

National Weather Service Melbourne

DRY SEASON FORECAST

Oct 2015

The Forecast

November – December - January

STRONG EL NINO	WELL ABOVE NORMAL ABOVE NORMAL NEAR NORMAL BELOW NORMAL WELL BELOW NORMAL	WELL ABOVE NORMAL	WELL ABOVE NORMAL
WEAK EL NINO NEUTRAL WEAK LA NINA STRONG LA NINA		ABOVE NORMAL NEAR NORMAL BELOW NORMAL WELL BELOW NORMAL	ABOVE NORMAL NEAR NORMAL BELOW NORMAL WELL BELOW NORMAL
ENSO State	Temperature	Precipitation	Storminess

February – March - April

STRONG EL NINO	WELL ABOVE NORMAL ABOVE NORMAL NEAR NORMAL BELOW NORMAL WELL BELOW NORMAL	WELL ABOVE NORMAL	WELL ABOVE NORMAL
WEAK EL NINO NEUTRAL WEAK LA NINA STRONG LA NINA		ABOVE NORMAL NEAR NORMAL BELOW NORMAL WELL BELOW NORMAL	ABOVE NORMAL NEAR NORMAL BELOW NORMAL WELL BELOW NORMAL
ENSO State	Temperature	Precipitation	Storminess

Forecast Overview

- Warmer waters over the eastern Pacific Ocean near the equator and the resulting atmospheric conditions continue to support a strong and perhaps historic El Niño this winter
- Seasonal storminess is forecast to be well above normal between November and April, leading to an enhanced risk of hazardous weather, including severe thunderstorms as well as strong-to-violent tornadoes and tornado outbreaks
- Wetter than normal conditions are favored through next spring, with increased chances for episodes of heavy rain and river flooding
- Below normal seasonal temperatures (typically a result of stormier and rainier conditions rather than intrusions of very cold air from the north) are forecast, especially between February and April
- Review your personal family all-hazards plan, including ways to receive severe weather warnings and knowing what to do when one is issued

About this Product

This forecast product is a result of research from the National Weather Service (NWS) in Melbourne, Florida on the El Niño - Southern Oscillation (ENSO) and its impact on Central Florida's dry season (November – April). This research, conducted since early 1997, was produced in recognition of the fact that climatic fluctuations on regional and global scales have been shown to have a profound impact on Florida's weather from season to season. The importance of seasonal forecasting continues to increase as extreme weather events affect more of Florida's growing population. These forecasts are meant to supplement, not replace, the official NWS Climate Prediction Center's (CPC) seasonal and winter outlooks by providing more detail and adaptive meteorological interpretation of the impact of predicted climatic events on Central Florida.

Forecast Basis & Interpretation

The seasonal forecast is produced by a team of National Weather Service Melbourne meteorologists that employ the use of linear and logistic regression equations as well as analog-based techniques. These methods are based on the official observed and forecast Niño 3.4 and 3.0 values from the CPC and historical weather data for the Central Florida region. The accuracy of these indices will have a bearing on the accuracy of the seasonal forecast.

The Florida dry season forecast is issued for the period between November 1, 2015 and April 30, 2016 and is intended to serve as an early warning of significant impacts from climatic variability for planners and decision makers. Seasonal temperature and precipitation for Central Florida (climate divisions 3 and 4 as shown in figure 1), as well as the number of extratropical storms expected to impact the state are forecast into two separate periods: November-December-January (NDJ) and February-March-April (FMA).

The ENSO state and forecasts for storminess, rainfall, and temperature are divided into five categories, or quintiles: well below normal, below normal, normal, above normal, and well above normal. Discussions for each individual forecast parameter are included on the next several pages to help address uncertainty and should be used to supplement the forecast charts.

