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and Opportunities in Meteorology”

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I. Oral Sessions

Session 1: Current Advances on Weather

Radiosonde intercomparison at Laoag during YMC-BSM2018

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As one Intensive Observing Periods (IOPs) of the Years of the Maritime Continent (YMC), YMC-Boreal Summer Monsoon study in 2018 (YMC-BSM2018) was set from July 1 to August 31, 2018. The YMC-BSM2018 is designed to understand boreal summer monsoon by conducting various observations at selected sites, where local unique phenomena are often observed. One key topic of the YMC-BSM2018 is atmospheric convection associated with northward propagating BSISO (Boreal Summer Intra-Seasonal Oscillation).

For this purpose, a mobile Doppler radar was deployed near Laoag, while radiosonde soundings were enhanced from 2 to 4 times/day at Laoag weather station during the IOP. We also performed intercomparison of different radiosondes (Vaisala, Lockheed Martin, and Modem) with simultaneous launching, and deployed one GNSS receiver to derive precipitable water vapor (PWV) continuously.

It is known that various types of radiosondes are used in each station and country during the YMC campaign. They satisfy the needs for operational use, but they often show different humidity profiles by types mainly due to different correction scheme for solar radiation induced error. To obtain accurate knowledge of monsoon systems including BSISO, radiosonde data should be the same quality regardless with types as much as possible.

While we can confirm their difference of radiosonde humidity data by direct comparison, the difference found in the comparison of PWV between GNSS-derived and radiosonde-derived requires explanation about which provides more accurate data. We present several examination results to explain these differences by using surface and satellite data. These may contribute to obtain more accurate radiosonde humidity data.

Keywords: radiosonde intercomparison, YMC-BSM2018

Taiwan-Philippines VOTE Meteorology of Typhoon Study

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Taiwan-Philippines VOTE-Meteorology project which funded jointly by DOST (Department of Science and Technology) of the Philippines and MOST (Ministry of Science and Technology) of Taiwan is focused on improving the forecast capability of typhoon in different time scales. It is a bilateral collaboration between Taiwan and the Philippine government. Data from satellite and coastal weather radars and numerical forecasting models such as Weather Research and Forecasting Model (WRF) and the Cloud-Resolving Storm Simulator (CReSS) are used to study the typhoon track, intensity, and precipitation over Taiwan and the Philippine area. On the other hand, long-term behavior of typhoons, e.g., the seasonal and intra-seasonal variability of typhoons in the region near Taiwan and the Philippines is also studied.

A special issue of VOTE-Meteorology typhoon study in TAO (Terrestrial, Atmospheric, and Oceanic Science Journal) is currently under call-for-papers. The collected effort from the project is expected to be published before end of this year. The second phase of VOTE-Meteorology program is under organizing and is expected to start execution on next fiscal year.

Keywords: VOTE-Meteorology, Cloud-Resolving Storm Simulator (CReSS)

Sensitivity of Taal Ash Dispersion on Ash Size Distribution and Model Initialization using WRF-Chem

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The Philippines is located in the Pacific ring of Fire where many earthquakes and volcanic eruptions occur. In 12 January of 2020, Taal volcano abruptly erupted and affected areas in regions 4a, 3, and NCR with ash deposits. This study presents a tool and its limitations on forecasting volcanic ash dispersion – the Weather Research and Forecasting – Chemistry with volcano pre-processor. To determine the source parameter during volcanic eruptions, inputs like plume injection height, ejected mass, and duration of eruption are manually selected. In addition, the total ash mass is distributed between 10 particle size bins of volcanic ash particles with diameter size range starting from 2 mm down to less than 3.9 μm . The model calculates ash settling velocity using the GOCART deposition module based on the Stokes law corrected by the Cunningham slip factor. Model tests show that simulated ash deposition spatial extent is sensitive to selected ash size distribution, which varies for different volcanoes. Ash coverage was compared to crowd-sourced photos of local ash fall in the following morning. This study shows the capability of WRF-Chem to forecast ash dispersion and deposition in the Philippines, however, prior determination of data on ash size distribution for each volcano is necessary.

