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Providing Information on Climate Variability for the U.S.-Affiliated Pacific Islands

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 development of La Niña conditions in the tropical Pacific. Many of the islands of Micronesia are typically slightly wetter than normal during a La Niña year, unless it is the year directly following El Niño, in which case most islands are drier than normal (particularly during the first half of the year). The month-to-month variability of rainfall is not as great during La Niña as it is during El Niño, primarily a result of the westward shift of tropical cyclone development during La Niña. The typhoon threat is reduced at most islands during La Niña, especially for islands east of the longitude of Guam (145° E).

During the 3rd Quarter of 2007, most of the islands of Micronesia had rainfall totals that were below normal. Many locations (especially those further to the east) had 3-month rainfall totals that were less than 80% of normal. Saipan (Capitol Hill), Palikir (Pohnpei Island), and Wotje (Northern RMI) received less than 70% of the normal rainfall expected during these three months, which are in the heart of the rainy season. Only two locations (American Samoa and Kapingamarangi, FSM) had 3rd Quarter 2007 rainfall totals in excess of 120% of normal **(Figs. 1a and 1b)**. The highest 3rd Quarter rainfall total recorded in Micronesia was the 52.16 inches at the Palau International Airport, followed closely by the 51.78 inches at Luweech on Yap Island. The lowest recorded 3rd Quarter 2007 rainfall total was the 17.73 inches of rain at Utirik in the northern RMI, followed closely by the 18.47 inches recorded at Wotje (also in the northern RMI). During the 3rd Quarter of 2007, individual monthly rainfall totals exceeding 20 inches occurred only at some locations in the Republic of Palau, some locations on Yap Island, at Kapingamarangi, and in American Samoa. Individual monthly rainfall totals of less than 10 inches occurred at Guam, the CNMI, Chuuk State, Pohnpei State, the central and northern RMI, and even at Kosrae where the 9.28 inches of rain during August was about 60% of the normal for that month.

Near normal rainfall is anticipated throughout much of Micronesia during the next 3 to 6 months. Tropical cyclone activity, which has been very quiet throughout the entire western North Pacific during 2007, should return to near normal in Micronesia for the remainder of 2007. (See each island summary for the meaning of a "normal" tropical cyclone threat.)

Considerable sea level was recorded across all USAPI locations in the July-August-September season, with some stations (such as Malakal, Palau and Marianas, Guam) recording more than 8 inches of rise in a month. While many stations recorded rise in the previous three quarters, the rise during the 3rd Quarter of 2007 is particularly great. As mentioned, the sea-level variability in the Pacific Islands is sensitive to ENSO-events, with low sea-level typically recorded during El Niño and high sea-level during La Niña events. Consistent with the shift toward La Niña conditions, the sea level has been rising in the vicinity of the USAPI since January. With the continued development (and possible strengthening) of La Nina conditions over the next several months, we may expect to observe several inches of sea-level rise in all of these stations during the upcoming seasons.

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 11, 2007:

Synopsis: La Niña will likely continue into early 2008.

"La Niña conditions strengthened during September 2007, as negative SST anomalies along the equator expanded westward and now extend from 170ºE to the South American coast… The magnitude of the negative SST anomalies increased in all of the Niño regions... And the upper-ocean heat content in the central and east-central equatorial Pacific remained below average during September. Consistent with these conditions, the low-level easterly winds and upper-level westerly winds remained stronger than average across the central equatorial Pacific, convection remained suppressed throughout the central and eastern equatorial Pacific, and enhanced convection again covered parts of Indonesia and the far western Pacific. Collectively, these oceanic and atmospheric conditions reflect a strengthening La Niña."

"The recent SST forecasts (dynamical and statistical models) for the Niño 3.4 region indicate a weak-to-moderate La Niña continuing into early 2008. Current atmospheric and oceanic conditions and recent trends indicate that La Niña will continue and may strengthen during the next 3 months."

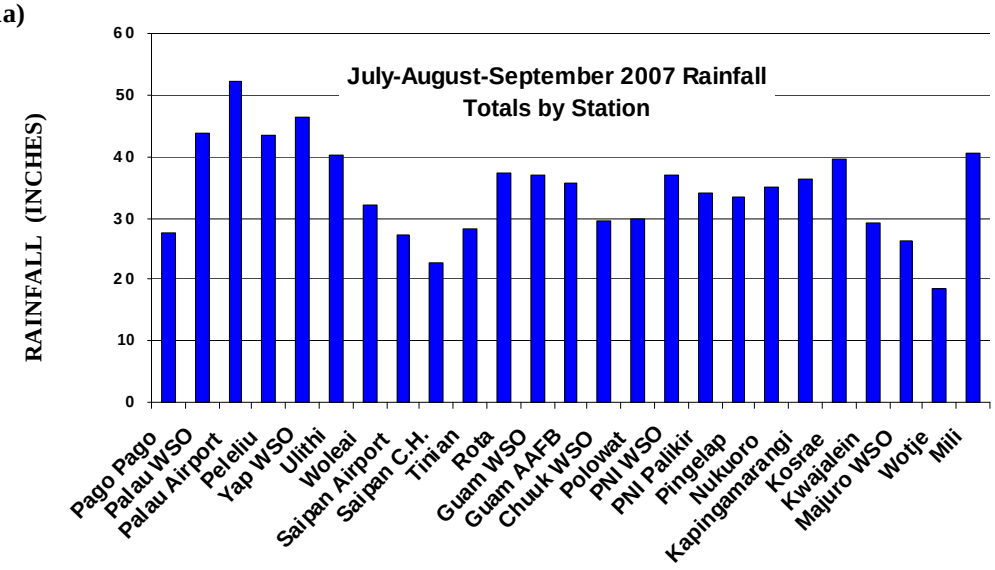
"Expected La Niña impacts during October – December include a continuation of above-average precipitation over Indonesia and below-average precipitation over the central equatorial Pacific…"

Sea Surface Temperature and Southern Oscillation Index

SST (Sea Surface Temperatures)

Sea surface temperatures (SST) in the equatorial eastern Pacific have been cooler than average since January 2007. Over the past several months, below average SSTs have expanded westward, and negative anomalies now extend from the Date Line to the west coast of South America. By mid-October, equatorial Pacific SSTs were more than 0.5ºC below average east of 170°E, and more than 1ºC below average between 160ºW and the South American coast. SSTs were more than 0.5ºC above average in much of the western Pacific. During August – September 2007 equatorial sub-surface temperatures were generally below average in the region east of the Date Line, while positive temperature departures were confined to the western Pacific. The most recent period shows negative anomalies between the surface and 150 m depth across the central and eastern half of the equatorial Pacific Ocean, with the largest departures between 120°W and 90°W. Current equatorial Pacific SST trends indicate La Niña conditions will likely strengthen during the next several months.

