

# Value of Satellite Data from Sentinel Asia in Supporting Disaster Response Activities in the Philippines

*Presentation on good practices of Sentinel Asia or expectations of Sentinel Asia*

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Philippine Space Agency

# Presentation Outline

1. Sentinel Asia by the numbers
2. PhilSA Sentinel Asia Activation Workflow
  1. Typhoon/Flooding
  2. Earthquake/Volcanic eruption/Oil spill
3. Sentinel Asia activations 2024 to 2025
  1. Data Analysis Node
  2. Data Provider Node
4. Challenges, Lessons Learned, Feedback, and Ways Forward

# Sentinel Asia

## By the numbers:

**20**

**ACTIVATIONS**  
2024 to December 2025



Philippine Space Agency (PhilSA)



Department of Science and Technology - Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)



Department of Science and Technology - Philippine Institute of Volcanology and Seismology (PHIVOLCS)



Department of Environment and Natural Resources - Mines and Geosciences Bureau (MGB)

**16**

**FLOOD,  
LANDSLIDE,  
STORM**

**2**

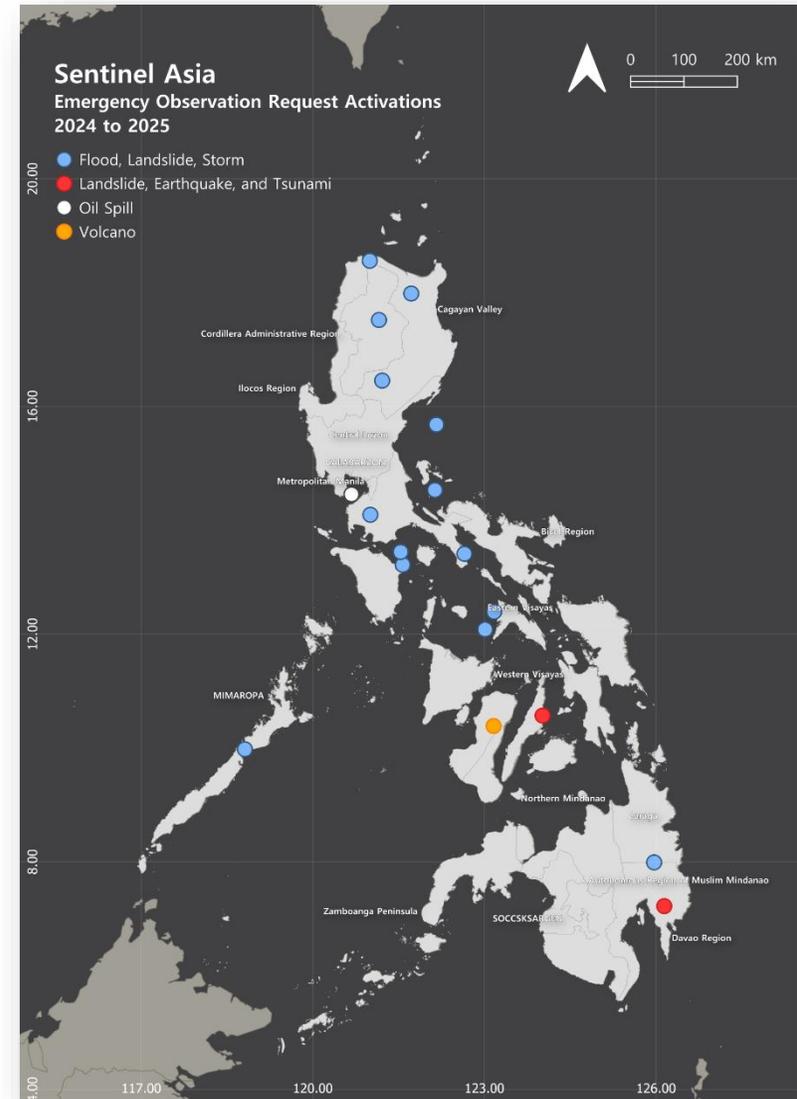
**LANDSLIDE,  
EARTHQUAKE,  
TSUNAMI**

**1**

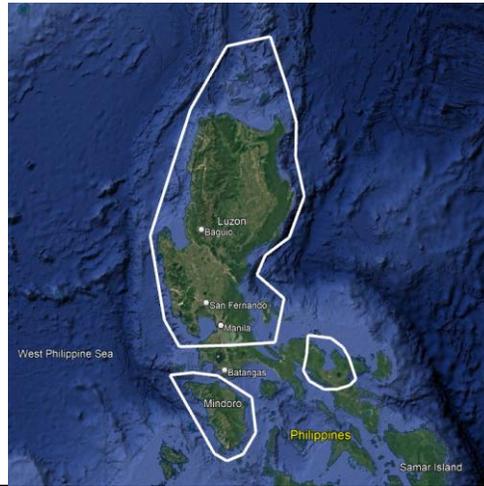
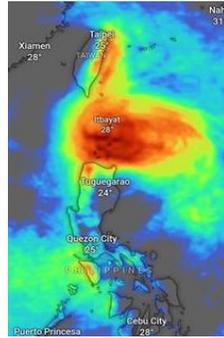
**OIL SPILL**

