



Extreme Rainfall in the Southeast U.S.



Applications to Agriculture

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Causes of Extreme Rainfall

Weather Scale

- Mid-latitude low pressure systems
- Slow moving or stalled fronts
- Tropical Storms or cyclones
- Stationary or training convective storms

Climate Scale

- Rainfall accumulated over weeks or months
- Difficult to predict in summer season
- Significant impacts from El Nino in the winter





Recent Extreme Rainfall Events

Weather Related

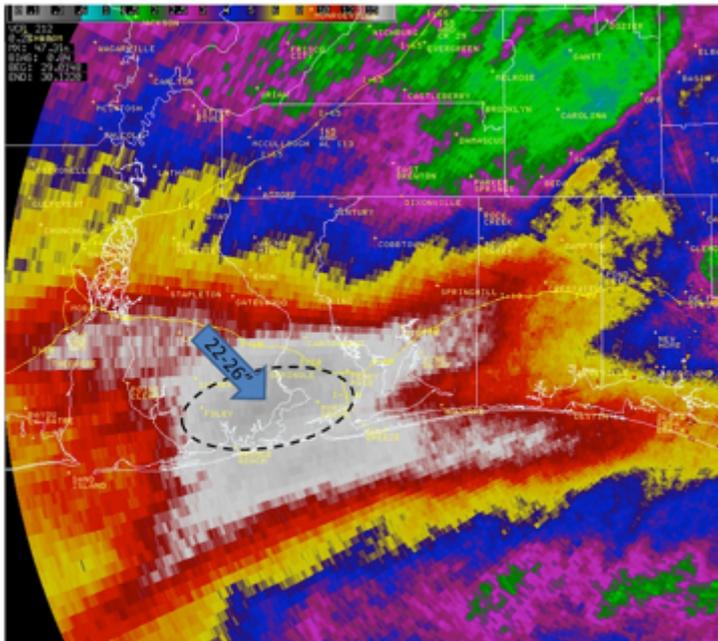
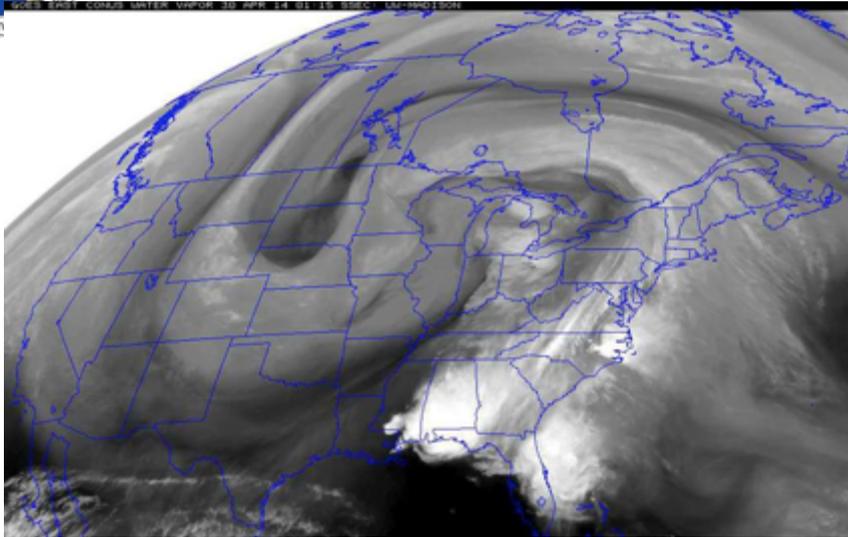
- Tropical Storm Debby 2012
- Panhandle April 2014 floods
- Colorado floods 2013
- South Carolina Sept. 2015

Climate Related

- Winter 1998
- Fall 2009
- Summer 2013
- Texas/Oklahoma May 2015
- Tampa Area July 2015



NW Florida April Flood 2014



Station Number	Station Name	Daily Precip Sum in.	Multi-Day Precip in.	Total Precip in. ▾
AL-BW-35	Orange Beach 1.3 E	19.00	4.67	23.67
AL-BW-45	Silverhill 5.0 SW	21.80		21.80
AL-BW-9	Foley 0.5 ESE	20.76		20.76
AL-BW-27	Orange Beach 2.1 NE	20.53		20.53
AL-BW-3	Daphne 1.2 NNW	16.47		16.47
AL-BW-32	Fairhope 3.1 NNW	16.13		16.13
AL-BW-40	Fairhope 1.5 WSW	15.51		15.51
AL-BW-65	Silverhill 0.9 SSE	15.47		15.47
AL-BW-68	Spanish Fort 1.6 W	15.45		15.45
AL-BW-13	Fairhope 3.7 NNW	14.29		14.29
AL-BW-4	Daphne 0.4 SW	14.23		14.23
AL-BW-1	Fairhope 2.3 N	14.12		14.12
AL-BW-60	Daphne 1.5 SSW	13.98		13.98
AL-BW-58	Spanish Fort 1.2 NE	13.83		13.83
AL-BW-36	Daphne 4.2 NE	13.81		13.81
AL-BW-26	Loxley 0.4 SSW	13.78		13.78
AL-BW-8	Foley 7.4 SW	13.47		13.47
AL-BW-41	Fairhope 2.3 E	13.44		13.44
AL-BW-31	Foley 2.0 SSW	13.17		13.17
AL-BW-20	Summerdale 4.3 WSW	13.03		13.03
AL-BW-53	Elberta 3.1 SSW	12.67		12.67
AL-BW-30	Fairhope 3.5 E	11.54		11.54
AL-BW-59	Bay Minette 10.9 N	5.98		5.98

FL-ES-21	Pensacola 9.2 NW	19.56		19.56
FL-ES-4	Gonzalez 2.5 NNW	15.43		15.43
FL-ES-15	Gonzalez 2.1 E	13.22		13.22
FL-ES-1	Pensacola 2.7 N	12.00		12.00
FL-ES-10	Pensacola 3.8 N	12.00		12.00

*Pensacola record calendar day rainfall – 15.55 inches (CO 7-day total 18.13 inches)