1a)



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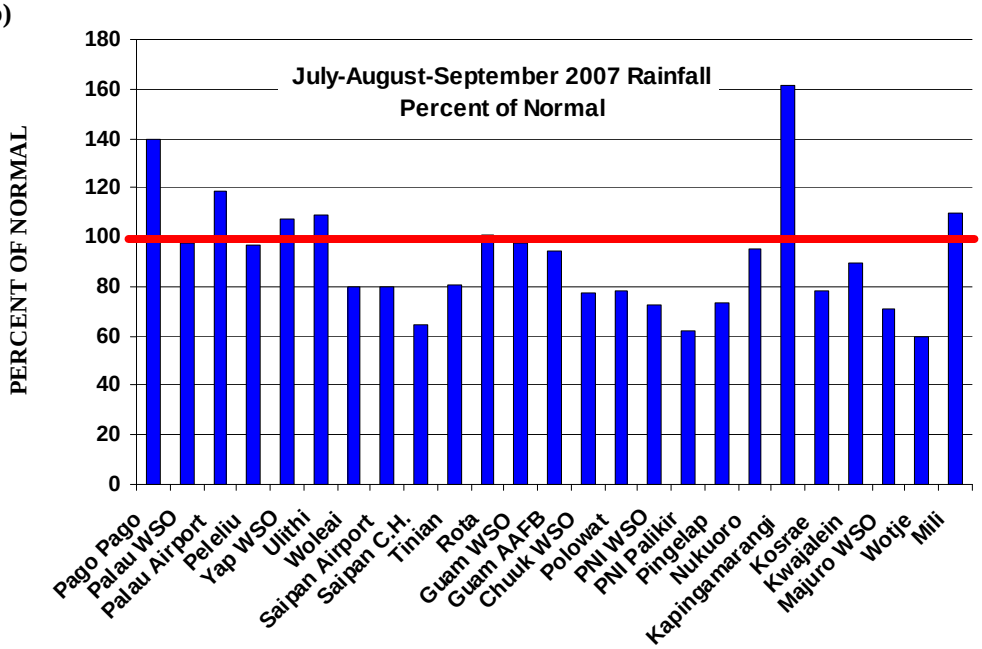

SOI (Southern Oscillation Index)

The 3-month average of the Southern Oscillation Index was -0.1 for the 3rd Quarter of 2007, with monthly values of -0.5, +0.1 and +0.2 for the months of July – September 2007, respectively. Monthly SOI values will likely become increasingly positive over the next several months, as La Niña conditions continue to develop into early 2008.

Normally, positive values of the SOI in excess of +1.0 are associated with La Niña conditions, and negative values of the SOI 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, left. 3rd Quarter 2007 Rainfall (a) totals in inches and (b) anomalies (expressed as percent of normal) at indicated stations. Solid line indicates normal (100% of average) rainfall.

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 U. S. 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 at Brisbane, Nadi, and 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.

TROPICAL CYCLONE

Tropical Activity Summary

The 2007 tropical cyclone season of the western North Pacific has been relatively quiet. Through October 15, the JTWC numbered only 18 tropical cyclones in the western North Pacific. The JMA named 16 of these. (Two systems — Haiyan and Podul — were named by the JMA, but not carried by the JTWC.) Of the 18 tropical cyclones numbered by the JTWC, the breakdown by intensity was: 11 typhoons (TY), 6 tropical storms (TS), and 1 tropical depression (TD). Normally there are approximately 22 tropical storms and typhoons (TS + TY) through October with a breakdown of 15 typhoons and 7 tropical storms. Four more typhoons and one tropical storm are needed by the end of October to bring 2007 back to a normal year (somewhat unlikely). In addition to a reduction in the annual number of tropical cyclones in the western North Pacific basin during 2007, the region of tropical cyclone formation was pushed well to the west and north of normal. Through mid-October 2007, no tropical cyclones formed south of 20°N and east of 160°E; a region designated as the "El Niño Box" by Lander (1994) **(Fig. 2, below)**. Tropical cyclone formation is observed in the "El Niño Box" primarily during El Niño years and almost no tropical cyclones form in this region during non El Niño years.

Two named storms in the Central Pacific approached the Hawaiian Islands in the 3rd Quarter. On July 21, Tropical Depression Cosme passed 160 NM south of South Point on the Island of Hawaii, where there was no appreciable increase in the winds. Three weeks later on August 14-15, Hurricane Flossie approached the Hawaiian Islands, but turned west and quickly weakened to a tropical depression before passing south of the Big Island. No significant wind- or flood-related damages were reported from Flossie, although heavy surf caused minor coastal inundation problems on the Big Island.

PEAC Center Tropical Cyclone Outlook

The PEAC outlook for tropical cyclones in the western North Pacific basin made during early 2007 called for below-normal activity in every category (e.g., number of typhoons and number of intense typhoons). Through mid-October 2007, this has held true, with one exception: there have been four super typhoons (those typhoons with peak intensities of 130 kt 1-minute sustained wind or higher). This is the normal annual number of such high-intensity typhoons. The PEAC forecast also called for typhoon activity to be displaced to the west because of La Niña. This has been the case throughout the year. No typhoons have made a direct strike anywhere in Micronesia during 2007.

The PEAC TC outlook for the rest of 2007 is for activity to recover to near normal (for the time of year) in the western half of Micronesia (Palau, Yap, Guam and the CNMI), and remain below normal in the eastern half of Micronesia (all island groups from Chuuk eastward). The coming cyclone season in the South Pacific should be near normal for areas west of the International Date Line, and near or below normal to the east of the Date Line. Thus, the risk of a damaging cyclone in American Samoa should be less than normal

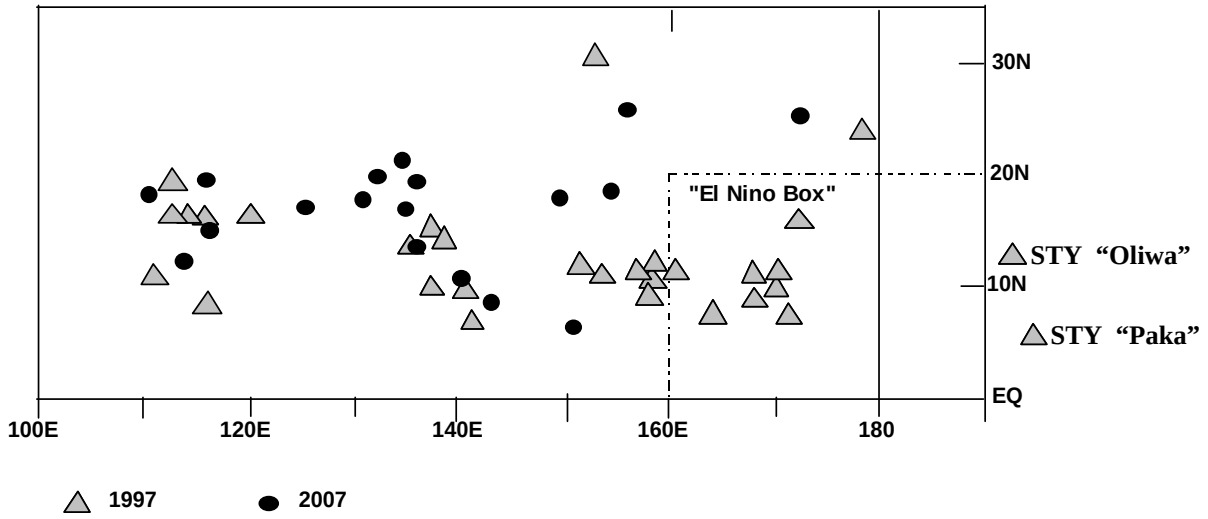

Figure 2. The formation locations of the tropical cyclones of 1997 (triangles) and 2007 (black dots). The formation location of each tropical cyclone is defined as that point on the JTWC best track where the cyclone first acquired 25 kt wind speeds. Note the several tropical cyclones in the "El Niño Box" during the El Niño year of 1997, and the lack of tropical cyclone formation in this region during 2007 (a year evolving into La Niña).

