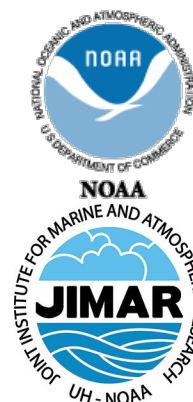




NWS Climate Services

April PEAC Audio Conference Call Summary

12 April 2018, 1430 HST (13 April 2018, 0030 GMT)



University of Hawai'i
M Ā N O A

UH/SOEST

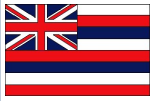


March rainfall totals reported (Joe)

% 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	March	Inches	inches	JFM
Koror	2.75	37	7.44	-4.69	20.16
Yap	12.29	270	4.56	7.73	32.37
Chuuk	10.86	131	8.32	2.54	33.57
Pohnpei	57.92	440	13.17	44.75	100.89
Kosrae	29.00	181	16.06	12.94	64.65
Kwajalein	15.55	662	2.35	13.20	34.21
Majuro	22.54	343	6.58	15.96	46.59
Guam NAS	1.40	68	2.07	-0.67	5.06
Saipan	0.93	49	1.89	-0.96	6.15
Pago Pago	6.36	60	10.68	-4.32	54.20
Lihue	9.03	349	2.59	6.44	18.62
Honolulu	2.57	325	0.79	1.78	6.75
Kahului	2.20	117	1.88	0.32	8.05
Hilo	10.93	101	10.78	0.15	41.01

Reports from around the Region



Hawaii (Rashed/Kevin)

Kauai

While not as wet as February, most of the monthly totals for March on Kauai were in the near to above average range. The U.S. Geological Survey's (USGS) gage on Mount Waialeale had the highest monthly total of 65.83 inches (174 percent of average) and the highest daily total of 15.36 inches on March 14. The 2-day total for March 13 and 14 was 21.76 inches. This 2-day total at Mount Waialeale was more than Lihue Airport's rainfall total for all of 2016 (13.39 inches) and nearly as much as the 2017 total (23.55 inches). Monthly totals from the Mount Waialeale and Omao gages were the highest March totals since 2006.

All of the gages on Kauai had rainfall totals for 2018 through the end of March in the near to above average range. Mount Waialeale had the highest year-to-date total of 142.78 inches (164 percent of average).

Oahu

Most of the March monthly rainfall totals on Oahu were in the near to above average range. The USGS' Poamoho Rain Gage No. 1 had the highest monthly total of 32.80 inches (155 percent of average) and the highest daily total of 6.68 inches on March 23. A cluster of gages along the northern half of the Koolau Range had below average totals. There were no long term March rainfall records broken on Oahu. Most locations had higher March totals in 2012 and 2014.

Rainfall totals for 2018 through the end of March were in the near to above average range at most of the gages on Oahu. There were a few gages along the leeward slopes of the Waianae Range that had near to below average totals due to lingering deficits from a very dry January. The Poamoho Rain Gage No. 1 had the highest year-to-date total of 76.99 inches (140 percent of average).

Maui

March totals from most of the gages across Maui County were in the near to below average range. The USGS' West Wailuaiki gage had the highest monthly total of 24.51 inches (85 percent of average). The highest daily total of 6.10 inches was recorded at Hana Airport during the March 14 flash flood event. Hana Airport's 13.18 inches marked the highest March total at this location since 2005.

Most of the gages across Maui County had rainfall totals for 2018 through the end of March in the near to above average range. The West Wailuaiki gage has leap-frogged Puu Kukui and now has the highest year-to-date rainfall total in Maui County with 56.67 inches (89 percent of average). Puu Kukui's 49.30 inches was only 51 percent of average.

Big Island

Big Island gages posted a wide range of conditions but most of the monthly totals were in the near average range. The highest monthly total of 29.26 inches (186 percent of average) came from the USGS' Saddle Road Quarry gage. The highest daily total was 4.65 inches on March 14 from the Papaikou Well gage.

Hilo Airport had 10.93 inches, or 81 percent of the March average. There were 24 days with measurable rainfall (greater than 0.01 inches), which was above the March average of 21 days, and there were 3 days with more than 1 inch. The last time Hilo Airport had a wet March, in 2014, there were also 24 days with measurable rain but there were 6 days with more than 1 inch which contributed to the monthly total of 18.73 inches (139 percent of average). Compared to the last couple of years, 2017 and 2016 had only 14 and 21 days of measurable rainfall, and 0 and 1 day with greater than 1 inch, respectively.

