NWS Climate Services

July PEAC Audio Conference Call Summary

11 July, 1430 HST (12 July 2019, 0030 GMT)

June rainfall totals reported (Sony)

% Normal: blue above normal & red below normal. Departure from normal: blue-above & red-below

	Rainfall	% Norm	Median	Departure	3 Month Total
	Inches	June	Inches	inches	AMJ
Koror	16.30	93	17.48	-1.18	29.97
Yap	13.14	109	12.04	1.10	23.21
Chuuk	14.62	125	11.66	2.96	25.36
Pohnpei	23.56	159	14.81	8.75	44.73
Kosrae	15.08	103	14.64	0.44	71.32
Kwajalein	4.76	69	6.93	-2.17	16.61
Majuro	11.31	103	11.01	0.30	30.79
Guam NAS	2.85	46	6.18	-3.33	6.61
Saipan	2.11	58	3.62	-1.51	8.82
Pago Pago	6.24	117	5.33	0.88	31.29
Lihue	5.79	452	1.28	-4.51	9.68
Honolulu	5.68	3156	0.18	5.50	6.18
Kahului	0.03	33	0.09	-0.06	1.23
Hilo	3.90	62	6.33	-2.43	21.26

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

Tide Gauge stations	Seasonal Forecasts JAS (mean[1]) (ano)	SD of AMJ (mean)	Monthly mean[1] anomaly			Current State/ Trend AMJ 2019	Seasonal Forecasts MJJ (max[2]) (ano.)	SD of AMJ (max)	Monthly max[2] anomaly		
			Observed rise/fall						Observed rise/fall		
			Apr/ 2019	May/ 2019	Jun/ 2019				Apr/ 2019	May/ 2019	Jun/ 2019
Marianas, Guam	+3	3.6	+2	+5	+4.5	Above	+19	4.0	+15	+18	+18
Malakal, Palau	+1	4.3	-3	-3	+2	Normal	+36	4.3	+33	+34	+33
Yap, FSM	+1	4.2	-4.5	0	+1	Normal	+30	4.6	+25	+27	+25
Chuuk, FSM***	+2		+1	+4	+3.5	Above	+29				
Pohnpei, FSM	+3	2.7	+4	+5	+7	Above	+32	3.1	+30	+32	+33
Kapingamarangi	+2		**	**	**	**	**	**	+27	+34	**
Majuro, RMI	+3	2.2	+3	+6.5	**	Above	+40	3.0	+41	+43	
Kwajalein, RMI	+3	2.7	+4	+4	+6.5	Above	+40	3.0	+42	+38	+41
Pago Pago*	+7 [+10]	4.5	+9 [+14]	+9 [+14]	+9 [+14]	Above	(+30) [+35]	4.9	+35	+35	+35
Honolulu	+2	2.0	+2	+3	+1	Normal	+21	2.5	+19	+22	+20
Hilo	+3	2.2	+4	+4	+4	Above	+26	2.6	+24	+30	+25

+/- 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: Models and expert opinion suggest a continuation of El Niño through July-September of 2019.

- *Since January 2019, the pattern of sea level variability corresponded very well with WP El Niño, where the positive sea level anomaly is located over/or near the central Pacific and maximum near 160°E-180 (i.e., Pohnpei, Kwajalein, and Majuro) and the negative SLA is located near 130°E-150°E (i.e., Koror, Yap, and Chuuk) (also see Kug, J.-S., et al. (2009).*

- *The ENSO pattern has slightly changed and started to display characteristics similar to central Pacific El Niño (CPE). In any CPE, the sea level is likely to react with below normal SL in all USAPI regions. CURRENTLY, **all of our stations are reading above normal. Palau is 2 inches above normal**— the sea level in Palau is highly sensitive to ENSO, with El Niño to low sea level and La Niña to high sea level.*

- *The MJO weakened early last week but has begun to strengthen again, in an RMM sense. The RMM index places the MJO in Phase 1, but this is likely due to Rossby wave interference.*

Impacts: *There are reports of minor-to-moderate inundations in the low-lying atolls with some minor damages.*

Kug, J.-S., et al. (2009). Two types of El Niño events: Cold tongue El Niño and warm pool El Niño. J. Climate, 22, 1499–1515 (available @ https://journals.ametsoc.org/doi/pdf/10.1175/2008JCLI2624.1).

