

*pacific*

# ENSO

*update*

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**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](http://www.soest.hawaii.edu/MET/Enso)

## CURRENT CONDITIONS

**According to the U.S. Climate Prediction Center (CPC), the present oceanic and atmospheric anomalies are consistent with the continuation of ENSO-neutral conditions in the tropical Pacific.** Although the word “neutral” might imply that conditions are “middle-ground” or “near normal”, the tropical Pacific atmospheric circulation patterns during recent months have been quite unusual.

While the commonly used climate indices (Southern Oscillation Index, Oceanic Niño Index, Multivariate ENSO Index, etc.) support the claim of ENSO-neutral conditions, recent circulation anomalies in the Pacific basin have exhibited characteristics of BOTH La Niña and El Niño simultaneously. For example, low-level equatorial westerly winds over the Eastern Pacific and low-level equatorial easterlies over the Indian Ocean are consistent with El Niño. The tendency for anomalously suppressed convection over the Maritime Continent region is also consistent with weak El Niño conditions. Conversely, the Central Pacific has been cooler than average, and sea-levels across Micronesia remain higher than average (with values typically seen during La Niña). The persistent brisk trade winds across Micronesia, along with below normal cloudiness and a shift of tropical cyclone activity to the north and west, are also typical of La Niña.

Strong and persistent low-level equatorial easterly wind anomalies over the western North Pacific associated with this pattern have almost completely suppressed the normal hot bed of tropical cyclone activity over the deep tropics (see the PEAC tropical summary). The overall basin-wide tranquil weather has led to extraordinary departures from normal seasonal rainfall across the U.S.-Affiliated Pacific Islands (USAPI) (see Figure 1). Unusually persistent trade winds have dominated the weather across Micronesia. The monsoon trough was absent, and tropical cyclones stayed out of the region. There were no notable extremes of wind and few extremes of rainfall at any location during the 3rd Quarter of 2008.

Surely, coupled ocean-atmosphere climate dynamics related to the present state of ENSO are responsible for much of the basin’s unusual weather patterns. This year’s strange collection of climate anomalies offers strong motivation to extend our characterizations of ENSO beyond the oversimplification of labeling the ENSO state strictly as El Niño, La Niña, or ENSO-neutral. This is not a one-time occurrence; the weak El Niño of 2006-2007 had many La Niña characteristics in the western North

Pacific. Feedback from the Pacific Island communities is encouraged and welcome.

**Near normal rainfall is anticipated throughout much of Micronesia during the next 3 to 6 months. Tropical cyclone activity, which has been very quiet in Micronesia and throughout much of the western North Pacific for the past two years, should remain suppressed for the remainder of 2008.** (See each island’s summary for the meaning of a “normal” versus a “suppressed” tropical cyclone threat.)

Sea-level variation in the USAPI is sensitive to the ENSO-cycle, with low sea-level observed during El Niño years and high sea-level during La Niña years. Sea-levels have been above normal since early 2007. Current forecasts indicate that sea-levels will remain slightly elevated at all USAPI stations for another 1 to 3 months, although sea-level at all locations should begin slowly receding toward normal.

The following comments from the EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION were posted on the U.S. Climate Prediction Center web site on October 9, 2008:

**Synopsis: ENSO-neutral conditions are expected to continue into early 2009.**

“ENSO-neutral conditions continued during September 2008... Sea-surface temperatures (SSTs) remained slightly below-average in the central Pacific, and slightly above-average in the eastern Pacific.”

“Although ENSO-neutral conditions have been in place since June 2008, the atmospheric circulation over the western and central tropical Pacific continues to reflect lingering aspects of La Niña... Overall, the ocean-atmosphere system remains consistent with ENSO-neutral conditions.”

“Most of the dynamical and statistical SST forecasts for the Niño 3.4 region indicate a continuation of ENSO-neutral conditions (-0.5°C to 0.5°C in the Niño-3.4 region) into the first half of 2009. While the model spread continues to include possibilities ranging from El Niño to La Niña, the recent decrease in subsurface and surface temperatures favors a return to La Niña over the development of El Niño. However, based on current atmospheric and oceanic conditions, recent trends, and model forecasts, ENSO-neutral conditions are expected to continue into early 2009.”

SEA SURFACE TEMPERATURES

SOUTHERN OSCILLATION INDEX

Sea Surface Temperatures (SST)

ENSO-neutral conditions continued during September 2008, as sea surface temperatures (SSTs) remained near-average in the east-central equatorial Pacific Ocean. SSTs remained slightly below-average in the central Pacific, and slightly above-average in the eastern Pacific. From west to east, the latest weekly SST index values range from -0.2°C in the Niño-4 region to +0.3°C in the Niño 1+2 region. The subsurface oceanic heat content (average temperatures in the upper 300m of the ocean) continued to decrease in response to the strengthening of negative temperature anomalies at thermocline depth in the east-central Pacific. Although ENSO-neutral conditions have been in place since June 2008, the atmospheric circulation over the western and central tropical Pacific continues to reflect lingering aspects of La Niña.

Southern Oscillation Index (SOI)

The 3-month average of the Southern Oscillation Index for the 3rd Quarter of 2008 was +0.8, with monthly values of +0.2, +0.8, and +1.5 for the months of July, August and September 2008, respectively. 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.