Rainfall totals for 2018 through the end of March were in the near to above average range at most of the gages in the North Hilo, South Hilo, Puna, and Kau Districts. Many of the sites in the North Kona, South Kona, and South Kohala Districts had year-to-date totals remaining in the below average range due to significant January dryness. The Saddle Road Quarry gage had the highest year-to-date total of 99.08 inches (271 percent of average).



American Samoa (Eleanor):

The 2017 annual rainfall at the WSO Pago Pago was moderately above average despite seven months of the year having below average rainfall. Very high rainfall in some of the wet months (notably May and October) more than compensated for the deficit accrued during the below-average months. Early on the morning of February 9th, very heavy flooding monsoonal rains occurred in American Samoa two days prior to the direct passage of Cyclone Gita. The month March recorded 60% of normal (% of normal and % are synonymously used throughout this call-note) rainfall. However, the island is very wet with few flash floods. Sea level stays elevated but there is no report of any inundations. Model-based PEAC's seasonal climate outlook is now indicating above-below rainfall with moderate confidence. The sea level will stay elevated over the next three months (AMJ).

Reports from around the Region (CON'T)



Kwajalein (Chip):

Kosrae is one of the wettest locations in Micronesia. At 206 inches per year, the annual rainfall at Kosrae SAWRS is roughly equivalent to that on Palikir, Pohnpei Island (204 inches per year). Only at some unusual locations, such as the summit of Pohnpei's highest mountain (Nahna Laud), are found higher values; as in the case of Nahna Laud with its incredible 330 inches per year! The month of March recorded 181% rainfall. As anticipated by PEAC and the PacIOOS wave run-up model forecasts for Kwajalein, tides have been relatively high with higher-than-normal waves, and there was some minor inundation; otherwise, the overall island climate is wet with strong trade winds. PEAC-model forecasts have trended to show above average rainfall and elevated sea level over the next 3 months, and there is no active TC warning now.



Majuro (Lee):

Majuro had good rainfall in January (204%) and February (120%), which has already helped them to keep their water reservoirs around 31 million gallons. March's rainfall (343%) continued to further improve the situation. Despite considerable rainfall for the last three months, there is still a concern of "abnormal dry" weather condition. As anticipated by PEAC and the PacIOOS wave run-up model forecasts for Majuro, tides have been high with high waves, but there was no inundation and no damage reports received from the northern islands. PEAC-model forecasts have trended average-above rainfall and elevated sea level over the next 3 months, and there is no active TC warning now.



Pohnpei (Wilfred):

Pohnpei remained sustainable without any major problems as the Island and most of the atolls of Pohnpei have lately been, "Plenty wet". However, it has become very wet now with 440% of normal rainfall in the month of March (wettest month in 66 years). It also received 219% of normal rainfall in February. The trade-winds have been strong and the sea level has been high with high waves. Overall, the month of March was very disturbing for Pohnpei. There were severe damages from heavy downpour. On March 17, there were 24 landslides/mudslides resulting in one fatality and one severely injured. There was heavy structural damage: 11 bridge/culverts were completely washed out. There were six flood statements/warnings issued during the month of March. There was also overflow of rivers that inundated roads. PEAC-model forecasts have trended average-above rainfall and elevated sea level over the next 3 months.



Damage to road in Madolenihmw



Landslides covering half the road at Madolenihmw



Flooding due to rain

Picture. 1: Pictures of landslides (top) and flooded roads (middle), and damaged roads (bottom) (Photo Credit: M/s Wilfred and Wallace, WSO, Pohnpei)

Reports from around the Region (CON'T)



Kosrae (Wilfred):

Kosrae received 181% of normal rainfall in March. After prolonged dry periods, the situation has improved in Kosrae. Currently, the island is wet. The trade-winds have been strong and the sea level has been high with high waves. There were severe reports of flooding but no severe damage has been reported, so far. PEAC forecasts have trended to show average-above rainfall for the next three months.



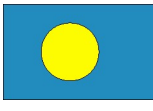
Chuuk (Sanchez):

Chuuk has had good rainfall in the last couple of months: January (99%), February (175%), and March 13%. There were larger high-tides with waves and high-surf adversaries. Some areas were flooded but didn't cause any major damage. There were no landslides or mudslides and no report of insufficient water. PEAC forecasts are favoring above-average rainfall and high sea level in the next season.



