Extreme Weather Bulletin and Emergency Observation/Mapping of Manila Observatory

The 12th Asia-Oceania Meteorological Satellite Users' Conference

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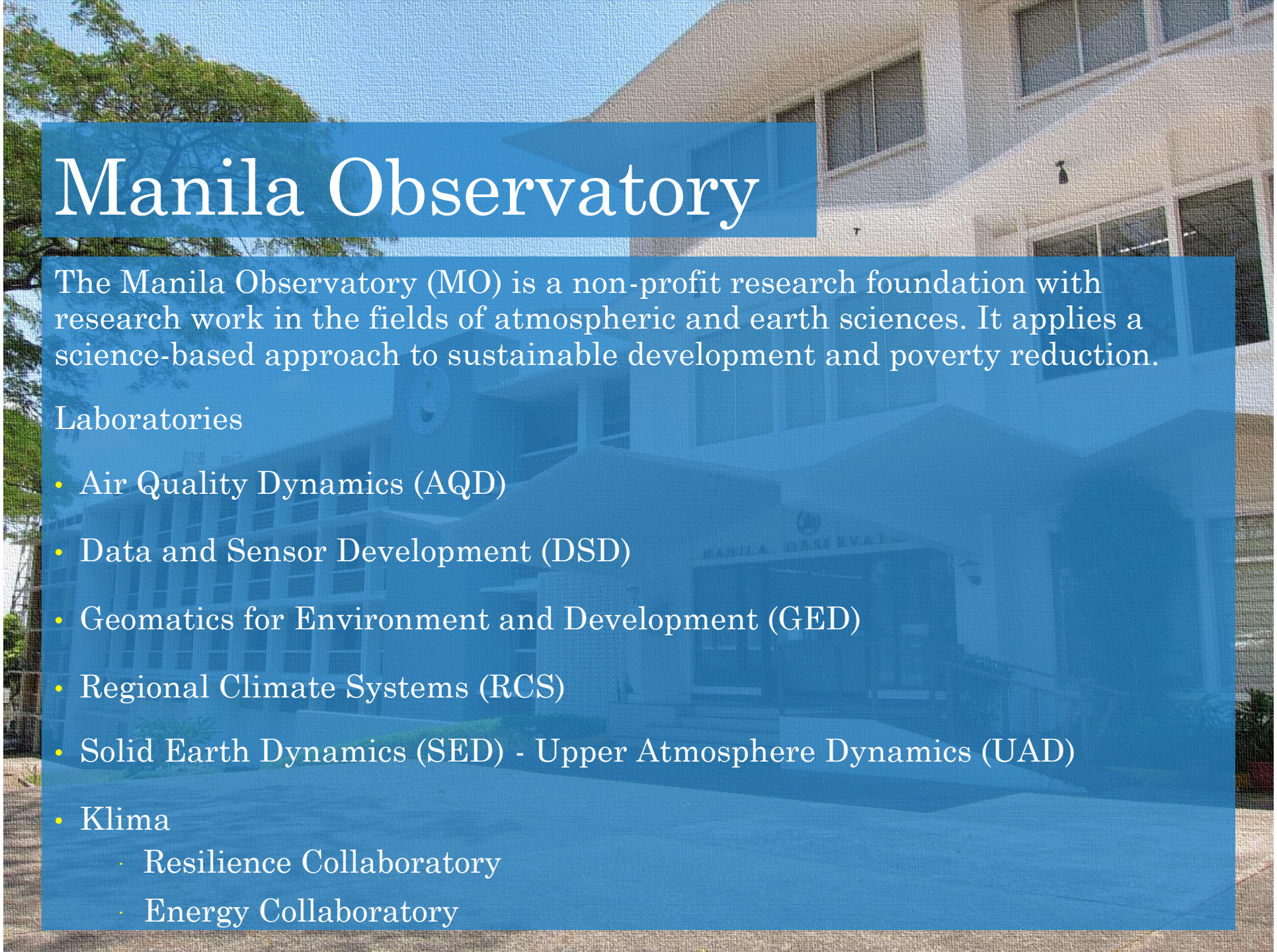
Agenda

- Manila Observatory Background
- Extreme Weather Bulletin (EWB)
- Emergency Observation/Mapping (EO/M)
- How we use Sentinel Asia's OPTEMIS and IDC dashboard
- Current research: Optimizing the Microsoft Planetary Computer for EO/M
- Next Steps



Manila Observatory

The Manila Observatory (MO) is a non-profit research foundation with research work in the fields of atmospheric and earth sciences. It applies a science-based approach to sustainable development and poverty reduction.

