

pacific

ENSO

update

3rd Quarter, 2009 Vol. 15, No. 3

ISSUED: July 27, 2009

**A Quarterly Bulletin of the Pacific El Niño/Southern Oscillation Applications Climate (PEAC) Center
Providing Information on Climate Variability for the U.S.-Affiliated Pacific Islands**

www.soest.hawaii.edu/MET/Enso

CURRENT CONDITIONS

During the first half of 2009, the climate of the tropical Pacific transitioned from ENSO-neutral conditions to El Niño. On July 9th, the U.S. Climate Prediction Center's *ENSO Alert System Status* was elevated from the level of "*El Niño Watch*" to "*El Niño Advisory*". Manifestations of the shift in climate state to El Niño consisted of tropical Pacific oceanic warming at the surface and at depth, a fall of sea level across most of Micronesia, and a weakening of the strong easterly wind flow that has dominated the region for the past two years. While the ocean has shown the strongest indications of El Niño with its extensive warming, the atmosphere has not yet shown many signs typical of El Niño; tropical cyclone distribution remains shifted to the west of normal, trade winds have persisted in many regions, and there have been few episodes of strong westerly surface winds at low latitudes that are typical during the development of El Niño. Sea levels, which have been very high throughout much of the region for the past few years, have begun to fall in response to El Niño, but still remain elevated above normal at most locations.

The total rainfall during the first half of 2009 was somewhat dry throughout the region, with a few exceptions (see Figures 1a and 1b). In the west, at Palau and Yap, the first half of 2009 was wetter than normal. With the ongoing and persistent westward shift of tropical cyclone activity, these areas still catch heavy rainfall from disturbances and tropical depressions that head toward the Philippines and Taiwan. Nukuoro and Kapingamarangi were also wet during the first half of 2009 due to their southerly latitude. The 101.47 inches recorded at the Kosrae airport was the highest recorded rainfall total in the USAPI during the first half of 2009. The most problematic rainfall anomaly during the first half of 2009 was the persistent, very dry conditions in some of the northern atolls of the Republic of the Marshall Islands, where some locations have been critically dry for many months. Six-month rainfall totals were about half of normal at Kwajalein, Utirik, Wotje, and other atolls of the northern RMI. Six-month rainfall totals below 20 inches were noted in parts of the CNMI, Guam and in the northern RMI.

The Hawaiian Islands were generally very dry during the first half of 2009. Leeward areas, especially on Maui and the Big Island, did not receive much rainfall and remain under drought conditions. Pasture conditions have also been deteriorating on portions of all the islands and impacts to livestock operations

have been increasing. With the development of El Niño, Hawaii may receive below normal rainfall during the winter months.

No typhoons directly affected any island in the western North Pacific basin during the first half of 2009. Some of the early stages in the development of the year's first few named tropical cyclones evolved through their tropical disturbance and depression stages within the territorial waters of Palau and Yap States.

Sea level variation in the USAPI is sensitive to the ENSO-cycle, with low sea level observed during El Niño events and high sea level observed during La Niña events. Sea levels have been higher than average in the Pacific since early 2007. Consistent with the recent transition from ENSO-neutral to El Niño, sea levels will remain slightly elevated at all USAPI and Hawaiian stations for the next three months. However, no further rise is expected. As El Niño conditions develop further, sea levels across the USAPI and Hawaii are expected to fall to normal or below normal levels over the next 3-6 months, depending on the strength of the event.

The following comments were taken from WFO Guam's MONTHLY PACIFIC ENSO DISCUSSION FOR MICRONESIA AND AMERICAN SAMOA, issued in July 2009:

"With the transition to El Niño conditions, the trade winds should continue to weaken, tropical cyclone activity and rainfall distribution should return to near normal, and sea levels should slowly fall toward normal levels. Most Micronesian locations have, in fact, seen sea levels fall over the past month or two. **As El Niño conditions further develop, the region will see more westerly monsoon flow and a more typical tropical cyclone distribution in Micronesia.** American Samoa is in its dry season, which should be relatively normal and cyclone-free. Generally ample but somewhat below normal rainfall has returned to most locations in Micronesia. **The Republic of the Marshall Islands, however, has had well-below normal rainfall, and the National Weather Service and PEAC have recommended continued water conservation for the Marshall Islands for the next few weeks.** Other locations will have near normal rainfall, but will likely see high month-to-month variability with occasional episodes of strong westerly winds and heavy rainfall. Increased tropical cyclone activity is expected to affect Micronesia by September, and dry conditions could evolve by the end of the year."

