



**REPORT OF STRENGTHENING
CLIMATE INFORMATION AND
EARLY WARNING SYSTEMS
(SCIEWS) PROJECTS' TEAM
EXPOSURE VISIT TO THE
PHILIPPINES;
9-16TH AUGUST, 2015.**

Compiled 24-9-2015



Table of Contents

1.0. INTRODUCTION.....	3
2.0. OBJECTIVES OF THE TRIP.....	3
3.0. THE REPORT	3
3.1. An brief Overview of the MeteoGroup and the Weather Philippine Foundation:.....	3
3.2. WPF Operations and maintenance Unit:.....	5
3.3. Field/Site Visits:.....	5
a) SM Aura located in Bonifacio Global City:.....	5
b) Tagaytay Province (Disaster Risk Reduction Office):.....	6
c) Meeting with the League of Corporate Foundations:	6
d) Meeting with Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA).....	6
4.0. THE UPGRADED BACK_TO OFFICE REPORT.....	7
7.0. PROGRAM:	16
8.0. LIST OF VISITING TEAM	16
9.0. LIST AND CONTACT OF KEY PARTNERS/PERSONS MET:	17



1.0. INTRODUCTION

The Multi-Country Support Programme to Strengthen Climate Information for Resilient Development and Adaptation to Climate Change in Africa (CIRDA) through the Global Environment Facility/UNDP has over the past two years been supporting 11 Least Developed Countries in Africa to improve their meteorological and hydrological monitoring systems, so as to cope with changing climatic conditions in the Africa Region.

The projects on “strengthening Climate Information and Early Warning Systems (SCIEWS) for Climate Resilient Development” in Africa, identified some innovative options for transferring technologies for weather monitoring and forecasting to the LDCs for example by using affordable technologies for scaling up the Automatic Weather Stations (AWS) to increase the density of weather monitoring stations and by partnering with the telecommunication companies in hosting the automatic weather stations.

The Philippines was identified as the most relevant destination for exposing the CIRDA/the SCIEWS project teams, via exchange visits so as to learn about their application of weather data for early warning against weather related hazards and disasters. The justification for this choice was based on the success stories from the Weather Philippines in partnership with the MeteoGroup in applying the North-South cooperation to the technology transfer using the Public Private Partnership (PPP) principles in the weather industry. With the endorsement of the CIRDA Global, a team of 5 participants comprising Uganda (3), Zambia (1) and Tanzania (1) visited the Meteo Group/Weather Philippines operations, from the 9th to the 15th August, 2015. The team comprised the following: The Head of Stations Network and Technical Services from the Uganda National Meteorological Authority (UNMA); The SCIEWS Project Managers/Coordinator from Uganda, Zambia and Tanzania.

2.0. OBJECTIVES OF THE TRIP

1. To expose the selected CIRDA countries to best practices in weather monitoring and forecasting that could be emulated in the rest of the CIRDA countries;
2. To learn from the Philippine’s experience on scaling up weather monitoring and forecasting services using modern meteorological equipment and the private sector involvement in the weather industry.

3.0. THE REPORT

This section of the Report comprises summary notes purely from the visitor’s perspective and is also integrated with the hosts input in the Back to Office Report section 4.0.

3.1. An brief Overview of the MeteoGroup and the Weather Philippine Foundation:

MeteoGroup is a private international weather company operating in Europe, North America and South East Asia. It partnered with energy firm the Aboitiz Group to establish the Weather Philippines Foundation, a not-for-profit organization that provides free weather information to the public. WPF's main dissemination channels are its website weather.com.ph and mobile applications. On the website, data is updated hourly and 6-hour forecasts are provided. Users requiring more frequent and detailed weather information can subscribe to a paid service from MeteoGroup. MeteoGroup’ S profits are split 50/50 with the Weather Philippine Foundation (WPF).

The Philippines Area of Responsibility experiences about 19 Typhoons per year, 6-9 of which make landfall. These can cause loss of life and damage to property. Thus, the need for accurate early warnings is critical. However, the government-owned national meteorological service, PAGASA, does not have a network dense enough to meet this critical need, with only 56 weather stations over a land area of 300,000 square kilometers.



Over the past 3 years, WPF has installed a network of 750 automated weather stations and is set to grow the network to 1000 stations by June 2016. This enables WPF to provide localized weather data and forecasts. WPF raises funds from corporate sponsors to procure AWSs, which can be installed at the sponsor's premises, thereby benefiting the sponsor directly, as well as the surrounding community. WPF sustains its operations through innovative barter agreements. For example, it gives free data to Cebu Pacific Airlines in exchange for free flights for its technical staff to install and service AWSs in distant locations. Establishing such partnerships took 3 years of negotiations, and the license to operate was also difficult to obtain, as there were legal and political challenges.

MeteoGroup works in 15 countries, with 400 employees including 150 meteorologists and operations across Europe and in Southeast Asia and the USA. It works with over 17,000 weather stations worldwide: 4,500 weather stations in Europe, more than 1,700, weather stations in Germany and Switzerland and 750 currently installed in the Philippines. Rich innovation in meteorology, associated technologies and visualization:

- The MeteoGroup products are produced with the application of 10 different weather models including the best models of ECMWF & GFS (European and American weather service)
- Has established a good link with the global weather stations which gave the company ability to access to global weather models and application to various systems in the production weather products.
- Has established a centralized weather cockpit with different weather options and this has improved data delivery.

