



REPUBLIC OF MARSHALL ISLANDS
METEOROLOGICAL SERVICE COUNTRY REPORT
Reporting on National Priority Actions of the Pacific Islands Meteorological
Strategy (PIMS) 2012-2021

This Report is presented to the Fourth Pacific Meteorological Council (PMC-4) Meeting held in Honiara from 14-18 August 2017

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1.0 Summary

This report is prepared by Weather Service Majuro-RMI (WSO Majuro, RMI) for the Pacific Meteorological Council fourth sessions in Honoria, Solomon Islands. This country report intends to report the track of WSO Majuro's progress on key issues outlined in the 2012-2017 Pacific Islands Met Strategy.

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2.0 Background Information

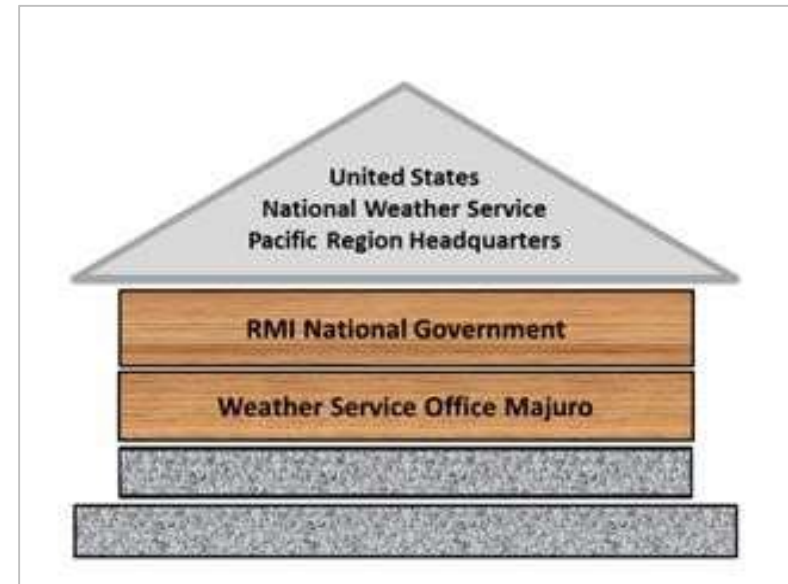
2.1 Institutional Setup

In June 25, 1983, Government of United States and the Government of Republic of Marshall Islands signed the Compact of Free Association (COFA). This treaty arranged for the United States NOAA National Weather Service to provide weather services and related programs in the Republic in accordance with Article VII (Weather Services and Related Programs) of COFA. According to Sections 5 to 13 of Article VII of COFA, U.S NOAA NWS provides weather services through a WSO, established in Majuro, Republic of Marshall Islands which is now called WSO Majuro.

Subsequently at the operational level, the National Weather Service Pacific Region Headquarters (NWSPRH) based in Honolulu, Hawaii Islands via a contract between U.S NOAA NWS and the Government of the Republic of Marshall Islands provides administration, financial, operational, management and oversight assistance to WSO Majuro. (Figure 1)

NOAA NWS Weather Forecast Offices in Guam and Honolulu prepare and provide weather forecasts, watches, warnings and advisories to the Republic. *Figure 1*

In its 19th session in October of 2003, the International Coordination Group for the Tsunami Warning System in the Pacific (IOCPTWS) put forth recommendation for creation of a National Tsunami Warning Centers and the transferring of the tsunamis assessments and issuance of warning from the Pacific Tsunami Warning Center (PTWC) to each of its member countries. In October 1, 2014, WSO Majuro took on the role and responsibility of a *National Tsunami Warning Center* (NTWC) for the Republic.



2.2. Organizational Structure

WSO Majuro organization comprises of 3 main programs, namely the *Supervisory; Operation; Forecast and Warnings; and Electronic and Facility*. (Figure 2).

Supervisory program comprises of U.S NWS Pacific Region Headquarters and the Office of the Meteorologist-In-Charge of WSO Majuro.

Forecast and warning program: The staff meteorologist and the Weather Service Specialists prepare and transmit adaptive or tailored weather forecast products and information to the communities in the Republic of Marshall Islands utilizing weather forecasts, watches, warnings and advisories from the U.S. NWS Weather Forecast Offices (WFO) in Guam and Honolulu and the US Joint Typhoon Warning Center (JTWC).

