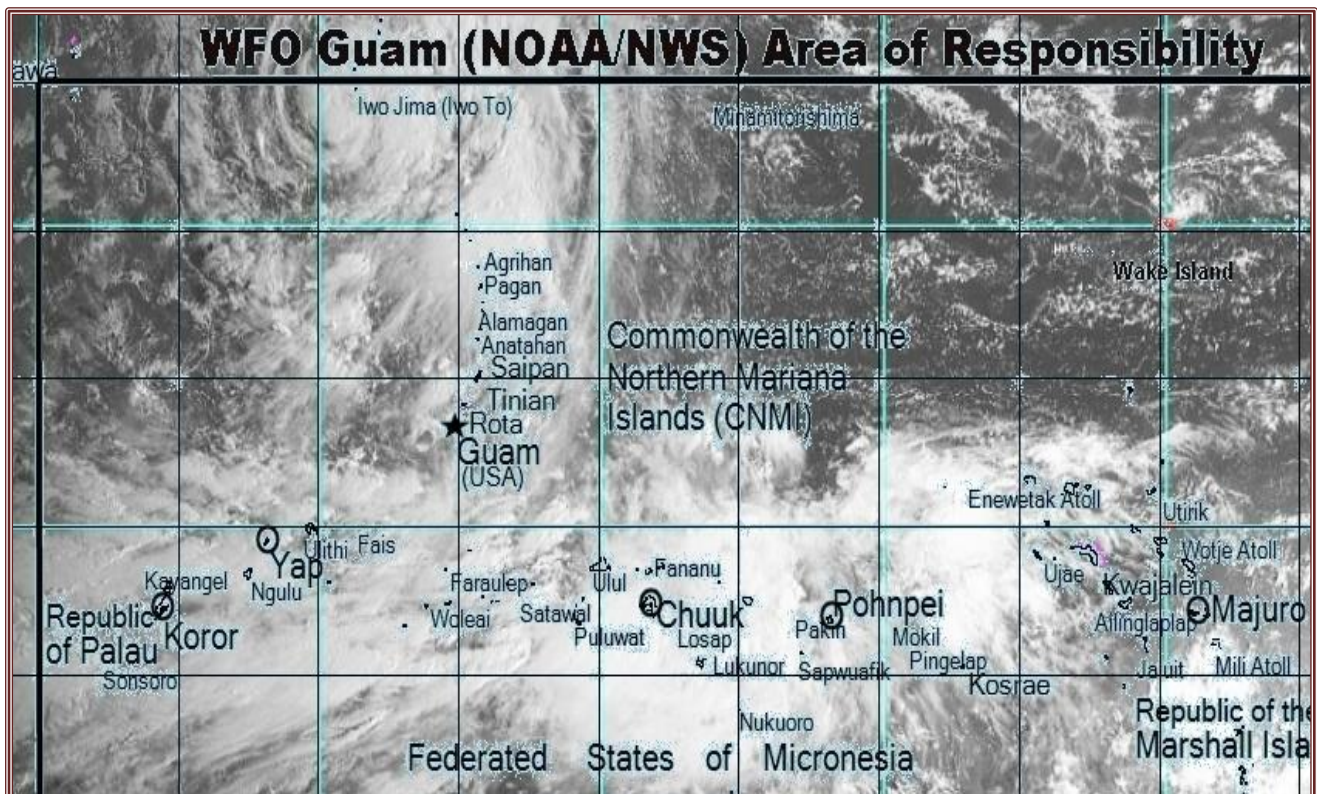


# MEMBER REPORT

## United States of America

### Pacific Region



**UNESCAP/WMO Typhoon Committee**  
**7<sup>th</sup> Session Integrated Workshop (IWS)**  
**26-30 November 2012**  
**Nanjing, China**