Yap (Chip):

Yap has been wet for the last couple of months. It received 270% rainfall in March. Everything looks normal in Yap—reservoirs are full and streams are flowing well. Tropical storms caused heavy rainfall in Yap. All the rain was concentrated to the west side of the State. 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. PEAC forecasts are favoring above normal rainfall and high sea level in the AMJ.



Palau (Chip):

As compared to other islands, Palau is bit drier now. It received only 37% of normal rainfall in March. Tropical storms in March jumped up to Yap and deprived Palau from any rainfall. The rainfall at Palau tracks ENSO so well that it makes a good ENSO index in its own right! During La Niña, the ONI is cold and Palau's rainfall is high. Currently, the state of ENSO is leaning towards neutral, so normal rainfall is expected in the forthcoming months. Sea level is slightly elevated. PEAC forecast still favors average-above rainfall in the next season.



Guam and CNMI (Mark, Chip):

In Guam and Saipan, dry conditions became established in November and December. The rainfall recorded in March was 68% for Guam and 49% for Saipan. While the climate model output largely indicates a wetter Guam and Saipan in JFM, both Guam and Saipan has been found to be dry during the same time period. Both Guam and Saipan are dry now! Reasons for this persistent dryness include a weak and largely absent monsoon and a lack of tropical cyclone activity. Impacts of dry conditions emerged by late December with an uptick of wildfires on Guam, and an early drawdown of potable water supplies on Saipan (e.g. the Donne Spring). Guam and the islands of the CNMI were moved into the drought categories of D0 (unusually dry) and D1 (moderate drought) on the U.S. drought monitor. PEAC forecasts are now indicating average rainfall for both Guam and Saipan over the next three months. The climate is now in a state of La Niña, and La Niña (0) correlates well with average-to-above average rainfall in Guam.



Tropical Cyclones (TC) (Mark, Rashed)

A particular characteristic of the 2017 typhoon season was a clustering of activity across the South China Sea. The westward and northward displacement of the 2017 TCs are consistent with the development of La Niña. However, early on the morning of February 9th, the only Cyclone Gita, swept past American Samoa. The new 2017–18 Southern Hemisphere cyclone season (beginning 1 July 2017), now past its mid-point, has been well below average in overall numbers (10 named storms to-date versus an average of 17). Despite the low activity, one long-lasting and very intense cyclone (Gita) meandered across the South Pacific with serious impacts occurring throughout the region from American Samoa through Tonga, Fiji and on southward to New Zealand.

Despite the lack of customary guidance, the PEAC anticipates that TC activity numbers will be at least near average during 2018. For example, the average annual number of named tropical cyclones passing within 180 n mi of either Guam, the CNMI, Yap, or Palau is four. The average yearly threat of a damaging typhoon strike on Guam is roughly 1-in-7, or 15%. This will be the PEAC forecast until such time as other available forecasts provide a diverging outlook, or the forecast of the behavior of ENSO radically changes. Eastward of Chuuk State, the risk of a tropical storm or typhoon is much lower than at locations farther to the west, except during strong or some moderate El Niño events.

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

Tide Gauge stations	Seasonal Forecasts AMJ (mean ¹) (ano)	SD of JFM (mean)	Monthly mean ¹ anomaly			Current State/ Trend	Seasonal Forecasts AMJ (max ²) (ano.)	SD of JFM (max)	Monthly max ² anomaly			
			Observed rise/fall						JFM 2018	Observed rise/fall		
			Jan/ 2018	Feb/ 2018	Mar/ 2018					Jan/ 2018	Feb/ 2018	Mar/ 2018
Marianas, Guam	+6	4.4	+8	+7.5	+8	Above/ Stable	+22	4.0	+25 (3)	+24	+23	
Malakal, Palau	+4	5.3	+3	+1.5	+6	Above/ falling	+41	5.3	+39 (3)	+39	+41	
Yap, FSM	+6	4.9	+9.5	+8.5	+7	Above/ Stable	+34	5.2	+37 (9)	+35	+35	
Chuuk, FSM***	+4	*	+6	+3.8	+5.2	Above/ falling	+34		n/a			
Pohnpei, FSM	+5	3.6	+10	+8.5	+6.2	Above/ Stable	+36	3.5	**	**	+34 (4)	
Kapingamarangi	+7	**	**	+9	+7.5	Above/ Stable		**	+38	+38	+29	
Majuro, RMI	+5	2.4	+10.5	+8.8	+5	Above/ Stable	+45	2.7	**	**	+45 (5)	
Kwajalein, RMI	+5	3.1	+9	+7	+4.4	Above/ Stable	+44	3.4	+47 (10)	+47	+46	
Pago Pago*	+8 (+2)	3.3	+11.5 [+6.5]	+10.5 [+5.5]	+10.5 [+5.5]	Above/ Stable	+32 (+27)	3.8	+38(5) [33]	+38	+34	
Honolulu	+3	1.6	+4.7	+3	+2	Above/ Stable	+23	2.4	+27 (7)	+25	+18	
Hilo	+2	2.0	+3.5	+4	+1	Above/ Stable	+26	3.0	+31 (8)	+29	+21	

