NWS Climate Services

January PEAC Audio Conference Call Summary

10 January, 1430 HST (11 January 2019, 0030 GMT)

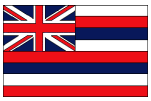
December rainfall totals reported (Joe)

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

*** Denotes missing data

	Rainfall	% Norm	Median	Departure	3 Month Total
	Inches	December	Inches	inches	OND
Koror	11.48	89	12.83	-1.35	41.52
Yap	10.68	125	8.51	2.17	28.27
Chuuk	8.53	76	11.25	-2.72	34.21
Pohnpei	16.13	100	16.08	0.05	42.41
Kosrae	7.50	47	16.11	-8.61	19.71
Kwajalein	6.58	99	6.66	-0.08	25.75
Majuro	12.71	112	11.39	1.32	30.53
Guam NAS	7.75	152	5.11	2.64	21.13
Saipan	2.20	57	3.85	-1.65	18.76
Pago Pago	22.59	176	12.84	9.75	46.32
Lihue	4.04	127	3.17	0.87	12.79
Honolulu	0.60	45	1.32	-0.72	5.25
Kahului	0.54	20	2.66	-2.12	3.79
Hilo	9.97	97	10.24	-0.27	39.65

Reports from around the Region



Hawaii (Kevin)

Kauai

Most of the windward and upslope rainfall totals were near to above average for the month of December. The U.S. Geological Survey's (USGS) gage on Mount Waialeale had the highest monthly total of 34.62 inches (115 percent of average) and the highest daily total of 6.55 inches on December 25. Leeward monthly totals were mostly below average with most amounts at less than 50 percent of average.

Kauai rainfall totals were above average for 2018 at most of the gages across the island. The highest annual total was 519.10 inches (132 percent of average) at Mount Waialeale, which also marked the wettest year at this location since 1990. This substantial 2018 total also resulted in one of the few times in recent years that the running 30-year average for annual rainfall did not decrease. In 1997, the 30-year average annual rainfall at Mount Waialeale was 406.03 inches. By 2017, it had decreased to 362.37 inches before rising a bit to 365.78 inches in 2018.

Oahu

Near to above average December rainfall occurred at most of the gages along the Koolau Range. However, most of the gages on the Waianae Range had near to below average totals. The USGS' Poamoho Rain Gage No. 1 had the highest monthly total of 19.45 inches (96 percent of average). The highest daily total of 6.86 inches came from the Luluku rain gage during the windward Koolau flash flood event on December 28.

Oahu rainfall totals for 2018 ended up in the near to above average range at many of the gages. The main exceptions were along the leeward slopes of the Waianae Range where 2018 totals ended up mostly near to below average. The highest annual total was 247.74 inches (109 percent of average) at the Poamoho Rain Gage No. 1.

Maui

December rainfall totals were mostly below average across Maui County. The exceptions were along the windward slopes of Maui and Molokai, including the USGS' rain gage at West Wailuaiki Stream which had the highest monthly total of 31.01 inches (190 percent of average). This gage also had the highest daily total of 7.00 inches on December 19 associated with the passage of a weak cold front. Many of the leeward Maui totals were below 20 percent of the December average.

Most of Maui County finished 2018 with near to above average annual rainfall totals. The rain gage at West Wailuaiki Stream had the highest annual total of 350.05 inches (155 percent of average). The USGS' gage on Puu Kukui had its highest annual total (318.16 inches, 87 percent of average) since 2005.

Big Island

Windward gages turned in mostly near to above average December rainfall totals. However, the rest of the Big Island had mostly below average monthly totals with several sites in the Kau District and the Pohakuloa region of the island at less than 10 percent of average. The USGS' rain gage at Kawainui Stream had the highest monthly total of 30.63 inches (228 percent of average) and the highest daily total of 5.82 inches on December 19. The Pahala gage tied its record for the driest December (0.18 inches, 3 percent of average), and the Pali 2 rain gage had its lowest December total since 2005.

