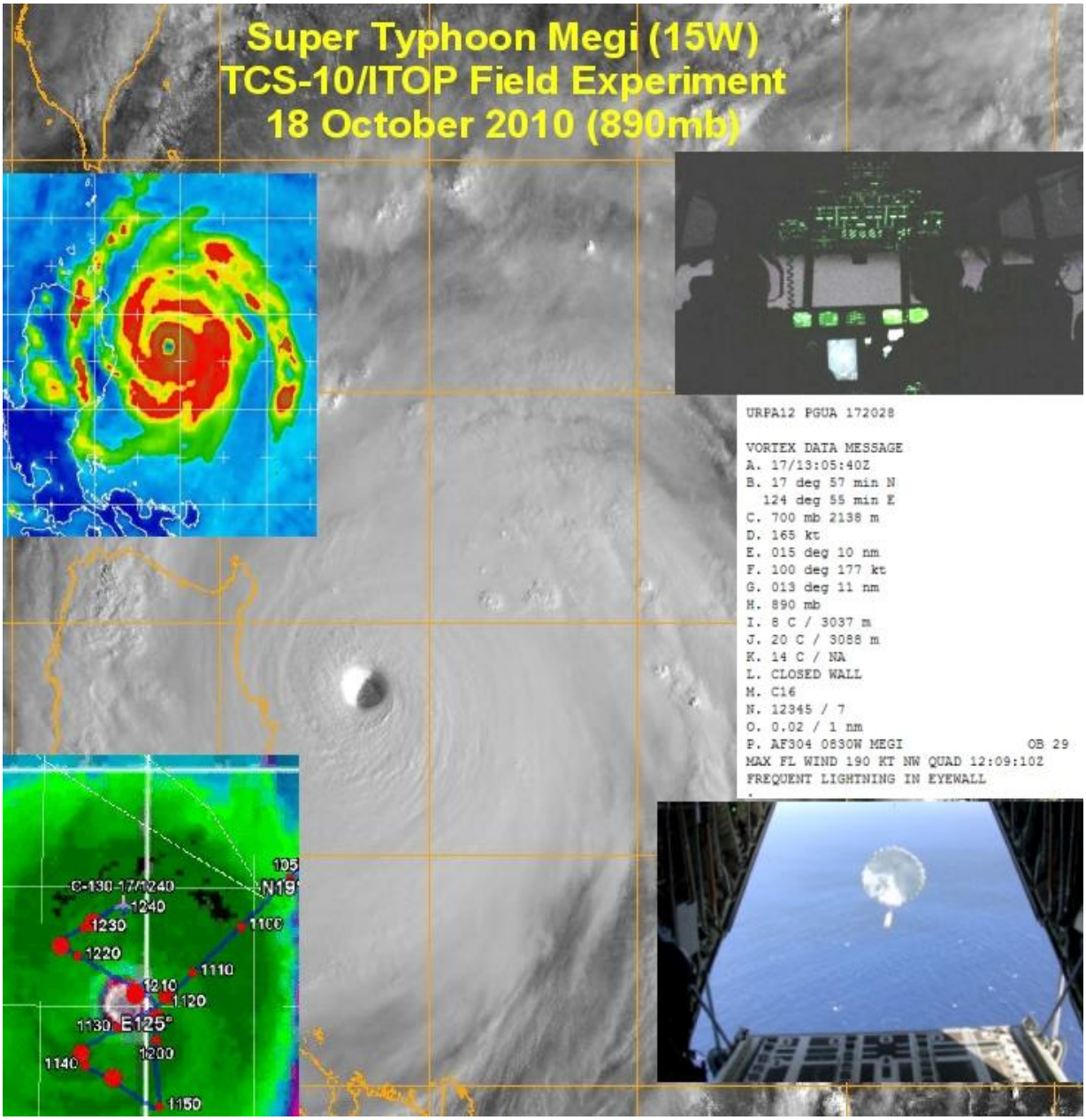
MEMBER REPORT



ESCAP/WMO Typhoon Committee
43rd Session
17 - 22 January 2011
Jeju, Korea
United States of America

Cover caption: A penetration flight into Super Typhoon Megi (15W), east of Luzon, on 18 October 2010 by the WC-130 Hurricane Hunters, as part of the multi-national THORPEX Pacific Asian Regional Campaign, TCS10/ITOP (Impact of Typhoons on the Ocean in the Pacific Ocean) field experiment held in the western North Pacific between 20 August and 20 October 2010.

