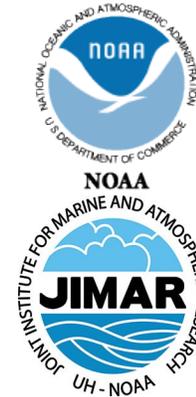




# NWS Climate Services

## June PEAC Audio Conference Call Summary

### 14 June, 1430 HST (15 June 2018, 0030 GMT)



University of  
**Hawai'i**  
M Ā N O A  
UH/SOEST

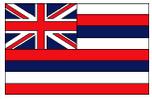


#### May rainfall totals reported (Joe)

% Normal: **blue** above normal & **red** below normal. Departure from normal: **blue**-above & **red**-below (same for 3 mon %)

	Rainfall	% Norm	Median	Departure	3 Month Total
	Inches	May	Inches	Inches	MAM
Koror	10.91	92	11.83	-0.92	21.91
Yap	7.41	94	7.85	-0.44	23.50
Chuuk	14.01	124	11.30	2.71	30.47
Pohnpei	16.91	85	19.96	-3.05	93.63
Kosrae	24.16	136	17.75	6.41	71.61
Kwajalein	22.33	332	6.72	15.61	49.93
Majuro	21.81	216	10.11	11.70	62.14
Guam NAS	8.15	240	3.40	4.75	17.54
Saipan	9.14	384	2.38	6.76	18.79
Pago Pago	9.26	96	9.66	-0.40	33.38
Lihue	1.60	107	1.49	0.11	16.35
Honolulu	0.25	63	0.40	-0.15	4.01
Kahului	1.19	243	0.49	0.70	7.85
Hilo	10.74	146	7.36	3.38	34.92

## Reports from around the Region



### Hawaii (Kevin)

#### Kauai

May rainfall totals were near to above average at many of the gages on Kauai. The U.S. Geological Survey's (USGS) gage on Mount Waialeale recorded the highest monthly total of 26.78 inches (87 percent of average) and the highest daily total of 4.57 inches on May 18. Lower elevation leeward gages had monthly totals of 1 to 2 inches. While not excessive in the big picture, these amounts were above average for May in leeward Kauai.

Rainfall totals for 2018 through the end of May were above average at most of the gages on Kauai. Mount Waialeale had the highest year-to-date total of 233.80 inches (150 percent of average).

#### Oahu

Gages along the windward and interior sections of the Koolau Range had mostly near to above average rainfall totals for May. Most of the remaining gages on the island had near to below average amounts. Gages along the leeward slopes of the Waianae Range were especially dry with most totals below 20 percent of average. The Manoa Lyon Arboretum gage had the highest monthly total of 14.95 inches (148 percent of average) and the highest daily total of 3.35 inches on May 14. The arboretum's total also registered as the highest May total at this site since 2002.

Most of the Oahu rainfall totals for 2018 through the end of May were above average. A few of the gages along the lower leeward slopes of the Waianae Range had below average totals. The USGS' Poamoho Rain Gage No. 1 had the highest year-to-date total of 118.17 inches (125 percent of average).

#### Maui

Windward totals for May were mostly above average and leeward totals mostly below average across Maui County. The USGS' rain gage at West Wailuaiki Stream had the highest monthly total of 29.68 inches (159 percent of average) and the highest daily total of 4.31 inches on May 7. Haiku's 5.72 inches marked the highest May total since 1994.

Maui County rainfall totals for 2018 through the end of May were mostly near to above average. The West Wailuaiki gage had the highest year-to-date total of 140.24 inches (130 percent of average).

#### Big Island

The windward slopes of the Big Island were quite wet with most of the gages posting above average May rainfall totals. In contrast, leeward areas were drier than average overall, especially in the North Kona District where several gages had monthly totals at less than 10 percent of average. The USGS' Saddle Road Quarry gage had the highest monthly total of 31.10 inches (312 percent of average) while the highest daily total of 3.86 inches came from the Papaikou Well gage on May 7. Honokaa had its highest May total in a data record going back to 1991. Hilo Airport, Kamuela Upper, Laupahoehoe, Mountain View, Pahoa, and Piihonua had their highest May totals since 2006. On the leeward side, the Kealakekua gage logged its lowest May total since 2004.