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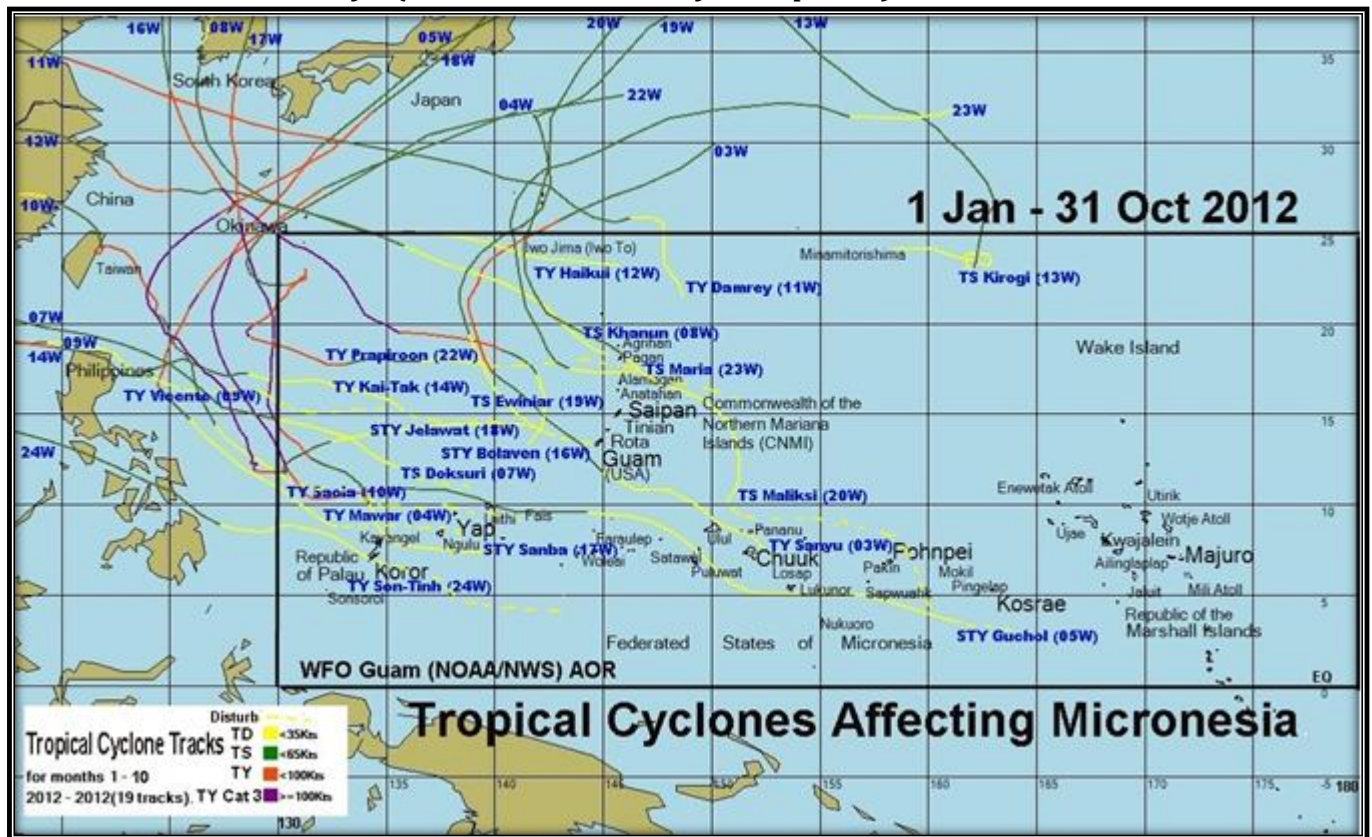
**Cover caption:** A MTSAT visual image from 3 October 2012 showing an active monsoon pattern across Micronesia from the Republic of Palau to the Marshall Islands. Tropical Storm Maliksi (20W) can be seen to the northwest of the Marianas moving out of the WFO Guam (NOAA/NWS) Area of Responsibility. Near gale-force winds, heavy rain and high surf persisted over many of the islands for over two weeks.

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I. Overview of tropical cyclones which have affected/impacted Member's area in 2012

1. Meteorological Assessment (highlighting forecasting issues/impacts)  
**Western North Pacific (130E to 180, north of the equator) Overview**



