

# Philippine Space Data Mobilization for Enhancing Disaster Resilience

**UN COPUOS - 61<sup>st</sup> Session of Scientific and Technical Subcommittee  
31 January 2024 | Vienna, Austria**

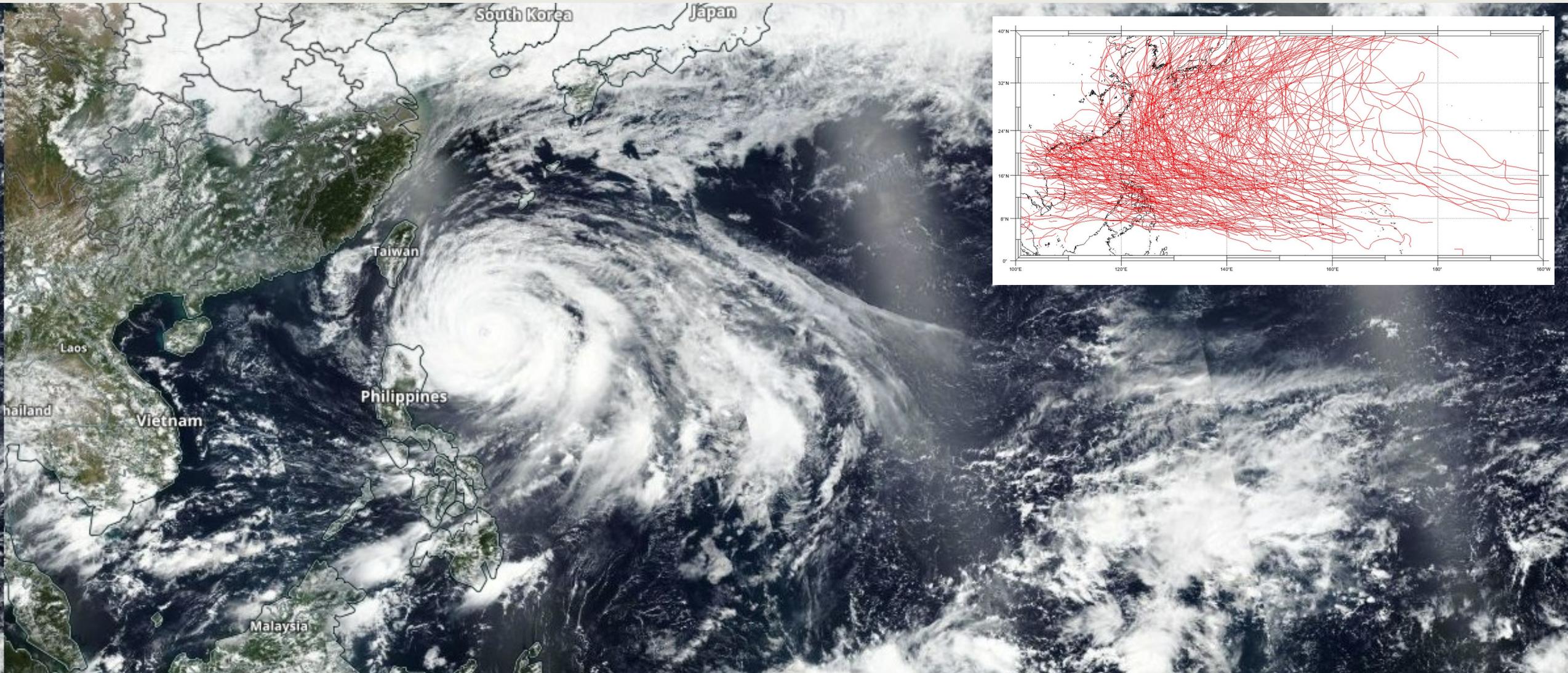
**Geniffer De Maligaya**

*Senior Science Research Specialist*

Earth Sciences Space Mission Studies Division (**ESSMSD**)

Space Science Missions Bureau (**SSMB**)

# Philippines in the Pacific Ring of Fire and Typhoon Belt



Satellite Image of Typhoon Mawar approaching the North Luzon region captured by Suomi NPP/VIIRS (subset : Typhoon tracks for the last 10 years in WNP from IBTrACS)

# The Philippine Space Agency

## Building an integrated and sustainable national space program

08 to 14 August

# Philippine Space Week

Proclamation No. 302, s. 2023

**Key Development Areas**

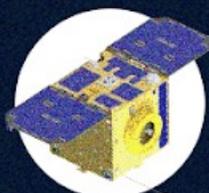
- National Security & Development
- Space Research & Development
- Hazard Management & Climate Studies
- Space Education & Awareness
- Space Industry Capacity Building
- International Cooperation

# Satellite Data Sources



## Sovereign

Satellites owned, operated, and tasked by the Philippines.



Diwata-2



NovaSAR\*

## Disaster Charter-Activated

Satellite images shared through the International Charter: Space and Major Disasters for rapid response to major disasters

## Commercial

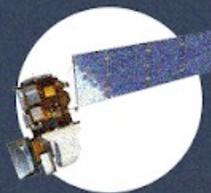
Satellites with paid subscription.

## Open

Satellite images that are free to use and download.