Laboratories

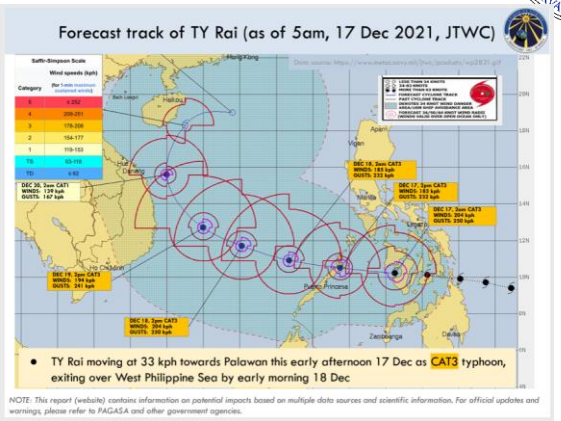
- Air Quality Dynamics (AQD)
- Data and Sensor Development (DSD)
- Geomatics for Environment and Development (GED)
- Regional Climate Systems (RCS)
- Solid Earth Dynamics (SED) - Upper Atmosphere Dynamics (UAD)
- Klima
  - Resilience Collaboratory
  - Energy Collaboratory

Extreme Weather Bulletin (EWB)

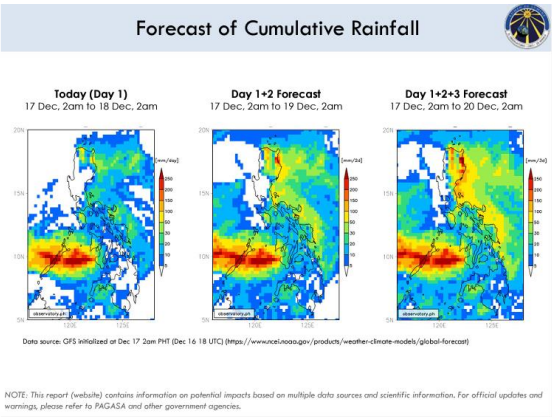
- EWB is consolidated forecast information on extreme weather events and the associated potential risks to vulnerable areas
- Prepared by a team from RCS and GED Laboratory
- Issued at least once a day upon the JTWC's detection of TC which can potentially affect the Philippines
- The bulletin ends when TC no longer poses a threat to the Philippines

EWB for Typhoon Rai

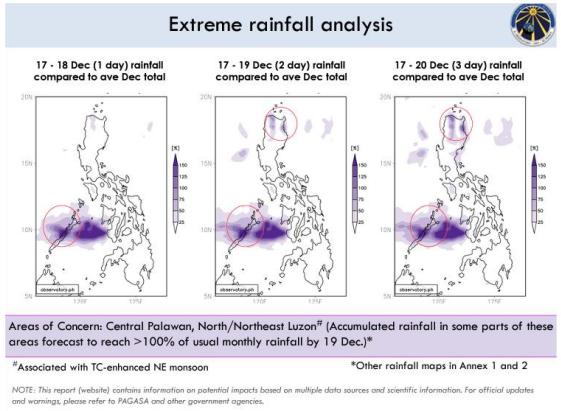
Current and Forecast track



Forecast of Cumulative Rainfall



Extreme Rainfall Analysis

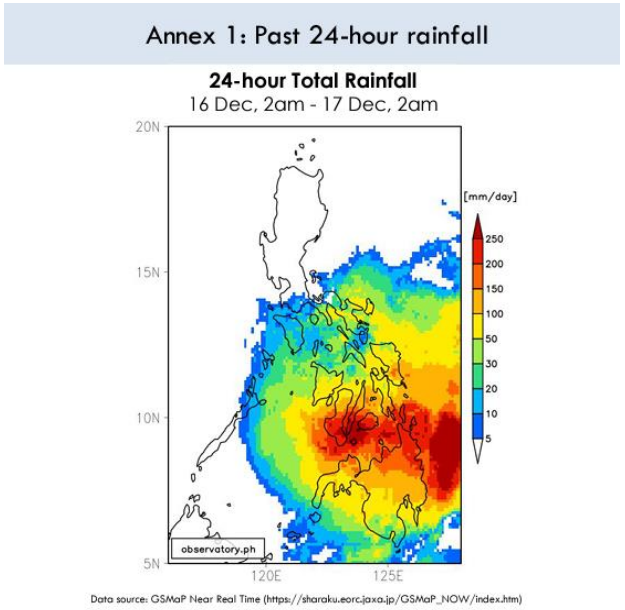


Extreme Weather Bulletin (EWB)

