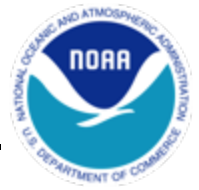




North Atlantic El Niño Resources Webinar

North Atlantic Regional Team
January 28, 2016

Call Agenda



- Regional Collaboration & NOAA In-Reach, Jason Tuell, Regional Team Lead
- El Niño in the North Atlantic, Art DeGaetano, Northeast Regional Climate Center
- NOAA El Niño Resources & Coordination, Ellen Mecray, Eastern Regional Climate Services Director
- New York/New England perspective on ENSO impacts on precipitation and flood potential, David Vallee, Northeast River Forecast Center
- Discussion

Why Regional Collaboration?



Regional Collaboration Mission

To identify, communicate, and respond to regional needs, catalyze collaboration and connect people and capabilities to advance NOAA's mission and priorities.

Line of Sight:

COMMERCE
Strategic goals

NOAA
Top priorities for 2014-2016

NOAA
Regional Collaboration Goals

GOAL 5 OPERATIONAL EXCELLENCE
Deliver better services, solutions,
and outcomes that benefit the
American people

ACHIEVE ORGANIZATIONAL
EXCELLENCE

Address regional challenges by
connecting people and resources

Focus on people, teams and tools
to advance organizational
excellence

Exchange both national and
regional insights that inform action

OBJ. 5.1: Strengthen organizational
capabilities to drive customer-
focused, outcomes-driven mission
performance

Improve the understanding of and
respect for NOAA's broad mission
and regional capabilities₃

NART members



Betsy Nicholson,
NOS/OCM



Beth Turner
NOS/NCCOS



Colleen Coogan
NMFS/GARFO



Sylvain DeGuise
OAR/CT Sea Grant



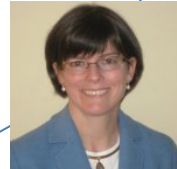
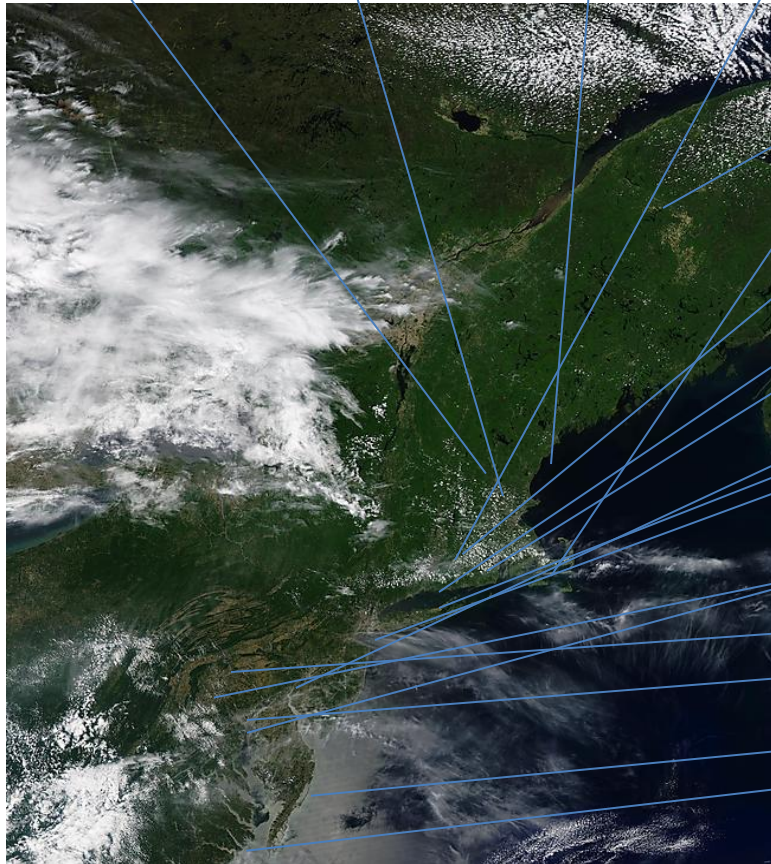
Nicole Bartlett
NART Coordinator



Rich Okulski
NWS/Caribou
WFO



Sim Aberson
OAR/AOML



Ellen Mecray
NESDIS/NCEI



**Catalina
Martinez**
OAR/OER



Kim Hyde
NMFS/NEFSC



Kevin Schabow
NMFS/NCBO



Jason Tuell
NWS/ER



George McKillop,
NWS/ER, HSD



**Beth
Phelan**
NMFS/
NEFSC



Randy Schneider
NOS/OCM



Troy Hartley
OAR/VA Sea Grant



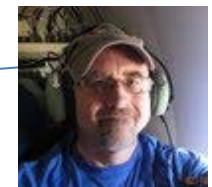
Simeon Hahn
NOS/OR&R



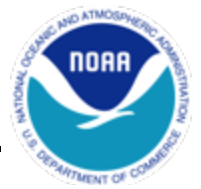
Jen Dopkowski
OAR/CPO



Paul Ticco,
NOS/ONMS



Joe Sienkiewicz
NWS/NCEP



El Niño in the press



tatoedSailor

Mar 7, 2014

"A strong El Niño, by contrast, tends to push the southern stream even further north, and with it, milder air. Some of the most snow barren winters in the northeast have occurred during these winters."