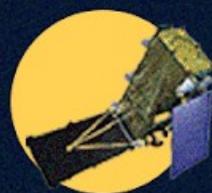
Terra and Aqua



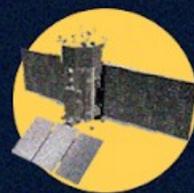
Landsat-8, 9



Suomi-NPP



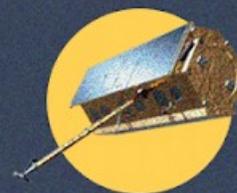
RCM-2\*\*



SAOCOM-1A



\*Komsat-3, 3A



TerraSAR-X



#Dove & #Skysat\*\*



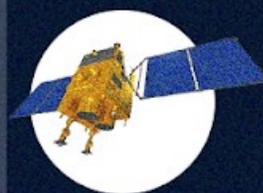
Sentinel-5P



Sentinel-3



Sentinel-1A, 1B



Goafen-2



Kanopus-V



\*Worldview-2,3,4



#Plelades Neo\*\*



#ICEYE\*\*

# Data Sharing for Disaster Management



25

MISSIONS TASKED for Sentinel-Asia requests using Diwata-2

5

CHARTER ACTIVATIONS for local disasters

25

PRODUCTS GENERATED and distributed locally

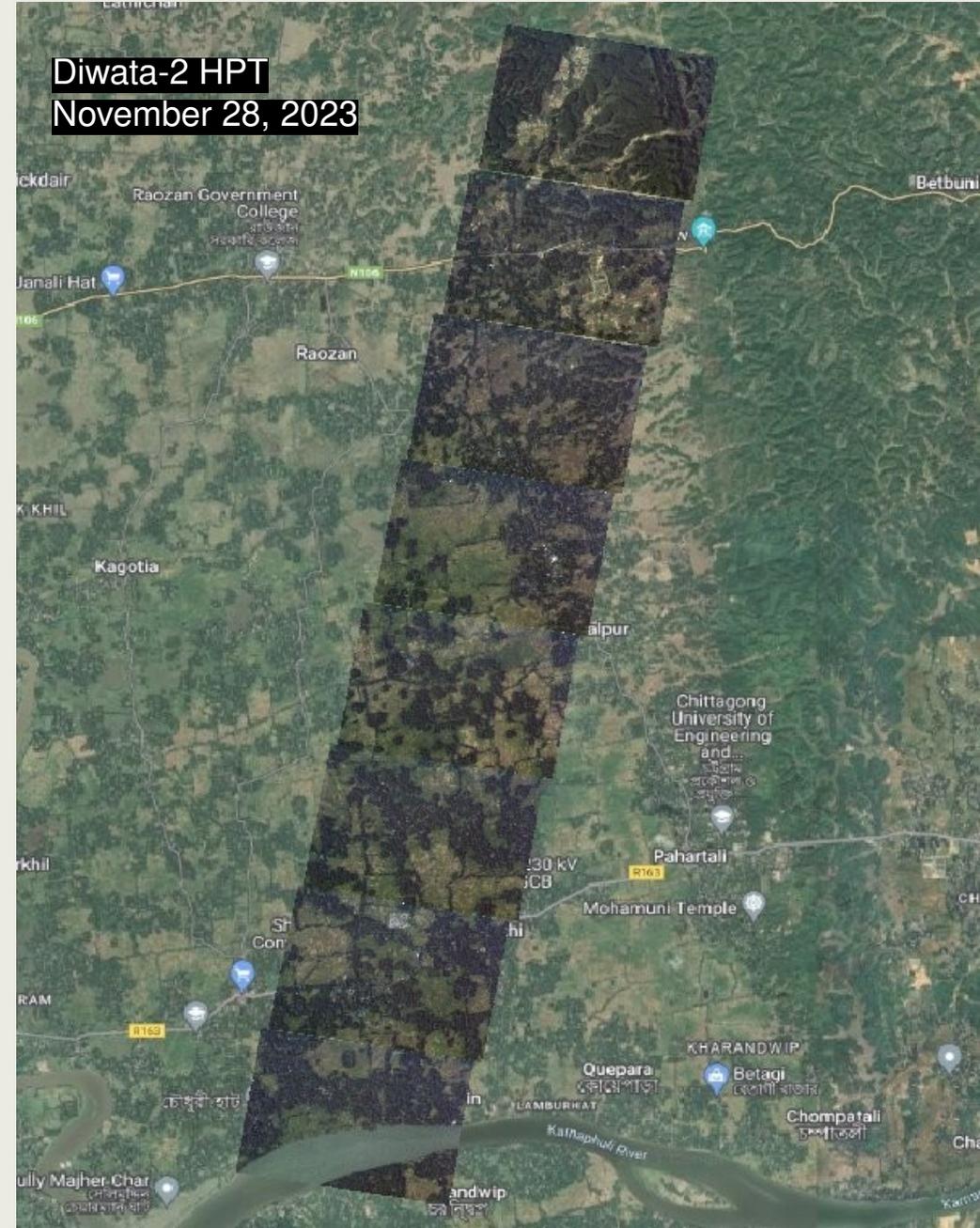
# PhilSA as Data Provider Node

**25**

MISSIONS TASKED for Sentinel-Asia requests using Diwata-2

Disaster Type	<b>Storm</b>
Country	Bangladesh
Occurrence Date (UTC):	17 November 2023
SA activation Date(UTC):	17 November 2023
Requester	Bangladesh Water Development Board (BWDB)
Escalation to the International Charter	No
GLIDE Number	<b>TC-2023-000230-BGD</b>

Sample successful capture from Diwata-2 (After Disaster)