Big Island rainfall totals were mostly near to above average for 2018 through the end of May. Isolated below average totals were located across various parts of the island. The Saddle Road Quarry gage had the highest year-to-date total of 178.72 inches (292 percent of average).



### American Samoa (Carol):

American Samoa is bit drier now. While the month of May recorded 189% of normal (% of normal and % are synonymously used throughout this call-note) rainfall, the month of June recorded only 96%. The island is bit drier now with few flash floods due to coastal inundations. Trades are starting to pick up! There were several surf advisors, but no reports of any significant damage. Sea level stays elevated with big waves. PEAC's Model-based seasonal climate outlook is now indicating average rainfall for JJA with moderate confidence. The sea level is staying above but stable now. Forecasts indicate that it will stay marginally elevated over the next three months (JJA).



### Kwajalein (Jason):

The atoll experienced a relatively dry windy season from mid-December to mid-May and a relatively wet calm (wind) season from mid-May to mid-November. The month of April and May recorded 229% and 332% of normal rainfall (4 inches rainfall in one day on June 5th). The rainfall in March was significant as well. The atoll is currently very wet with strong trade winds. The sea level has gone receded and is currently at the normal range (reading 0). PEAC-model forecasts have trended to show above-average rainfall and normal sea level over the next 3 months, and there are no active TC warnings at present.

## Reports from around the Region (CON'T)



### **Majuro** (Nover):

Majuro has been receiving good rainfall since January 2018. The rainfall in April and May were 189% and 216% of normal. This downpour sufficiently improved Majuro's drought situation. The drought statement in the last week of April was the last to be issued. The water reservoirs capacity in Majuro now is 36 million gallons, and as of June 14th, 2018 the water reservoirs reached around 35 million gallons. PEAC-model forecasts have trended above-average rainfall and normal sea level over the next 3 months, and there is no active TC warnings at present.



### **Pohnpei** (Kenley):

It has been very wet in Pohnpei with 440% of normal rainfall in the month of March (wettest month in 66 years) and 102% rainfall in April. Currently, Pohnpei has been "fairly wet". The trade-winds have been strong and the sea level has gone down. There were two flood statement issued during May. The Island is very hot now (*PEAC call it a diagnostic signal of forthcoming El Niño*), especially starting from the 1<sup>st</sup> week of May. PEAC-model forecasts have trended average-above rainfall and normal sea level over the next 3 months.



### **Kosrae** (Kenley, Chip):

Kosrae received 105% and 136% of normal rainfall in April and May. After prolonged dry periods, the situation has improved in Kosrae. Currently, the island is fairly wet. The trade-winds have been strong and the sea level has gone down. PEAC forecasts have trended to show average rainfall for the next three months.



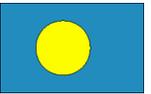
### **Chuuk** (Sanchez):

Chuuk recorded 124% of normal rainfall in May. The island is still wet and there was reports inundation across the south-east region of the island. PEAC forecasts are favoring above-average rainfall and normal sea level in the next season.



### **Yap** (Mark, Chip):

Yap is having their monsoon now. It received only 94% of normal rainfall in May. There were some convergences, but it produced some rainfall to the northern side of Yap. However, everything looks normal in Yap—reservoirs are full and streams are flowing well. The overall climate was feeling cold, which was caused partly due to the flow of tradewinds. The island is relatively high and the south-west part of the island is protected by mangrove forest, so it is protected from any minor inundation problem. A special bulletin about the seasonal storm activities is in progress. PEAC forecasts are favoring above-average rainfall and normal to slightly below normal sea level in the next three months.