**1**

**VOLCANO**



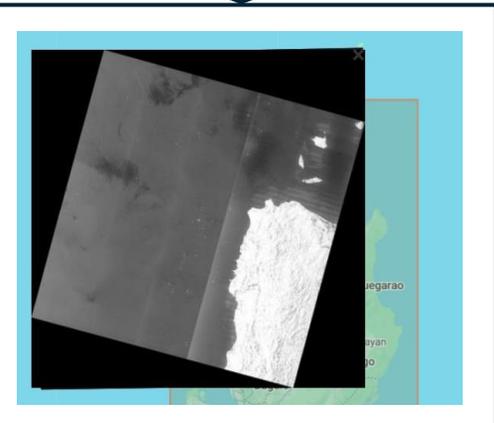
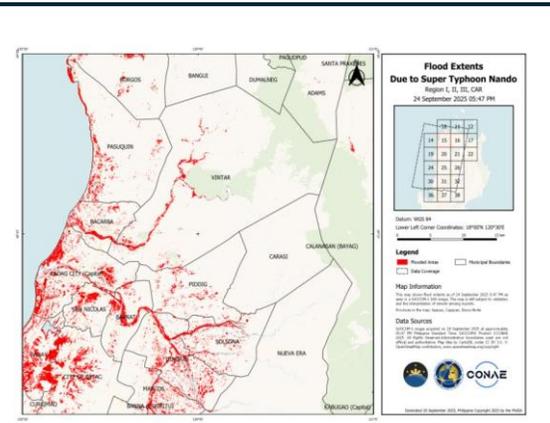
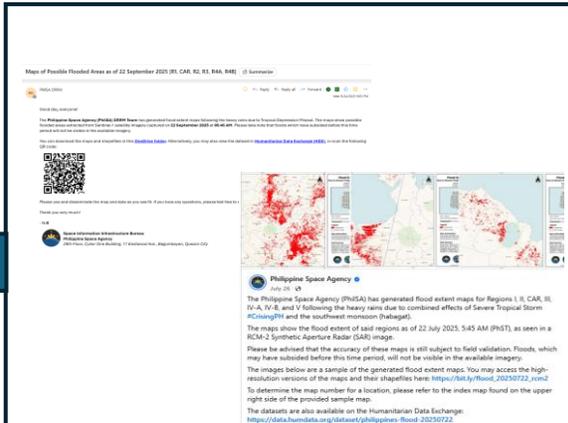
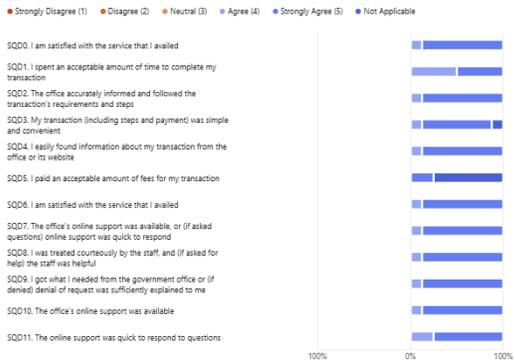
# Activation Workflow (Typhoon/Flooding)



**1.) Information Gathering (T minus 1-2 days)**

**2.) AOI Generation (T minus 1 day)**

**3.) Sentinel Asia Activation (T minus 1 day)**



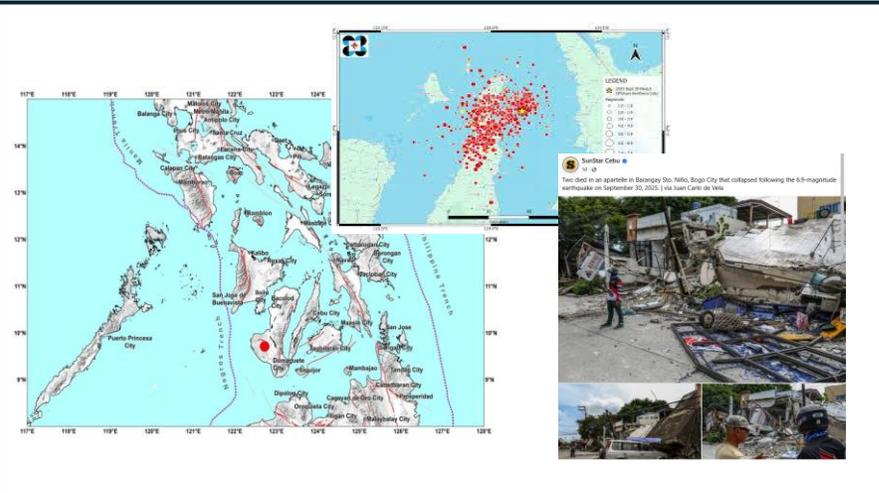
**7.) Feedback (T plus 1 month)**

**6.) Data Distribution (T plus 1-3 days ++)**

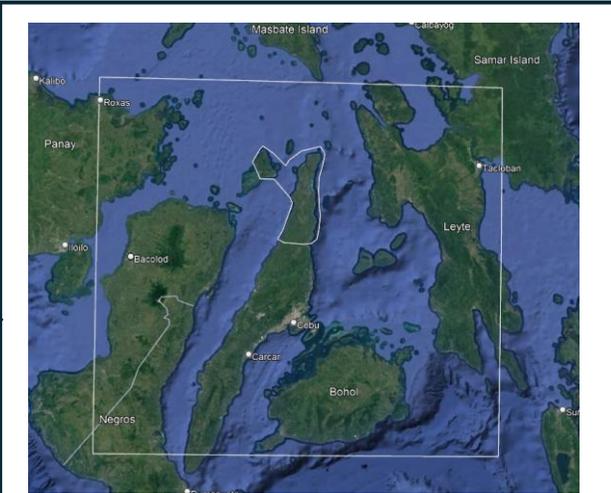
**5.) Map Generation (T plus 1-3 days ++)**

**4.) Data Download (T plus 0-2 days++)**

# Activation Workflow (Earthquake/Volcanic eruption/Oil spill)



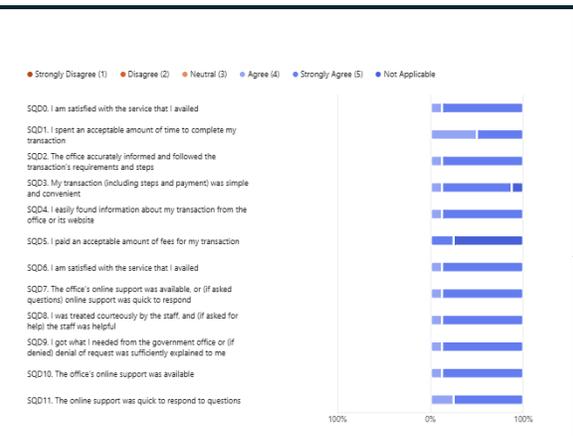
**1.) Information Gathering**  
(T plus 0-1 day)



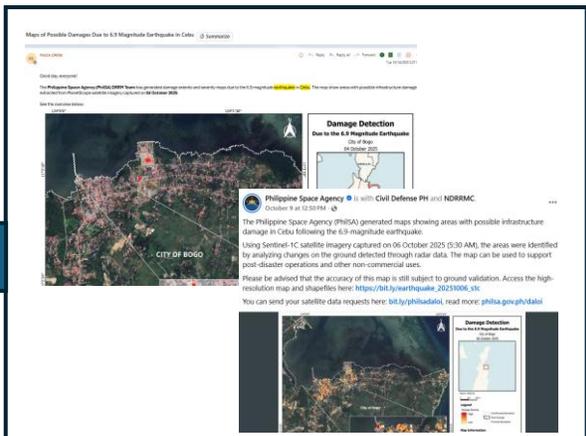
**2.) AOI Generation**  
(T plus 0-1 day)