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I. Overview of tropical cyclones which have affected/impacted Member's area in 2010

1. Meteorological Assessment (highlighting forecasting issues/impacts)

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

Tropical Cyclone activity in the Micronesian portion (area between the Equator and 21N from 130E to 180, not including Kiribati) of the western North Pacific from 1 January 2010 through 10 December 2010 was well below the normal of 18 to 20 tropical cyclones per year for this region with a record low number of 8. Only two tropical cyclones (Omais (02W) in March and Malakas (13W) in September, directly affected the islands of Yap State and the Commonwealth of the Northern Mariana Islands (CNMI), respectively. Both passed over the islands as tropical storms with no significant damage or injuries. The other six tropical cyclones (Conson (03W), Kompasu (08W), Malou (10W), Megi (15W), Chaba (16W) and 17W) formed well away from any island group. In addition, two cyclones (Dianmu (05W) and Fanapi (12W)) passed through the region as tropical disturbances before forming outside of the AOR. Finally, no tropical cyclones crossed over from the Central Pacific this year (see Figure 1).

This lack of activity followed along with the record low activity for the entire western North Pacific and South China Sea Basins. The year 2010 started with a weak El Niño pattern that gave way to a La Niña pattern by early summer. The La Niña pattern was classified a moderate to strong by late summer. The resulting reduction in the number of tropical cyclone formations also followed with a shift of most of the activity to the west and north, though, there was also very little activity in the subtropics north of the Marianas that often acts as a secondary location of tropical cyclone development during these conditions. Through most of the summer, there was very little evidence of the summer monsoon stretching east of the Philippines and thus limiting the availability of favorable low-level westerly flow south of the normal genesis region.

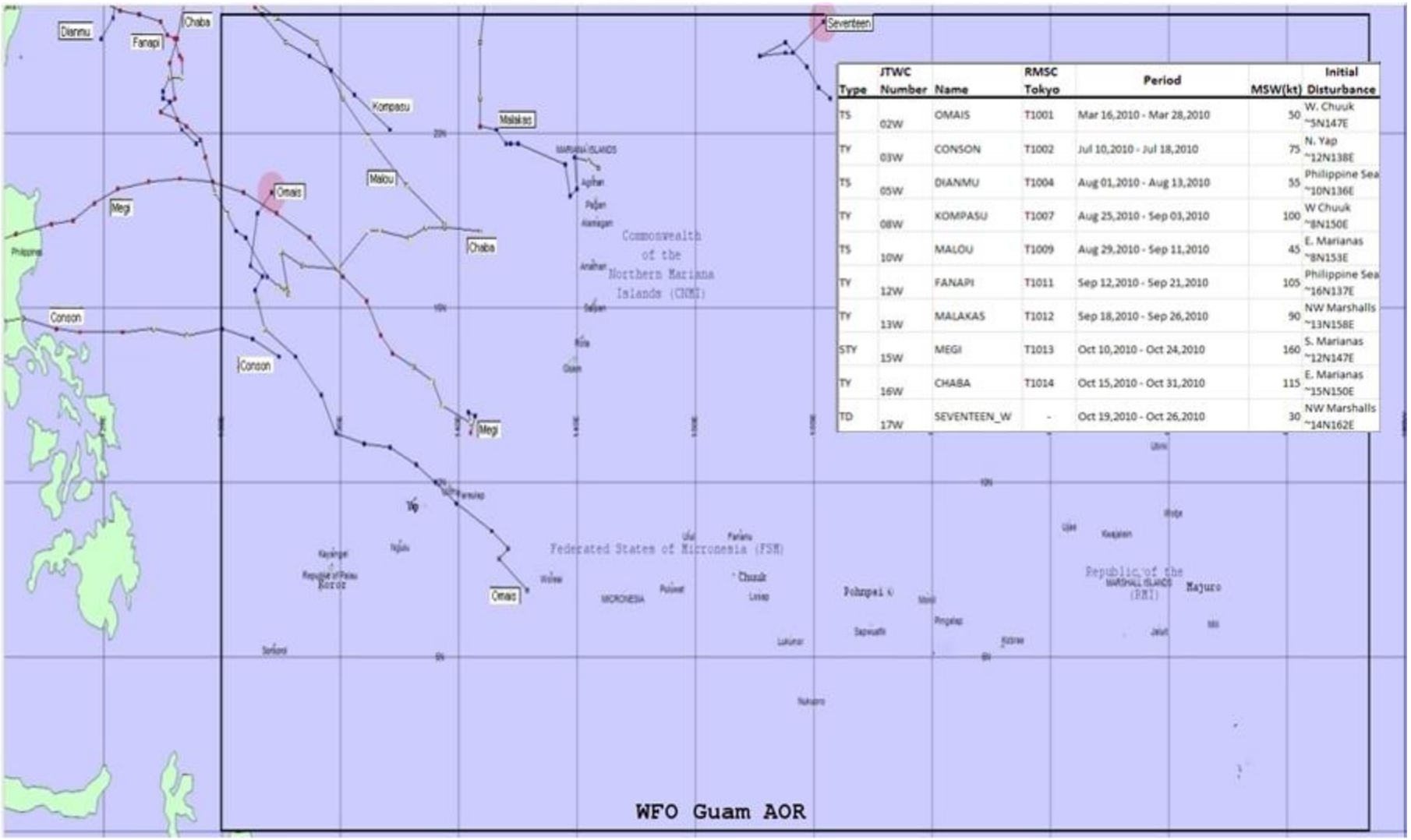
Central North Pacific (140W to 180, North of the Equator) Overview