RAINFALL TOTALS

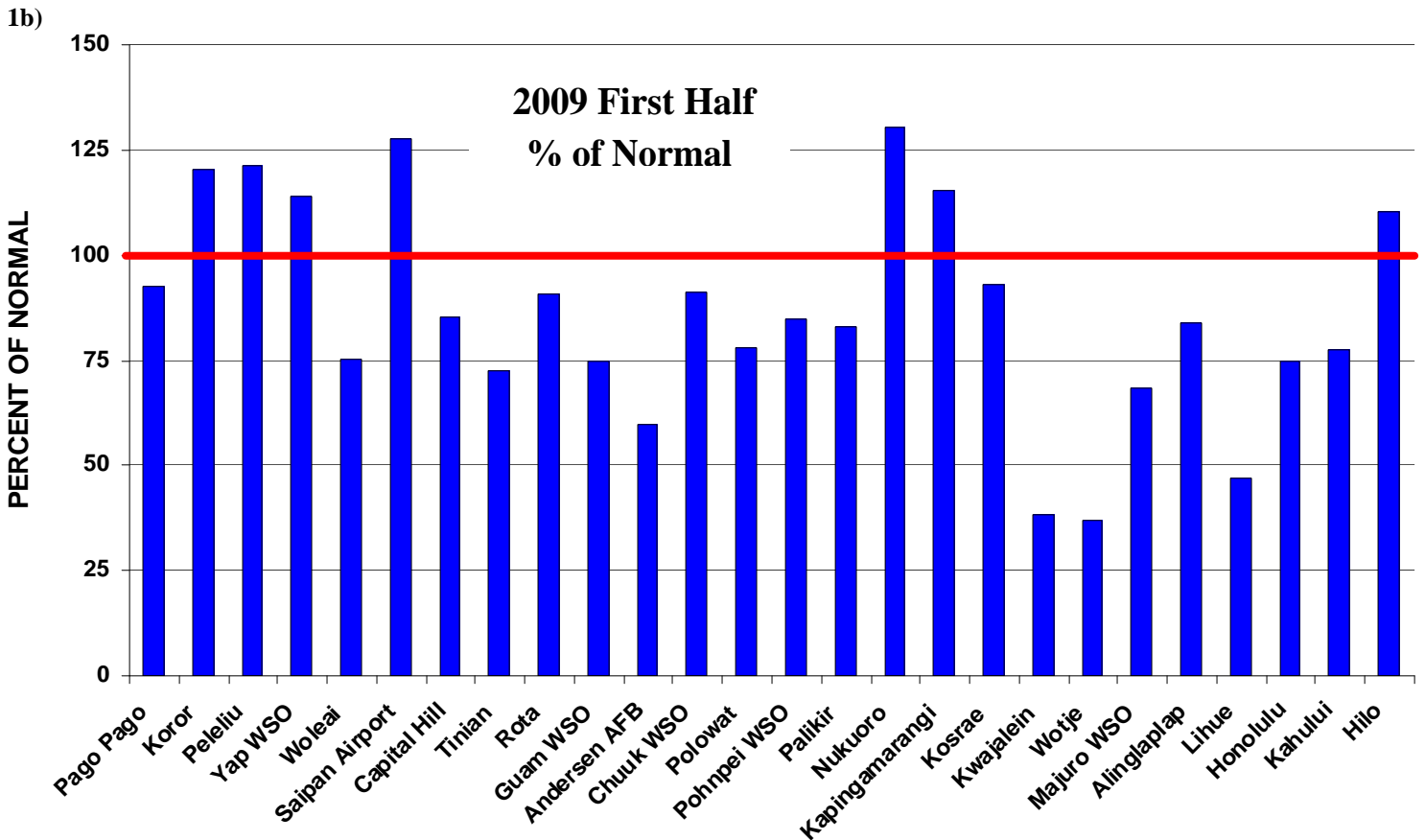
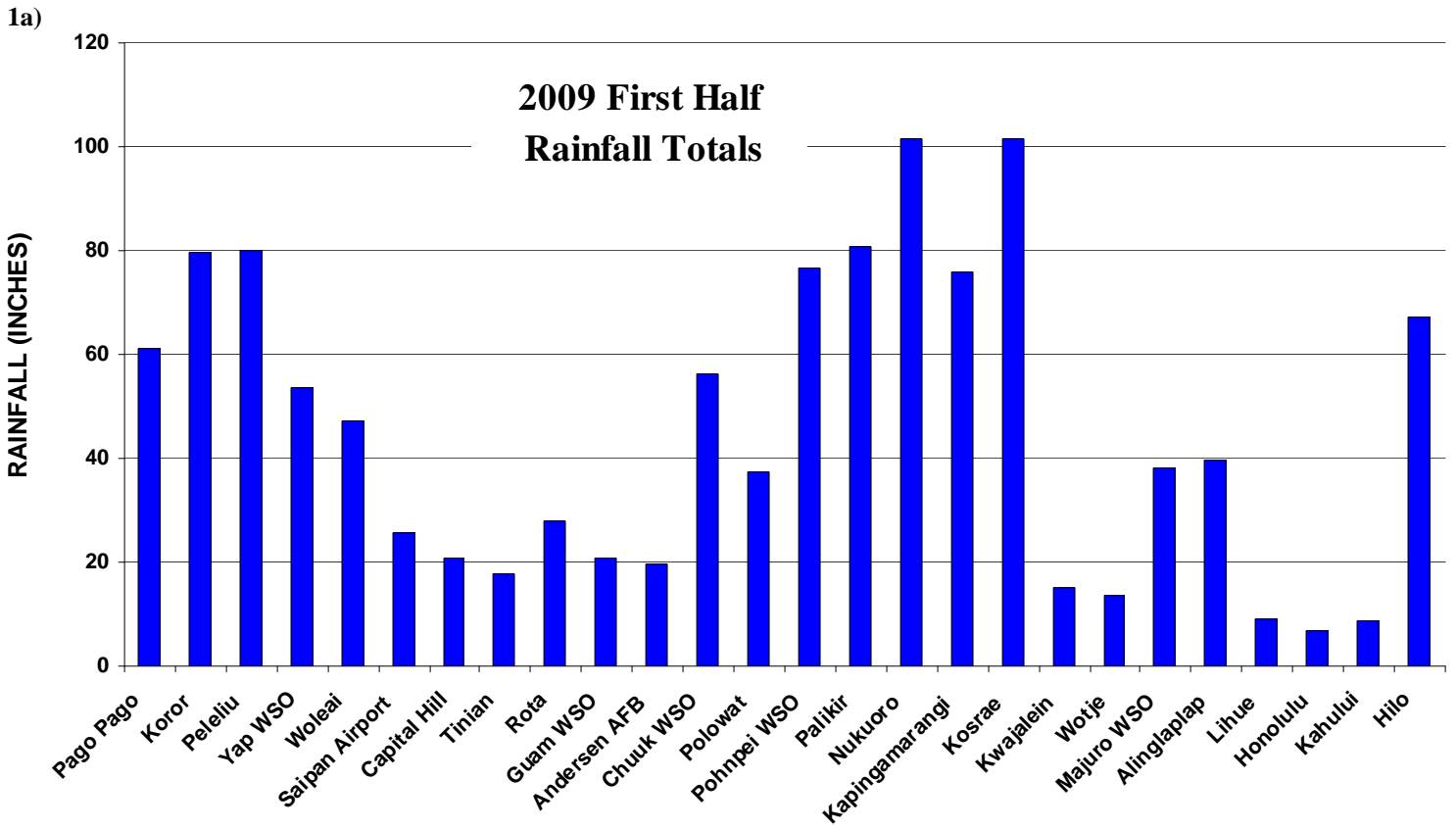


Figure 1, above. 1st Half 2009 rainfall totals (a) in inches and (b) anomalies (expressed as % of normal).

SEA SURFACE TEMPERATURES

Since the beginning of May 2009, positive sea-surface temperature (SST) anomalies have increased across the equatorial Pacific. During the last four weeks, SST anomalies have become increasingly positive across the equatorial Pacific Ocean. During mid-May through early July 2009, positive sub-surface temperature departures strengthened, especially in the eastern Pacific. Positive sub-surface temperature anomalies now stretch across the entire equatorial Pacific, extending to the surface from about 140°W to the South American coast. The upper ocean heat content anomalies have been positive since April, and have steadily increased since that time, reflecting El Niño conditions.

SOUTHERN OSCILLATION INDEX

The 3-month average of the Southern Oscillation Index for the 2nd Quarter of 2009 was 0.0, with monthly values of +0.7, -0.4 and -0.3 for the months of April, May and June 2009, respectively. March 2009 was the first month since June 2008 to record a negative SOI value, indicating a shift away from La Niña toward ENSO-neutral conditions.

Normally, positive SOI values in excess of +1.0 are associated with La Niña conditions, and negative SOI values below -1.0 are associated with El Niño conditions. The SOI is an index representing the normalized sea level pressure difference between Darwin, Australia and Tahiti, respectively.

TROPICAL CYCLONE

The PEAC Center archives western North Pacific tropical cyclone numbers, track coordinates, and 1-minute average maximum sustained wind taken from operational warnings issued by the Joint Typhoon Warning Center (JTWC) of the United States Air Force and Navy, located at Pearl Harbor, Hawaii. Western North Pacific tropical cyclone names are obtained from warnings issued by the Japan Meteorology Agency (JMA), which is the World Meteorological Organization's Regional Specialized Meteorological Center (RSMC) for the western North Pacific basin. The PEAC archives South Pacific tropical cyclone names, track coordinates, central pressure, and 10-minute average maximum sustained wind estimates from advisories issued by the Tropical Cyclone Warning Centers (TCWC) at Brisbane, the RSMC Nadi, and the New Zealand Meteorological Center at Wellington. The numbering scheme and the 1-minute average maximum sustained wind estimates are taken from warnings issued by the JTWC. There are sometimes differences in the statistics (e.g., storm maximum intensity) for a given tropical cyclone among the agencies that are noted in this summary, but JTCW values are given precedence when available.

