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

http://www.prh.noaa.gov/peac

CURRENT CONDITIONS

The state of the climate during 2011 began as strong La Niña. The La Niña waned over the course of the first few months of 2011, and conditions evolved to ENSO-neutral by the summer. The weather patterns across Micronesia during the first half of 2011 were generally those expected for La Niña; for example, very strong and persistent easterly surface winds and a westward displacement of tropical cyclone activity. In response to the strong easterly low-level wind anomalies, the sea level across Micronesia remained higher than normal during all of 2011. During the summer, while the climate system had evolved to ENSO-neutral, the monsoon advanced into parts of Micronesia. For several weeks, spread across July, August and September, Guam and the CNMI experienced light-to-moderate southwesterly wind accompanied by occasional heavy monsoonal rain showers and some impressive lightning displays in monsoon convection. Several tropical disturbances evolved into tropical depressions shortly after passing Guam and the CNMI, and contributed directly to heavy rain events in those islands and also in Yap State and in the Republic of Palau. In October of 2011, the climate system once again shifted back toward La Niña, ending the monsoon early and effectively halting late season (Oct, Nov, Dec) tropical cyclone activity in the basin and especially in the region. The year's final tropical cyclone, TC 27W (Washi), passed over Palau in mid-December as a tropical depression, and later passed over the central Philippines as a tropical storm, with deadly flooding there. No significant damage was reported from Palau. La Niña strengthened through November and December 2011, and a weak-to-moderate La Niña continues at the time of this writing. The start of the 2011-2012 rainy season in American Samoa was generally tranquil and a bit drier than average. Since the passage of Cyclone Wilma in January 2011, no tropical cyclones have affected American Samoa through January 2012.

The State of Hawaii overall in 2011 received a sufficient amount of rain with some exceptions. There seemed to be a line drawn over Maui where to the east (Big Island) received below-normal rainfall, while to the west (Oahu, Kauai, Molokai, and Lanai) collected above-normal rainfall during the first 6 months of 2011. Specifically in the month of May an upper level low abided over top of most of the islands, which cause several thunderstorms. This tripled the normal amounts of rainfall in Lihue (on Kauai) and Honolulu (on Oahu) for the month. The rainfall continued into June, causing the Punaluu Stream rain gauge (on the windward side of Oahu) to report an amazing 8.53 inches in three hours with a total of 10.13 inches in 24 hours on the 5th. The normal rainfall amount for June on Oahu is only 0.18 inches. However, in September and October as the climate shifted back into La Niña status, all islands saw well below-normal rainfall and warmer-than normal temperatures. These conditions negatively impacted any strides made to eradicate drought on the islands (especially on the Big Island and Maui) at the beginning of the year. It should be noted that drought that has been present in some capacity since June 2008 in the State. More rainfall is needed to promote a full recovery from this drought.

Although, persistent trade winds in November and December helped bring abundant amounts of rainfall for the eastern areas on most of the Hawaiian Islands, the leeward sides received very little rain. This led to the end of the year rainfall totals (depicted on page 9) of the Big Island and Maui near-normal rainfall totals, 90% and 83% respectively. Kauai and Oahu had well above-normal annual rainfall totals with 153% and 172% for the year of 2011.

The following comments from the 05 January 2012 **ENSO DIAGNOSTIC DISCUSSION** were posted on the U.S. Climate Prediction Center web site: "ENSO Alert System Status: **La Niña Advisory**. Synopsis: La Niña is expected to continue well into the Northern spring 2012."

"During December 2011, below-average sea surface temperatures (SST) associated with La Niña continued across the eastern and central equatorial Pacific Ocean. The weekly SST index in the Niño-3.4 region remained near –1.0°C throughout the month, indicating a weak to moderate La Niña. The oceanic heat content (average temperature in the upper 300m of the ocean) anomalies strengthened across the eastern Pacific, reflecting a large area of below-average temperatures in the subsurface. In the atmosphere, anomalous low-level easterly and upper-level westerly winds strengthened over the central and west-central Pacific. Convection remained suppressed in the western and central Pacific and enhanced over northern Australia and parts of Indonesia and the Philippine Islands. Consistent with these conditions, the Southern Oscillation Index (SOI) also strengthened. This evolution is consistent with past events, in which the atmospheric components of La Niña become strongest and most well-defined during the Northern Hemisphere winter. Collectively, the ongoing oceanic and atmospheric patterns reflect the continuation of a weak to moderate La Niña."

SEA SURFACE TEMPERATURES

During December 2011, below-average sea surface temperatures (SST) associated with La Niña continued across the eastern and central equatorial Pacific Ocean. The weekly SST index in the Niño-3.4 region remained near –1.0°C throughout the month, indicating a weak to moderate La Niña. The oceanic heat content (average temperature in the upper 300m of the ocean) anomalies strengthened across the eastern Pacific, reflecting a large area of below-average temperatures in the subsurface. In the atmosphere, anomalous low-level easterly and upper-level westerly winds strengthened over the central and west-central Pacific. Collectively, the ongoing oceanic and atmospheric patterns reflect the continuation of a weak to moderate La Niña.

SOUTHERN OSCILLATION INDEX

The 3-month average of the Southern Oscillation Index for the 4th Quarter of 2011 was +1.5, with monthly values of +0.8, +1.1, and +2.5 for the months of October, November and December 2011, respectively. A relatively strong phase of La Niña opened the year, then dissipated in the spring. It then re-emerged in October and lasted through the end of the year.

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. Low SOI values suggest a weak coupling between the ocean and the atmosphere. The SOI is an index representing the normalized sea-level pressure difference between Darwin, Australia and Tahiti, respectively.