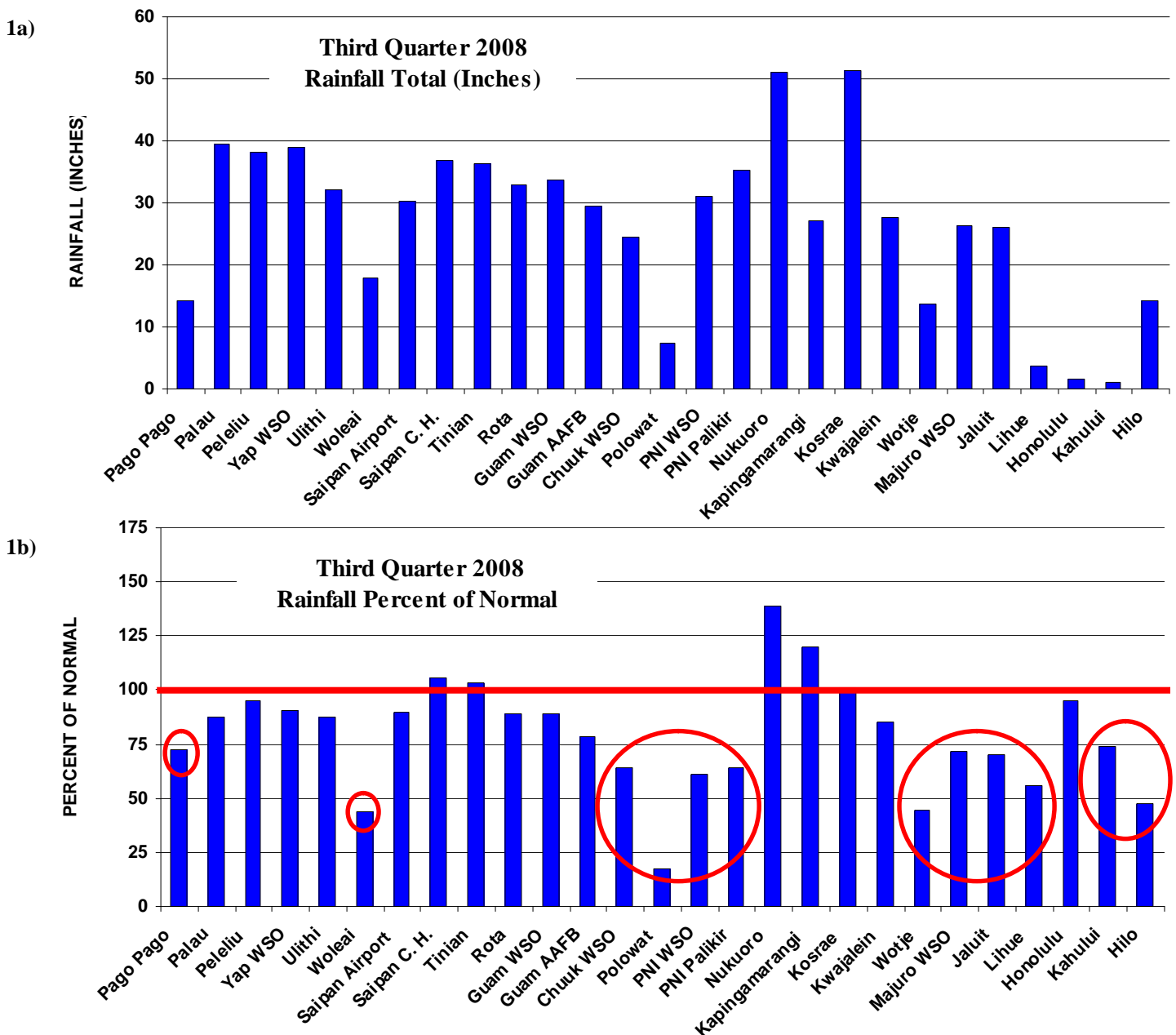


Figure 1, above. 3rd Quarter 2008 rainfall totals (a) in inches and (b) anomalies (expressed as % of normal). In 1b, solid line indicates normal rainfall (100%) and circles indicate rainfall less than 75% of normal.

**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**

**No tropical cyclones have adversely affected any locations within the USAPI during the past six months.** Through October 2008, the JTWC numbered 23 tropical cyclones in the western North Pacific basin. This is close to the normal number that might be expected to occur, however, tropical cyclone activity in the western North Pacific has been very unusual through the heart of the 2008 typhoon season. The season started relatively slowly in the spring (although the month of May was busy), and the summer activity was displaced far from its usual location. One of the most extraordinary climate anomalies of 2008 has been the displacement of the western North Pacific tropical cyclone activity far to the north and west of normal. This behavior is typical of La Niña (especially those La Niña years that follow El Niño), and the degree to which the tropical cyclone activity was displaced during 2008 was not anticipated.

In the Central North Pacific, Hurricane Boris formed in the Eastern Pacific on July 1 but weakened to a tropical depression by July 4. Tropical Storm Elida developed in the East Pacific in July 12 and intensified to hurricane strength by July 14, becoming the second hurricane of the Eastern Pacific season. Upon reaching cooler waters of the Central Pacific, Hurricane Elida weakened briefly to a tropical storm on July 18 before dissipating into a disturbance well to the southeast of the Hawaiian Islands. The remnants of the former Hurricane Genevieve passed south of the Hawaiian islands August 3 - 4, bringing a brief boost to windward rainfall with peak 24-hour totals of 1 to 4 inches at several locations. On August 6, Tropical Storm Kika formed far southeast of Hawaii and moved harmlessly over open water, passing several hundred miles south of Johnston Atoll before dissipating. The remnants of Hurricane Hernan passed south of the Big Island of Hawaii on August 16, but did not provide much enhanced rainfall to the islands.

**PEAC Center Tropical Cyclone Outlook**

**The PEAC Center outlook for tropical cyclones in the western North Pacific basin for the remainder of 2008 (November through December) calls for suppressed tropical activity, particularly within Micronesia. The anticipated distribution of tropical cyclones for the remainder of 2008 substantially reduces the risk of a damaging tropical storm or typhoon at all islands located eastward of 140°E longitude.** For example, Guam (located at 145°E) will experience a well-below normal risk, while the RMI (located at 170°E) will have almost no risk of a damaging tropical cyclone. The risk of a damaging tropical cyclone at Yap or Palau (both located to the west of 140°E) will be closer to normal, but still unlikely. The upcoming hurricane season for American Samoa is also anticipated to be relatively quiet. (See island summaries for further details.)

The PEAC Center 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 J. C-L. Chan ([http://aposf02.cityu.edu.hk/tc\\_forecast/2008\\_forecast\\_APR.htm](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/>).

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LOCAL SUMMARY AND FORECAST



**American Samoa:** After a particularly wet 2nd Quarter, American Samoa passed through the heart of its 2008 dry season with drier than normal rainfall. Pago Pago International Airport recorded below-average rainfall during the months of July, August and September, for a 3rd Quarter total of 14.18 inches (73% of normal).

American Samoa Rainfall Summary 3rd Qtr 2008						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predicted <sup>1</sup>
Pago Pago WSO	Inches	4.46	3.59	6.13	14.18	19.55
	% Norm	77%	56%	83%	73%	100%
A'asufou	Inches	7.10	N/A	N/A	N/A	38.41
	% Norm	62%	N/A	N/A	N/A	100%

<sup>1</sup> Predictions made in 2nd Quarter 2008 newsletter.

**Climate Outlook:** Computer forecasts and a consensus of outlooks from several regional meteorological centers indicate that rainfall in American Samoa is likely to be slightly below normal for the next few months as the next rainy season becomes established.

