

MEMBER REPORT
Philippines

ESCAP/WMO Typhoon Committee
14th Integrated Workshop
Guam, USA
04 07 November 2019

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I. Overview of tropical cyclones which have affected/impacted Member's area in 2017

Meteorological Assessment (highlighting forecasting issues/impacts)

In 2019 only 15 tropical cyclones entered and developed inside the Philippine Area of Responsibility (PAR), eight (8) were Tropical Depression, two (2) Tropical Storm (TS), two (2) Severe Tropical Storm (STS) and three (3) typhoon. From the 15 tropical cyclones shown in Figure 1, only three (3) made landfall and these were TD (Amang), TD (Crising) that weakened into a Low Pressure Area (LPA) after making a landfall and Typhoon PODUL (Jenny). Luckily, there was no significant damage during the occurrence of the tropical cyclones.

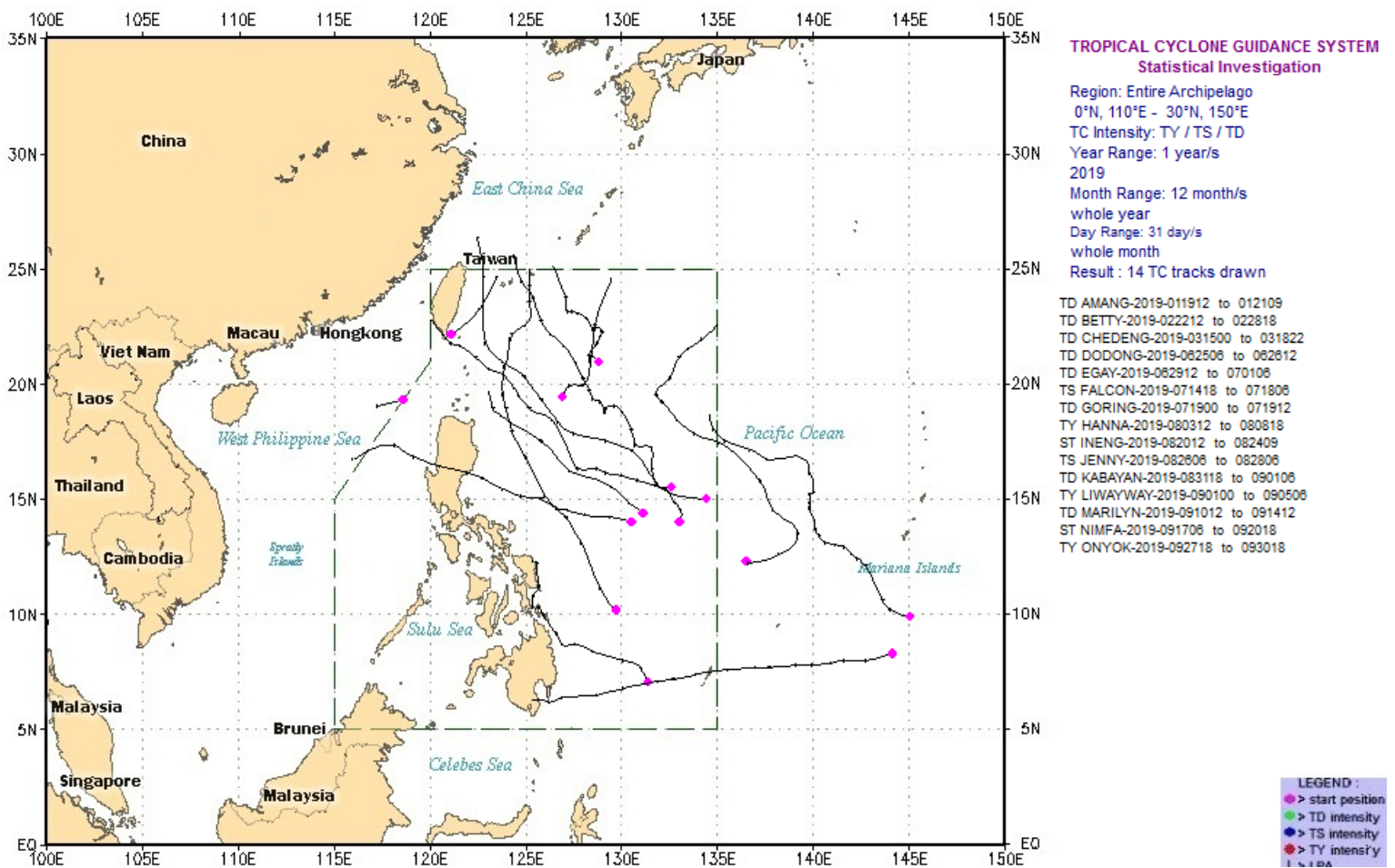


Figure A. Tracks of Tropical cyclones that entered and developed inside the PAR in 2017