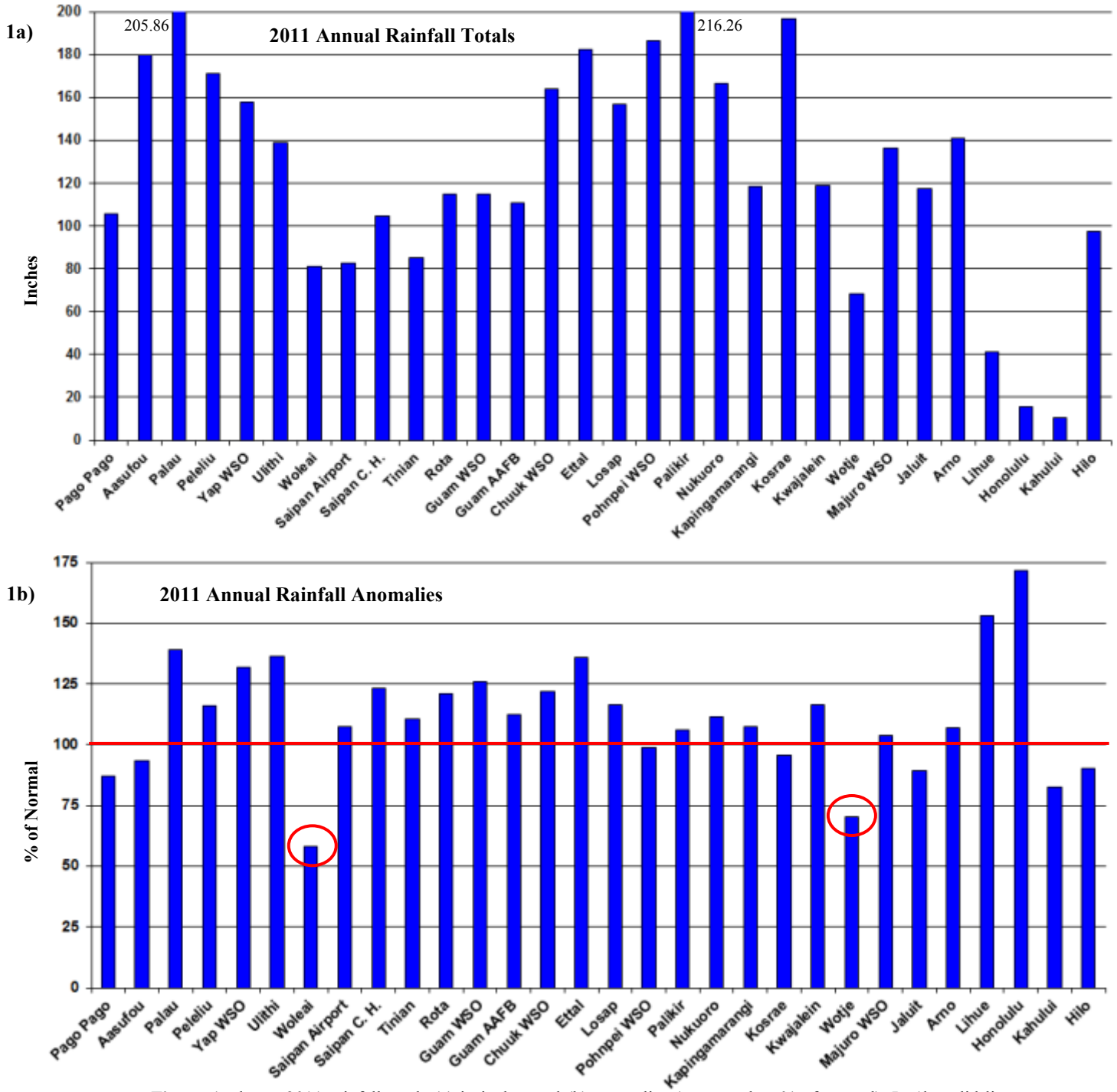

Figure 1, above. 2011 rainfall totals (a) in inches and (b) anomalies (expressed as % of normal). In 1b, solid line indicates normal rainfall (100%) and circles indicate rainfall less than 75% of normal.

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 U. S. Air Force and Navy, located at Pearl Harbor, Hawai'i. Western North Pacific tropical cyclone names are obtained from warnings issued by the Japan Meteorological 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 Summary

During 2011, tropical cyclone activity recovered somewhat in both the western North Pacific and eastern North Pacific from the extreme quiescence seen in both basins during 2010. The 2011 activity, however, was still well below normal in both basins with the JMA naming a total of 21 tropical cyclones (75%) in the western North Pacific, and the National Hurricane Center, Miami, naming 11 tropical cyclones (69%) in the eastern North Pacific. The JTWC numbered a total of 27 tropical cyclones, of which seven reached only tropical depression (TD) status (i.e., peak winds less than gale force). Only one of the seven JTWC TDs was given a name by the JMA (JTWC = TD 09W, JMA = Tropical Storm Tokage). There were only 10 typhoons (58%) in the western North Pacific, but 10 of the 11 named cyclones in the eastern North Pacific became hurricanes, which is a normal number of hurricanes, but an unusual proportion of hurricanes to the total number of named cyclones. The Central Pacific Hurricane Center in Honolulu did not name any tropical cyclones during 2011. The low tropical cyclone activity of 2011 continues a decade-long lull in basin and global tropical cyclone activity. There is currently no generally accepted explanation for the dramatic decline in North Pacific tropical cyclones. Some climate simulations of a warmer world indicate reduced tropical cyclone activity in the Pacific and most other global basins, but given the high activity of the decade of the 1990s, it is difficult to attribute the recent abrupt reduction of activity to global warming.

PEAC Center Tropical Cyclone Outlook

The PEAC tropical cyclone outlook[1] for the first half of 2012 (the quiet half of the typhoon season) is for below normal tropical cyclone activity in the western North Pacific basin. The continuation of the La Niña weather patterns of anomalous low-level easterly winds coupled with anomalous westerly winds in the upper troposphere should continue to prevent the normal development of the monsoon trough, and inhibit tropical cyclone development through at least June 2012. Thereafter, the weather patterns should return to a state that is closer to normal, and the distribution of tropical cyclones in the western North Pacific should return to a more normal distribution. The extreme reduction and westward displacement of tropical cyclones seen in 2010, and to a lesser extent during 2011, is not expected to repeat during 2012. At the regional scale, above average cyclone activity typically occurs in Micronesia when the state of the Pacific climate is entering El Niño. Two agencies[1] that publish long-range outlooks of TC activity for the western North Pacific have not yet done so. These outlooks are generally available by April 1st, and will be reported in the next PEAC Newsletter.

At the time of this writing, American Samoa has not yet experienced the passage of a tropical cyclone during its ongoing 2011-12 cyclone season that began in November 2011 and will come to a close in April or May of 2012. The ongoing 2011-12 cyclone season in the Southern Hemisphere has been relatively quiet, with nine cyclones numbered by the JTWC and eight named by the respective cyclone warning agencies. All cyclones to-date have been in the South Indian Ocean. Tropical cyclone activity in the South Pacific has been very quiet through January 2012, with no cyclones in the South Pacific numbered by the JTWC or named by the Tropical Cyclone Warning Centers in Nadi or Brisbane. It is anticipated that tropical cyclone activity will remain relatively quiet in the South Pacific (but not zero!) over the next several months, with any additional activity likely to be in the Coral Sea with reduced odds of a cyclone east of the 180° meridian. The PEAC is cautiously optimistic that American Samoa will not be adversely affected by any tropical cyclones for the remainder of its cyclone season. There could yet be one or two cyclones that form in Samoan waters bringing some gusty winds and heavy rains, and the northwest monsoon may also extend into Samoan regional waters a couple of times before the persistent southeast trades of the dry season return in May.

[1]The PEAC tropical cyclone forecasts for 2012 are provisional. The PEAC considers input from three seasonal outlooks for tropical cyclone activity in the western North Pacific basin: (1) The City University of Hong Kong Laboratory for Atmospheric Research, under the direction of Dr. J. C-L. Chan; (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://www.tropicalstormrisk.com); and, (3) an experimental typhoon outlook produced by Paul Stanko (forecaster at the Guam WFO).