NW Florida April Flood

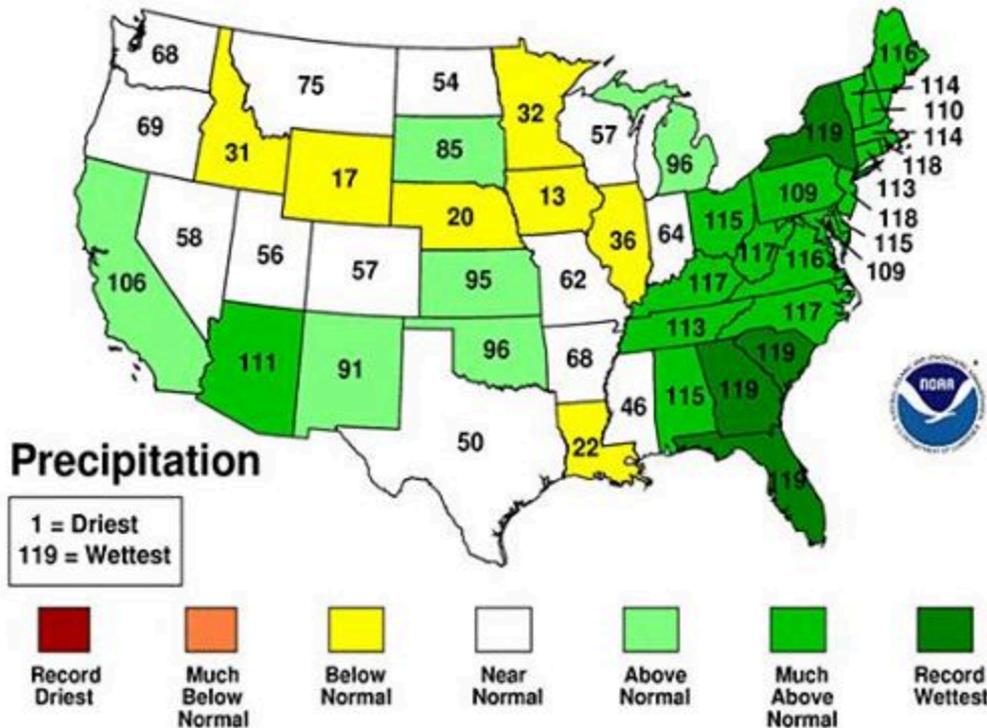




2013 Wettest Summer Ever?

June-August 2013 Statewide Ranks

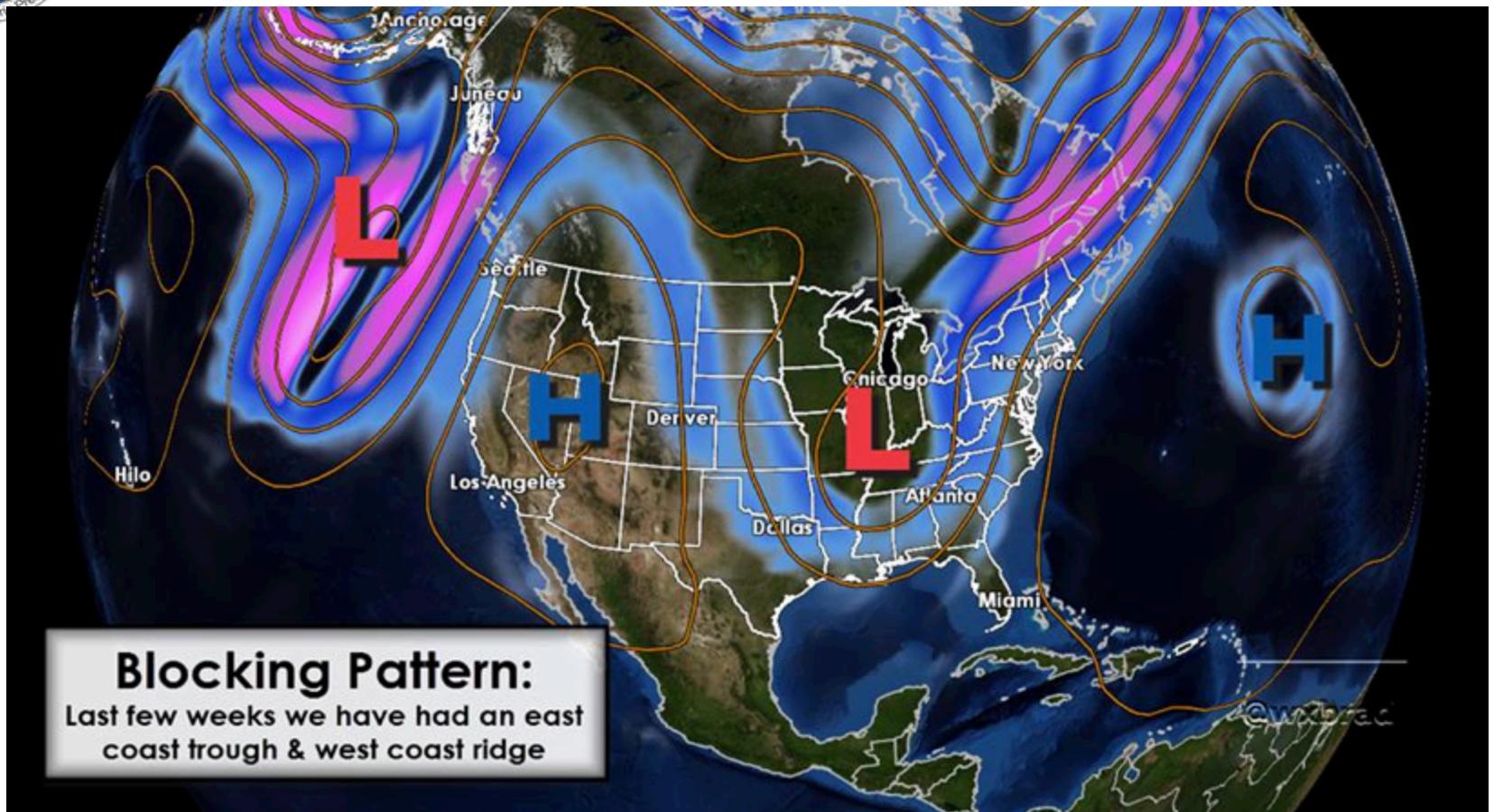
National Climatic Data Center/NESDIS/NOAA



- Wettest July on record for Florida, Georgia and Alabama 4th wettest
- Wettest May-July on record for South Carolina, Florida 2nd wettest and Georgia 3rd
- Wettest Feb-July on record for Georgia and South Carolina
- Wettest June-August for entire Southeast Region



Blocking Pattern

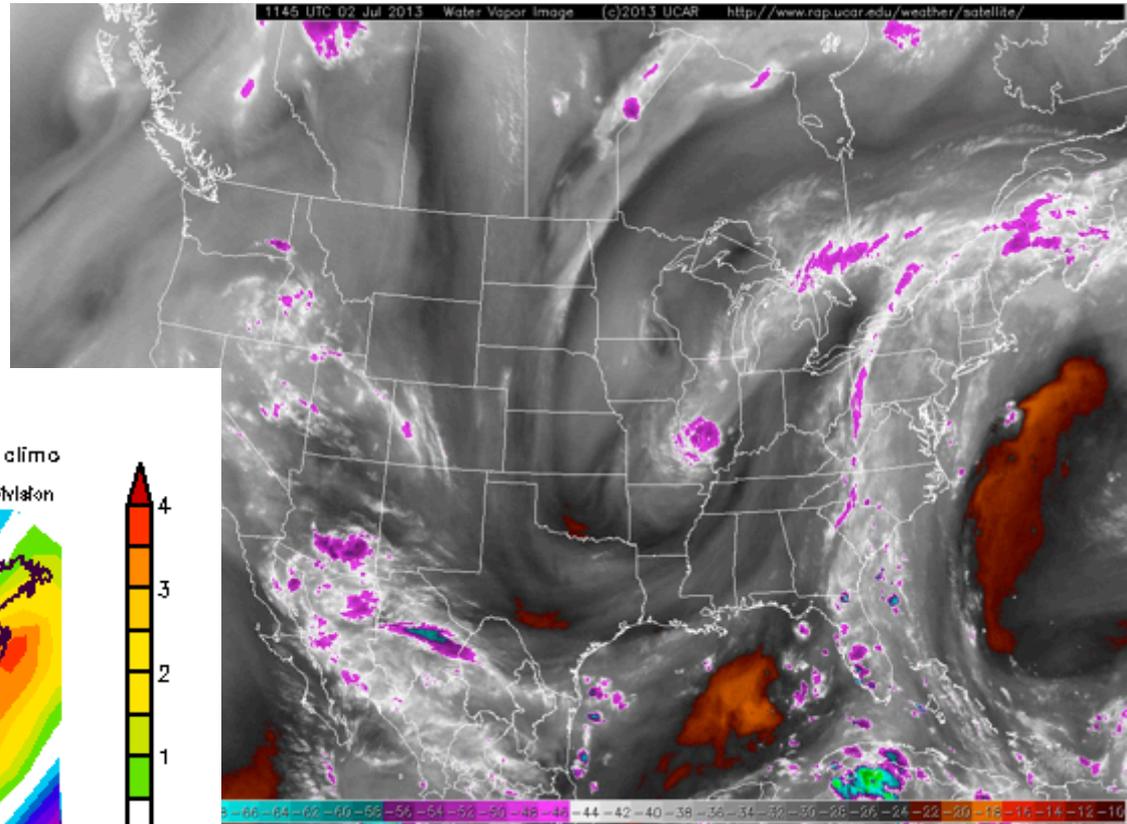
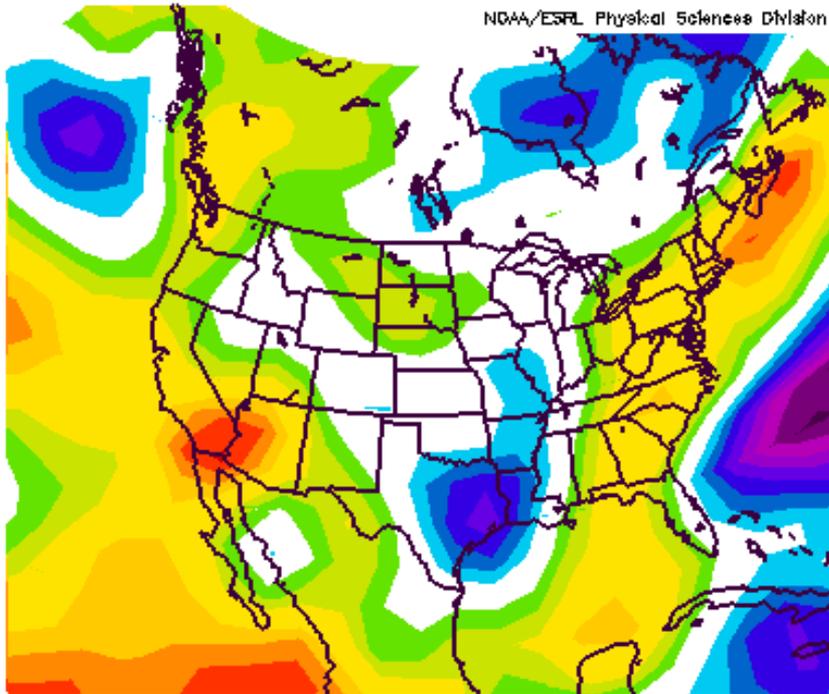


