Optimizing the Microsoft Planetary Computer for Emergency Observation and Mapping (EO/ M)

9th Joint Project Team Meeting for Sentinel Asia STEP-3 (JPTM2024)

05 to 07 November 2024

Novotel Manila Araneta City

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Background

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.

Manila Observatory

Laboratories

- Air Quality Dynamics
- Data and Sensor Development
- GeoDynamics Research
- Geomatics for Environment and Development
- Regional Climate Systems

Klima

Xavier University Ateneo de Cagayan

PULCHRA ES

Xavier University - Ateneo de Cagayan (XU) is a Filipino, Catholic and Jesuit educational community dedicated to the integral development of the person for the needs of Mindanao, the Philippines and Asia-Pacific.



Extreme Weather Bulletins (EWBs)

Provide forecast information on extreme weather events affecting the Philippines

It is a service for community partners to supplement the official information provided by the country's weather agency, Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA). 24-hour Total Rainfall Model Forecast 11 Nov 2 PM – 12 Nov 2 PM 24-hour Total Rainfall Model Forecast 12 Nov 2 PM – 13 Nov 2 PM



Figure 1. EWB for TC Ulysses/Vamco in November 2020 24 Hour Total Rainfall Forecast



Emergency Observation and Mapping (EO/M)

In 2011, MO became a Data Analysis Node (DAN) for Sentinel Asia (SA) and Project Managers for the International Disaster Charter (IDC).

With satellite imageries from SA and IDC, MO provides satellite-based emergency observation/mapping of areas of interest (AOIs) to assess the impact of a disaster at local scale.



Figure 2. EO/ M for TC Ulysses/ Vamco in November 2020 Barangay Population Density in 2015 Detected Flood in 2020 11 13



EWBs and EO/M

Gaps

 One of the gaps in the EWBs and EO/ M services is the lack of weather-related risk (R) and impact (I) information.



Addressing the Gaps

EWBs and EO/ M were streamlined and automated to three stages

1st Stage

 Generates a risk-informed forecasted impact map that is the basis for the selection of areas of interest (AOIs)

2nd Stage

 Lodge the emergency observation request (EOR) is on the SA-OPTEMIS dashboard and/or to IDC charter operation system version 2 (COS-2)

3rd Stage

• Actual impact assessment through processing of satellite imageries and auxiliary datasets.



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

- Funded by Group on Earth Observation (GEO) Microsoft Planetary Computer
- 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 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.





Initial Result







System Architecture



Current System (Test/Staging) Architecture



Summary

- The automation of risk-informed EWBs and EO/ M become seamless and archival enabling a deeper understanding of the behavior of extreme events like TCs.
- The test case is TC Ulysses/ Vamco which happened in November 2020.
- Ultimately, spatiotemporal risk information enhances EWBs and rationalizes the selection of satellite scenes for AOIs.

Ways Forward

This research has three time frames to which timeframe 1 is ongoing

Timeframe two (2) and three (3) have the following activities:

- real-time TC EO/ M application;
- maintenance and improvement; and
- stakeholder outreach workshop.



Thank you for you attention