Tropical Cyclone Summary

Tropical cyclone activity in the western North Pacific basin had a late start this year. There were no named cyclones until May 3, when the tropical depression that became typhoon Kujira was given its name by the JMA. Through July 20, the JTWC numbered 7 tropical cyclones in the western North Pacific basin. This was near normal. Of these 7 cyclones, 4 were typhoons, 2 were tropical storms, and one of them (TC 06W) intensified only to the depression stage, and was not named by the JMA. **A westward shift is still noted in the tropical cyclone activity, which is one of the several ways in which the tropical Pacific atmosphere continues to exhibit characteristics not typically noted during the onset of El Niño.**

PEAC Center Tropical Cyclone Outlook

Beginning in August and continuing especially from September through the end of the year, the geographical distribution of western North Pacific tropical cyclones should become established in a more typical pattern (not seen for the past two years) with a possible easterly shift of the activity in the late fall. Whereas the tropical cyclone activity was far below normal in Micronesia for both 2007 and 2008, activity should return to normal or even above normal during the remaining months of 2009. Guam and the CNMI should see an increased risk of a typhoon through the remainder of 2009. Islands eastward of Guam including Chuuk, Pohnpei, and the RMI, may be threatened by the gales and heavy rains of a tropical cyclone for the first time in several years. At a minimum, the islands of eastern Micronesia should begin to see more episodic heavy rainfall events associated with tropical disturbances, especially in the fall of 2009. Thereafter, beginning roughly in late November or December, American Samoa's hurricane season could be more active than normal. See each island's variability summary for discussions of specific tropical cyclone risk.

In the Central Pacific, El Niño conditions are usually associated with a more active tropical cyclone season as there is a greater chance of late season tropical cyclones developing in the Central Pacific. While a more active season does increase the chance of Hawaii being impacted, El Niño conditions do not necessarily mean that a tropical cyclone will hit the islands. The Central Pacific Hurricane Center (CPHC) is currently forecasting a near normal or below-normal hurricane season for the Hawaiian Islands. CPHC predicts three to five tropical cyclones forming in the Central Pacific during the 2009 hurricane season, which officially begins June 1 and ends Nov. 30. An average season has four or five tropical cyclones (which includes tropical depressions, tropical storms and hurricanes).

The PEAC tropical forecast considers input from two seasonal outlooks for tropical cyclone activity in the western North Pacific basin: (1) The City University of Hong Kong Laboratory for Atmospheric Research, under the direction of Dr. J. C-L. Chan (http://aposf02.cityu.edu.hk/tc_forecast/2008_forecast_APR.htm), and, (2) The Benfield Hazard Research Centre, University College London, Tropical Storm Risk (TSR) research group, UK, led by Dr Adam Lea and Professor Mark Saunders (<http://tsr.mssl.ucl.ac.uk/>). The Central Pacific Hurricane Center (<http://www.prh.noaa.gov/cphc>) issues the seasonal tropical cyclone outlook for the Central Pacific, including the Hawaiian Islands.

LOCAL SUMMARY AND FORECAST



American Samoa: During the first half of 2009 the rainfall in American Samoa was near normal. Rainfall in American Samoa typically begins to decrease during May and June as the dry season gets underway. However, May was very wet with nearly 20 inches of rain (193% of normal) at Pago Pago International Airport. At A'asufou, a station at 408m elevation in the hills behind the WSO, the May 2009 rainfall was 27.22 inches (177% of normal). This was the wettest monthly total noted at any recording location in the USAPI during the first half of 2009. After the wet May, June was quite dry. American Samoa passed through its hurricane season without any serious affects from any tropical cyclone. Very high surf was observed during June, caused by intense mid-latitude lows to the south, and further exacerbated by strong southeast trade winds.

American Samoa Rainfall Summary 2nd Qtr 2009						
Station		Apr.	May	June	2nd Qtr	1st Half
Pago Pago WSO	Inches	9.28	19.17	3.65	32.10	61.05
	% Norm	77%	193%	49%	109%	93%
Aasufou	Inches	17.40	27.22	N/A	36.14	53.42
	% Norm	96%	177%	N/A	N/A	N/A

Climate Outlook: American Samoa is now within the heart of its dry season (May through November). Nearly all climate models favor slightly below normal rainfall over the next few months, which span the heart of the 2009 dry season.

For the past two years, the focus of South Pacific tropical cyclone activity has been in the Coral Sea from northeastern Australia eastward to Fiji. In the upcoming 2009-10 cyclone season, El Niño conditions may elevate the risk of a damaging impact by a hurricane or strong tropical storm affecting American Samoa. During El Niño, the Australian Northwest Monsoon episodically pushes to the east of the International Date Line in the rainy season, bringing several periods of gusty northwesterly winds to American Samoa. This weather pattern also enhances tropical cyclone activity from Tonga and Samoa eastward into the Cook Islands. A moderate El Niño brings greater hurricane risk to American Samoa than a strong El Niño.

Predicted rainfall for American Samoa from July 2009 through June 2010 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²
July – September 2009 (Heart of next Dry Season)	90% (17.60 inches - Pago Pago)
October – December 2009 (Onset of next Rainy Season)	100%
January – March 2010 (Heart of Rainy Season)	120%
April – June 2010 (Onset of Next Dry Season)	90%

² Forecast rainfall quantities represent BEST ESTIMATES given the probabilistic forecast for each particular season and station.

LOCAL SUMMARY AND FORECAST



Guam/CNMI: The first half of 2009 was generally drier than normal throughout Guam. Persistent trade winds accompanied especially dry conditions at some Guam locations during the 2nd Quarter months. Despite dry conditions, the weather remained just wet enough to sustain southern Guam's drinking water sources at the Ugum River pumping stations and the Fena Reservoir, and to reduce the number of dry season grass fires. The rainfall totals during the first half of 2009 were approximately 20-25 inches at all recording locations, ranging from 19.25 inches at WFO Guam to 26.60 inches at the head of the Ugum watershed in the southern mountains. The weather on Guam during the first half of 2009 continued to be mundane, as it has been for much of the past three years, with no unusually heavy rains or strong winds.

The 2nd Quarter 2009 and 1st half of 2009 rainfall totals in the CNMI were generally drier than normal, with six-month totals near 25 inches, similar to Guam. However, a particularly wet

Guam and CNMI Rainfall Summary 2nd Qtr 2009						
Station		Apr.	May	June	2nd Qtr	1st Half
Guam						
GIA (WFO)	Inches	3.03	3.57	4.58	11.18	20.67
	% Norm	77%	59%	71%	68%	75%
AAFB	Inches	3.40	2.66	3.50	9.56	19.54
	% Norm	70%	40%	55%	54%	60%
University of Guam	Inches	2.04	1.77	5.43	9.24	19.25
	% Norm	52%	29%	84%	56%	70%
Dededo (Ypapao)*	Inches	2.57	4.08	4.11	10.76	22.72
	% Norm	66%	67%	64%	65%	82%
Ugum Watershed**	Inches	4.96	5.29	3.86	14.11	26.60
	% Norm	102%	87%	60%	81%	82%
Sinajaña***	Inches	2.37	5.08	6.34	13.79	25.02
	% Norm	61%	84%	98%	84%	91%
CNMI						
Saipan Intl. Airport	Inches	1.25	2.38	8.25	11.88	25.83
	% Norm	43%	52%	170%	96%	128%
Capitol Hill	Inches	0.97	3.18	6.61	10.76	20.74
	% Norm	28%	58%	114%	73%	85%
Tinian Airport	Inches	1.46	4.96	5.20	11.62	17.62
	% Norm	42%	90%	90%	79%	73%
Rota Airport	Inches	2.55	2.24	8.32	13.11	27.88
	% Norm	56%	35%	134%	77%	91%

* % of normal with respect to Andersen AFB.

** % of normal with respect to WSMO Finigayan (now closed), on the northwest side of Guam.

*** % of normal for Sinajaña is with respect to WFO Guam.

LOCAL SUMMARY AND FORECAST

June – with 8.25 inches and 8.32 inches recorded at the Saipan International Airport and Rota Airport, respectively – inflated seasonal rainfall totals, masking the true extent of persistent dryness. For the first time in recent history, it was noted that Donni Spring in the central Saipan highlands completely dried up; the combination of low rainfall and new wells in the area were thought to have contributed to this. The weather continued its long period of tranquility throughout the CNMI during the first half of 2009 with no unusually heavy rains or strong winds, some brief periods of heavy showers in June notwithstanding.