Snow barren...northeast? YOU ROCK Niño!

Did El Nino Make This Weekend's Colossal Snowstorm Worse?

ALEX BEAM

Beware . . . El Niño is coming!

Eye On Weather: El Niño A Big Player In Winter Outlook

By: Chief Meteorologist Eric Fisher

El Niño watch issued: What could that mean for NJ?

Enjoy the warmth while you can – we could still get blizzards

SCIENCE WEATHER

Here's Why the East Coast Has Been So Warm

Kevin Worland @jdworland | Dec. 14, 2015



You can forget about a white Christmas if you live on the East Coast



Winter Preview: El Niño contributes to a tale of two seasons



Gunny

El Niño = El BS' O.

Mar 7, 2014



THE WEATHER

Super El Niño Means Less Snow, Warm Weather for Northeast

Friday, December 18, 2015, by Megan Barber



Webcam Image from Dec. 15 Camelback, Pennsylvania

- KILLINGTON
- MAD RIVER GLEN
- NEW ENGLAND
- STOWE
- STRATTON
- SUGARBUSH
- SUGARLOAF
- EL NINO
- NEW ENGLAND SKIING
- NORTHEAST
- THE WEATHER

1 COMMENT

Like 138

US Winter Forecast: Northeast to Dodge Winter's Brutal Cold; Rain, Snow to Dent California Drought