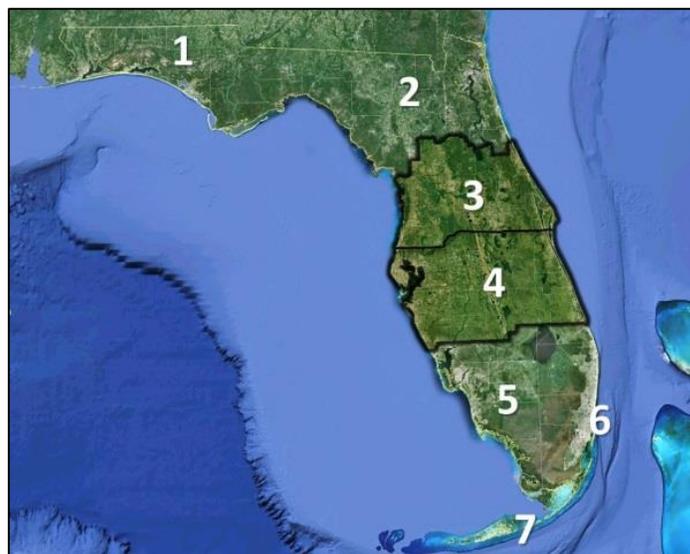


Fig 1. Temperature and precipitation forecasts are provided for Division 3 and 4 (Central Florida) while storminess forecasts are for the entire state of Florida.

ENSO

Latest Discussion | An **El Niño Advisory** is in effect. Strong El Niño conditions are present with warmer than normal sea surface temperatures (SST) across the central and eastern equatorial Pacific Ocean. The latest 3-month (July through September) running mean of SST departures in the Niño 3.4 region was +1.5°C. As of October 12, the latest weekly SST departure in the Niño 3.4 region was +2.4°C. As noted in the Climate Prediction Center’s most recent ENSO diagnostic discussion, the atmosphere remains strongly coupled to the oceanic warming and reflects a significant and strengthening El Niño.

El Niño is virtually certain to continue through this winter. Both the CPC/IRI forecaster and model consensus (figure 1) unanimously favors a strong El Niño, with peak 3-month SST departures in the Niño 3.4 region near or exceeding +2.0°C in late fall/early winter.

Additional Information | The El Niño Southern Oscillation or ENSO is a complex meteorological phenomenon that relates to changes in sea surface temperature and sea level pressure over the equatorial regions of the Pacific Ocean. ENSO has a warm phase (El Niño) and a cool phase (La Niña) and has profound influences on the atmospheric circulations over the Pacific Ocean, and consequently, the circulations over North America and other parts of the globe. Locally, research shows that there is a physical relationship between the state of ENSO and the mean position of the jet stream over North America during the winter and spring seasons. These shifts in the jet stream often influence Central Florida in the form of increased/decreased rainfall, storminess, and seasonal temperatures depending on the state of ENSO.

The relationship between Florida weather and ENSO is not just a simple “one-to-one” relationship, however, as other weather patterns (teleconnections) including the North Atlantic Oscillation (NAO), Arctic Oscillation (AO), Pacific-North American teleconnection pattern (PNA) and Madden-Julian Oscillation (MJO) can also play a major role in Florida dry season weather. Even when El Niño/La Niña conditions are occurring over the equatorial pacific, these other teleconnections can act to enhance or suppress the impact of ENSO, or cause extreme variability on their own. Considerable uncertainty remains in longer range outlooks since these other oscillations are generally not predictable beyond 10 – 14 days.