Climate Outlook: The 2009 dry season on Guam and in the CNMI persisted through June. In early July, the monsoon trough developed normally across Micronesia, and the rainy season commenced on Guam and in the CNMI. With El Niño conditions now developing in the Pacific Basin, the tranquil weather of the past three years may be coming to an end. **All islands should have abundant rainfall through the end of 2009 and may see an increase in the frequency of heavy rainfall events (i.e., 2 inches or more in 24 hours), with high month-to-month variability.** Thereafter, the rainfall amounts will depend on the evolution of El Niño: if El Niño persists into the first half of 2010, near normal rainfall will continue, but if El Niño ends in the first half of next year, tranquil and dry conditions will resume. **Very dry conditions in Guam and throughout Micronesia are almost always experienced after a strong El Niño, and sometimes follow a weak or moderate El Niño as well.**

El Niño also brings an increased risk of the damaging effects from a passing tropical storm or typhoon, especially later in the year. Damaging effects from tropical cyclones include heavy rainfall, high winds, and dangerously high surf. **From August through December 2008, Guam and the CNMI can expect to be threatened by 2 or 3 tropical cyclones that will produce gales and hazardous seas in the island waters. The odds of damaging winds (60 mph or higher) from a severe tropical storm or a typhoon on Guam and for each island of the CNMI will be 20 to 25% for the remainder of 2009, which is roughly two to three times the normal level of risk.**

Predicted rainfall for Guam and the Mariana Islands from July 2009 through June 2010 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²	
	Guam/Rota	Saipan/Tinian
July – September 2009 (Heart of Next Rainy Season)	110% (41.53 inches)	110% (31.74 inches)
October – December 2009 (End of Next Rainy Season)	120%	120%
January – March 2010 (Onset of Next Dry Season)	90%*	90%*
April – June 2010 (End of Dry Season)	90%*	90%*

² Forecast rainfall quantities represent BEST ESTIMATES given the probabilistic forecast for each particular season and station.

* These months will be even drier if El Niño ends in early 2010.

LOCAL SUMMARY AND FORECAST



Federated States of Micronesia

Yap State: Yap Island and the outer islands of Yap State were among the few locations to receive above normal rainfall during the first half of 2009. The six-month rainfall total was roughly 50 inches at the Yap WSO, and nearly all other Yap State locations recorded just over 100% of their respective normal values. The WSO Yap experienced high month-to-month rainfall variability during the first half of 2009, with rainfall totals ranging from 15.07 inches (277% of normal) in February to 3.16 inches (51% of normal) in March. Several tropical disturbances passed through Yap State during May, June and early July of 2009 contributing abundant rainfall to most locations in Yap State and also throughout the Republic of Palau. While still drier than normal through the 2nd Quarter of 2009, Woleai has received enough rainfall to start rebounding from last year's extremely dry conditions.

Yap State Rainfall Summary 2nd Qtr 2009						
Station		Apr.	May	June	2nd Qtr	1st Half
Yap Island						
Yap WSO	Inches	11.68	6.43	8.48	26.59	53.42
	% Norm	206%	71%	67%	97%	114%
Dugor*	Inches	9.51	7.47	12.16	29.14	51.45
	% WSO	170%	92%	90%	106%	110%
Gilman*	Inches	16.87	5.95	10.48	33.30	59.10
	% WSO	302%	73%	78%	121%	126%
Luweech*	Inches	9.94	7.89	7.34	25.17	48.02
	% WSO	178%	97%	55%	91%	103%
Maap*	Inches	8.01	6.50	9.50	24.01	46.22
	% WSO	144%	80%	71%	87%	99%
North Fanif*	Inches	9.65	6.44	10.16	26.25	52.13
	% WSO	173%	79%	75%	95%	111%
Rumung*	Inches	9.97	6.02	9.77	25.76	51.05
	% WSO	179%	74%	73%	94%	109%
Tamil*	Inches	4.14	5.95	10.92	21.01	48.49
	% WSO	74%	73%	81%	76%	104%
Outer Islands						
Ulithi	Inches	N/A	N/A	N/A	N/A	N/A
	% Norm	N/A	N/A	N/A	N/A	N/A
Woleai	Inches	12.25	10.46	9.29	32.00	47.25
	% Norm	111%	86%	71%	88%	75%

Climate Outlook: All islands of Yap State should remain wet for the next three months (the heart of the rainy season), and should receive adequate rainfall through the end of the year.

Tropical cyclone activity across Micronesia is expected to be much higher than it was during the very quiet 2008 season. During August through December, 2 or 3 typhoons should pass to the north of Yap Island and Ulithi producing gusty westerly winds and hazardous seas in the island waters. The odds of damaging winds from a tropical cyclone on Yap or any of its northern atolls will be approximately 10-15% for the remainder of 2009, which represents a slightly higher risk than normal.

LOCAL SUMMARY AND FORECAST

Predicted rainfall for Yap State from July 2009 through June 2010 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²	
	Yap and Ulithi	Woleai
July – September 2009 (Heart of Rainy Season)	120% (49.43 inches)	100% (40.30 inches)
October – December 2009 (End of Rainy Season)	100%	100%
January – March 2010 (Onset of next Dry Season)	90%	90%
April – June 2010 (End of next Dry Season)	90%*	90%*

² Forecast rainfall quantities represent BEST ESTIMATES given the probabilistic forecast for each particular season and station.

* These months will be even drier if El Niño ends in early 2010.

Chuuk State: Rainfall amounts during the first half of 2009 were near normal to slightly below normal throughout Chuuk State. A tendency for higher rainfall totals at the more southerly atolls, and lower rainfall totals at the northern atolls (e.g., Fananu and Onoun) was observed. Ettal was the wettest of the Chuuk recording stations, with a 2nd Quarter 2009 rainfall total of 42.44 inches (117% of normal) and a 1st half 2009 total of 61.06 inches (99% of normal). The two driest Chuuk locations during the first half of 2009 were Fananu and Onoun in the northern atolls. On average, locations in Chuuk State receive about 12 inches of rain in each of the months April, May and June. In a pattern noted from Chuuk State eastward through the RMI, June was very dry. The weather was generally tranquil throughout Chuuk State during the first half of 2009 with no unusually heavy rains or strong winds.

Chuuk State Rainfall Summary 2nd Qtr 2009						
Station		Apr.	May	June	2nd Qtr	1st Half
Chuuk Lagoon						
Chuuk WSO	Inches	15.11	13.48	5.63	34.22	56.20
	% Norm	122%	110%	48%	94%	91%
Piis Panew*	Inches	9.40	5.01	1.39	15.80	24.11
	% WSO	82%	38%	13%	44%	39%
Southern Mortlocks						
Lukunoch*	Inches	10.68	11.55	5.00	27.23	51.96
	% WSO	94%	88%	45%	75%	84%
Ettal*	Inches	16.80	14.99	10.65	42.44	61.06
	% WSO	147%	115%	96%	117%	99%
Ta*	Inches	15.36	8.01	11.74	35.11	59.11
	% WSO	135%	61%	106%	97%	97%
Namoluk*	Inches	12.11	12.83	9.82	34.76	55.41
	% WSO	106%	98%	89%	96%	90%

* Long term normal is not established for these sites.