### **Palau** (Chip, Mark):

Palau has had some showers but is currently a bit drier than normal. It received 92% of normal rainfall in May. The rainfall at Palau tracks ENSO so well that it makes a good ENSO index in its own right! Sea level has already gone below normal (currently reading -4 inches below!). The normal sea level and drier than normal atmospheric climate is a precursor of forthcoming El Niño. PEAC forecast favors average-above rainfall and below normal sea level in the next season.



### **Guam and CNMI** (Mark, Chip):

With weak La Niña now in-place, and expected to transition to ENSO-neutral over the next few months, it is not surprising that computer model forecasts have aggressively indicated above average rainfall over Guam and Saipan. However, for the past three months, such aggressive forecasts for wetter than average rainfall for Guam and the CNMI have been incorrect; instead, a "personal" drought occurred in the region. The PEAC has manually tempered the current model aggressiveness for above average rainfall for Guam and the CNMI. This situation has changed and, after prolonged dry conditions, Guam and Saipan are moderately wet now—particularly in the month of April and May. The 240% and 384% of rainfall in Guam and Saipan have significantly improved the dry conditions and changed these two islands to wet and green. Hawaiian volcanic haze that reached Guam is now dissipating. However, the Guam National Guard and the Guam Fire Department conducted air monitoring tests at various locations and detected no volcanic gases or other hazards. PEAC forecasts are now indicating average-above rainfall for both Guam and Saipan over the next three months and slightly elevated sea level.

## Reports from around the Region (CON'T)



### Tropical Cyclones (Chip, Mark L)

We expect more tropical cyclone activity than in 2016 and 2017, about the same activity as in 2015 for Guam (Typhoon Dolphin), but not quite as busy as 2015 for the CNMI (Typhoons Soudelor and Dolphin). For the remainder of the year, there is a 50% chance of getting a strong tropical storm (sustained winds 50-73 mph) and a 25% chance of getting a Category 1 typhoon (sustained winds 74-95 mph). The chance of getting a Category 2 typhoon (sustained winds 96-110 mph) is about 15%, while the chance of getting a Category 3 typhoon (sustained winds 111-129 mph) is around 10%. Tropical cyclone activity for Guam could begin a little late, toward mid-summer, but keep in mind that the weather patterns can change quite rapidly. Remember, we are in the only basin that can get a typhoon any month of the year.

There is a correlation between tropical cyclone activity and the state of El Niño-Southern Oscillation in Micronesia. During El Niño, tropical storms and typhoons begin to develop earlier in the year and farther to the east of eastern Micronesia. During La Niña, storms are more likely to develop later in the year and to the west of or near the Mariana Islands. Currently the tropical distribution does not look very consistent with the onset of a strong El Niño pattern.

**Sea Level Discussion Remarks** (Rashed) All values are in inches (1 inch=25.4 mm); Seasonal cycle removed.

Tide Gauge stations	Seasonal Forecasts JJA (mean <sup>1</sup> ) (ano)	SD of MAM (mean)	Monthly mean <sup>1</sup> anomaly			Current State/ Trend	Seasonal Forecasts JJA (max <sup>2</sup> ) (ano.)	SD of MAM (max)	Monthly max <sup>2</sup> anomaly		
			Observed rise/fall						Observed rise/fall		
			Mar/ 2018	Apr/ 2018	May/ 2018	MAM 2018			Mar/ 2018	Apr/ 2018	May/ 2018
Marianas, Guam	+2	3.9	+8	+6	+4	Falling	+20	4.0	+23	+20	+18
Malakal, Palau	-3	4.2	+6	0	-4	Falling	+33	4.3	+41	+37	+31
Yap, FSM	-1	4.5	+7	+6	+4.5	Falling	+27	5.0	+35	+32	+29
Chuuk, FSM***	+1	*	+5.2	+2.8	+2	Falling	+28				
Pohnpei, FSM	0	2.5	+6.2	+4.6	0	Falling	+29	2.9	+34	+32	+29
Kapingamarangi	0	**	+7.5	+6.6	+6.6	Falling	+28	**	+29	+28	+31
Majuro, RMI	0	2.0	+5	+5	+3	Falling	+40	3.0	+45	+43	+40
Kwajalein, RMI	0	2.6	+4.4	+1.7	0	Falling	+38	3.3	+46	+36	+36
Pago Pago*	+7 (+2)	4.2	+10.5 [+5.5]	+10.5 [+5.5]	+11 [+6]	Above Stable	+34 (+29)	4.8	+34	+31	+31
Honolulu	+2	1.7	+2	+2	+1.5	Stable	+23	1.9	+18	+16	+20
Hilo	+2	1.9	+1	+3.5	+5	Stable	+26	2.4	+21	+23	+26