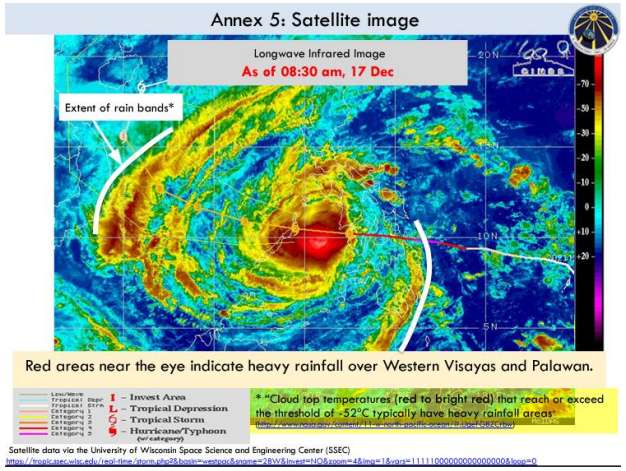
The EWB comprises of the following information:

- Track and wind intensity
- Associated rainfall extremes and
- Potential impact areas

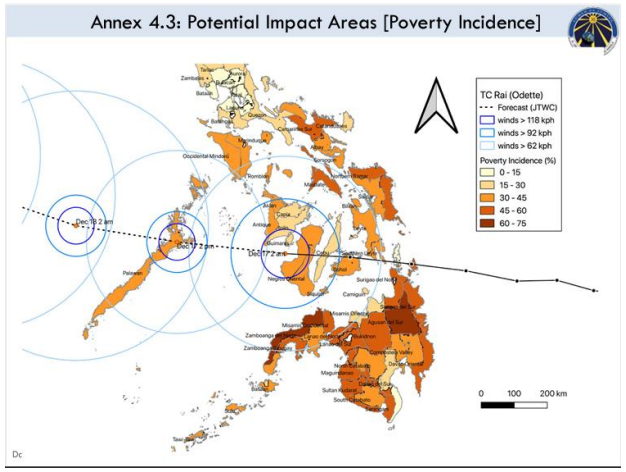
Past 24-hour rainfall



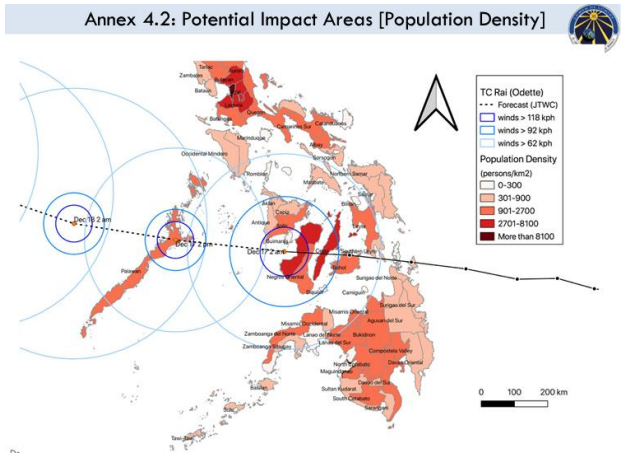
Satellite Image [longwave infrared]



Potential Impact [Poverty Incidence]



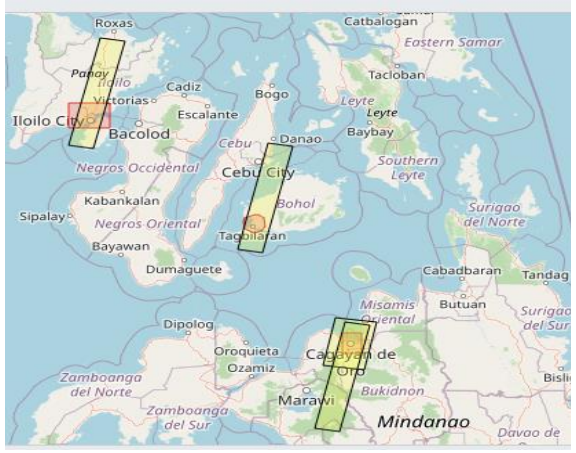
Potential Impact [Population Density]