Keywords: ash dispersion, ash deposition, ash fall, Taal volcano

Session 2: Current Trends on Climate

A cookbook for brewing storms - tropical cyclones & climate change in the Philippines: What do we know so far? What are the gaps and what should be done?

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Understanding whether global warming and climate change have an influence on the occurrence and behaviour of tropical cyclone activity is of great importance since the Philippines is constantly affected by tropical cyclones. Projections of future tropical cyclone activity shows potential increase in global tropical cyclone intensity and the proportion of very intense tropical cyclones, and increase in tropical cyclone-associated rainfall rates. The attribution and detection of climate change signal on tropical cyclone events activity remains to be difficult as there are still limitations and uncertainties about these projections.

This review discusses the state of the inquiry on tropical cyclones and climate change based on available literature on global and regional modeling studies and data, with a particular focus on the Western North Pacific Basin and the Philippines. In this review, we addressed the following questions: Are the number of tropical cyclones in the Philippines increasing? Are tropical cyclones getting stronger? What is the link between climate change and tropical cyclones and what will be the implication of this to the Philippines? Will there be more and stronger TCs in PH in the future? What does it mean, in terms of societal impact, for the Philippines? What are the research gaps and what can be done to prepare for these changes?

Keywords: Tropical Cyclones, Modeling, Climate Change, Global Warming

Overview of the Observed and Projected Climate Extremes in the Philippines

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This study investigates the characteristics of selected climate extremes indices of the observed period 1986-2005 and the future timelines of the early (2020-2039), middle (2046-2065), and late (2080-2099) 21st century under two Representative Concentration Pathway (RCP) scenarios (namely, RCP 4.5 and RCP 8.5) over the Philippine landmass. The historical simulations and future projections of rainfall, maximum and minimum temperature downscaled using Regional Climate Models (RCMs) to 25-km resolution were used as inputs to the ClimPACT2 tool to generate the climate indices defined by the Expert Team on Sector-Specific Climate Indices (ET-SCI). Baseline information is derived from the SA-OBS daily gridded dataset. On model output evaluation, systematic dependence to downscaling RCMs is apparent among indices. From the projections, the temperature indices show a uniform increasing trend. The precipitation indices, on the other hand, are more variable and distinct, driven mostly by the boundary conditions of the Global Climate Models (GCMs). The spatial distributions of temperature extremes are identical among simulations, but the precipitation extremes have minimal similarities.

Keywords: climate extremes indices, climate models, projections, ClimPACT2, SA-OBS

Session 3: Current Trends and Challenges on Hydrology

School Hydrological Information Network (SHINe)

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School Hydrological Information Network (SHINe) is a simple school-based program that generally aims to address issues and concerns on the effects of Climate Change, in particular focusing on awareness to hydrometeorological hazards such as flood, rain-induced landslide, storm surge, drought, etc. It is one way of supporting the Department of Education's developmental program on the Climate Change enhanced curriculum. Further, it is consistent with the underlying principle that disaster awareness is anchored in schools. Alternatively, it generally supports the Disaster Risk Reduction and Management (DRRM) program by preparing and enabling schools to be proactive and resilient in times of impending hydrometeorological hazard events. The main idea is to strengthen the community, through the schools, in its disaster preparedness, mitigation and resiliency activities in times of inclement weather, and after disasters resulting from effects of hydrometeorological hazards. Tracking of tropical cyclones, regular monitoring of rainfall, or river water levels and the like are undertaken by a group of students based at different schools doing it at their own level and capacity. The data and information are then shared to the school populace (and administration), and to the local disaster risk reduction and management units of their community whenever possible and thus supporting them in their disaster preparedness and mitigation activities. SHINe was a program idea of the Pampanga River Basin Flood Forecasting & Warning Center (PRFFWC) more than 10 years ago and was adapted by the Provincial Government of Bulacan (PGB) being an off-shoot of another program activity of the former in the said province which was the Community-Based Flood Mitigation and Management Program (CBFMMP).

