

PAGASA Early Warning System



CHRISTOPHER F. PEREZ

Philippine Atmospheric, Geophysical and Astronomical Services
Administration (PAGASA)

Advancing Volcanic Hazards in Early Warning For All Workshop 2025

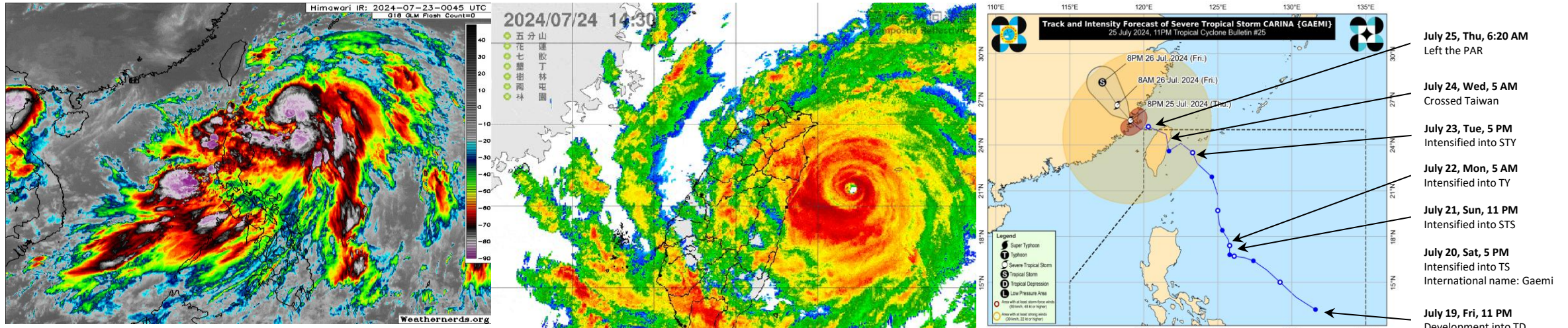
Geneva, Switzerland

07 - 09 July 2025

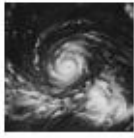


- 1) Brief Background on the Philippines' Weather And Climate
- 2) Key Hazards in the Philippines
- 3) PAGASA Commitments on the EW4ALL Initiatives
- 4) Importance of Collaboration and Multidisciplinary Strategies
- 5) Best Practices, Areas for Improvement and Challenges
- 6) Future perspectives

Brief Background on the Philippines' Weather And Climate

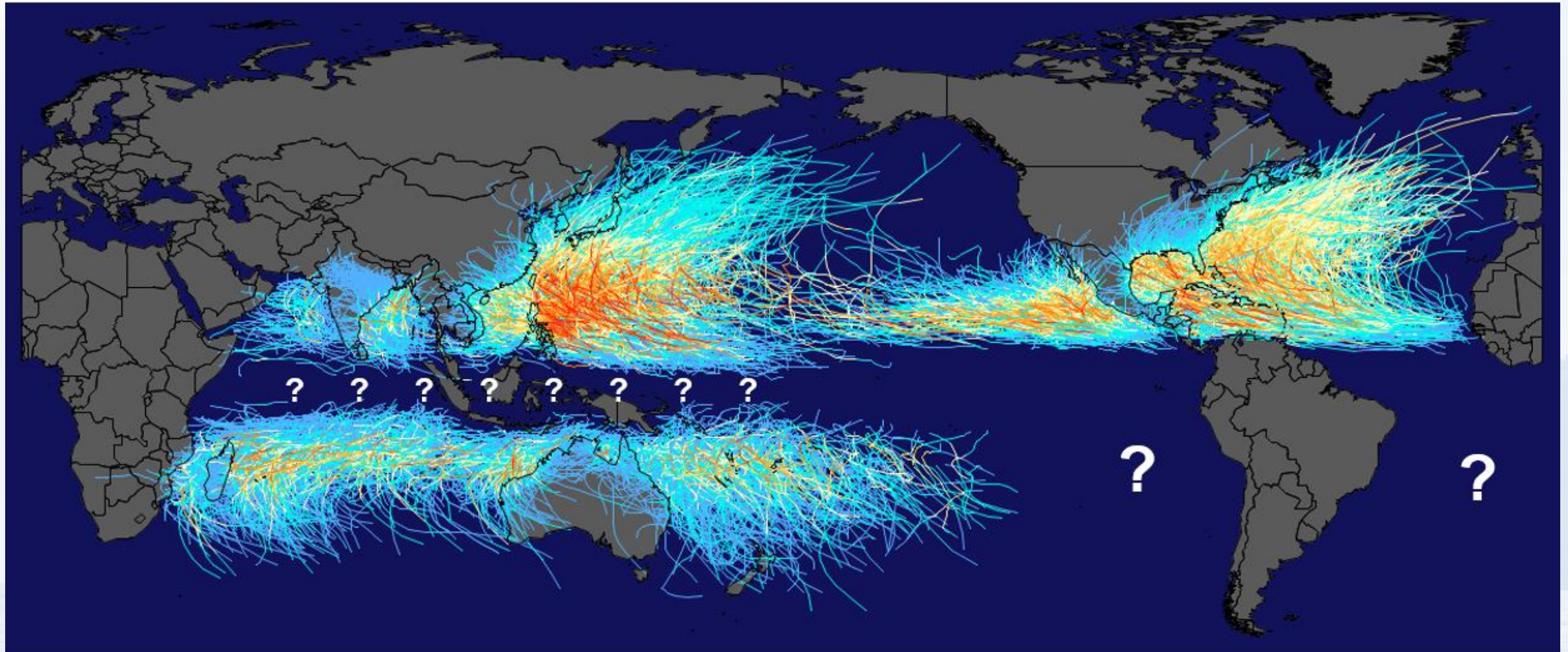


- Northeast and Southwest Monsoons, low pressures, shearlines, intertropical convergence zone and tropical cyclones are some of the weather systems that affect the country.
- The combined effects of the enhanced Southwest Monsoon or “Habagat,” and Super Typhoon “Carina” (int’l name: GAE) last year have left around PhP 4.73 billion worth of agricultural damage in the country.

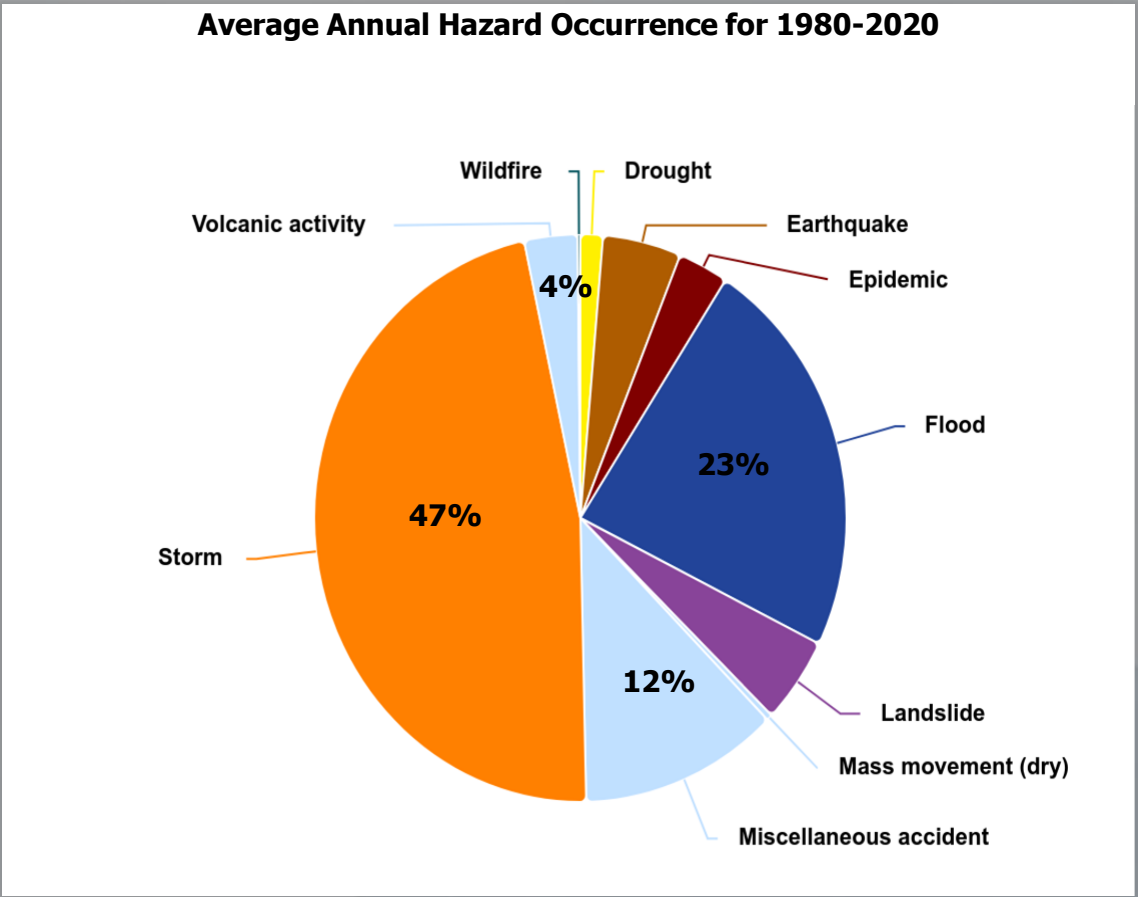
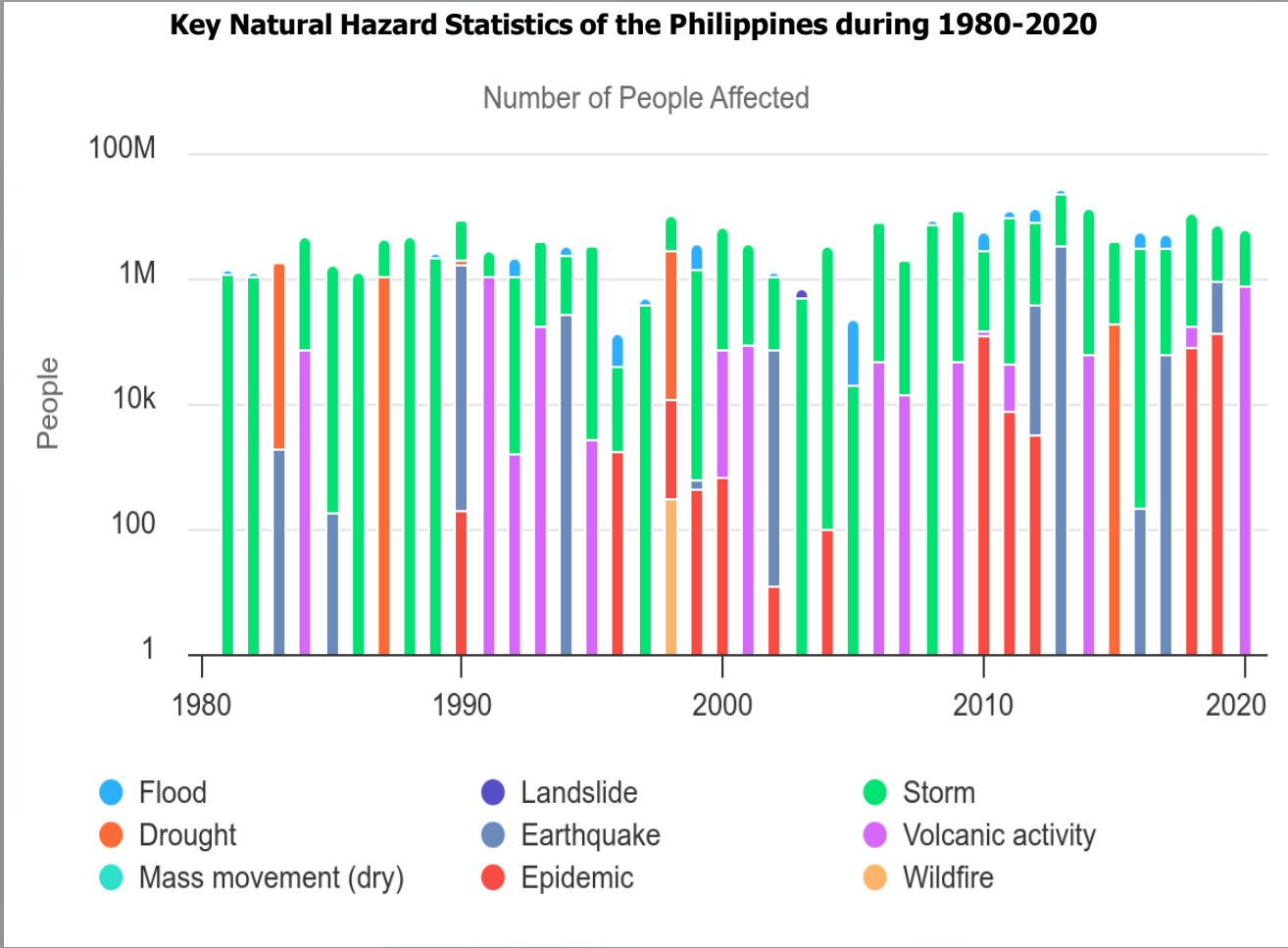