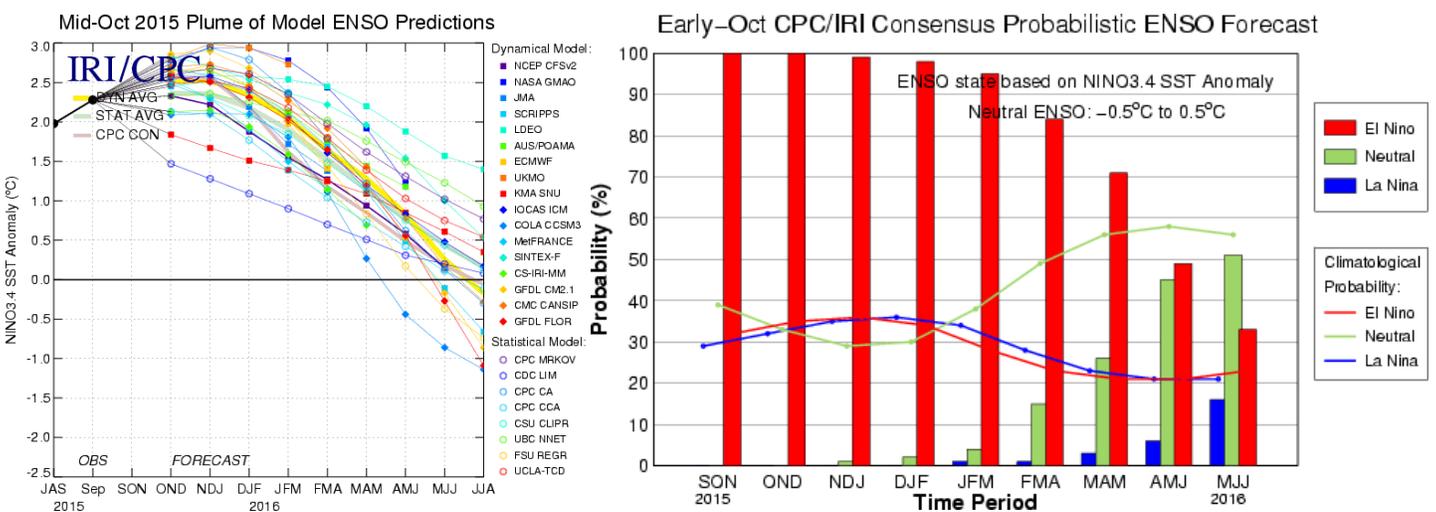


Fig 1. ENSO guidance from the International Research Institute (IRI) for Climate and Society and the Climate Prediction Center (CPC). (a) Dynamical and statistical model plume of ENSO predictions. (b) ENSO forecast probabilities based off of a consensus between IRI and CPC forecasts.

Temperature

Discussion | As indicated in the latest 3-month guidance issued by the Climate Prediction Center, there exists equal chances of below, near, and above normal temperatures between November and January (figure 3a), while below normal seasonal temperatures are favored during the February through April period (figure 3b). Statistical guidance typically favors below normal seasonal temperatures during a strong El Niño; however, confidence is lower compared to other seasonal forecast parameters. Below normal seasonal temperatures during El Niño events are typically the result of stormier and rainier conditions with attendant cloud cover rather than intrusions of very cold air from the north.

Additional Information | When trying to correlate the state of ENSO and seasonal temperature over Central Florida, one finds much less skill compared to precipitation and storminess. Other large-scale phenomena, including the North Atlantic Oscillation (NAO) and Arctic Oscillation (AO), play a significant role in the week-to-week weather patterns over the state. For instance, strongly negative (positive) phases of the AO often lead to colder (warmer) than normal weather across the eastern half of the United States, including Florida. The AO is not predictable beyond a few weeks, and there are no long-range outlooks available at this time.

Freezing conditions across Central Florida are most common in the months of December and January and can occur during all ENSO states (table 1); however, strong El Niño's often mitigate the chances for freezing temperatures.