# PhilSA as Data Requestor

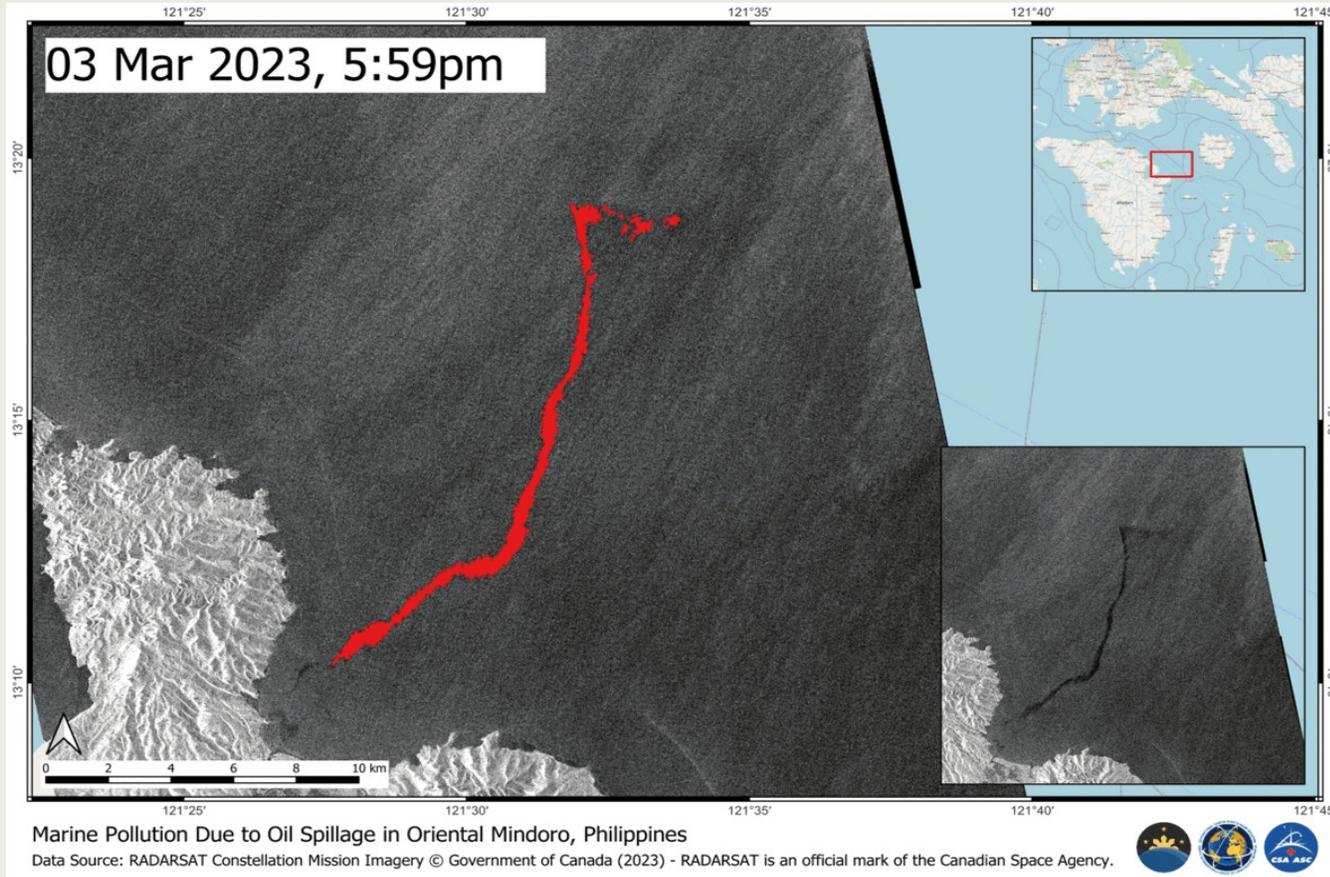
**5**

CHARTER ACTIVATIONS  
for local disasters

Activation	Date	Products	Products Produced by PhilSA	PhilSA's role
Oil spill in the Philippines	2023-03-02	46	17	Charter Requestor, Project Management, Value Adding
Tropical Storm Nalgae in the Philippines	2022-10-29	7	0	Charter Requestor
Typhoon Noru in the Philippines	2022-09-25	5	5	Charter Requestor, Value Adding
Tropical Storm Ma-On in the Philippines	2022-08-23	1	1	Charter Requestor, Value Adding
Tropical Storm Megi in the Philippines	2022-04-13	36	2	Charter Requestor, Value Adding