By engaging, enjoining and empowering schools, particularly its studentry, to do simple hydrological monitoring tasks can mean a lot in enhancing hazard awareness and eventually may prevent the loss of lives and reducing damage to properties.

Keywords: school-based, awareness, resiliency, empowering, hydrometeorological

Characterizing Extreme Tropical Cyclone Precipitation in the Mountainous Luzon Region, Philippines

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Due to its location in the western North Pacific Ocean basin, the Philippines is exposed to Tropical Cyclones (TCs) all year round. While these TCs provide much-needed precipitation for the country's hydrological cycle and agriculture, many also cause hazards such as floods and landslides. This study aims to examine the relationship between TC precipitation and TC characteristics such as movement speed and intensity, for TCs crossing the Mountainous Luzon Region (mainland Luzon bounded by Sierra Madre Mountain Range to the east, Cordillera Central to the west, and the Zambales Mountains to the west-southwest), or MLR, from 1978-2015. We classify extreme precipitation by getting the 95th percentile rainfall for June-September (JJAS) and October-December (OND). The daily area-weighted mean exceedance from extreme precipitation during TC events is compared with TC characteristics, particularly mean daily TC intensity and mean daily movement speed. Initial results show that there were more fast TCs (movement speed ≥ 11.25 knots) during JJAS, and more slow (movement speed < 11.25 knots) TCs during OND. On the other hand, there were more strong TCs (intensity ≥ 53.25 knots) during OND, with more weak TCs (intensity < 53.25 knots) during JJAS. This is attributed to the TC cyclogenesis locations further to the east during OND, allowing more time for TC intensification before crossing MLR. Extreme precipitation increases with TC intensity for slow TCs during JJAS ($R^2=0.38$) but decreases with TC movement speed for strong TCs ($R^2=0.29$) in the same season. These results suggest that it is important to consider both movement speed and intensity in predicting extreme TC precipitation.

Keywords: tropical cyclones, precipitation, orographic effect, Luzon

II. METeorology for YOUng (MET4YOU) Scientists: Science, Technology and Innovation

Project AMANIKABLE: Effectiveness of an Autonomous Floodgate in Managing Flood Flow in Rivers

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Flooding is a very common disaster that affects South East Asian countries, like the Philippines. It destroys a lot of property and risks the lives of thousands of Filipinos in the country. The researchers have built floodgates to regulate the flow of water although this requires monitoring by personnel on site

The researchers built an autonomous floodgate system which requires minimal human interaction due to a code they input in an Arduino Uno R3 equipped with an ultrasonic sensor and 2 DC motors connected to a motor driver connected on top of the Arduino Uno R3. The ultrasonic sensor allows the floodgate to measure the height of the water in the river and execute programs to the motors accordingly.

Utilizing the motors along the sensor to execute the code, the floodgate is successful in maintaining the river. Using the speed of sound as reference and creating a formula to find what the water level is, the researchers got a fairly accurate reading with a small margin of error. The researchers get the raw scores and plot it on the line graph and find that the slope is very small because the floodgate helped in equalizing the water level in the river.

Keywords: Floodgates, Arduino Uno R3, Water Level

Project AMANSINAYA: The Development of a Self-Sustained Weather Information and Alert System for Remote Areas

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This study focused on the development of a self-sustained weather station specifically designed to be used in remote areas and communities. Remote areas in the Philippines are always late or completely uninformed when it comes to weather updates and disaster prevention, it is due to lack of ways in disseminating information efficiently in these areas.

The weather station used solar panel/s to power itself; this type of power input can last long and doesn't require frequent maintenance. It has a 30W 12V Solar Panel and a 12V 12Ah lead-acid battery. It also uses a GSM Module and a Subscribers Identity Module to receive data from the main station, GSM Module (SIM800L Module).

The weather station used a temperature and humidity sensor (DHT11 Temp & Humid Sensor), the sensor can detect and measure accurate readings of the surrounding temperature and humidity, these factors are mostly used in weather forecasting, it makes this weather station a viable source of data of different regions especially remote areas in the Philippines to make a more accurate and broad weather forecast.