+/- 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: Weak La Niña conditions continued in the tropical Pacific, but trends in low-level winds and in sub-surface ocean temperatures indicate that the event is coming to an end. However, the lingering impact of la Niña will still be present for some time higher-than-normal sea level is expected—currently all north Pacific stations are 5-8 inches above normal. Hawaii sea levels returned to normal after many months of being elevated.

Forecasts for AMJ: PEAC-CCA Statistical model is predicting 4-7 inches above normal sea levels with reasonably high skill for the whole USAPI region.

Complementary to PEAC forecasts, some dynamical models are also predicted high sea levels (see <https://uhsic.soest.hawaii.edu/sea-level-forecasts/>). These models suggest an increase in sea levels (likely exceeding 15 cm above-normal for Majuro, Pohnpei, and Chuuk during the next four to six months). The rise seems related to oceanic Rossby waves.

5. Current State of ENSO and predictions: (Rashed) **ENSO Alert System Status: La Niña Advisory**

Synopsis: La Niña is expected to transition to ENSO-neutral during April-May, with ENSO-neutral then likely (greater than 50% chance) to continue through the Northern Hemisphere summer 2018.

During March 2018, La Niña continued to weaken, but was still reflected by below-average sea surface temperatures (SSTs) across the east-central and eastern equatorial Pacific Ocean. The latest weekly index values were -0.5°C and -0.3°C in the Niño-3.4 and Niño-3 regions, respectively, -1.1°C in the Niño1+2 region, and near zero in the Niño.4 region. While negative anomalies were weakening near the surface, the sub-surface temperature anomalies (averaged across 180° - 100°W) warmed due to the eastward propagation of a downwelling equatorial oceanic Kelvin wave. Convection was suppressed near and east of the Date Line and enhanced over the far western tropical Pacific Ocean. Low-level wind anomalies were easterly over the east-central Pacific, and westerly over the far western Pacific. At upper-levels, winds were anomalously westerly over the eastern Pacific. Overall, the ocean and atmosphere system remained consistent with a weak La Niña.

Most models in the IRI/CPC plume predict La Niña will decay and return to ENSO-neutral during the current March-May season. The fore-caster consensus similarly favors a transition to neutral, with a continuation of ENSO-neutral conditions through the summer 2018. Thereafter, there is considerable forecast uncertainty, in part due to the lower prediction skill for forecasts made at this time of year. In summary, La Niña is expected to transition to ENSO-neutral during April-May, with ENSO-neutral then likely (greater than 50% chance) to continue through the Northern Hemisphere summer 2018.

In summary:

- **La Niña conditions that developed in late 2017 have continued into the first quarter of 2018, although during February many key atmospheric patterns have weakened to neutral levels and the sub-surface sea temperature has also returned to neutral;**
- **Model predictions and expert opinion indicate that La Niña conditions are 75-80% likely to return to neutral during the second quarter of 2018;**
 - **Recent trends of atmospheric and Oceanic patterns indicate that the event is coming to an end;**

While some models predict the development of weak El Niño later in 2018, the uncertainty of long-lead forecasts made at this time of year is large, and the probability of El Niño development is considered at no more than 40% at this time, while continuing neutral conditions is seen as being more likely.

