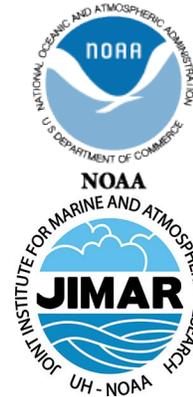




NWS Climate Services

January PEAC Audio Conference Call Summary

9 January, 1430 HST (10 January 2020, 0030 GMT)



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



December rainfall totals reported (Sony)
 % Normal: **blue** above normal & **red** below normal. Departure from normal: **blue**-above & **red**-below

	Rainfall	% Normal	Normal	Departure	3 mon
	Inches	December	Inches	inches	OND
Koror	9.86	88	11.16	-1.30	35.09
Yap	9.89	116	8.51	1.38	27.73
Chuuk	19.91	177	11.25	8.66	34.72
Pohnpei	21.17	132	16.08	5.09	67.09
Kosrae	10.06	62	16.11	-6.05	34.30
Kwajalein	6.62	99	6.66	-0.04	29.67
Majuro	13.03	114	11.39	1.64	42.81
Guam NAS	1.46	29	5.11	-3.65	27.81
Saipan	3.64	95	3.85	-0.21	28.62
Pago Pago	17.93	140	12.84	5.09	35.12
Lihue	7.02	221	3.17	1.05	14.67
Honolulu	1.69	128	1.32	0.37	5.42
Kahului	2.20	83	2.66	-0.46	2.62
Hilo	11.19	109	10.24	0.95	35.27

Reports from around the Region

Hawaii (Kevin) Large scale weather conditions during December 2019 included a higher than average frequency of trade winds across the main Hawaiian Islands. Normally, about half of the days in December involve trade winds blowing over the state. However, in December 2019, trade winds occurred during more than 75 percent of the month. This prevalence of trade winds was due to anomalously strong high pressure systems far to the north of the state. Showers embedded within the trades occurred along the north through east facing slopes of the island chain, with measureable amounts of rainfall occurring almost every day. On December 20, the remnant of a cold front cloud band embedded within the trade winds deposited 1 to 3 inches of rain over the windward slopes of Kauai. The cloud band affected the rest of the state the following day, with 8 to 10 inches of rainfall recorded along the windward slopes of Maui, and 1 to 3 inches on the windward slopes of the Big Island. The higher rainfall totals were in remote areas and there were no reported flooding problems during this event.

The most significant rain event of the month took place on Christmas Eve and Christmas Day when a cold front with significant upper level support moved across the state. Kauai was hardest hit by the weather system, which included significant flooding in several areas of the island and many reports of wind damage from the strong and gusty southerlies. Rainfall totals on Kauai were 5 to 9 inches in several spots across the island, and a peak 2-day total of just over 22 inches from the U.S. Geological Survey's (USGS) gage on Mount Waialeale. As would be expected from this amount of rainfall, the Hanalei River overflowed its banks and closed Kuhio Highway near the Hanalei Bridge for several hours on Christmas Day. Flood damage to a historic theater was reported in Waimea town, and the footbridge crossing the Hanapepe River was damaged by debris. The Kauai Emergency Management Agency reported rescues in Hanapepe and Keapana. The frontal rain band subsequently swept across Oahu and Maui County before dissipating near the Big Island. Storm total rainfall amounts were 1 to 5 inches on Oahu, 1 to 2 inches in Maui County, and mainly less than an inch on the Big Island. The lower rainfall amounts east of Kauai can be attributed to decreasing upper level support as the system progressed eastward. The remnant frontal cloud band recirculated back to the Big Island on December 27 and 28 and produced 1 to 3 inches along the windward slopes, but there were no reports of significant flooding problems.

Island of Kauai : December was Kauai's wettest month for 2019, and was the second rainiest December of the decade. The USGS' gage on Mount Waialeale had the highest monthly total of 64.13 inches (213 percent of average), which registered as the highest December total at this site since 1987. Not surprisingly, Mount Waialeale also had Kauai's highest daily total of 13.86 inches on December 24, which was part of a 2-day storm total of 22.04 inches mentioned previously.