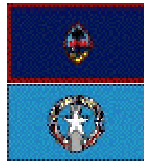
The 2008-2009 hurricane season is about to begin in the American Samoa region. **Anticipated atmospheric circulation anomalies will once again favor reduced tropical cyclone activity in the region of American Samoa.** Islands in the Coral Sea eastward to Fiji will likely be the site of much of the Southern Hemisphere's upcoming summer tropical cyclone activity. Low-level easterly wind anomalies will likely suppress the typical summer excursions of the Australian Northwest Monsoon into areas east of the International Date Line. **Only one or two episodes of gusty northwesterly winds are anticipated in American Samoa, with only one or two tropical cyclones posing a threat. (One or two tropical cyclones may pass safely to the south and/or west of American Samoa with mild effects on the islands.)**

Predicted rainfall from October 2008 through September 2009 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) <sup>2</sup>
Oct - Dec 2008 (Onset of Next Rainy Season)	80% (27.66 inches - Pago Pago)
January - March 2009 (Heart of Next Rainy Season)	100%
April - May 2009 (Onset of Next Dry Season)	100%
June - October 2009 (Heart of Next Dry Season)	100%

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

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**Guam/CNMI:** Overall, the 3<sup>rd</sup> Quarter of 2008 was drier than normal at most Guam and CNMI locations, with 3-month rainfall totals on Guam and in the CNMI generally between 30-35 inches. July and August were particularly dry at most locations as a long-lasting period of tranquil weather persisted. Because of a persistent large-scale pattern of light low-level easterly winds and an unusual lack of tropical cyclones, there were no unusual extremes of heavy rainfall or high winds observed at any Guam or CNMI location. During September, some tropical disturbances contributed to the highest monthly rainfall for the year at many locations. Throughout the 3<sup>rd</sup> Quarter, light wind conditions led to convective showers that were highly variable. In Central Guam (e.g., Sinajaña and the UOG), diurnal thunderstorm activity produced some lo-

cal activity. In the UOG, diurnal thunderstorm activity produced some lo-

Guam and CNMI Rainfall Summary 3rd Qtr 2008						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predicted <sup>1</sup>
<b>Guam</b>						
GIA (WFO)	Inches	10.42	7.84	15.47	33.73	37.75
	% Norm	99%	57%	115%	89%	100%
AAFB	Inches	7.96	8.88	12.58	29.42	37.75
	% Norm	73%	66%	93%	78%	100%
Dededo (Ypapao)*	Inches	9.96	9.96	12.86	32.78	37.75
	% AAFB	95%	73%	95%	87%	100%
Ugum Watershed **	Inches	11.66	9.38	12.80	33.84	41.52
	% WSMO	100%	58%	93%	82%	100%
Sinajaña ***	Inches	12.90	6.76	18.21	37.87	37.75
	% WFO	123%	49%	135%	100%	100%
<b>CNMI</b>						
Saipan Intl. Airport	Inches	9.68	9.23	11.24	30.15	33.50
	% Norm	120%	74%	86%	90%	100%
Capitol Hill	Inches	14.04	7.31	15.56	36.91	35.15
	% Norm	180%	71%	144%	105%	100%
Tinian Airport	Inches	11.72	9.09	15.41	36.22	35.17
	% Norm	130%	73%	114%	103%	100%
Rota Airport	Inches	11.82	7.44	13.72	32.98	37.06
	% Norm	113%	56%	103%	89%	100%

<sup>1</sup> Predictions made in 2nd Quarter 2008 newsletter.

\* % 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.

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cally heavier rainfall amounts that were not experienced on other parts of the island. (Note the difference between the Andersen AFB September total of 12.58 versus Sinaña's 18.21 inches.) A relatively heavy rainfall event in early October was the first of sufficient magnitude to wash the central mountain streams of Guam of their accumulated burden of algae, palm fronds, dead leaves and choking stream bank vegetation. An unusual effect of the two-year-running lack of extreme rainfall events on Guam has been the increase in the number of large paper wasp nests overhanging some of the streams. Normally washed out of the stream channels by flash floods, the paper wasps are now becoming an increasing menace to hikers.

**Climate Outlook: For the remainder of 2008, perhaps one tropical storm or typhoon may pass within 200 miles of any Guam or CNMI location (this represents a substantial reduction of risk).** If ENSO-neutral conditions persist through the first half of 2009, the typhoon activity may return to near normal in the western North Pacific basin, providing Guam and the CNMI with a slight threat (1 in 15 odds) of adverse effects from a spring tropical cyclone. If La Niña conditions redevelop, then the reduction of tropical cyclone activity noted in the region for the past two years will continue.

Rainfall is anticipated to be near normal to slightly below normal for Guam and the CNMI for the remainder of 2008, and into the first few months of 2009. No extremes of rainfall, wet (i.e., 4 inches or more in a 24-hour period), or dry (i.e., a month with less than 1 inch of rain), are anticipated through the first half of 2009.

Predicted rainfall for Guam and the Mariana Islands from October 2008 through September 2009 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) <sup>2</sup>	
	Guam/Rota	Saipan/Tinian
Oct – Dec 2008 (End of Rainy Season)	<b>90%</b> (23.07 inches)	<b>90%</b> (19.85 inches)
Jan – March 2009 (Onset of Next Dry Season)	<b>90%</b>	<b>90%</b>
Apr – June 2009 (End of Next Dry Season)	<b>100%</b>	<b>100%</b>
July - September 2009 (Next Rainy Season)	<b>100%</b>	<b>100%</b>

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

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Federated States of Micronesia

**Yap State:** The same monthly pattern of rainfall seen at Guam and in the CNMI (a dry July and August followed by a wet September) was noted at all Yap Island locations and at Ulithi. Tropical disturbances passing through the region caused some widespread heavier rainfall events during September, yet it was not enough to overcome the dry conditions of July and August. The 3<sup>rd</sup> Quarter of 2008 yielded below normal rainfall totals at all Yap State sites. The WSO on Yap Island was the only location in Micronesia (other than the four Kosrae sites) to have a monthly rainfall value in excess of 20 inches during any month of the 3<sup>rd</sup> Quarter. This is direct evidence of the very tranquil weather conditions that have persisted in the region for more than two years.