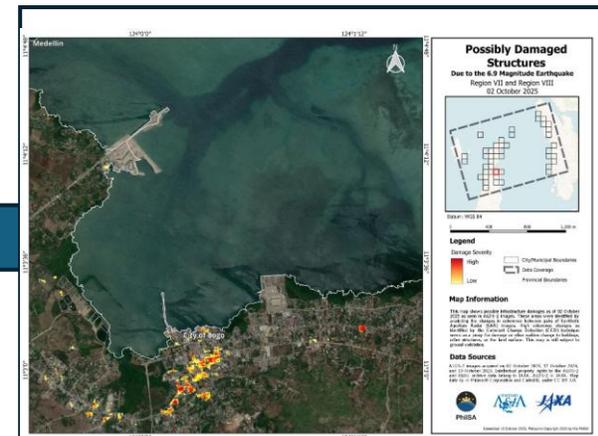
**3.) Sentinel Asia Activation**  
(T plus 0-1 day)



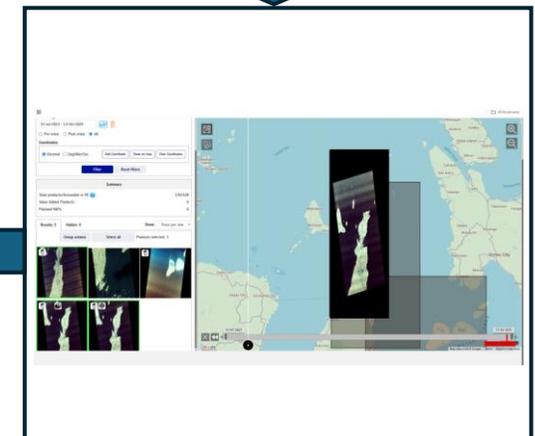
**7.) Feedback**  
(T plus 1 month)



**6.) Data Distribution**  
(T plus 3 days ++)

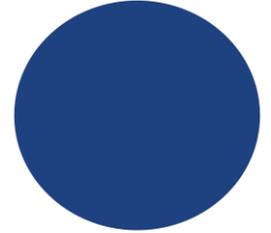
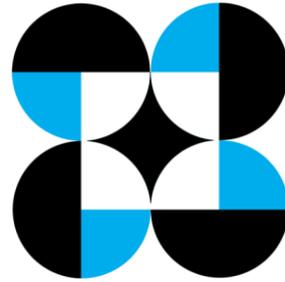


**5.) Map Generation**  
(T plus 3 days ++)



**4.) Data Download**  
(T plus 2 days ++)

# Data End Users



Department of Social Welfare and Development

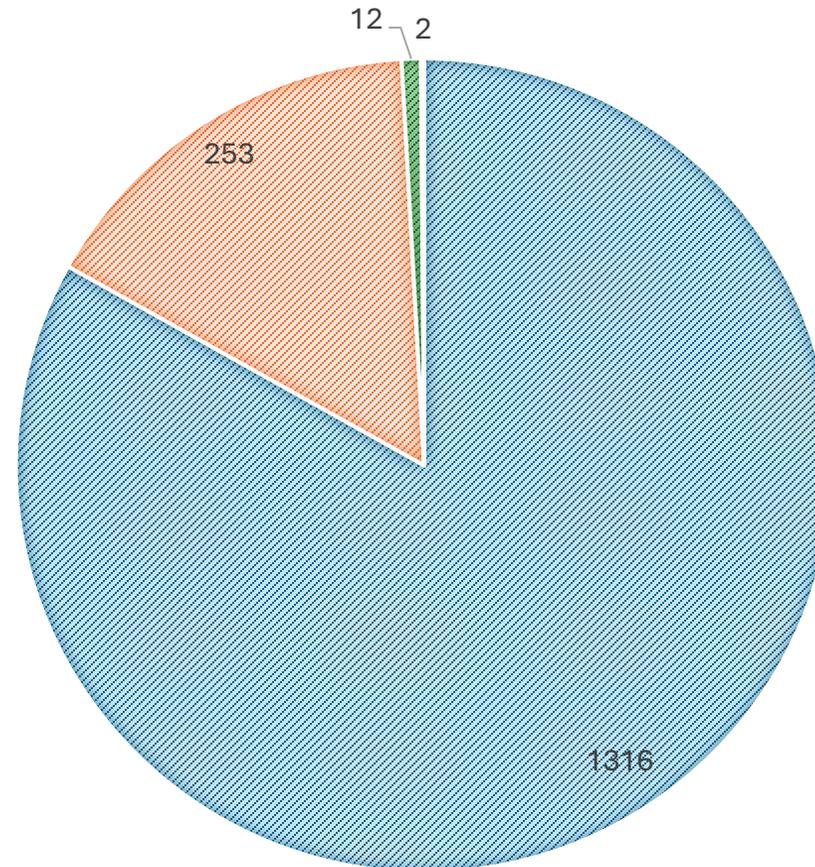


# Processing and Distribution of Disaster Maps

In 2025, PhilSA has generated...

## DRR MAPS PRODUCED IN 2025

Flood Damage Proxy Fires Landslides



# 1,583

Maps produced for various applications

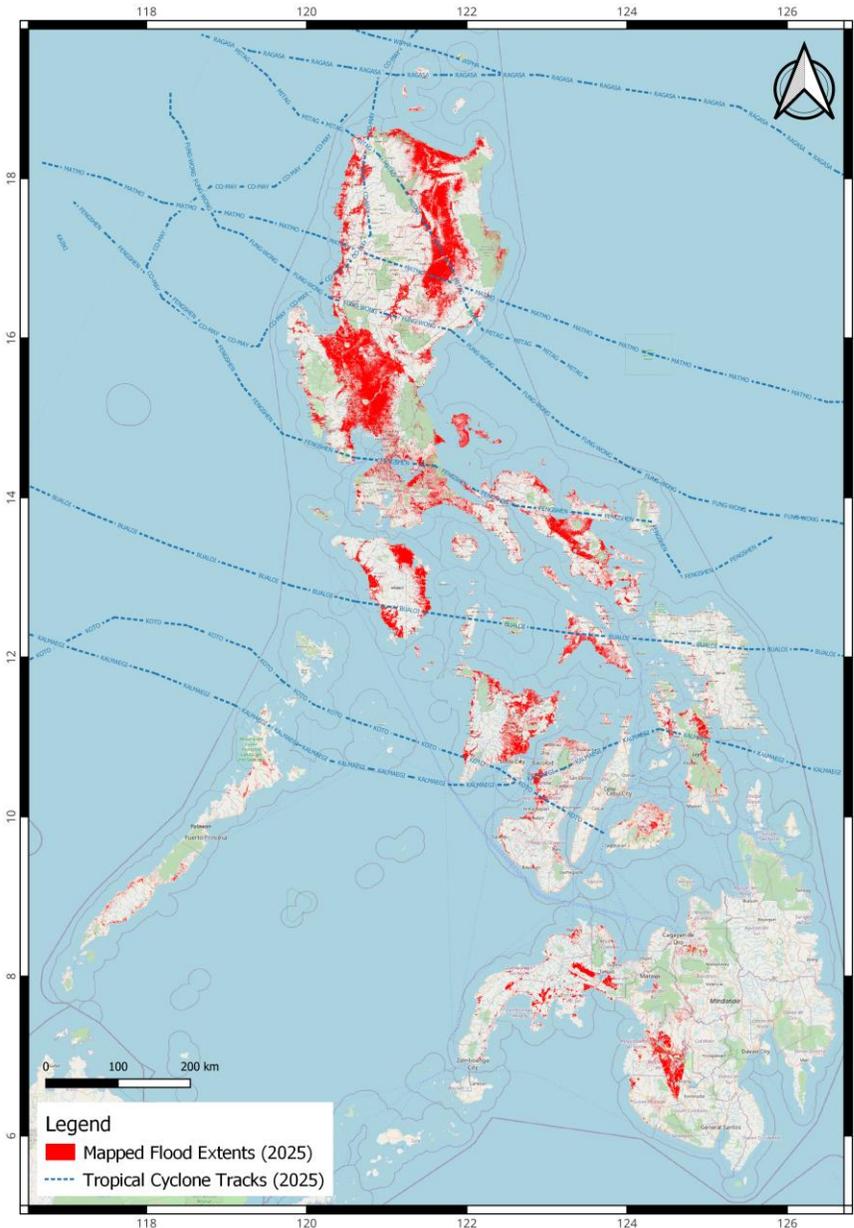
- 1316 Flood Maps
- 253 Damage Proxy Maps
- 12 Burnt Area Maps
- 2 Landslide Maps