6. Rainfall Outlooks for AMJ (Joe)

The verification result of JMF rainfall forecasts found 9 hits and 5 misses (Heidke score: 0.3417). The stations that hit the forecasts were: Chuuk, Pohnpei, Kosrae, Majuro, Pago Pago, Lihue, Honolulu, Kahului, and Hilo. The 4 missed stations were Koror, Yap, Kwajalein, Guam and Saipan.

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

Note

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

7. Drought monitoring updates (Richard Heim).

A. End-of-March Monthly Drought Assessment:

- i. With WxCoder III data, we have 23 stations in the monthly analysis.
- ii. March was dry (less than the monthly minimum required to meet most water needs) in the Marianas (all stations), American Samoa (Pago Pago), Republic of Palau (Koror), and 5 stations in the FSM (Ulithi, Woleai, Fananu, Lukonor, & Nukuoro); it was wet elsewhere in the FSM and in the RMI. The March monthly analysis (March 31) is consistent with the weekly analyses for March 27 & April 3. Compared to the end-of-February analysis, drought conditions at the end of March showed improvement in the northern Marshalls and worse conditions in the Marianas and parts of the FSM compared to the end of February:
 - a. D1-S continued at Rota.
 - b. D1-S worsened to D2-S at Guam & Saipan.
 - c. D-Nothing (no drought or abnormal dryness) worsened to D0-S at Fananu, Ulithi, and Woleai.
 - d. D1-SL improved to D0-L at Utirik & Wotje.
 - e. Pingelap was missing 19 days in March so could not be analyzed.
 - f. All other stations continued at a D-Nothing classification.

B. Current (Weekly) Drought Conditions: The discussion above is the monthly (end of March) analysis. The latest weekly USAPI USDM assessment may show different USDM classifications. The latest weekly USAPI USDM assessment is for April 10 and shows D1-S at Guam and Saipan, and has Nukuoro and Kapingamarangi missing, but otherwise is the same as the end of March depiction.

C. May NADM Forum Workshop: I will be in Canada the first week in May attending, helping run, and presenting talks at the North American Drought Monitor Forum Workshop, and will not be able to prepare the May 1, 2018 USAPI USDM that week.

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

The web page url is:

- a. <https://www.ncdc.noaa.gov/sotc/drought/201803#det-reg-pacis-usapi>
- b. <https://www.ncdc.noaa.gov/sotc/synoptic/201803>

E. 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: The computer program, that automates the ingest and processing of the data, is running every morning at 10 a.m. EST; I'm in the process of doing routine checking of the output.**

F. Weekly USAPI Drought Assessment:

- i. I assessed drought conditions for each week from December 9, 2014 through April 10, 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).
- v. 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: Northern Marshalls' catchments typically will last 2 weeks if no rain falls. Clint/Chip were thinking of issuing a revised drought statement for Marianas and northern Marshalls. I may go back to D1-SL for Utirik and Wotje if little rain falls the next 2 or 3 weeks. **Koror doesn't feel they are in a drought, but could go D0-S (some water supply problems) – I will go D0-S next week for Koror unless heavy rain falls.** Chip/Clint: Wait until next week to re-assess and if things look good they will drop the drought statement. **A spring on Saipan went dry in March – bad impact; spring still dry now (grass is a little green, but spring still dry) – enough to make me go back to D2-S on Saipan.** Need to get Kwajalein and Pago Pago added to WxCoder III. Elinor & Chip working on getting Pago Pago in WxCoder III.

Participants:

NWS Climate Services Program Managers (CSPMs): Joe Brinkley

WSO Climate Service Focal Points (CSFPs):

Lee, Nover, Sampson (Majuro)
Wilfred(Kosrae)
(Palau)

Sanchez (Chuuk)
(Yap)
(Kwajalein)

Wilfred (Pohnpei)
Eleanor, Jane, Danny (Pago Pago)
Mark/Chip/Clint (Guam & CNMI)

PEAC Principal Research Scientist: Rashed Chowdhury

WERI Scientist: Mark Lander

CPC Forecaster: Matthew

WFO Guam : Chip Guard, Clint Simpson

NWS MIC, Honolulu: Christopher Brenchley

NCEI: Richard Heim

Pacific RISA: Krista Jaspers

NWS Hydrologist: Kevin Kodama

Additional Attendees: John Marra

***** Next Call– 10 May 2018, 1430 HST (11 May 2018, 0030 GMT)*****