Yap State Rainfall Summary 3rd Qtr 2008						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predicted <sup>1</sup>
<b>Yap Island</b>						
Yap WSO	Inches	7.70	10.62	20.68	39.00	<b>41.19</b>
	% Norm	53%	70%	153%	90%	<b>100%</b>
Dugor*	Inches	7.57	8.35	16.31	32.23	<b>41.19</b>
	% WSO	57%	58%	121%	78%	<b>100%</b>
Gilman*	Inches	9.13	8.68	18.16	35.97	<b>41.19</b>
	% WSO	69%	60%	134%	87%	<b>100%</b>
Luweech*	Inches	5.89	8.34	16.58	30.81	<b>41.19</b>
	% WSO	44%	58%	123%	75%	<b>100%</b>
Maap*	Inches	4.46	13.02	12.41	29.89	<b>41.19</b>
	% WSO	34%	90%	92%	73%	<b>100%</b>
North Fanif*	Inches	11.47	9.18	13.24	33.89	<b>41.19</b>
	% WSO	87%	64%	98%	82%	<b>100%</b>
Rumung*	Inches	8.92	12.91	13.35	35.18	<b>41.19</b>
	% WSO	67%	90%	99%	85%	<b>100%</b>
Tamil*	Inches	9.42	10.64	15.65	35.71	<b>41.19</b>
	% WSO	71%	74%	116%	87%	<b>100%</b>
<b>Outer Islands</b>						
Ulithi	Inches	4.10	12.80	15.26	32.16	<b>36.97</b>
	% Norm	33%	99%	133%	87%	<b>100%</b>
Woleai	Inches	5.54	7.23	5.01	17.78	<b>44.45</b>
	% Norm	40%	49%	43%	44%	<b>110%</b>

<sup>1</sup> Predictions made in 2nd Quarter 2008 newsletter.  
\* Long term normal is not established for these sites.

**Climate Outlook:** Based on an expected continuation of the current tranquil weather pattern, rainfall should be near normal throughout most of Yap State for the next few months.

**There is a slight risk of a damaging tropical cyclone in Yap State or its northern atolls in November or December of 2008;** about the only place in Micronesia where there will be any tangible risk of gales (or stronger) from a

For more information on Guam's weather and climate go to <http://www.prh.noaa.gov/guam>

LOCAL SUMMARY AND FORECAST

tropical cyclone. The level of threat (5% chance) of damaging winds from a tropical storm or typhoon at Yap Island and at Ulithi, however, is relatively low. The threat is even less to the southeast at Woleai.

Predicted rainfall for Yap State from October 2008 through September 2009 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) <sup>2</sup>	
	Yap and Ulithi	Woleai
October – December 2008 (End of Rainy Season)	<b>110%</b> (33.45 inches)	<b>90%</b> (36.21 inches)
January – April 2009 (Next Dry Season)	<b>100%</b>	<b>100%</b>
May – June 2009 (Onset of Next Rainy Season)	<b>120%</b>	<b>90%</b>
July – September 2009 (Heart of Next Rainy Season)	<b>100%</b>	<b>100%</b>

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

**Chuuk State:** Chuuk State was relatively dry throughout most of the 3<sup>rd</sup> Quarter of 2008. Very dry conditions in July and August were followed by a wet September, a pattern also seen nearly everywhere else in Micronesia. The 3-month total rainfall ranged from about 25 to 30 inches throughout Chuuk State. Polowat’s 3-month total of only 7.38 inches (17%) looks suspiciously low, but is somewhat in-line with low values of rainfall at Woleai (Yap State) where the 3-month total was reported to be 17.78 inches (44%). No problems were reported from within Chuuk State with respect to the dry conditions in July and August.

Chuuk State Rainfall Summary 3rd Qtr 2008						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predicted <sup>1</sup>
<b>Chuuk Lagoon</b>						
<b>Chuuk WSO</b>	<b>Inches</b>	7.46	3.27	13.85	<b>24.58</b>	<b>39.80</b>
	<b>% Norm</b>	62%	22%	120%	<b>64%</b>	<b>110%</b>
<b>Piis Panew*</b>	<b>Inches</b>	3.81	4.67	10.24	<b>18.72</b>	<b>39.80</b>
	<b>% WSO</b>	31%	37%	89%	<b>49%</b>	<b>110%</b>
<b>Southern Mortlocks</b>						
<b>Lukunoch*</b>	<b>Inches</b>	11.54	5.14	10.63	<b>27.31</b>	<b>39.80</b>
	<b>% WSO</b>	95%	41%	93%	<b>71%</b>	<b>110%</b>
<b>Ettal*</b>	<b>Inches</b>	7.01	8.67	10.22	<b>25.90</b>	<b>39.80</b>
	<b>% WSO</b>	58%	69%	89%	<b>68%</b>	<b>110%</b>
<b>Ta*</b>	<b>Inches</b>	8.99	8.93	15.34	<b>33.60</b>	<b>39.80</b>
	<b>% WSO</b>	74%	71%	134%	<b>87%</b>	<b>110%</b>
<b>Namoluk*</b>	<b>Inches</b>	8.56	5.77	10.64	<b>24.97</b>	<b>39.80</b>
	<b>% WSO</b>	71%	46%	93%	<b>65%</b>	<b>110%</b>

<sup>1</sup> Predictions made in 2nd Quarter 2008 newsletter.  
\* Long term normal is not established for these sites.

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Chuuk State Rainfall Summary 3rd Qtr 2008						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predicted <sup>1</sup>
<b>Northern Atolls</b>						
<b>Fananu*</b>	<b>Inches</b>	3.77	5.15	9.06	<b>17.98</b>	<b>39.80</b>
	<b>% WSO</b>	31%	41%	79%	<b>47%</b>	<b>110%</b>
<b>Onoun*</b>	<b>Inches</b>	9.07	5.14	14.56	<b>28.77</b>	<b>39.80</b>
	<b>% WSO</b>	75%	41%	127%	<b>75%</b>	<b>110%</b>
<b>Northern Mortlocks</b>						
<b>Losap*</b>	<b>Inches</b>	14.19	4.29	12.32	<b>30.80</b>	<b>39.80</b>
	<b>% WSO</b>	117%	34%	107%	<b>81%</b>	<b>110%</b>
<b>Nama*</b>	<b>Inches</b>	11.74	4.65	9.67	<b>26.06</b>	<b>39.80</b>
	<b>% WSO</b>	97%	37%	84%	<b>68%</b>	<b>110%</b>
<b>Western Atolls</b>						
<b>Polowat</b>	<b>Inches</b>	2.72	2.12	2.54	<b>7.38</b>	<b>36.19</b>
	<b>% WSO</b>	22%	17%	22%	<b>19%</b>	<b>100%</b>

<sup>1</sup> Predictions made in 2nd Quarter 2008 newsletter.  
\* Long term normal is not established for these sites