By Jillian MacMath, AccuWeather.com Staff Writer
October 16, 2015; 4:04 AM ET

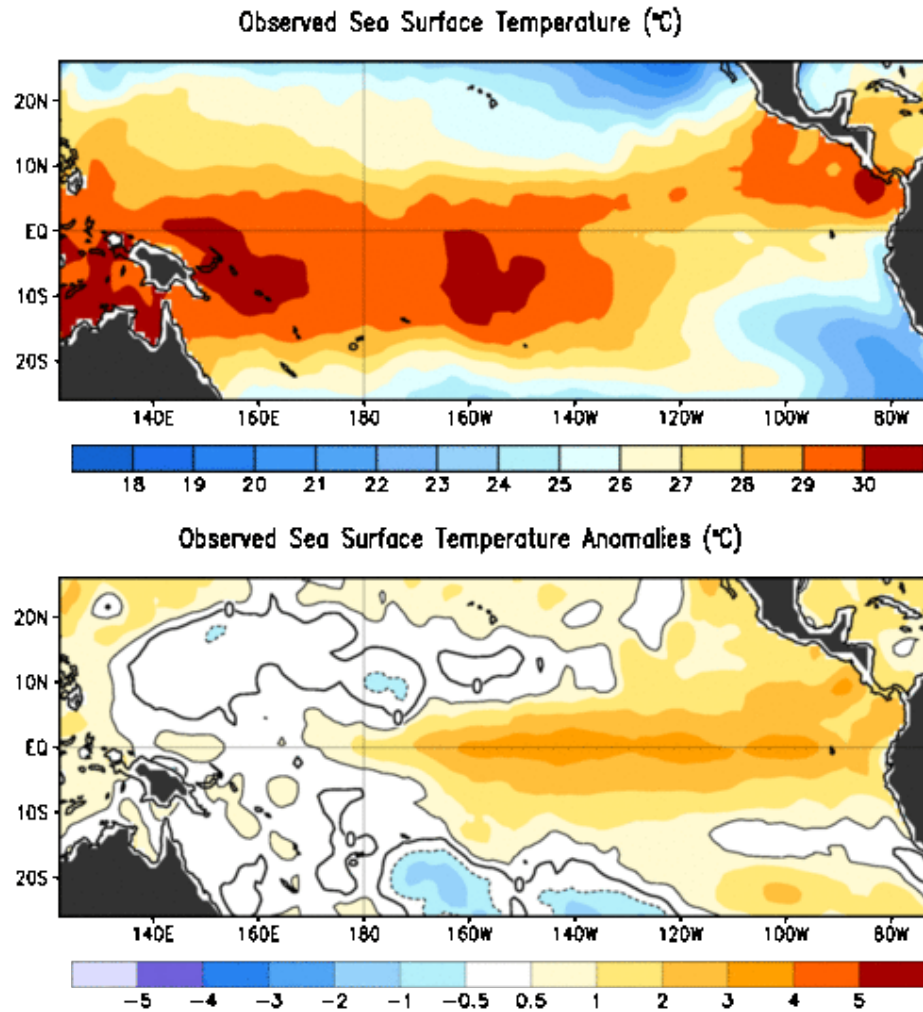




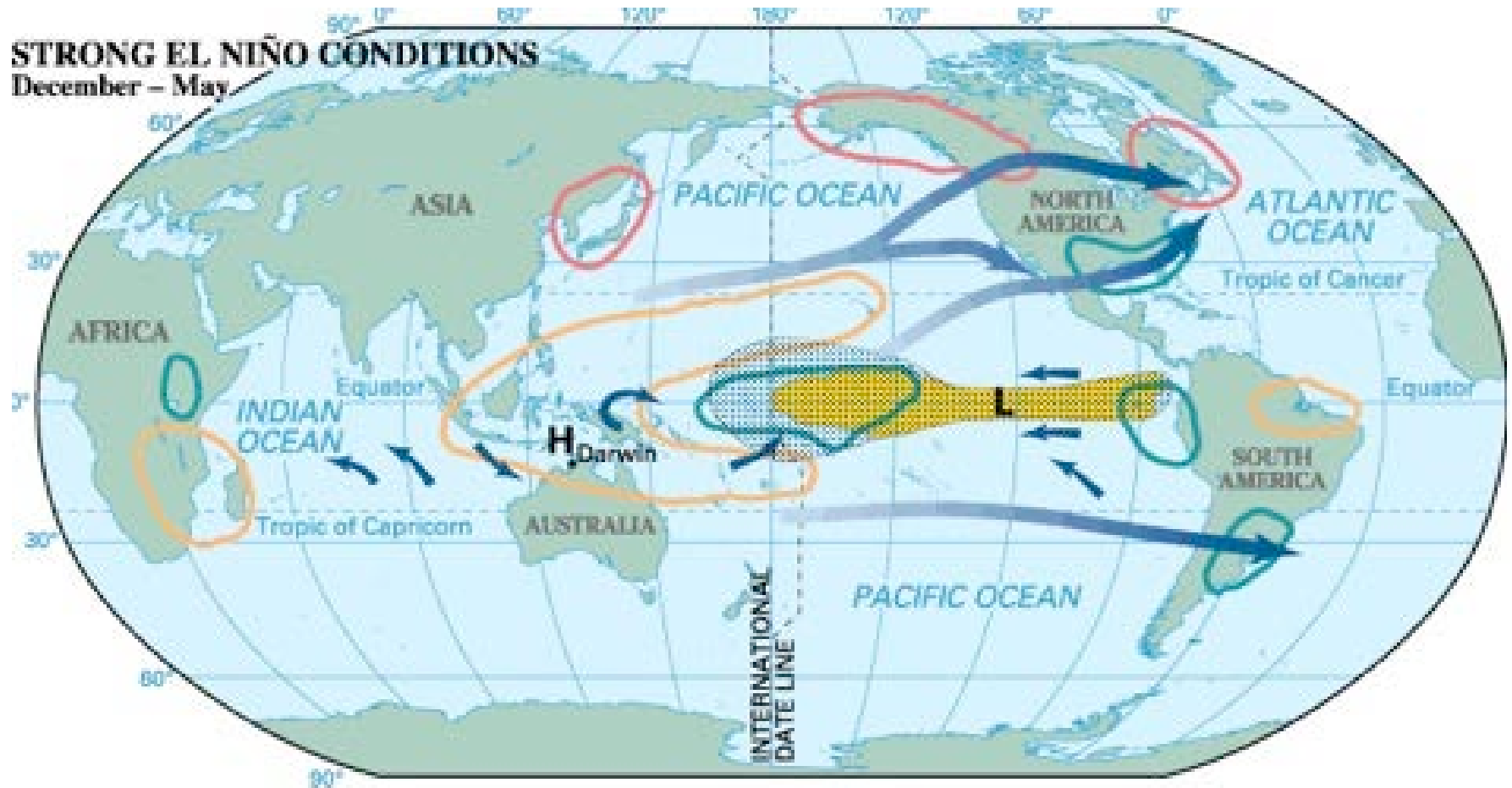
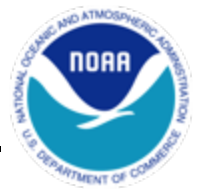
El Niño in the North Atlantic