42 Satellite data sources

6 Sentinel Asia activations

2 Activations escalated to IDC

263 Distinct data end users





# Super Typhoon Carina (Gaemi) - July 2024

20240723-Philippines-Flood-00526

Super typhoon Carina entered the Philippine Area of Responsibility at around 5:00 p.m. on July 21, 2024. Although it didn't make landfall in the Philippines, the typhoon intensified the southwest monsoon, bringing heavy rains and strong winds across the country. Several weather stations recorded around 300mm of rainfall within 24 hours. Based on the report of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), a total of 6,498,918 individuals were affected, with damages amounting to Php 10.372 billion.



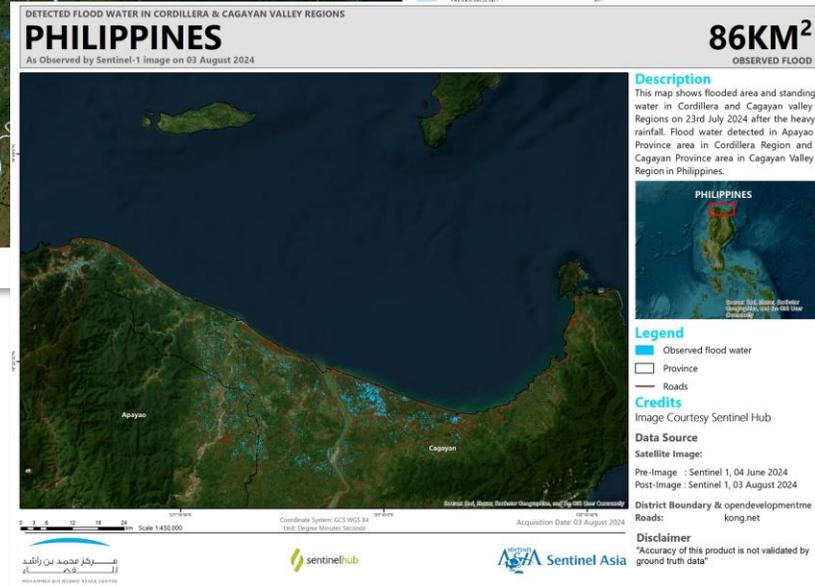
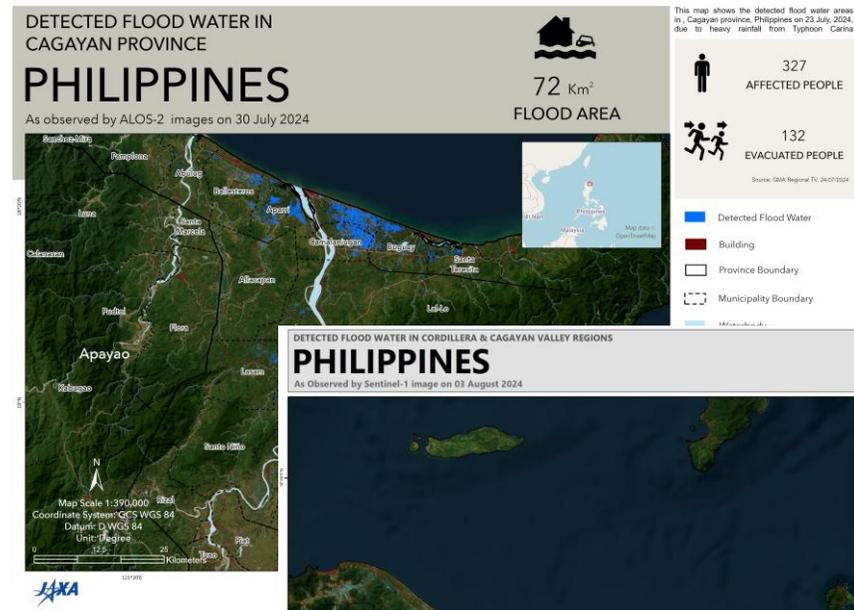
Residents riding a boat in a flooded road in Marikina City last July 24, 2024. Photo by Lisa Marie David, REUTERS



Flooded Taytay-San Isidro Bridge in Bagao, Cagayan last July 23, 2024. Photo by Eric Balisi, Cagayan PIA

**Data Provider Node**

**Data Analysis Node**





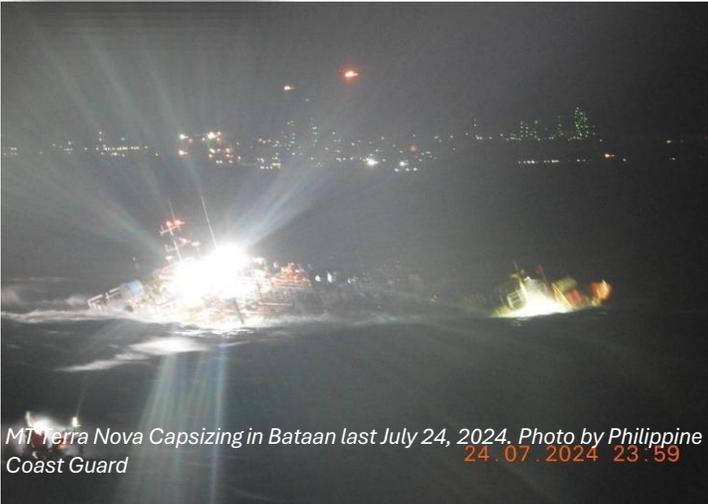
# Limay, Bataan Oil Spill - July 2024

20240725-Philippines-Other-00528

ESCALATED  
TO  
CHARTER



Due to poor weather conditions, the oil tanker *MT Terra Nova*, enroute to Iloilo, capsized and eventually sank approximately 3.6 nautical miles to the east of Lamao Point in Limay, Bataan. The vessel was carrying 1.4 to 1.5 million liters of fuel oil, which caused a massive oil spill that spread across Manila Bay and eventually reached parts of Bulacan and Cavite. Several areas in Bataan and Cavite were placed under state of calamity as a result of the incident.