Extremely quiet 2010 hurricane season in the Central North Pacific

In contrast to the active 2009 hurricane season, for the first time since 1979, there were no tropical cyclones in the central North Pacific Ocean. La Niña conditions did not favor development of tropical systems either locally within the north central Pacific basin or in the northeast Pacific and then moving into the central north Pacific.

La Niña conditions are typically not favorable for tropical cyclones to occur in the central north Pacific as opposed to the typically more active hurricane seasons associated with El Niño conditions However, there were 8 tropical cyclones in the basin during the La Niña of 1985. There were other years with no tropical cyclones in the central north Pacific during the satellite era (which began in 1966). These inactive years included 1969, 1977, and 1979.

Even though the 2010 hurricane season was extremely quiet, the upcoming 2011 hurricane season which will officially start on the first of June 2011 could potentially have more activity. For example, following the inactive 1969, 1977 and 1979 hurricane seasons, there were three tropical cyclones during 1970, seven tropical cyclones during 1978, and two tropical cyclones during 1980.



Type	JTWC Number	Name	RMSC Tokyo	Period	MSW(kt)	Initial Disturbance
TS	02W	OMAIS	T1001	Mar 16,2010 - Mar 28,2010	50	W. Chuuk ~5N147E
TY	03W	CONSON	T1002	Jul 10,2010 - Jul 18,2010	75	N. Yap ~12N138E
TS	05W	DIANMU	T1004	Aug 01,2010 - Aug 13,2010	55	Philippine Sea ~10N136E
TY	08W	KOMPASU	T1007	Aug 25,2010 - Sep 03,2010	100	W Chuuk ~8N150E
TS	10W	MALOU	T1009	Aug 29,2010 - Sep 11,2010	45	E. Marianas ~8N153E
TY	12W	FANAPI	T1011	Sep 12,2010 - Sep 21,2010	105	Philippine Sea ~16N137E
TY	13W	MALAKAS	T1012	Sep 18,2010 - Sep 26,2010	90	NW Marshalls ~13N158E
STY	15W	MEGI	T1013	Oct 10,2010 - Oct 24,2010	160	S. Marianas ~12N147E
TY	16W	CHABA	T1014	Oct 15,2010 - Oct 31,2010	115	E. Marianas ~15N150E
TD	17W	SEVENTEEN_W	-	Oct 19,2010 - Oct 26,2010	30	NW Marshalls ~14N162E

Figure 1: Tracks of Tropical Cyclones affecting Micronesia from 1 January to 10 December 2010 (partial tracks shown).

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

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

For the few tropical cyclones that occurred in Micronesia during 2010, there were no significant hydrological events. The Weather Forecast Office (WFO) Guam issued a few hydrologic products such as *Urban and Small Stream Flood Advisories* and *Short-Term Forecasts*, mostly for thunderstorms that occurred on Guam or on Pohnpei Island. Monsoon flow that often leads to prolonged heavy rains and floods was virtually non-existent, except occasionally in the extreme western part of Micronesia.

As the El Niño began to weaken in early 2010, the post-El Niño drought began to set in. February and early March were especially dry across Micronesia, but rains returned to most of the islands by the end of March. This was not the case for Guam, the CNMI and especially for the northern Marshall Islands. WFO Guam issued Drought Statements for the northern Marshall Islands. Eventually, drinking water had to be transported to some of the islands there.

With the La Niña pattern, easterly trade winds dominated the flow in Micronesia, producing shallower, more short-lived rainfall events. As a result, most locations were somewhat drier than normal, except for the western portions of Micronesia such as Yap and Palau. Cold equatorial sea surface temperatures pushed west to around 150°E, bringing very dry conditions to near equatorial areas east of 150°E, such as Kapingamaringi (Pohnpei State, Federated States of Micronesia (FSM)), Nauru, and western Kiribati. From August until December, the Guam forecast office issued weekly drought statements for Kapingamaringi. Those statements also mentioned severe drought conditions for Nauru and the islands of western Kiribati.