**Climate Outlook:** Based on a continuation of the pattern of anomalous low-level easterly wind, **the risk of a tropical storm or typhoon is very unlikely anywhere in Chuuk State through the remainder of 2008 through the first half of 2009. In addition, this same easterly wind pattern should be accompanied by near normal rainfall for the foreseeable future.**

Predictions for Chuuk State from October 2008 through September 2009 are as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) <sup>2</sup>			
	Chuuk Lagoon, Northern Mortlocks	Polowat	Northern Atolls and Islands	Southern Mortlocks
Oct – Dec 2008	<b>100%</b> (35.55 inches)	<b>90%</b> (32.0 in)	<b>100%</b> (35.55 in)	<b>100%</b> (35.55 in)
Jan – Mar 2009	<b>100%</b>	<b>90%</b>	<b>100%</b>	<b>110%</b>
Apr – June 2009	<b>110%</b>	<b>100%</b>	<b>100%</b>	<b>120%</b>
Jul – Sep 2009	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

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

**Pohnpei State:** The 3<sup>rd</sup> Quarter rainfall was below normal almost everywhere across Pohnpei State, with the month of August being notably dry. The 5.69 inches of rainfall at the WSO in Kolonia was only 34% of the normal August value. During September, rainfall amounts increased to values closer to normal. The pattern of a dry July and August, followed by a wetter September, was seen throughout Micronesia. During September, the basin weather patterns were closer to normal, and a few vigorous and widespread tropical disturbances passed through the



LOCAL SUMMARY AND FORECAST

region. Kapingamarangi typically enters its 3-month dry season in August, and though the rainfall values for August and September were relatively low, they were still slightly above normal.

Pohnpei State Rainfall Summary 3rd Qtr 2008						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predicted <sup>1</sup>
<b>Pohnpei Island</b>						
Pohnpei WSO	Inches	12.26	5.69	13.84	31.03	52.83
	% Norm	67%	34%	86%	61%	110%
Palikir	Inches	11.68	10.91	12.61	35.20	60.50
	% Norm	N/A	N/A	N/A	64%	110%
Kolonia Airport	Inches	8.83	7.65	12.25	28.73	47.17
	% Norm	N/A	N/A	N/A	67%	110%
<b>Atolls of Pohnpei State</b>						
Nukuoro	Inches	18.35	13.38	19.40	51.13	40.46
	% Norm	127%	118%	176%	139%	110%
Pingelap	Inches	8.64	7.14	14.79	30.57	50.19
	% Norm	54%	48%	99%	67%	110%
Mwoakilloa	Inches	9.32	8.76	13.37	31.45	45.52
	% Norm	N/A	N/A	N/A	76%	110%
Kapingamarangi	Inches	14.00	6.92	6.06	26.98	20.23
	% Norm	134%	112%	103%	120%	90%

<sup>1</sup> Predictions made in 2nd Quarter 2008 newsletter.

**Climate Outlook:** Based on a continuation of the pattern of anomalous low-level easterly winds, **the risk of a tropical storm or typhoon is very unlikely anywhere in Pohnpei State through the remainder of 2008 into the first half of 2009. In addition, this same easterly wind pattern should be accompanied by near normal rainfall for the foreseeable future.** As in the spring of 2008, the rainfall during the spring of 2009 (especially during April and May) could once again be quite wet, at Sapwuafik (Ngetik) and Nukuoro in particular.

Predicted rainfall for Pohnpei State from October 2008 through September 2009 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) <sup>2</sup>	
	Pohnpei Island and atolls	Kapingamarangi
Oct - Dec 2008	100% (46.91 inches)	100% (21.85 inches)
Jan - Mar 2009	100%	100%
Apr - Jun 2009	120%	100%
Jul - Sep 2009	100%	100%

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

LOCAL SUMMARY AND FORECAST

**Kosrae State:** The pattern of a dry July and August followed by a wetter September was also seen at Kosrae. However, the rainfall total was near normal for the entire 3-month period. During September, all recording locations on Kosrae reported over 20 inches of rain, with Tofol on the east side of the island recording 25.59 inches. There were few places anywhere in the USAPI that had more than 20 inches of rain in any month of 2008.

Kosrae State Rainfall Summary 3rd Qtr 2008						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predicted <sup>1</sup>
Airport (SAWRS)	Inches	14.76	13.49	23.08	51.33	50.70
	% Norm	87%	82%	134%	101%	100%
Utwa*	Inches	13.49	12.74	20.68	46.64	50.70
	% WSO	79%	77%	120%	92%	100%
Nautilus Hotel*	Inches	10.42	14.91	20.35	45.68	50.70
	% WSO	61%	90%	118%	90%	100%
Tofol*	Inches	14.73	13.33	25.59	53.65	50.70
	% WSO	87%	81%	149%	106%	100%

<sup>1</sup> Predictions made in 2nd Quarter 2008 newsletter.

\* Long term normal is not established for these sites.

**Climate Outlook:** The risk of a damaging tropical storm or typhoon is very unlikely at Kosrae during the remainder of 2008 through the first half of 2009. Based on the continuation of anomalously strong low-level easterly wind flow, **rainfall at Kosrae should be near normal for the foreseeable future.**

Forecast rainfall for Kosrae State from October 2008 through September 2009 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) <sup>2</sup>
October – December 2008	100% (46.60 inches)
January – March 2009	110%
April – June 2009	110%
July - September 2009	95%

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



**Republic of Palau:** Palau had below normal rainfall during the 3<sup>rd</sup> Quarter of 2008.

The same general pattern of rainfall which occurred throughout Micronesia (a dry July and August followed by a wet September) also occurred at Palau. For most of July and August, the monsoon was weak, absent or displaced well to the north, and there was a notable absence of tropical cyclone activity in the low latitudes of the basin. In fact, a high pressure ridge ran through southern

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Yap State and Palau during much of the time. During September a few more vigorous and widespread tropical disturbances passed through the western half of Micronesia bringing some episodes of heavy rain showers to many locations including Palau. This helped to boost the September rainfall. The 3<sup>rd</sup> Quarter total rainfall of 39.37 inches at the WSO Koror was 88% of normal. The rainfall at the International Airport has been consistently heavier than at the Koror WSO, whereas the rainfall at Peleliu is usually lower.