Each of WPF's automated weather stations costs about 2500 USD including operation and maintenance costs over their 10-year lifespan. This is significantly cheaper than the stations the CIEWS projects are buying, as WPF is buying locally-produced data loggers, and individual sensors from Lufft of Germany, and then assembles the AWSs themselves. There are various levels of AWS sponsorship, the highest being platinum sponsors, which are firms that sponsor at least 20 AWSs. WPF's platinum sponsors are: Nickel Asia Corporation; Sumitomo Metal Mining; Supermalls; International Container Terminal Services; Aboitiz Group.

The League of Provinces, the League of Cities and the Presidential Assistant for Rehabilitation and Recovery are public sector partners that have received AWSs free of charge. They are required to conduct basic maintenance of the AWSs. WPF is a member of the League of Corporate Foundations, through which it obtains more sponsors.

In partnership with these and several other sponsors and partners, WPF has procured and installed 750 AWSs across the Philippines. In addition to these, MeteoGroup has access to 17,000 weather stations globally, and uses 10 global weather models to develop its forecasts. One of MeteoGroup's biggest revenue sources is from nautical route analysis, through which they provide forecasts to ocean vessels. In the Philippines, after each typhoon, MeteoGroup produces a postmortem report to determine the accuracy of its forecast. Its forecasts have been found to be accurate in 95% of cases. This is in spite of the fact that so far MeteoGroup has only 3 years of historical data; the rest is reanalysis data.

MeteoGroup Philippines offices comprises staff performing the following functions: Data quality control; Information Technology; meteorology; nautical route analysis; and Software development. MeteoGroup's main focus is on data processing, hardware and software. Processed data for public use is provided to weather.com.ph, while more detailed data is retained for commercial purposes. MeteoGroup was attracted to the Philippines due to high demand for weather services, and is still looking to expand globally.

3.2. WPF Operations and maintenance Unit:

i) The Hard ware

The weather stations equipment comprise Lufft and Davis types. Lufft is an automatic weather station equipment imported from Germany but with its data logger fabricated locally in the Philippines. It was a good system as per specifications and simple to install and use. It had sensors that can record up to seven parameters including: Global radiation (solar energy); Wind speed; Wind direction; Temperature; Pressure; Humidity; and Dew point. Unlike the other AWSs that have moving parts (rotational) for the anemometer and wind vane, this system employs the ultrasonic sensors to capture the wind direction and speed. This is of great advantage because it reduces issues arising from wear or tear, non-lubrication, corrosion and other mechanical losses. The system has an automatic rain gauge fitted with a sensitive tipping bucket, a solar panel of 15W and a battery of 25.2 WH, 3.7V fitted in the data logger. The data logger is a GSM unit that is programmed to send a short message (SMS) after every 10 minutes to the server. The AWS is mounted on a mast 6m (20') with the rain gauge at 1.5m above the ground, and all the bolts required to fix the station firmly were available.

The main challenge with the Davis system, is with the moving parts of the anemometer and the wind vane. The solar panel provided is small because it is meant to work during day time, and at night the internal battery (non-rechargeable) provides the power. This requires periodic checks and replacement of the used batteries. The Davis system has a console that required separate powering and an internal battery, which appeared to complicate the system, although its data can also be uploaded on a website.

ii) Software architecture

The different sensors interact to transmit data from the station to a centralized station where it can be processed and used for forecasting purposes. The server has 4 SMS gateway lines. The sensors in the field (weather stations) communicate through the data loggers (METRILOG, ASTI, and GSMETRIX) via network provider (telecom companies) to the respective servers where data is processed and sent to Meteo group for dissemination.

Meteo group and weather Philippines data can be accessed at their websites www.meteogroup.com and www.weather.com.ph. Or at <https://www.meteomedia-portal.com/>

Specialized forecasts and severe weather warnings using the color coding system, and the weather portal is accessible to the public. The models are working fairly well for monsoon rains, seasons but not so well for thunderstorms. Models use WMO and satellite data and they are verified using data from the AWSs. However they are still facing difficulties in forecasting actual rainfall amounts during the monsoons. The Models are also good at forecasting tropical cyclones. Whenever WPF issues weather information, they always put a disclaimer that their information is not official information. It is only PAGASA that is authorized to issue official weather and climate information.

3.3. Field/Site Visits:

The team visited two sites, one within the city and one in the province, so as to link the on the job exposure to the outreach sites. In addition the team interacted with the League of Corporate Foundations and the PAGASA so as to appreciate the public and NGO perspective to the early warning services:

a) SM Aura located in Bonifacio Global City:

This has a Lufft type automatic weather station was installed on top of a high rising story building, bearing in mind not to exceed the highest point of the building (lightening arrester). The system has sensors mounted at a height of 2meters with the rain gauge mounted at 1 meter from the base (top of the building). The system was fully functioning, communicating through the ASTI data loggers to the servers for processing. The wind speeds at that height are computed bearing in mind the height of the building so as to minimize errors brought about by the difference in the heights.

b) Tagaytay Province (Disaster Risk Reduction Office):

This has a Davis type automatic station. Here there is a good clearance between the rain gauge and the other set of sensors. The anemometer and the wind vane are installed at the recommended height, and they were noted to be recording the parameters well. Data was displayed on the console separately powered and installed in an accessible point within the Offices. To automatically send the data, a telephone line through the telephone adapter is connected through a memory chip (SDI-12) fitted on the console. The telephone line ends at the METRILOG adapter that is also separately powered. The METRILOG adapter links the telephone line to the METRILOG data logger, fixed outside the building at a point where it easily picks the signal of the network provider (GPRS). This setup enables the station to generate and transmit data automatically to the METRILOG servers for processing.