LOCAL SUMMARY AND FORECAST

NOTE: *Rainfall averages in the following summaries are based on the 1971-2000 normals. The PEAC Center plans to switch to the 1981-2010 normals with the next issue of the Pacific ENSO Update newsletter. Also, the PEAC Center researchers will make efforts to establish normals for the many outer island sites that do not yet have a 30-year climate record available.*

American Samoa: For eight of the 12 months of 2011, the rainfall at American Samoa was below normal yielding an annual total of 105.86 inches at WSO Pago Pago, which was 87% of normal. The dry season was much drier than normal with every month from March through September below normal. The 28.56 inches of rainfall at Pago Pago during this 7-month period was only 47% of normal. In the final three months of 2011, near-normal rainfall returned to American Samoa as its 2011-12 rainy season began. With 2011 beginning and ending in La Niña, the SPCZ was shifted to the west and south, taking its band of heavier rain away from American Samoa. A notable weather event of 2011 was the passage of Cyclone Wilma directly over American Samoa at the end of January 2011. Peak measured winds were 50 kts with gusts to 70 kts. Damage was not substantial.

American Samoa Rainfall Summary 4th Qtr 2011						
Station		**Oct.**	**Nov.**	**Dec.**	**4th Qtr**	**Annual**
Pago Pago WSO	**Inches**	12.67	15.91	9.61	**38.19**	**105.86**
	% Norm	117%	147%	66%	**106%**	**87%**
Aasufou	**Inches**	15.57	21.52	17.16	**54.25**	**179.73**
	% Norm	83%	119%	88%	**96%**	**93%**

Climate Outlook: American Samoa is now entering the heart of its rainy season. Climate models are indecisive on the rainfall in American Samoa over the next few months, and the outlook is for equal chances of above-normal, normal, or below-normal rainfall. With the current La Niña near its peak and anticipated to fade to ENSO-neutral over the next few months, it is likely that no extremes of rainfall would be experienced and that the northwest monsoon and tropical cyclone activity should remain mostly to the west of the region. Recent flooding across Fiji is an example of La Niña weather patterns. It is difficult to forecast rainfall in American Samoa because it is so close to the line where, to the west the rainfall is above normal and to the east, it is below normal. The next dry season (June - September 2012) is currently anticipated to have near-normal rainfall. The risk of a damaging tropical cyclone is typically below normal during La Niña. For the remainder of the cyclone season (through June 2012) we are cautiously optimistic that there will be no substantial adverse impacts from tropical cyclones in the Samoa region. However, the recent direct hit of Hurricane Wilma on American Samoa in late January 2011 illustrates that the risk of a tropical cyclone in American Samoa is never zero during its cyclone season! Through June 2012, South Pacific tropical cyclones should favor the Coral Sea, and be a threat primarily to the east coast of Australia across to Fiji.

Predicted rainfall for American Samoa from January 2012 through December 2012 is:

LOCAL SUMMARY AND FORECAST

Inclusive Period	% of long-term average / Forecast rainfall (inches) [1]
January - March 2012 (Heart of Rainy Season)	**100% (37.31 - Pago Pago)**
April - June 2012 (Onset of Next Dry Season)	**100%**
July - September 2012 (Heart of Next Dry Season)	**100%**
October - December 2012 (Onset of Next Rainy Season)	**100%**

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

Guam/CNMI: Throughout Guam and the CNMI, the weather and climate of 2011 was not quite so dull and uneventful as it was during 2010. As La Niña relaxed during the first half of the year, and the state of the climate became ENSO-neutral for the summer, some weak to moderate episodes of the western Pacific monsoon occurred. These brought periods of widespread heavy rain showers and thunderstorms, and also a few episodes of high surf on the western sides of the islands. Rainfall throughout the region was generally above normal, especially during July through October. During the night of 02 September, up to seven inches of rain fell across mid-Guam, and the 7.02 inches of rainfall recorded at the UOG was the heaviest daily rainfall total there since August 2004. When La Niña returned in the final months of 2011, the weather and climate of the region returned to its dull and uneventful state. Trade winds returned to dominate the weather, tropical cyclone activity shifted far to the west, and rainfall was near normal.

The dry season is now underway on Guam and in the CNMI. The trade winds are well established, and trade wind showers and some weak shear line passages have kept conditions somewhat wet. The cool wet weather has kept the grasslands green, and helped to prevent the usual upswing in dry season brush fires.

Guam Rainfall Summary 4th Qtr 2011						
Station		**Oct.**	**Nov.**	**Dec.**	**4th Qtr**	**Annual**
GIA (WFO)*	**Inches**	15.45	6.14	5.24	**26.83**	**114.59**
	% Norm	128%	75%	97%	**107%**	**126%**
AAFB**	**Inches**	11.54	8.09	6.12	**25.75**	**110.74**
	% Norm	90%	89%	103%	**92%**	**113%**
Dededo (Ypapao)	**Inches**	11.94	8.33	7.02	**27.29**	**119.09**
	% Norm	93%	92%	118%	**98%**	**121%**
Ugum Watershed	**Inches**	12.61	8.40	5.43	**26.44**	**119.08**
	% Norm	134%	81%	86%	**95%**	**121%**
Sinajaña	**Inches**	19.42	6.24	5.53	**31.19**	**121.48**
	% Norm	161%	76%	103%	**122%**	**134%**

*GIA-Guam International Airport, WFO-Weather Forecast Office
**AAFB-Anderson Air Force base

LOCAL SUMMARY AND FORECAST

CNMI Rainfall Summary 4th Qtr 2011						
Station		**Oct.**	**Nov.**	**Dec.**	**4th Qtr**	**Annual**
Saipan Intl. Airport	**Inches**	17.63	3.22	4.65	**25.50**	**82.59**
	% Norm	157%	53%	116%	**119%**	**107%**
Capitol Hill	**Inches**	16.34	2.81	6.00	**25.15**	**104.81**
	% Norm	136%	38	125%	**104%**	**126%**
Tinian Airport	**Inches**	9.70	2.66	2.48	**14.84**	**85.10**
	% Norm	81%	36	52%	**62%**	**102%**
Rota Airport	**Inches**	14.37	6.21	5.59	**26.17**	**114.70**
	% Norm	113%	72	98%	**97%**	**121%**

Climate Outlook: Guam and the CNMI are now entering the heart of their dry season. March is typically the driest month of the year in this region, with 3 to 4 inches of rainfall on Guam and only about 2 to 3 inches on Saipan. The evolution of the state of the climate system during the first half of 2012 is anticipated to be somewhat similar to what it was during the first half of 2011: La Niña conditions falling back toward ENSO-neutral. During years that begin in La Niña and then transition towards ENSO-neutral, the spring rainfall on Guam and in the CNMI is typically near normal or above normal. Tropical cyclone activity is likely to see a delay in the basin and in the region, but during July or August, the monsoon should once again bring abundant rainfall and an upswing of tropical cyclone formations to near-normal levels. There has not been a strong monsoon on Guam, the CNMI, or anywhere in Micronesia since 2004! The reason for this is an unusual inter-decadal shift in ENSO behavior since 1998 that has resulted in a climate state more strongly dominated by La Niña with weaker El Niño events (e.g., 2006 and 2009). It is not known when again there will be a return to a period dominated by El Niño, with strong monsoons and many tropical cyclones.