Art DeGaetano, Director
Northeast Regional Climate Center
January 28, 2016

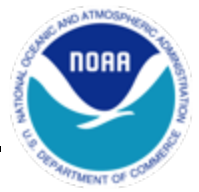
What is El Niño... Current Status



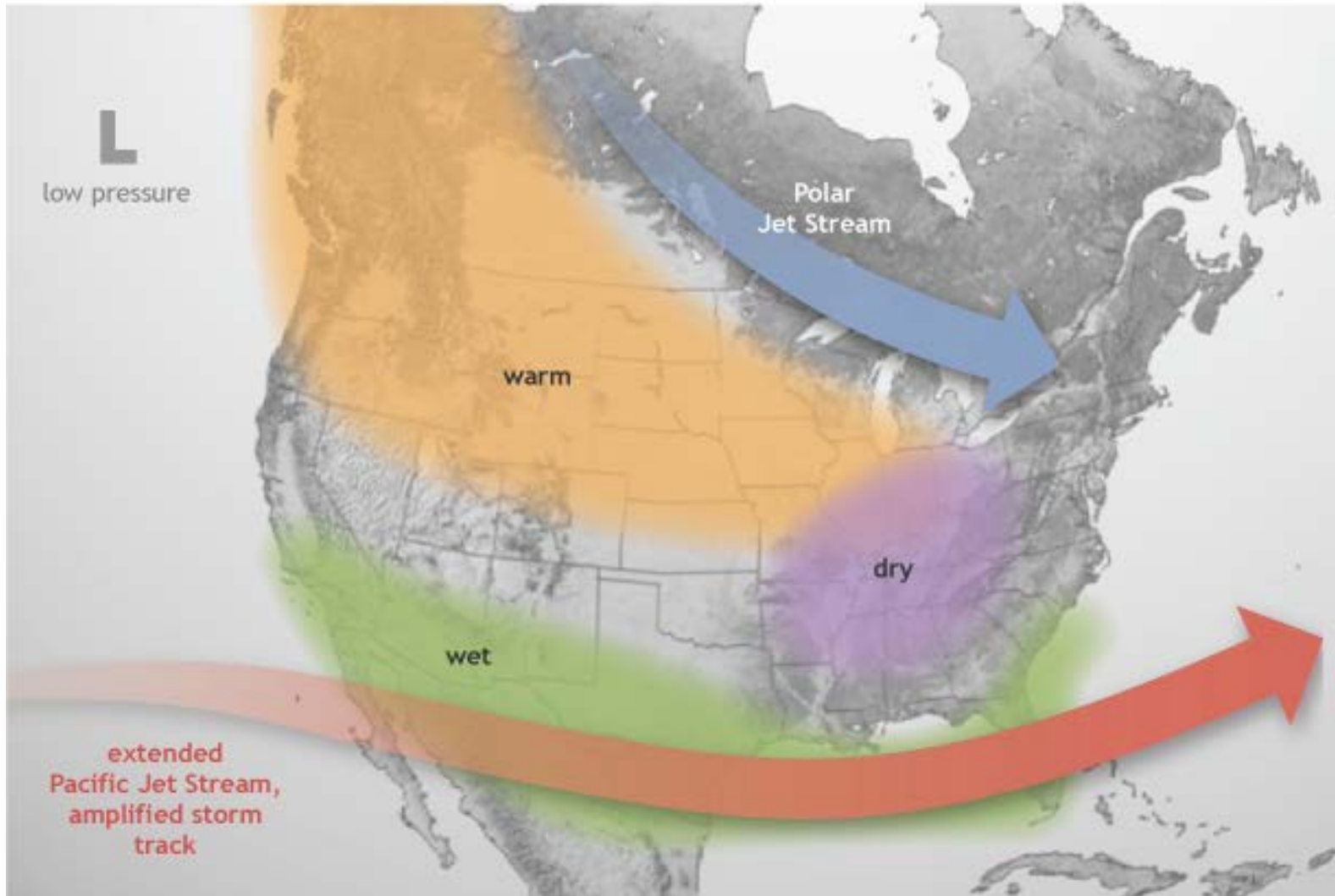
Pacific to North Atlantic