The Science Behind Typhoons

Tropical Cyclone Basins

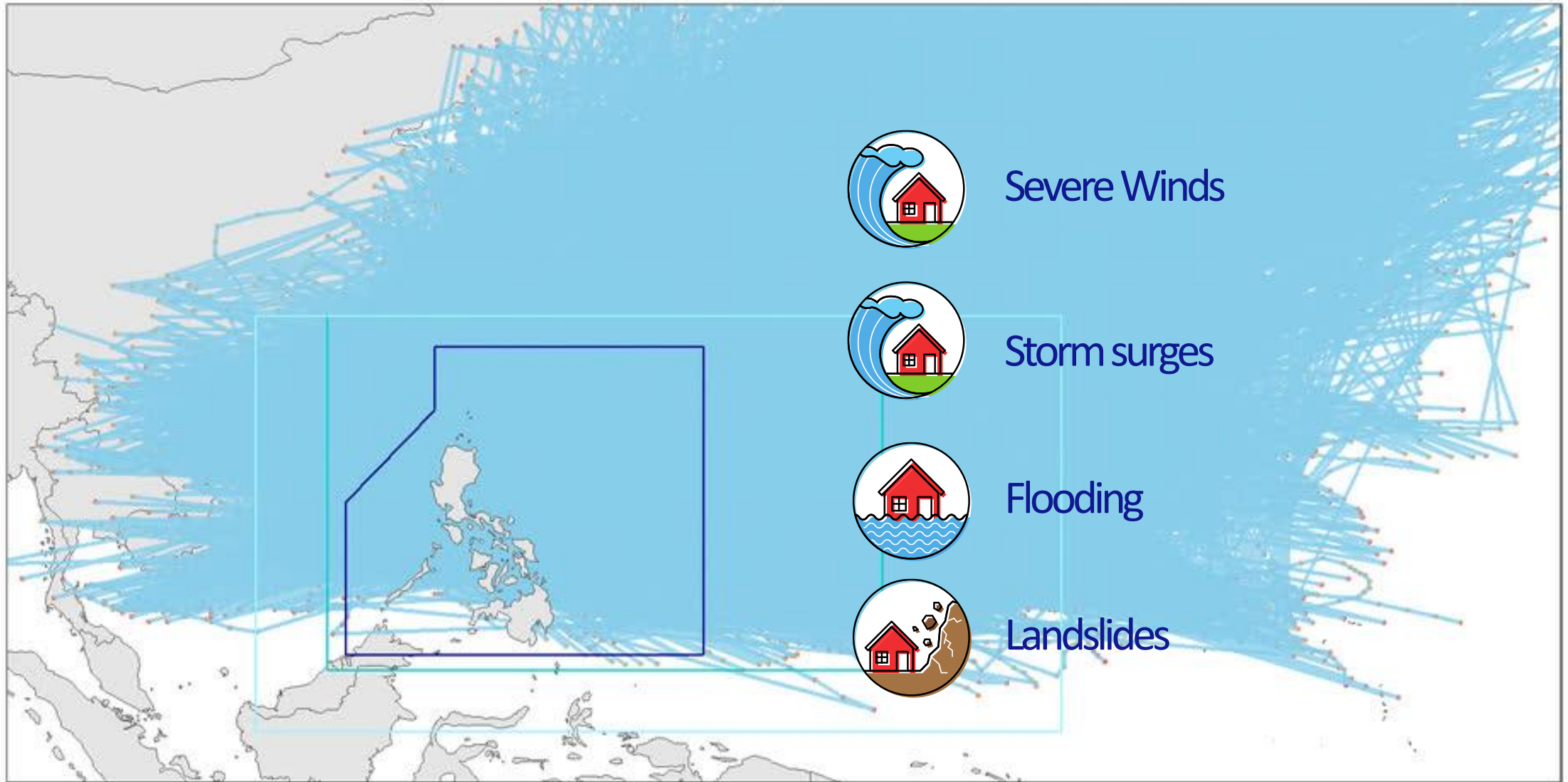


Key Hazards in the Philippines



Source: WorldBank Climate Change Portal

Key Hazards in the Philippines





83

Synoptic/Agromet stations

175

Automatic Weather Stations

11

Upper Air stations

7

Aviation Weather Observation
Stations

22

Disdrometer-Parsivel Stations



28

Lightning Detection Systems

19

Doppler RADARS

7

X-Band RADARS (stationary)

32

High Frequency RADARS

17

Flood Forecasting and
Warning System





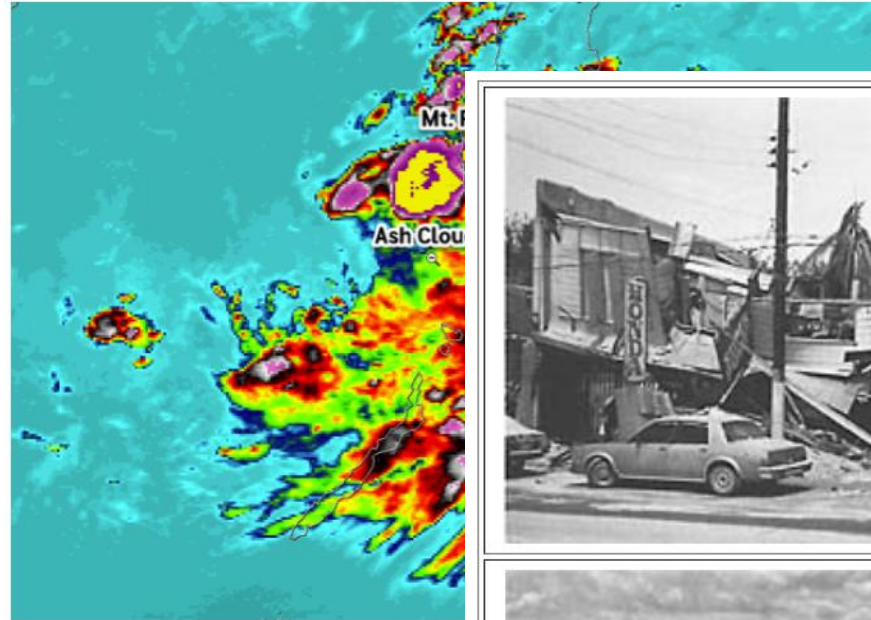
EW4All Pillars	Severe Wind	Heavy Rainfall
Disaster risk knowledge	Hazard susceptibility and risk assessment <ul style="list-style-type: none"> Existing nationwide regional and local severe wind hazard maps at 5%, 2%, 1%, 0.5%, and 0.2% AEP in <u>GeoRisk</u> Philippines Existing severe wind risk maps for selected areas (e.g., Metro Manila, Cebu City) through completed risk analysis projects Disaster prevention and mitigation Early Preparedness Actions for Local Governments under the Operation LISTO Disaster Preparedness Manual	Hazard susceptibility and risk assessment Existing rain-induced landslide and flood susceptibility map in <u>GeoRisk</u> Philippines Disaster Prevention and Mitigation Early Preparedness Actions for Local Governments under the Operation LISTO Disaster Preparedness Manual
Detection, observations, monitoring, analysis and forecasting of hazards	Public Forecast and Warning Products <ul style="list-style-type: none"> Tropical Cyclone Advisory Tropical Cyclone Bulletin + Tropical Cyclone Wind Signals Tropical Cyclone Warning for Agriculture Tropical Cyclone Warning for Shipping Specialized Forecast and Warning Products <ul style="list-style-type: none"> High Seas and Offshore Waters Forecast (and Warning) Gale Warning (for coastal waters) SIGMET for tropical cyclones National Met-Hydro Observation Network Numerical Weather Prediction Model Products (WRF 12km and 3km, ECMWF 0.1-degree resolution, probability of exceedance for rainfall and winds) PAGASA Satellite Ground Receiving Stations (GRS) <ul style="list-style-type: none"> <u>HimawariCast</u> System (multiple sites nationwide) GEO-KOMPSAT-2A GRS (Quezon City) <u>CMACast</u> System (Quezon City) Utilization of meteorological satellite products from other NMHS/centers Meteorological data and information exchange via the WMO GTS (operational) and WIS 2.0 (under testing)	Public Forecast and Warning Products <ul style="list-style-type: none"> Tropical Cyclone Advisory Tropical Cyclone Bulletin Weather Advisory (for non-TC cases) Heavy Rainfall Warning Thunderstorm Watch/Information and Advisory



EW4All Pillars	Severe Wind	Heavy Rainfall
Warning dissemination & communication	<ul style="list-style-type: none">• Adoption of Common Alerting Protocol (CAP) Services in PAGASA (since 2014)• Utilization of social media and YouTube for live weather updates (since 2017)• Parallel horizontal and vertical information dissemination framework (national to local)	
Preparedness to respond	<ul style="list-style-type: none">• Pre-Disaster Risk Assessment (PDRA) mechanism• Office of Civil Defense Four-Tier Emergency Preparedness and Response (EPR) Protocols• Critical Preparedness Actions for Local Governments under the Operation LISTO Disaster Preparedness Manual <p>LISTO Disaster Preparedness Manual</p>	



Mt. Pinatubo in Central Luzon erupted in 1991.



Infrared satellite photo of Typhoon Yunya and Mt. Pinatubo (CIMSS/GMS-4 Satellite)

https://www.aol.com/volcano-vs-typhoon-island-hit-152205335.html?guccounter=1&guce_referrer=aHR0cHM6Ly93cy44hHYO7oDifsQfE9CMk1EM17fa8iAyLBv3xyQbzMidUFoR95MIRsgECUsUTW2-v7hrNrpN8JC62ZuTQG6BUpv2v_Bsl6_2Est



Following Mount Pinatubo's cataclysmic June 15, 1991, eruption, thousands of roofs collapsed under the weight of ash made wet by heavy rains (see example in photo above). Ash deposits from the eruption have also been remobilized by monsoon and typhoon rains to form giant mudflows of volcanic materials (lahars), which have caused more destruction than the eruption itself (photo at right shows village buried by lahars). (Photo above courtesy of Peter Baxter, University of Cambridge).

<https://pubs.usgs.gov/fs/1997/fs113-97/>

PAGASA provided Severe Weather Bulletins regarding Typhoon “DIDING” (int’l name: Yunya) to DRRM-partner government agencies during its course.