Predicted rainfall for the Mariana Islands from January 2012 through December 2012 is as follows:

Inclusive Period	**% of long-term average / Forecast rainfall (inches)** [1]	
	Guam/Rota	**Saipan/Tinian**
January – March 2012 (1st Half of Dry Season)	**120% (13.40 inches)**	**100% (7.74 inches)**
April – June 2012 (2nd Half of Dry Season)	**120%**	**100%**
July - September 2012 (Onset of Next Rainy Season)	**120%**	**120%**
October - December 2012 (2nd Half of Next Rainy Season)	**110%**	**100%**

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

Federated States of Micronesia

Yap State: During 2011, all Yap island locations were very wet, with annual totals of 150 inches or more. The 158.05 inches of rain at the Yap WSO during 2011 was 132% of normal. Rainfall was above normal during every month of 2011 at the Yap WSO, and also at most locations across Yap Island. Ulithi was also very wet with an annual total that was 140% of normal, but with 8 months above and 4 months below normal. Woleai was the only reporting location in Yap State that had below-normal rainfall. It is likely that all of the southern Yap State Islands had below-normal rainfall as La Niña frequently creates a high pressure ridge and improved weather over these islands. It is also possible that the archived normal values for this site are too high, and refinements and corrections to outer-island rainfall statistics remain important tasks for the PEAC Center and others. The monsoon trough was continually near Yap State during the rainy season of 2011, and the rains from the monsoon and from developing tropical cyclones in the monsoon trough contributed to abundant rainfall there. Aside from abundant rainfall, the weather was otherwise unremarkable in Yap State, and there were no serious impacts by tropical cyclones.

Climate Outlook: Yap State is entering its dry season. The months of February through April are the heart of the normal dry

Yap State Rainfall Summary 4th Qtr 2011						
Station		**Oct.**	**Nov.**	**Dec.**	**4th Qtr**	**Annual**
Yap Island						
Yap WSO	**Inches**	12.32	9.92	9.91	**32.15**	**158.05**
	% Norm	103%	109%	110%	**107%**	**132%**
Dugor	**Inches**	19.12	12.36	12.38	**43.86**	**179.59**
	% WSO	160%	136%	138%	**146%**	**150%**
Gilman	**Inches**	13.44	11.15	9.94	**34.53**	**160.59**
	% WSO	112%	123%	111%	**115%**	**134%**
Luweech	**Inches**	10.86	9.28	10.19	**30.33**	**149.09**
	% WSO	91%	102%	113%	**101%**	**124%**
Maap	**Inches**	6.94	13.00	8.94	**28.88**	**156.26**
	% WSO	58%	143%	99%	**96%**	**130%**
North Fanif	**Inches**	15.61	12.62	7.49	**35.72**	**171.15**
	% WSO	130%	139%	83%	**119%**	**143%**
Rumung	**Inches**	11.22	12.04	8.08	**31.34**	**147.82**
	% WSO	94%	133%	90%	**104%**	**123%**
Tamil	**Inches**	17.27	13.40	9.85	**40.52**	**158.86**
	% WSO	144%	148%	110%	**135%**	**132%**
Outer Islands						
Ulithi	**Inches**	9.60	13.46	10.68	**33.74**	**142.69**
	% Norm	94%	175%	140%	**132%**	**140%**
Woleai	**Inches**	8.64	5.79	7.50	**21.93**	**82.42**
	% Norm	64%	54%	66%	**61%**	**59%**

LOCAL SUMMARY AND FORECAST

season. During 2012, it is anticipated that the most likely scenario would be for the current La Niña conditions to slowly fade back to ENSO-neutral by June or July. In this scenario, near-normal to above-normal rainfall is likely for most islands of Yap State through the dry season (February through May). The rainy season should begin on time in late May or early June, and abundant rainfall should occur throughout the upcoming rainy season. Tropical cyclone activity should be delayed through the first half of 2012, and then become near normal for the remainder of 2012. It is possible that one of the western North Pacific basin's first tropical cyclones of the year could pass near Yap State in the months of April through June, but the risk of damage in Yap State from such a tropical cyclone is small because it would likely intensify to the west of Yap State.

Predicted rainfall for Yap State from January 2012 through December 2012 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) [1]	
	Yap and Ulithi	Woleai
January – March 2012 (Heart of Dry Season)	**100% (18.83 inches)**	**90% (23.83 inches)**
April – June 2012 (Onset of Rainy Season)	**110%**	**90%**
July – September 2012 (Heart of Next Rainy Season)	**110%**	**100%**
October – December 2012 (End of Next Rainy Season)	**110%**	**100%**

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

Chuuk State: The annual rainfall throughout Chuuk State was well above normal during 2011. Twelve-month totals were in the range of 160 to 180 inches across Chuuk Lagoon and in the Mortlocks. The 163.85 inches at the WSO Chuuk was 122% of normal, and only the 12th time in a 68-year record (including the Japanese data from 1932-37 and the post-war record from 1951-present). This puts the 2011 annual rainfall total at the Chuuk WSO in the top 20% wettest years. 2011 annual rainfall was below average only at Fananu in the north, and at Polowat in the far western side of Chuuk State. Polowat was much drier than at other locations in Chuuk State, and it is possible that the archived normal values for this site are too high, and refinements and corrections to outer-island rainfall statistics remain important tasks for the PEAC Center and others. Although it was very wet during 2011 in many parts of Chuuk State, there were no exceptional daily extremes, and no reports of any major damage from flooding or landslides. The rainfall did hamper a major road construction project on the main island of Weno in the lagoon. No tropical cyclones affected Chuuk State during 2011.

Chuuk State Rainfall Summary 4th Qtr 2011						
Station		**Oct.**	**Nov.**	**Dec.**	**4th Qtr**	**Annual**
Chuuk Lagoon						
Chuuk WSO	**Inches**	11.14	14.44	14.01	**39.59**	**163.85**
	% Norm	83%	140%	129%	**114%**	**122%**
Piis Panew*	**Inches**	*	*	10.50	*	*
	% WSO	*	*	97%	*	*

LOCAL SUMMARY AND FORECAST

Chuuk State Rainfall Summary 4th Qtr 2011						
Station		**Oct.**	**Nov.**	**Dec.**	**4th Qtr**	**1st Half**
Southern Mortlocks						
Lukunoch	**Inches**	6.38	14.02	28.38	**48.74**	**183.66**
	% WSO	48%	136%	261%	**141%**	**137%**
Ettal	**Inches**	11.59	11.67	21.98	**45.24**	**182.26**
	% WSO	86%	113%	203%	**131%**	**136%**
Ta	**Inches**	1.50	9.86	12.18	**23.54**	**170.17**
	% WSO	11%	95%	112%	**68%**	**127%**
Northern Atolls						
Fananu	**Inches**	9.25	12.33	2.47	**24.05**	**119.24**
	% WSO	69%	119%	23%	**70%**	**89%**
Onoun	**Inches**	15.47	15.94	8.06	**39.47**	**161.53**
	% WSO	115%	154%	74%	**114%**	**120%**
Northern Mortlocks						
Losap	**Inches**	9.43	12.48	8.46	**30.37**	**156.60**
	% WSO	70%	121%	78%	**88%**	**117%**
Nama	**Inches**	5.71	9.22	14.88	**29.81**	**167.56**
	% WSO	43%	89%	137%	**86%**	**125%**
Namoluk	**Inches**	5.19	12.25	15.22	**32.66**	**164.42**
	% WSO	39%	119%	140%	**94%**	**122%**
Western Atolls						
Polowat	**Inches**	3.30	5.80	7.09	**16.19**	**68.34**
	% Norm	28%	63%	77%	**53%**	**57%**

* Data not available. New observer in training at Piis Panew.

