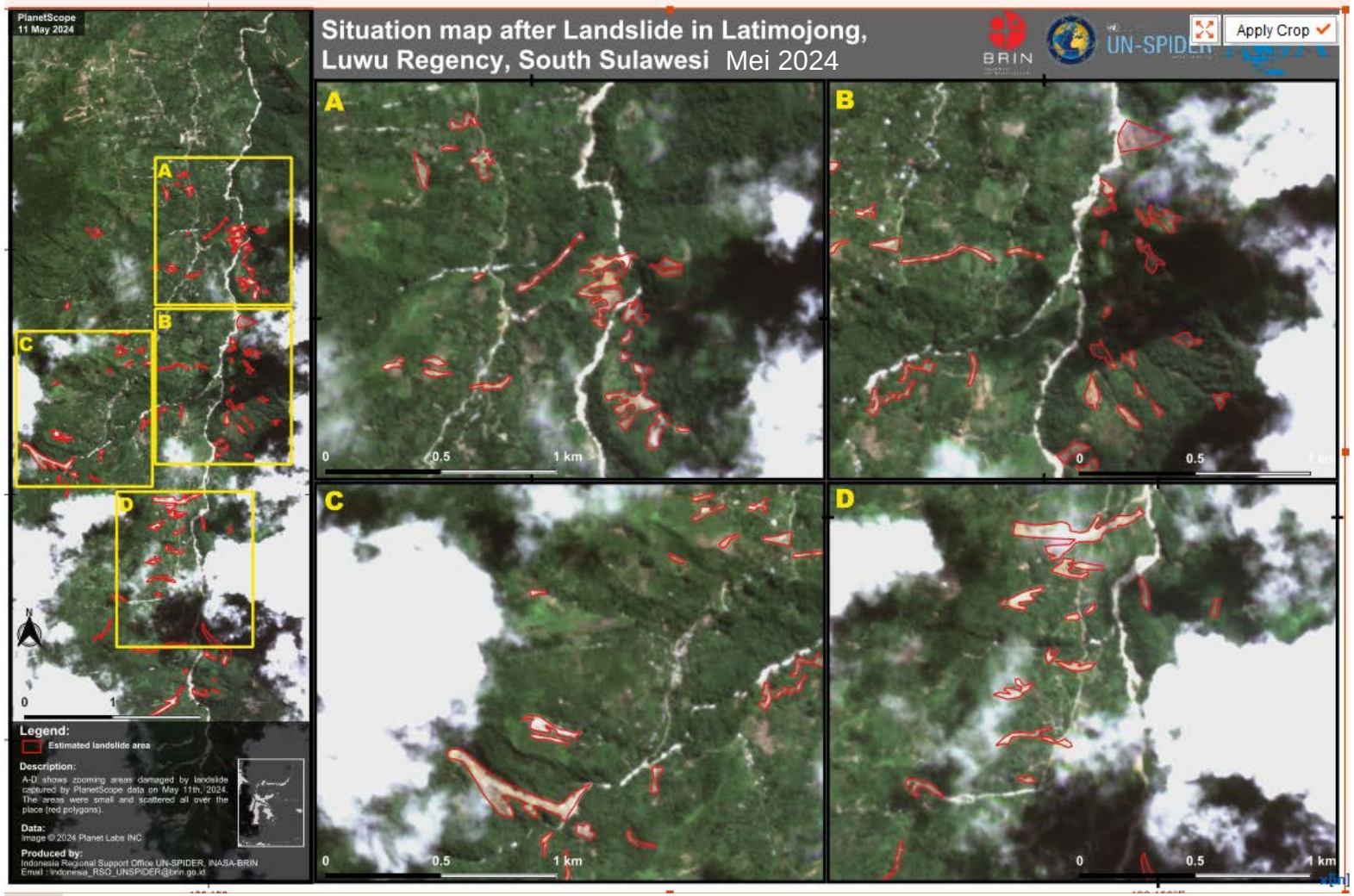
2024-04-17

ALOS-2 Level2.1
IMG HH ALOS2



2024-04-22

ALOS-2 Level2.1
IMG HH ALOS2

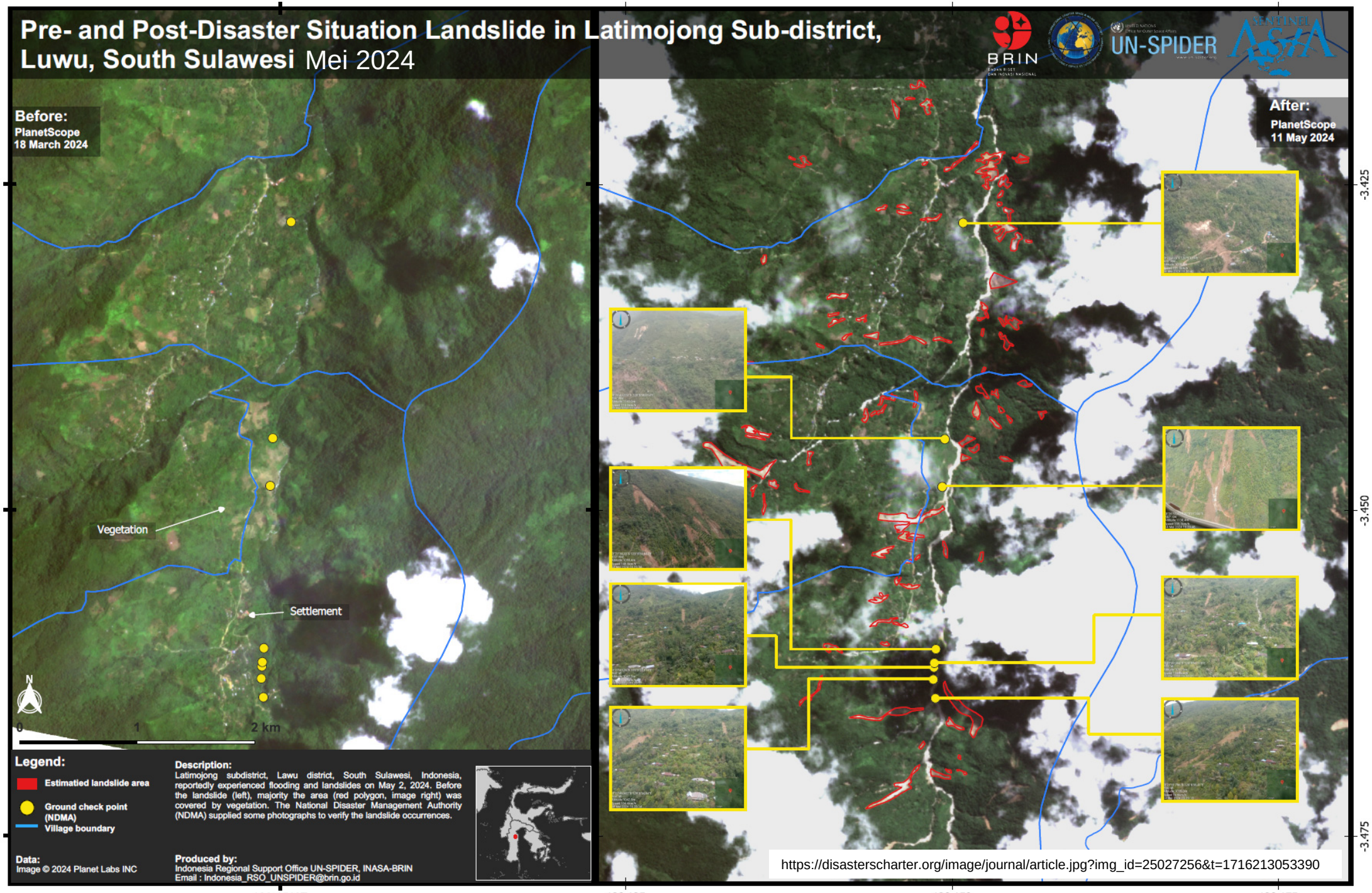


Type of Event:	Flood
Location of Event:	Indonesia
Date of Charter Activation:	2024-05-12
Time of Charter Activation:	19:51
Time zone of Charter Activation:	UTC+09:00
Charter Requestor:	ADRC on behalf of National Research and Innovation Agency (BRIN)
Activation ID:	877
Project Management:	Kholifatul Aziz (National Research and Innovation Agency (BRIN))
Value Adding:	Yenni Vetrita (National Research and Innovation Agency (BRIN))

- 14 people died
- Data: Planetscope
- ALOS PALSAR-2 data provided, but results were inconclusive due to small and scattered affected areas
- Few useful images available during this event

https://disasterscharter.org/web/guest/activations/-/article/flood-in-indonesia-activation-877-

Pre- and Post-Disaster Situation Landslide in Latimojong Sub-district, Luwu, South Sulawesi Mei 2024