1. TROPICAL DEPRESSION (TD) AMANG

On 04 January, a Low-Pressure Area (LPA) was formed estimated southeast of Marshall Islands. This LPA slowly moved westward and entered the PAR at 10:00 AM on 19 January. The LPA developed into a tropical depression at 8:00 PM of 19 January and was named “Amang”, with estimated maximum winds of 45 km/h. On 20 January at around 8:00 PM, AMANG made its first landfall over Siargao Island, Surigao del Norte. After its landfall, it continued to move northwestward and made its second landfall over Salcedo, Eastern Samar at 7:30 AM on 21 January. TD Amang gradually changed its course from northwestward to generally northward. At 5:00 PM on 21 January, AMANG has weakened into LPA while it was located east of Catarman, Northern Samar.

The majority of the rainfall was experienced over Samar provinces and the eastern sections of Caraga and of Davao region.

TCWS # IN EFFECT:

#1: Agusan del Sur, Agusan del Norte, Surigao del Sur, Surigao del Norte, Dinagat Islands, Camiguin, Eastern Samar, Samar, Biliran, Leyte, Southern Leyte, Eastern Bohol, Northern Cebu, Sorsogon, and Masbate including Ticao Island.

Affected Region(s):
Caraga, and Samar provinces.

Impacts:
Damage (Agri and Infra) and Casualties– None

No. of TC Warning/Alert Issued:
SWB – 16
IWS - 9
WA - 1

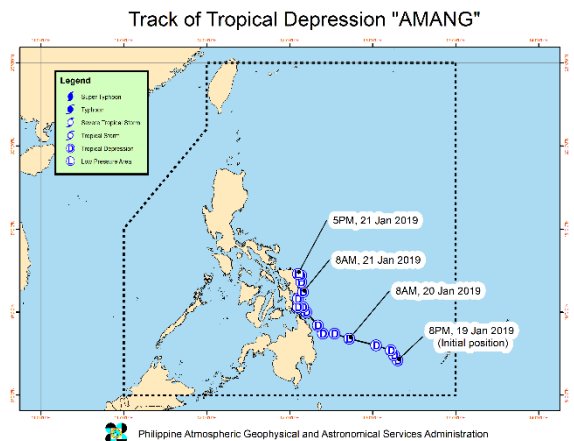


Figure B. Tracks of TD Amang

2. TD CHEDENG

Chedeng developed from a tropical disturbance along with a wave or inverted trough in the vicinity of the Caroline Islands in the Central Pacific. It was first noted as LPA on the surface weather map in the afternoon of 14 March. On the next day at 8:00 AM, it developed into TD with an estimated maximum sustained wind of 45 km/h and a central pressure of 1006 hPa. It entered the PAR at 11:00 AM on 17 March while it moved generally westward. Chedeng is a small and disorganized system. Strong vertical wind shear and strong divergence prevented it from further developing

From a westward track, Chedeng changed its course to generally west-southwestward before it made landfall over Malita, Davao Occidental at around 5:00 AM on 19 March. Shortly after its landfall, the TD weakened into an LPA due to land interaction and lack of moisture. Although it is considered a weak TC, it brought moderate to heavy rains over most parts of the Caraga and Davao Region.

TCWS # IN EFFECT:

#1: Davao Oriental, Davao del Sur, Davao City, Davao Occidental, Southern part of Davao del Norte incl. Samal Island, Compostela Valley, the eastern part of North Cotabato and of South Cotabato, the eastern part of Sarangani, eastern portion of Sultan Kudarat, and General Santos City.

Affected Region(s):
Davao Region

Impacts:
Damage (Infra) - ₱ 1.2 M
Casualties - None

No. of TC Warning/Alert Issued:

SWB - 11
IWS - 8
WA - 2

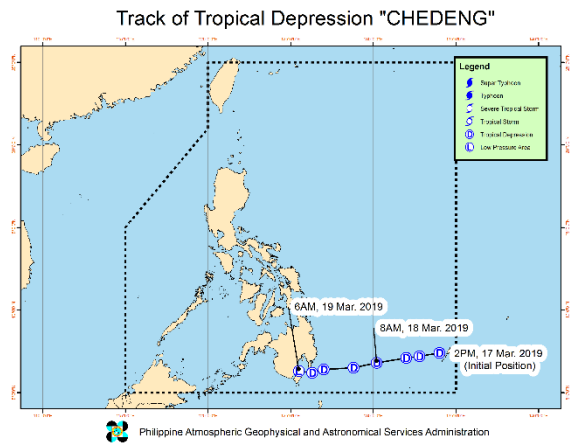


Figure C. Tracks of TD Chedeng

3. Tropical Storm PODUL (Jenny) (1912)

A LPA inside PAR and developed into a TD in the afternoon of 26 August 2019. It then moved WNW @ 20kph towards Northern Luzon. The TD intensified into a Tropical Storm in the morning of 27 August 2019 and was named PODUL. It then accelerated at 35 kph with the same direction as it approached Aurora Province. Jenny made landfall in Casiguran, Aurora in the early morning of 28 August 2019 and weakened into a TD. It then traversed the rugged terrain of Northern Luzon and exited in the coast of Pangasinan in the morning of the same day. Podul re-intensified into a Storm while over the West Philippine Sea and exited PAR in the afternoon of the same day.

TCWS NO. IN EFFECT:

#2: Isabela, Aurora, Quirino, Nueva Vizcaya, Mountain Province, Ifugao, Benguet, Ilocos Sur, La Union, Pangasinan

#1: Cagayan, Apayao, Abra, Kalinga, Ilocos Norte, Nueva Ecija, Tarlac, Zambales, Bataan, Pampanga, Bulacan, Metro Manila, Rizal, northern portion of Quezon including Polillo Islands and Alabat Island, Cavite, Laguna, Camarines Norte, northeastern portion of Camarines Sur, Catanduanes.

Casualties:
Deaths - 2
Injured - 2

No. of TC Warning/Alert Issued:

SWB - 14
IWS - 9
WA - 1

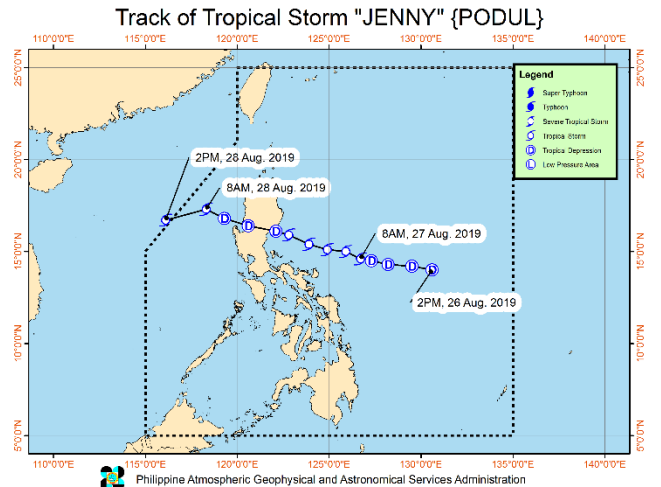


Figure D. Tracks of TS Jenny (PODUL)

2. Hydrological Assessment (highlighting water-related issues/impact)

- The 15 tropical cyclones that made landfall and crossed the PAR and caused some flooding and landslides but severe and there were two casualties caused by drowning.
- PAGASA issued Flood Bulletins for the telemetered River Basin and Flood Advisories for Non-Telemetered River Basin in Luzon and some regions in Visayas and Mindanao during the passage of these tropical cyclones.
- From January to June 2019, the Philippines did not receive a significant amount of rainfall causing the water level of Angat Dam, that supply potable water in Metro Manila, to be way below (157.96m) the normal level (180.0m) in June. There was an interruption of water supply to the households of Manila for almost a month and the supply for irrigation and Hydropower Plant was cut off. From the last week of June until mid August, there were five (5) TCs that affected Philippines and brought significant amount of rainfall to the watershed of the Angat Dam that increased the water level to almost normal.