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LOCAL SUMMARY AND FORECAST

American Samoa: Monthly rainfall for the 3rd quarter of 2007 was highly variable across American Samoa, due to the actively shifting location of the South Pacific Convergence Zone (SPCZ). In July, Pago Pago recorded near normal rainfall (98% of normal) while Aasufou recorded slightly lower than normal rainfall (77% of normal). August was considerably drier, with both sites receiving below normal rainfall for the month. September marked the return of abundant rainfall across American Samoa, as Pago Pago ended the month with 231% of normal rainfall, and Aasufou with 182.2% of normal rainfall. Overall, the 3rd Quarter of 2007 ended with above-normal rainfall for both Pago Pago (140% of normal) and Aasufou (106% of normal). — WSO Pago Pago

American Samoa Rainfall Summary 3rd Qtr 2007

Station		July	Aug.	Sep.	3rd Qtr	Predicted [1]
Pago Pago WSO	Rain (Inches)	5.67	4.74	17.02	**27.43**	**16.65**
	% of Normal	98%	74%	231%	**140%**	**85%**
Aasufou	Rain (Inches)	8.86	8.65	21.63	**39.14**	**31.39**
	% of Normal	77%	57%	182%	**106%**	**85%**

[1] Predictions made in the 2nd Quarter 2007 PEAC Newsletter

Climate Outlook: American Samoa is now in the heart of its rainy season. With the continued development of La Niña conditions, American Samoa is expected to receive near normal to slightly above normal rainfall through early 2008. However, month-to-month rainfall may be quite variable depending on the location and activity of the South Pacific Convergence Zone (SPCZ).

The threat of a tropical cyclone in the islands of American Samoa is expected to be lower than normal as La Niña forces a shift of tropical cyclone activity to the west. Only one or two named cyclones are expected to pass close to American Samoa during the period December 2007 to April 2008, bringing heavy rain and northwesterly winds approaching gale force. A direct strike by an intense hurricane such as occurred during February 2005 is not expected.

Forecast rainfall for American Samoa from November 2007 through October 2008 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) [2]
Nov 2007 – Dec 2008 (Onset of Next Rainy Season)	**120% (29.45 inches - Pago Pago)**
Jan – Apr 2008 (Heart of Next Rainy Season)	**110%**
May – July 2008 (Onset of Next Dry Season)	**100%**
Aug – Oct 2008 (Heart of Next Dry Season)	**100%**

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

LOCAL SUMMARY AND FORECAST

Guam/CNMI: For all of June, July, August and September, the weather on Guam has been rather tranquil. Winds have been very light (easterly for the most part, with a few periods of light westerly wind flow), only one tropical cyclone (Man-Yi) adversely affected the island (it generated near-gale winds for one day in early July), and there have been no extreme island-wide heavy rainfall events. In association with La Niña, monsoon southwest winds remained mostly to the west of Guam, and tropical cyclone development was also pushed to the west and north of Guam. In an environment of light wind, rainfall was produced on-island by short-lived (6-12 hr) mesoscale convective systems, and by isolated (mostly daytime) thunderstorms that affected only parts of the island on any given day. Daytime thunderstorms have produced isolated heavy rain-

Guam and CNMI Rainfall Summary 3rd Qtr 2007

Station		July	Aug.	Sep.	3rd Qtr	Predicted [1]
Guam						
GIA	Rain (Inches)	7.40	16.01	13.59	**37.00**	**35.87**
	% of Normal	70%	117%	101%	**98%**	**95%**
AAFB	Rain (Inches)	13.08	13.05	9.57	**35.73**	**35.73**
	% of Normal	120%	97%	72%	**95%**	**95%**
University of Guam	Rain (Inches)	7.94	13.03	13.18	**34.15**	**35.26**
	% of WSO	N/A	N/A	N/A	**92%***	**95%**
Ugum Watershed	Rain (Inches)	7.23	14.33	15.35	**36.91**	**35.06**
	% of WSO	N/A	N/A	N/A	**100% ****	**95%**
CNMI						
Saipan Intl. Airport	Rain (Inches)	4.40	12.55	10.27	**27.22**	**32.32**
	% of Normal	54%	100%	76%	**80%**	**95%**
Capitol Hill	Rain (Inches)	7.01	7.43	8.15	**22.59**	**33.02**
	% of Normal	78%	59%	60%	**65%**	**95%**
Tinian Airport	Rain (Inches)	5.52	11.51	11.23	**28.26**	**33.14**
	% of Normal	61%	92%	83%	**81%**	**95%**
Rota Airport	Rain (Inches)	6.61	13.61	17.16	**37.38**	**35.16**
	% of Normal	53%	103%	128%	**101%**	**95%**

[1] Predictions made in the 2nd Quarter 2007 PEAC Newsletter
* % of normal are with respect to WSMO Finigayan
** % of normal are with respect to the WSO Tiyan (GIA)

LOCAL SUMMARY AND FORECAST

fall totals near 2 or 3 inches in a few hours at some locations, however, and over the course of a month, rainfall amounts in this weather pattern tend to average near to slightly below normal. Surprisingly, the highest 3rd Quarter rainfall on Guam was at the WSO where the 3-month total was 37.00 inches (98% of normal). Three-month rainfall totals at other locations were lower: 32.71 inches at Ypapao, 34.15 inches at the UOG, 35.70 inches at AAFB, and 36.91 inches at the upper Ugum watershed in the southern mountains.

A similar tranquil weather pattern dominated the CNMI for the heart of the summer rainy season (June through mid-October). Most rainfall stations reported about ten inches less total rainfall than on Guam. In terms of percent of normal rainfall, it was drier in much of the CNMI than on Guam. Among all Guam and CNMI reporting stations, the island of Rota in the CNMI topped the 3rd Quarter rainfall list with 37.38 inches (101% of normal). Elsewhere in the CNMI, rainfall totals for the 3rd Quarter averaged around 25 inches.

Climate Outlook: During La Niña years, the tropical cyclone season in the western North Pacific basin is often delayed, and the number of tropical cyclones through mid-July is typically below normal. Also during La Niña years, the site of formation of the basin's tropical cyclones is shifted to the west. There is a tendency for typhoon activity to return to near normal in the latter part of the year, although the westward shift continues. This reduces the threat of typhoons on Guam, the CNMI, and for those islands from Chuuk eastward to the RMI. For the remainder of 2007 (and January 2008), one or two tropical storms and one typhoon may pass within 200 miles of any Guam and CNMI location. (This represents a lower than normal risk of adverse impact by a tropical storm or typhoon for this time of year.) Rainfall is anticipated to be near- to above- normal for Guam and the CNMI for the remainder of 2007, and to be near normal through the dry season of 2008.