LOCAL SUMMARY AND FORECAST

Chuuk State Rainfall Summary 2nd Qtr 2009						
Station		Apr.	May	June	2nd Qtr	1st Half
Northern Atolls						
Fananu*	Inches	7.30	6.07	7.23	20.60	36.24
	% WSO	64%	46%	65%	57%	59%
Onoun*	Inches	9.31	8.53	4.86	22.70	41.38
	% WSO	82%	65%	44%	63%	67%
Northern Mortlocks						
Losap*	Inches	11.19	10.16	8.51	29.86	47.09
	% WSO	98%	78%	77%	82%	77%
Nama*	Inches	16.50	15.50	5.14	36.24	55.13
	% WSO	145%	119%	46%	100%	90%
Western Atolls						
Polowat	Inches	9.58	9.52	7.36	26.46	37.48
	% Norm	160%	106%	59%	96%	78%

* Long term normal is not established for these sites.

Climate Outlook: The weather over the next few months should be more active than it has been in recent years, and rainfall should remain abundant across Chuuk State as the monsoon trough extends into the region. **The island and atolls of Chuuk State may see some episodes of excessive rainfall (more than 3 inches in one day), and the potential for two or three episodes of gale force winds within the State.** Mudslides are also a possibility on the high islands of Chuuk Lagoon.

The threat of a gales and high seas associated with a tropical storm or typhoon will be above normal for the remainder of 2009. Because of the onset of El Niño conditions, some of the tropical disturbances forming in Chuuk State or Pohnpei State could become named cyclones while still within regional waters.

Predictions for Chuuk State from July 2009 through June 2010 are as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²			
	Chuuk Lagoon, Northern Mortlocks	Polowat	Northern Atolls and Islands	Southern Mortlocks
Jul – Sep 2009	100% (36.19 inches)	100% (36.19 in)	100% (36.19 in)	110% (39.81 in)
Oct – Dec 2009	120%	110%	120%	120%
Jan – Mar 2010	95%	95%	90%	100%
Apr – Jun 2010	90%*	90%*	90%*	90%*

² Forecast rainfall quantities represent BEST ESTIMATES given the probabilistic forecast for each particular season and station.

* These months will be even drier if El Niño ends in early 2010.

LOCAL SUMMARY AND FORECAST

Pohnpei State: Most locations on Pohnpei Island and the atolls of Pohnpei State were slightly drier than normal (80-90%) during the first half of 2009. The State's driest conditions occurred on the eastern atolls of Mwoakilloa and Pingelap. Located closer to the equator, Nukuoro and Kapingamarangi were very wet, with six-month rainfall totals of 101.42 inches (130%) and 75.78 inches (115%), respectively. The 101.42 inches of rain at Nukuoro during the first half of 2009 was second only to the 101.47 inches recorded at the Kosrae airport, which was the wettest Micronesian location during the first half of 2009.

Pohnpei State Rainfall Summary 2nd Qtr 2009						
Station		Apr.	May	June	2nd Qtr	1st Half
Pohnpei Island						
Pohnpei WSO	Inches	15.85	15.75	9.28	40.88	76.45
	% Norm	96%	82%	54%	78%	85%
Palikir	Inches	19.45	14.89	11.02	45.36	80.75
	% Norm	110%	72%	60%	80%	83%
Kolonia Airport	Inches	17.30	13.10	9.64	40.04	69.92
	% Norm	128%	84%	69%	93%	94%
Atolls of Pohnpei State						
Nukuoro	Inches	10.69	14.59	16.45	41.73	101.42
	% Norm	71%	99%	135%	99%	130%
Pingelap	Inches	11.24	14.47	4.42	30.13	62.17
	% Norm	66%	85%	27%	60%	80%
Mwoakilloa	Inches	17.05	10.71	5.32	33.08	67.63
	% Norm	114%	77%	44%	79%	87%
Kapingamarangi	Inches	10.93	14.60	14.81	40.34	75.78
	% Norm	80%	141%	204%	129%	115%

Climate Outlook: In response to the developing El Niño, rainfall over the next 6 months is expected to be highly variable, and there is potential for a heavy rainfall event to cause minor flooding and an elevated risk of mudslides. For the remainder of 2009, several of the basin's tropical cyclones will begin their lives as disturbances in the region of Pohnpei State. **During the months of October, November and December, one or two of these disturbances may develop into a tropical depression or tropical storm close enough to Pohnpei Island to bring gusty southwest winds to that island and the outer atolls.** While damaging effects on Pohnpei from a tropical storm or typhoon are not likely, El Niño increases the chances for this to happen.

Predicted rainfall for Pohnpei State from July 2009 through June 2010 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²	
	Pohnpei Island and atolls	Kapingamarangi
Jul - Sep 2009	100% (48.03 inches)	100% (22.70 inches)
Oct - Dec 2009	120%	100%
Jan - Mar 2010	100%	100%
Apr - Jun 2010	90%	90%

² Forecast rainfall quantities represent BEST ESTIMATES given the probabilistic forecast for each particular season and station.

LOCAL SUMMARY AND FORECAST

Kosrae State: The rainfall at Kosrae during the first half of 2009 was near normal. Typically one of Micronesia's wettest locations, the 101.47 inches at the Kosrae Airport during the first half of the year was the highest official value seen throughout the region. As seen in most locations in the eastern half of Micronesia, June was drier than April or May.

Kosrae State Rainfall Summary 2nd Qtr 2009						
Station		Apr.	May	June	2nd Qtr	1st Half
Airport (SAWRS)	Inches	21.63	15.73	14.53	51.89	101.47
	% Norm	100%	84%	76%	87%	93%
Utwa*	Inches	20.91	14.42	N/A	N/A	N/A
	% WSO	97%	77%	N/A	N/A	N/A
Nautilus Hotel*	Inches	20.37	13.68	10.90	44.95	86.80
	% WSO	94%	73%	57%	76%	80%
Tofol*	Inches	20.97	N/A	N/A	N/A	N/A
	% WSO	97%	N/A	N/A	N/A	N/A

* Long term normal is not established for these sites.

Climate Outlook: The persistent easterly winds that dominated the flow in eastern Micronesia for the past two years should give way to a more variable wind pattern as El Niño brings the monsoon trough and tropical disturbances into the region. Normal monthly rainfall for Kosrae is typically between 17 and 20 inches for all months of the year. Rainfall for the next few months should be near normal, although month-to-month rainfall variability may become greater as the weather pattern becomes more active. **In the final three months of the year, a tropical cyclone may form near Kosrae State bringing heavy rains, gusty southwesterly winds, and rough seas to island waters. Southwesterly winds may bring rough seas to the west and southwest side of the island.**

Forecast rainfall for Kosrae State from July 2009 through June 2010 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²
July - September 2009	100% (50.70 inches)
October - December 2009	110%
January - March 2010	95%
April - June 2010	95%

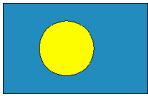
² Forecast rainfall quantities represent BEST ESTIMATES given the probabilistic forecast for each particular season and station.

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LOCAL SUMMARY AND FORECAST



Republic of Palau: Rainfall was abundant throughout the Republic of Palau during the first half of 2009. Six-month rainfall totals of roughly 80 inches at all of the Palau recording sites was 120% of normal. The 86.20 inches of rainfall at the International Airport was the highest value recorded in Palau, and was a bit higher than the 79.53 inches recorded at the Koror WSO. The airport generally receives slightly more rainfall than the WSO in Koror. Likewise, Peleliu is typically drier than the WSO Koror; however, during the first half of 2009, Peleliu recorded slightly more rainfall than the WSO (80.80 inches versus 79.53 inches).