In conclusion, the self-sustained weather info and alert system displayed local weather information and information from a source and by recording the data and putting it into a standard deviation test, a simple analysis was made.

Keywords: weather station, GSM Module, Subscriber Identity Module

Development of alikaVOC: a Cloud-Based Air Quality Monitoring Network

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Indoor air quality (IAQ) can be measured using density of particulate matter 2.5 (PM_{2.5}), known to cause a variety of health problems; and volatile organic compounds (VOCs), which, when above certain doses, are toxic to humans. An information dissemination system was implemented by Khedo, Perseedoss, and Mungur (2010) specifically for outdoor air quality with periodic data reports; an IAQ monitoring system that displays data on demand is yet to be created. An IAQ monitoring system named alikaVOC was created that collects PM, temperature, air pressure, humidity, and IAQ index data. These are sent to a server, which hosts a website that visualizes them, and shows the current location of the device. When subjected to a transmission test, data stored in an SD card over a period of 3 days resulted in a 98.95% transmission rate compared to server data. The alikaVOC device was then run side-by-side with the TSI DustTrak, a commercially available air quality monitor, three times for one hour each time; the R² values obtained from the linear regression comparisons were 0.6820, 0.9056, and 0.9499 respectively. The most evident correlation was found when PM_{2.5} levels were below 500 µg/m³, since the PMS3003 starts giving inaccurate readings beyond this point. The device is heavily dependent on the Internet connection; weaker connections will hinder data transfer and destroy the data. By letting it adapt to more devices, this may give way to a comprehensive IAQ monitoring system that reports from multiple locations.

Keywords: Indoor Air Quality (IAQ), Particulate Matter, TSI DustTrak

Development of a Low-cost Landslide Alert System for Landslide-Prone Areas in the Philippines

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Existing landslide monitoring and alert systems in the Philippines are expensive and difficult to install. This study aimed to develop a minimally invasive alert system for landslide-prone areas in the Philippines that will allow landslide monitoring to be more accessible by being low-cost and easy to install. An Arduino-based system was created wherein the transmitter component was able to detect the tilt changes in the transmitter component itself and the moisture content of soil. A receiver sent alerts to the user through a light and sound system. A prototype was first created to prove the functionality of the sensors. The system was tested for fifteen trials with a small-scale landslide simulation setup, five times each for three different inclination levels (15°, 20°, 25°). During testing, an alert was sent once the tilt change in the x, y, or z-axis would reach the threshold of 30°. The landslide alert system had an F1-score of 1.000 since, in all trials, the transmitter component sent an alert when a landslide occurred. Soil moisture values were acquired in all test cases. The transmitter component has a power consumption of 0.6 mW and a transmission range of 5 m. The cost to assemble the prototype system was more than 1000 times lower than the price of conventional systems, making it a cost-effective alternative. In conclusion, a model for landslide detection by tilt change monitoring and alert transmission by RF communication was developed. The model has a potential to be an effective and accessible landslide monitoring system once implemented.

Keywords: Landslide Monitoring, Geotechnical Monitoring, Tilt Detection, Soil Moisture Detection, RF Communication, Landslide Simulation

Development of an iOS Application for Real-Time Spectral Classification of Stars Based on a Convolutional Neural Network

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This study explored the feasibility of creating an iOS application with a Convolutional Neural Network model that can identify stars based on their spectral properties. Specifically, the study used the Morgan-Keenan classification system to categorize the stars into several spectral classes. The study was done to make spectroscopy more accessible and convenient to amateur astronomers via the developed application. The Meade LX85014" along with the Star Analyzer 100 was used to gather 270 spectral images from 27 stars found in the night sky of Philippine Science High School Main Campus. Each spectral image is composed of 20 stacked images through mean image stacking. During training, 80% of the images were augmented and used to train the model and the remaining 20% were used to test the model. The model yielded a testing accuracy of 96.58%, a validation accuracy of 88.88% and a testing accuracy of 91.25%. Additionally, the model yielded an average of 91.25% sensitivity, 98.75% specificity, 1.25% false positive rate, 91.44% selectivity and an F1 score of 0.9101 on the testing dataset. These results can be further improved if more spectral images were gathered. The performance measure values indicate that the model can accurately classify the stars. Additionally, given that the model classifies seven classes, the values also indicate that the model is not classifying the spectra randomly. If successful, this study can make spectral analysis easier by providing a more efficient method to existing spectral analysis of stars.