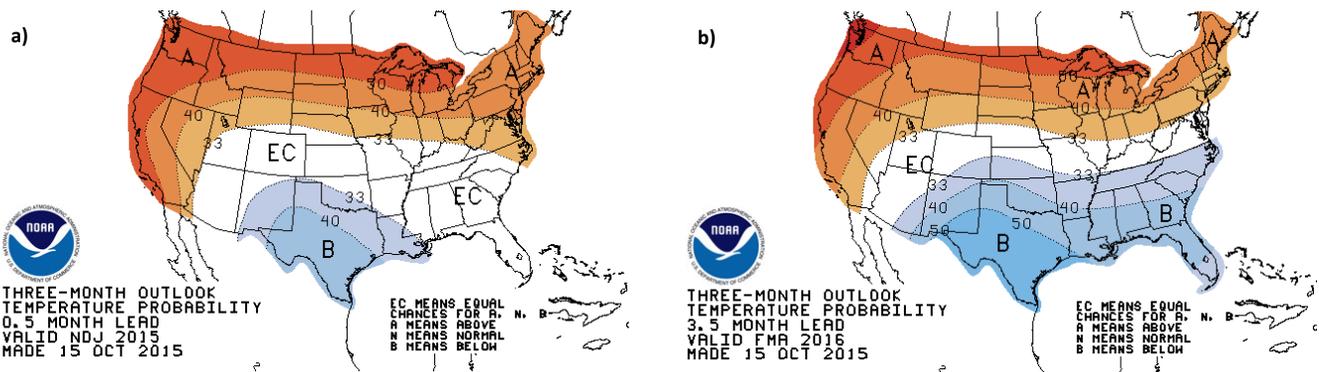


Fig 3. Three-month temperature probability outlooks issued by the Climate Prediction Center (CPC). Temperature probabilities for (a) Nov-Dec-Jan and (b) Feb-Apr-May.

ENSO State	Daytona Beach		Orlando		Melbourne		Vero Beach		ENSO State
	≤ 32°F	≤ 28°F	≤ 32°F	≤ 28°F	≤ 32°F	≤ 28°F	≤ 32°F	≤ 28°F	
El Niño	4.4	0.9	2.2	0.6	1.9	0.4	1.6	0.2	El Niño
Neutral	4.5	1.0	2.0	0.5	2.1	0.5	1.8	0.4	Neutral
La Niña	6.1	1.2	3.3	0.5	2.6	0.4	2.4	0.4	La Niña

Table 1. Average number of days during the dry season when the minimum temperature reaches at or below freezing based on ENSO state. A hard freeze is when minimum temperatures reached 28°F or lower.

Precipitation

Discussion | With a strong El Niño expected, well above normal rainfall is forecasted during the upcoming dry season (November 1, 2015 through April 30, 2016). This is in line with the latest CPC 3-month guidance that shows increased odds of above normal precipitation between November and April (figure 4).

During past strong El Niño events (i.e. 1982-1983, 1997-1998), storminess was greatly increased over the state, leading to well above average rainfall and at times widespread flooding across Central Florida. Given the forecasted strength of El Niño this season, chances are increased for episodes of heavy rain and river flooding.

Additional Information | The relationship between ENSO and rainfall is perhaps the most straightforward and statistically significant of all weather parameters. In general, during the Florida dry season, substantial rainfall is only provided by passing extratropical disturbances in the westerlies or by stalled frontal boundaries. During an El Niño event, the number of extratropical systems is often increased over Florida and the Gulf of Mexico leading to above average rainfall. Likewise, during a La Niña event, rainfall is often lower than normal due to a limited number of extratropical systems impacting the state.