+/- indicate positive anomaly (rise) and negative anomaly (fall) respectively. Note that any changes between (0~ ±1) inch is considered to be negligible. Also note that changes within the range of (+/-) 2 inches are unlikely to cause any adverse climatic impact. \*\*\* (Experimental) Satellite Aviso Altimetry data, \*\* Data currently unavailable; *Figures in parenthesis for monthly-max anomaly indicates difference between the maximum anomaly for the given month and the long-term monthly average anomaly.*

1: Difference between the mean sea level for the given month and the 1983 through 2001 monthly mean sea level value at each station (seasonal cycle removed); 2: Same as 1 except for maxima; SD stands for standard deviations.

\* **In Pago Pago**, There was a level shift (approximately 5 inches) in American Samoa at the time of September 2009 earthquake. So, -5 inches has been adjusted (shown in parenthesis) to the current tide-gauge values of Pago Pago.

**Current Conditions:** All stations displayed considerably above normal sea level during JFMA. However, in April, sea level started to fall. Some of the stations may still remain marginally elevated in June, but likely to fall below normal in July or August 2018. Hawaii sea levels also returned to normal, but Hilo recorded some considerable rise in May.

**Impacts:** Tides have been very high with high waves all over Micronesia and Marshalls Islands during JFMA. Most of the events were associated with northerly swell from northern Pacific storm. There have been regular minor-to-moderate inundations in low-lying atolls and Pohnpei, Kosrae, and Chuuk reported road damage during this quarter.

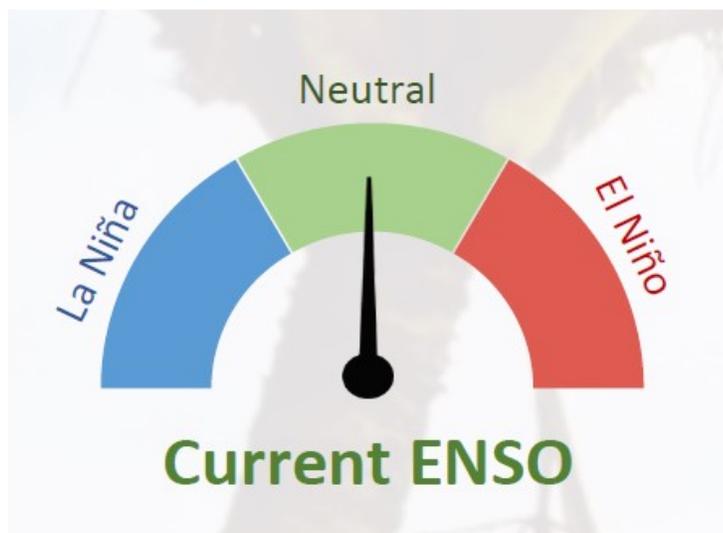
**Forecasts for JJA:** PEAC-CCA Statistical model is predicting normal to marginally below-normal in the forthcoming JJA-ASO seasons. If El Niño develops as per projections, then the lowest anomalies of sea level may likely to occur at the later part of 2018. In Hawaii, both Honolulu and Hilo are likely to be slightly elevated, but still close to normal. Note that the south Pacific station (i.e., Pago Pago) maintains a 4-6 months' time-lag to change fall/rise when compared to north Pacific stations (i.e., Guam and the Marshalls).