Keywords: CoreML; Keras; Morgan-Keenan Classification; Python; Swift; Tensor Flow

Against the Current, Public Meteorologists Who Continue to Serve the Country in the Midst of a Brain Drain

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All of the public meteorologists based in the Philippines are currently employed by the Philippine Atmospheric, Geophysical and Astronomical Services Administration. Their profession is in demand as it provides an important service in society, because of that there has been a brain drain in the administration, mainly due to the fact that public meteorologists choose to seek greener pastures abroad. This study investigates the reasons and motivations of those who choose to stay in the country despite better financial opportunities abroad. This study used a qualitative phenomenological research design, a purposive sampling method was used to identify key participants. Colaizzi approach was used to analyze data to produce five (5) major themes from the data from the sample of five (5) respondents. The results disclosed that Filipino public meteorologists, notwithstanding the brain drain phenomena, have chosen to stay. The study further disclosed that the five major reasons why the public meteorologists chose to stay are importance of family, fulfillment of self, personal and professional growth, opportunity to progress academically, and service to the bureau and nation.

Keywords: meteorologist, brain drain, phenomenological, purposive sampling, colaizzi approach

Laging Handa: Development of a Mobile Game on Hydrometeorological and Geological Hazard Awareness

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The Philippines, being located in the Pacific Region, is subjected to various hydrometeorological and geologic hazards. In terms of susceptibility to these hazards, it was observed that children are among the most vulnerable population groups during disasters. As children nowadays prefer to use gadgets as a means of entertainment, mobile gaming could also be utilized for their learning. This study aimed to develop a mobile game about hydrometeorological and geological disaster awareness for elementary pupils, and have it evaluated by Disaster Readiness and Risk Reduction experts as a learning tool. The information and concepts incorporated in the game were appropriated from Save the Children Foundation's Batang Empowered Resilient Team (BERT) modules. ADDIE method was employed into the study, and the game was evaluated by DRRR experts. A Likert survey questionnaire was used in order to assess the quality of the game with questions under the categories of Functional Suitability, Instructional Content, Performance Efficiency, and Usability. For each category, the means were 3.93, 3.83, 3.60, and 3.87 respectively with 1 being the lowest possible score and 4 being the highest. It was found out that the game could be used as a potential learning material for elementary pupils.

Keywords: hydrometeorological, geological, disaster, mobile game, hazard

AMBON: A Simulation Training Program for Typhoon Hazard Awareness via Virtual Reality

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The Philippines is a typhoon frequented country, experiencing twenty typhoons annually. With improper education, there are higher risks and chances of casualties amongst citizens as they try to evacuate. Accordingly, governments and non-government associations offer educational disaster programs and emergency training in raising disaster preparedness and awareness in communities. Although these campaigns may have benefits, many studies confirm that traditional educational programs are insufficient in educating community members. As technology evolves, engaging forms of learning has become easier and more accessible. For instance, Virtual Reality (VR) offers an immersive user experience designed to make users perceive life-like events. Moreover, virtual reality can be accessed and downloaded on smart phones given that a large percentage of Filipinos own one.

AMBON, which stands for “**A**ssessment and **M**itigation **B**ased **O**n **N**atural Typhoon Hazards”, is a virtual reality mobile application and VR headset that aims to educate the masses on proper evacuation and mitigation of typhoon hazards. The invention was designed for the implementation and adaptation to educational institutions and DRR associations.