Chowdhury M. R., Chu P-S, and Guard C. (2014): An Improved Sea Level Forecasting Scheme for Hazards Management in the U.S.-Affiliated Pacific Islands. *Int. J. Climatology* 6, 2320-2329.

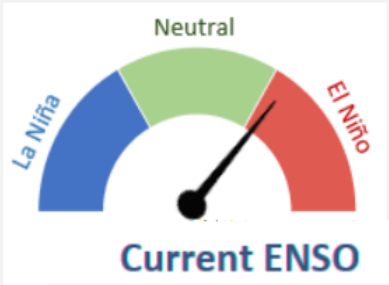
Current State of ENSO and predictions: (Matt) **ENSO Alert System Status: El Niño Advisory**

Synopsis: **El Niño is predicted to persist through the Northern Hemisphere summer 2019 (66% chance), with lower odds of continuing through the fall and winter (50-55% chance).**

During May, El Niño was reflected in the continued presence of above-average sea surface temperatures (SSTs) across most of the equatorial Pacific Ocean. The latest weekly ENSO indices indicate the largest positive SST anomalies were within the central Pacific (+1.1°C in Niño-4 and +0.9°C in Niño-3.4) with smaller departures in the Niño-3 and Niño-1+2 regions. Upper-ocean sub-surface temperatures (averaged across 180°-100°W) were nearly average at the start of May, but positive anomalies increased toward the end of the month in association with a downwelling Kelvin wave. Thus, anomalies remained positive at depth in the central equatorial Pacific Ocean, with negative anomalies evident in the eastern Pacific. Suppressed tropical convection continued over Indonesia, while weak, enhanced convection persisted near the Date Line. Low-level wind anomalies were westerly over the western tropical Pacific Ocean, and upper-level wind anomalies were easterly over the western and east-central Pacific. Overall, oceanic and atmospheric conditions were consistent with El Niño.

The combined averages in the IRI/CPC plume predict El Niño to continue into Northern Hemisphere winter 2019-20, but individual models span ENSO-neutral to El Niño outcomes (generally +0.0°C to +1.0°C). The forecast consensus reflects this uncertainty, with slightly lower chances for El Niño compared to the previous month. Ongoing subseasonal variability within the tropical Pacific contributes to an overall murky picture, but the current downwelling oceanic Kelvin wave should fuel the persistence of El Niño at least in the short-term. In summary, El Niño is predicted to persist through the Northern Hemisphere summer 2019 (66% chance), with lower odds of continuing through the fall and winter

El Nino-Southern Oscillation Watch



Source: NIWA Island Climate Update: April 2019

Current situation

Sea surface temperatures remained above El Niño thresholds in the central Pacific Ocean during May 2019, but cooled for the second consecutive month.

The atmosphere continued to respond to the warm pool of water in the central Pacific.

The Southern Oscillation Index (SOI) decreased in May to -0.7 (April was 0.0).

Forecast situation

66% chance for El Niño conditions during June-August 2019.

56% chance for El Niño conditions during September-November 2019.

Rainfall Verification and Outlooks for JJA (Sony)

The verification result of **AMJ** rainfall forecasts was8 hits and 6 misses (Heidke score: 0.3386). The 6 stations we missed were: Yap, Ponphei, Kwajalein, Saipan, Lihue, and Honolulu.