Rainfall totals for 2018 ended up in above average territory at most of the gages on the Big Island. The USGS' Saddle Road Quarry gage had the highest annual total of 364.79 inches (259 percent of average). Hilo Airport (174.97 inches, 138 percent of average) ended up with its third wettest year on record (data going back to 1949). The record annual total for Hilo Airport is 211.22 inches in 1990, followed by 182.81 inches in 1994.

American Samoa (Chip):

American Samoa (AS) is influenced by Tropical Wet climate. The month of December received 176% of normal (% of normal and % are synonymously used throughout this call-note) rainfall. Trades are picking up as SPCZ is active over American Samoa! There is no report of any significant damage, but sea level stays elevated. Model-based PEAC's seasonal climate outlook is now indicating above-average rainfall for JFM with moderate confidence. Currently the sea level is staying above but stable. Forecasts indicate that it will stay elevated over the next three months. A pulse of MJO may push across the tropical Pacific as we head into January. This may be associated with an enhanced risk for tropical cyclone activity.

Kwajalein (Jason):

The weather in Kwajalein is bit dry now. The month of December recorded 99% of normal rainfall. There are some high waves, but no inundations reported so far. Current model projections show most of the precipitation staying to the north or southwest. Winds during this period will be gentle and generally easterly. Cloud coverage will be moderate due to the shower activity surrounding the atoll. The sea level currently stays marginally above normal. PEAC-model forecasts have trended to show average-below rainfall and near normal sea level over the next 3 months, and there is no active TC warning now.

(Also see https://www.rts-wx.com/forecasts-kwajalein-atoll-forecast)

Reports from around the Region (CON'T)

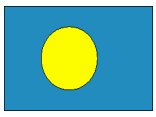
Majuro (Nover):
The recent rainfall (67%, 69%, and 112% in October, November, and December) has made Majuro a bit dry. Rainfall is consistently low for the last three months. Current water reserves are at about 80% capacity, which is okay as compared to the maximum capacity of 36 million gallons. However, this is still manageable without any major water crisis. Rainfall in Jaluit atolls has been pretty low for the last couple of months. PEAC-model forecasts have trended average-below rainfall and slightly elevated sea level over the next 3 months, and there is no active TC warning now.

Pohnpei (Chip):
Pohnpei recorded 100% of normal rainfall in December. However, the streamflow is less than normal. The southern part of the State has been wet, while the eastern part of the State has been drier than normal. There has been some high surf, but no inundation reported so far. The outer islands are wet. Winter is picking-up. PEAC-model forecasts have trended average rainfall and slightly elevated sea level over the next 3 months.

Kosrae (Chip, Brandon):
Kosrae is dry now. It only recorded 34%, 58%, and 47% of normal rainfall in October, November, and December. The overall climate looks like post El Niño type. PEAC-model forecasts have trended average-below rainfall and slightly elevated sea level over the next 3 months. The PEAC is now leaning toward an expectation of a higher than average risk of TC impacts for Kosrae (high waves, heavy rainfall and rough seas) in the fall months (JFM).

Chuuk (Sanchez, Joe):
Chuuk recorded 76% of normal rainfall in December. Despite the below average rainfall, the island is enjoying normal conditions now with no report of water shortages. Trade winds have already started to pick up. There were some surf adversaries and mudslides during the month. PEAC forecasts indicate average-below rainfall for the island state for the next three months. While there is no operational tide gauge now sited at Chuuk, based on virtual satellite data, it is seen that the mean sea level throughout Chuuk State has been falling over the past few months, but it recorded a sharp rise (5 inches above normal) in December.

Yap (Chip):
Yap is actually out of its monsoon season. However, the equatorial westerly flow in combination with the strong trade winds has created a temporary monsoon trough that is affecting Yap State. Yap received 136% and 125% of normal rainfall in November and December. PEAC forecasts are favoring average-below rainfall and below normal sea level in the next three months.