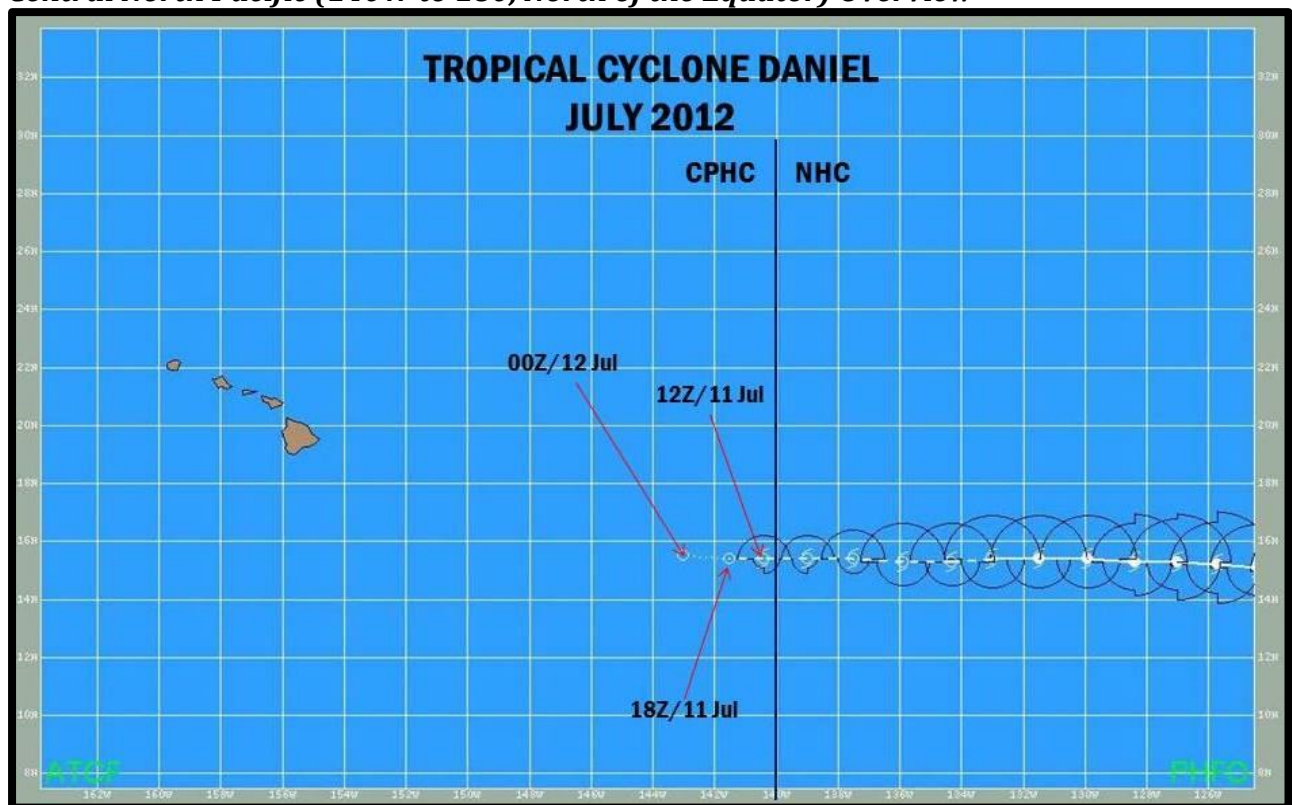
**Figure 1: Tropical Cyclones affecting Micronesia 1 January through 31 October 2012**

Tropical Cyclone activity in the Micronesian portion (area between the Equator and 25N from 130E to 180, not including Kiribati) of the western North Pacific from 1 January through 31 October 2012 was up from the past several years of very low activity. Through 31 October, 19 tropical cyclones either developed or were initiated within the US National Weather Service (NWS) Weather Forecast Office (WFO) Guam Area of Responsibility (AOR). In addition, three other non-developing disturbances and two periods of persistent monsoon flow helped to increase the rainfall to well above average for many of the island stations west of Chuuk State (around 150E). Further to the east, rainfall and organized tropical activity were both below normal, which is consistent with the weak La Niña and El Niño-Southern Oscillation (ENSO)-neutral patterns that dominated the year through October. Although the total number of tropical cyclones through the end of October was near normal for the entire western North Pacific basin, tropical cyclone activity was below normal for the AOR with only 12 tropical cyclones warranting Public Advisories from WFO Guam. The weather office issued Tropical Storm Warnings for only three cyclones, and like last year, no Typhoon Watches or Warnings were issued for the Micronesia region this year. In addition, no tropical cyclones crossed into the AOR from the Central Pacific.

Type	Definition
Tropical Storm Watch	Tropical storm-force winds (34-63 knots, 1-minute average sustained) are possible within the next 48 hours
Tropical Storm Warning	Tropical storm-force winds (34-63 knots, 1-minute average sustained) are expected within the next 24 hours or are occurring
Typhoon Watch	Typhoon conditions (64 knots or more, 1-minute average sustained) are possible within the next 48 hours
Typhoon Warning	Typhoon conditions (64 knots or more, 1-minute average sustained) are expected within the next 24 hours or are occurring.