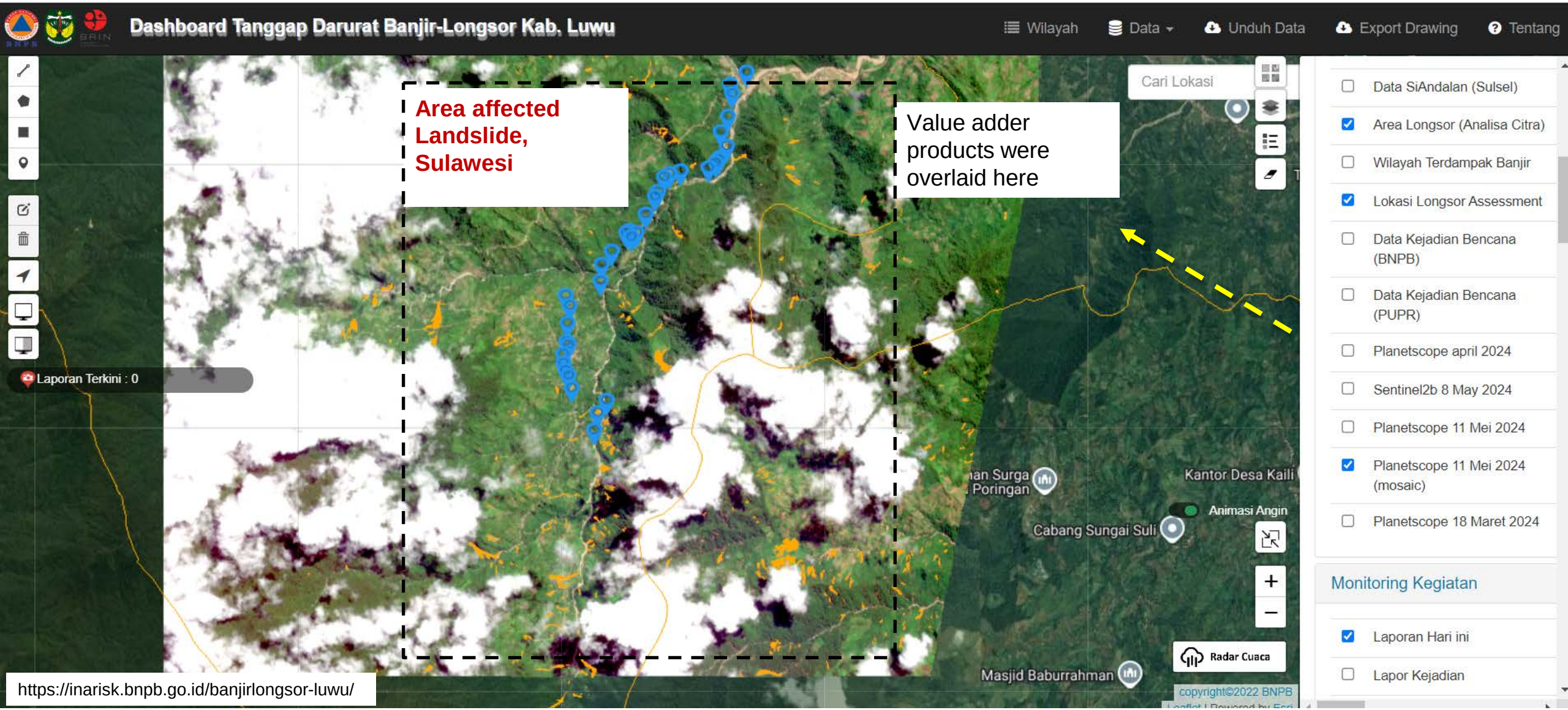
Legend:

- Estimatied landslide area
- Ground check point (NDMA)
- Village boundary

Description:
Latimojong subdistrict, Lawu district, South Sulawesi, Indonesia, reportedly experienced flooding and landslides on May 2, 2024. Before the landslide (left), majority the area (red polygon, image right) was covered by vegetation. The National Disaster Management Authority (NDMA) supplied some photographs to verify the landslide occurrences.

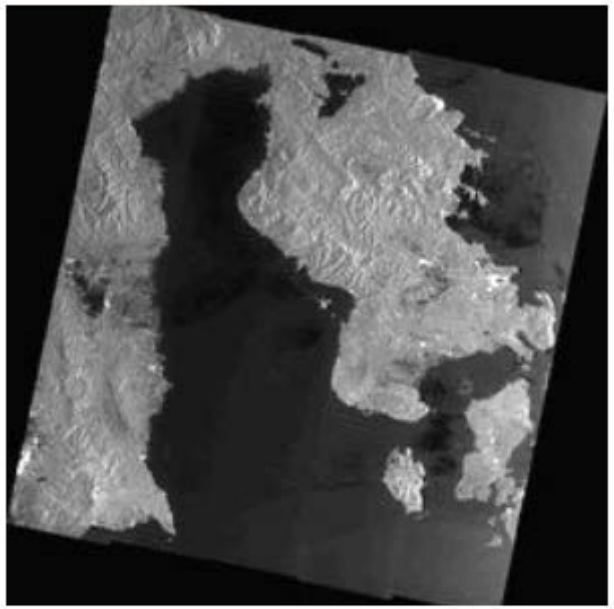
Data:
Image © 2024 Planet Labs INC

Produced by:
Indonesia Regional Support Office UN-SPIDER, INASA-BRIN
Email : Indonesia_RSO_UNSPIDER@brin.go.id



InaRISK: A risk assessment portal utilizing GIS Server as a data service (National Disaster Management Authority)