Palau (Chip):
Palau is actually out of its monsoon season. However, the equatorial westerly flow in combination with the easterly trade winds has created a temporary monsoon trough that is affecting Palau. Palau is heading into the drier months of the year from January to April; various seasonal forecasts are showing a generally drier trend and looking more like a post-(weak) 2018 El Nino drying. PEAC forecast favors average-below rainfall and below normal sea level in the next season.

Guam and CNMI (Chip & Clint):
The summer monsoon became well established in the western North Pacific Basin, and after a wet month Guam and Saipan are now starting to dry out. The 152% and 57% of rainfall in December in Guam and Saipan have further the illustrated the dryness in Saipan. However, these two islands are still doing okay without any major water problems. PEAC forecasts are now indicating below rainfall for both Guam and Saipan over the next three months and slightly below normal sea level.

Tropical Cyclones (Chip)
Micronesia has moved out of its tropical cyclone season and risks are greatly reduced, while American Samoa is moving into the beginning of its tropical cyclone season. There is a slight increase in the risk that some tropical cyclones could develop east of the date line and could affect American Samoa.

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

Tide Gauge stations	Seasonal Forecasts JFM (mean[1]) (ano)	SD of OND (mean)	Monthly mean[1] anomaly — Observed rise/fall			Current State/ Trend	Seasonal Fore-casts JFM (max[2]) (ano.)	SD of OND (max)	Monthly max[2] anomaly — Observed rise/fall		
			Oct/ 2018	Nov/ 2018	Dec/ 2018	OND 2018			Oct/ 2018	Nov/ 2018	Dec/ 2018
Marianas, Guam	-2	**4.1**	**-1.8**	**-2**	**-1**	Normal	+18	**3.6**	**+15**	**+15**	**+13**
Malakal, Palau	-4	**4.3**	-4.2	-6	-4	**Below**	+37	**4.4**	+31	+30	+35
Yap, FSM	-2	**4.6**	-2.5	-3	-3	Below	+29	**5.1**	+24	+24	+25
Chuuk, FSM***	-1	**	-1	-1	+5	Normal	+28	**			
Pohnpei, FSM	+2	**4.7**	**+3.3**	**+2**	**+2**	Normal	+33	**4.9**	**+31**	**+30**	**+31**
Kapingamarangi	+2		**	**	**		+45		**+39**	**	**
Majuro, RMI	+2	**3.5**	**+5.5**	**+3.2**	**+4.2**	**Above**	+41	**3.7**	+43	+43	+45
Kwajalein, RMI	+1	**3.6**	**+3.3**	**+1.2**	**+1**	Normal	+25	**3.8**	**+38**	**+37**	**+39**
Pago Pago*	+6	**3.1**	+5 [+10]	+5 [+10]	+7 [+12]	**Above**	+30)	**3.3**	**+28**	**+27**	**+37**
Honolulu	+2	**1.7**	+3	+1.2	+1	Normal	+20	**2.5**	**+19**	**+20**	**+23**
Hilo	+2	**1.8**	**+5**	**+1.5**	**+1**	Normal	+24	**2.2**	**+25**	**+22**	**+27**

+/- 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: D*ifference 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: Consistent with the **Warm Pool El Niño (WPE)**, all of the north Pacific stations stayed near normal in the month of December. Some of the stations **recorded slight rise too**. Hawaii and Hilo's sea levels are also staying near normal too. Note that the south Pacific station (i.e., Pago Pago) is elevated (+5). This station maintains 4-6 months' time-lag w.r.t north Pacific stations (i.e., Guam and the Marshalls).

The recent variability of sea level may be explained as WP El Niño, the positive sea level anomaly is located over the central Pacific. In this regard, the sea level anomaly in the tropical central Pacific may not efficiently produce a warm SST anomaly. Furthermore, anomalous easterlies over the tropical eastern Pacific induce shoaling of the thermocline and play a role of cooling, rather than warming, over the tropical eastern Pacific. In addition, there are anomalous easterlies over the eastern Pacific; as a result, the sea level anomaly is small over the eastern Pacific, indicating that the thermocline there does not support SST warming.