Republic of Palau Rainfall Summary 2nd Qtr 2009						
Station		Apr.	May	June	2nd Qtr	1st Half
WSO Koror	Inches	19.71	11.93	15.51	47.15	79.53
	% Norm	227%	99%	90%	124%	121%
Nekken	Inches	16.33	10.06	17.21	43.60	77.90
	% Norm	173%	89%	98%	115%	118%
Intl. Airport	Inches	20.56	16.27	16.93	53.76	86.20
	% Norm	218%	144%	97%	142%	131%
Peleliu	Inches	22.00	8.76	15.44	46.20	80.08
	% Norm	233%	78%	88%	122%	121%

Climate Outlook: Palau has a complex pattern of monthly rainfall with the highest average rainfall in the months of June and July; the lowest average rainfall in the months of February, March and April; and a secondary minimum in September when the monsoon trough and typhoon tracks pull well to the north. As anticipated in the last PEAC newsletter, the period April to June was wet. During El Niño, the monsoon trough often extends much further to the east than normal. As a result, the rainfall associated with the monsoon trough moves eastward, and dry conditions typically begin to be felt first in Palau in October or November. As the current El Niño is anticipated to be weak to moderate, substantial dryness is not anticipated at this time. **Palau could experience two or three episodes of near-gale (25 to 35 mph) westerly winds associated with tropical cyclones passing to the north at any time between mid-August and the end of the year. Because of its southerly location, it is not anticipated that Palau will experience a direct strike by a strong tropical storm or a typhoon.**

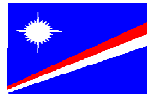
Predicted rainfall for Palau from July 2009 through June 2010 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²
July – September 2009	100% (43.11 inches)
October – December 2009	90%
January – March 2010	90%
April – June 2010	100%

² Forecast rainfall quantities represent BEST ESTIMATES given the probabilistic forecast for each particular season and station.

3rd Quarter, 2009

LOCAL SUMMARY AND FORECAST



Republic of the Marshall Islands (RMI): During the first half of 2009, several locations in the RMI were among the driest in the USAPI, both in terms of observed amount and in terms of percent of normal. Islands in the northern RMI (e.g., Kwajalein and Wotje) were particularly dry with less than 40% of normal rainfall. Even some islands further south such as Majuro and Jaluit were quite dry. The 38.20 inches of rainfall at the WSO Majuro during the first half of 2008 was 68% of normal. Some of the atolls of the northern RMI have been relatively dry for over two years. The return of normal springtime rainfall typically seen during La Niña did not materialize as forecasted. With damaging surf this past winter and persistent dry weather for many months, the RMI was stressed during a period normally associated with good weather. For several months through mid-July 2009, the National Weather Service (NWS) has been issuing special weather statements for very dry conditions in the northern RMI. The NWS cancelled its drought advisory on the 24th of July. The numerical guidance available to forecasters in this region has been quite good in its ability to indicate the continuance of dry conditions in the RMI at lead times of 7 days.

RMI Rainfall Summary 2nd Qtr 2009						
Station		Apr.	May	June	2nd Qtr	1st Half
RMI Central Atolls (6° N - 8° N)						
Majuro WSO	Inches	10.86	5.53	4.50	20.89	38.20
	% Norm	106%	49%	39%	63%	68%
Aling-laplap*	Inches	10.91	5.51	4.97	21.39	39.81
	% Norm	97%	44%	45%	71%	84%
Laura*	Inches	N/A	N/A	N/A	N/A	N/A
	% Norm	N/A	N/A	N/A	N/A	N/A
RMI Southern Atolls (South of 6° N)						
Jaluit*	Inches	9.99	9.03	0.35	19.37	37.50
	% Norm	88%	78%	3%	59%	67%
RMI Northern Atolls (North of 8° N)						
Kwajalein	Inches	5.29	1.58	2.14	9.01	15.00
	% Norm	70%	16%	22%	33%	38%
Wotje*	Inches	4.59	2.20	3.18	9.97	13.64
	% Norm	64%	23%	35%	39%	42%
Utirik*	Inches	N/A	N/A	N/A	N/A	N/A
	% Norm	N/A	N/A	N/A	N/A	N/A

* Normal values are estimated based on WSO Majuro, Kwajalein and satellite-derived precipitation distribution.

Climate Outlook: There has been a persistent tendency for below normal rainfall in the RMI for many months, but now **near normal or slightly below normal rainfall is anticipated for most of the atolls of the RMI for the next several months.** It is now the rainy season in the RMI, and slightly below normal rainfall should still be adequate for fresh-water needs. Because of El Niño, adequate rainfall should continue in the RMI through

LOCAL SUMMARY AND FORECAST

the end of the year. Thereafter, dryness could return at the beginning of 2010, particularly if the El Niño is moderate or strong, and ends in early 2010. A strong El Niño raises the risk of a tropical cyclone in the RMI (e.g., Typhoon Zelda in 1991 and Typhoon Paka in 1997). Since the current El Niño is anticipated to be weak or moderate, a strong tropical storm or typhoon is not anticipated in the RMI; however, a few episodes of heavy rainfall may be experienced from tropical disturbances or tropical storms passing through the region from now through December.

Predicted rainfall for the RMI from July 2009 through June 2010 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²		
	South of 6°N	6°N to 8°N	North of 8°N
July – Sept 2009 (Onset of Rains)	100% (36.32 inches)	100% (36.32 in)	100% (32.48 in)
Oct – Dec 2009 (Rainy Season)	100%	120%	120%
Jan – Mar 2010 (Dry Season)	100%	95%	90%
Apr – June 2010 (End of Dry Season)	100%	90%	85%

² Forecast rainfall quantities represent BEST ESTIMATES given the probabilistic forecast for each particular season and station.



Hawaii: The first half of April included trade winds with daily rainfall recorded along the windward slopes of the Hawaiian Islands. An upper level trough brought enhanced shower activity to the western half of the state on April 9 – 11. Heavy showers over the windward slopes of Oahu on April 10 produced minor flooding, with gages recording 24-hour totals of 1 to 3 inches. A shift in the central North Pacific weather pattern during the second half of April brought winter-like conditions to the Hawaiian Islands, including snowfall over the summits of Mauna Kea and Mauna Loa, and weak to non-existent trade winds. A cold front on April 20 – 21 produced 2 to 5 inches of rainfall in various areas of the state and minor flooding problems on Kauai, Oahu, Molokai, and Maui. Unstable conditions helped boost rainfall totals with more than 8 inches in 24 hours recorded at West Wailuaiki in east Maui. No significant flooding problems were associated with this rainfall event, and many locations throughout the State of Hawaii finished the month with near to below normal totals.

The unusual winter-like weather pattern over the central North Pacific continued during May. However, this did not translate to increased rainfall over the Hawaiian Islands. Normally one of the wettest locations in the world, the U.S. Geological Survey (USGS) gage on Mount Waialeale recorded only 1.51 inches (4% of normal) for the month, unofficially marking the driest May on record at this site. Conversely, the Pali 2 gage located in the Kau Desert of the Big Island recorded the state’s highest monthly total of 5.94 inches (540% of normal), surpassing the combined totals from Mount Waialeale and Puu Kukui – normally the two wettest spots in the state. An unusually late cold front passage on May 17 and 18 produced 1 to 3 inches of rain over windward Oahu and lesser amounts over the rest of the

LOCAL SUMMARY AND FORECAST

state. A surface trough lingering near Kauai and Oahu helped trigger isolated heavy showers on both islands from May 26 – 28 but caused no significant flooding issues.

The weather pattern during the month of June appeared to be more typical of the warm season as trade winds dominated conditions over and around the Hawaiian Islands. There were no heavy rain events in June, but the resumption of trades brought much needed rainfall to windward areas of the state. Leeward areas, especially on Maui and the Big Island, did not receive much rainfall and remain under drought conditions. On June 25, the Maui County Board of Water Supply requested a 5 percent voluntary cut-back on water use for Upcountry Maui residents due to diminishing reservoir water levels. Pasture conditions have also been deteriorating on portions of all the islands and impacts to livestock operations have been increasing.