## 5. Current State of ENSO and predictions: (Rashed) **ENSO Alert System Status: El Niño Watch**

**Synopsis:** ENSO-neutral is favored through Northern Hemisphere summer 2018, with the chance for El Niño increasing to 50% during fall, and ~65% during winter 2018-19.

ENSO-neutral continued during May, as indicated by mostly average sea surface temperatures (SSTs) across the central and eastern equatorial Pacific. The latest weekly Niño indices were between +0.2°C and 0.0°C, except for the Niño-1+2 index, which remained negative (-0.5°C). Positive subsurface temperature anomalies (averaged across 180°-100°W) increased over the past month, as another downwelling equatorial oceanic Kelvin wave reinforced the already above-average subsurface temperatures. Convection remained suppressed near the Date Line and was slightly enhanced over Indonesia. Low-level and upper-level winds were near average across the equatorial Pacific Ocean. Overall, oceanic and atmospheric conditions reflected ENSO-neutral.

The majority of models in the IRI/CPC plume predict ENSO-neutral to continue through the Northern Hemisphere summer 2018, with El Niño most likely thereafter. The forecaster consensus favors the onset of El Niño during the Northern Hemisphere fall, which would then continue through winter. These forecasts are supported by the ongoing build-up of heat within the tropical Pacific Ocean. In summary, ENSO-neutral is favored through Northern Hemisphere summer 2018, with the chance for El Niño increasing to 50% during fall, and ~65% during winter 2018-19.



Source: NIWA , The Island Climate Update Bulletin

### In summary:

- The La Niña of 2017-18 ended in April 2018, and conditions in the ocean and atmosphere have returned to neutral.
- Model predictions and expert opinion indicate that ENSO conditions are about 75% likely to remain neutral through August of 2018.
- While more than half of the models surveyed predict the development of weak El Niño later in 2018, the uncertainty of long-lead forecasts made at this time is still high, and therefore the probability of El Niño development is considered only at about 45-50% at this time.

## 6. Rainfall Outlooks for JJA (Joe)

The verification result of MAM rainfall forecasts has been found to be encouraging with 11 hits and 3 misses (Heidke score: 0.4811). The stations that hit the forecasts were: Yap, Chuuk, Pohnpei, Kosrae, Kwajalein, Majuro, Pago Pago, Lihue, Honolulu, Kahului, and Hilo. The 3 missed stations were Koror, Guam and Saipan. PEAC forecasts are based on six GCMs and two statistical models.

Location	Rainfall Outlook	Final Probs	3 mo Verification		
			% norm	Total (in)	Tercile
<b>Palau</b>					
Koror 7° 22' N, 134° 32' E	Above	25:35:40	82	21.91	Below
<b>FSM</b>					
Yap 9° 29' N, 138° 05' E	Above	25:35:40	130	23.50	Above
Chuuk 7° 28' N, 151° 51' E	Avg-above	30:35:35	95	30.47	Avg.
Pohnpei 6° 59' N, 158° 12' E	Avg-above	30:35:35	182	93.63	Above
Kosrae 5° 21' N, 162° 57' E	Avg-above	30:35:35	140	71.61	Above
<b>RMI</b>					
Kwajalein 8° 43' N, 167° 44' E	Above	25:35:40	348	49.93	Above
Majuro 7° 04' N, 171° 17' E	Avg-above	30:35:35	238	62.14	Above
<b>Guam and CNMI</b>					
Guam 13° 29' N, 144° 48' E	Avg.	30:40:30	219	17.54	Above
Saipan 15° 06' N, 145° 48' E	Avg.	30:40:30	272	18.79	Above
<b>American Samoa</b>					
Pago Pago 14° 20' S, 170° 43' W	Avg-above	30:35:35	112	33.38	Avg.
<b>State of Hawaii</b>					
19.7° - 21.0° N, 155.0° - 159.5° W					
Lihue	Avg-above	30:35:35	272	16.35	Above
Honolulu	Avg-above	30:35:35	235	4.01	Above
Kahului	Avg-above	30:35:35	241	7.85	Above
Hilo	Above	25:30:45	129	34.92	Above