Operations include upper air, surface aviation observations,

supplementary aviation weather reporting station (SAWRS) and climate services. To support the preparation of weather forecasts, watches, warnings and advisories for Micronesia, WSO Majuro and other WSOs in Micronesia operate surface and upper air observation programs making available weather and climate observation data to WFOs Guam and Honolulu, and also to other countries. Upper air observations are scheduled and collected at 0000 and 1200 Coordinate Universal Time (UTC). Additional observations are made as required. Surface aviation observations include METAR on an hourly basis; SPECI (as required); SYNOPs every 6 hours (0000, 0600, 1200 and 1800 UTC); and additional SYNOP are taken as required. Daily oversight of SAWRS observations are carried out by WSO Majuro's staff. WSO Majuro collects and transmits weather and climate data from observation stations around the country.

These observation stations are classified into the following categories: First Order Station (FOS); Second Order Synoptic Station (SOSS); and Cooperative Climate Station Network (CCS). Refer to **Table 1** for the definitions of these stations.

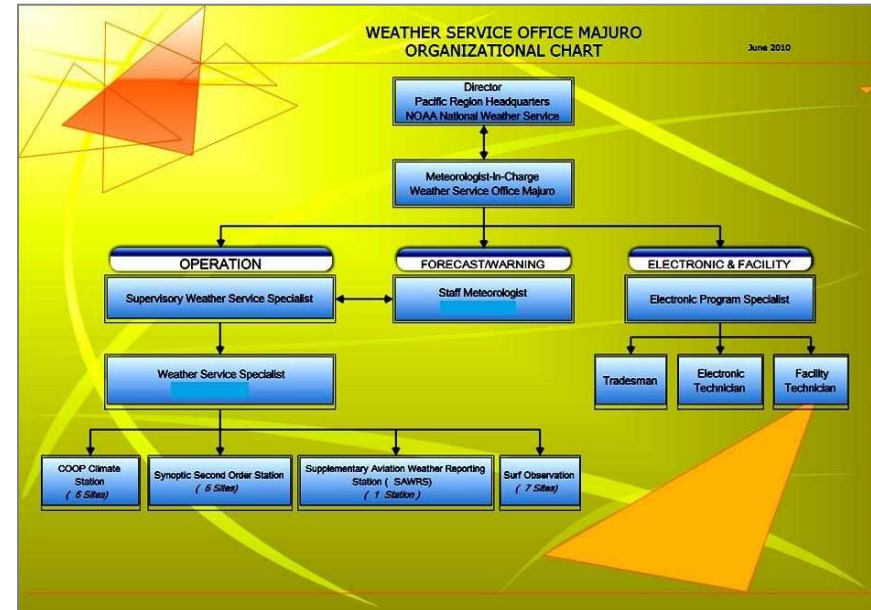


Figure 2

Table 1. Station classifications and definitions

Station	Definition
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First Order Station (FOS)	U.S NOAA NWS staffed Offices. It provides hourly METAR, 6 hourly (0600, 1200, 1800 and 000 UTC) synoptic and upper air observations; and supervises second order and climate cooperative network of stations.
Second Order Synoptic Station (SOSS)	U.S NOAA NWS operates a synoptic network, located on remote islands and atolls and these are paid network of stations reporting in WMO synoptic code FM12. It provides 6 hourly (0600, 1200, 1800 and 000 UTC) synoptic observations and climate observations and CLIMAT at 0000 UTC; and it can also perform as a climate/cooperative and surf network of stations.
Cooperative Climate Network of Stations (CCNS)	U.S NOAA NWS Pacific Region network. Data base generated through efforts of volunteer observers. It provides 1 climate observation per day at 0000 UTC.