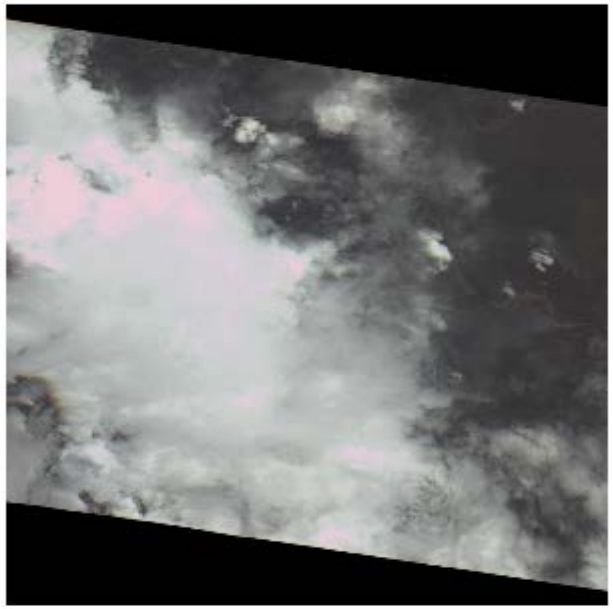
JAXA



2024-05-11

ALOS-2 Level2.1
IMG HH ALOS2
53820/3700 2024/05/11
WBD R 2.1 GUD

TASA

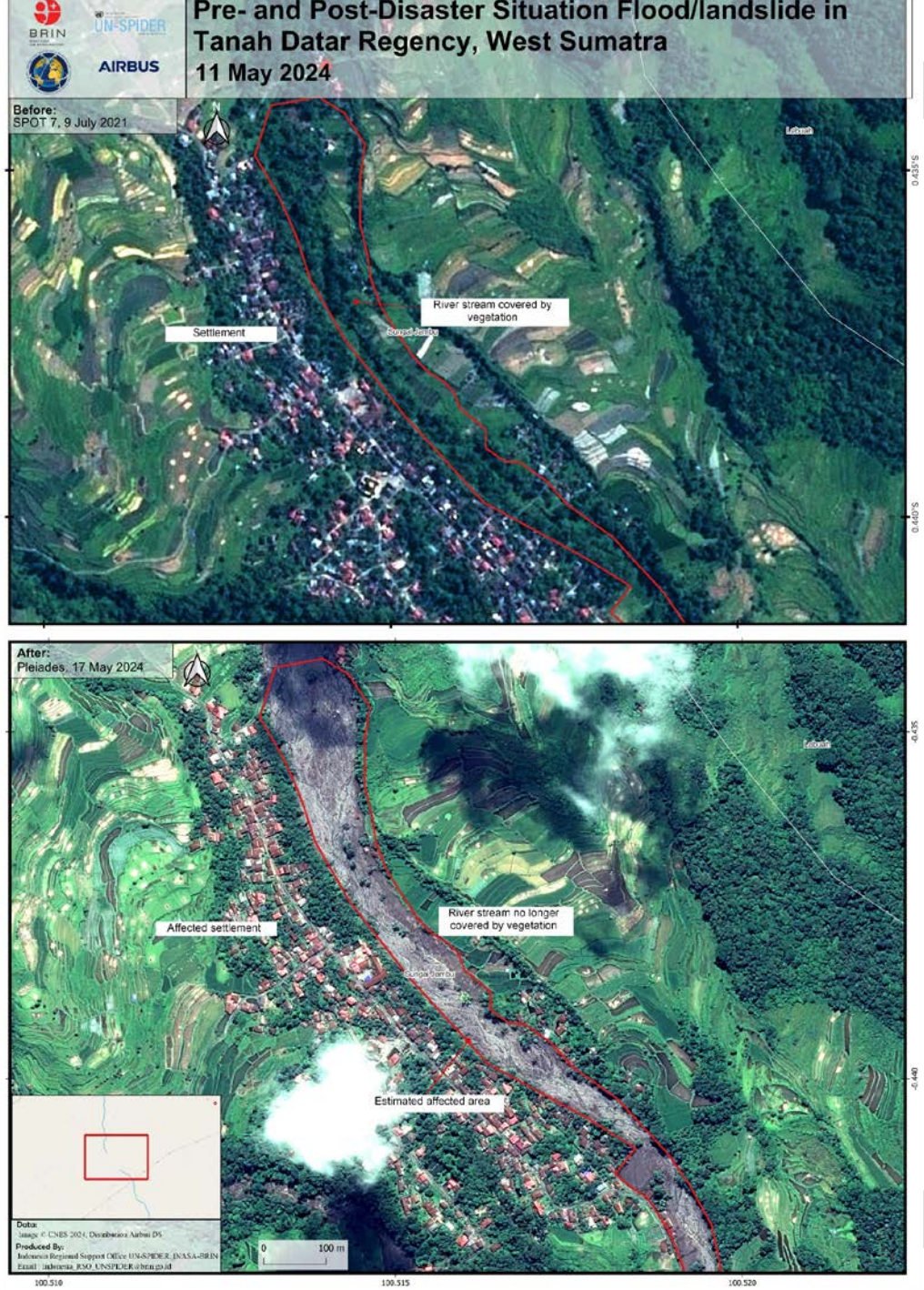


2024-05-19

FORMOSAT-5 Level4
FS5 G000 PMS L4UTM
2024/05/19 03:03:15

- ALOS PALSAR-2 data provided, but results were inconclusive due to small and scattered affected areas
- Few useful images available during this event