Location	UKMO	ECMWF	CA	NASA	NCEP	IRI	APCC	PEAC CCA	Rainfall Outlook	Final Probs	3 mo Verification		
											% norm	Total (in)	Tercile
Palau													
Koror 7° 22' N, 134° 32' E	Avg.	Below	Below	Below	Below	Below	Below	Below	Below	40:35:25	82	29.97	Below
FSM													
Yap 9° 29' N, 138° 05' E	Below	Below	Below	Avg-below	Below	Below	Below	Below	Below	45:30:25	91	23.21	Avg.
Chuuk 7° 28'N, 151° 51'E	Below	Below	Avg-below	Avg-above	Avg-below	Below	Avg.	Below	Avg-below	35:35:30	72	25.36	Below
Pohnpei 6° 59'N, 158° 12'E	Below	Below	Avg-below	Avg-above	Avg.	Below	Above	Avg-below	Avg.	30:40:30	84	44.73	Below
Kosrae 5° 21'N, 162° 57'E	Below	Below	Avg-below	Above	Avg-above	Above	Above	Avg.	Avg-above	30:35:35	143	71.32	Above
RMI													
Kwajalein 8° 43'N, 167° 44'E	Below	Below	Avg-below	Avg-above	Below	Below	Below	Avg.	Below	40:35:25	88	16.61	Avg.
Majuro 7° 04' N, 171° 17'E	Below	Below	Avg-below	Avg-above	Avg-below	Clim.	Above	Avg.	Avg-below	35:35:30	101	30.79	Avg.
Guam and CNMI													
Guam 13° 29'N, 144° 48' E	Below	Below	Avg-below	Avg-below	Avg-below	Below	Below	Avg-below	Below	45:30:25	55	6.61	Below
Saipan 15° 06'N, 145° 48' E	Below	Below	Avg-below	Avg-below	Avg-below	Below	Below	Avg-below	Below	45:30:25	102	8.82	Avg.
American Samoa													
Pago Pago 14° 20'S, 170° 43'W	Above	Above	Avg-above	Avg-above	Avg.	Above	Avg.	Avg-above	Avg-above	30:35:35	128	31.29	Avg.
State of Hawaii													
19.7° - 21.0' N, 155.0° - 159.5' W													
Lihue	Below	Below	Avg-below	Avg-below	Avg.	Below	Below	Below	Below	40:35:25	206	9.68	Above
Honolulu	Below	Below	Avg-below	Avg-below	Avg.	Below	Below	Below	Below	40:35:25	562	6.18	Above
Kahului	Below	Below	Avg-below	Avg-below	Avg.	Below	Below	Avg-below	Avg-below	40:35:25	84	1.23	Below
Hilo	Below	Below	Avg-below	Avg-below	Avg.	Below	Below	Avg-below	Avg-below	40:35:25	94	21.26	Below

Hit	
Miss	
Heidke:	0.3386
RPSS:	-0.0377

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

	Koror	Yap	Chuuk	Pohnpei	Guam	Saipan	Majuro	Kwaj	Lihue	Honolulu	Kahului	Hilo	Pago Pago	Kosrae
below (<)														
33.33%	39.422	21	32.97	49.71	13.05	8.14	25.63	15.41	4.74	1.23	1.25	21.42	22.42	47.62
near														
66.66%	48.415	32.89	39.15	56.96	15.95	11.06	34.51	26.35	5.97	1.77	2.17	29.01	33.53	51.87
above (>)														
Rainfall in inches														

Rainfall Verification and Outlooks for JJA (Con't)

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

Note:

Interpretation of tercile probability Example: 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 b different*

Drought monitoring updates.

A. End-of-June Monthly Drought Assessment:

i. With WxCoder III data, we have 23 stations in the monthly analysis.

ii. June continued dry (less than the 4- or 8-inch monthly minimum needed to meet most water needs) in northern portions of Micronesia, and wet (more than 8 inches) in southern portions. Drought Information Statements issued by Guam. The end-of-June monthly analysis (June 30) is consistent with the weekly analyses for June 25 & July 2 (and, in fact, is identical to the July 2 analysis). Compared to the end-of-May analysis:

a. Drought improved in Palau & the FSM:

1. D2-S improved to D0-S at Yap & Palau
2. D2-S improved to D1-S at Fananu
3. D2-S improved to D-Nothing at Woleai & Chuuk
4. D0-S improved to D-Nothing at Lukunor & Nukuoro

b. No change in Marianas and part of RMI

1. D3 (S,L,SL) continued at Guam, Rota, Saipan
2. D4-SL continued at Utirik & Wotje
3. D1-S continued at Kwajalein
4. D0-S continued at Majuro

c. Others:

1. Ailinglapalap improved from D0-S to D-Nothing
2. But Jaluit worsened from D0-S to D1-S
3. D-Nothing continued at Mili, Tutuila (Pago Pago), Pohnpei, Pingelap, Kosrae, & Kapingamarangi

d. Ulithi was missing for the last several months, so could not be analyzed for the month.

iii. Some dry precipitation ranks:

a. Guam & Saipan: 7^{th} driest June (out of 63 years @ Guam) (out of 39 years @ Saipan); 4^{th} driest March-June (Guam, 63 yrs); 4^{th} driest Oct-Jun (Saipan, 30 yrs)

b. Lukunor: 5^{th} driest June (35 yrs), 2^{nd} driest Oct-Jun thru Jul-Jun (33 yrs)

c. Kwajalein: 8^{th} driest Jun (68 yrs)

d. Utirik: 5^{th} wettest Jun (15 yrs) but driest Mar-Jun (9 yrs)

e. Ailinglapalap: 6^{th} driest Jul-Jun (33 yrs)

f. Chuuk: 6^{th} driest Apr-Jun (68 yrs)

g. Woleai: 3^{rd} wettest Jun (37 yrs) but 5^{th} driest Jul-Jun (22 yrs)

Drought monitoring updates (CON'T).

B. Current (Weekly) Drought Conditions: The discussion above is the monthly (end of June) analysis. The latest weekly USAPI USDM assessment may show different USDM classifications. The latest weekly USAPI USDM assessment is for July 9.

i. For July 9, differences include:

a. Deterioration: Tutuila is D0-S instead of D-Nothing

C. June 2019 NCEI State of the Climate Drought Report: I included a discussion of USAPI drought and climate conditions in my June 2019 NCEI SotC Drought report (which went online today).

i. The web page url is:

a. https://www.ncdc.noaa.gov/sotc/drought/201906#det-reg-pacis-usapi

D. Next 2 Weeks: I will be USAPI USDM author the next 2 weeks. Next week I'm in the office, but the following week I'll be in Hawaii helping run a drought workshop. I plan to do the first draft of the 7/23 map Monday in the hotel room, probably won't put out a draft on Tuesday (day of the workshop), and finish up Wednesday afternoon.

i. For next week, thinking of changing Kwajalein to D0-S (from D1-S) due to improving vegetation and water levels (Jason: Conditions not drought-like, everything vegetation is green, water levels are good.). What about Majuro? Reservoir level dropping last week or so, so probably will leave Majuro at D0-S

ii. Saipan & Rota improve to D2 (lush vegetation). Saipan June 18th percentile. Guam June 11th percentile. Starting to get rain on more days at Saipan & Rota, which helps vegetation and also helps minimize/prevent fires (even though total rainfall amount still below min, the frequency of rain days is increasing and helping).

E. North America Commission for Environmental Cooperation Survey: As part of a project to improve drought indices, drought monitoring, and drought products in the US, Canada, & Mexico, a group of us are working with a contractor to run a survey on drought indices used in the 3 countries. We plan to have the contractor send the survey request to you for USAPI input, so please do participate in the survey!

F. USAPI USDM Authors: -- NO CHANGE IN STATUS

i. The OCONUS (USAPI) USDM became an operational product at the beginning of March, with authorship rotating amongst the NCEI, NDMC, USDA, & CPC authors.

ii. There are 7 USAPI USDM (OCONUS) authors: Ahira Sanchez-Lugo and myself (Richard Heim) from NCEI; Curtis Riganti, Claire Shield, and Deb Bathke from NDMC; Brad Rippey (from USDA); Anthony Artusa (from CPC).

a. Claire, Curtis, & Brad have authored besides Ahira & me.

With the June 4 map, the U.S. Virgin Islands have been added to the USDM product suite. The USDM web site (https://droughtmonitor.unl.edu/) has been revised so that two USDM products (sets of maps) are produced each week: a CONUS USDM and an OCONUS USDM. The OCONUS USDM includes the USAPI and the US Virgin Islands (dots), while the CONUS USDM is what has been done for years (50 States & Puerto Rico) (polygon shapefiles).