Governance	Description
MET LEGISLATION: Update on whether or not your country has a stand-alone Meteorology Act or equivalent or is it part of other government's legislations to guide the NMHS to perform its role and responsibility? Briefly describe it.	Currently the Weather Services Office operates under Sections 5 to 13 of Article VII of COFA. No National Acts/Mandates are in place. There is the need to to Enact Laws to govern Weather Services.
Do you require for your Act to be reviewed? If it is already reviewed, what is the current status of your Act	COFA came into effect on June 25, 1983 and in April 30, 2003 was renewed for 20 years.
Strategic Planning	
Describe how meteorology (weather) and climatology (climate variability and climate change) are featured in the current national development plan, government ministries corporate and implementation/operational plans.	<ul style="list-style-type: none"> ▪ Sendai Framework for Disaster Risk Reduction 2015–2030 ▪ Pacific Disaster Risk Reduction and Disaster Management Framework for Action (Regional Framework for Action) 2005–2015 ▪ Drought Disaster Plan, 1996 ▪ National Emergency Response Plan, 2010 ▪ Joint National Action Plan (JNAP) for Disaster Risk Management and Climate Change Adaptation, 2011–2018
Describe the process if your NMHSs is reporting against the SDG or its national equivalent	

Does your NMHS have a strategic plan, implementation/operational plan or equivalent(s)?	The WSO Majuro 5-years Plans, 2013-2017 (AB-133W-13-CN-0024)
Describe how meteorology (weather), climatology (climate variability and climate change), disaster management and early warning systems are feature in your NMHS strategic plan, implementation/operational plan or equivalent(s).	

2.2 Staffing

The RMI Weather Service Office maintained the following staffing levels:

1

Meteorologist-In-Charge (MIC)

1 Staff Meteorologist (WCM) (*vacant*)

1 Supervisory Weather Service Specialist (SWSS)

6 Weather Service Specialist (WSS)

2 Electronic Program Specialist (EPS)

1 Tradesman (*vacant*)

2.2.1 Staff Qualification

Staff	Qualification	Division/Section	No. Professional Staff	
			Male	Female
Staff Name	(Description the qualification under each division) Example; WMO Class 1-4 or other qualification or professional training, education and research]	Responsibility of Staff (Forecast, Climate, Observation, Administration, etc.)		
<i>Reginald White</i>	<i>Class 1 Forecaster Bachelor Degree, Meteorology</i>	<i>Forecast, Climate, Warning, Administration</i>	✓	
<i>Lee Jacklick</i>	<i>Class 2 Forecaster Senior-level Meteorological Technician</i>	<i>Forecast, Climate, Observation, Warning, Administration</i>	✓	
<i>Nover Juria</i>	<i>Class 2 Forecaster Mid-level Meteorological Technician</i>	<i>Forecast, Climate, Observation, Warning,</i>	✓	
<i>Samson Kaneko</i>	<i>Class 3 Forecaster Mid-level Meteorological Technician</i>	<i>Forecast, Climate, Observation, Warning</i>	✓	
<i>Simon Kattil Jr.</i>	<i>Class 3 Forecaster Mid-level Meteorological Technician</i>	<i>Forecast, Observation, Warning</i>	✓	

Ronald Alfred	Class 3 Forecaster Mid-level Meteorological Technician	Forecast, Observation, Warning	✓	
Elai Aiseia	Class 3 Forecaster Mid-level Meteorological Technician	Forecast, Observation, Warning, Administration	✓	
Corrie Lejjena	Senior-level Meteorological Technician	Observation, Warning,	✓	

2.3 Finance

Description	2016 (US\$)	2017 Funds (US\$)		Total (US\$)
	Total Budget	Administration	Operation	
COFA	\$622,249.90	\$53,793.26	\$600k Plus	\$1,268,821.28

2.3.1 Projects supporting the NMHSs

Name of Project	Total Project Budget	Percentage of how much is provided to the NMHSs	Summary of NMHSs activities covered by the project			
			Product	Unit Cost (US\$)	Quantity	Total
<i>India-UN Development Partnership Fund</i>	\$100K	69.9%	Standard Rain Gauge	400	30	12,000
			Training of Hydrologist and Meteorologist for (Training Center fee, travel and living expenses and follow ups) at the Regional Training Center - Pune (India)	20,000	10 Staff	200,000
			Automated Weather Station	51,00	2	102,000
			Automated Weather Station	77,000	5	385,000
			Total			
<i>GCF</i>	1 Million	100%	For the establishment of additional 13 Synoptic observing stations.			
Total (USD)	+1 Million					

2.3.1 Potential Collaboration on project proposals

[Priority areas for collaboration on future projects]

(will be available soon)

2.4 Development

[Highlight development since 2015 and also anticipated development in the near future. Pictures would assist in this section. Highlight gaps and needs.]