# Remote Sensing for Maritime Disasters

## Sample Generated Product



## Oil Spill in the Verde Island Passage

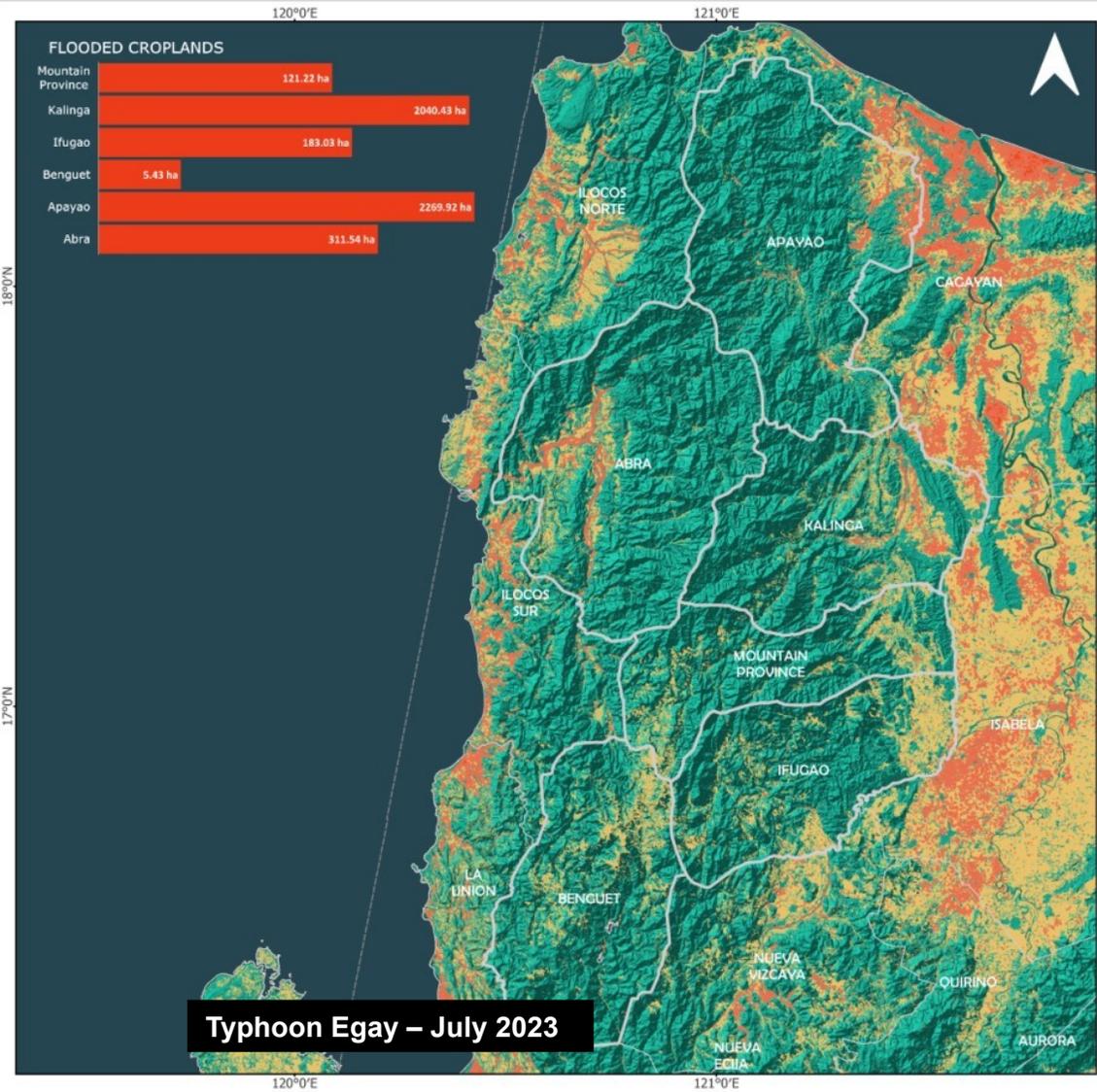
<b>Type of Event:</b>	Oil Spill
<b>Location of Event:</b>	Philippines
<b>Date of Charter Activation:</b>	2023-03-02
<b>Time of Charter Activation:</b>	15:56
<b>Time zone of Charter Activation:</b>	UTC+09:00
<b>Charter Requestor:</b>	ADRC on behalf of Philippine Space Agency (PhilSA)
<b>Activation ID:</b>	807
<b>Project Management:</b>	Jamaica Pangasinan (Philippine Space Agency (PhilSA)) Roel de la Cruz (Philippine Space Agency), Machele Felicen (Philippine Space Agency), Jamie Stovin-Bradford (ITOPF)
<b>Value Adding:</b>	

### Local recipients



25

PRODUCTS GENERATED and distributed locally



### Flooded Croplands in Cordillera Administrative Region



Datum: WGS 84  
0 20 40 60 80 km

**Legend:**

- Flooded Areas
- Annual Croplands
- Non-Cropland
- Data Coverage
- Provincial Boundaries

**Map Information:**  
This map shows flooded croplands in Cordillera Administrative Region (CAR) as of July 29, 2023, 6:00 AM. Flooded areas were identified from Sentinel-1A images and overlaid with the annual crops delineated by NAMRIA in 2020. The map is still subject to ground validation.

**Data Sources:**  
Sentinel-1A Images from European Space Agency (ESA) Copernicus Open Access Hub. Annual Land Cover Map from National Mapping and Resource Information Authority (NAMRIA). Political Boundaries from NDRRM IM-TVG. Basemap from ESRI. Index Basemap from OpenStreetMap.

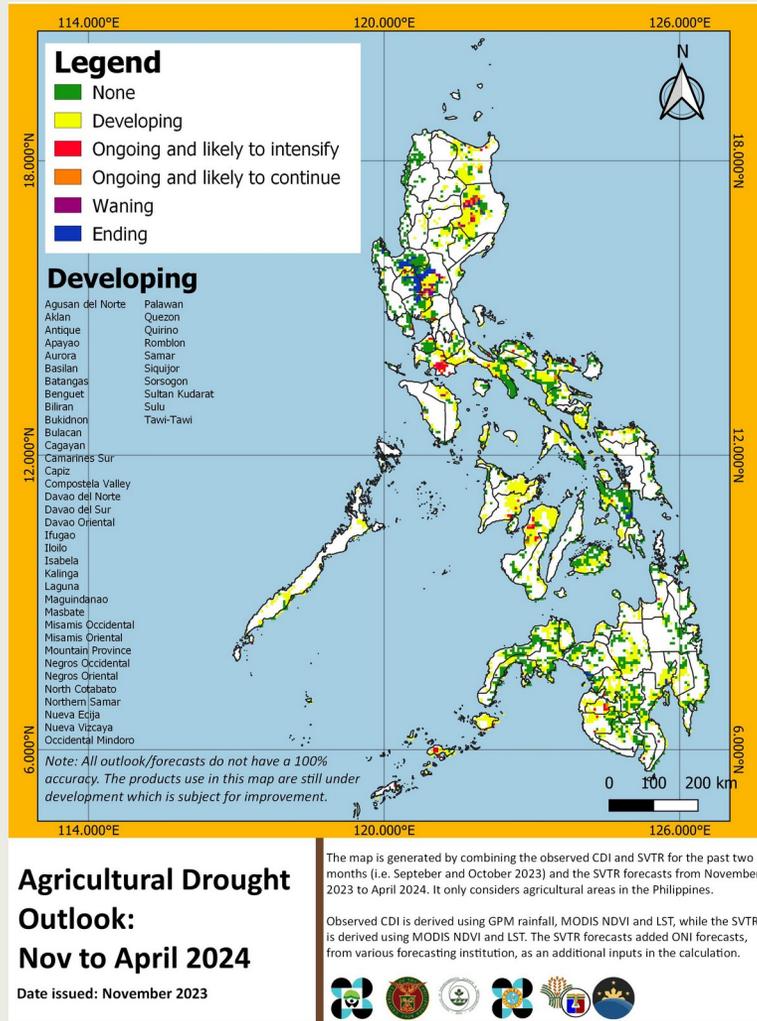


>  
**1000**

MAPS and IMAGES distributed to various agencies for disaster response



# El Niño Preparations using space-based information



Generated drought outlook maps for stakeholders



Used as a reference by BSWM and DA-FPOPD for operations



Interagency Workshop held May 2023 to craft the National Agricultural Drought Protocol (NADP)