https://sentinel-asia.org/EO/2024/article20240502ID.html



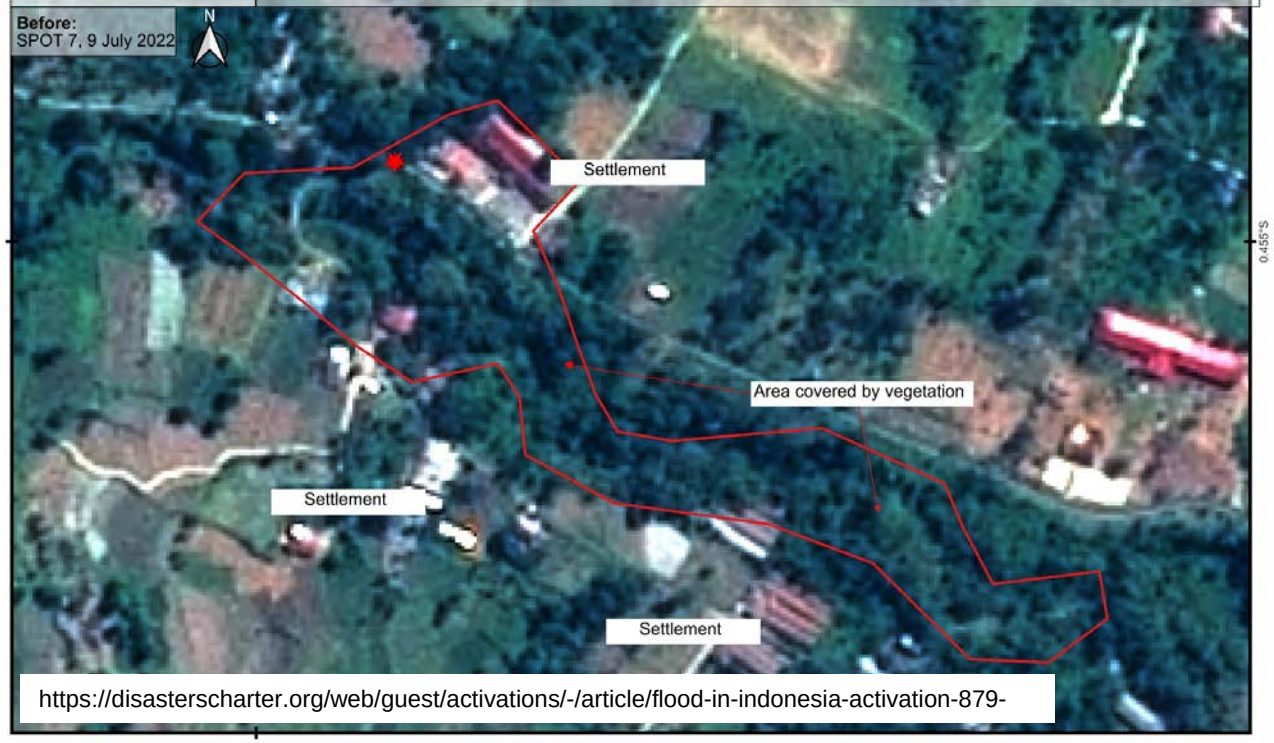
Type of Event:	Floods
Location of Event:	Sumatra
Date of Charter Activation:	2024-05-14
Time of Charter Activation:	00:42
Time zone of Charter Activation:	UTC+09:00
Charter Requestor:	ADRC on behalf of National Research and Innovation Agency (BRIN)
Activation ID:	879
Project Management:	Anjar Ilham Pambudi (National Research and Innovation Agency (BRIN))
Value Adding:	National Research and Innovation Agency Indonesia (BRIN) Jakrapong Tawala (UNITAR)

- >37 people died
- Data: Planetscope dan Pleiades, SPOT 7,
- ALOS Palsar 2 was used but the results was not conclusive

BRIN UN-SPIDER AIRBUS

Pre- and Post-Disaster Situation Flood/landslide in Tanah Datar Regency, West Sumatra