MT Terra Nova Capsizing in Bataan last July 24, 2024. Photo by Philippine Coast Guard 24.07.2024 23:59



Oil Spill effect reaching the coast of Brgy. Amaya 5, Tanza, Cavite last July 30, 2025. Photo by Joan Bondoc, PNA

## Data Provider Node



## Data Analysis Node



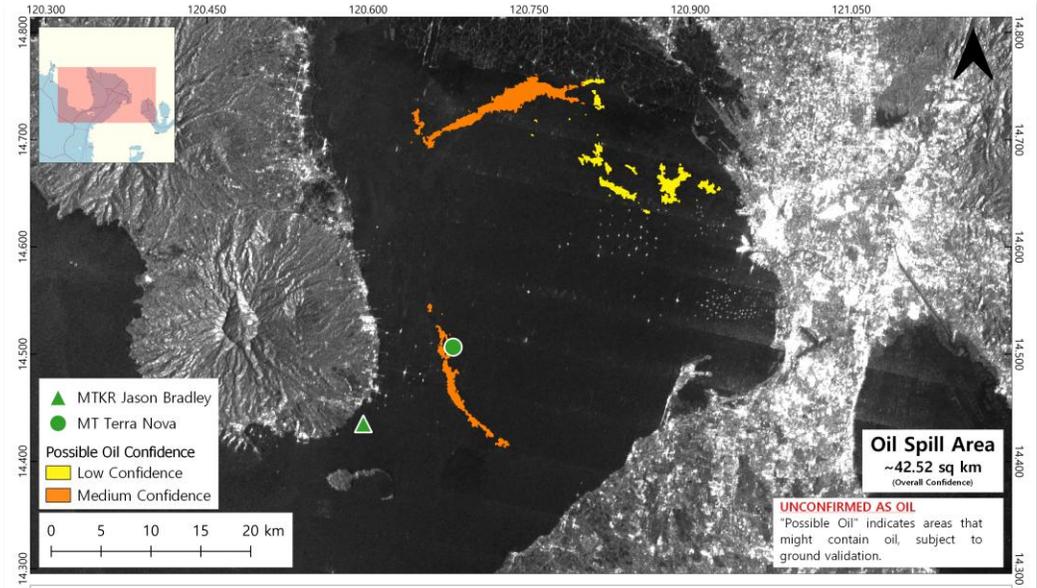
مركز محمد بن راشد  
للفضاء  
MOHAMMED BIN RASHID SPACE CENTRE



**AIT**  
Asian Institute of Technology



**Philippine  
Space  
Agency**



## OIL SPILL EXTENT IN MANILA BAY

Date/Time: 27 July 2024 12:18 PM PHT  
Data Sources: ALOS-2, OpenStreetMap  
Produced: 05 August 2024 by the Philippine Space Agency



© JAXA  
© OpenStreetMap contributors



# Super Typhoon Julian (Krathon) - August 2024

20240929-Philippines-Flood-Landslide-Storm-00558



Super typhoon Julian entered the Philippine Area of Responsibility at around 5:00 a.m. on August 27, 2024. Although it did not make landfall, the typhoon intensified the southwest monsoon, bringing heavy rains and flooding, particularly in Northern Luzon. According to the report of PAGASA, a total of 380,778 individuals were affected, with damages amounting to Php 1.572 billion.



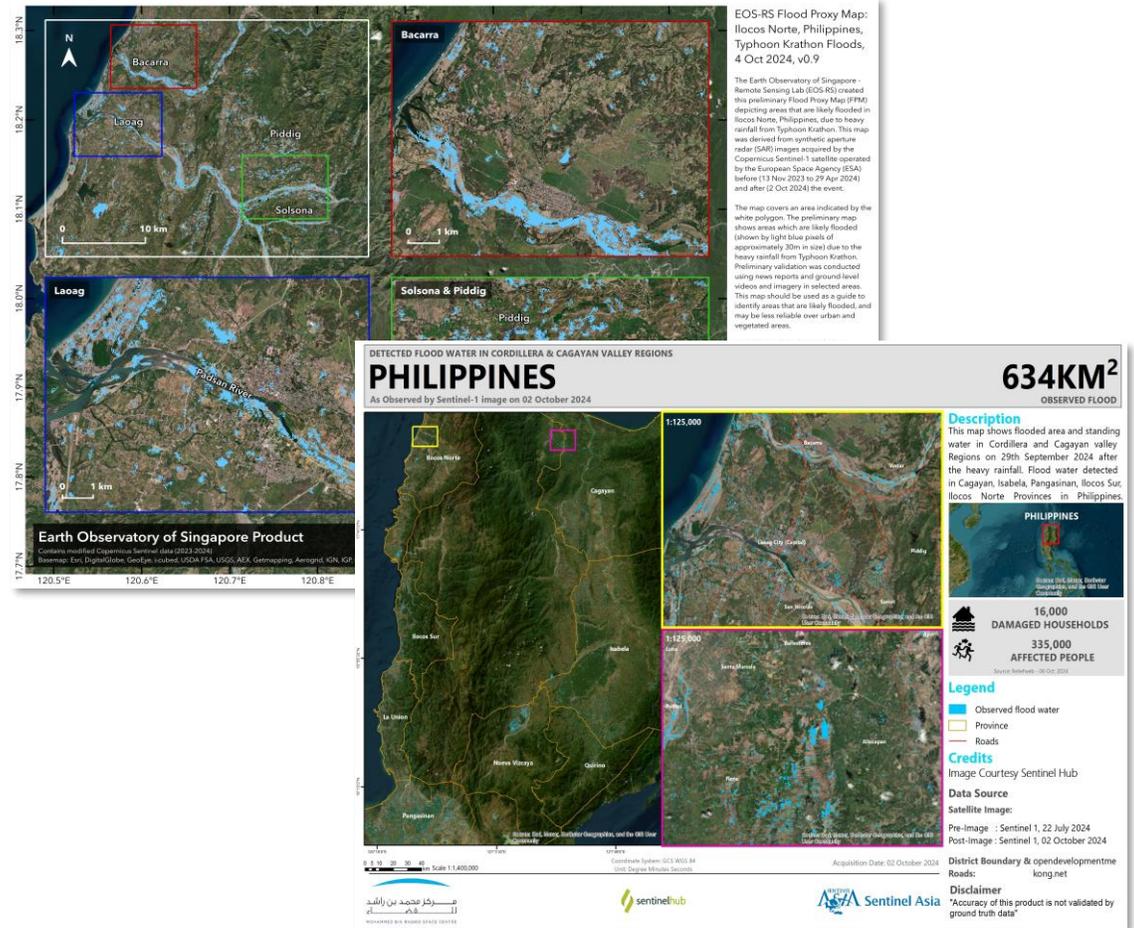
Temporary bridge destroyed by floodwaters in Solsona, Ilocos Norte on September 30, 2024. Photo by Alfonso Jaziel De Los Reyes