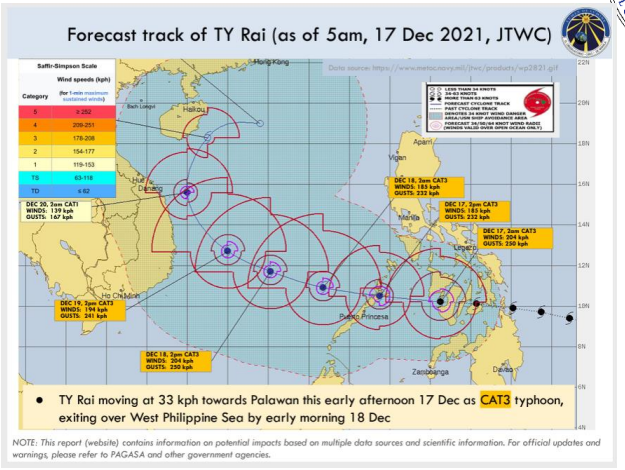
Emergency Observation/ Mapping (EO/M)

- The issuance of EWB together with the Situation Report from the Philippines National Disaster Risk Reduction and Management Council (NDRRMC) and other news triggers the start of Emergency Observation/ Mapping (EO/M)
- The GED laboratory prepares auxiliary datasets and determines the Area of Interest (AOI)
- The AOI is selected based on the forecasted impact areas based on RCS EWBs, NDRRMC situation reports, and other news

