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ENSO

update

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

Special Edition ENSO Bulletin

Issued: February 1, 2010



Current Conditions

The USAPI have entered a critical phase of El Niño when very dry conditions typically occur. During past El Niño events, dry conditions have plagued many of the USAPI from Micronesia to Hawaii during the winter and spring months that follow the onset of an event. Historically, the most serious dry spells have occurred following a strong El Niño. El Niño conditions began in mid-2009, strengthened throughout the fall and early winter, and by December had become “strong”. The potential for an extended period of dryness in many areas of the USAPI prompted this Special Edition ENSO Bulletin. The regular edition of the Pacific ENSO Update will follow in mid-February.

According to the U.S. Climate Prediction Center (CPC), El Niño strengthened during December 2009, with oceanic and atmospheric anomalies indicating a strong El Niño. At this time, the 3-month Niño-3.4 SST average is anticipated to exceed $+1.5^{\circ}\text{C}$ during the winter (e.g. November-December-January and December-January-February). Most models indicate that SST anomalies in the Niño-3.4 region will begin to decrease in early 2010, and El Niño will persist through April-May-June 2010. Regardless of its precise peak strength, the event is expected to exert a significant influence on global weather and climate in the coming months.

Widespread dry conditions are beginning to materialize in the USAPI and at many locations throughout the state of Hawaii. However, in the USAPI a strong shearline passed through the Mariana Islands during the week of January 18th, yielding cool temperatures, high surf, and 2-3 inches of rainfall. In addition, a tropical disturbance delivered welcome rains to eastern Micronesia, and through January 22nd the monthly rainfall at Kwajalein was above normal. American Samoa received abundant rainfall during December 2009. Overall, predictions call for even drier conditions over the next 3 to 5 months for both Hawaii and Micronesia.

ENSO-related dryness occurs across Micronesia and into Hawaii during the winter and spring that follow El Niño. Widespread and prolonged dry conditions have occurred during the course of very strong El Niño events, such as those of 1983 and 1998. Although the current El Niño does not match the intensity of these past events, CPC has declared it a “strong El Niño”. There is a high probability that many island groups will experience some very dry months during the first half of 2010, but we do not expect the severity of dryness experienced in 1983 or 1998. A brief summary is given below for conditions expected at each island group.

LOCAL RAINFALL FORECASTS DURING 2010 ENSO-CRITICAL PERIOD



American Samoa: American Samoa has entered its rainy season, and rainfall has been abundant so far. Rainfall is expected to lessen in the next few months, especially if El Niño conditions force the northwest monsoon and tropical-cyclone activity further eastward into the Cook Islands and French Polynesia. For February and March there is still an above-normal risk for a tropical cyclone to occur near American Samoa.

ENSO-Critical Period Climate Outlook (February through June 2010): Computer forecasts and consensus outlooks from several regional meteorological centers indicate that rainfall in American Samoa is likely to be slightly below normal for the next few months during the remainder of rainy season.

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²
February - April 2010 (Heart of Rainy Season)	90% (31.01 inches)
May - June 2010 (End of Rainy Season)	85%

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



Guam/CNMI: Abundant rainfall occurred in Guam and the CNMI during December 2009. A recent shearline passage during the week of January 18th brought cool, wind-driven rain that pushed January totals past monthly normals at many locations, helping this region to prepare for anticipated low rainfall over the next several months. By March or April, it should become dry enough to increase the risk of brush fires that normally occur in the latter half of the dry season. During the drought of 1998, twelve percent of Guam’s land area was scorched by brush fires.

ENSO-Critical Period Climate Outlook (February through June 2010): Guam and the CNMI are now entering the heart of their respective dry seasons. Rainfall is normally quite low at this time of year (e.g., 3 inches during a normal March). El Niño typically extends the dry season into June and reduces rainfall during this period. Months with total rainfall below 1 inch are common during ENSO-related dry periods. One or two months with rainfall totals at or below 2 inches are anticipated during February through May 2010.

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²	
	Guam/Rota	Saipan/Tinian
February - April 2010 (Heart of Dry Season)	70% (7.44 inches)	75% (4.74 inches)
May - June 2010 (Extended Dry Season)	65%*	75%*

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

*May-June are severe months as rainfall totals will increase above 3-4 inches until July for Guam-Rota and August for Tinian-Saipan.



Federated States of Micronesia

Yap State: A reduction of normal rainfall has already begun in Yap State as demonstrated by the December rainfall total of only 3.75 inches at the Yap Weather Service Office (WSO). Southern Islands fared a little better, with 7.7 inches at Woleai in December. Occasional rains have continued and water supplies remain adequate for now. However, this may change in the next few months.

ENSO-Critical Period Climate Outlook (February through June 2010): Yap Island and the atolls of Yap State are entering the heart of their respective dry seasons. Rainfall is often quite low (monthly values of 5 inches or less) at this time of year. El Niño typically reduces dry season rainfall and extends the dry season into May and June when monthly values normally begin to rise. The reservoir near Colonia could “dry up”.

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²	
	Yap and Ulithi	Woleai
February - April 2010 (Heart of Dry Season)	60% (10.30 inches)	60% (16.08 inches)
May - June 2010 (Extended Dry Season)	70%	75%

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

LOCAL RAINFALL FORECASTS DURING 2010 ENSO-CRITICAL PERIOD

Chuuk State: A reduction of normal rainfall has already begun in Chuuk State, as evidenced by the December rainfall total of only 5.26 inches at the Chuuk WSO. Occasional rains have continued and water supplies remain adequate for now, but conditions will likely change in the next few months.