ANGAT ANNUAL TREND

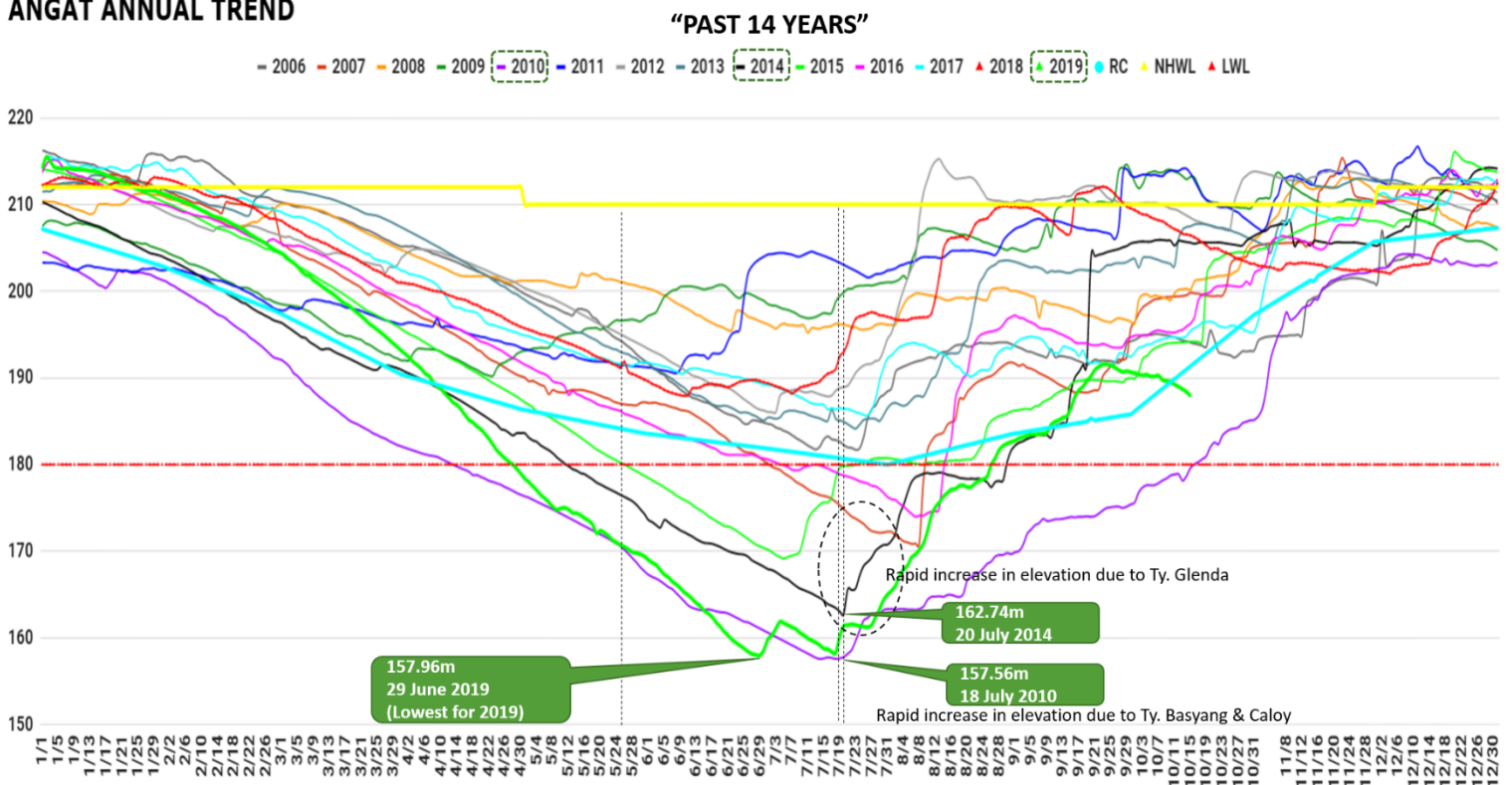


Figure E. Showing the Flooding Incidents



LAOAG CITY PROPER, ILOCOS NORTE. Photo by Mon Escalante



FLOODS. Motorists and vehicles waded through floods brought by heavy rain at UN Avenue, Manila, on Friday morning, August 2, 2019. Photo by Lito Borras/Rappler

Figure F. Photos of Laoag City, Ilocos Norte (left) and United Nations Avenue, Manila (right) being flooded.

TC Members' Report Summary of Progress in KRAs

Title of item 1(KRA 1,2, 6):

New Synoptic Stations

14 new Synoptic Stations will be added to the current 59 stations and these are: Bataan, Marinduque, Biliran island, Siquijor, Antique, Apayao, Quirino, Isabela, Banaue, La Carlota, Panglao, Kalibo, Laguindingan and Camiguin. These stations will help us in the observations and validations of the different weather parameters during the occurrence or passage of a weather disturbance.

Radar, High Frequency Doppler Radar (Coastal Radar), Lightning Detection System, Automatic Weather Station

Seven (7) new S-band Doppler Radars were installed in Busuanga, Zamboanga, Daet, Camarines Norte, Agno, Pangasinan and Bohol. Another six (6) X-Band radars will be installed over the river basins of Visayas and Mindanao. These radars will be operational late this year or early next year (2020). The radars will be used in monitoring tropical cyclones when the TC is over inland in any part of the country and over offshore as long as it is within the range. These radars will also cover the blind areas of the existing radars. This will also be used in rainfall monitoring and heavy rainfall warning by the PAGASA Regional Services Division throughout the country.