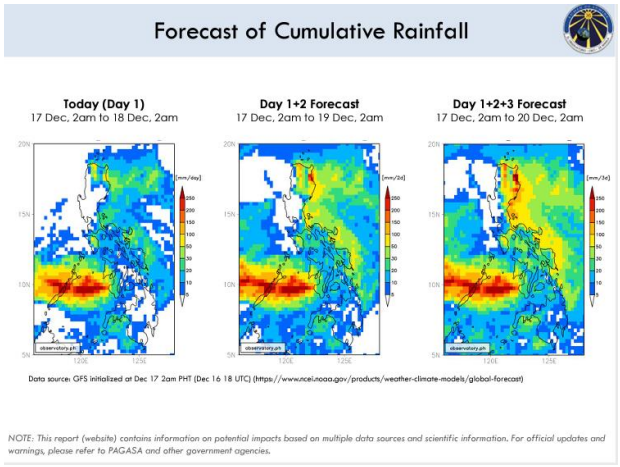
AOI of typhoon Rai



Current and Forecast track



Forecast of Cumulative Rainfall



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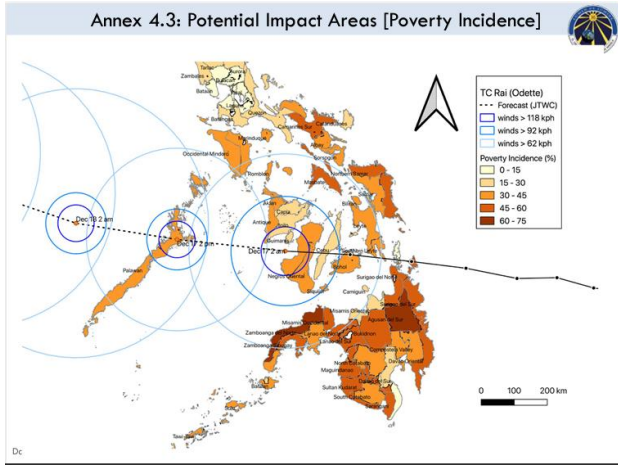
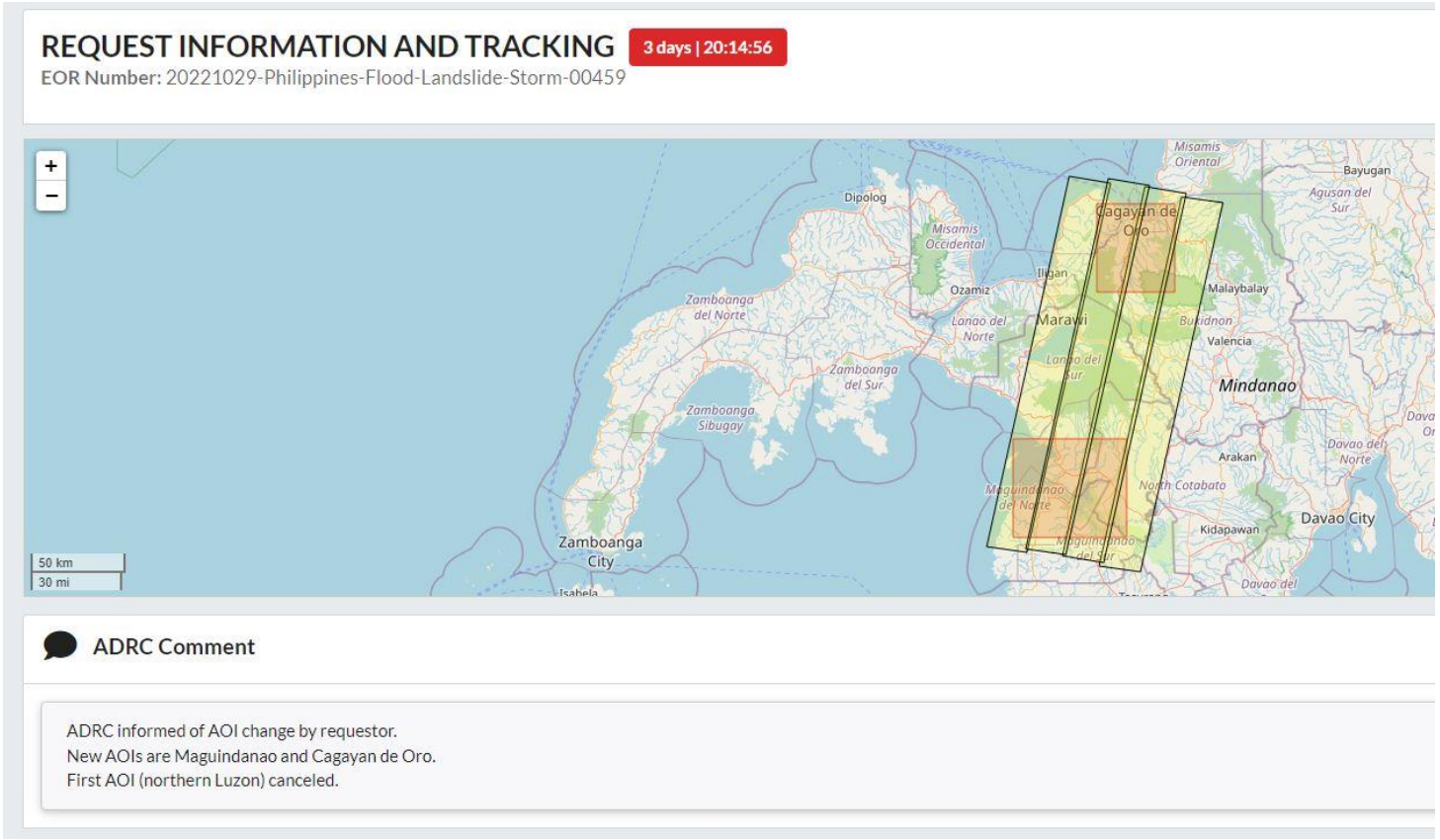


Sentinel Asia OPTEMIS and IDC

- Upon selecting the AOI, the Emergency Observation Request (EOR) through the Sentinel Asia OPTEMIS dashboard is lodged.
- The Sentinel Asia permits adjustment of the AOI in a few days.
- When the impact is severe, the EOR in the OPTEMIS dashboard may be elevated to IDC
- Once the EOR is accepted, the acquisition of pre, during, and post-disaster imageries are facilitated.
- After acquiring the satellite imageries as well as value added products from the SA OPTEMIS dashboard, appropriate image pre-processing and flood detection are applied to assess the impact of the TC.



Emergency Observation/ Mapping (EO/M) Report

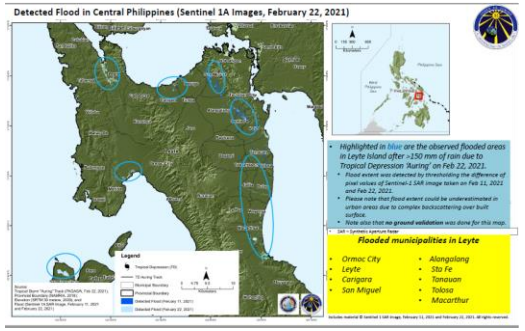
The report contains the following:

- Typhoon Track
- Low Lying Areas
- Detected Flood
- Extracted Flood overlaid with exposure such as:
  - critical infrastructure,
  - lifeline utilities, and
  - land cover