Republic of Palau Rainfall Summary 3rd Qtr 2008						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predicted <sup>1</sup>
WSO Koror	Inches	9.04	14.10	16.23	39.37	47.42
	% Norm	50%	94%	137%	88%	110%
Nekken	Inches	10.42	11.66	21.45	43.53	47.42
	% WSO	61%	81%	184%	97%	110%
Intl. Airport	Inches	11.19	21.98	17.76	50.93	47.42
	% WSO	66%	152%	152%	114%	110%
Peleliu	Inches	8.04	13.95	16.26	38.25	47.42
	% WSO	47%	96%	140%	85%	110%

<sup>1</sup> Predictions made in 2nd Quarter 2008 newsletter.

**Climate Outlook:** There is a slight risk of a damaging tropical cyclone in the Republic of Palau in November or December of 2008. The level of threat is quite low (less than a 5% chance), but higher than at islands eastward of 140°E, where there is almost no risk from adverse effects from a tropical storm or typhoon under present conditions.

Based on an expected continuation of the current tranquil weather pattern, **the rainfall throughout the Republic of Palau should be near normal or slightly wetter than normal for the foreseeable future.**

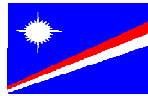
Predicted rainfall for Palau from October 2008 through September 2009 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) <sup>2</sup>
October – December 2008	110% (41.10 inches)
January – March 2009	100%
April – June 2009	120%
July – September 2009	100%

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

For more information on Palau's weather and climate go to <http://www.prh.noaa.gov/koror/>

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**Republic of the Marshall Islands (RMI):**

The rainfall throughout most of the atolls of the Republic of the Marshall Islands was below normal during the 3<sup>rd</sup> Quarter of 2008. The 3-month total of 26.36 inches at Majuro WSO, in the central RMI, was 71% of its normal rainfall. In the northern RMI, Kwajalein was dry with 85% of its normal 3-month total; Jaluit was even drier, having only received 45% of its normal 3-month total. Because we are now in the wetter months of the year, the municipal water supply on Majuro (a rain-water catchment system that collects water from the airport's runway) should remain at or above adequate levels.

**Climate Outlook:** The rainy season in the RMI extends through December. Therefore, even with slightly below normal rainfall, there should be enough precipitation to ensure adequate water supplies through the end of the year. With the onset of the dry season in January, below normal rainfall could result in some water stress, especially in the northern atolls. However, no extreme dryness is anticipated at this time. **Given the underlying climate pattern, it is reasonable to expect that near normal to slightly below normal rainfall will continue for the next three to six months.** Based on a persistence of the Micro-

RMI Rainfall Summary 3rd Qtr 2008						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predicted <sup>1</sup>
RMI Central Atolls (6° N - 8° N)						
Majuro WSO	Inches	10.11	8.40	7.85	26.36	34.50
	% Norm	78%	73%	63%	71%	95%
Laura*	Inches	8.74	N/A	11.12	N/A	34.50
	% WSO	70%	N/A	93%	N/A	95%
Arno*	Inches	N/A	N/A	N/A	N/A	34.50
	% WSO	N/A	N/A	N/A	N/A	95%
Aling-laplap*	Inches	7.35	N/A	N/A	29.85	34.50
	% WSO	59%	N/A	N/A	70%	95%
RMI Southern Atolls (South of 6° N)						
Jaluit*	Inches	6.34	6.54	13.09	25.97	36.32
	% WSO	51%	55%	109%	70%	100%
RMI Northern Atolls (North of 8° N)						
Kwajalein	Inches	11.62	6.83	9.20	27.65	30.86
	% Norm	111%	68%	78%	85%	95%
Wotje*	Inches	1.94	5.52	6.19	13.65	30.86
	% Norm	20%	56%	55%	45%	95%
Utirik*	Inches	N/A	N/A	N/A	N/A	30.86
	% Norm	N/A	N/A	N/A	N/A	95%

<sup>1</sup> Predictions made in 2nd Quarter 2008 newsletter.

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



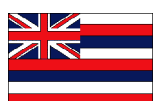
LOCAL SUMMARY AND FORECAST

nesia-wide low-level easterly wind anomalies, the RMI has a very low risk of a typhoon during the foreseeable future.

Predicted rainfall for the RMI from July 2008 through June 2009 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) <sup>2</sup>		
	South of 6°N	6°N to 8°N	North of 8°N
Oct – Dec 2008 (End of Rains)	95% (36.14 inches)	90% (34.23 in)	90% (27.13 in)
Jan – March 2009 (Dry Season)	95%	85%	80%
April – June 2009 (Onset of Rains)	110%	90%	90%
July – Sept 2009 (Rainy Season)	100%	100%	90%

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



**Hawaii:** Drought conditions continue to affect the entire state of Hawaii, as every county now has at least one location with some level of voluntary or mandatory water use conservation measure in place. In July, trade wind showers finally returned to expected summer levels, helping to stabilize drought conditions along the windward slopes of the Hawaiian Islands. The remnant of former tropical cyclone Elida brought frequent showers to the Big Island and Maui on July 22 and 23. Despite the return of trade wind showers, water use conservation notices and restrictions remained in place across the state.

Tropical activity affected the island chain throughout the month of August, including the remnants of former Hurricanes Genevieve (August 3 - 4) and Hernan (August 16). Of the two hurricane remnants, Genevieve's impact was more significant, bringing a brief boost to windward rainfall with peak 24-hour totals of 1 to 4 inches at several locations. Hernan's remnant moisture mainly affected the Big Island and did not provide much enhanced rainfall. On August 26, the City and County of Honolulu's Board of Water Supply requested windward Oahu residents to cut back on water use by 10% on a voluntary basis.

Unlike the month of August, organized tropical weather systems did not play a significant role in shaping September rainfall across the island chain. An upper level low pressure system near Kauai helped support brief heavy afternoon showers over portions of Kauai and Oahu from September 11 - 14. A second, more persistent upper level low settled in near Kauai from September 21 - 25, triggering heavy showers over the Kona slopes during the late afternoon of September 21. On September 30, a weak cold front swept across the state and brought 0.25 to 0.50 inches of rain to several areas, and as much as 1 to 2

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inches over some of the upper slopes. This frontal passage was noteworthy because it came unusually early; the first frontal passage of Hawaii's wet season normally occurs during the latter half of October.

Water use conservation notices and restrictions continue to remain in place through early October, including a mandatory 30% reduction in irrigation water use for the Waimanalo Reservoir system and a mandatory 20% reduction for the Kualapu'u Reservoir system in west Molokai. Residents of central and Upcountry Maui remain under a request for voluntary reductions in water use by 10% and 5%, respectively. Effects of the drought so far have been greatest on the agriculture sector, especially in the cattle industry where some ranchers have reported stocking rates reduced by at least 50%, very poor pasture conditions, and even livestock deaths. The ongoing drought prompted the U.S. Department of Agriculture to declare the State of Hawaii a primary disaster area on August 1 for agriculture interests.