Forecast rainfall for Guam and the CNMI from November 2007 through October 2008 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) [2]	
	Guam/Rota	Saipan/Tinian
Nov 2007 – Jan 2008 (End of Rainy Season)	**110 % (19.84 inches)**	**110 % (15.87 inches)**
Feb – Apr 2008 (Heart of Dry Season)	**100 %**	**95 %**
May – June 2008 (End of Next Dry Season)	**100 %**	**100 %**
July – Oct 2008 (Heart of Next Rainy Season)	**110 %**	**100 %**

For more information on Guam's weather and climate go to
www.weather.gov/guam

LOCAL SUMMARY AND FORECAST

Federated States of Micronesia

Yap State: During the 3rd Quarter of 2007, the rainfall throughout most of Yap State was near normal to slightly above normal. Most locations on Yap Island received approximately 45 inches of rain with a low of 40.77 inches at Rumung and a high of 51.78 inches at Luweech. The 51.78 inches of rain at Luweech was one of the highest rainfall amounts recorded in the USAPI during the 3rd Quarter of 2007, second only to the 52.16 inches of rain recorded at the Palau International Airport **(Fig 1)**. Woleai was the only location in Yap State to record substantially below normal (80%) rainfall in the 3rd Quarter. During September, some of the Yap Island stations recorded in excess of 20 inches of rainfall. The occurrence of twenty inches or more of rain during one month was rare during the 3rd Quarter, and occurred only in Yap State (in September), the Republic of Palau (in July), and at Kapingamarangi (in July).

Climate Outlook: The tropical cyclone threat for the remainder of 2007 and into January of 2008 should be near normal in Yap State. During this 3-month period, approximately 2 or 3 tropical cyclones should pass close enough to the islands of Yap State to bring heavy rainfall, gusty westerly winds, and hazardous surf. The threat of a direct strike by a typhoon at Yap Island and

Yap State Rainfall Summary 3rd Qtr 2007

Station		July	Aug.	Sep.	3rd Qtr	Predicted [1]
Yap Island						
Yap WSO	**Rain (Inches)**	15.19	13.36	17.96	**46.51**	**40.91**
	% of Normal	104%	88%	133%	**108%**	**95%**
Dugor*	**Rain (Inches)**	11.31	12.22	23.35	**46.88**	**40.91**
Gilman*	**Rain (Inches)**	13.40	10.38	18.04	**41.82**	**40.91**
Luweech*	**Rain (Inches)**	15.13	18.77	17.88	**51.78**	**40.91**
Maap*	**Rain (Inches)**	14.40	9.47	22.83	**46.70**	**40.91**
North Fanif*	**Rain (Inches)**	13.59	11.23	21.36	**46.18**	**40.91**
Rumung*	**Rain (Inches)**	14.29	10.58	15.90	**40.77**	**40.91**
Tamil*	**Rain (Inches)**	10.85	11.73	23.14	**45.72**	**40.91**
Outer Islands						
Ulithi	**Rain (Inches)**	7.54	15.67	16.91	**40.12**	**34.97**
	% of Normal	61 %	121%	147%	**109%**	**95%**
Woleai	**Rain (Inches)**	7.01	14.93	10.24	**32.18**	**40.23**
	% of Normal	50%	102%	88%	**80%**	**100%**

[1] Predictions made in the 2nd Quarter 2007 PEAC Newsletter
* Long term normal is not established for these sites

LOCAL SUMMARY AND FORECAST

Ulithi is roughly one-half to two-thirds that of the threat to Guam and the CNMI. The threat is even less to the south at Woleai. While we expect no direct strikes by a typhoon of any island or atoll of Yap State during the next three months (November 2007 through January 2008), residents should always remain prepared for the remote possibility. Because of La Niña weather patterns, rainfall should continue to be above normal throughout Yap State for at least the next 3 months.

Forecast rainfall for Yap State from November 2007 through October 2008 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) [2]	
	Yap and Ulithi	Woleai
Nov 2007 – Jan 2008 (End of Rainy Season)	**125% (31.75 inches)**	**110% (27.94 inches)**
Feb – May 2008 (Heart of Next Dry Season)	**100%**	**100%**
June – July 2008 (Onset of Next Rainy Season)	**110%**	**100%**
Aug – Oct 2008 (Heart of Next Rainy Season)	**110%**	**100%**

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

Chuuk State: It was relatively dry throughout most of Chuuk State during the 3rd Quarter of 2007. As at Guam and other locations in the eastern half of Micronesia, the weather was very tranquil: winds were light, there were few instances of rainfall in excess of 2-inches in 24 hours, and no organized tropical cyclones passed through the area. Whereas the normal rainfall throughout Chuuk State for each month at this time of year is over 10 inches, most locations experienced at least one month during the past 3 months with less than 10 inches of rain. At several locations, all three months (July through September) received less than 10 inches apiece. The 3rd Quarter total rainfall of 29.48 inches at the WSO was 77% of the normal. Only Ta, Losap, and Polowat received more rainfall than the WSO during this time period

Chuuk State Rainfall Summary 3rd Qtr 2007

Station		July	Aug.	Sep.	3rd Qtr	Predicted [1]
Chuuk Lagoon						
Chuuk WSO	**Rain (Inches)**	10.97	8.84	9.67	**29.48**	**38.29**
	% of Normal	91%	60%	84%	**77%**	**100%**
Piis Panew*	**Rain (Inches)**	2.96	7.34	5.95	**16.25**	**38.29**
Xavier H. School*	**Rain (Inches)**	14.02	9.30	3.12	**26.44**	**38.29**
Southern Mortlocks						
Lukunoch*	**Rain (Inches)**	9.78	5.85	6.70	**22.33**	**38.29**
Ettal*	**Rain (Inches)**	8.25	7.58	10.80	**26.63**	**38.29**
Ta*	**Rain (Inches)**	8.09	15.47	7.87	**31.43**	**38.29**

[1] Predictions made in the 2nd Quarter 2007 PEAC Newsletter
* Long term normal is not established for these sites

LOCAL SUMMARY AND FORECAST

Chuuk State Rainfall Summary 3rd Qtr 2007

Station		July	Aug.	Sep.	3rd Qtr	Predicted [1]
Northern Atolls						
Fananu*	**Rain (Inches)**	4.87	9.36	7.59	**21.82**	**36.38**
Onoun*	**Rain (Inches)**	7.19	4.73	14.54	**26.46**	**36.38**
Northern Mortlocks						
Losap*	**Rain (Inches)**	10.66	11.22	16.69	**38.57**	**38.29**
Nama*	**Rain (Inches)**	8.23	5.92	11.05	**25.20**	**38.29**
Western Atolls						
Polowat	**Rain (Inches)**	6.67	17.35	5.81	**29.83**	**38.29**

[1] Predictions made in the 2nd Quarter 2007 PEAC Newsletter
* Long term normal is not established for these sites

Climate Outlook: The threat of a direct strike by a strong tropical storm or typhoon on any of the islands of Chuuk State should remain below normal for the remainder of 2007. Because of La Niña-related weather patterns, any tropical systems that form near Chuuk in the next three months will likely be in their disturbance state of development, and only become tropical storms after passing out of Chuuk State. Some heavy rainfall events (more than 2 inches of rainfall in one day) may occur in the next three months in association with tropical disturbances in the area. Overall, however, rainfall at most locations within Chuuk State should be near normal for at least the next three months.

Based on a continuation of La Niña conditions during the first few months of 2008, rainfall at islands and atolls of the Chuuk Lagoon and on the other atolls of Chuuk State could become wetter than normal in the spring (late March through early June) when the trade-wind trough becomes established in the region.