- The AWS has sensors captures 7 parameters of wind speed; rainfall; pressure and humidity; radiation; wind speed; temperature and dew point. The data logger that is made locally also has the battery and it ensures compatibility with the AWS.
- Each area has a different data logger requirement depending on whether it is using the GPRS or SMS. These are mounted according to standard installation procedures;
- These AWSs can also be mounted on the Mobile Telecommunications masts without being interfered with by the communications systems;
- Lightning detectors cannot be mounted on the Telecom. Masts. The MeteoGroup is currently researching on the lightning detection systems;
- Storm and flood forecasting is another area of collaboration for the hydrological modelling (an area of interest for the DWRM in the case of Uganda);
- In terms of maintenance, the first level of diagnosis is the partners/contact persons in the field in the regions/provinces/
- The advantage of the system is that apart from the rain gauges, there are no moving parts.

c) Meeting with the League of Corporate Foundations:

This is a network of 84 organizations including the Banking, Aviation, Motor, Insurance, Shipping Companies. Their focus is on Corporate Social Responsibility (CSR) for sustainable development and disaster reduction. It has a strong link with the Association of Southeast Asian Nations (ASEAN), to support social services in the country. It has an integrated response system including anti-corruption. The main thematic areas are: Arts and culture, education, environment (weather), enterprise development, health, communications. Its CSR system originated in the “people power” in addressing poverty issues and it collaborates with Government institutions for certification. It has a network of 300,000 CSOs throughout the country which gives it a comparative advantage in mobilizing for community resilience.

d) Meeting with Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA)

- Though an informal two hours interaction with the PAGASA, the team noted that: The Forecasting Unit focuses on weather and sea forecasts, including rain warning for sea boats. This is important to respond to tropical cyclones which occurs up to 18 times yearly. Rainfall Advisories are coded in yellow and red depending on the severity of the incidences. There are 9 radars throughout the country, with one stationed in Takloban where the greatest disaster (Yolandar) took place in. PAGASA also collaborates with the MeteoGroup, and has access to some data from the 750 AWSs; Serving 7,000 islands, each province has its own weather system with the involvement of the Local Government structures (Barangay) for dissemination of weather data, and minor maintenance. PAGASA follows the WMO standards in its operation, and it buys the AWSs directly from the suppliers while complementing with locally made data loggers; Data is disseminated via SMS or GPRS using the



simplest terms possible; Not yet doing long term forecasts because of lack of historical data, but has been successful in reaching the Filipino needs/responses. The “Project Noah” commissioned by the President has been instrumental in flood monitoring. It also operates a satellite system.

4.0. THE UPGRADED BACK_TO OFFICE REPORT

Date: 20th August, 2015

8-15 August 2015 (including travels)

Participating organizations: The Uganda National Meteorological Authority (UNMA) and the PMU; Tanzania Meteorological Services; Zambia Meteorological Service/SCIEWS PMU.

Location of Activity: MeteoGroup/Weather Philippines Foundation- Bonifacio Global City-Manila

Purpose of Travel/Learning event:

To learn the public-private-partnership mode of generating and utilizing weather information in the Philippines, in order to enrich the CIRDA projects in Africa.

Participation: The MeteoGroup; The Weather Philippine Foundation (WPF); The Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA); The Uganda National Meteorological Authority (UNMA); The Tanzania Meteorological Services; The Zambia Meteorology Service; and the respective SCIEWS Project Managers.

Key Topics discussed during the meeting/event:

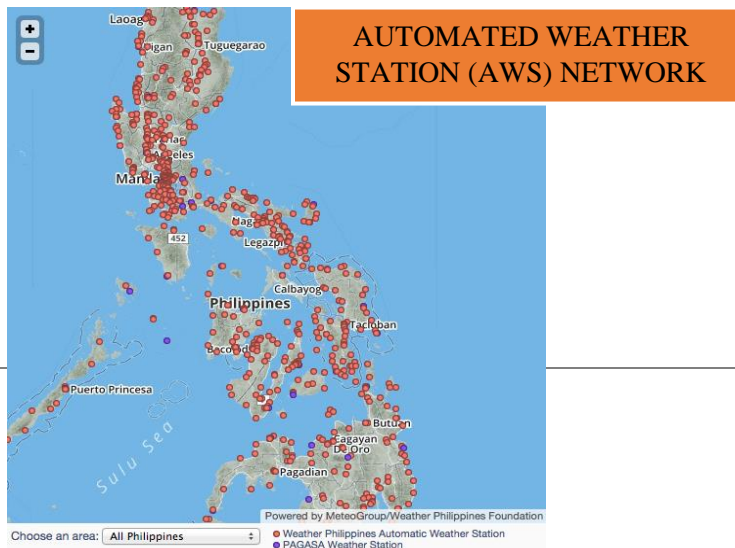
- Overview of MeteoGroup, Weather Philippine Foundation and Philippine Atmospheric, Geographical and Astronomical Services Administration (PAGASA);
- Automatic Weather Stations (hardware) and Weather Systems & Data Processing (Software)
- Meteorological Forecasting System;
- Site visit to Automatic Weather Station sites;
- Sustainability and Partnerships-Meteorology Products & Sales;

Issues /Main observations

1) MeteoGroup:

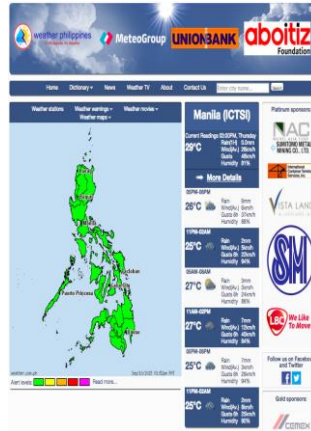
Is an independent (private) weather forecasting Bureau, operating in 15 countries including the Philippines and has access to 17,000 weather stations across the globe; Its main business is selling weather forecasting solutions, providing meteorological expertise & consultancy, data processing and giving back via Corporate Social Responsibility (CSR) by ultimately setting up 1,000 Automated Weather Stations (AWS) in the Philippines and giving free local weather information to the public.