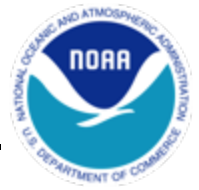
A Typical El Niño pattern



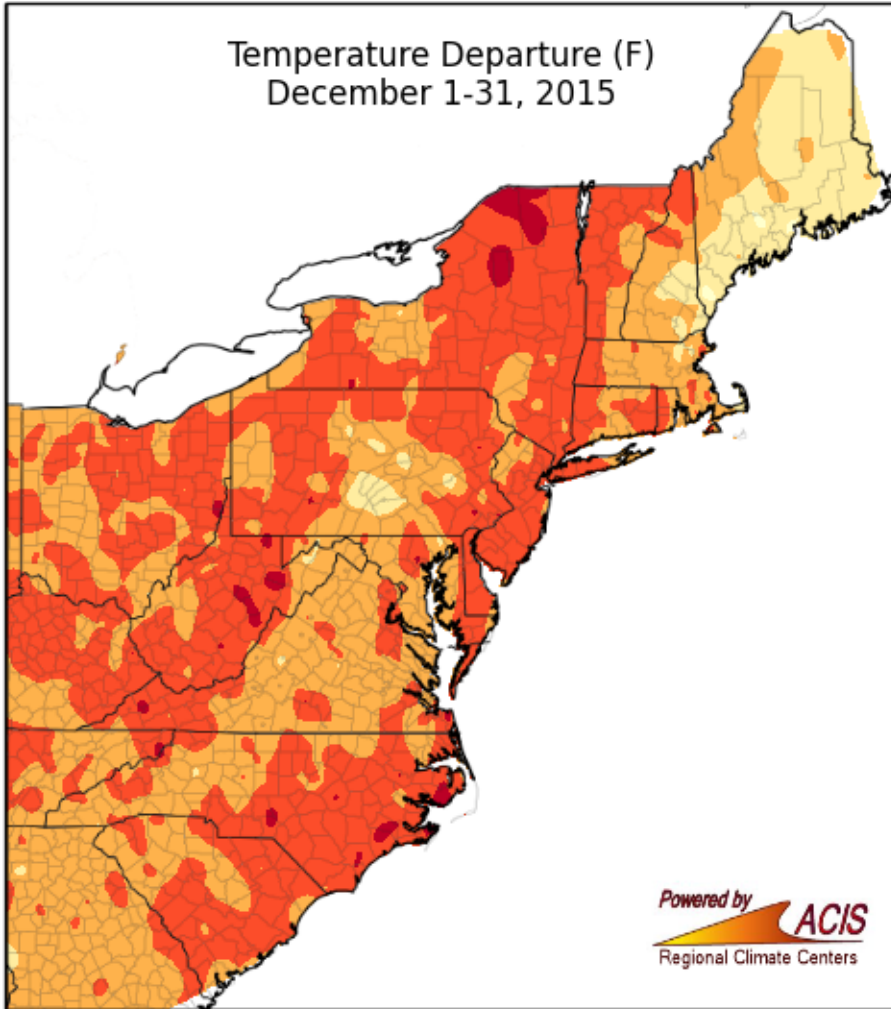
Wintertime El Niño pattern



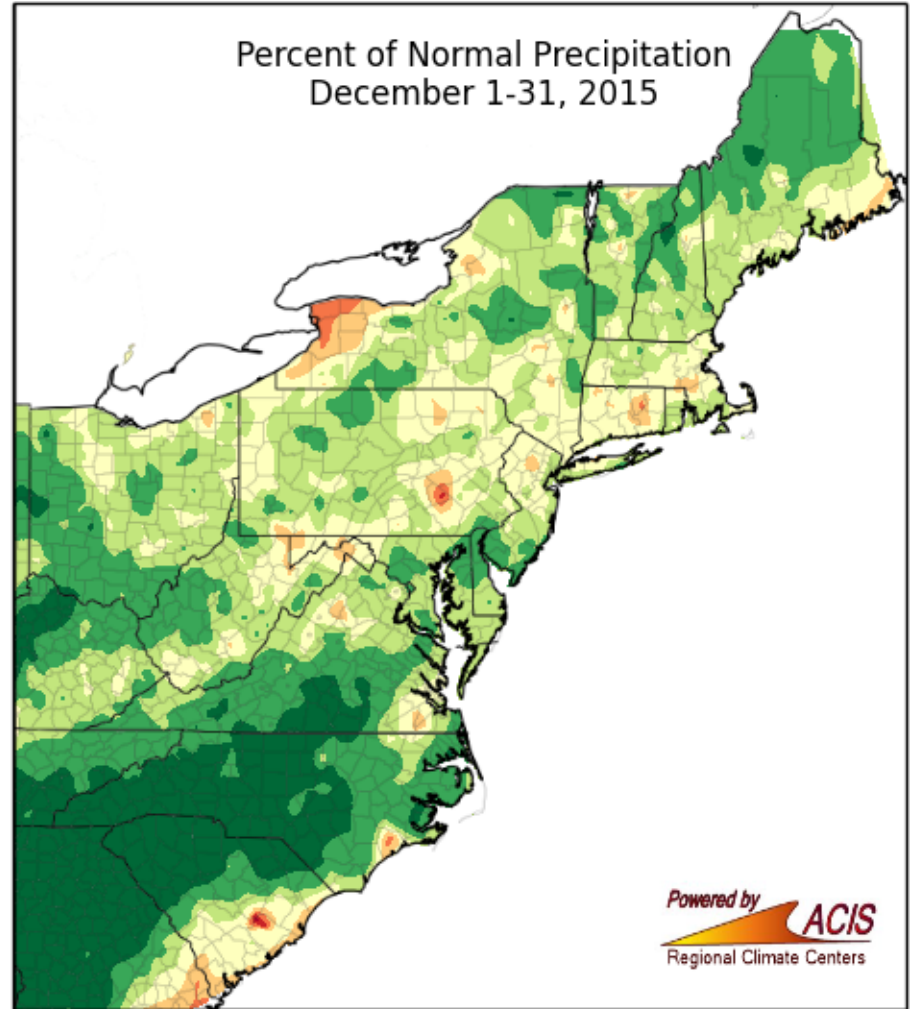
This December...El Niño?