Kauai finished 2019 with most locations having near to above average annual rainfall totals. Mount Waialeale had the highest annual total of 347.70 inches (88 percent of average). However, this site's 30-year running average resumed its long term decline following a slight uptick in the average in 2018. The average for the 30-year period from 1968 through 1997 was 406.03 inches. In contrast, the 30-year period from 1990 through 2019 had an average annual total of 361.80 inches.

Island of Oahu: For the month of December, rainfall totals from sites along the slopes of the Koolau Range were near to above average, while totals from sites along the Waianae Range were mostly near to below average. The USGS' Poamoho Rain Gage No. 1 had the highest monthly total of 17.79 inches (88 percent of average). The highest daily total came from a lower elevation gage at the Poamoho Experiment Farm, which recorded 4.56 inches on Christmas Day associated with the passage of the previously mentioned cold front. Several of the gages along the slopes of the Koolau Range had their second highest December totals of the decade.

Most of the rain gages on Oahu finished 2019 with near average rainfall totals. The Manoa Lyon Arboretum gage had the highest annual total of 134.86 inches (89 percent of average).

Maui County: Windward areas of Maui County had near to above average rainfall totals for the month of December. All other areas of the county had below average totals. The USGS' rain gage at West Wailuaiki Stream had the highest monthly total of 28.24 inches (173 percent of average), and the highest daily total of 9.96 inches on December 21.

Annual rainfall totals for 2019 were near average at most of the gages in Maui County. The West Wailuaiki gage had the highest annual total of 220.15 inches (98 percent of average). Puu Kukui's 203.30 inches was second highest in the county, but this was only 56 percent of its annual average.

Island of Hawaii: Rainfall totals for December were near to above average along the windward and Kona slopes, but below average in portions of the Kau District and in the interior sections of the island. The USGS' rain gage at Kawainui Stream had the highest monthly total of 16.37 inches (122 percent of average) and the highest daily total of 4.43 inches on December 21. Honokaa was right behind with 4.42 inches on the same day.

Big Island rainfall totals for 2019 were mostly near to above average. The USGS' Saddle Road Quarry rain gage had the highest annual total of 171.29 inches (122 percent of average). The gages at Kealakekua and Honaunau had their highest annual totals in data records going back to 1993.

American Samoa: (Hans)

Day before Christmas, flash flood event that resulted in debris on road and land slide incident. Two tropical disturbances occurred in the previous month resulting on strong winds and high surf.

During this drought week, Pago Pago, Tutuila had a total of 7.27 inches of rain, with neighboring stations reporting 2.29 (Siufaga Ridge) and 3.19 (Toa Ridge) inches of rain. The monthly rainfall total for Pago Pago, as of January 28, was 20.89 inches, which is five times the monthly threshold of 4 inches to meet most water needs. Drought development was not a concern for Tutuila this week.

Kwajalein: (Jason)

November events included high tides with inundation with the coastal roads. In December, most of the precipitation came from 4 day events (Dec. 6, 15, 28, 29). In early January, currently have 1.53 inches which is above normal for about first 9 days of the month but expecting a drier period for the rest of the month. Southern island is displaying greener conditions than the north side of the island.

Majuro: (Nover)

First week of December, Majuro received about 4.39 inches of rain. Later end of the month displayed lower precipitation levels. Water level for reservoirs are currently around 30 million gallons and slowly declining with less precipitation. Majuro received some alerts for flood but no events took place. Last inundation took place in November. Vegetation on island is in good condition.

Pohnpei: (Eden)

Pohnpei received about 21.17 inches of rain which was above normal. Pohnpei had less than their 2-inch weekly threshold to meet most water needs. However, they all remained in drought free conditions as they received close to or slightly surpassed the threshold of 8 inches of rain for the month to meet most water needs. No inundation reports. December is a festive month for Pohnpei and the great weather was in great favor.

Kosrae: (Eden)

Kosrae received below normal rainfall for December. Kosrae, Nukuoro, Pingelap were the only stations with over 3 inches of rain for the week. Nukuoro had the highest rainfall total at 6.04 inches, resulting in 15.67 inches for the month so far. All three stations continued to be in drought free conditions as their monthly totals were close to or above the monthly threshold of 8 inches. December is a festive month for Kosrae and the great weather was in great favor.