The Weather Philippines Foundation (WPF) aims to deliver critical and accurate weather forecasts to the Filipino community, with the hope of improving nationwide disaster preparedness, and timely response to variable weather conditions. By bringing together the Aboitiz Group's resources and network, and MeteoGroup's technical expertise, WPF is poised to be the country's premiere private weather information/content provider. WPF plans to have roughly 1,000 automated weather station/devices installed across the Philippines.





Weather Philippines MOBILE APPLICATION (iOS / Android)



www.weather.com.ph WEBSITE

MeteoGroup and Weather Philippines Foundation have developed a system to distribute weather information to the public, specifically (1) AWS Current Measurements (2) 5-Day Forecast (3) Severe Weather Warning per zip code level. The information can be seen in the weather.com.ph website and Weather Philippines Mobile Application. There are also advanced features in the website like (WeatherTV, Satellite Feeds, Forecast Videos, Daily Weather Report, and more...

The Niche: The MeteoGroup is a global weather solutions business operating across all sectors where weather impacts business decision making, by providing innovative tools and support to assist customers make critical decisions at affordable rates in order to minimize risks and manage environmental impacts. Their team of experts are available 24/7 to deliver the highest quality information and advice on weather information;

The MeteoGroup is also the author of Weather Pro (and MeteoEarth and other weather websites. This is in response to the fact that world over there is a lot of demand for accurate weather data. In the Philippines, the MeteoGroup works to complement the role of Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA), which is the authorized official National weather service provider in the country;

Has established a good link with the global weather stations which gave the company ability to access global weather models and application to various systems in processing of weather products, with application of 10 different weather models including the best models of ECMWF & GFS (European and American weather service); and has its own proprietary model the MeteoGroup MOS.

Has established a centralized weather cockpit with different weather options (current measurement, 5 days forecasts, Tropical cyclones) which has improved data delivery;

Has a substantial infrastructure investment (750 AWSs with a target of 1,000 by 2018) using a private sector approach with innovative mode of weather information , generation and dissemination using a lean human resource base, and efficient systems;

Its Philippines offices comprise a team of highly qualified staff performing the following functions: Data quality control for the AWS Measurement network; Information Technology for the maintenance and support of IT related Hardware and Software; Meteorology (Forecasters) for consultation and Severe Weather Warning analysis; Nautical Route Analysts for the Marine sector; and Software development. Its main focus is on data processing, hardware and software.

Is using cheaper (2,500 US\$ each) imported technology option of AWSs, with locally manufactured data loggers (approx. 600 US\$ each); in partnership with sponsors and partners, has procured and installed 750 of these AWSs across the country;

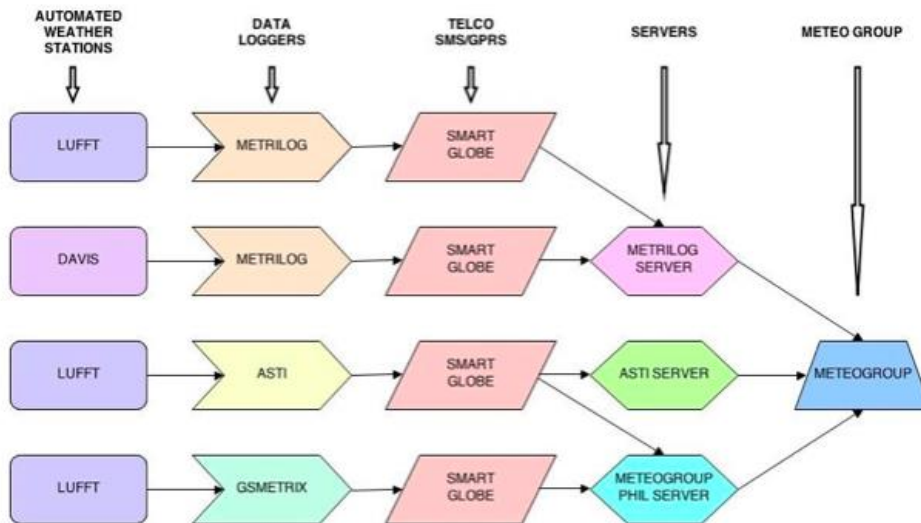
2 types of AWSs (Lufft and Davis) are in use, with 3 types of data loggers and servers (METRILOG, ASTI or GSMETRIX). METRILOG is more expensive than the ASTI, and the Luft AWSs had failing batteries.

Currently MeteoGroup has different combinations because of the nature of TELCO in each location. Not all locations have GPRS signal so SMS is widely used for AWS data communications.

MeteoGroup currently maintains a cloud server for the website and data processing, and SMS Gateway for SMS Data communication. To avoid risk of losing data MeteoGroup will be transitioning to a hybrid cloud solution but is still maintaining both original and new setup.