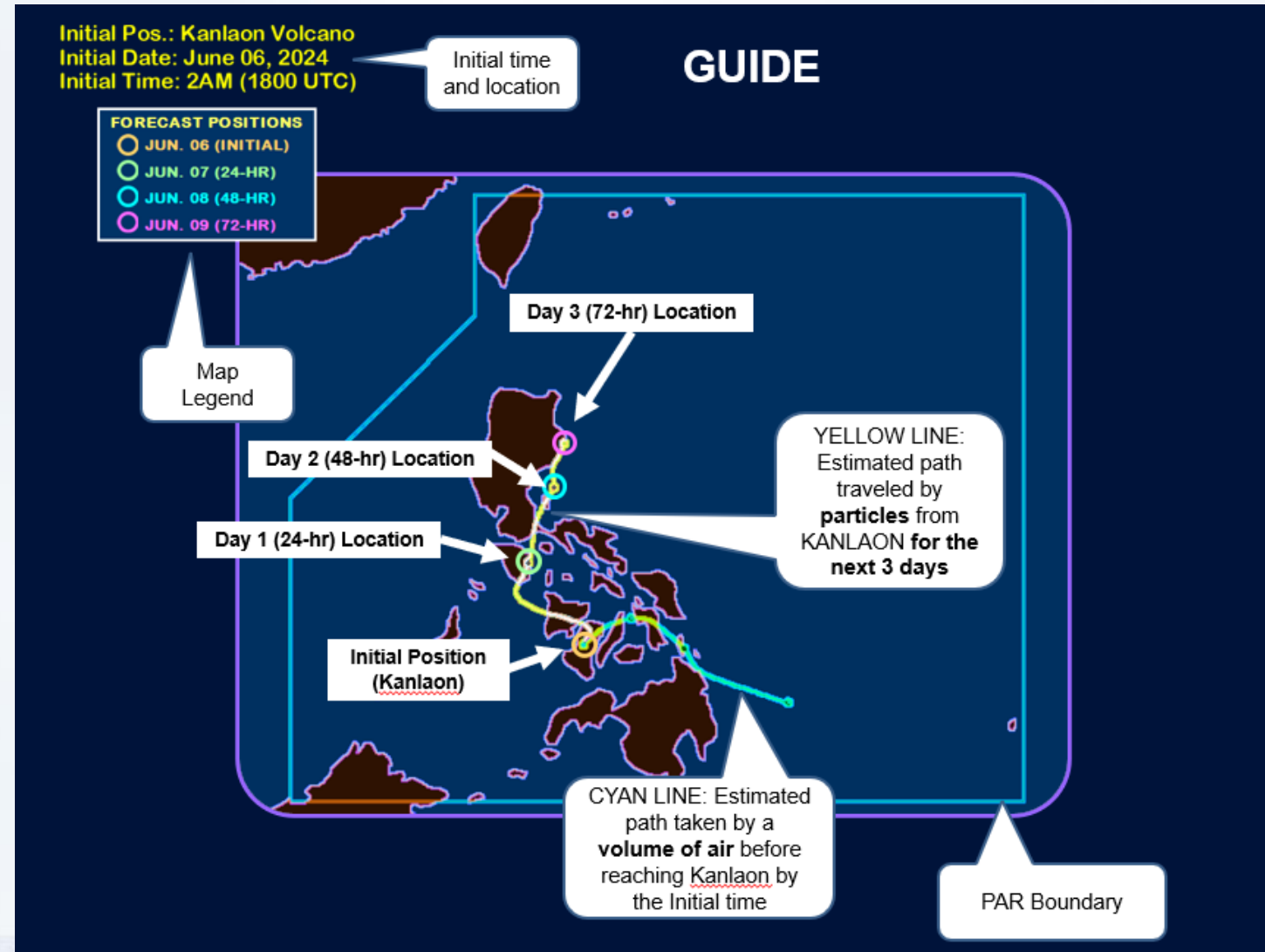
Mt. Kanlaon in Western Visayas

PAGASA continues to provide the **Air Parcel trajectory** to know the estimated locations traveled by airborne particles emitted by the Kanlaon Volcano for the next three days (yellow line). The cyan line (supplemental information only) can be used to trace back the origin of the volume of air over Kanlaon Volcano at the initial time (see **Guide**, next slide)



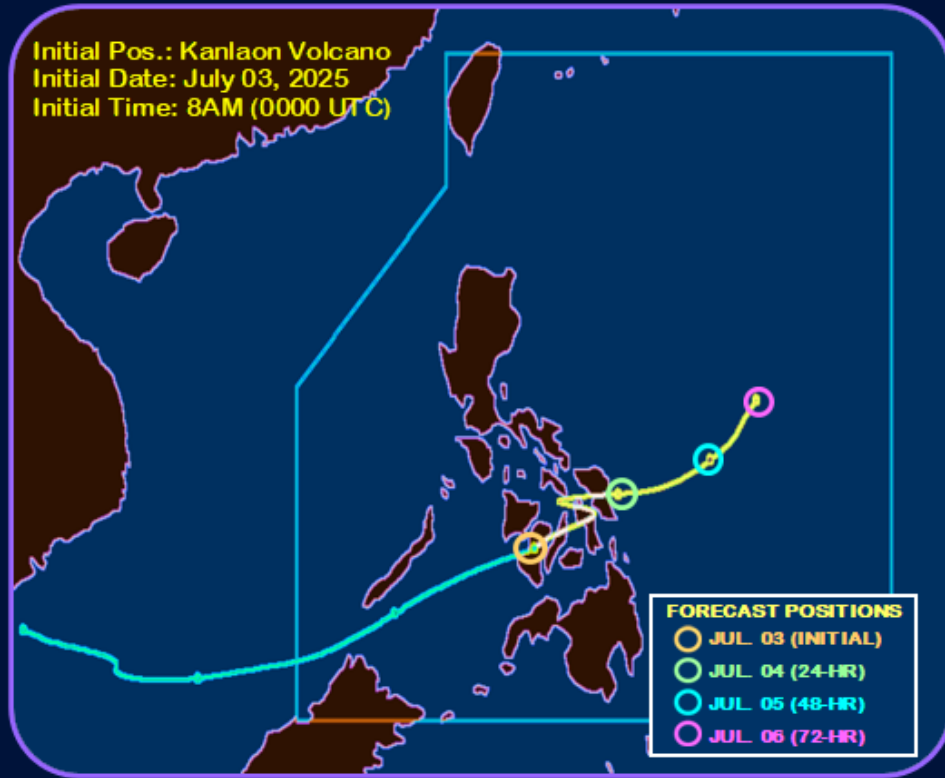
The **wind speed and direction map** shows wind information from ~1km to ~12km above sea level.

- PAGASA forecasts the air parcel trajectory using data from Global Spectral Model (GSM) of Japan Meteorological Agency. (The data used in the analysis is initialized at 8 AM, 03 July 2025).



850 hPa (~1.5Km) Level

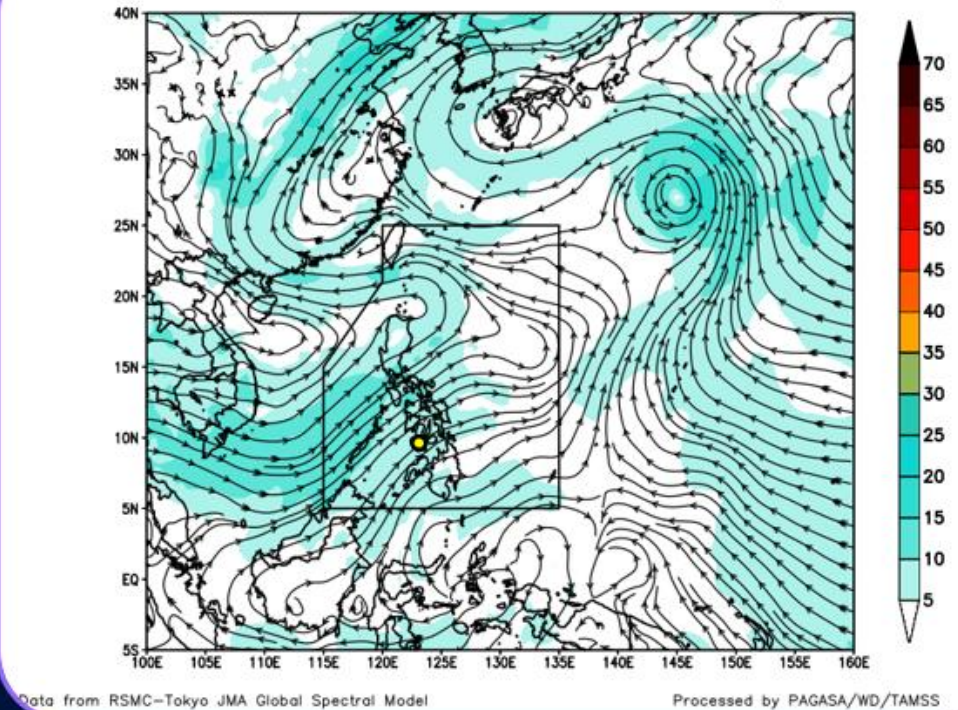
Initial Pos.: Kanlaon Volcano
Initial Date: July 03, 2025
Initial Time: 8AM (0000 UTC)



At 850 hPa level (1.5km above the surface)

850 hPa (~1.5Km) Level

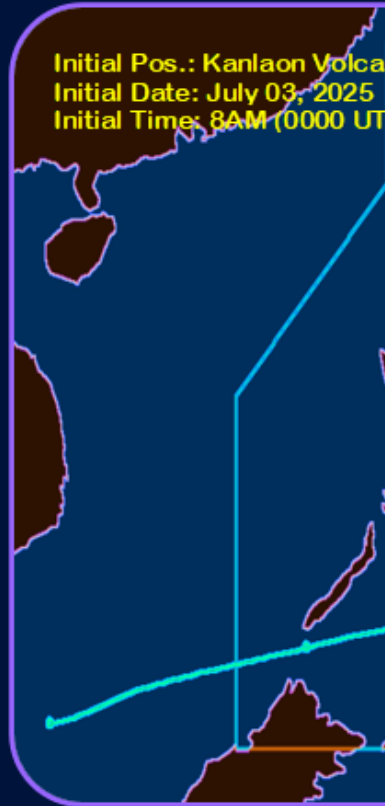
850 hPa Wind Speed and Direction (m/s) for JUL 03, 2025 00UTC Thu
Initial time: 00 UTC 03 JUL 2025
Analysis



850 hPa level (1.5km above the surface): Wind field (m/sec)



700 hPa (~3Km) Level



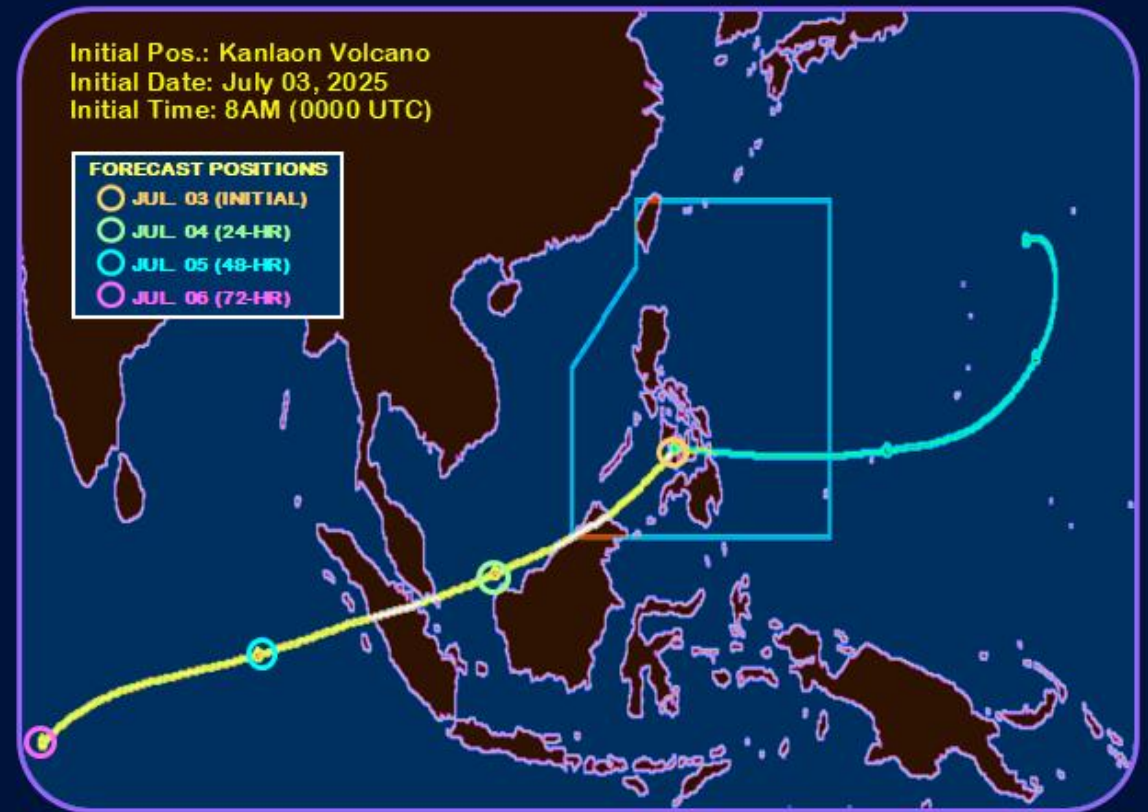
500 hPa (~5

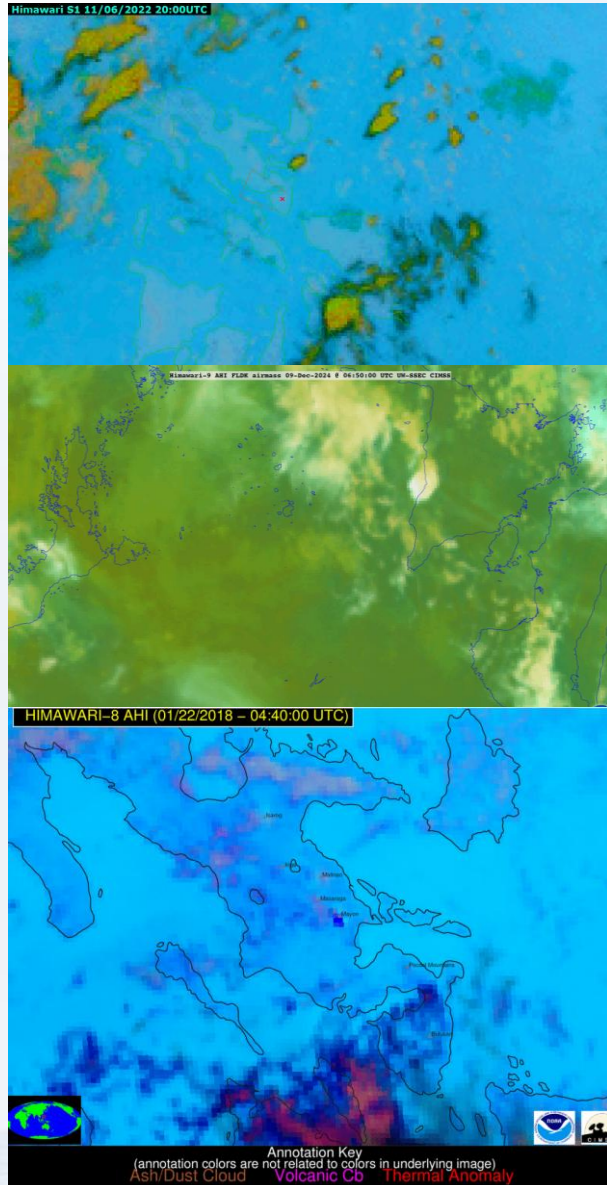


300 hPa (~9 Km) Level



200 hPa (~12km) Level





Flight into a volcanic ash cloud is considered unsafe and should be avoided due to severe adverse effects on the aircraft such as:

- Engine malfunction
- Long-term engine damage
- Clogging of exposed sensors
- Abrasion of external surface

PAGASA issues **SIGMET (SIGnificant METeorological information) for volcanic ash (VA)** to provide timely and concise warnings about hazardous volcanic ash clouds that may affect aircraft safety. This information enables pilots and other civil aviation users to make informed decisions and avoid potentially dangerous areas.

SIGMET FOR VOLCANIC ASH

WVPH31 RPLL 141221

RPHI SIGMET 6 VALID 141221/141821 RPLL-

RPHI MANILA FIR MT KANLAON PSN N1025 E12308 VA CLD OBS AT 1130Z WI N1043 E12202 - N1042 E12211 - N1039 E12210 - N1038 E12202 - N1043 E12202 SFC/FL110 FCST AT 1730Z WI N1043 E12135 - N1023 E12149 - N1009 E12130 - N1039 E12113 - N1043 E12135 AND OBS AT 1130Z WI N1025 E12307 - N1026 E12257 - N1021 E12300 - N1025 E12307 SFC/FL090 FCST AT 1730Z WI N1018 E12250 - N1000 E12240 - N1014 E12214 - N1031 E12230- N1018 E12250=

"tracking the sky...helping the country"

Aeronautical Meteorology Services Section
Rm.415, 4th Floor, IPT Bldg., NAIA Terminal 1, Pasay City

Tel. Nos. (632) 8852 2927
(632) 8832 3023

www.bagong.pagasa.dost.gov.ph



Importance of Collaboration and Multidisciplinary Strategies



Volcanic Ash Advisory Text

FVFE01 RJTD 122038
VA ADVISORY
DTG: 2025
VAAC: TOK
VOLCANO:
PSN: N102
AREA: PHI
SUMMIT E
ADVISORY
INFO SOU
AVIATION
ERUPTION
OBS VA D1
OBS VA CL
N1021 E12
FCST VA C
N1024 E12
FCST VA C
N1035 E12
FCST VA C
N1035 E11
RMK: NIL
NXT ADVIS



- (1) **VOLCANO OBSERVATORY NOTICE FOR AVIATION (VONA)**
(2) Issued: (20250414/1628Z)
(3) Volcano: Kanlaon (CAVW# 0702-02=)
(4) Current Aviation Color Code:
(5) Previous Aviation Color Code:
(6) Source: Kanlaon Volcano Observatory (PHIVOLCS)
(7) Notice Number: PIVS-VONA-KV-20250414-4_UPDATE
(8) Volcano location: N 10 deg 24 min E 123 deg 7 min
(9) Area: Negros Oriental
(10) Summit Elevation: 7989 ft (2435 m)
(11) Volcanic Activity Summary: Onset: 1628Z
Duration: 01:10:00
Eruption Type: ash emission
492 ft (150 m)
(12) Volcanic Cloud Height:
(13) Other volcanic cloud information: indiscernible; West drift
(14) Remarks: observed in VKLM IPcam with accompanying weak tremor and
infrasound signal.
(15) Contacts: Philippine Institute of Volcanology and Seismology
Volcano Monitoring and Eruption Prediction Division
mail.vmped@phivolcs.dost.gov.ph (632) 8927-1095; (632)
8426-1468 loc 311 or 312
(16) Next Notice: A new VONA will be issued if conditions change significantly.
While a VONA is in effect, regularly scheduled updates are
posted at <http://www.phivolcs.dost.gov.ph>

[Back to i](#)

Postal Address: PHIVOLCS Building, C.P. Garcia Avenue, U.P. Campus
Diliman, Quezon City 1101 Philippines
Website: www.phivolcs.dost.gov.ph
Tel. Nos.: +63 2 8426-1468 to 79; +63 2 8926-2611
Fax Nos.: +63 2 8929-8366; +63 2 8928-3757



Republic of the Philippines
DEPARTMENT OF SCIENCE AND TECHNOLOGY
**Philippine Atmospheric, Geophysical and
Astronomical Services Administration (PAGASA)**
Weather Division



AMSS-07 Rev.1/24-06-2024

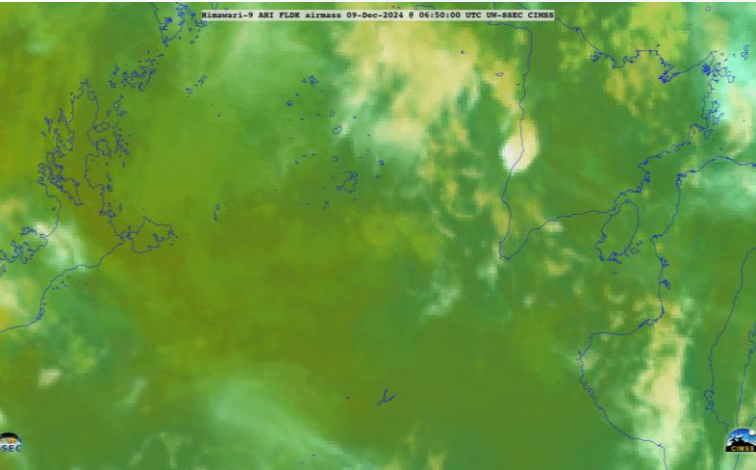


SIGMET FOR VOLCANIC ASH

WVPH31 RPLL 141221
RPHI SIGMET 6 VALID 141221/141821 RPLL-
RPHI MANILA FIR MT KANLAON PSN N1025 E12308 VA CLD OBS AT 1130Z WI N1043 E12202
- N1042 E12211 - N1039 E12210 - N1038 E12202 - N1043 E12202 SFC/FL110 FCST AT 1730Z
WI N1043 E12135 - N1023 E12149 - N1009 E12130 - N1039 E12113 - N1043 E12135 AND
OBS AT 1130Z WI N1025 E12307 - N1026 E12257 - N1021 E12300 - N1025 E12307 SFC/FL090
FCST AT 1730Z WI N1018 E12250 - N1000 E12240 - N1014 E12214 - N1031 E12230- N1018
E12250=

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Aeronautical Meteorology Services Section Tel. Nos. (632) 8852 2927 www.bagong.pagasa.dost.gov.ph
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PAGASA issues SIGMET VA



PAGASA analyzes movement of VA from satellite imagery and monitors subsequent updates PHIVOLCS and Tokyo VAAC

Is volcanic ash signature still present in Manila Flight Information Region (FIR)?

PAGASA cancels its SIGMET VA

PAGASA receives **Volcano Observatory Notice for Aviation (VONA)** from **PHIVOLCS** and Volcanic Ash Advisory (VAA) from Tokyo VAAC



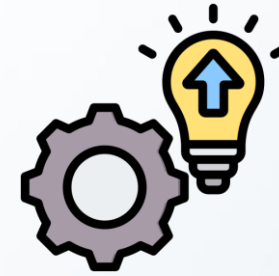
PAGASA participation on the National Disaster Risk Reduction and Management Council's (NDRRMC) Pre-Disaster Risk Assessments (PDRA) meetings on both national and local levels before, during and even after the event of a tropical cyclone.





What worked well?

- Capacity of PAGASA in providing Forecast and Early Warning for the different hydrometeorological hazards.
- The existence of Pre-Disaster Risk Assessment (PDRA) mechanism at the national, regional, and local levels to bridge hazard information into preparedness actions.



What needs to be improved?

- Updated hazard susceptibility and risk maps
- Sufficient annual appropriations for the expansion of new meteorological and hydrological observation station and the operations and maintenance of observation facilities
- Impact-based forecasts (IbF) both at the national and local levels to support early action.
- Preparedness actions protocols by local governments and national agencies needs to be updated and aligned to IBF.



Disaster Risk Knowledge

- Central national exposure database not yet fully realized.
- Limited hazard vulnerability data for buildings, houses, agriculture, and critical infrastructure and lifelines.
- Impact forecasting still far from operational.
- Poor data sharing framework for risk information.
- Infrequent updating of hazard and risk maps
- Limited funding for a robust disaster risk knowledge data bank

- Preparedness and response capabilities highly dependent on income and fiscal status of local government authorities
- Disaster managers typically co-terminus with their appointing executives, affecting knowledge retention in DRRM.
- Lack of legal framework for use of DRRM funds before a disaster for anticipatory action activities



Observation,
Monitoring,
Analysis, and
Forecasting

Preparedness and
Response
Capabilities

Warning Dissemination and Communication

- Limited manpower (meteorologists, hydrologists field station personnel, instrument technicians)
 - Limited annual appropriation to support growing number of equipment, facilities, and services
 - Sparse station network with limited observation frequency (mostly every 3 h)
 - Manual instruments and visual observations
 - Poor integration of observation network
 - Vulnerable met telecommunications infrastructure
 - No DA and BC for in-house high-resolution NWP
 - Limited high-performance computers (HPC)
 - Most products still text-based (no digital forecasts)
- Emergency cell broadcast implemented manually
 - CAP not fully maximized (only used for typhoon and river flood-related messages), with no integration to cell broadcast systems
 - Some local governments issue their localized weather warnings despite not being their role.
 - Conflicting and fake weather information from pseudo-meteorologists, and weather enthusiasts
 - Multilingual setting poses challenge in warning communication



Thank you for your attention!



Department of Science and Technology-
**Philippine Institute of
Volcanology and
Seismology**

Volcano Early Warning Systems



Department of Science and Technology
PHIVOLCS
Philippine Institute of Volcanology and Seismology

Republic Act No. 10121 (2010)

NATIONAL DISASTER RISK REDUCTION AND MANAGEMENT COUNCIL

Secretariat: Office of Civil Defense

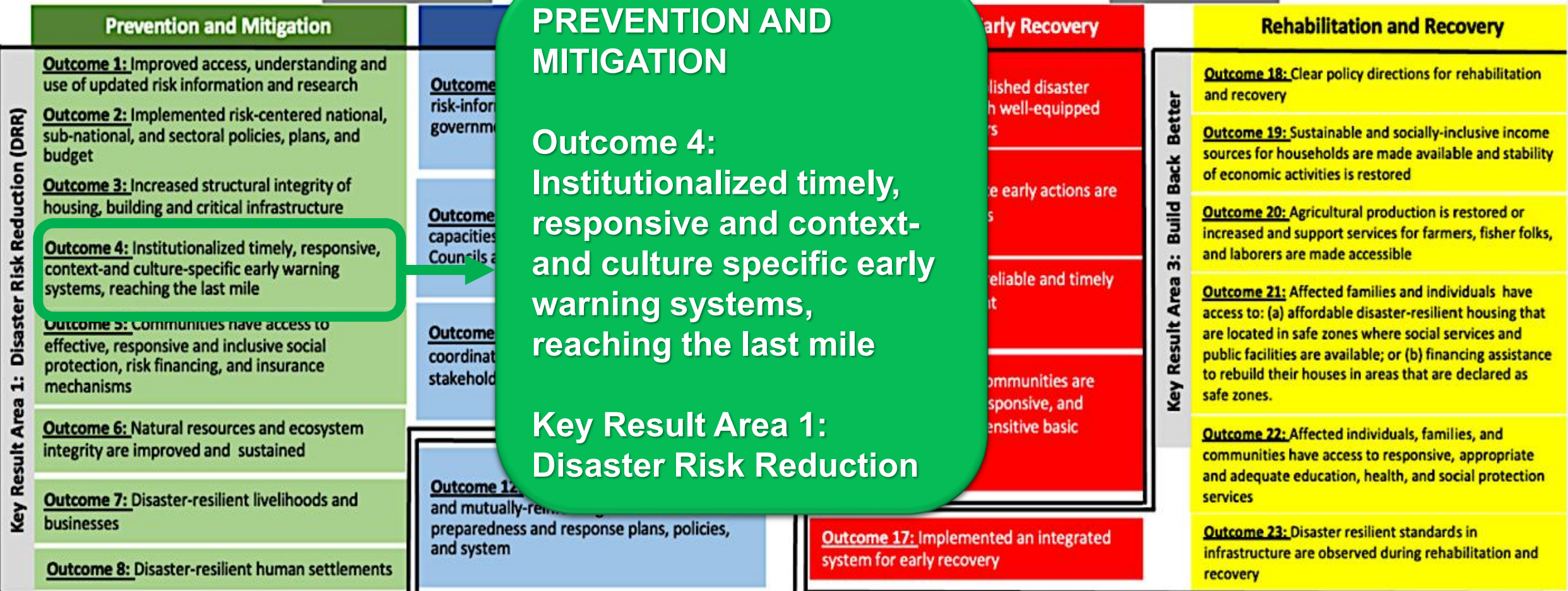
PREVENTION AND MITIGATION

Outcome 4:
Institutionalized timely, responsive and context- and culture specific early warning systems, reaching the last mile

Key Result Area 1:
Disaster Risk Reduction

Early Recovery

Rehabilitation and Recovery



VISION

A leading global science and technology institution of empowered men and women helping develop communities safe from and resilient to volcanic eruptions, earthquakes, tsunamis and other related hazards.