**Figure 2: Definitions of WFO Guam watches and warnings**

**Central North Pacific (140W to 180, North of the Equator) Overview**



**Figure 3: Tropical cyclone affecting central North Pacific 1 January through 31 October 2012**

There was only one tropical cyclone in the central North Pacific during the 2012 hurricane season. Hurricane Daniel formed in the eastern North Pacific on 3 July and crossed 140W into the central North Pacific on 11 July as a tropical storm. Hurricane Daniel reached a peak intensity of 90 knots. Daniel quickly dissipated into a remnant low once in the central North Pacific and there were no impacts for Hawaii. La Niña and ENSO-neutral conditions did not favor development of any other tropical systems either locally within the central North Pacific basin or in the northeast Pacific and then moving into the central North Pacific.

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

### ***Western North Pacific (130E to 180, north of the equator) Overview***

Although the tropical cyclone activity increased from 2011, no significant hydrological events occurred. WFO Guam issued a few hydrologic products such as *Urban and Small Stream Flood Advisories* and *Special Weather Statements* to address these rather short-lived events. The monsoon trough emerged as a major rainmaker in the latter part of the year and generated several tropical cyclones later in the year. As the transition from La Niña in the first half of the year to ENSO-neutral conditions, rainfall was normal to above normal west of 155E longitude and below normal east of 155E longitude.

### ***Central North Pacific (140W to 180, North of the Equator) Overview***

The usually wetter east-facing slopes of the Hawaiian Islands had a near normal amount of rainfall days in 2012, but the average amount of rain per day was below normal. Drought conditions worsened across all islands toward the end of the year. West-facing slopes and leeward areas were the hardest hit with drought intensities at severe to extreme levels.

## **3. Socio-Economic Assessment (highlighting socio-economic and DRR issues/impacts)**

### ***Western North Pacific (130E to 180, north of the equator) Overview***

Drought conditions in the early part of the year were a result of La Niña. Periodic episodes of water rationing occurred in Majuro in the Republic of the Marshall Islands whenever the 33-million gallon runway catchment reservoir fell to less than half its capacity. Transport of water to some of the more remote islands and atolls was needed, but the Marshall Islands Government acquisition of reverse osmosis desalination units reduced the impacts at some of these locations.

### ***Central North Pacific (140W to 180, North of the Equator) Overview***

Regional Specialized Meteorological Center (RSMC) Honolulu conducted over 40 tropical cyclone related outreach events in 2012. The highlight of these outreach events was the Central Pacific Hurricane Center (CPHC)/Federal Emergency Management Agency (FEMA) course entitled "Hurricane Preparedness for Decision Makers". This course was attended by emergency managers, police, fire, homeland security, and other decision makers from across the State of Hawaii on April 10-12, 2012. For all events, RSMC Honolulu emphasized that even though there was a likelihood of developing La Niña conditions and a resulting decrease in tropical cyclone activity expected, it only takes one hurricane hitting Hawaii to produce major damage and impacts.

## **4. Regional Cooperation Assessment (highlighting regional cooperation successes and challenges)**

Nil

## **II. Summary of progress in Key Result Areas**

### **1. Progress on Key Result Area 1: Reduced Loss of Life from Typhoon-related Disasters.**

#### **a. Meteorological Achievements/Results**

Nil

#### **b. Hydrological Achievements/Results**

Nil

- c. DisasterRiskReductionAchievements/Results
  - RSMC Honolulu received funding from FEMA to produce a second printing of a children’s book developed in partnership with the University of Hawaii Sea Grant Program emphasizing hurricane safety and preparedness. The second run consisted of 7,000 soft cover books. These books were read to school groups visited by or hosted at RSMC Honolulu. This outreach effort ensures the children of Hawaii are aware of the hazards associated with hurricanes and speak to their parents about being prepared.
  - RSMC Honolulu assisted the cities of Kailua and Hauula on the island of Oahu and the Hawaii Volcanoes National Park in their successful campaigns to be designated as aStormReady Community. RSMC Honolulu ensured each community had disaster action plans in place and held outreach events to convey a preparedness message.
  - WFO Guam assisted the Island of Guam in applying for and preparing for its second 6-year period of StormReady and TsunamiReady recognition. The island, led by the Office of Civil Defense, underwent a comprehensive evaluation and was recognized by NOAA in June as earning StormReady and TsunamiReady status.
- d. Research,Training,andOtherAchievements/Results  
Nil
- e. Regional CooperationAchievements/Results  
Nil
- f. IdentifiedOpportunities/ChallengesforFutureAchievements/Results  
Nil