One of its main revenue sources (global) is from nautical route analysts, through which they provide forecasts to ocean vessels. In the Philippines, majority of the systems are related to general Weather Data and Risk Management data. Currently the customers are from (Aviation, Logistics, Agriculture, Energy, IT-BPM, and Tourism Sector). A combination of automated online systems and analysis of weather forecasters are provided to a customer. Tropical Cyclone warnings and reports are provided for both public and customers (detailed version to customers). After each Tropical Cyclone, MeteoGroup produces a postmortem report to review the accuracy of its forecast, which have been found to be accurate in 95% of cases. This is in spite of the fact that so far MeteoGroup has only 3 years of historical data, hence its use of modern statistical analysis for long-term forecasts. MeteoGroup will continue to gather historical data to implement MeteoGroup- Model Output Statistics (MOS) which is a proprietary forecast model of MeteoGroup.

Processed data for public use is provided to *weather.com.ph*, while more detailed data is retained for commercial purposes. MeteoGroup was attracted to the Philippines due to high demand for weather services, and is still looking to expand globally;



MeteoGroup has a good network of donors that sponsor scaling up the AWSs:

Platinum Donors

- International Container Terminal Services,
- Inc. Nickel Asia Corporation
- SM Investments Corporation
- Vista Land and Lifescapes, Inc.
- LBC Express, Inc.

Gold Donors

- Aviation Concepts LLC
- Crystal Sugar Company, Inc.
- Hedcor, Inc.
- Manila Polo Club
- Ocean Adventure
- Syngenta Philippines, Inc.
- SN Aboitiz Power Benguet
- SN Aboitiz Power Magat
- Anvaya Cove Beach and Nature Club (Ayala Land)
- Cemex Philippines
- The NET Group
- Philippine Airlines
- San Miguel Consolidated Power Corp. SMC Consolidated Power Corp.
- Sarangani Power Corporation Pico De Loro Resort Visayan Electric Company (VECO) Davao Light & Power Co.

Service Partners

- Cebu Air, Inc.
- Department of Science and Technology - Advance Science and Technology Institute
- GeiserMaclang Communications Inc. iAcademy League of Cities of the Philippines (LCP) League of Provinces of the Philippines (LPP) Rappler, Inc.
- Globe Telecommunications, Inc. Mountain Hardware (Kenrich International) Pisig Worldwide Department of Education

Site Partners

- Taal Yacht Club
- GMA Baler Resort, Inc.
- Davao Light and Power Company
- 128 cities c/o League of Cities of the Philippines
- 80 provinces c/o League of Provinces of the Philippines
- HILTI Philippines, Inc. Naga College Foundation PILMICO Foods Corp. First Farmers Association 227 municipalities (priority meteorological sites) Electric Cooperatives

2) Weather Philippines Foundation(WPF):

WPF is a local National NGO that has a formal partnership relationship with the MeteoGroup, paying for scientifically analyzed data that has been processed by MeteoGroup. In this partnership, some leading private companies donate AWSs at the rate of US\$ 2,500 each, and locally produced data loggers are used to reduce on the cost of complete system;

The Weather Philippines Foundation (WPF) aims to deliver critical and accurate weather forecasts to the Filipino community, with the hope of improving nationwide disaster preparedness, and timely response to variable weather conditions. By bringing together the Aboitiz Group's resources and network, and MeteoGroup's technical expertise, WPF is poised to be the country's premiere private weather information/content provider. WPF plans to have roughly 1,000 automated weather station/devices installed across the Philippines.

MeteoGroup and Weather Philippines Foundation have developed a system to distribute weather information to the public, specifically (1) AWS Current Measurements (2) 5-Day Forecast (3) Severe Weather Warning per zip code level. The information can be seen in the weather.com.ph website and Weather Philippines Mobile Application. There are also advanced features in the website like (WeatherTV, Satellite Feeds, Forecast Videos, Daily Weather Report, and more...

The weather stations have MoUs with Telecommunications Companies for uninterrupted data monitoring

services(via pre and post-paid options);Weather data per station is updated every hour, with real-time maps and alerts (weather.com.ph/view/980043; meteoearth.com); Localized severe early warning gives it visibility and credibility as an alternative weather service provider;

A sponsorship arrangement with leading private companies (e.g. Shell, CEBU Airlines, Philippines Airlines...) sustains this partnership relationship, which enables MeteoGroup to sell weather data and shares the income with WPF at a 50%/50% ratio. There is a clear distinction between the weather data generation role (MeteoGroup) which is also the supplier of technology; and weather information dissemination (WPF) which is responsible for managing the applications component. Through the PAGASA modernization Bill, relationship with the National Authority is expected to be streamlined and enhanced;

WPF manages the applications across the 12 regions comprising across the country, comprising 7,000 islands. Established strong partnership with the community and other private companies in provision of security of the stations and supporting operations cost;

Each area has a different data logger requirement-either using SMS or GPRS for dissemination of weather information(wind speed, rainfall, pressure and humidity, radiation, wind speed, temperature and dew point);

Notwithstanding the modest relationship between WPF and PAGASA, in the interest of the country there is some sharing of weather data between PAGASA and the private sector, but at a limited level. And there is a close collaboration between the Meteorological services providers and the Disaster Risk Response services. For the national good and in the interest of disaster risk reduction, there is a strong coordination with various organizations within the country for the supply of weather information;

A Corporate Social Responsibility (CSR) strategy is being used for acquisition and maintenance of AWSs, and also to ensure sustainability of the equipment. The League of Corporate Foundations comprising 84 organizations including the banking, insurance, shipping and aviation sectors is a useful complementary platform for mobilizing resources for disaster preparedness and response;