Impacts: While the MSL is near normal, t*ides are sometimes high with waves. However, there is no noticeable inundation in low-lying atolls and there is no report for damage, so far.*

Forecasts for JFM: PEAC-CCA Statistical model is predicting **normal to marginally** below-normal sea level for the north Pacific islands. Micronesia and RMI's stations are likely to stay slightly higher than normal. In Hawaii, both Honolulu and Hilo are likely to be near normal.

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

(10 January 2019)

Synopsis: El Niño is expected to form and continue through the Northern Hemisphere spring 2019 (~65% chance).

ENSO-neutral continued during December 2018, despite widespread above-average sea surface temperatures (SSTs) across the equatorial Pacific Ocean (Fig. 1). In the last couple of weeks, all four Niño indices decreased, with the latest weekly values at +0.2°C in the Niño-1+2 region and near +0.7°C in the other regions. Positive subsurface temperature anomalies (averaged across 180°-100°W) also weakened, but above-average temperatures continued at depth across most of the equatorial Pacific Ocean. The atmospheric anomalies largely reflected intra-seasonal variability related to the Madden-Julian Oscillation, and have not yet shown a clear coupling to the above-average ocean temperatures. Equatorial convection was generally enhanced west of the Date Line and suppressed east of the Date Line, while anomalies were weak or near average over Indonesia. Low-level winds were near average, while upper-level wind anomalies were westerly over the eastern Pacific. The traditional Southern Oscillation index was positive, while the equatorial Southern Oscillation index was slightly negative. Despite the above-average ocean temperatures across the equatorial Pacific Ocean, the overall coupled ocean-atmosphere system continued to reflect ENSO-neutral.

The majority of models in the IRI/CPC plume predict a Niño3.4 index of +0.5°C or greater to continue through at least the Northern Hemisphere spring 2019. Regardless of the above-average SSTs, the atmospheric circulation over the tropical Pacific has not yet shown clear evidence of coupling to the ocean. The late winter and early spring tend to be the most favorable months for coupling, so forecasters still believe weak El Niño conditions will emerge shortly. However, given the timing and that a weak event is favored, significant global impacts are not anticipated during the remainder of winter, even if conditions were to form. In summary, El Niño is expected to form and continue through the Northern Hemisphere spring 2019.

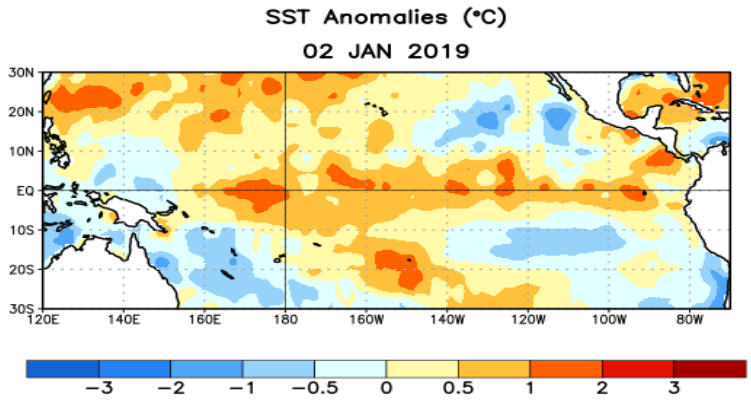


Figure 1. Average sea surface temperature (SST) anomalies (°C) for the week centered on 2 January 2019. Anomalies are computed with respect to the 1981-2010 base period weekly means.

NIWA's ENSO Watch is provided below:

El Nino-Southern Oscillation Watch

Current ENSO

Current situation

The equatorial Pacific Ocean remains warmer than normal and exceeds the conventional El Niño thresholds.

However, the atmosphere has not caught up with the ocean.

The Southern Oscillation Index (SOI) was on the La Niña side of neutral in December 2018.

Alert

Forecast situation

96% chance for El Niño conditions during January-March 2019.