June 6-7, 9-10; June 29-July 7, July 22-29, Aug. 16-20

Moisture Anomalies

Precipitable Water Anomalies (JJA)

NCEP/NCAR Reanalysis
Surface Precipitable Water (kg/m^2) Composita Anomaly 1981-2010 climo
NOAA/ESRL Physical Sciences Division



Water Vapor Image (7/02)



Saturated Peanuts



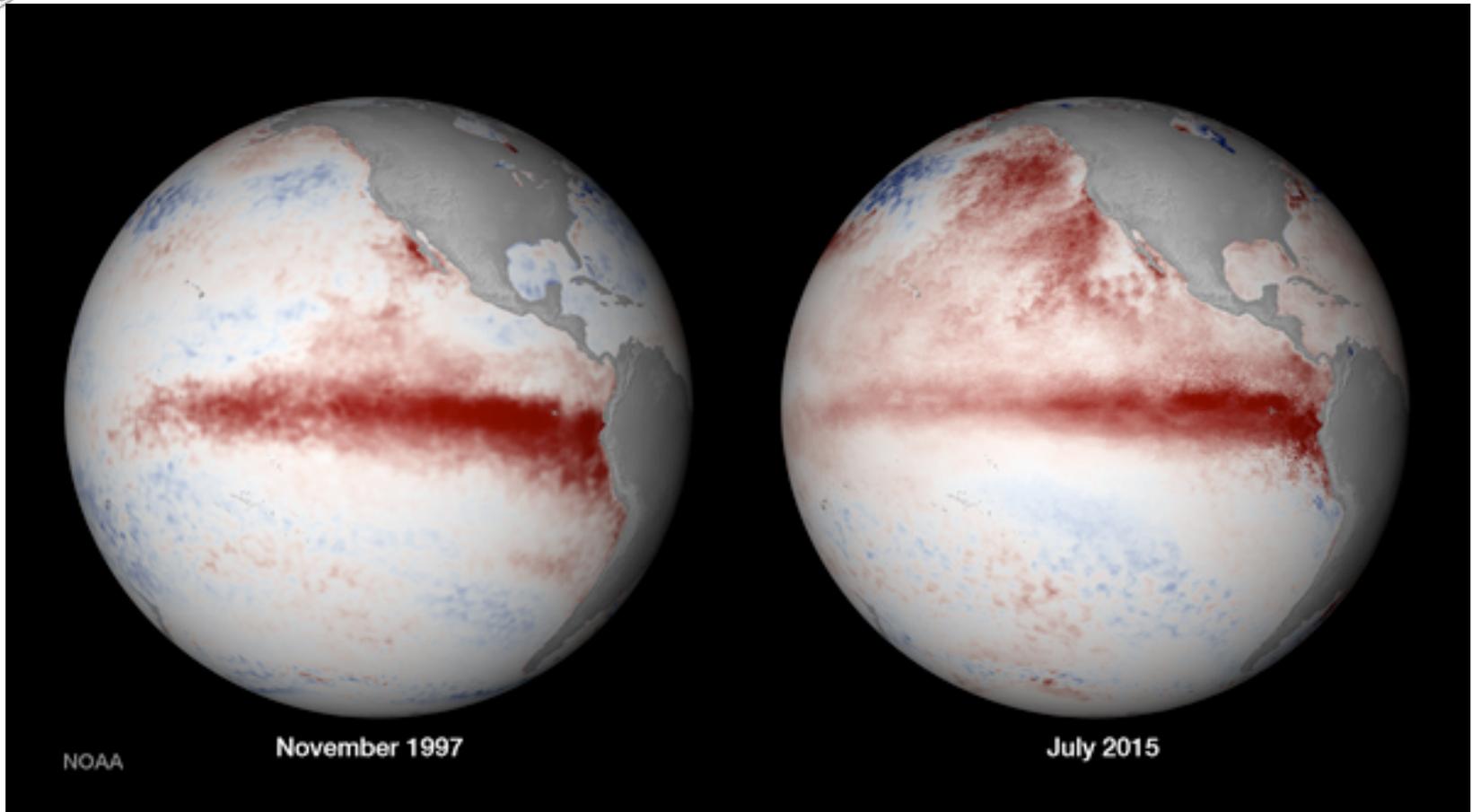
*Courtesy Rome
Etheridge*

Poor Quality Melons



New York Times