The model of AWS that is being scaled up has an automatic rain gauge fitted with a sensitive tipping bucket, a solar panel of 15W and a battery of 25.2 WH, 3.7V fitted in the data logger. The data logger is a GSM unit that is programmed to send a short message (SMS) after every 10 minutes to the server. This station is mounted on a mast 6m (20') with the rain gauge at 1.5m above the ground;

Installation of AWSs with a *service partner* (e.g. shopping mall) ensures security and continuous power supply; The future plan includes scaling up the lightning detection system;

Other Lessons learnt:

- Communication of the AWS to the server (AMSS) should be effective and efficient; Meteorological Agencies could sign MoUs with Mobile Telecom. Companies for un-interrupted data relay services;
- Environmental concerns are critical in determining the locations and sites for the AWSs;
- Dissemination of data via SMSs is cheaper than using a GPRS based internet or other options;
- Using locally manufactured data loggers has reduced the cost of installations;
- Real time information updated every 10 minutes has improved the early warning system in the country; This has adequately complemented the Government's weather services;
- Dissemination of localized information using different approaches for example through real time maps and news through weather television;
- As with the MeteoGroup, WPF has qualified personnel who provide regular maintenance to the stations are working and provide quality data ;
- To enhance its dissemination efforts, the WPF owns a weather television, operates the weather portal (weather.com.ph), with well-established weather application apps for android smart phones.

Challenges:

- PAGASA operates fewer stations than the private weather partners and these stations are not connected with the 750 stations owned and operated by Philippines Weather foundation;
- There is a sense of monopoly in the Government approach that makes it difficult to communicate on weather business;

- Traversing the 7,000 islands is demanding but manageable through the weather system in each province and the involvement of the Local Government structures (Barangay) for dissemination of weather data, and minor maintenance by the LGUs;
- Follow the WMO standards in its operation;
- Not yet doing long term forecasts because of limited historical data, but has been successful in reaching the Filipino needs/responses;

Hardware (Automated Weather Stations)

- The Davis system has challenge with moving parts of the anemometer and the wind vane; the solar panel provided is small because it is designed for work during day time backed up by the internal battery (non-rechargeable) at night. This requires periodic checks and replacement of the used batteries. The system also has a console that requires separate powering and an internal battery, which appeared to complicate the system, although its data can also be uploaded on a website;
- Different sensors interact to transmit data from the station to a centralized station where it can be processed and used for forecasting purposes. With 4 gateway lines the sensors in the field (weather stations) communicate through the data loggers (METRILOG, ASTI, and GSMETRIX) via network provider (telecom companies) to the respective servers where data is processed and sent to Meteo group for analysis and dissemination. Data is sent in two formats i.e., Short Messaging Service (SMS) and General Packet Radio Service (GPRS);
- METRILOG data loggers use GPRS (packet data switching) whereas ASTI and METRILOG that are locally made use SMS. SMS is cheap to use and readily available compared to the GPRS but in case of failure of connectivity data is lost unlike GPRS where data is recoverable upon re-connectivity.
- As a solution, Meteo group is looking at an alternative option of using the Cloud SMS service where data will use one line gate way provided by the telecom company and stored on the cloud (telecom servers). In case of service interruptions, data is recoverable, though expensive to implement as it would provide data reception and storage for a period of 1 month before it can be written off.
- The main portals for the MeteoGroup and weather Philippines data are: www.meteogroup.com and www.weather.com.ph. They also run a weather cockpit via: <https://www.meteomedia-portal.com/>

Software (Weather Tools) used by Weather Philippines Foundation

MeteoGroup uses various proprietary and non-proprietary software that is also used internally by Weather Philippines Foundation. This comprises the following software:

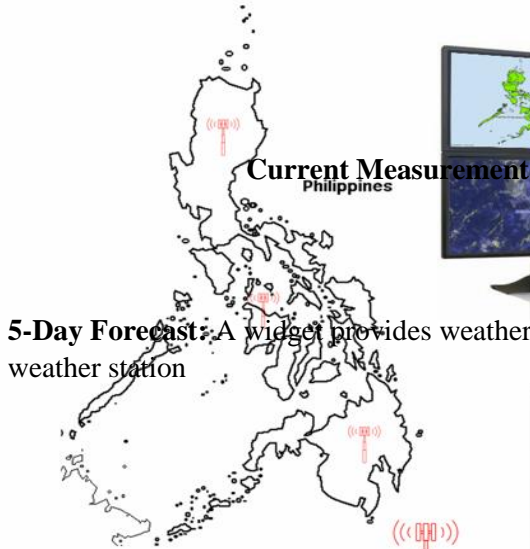
- Wetter4
- Weather Cockpit
- Severe Weather Center PH
- Storm Tracks
- 12h Weather Station Event Detection Map
- Event Detection List
- Meteogramm
- Facebook Image Generator
- Karten - MSAT(Satellites)
- Typhoon Track Editor
- Storm Surge Forecast

Software (Weather Tools) used by MeteoGroup Customer - Weather Cockpit

The Weather Cockpit is a collection of customized widgets that shows processed weather data from a specified location.



The **WEATHER COCKPIT** is a collection of customized widgets that gives visualization over processed weather data from specific locations in the Philippines. The sources of data are from standard weather models and more than 700 Automated Weather Stations (AWS) in the Philippines.