The prototype application was used for pilot testing and initial data collection from students in Quezon City Science High School. The data showed that there has been a significant difference between the groups of randomly selected students: students who first used AMBON influenced higher Disaster Awareness than those in the control and traditional method groups.

Recommendations gathered after the pilot testing include extending access to operating systems other than android, like Apple’s iOS. The application should be made available as well to those who live in areas that experience the effects of typhoon the most. Moreover, AMBON should offer a wider inclusion of likely incidents and circumstances that could happen during a typhoon.

Keywords: Disaster, Disaster Risk Reduction, Typhoon, Typhoon Mitigation, Virtual Reality

Development of Arduino-Based Monitoring System for Greenhouse Gases: Ammonia, Carbon Dioxide, and Methane

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The two primary subsectors of agriculture are farming and livestock. As a result, there are large numbers of animal farms that can lead to greenhouse gases such as carbon dioxide (CO₂), ammonia (NH₃) and methane (CH₄) emissions. Research shows that these farms have an adverse environmental effect. Through the development of an Arduino powered monitoring system, this evidence aims to determine how large these present pollutants are in farms and the possible sources of those emissions. With each emission, the monitoring device has three different sensors; MQ-4, MQ-135 and MQ-137, which can measure in order methane, carbon dioxide and ammonia. The equipment was then used in Bulacan to gather data from ambient air around farms specifically piggeries. The outcome of the monitoring and statistical analysis shows the reading of the estimated value in ppm and the pattern of the farms' concentration levels being considered one of the pollution contributors. The instrument will approximate the ppm of emission depending on the sample.

Keywords: Greenhouse gases, Arduino, MQ-4, MQ-135, MQ-137

Terrestrial Automated Monitoring and Risk Assessment of Woodlands (TAMARAW) System: A Mobile Arduino-based Solution towards Safeguarding Philippine Forestlands

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Illegal-logging activities, an emerging dangerous and harmful hazard, are under-researched. Therefore, the aim of this study was to develop a creative, effective, and efficient solution to address the problems of illegal logging. Since the lack of resources and manpower is a complication, the use of accessible automated solutions was used as a strategy. A setup containing Arduino-based hardware and software elements was designed, developed, and tested. The TAMARAW system, modeled after the guardian nature of tamaraws, is a mobile Arduino-based solution towards safeguarding Philippine forestlands. After the results of various specially designed tests on the different components and functions of the system, data analysis and interpretation infer that the TAMARAW system is an effective solution to combat illegal logging efforts, while providing flexible capabilities towards other areas of forest-related management.

Keywords: Illegal-logging, Biodiversity, Arduino, Forest Management, Forest Welfare

Society Profile

The **Philippine Meteorological Society, Inc.** (PMS) is a non-stock, non-profit governmental organization dedicated to the advancement of the atmospheric sciences and related disciplines in the Philippines.

Objectives of the Society

- Formulates, implements and coordinates projects to strengthen education, research and development in the atmospheric and related sciences;
- Establishes linkages with universities/colleges, operational forecast centers/offices, meteorological societies, non-government organizations and the private sector;
- Conducts research and extension services in various sectors impacted by climate change;
- Conducts training, seminars, workshops, symposia, etc. on atmospheric science and related disciplines;
- Publishes and distributes results of research and other scientific information on atmospheric and other related fields;
- Promotes meteorology, hydrology, climatology, agrometeorology, and astronomy as a profession; and
- Administers gifts, grants and donations of cash, property and services that will redound to the benefit of the society.

Society's mission

- To develop and disseminate knowledge of meteorology and related hydrologic sciences (hereinafter referred to as "Meteorology")
- To promote and advance the professional application of Meteorology
- To encourage collaboration amongst Members of the Society, individuals, bodies both corporate and non-corporate who may share the Society's interest in Meteorology.
- To promote among the public an understanding of weather and an appreciation of the value of Meteorology and its applications

Society's Structure

The Society's affairs are run by an elected Board of Trustees, within the constraints of the By-laws of the Society. The Society is served by Executive officers composed of a President, a Vice-President, Secretaries, a Treasurer, an Auditor and a Business Manager duly appointed by the Board of Trustees. In addition, the Board of Trustees appointed members to serve certain committees such as the Membership and Awards Committee.