Strong El Nino Currently in Place

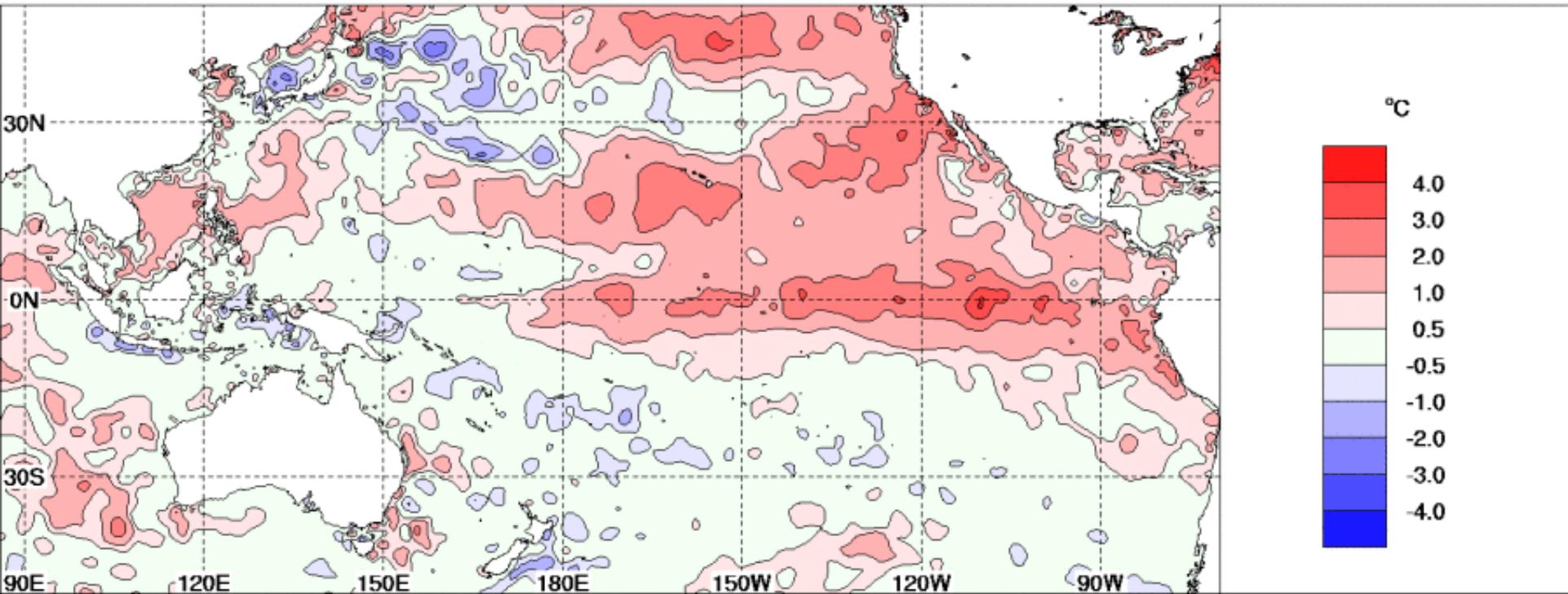


Current El Nino has the potential to rival the super events of 1982/1983 and 1997/1998

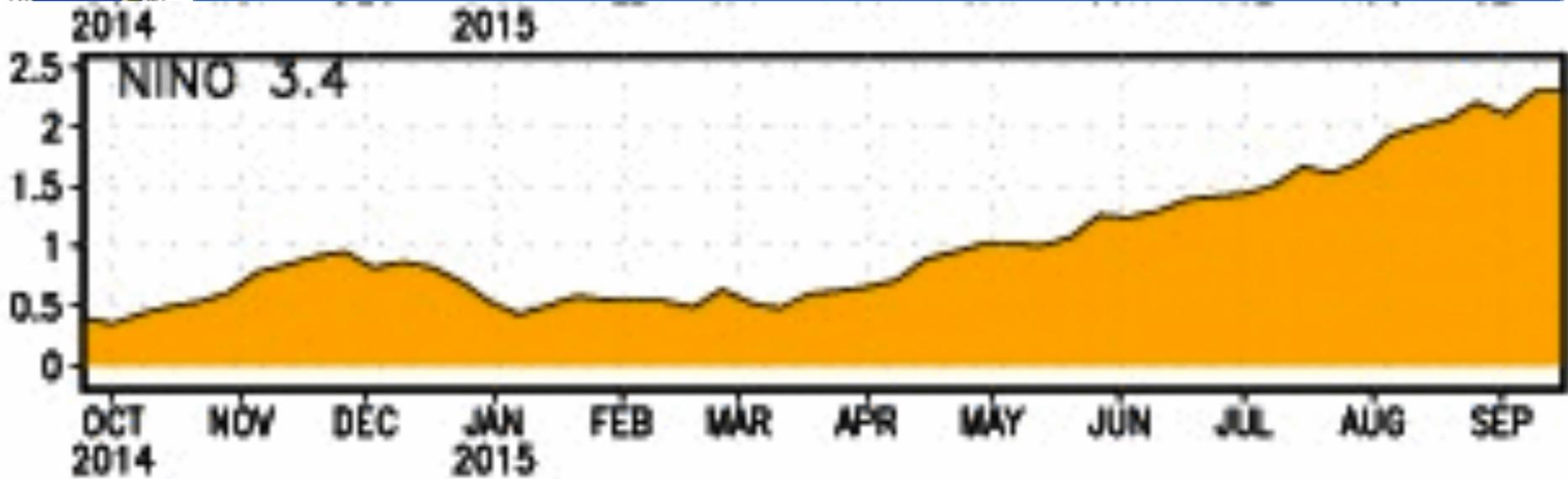


Current SST Anomalies

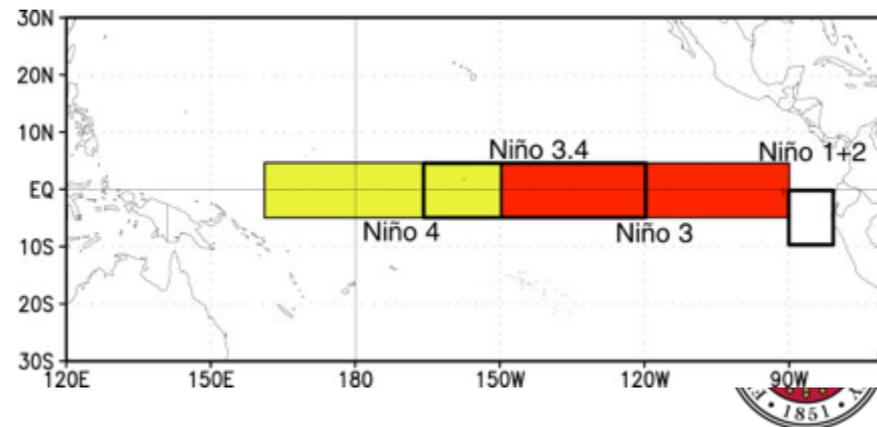
SSTA 1.0X1.0 NMOC OCEAN ANOMALIES (C) 20150907 20150913



Nino 3.4 Index

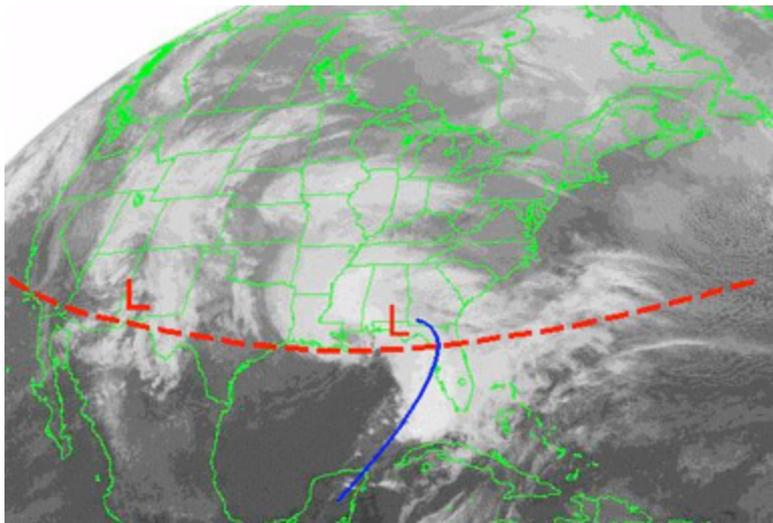
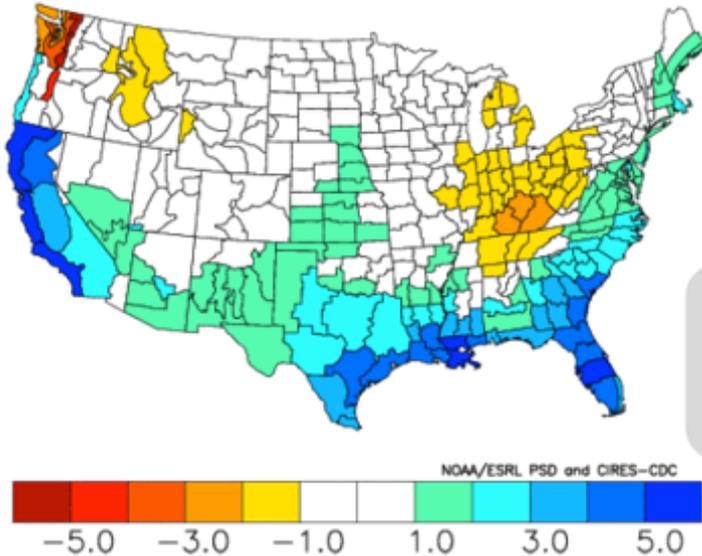