Chuuk: (Joe)

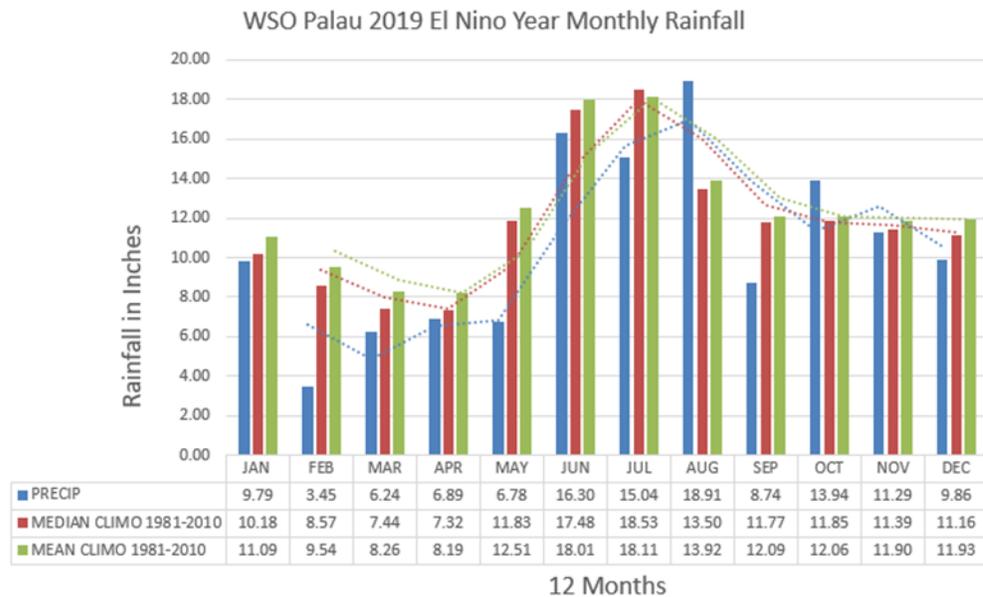
19.91 inches of rain for the month of December and was a good amount for the island. Chuuk Lagoon had less than their 2-inch weekly threshold to meet most water needs. However, they all remained in drought free conditions as they received close to or slightly surpassed the threshold of 8 inches of rain for the month to meet most water needs. Some high surf events took place on the 17, 25, and 28th. No inundation events took place.

Yap: (Justin)