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

State of Hawaii Rainfall Summary 3rd Qtr 2008					
Station		July	Aug.	Sep.	3rd Qtr
Lihue Airport	Inches	0.96	1.15	1.65	3.76
	% Norm	45%	60%	61%	56%
Honolulu Airport	Inches	0.80	0.38	0.44	1.62
	% Norm	160%	83%	59%	95%
Kahului Airport	Inches	0.47	0.42	0.15	1.04
	% Norm	96%	79%	38%	74%
Hilo Airport	Inches	6.17	3.72	4.27	14.16
	% Norm	58%	38%	47%	48%

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

"NCEP models predict a tendency for below normal temperature for Hilo from November-December-January to December-January-February 2008-09. A tendency for above normal temperature us expected for Hilo from February-March-April to April-May-June 2009... for Kahului and Honolulu from January-February-March to April-May-June 2009... and for Lihue from December-January-February to April-May-June 2009. **Models also predict below normal precipitation for all Hawaii stations from January-February-March to March-April-May 2009.**"

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](http://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 OND, NDJ and DJF 2008-09; (ii) the observed monthly mean and maximum sea-level deviations for the season JAS 2008, and (iii) forecast verifications (observed/forecast values) for the previous season JAS 2008. 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 OND, NDJ and DJF 2008-09 (Table 1). See Figure 2 for locations of tide stations.

**Table 1: Forecasts of sea level deviation (in inches) for Oct-Nov-Dec, Nov-Dec-Jan, and Dec-Jan-Feb 2008-09.**

Tide Gauge Station	Seasonal Mean Deviations <sup>1</sup>				Seasonal Max Deviations <sup>2</sup>					
	OND	NDJ	DJF	Forecast Quality <sup>3</sup>	OND	NDJ	DJF	Forecast Quality <sup>3</sup>	Return Period <sup>4</sup> for OND Season	
Lead Time <sup>5</sup>	0	1M	2M		0	1M	2M		20 Year	100 Year
Marianas, Guam	+3	+3	+3	V. Good	+18	+18	+18	Good	6.5	9.1
Malakal, Palau	+4	+2	+2	V. Good	+40	+39	+37	V. Good	6.1	6.4
Yap, FSM	+3	+2	+2	V. Good	+30	+29	+28	V. Good	8.2	11.0
Chuuk, FSM**	+3	+2	+2	N/A	+30	+29	+28	N/A	N/A	N/A
Pohnpei, FSM	+4	+4	+4	V. Good	+34	+35	+33	V. Good	9.1	11.8
Kapingamarangi, FSM	+3	+3	+3	Good	+26	+26	+29	Fair	5.7	6.4
Majuro, RMI	+3	+2	+2	V. Good	+30	+31	+31	V. Good	6.6	8.4
Kwajalein, RMI	+2	+1	+1	V. Good	+40	+40	+39	V. Good	4.9	6.1
Pago Pago, Am. Samoa	+1	+2	+1	Good	+24	+25	+25	Good	3.0	3.7
Honolulu, Hawaii <sup>6</sup>	+1	+1	0	Fair	+20	+20	+21	Fair	3.2	5.2
Hilo, Hawaii <sup>6</sup>	+1	0	0	Good	+23	+24	+24	Good	5.5	6.8

**Remarks:** The positive sea-level deviations forecast for the OND, NDJ, and DJF seasons (Table 1, above) indicate that sea-levels will remain slightly elevated at all USAPI and Hawaii stations for the next 1 to 3 months. From OND 2008 to DJF 2009, mean sea-levels are expected to begin receding back toward normal levels, consistent with the transition from La Niña to ENSO-neutral conditions that occurred in June 2008. Mean and maximum sea-levels are expected to remain 0 - 3 inches above median values at each station during the forthcoming seasons.

**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/2008\\_4th/Sea\\_Level.htm](http://www.soest.hawaii.edu/MET/Enso/peu/2008_4th/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 6.5 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 6.5 inches **above the median of seasonal maxima** during the OND season. Likewise, about once every 100 years we can expect the highest OND tide at Marianas, Guam to be as high as 9.1 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 (OND), 1 (NDJ), and 2 (DJF) month leads based on SSTs of JAS 2008.

**Hawaii stations (6)** are newly added and 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 July-August-September (JAS) 2008 Season

The monthly time series (July—September) 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 <sup>1</sup>				Monthly Max Deviations <sup>2</sup>			
	July	Aug.	Sept.	Standard Deviations	July	Aug.	Sept.	Standard Deviations
Marianas, Guam	+9.3	+9.8	+9.1	(+3.6)	+26.4	+25.5	+23.6	(+3.6)
Malakal, Palau	+7.5	+8.1	+8.3	(+4.3)	+40.5	+42.6	+42.5	(+4.3)
Yap, FSM	+7.5	+7.2	+8.3	(+4.3)	+30.3	+33.2	+31.8	(+4.3)
Chuuk, FSM**	*	*	*	(*)	*	*	*	(*)
Pohnpei, FSM	+4.4	+3.7	*	(+3.0)	+33.5	+32.9	*	(+3.7)
Kapingamarangi, FSM	***	***	+1.1	(+2.5)	+27.8	+27.3	+22.8	(+2.7)
Majuro, RMI	+1.7	+1.6	*	(+2.5)	+40.6	+41.9	*	(+3.1)
Kwajalein, RMI	+3.3	+3.5	+2.9	(+2.4)	+39.2	+42.5	+37.8	(+2.8)
Pago Pago, American Samoa	+3.6	+3.5	+2.2	(+2.9)	+28.1	+28.1	+22.8	(+3.4)
Honolulu, Hawaii	+3.0	+4.6	+3.4	(+1.8)	+26.1	+25.7	+18.7	(+2.4)
Hilo, Hawaii	+3.2	+2.4	+3.9	(+1.8)	+27.0	+28.8	+21.8	(+2.4)

**Note:** - indicate negative deviations (fall from the mean), and + indicate positive deviations (rise from the mean); N/A: 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 displayed positive deviations in all the USAPI stations during the July - August - September 2008 season. No significant fall of sea-level was recorded during JAS 2008, although levels have been expected to start receding back toward normal. Sea-levels remain influenced by the lingering La Niña affects in the atmospheric circulation pattern over the western and central tropical Pacific.