- Current weekly value at +2.3, into the “very strong” range
- Reached weekly peak value of 2.8 in Nov. 1997



El Nino and Winter Rainfall

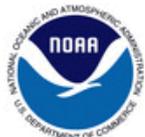
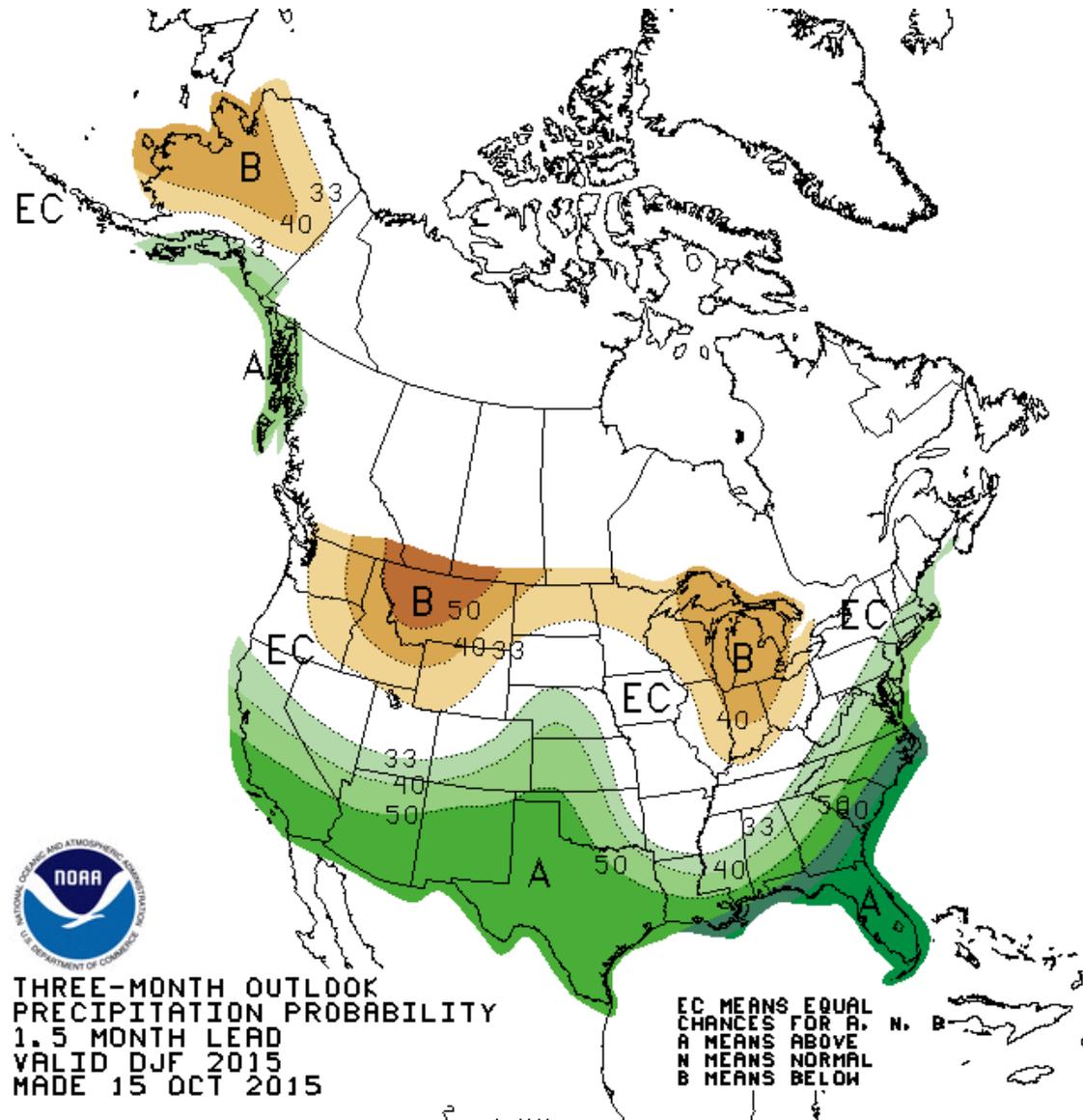
Composite Precipitation Anomalies (inches)
Versus 1971–2000 Longterm Average
Nov to Mar 1982–83, 1972–73, 1957–58, 1965–66, 1986–87, 1991–92, 1968–69, 1997–98,
2002–03,



- El Nino typically brings enhanced winter rainfall to California and the southern U.S., including Texas and Florida.
- California Rainfall more hit or miss than other Southern States
- Strong El Nino does not necessarily mean even more rainfall, just more confidence in following the pattern.