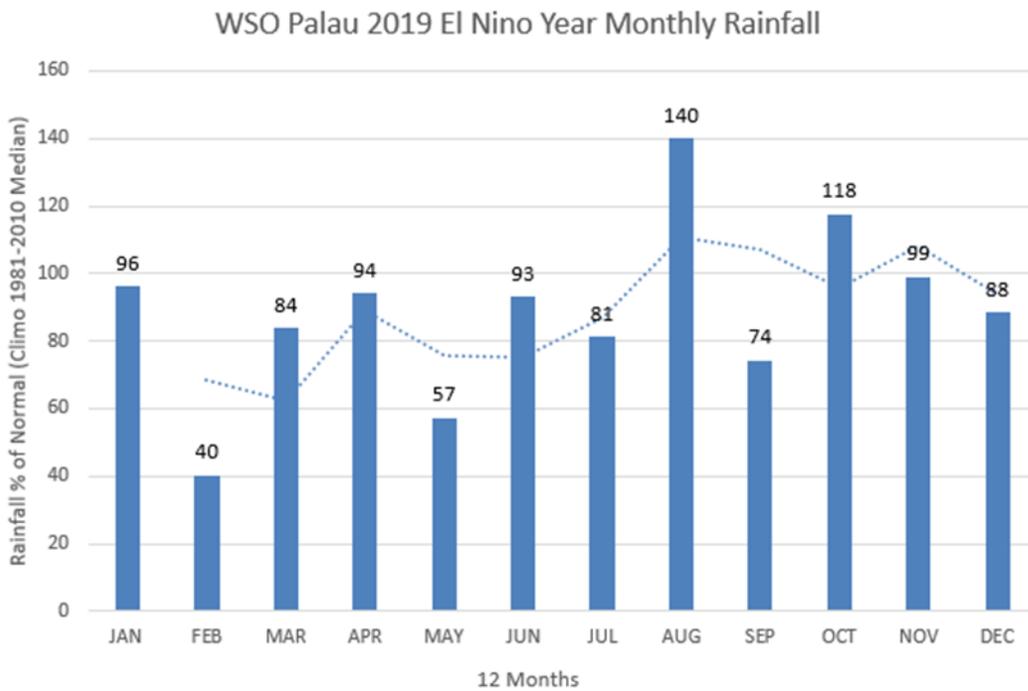
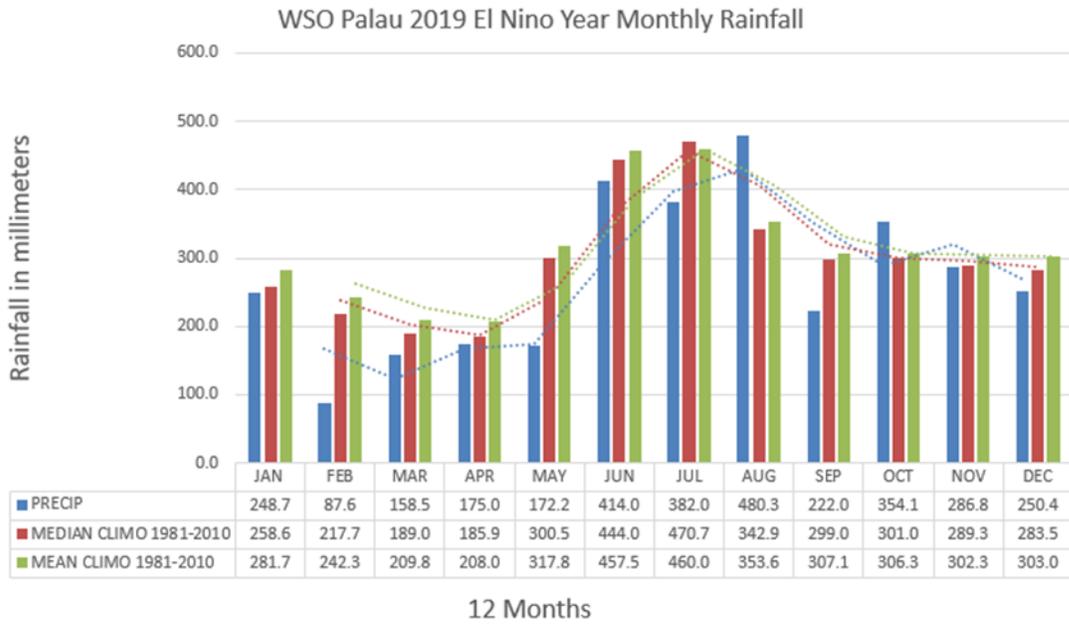
Large rainfall event took place Dec 22 with 4.4 inches of rain from the tropical disturbance. Yap's and Lukunoch preliminary monthly totals of 1.45 and 1.23 inches of rain, respectively, were the second driest January on record. For Yap, only January 1983 was drier with a rainfall total of 1.25 inches, while January 1998 was drier for Lukunoch at 0.31 inch. Reservoir is still maintain the healthy levels.

Palau: (Kiku) A late monsoon season trough found south Palau provided nearly 4 inches (101.6mm) of rain for the first week of December. Thereafter, the Trade-winds dominated the weather for Palau for the rest of the month. The Trades were moist, wet and fresh to strong for the second and third week of December doubling rainfall totals and warranting Regional and Local Advisories for the Palau. The last week of 2019 the trades became drier and December rainfall totals fell below the Norm, coming in at 88%. No hazards to report in terms of wind and rain. The only impact due to strong trades and hazardous seas were the lack of fish at the fish market which started before Christmas through the end of Dec and into the first week of Jan. No King Tide inundation events to share for this month.