Typhoon Julian aftermath in Batanes on October 3, 2024. Photo by Office of the Civil Defense

### Data Provider Node

### Data Analysis Node





# Severe Tropical Storm Kristine (Trami) - Oct. 2024

20241023-Philippines-Flood-00557

**ESCALATED  
TO  
CHARTER**



Severe Tropical Storm Kristine made landfall in Isabela at around 12:30 a.m. on October 24, 2024. Provinces in the Northern and Central Philippines were among the most affected by the storm. It also strengthened southwest monsoon, bringing heavy rainfall across several areas. According to PAGASA, a total of 9,652,607 individuals were affected, with estimated to be around Php 18.4 billion.



Inundated Barangay in Baao, Camarines Sur on October 23, 2024. Photo by Oliver Collins



People crossing a flooded river on October 2024. Photo by Bullit Marquez, VERA Files

## Data Provided Node



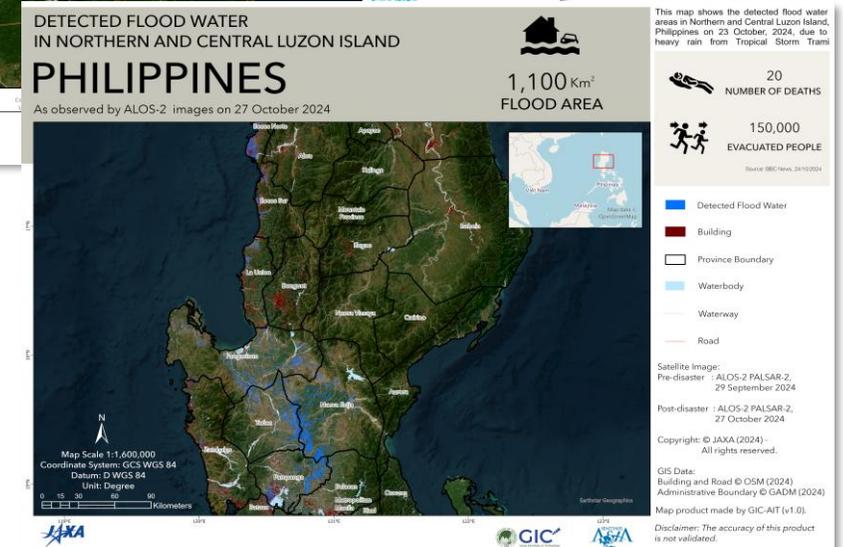
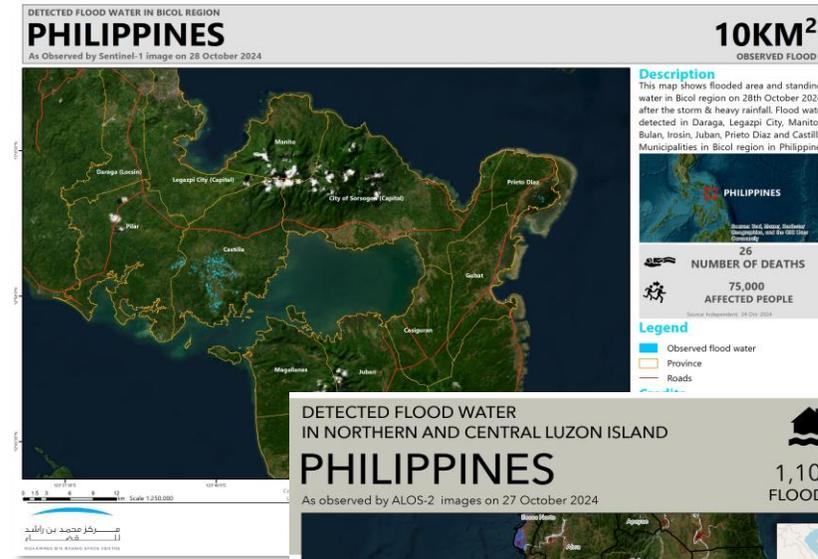
## Data Analysis Node



**AIT**  
Asian Institute of Technology



EARTH  
OBSERVATORY  
OF SINGAPORE





# Severe Tropical Storm Crising (Wipha)

20250716-Philippines-Flood-Landslide-Storm-Volcano-Earthquake-00591

On July 2025, Severe Tropical Storm *Crising* enhanced the southwest monsoon (*habagat*), bringing torrential rains that caused widespread flooding and disruptions across Luzon, Visayas, and Mindanao, including the Philippine capital. The heavy rainfall and strong winds led to river swelling, landslides, and maritime interruptions, affecting transportation, livelihoods, and community activities in multiple regions.