5-Day Forecast: A widget provides weather forecast for the site of a weather station



Multi-Screen

SYSTEM FEATURES

- Storm Tracker
- Severe Weather Warning Notification
- Severe Weather Warning Map

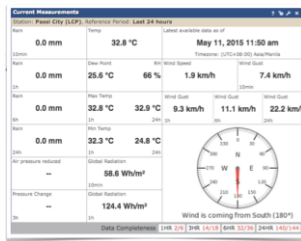
- DMO Weatherlight Notification
- Observation Map
- Weather Measurement based on Location
 - Wind Speed
 - Wind Gust
 - Wind Direction
 - Rain
 - Temperature
 - Pressure
 - Global Radiation

- 5-Day Forecast based on Location
- 3-Day Wind Forecast Movies
- 3-Day Precipitation Forecast Movies
- Satelite Movies

Other Advanced Features

MINIMUM REQUIREMENTS

- Standard Web Browser
- Internet Connection



700 the Philippines

Observation Map

data collected by MeteoGroup shall not be distributed by PAGASA remains as official data. The Solution was developed to complement information provided by PAGASA. A widget to view current and archived weather station data on a map



Single Screen



BASED on per AWS location



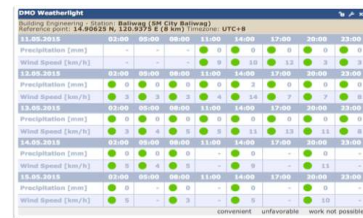
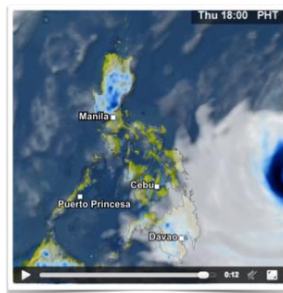
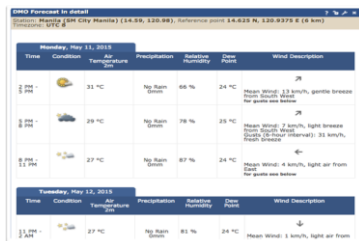
Measurement Table

A widget to see a table view of the current and archived weather station data and to export raw measurement data of the weather stations.

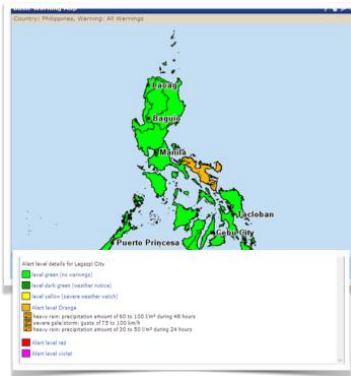


Wind and Precipitation Animated Forecasts

A widget with currents and cloud/precipitation animations forecasts.



Typhon Tracker



Warning Status: Displays status for each post code for severe weather warning

A note on PAGASA:

With a critical challenge of up to 18 cyclones every year, PAGASA has positioned itself to serve the nation with the following facilities:

Infrastructure: Has 58 synoptic stations, 23 Agro-met stations, 155 AWSs, 187 Rain Gauges, 11 weather radars, 3 mobile X-Band radar, 6 upper air stations, 2 marine Buoy, 1 wind profiler and 16 VSAT facilities;

Has operational Forecasting, satellite, Hydro-met monitoring and communications facilities;

Services/ products : 24 –Hr. Public Weather Forecasts and Severe Weather Bulletins; Hourly Tropical Cyclone Warning Update; Shipping Forecasts & Tropical Cyclone Warning for Shipping; Gale Warning ; Meteorological Aviation Services for Aeronautical Users through Access to the World Area Forecasts Systems (WAFS); Rainfall Warning System ;

A tendency of relying more on satellite data, as compared to data from the AWSs which could have implications on the accuracy of data generated;

Mandate: A Presidential initiative code named “ Project Noah” for flood monitoring to complement the PAGASA response to disasters and the PAGASA Modernization Bill is expected to improve the institutional capacity of the Government Agency to improve its services;

Severe Weather Warning Map (Country & Region view);

A Widget shows severe warning forecast released by the meteorologist based on rain and wind parameters

The Severe Weather Matrix is the standard **color coding** used by Weather Philippines Foundation for Severe Weather Warnings The Meteorologists and Forecasters are equipped with Meteorological Tools provided by Meteogroup.

The warnings are triggered combining automated systems and manual input from the Meteorologists.

Warning Maps are available to the public.

weather philippines
By. Prepared. By. Weather.

WEATHER SEVERITY MATRIX

	RAIN	WIND	WARNING	ACTIONS TO TAKE
NORMAL			No severe weather warning*	
WEATHER WATCH	 Uncertain	 Uncertain	Severe weather expected but the intensity and/or affected areas are still uncertain. Monitor situation closely.	
MODERATE	 F* 24 hrs: 30-50 mm F* 48 hrs: 60-100 mm	 F* 75-100 kph	Moderate severe weather. Be prepared. Expect impacts on traffic and outdoor activities.	
HEAVY	 F* 24 hrs: 80-100 mm F* 48 hrs: 100-150 mm	 F* 100-130 kph	Severe weather of heavy intensity. Take precautions. Expect heavy traffic and some damage. Consider work suspension.	
EXTREME	 F* 24 hrs: 150 mm or more F* 48 hrs: 200 mm or more	 F* 120 kph or more	Extremely severe weather that poses significant risk to life. Take precautionary actions. Expect widespread damage and follow evacuation orders.	