Forecast rainfall for Chuuk State from November 2007 through October 2008 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) [2]			
	Chuuk Lagoon and Northern Mortlocks	Polowat	Northern Atolls	Southern Mortlocks
Nov - Dec 07	**100% (21.55 inches)**	**100% (21.55 in)**	**100% (21.55 in)**	**100% (21.55 in)**
Jan - Mar 08	**100%**	**95%**	**95%**	**110%**
Apr - June 08	**110%**	**100%**	**100%**	**120%**
July - Oct 08	**100%**	**100%**	**100%**	**100%**

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

LOCAL SUMMARY AND FORECAST

Pohnpei State: Rainfall was generally below normal throughout all of Pohnpei State during the 3rd Quarter of 2007. On Pohnpei Island, the 2007 3rd Quarter totals were approximately 35 inches at all recording locations around the coastal perimeter of the island. The 36.91 inches at the WSO Kolonia fell short of the normal 50.98 experienced there during this time period. All of the outer atolls Pohnpei State also recorded approximately 35 inches of rain in the 3rd Quarter of 2007. For Nukuoro, Pingelap, and Mwoakilloa, these values were probably below normal (no official normals have been established for these sites), however, at Kapingamarangi, the 3rd Quarter 2007 total of 36.21 inches was well above normal (161%) largely due to a very wet July. Kapingamarangi has been wetter than normal for a long time, and continued to be very wet through its 2007 dry season. **The current shift to La Niña conditions may finally force an end to the long period of above normal rainfall at Kapingamarangi, and for this reason it may be prudent for residents of this atoll to begin voluntary conservation measures of drinking water.**

Pohnpei State Rainfall Summary 3rd Qtr 2007

Station		July	Aug.	Sep.	3rd Qtr	Predicted [1]
Pohnpei Island						
Pohnpei WSO	**Rain (Inches)**	15.72	9.35	11.84	**36.91**	**50.98**
	% of Normal	85%	57%	74%	**72%**	**100%**
Palikir	**Rain (Inches)**	8.71	10.93	14.57	**34.21**	**50.98**
	% of WSO	N/A	N/A	N/A	**67%**	**100%**
Kolonia Airport	**Rain (Inches)**	13.55	10.75	11.61	**35.91**	**50.98**
	% of WSO	N/A	N/A	N/A	**70%**	**100%**
Atolls of Pohnpei State						
Nukuoro*	**Rain (Inches)**	13.49	8.46	13.07	**35.02**	**36.86**
	% of Normal	94%	75%	119%	**95%**	**100%**
Pingelap*	**Rain (Inches)**	7.65	9.79	16.06	**33.50**	**46.52**
	% of Normal	48%	66%	107%	**72%**	**100%**
Mwoakilloa*	**Rain (Inches)**	10.30	8.34	12.98	**31.62**	**50.98**
Kapingamarangi	**Rain (Inches)**	22.18	6.18	7.85	**36.21**	**21.37**
	% of Normal	213%	100%	127%	**161%**	**95%**

[1] Predictions made in the 2nd Quarter 2007 PEAC Newsletter
* Long term normal is not established for these sites

Climate Outlook: Because of weather patterns associated with La Niña, the risk of a damaging tropical storm or typhoon at any island in Pohnpei State is very unlikely during the remainder of 2007 through the summer of 2008. The very early stages of some developing tropical cyclones may bring some episodes of heavy rain to Pohnpei in the next three months, but these systems should not become tropical storms or typhoons until they are well away from Pohnpei.

Based on the continuation of La Niña conditions for the next few months, rainfall around Pohnpei State should be near normal for the next 3 months, and then becoming wetter than normal in the spring (late March through early June) when the trade-wind trough becomes established in the region. The only exception to the expectation of overall wetter-than-normal rainfall in Pohnpei State will be at Kapingamarangi, where La Niña-related weather patterns may cause conditions to be drier than normal over the next few months.

Forecast rainfall for Pohnpei State from November 2007 through October 2008 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) [2]	
	Pohnpei Island and atolls	**Kapingamarangi**
Nov 2007 – Jan 2008	**110% (47.44 inches)**	**95% (23.75 inches)**
Feb - Mar 2008	**100%**	**95%**
Apr - June 2008	**120%**	**90%**
July - Oct 2008	**100%**	**90%**

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

LOCAL SUMMARY AND FORECAST

Kosrae State: Rainfall was below normal during the 3rd Quarter of 2007 at all recording locations around Kosrae. The 3-month totals ranged from 37.70 inches at the Nautilus Hotel to 44.21 inches at Tofol. Normal rainfall at Kosrae for the 3-month period of July through September is approximately 51 inches.

Kosrae State Rainfall Summary 3rd Qtr 2007

Station		July	Aug.	Sep.	3rd Qtr	Predicted [1]
Airport (SAWRS)	**Rain (Inches)**	13.88	10.61	15.01	**39.50**	**50.70**
	% of Normal	82%	64%	87%	**78%**	**100%**
Utwa*	**Rain (Inches)**	15.10	10.00*	13.23	**38.33**	**50.70**
	% of WSO	N/A	N/A	N/A	**76%**	**100%**
Nautilus*	**Rain (Inches)**	18.14	10.26	15.81	**44.21**	**50.70**
	% of WSO	N/A	N/A	N/A	**87%**	**100%**

[1] Predictions made in the 2nd Quarter 2007 PEAC Newsletter
* Long term normal is not established for these sites

Climate Outlook: Because of weather patterns associated with La Niña, the risk of a damaging tropical storm or typhoon is very unlikely at Kosrae during the remainder of 2007 through the summer of 2008. The very early stages of some developing tropical cyclones may bring some episodes of heavy rain to Kos-

LOCAL SUMMARY AND FORECAST

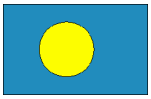
rae in the next three months, but these systems should not become tropical storms or typhoons until they are well west of Kosrae.

Based on the continuation of La Niña conditions for the next few months, rainfall at Kosrae should be near normal for the next 3 months, and then have a good chance of becoming wetter than normal in the spring (late March through early June) when the trade-wind trough becomes established in the region.

Forecast rainfall for Kosrae State from November 2007 through October 2008 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) [2]
Nov 2007 – Jan 2008 (Heart of Next Dry Season)	**100% (44.79 inches)**
Feb – Mar 2008 (Onset of Next Rainy Season)	**100%**
Apr – June 2008 (Heart of Next Rainy Season)	**120%**
Jul – Oct 2008 (Onset of Next Dry Season)	**100%**

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



Republic of Palau: Palau had widespread abundant rainfall of 40 to 50 inches during the 3rd Quarter of 2007. The 43.93 inches at the WSO Koror was 98% of the long-term average. The Palau International Airport had almost 10 inches more than at the nearby WSO in Koror. The airport's 3rd Quarter total of 52.16 inches was 116% of Koror's normal value, and was the highest rainfall total recorded in Micronesia during the 3rd Quarter. Because of La Niña-related weather patterns, both Yap State and the Republic of Palau have had abundant rainfall for the past few months. This is likely to continue to be the case. Tropical cyclone formation in the western North Pacific basin was shifted westward during 2007. This allowed Palau and Yap to experience episodes of heavy showers

Republic of Palau Rainfall Summary 3rd Qtr 2007

Station		July	Aug.	Sep.	3rd Qtr	Predicted [1]
Koror WSO	**Rain (Inches)**	16.40	11.09	16.44	**43.93**	**38.80**
	% of Normal	91%	74%	137%	**126%**	**90%**
Nekken*	**Rain (Inches)**	18.43	14.98	12.20	**45.61**	**38.80**
	% of WSO	N/A	N/A	N/A	**102%**	**90%**
Intl. Airport*	**Rain (Inches)**	22.70	13.90	15.56	**52.16**	**38.80**
	% of WSO	N/A	N/A	N/A	**116%**	**90%**
Peleliu*	**Rain (Inches)**	18.55	13.85	11.03	**43.43**	**40.30**
	% of Normal	N/A	N/A	N/A	**97%**	**90%**

[1] Predictions made in the 2nd Quarter 2007 PEAC Newsletter

* Long term normal is not established for these sites

LOCAL SUMMARY AND FORECAST

within the southern portions of tropical disturbances and developing tropical cyclones, and also to receive abundant rains associated with the monsoon trough of the western North Pacific.