Additional comments: Looking at 2019 rainfall for Palau, it fell below Norm for most months in 2019 except for August and October rising above normal at 140% and 118%, respectively. Recap or reminder, the beginning of the year or Palau's dry season was looking like a post El Nino pattern. Rainfall totals for 2019 came in at 127.23 inches (3231.6mm) which is 83% of the Annual Norm (Climo 1981-2010 Annual Median at 152.81in or 3881.1mm)



Palau: (continue)



Guam/CMNI: (Brandon and Mark)

You've probably noticed the stronger trade winds, the higher seas and surf—and the cooler, drier weather. Winter is here. Although we do not expect the 'traditional' winter weather hazards of snow and ice, our winters in the tropics come with their own hazards. Strong trade winds across the region and powerful cold fronts and frontal boundaries across the North Pacific can generate large swell causing hazardous conditions for mariners and small craft across the islands. They can also generate hazardous surf and dangerous rip currents—the number one natural killer in the Marianas and outer atolls of Micronesia. Two of the three stations analyzed in the Marianas Islands had precipitation totals near or slightly above the weekly 1 inch threshold to meet most water needs. Guam had the highest rainfall total at 1.02 inches, followed by Rota with 0.85 inch of rain. Saipan had the least rainfall, receiving only 0.26 inch (ASOS: 0.16 inch; NPS: 0.27 inch). The monthly rainfall total for Saipan is 1.53 inches, with data through January 28. Following a very dry December, Rota and Guam's January 2020 rainfall totals were also below the 4-inches monthly threshold at 2.99 and 2.53 inches, respectively. For this week, abnormally dry conditions continued across Saipan and Rota, while Guam continued in moderate drought.

JFMAMJ of 2020. The status of the climate is now at ENSO-neutral, but on the warm side of it (ONI values between 0 and +0.5). The CPC (with concurrence of the PEAC) anticipate the continuance of ENSO-neutral through the summer of 2020. The x-axis on my contingency diagram is the 6-month average of the ONI during JFMAMJ. The y-axis is the trend of the ONI as computed from $((\text{ONI J+F+M})/3) - ((\text{ONI A+M+J})/3)$. Some behaviors stand out:

- (1) Most cases of ONI Warm and trending colder (red dots) are dry (the classic post-El Nino drought);
- (2) Nearly all wet JFMAMJ periods (green dots) have an ONI that is trending warmer;
- (3) Nearly all JFMAMJ periods in which the ONI is cold, are wet (green dots) or near average (black dots).

Whereas the ONI is now on the warm side of ENSO-neutral, and whereas the ONI is anticipated to remain in ENSO-neutral, and whereas the ONI is more likely to remain the same, or fall slightly during JFMAMJ, the following forecast is made for Guam during JFMAMJ:

- (1) Near average to a little bit below average total rainfall is forecast for the next 6 months;
- (2) Very wet, or very dry conditions have the least weight.

Tercile forecasts are (lowest to highest):

30 - 50 - 20

Quintile forecasts are (lowest to highest) (see attached quintile chart):

9 - 25 - 50 - 15 - 1

Thus near-average rainfall is given the most weight with a slight advantage given to the below average quintiles VS the above average ones. The lower and upper boundaries of the 3rd (middle) quintile of rainfall are roughly 21 and 26 inches, respectively.

Tropical Cyclone: (Lander)

Normal and average amount of cyclones for the 2019 year. ENSO neutral pattern here on out with drier periods taking place as we move forward.

Current State of ENSO and predictions: (Anthony Artusa) ENSO Alert System Status: *Not Active*

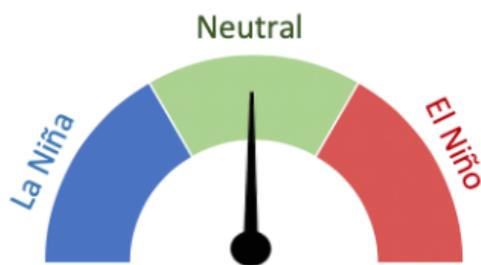
January 9, 2020

Synopsis: ENSO-neutral is favored through Northern Hemisphere spring 2020 (~60% chance), continuing through summer 2020 (~50% chance).