(will be available soon)

2.4.1 Buildings Infrastructure

Continuing works on improving the current Synoptic and Climate networks. Establishment of 3 weather shack (8ft x10ft) to house delicate instruments.

2.4.3 Update on Communications Infrastructure (to support current and future development)

	Details
What is the mode of communication for transmitting oceanographic and hydrometeorological data from remote stations?	<ul style="list-style-type: none">▪ Chatty Beetle (Iridium satellite-based)▪ HF radios▪ Cellular phone▪ Air/sea mail
What is the Mode of transmitting data to the Global Data Network?	<ul style="list-style-type: none">▪ FAA Aeronautical Information System Replacement (AISR)▪ VSAT▪ In the event of communication outages, transmission relay to other Micronesian WSOs, WSO Pago Pago and WFO Guam via:<ul style="list-style-type: none">- Facsimile- Telephone- Chatty Beetle- Satellite phone
What is your Current Internet speed, and is your main office connected to a secure national Government provided IT network (inbound and outbound)?	Internet connection: DSL @1Mbps. WSO has its own Cisco firewall router.
Does your NMHS have access to SATAID information?	No.

<p>Which geostationary satellite(s) do you utilize, and which product(s) do you rely upon and how do you obtain it?</p>	<ol style="list-style-type: none"> 1. Himawari-8 Imagery via internet: <ul style="list-style-type: none"> ▪ Band 3 (0.64 μm, 0.5 km) ▪ Band 13 (10.4 μm) ▪ Band 9 (6.9 μm) 2. JAXA Real-time Rainfall Watch via internet 3. MTSAT via LRIT and EMWIN 4. GOES-15 via LRIT and EMWIN 5. GOES-13 via LRIT and EMWIN
<p>How many Upper Air Station does your NMHSs operate and what is their status? Do you have access to Lightning data, and do you use in in your forecasts?</p>	<p>The WSO operates 1 UA station. The status of the system is operational. There is not access to Lightning Data thus lightning information is not included in forecasts.</p>
<p>What is the scope and extent of marine weather services provided by your NMHSs and describe your NMHSs interaction with your national marine/port authorities and the marine user communities?</p>	<p>Thru the PacIOOS program:</p>
<p>What type of marine weather products, warnings, and advisories do you provide?</p>	<ul style="list-style-type: none"> ▪ Near-real time wave heights, characteristics, velocities and current observation from an off-shore wave-rider buoy at Majuro Atoll only.
	<ul style="list-style-type: none"> ▪ Near-real time sea-level height and sea surface temperatures from Seaframe tide gauge at Majuro Atoll lagoon. ▪ Tidal information for RMI ▪ Wave run-up forecasts for Majuro and Kwajalein Atolls ▪ Coastal Flooding watches, warnings and statements for RMI ▪ High surf advisories, watches, warnings and statements for RMI
<p>Does your NMHS have a Port Meteorological Officer and are they involved in the WMO VOS Program?</p>	<p>No PMO and not participating in the WMO VOS Program.</p>

2.4.4 Training

List any international, regional or national training, educational or research related events or workshops in which the NMHS has participated in the last 2 years (2015-2017) by using the table below;

<i>Training or Workshop Title attended by NMHS staff from 2011-2013</i>	<i>Start and End dates</i>	<i>Donor</i>	<i>Number of Participants from the NMS</i>
Sub-Regional Oceans and Tides Workshop	5-8 September 201	COSPPac, BOM	1
Young Scientist Support Program	October-December 2015	Koran APCC	2
Pacific Desk Training Course	January-February 2016	Pacific Desk	1
Pacific Desk Training Course	March-April 2016	Pacific Desk	1
Pacific Desk Training Course	2-27 May 2016	Pacific Desk	1
Pacific Leaderships Academy's Senior Leadership Course	July 18-26, 2016	NOAA	1
In-country Ocean and Tides Workshop	5-9 March 2017	COSPPac, BOM	4
Pacific Desk Training Course	March-April 2017	Pacific Desk	1
Pacific Desk Training Course	May-June 2017	Pacific Desk	1
Pacific Desk Training Course	June-July 2017	Pacific Desk	1