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

With the low precipitation amounts during the northern hemisphere winter and spring associated with El Niño conditions and the lack of tropical cyclones in the summer and fall due to quickly developed La Niña conditions, Hawaii experienced severe drought.

Extreme to exceptional drought occurred over the eastern half of the Hawaiian Islands, the worst drought conditions throughout the entire U.S. The drought primarily impacts the agriculture sector including ranching, ornamental flowers, and coffee. Portions of Hawaii have been in severe drought or worse continuously since June 17, 2008 and extreme drought since July 7, 2009. On March 2, 2010, a portion of the island of Hawaii slipped into the exceptional drought category which marked the first use of this designation since the inception of the U.S. Drought Monitor in 1999 and these conditions continued through December 2010. Regional Specialized Meteorological Center (RSMC) Honolulu provided decision support to the State Drought Council, Wildland Fire Council, State and County Government, and various associations. The U.S. Dept. of Agriculture's Farm Service Agency has provided relief funds through its Livestock Forage Program which uses the Drought Monitor as the deciding factor for granting relief funds to farmers.

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

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

Tropical cyclone activity across the western North Pacific was the lowest in more than 30 years. While this may be welcome news as concerns damage to property and people, it is indicative of lower

monsoonal activity across the region. Developing tropical cyclone and the monsoon are beneficial in that they bring needed rainfall to the Micronesia islands.

In the Federated States of Micronesia, trade-wind showers did produce rainfall across Yap State, but at a lower level than usual. This lower rainfall resulted in damaged food crops across some of the low islands of Yap. Reduced rainfall over Pohnpei caused stream flow in the rivers to slacken. People using the river water were advised to boil the water before using it. The drought on Pohnpei did damage to the taro, breadfruit, banana, tapioca and coconut crops.

Across the Republic of the Marshall Islands aquifers of several of the northeastern island experienced salt intrusion. Some residents migrated to islands with better water resources because of the drought. The National Weather Service Office in Guam issued drought statements for these conditions until 24 June.

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

A comprehensive tropical cyclone outreach program for the 2010 Central Pacific Hurricane Season generated a heightened awareness of emergency preparedness in the State of Hawaii. The theme of the 2010 campaign, *Prepare! Watch! Act!* focused on preparations needed before a hurricane threatens an area, maintaining an awareness of possible tropical cyclone development near Hawaii, and then acting on plans and preparedness when a hurricane hits. 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)

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

To provide some critical hydrological information for the smaller, less developed countries of Nauru and Kiribati, WFO Guam discussed them in the drought statements that were issued for Kapingamaringi. These bulletins were passed to the US and Australian Embassies to pass to the affected nations.

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. N/A
   b. Hydrological – Achievements/Results. N/A
   c. Disaster Risk Reduction - Achievements/Results. N/A
   d. Training, Research, and Other – Achievement/Results
      - RSMC Honolulu hosted a three-day class for 18 Emergency Managers and First Responders on February 23-25, 2010. The three-day course was a specialized training opportunity to build the capacity of the civil defense/emergency manager to understand hurricanes and make effective protective action decisions during a hurricane threat. Through hands-on and interactive instruction with specialists at RSMC Honolulu, the course provided participants with an intensive instruction on all aspects of tropical cyclone forecasts and products, along with local National Weather Service forecast office products. This was the second year that RSMC Honolulu presented this training.
   e. Regional Cooperation – Achievement/Results. N/A
   f. Identified Opportunities/Challenges for Future - Achievements/Results. N/A

2. Progress on Key Result Area 2: Minimized Typhoon-related Social and Economic Impacts
   a. Meteorological - Achievements/Results. N/A
   b. Hydrological – Achievements/Results. N/A
   c. Disaster Risk Reduction - Achievements/Results. N/A
   d. Training, Research, and Other – Achievement/Results. N/A
   e. Regional Cooperation – Achievement/Results. N/A
   f. Identified Opportunities/Challenges for Future - Achievements/Results. N/A

3. Progress on Key Result Area 3: Enhanced Beneficial Typhoon-related Effects for the Betterment of Quality of life.
   a. Meteorological - Achievements/Results. N/A
   b. Hydrological – Achievements/Results. N/A
   c. Disaster Risk Reduction - Achievements/Results. N/A
   d. Training, Research, and Other – Achievement/Results. N/A
   e. Regional Cooperation – Achievement/Results. N/A
   f. Identified Opportunities/Challenges for Future - Achievements/Results. N/A