PhilSA participates in the DSWD and UN FAO Scoping Mission in Isabela

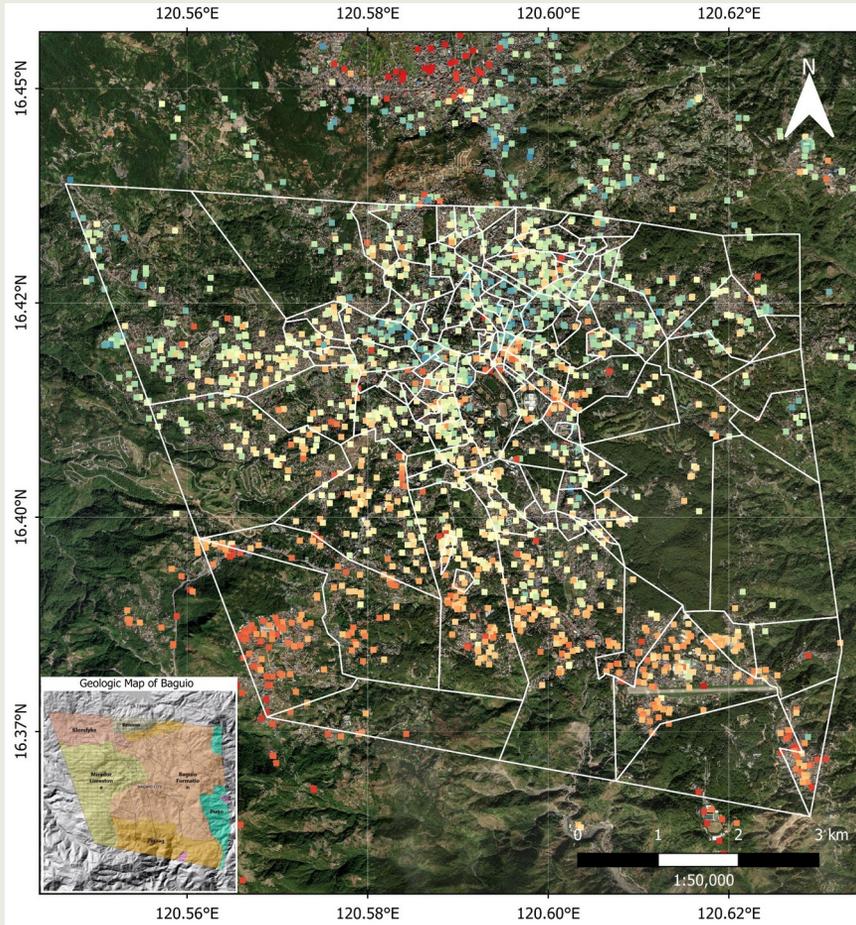


Support to DSWD and UNFAO in mitigating El Niño-induced drought



Field validation activities to calibrate drought maps

# Ground deformation



### Ground Displacement Map of Baguio City and vicinity for 2017-2022

Cumulative vertical displacement from 2017-2022 (mm)