Climate Outlook: During the heart of the 2007 rainy season in Micronesia, the formation region of tropical cyclones was pushed westward, and Palau was affected by many tropical disturbances and monsoonal weather patterns that contributed to abundant rainfall. In general, most of the tropical storms and typhoons stayed well to the north of Palau. For the remainder of 2007 and continuing into January of 2008, there should be a few more episodes of heavy rainfall and 2 or 3 occurrences of gusty westerly winds and rough seas from tropical cyclones passing to the north of Palau, as the focus of the basin's tropical cyclone activity remains shifted to the west of normal. **Based on a continuation of La Niña conditions for the next few months, 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 November 2007 through October 2008 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) [2]
Nov 2007 – Jan 2008 (End of Rainy Season)	**120% (29.29 inches)**
Feb – Apr 2008	**110%**
May – Aug 2008	**100%**
Sept – Oct 2008	**100%**

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

Republic of the Marshall Islands (RMI): Most of the atolls of the RMI were drier than normal during the 3rd Quarter of 2007. The exception was for some of the southern atolls of the RMI (e.g., Mili) where the 3-month rainfall totals were quite a bit higher than at Majuro and other atolls to the north. Some of the atolls in the northern RMI were still exceptionally dry in this normally wet time of year. The northern atolls of the RMI (Kwajalein, Utirik and Wotje) were among the driest of locations in Micronesia during the 3rd Quarter of 2007 **(Fig. 1)**, while Mili (in the southern portion of the RMI) had a relatively high value (40.57 inches). Wotje and Utirik received 60% and 64% of their normal rainfall during the 3rd Quarter of 2007, respectively**.**

Climate Outlook: As La Niña further develops, it is anticipated that a large north-south gradient of rainfall will become established in the RMI, whereby atolls in the southern portion of the RMI (e.g., Mili) have abundant rainfall, and atolls in the central and northern RMI are dry. Ironically, in the far south (Islands of Kiribati), the tongue of cold SST associated with La Niña should act to keep islands dry that are located within 3 degrees of the equator. The rainy season in the RMI extends through December, with October the wettest month of all at many locations. The rainfall deficits of the past few months (especially in the central and northern RMI) are worrisome, but there could still be abundant rainfall before the 2008 dry season begins. The worst-case scenario is that the rainfall during November and December is below normal, and many atolls go into the dry season with a lackluster rainy season behind them**. Based on this possible sce-**

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RMI Rainfall Summary 3rd Qtr 2007

Station		July	Aug.	Sep.	3rd Qtr	Predicted [1]
RMI Central Atolls (6º N - 8º N)						
Majuro WSO	**Rain (Inches)**	8.64	7.27	10.25	**26.16**	**36.32**
	% of Normal	66%	63%	83%	**71%**	**100%**
Jaluit*	**Rain (Inches)**	3.07	9.47	14.65	**27.19**	**36.32**
Arno*	**Rain (Inches)**	8.56	6.81	12.65	**28.02**	**36.32**
Aling-laplap*	**Rain (Inches)**	7.44	6.47	8.20	**22.11**	**36.32**
RMI Southern Atolls (South of 6º N)						
Mili*	**Rain (Inches)**	12.81	13.02	14.74	**40.57**	**36.32**
RMI Northern Atolls (North of 8º N)						
Kwajal-ein	**Rain (Inches)**	5.74	11.92	11.39	**29.05**	**32.48**
	% of Normal	55%	118%	96%	**90%**	**100%**
Wotje*	**Rain (Inches)**	4.59	7.57	6.31	**18.47**	**30.78**
Utirik*	**Rain (Inches)**	2.82	6.40	8.51	**17.73**	**27.70**

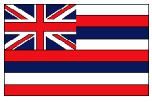
[1] Predictions made in the 2nd Quarter 2007 PEAC Newsletter
* Long term normal is not established for these sites

nario, it may be prudent for residents of Majuro and the atolls of the northern RMI to begin voluntary conservation measures to ensure adequate supplies of drinking water. However, many forecasts indicate that rainfall in the RMI is likely to be near normal (even in the north), at least through the next 3 months. With anticipation of La Niña conditions to persist for at least the next three months, the RMI has a very low risk of a typhoon during the foreseeable future.

Forecast rainfall for the RMI from November 2007 through October 2008 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) [2]		
	South of 6ºN	6ºN to 8ºN	North of 8ºN
Nov – Dec 2007 (Rainy months)	**120% (29.17 inches)**	**100% (24.31 in)**	**100% (18.68 in)**
Jan – Apr 2008	**100%**	**95%**	**90%**
May – July 2008	**120%**	**100%**	**95%**
Aug – Oct 2008	**110%**	**100%**	**100%**

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



Hawaii: The passage of Tropical Depression Cosme 225 miles south of Hilo on July 20 - 21 brought much needed rain to leeward Kohala sections of the Big Island, as well as the eastern and southeastern slopes. Despite the reprieve from Cosme, drought conditions prevailed across many leeward areas of the state through July, with mandatory water restrictions remaining in place across Up-

LOCAL SUMMARY AND FORECAST

country Maui, the South Kohala and Hamakua districts on the Big Island, and Waimanalo on Oahu. The approach of Hurricane Flossie on August 14-15 caused concern to the state of Hawaii, however the storm turned west and quickly weakened to a tropical depression before passing south of the Big Island. North- and east-facing slopes managed to catch 1-2 inches of rain from Flossie's outer shower bands as the hurricane approached the Big Island, while the storm later dropped 1 to 3 inches over windward Maui and 2 to 4 inches over the Koolau Range on Oahu. No significant wind- or flood-related damages were reported, although heavy surf caused minor coastal inundation problems on the Big Island.

Trade winds brought frequent showers to windward slopes of the state during September. The boost in trade wind rainfall has helped improve water supply conditions over portions of the state, especially in the Upcountry Maui area which depends on water sent from the windward slopes of Haleakala through a series of ditches. Residents and farmers in Upcountry Maui have been under a mandatory 10 percent cutback in water use since June 13. Drought conditions also continued over east Oahu where a mandatory 30 percent reduction in water use has been in place since September 6 for farms utilizing the Waimanalo Irrigation System.