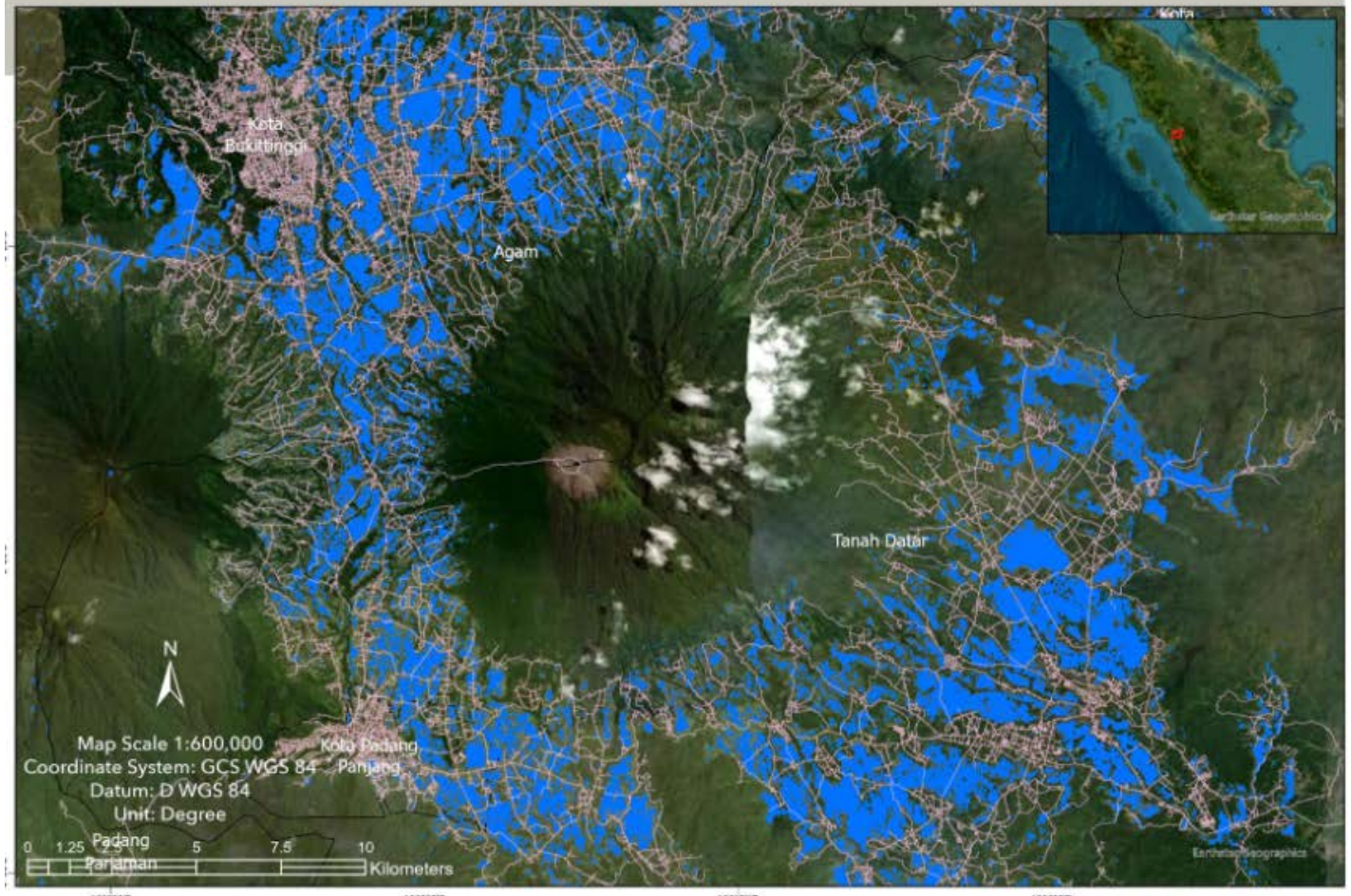
11 May 2024



https://disasterscharter.org/web/guest/activations/-/article/flood-in-indonesia-activation-879-

DETECTED SURFACE WATER IN WEST SUMATRA, INDONESIA

As observed by ALOS-2 image on 15 May 2024



This map shows the detected surface water areas in Agam, Tanah Datar and Padang Pariaman Districts, of West Sumatra, Indonesia on May 15, 2024. The surface water may include inundated water in agriculture area. A heavy rainfall has also caused flash flood in the area.

50
NUMBER OF DEATHS

23
INJURED PEOPLE

3396
DISPLACED PEOPLE

Source: ReliefWeb (OCHA), 15/05/2024

Detected Surface Water

District Boundary

Road

Satellite Image:

Post-disaster : ALOS-2 PALSAR-2, 15 May 2024

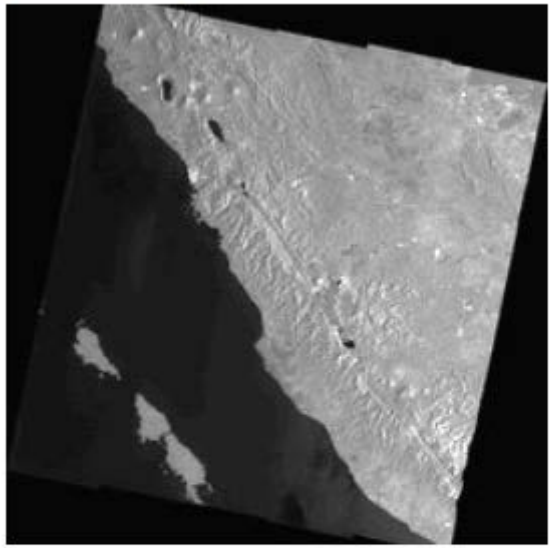
GIS Data:

Road © OSM (2024)
Administrative Boundary © Humanitarian Data Exchange (2024)

Map product made by GIC-AIT (v1.0).

Disclaimer: The accuracy of this product is not validated.