<https://manilastandard.net/news/top-stories/314617445/crising-seen-to-remain-in-par-till-saturday.html>

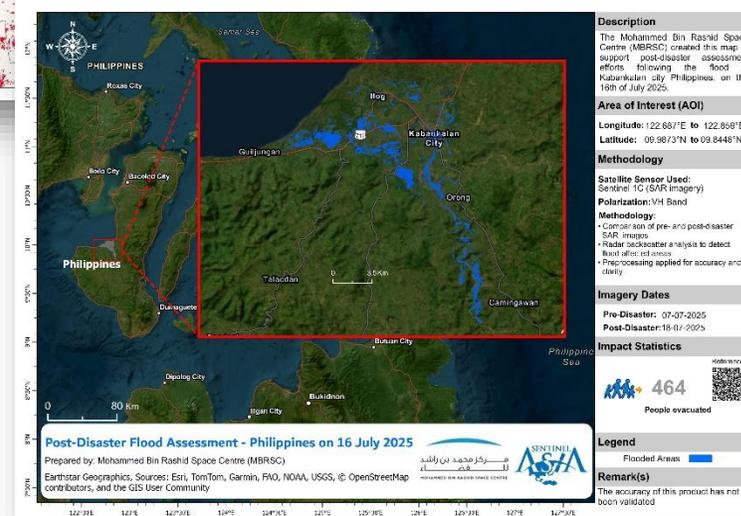
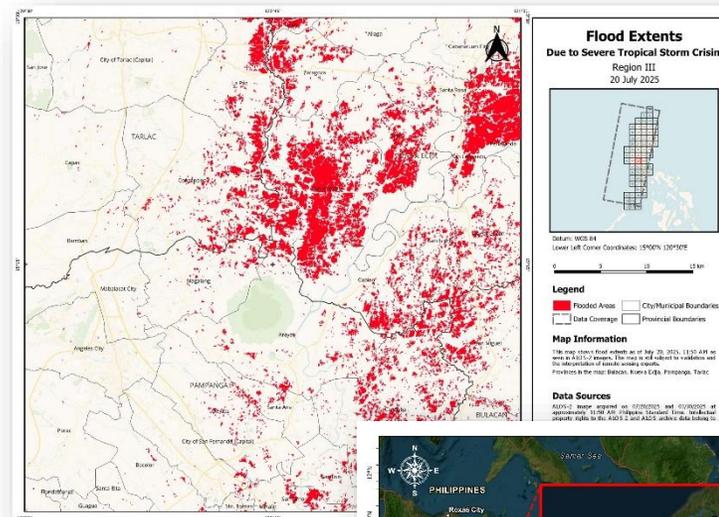


<https://philstarlife.com/news-and-views/381779-crising-habagat-displace-thousands-two-missing?page=3>

## Data Provider Node



## Data Analysis Node





# Severe Tropical Storm Opong (Bualoi)

20250925-Philippines-Flood-Landslide-00612

**ESCALATED  
TO  
CHARTER**

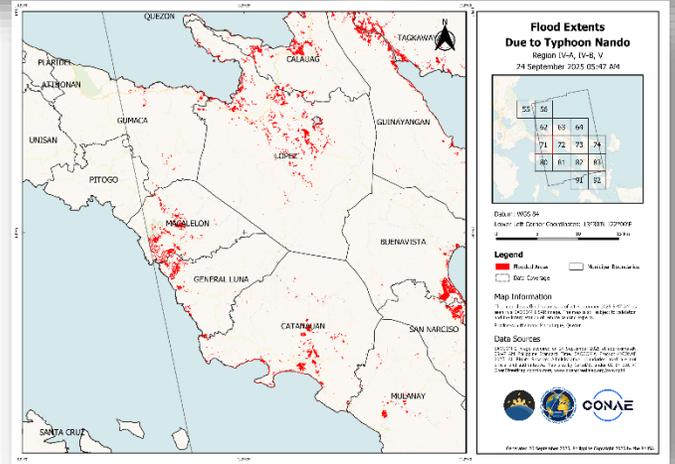
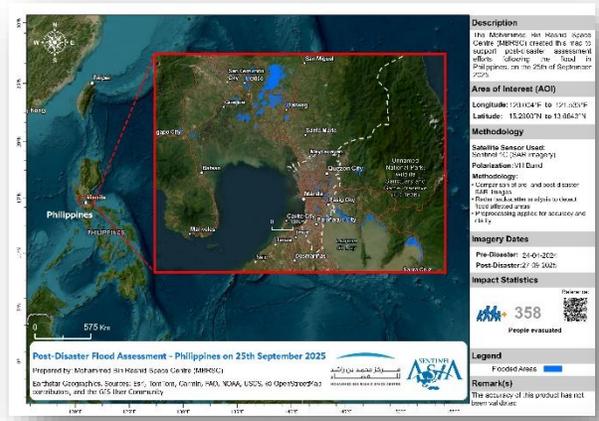


Severe Tropical Storm *Opong* entered the Philippine Area of Responsibility on 24 September and exited by 27 September. The storm swept through the Bicol and Visayas regions, and left widespread destruction in its wake, including damaged houses, agricultural lands, toppled power lines, and blocked roads. The activation were also useful for the subsequent flooding events due to different tropical storm i.e. Nando and Mirasol.



### Data Provider Node

### Data Analysis Node





# Earthquake in Cebu, Philippines

20251001-Philippines-Landslide-Earthquake-00614

On September 30 at 9:59 p.m. local time, a magnitude 6.9 earthquake with a shallow depth of 5 kilometers struck off the coast of Bogoto City, Cebu province. More than 3,600 aftershocks were recorded with varying magnitude of 1.4 to 5.1. Based on figures from the National Disaster Risk Reduction and Management Council (NDRRMC), the number of affected has increased to 80,595 families mainly in region 7, casualties report 68 deaths and 559 injuries, mostly in Bogoto City, Medellin, and San Remigio, more than 77,000 people were displaced.

**ESCALATED  
TO  
CHARTER**



Photo by Archdiocesan Shrine of Sta. Rosa de Lima

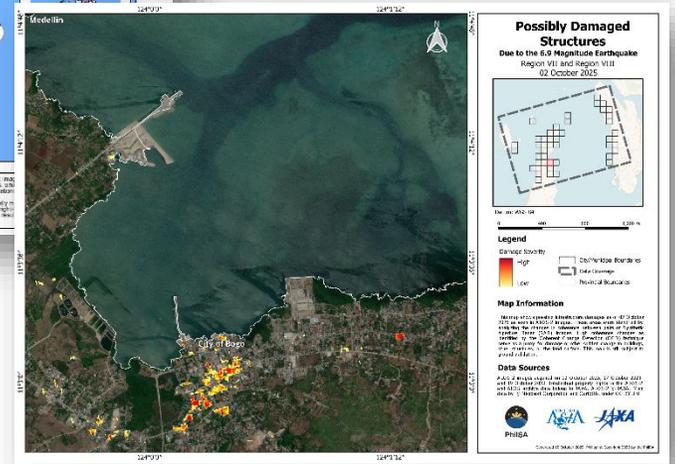
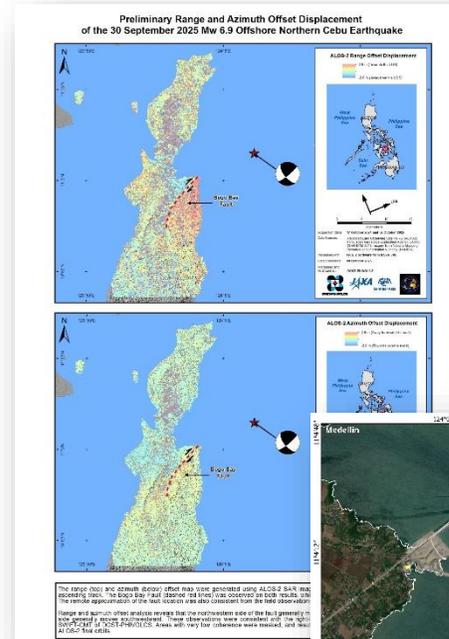