*F = FORECAST

5.0. RECOMMENDATIONS:

The Public-Private Partnership approach be explored and deepened for sustaining the operations of meteorological services; Installation of AWSs with service partners (e.g. shopping mall) ensures security and continuous power supply; Operations and maintenance of the AWSs is related to hardware and availability of the right personnel who are committed to the tasks. Outsourcing the maintenance function or use of site partners (e.g. schools) is a feasible option; Dissemination of data via SMSs recommended as it is cheaper than the GPRS or other options. This would increase the outreach and usage of the meteorological products; “Weather wiser packages” be adopted for educating communities and the public on meteorology. This could be distributed in schools to introduce the culture of being conscious of weather in their areas.

6.0. CONCLUSION:

The apparent success of the MeteoGroup and the Weather Philippines Foundation compared to its Government counterpart-PAGASA is due to the former’s willingness to experiment different technologies with innovative approaches to generation and dissemination of weather information; The MeteoGroup/Weather Philippines Foundation provides accurate weather forecasting solutions which has proved helpful to the Philippines energy, construction, transport (road, rail, aviation, shipping,), offshore, construction, insurance, agriculture, leisure, water management, media, consumer, retail and building automation sub-sectors; Successful weather monitoring system requires a good human resource base with relevant expertise in meteorology, Information Technology and related specialized areas; Unlike other models of AWSs that have moving parts (rotational) for the anemometer and wind vane, this system has ultrasonic sensors that capture the wind direction and speed, hence the advantage of reducing issues of wear or tear, non-lubrication, corrosion and other mechanical losses;

7.0. PROGRAM:

Day	Date	AM/PM	Activity	Facilitators	Location
Monday	10-Aug	AM	MeteoGroup Overview	Felix Ayque(Country Manager, MeteoGroup)	30F NAC Tower, BGC
		PM	Weather Philippines Foundation Overview	Celso Caballero(General Manager, Weather Philippines)	17F NAC Tower, BGC
Tuesday	11-Aug	AM	Automated Weather Stations(Hardware)	Alvin Tobias(Operations & Maintenance Manager, Weather Philippines)	17F NAC Tower, BGC
		PM	Weather Systems & Data Processing (Software)	Felix Ayque & Data Quality Team	30F NAC Tower, BGC
Wednesday	12-Aug	AM	Local Meteorologist	Mike"Mr.Typhoon: Padua,& Leonilo Millanes(Senior Weather Forecaster and Meteorologist)	30F NAC Tower, BGC
		PM	Sustainability and Partnerships-Meteorology Products & Sales	Kaye Rosario (Sustainability Specialist, Weather Philippines); Michael Artadi (Account Manager, MeteoGroup)	30F NAC Tower, BGC
Thursday	13-Aug	AM	AWS -site visit	Alvin Tobias(Operations & Maintenance Manager, Weather Philippines);Michael Artadi (Account Manager, MeteoGroup)	To be confirmed
		PM	AWS -site visit	Alvin Tobias(Operations & Maintenance Manager, Weather Philippines);Michael Artadi (Account Manager, MeteoGroup)	To be confirmed
Friday	14-Aug	AM	MeteoGroup & Weather Philippines Foundation.	Felix Ayque (Country Manager, MeteoGroup) & Celso Caballero(General Manager, Weather Philippines)	30F NAC Tower, BGC
		PM	MeteoGroup Event	Weather Risk Management for Business	F1 Hotel, BGC

8.0. LIST OF VISITING TEAM

#	Name	Sex	Country	Participating Organization	Title	Contact
1	James B. Magezi Akiiki	M	Uganda	UNMA	Ag. Director Stations Network	mageziakiikibj@yahoo.co.uk
2	Richard Tashobya	M	Uganda	UNMA	Technician	rtashii@yahoo.com
3	Pascal Onegiu Okello	M	Uganda	UNDP-SCIEWS	Project Manager	pascal.okello@undp.org
4	Chibesa Pensulo	F	Zambia	UNDP-SCIEWS	Project Manager	hibesa.pensulo@undp.org
5	Alfei Daniel	M	Tanzania	TMS	Program Coordinator	alfei.daniel@gmail.com



Empowered lives.
Resilient nations.

9.0. LIST AND CONTACT OF KEY PARTNERS/PERSONS MET:

#	Name	Sex	Organization	Title	Contact
1	Felix Ayque	M	MeteoGroup	General Manager	felix.ayque@meteogroup.com
2	Celso C. Caballero III	M	WPF	General Manager	celso.caballero@aboitiz.com
3	David Michael V. Padua	M	WPF	Senior Typhoon Specialist	michael.padua@aboitiz.com
4	Alvin A. Tobias	M	WPF	O & M Manager	alvin.tobias@aboitiz.com
5	Leonilo C. Millanes	M	WPF	Senior Meteorologist	leonilo.millanes@aboitiz.com
6	Charlie A. Fuellas	M	WPF	O & M Technician	charlie.fuellas@aboitiz.com
7	Elpi Norli Taberdo Jr.	M	WPF	O & M Technician	pitongdblack@live.com
8	Hellen O. Orande	F	League of Corporate Foundation	Executive Director	Exectivedirector@lcf.org.ph
9	Jose Clyde	M	Tagaytay City Emergency Service	DRR Official	Cyayong2000@yahoo.com
10	Geraldine Gibla P Nilo	F	PAGASA	Supervisor, Met. Satellite Facility	Gilda.aparr@yahoo.com
11	Teresa A Millnes	F	PAGASA	Meteorologist	Tessmillanes@yahoo.com