	Hit
	Miss
Heidke:	0.4811
RPSS:	0.0570

### Tercile Cut-offs for MAM Season based on 1981-2010 Pacific Rainfall Climatologies (Luke He)

	Koror	Yap	Chuuk	Pohnpei	Guam	Saipan	Majuro	Kwaj
below (<)								
33.33%	26.86	14.74	30.3	46.13	7.61	5.88	21.02	9.74
near								
66.66%	33.44	22.41	36.94	58.61	11.51	8.02	32.44	21.13

above (>)

Lihue	Honolulu	Kahului	Hilo	Pago Pago	Kosrae
5.32	1.83	2.45	22.5	27.97	51
7.98	3.05	4.64	34	38.33	55.49

Rainfall in inches

## 6. Rainfall Outlooks for JJA (Con't)

<i>Location</i>	<i>Rainfall Outlook</i>	<i>Final Probabilities</i>
<b>Palau</b>		
Koror	<i>Avg-above</i>	<b>30:35:35</b>
<b>FSM</b>		
Yap	<i>Avg-above</i>	<b>30:35:35</b>
Chuuk	<i>Avg-above</i>	<b>30:35:35</b>
Pohnpei	<i>Avg-above</i>	<b>30:35:35</b>
Kosrae	Average	<b>25:40:35</b>
<b>RMI</b>		
Kwajalein	<b>Above</b>	<b>25:30:45</b>
Majuro	<b>Above</b>	<b>25:35:40</b>
<b>Guam and CNMI</b>		
Guam	<i>Avg-above</i>	<b>30:35:35</b>
Saipan	<i>Avg-above</i>	<b>30:35:35</b>
<b>American Samoa</b>		
Pago Pago	Average	<b>25:40:35</b>
<b>State of Hawaii</b>		
Lihue	<b>Above</b>	<b>25:30:45</b>
Honolulu	<b>Above</b>	<b>25:30:45</b>
Kahului	<b>Above</b>	<b>20:30:50</b>
Hilo	<b>Above</b>	<b>20:30:50</b>

### Note

Interpretation of tercile probability: The *Avg-above* probability, **30:35:35** forecasts in *JJA* season means there is a **35%** chance (probability) for occurrence of excess rainfall during the *JJA* season, **35%** chance for occurrence of rainfall within a pattern considered normal during the *JJA* season, and **30%** chance for occurrence of deficit rainfall during the *JJA* season. Also note that *excess* and *deficit* limit for each of the stations are different

## 7. Drought monitoring updates (Richard Heim).

### A. End-of-May Monthly Drought Assessment:

- i. With WxCoder III data, we have 23 stations in the monthly analysis.
- ii. May was dry (less than the monthly minimum required to meet most water needs) at Ulithi & Yap & Lukonor (in FSM), and Ailing-lapalap (RMI). It was wet at the rest of the USAPI stations. Pingelap & Wotje could not be analyzed due to missing data. The May monthly analysis (May 31) is consistent with the weekly analyses for May 29 and June 5. Compared to the end-of-April analysis, abnormally dry conditions at the end of May continued in western Yap State and developed in Chuuk State (Lukonor):
  - D0-S continued at Ulithi & Yap.
  - D-Nothing worsened to D0-S at Lukonor.
  - Pingelap & Wotje were missing too many days in May so could not be analyzed.
  - All other stations continued at a D-Nothing classification.
- iii. Lots of missing data at Ulithi & Woleai in June, Woleai in May. Pingelap missing last 2 months (March 18 last), Wotje missing for about a month (May 13 last). Communications problems? Observer gone?