2.4.5 Update on Climate Services

Questions	Details
What level is your climate services according to WMO standard? (Class 1-4)	
Do you have an update climate science publication for your country? If not, when is the last one and how often do you want to have climate science published?	Published by the PCCSP Program
List the qualification obtained by climate officers (do not specify names)	<ul style="list-style-type: none"> ▪ Climate Science ▪ Climate Forecasting ▪ Climate tools, products and services ▪ Communication
List the types of training needed by you to enhance the generation and production of climate services	<ul style="list-style-type: none"> ▪ Climate Science ▪ Climate Forecasting ▪ Climate tools, products and services ▪ Communication

What tools do you use to provide seasonal forecast? (please select from SCOPIC, POAMA, METPI, CLIKP, PEAC)	<ul style="list-style-type: none"> ▪ PEAC ▪ SCOPIC ▪ POAMA ▪ CLIKP
What model(s) do you use to provide seasonal forecasts on monthly basis?	<ul style="list-style-type: none"> ▪ PEAC ▪ SCOPIC ▪ POAMA ▪ CLIKP
What are the climate variables you are forecasting?	<ul style="list-style-type: none"> ▪ Precipitation ▪ Temperature
What are some variables you would like to forecast in the future to meet needs of your client?	<ul style="list-style-type: none"> ▪ Sea level
How many AWS do you have that feed into the database you are using?	None
List in order of importance some sectors you engage with? List what products you issue for these sectors?	<ul style="list-style-type: none"> ▪ NDMO-rainfall outlook and climate bulletins ▪ MWSC-rainfall outlook
List 5 most important mode of communication of seasonal forecasts in your country.	<ul style="list-style-type: none"> ▪ Emails ▪ Phone conversations ▪ Fax ▪ Face-to-face meeting ▪ Workshops and Outreaches
Do you have any early warning system (EWS) for climate extreme events?	Jenrok Community Early Warning
What are some climate extreme events that you want to be included in your EWS?	<ul style="list-style-type: none"> ▪ Drought monitoring ▪ Seasonal forecasts ▪
What are some challenges that you have in climate division that you want to address with climate science and climate change mitigation and adaptation issues	<ul style="list-style-type: none"> ▪ Staff capacity building ▪ Better observational coverage (e.g. more rain gauges) ▪ Establishment of more additional observing sites in the cooperative climate network.
What are some priority needs for your services that you want to achieve in the next 5 years?	Training of 2 climate officers to become climatologists.

3.0 Progress of the NMHS

3.1. UPDATE on Achievements of the NMHS from 2015-2017

[This can reflect new activities, programs, services implemented by the NMHSs. Under each of the activities, indicate which PKO(s) this activity has achieved. One Activity can contribute to more than 1 PKO]

No.	Achievements (Activities) of the NMHS (2015-2017)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Pacific Desk-Meteorology Course (Level 1)	✓	✓	✓	✓		✓		✓	✓		✓			
2	Ocean & Tides Course		✓	✓	✓							✓			
3	Young Scientist Support Program			✓		✓	✓		✓			✓			
4	Jenrok Community Early warning & Information System		✓	✓	✓		✓								
5	Atoll water security Project			✓	✓		✓	✓	✓						✓
6	Pacific Leaderships Academy's Senior Leadership Course										✓	✓		✓	
7	US Sea Grant		✓	✓	✓							✓			

3.2. Proposed Activities to be carried out in the Future (2017-2019)

[Proposed Activities indicated in the Matrix will give an indication on the priorities]

No	Proposed Activities to be carried out between 2017-2019	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Pacific Desk-Meteorology Course (Level 2)		✓	✓	✓		✓		✓	✓		✓			
2	Climate Early Warning System			✓		✓	✓	✓	✓			✓			
3	Pacific Islands Ocean Observing System (PacIOOS)		✓	✓	✓							✓			

4.0. Identify Gaps and Future Needs that would Improve the National Meteorological and Hydrological Services

(will be made available soon)