Temperature Departure (F)
December 1-31, 2015

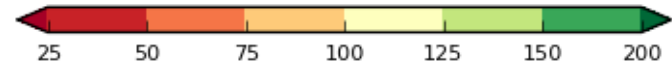
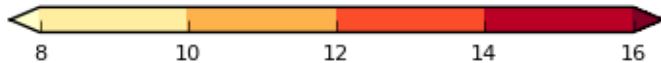


Percent of Normal Precipitation
December 1-31, 2015



Powered by **ACIS**
Regional Climate Centers

Powered by **ACIS**
Regional Climate Centers



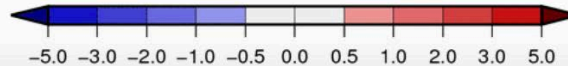
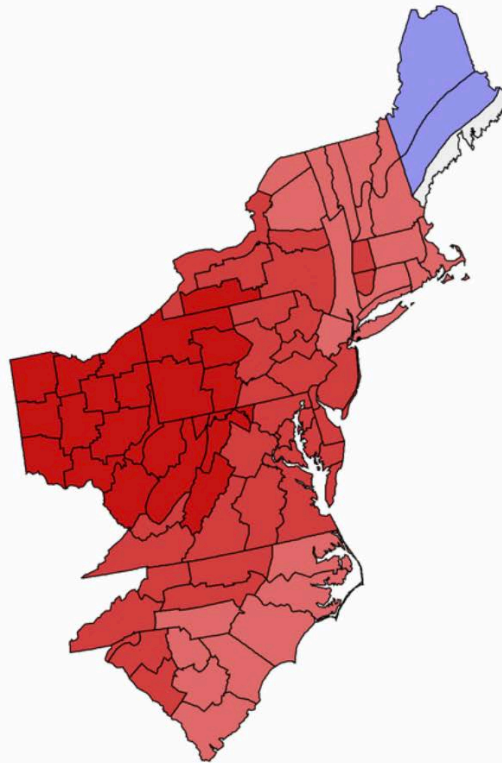
Classic Strong El Niño Analog



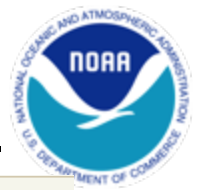
Data Set: Variable:
Region: Time Period: [View Map](#)

Strong El Niño Mean Temperature Departure from Average

National Weather Service Eastern Region
Composite: December 1957, 1965, 1972, 1982, 1991, 1997
Average Period: 1981-2010



El Niño 2015... Warmer than 1997



MRCC ENSO Comparison Tool

Variables:

- Temperature
- Precipitation
- Snowfall

?

- Month
- Season

December 2015

- Data Value (year 2015-2016)

Departure from...

?

- 30-yr Normal (1981-2010)
- El Niño year: Dec 1997
- El Niño year: Dec 1991
- El Niño year: Dec 1982
- El Niño year: Dec 1972
- El Niño year: Dec 1965
- El Niño year: Dec 1957

Image Export:

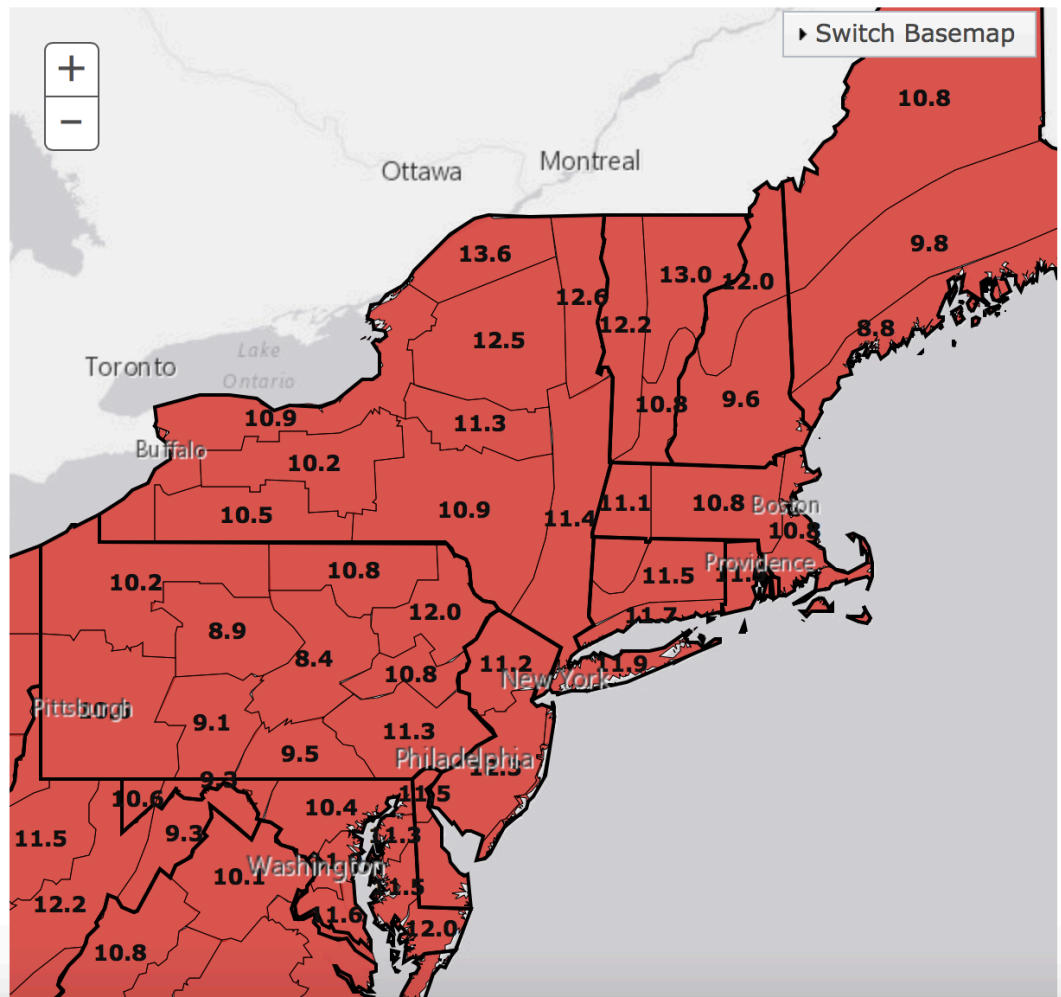
- PNG
- JPG
- PDF

Choose Page Size:

Legend:

December 2015, Temperature
Departure from Dec 1997 (°F)

TDep97



Potential Winter Impacts

Coastal Storms



Several research studies have noted an increased frequency of East Coast storms during El Niño winters. These storms, known as nor'easters, have a number of coastal impacts, ranging from beach erosion and high winds to heavy snowfall and precipitation. Storms that follow a classic nor'easter

Snowfall



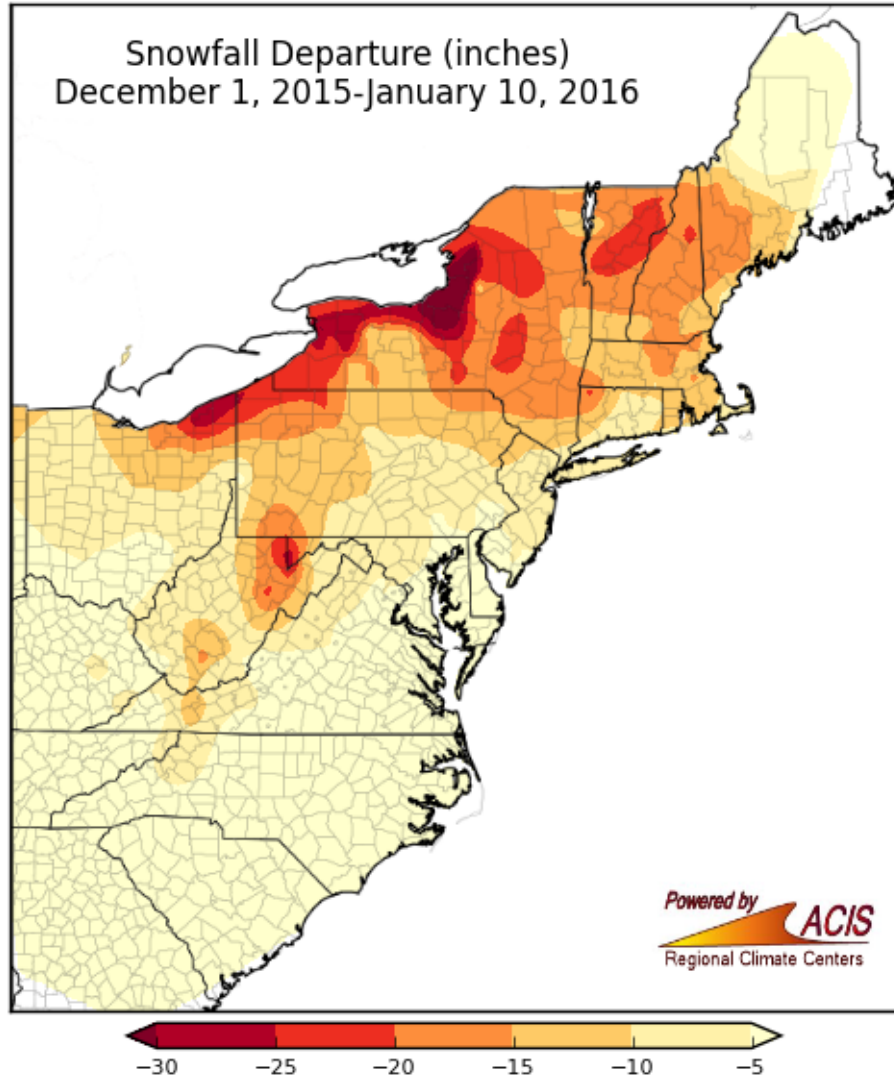
Snowfall along the Northeast coast is typically above average during El Niño winters. The exception to this is the lake-effect region in New York. Since 1950, six of the least snowy winters on record at Buffalo have occurred during El Niños. Typically, in regions closer to the coast, December through February snowfall is as