**2. ProgressonKeyResultArea 2:MinimizedTyphoon-relatedSocial andEconomic Impacts.**

- a. MeteorologicalAchievements/Results  
Nil
- b. Hydrological Achievements/Results  
Nil
- c. DisasterRiskReductionAchievements/Results  
Nil
- d. Research,Training,andOtherAchievements/Results  
Nil
- e. Regional CooperationAchievements/Results  
Nil
- f. IdentifiedOpportunities/ChallengesforFutureAchievements/Results  
Nil

**3. ProgressonKeyResultArea 3:Enhanced BeneficialTyphoon-related Effectsfor the Bettermentof Qualityof life.**

- a. MeteorologicalAchievements/Results

Nil

b. Hydrological Achievements/Results

Nil

c. Disaster Risk Reduction Achievements/Results

Nil

d. Research, Training, and Other Achievements/Results

Nil

e. Regional Cooperation Achievements/Results

Nil

f. Identified Opportunities/Challenges for Future Achievements/Results

Nil

**4. Progress on Key Result Area 4: Improved Typhoon-related Disaster Risk Management in Various Sectors.**

a. Meteorological Achievements/Results

- Tropical Weather Outlook graphic. During the tropical cyclone season, RSMC Honolulu prepares and transmits a text and graphical Tropical Weather Outlook. This text product and graphical representation describes the probability of tropical cyclone development in the next 48 hours.
- Evaluation of HURREVAC 2010. During 2012, the WFO Guam staff continued to work with the developers of the new HURREVAC 2010 program to ensure compatibility of western Pacific (WPAC) warnings issued by the Joint Typhoon Warning Center (JTWC) to Disaster Preparedness and Emergency Management Offices (EMO) in Micronesia to watch and warning criteria. HURREVAC is a software program used by emergency managers to gather the information they need to make evacuation decisions. WFO Guam uses this tool to generate a Tropical cyclone graphic for their web page and evaluate wind timing.
- New Climatological Tool for Tropical Cyclone Activity. WFO Guam began evaluating a new climatological tracking tool presented to WFO Guam by a former JTWC Typhoon Duty Officer, John Rupp. This display system enables the user to evaluate climatological tracks within Micronesia under various criteria such as by distance from a particular point, intensity, or over a swath of years or months. Track information are available both graphically and in tabular form. Results will be prepared for each of the weather forecast offices in the Guam AOR.

b. Hydrological Achievements/Results

Nil

c. Disaster Risk Reduction Achievements/Results

- The Hawaii State Hazard Mitigation Forum, of which RSMC Honolulu is a member, is tasked with maintaining and updating the Hawaii State Hazard Mitigation Plan. Forum members met regularly and to discuss hazard threat, risk assessment, and actions which can be taken to mitigate the hazard risk to protect lives and property from loss and destruction during a natural hazard.



- RSMC Honolulu is a member of the Hawaii Emergency Preparedness Executive Consortium (HEPEC). HEPEC is comprised of emergency managers and disaster mitigation personnel from local, state, and federal agencies. HEPEC meets quarterly to provide updates on current and outstanding threats, both natural and manmade, to the State of Hawaii. The RSMC Honolulu Director provided a hurricane presentation to the group during the April 2012 meeting.
- d. Research, Training, and Other Achievements/Results
- Annual Tropical Cyclone Drills were conducted at both Hawaii and Guam. In Hawaii, the annual Hurricane Exercise, coordinated by Hawaii State Civil Defense (SCD) in partnership with the NWS Forecast Office in Honolulu was held in late May and early June. On Guam, the 3-day annual tropical cyclone exercise sponsored by the Department of Homeland Security/US Federal Emergency Management Agency (FEMA) and the US military was held in June. WFO Guam provided extensive planning and execution support for both the military and Government of Guam agencies. This included several on-site typhoon weather presentations for the Emergency Operations Center decision makers.
- e. Regional Cooperation Achievements/Results  
Nil
- f. Identified Opportunities/Challenges for Future Achievements/Results  
Nil