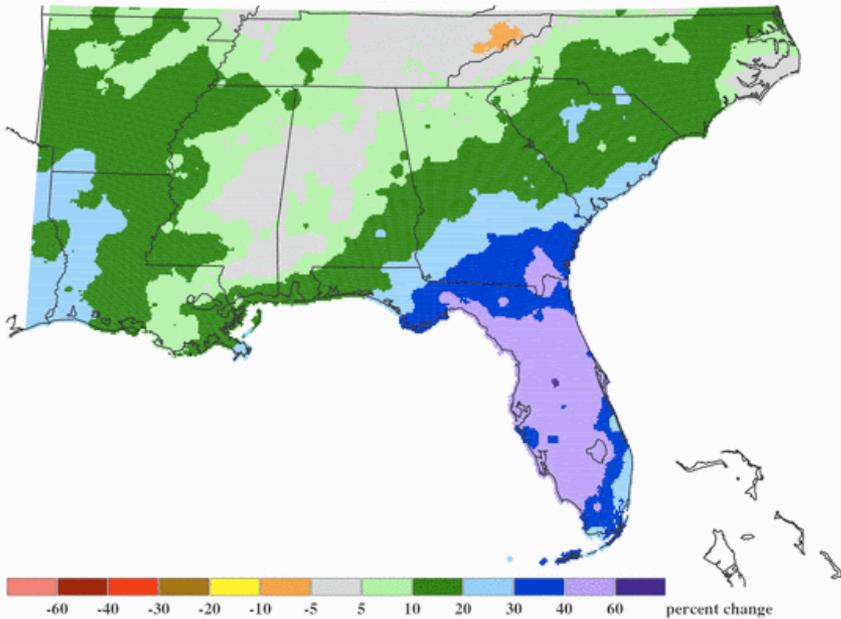
Official NOAA Winter Outlook



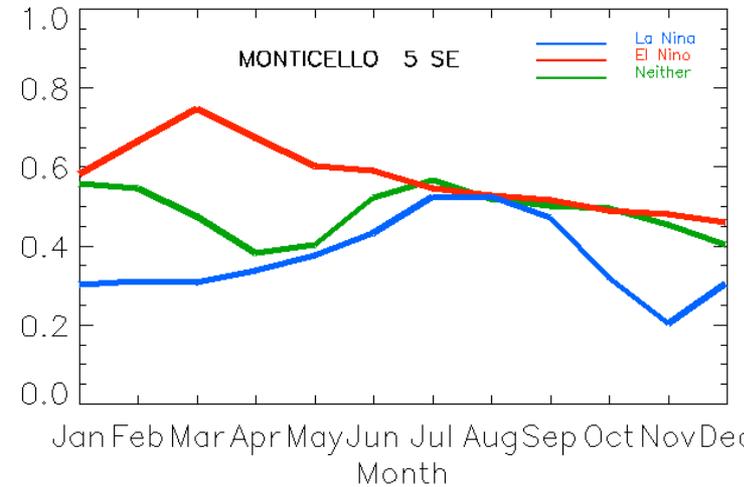


El Nino and Heavy Rain

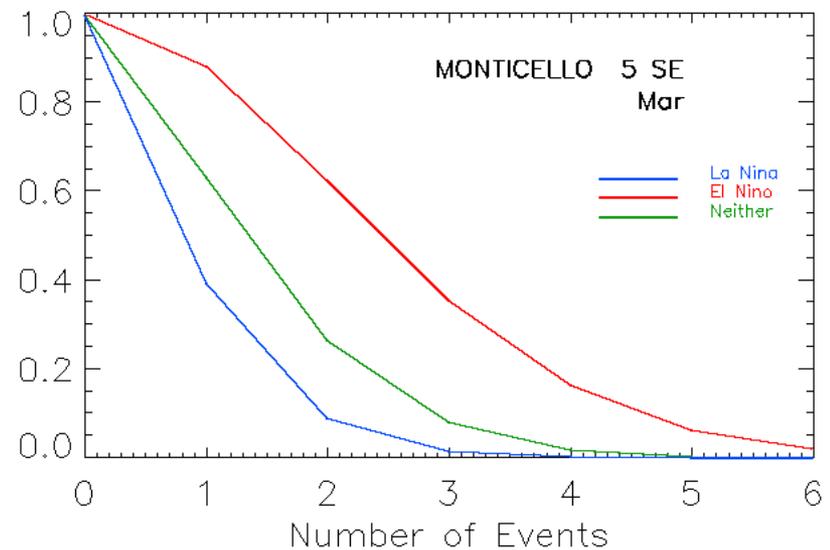
JANUARY
EL NINO vs. NEUTRAL
PRECIPITATION



Probability of One or More Two-Inch Rains

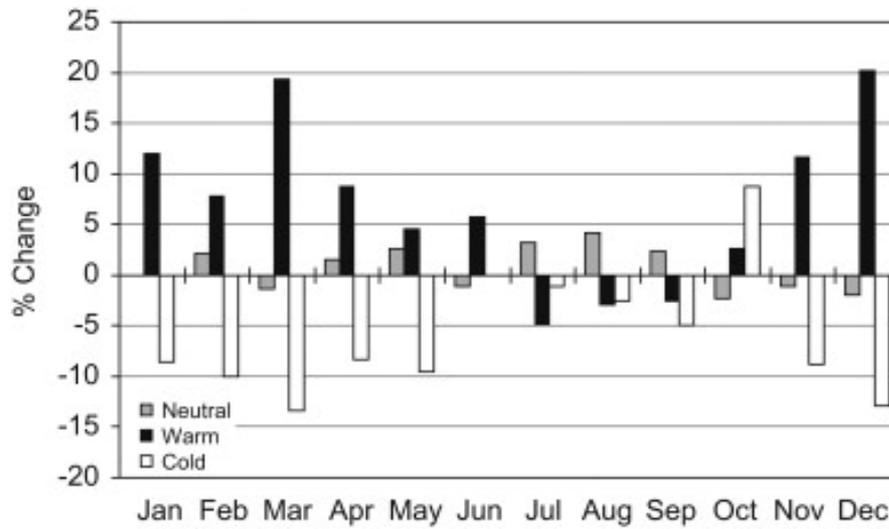
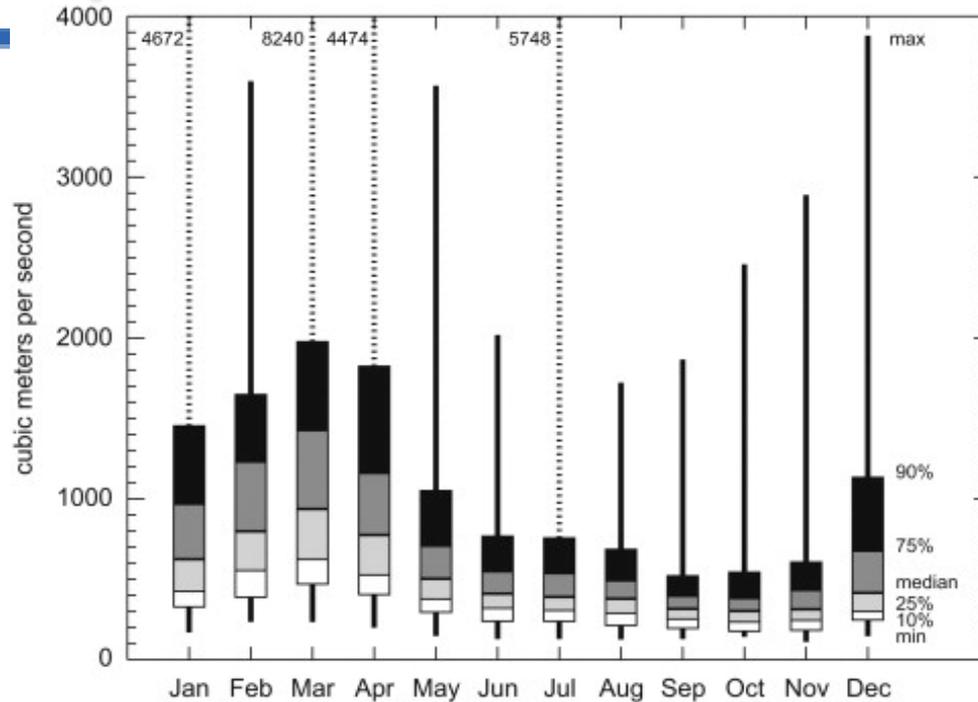


Probabilities of Two-Inch or Greater Rain





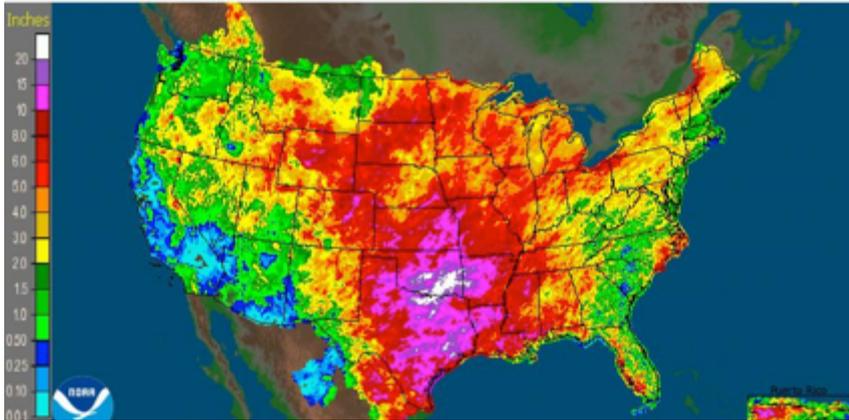
Apalachicola River Flows



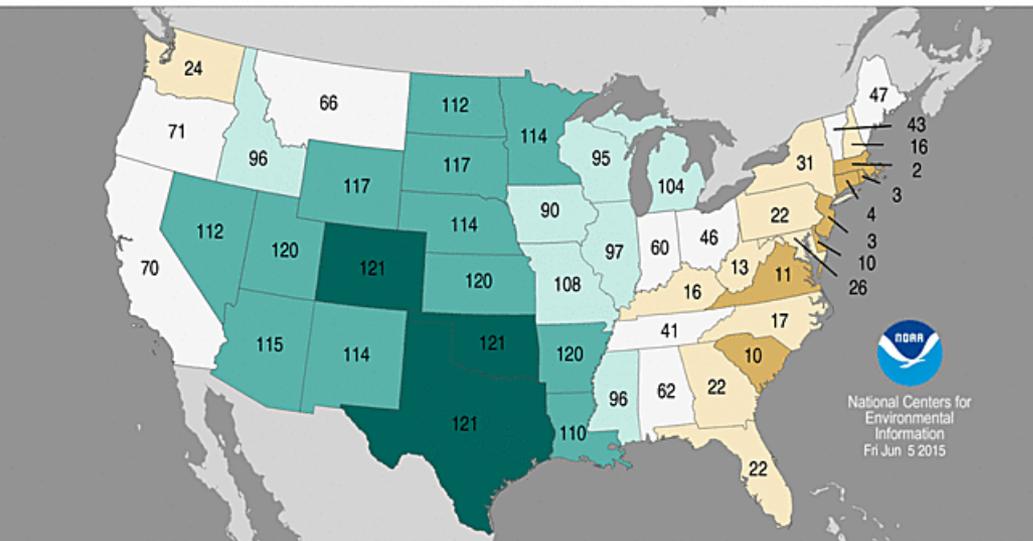


Record Wet May

CONUS + Puerto Rico: May, 2015 Monthly Observed Precipitation
Valid at 6/1/2015 1200 UTC- Created 6/12/15 3:35 UTC