For up-to-date information about hydrology in Hawaii, please visit: www.prh.noaa.gov/hnl/pages/hydrology.php.

State of Hawaii Rainfall Summary 2ndQtr 2009						
Station		Apr.	May	Jun.	2nd Qtr	1st Half
Lihue Airport	Inches	2.56	0.29	0.54	3.39	8.94
	% Norm	85%	10%	30%	44%	47%
Honolulu Airport	Inches	0.55	0.15	0.04	0.74	6.93
	% Norm	50%	19%	9%	32%	75%
Kahului Airport	Inches	1.42	0.01	0.14	1.57	8.60
	% Norm	81%	2%	61%	59%	78%
Hilo Airport	Inches	11.38	2.13	5.37	18.88	67.24
	% Norm	91%	26%	73%	68%	110%

Climate Outlook: For Hawaii, El Niño typically brings below average rainfall to the islands during the usually wet winter months. El Niño conditions may also produce more frequent and larger episodes of high surf, mainly along north and west facing shores, during the winter months.

The following comments are from the US Climate Prediction Center’s Seasonal Outlook Discussion:

“NCEP models predict a tendency for above normal temperature for Hawaii from August-September-October to October-November-December 2009, and below normal temperature for Hawaii from December-January-February to February-March-April 2010. Below median precipitation for Hawaii is expected from December-January-February to January-February-March 2010 based on the El Niño composite.”

For more information on weather and climate in Hawaii go to
<http://www.prh.noaa.gov/pr/hnl/>
 or
www.cpc.noaa.gov/products/predictions/long_range/fxhw40.html

Seasonal Sea Level Outlook for the US-Affiliated Pacific Islands

The following sections describe: (i) the *Canonical Correlation Analysis (CCA)*-based forecasts of sea level deviations for forthcoming seasons JAS, ASO and SON 2009; (ii) the observed monthly mean and maximum sea-level deviations for the season AMJ 2009, and (iii) forecast verifications (observed/forecast values) for the previous season AMJ 2009. All units are in inches. *Note that 'deviation' is defined here as 'the observed or forecast difference between the monthly mean [or maximum] and the climatological monthly mean values (from the period 1975- 1995) computed at each station'. Also, note that the forecasting technique adapted here does not account for sea level deviations created by other atmospheric or geological conditions such as tropical cyclones, storm surges or tsunamis.*

(i) Seasonal Sea Level Forecast (deviations with respect to climatology) for JAS, ASO and SON 2009 (Table 1). See Figure 2 for locations of tide stations.

Table 1: Forecasts of sea level deviation (in inches) for July-Aug-Sep, Aug-Sep-Oct, and Sep-Oct-Nov 2009.

Tide Gauge Station	Seasonal Mean Deviations ¹				Seasonal Max Deviations ²					
	JAS	ASO	SON	Forecast Quality ³	JAS	ASO	SON	Forecast Quality ³	Return Period ⁴ for JAS Season	
Lead Time ⁵	0	1M	2M		0	1M	2M		20 Year	100 Year
Marianas, Guam	+4	+2	0	Good	+20	+20	+18	Good	6.3	10.9
Malakal, Palau	+2	+2	+1	V. Good	+38	+39	+38	Good	8.1	10.2
Yap, FSM	+2	+2	0	V. Good	+28	+29	+28	Good	8.4	11.3
Chuuk, FSM**	+2	+2	0	N/A	+28	+29	+28	N/A	N/A	N/A
Pohnpei, FSM	0	0	0	Good	+29	+29	+30	V. Good	5.8	7.0
Kapingamarangi, FSM	+1	+1	+2	Good	+27	+27	+28	V. Good	3.5	4.2
Majuro, RMI	0	+1	+1	Good	+40	+41	+41	Good	5.2	6.8
Kwajalein, RMI	+1	+1	+1	Good	+39	+39	+38	Good	4.1	5.2
Pago Pago, AS	+4	+3	+3	V. Good	+28	+28	+27	V. Good	4.1	5.4
Honolulu, Hawaii ⁶	+2	+3	+3	Fair	+22	+21	+21	Fair	3.4	5.7
Hilo, Hawaii ⁶	+3	+3	+3	Fair	+25	+25	+25	Fair	6.4	7.7

Remarks: The forecast for the JAS, ASO, and SON 2009 seasons (Table 1, above) indicates that sea levels will continue to gradually fall toward normal levels over the next three months. Consistent with the recent transition from ENSO-neutral to El Niño, sea levels will remain slightly elevated at all USAPI and Hawaiian stations for the next three months. However, no further rise is expected. As El Niño conditions develop further, sea levels across the USAPI and Hawaii are expected to fall to normal or below normal levels over the next 3-6 months, depending on the strength of the event.

Note: (-) indicates negative deviations (fall of sea level from the mean), and (+) indicates positive deviations (rise of sea level from the mean); N/A: data not available. Deviations from -1 to +1 inch are considered negligible (***), and deviations from -2 to +2 inches are unlikely to cause any adverse climatic impact. Forecasts for Chuuk (**) are estimated subjectively based on information from WSO Chuuk and observations from neighboring stations of Pohnpei and Yap.

Seasonal Mean Deviations (1) is defined as the difference between the mean sea level for the given month and the 1975-1995 mean sea level value at each station. Likewise, **Seasonal Maximum Deviations (2)** is defined as the difference between the maximum sea level (calculated from hourly data) for the given month and the 1975-1995 mean sea level value at each station.

Forecast Quality (3) is a measure of the expected CCA cross-validation correlation skill. Higher skills correspond to greater expected accuracy of the forecasts. In general terms, these kinds of forecasts are thought to be of useful (but poor) skill if the CCA cross-validation value lies between 0.3~0.4. Skill levels greater than 0.4 and 0.6 are thought to be fair and good skills. Skill level greater than 0.7 is thought to be very good. Refer to www.soest.hawaii.edu/MET/Enso/peu/2009_3rd/Sea_Level.htm for cross-validation skills.

Return period (RP) (4) of extreme values are calculated from hourly sea-level data. For example, the predicted rise of 6.3 inches at 20-year RP at Marianas, Guam indicates that this station may experience an extreme tide event once every 20 years that could result in sea level rise of up to 6.3 inches above the median of seasonal maxima during the JAS season. Likewise, about once every 100 years we can expect the highest JAS tide at Marianas, Guam to be as high as 10.9 inches above the median of seasonal maxima. *During some seasons some stations display alarmingly high values at the 20 and 100 year RP. These high values are due to large and significant increases in the tidal range caused by the passage of past storm events during that season.*

Lead time (5) is the time interval between the end of the initial period and the beginning of the forecast period. For example, lead-0, lead-1M, and lead-2M means 'sea level' of target season 0 (JAS), 1 (ASO), and 2 (SON) month leads based on SSTs of AMJ 2009.

Hawaii stations (6) should be considered experimental. Any feedback regarding the usefulness of these forecasts will be appreciated.

Seasonal Sea Level Outlook for the US-Affiliated Pacific Islands

(ii) Observed Monthly Sea Level Deviation in April-May-June (AMJ) 2009 Season

The monthly time series (April—June 2009) for sea level deviations have been taken from the UH Sea Level Center. The full time series (in mm) is available at <ftp://ilikai.soest.hawaii.edu/islp/slpp.deviations>. See Figure 2 (below) for location of these stations.