Climate Outlook: During 2012, it is anticipated that the current La Niña conditions should slowly fade back to ENSO-neutral by June or July. In this scenario, easterly low-level winds typically dominate throughout Chuuk State. Rainfall is typically average to above average, with heaviest rainfall confined to an east-west band known as the trade-wind trough/ convergence or Inter-Tropical Convergence Zone (ITCZ). Through the spring months, the location of the ITCZ produces a gradient of rainfall, with higher amounts to the south (e.g., Ettal and Lukunoch) and lower amounts to the north (e.g., Fananu, the Lagoon area and Losap). No early season (January through June) tropical cyclones are expected to occur within Chuuk State. Later in the year however, (especially during Oct, Nov and Dec) as the monsoon works its way eastward into the region, a few tropical depressions and/or a tropical storm may develop within Chuuk State.

Predictions for Chuuk State from January 2012 through December 2012 are as follows:

LOCAL SUMMARY AND FORECAST

Inclusive Period	% of long-term average / Forecast rainfall (inches) [1]			
	Chuuk Lagoon, Losap, and Nama	Polowat	Northern Atolls and Islands	Southern Mortlocks
Jan – Mar 2012	**90% (23.19 inches)**	**90% (23.19 in)**	**90% (23.19 in)**	**110% (28.34 in)**
Apr – Jun 2012	**110%**	**100%**	**100%**	**120%**
Jul – Sep 2012	**110%**	**95%**	**110%**	**110%**
Oct – Dec 2012	**100%**	**95%**	**100%**	**100%**

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

Pohnpei State: Weather conditions on Pohnpei Island and at most atolls of Pohnpei State were tranquil and unremarkable during 2011, although it was quite wet in some locations. One of the atolls of Pohnpei State, Kapingamarangi had an extended and damaging drought during the six-month period beginning in September 2010 through February 2011. The total rainfall during these 6 months was only 7.12 inches, or 7% of the normal 48.37 inches. During February of 2011 Kapingamarangi recorded only 0.20 inches of rain. Small rainfall values such as these can quickly become a life-threatening emergency as rain catchment systems run dry and agricultural plants are damaged. The dry conditions at Kapingamarangi and at other islands close to the equator (e.g., Tarawa and Nauru) occurred because of the La Niña-related westward extension of cold sea surface temperatures along the equator. Small personal distillation units from government and non-government sources and reliable water shipments by the FSM and Pohnpei State governments averted a likely disaster. In March of 2011, abundant rainfall returned to Kapingamarangi, and enough rain fell thereafter to bring the 2011 annual total above normal! Most locations on Pohnpei Island and at the other atolls of Pohnpei State had above-normal rainfall during 2011. As usual, Palikir topped the list of rainfall totals observed in Pohnpei State during 2011 with 216.26 inches (106%). This was also the highest total annual rainfall observed throughout Micronesia during 2011. A few miles away at the WSO, Pohnpei, the rainfall total during 2011 was 186.26 inches (99%).

Pohnpei State Rainfall Summary 4th Qtr 2011						
Station		Oct.	Nov.	Dec.	4th Qtr	Annual
Pohnpei Island						
Pohnpei WSO	Inches	11.74	18.21	17.61	**47.56**	**186.26**
	% Norm	70%	116%	116%	**100%**	**99%**
Palikir	Inches	20.28	15.67	22.43	**58.38**	**216.26**
	% Norm	112%	92%	136%	**113%**	**106%**
Kolonia Airport	Inches	15.54	17.36	16.08	**48.98**	**182.91**
	% Norm	113%	134%	127%	**125%**	**118%**
Atolls of Pohnpei State						
Nukuoro	Inches	8.58	8.08	19.66	**36.32**	**166.74**
	% Norm	80%	67%	164%	**105%**	**112%**
Pingelap	Inches	13.02	11.88	29.32	**54.22**	**172.19**
	% Norm	88%	83%	219%	**128%**	**97%**
Mwoakilloa	Inches	11.71	13.51	23.68	**48.90**	**199.38**
	% Norm	85%	105%	189%	**125%**	**129%**
Kapingamarangi	Inches	4.63	7.54	12.19	**24.36**	**118.20**
	% Norm	96%	92%	139%	**112%**	**107%**

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Climate Outlook: Easterly low-level winds should continue to dominate throughout Pohnpei State for the next several months, as the current weak-to-moderate La Niña slowly fades back to ENSO-neutral by June or July. In this scenario, the trade-wind trough/convergence (also called the ITCZ) becomes established across Pohnpei State in the spring. Thus, during the first half of 2012, rainfall is likely to be near normal to above normal for most islands and atolls of Pohnpei State. February is the driest month for most Pohnpei locations, and May is typically the wettest month for most locations on Pohnpei Island. This year should be no exception, with abundant rainfall, especially for the 3-month period of April through June. Thereafter, near-normal rainfall is anticipated on Pohnpei Island and the outer atolls. The risk on Pohnpei Island, or for any of the atolls of Pohnpei State, of hazardous effects from tropical cyclones is anticipated to be very low during 2012.

Predicted rainfall for Pohnpei State from January 2012 through December 2012 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) [1]	
	Pohnpei Island and Atolls	Kapingamarangi
Jan - Mar 2012	**100% (33.93 inches)**	**70% (34.60 inches)**
Apr - Jun 2012	**110%**	**100%**
Jul - Sep 2012	**100%**	**100%**
Oct - Dec 2012	**100%**	**100%**

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

Kosrae State: Kosrae is typically one of Micronesia's wettest locations, with an annual average rainfall of slightly over 200 inches. During 2011, Kosrae locations fell just short of their normal high rainfall values. This was likely a residual effect of the rather wide La Niña-associated cold water wedge. During 2010 and the first three months of 2011, the cold sea surface temperature anomaly that accompanies La Niña was so extensive that rainfall was reduced in a wide region near the equator and extending away from the equator to produce some dry conditions at low-latitiude islands such as Nukuoro (3.8° N) and at Kosrae (5.3° N). Mukuoro has since become wet, and Kosrae

LOCAL SUMMARY AND FORECAST

has returned to near normal. It was particularly dry in Kosrae during the first three months of 2011, and then beginning in April and May, heavier rainfall amounts helped to bring the annual total to near normal. The annual total rainfall of 196.72 inches at the Kosrae Airport during 2011 was just under normal at 95%. Several locations in eastern Micronesia (including Pohnpei, Majuro, and Kwajalein) have seen a long-term decline in annual rainfall over their periods of record-keeping (which extend back to the early 1950s) for at least one primary station in each of the major island groups. Some islands (Kosrae included), also have a period of climatic record-keeping by the Japanese during the late 1920s to mid 1930s. Recent longer-term trends in dryness in Kosrae may be related to an unusual persistence of La Niña over the past decade, which has seen an increase in the trade winds across the region, and shifts in the rainfall patterns.