State of Hawaii Rainfall Summary 3rd Qtr 2007

Station		July	Aug.	Sep.	3rd Qtr
Lihue Airport	**Rain (Inches)**	0.95	0.44	0.44	**1.83**
	% of Normal	45%	23%	16%	**27%**
Honolulu Airport	**Rain (Inches)**	0.05	0.09	0.50	**0.64**
	% of Normal	10%	20%	68%	**38%**
Kahului Airport	**Rain (Inches)**	0.12	0.13	0.03	**0.28**
	% of Normal	24%	25%	8%	**20%**
Hilo Airport	**Rain (Inches)**	1.93	16.01	13.59	**23.77**
	% of Normal	68%	79%	96%	**80%**

Climate Outlook: The following is in excerpt from the Climate Prediction Center's official Seasonal Outlook Discussion for Hawaii:

"La Niña conditions are present across the tropical Pacific... Current atmospheric conditions and observed oceanic trends indicate that La Niña conditions will further develop and possibly strengthen during the next 3 months. Based on current conditions... and results from historical studies on the effects of cold episodes, wetter [and warmer] than normal conditions are expected over Hawaii and some U.S.-Affiliated Islands during the winter."

The Climate Prediction Center's (CPC's) Prognostic Discussion and official 90-day Seasonal Outlook Discussion for Hawaii can be viewed at www.cpc.noaa.gov/products/predictions/90day/fxhw40.html.

Seasonal Sea Level Outlook for the US-Affiliated Pacific Islands

The following sections describe: (i) the *Canonical Correlation Analysis* (*CCA*)-based forecasts for sea level deviations for the forthcoming seasons; (ii) tide predictions for October 1 - December 31, 2007; (iii) the observed/forecast monthly sea-level deviations for the previous season JAS 2007; and (iv) the *Generalized Extreme Value* (*GEV*)-based seasonal extreme values of sea level at 20 and 100-year return periods for the OND season. All units are in inches. *Deviations are defined here as the difference between the mean sea level for the given month and the 1975 - 1995 mean sea level value 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 2007-2008.**

Forecasts of the sea level anomalies in the USAPI are presented using CCA statistical model. Based on the independent SST values in JAS 2007, the resulting CCA model was used to forecast the sea level of three consecutive seasons: OND, NDJ and DJF (**Table 1**).

Table 1: **Forecasts of sea level deviation (in inches) for OND, NDJ and DJF 2007-2008**

Tide Gauge	OND	NDJ	DJF	Forecast Quality[1]
Lead time[2]	**0**	**1M**	**2M**	
Guam	+2	+2	+3	V. Good
Palau	+3	+2	**	V. Good
Yap	+2	**	**	V. Good
Pohnpei	+5	+4	+4	V. Good
Kapinga-marangi	+5	+5	+5	Good
Majuro	+5	+4	+3	Good
Kwajalein	+3	+2	+2	V. Good
Pago Pago	+4	+3	+3	Good

1. Forecast quality is a measure of the expected CCA cross-validation correlation skill. 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. Higher skills correspond to greater expected accuracy of the forecasts. Skill levels greater than 0.4 and 0.6 are thought to be fair and good skills. Skill level greater than 0.7 are thought to be very good. For CCA cross-validation skill in OND, NDJ and DJF, please refer to: **www.soest.hawaii.edu/MET/Enso/peu/2007_4th/Sea_Level.htm.**

2. Lead time 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 2007.

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 of +/-1 in. are considered negligible and denoted by **. Deviations +/- 2 in. are unlikely to cause any adverse climatic impact.

With a mean skill greater than 0.73 (at 0 to 2-months lead time) in all three consecutive seasons (OND, NDJ, and DJF), all tide gauge stations are very well predicted. All of the stations in the USAPI are forecast to observe a rise in sea level during the upcoming OND, NDJ, and DJF seasons (Table 1). *This rising trend is consistent with the current development of La Niña conditions, which, according to the Climate Prediction Center (CPC), may continue for several months.* Since the Pacific Islands are sensitive to ENSO — with rising sea level during La Niña years — we may expect to observe several inches of sea-level rise in all of these stations during the upcoming seasons.

(ii) Tide Predictions (October 1 to December 31, 2007)

Figure 3, right: Predicted water level plots from Oct 1 - Dec 31 for 3 major stations (a) Marianas, Guam (b) Kwajalein, RMI and (c) Pago Pago, American Samoa. X-axis: date/time (GMT); Y-axis: height in feet relative to mean lower low water level (MLLW); MR = Mean difference between high and low tides; SR = Difference between high and low tide during full moon (spring tide); and ML = Arithmetic means of high and low tides.

NOAA's website for tide and currents has been used to generate this water level plot for the next three months. Other tide-related monthly extreme data can be found in the web edition of this newsletter. *Observations reveal that the MR, SR, and ML for all these above stations are likely to record several inches rise during the OND season. Guam, the Federated States of Micronesia, the Republic of the Marshall Islands, and American Samoa are likely to experience a higher tide level (i.e., rise by 2 to 4 inches) during the next three months (Oct 1 to Dec 31).*

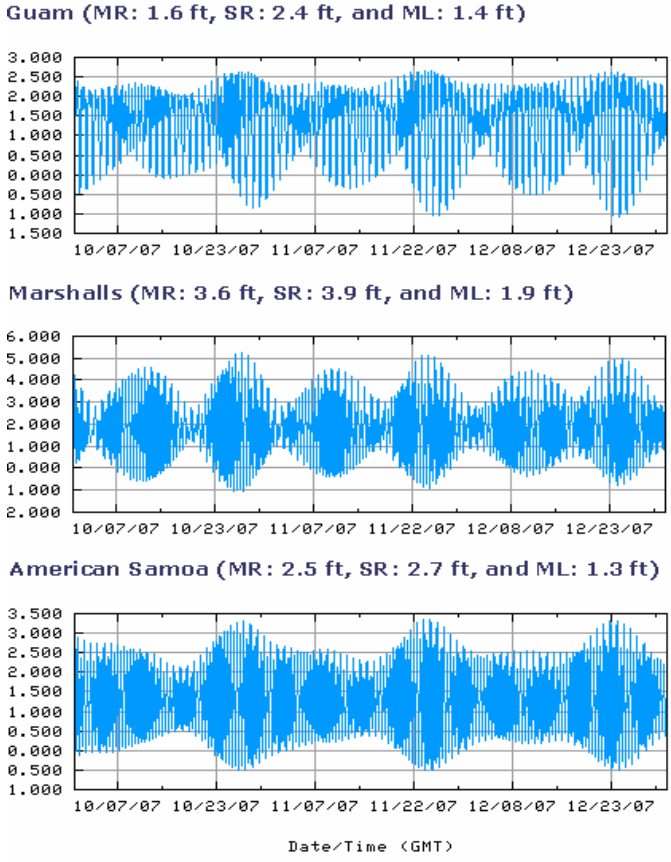


Figure 3: Predicted water level for OND 2007 at (a) Marianas, Guam (b) Kwajalein, RMI and (c) Pago Pago, American Samoa.

Seasonal Sea Level Outlook for the US-Affiliated Pacific Islands

(iii) Observed monthly sea level deviation in Jul-Aug-Sep (JAS), 2007

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 4** (below) for location of these stations.