MISSION

We provide timely, quality and socially-inclusive information and services for warning, disaster preparedness and mitigation. This we do through the development and application of technologies for the monitoring and accurate prediction of, and determination of areas prone to, volcanic eruptions, earthquakes, tsunamis and other related hazards, and capacity enhancement of communities for comprehensive disaster risk reduction.

SOCIETAL OUTCOME: Communities have achieved resilience to volcanic eruptions, earthquakes, tsunamis and other related hazards

Organizational Goal 1: Enhanced safety of communities

1. Accurately predicted and simulated geologic phenomena
2. Provided accurate and timely warning and information
3. Developed cost-effective monitoring and warning system
4. Empowered partners to lead in reducing risks from geologic hazards down to the barangay level
5. Enhanced collaboration with stakeholders

Organizational Goal 2: Highly responsive and competent

1. Highly prominent, globally recognized experts
2. Motivated, rewarded and competent staff
3. Effective and efficient systems, procedures, structures
4. Inspiring, dynamic leadership

Excellence

Innovation

Integrity

Service

STRATEGIC INITIATIVES FOR EARLY-WARNING:

- ▲ National Volcano Monitoring and Warning
- ▲ National Earthquake Monitoring and Information
- ▲ National Tsunami Monitoring and Early Warning
- ▲ Landslide Monitoring, Early Warning and Risk Assessment

9 Volcano Observatories

on 8 most active volcanoes (Bulusan, Hibok-Hibok, Kanlaon, Mayon, Pinatubo, Taal, Matutum, Parker)

- ▲ Resident Volcanologist (VO chief officer)
- ▲ 3-8 Technical personnel
- ▲ Engineers, physicists, geologists

Planned Volcano Observatories (2026-2030):

- Northern Luzon
- Camarines

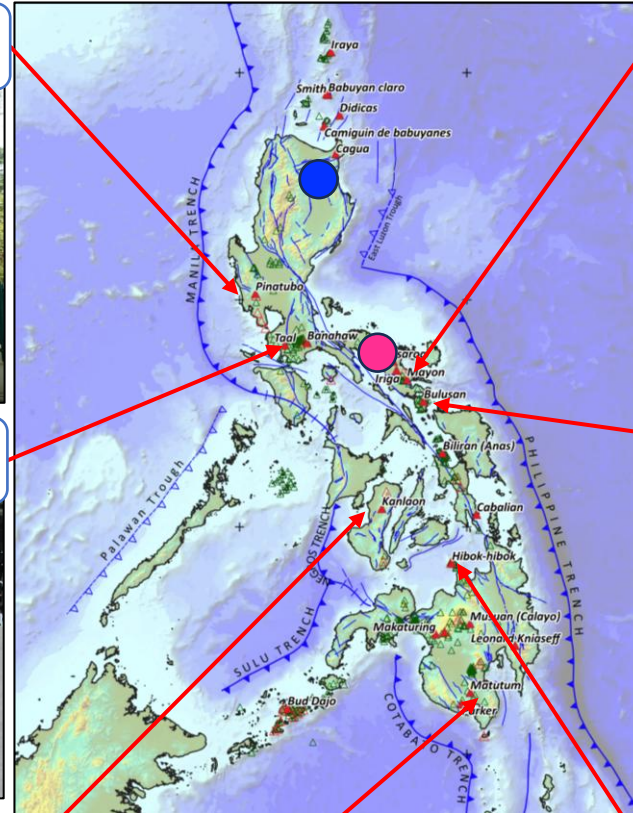
PINATUBO VOLCANO OBSERVATORY
PASU Campus, Magalang, Pampanga



TAAL VOLCANO OBSERVATORY
Buco, Talisay, Batangas



KANLAON VOLCANO OBSERVATORY
Cubay, La Carlota City, Negros Occidental
Pula, Canlaon City, Negros Oriental



MAYON VOLCANO OBSERVATORY
Ligñon Hill, Legaspi City, Albay



BULUSAN VOLCANO OBSERVATORY
Cabid-an, Sorsogon City, Sorsogon



GENERAL SANTOS OBSERVATORY
Mindanao Statue University, General Santos City



HIBOK-HIBOK VOLCANO OBSERVATORY
Quiboro, Mambajao, Camiguin



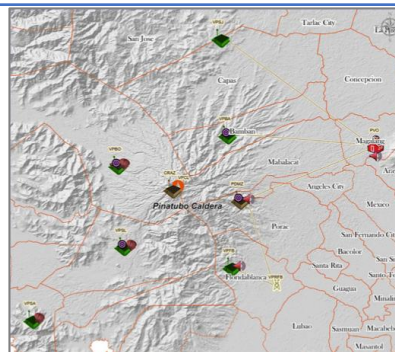
7 Volcano Networks

on 12 monitored volcanoes
(+ Iriga, Isarog, Apo, Leonard-Kniasseff)

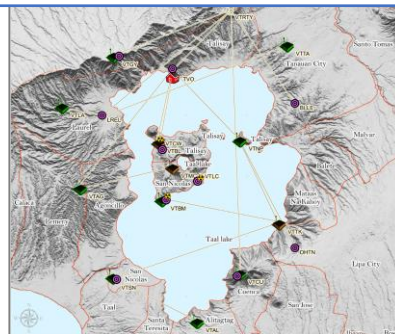
106 built multi-parameter +
repeater stations

- ▲ 81 remote seismic systems
- ▲ 37 infrasound systems
- ▲ 16 repeater stations
- ▲ 51 continuous GPS stations
- ▲ 24 electronic tilt stations
- ▲ 4 continuous gas stations
- ▲ 14 all-weather stations
- ▲ 33 IP/IR camera systems
- ▲ 5 thermal camera systems

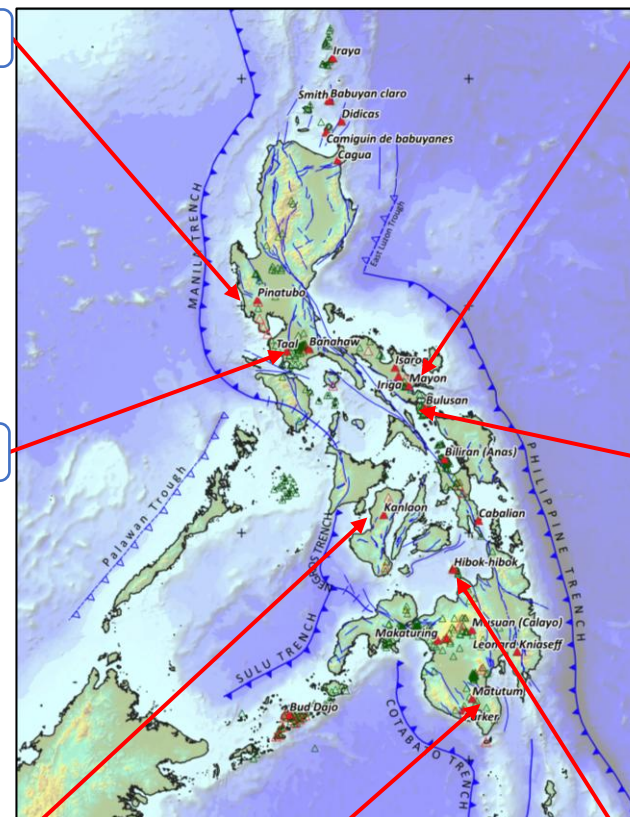
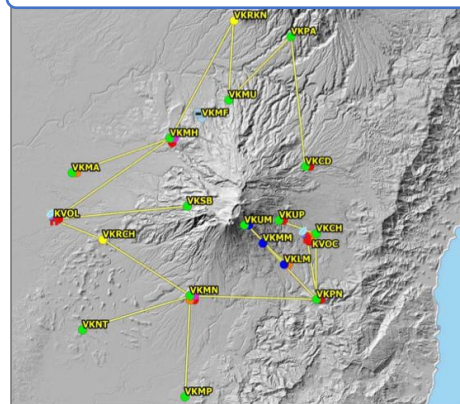
PINATUBO VOLCANO NETWORK