## **5. Progress on Key Result Area 5: Strengthened Resilience of Communities to Typhoon-related Disasters.**

- a. Meteorological Achievements/Results
- Monthly Pacific ENSO Discussion. WFO Guam provides a monthly written discussion on the status of the ENSO and its effects on Micronesia. This discussion is relayed to weather officials, emergency managers, US ambassadors and other organizations in Micronesia. These discussions not only describe the trends of the ENSO but provide information on tropical cyclone, hydrological and sea level conditions associated with it. However, if drought conditions exist and Drought Statements are in effect, these monthly discussions are temporarily postponed. WFO Guam also assists with the composition of the quarterly *Pacific ENSO Update* newsletter produced by the Pacific ENSO Applications Center and provides input to the Climate Prediction Center's Monthly *ENSO Diagnostics Discussion*.
  - Tropical Cyclone Prediction Method. A WFO Guam Senior Forecaster developed a seasonal Tropical Cyclone prediction method for the entire western North Pacific and for the islands of Micronesia. His predictors include: the current state of the Pacific Decadal Oscillation (PDO) (active or inactive) and the current state of ENSO (El Niño, La Niña or Neutral) along with the intensity of any ENSO events and any expected changes, and the number of tropical cyclones observed so far this season. This method uses all these different sets of initial conditions as perturbations on the whole data set, with a regression analysis run on each perturbation. These then constitute a cloud of possible values, from which the most likely are chosen based on the current state of ENSO, past values of the ONI from earlier in the year and ENSO forecasts from the IRI and CPC. These likely forecasts are then fed into a weighted average to come up with a deterministic forecast. This method is currently applied to the whole Northwest Pacific and also to Micronesia, defined as a subset of the Northwest Pacific between the equator and 20N from 130E to 180. Future work planned will include further downscaling to portions of Micronesia and possibly probability density function graphs to highlight the whole cloud of possible values.

b. Hydrological Achievements/Results  
Nil

c. Disaster Risk Reduction Achievements/Results

- Annual Tropical Cyclone, Disaster Preparedness and Climate Workshop. These two-day, 18-module workshops are designed for decision makers in the local, state, and national governments and agencies. They cover various topics such as: tropical cyclone behavior, structure and hazards; the WFO Guam tropical cyclone program, products and timing of products; tsunamis and volcanoes; rip currents, currents, and tides; earthquakes and tsunamis; tropical cyclone plotting and speed-distance-time computations; general climate familiarity, climate variability and climate change; typhoon risk and vulnerability; a scale that relates tropical cyclone wind speed to damage and storm surge; El Niño /La Niña and their effects, impacts and status; tropical cyclone decision making for individual islands/states; and WFO Guam website products and navigation. In 2012, WFO Guam conducted workshops: in Pohnpei, Yap, Kosrae and Chuuk in the Federated States of Micronesia (FSM); at Majuro in the Republic of the Marshall Islands (RMI); at Saipan, Tinian and Rota in the Commonwealth of the Northern Marianas Islands (CNMI); and on Guam. In addition to conducting the workshops, WFO Guam also provides seminars at the local colleges, training at the meteorological service offices, and training to disaster managers. *(also in KRA 4)*



**Figure 4: Workshop participants in the island of Chuuk, FSM**



**Figure 5: Workshop participants on the island of Majuro, RMI**

- National Disaster Preparedness Month. September was declared National Disaster Preparedness Month for 2012. The Emergency Management Offices on Guam and in the CNMI took the leads and arranged the events. On Guam, several events and numerous activities such as school presentations and a Grand Finale event at a major shopping center were showcased during the Preparedness Month. WFO Guam participated in the proclamation signing by the Governor of Guam, several awareness activities with over 250 contacts, the Grand Finale Display at the local Shopping Center with more than 300 contacts. WFO Guam also took its display to Saipan in the CNMI, and participated in radio and television spots/interviews for the CNMI Grand Finale.