Table 2 : Monthly observed max/mean sea level deviations in inches (year to year standard deviation in parentheses)

Tide Gauge Station	Monthly Mean Deviations ¹				Monthly Max Deviations ²			
	April	May	June	Standard Deviations	April	May	June	Standard Deviations
Marianas, Guam	+7.8	+7.2	+7.2	(+4.1)	+22.3	+20.8	+22.8	(+3.5)
Malakal, Palau	+5.7	+6.6	+6.8	(+4.5)	+39.7	+41.8	+39.9	(+4.3)
Yap, FSM	+8.2	+6.7	+7.5	(+3.8)	+33.9	+33.5	+34.4	(+4.2)
Chuuk, FSM**	*	*	*	(*)	*	*	*	(*)
Pohnpei, FSM	+6.4	+4.2	*	(+2.4)	+36.5	+33.3	*	(+3.2)
Kapingamarangi, FSM	*	*	*	(+2.8)	+30.8	+29.5	+21.8	(+2.6)
Majuro, RMI	+4.0	+2.2	*	(+2.0)	+39.8	+39.7	*	(+3.1)
Kwajalein, RMI	+2.8	+2.3	+2.2	(+2.3)	+39.7	+37.6	+39.5	(+2.8)
Pago Pago, American Samoa	*	*	*	(+3.9)	*	*	*	(+3.3)
Honolulu, Hawaii	-2.8	-3.3	-1.9	(+1.7)	+15.7	+17.5	+19.5	(+2.4)
Hilo, Hawaii	-2.5	0	0	(+2.2)	+20.5	+27.3	+23.5	(+2.4)

Note: - indicate negative deviations (fall from the mean), and + indicate positive deviations (rise from the mean); *: data not available; Data for Chuuk (***) is estimated subjectively based on information from WSO Chuuk and observations from neighboring stations. Standard deviations describe how widely spread the values are in the dataset. See Table 1 for other notes.

Remarks: The observed values for seasonal mean/maxima sea level remain slightly elevated at all the USAPI stations. The Hawaiian stations, on the other hand, remain near or slightly below normal. These trends (falling sea levels) are consistent with the transition from ENSO-neutral to El Niño that has recently occurred.

(iii) Forecast Verification (Seasonal Mean) for AMJ 2009

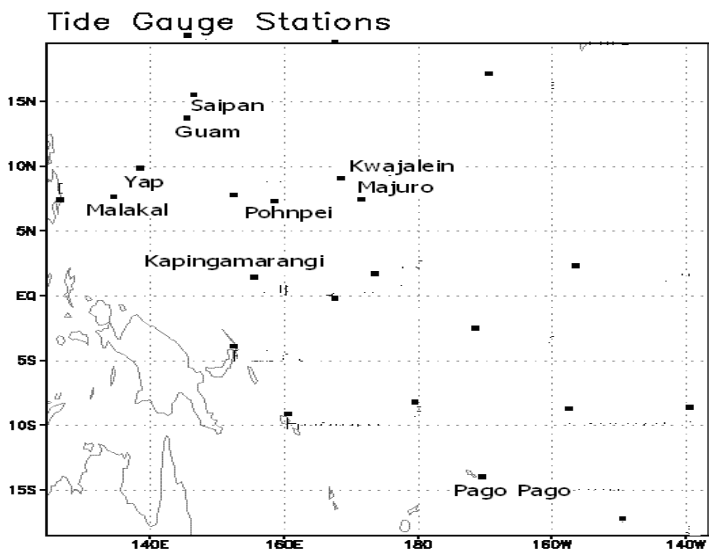


Figure 2, above: Locations of USAPI tide gauge stations.

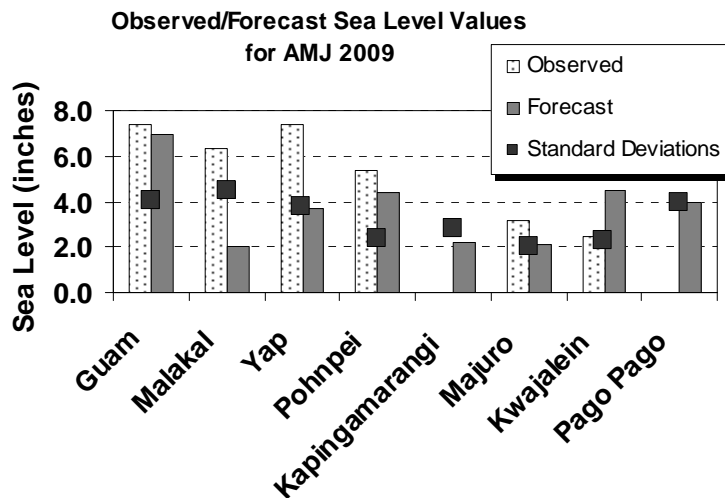


Figure 3: The observed and forecast values for the previous season JFM is presented above. Forecasts were generally skillful; however, Malakal and Yap were under-forecasted by four inches while Kwajalein was over-forecasted by two inches.

Pacific ENSO Update

Excerpts from EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION

Issued by the U.S. Climate Prediction Center (CPC)

9 July 2009

ENSO Alert System Status: El Niño Advisory

Synopsis: El Niño conditions will continue to develop and are expected to last through the Northern Hemisphere Winter 2009-2010.

During June 2009, conditions across the equatorial Pacific Ocean transitioned from ENSO-neutral to El Niño conditions. Sea surface temperature (SST) anomalies continued to increase, with the latest weekly departures exceeding +1.0°C along a narrow band in the eastern equatorial Pacific. All of the weekly SST indices increased steadily during June and now range from +0.6°C to +0.9°C. Subsurface oceanic heat content anomalies (average temperatures in the upper 300m of the ocean) also increased as the thermocline continued to deepen. Consistent with the oceanic evolution, the low-level equatorial trade winds were weaker-than-average across much of the Pacific basin, and convection became increasingly suppressed over Indonesia. This coupling of the ocean and atmosphere indicates the development of El Niño conditions.

Model forecasts of SST anomalies for the Niño-3.4 region reflect a growing consensus for the continued development of El Niño (+0.5°C or greater in the Niño-3.4 region). However, the spread of the models indicates disagreement over the eventual strength of El Niño (+0.5°C to +2.0°C). Current conditions and recent trends favor the continued development of a weak-to-moderate strength El Niño into the Northern Hemisphere Fall 2009, with further strengthening possible thereafter.

Expected El Niño impacts during July-September 2009 include enhanced precipitation over the central and west-central Pacific Ocean, along with the continuation of drier than average conditions over Indonesia. Temperature and precipitation impacts over the United States are typically weak during the Northern Hemisphere Summer and early Fall, and generally strengthen during the late Fall and Winter.

The Pacific ENSO Update is a bulletin of the Pacific El Niño-Southern Oscillation (ENSO) Applications Climate (PEAC) Center. PEAC conducts research & produces information products on climate variability related to the ENSO climate cycle in the U.S.-Affiliated Pacific Islands (USAPI). This bulletin is intended to supply information for the benefit of those involved in such climate-sensitive sectors as civil defense, resource management, and developmental planning in the various jurisdictions of the USAPI.

The Pacific ENSO Update is produced quarterly both online and in hard copy, with additional special reports on important changes in ENSO conditions as needed. For more information about this issue please contact the editor, LTJG Julie Earp, at peac@noaa.gov or at the address listed below.

PEAC is part of the Weather Forecast Office (WFO) Honolulu's mission and roles/responsibilities. All oversight and direction for PEAC is provided by the Weather Forecast Office Honolulu in collaboration with the Joint Institute for Marine and Atmospheric Research (JIMAR) at the University of Hawaii. Publication of the Pacific ENSO Update is supported by the National Oceanic and Atmospheric Administration (NOAA), National Weather Service-Pacific Region Climate Services. The views expressed herein are those of the author(s) and do not necessarily reflect the views of NOAA, any of its sub-agencies, or cooperating organizations.

ACKNOWLEDGEMENTS AND FURTHER INFORMATION

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