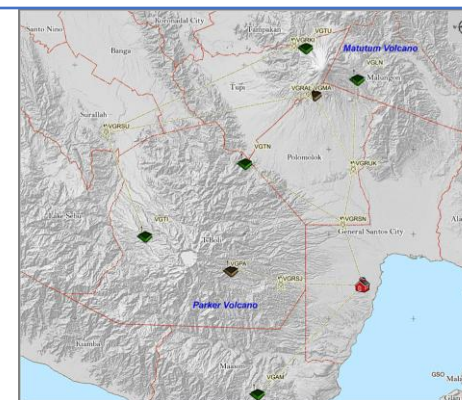
TAAL VOLCANO NETWORK



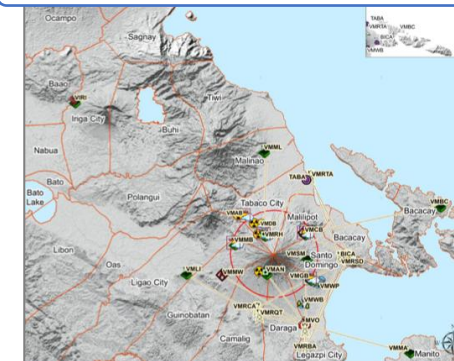
KANLAON VOLCANO NETWORK



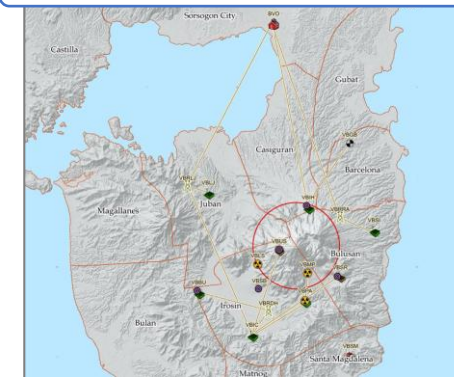
PARKER-MATUTUM VOLCANO NETWORK



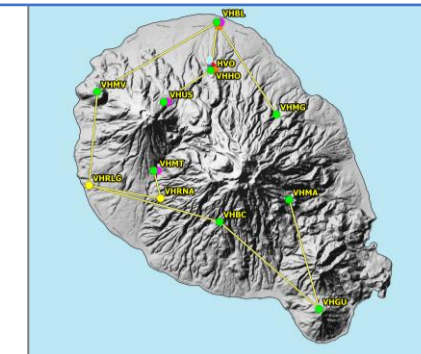
MAYON VOLCANO NETWORK



BULUSAN VOLCANO NETWORK



HIBOK-HIBOK VOLCANO NETWORK



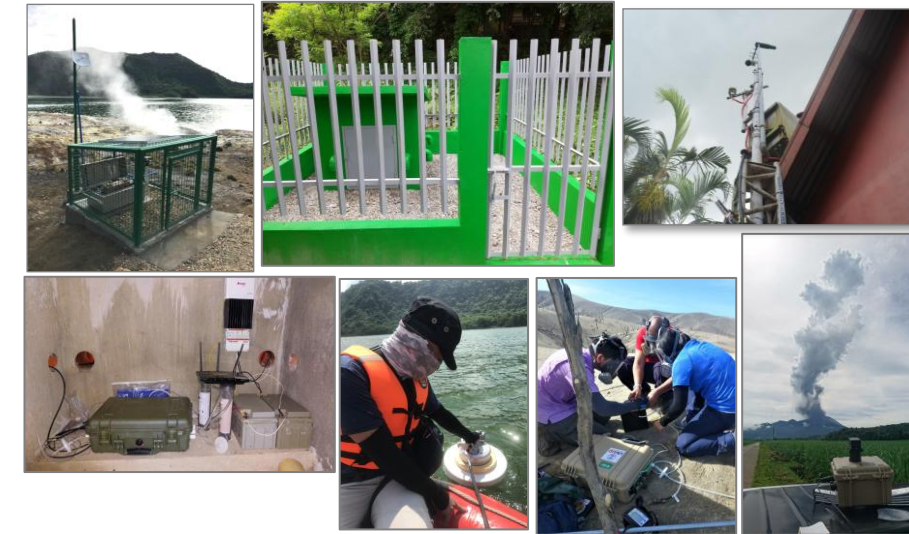
SEISMIC MONITORING STATIONS



GROUND DEFORMATION STATIONS / CAMPAIGNS



GEOCHEMICAL STATIONS / CAMPAIGNS



VISUAL AND WEATHER MONITORING



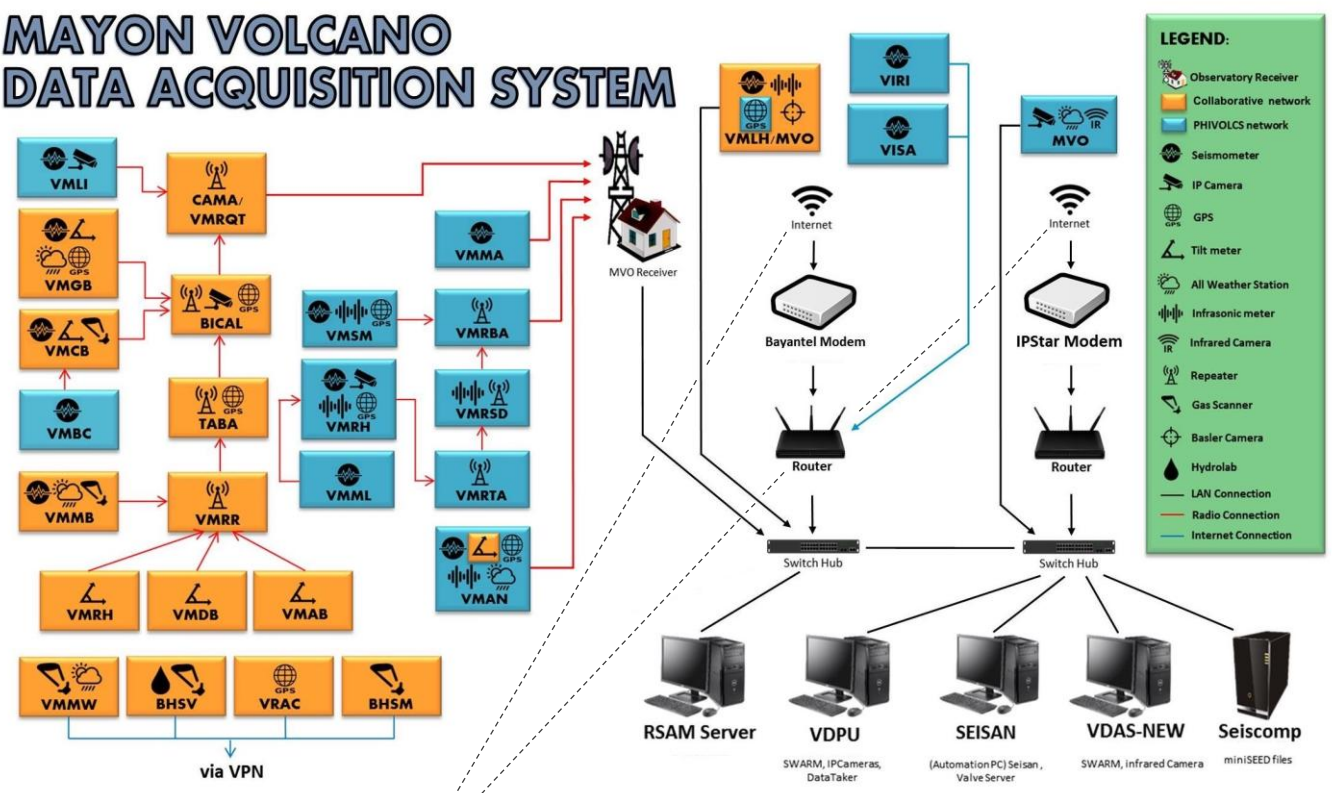
COMMUNICATIONS SYSTEMS



MICROGRAVITY / RESISTIVITY CAMPAIGNS



MAYON VOLCANO DATA ACQUISITION SYSTEM



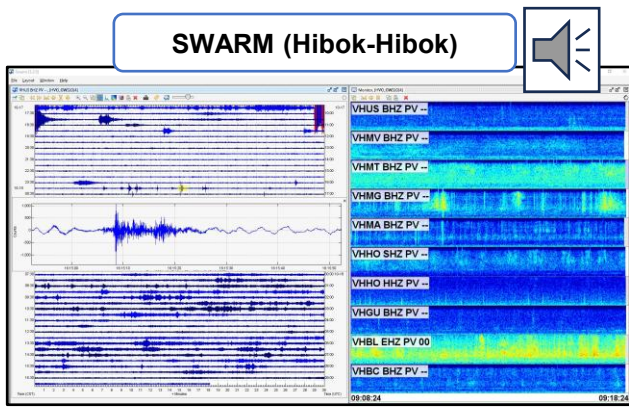
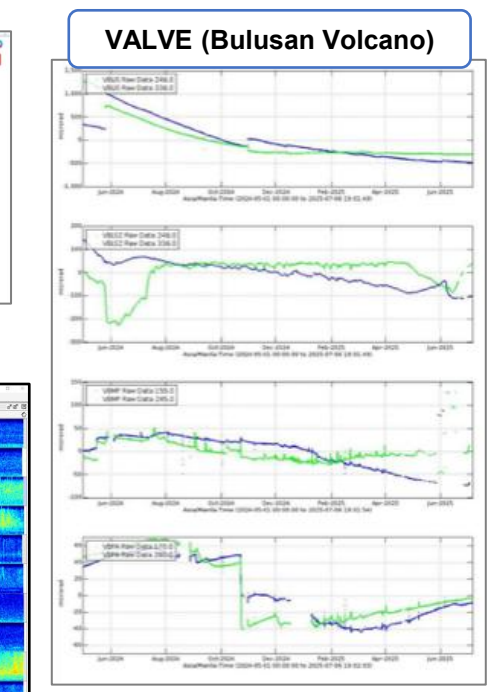
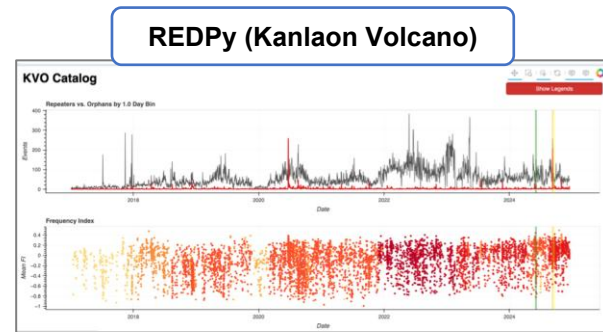
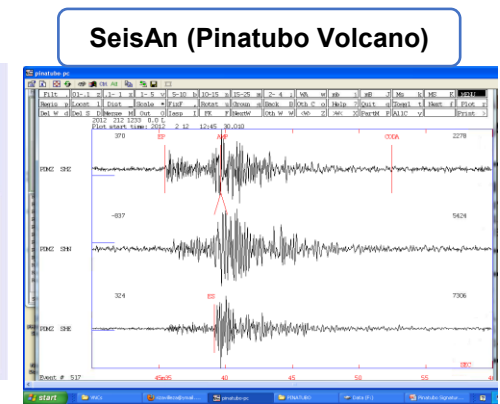
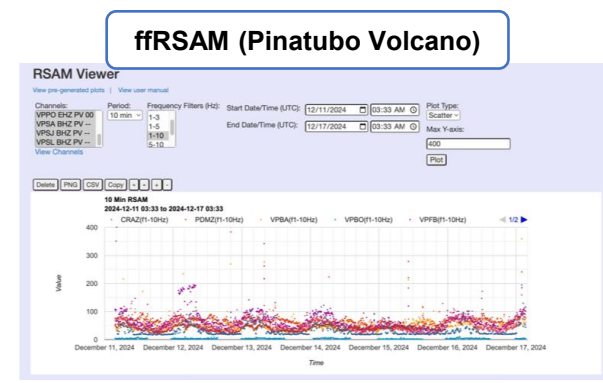
PHIVOLCS Main Office

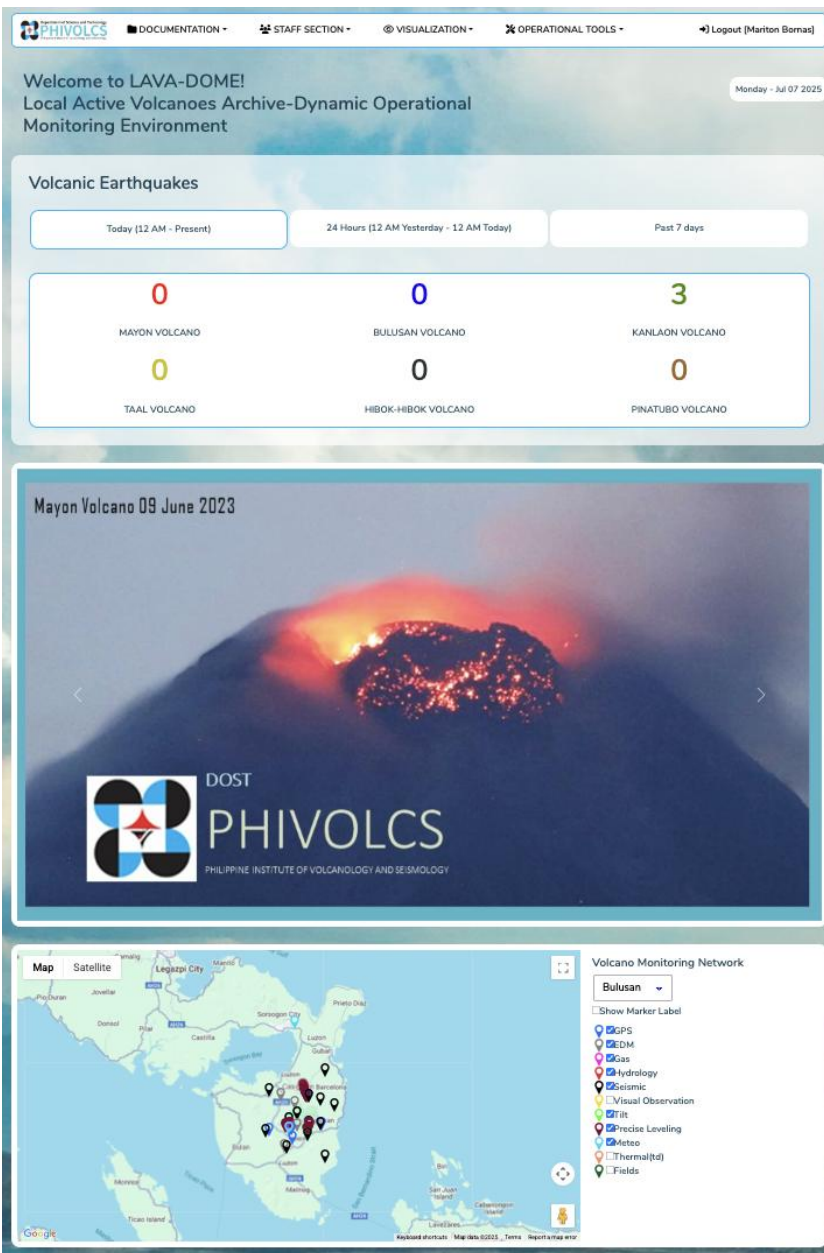


VolRec1-3
(Raw Volcano Monitoring Data)