**Figure 6: Static Display in Saipan**



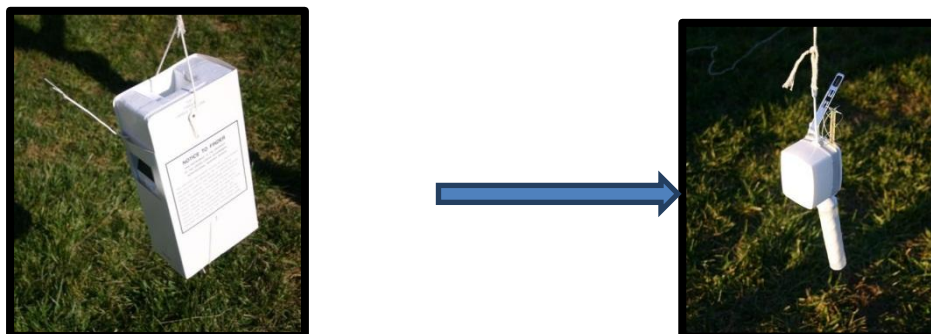
**Figure 7: Static Displays on Guam**

- RSMC Honolulu hosted a press conference to announce the 2012 Central Pacific Hurricane Season Outlook on May 23, 2012.
  - RSMC Honolulu partnered with Hawaii State Civil Defense to host a press conference on September 11 to commemorate the 20<sup>th</sup> anniversary of Hurricane Iniki making landfall on the island of Kauai. The RSMC Director was featured in a two page article in the Honolulu StarAdvertiser on September 14.
  - University of Guam lectures. Environmental Biology classes at the University of Guam participated in a field trip and lecture series at the WFO Guam during the spring and fall semesters. WFO Guam gave 2-hour presentations, which covered basic weather concepts, climate and climate change, and weather and ocean hazards, such as tropical cyclones, volcanic eruptions, and tsunamis. A total of 135 students benefitted from the training.
- d. Research, Training, and Other Achievements/Results  
Nil
- e. Regional Cooperation Achievements/Results  
Nil
- f. Identified Opportunities/Challenges for Future Achievements/Results  
Nil

**6. Progress on Key Result Area 6: Improved Capacity to Generate and Provide Accurate, Timely, and Understandable Information on Typhoon-related Threats. (List progress on the Strategic Goals and Associated Activities in the Strategic Plan and progress on the 2012 Typhoon Committee Annual Operating Plan goals)**

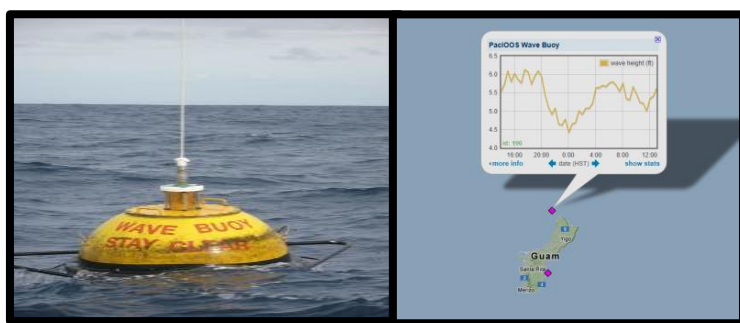
- a. Meteorological Achievements/Results
- Radiosonde Replacement System (RRS) and Data Continuity Study (DCS). The National Weather Service completed its RRS Program in 2011 with the installation of the new system throughout the NWS Pacific Region. This program successfully replaced the antiquated Microcomputer Automatic Radio-theodolite (Micro-ART) system which had been in operation since the late 1980s. The RRS is comprised of a new Global Positioning

System (GPS) tracking antenna referred to as the telemetry receiving system or TRS, 1680 MHz GPS radiosondes, and a new NT-based workstation. In 2012, a Data Continuity Study (DCS) commenced. Sites were chosen based on climate community goals of maintaining a continuity of global climate data at representative locations.



**Figure 8: Sippican B2 Radiosonde on left, Vaisala RS92 Radiosonde on right**

- The NWS International Activities and Pacific Region Headquarters contracted Dr. Steve Bussinger from the University of Hawaii to conduct a thorough assessment of Pacific Training Desk funded by the U.S. contribution to the World Meteorological Organization (WMO) and produce recommendations for improvements to the training program. The report will be completed in December of 2012 and will help to determine the future path of the Pacific Desk. The U.S. is committed to support training in the Pacific Region and is looking for the most effective way to improve the meteorological forecasting skills of weather service professionals. Since the Pacific Training Desk inception in 2001, 62 people from 15 Members of WMO RA V (Philippines and Malaysia are also Members of the Typhoon Committee) and Viet Nam and Cambodia from the Typhoon Committee have attended this programme.
- Hurricane Specialists and Hurricane Forecasters at RSMC Honolulu completed their annual hurricane and Dvorak technique training.
- New Marianas Buoys off of Guam and Saipan. The Pacific International Ocean Observing System (PacIOOS) program and the University of Hawaii at Manoa teamed up to provide two new wave rider buoys off the west coast of Guam and Saipan this past October 2012. In addition, they took over the maintenance of the Kalo, Majuro buoy in the Marshall Islands. The addition of these three buoys provides a greatly improved capacity for WFO Guam to monitor the damaging swells and surf generated by tropical cyclone activity in the western North Pacific.