JAXA



2024-04-17

ALOS-2 Level2.1
IMG HH ALOS2
53466/3650 2024/04/17
WBD R 2.1 GUD

https://sentinel-asia.org/EO/2024/article20240511ID.html

Enhancing Disaster Management through Research and Innovation

Land/forest fires

Land subsidence

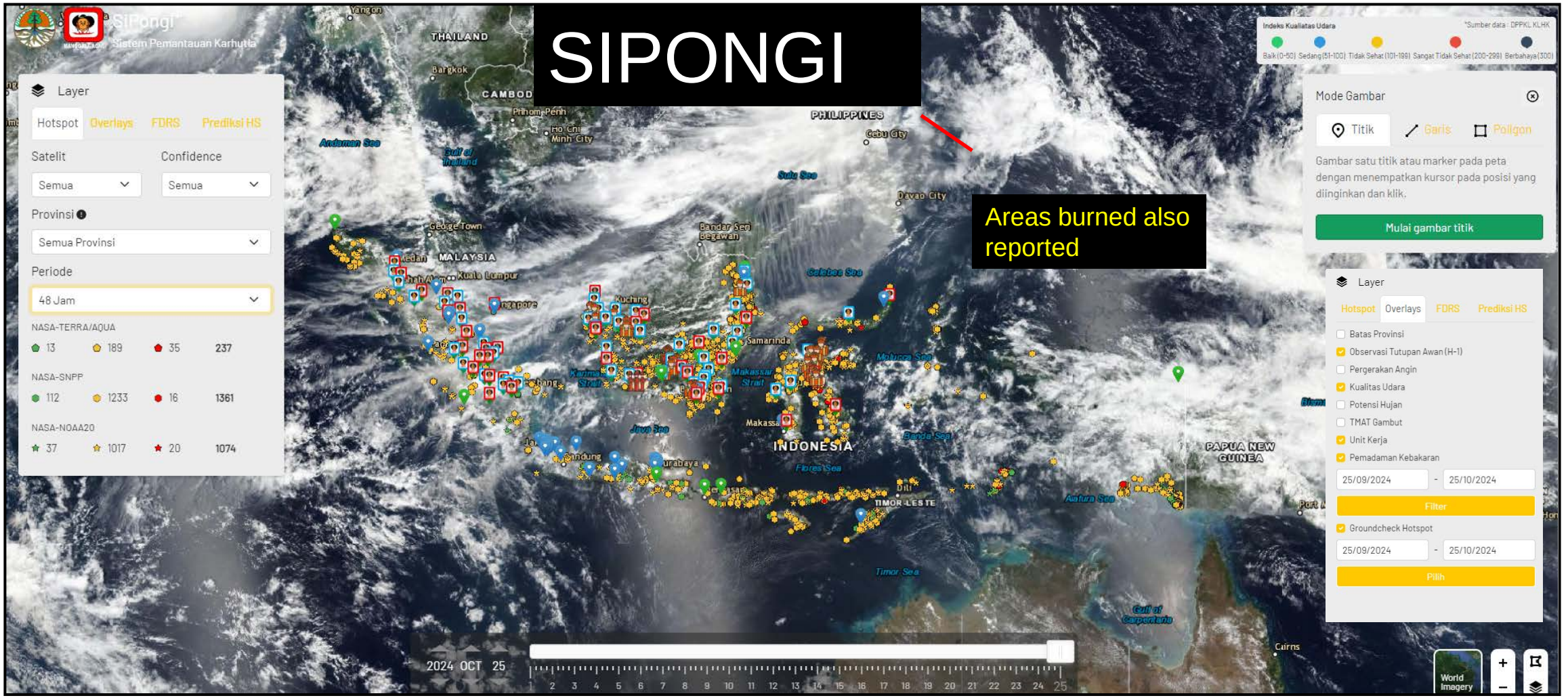
Indonesia effort on mitigating fires

INTERNATIONAL JOURNAL OF REMOTE SENSING
https://doi.org/10.1080/01431161.2024.2421942

Monthly mapping of Indonesia's burned areas: implementation, history, techniques, and future directions

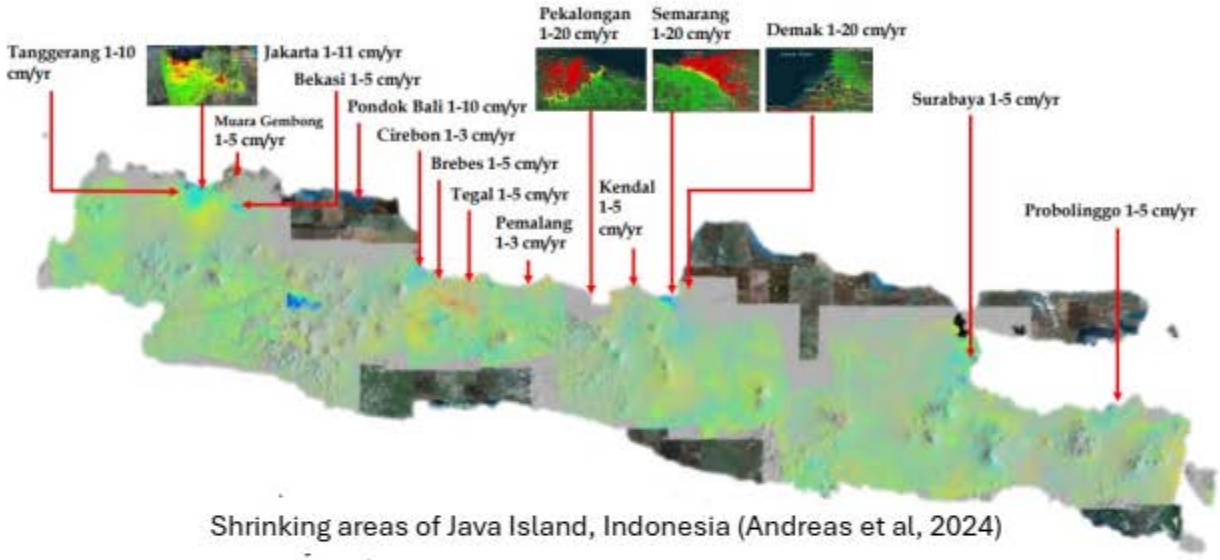
Yenni Vetrita[a], Israr Albar[b], Imam Santoso[a], Indah Prasasti[a], Tatik Kartika[a], Ahmad Basyiruddin Usman[b], Anna Tosiani[b], Deny Haryanto[b], Endrawati[b], Eva Famurianty[b], Kurnia Ulfa[a] and Judin Purwanto[b]