Seismic, Infrasound and geodetic data processing w/ OpenSource software (SWARM, SeisAn, VALVE, RedPy, fFRSAM, Pensieve)

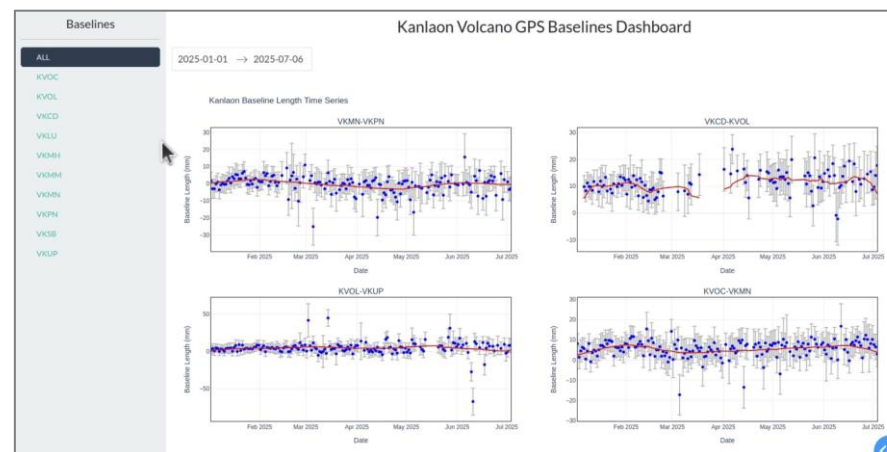




LAVA-DOME (Operational Database):

<https://vmepd.phivolcs.dost.gov.ph>

- WVOVODat schema customized for operational use
- Real-time data intake and processing (e.g. lake CO₂/dT, Multigas, GPS baselines)
- Data upload tools (e.g. daily VQ phase data via Sei2LAVA, SO₂ flux, EDM data, etc.)
- Operational performance tools (Exit Report, Network state-of-health)



VMT ID	Observatory	Code	Instrument	Number of Days with Issues	Type	Target Date of Maintenance
10048	Bulusan	VBSP_20250703_1	Seismic	4 (start: 2025-07-03)	Non Operational	2025-07-11
10049	Bulusan	VBSP_20250703_1	Seismic	6 (start: 2025-07-03)	Non Operational	2025-07-11
9824	Bulusan	VBSP_20250605_1	IP Cam	32 (start: 2025-06-05)	Non Operational	2025-07-11
9767	Bulusan	VBSP_20250703_1	Seismic (Pulled out)	46 (start: 2025-06-22)	Non Operational	2025-07-11
9863	Bulusan	VBSP_20250703_1	GPS (Pulled out)	46 (start: 2025-06-22)	Non Operational	2025-07-11
9808	Hibok-Hibok	HVSP_20250703_1	AWS (Pulled out)	294 (start: 2024-10-22)	Non Operational	2025-07-30
10041	Kanaon	VBSP_20250703_1	Seismic	5 (start: 2025-07-03)	Intermittent	2025-07-07
10050	Kanaon	VBSP_20250703_1	IP Cam	6 (start: 2025-07-03)	Intermittent	2025-07-07
10053	Kanaon	VBSP_20250703_1	Seismic	6 (start: 2025-07-03)	Intermittent	2025-07-07
10050	Kanaon	VBSP_20250703_1	GPS	7 (start: 2025-07-03)	Intermittent	2025-07-07
5449	Kanaon	VBSP_20250703_1	AWS (Pulled out)	744 (start: 2025-06-24)	Non Operational	2025-07-18
5448	Kanaon	VBSP_20250703_1	Tilt (Pulled out)	744 (start: 2025-06-24)	Non Operational	2025-07-18
5448	Kanaon	VBSP_20250703_1	Seismic (Pulled out)	744 (start: 2025-06-24)	Non Operational	2025-07-18
9861	GSD	VBSP_20250703_1	GPS	13 (start: 2025-06-28)	Non Operational	2025-07-17
9860	GSD	VBSP_20250703_1	IP Cam	13 (start: 2025-06-28)	Non Operational	2025-07-17
9859	GSD	VBSP_20250703_1	Seismic	13 (start: 2025-06-28)	Non Operational	2025-07-17
9161	GSD	VBSP_20250703_1	GPS	154 (start: 2025-02-02)	Non Operational	2025-06-30
9160	GSD	VBSP_20250703_1	GPS	154 (start: 2025-02-02)	Non Operational	2025-06-28
9162	GSD	VBSP_20250703_1	Seismic	154 (start: 2025-02-02)	Non Operational	2025-07-18
9120	GSD	VBSP_20250703_1	Seismic	180 (start: 2025-01-27)	Non Operational	2025-06-28
9099	GSD	VBSP_20250703_1	Seismic	184 (start: 2025-01-28)	Non Operational	2025-07-18
9098	GSD	VBSP_20250703_1	Seismic	210 (start: 2024-12-08)	Non Operational	2025-06-28
10026	Mayon	VBSP_20250703_1	Tilt	7 (start: 2025-06-28)	Non Operational	2025-07-15
10023	Mayon	VBSP_20250703_1	Seismic	7 (start: 2025-06-28)	Non Operational	2025-07-15
10014	Mayon	VBSP_20250703_1	Thermal Cam	8 (start: 2025-06-28)	Non Operational	2025-07-14
10013	Mayon	VBSP_20250703_1	Tilt	8 (start: 2025-06-28)	Non Operational	2025-07-14
10012	Mayon	VBSP_20250703_1	Tilt	8 (start: 2025-06-28)	Non Operational	2025-07-14
10011	Mayon	VBSP_20250703_1	GPS	8 (start: 2025-06-28)	Non Operational	2025-07-14
9821	Mayon	VBSP_20250703_1	GPS (Pulled out)	30 (start: 2025-06-06)	Non Operational	2025-07-11

LAVA-DOME (Operational Database):

<https://vmepd.phivolcs.dost.gov.ph>

- Tools for bulletin/advisory/update infographic creation for VolcanoPH Info App, SocMed
- Automated templates for Eruption Notification (EN) and Volcano Notification for Aviation (VONA) w/ Early-Alert Warning Messaging (EAWM)

PHIVOLCS

DOCUMENTATIONSTAFF SECTIONVISUALIZATIONOPERATIONAL TOOLSLogout (fictional user)

List of BulletinsNew BulletinNew Advisory/Alert Level/OthersCreate Separate Pages

Bulletin Form

Bulletin Date (Note: System Date)2025-07-07Start Publishing:2025-07-08 07:50:00Volcano:

PHIVOLCS

DOCUMENTATIONSTAFF SECTIONVISUALIZATIONOPERATIONAL TOOLSLogout (fictional user)

List of BulletinsNew BulletinNew Advisory/Alert Level/OthersCreate Separate Pages

Advisory/Alert Level/Others Form

Date and Time of Bulletin/Advisory:2025-07-07 03:49:28Start Publishing:2025-07-07 03:49:28

Volcano:Select Volcano

Alert Level:Select

Category:Select

Comment:
Raising from alert level 0 to 1 / Lowering from alert level 2 to 1

(Note: Include the header)

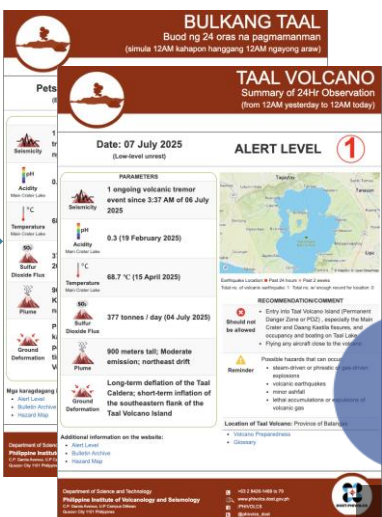
Body

Source:NormalFontSize12pt

This is a notice of increased seismic energy release from Taal Volcano.

Since 04 January 2025, stations of the Taal Volcano Network (TVN) situated on Taal Volcano Island (TVI) have been recording a pronounced increase in real-time seismic energy measurement or RSAM. A total of only twelve (12) volcanic earthquakes including six (6) tremor events were recorded by the TVN since 01 January 2025. Visual observations also noted the absence of a degassing plume from the Taal Main Crater since the start of RSAM increase. Taal has been degassing sustained levels of sulfur dioxide or SO₂ for the past four years with the latest emission measured on 30 December 2024 averaging 2,753 tonnes/day. The sharp increase in RSAM and the lack of observable degassing from the Main Crater may indicate blockage or plugging of volcanic gas pathways within the volcano, which may lead to short-term pressurization and trigger a phreatic or even a minor phreatomagmatic eruption.

DOST-PHIVOLCS reminds the public that Alert Level 1 prevails over Taal Volcano, which means that it is still in abnormal condition and should not be interpreted to have ceased unrest nor ceased the threat of eruptive activity. At Alert Level 1, further steam-driven or phreatic or minor phreatomagmatic eruptions



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DOCUMENTATIONSTAFF SECTIONVISUALIZATIONEN / VONA

EN/VONA Actual / VONA Drill

Volcano*Select Volcano

Notice No.1

Start time(PST)*YYYY-MM-DD HH:MM:SS

End time(PST)YYYY-MM-DD HH:MM:SS

Note: Leave empty if Ongoing

Event type*Phreatic eruption

Plume height(m)1000

Plume driftnorthwest

Plume colorbrownish

Other details

Observer*rg.tr

Save

PHIVOLCS

DOCUMENTATIONSTAFF SECTIONVISUALIZATIONChat Format

VONA CopyEN CopyEditList of Chat Format

VONA #1

Volcano: Kanlaon Volcano

Date: 08 May 2025

Start Time: 16:30:00H (PST)

End Time: 16:35:00H (PST)

Event type: ash emission

Plume height: 200m

Plume drift: northwest

Plume color: grayish

Other Details: visually observed via VKMN and KXNV IPCamera

Observer: AQ, PS, SRG, PB, CD

Eruption Notification #1

Volcano: Kanlaon Volcano

Date: 08 May 2025

Start Time: 16:30:00H (PST)

End Time: 16:35:00H (PST)

Event type: ash emission

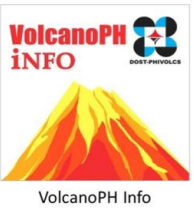
Plume height: 200m

Plume drift: northwest

Plume color: grayish

Other Details: visually observed via VKMN and KXNV IPCamera

Observer: AQ, PS, SRG, PB, CD



Download link of apk:
<https://cutt.ly/volcanoinfoph>

Monthly drills w/ Tokyo-VAAC

VONA

Republic of the Philippines
DEPARTMENT OF SCIENCE AND TECHNOLOGY
PHILIPPINE INSTITUTE OF VOLCANOLOGY AND SEISMOLOGY

(1) VOLCANIC OBSERVATORY NOTICE FOR AVIATION (VONA)
(2) Issued: 202509090302
(3) Volcano: Kanlaon (JAVVOL 0102-024)
(4) Current Aviation Color Code:
(5) Previous Aviation Color Code:
(6) Status:
(7) Notice Number: PIVS-VONA-KV-20250908-1_UPDATE
(8) Volcano location: N 10 deg 24 min E 123 deg 7 min
(9) Region: Oriental
(10) Summit Elevation: 7989 ft (2435 m)
(11) Volcanic Activity Summary: Choked: 0830Z
Duration: 06:00:00
Eruption Type: ash emission
656 ft (200 m)
grayish, northwest drift
visually observed via VOMN and VKNV iCameras
(12) Volcanic Cloud Height:
(13) Other volcanic cloud information:
(14) Remarks:
(15) Contacts: Philippine Institute of Volcanology and Seismology
Volcano Monitoring and Eruption Prediction Division
Email: emepd@dost.gov.ph phone: (832) 8527-1095, (832) 8426-1466 loc 311 or 312
(16) Next Notice: A new VONA will be issued if conditions change significantly. While a VONA is in effect, regularly scheduled updates are posted at <http://www.phivolcs.dost.gov.ph>

Printed Address: PHIVOLCS Building, C.P. Garcia Avenue, U.P. Campus
Diliman, Quezon City 1101 Philippines
Website: www.phivolcs.dost.gov.ph
Tel. No.: +63 2 8626-1466 to 79; +63 2 8626-2811
Fax No.: +63 2 8626-4395; +63 2 8626-3157

- ≤ 10 Minutes
- email**
- ▶ (CAAP) Civil Aviation Authority of the Philippines
 - ▶ (PAGASA) Philippine Atmospheric, Geophysical and Astronomical Services Administration
 - ▶ (Tokyo-VAAC) Tokyo Volcanic Ash Advisory Center
- fax**
- SIGMET**

gases dulot ng patuloy na pagputok ng Bulkang Kanlaon.