Subsiding  Uplifting

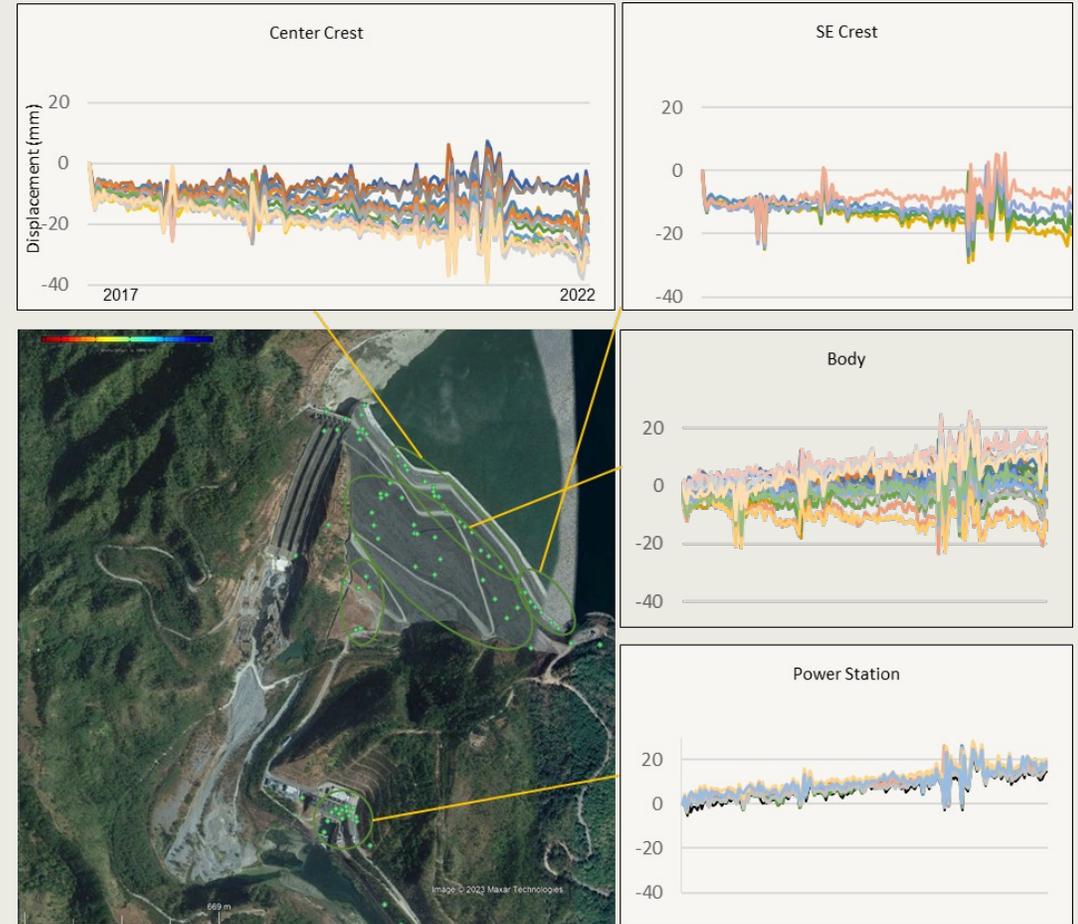
-150   -75   0   +25   +50

**Map Information**

This map illustrates the ground displacement in Baguio City and its vicinity from January 2017 to December 2022, using Satellite Synthetic Aperture Radar (SAR). The precise measurement of ground deformation was conducted by tracking movement from specific points across Baguio City using Persistent Scatterer Interferometric Synthetic Aperture Radar (PS-INSAR) technology. Notably, the map reveals predominantly negative displacement in areas over the Mirador limestone and Zigzag formation. It's important to note that this map is still subject to ground validation.

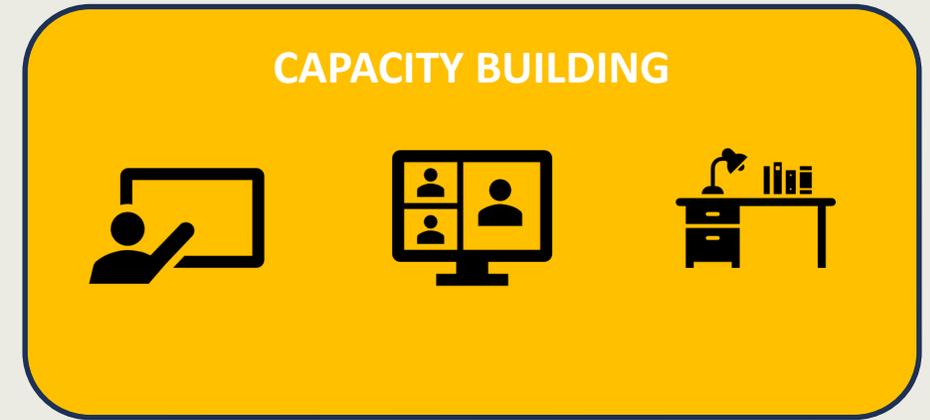
**Data source**

Copernicus Sentinel-1 C-band SAR images of the European Space Agency (ESA) processed using SARProz using the computational resources of DOST-ASTI, and Baguio City shapefiles from the CPDSO.

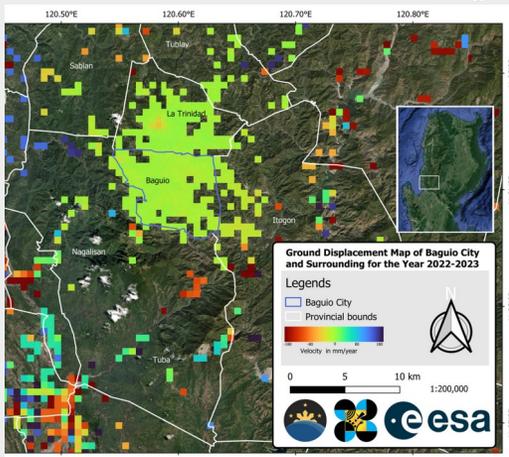





**CopPhil – National Copernicus  
Capacity Support Action Programme  
for the Philippines**



**Ground Motion Monitoring**



- ✓ Site specific ground motion monitoring **at request**
- ✓ End-users: **LGUs, other agencies**

**Land cover (LC) and Forest Mapping Service**



- ✓ Increase frequency of LC map production **5 → 1 year**
- ✓ End-users: **NAMRIA, FMB, DHSUD, LGUs**

**Benthic Habitat Monitoring Service**



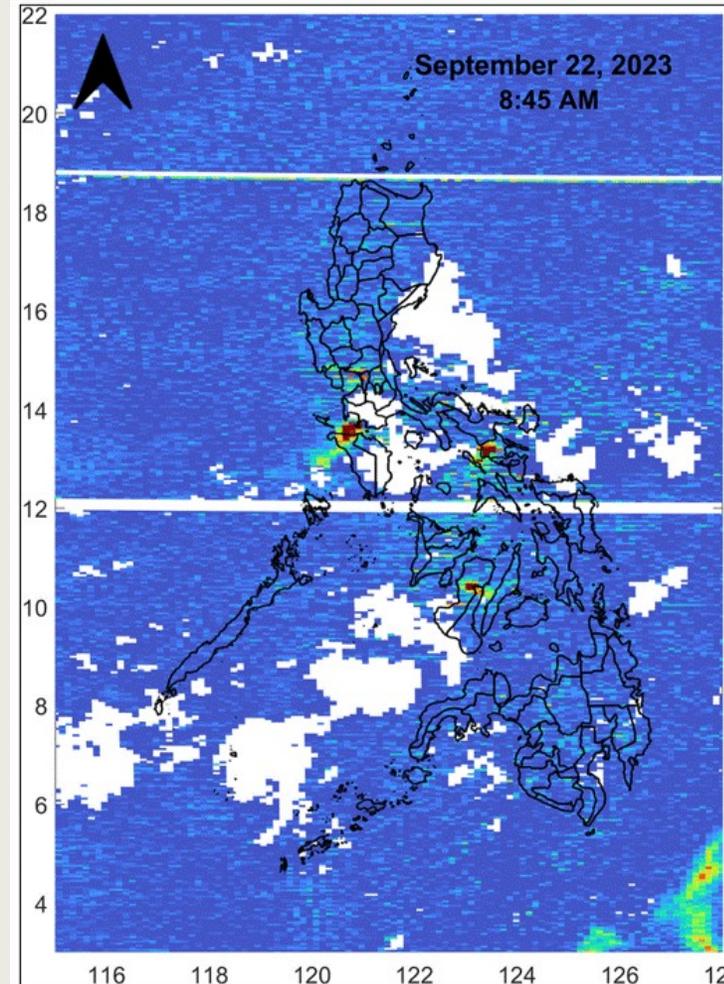
- ✓ **Automated** benthic seabed coverage mapping service produced at **regular intervals**
- ✓ End-users: **BMB, NAMRIA, LGUs**