PAGASA will install additional twelve (12) High Frequency Doppler Radar (Coastal Radar) along eastern seaboard and on the nautical highway that connect the three main islands, Luzon, Visayas and Mindanao where many Ferry Boats and small Sea Vessels are plying. These Coastal Radars are used to monitor the wind speed and direction, wave height and ocean current. This can also be used to monitor and track weaker TC's.

Lightning detection system will be used in the issuance of SigMet at the airports and also in Thunderstorms Advisory.

Automatic Weather Station will be used for monitoring and validating the different weather parameters.

Identified opportunities/challenges, if any, for further development or collaboration:

An enhancement training on Radar images analysis especially on tornado and hailstorm formation within the severe thunderstorm cells.



Figure G. A photo of the mobile X-band Radar used by storm chasers.

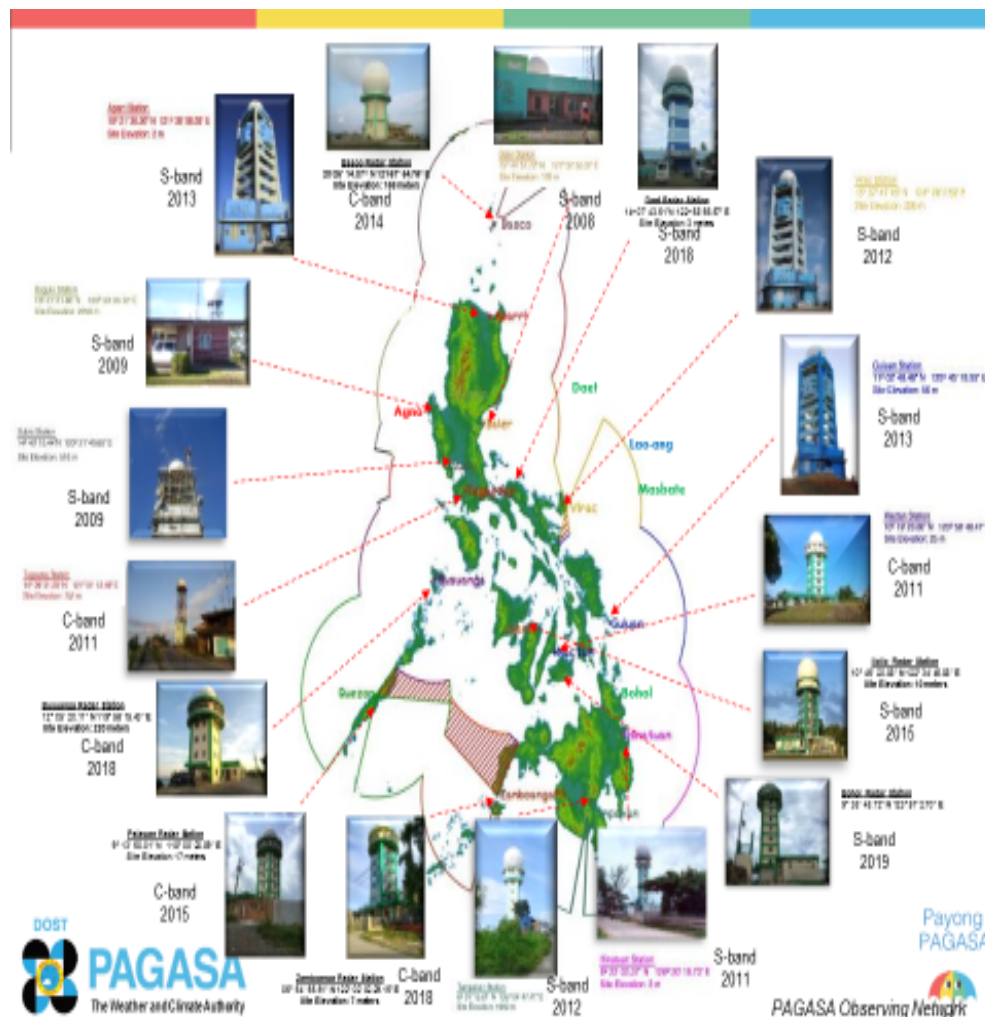


Figure H. An illustration of the geographical locations of the currently installed radars (17) in the Philippines.