Statewide Precipitation Ranks
May 2015
Period: 1895-2015



National Centers for Environmental Information
Fri Jun 5 2015



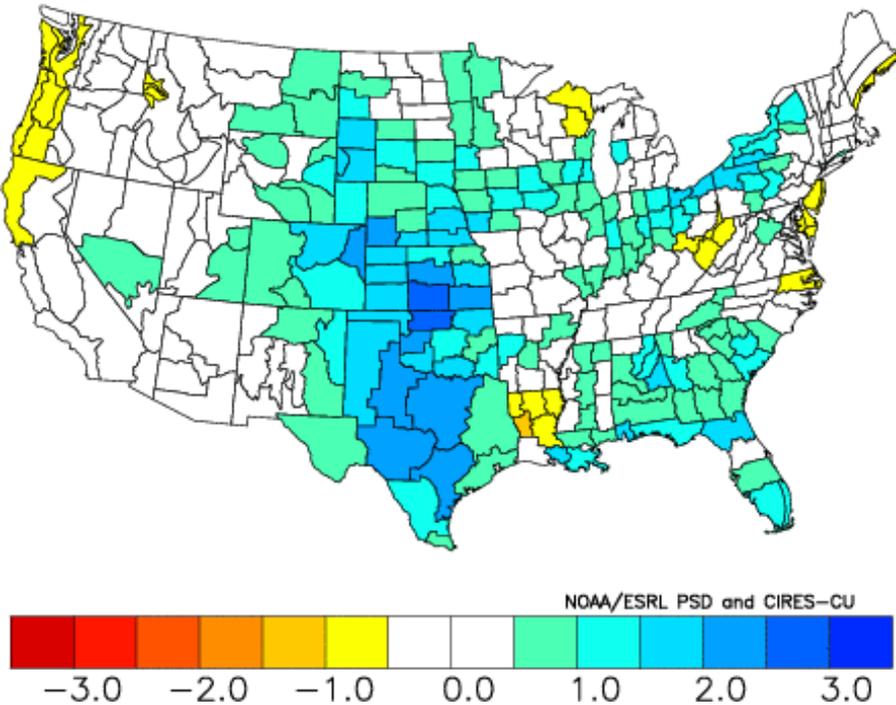
- May set record as wettest month ever for contiguous U.S.
- Over 20 inches across TX and OK, widespread flooding
- TX, OK set records for wettest month ever.
- CO sets record for wettest May





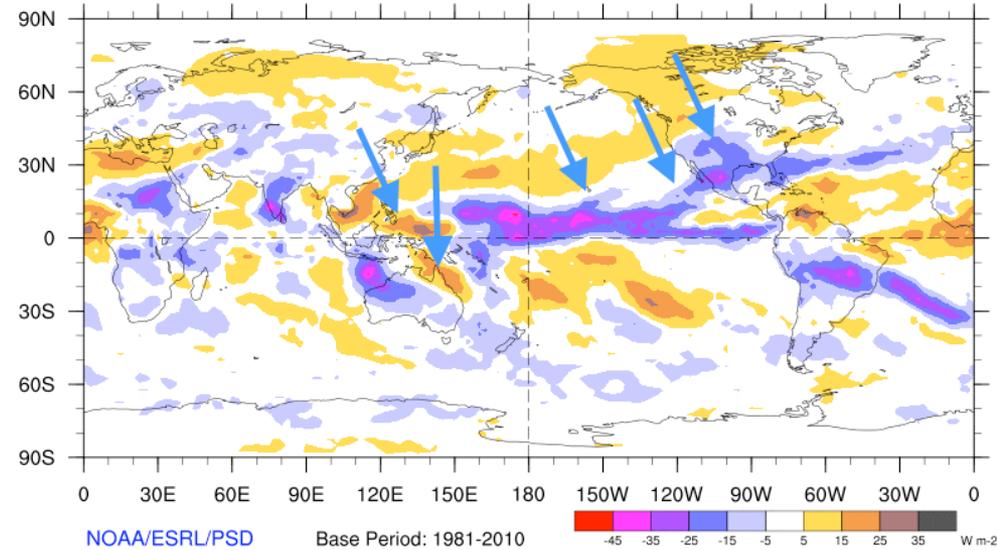
Outgoing Longwave Radiation

NOAA/NCDC Climate Division Composite Precipitation Anomalies (in)
May to Jun 1957,1965,1969,1972,1982,1987,1997,2014
Versus 1950-1995 Longterm Average



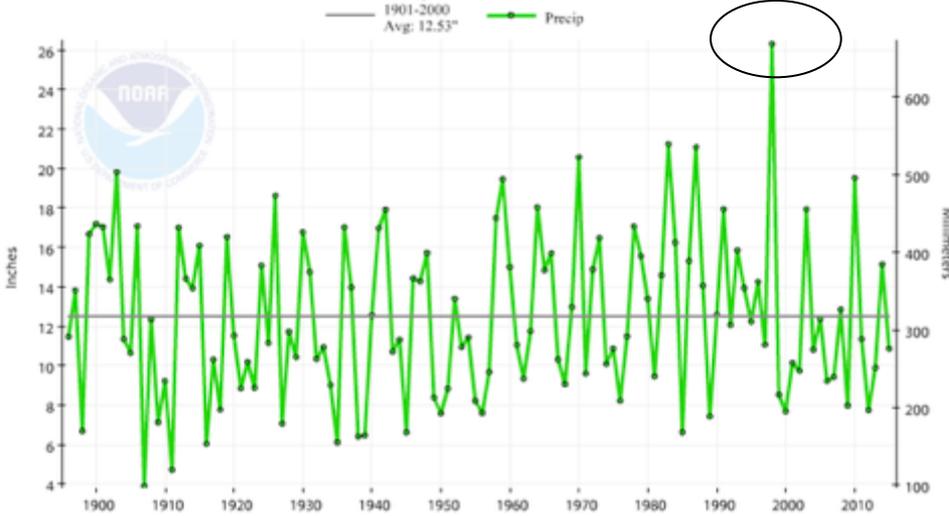
30-Day Average OLR Anomaly

2015/04/17 - 2015/05/16

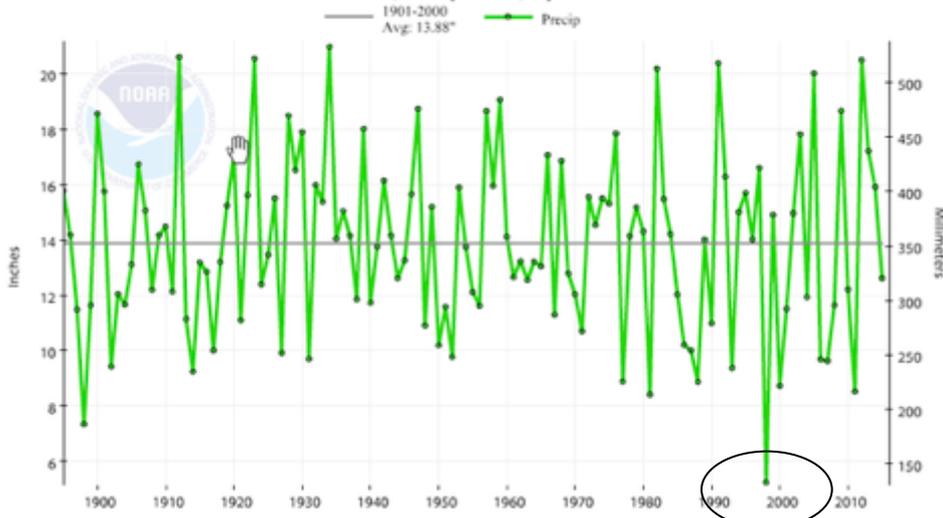


Will 2016 in Florida Repeat 1998?