ENSO-Critical Period Climate Outlook (February through June 2010): The islands of Chuuk Lagoon and the other atolls of Chuuk State are entering their normal dry season, which often lasts only a couple of months. Chuuk normally experiences reduced rainfall during February and March (less than 10 inches per month), and abundant rainfall returns in April. El Niño typically reduces dry season rainfall and extends the dry season into April and May (when monthly values begin to rise). Large populations and relatively small fresh water sources make Chuuk State especially vulnerable to drought.

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²			
	Chuuk Lagoon, Northern Mortlocks	Polowat	Northern Atolls	Southern Mortlocks
February - April 2010	60% (15.80 inches)	60% (11.10 inches)	60% (12.72 inches)	60% (18.28 inches)
May - June 2010	70%	70%	70%	80%

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

Pohnpei State: Rainfall throughout Pohnpei State has been near normal for the past few months. Typically, Pohnpei Island does not have much of a dry season, and February is the only month receiving rainfall below 10 inches. By April and May, abundant rainfall returns, with May having the highest average monthly value (e.g., 19.41 inches at the WSO).

ENSO-Critical Period Climate Outlook (February through June 2010): In response to strong El Niño conditions, Pohnpei rainfall may be substantially reduced during the next five months (January - May), with one or two months receiving rainfall at or below 5 inches. The expected dryness for the first half of 2010 is not anticipated to be as severe as during 1983 and 1998.

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²	
	Pohnpei Island and Atolls	Kapingamarangi
February - April 2010	70% (28.48 inches)	85% (32.08 inches)
May - June 2010	80%	90%

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

Kosrae State: A slight reduction of normal rainfall has already begun in Kosrae as demonstrated by the 2009 4th Quarter total of 41.60 inches (vs. normal 46.60 inches) at the Kosrae Airport. Water supplies remain adequate for now, but there will likely be a moderate reduction of rainfall in the next few months.

ENSO-Critical Period Climate Outlook (February through June 2010): Kosrae does not usually have a dry season, and monthly average rainfall values are over 15 inches per month, except December and January, which have normal monthly rainfall totals of just under 15 inches. The current strong El Niño event could potentially diminish the rainfall at Kosrae during the next four months (January - April). Rainfall typically recovers to near normal after this period. Normally, Kosrae's small population does not severely stress the island's water resources.

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²
February - April 2010	75% (42.51 inches)
May - June 2010	90%

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

LOCAL RAINFALL FORECASTS DURING 2010 ENSO-CRITICAL PERIOD



Republic of Palau: Rainfall across the Republic of Palau has been abundant over the past three months. The 2009 annual and 2009 4th Quarter rainfall totals were both above normal at the Koror WSO.

ENSO-Critical Period Climate Outlook (February through June 2010): The Republic of Palau typically has a short dry season from February to April, during which average monthly rainfall values fall below 10 inches. A response to a strong El Niño can reduce rainfall during the dry season, and extend dry conditions into May and June. Thereafter, rainfall throughout the Republic of Palau should recover to near normal.

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²
February - April 2010 (Short Dry Season)	70% (19.52 inches)
May - June 2010 (Rainy Season Onset)	80%

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



Republic of the Marshall Islands (RMI): Rainfall across the RMI was near normal through the end of 2009. In the first half of January 2010, a period of dry weather impacted rain catchment. A tropical disturbance moved through the RMI during the week of January 18th, providing some much-needed rainfall and helping to replenish the water supply.

ENSO-Critical Period Climate Outlook (February through June 2010): The RMI typically has a short dry season from January to March, when the average monthly rainfall values fall below 10 inches at Majuro and below 5 inches at Kwajalein. In response to strong El Niño conditions, rainfall during the dry season can be reduced, and the dry season can be extended into May or June. Thereafter, the rainfall throughout the RMI recovers to near normal. For the next few months, rainfall across the RMI may be substantially reduced, with one or two months experiencing less than 3 inches at Kwajalein and adjacent atolls, and less than 5 inches at Majuro and its adjacent atolls. Atolls to the south of Majuro (e.g., Mili and Ebon) will have the most rainfall and will recover to near normal sooner than atolls further to the north.

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²		
	Ebon and Mili	Majuro	Northern Atolls
February - April 2010 (Normal Dry Season)	75% (18.53 inches)	70% (18.61 inches)	60% (8.93 inches)
May - June 2010	80%	75%	70%

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



Hawaii: El Niño is responsible for creating stable and dry weather patterns across the state and increasing the drought severity in December for leeward areas of Big Island, south and west areas of Maui, and the western third of Molokai. Pasture lands are severely degraded on all three of these islands, and ranchers are facing losses and culling their herds. The Big Island, Maui, Molokai, and Oahu have water use restrictions in effect for irrigation or public water consumption. The south and west-facing slopes of the Big Island remain at high risk for brush fires and have recently experienced fires in the South Kona district. In Maui County, the south and west-facing slopes of Molokai and Maui are also at high risk for brush fires. The presence of El Niño conditions means that probabilities favor below normal precipitation, and this trend will most likely continue through Spring 2010.

El Niño has also brought big swells to the North Shore of Oahu. On December 7, Waimea Bay received over 40 ft waves, the largest swell in years. The Quicksilver in Memory of Eddie Aikau surf contest was held, and the waves were bigger than in any of the past three events. Big swells continued throughout December, and north-facing shores had a high surf advisory during mid-January.

For more information on weather and climate in Hawaii go to <http://www.prh.noaa.gov/hnl>.

More detailed information on rainfall outlooks, tropical cyclone threat, and sea level forecasts will be included in the February issue of the Pacific ENSO Update.

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