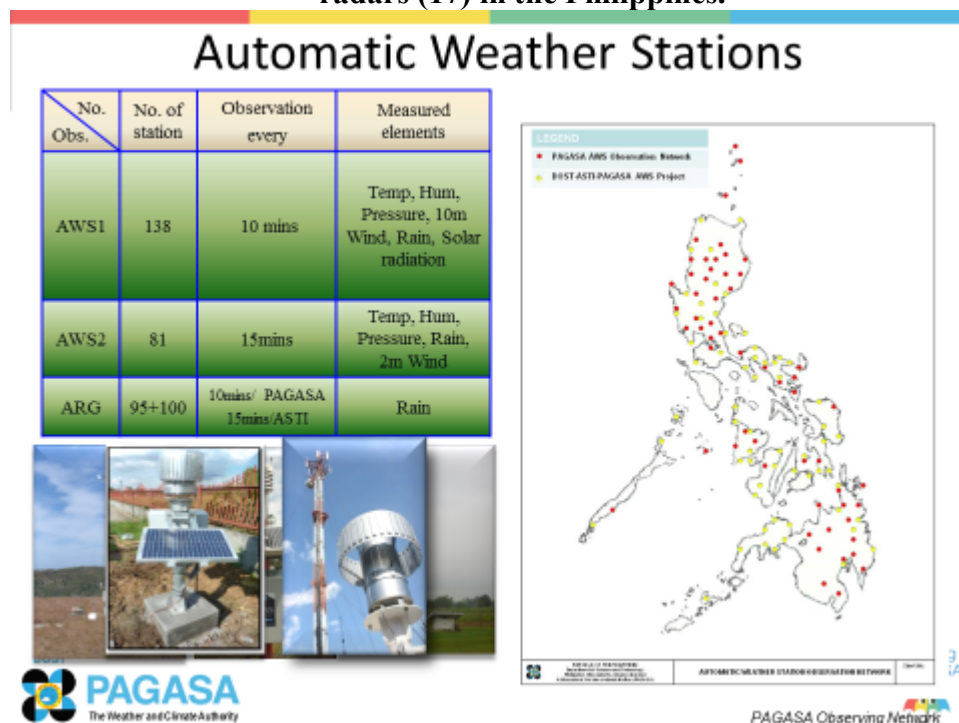


Figure I. An illustration of the geographical locations of AWS (13 more will be installed) in the Philippines.

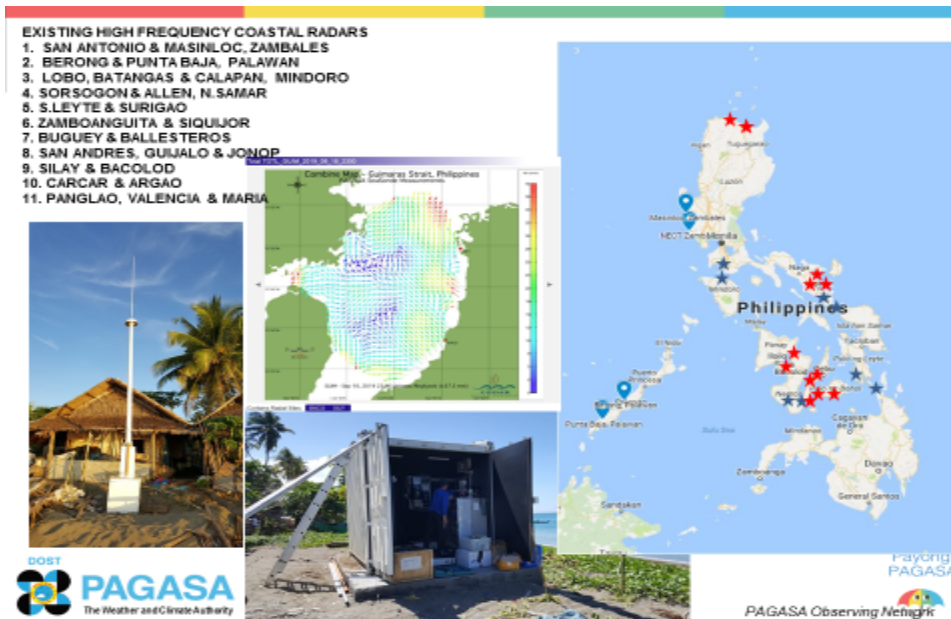


Figure J. An illustration of the geographical locations of currently installed HFDR (12 stations will be added) in the Philippines.