B. Current (Weekly) Drought Conditions: The discussion above is the monthly (end of May) analysis. The latest weekly USAPI USDM assessment may show different USDM classifications. The latest weekly USAPI USDM assessment is for June 12 and shows D-Nothing at Lukonor & Yap and 6 stations missing (including Ulithi), but otherwise is the same as the end of May depiction.

C. May NCEI State of the Climate Drought Report: I included a discussion of USAPI drought conditions in my May 2018 NCEI SotC Drought & Synoptic reports (which went online Monday).

The web page url is:

<https://www.ncdc.noaa.gov/sotc/drought/201805#det-reg-pacis-usapi>

<https://www.ncdc.noaa.gov/sotc/synoptic/201805>

D. Automated Ingest of Daily Rainfall Data: We are working with NWS, WRCC, and HPRCC personnel to have the WxCoder III daily data transmitted near-real time every day so we can incorporate it into our GHCN-Daily data base here at NCEI. This will enable us to automate the processing, which is a required step before we can make the USAPI USDM weekly analyses official and release them publicly (they are considered experimental now). – **Status:**

- i. **The computer program, that automates the ingest and processing of the data, is running every morning at 10 a.m. EST; it sends out an email every day containing daily and weekly rainfall totals for several USAPI stations.**
- ii. **I checked the output and it looks reasonable; the data for 4 stations (Kwajalein, Pago Pago, Jaluit, & Woleai) aren't getting into our system for some reason (am checking out solutions).**
- iii. **I have been including discussions of the automated output in my weekly analysis in addition to my usual manual discussion. We are working on creating a web page where tables of this data will be put, updated daily.**

### E. Weekly USAPI Drought Assessment:

- i. I assessed drought conditions for each week from December 9, 2014 through June 12, 2018.
- ii. Stations that don't have data (or enough data) for the week in question are designated as having No Data for that weekly assessment.
- iii. Source of the daily data for the weekly assessments: Guam and Pago Pago NWS web sites; Kwajalein PLCD web site; WRCC web sites for the automated stations; WxCoder III for most of the stations.
- iv. I will continue this on a weekly basis (Monday afternoons EST).  
Preferred process: I can do the weekly rainfall analysis, send my drought classification recommendation to the USAPI folks (either just Guam or Guam and all WSOs) for confirmation and local impacts, then send it after any modification to the USDM author.

Discussion: Lots of missing data at Ulithi & Woleai in June, Woleai in May. Pingelap missing last 2 months (March 18 last), Wotje missing for about a month (May 13 last). Communications problems? Observer gone? Will look into it for Pingelap, observers and exposure. Wotje observer on medical leave in hospital. Jaluit observer was gone, just returned last week. Will work on getting backup observers.

**Participants:**

**NWS Climate Services Program Managers (CSPMs):** Joe Brinkley

**WSO Climate Service Focal Points (CSFPs):**

Nover (Majuro)  
(Kosrae)  
(Palau)

Sanchez, Lucas (Chuuk)  
(Yap)  
Jason (Kwajalein)

Kenley (Pohnpei)  
Carol (Pago Pago)  
Mark/Chip/Brandon B. (Guam & CNMI)

**PEAC Principal Research Scientist:** Rashed Chowdhury

**WERI Scientist:** Mark Lander

**CPC Forecaster:**

**WFO Guam :** Chip Guard, Clint Simpson

**NWS MIC, Honolulu:** Christopher Brenchley

**NCEI:** Richard Heim

**Pacific RISA:** Krista Jaspers

**NWS Hydrologist:** Kevin Kodama

**Additional Attendees:**

***\*\* Next Call– 12 July 2018, 1430 HST (13 July 2018, 0030 GMT)\*\****