# Remote Sensing for Air Quality Monitoring: Taal Volcano Smog Monitoring 2023

## PhilSA takes air quality training workshop to Cebu

Posted by: Philippine Space Agency

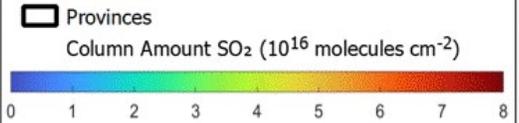
14 June 2023



### SULFUR DIOXIDE MAP

During Taal Volcano Activity  
September 22 to 25, 2023

#### Legend



#### Map Information

This map shows the sulfur dioxide (SO<sub>2</sub>) detected concentration emitted by Taal Volcano from September 22 to 25, 2023. This map is still subject to validation and interpretation of air quality and remote sensing experts.

#### Data Sources

Sulfur Dioxide (SO<sub>2</sub>) Column Amount from GEMS SO<sub>2</sub> Product of Korea's National Institute of Environmental Research (NIER).

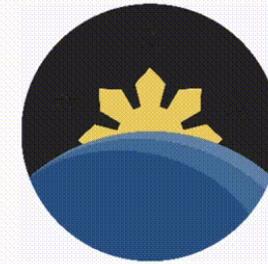
>  
**1000**

MAPS and IMAGES  
distributed to various agencies  
for disaster response

# Data accessibility

The Agency has developed a **Space Data Dashboard** to enable institutions and citizens to learn about and access available geospatial data and information.

This is part of the "system of systems" for disseminating satellite images and space-derived data to national government agencies, local government units, university and R&D institutions, civil society organizations, private sector, and individuals.