4. Progress on Key Result Area 4: Improved Typhoon-related Disaster Risk Management in Various Sectors.
   a. Meteorological - Achievements/Results
      - American Meteorological Society (AMS) Conference on Hurricanes/Tropical Meteorology. WFO Guam Science and Operations Officer (SOO) attended the AMS Tropical conference in May in the state of Arizona and provided two presentations on the "Analysis of typical tropical cyclone genesis during TCS-08" and "Signs of rapid intensification as depicted in microwave imagery". He also participated in a coordination meeting for this summer's TCS-10 Field experiment to be held between 20 August and 20 October. Guam will be one of the coordinating centers where two weather reconnaissance aircraft will be stationed.
      - During 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. Starting in 2010, RSMC Honolulu began providing specific probabilities of development (10%, 20%, 30%, etc.) rather than a three categorical outlook.
   b. Hydrological – Achievements/Results. N/A
   c. Disaster Risk Reduction - Achievements/Results
      - Hawaii State Hazard Mitigation Forum. 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.
      - Hawaii Emergency Preparedness Executive Consortium (HEPEC). RSMC Honolulu is a member of the 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 June 2010 meeting.

- FEMA Catastrophic Plan unveiled. WFO Guam participated in several meetings with the Federal Emergency Management Agency (FEMA) and the US Agency for International Development/Office of Foreign Disaster Assistance (USAID/OFDA) to ensure that the transition from a FEMA disaster assistance mode to a USAID/OFDA disaster assistance mode went off smoothly and without significant degradation to islanders. This transition affected the FSM and the Republic of the Marshall Islands.
- The US operates under an "all hazards" disaster preparedness and response methodology. This means that most communications, infrastructure, evacuation shelters and the like are designed to support responses to multiple hazards. During December 2009, WFO Guam participated in the implementation of a newly developed tsunami inundation model for Guam and preliminary model development for Saipan. In July, the WFO Guam Warning and Coordination Meteorologist (WCM) participated in 2-day Tsunami Awareness Workshops in Guam and in Saipan. This work resulted in updates to the local All Hazards Response Plans. The Meteorologist-in-Charge also attended a tsunami training course, allowing her to better integrate the all hazards concepts into operational plans.
- The Guam WCM also participated as an instructor at a week-long Climate Services Workshop that included attendees from Palau, Yap, Chuuk, Guam, Pohnpei, Majuro, Kwajalein, and the Islands of Hawaii. This Workshop presented climatological techniques that will improve all aspects of both climate assessment and prediction throughout the region. The relevance of climate patterns to tropical cyclone activity was covered in detail.

d. Training, Research, and Other – Achievement/Results
   - Exercise Pakyo. A 3-day exercise sponsored by the Department of Homeland Security/FEMA was held on Guam on 7 to 9 June. WFO Guam participated in this exercise and was responsible for devising the scenario of the exercise. The scenario consisted of an intensifying Category 5 typhoon (super typhoon) moving directly over Guam. Local and Federal government agencies and several representatives of the private sector plus observers from the FSM and from the CNMI participated in the exercise. The objective was to evaluate a recently updated All-Hazards Response Plan. It also validated the Guam Typhoon Operations Plan and synchronized the Department of Defense (DoD) and the Government of Guam Conditions of Readiness. Participants/players responded to three distinct phases: Elevated threat, Credible threat, and Response.
   - Makani Pahili Hurricane Exercise. The annual Makani Pahili Hurricane Exercise, coordinated by Hawaii State Civil Defense in partnership with the National Weather Service (NWS) Forecast Office in Honolulu was held May 28 - 31. RSMC Honolulu created over 175 text and graphical products for the exercise, featuring a fictitious, category 4 hurricane making landfall on Oahu. RSMC Honolulu also provided four separate VTC briefings and experimented with *GoToMeeting* to provide a visual component to participants who only participate via phone previously. The *GoToMeeting* format was a huge success in decision support for over 60 Federal, state, and county agencies.