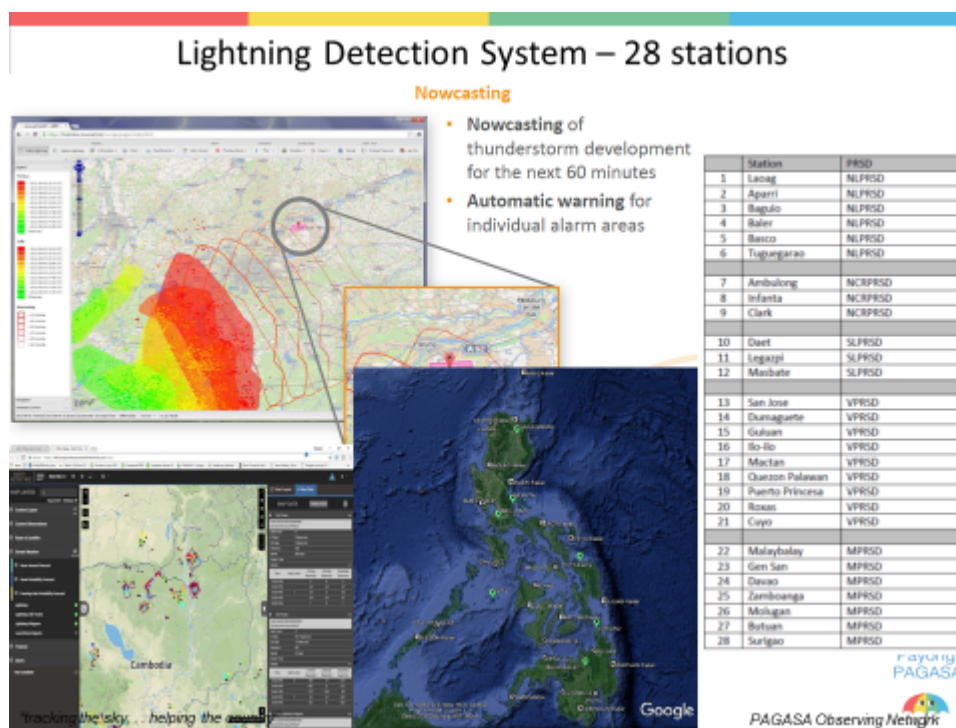


Figure K. An illustration of the location of lightning detection systems (28 stations) in the Philippines.

Problems/Challenges:

Most of the problem is the communication of Globe or Smart. The signal is very weak that it cannot sustain the transmission of data. The possible solution to this problem is putting a high gain antenna for the cellular mobile phone. Training on Coastal Radar is also needed to capacitate our Marine Forecasters.

Title of item (2):

New Monitoring Domain used by PAGASA

- PAGASA added two (2) domain, aside from the Philippine Area of Responsibility (PAR), the Tropical Cyclone Information domain and the TC Advisory domain. This is to give early information of the TC to the public even if it is still far away from the landmass so that they will be aware of the presence of the weather disturbance. We also include information on the possible raising of Tropical Cyclone Warning Signal #1 of Provinces where there are Ports, because when TCWS #1 is raised, there will be no movement of all kinds sea vessels regardless of tonnage and size. This will also avoid or minimize the number of stranded passengers at the Ports.

Once a tropical cyclone enters the Tropical Cyclone Information domain (marked in **blue**), PAGASA will issued a **Tropical Cyclone Information** included in the 4AM and 4PM Public Weather Forecast.

Once a tropical cyclone enters the Tropical Cyclone Advisory domain (marked in **green**), PAGASA will issued a **Tropical Cyclone Advisory** if the TC is forecast to enter the PAR within 3-4 days.

TC Advisories are issued at **11 AM**, once a day, except for initial and final issuances (can be issued at any time). This is in addition to the 4AM and 4PM updates in the Public Weather Forecast