Kosrae State Rainfall Summary 4th Qtr 2011						
Station		**Oct.**	**Nov.**	**Dec.**	**4th Qtr**	**Annual**
Airport (SAWRS)	**Inches**	16.83	13.07	28.11	**58.01**	**196.72**
	% Norm	104%	82%	194%	**124%**	**95%**
Utwe	**Inches**	16.20	11.17*	35.05	**62.42**	**198.35**
	% WSO	100%	70%	242%	**134%**	**96%**
Tofol	**Inches**	19.00	10.25	19.05	**48.30**	**186.86**
	% WSO	117%	64%	131%	**104%**	**91%**
Nautilus Hotel	**Inches**	15.52	10.18	28.56	**54.26**	**189.25**
	% WSO	96%	64%	196%	**116%**	**92%**

* Estimated from nearby stations

Climate Outlook: A weather pattern of persistent trade winds should continue to dominate at Kosrae. During persistent trade-wind conditions, there is normally abundant rainfall on Kosrae. While computer forecasts of rainfall indicate continued slight dryness at Kosrae for at least the next three months, rainfall should remain more than sufficient. No adverse tropical cyclone activity is expected for Kosrae State during 2012.

Predicted rainfall for Kosrae State from January 2012 through December 2012 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) [1]
January – March 2012	**90% (44.47 inches)**
April – June 2012	**100%**
July - September 2012	**100%**
October - December 2012	**100%**

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

Republic of Palau: The 2011 annual rainfall at the WSO Koror set a new record high: the 205.86 inches of rainfall was the highest annual total in a

LOCAL SUMMARY AND FORECAST

period of record at Koror that extends back to 1948 and also contains a period of climatic record-keeping by the Japanese that covers the years 1932-37. The previous record-high annual total at Koror occurred during 1974 when 184.99 inches was observed. The 2011 annual rainfall total was even higher at the Palau International Airport (PIA) where the 215.52 inches was the second-highest 2011 annual total seen in all of Micronesia. It was exceeded only slightly by the 216.26 inches recorded at Palikir, Pohnpei Island. The PIA has only a short record that begins in 2004, and it is usually wetter there than at the Koror WSO located only a few miles to the southwest. While the airport in its short history has a record of being wetter than Koror, Peleliu has a history of being slightly drier than at the WSO, and this was true during 2011 when the annual total there was 171.25 inches. The weather and climate conditions during 2011 in the Republic of Palau, though persistently wet, were relatively tranquil and uneventful. There were a few rainfall events that caused minor mudslides on Babeldaob.

Republic of Palau Rainfall Summary 4th Qtr 2011						
Station		**Oct.**	**Nov.**	**Dec.**	**4th Qtr**	**Annual**
WSO Koror	**Inches**	14.39	7.04	10.79	**32.22**	**205.86**
	% Norm	104%	62%	90%	**87%**	**139%**
Nekken	**Inches**	12.10*	9.56*	12.46*	**34.12***	**169.88**
	% Norm	87%	84%	104%	**106%**	**115%**
Intl. Airport	**Inches**	16.63	12.07	14.12	**42.82**	**215.52**
	% Norm	119%	107%	118%	**115%**	**146%**
Peleliu	**Inches**	9.90	16.37	13.00	**39.27**	**171.25**
	% Norm	71%	145%	108%	**106%**	**116%**

* Estimated from nearby stations

Climate Outlook: The Republic of Palau is likely to continue to be wetter than normal for at least the next few months. Beyond that, it is hard to envision Koror setting another new record high annual rainfall during 2012, and conditions that contributed to such high rainfall (e.g., part of the monsoon trough anchored in the vicinity of Palau for much of 2011) are not likely to be repeated during 2012. Normally the monsoon trough moves far enough north of Palau in August through September so that a "mini" dry season occurs, and hazy dry southwest winds are a common weather pattern. During the summer of 2012, it is anticipated that the monsoon trough will likely exhibit a more normal behavior and the rainfall on Palau will not be quite so persistently heavy as it was during 2011. Palau is one of the few places in Micronesia where an upward trend in annual rainfall is observed across its period of record. At Yap there is no observed long-term trend; on Guam there is a slight upward trend; and, across most of the rest of Micronesia, the trend of annual rainfall is downward.

It may be interesting to note that exactly one year ago, the PEAC Center made the following forecast: "*With La Niña weakened, the southwest monsoon will extend further into the western North Pacific than it did during 2010. There will therefore be an increase of monsoon depressions and other tropical disturbances that will provide abundant rainfall to Palau*

LOCAL SUMMARY AND FORECAST

throughout the year [i.e., 2011]."

Predicted rainfall for Palau from January 2012 through December 2012 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) [1]
January – March 2012	**110% (32.60 inches)**
April – June 2012	**110%**
July – September 2012	**100%**
October – December 2012	**110%**

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

Republic of the Marshall Islands (RMI): The RMI is one of the regions of the tropical Pacific basin where the mean annual rainfall exhibits a statistically significant long-term decline. Hawaii is another such region, where, over its 100-year climate record, the rainfall and stream flow has been declining. In this respect, 2011 saw a reversal of this ongoing condition in the RMI: annual rainfall was above normal at many atolls. For example, Kwajalein's 2011 annual total of 119.02 inches was 117% of normal, and Majuro's 136.31 inches was 104% of normal. Kwajalein's annual rainfall has exceeded 119.02 inches only ten times in its 60-year rainfall record extending back to 1953, and most recently during 1997.

RMI Rainfall Summary 4th Qtr 2011						
Station		**Oct.**	**Nov.**	**Dec.**	**4th Qtr**	**Annual**
RMI Central and Southern Atolls (6º N - 8º N)						
Majuro WSO	**Inches**	14.65	15.97	10.37	**40.99**	**136.31**
	% Norm	106%	125%	88%	**106%**	**104%**
Laura	**Inches**	**	**	**	**	**
	% WSO	**	**	**	**	**
Mili	**Inches**	4.56	**	**	**	**
	% WSO	33%	**	**	**	**
Arno	**Inches**	12.50	12.39	10.00*	**30.51**	**139.58**
	% WSO	97%	106%	100%	**88%**	**120%**
Aling-laplap	**Inches**	7.50	5.82	8.00*	**19.05**	**112.91**
	% WSO	54%	45%	68%	**49%**	**86%**
Jaluit	**Inches**	12.21	15.48	10.00*	**34.64**	**137.62**
	% WSO	88%	121%	84%	**90%**	**105%**
RMI Northern Atolls (North of 8º N)						
Kwajalein	**Inches**	14.00	14.68	5.59	**34.27**	**119.02**
	% Norm	118%	138%	69%	**112%**	**117%**
Wotje	**Inches**	5.19	5.24	5.00*	**12.18**	**64.67**
	% Norm	46%	52%	65%	**42%**	**67%**
Utirik	**Inches**	**	2.52	**	**	**
	% Norm	**	**	**	**	**

* Estimated from nearby stations
** Missing data

LOCAL SUMMARY AND FORECAST

Climate Outlook: During both 2010 and 2011, there was often a fortuitous set-up of the upper atmospheric wind patterns that helped to bring some episodes of very heavy rainfall to many of the atolls. In addition, the trade-wind trough/convergence was well established. Some high 24-hour rainfall totals were observed and also some unusual lightning displays (e.g., a notable thunderstorm near Kwajalein in January 2011). Not counting on the continued help of unusually favorable upper air flow patterns, and considering computer forecasts of near normal rainfall for the next three months, and also factoring-in the long-term trend of declining rainfall in the RMI, the outlook for 2012 is for near-normal rainfall for at least the next three months and likely also the following months of the year.