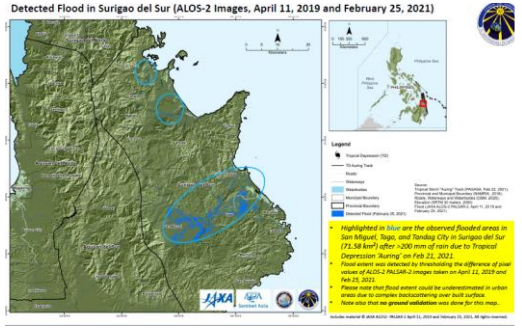
Tropical Depression Dujuan (Auring)

TC Track

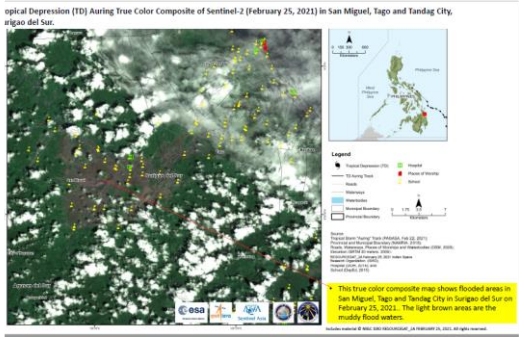
Detected Flood in Leyte



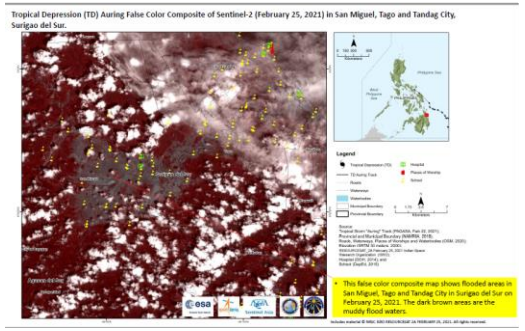
Detected Flood in Surigao Del Sur



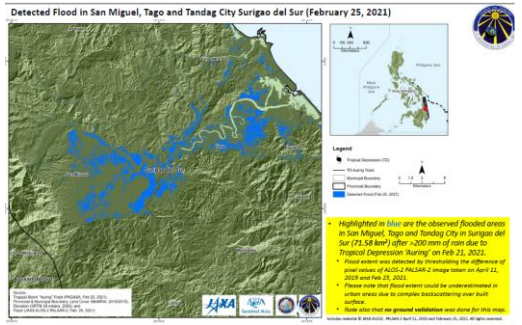
True Color (Sentinel-2)



False Color Sentinel-2



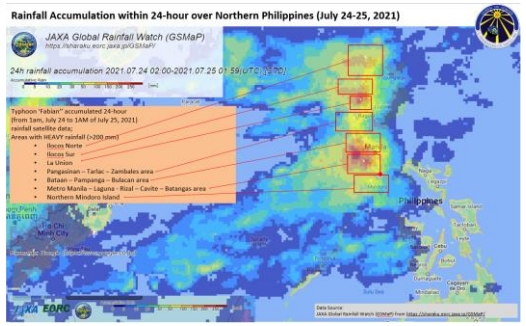
Detected Flood in San Miguel, Tago and Tandag City