PAGASA OPERATIONAL TROPICAL CYCLONE (TC) MONITORING DOMAIN

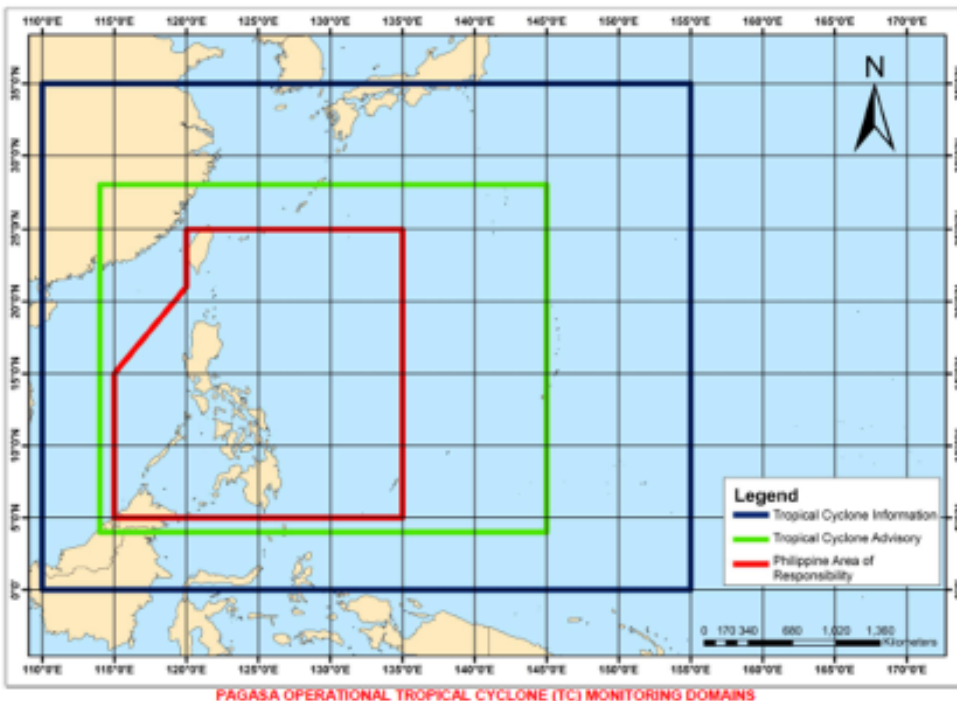


Figure L. An illustration of the new monitoring domain used.

Title of item (3):

Information and Educational Campaign to Strengthen the Readiness and Resilience of Communities to Typhoon-related Disasters

- PAGASA conducted regular exercises and drills every year on tropical cyclone disaster prevention and preparedness with relevant government departments and organizations. Information and Educational Campaign (IEC) is also a continuing activities of the agency especially to the tri-media, local government units (LGU's) and other agencies involve in disaster preparedness, relief and rescue activities.
- Every occurrence or formation of a TC inside or outside PAR, PAGASA will continue to give the current and the forecast scenario as to the effect of the TC to any part of the country, as member of a core group called Pre-Disaster Risk Analysis (PDRA). This kind of advance meeting is done if the TC is landfalling or will pass very close to the landmass, so that early preparations can be made from the national level down to the barangay level. Every day PAGASA will give an update on the typhoon track and other relevant information until it will made landfall.
- PAGASA also conducted regular workshops to the Municipal, Provincial and City Disaster Risk Reduction Officers to capacitate and enhanced their knowledge of the information that we issued during the occurrence of

inclement weather and how to use our website to find the information that will help them decide especially in the cancellation of classes and work.

- We also conduct regular trainings and workshops for the Quad Media so that they will be familiar with the warnings we issue and the meteorological terminology that we used.



Figure M. Pre-Disaster Risk Analysis (PDRA) Meeting whenever there is a weather disturbance that will affect the Philippines



DOST-PAGASA conducted a Media Seminar-Workshop for media of Region V on April 30-May 1, 2019 in Pili, Camarines Sur. Region V consists of provinces: Camarines Norte, Camarines Sur, Albay, Sorsogon, Catanduanes and Masbate.

Figure N. DOST-PAGASA regularly conducts Media Seminar-Workshops to present the agency's products and services and to sustain media relations among various provinces and regions.



DOST-PAGASA conducted a Media Seminar-Workshop for media of National Capital Region on June 21-23, 2019 in Silang, Cavite.

Figure O. DOST-PAGASA conducted a Media Seminar-Workshop for NCR media on June 21-23, 2019 at Silang, Cavite.



Figure P. DOST-PAGASA conducted a press conference on the first tropical cyclone (TD Amang) that entered the PAR on January 18, 2019.

Identified opportunities/challenges, if any, for further development or collaboration:

PAGASA will continue to do IEC to the different stakeholders and the Media in view of future needs and explore opportunities to collaborate with communication and social expert on warning communication strategies and public education aspects of Disaster Risk Reduction.

Title of item (5):

Continual Capacity Building through Various Trainings

- Enhancing and updating the knowledge of PAGASA personnel due to the fast advancement of technology, trainings and workshops were done in the different fields and subjects. This was in collaboration with experts from the different institutions and academe.

National Rainfall Warning System Conference

May 27 – 29, 2019
Tuguegarao City



Figure Q. DOST-PAGASA conducted a National Rainfall Warning System at Tuguegarao City on May 27-29, 2019.

MTTC Opening Ceremony

May 6, 2019
WMO/PAGASA Training Room



Figure R. DOST-PAGASA conducted a Meteorological Technicians Training Course (MTTC) at WMO/PAGASA, Diliman, Quezon City on May 2019.

06 - 10 May 2019 at
WMO/PAGASA Regional Training Center



Figure S. DOST-PAGASA conducted training on Capacity Building on Data, Visualization Processing & Mapping of Severe Wind Multi-hazard using QLIK Sense.

06 - 10 May 2019 at
WMO/PAGASA Regional Training Center



Figure T. DOST-PAGASA conducted training on Weather and Climate Science for Service Partnership for Southeast Asia (WCSSP SE Asia) Forecaster Training.