During December 2019, near-to-above-average sea surface temperatures (SSTs) were evident over the equatorial Pacific Ocean. Most SST indices increased in the past week, with the eastern Niño-1+2 and Niño-3 regions remaining near average (+0.1°C to +0.3°C), while the Niño-4 and Niño-3.4 regions were warmer at +1.2°C and +0.7°C, respectively. The recent increase in SST anomalies was partially driven by a combination of low-level westerly wind anomalies and the growth in positive equatorial subsurface temperature anomalies (averaged across 180°-100°W; . The latter indicates a downwelling Kelvin wave, which was evident in the above-average temperatures in the central and east-central Pacific Ocean. Over the month, westerly wind anomalies persisted over small regions of the western and eastern equatorial Pacific Ocean, while upper-level winds were near average over most of the equator. Tropical convection remained suppressed over Indonesia and east of the Date Line, and was enhanced to the west of the Date Line. The overall oceanic and atmospheric system was consistent with ENSO-neutral, though recent observations reflected a trend toward warmer conditions that will be monitored.

The majority of models in the IRI/CPC plume continue to mostly favor ENSO-neutral (Niño-3.4 index between -0.5°C and +0.5°C) through the Northern Hemisphere summer. For the December 2019-February 2020 season, the Niño-3.4 index is predicted to be near +0.5°C, which is consistent with the latest observations. The forecasters also favor above-average ocean temperatures to continue in the next month or two, but, in alignment with most model guidance, do not foresee a continuation over several consecutive seasons or shifts in the atmospheric circulation that would indicate El Niño. In summary, ENSO-neutral is favored through Northern Hemisphere spring 2020 (~60% chance), continuing through summer 2020 (~50% chance; click [CPC/IRI consensus forecast](#) for the chance of each outcome for each 3-month period)

El Niño-Southern Oscillation Watch



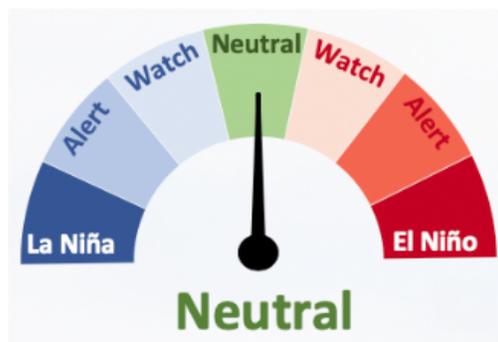
Current ENSO

Current situation

ENSO-neutral conditions continued during November 2019.

Sea surface temperatures (SSTs) warmed during November but were still in the neutral range.

The Southern Oscillation Index (SOI) was -1.0 in November (on the El Niño side of neutral).



Neutral

Forecast situation

70% chance for ENSO-neutral conditions persisting during December 2019-February 2020.

63% chance for ENSO-neutral conditions during March-May 2020.

Source: NIWA Island Climate Update:

January 2020

Rainfall Verification and Outlooks for JFM (Con't)

JANUARY, FEBRUARY, MARCH

<i>Location</i>	<i>Rainfall Outlook</i>	<i>Final Probabilities</i>
Palau		
Koror	Average	40:50:10
FSM		
Yap	Avg. Below	35:35:30
Chuuk	Average	30:40:30
Pohnpei	Average-Above	30:35:35
Kosrae	Above	25:30:45
RMI		
Kwajalein	Average-Above	30:35:35
Majuro	Average-Above	30:35:35
Guam and CNMI		
Guam	Avg. Below	40:40:20
Saipan	Avg. Below	40:40:20
American Samoa		
Pago Pago	Avg.	30:40:30
State of Hawaii		
Lihue	Average-Above	30:35:35
Honolulu	Average-Above	30:35:35
Kahului	Average-Above	30:35:35
Hilo	Average-Above	30:35:35

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 different

Drought monitoring updates.

Drought monitoring updates.