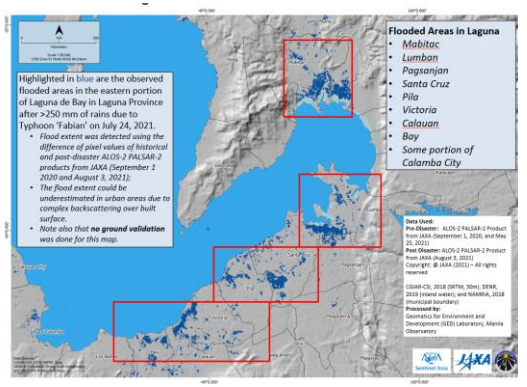
Sample EO/M Report in 2021

July: Typhoon Fabian

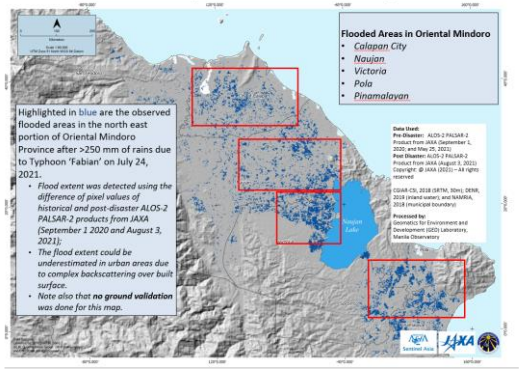
Rainfall Accumulation



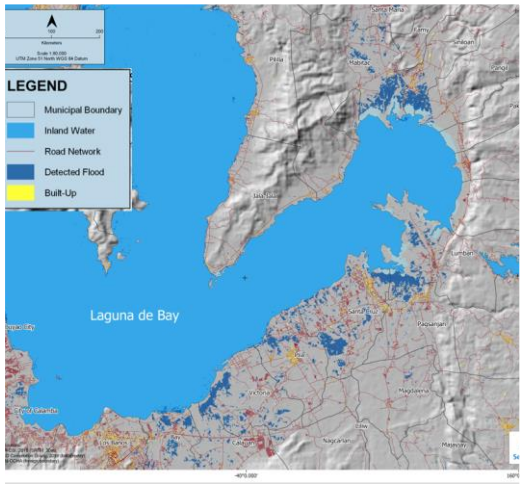
Detected Flood in Laguna



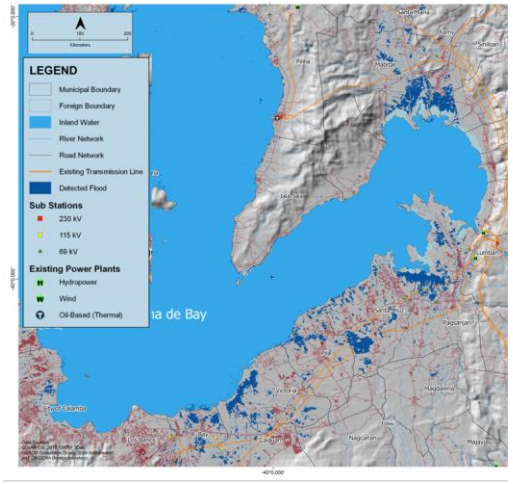
Detected Flood in Oriental Mindoro



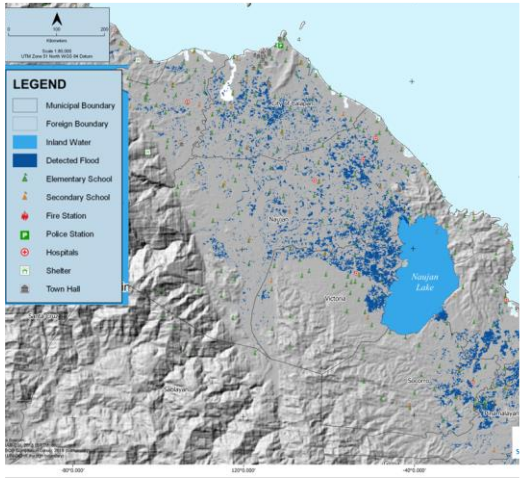
Exposed Population



Exposed Lifeline Utilities



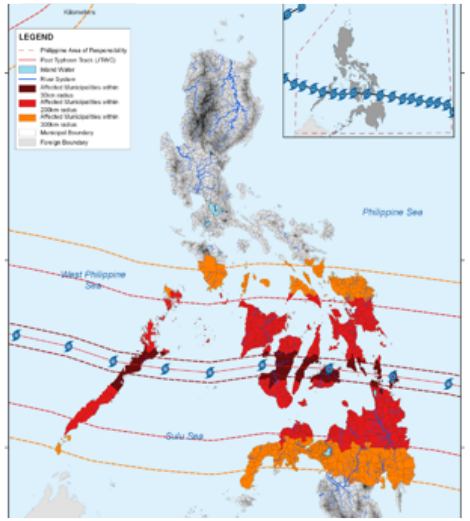
Exposed Critical Infrastructure



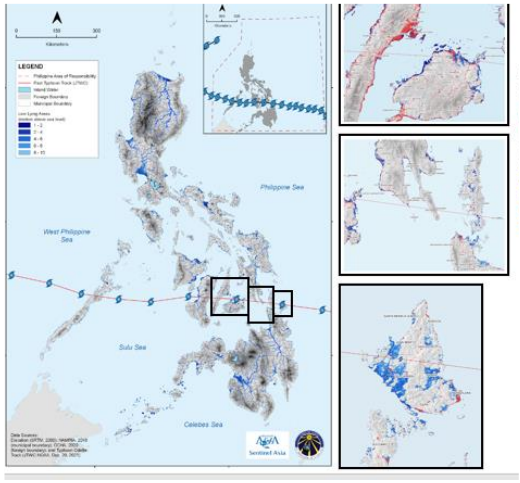
Sample EO/M Report in 2021

December: Super Typhoon Rai (Odette)