Rescuers search for victims trapped in the debris of the collapsed Pension House in Bogoto City, Cebu following the magnitude 6.9 earthquake on Sept. 30, 2025. Photo by Aldo Banaynal, The Freeman

## Data Provider Node



## Data Analysis Node

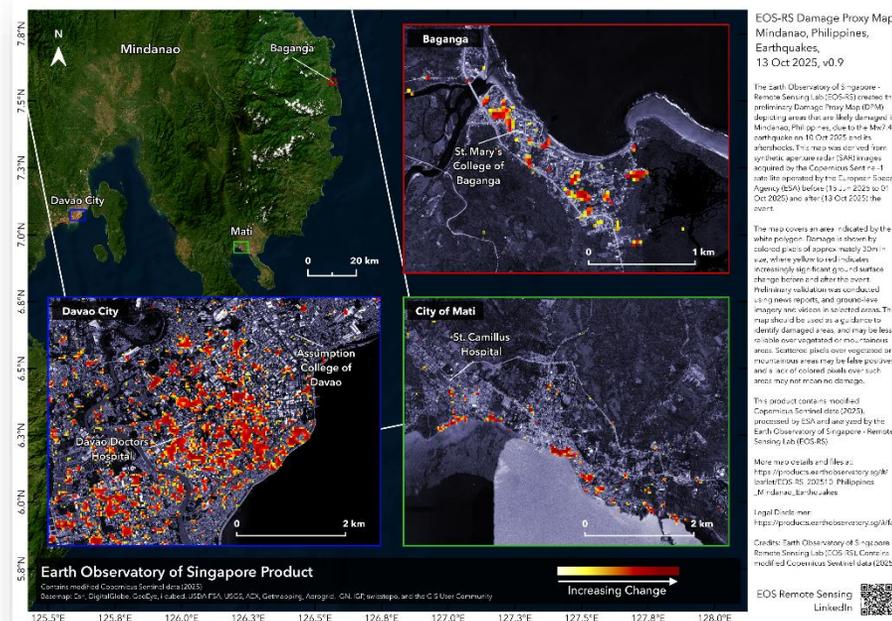




# Earthquake in Davao, Philippines

20251010-Philippines-Landslide-Earthquake-Tsunami-00619

A magnitude 7.4 earthquake struck offshore near Davao Oriental in southern Philippines on 10 October 2025. The earthquake resulted in at least two reported fatalities, while several towns near the epicenter experienced structural damage. Authorities have warned of potential strong aftershocks, with PHIVOLCS estimating that some could reach up to magnitude 6.4. Residents in affected coastal areas were also advised to stay away from the shoreline due to the risk of secondary hazards.



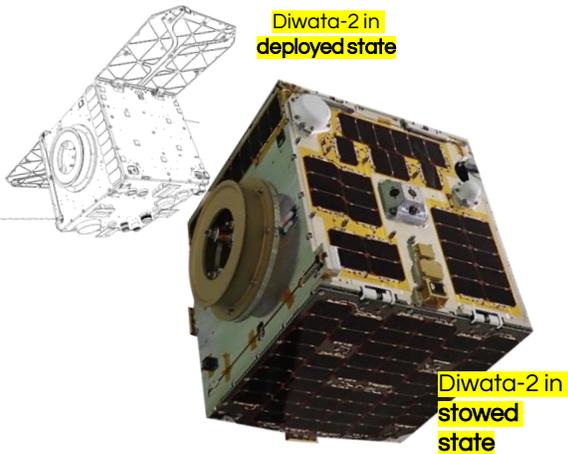
**Data Provider Node**

**Data Analysis Node**

EARTH OBSERVATORY OF SINGAPORE

# Diwata-2

<b>Class</b>	Microsatellite
<b>Mass</b>	57.36 kg
<b>Type</b>	Earth Observation
<b>Altitude</b>	577 km (LEO)
<b>Orbit</b>	Sun-synchronous



# Multispectral Unit for Land Assessment (MULA)

## MULA technical specifications

### Launch Mass

100-150 kg advanced satellite platform for Earth observation

Resolution  
**5m**

Swath  
**120km**

Number of bands  
9 bands (Vis to NIR)

### Primary payload

Truecolor Multispectral Optical Imager

### Secondary payloads

Automatic Identification System (AIS) and Automatic Dependent Surveillance-Broadcast (ADS-B) Receivers

### Features

- High daily throughput at 127,000 km<sup>2</sup>
- Simultaneous capture and download of image data in a single pass
- Propulsion system for orbital maneuvers

At optimal capture opportunity, a single pass of MULA over the Philippines could be equivalent to passing important agricultural lands in Luzon, some parts of Panay, Negros, and Zamboanga Peninsula



# Feedback

1. **Fast approval** of activation requests (Average of 1.5 hours upon request)
2. Alternative way of accessing data (**SFTP**) unlocked an **automated** way of checking and downloading new datasets uploaded for the activation;
3. The **AOI generation interface** could be improved (certain errors are encountered while trying to draw using the platform).

# Challenges

1. PhilSA's sovereign satellite, the **Diwata-2**, was developed and launched as an **experimental satellite**, focused on strengthening the Philippines' capabilities in satellite development. Thus, the data from Diwata-2 is not as reliable as operational satellites in terms of accuracy and quality;
2. Diwata-2 also entered an **increased exposure to sunshine** phase this year, **limiting its operations** as a DPN for Sentinel Asia.

# Lessons Learned

- 1. Designation** of departments and agencies who will activate Sentinel Asia based on hazard also needs to be revisited to ensure timely data request and provision. This also reduces the time needed to finalize Areas of Interest (AOIs). For example, the Philippine Institute of Volcanology and Seismology (PHIVOLCS) has access to various ground sensors nationwide which could help identify critical areas affected by earthquakes, volcanic eruptions, and other geological hazards.

# Ways Forward

1. Sentinel Asia has provided data which been helpful in PhilSA's disaster response operations.

Specifically, in producing **actionable information** in the form of impact maps during and after a disaster.

2. PhilSA also looks forward to becoming a more active Data Provider Node (DPN) with the expected launch of the **Multispectral Unit for Land Assessment (MULA) satellite** in the near future.

**Thank you.**



**Philippine  
Space  
Agency**

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**LI:** philspaceagency