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

Tide Gauge Station	July	Aug.	Sep.
Marianas, Guam	+9.4 (3.6)	+8.9 (3.5)	n/a (3.6)
Saipan, CNMI	n/a (2.9)	n/a (2.4)	n/a (3.1)
Malakal, Palau	-1.3 (4.4)	+3.8 (4.1)	+8.7 (4.3)
Yap, FSM	n/a (4.5)	n/a (4.0)	n/a (4.6)
Kwajalein, Marshalls	+6.4 (2.3)	+5.4 (2.1)	+5.5 (2.7)
Majuro, Marshalls	+2.4 (2.2)	+0.2 (2.2)	n/a (3.2)
Pohnpei, FSM	+5.4 (2.8)	+5.0 (2.8)	n/a (3.6)
Kapingamarangi, FSM	+2.2 (2.3)	+2.0 (2.5)	+2.2 (2.7)
Pago Pago, A. Samoa	+5.6 (3.1)	+5.4 (2.9)	+4.3 (2.6)

Note: - indicate negative deviations (fall of sea-level from the mean), and + indicate positive deviations (rise of sea-level from the mean), n/a: data not available, and figures in parenthesis are year-to-year SD (standard deviations) for the month.

Table 2 (left) provides the monthly observed sea level deviations (in inches). A considerable positive deviation has been observed in most of the tide-gauge stations in the JAS season. While the previous three quarters recorded rise, the rise in JAS is particularly great. As mentioned, the sea-level variation in the USAPI is sensitive to ENSO-events, with low sea-level typically recorded during El Niño and high sea-level during La Niña events. Consistent with the on-going La Niña conditions, the sea level has been rising in the vicinity of the USAPI since January. The present amount of rise is not alarming, but it is quite considerable for some stations (such as Guam and Malakal).

Note: Due to technical problems, sea-level data for Yap and Saipan was not available for the JAS season.

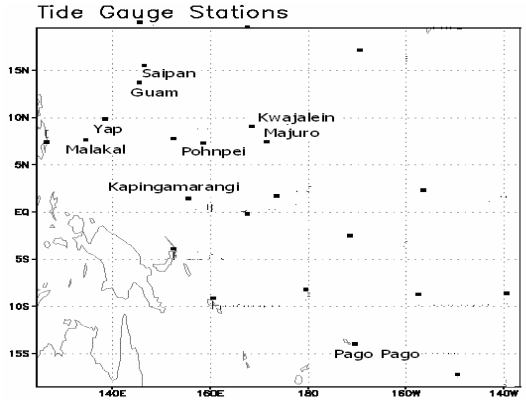


Figure 4, left: Locations of tide gauge stations in the USAPI.

(iv) Seasonal Extremes for OND at 20 and 100-year return periods

Table 3: GEV	Sea Level Rise (inches)	
Station	**20 year RP**	**100 year RP**
Marianas, Guam	6.5 ~ 8.0*	9.1 ~ 11.8*
Saipan, CNMI	30.5 ~ 41.1	48.1 ~ 87.9
Malakal, Palau	6.1 ~ 8.7	6.4 ~ 12.1
Yap, FSM	8.2 ~ 11.2	10.9 ~ 16.8
Kwajalein, RMI	4.9 ~ 5.8	6.1 ~ 7.6
Majuro, RMI	6.6 ~ 7.7	8.4 ~ 10.6
Pohnpei, FSM	9.1 ~ 11.3	11.7 ~ 16.2
Kapingamarangi, FSM	5.7 ~ 7.6	6.4 ~ 9.8
Pago Pago, A. Samoa	2.9 ~ 3.7	3.7 ~ 4.7

Note: Upper boundaries of rise are calculated at the 90% confidence interval. RP stands for Return Period. Bootstrap methods with 5000 iterations were used to estimate these upper limit values of sea level rise.

The *Generalized Extreme Value (GEV)* products define the thresholds beyond the seasonal tidal range that have low but finite probabilities of being exceeded on a seasonal scale. Results of the GEV analysis for the OND season is presented in **Table 3** (left). The extreme values are calculated from the 6-hourly sea-level data. The upper limit (at 90% confidence interval) of rise has been shown in the right side of the column, the left side is the estimated rise based on observations. For example, the predicted rise of 6.5 ~ 8.0 inches at Marianas (*) indicates that this station may experience sea level rise of up to 8.0 inches during OND within any 20 year period (20 year RP). Likewise, about once every 100 years we can expect the highest OND tide at Marianas to be as much as 9.1 - 11.8 inches above normal (100 year RP).

Note that Saipan displays much higher rise than the other stations. *These high values are due to large and significant increases in the tidal range during the passage of past storm events in the OND season.* Saipan was hit by Super Typhoon *Kim* on December 3, 1986 and Super Typhoon *Wilda* on October 25, 1994. The closest point of approach (CPA) intensity for Super Typhoon *Kim* was 135 kts (nautical miles per hour), and for *Wilda* was 115 kts.

For plots of extreme values from 1-year to 100-year RP for all stations, please see the web edition of this newsletter at **www.soest.hawaii.edu/MET/Enso/peu/2007_4th/Sea_Level.htm**.

Pacific ENSO Update

MONTHLY PACIFIC ENSO DISCUSSION FOR MICRONESIA AND AMERICAN SAMOA
Excerpts from October Discussion — Issued by NOAA-NWS-Guam WFO

Weak La Niña conditions are consistent with the observed atmospheric patterns in the western North Pacific. For example, tropical cyclone activity to-date has been below normal and displaced to the north and west. Likewise, monsoon activity has been constrained to the western part of the basin and the monsoon trough has been reverse-oriented (oriented from the northeast to the southwest). Rainfall activity has shown high month-to-month variability, a typical characteristic of weak La Niña conditions.

In September, the South Pacific Convergence Zone shifted eastward to the Samoa region, bringing copious amounts of rainfall to the region. Overall, rainfall over the Samoa area for the next few months should be average to slightly above average, but high month-to-month variability is expected. Trade winds should continue to dominate the flow in eastern Micronesia (Pohnpei and eastward), and keep rainfall average to slightly below average for the remainder of the year. The westward spread of cooler equatorial SSTs will reduce equatorial rainfall east of 145ºE. Residents of Kapingamarangi should likely begin to conserve water. Monsoon and storm activity will be more prevalent in western Micronesia, and these areas will see average to slightly above average rainfall. Chuuk and the Marianas will have near average rainfall, with high month-to-month variability. The easterly trade winds will keep sea levels above normal for the next few months in the western Pacific and in the Samoa region.

Excerpts from El NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION
Issued by NOAA NWS Climate Prediction Center - 11 October 2007

Synopsis: La Niña will likely continue into early 2008.

La Niña conditions strengthened during September 2007, as negative SST anomalies along the equator expanded westward and now extend from 170ºE to the South American coast… The magnitude of the negative SST anomalies increased in all of the Niño regions... And the upper-ocean heat content in the central and east-central equatorial Pacific remained below average during September. Consistent with these conditions, the low-level easterly winds and upper-level westerly winds remained stronger than average across the central equatorial Pacific, convection remained suppressed throughout the central and eastern equatorial Pacific, and enhanced convection again covered parts of Indonesia and the far western Pacific. Collectively, these oceanic and atmospheric conditions reflect a strengthening La Niña.

The recent SST forecasts (dynamical and statistical models) for the Niño 3.4 region indicate a weak-to-moderate La Niña continuing into early 2008. Current atmospheric and oceanic conditions and recent trends indicate that La Niña will continue and may strengthen during the next 3 months.

Expected La Niña impacts during October – December include a continuation of above-average precipitation over Indonesia and below-average precipitation over the central equatorial Pacific…

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 or at the address listed below.

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