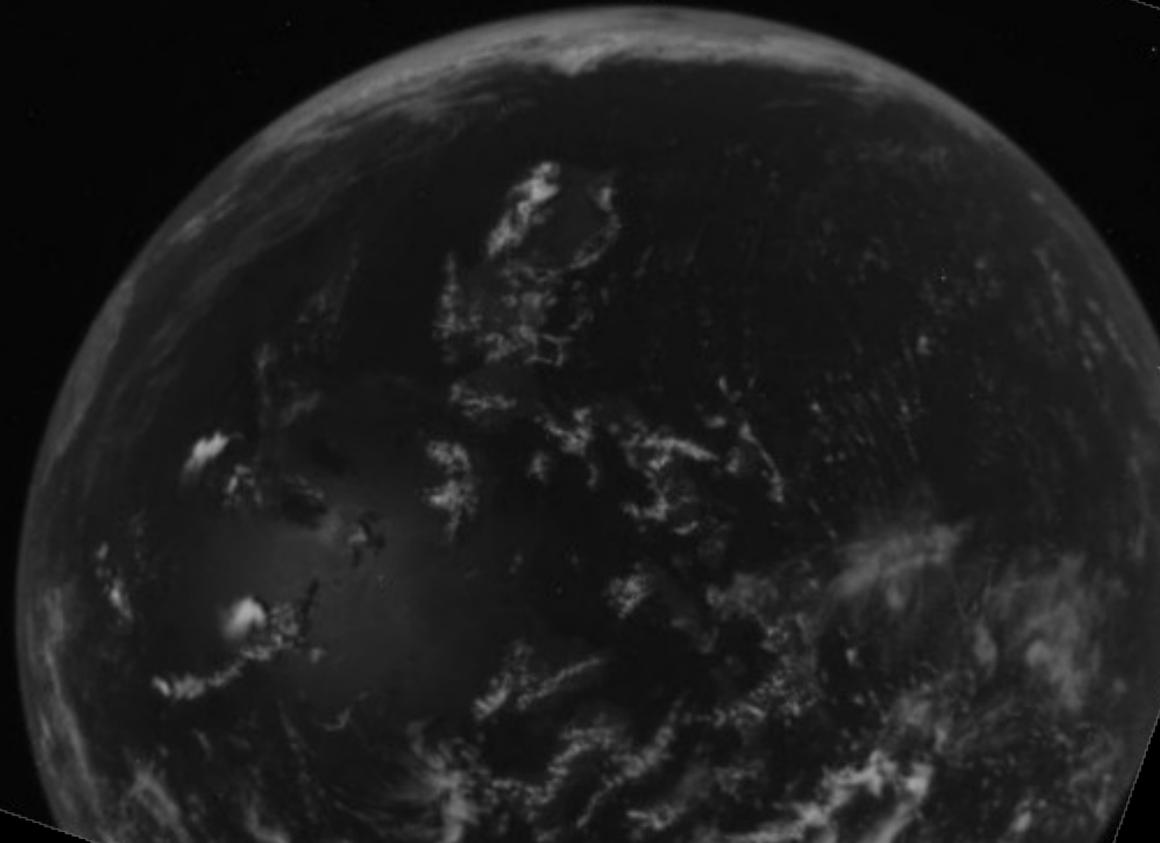


# Kabatiran mula Kalawakan

The 2023 Decadal Survey of Earth Observation in the  
Philippines



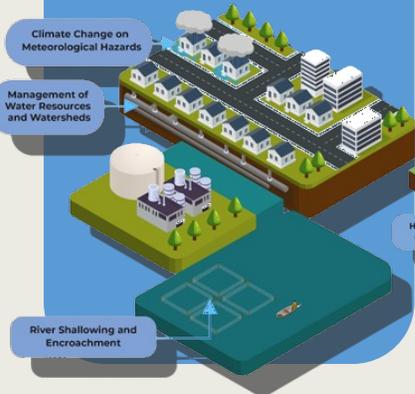
Philippine  
Space  
Agency



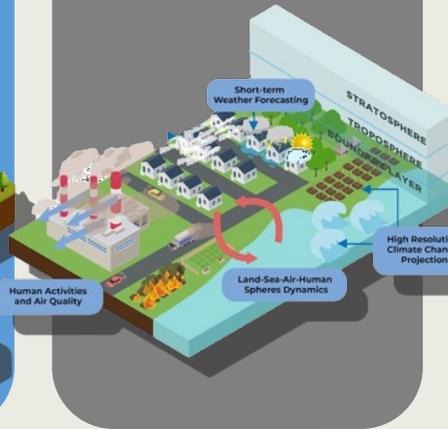
# The 2023 Decadal Survey of Earth Observation in the Philippines



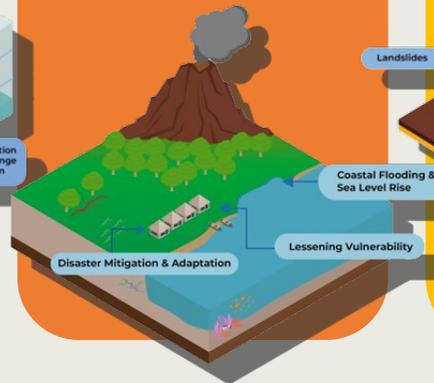
Hydrologic Cycles and Climate Studies



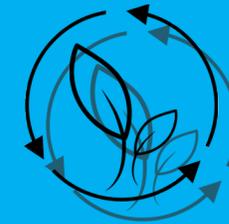
Weather, Air Quality and Atmospheric Processes



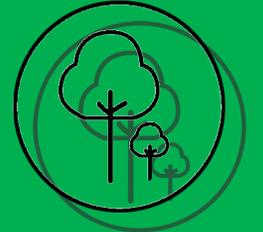
Earth Surface and Interior: Dynamics and Processes



Hazards and Disaster Risk Reduction and Management



Aquatic Ecosystems and Water Resources Management



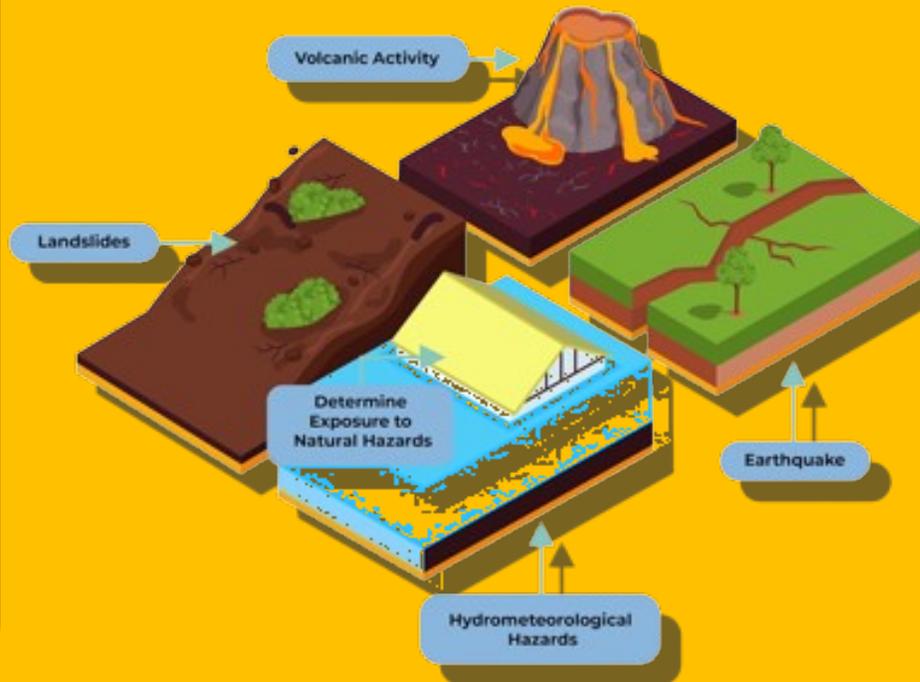
Terrestrial Ecosystems and Land Resources Management



# The 2023 Decadal Survey of Earth Observation in the Philippines



**Hazards and  
Disaster Risk  
Reduction  
and  
Management**



Experts and stakeholders agreed that land surface and hydrometeorological hazards are the top challenges that the country need to address.



## Understanding Natural Hazards

To analyze hydro-meteorological hazards (e.g. flood, storm surge, sea-level rise)

To analyze fault processes, earthquake hazards, and landslides

To analyze volcanic processes and volcanic hazards



## Exposure to Various Hazards

To generate hazard information such as hazard maps and site-specific hazard assessment reports in a regular manner (e.g., every 3-5 years)

To develop flood models to simulate flooding satisfying a certain level of accuracy

To obtain topographic (elevation), land-cover, and exposure datasets for hazard assessment purposes in a regular manner (e.g., every 3-5 years)

# Thank you!



**Philippine  
Space  
Agency**

## **Our Vision**

The PhilSA envisions a Filipino nation bridged, uplifted, and empowered through the peaceful uses of outer space.

## **Our Mission**

We will promote and sustain a robust Philippine space ecosystem that adds and creates value in space for and from Filipinos and for the world.