Predicted rainfall for the RMI from January 2012 through December 2012 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) [1]		
	South of 6ºN	**6ºN to 8ºN**	**North of 8ºN**
Jan – March 2012 (Dry Season)	**95% (22.21 inches)**	**95% (22.21 in)**	**90% (11.40 in)**
April – June 2012 (Onset of Rains)	**95%**	**100%**	**95%**
July – Sept 2012 (Rainy Season)	**100%**	**100%**	**100%**
Oct – Dec 2012 (Start of Dry Season)	**100%**	**100%**	**100%**

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

Hawaii: See page 1 for local summary.

Climate Outlook: The long-lead outlook issued on January 19 by the NOAA Climate Prediction Center indicates that probabilities favor above-normal precipitation during early 2012 as part of the mature phase of La Niña. Note that even if the long range projection for the next two to three months verifies correctly, full drought recovery (especially for the Big Island and Maui County) may not occur due to the intensity of the ongoing dry conditions. The next long-lead outlook will be issued by the CPC on February 16.

State of Hawaii Rainfall Summary 4th Qtr 2011						
Station		**Oct.**	**Nov.**	**Dec.**	**4th Qtr**	**Annual**
Lihue Airport	**Inches**	2.40	4.96	1.68	**9.04**	**41.11**
	% Norm*	73%	141%	53%	**90%**	**153%**
Honolulu Airport	**Inches**	0.24	0.89	1.10	**2.23**	**15.67**
	% Norm*	19%	65%	83%	**57%**	**172%**
Kahului Airport	**Inches**	0.10	0.07	**	**0.17**	**10.60**
	% Norm*	18%	4%	**	**3%**	**83%**
Hilo Airport	**Inches**	4.10	17.47	20.26	**41.83**	**97.66**
	% Norm*	48%	154%	198%	**138%**	**90%**

* Hawaii normals are computed from 1981-2010 data.
** Missing data

Seasonal Sea Level Outlook for the US-Affiliated Pacific Islands

The following sections describe: (i) the Canonical Correlation Analysis (CCA) forecasts for seasonal (mean and maxima) sea-level deviations for the forthcoming seasons JFM, FMA, and MAM of 2012, (ii) the observed monthly mean and maximum sea-level deviations for the season OND 2011, and (iii) forecast verifications for OND 2011 (observed/forecast values) and discussion. *Note that the deviations are defined as 'the difference between the mean sea level for the given month and the 1975 through 1995 mean sea level value computed at each station'. Also note that the CCA-forecasting technique adapted here does not account for sea-level deviations created by other atmospheric or geological factors such as tropical cyclones, storm surges or tsunamis.*

(i) Seasonal Sea Level Forecast *(deviations with respect to climatology*) for JFM, FMA and MAM 2012 (Table 1).

Forecasts of the sea-level deviations in the USAPI (see http://www.prh.noaa.gov/peac/map.php for location of stations) are presented using the CCA statistical model based on the independent SST values in OND 2010. The resulting CCA model has been used to forecast the sea-level of three consecutive months: JFM**,** FMA, and MAM (see Table 1: left panel shows values for seasonal mean while the right panel shows the seasonal maxima). All the tide gauge stations (at 0 to 2-months lead time) show skillful forecasts for these three consecutive seasons (Table 1: bottom panel). Consistent with the on-going La Niña event, the sea level in these islands are higher than normal.

Table 1: **Forecasts of Sea Level Deviation (in inches) for JFM, FMA, and MAM 2012.**

	Seasonal Mean Deviations				Seasonal Max Deviations					
Tide Gauge Station	**JFM**	**FMA**	**MAM**	**Forecast Quality**	**JFM**	**FMA**	**MAM**	**Forecast Quality**	***Return Period for JFM Season***	
Lead Time	*0*	*1M*	*2M*		*0*	*1M*	*2M*		*20 Year*	*100 Year*
Marianas, Guam	+6	+6	+6	V. Good	+21	+21	+21	V. Good	5.6	6.7
Malakal, Palau	+5	+5	+4	V. Good	+41	+41	+41	Good	9.6	14.3
Yap, FSM	+4	+4	+5	V. Good	+31	+33	+33	Good	16.7	33.0
Chuuk, FSM**	+5	+5	+5	N/A	+31	+33	+33	N/A	N/A	N/A
Pohnpei, FSM	+6	+6	+5	V. Good	+35	+34	+34	V. Good	5.8	7.1
Kapingamarangi, FSM	+6	+6	+5	Good	+31	+30	+30	Fair	7.4	9.4
Majuro, RMI	+4	+4	+3	Good	+44	+44	+43	Fair	4.1	5.1
Kwajalein, RMI	+3	+4	+4	Good	+42	+42	+42	Good	4.5	5.9
Pago Pago, Am. Samoa	+4	+5	+5	V. Good	+29	+29	+29	V. Good	3.9	5.4
Honolulu, Hawaii	-1	-1	-1	Poor	+17	+16	+16	Poor	4.1	5.9
Hilo, Hawaii	-1	-1	-1	Good	+22	+20	+20	Fair	7.9	11.4

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. See http://www.prh.noaa.gov/peac/peu/2012_1st/sea_level.php#footnote for explanations of footnotes 1 through 5.

Remarks: The forecasted values of sea level for JFM, FMA, and MAM seasons (Table 1, above) indicate that sea levels for some of the stations (i.e., Guam, Malakal, Yap, Pohnpei, and Kapingamarangi) are likely to be about 4-6 inches higher than normal in the forthcoming seasons. Other stations in the Marshalls (Majuro, Kwajalein) and American Samoa (Pago Pago) are also expected to be about 3-5 inches higher than normal.

These forecasts (e.g., higher than average sea level) are supportive to on-going La Niña condition. According to CPC's ENSO Alert System Status, which has been marked as 'La Niña Advisory'— La Niña is expected to continue into the Northern spring 2012. Collectively, the current oceanic and atmospheric anomalies reflect a moderate-to-weak strength La Niña. During any La Niña event the sea level in the USAPI region experiences a rise. However, the current La Nina is weakening now. As a result, a trend of gradual fall of sea level has been observed in the seasons FMA and MAM.

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Seasonal Sea Level Outlook for the US-Affiliated Pacific Islands

(ii) Observed Monthly Sea Level Deviation in OND 2011. The monthly time series (OND) for sea level deviations have been taken from the UH Sea Level Center. The full time series (in mm) for monthly mean is available at ftp://ilikai.soest.hawaii.edu/islp/slpp.deviations. Locations of these stations can be found at: http://www.prh.noaa.gov/peac/map.php.