G. Automated Ingest of Daily Rainfall Data: -- NO CHANGE IN STATUS

i. Automated Program: I modified the automated program that ingests the USAPI station daily data to send out a master file of the current data to the authors, in case NCEI's web pages go down because of a future government shut down or for other reasons.

ii. **Updates and Fixes: I've begun to research how to address several updates to the automated data ingest system. This is a list of things I'll be doing or looking at in the weeks ahead:** ***(with travel, 2 USDM author rotations, and deadlines for writing the NCEI FY20 drought product plan and the TOR for an RFP for a North America Committee for Environmental Cooperation project, I have had no time in May to work on these)***

a. Follow up on why Jaluit, Woleai, & Kwajalein are not getting into the automated process.

Drought monitoring updates (CON'T).

1. From Chip: Kwajalein is in the Super Form in WxCoder III, but it is not in the regular station list. Question: Can Kwajalein's data be automatically transmitted daily from WxCoder III into the NOAAPort data feed? (need to find out station I.D. and other info to get it in to the NOAAPort feed)

2. Question: Regarding Jaluit and Woleai, has it been determined yet why their data are not being sent into the NOAAPort data feed? -- From the November call: Guam will check with WRCC on the station code letters for Jaluit & Woleai since that may be why they aren't getting into the NOAAPort feed (what WxCoder III is using may be different from what WRCC is looking for) – status?

b.Find out why Saipan's ASOS data are being transmitted and getting into our automated process instead of the manual gauge WxCoder III data.

c. Add new stations to the automated process (Capital Hill 1, Nimitz Hill, Palau International Airport, Mwoakilloa). I need to identify the WxCoder I.D. call sign and the COOP station numbers for these stations, then find them in our (NCEI) metadata base, then determine if they are being captured from the NOAAPort feed.

d.Follow-up with Bill Ward about good synoptic observations from the outer islands that we could be using (want to use) in this process (get into automated data ingest system and use for USAPI USDM analysis); let's (Bill and me and Chip) schedule a conference call to discuss how to get these data included.

iii. Web interface: url is:

a. https://www.ncdc.noaa.gov/temp-and-precip/drought/usapi-pcp/

b. The "All Indicators" tab is the most used tab by USDM authors:

1. https://www.ncdc.noaa.gov/temp-and-precip/drought/usapi-pcp/all

c. The "Weekly", "Monthly", and "Seasonal" tabs have data tables as well as maps plotting the values.

d. The web page is updated automatically every day by a computer program that automates the ingest and processing of the data. The program runs every morning at 10 a.m. EST; it also sends out an email every day containing daily and weekly rainfall totals for several USAPI stations.

e. Some data on the web page are color coded to indicate wet or dry conditions (weekly and monthly precipitation totals), missing days (grey), and USDM categories (monthly and seasonal rank percentiles).

f. The web page is for internal use by NWS Pacific Island personnel and USDM author personnel. It is not for public release (NCEI does not have the staff to answer questions from the public and media and other users about why there is missing data).

H. USAPI Listserv: -- NO CHANGE IN STATUS

i. NDMC (National Drought Mitigation Center) set up a listserv for communication of the USAPI USDM analyses and discussion, similar to the listservs that were set up for the Mainland and for the U.S. Virgin Islands. **We have been using this for communications, both for sending out the USAPI USDM analyses and it is also for NWS offices to report drought impacts to the authors and rest of the group.**

ii. If others want to be added to the listserv, let me (Richard Heim) or Brian Fuchs know and Brian will get them added.
There is also a DMUpdate Listserver for those who just want to know when the new USDM maps are released.

Participants:

NWS Climate Services Program Managers (CSPMs):

WSO Climate Service Focal Points (CSFPs):

Lee, Nover (Majuro)	Sanchez (Chuuk)	Wallace (Pohnpei)
(Kosrae)	Matt, Justin (Yap)	(Pago Pago)
(Palau)	(Kwajalein)	Mark/Chip/Brandon/Clint (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– 8 August 2019, 1430 HST (9 August 2019, 0030 GMT)*****