e. Regional Cooperation – Achievement/Results. N/A

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

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

a. Meteorological - Achievements/Results
   - RSMC Honolulu Pacific El Niño -Southern Oscillation (ENSO) Applications Climate (PEAC) Center sponsored a Pacific Region Climate Operations Course for 22 people, mostly from NWS offices but also NOAA Corps officers from National Environmental Satellite, Data, and Information Service, and National Ocean Service. The course presented basic climate aspects, impacts, and outreach/education activities.
   - US National Weather Service Pacific Region and Pacific ENSO Applications Climate (PEAC) Center are foundation members of the Pacific Climate Information System (PaCIS) which is the pilot regional climate program under the new NOAA Climate Service.
   - Monthly Pacific ENSO Discussion. Each month, WFO Guam WCM provides a 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 agencies in Micronesia. These discussions not only entail the trend of the ENSO but provide information on tropical cyclone, hydrological and sea level conditions associated with it. These Monthly Discussions are not usually issued if Drought Statements are in effect. The Weather Forecast Office also helps write the quarterly Pacific ENSO Update newsletter produced by the Pacific ENSO Applications Center.

b. Hydrological – Achievements/Results
   - Hazard Mapping on Guam. Hazard mapping for sediment-related disasters on Guam was completed on 15 January. This report looked into mapping areas on Guam that might be susceptible to sediment-related disasters and the use of these to set warning areas for landslides. Two major criteria for this are having the slope of valley at least 10 degrees and finding a valley where people reside on the alluvial fan. Of the areas on Guam that may be steep enough to be a concern, none are in populated areas.

c. Disaster Risk Reduction - Achievements/Results
   - RSMC Honolulu Press Conference for the 2010 Central Pacific Hurricane Season. RSMC Honolulu hosted a press conference to announce the 2010 Central Pacific Hurricane Season Outlook on May 19. Following opening remarks from the RSMC Honolulu Director, guest speaker Barry Stieglitz, Hawaii and Pacific Islands National Wildlife Refuge Complex, U.S. Fish and Wildlife Service, spoke on the timely and accurate watches and warnings and provided critical decision support briefings provided to his agency which permitted the successful evacuation effort of 7 people on Laysan Island by NOAA ship Oscar Sette and 10 people from Tern Island and French Frigate Shoals by US Coast Guard C-130 aircraft. RSMC personnel members were awarded a Department of Commerce silver medal for these actions and the US Fish and Wildlife Service presented the office with an award for service. The keynote speaker was the Honorable Linda Lingle, governor of the State of Hawaii who spoke on the need for family preparedness in the event of a hurricane. All four local television stations and the state-wide newspaper attended the press conference and featured stories that evening and/or the next day on hurricane preparedness and the forecast for an 70 percent chance of a below normal season, a 25 percent chance of a normal season, and a 5 percent chance of an above average season based upon the development of La Niña conditions.

- RSMC Honolulu continued to conduct extensive outreach and education. They held two news conferences, one on tropical cyclone preparedness and the other in preparation of the wet season; participated in the University of Hawaii, School of Ocean and Earth Science and Technology, Open House with over 1000 children attending; staff a booth at the Hawaii Fishing and Seafood festival for over 20,000 participants; judged at the state science fair; made a presentation to the Hawaii Emergency Preparedness Executive Consortium and to the Hotel Security Association; a radio and two television hurricane preparedness seminars; a statewide hurricane exercise; and over a 100 other presentations and events.
- Saipan StormReady/TsunamiReady Recognition Extended. The island of Saipan, CNMI, was recognized as StormReady/TsunamiReady for an additional three years through 2013. StormReady and TsunamiReady are two prestigious NOAA programs that recognize locations as being highly prepared to respond to and recover from severe storms and tsunamis.
- Annual Tropical Cyclone and Disaster Preparedness Workshop. These two-day, 15-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; tropical cyclone plotting and speed-distance-time computations; 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; and tropical cyclone decision making for individual islands/states. WFO Guam conducted workshops at Pohnpei, Yap, Kosrae and Chuuk in the FSM, at Saipan and Rota in the CNMI, on Guam, and at Majuro and Kwajalein/Ebeye in the Republic of the Marshall Islands. *(also in KRA 4)*
- National Disaster Preparedness Month. September was declared National Disaster Preparedness Month for 2010. 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 showcased 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.

d. Training, Research, and Other – Achievement/Results
- Aviation Training. Seven Aviation Training sessions were held on Guam throughout the year to familiarize new pilots with tropical weather. The presentations included basic weather and its causes in the west Pacific, typhoons and outlook for 2010, thunderstorms, wind shear, ENSO update for aviators, and local aviation issues.
- University of Guam lectures. Environmental Biology classes at the University of Guam participated in a lecture series at the WFO Guam during the spring and fall semesters. The Guam WCM gave the 2-hour presentations, which covered basic weather concepts and weather and ocean hazards, such as tropical cyclones, volcanic eruptions, and tsunamis. There were a total of six of the presentations, with about 175 total students. Similarly, the Guam SOO hosted a class from the University of Guam Marine Lab and presented topics on basic meteorology, marine forecasting and tsunamis**.**
- About 13 tours were given to Guam public school children at the weather forecast office.