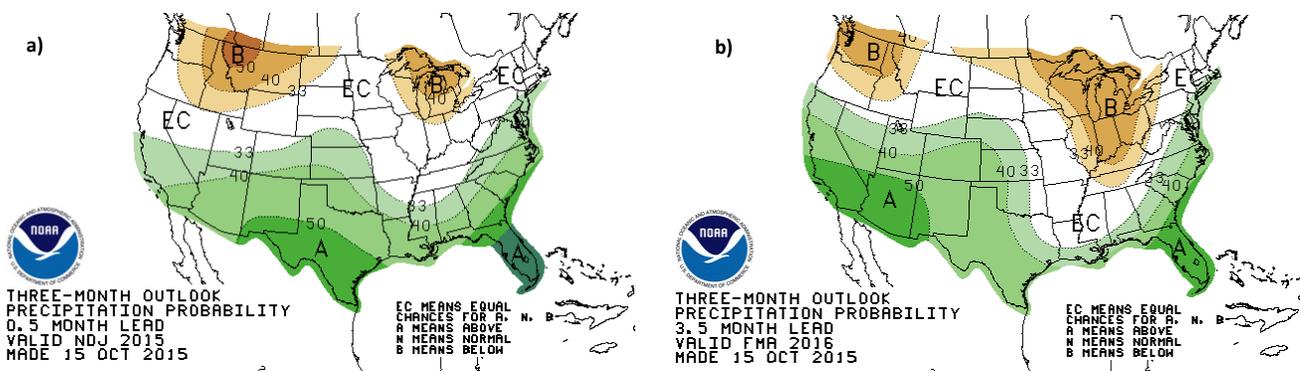


Fig 4. Three-month precipitation probability outlooks issued by the Climate Prediction Center (CPC). Precipitation probabilities for (a) Nov-Dec-Jan and (b) Feb-Apr-May.

Storminess

Discussion | There is a direct relationship between the presence of a strong El Niño and increased winter storminess in Florida, mainly due to a southward shift in the position of the jet stream over North America. This southward shift enhances lift and allows low pressure systems to track closer to or over the state, which in turn creates more opportunities for instability, moisture, and wind shear to come together to create environments favorable for severe thunderstorms.

Past strong El Niño events have been highly correlated with well above normal storminess and strong tornadoes (EF2+) across the Florida Peninsula between November and April (figure 5). An enhanced risk of severe weather is expected, bringing increased chances for strong-to-violent tornadoes and tornado outbreaks. Remember, El Niño doesn't cause violent tornadoes in Florida, but they can set the stage!

Additional Information | This forecast attempts to estimate the number of extratropical low pressure systems that will impact the state during a given dry season. There is a very strong relationship between El Niño and increased winter storminess and severe weather in Florida. Extratropical cyclones can produce excessive rainfall, severe thunderstorm winds, tornadoes, damaging straight-line winds, dangerous marine conditions, coastal flooding, and beach erosion. Storminess often increases during El Niño episodes due a shift in the position of the jet stream over North America. Likewise, storminess over the state often decreases during La Niña episodes.