**Figure 9: Wave Rider buoy**

System (PacIOOS) program and the University of Hawaii at Manoa teamed up to provide two new wave rider buoys off the west coast of Guam and Saipan this past October 2012. In addition, they took over the maintenance of the Kalo, Majuro buoy in the Marshall Islands. The addition of these three buoys provides a greatly improved capacity for WFO Guam to monitor the damaging swells and surf

- Use of the Indian Meteorological Office Ocean Scatterometer (OSCAT). The European Space Agency (ESA) and the NOAA/NESDIS have begun providing near-real time ocean surface wind vector data from the OSCAT instrument. These data in conjunction with the ESA Advanced Scatterometer instrument have combined to cover more than 90% of the tropical ocean surface with estimated surface wind vectors. Although these instruments are still subject to evaluation from the effects of strong rainfall rates and under very light and strong wind conditions, they have greatly improved the capability of tropical weather

offices around the world to monitor for tropical development and to observe the structure and initial intensities of tropical cyclones in their AOR.

b. Hydrological Achievements/Results

Nil

c. Disaster Risk Reduction Achievements/Results

- WFO Honolulu has actively contributed to the WMO Region V Severe Weather Forecast and Disaster Risk Reduction Demonstration Pilot Project. Meteorologist-In-Charge, Ray Tanabe and forecasters, Eric Lau and Leigh Ann Eton, participated in several training events on the participating island states. The WFO Honolulu is also running a WRF modeling experiment for the pilot.
- RANET Chatty Beetle. The Radio and Internet (RANET) Chatty Beetle, which utilized Iridium Short Burst technology, was developed to meet the needs of remote islands and atolls with no or poor telecom infrastructure. The system is a text based alert and messaging device, which provides a heads up that a hazard message has been issued by a regional or national warning center. It was found that there is a lack of literature on designing Early Alert Warning Systems. Initial funding was through USAID and the project is approaching the end of the 3-year grant but will continue. Over 100 units have been deployed in Pacific, Africa, Latin America, Caribbean. Chatty Beetle Version 2 includes several improvements. It is being utilized to transmit meteorological (SNYOPs) observations from outer island weather observations to the main Pacific Island meteorological center for redistribution onto the GTS, replacing HF radio collections.



Figure 10: Chatty Beetle

d. Research, Training, and Other Achievements/Results

Nil

e. Regional Cooperation Achievements/Results

- RSMC Honolulu participated in two international tests of Tropical Cyclone SIGMET dissemination which was coordinated by the WMO. RSMC Honolulu issued a test Tropical Cyclone Advisory followed by a test Tropical Cyclone SIGMET.

f. Identified Opportunities/Challenges for Future Achievements/Results

Nil

**7. Progress on Key Result Area 7: Enhanced Typhoon Committee's Effectiveness, Efficiency and International Collaboration.**

**(List progress on the Strategic Goals and Associated Activities in the Strategic Plan and progress on the 2012 Typhoon Committee Annual Operating Plan goals)**

a. Meteorological Achievements/Results

Nil

b. Hydrological Achievements/Results

- UNESCAP First meeting of WGH, Seoul Korea. The Republic of Korea Ministry of Land, Transport and Maritime affairs (MLTM) sponsored the first meeting of the Working Group on Hydrology in Seoul, Korea. The meeting's theme was *"Comprehensive Counterplan for Extra-Ordinary Flood"* and enabled the group to review the WGH Annual Operating plan, review flood events in China and the Philippines, plan for 2013 and prepare for the upcoming UNESCAP 7<sup>th</sup> Integrated Workshop.
- c. DisasterRiskReductionAchievements/Results
- UNESCAP WGD RR TCDIS expert mission. Five experts of the Republic of Korea National Disaster Management Institute(NDMI) conducted an expert mission to Guam on 8 October. Presentations on the Typhoon Committee Disaster Information System (TCDIS), Introduction of NDMI,Flash Flood Alert System (FFAS), Frequency Analysis for Rainfall Data (FARD) and Disaster Prevention and Recovery Strategies were given to key members of the Guam Homeland Security Office of Civil Defense and the National Weather Service.



**Figure 11: WGD RR Expert mission to Guam**

- d. Research, Training, and Other Achievements/Results

Nil

- e. Regional Cooperation Achievements/Results

Nil

- f. Identified Opportunities/Challenges for Future Achievements/Results

Nil

### III. Resource Mobilization Activities

None.

### IV. Update of Members' Working Groups representatives

1. Working Group on Meteorology

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