A. End-of-December Monthly Drought Assessment:

- i. With WxCoder III data, we have 23 stations in the monthly analysis.
- ii. December was dry (less than the 4- or 8-inch monthly minimum needed to meet most water needs) across the Marianas, over much of the Marshall Islands, and three stations in the FSM; it was wet at Koror, Majuro and Mili in the RMI, Pago Pago, and most of the FSM. The end-of-December monthly analysis (December 31) is consistent with the weekly analysis and is the weekly analysis for December 31. Compared to the end-of-November monthly analysis:
 - a. The status is the same on December 31 as on November 30, except Woleai and Lu-konor went from D0-S to D-Nothing, and Majuro went from D-Nothing to D0-S.
 - b. Others: The rest of the stations continued at D-Nothing (no drought or abnormal dryness)
 - c. Fananu and Utirik were plotted as missing (could not be analyzed) due to missing data for the last 3 months (Fananu) and last 12 days of December (Utirik).
- iii. Some December 2019 precipitation ranks:
 - a. Guam: driest December in 63 years of data
 - b. Kosrae: 6th driest December (52 yrs), 7th driest Jul-Dec (39 yrs)
 - c. Nukuoro: 7th driest December (37 yrs), 3rd driest Sep-Dec (36 yrs)
 - d. wet: 5th wettest December at Chuuk (69 yrs) & Mili (36 yrs)

B. Current (Weekly) Drought Conditions: The discussion above is the monthly (end of December) analysis. The latest weekly USAPI USDM assessment may show different USDM classifications. The latest weekly USAPI USDM assessment is for January 7.

- i. The January 7 analysis is the same as the end of December analysis, except Guam, Rota, and Kapingamarangi are analyzed as D0-S instead of D-Nothing.

C. December and Annual 2019 NCEI State of the Climate Drought Report: The December and Annual 2019 NCEI SotC Drought report will be put online next week.

- i. The web page urls will be:

- a. <https://www.ncdc.noaa.gov/sotc/drought/201912#det-reg-pacis-usapi>

- b. <https://www.ncdc.noaa.gov/sotc/drought/201913#usapi-sect>

D. This Month and Next Month: I will be attending the AMS Annual Meeting in Boston next week (gone January 11-18). Then I will be USDM author the 2 weeks after I get back (January 21 & 28 USDM). The first week of February I must complete the January SotC Drought report. Then the following week (February 9-17), I will be in Anchorage for an Alaska NWS Climate Services Workshop reporting on the USDM and drought monitoring in Alaska. I likely won't be able to participate in next month's PEAC conference call (2nd Thursday, Feb 13, I will be in Alaska).

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

Drought monitoring updates (CON'T).

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! **The contractor (Ernest Cooper Environmental Consulting) is converting the survey into a web-based format and expects to have it ready by sometime this month.**

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: -- NO CHANGE IN STATUS—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

- a. **Follow up on why Kwajalein & Palau are not getting into the automated process.**

1. **Thank you, Chip, for getting the metadata for Jaluit and Woleai changed so they are getting into the automated system!**

2. **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)**

3. **Chip: C/would you send me the COOP station i.d. number and NWSLI code for Palau International Airport, so we can get that station into the automated data base.**

- 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. **I had a good meeting with Bill Ward (when I was in Honolulu in July 2019) about getting automated observations set up.**

Drought monitoring updates (CON'T).

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.

iii. There is also a DMUpdate Listserv 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):

Nover & Samson (Majuro)

Joe & Sanchez (Chuuk)

Eden (Pohnpei)

Eden (Kosrae)

Justin (Yap)

Hans (Pago Pago)

Kikuko (Palau)

Jason (Kwajalein)

Chip, Brandon, Mark, Clint (Guam & CNMI)

PEAC Principal Research Scientist: Rashed Chowdhury

WERI Scientist:

CPC Forecaster: Anthony Artusa

WFO Guam : Chip Guard

NWS MIC, Honolulu:

NCEI: Richard Heim

Pacific RISA:

NWS Hydrologist: Kevin Kodama

Additional Attendees:

***** Next Call– 13 February 2020, 1430 HST (14 February 2020, 0030 GMT)*****