These tours included watching a weather balloon launch, a weather-related seminar with typhoon and tsunami video footage, and a tour of the operations area. Participants included 315 students from kindergarten to 12th grade and teachers. Similar tours were given to local agencies, such as the police, civil defense, and the military.

- Summer Science Programs. RSMC Honolulu participated in three summer science programs for elementary and high school students. One was for students from the "How to be a Weather Wiz Kid" class at Kamehameha Schools to learn about tropical cyclones and severe weather and the second were students from the "Discovering Science through Aerospace" class at Mid Pacific Institute to learn about tropical cyclones and climate in Hawaii. The third was the Sky and Space Class taught at the University of Hawaii Lab School.

e. Regional Cooperation – Achievement/Results. N/A
f. Identified Opportunities/Challenges for Future - Achievements/Results. N/A

6. Progress on Key Result Area 6: Improved Capacity to Generate and Provide Accurate, Timely and understandable Information on Typhoon-related Threats.
   a. Meteorological - Achievements/Results
      - Coastal Data Information Program (CDIP). A new CDIP buoy was placed recently east of Majuro in the Republic of the Marshall Islands. The buoy is monitored by Scripps Institute of Oceanography and the University of Hawaii and funded by a grant from the National Science Foundation. This buoy, the second active one in the western North Pacific within WFO Guam's Area of Responsibility (AOR), will address inundation and sea level rise in the Marshalls while providing invaluable ground truth to the WFO Guam and the Wave Watch 3 (WW3) developers at National Centers for Environmental Predication (NCEP) on sea conditions in this part of the AOR.
      - WMO THORPEX Pacific Asian Regional Campaign (T-PARC). The T-PARC program continued again this past year with the TCS10/ITOP (Impact of Typhoons on the Ocean in the Pacific Ocean) field experiment that was held in the western North Pacific between 20 August and 20 October 2010. The scientific goals for THORPEX include examining the interaction of various scales of motion in order to improve the description and prediction of medium range weather phenomena. This summer, the TCS10/ITOP experiment focused on the impact and response of the ocean to the passing of typhoons. These impacts included the examination and measurements of cold wakes from strong typhoons, air/sea interactions; and the study of ocean eddies. A continuation of some of the TCS08 objectives included determining how the environment affected tropical cyclone genesis as well as intensification and movement. Mission centers were on Guam, as well as in Taiwan and Monterey, California. Multiple international agency cooperation was again required to coordinate the complex mix of aircraft, research vessels, satellite and land-based observations. The WFO Guam SOO provided critical analysis and interpretation support to the ITOP.
      - The US is participating in the WMO RA-V Severe Weather Forecasting Demonstration and Disaster risk reduction Project (SWFDDP) for the South Pacific Islands. The goals of the SWFDDP are to: 1) further explore and enhance the application of outputs of existing NWP systems available through WFO's Global Data-Processing and Forecasting System (GDPFS) for the improvement of severe weather forecasting in South Pacific Islands where currently sophisticated NWP outputs are underutilized; 2) Provide training

for the National Meteorological Services (NMH) of South Pacific Islands; and 3) Through the WMO Public Weather Services Programme, improve the warning services in four main areas: Strong Winds (≥ 25 knots), Large Waves (≥2.5 meters), Heavy Rain (≥ 50 mm in 24 hours), and Tropical Cyclones (impacts). The SWFDDP pilot phase was carried out from 1 November 2009 to 31 October 2010 and involved the NMH's of Fiji, Samoa, Solomon Islands, and Vanuatu.

b. Hydrological – Achievements/Results. N/A

c. Disaster Risk Reduction - Achievements/Results

- On two occasions, RSMC Honolulu hosted Forecasters and Typhoon Duty Officers from the Naval Maritime Forecast Center (NMFC) and Joint Typhoon Warning Center (JTWC). The visits were to familiarize NMFC and JTWC staff with RSMC Honolulu operations and forecast software packages and to increase collaboration amongst the two agencies.
- RANET Chatty Beetle. The Radio and Internet (RANET) Chatty Beetle (see Figure 2) is a messaging device designed for remote alert and warning applications. Prototyping and pilot deployment is funded by the USAID/OFDA. The current terminal design is hardened to operate in remote and environmentally harsh locations where communications are limited. It can operate in stand-by for 36- 48 hours, and, based upon Iridium Short Burst Data (SBD) service, the terminal supports two-way communication. Twenty units have been distributed to Guam and the five Micronesia Weather Service Offices.