Services Offered by the Society

- Consultancy (weather, climate, hydrology, air pollution and water quality assessment)
- Client-customized weather forecasts and extended outlooks
- Wind and wave forecast
- Capacity building in the mitigation of impacts of extreme weather and climate
- Conducts lectures, seminars and conference on current environmental issues

Past Activities of the Society

In order to meet its responsibilities and challenges, the PMS has sponsored a number of symposia both local and international.

- 2019thPMS Annual Convention – March 20, 2019
Theme: *Leveling Up Meteorological Services to Meet Societal Needs*
- 2018thPMS Annual Convention – March 15, 2018
Theme: *Recent Advances in Philippine Weather, Climate and Hydrologic Information*
- 12th National Meteorological Hydrological Convention – March 2, 2017
- 11th National Meteorological Hydrological Convention – February 17-18, 2016
Theme: *"The Role of Meteorology in Disaster Prevention and Mitigation"*
- 10th National Meteorological Hydrological Convention – November 19-20, 2014
Theme: *"Extreme Weather and Climate: Impacts and Preparedness"*
- 9th National Meteorological Hydrological Convention – February 20-21, 2014
Theme: *"State-of-the-Art Technologies in response to Extreme Weather Climate Events"*
- 8th National Meteorological Hydrological Convention – February 21-22, 2013
Theme: *"Today's Meteorologists: Scaling up Effective Early Warning Services (EWS)"*.
- 7th National Meteorological Hydrological Convention – November 17-18, 2011
Theme: *"Dots, Isobars and Meteograms: Understanding the Science of Meteorology"*
- 6th National Meteorological Hydrological Convention - November 18-19, 2010
Theme: *"Adaptation Strategies: Building Blocks for a Climate Change Resilient Philippines"*
- 5th National Meteorological Hydrological Convention – November 19-20, 2009
Theme: *"Understanding the Climate change Issues: A Key to a better planning and investment."* Makati Convention Hall
- 4th National Meteorological Hydrological Convention – November 27-28, 2008
Theme: *"Connection and Fusion: Coping with Winds of Change"*
- Co-Organized the Symposium titled *"Rediscovering Philippine Setting: Meteorology and Mineralization and Tectonics"* – October 2-4, 2008

- 3rd National Meteorological Hydrological Convention – March 26-27, 2008
Theme: *“Climate Change: Local, Regional and Global Initiatives”*
- 2nd National Meteorological Hydrological Convention – November 27-28, 2006
Theme: *“Weather Climate and Water Implication to Sustainable Development”*
- 1st National Meteorological Hydrological Convention – December 12-13, 2005
Theme: *“Towards Understanding Weather, Climate and Consequences to Hydrology for Socio-Economic Development”*
- PMS-ADPC National Workshop (May 15, 2003)
- Symposia on Tropical Cyclones in the South China Sea and Western North Pacific Ocean
- Extreme Climate Events (ECE)
- National Symposium on the Application of Weather and Climate information

Highlights of the 2019 PMS Activities

- Mangrove Tree Planting - 23 March 2019, Pagbilao Mangrove Experimental Forest (PMEF), Pagbilao, Quezon
- The 4th PAGASA Para sa mga Bata: A Bood-Letting Activity, 26 March 2019, PAGASA Training Room, PAGASA Central Office, Quezon City
- Essay Writing Contest (in line with the celebration of the 2019 Typhoon and Flood Awareness Week) - 19 June 2019, Amihan Conference Room, PAGASA Central Office, Quezon City
- IEC to PAGASA Non-technical Personnel (in line with the celebration of the 2019 Typhoon and Flood Awareness Week) - 19 June 2019, Amihan Conference Room, PAGASA Central Office, Quezon City
- The 5th PAGASA Para sa mga Bata: A Bood-Letting Activity, 26 June 2019, Amihan Conference Room, PAGASA Central Office, Quezon City



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