[a]The National Research and Innovation Agency (BRIN), Cibinong, Jawa Barat, Indonesia; [b]The Ministry of Environment and Forestry (MoEF), Jakarta, Indonesia

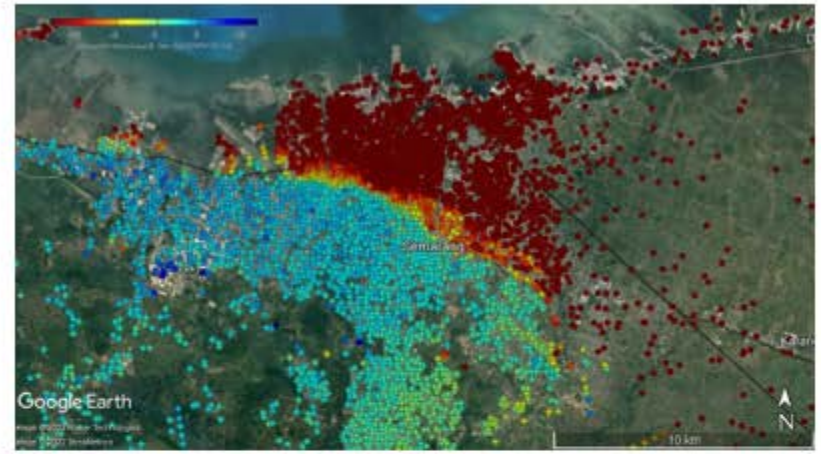


- A system developed by the Ministry of Environment and Forestry of Indonesia to monitor forest and land fires across the country providing information on hotspots detected by satellites, fire incidents, affected areas, and fire control efforts.

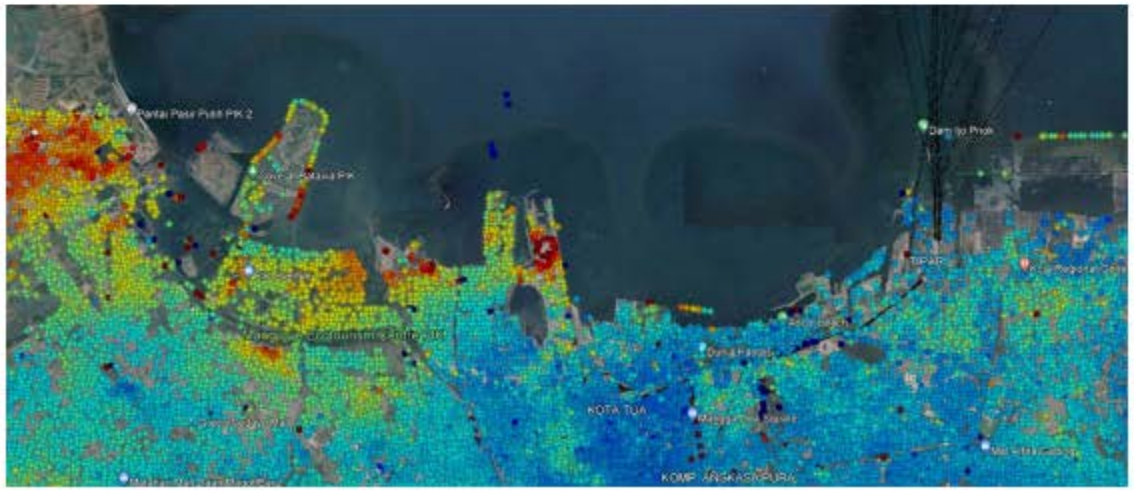
Land Subsidence Monitoring in Indonesia Using Remote Sensing Application



Shrinking areas of Java Island, Indonesia (Andreas et al, 2024)



Shrinking areas of Semarang and Demak based on PS-InSAR analysis using ALOS-2 PALSA-2 Data by JAXA, Japan is shown in red & yellow color (Widodo, 2024)



Shrinking areas of Jakarta are shown in red & yellow color (Widodo, 2024)

Muara Baru Jakarta 2.4 meters under the sea level (Widodo, 2024)

Key Lessons and Insights

1. PM Charter training has strengthened our team's capacity to lead during national disasters
2. Additional training needed to optimize the use of Charter Mapper
3. Increased data availability:
   - Some datasets are useful
   - Some are limited due to disaster impact size or sensor limitations
4. Close collaboration with stakeholders is critical to maximize the utility of space-based datasets during QR
5. Research and innovation needed to map and analyze space-based information for disaster response, early warning, and risk reduction
6. Emphasis on knowledge sharing and open collaboration among Asia-Pacific countries

Contact

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