Florida, Precipitation, December-March

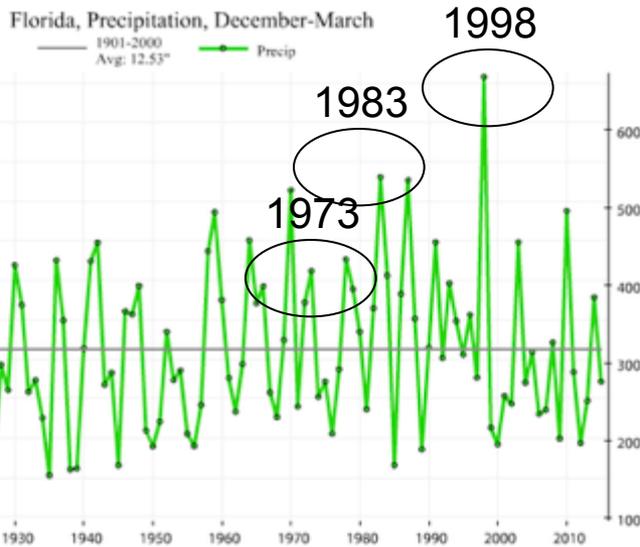


Florida, Precipitation, April-June

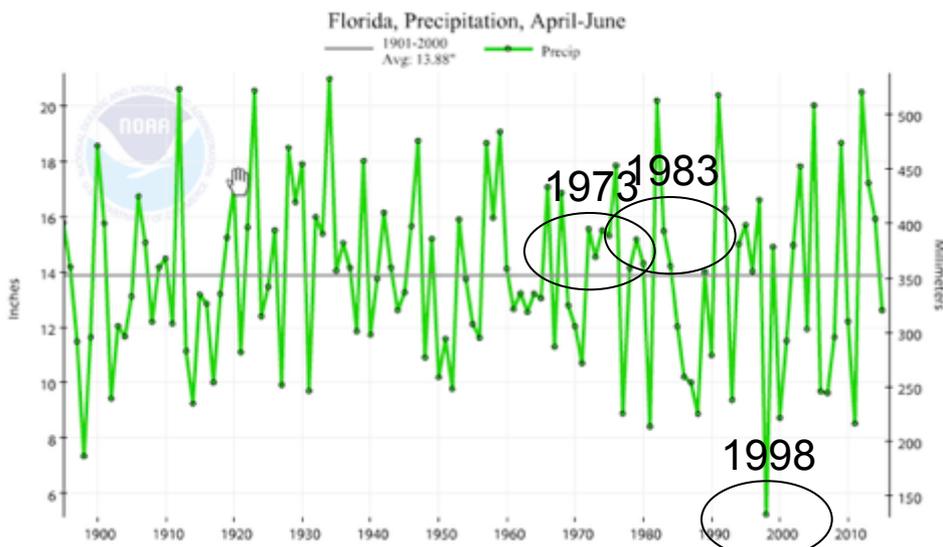


- Super El Nino of 1998 brought record winter rainfall to Florida
- April-June brought record dryness
- Over half million acres burned in worst wildfire season in memory
- In April and May, Pacific Ocean had unprecedented rapid transition from El Nino to La Nina, contributing to the changing weather patterns
- Similar transition unlikely, but Pacific conditions should be monitored closely as spring approaches

Similar El Nino's to 1998?



- 1983 was El Nino of similar strength
- 1973 was strong El Nino with rapid spring transition to La Nina.
- 1998 brought record winter rainfall, 1983 set previous record, 1973 above normal.



- 1998 brought record spring dryness.
- 1983 and 1973 brought above normal spring rainfall.
- No precedent for the record spring drought in Florida in 1998.



Impacting Agriculture



- Do not delay harvest, take advantage of good weather windows
- Plant cover crops early
- Make sure fields are well-drained
- Good conditions for winter pasture
- Anticipate more fungicide
- Cover crops can be left longer in the spring





Kirk Brock



Farms nearly 2,000 acres
near Monticello, FL

Most of the acreage is on
leased parcels of less than
5 acres





The Problem...



The year-to-year variability in yields was causing too much financial risk and losses during down years.

Climate Considerations

- Climate variations causing drought years and affecting yields
- Heavy rainfall events leading to erosion, nutrient leaching, and water losses to runoff





The Solution...

High-residue cover crops and conservation tillage





Benefits

For the field itself...

- Reduced erosion and runoff, greater infiltration to the soil
- Less evaporative losses
- Weed control
- Increased organic matter in the soil
- Cooler soil temperatures



Climate connections...

- Use of cover crops makes the whole system more resilient to climate variations (change)
- Seasonal forecasts (El Nino/La Nina) used to manage cover crops





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FSU-COAPS Predicts Above Average Atlantic Hurricane Season

The 5th annual forecast, led by Dr. Tim Laflow, calls for a 70 percent probability of 12 to 17 named storms, including 5 to 10 hurricanes. The mean forecast is 15 named storms, 8 hurricanes, and an average accumulated cyclone energy (a measure of the strength and duration of storms accumulated during the season) of 135. [More...](#)

News

- Southeast climate not following global warming trend
- FL Climate Center newsletter
- NOAA monthly climate report
- Global Warming's Six Americas report

Events

North FL AMS/NA Meeting
Thu, 11/21/2013
Tallahassee, FL

Climate Roundup Seminar with David Zierden
Thu, 11/21/2013
3:30pm - 4:30pm
Werner A. Baum Seminar Room (353 Love Building)

FL Climate Summary

During October, average temperatures and rainfall totals varied across Florida. ENSO-neutral conditions are continuing in the equatorial Pacific. NOAA's Climate Prediction Center predicts normal temperatures and below normal precipitation for Florida through January.

Hurricane Activity

Tallahassee Weather

61.8° F (16.1° C)
Mostly Cloudy

Dewpoint: 54.0° F (12.2° C)
Relative Humidity: 78%
Wind: East at 10.4 MPH (8 KT)
Visibility: 10.00 miles

Newsletter

THE FLORIDA STATE UNIVERSITY

FloridaClimateCenter
Office of the State Climatologist

November 2013 Newsletter

Join Our Email List

Dear Florida Climate Center Friends,

We'd like to present you with the November 2013 edition of our newsletter. In this newsletter, you'll find our monthly climate summary, a list of special events that our staff attended, and a winter 2013-2014 climate outlook. If you have any questions, please email us at climate@coaps.fsu.edu.

Thanks,
The Staff of the Florida Climate Center

David Zierden
State Climatologist

James O'Brien
Professor Emeritus

Melissa Griffin
Asst. State Climatologist

Fall Back Sunday, November 3

Just a reminder to everyone that Daylight Saving Time ends at 2:00 AM on Sunday, November 3rd. Remember to turn your clocks back an hour before you go to sleep Saturday night.

October Climate Summary for Florida

The Florida Climate Center's [October 2013 Florida Climate Summary](#) is now available. The summary provides an analysis of temperature and precipitation trends across the state, along with data on hazardous weather, drought, the impacts

AgroClimate.org