85% chance for El Niño conditions during April-June 2019

Source: NIWA Island Climate Update:

January 2019

6. Rainfall Outlooks for JFM (Joe)

The verification result of **OND** rainfall forecasts was 5 hits and 9 misses (Heidke score: 0.2334). The stations that hit the forecasts were: Koror Yap, Chuuk, Lihue, and Honolulu,. Kahului. The 9 missed stations were Pohnpei, Kosrae, Kwajalein, Majuro, Guam, Saipan, Pago Pago, Kahului, and Hilo. PEAC forecasts are based on six GCMs and two statistical models.

OND Verification Location	Rainfall Outlook	Final Probs	3 mo Verification		
			% norm	Total (in)	Tercile
Palau					
Koror 7º 22' N, 134º 32' E	Avg-below	**35:35:30**	105	41.52	**Avg.**
FSM					
Yap 9º 29' N, 138º 05' E	Avg.	**30:40:30**	96	28.27	**Avg.**
Chuuk 7º 28'N, 151º 51'E	Avg.	**30:40:30**	103	34.21	**Avg.**
Pohnpei 6º 59'N, 158º 12'E	Avg-above	**30:35:35**	92	42.41	**Below**
Kosrae 5º 21'N, 162º 57'E	Avg-above	**30:35:35**	**48**	19.71	**Below**
RMI					
Kwajalein 8º 43'N, 167º 44'E	Avg-above	**30:35:35**	88	25.75	**Below**
Majuro 7º 04' N, 171º 17'E	Avg-above	**30:35:35**	81	30.53	**Below**
Guam and CNMI					
Guam 13º 29'N, 144º 48' E	Avg.	**30:40:30**	88	21.13	**Below**
Saipan 15º 06'N, 145º 48' E	Avg.	**30:40:30**	93	18.76	**Below**
American Samoa					
Pago Pago 14º 20'S, 170º 43'W	Avg.	**30:40:30**	**144**	46.32	**Above**
State of Hawaii					
19.7º - 21.0' N, 155.0º - 159.5' W					
Lihue	Avg-above	**30:35:35**	128	12.79	**Avg.**
Honolulu	Avg-above	**30:35:35**	133	5.25	**Avg.**
Kahului	**Above**	**25:30:45**	75	3.79	**Below**
Hilo	**Above**	**25:30:45**	131	39.65	**Avg.**

	Hit
	Miss
Heidke:	**0.2334**
RPSS:	**-0.0430**

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

	Koror	Yap	Chuuk	Pohnpei	Guam	Saipan	Majuro	Kwaj
below (<)								
33.33%	35.926	27.44	30.88	43.58	24.01	20.13	35.14	29.07
near								
66.66%	44.8385	32.32	38.67	49.78	29.41	23.26	41.82	31.88
above (>)								

Lihue	Honolulu	Kahului	Hilo	Pago Pago	Kosrae
9.18	4.36	4.18	28.26	31.15	39.86
15.56	8.52	8.05	41.99	41.56	44.83

Rainfall in inches

6. Rainfall Outlooks for JFM (Con't)

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

Note:

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

Participants:

NWS Climate Services Program Managers (CSPMs): Joe Brinkley

WSO Climate Service Focal Points (CSFPs):

Nover (Majuro)	Sanchez, Joe (Chuuk)	(Pohnpei)
(Kosrae)	(Yap)	(Pago Pago)
(Palau)	Jason (Kwajalein)	Chip/Clint/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: Bill Ward

Additionanl note:

The PEAC Center is currently in the process of transitioning over to NWS. This transition will be completed in June 2019. This means the PEAC Center itself will no longer be in operation as "PEAC." The monthly conference calls will continue (led by WFO Guam, WFO HFO and the NOAA Corp Officer) as well as monthly forecast. At the next call we will discuss more about the transition. Please let me know if you have any questions or concerns.

***** Next Call– 14 February 2019, 1430 HST (15 February 2019, 0030 GMT)*****