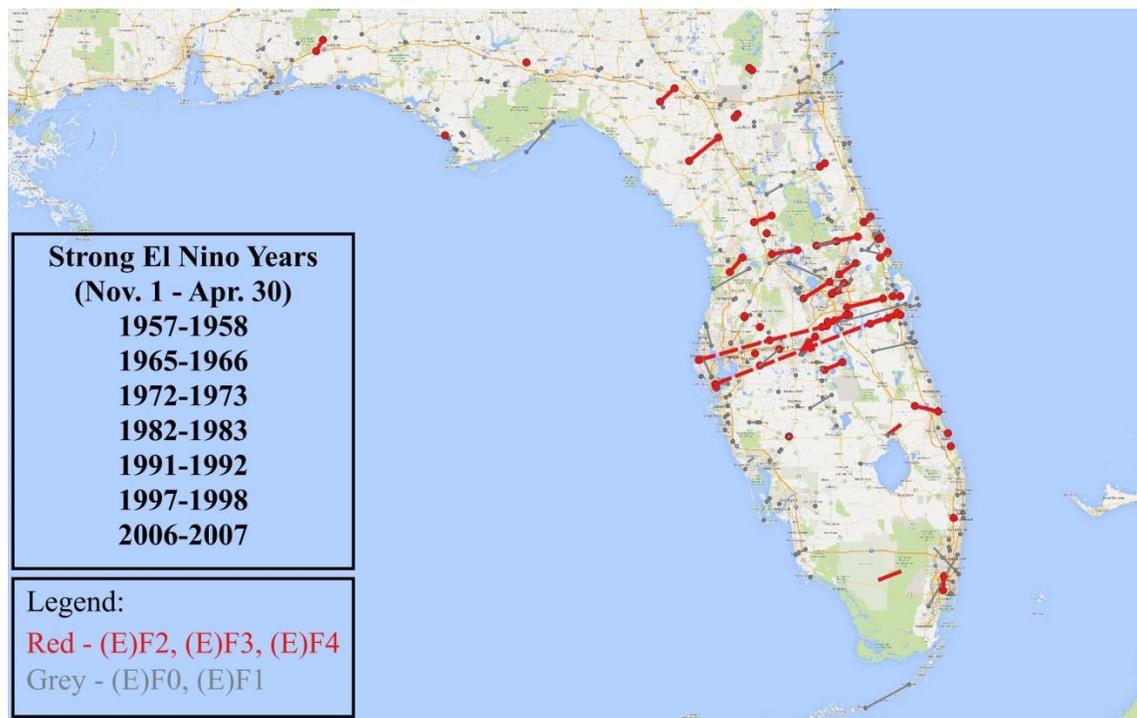


Fig 5. Location and tracks (line) of tornadoes over the Florida Peninsula during seven strong El Niño events. Track and location information gathered from National Weather Service StormData.

Preparedness Advice

With no strong-to-violent tornadoes recorded over the past EIGHT winters, the likely transition to a very active season may come as a surprise to those who are unaware! We've put together some preparedness advice for residents of east central Florida.

BE AWARE: PREPARE!

- ✓ Monitor local television, radio, and the internet for severe weather situations
 - Severe weather threats are typically identified a few days in advance, with more specific information about the most likely time(s) and location(s) of impact provided one day in advance
- ✓ Have an all-hazards plan in place
 - Every person and/or family should have an all-hazards plan that includes multiple ways to receive severe weather warnings and knowing what to do when one is issued
- ✓ Have the ability to receive timely weather warnings
 - Can save lives, especially with dangerous, nighttime tornadoes
- ✓ Have a dependable alerting feature or device
 - Ensure that you have a NOAA Weather Radio (programmed, with fresh batteries) and/or the Wireless Emergency Alert feature on your cell phone (or NWS warnings relayed by text message from Emergency Management, Media, or another reliable app)

BEFORE / DURING THREAT

- ✓ If living in a mobile home, RV, or boat:
 - Make plans to stay with family or friends and leave before the severe weather arrives
 - If you can't leave, identify the closest sturdy shelter such as a clubhouse or laundry room and go there immediately if a warning is issued for your location
- ✓ Identify your shelter location and "safe place" in advance of a threat
 - Small interior room on the lowest floor of your home or business, far from windows
 - Ensure everyone in your family or business is aware of the location
- ✓ Words of advice from those who have survived tornadoes
 - "Putting on your shoes, placing your charged cell phone in your pocket, making good use of any kind of helmet and/or pillow to protect your head, and holding tightly to one another" (these actions must be done quickly and prior to the arrival of a tornado)
- ✓ If a tornado warning is issued for your location:
 - Take immediate action and move to your shelter, remain in place until the threat passes

Helpful Links

Teleconnection Guidance & Forecasts from the Climate Prediction Center (CPC)

[ENSO](#) | [AO](#) | [NAO](#) | [PNA](#) | [MJO](#)

CPC Guidance (Temperature, Precipitation, Drought, Hazards)

[1-Month Outlook](#) | [3-Month Outlook \(~90 Days\)](#)

[U.S. Drought Information](#) | [U.S. Hazards Assessment](#) (out to 2 weeks)

National Weather Service Melbourne, FL Research

[ENSO and Climate](#) | [Storminess](#) | [Severe Weather](#) | [Rainfall](#) | [Temperature](#)

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Issued: October 15, 2015
Next Forecast Issuance: November 15, 2015