(iii) Forecast Verification (Seasonal Mean) for JAS 2008

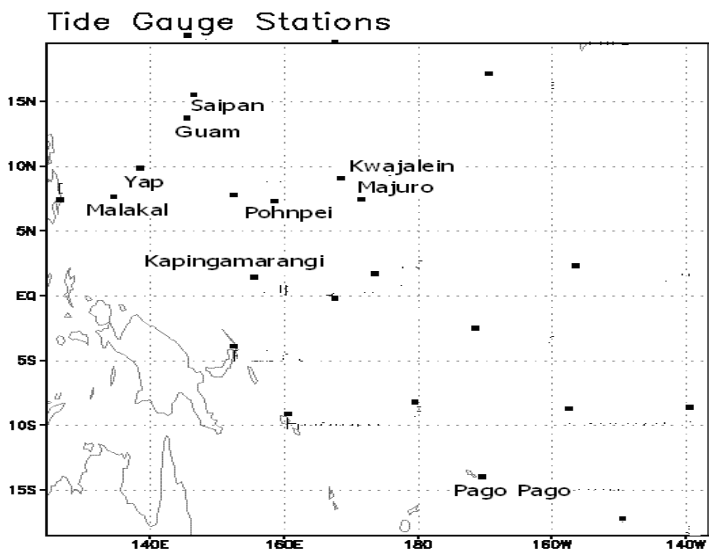


Figure 2, above: Locations of USAPI tide gauge stations.

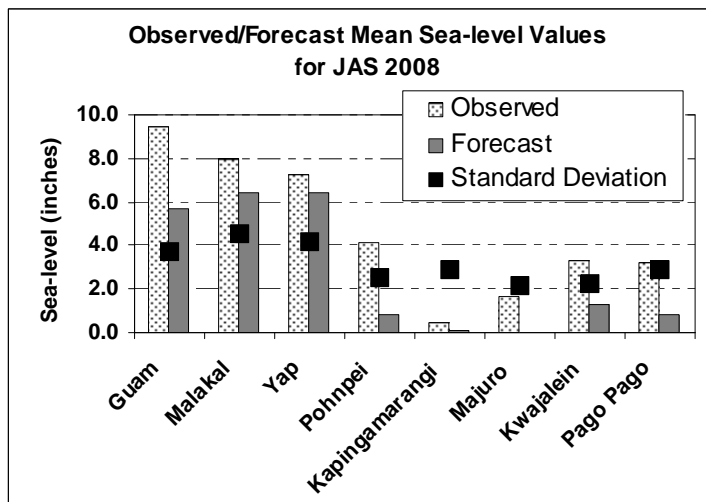


Figure 3: The observed and forecast values for the previous season JAS is presented above. Forecasts were in general skillful; however, all locations were under-forecast by 1 to 3 inches.

# Pacific ENSO Update

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## Excerpts from El Niño/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION

Issued by NOAA NWS Climate Prediction Center - 9 October 2008

[http://www.cpc.noaa.gov/products/analysis\\_monitoring/enso\\_advisory/index.shtml](http://www.cpc.noaa.gov/products/analysis_monitoring/enso_advisory/index.shtml)

*Synopsis: ENSO-neutral conditions are expected to continue into early 2009.*

ENSO-neutral conditions continued during September 2008, as sea surface temperatures (SSTs) remained near-average in the east-central equatorial Pacific Ocean. SSTs remained slightly below-average in the central Pacific, and slightly above-average in the eastern Pacific. From west to east, the latest weekly SST index values range from  $-0.2^{\circ}\text{C}$  in the Niño-4 region to  $+0.3^{\circ}\text{C}$  in the Niño 1+2 region. The subsurface oceanic heat content (average temperatures in the upper 300m of the ocean) continued to decrease in response to the strengthening of negative temperature anomalies at thermocline depth in the east-central Pacific.

Although ENSO-neutral conditions have been in place since June 2008, the atmospheric circulation over the western and central tropical Pacific continues to reflect lingering aspects of La Niña. The MJO accentuated this signal during early-to-mid September, and suppressed it during the latter part of the month. The combined monthly average signal featured enhanced low-level easterly winds and upper-level westerly winds in the central Pacific, with convection enhanced over Indonesia and suppressed over the central Pacific. Overall, the ocean-atmosphere system remains consistent with ENSO-neutral conditions.

Most of the dynamical and statistical SST forecasts for the Niño 3.4 region indicate a continuation of ENSO-neutral conditions ( $-0.5^{\circ}\text{C}$  to  $0.5^{\circ}\text{C}$  in the Niño-3.4 region) into the first half of 2009. While the model spread continues to include possibilities ranging from El Niño to La Niña, the recent decrease in subsurface and surface temperatures favors a return to La Niña over the development of El Niño. However, based on current atmospheric and oceanic conditions, recent trends, and model forecasts, ENSO-neutral conditions are expected to continue into early 2009.

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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 Sarah Jones, at [peac@noaa.gov](mailto: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.

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## ACKNOWLEDGEMENTS AND FURTHER INFORMATION

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Dr. Rashed Chowdhury, Principal Research Scientist, at 808-956-2324  
for information on ENSO and sea level variability in the USAPI.

### **UNIVERSITY OF HAWAII (UH)**

**JOINT INSTITUTE OF MARINE AND ATMOSPHERIC RESEARCH (JIMAR),**

**SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY (SOEST),**

**DEPARTMENT OF METEOROLOGY:**

HIG #350, 2525 Correa Road, Honolulu, Hawaii 96822  
Dr. Tom Schroeder, PEAC Principal Investigator at 808-956-7476  
for more information on hurricanes and climate in Hawaii.

### **NOAA NATIONAL WEATHER SERVICE**

**WEATHER FORECAST OFFICE (WFO) HONOLULU:**

HIG #250, 2525 Correa Rd., Honolulu, HI, 96822  
James Weyman, PEAC Director, at 808-973-5270

**WEATHER FORECAST OFFICE (WFO) GUAM:**

3232 Hueneme Road, Barrigada, Guam, 96913  
Chip Guard, Warning Coordination Meteorologist,  
at 671-472-0900 for information on tropical cyclones  
and climate in the USAPI.

### **UNIVERSITY OF GUAM**

**WATER AND ENVIRONMENTAL RESEARCH INSTITUTE (WERI):**

UOG Station, Mangilao, Guam 96913  
Dr. Mark Lander, PEAC Meteorologist, at 671-735-2685  
for information on tropical cyclones and climate in the USAPI.