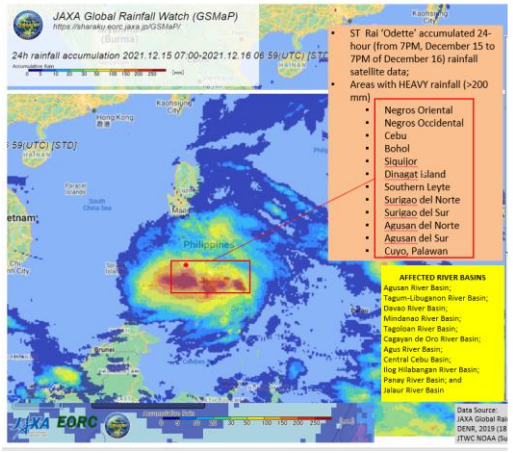
Typhoon Track



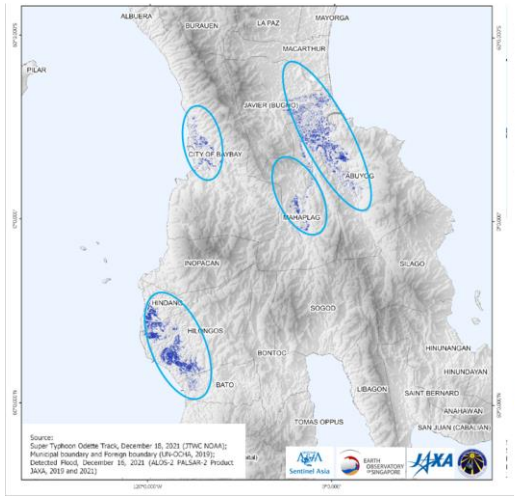
Low Lying Areas



Accumulated Rainfall



Detected Flood in Leyte



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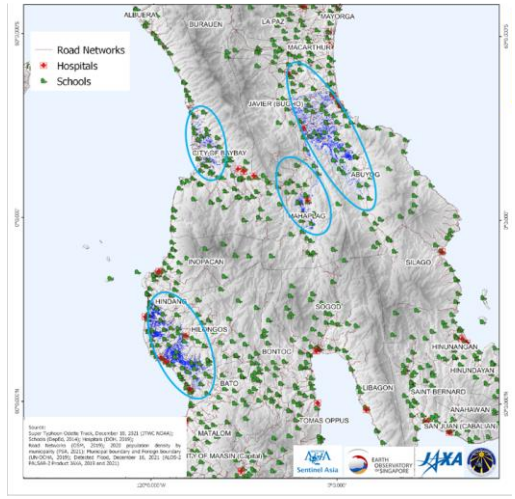
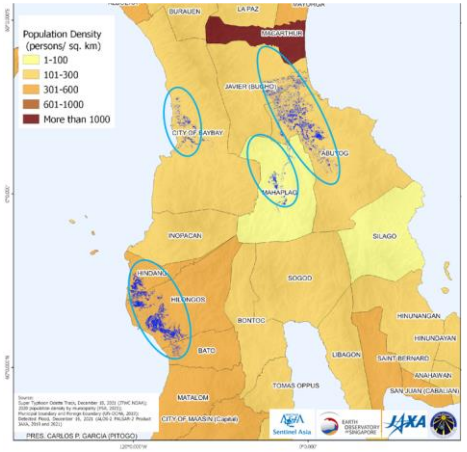


Affected Population



Current Research: Optimizing the Microsoft Planetary Computer for EO/M

- Funded by Group on Earth Observation (GEO) – Microsoft Planetary Computer (GMSPC)
- This project aims to enhance and optimize the automation of the current EO/M protocol of the Geomatics for Environment and Development (GED) Laboratory on the Microsoft Planetary Computer
- Through automation, it is hoped that the outputs of EO/M may be available to end-users in a timely manner.
- The project also intends to deepen the understanding of disaster risks and the severity of their actual impacts.

GEO GROUP ON EARTH OBSERVATIONS

Microsoft

Next Steps

- Applying the previous datasets from Sentinel Asia Optemis in the project activities
- In particular, the datasets to be use were the imageries provided for typhoon Vamco (Ulysses) and Goni (Rolly) in 2020.

Thank you for your kind attention.