Table 2 : Monthly Observed Max/Mean Sea Level Deviations in Inches (1 inch = 25.4mm)

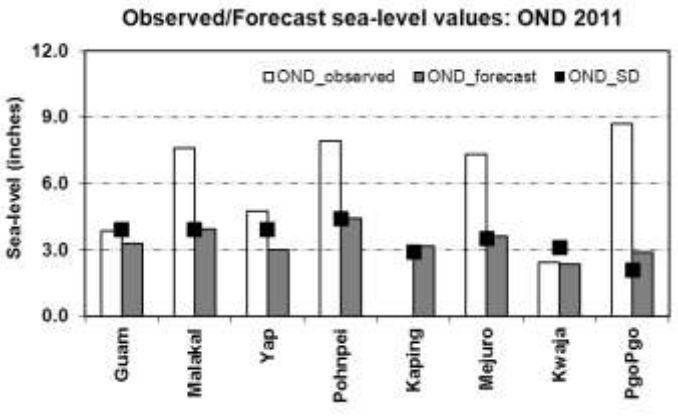
Tide Gauge Station	Monthly Mean Deviations[1]				Monthly Max Deviations[2]			
	Oct.	Nov.	Dec.	Standard Deviations	Oct.	Nov.	Dec.	Standard Deviations
Marianas, Guam	+6.7	+4.5	+3.3	4.0	+21	+19	+21	3.5
Malakal, Palau	+9.2	+8.1	+7.2	4.0	+47	+43	+42	4.1
Yap, FSM	+6.3	+3.7	+4.2	4.1	+36	+30	+35	4.1
Chuuk, FSM	*	*	*	*	*	*	*	*
Pohnpei, FSM	+8.2	+7.6	*	4.7	+40	+39	*	4.9
Kapingamarangi, FSM	*	*	*	3.1	*	*	*	3.8
Majuro, RMI	+8.6	+6.0	*	3.7	+48	+47	*	3.8
Kwajalein, RMI	+4.0	+0.5	+2.7	3.1	+44	+39	+43	3.2
Pago Pago, American Samoa	+8.9	+8.6	*	2.5	+35	+33	*	2.2
Honolulu, Hawaii	+1.0	0.0	-2.3	1.8	+23	+19	+17	2.6
Hilo, Hawaii	+3.5	*	-1.2	1.8	+26	+24	+19	2.2

* Data currently unavailable; [1] Difference between the mean sea level for the given month and the 1975 through 1995 mean sea level value at each station; [2] Same as [1] except for maxima; SD stands for standard deviations.

Remarks: As compared to November 2011, the monthly mean sea level in December 2011 shows fall in all stations except Yap and Kwajalein. During the month of August 2011, sea level of all stations (except Kwajalein) recorded rise. In September, some stations recorded rise and others recorded fall. In October, most of the stations recorded a marginal fall while a few stations recorded marginal rise. In November and December most of the stations (except Yap and Kwajalein) recorded fall. Currently, all stations are 2 to 7 inches higher than normal. The monthly maxima also displayed a similar trend. Current elevated sea levels are supportive to on-going La Niña condition.

(iii) Forecast Verification (Seasonal Mean) for OND 2011

Figure 1: Observed and Forecast Sea Level Values



Remarks: Forecasts were, in general, skillful. However, several stations are found to be under-forecasted. A probable reason was the recent trend of enhanced trade winds. Therefore, only SST-based sea-level forecasts are found to be less skillful in this season.

(iv) ENSO and Seasonal Sea Level Variability: A Synopsis

Table 3: Sea-Level Deviation in Current and Major ENSO Years

	Seasonal Mean Deviations: Observed rise/fall (inches)			
Seasons	OND11 (La Nina)	OND10 (La Nina)	OND97 (El Nino)	OND98 (La Nina)
Marianas, Guam	+4	+8	-7	+8
Malakal, Palau	+8	+7	-7	+9
Yap, FSM	+5	+5	-9	+7
Pohnpei, FSM	+8	+4	-10	+8
Majuro, RMI	+7	+4	-9	+6
Kwajalein, RMI	+2	+2	-7	+3
Pago Pago	+9	+2	+2	+7

Remarks: As the sea level in the USAPI is very sensitive to the phase of the ENSO climate cycle, a perspective of sea level anomalies during the recent ENSO event (2010-11) and the ENSO event of 1997-98 is presented in the above Table. Data for the season OND is presented here: a more comprehensive analysis on this issue is available in http://www.soest.hawaii.edu/MET/Hsco/Paper/Weather-65-10263-68.pdf.

Pacific ENSO Update

Excerpts from El NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION
Issued by NOAA NWS Climate Prediction Center - 5 January 2012

http://www.cpc.noaa.gov/products/analysis_monitoring/enso_advisory/index.shtml

ENSO Alert System Status: La Niña Advisory

Synopsis: **La Niña is expected to continue into the Northern spring 2012.**

During December 2011, below-average sea surface temperatures (SST) associated with La Niña continued across the eastern and central equatorial Pacific Ocean. The weekly SST index in the Niño-3.4 region remained near –1.0°C throughout the month, indicating a weak to moderate La Niña. The oceanic heat content (average temperature in the upper 300m of the ocean) anomalies strengthened across the eastern Pacific, reflecting a large area of below-average temperatures in the subsurface. In the atmosphere, anomalous low-level easterly and upper-level westerly winds strengthened over the central and west-central Pacific. Convection remained suppressed in the western and central Pacific and enhanced over northern Australia and parts of Indonesia and the Philippine Islands. Consistent with these conditions, the Southern Oscillation Index (SOI) also strengthened. This evolution is consistent with past events, in which the atmospheric components of La Niña become strongest and most well-defined during the Northern Hemisphere winter. Collectively, the ongoing oceanic and atmospheric patterns reflect the continuation of a weak to moderate La Niña.

A majority of models predict a weak or moderate strength La Niña to peak during the December – February season, and then to continue into early Northern Hemisphere spring season before dissipating during the March to May period. A slight majority of models predict La Niña to remain weak (3-month average SST anomaly in the Niño-3.4 region between -0.5 and -0.9°C) this winter, while several others predict a moderate-strength episode (anomaly in the Niño-3.4 region between -1.0 and -1.4°C). The latest observations, combined with model forecasts, suggest that La Niña will be of weak-to-moderate strength this winter, and will continue thereafter as a weak event until it likely dissipates sometime between March and May.

During January - March 2012, there is an increased chance of above-average temperatures across the south-central and southeastern U.S., and below-average temperatures over the western and the northwest-central U.S. Also, above-average precipitation is favored across most of the northern tier of states and in the Ohio and Tennessee Valleys, and drier-than-average conditions are more likely across the southern tier of the U.S. (see 3-month seasonal outlook released on 15 December 2011).

The Pacific ENSO Update is a bulletin of the Pacific El Niño-Southern Oscillation (ENSO) Applications Climate (PEAC) Center. PEAC Center 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 Charlene Felkley, at peac@noaa.gov or at the address listed below.

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