Figure 2: Chatty Beetle

- WFO Guam WCM provided surf observation training at locations throughout Micronesia. This included 1 hour of classroom (theory) training and 1-2 hours of field training.

d. Training, Research, and Other – Achievement/Results

- From January 1 to December 17, the Pacific International Desk Training Programme, RSMC Honolulu, Hawaii Islands, USA trained 11 forecasters from 6 different members of WMO RA V regions, including Cook Islands, Kiribati, Solomon Islands, Papua New Guinea, Vanuatu, and Tonga. Since its inception in 2001, 61 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. The USA government, through NOAA NWS funded the training programme.
- Hurricane Specialists and Hurricane Forecasters at RSMC Honolulu completed their annual hurricane and Dvorak technique training.

e. Regional Cooperation – Achievement/Results

- RSMC Honolulu participated in an international test 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.
- The WFO Guam WCM was part of a State Department Team that represented the US at the WMO Regional Association V (RA-V) Tropical Cyclone Conference and at the RA-V Annual Meetings in Bali, Indonesia from 30 April to 6 May. The WCM provided a progress report on the WMO's *Global Guide to Tropical Cyclone Forecasting*. In

addition to several reviews, Guam WCM wrote two Position Papers on "Enhanced Capabilities of Members in Multi Hazard, Early Warning and Disaster Prevention and Preparedness" and on "Enhanced Capabilities of Members to Provide and Use Weather and Climate, Water, and Environmental Applications and Services." Numerous recommendation and action items came out of both conferences that will strengthen Pacific typhoon/cyclone support.

- Interagency Climate Change Meeting. WFO Guam WCM attended the Interagency Climate Change Adaptation Task Force Meeting held on Friday, 9 July. In addition to comprehensive input from the Governor of Guam representative, the WCM encouraged the Task Force to more actively engage the education community so that local climate and hazard information could be better incorporated into school curricula and could more easily become a part of the culture.
- Video-teleconferencing equipment at WFO Guam. The FEMA provided video-teleconferencing equipment to the WFO Guam to assist with briefings to the FEMA headquarters in preparation for tropical cyclones threatening Micronesia. The equipment provides a valuable communication tool to effectively provide coordination during severe weather event.

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

7. Progress on Key Result Area 7: Enhanced Typhoon Committee's Effectiveness and International Collaboration.
   a. Meteorological - Achievements/Results. N/A
   b. Hydrological – Achievements/Results
      - USA participated in the Typhoon Committee Integrated Workshop on "Urban Flood Risk Management in a Changing Climate: Sustainable and Adaptation Challenges" in Macau, China from September 25 – 29, 2010. The main focus was on urban flood risk management and possible pilot projects.
   c. Disaster Risk Reduction - Achievements/Results. N/A
   d. Training, Research, and Other – Achievement/Results. N/A
   e. Regional Cooperation – Achievement/Results. N/A
   f. Identified Opportunities/Challenges for Future - Achievements/Results. N/A

III. Resource Mobilization Activities

None.

IV. Update of Members' Working Groups representatives

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V. Glossary of Acronyms

AMS	American Meteorological Society
AOR	Area of Responsibility
CDIP	Coastal Data Information Program
CNMI	Commonwealth of the Northern Mariana Islands
DoD	Department of Defense
ENSO	El Nino-Southern Oscillation
FEMA	Federal Emergency Management Agency
FSM	Federated States of Micronesia
GDPFS	Global Data-Processing and Forecasting System
HEPEC	Hawaii Emergency Preparedness Executive Consortium
ITOP	Impact of Typhoons on the Ocean in the Pacific Ocean
NCEP	National Centers for Environmental Prediction
NMFC	Naval Maritime Forecast Center
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
OFDA	Office of Foreign Disaster Assistance
PaCIS	Pacific Climate Information System
PEAC	Pacific ENSO Applications Climate
RA	Regional Association
RSMC	Regional Specialized Meteorological Center
SIGMET	Significant Meteorological Information
SOO	Science and Operations Officer
TCS	Tropical Cyclone Structure
THORPEX	The Observing-System Research and Predictability Experiment
T-PARC	THORPEX Pacific Asian Regional Campaign
WCM	Warning and Coordination Meteorologist
WMO	World Meteorological Organization
Wave Watch 3 (WW3)	
SWFDDP	Severe Weather Forecasting Demonstration and Disaster risk reduction Project
JTWC	Joint Typhoon Warning Center
RANET	Radio and Internet
WFO	Weather Forecast Office
US	United States
USAID	United States Agency for International Development