Monday, Dec 9 • 5:26 PM

NDRRMC: (4:20PM, 09Dec24) Naganap ang explosive eruption sa Bulkang Kanlaon mula 3:03PM hanggang 3:10PM. Sumunod sa abiso ng awtoridad.

Mag-ingat at sumunod sa abiso ng kinauukulan.

NDRRMC: (3:29PM, 09Dec24) Mag-ingat sa pyroclastics at ashfall, at nakalalasong volcanic gases dulot ng patuloy na pagputok ng Bulkang Kanlaon.



Republic Act 10639 (Free Mobile Disaster Alerts Act)

- ▶ (ISP) Independent Service Providers



! EAWM may be late (up to a day) or not received !

EN

PHIVOLCS DOCUMENTATION STAFF SECTION VISUALIZATION OPERATIONAL TOOLS Logout (Marlon Borja)

Emergency Alert and Warning Message (EAWM)

Volcano Information to Release: Eruption Notification

Volcano hazards pagpatuloy ng lava, pagputok ng pyroclastics, pagputok, pagputok ng luto, pagputok, base surge, volcanic tsunami, cabalantungan volcanic gases.

Viber group: DOST-PHIVOLCS EAWM Group

Select Volcano: Kanlaon Volcano

10deg24' 7"N, 123deg7' 0"E
2,435 m above sea level (asl)

DATE: May 08, 2025
STARTED AT: 04:30 PM (Local Time) ENDED AT: 04:35 PM
ESTIMATED HEIGHT OF ASH/STEAM PLUME/CLOUD: 656 ft (200 m)
ERUPTION TYPE: ash emission
GENERAL DRIFT OF PLUME, 1: northwest
GENERAL DRIFT OF PLUME, 2:
GENERAL DRIFT OF PLUME, 3:
REMARKS:
Ash/Steam Plume/Cloud color: visually observed via VOMN and VKNV iCameras; grayish

NOTES TO OGD (EAWM):
Use template C.6.3.2

This notification is being issued as initial information on the volcano's activity for appropriate action of concerned agencies.

Issued by: VMPEO - AQ, PS, SRG, PB, DC, PC, LB, JC, SD, KR
05/08/25 04:47 PM

V1-2025-09-08

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Fax No.: +63 2 8626-4395; +63 2 8626-3157

- ≤ 10 Minutes
- chat**
- ▶ (OCD) Office of Civil Defense
 - ▶ (DOST-CO) Department of Science and Technology Secretary
 - ▶ (OP-PCO) Office of the President through the Presidential Communications Office
- email**
- EAWM**

Visitors: 891298 Alert Level Status: **Taal - 1** (+632) 8426-1468 loc 311/312 mail.vmeprd@phivolcs.dost.gov.ph

Department of Science and Technology
PHIVOLCS
Philippine Institute of Volcanology and Seismology

Welcome Mariton Bornas

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WVOdat Manual
WVOdat 1.1

PHIVOLCS-WOVODAT Posters Presented
AOGS 2015 NTU, Singapore
COV8 2014 at Yogyakarta, Indonesia
IAVCEI 2013 at Kagoshima, Japan

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What is **WVOdat**

The World Organization of Volcano Observatories Database, or WVOdat, is a **database structure or schema** designed for standardized digital storage and use of processed volcano monitoring data by all WOVO member organizations.

Learn More →

WVOdat in PHIVOLCS

The backend database and core scripts of WVOdat were programmed by the Earth Observatory of Singapore (EOS) in Open Source MySQL and PHP, respectively, and were completed in 2012.

Read More →

PHIVOLCS Volcano Database History

From the early 1990's, PHIVOLCS had been using spreadsheets of simple to more complex functionalities for storing, analysis and visual output of processed volcano observation data...

Read More →

WELCOME TO PHIVOLCS-LAVA
Philippine Institute of Volcanology and Seismology
Local Active Volcanoes Archive

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View or download the latest volcano bulletins, advisories, updates & other issuances, or archived issuances.
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Browse & learn about volcanoes of the Philippines interactively.
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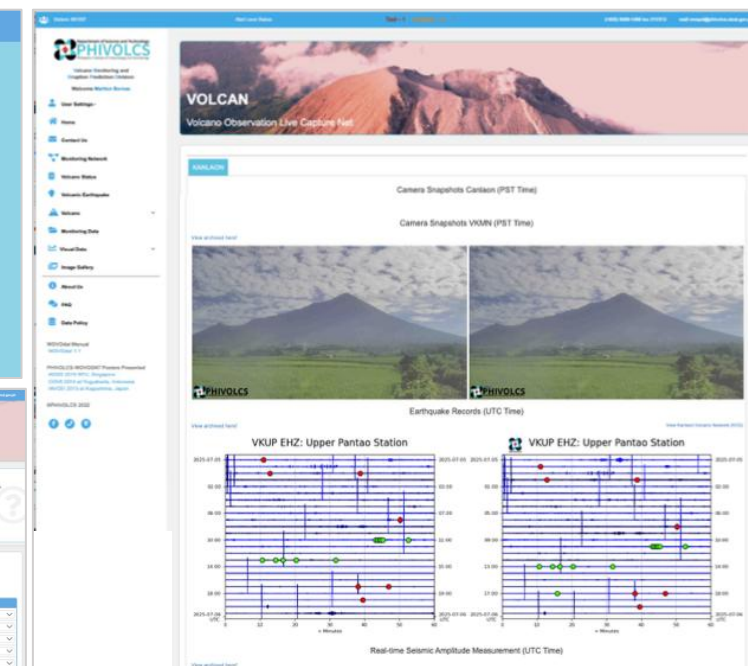
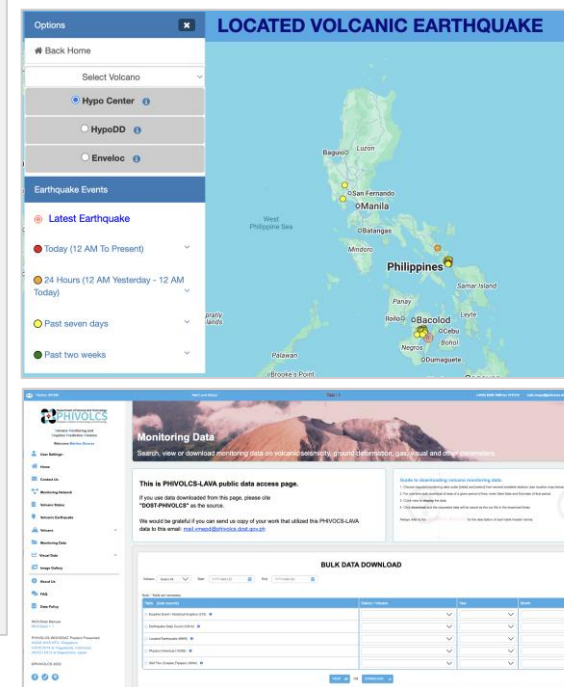
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Visualize time-series volcano monitoring data interactively.
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Image Gallery
View or download volcano photos & scanned selected legacy monitoring records.
Explore →

PHIVOLCS-LAVA (Public portal): <https://wovodat.phivolcs.dost.gov.ph>

- Public access to volcano monitoring data for supporting research, assessments
- Legacy data older than 2017 (updating in progress)
- Volcano catalog (review in progress)
- Real-time tools (for Operations Centers)
 - Located volcanic earthquakes
 - Soft Launch: VOLCAN- Volcano Observation Live Capture Net



Alert Level	Monitoring Criteria	Interpretation	Recommendations
0 NORMAL	Background parameters: Volcanic earthquakes typically <5/day; Main Crater Lake gas (diffuse CO ₂) emission within 1,000 tonnes/day, average water temperature <35°C and acidity >pH2.5; General stationary or deflationary trends in ground deformation.	Quiescence; no eruption in foreseeable future.	Permanent habitation on Taal Volcano Island, the Permanent Danger Zone is strongly discouraged because steam-driven and gas eruptions can occur without warning.
1 LOW-LEVEL UNREST	Abnormal parameters: Moderate level of seismicity with some felt events; Lake gas (diffuse CO ₂) emission > 1,000 tonnes/day, lake and slight increases in fumarole temperatures and acidity; Low level change in Main Crater Lake temperature and/or acidity; Slight inflationary ground deformation changes in most stations/ benchmarks.	Hydrothermal or tectonic unrest.	Entry into the Taal Volcano Island Main Crater, the Daang Kastila fissure and the Mt. Tabaro eruption site must be prohibited due to the possibilities of steam-driven, gas or hydrothermal explosions.
2 INCREASING UNREST	Increasing changes in parameters: Elevated level of seismic activity with some felt events in Taal Volcano Island and Taal Caldera; Occurrence of volcano-tectonic swarms and low-frequency events; Sustained increases in inflationary ground deformation; Increasing fumarole temperature and acidity, upwelling in the Main Crater Lake; significant increases in CO ₂ emission, instrumental detection of airborne SO ₂ >500 tonnes/day; Slight positive microgravity changes in the Caldera.	Shallow hydrothermal unrest and/or deep-seated magmatic intrusion may be occurring.	Entry into Taal Volcano Island must be prohibited.
3 INTENSIFIED UNREST	Intensifying changes in parameters: Sudden increase or decline in seismic activity; Perceptible earthquakes, occurrence of swarms of shallow volcano-tectonic and/or hybrid earthquakes; Increasing SO ₂ ; Significant increase in ground inflation, rapid increase in ground tilt; Pronounced microgravity changes recorded; Precursory phreatic eruptions may occur.	Magmatic unrest is imminent.	TVI, Taal Lake and lakeshore communities of Agoncillo and Laurel, Batangas, must be evacuated.
4 HAZARDOUS ERUPTION IMMINENT	Accelerating changes or abrupt decline in parameters: Rapidly intensifying volcanic earthquakes, intense volcanic tremor, frequent felt earthquakes; Profuse steaming or explosions along existing and perhaps new vents and fissures; Elevated SO ₂ flux; Accelerating increase or reversal of ground deformation patterns; precursory phreatomagmatic or low-level magmatic eruption may occur.	Pre-climactic eruption in progress, which may or may not lead to highly explosive magmatic eruption.	Communities in pre-determined hazards zones for base surge and volcanic tsunami must be evacuated
5 HAZARDOUS ERUPTION ONGOING	Highly explosive magmatic eruption in progress; Sustained tall eruption column (>20 kms) with umbrella cloud and pyroclastic density currents (PDCs) visibly transporting across TVI and Taal Lake. VT, hybrid and eruption tremor events continuously recorded by caldera and farther stations, felt at high intensities in the Taal region.	Hazardous Plinian eruption in progress.	Extreme hazards of base surges, column-collapse PDCs, volcanic tsunami, thick tephra fall/ ashfall and fissuring can impact communities around the lake and downwind. Additional areas for evacuation may be recommended.

Evacuation of PDZ and High Hazard Zones

Numeric Alert Level Scheme:

- ▲ Since Pinatubo 1991 eruption
- ▲ Alerts 1-2: Prohibition of PDZ entry
- ▲ Alert Level 3: Evacuation of PDZ + High Hazard Zones
- ▲ Alert Level 4: Evacuation for worst-case scenario
- ▲ Alert Level 5: Statement only of ongoing worst-case scenario eruption

DRRM Applications:

- ▲ Contingency Plans (City/Municipal, Provincial, Regional)
- ▲ NDRRM Plan (Operation Listo-Response- Incident Command System)

Climate / Hazard impacts on monitoring infrastructure

- ▶ Repetitive damage, recovery and rehabilitation
- ▶ High cost and time consumption of maintenance
- ▶ Physical toll on VO personnel
- ▶ Direct impairment of early-warning service



Damages caused by
Typhoon *Glenda*
(Rammasun), July 2014

Human Resource:

- ▶ High turnover of personnel
- ▶ Very rigid and small plantilla (65 positions for 9 VO plus PHIVOLCS Main Office)
- ▶ Skills development for communication, crisis management



Best Practices:

- ▲ Early-warning program strategically aligned to organizational goals, mission and vision and role in the overall DRR framework
- ▲ Use of multi-parameter stations with both high-resolution and low-cost systems; OpenSource applications
- ▲ WOVODat schema for operations, early warning and public access to monitoring data
- ▲ Leveraging partnerships and applications for information dissemination
- ▲ Alert Levels embedded in government emergency plans

Challenges:

- ▲ Climate and other hazard impacts
- ▲ Human resource

THANK YOU!



Department of Science and Technology

PHIVOLCS

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