Energy Usage



Across a broad swath of the Southeast, El Niño winter temperatures average 1 to 2 degrees cooler than those that do not experience El Niño conditions. Therefore, heating degree day accumulations tend to be higher during El Niño winters in this region. The [Residential Energy Demand Temperature Index \(REDTI\)](#) provides a

El Niño and Winter Snow

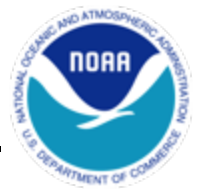


Since 1950, during El Niño

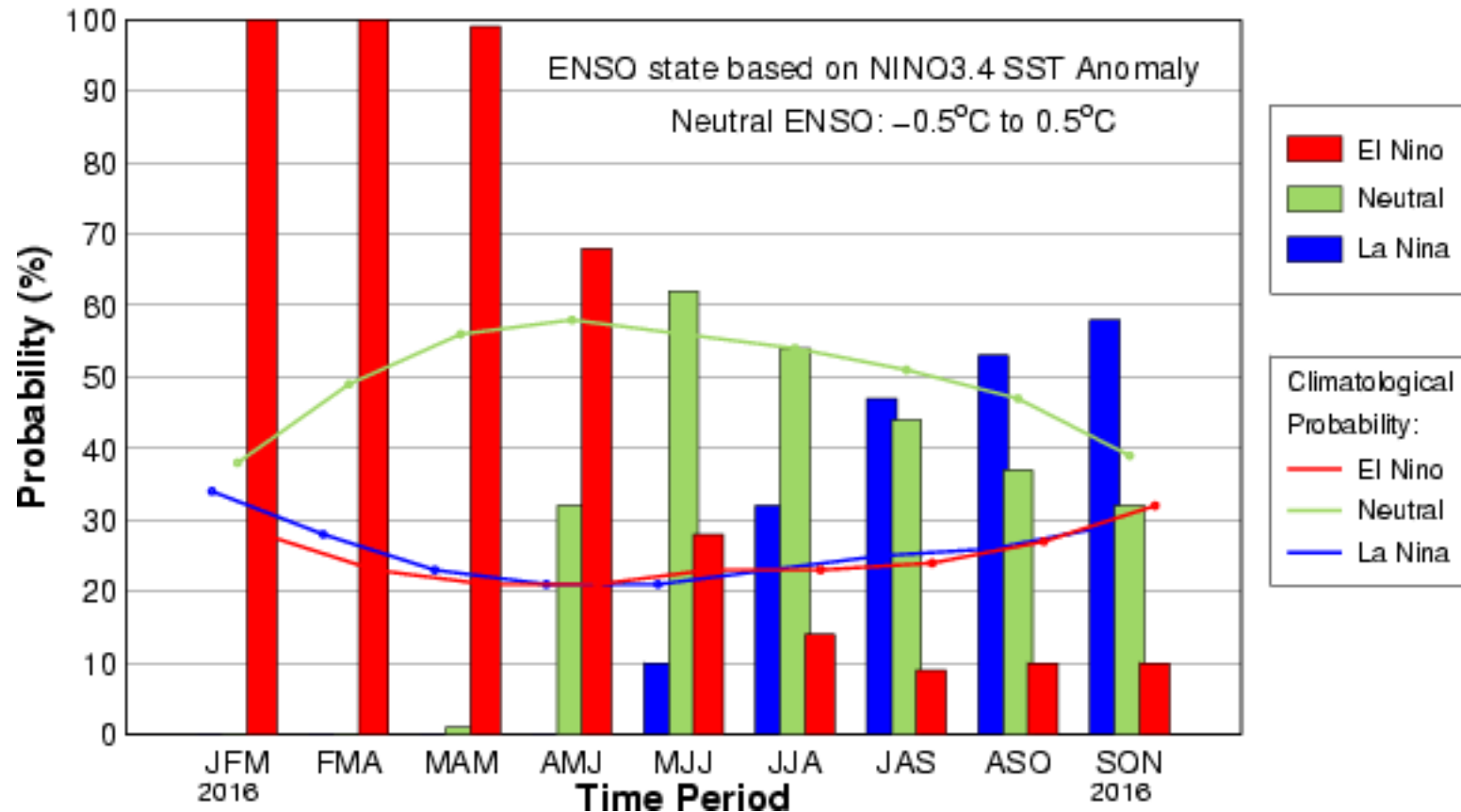
6 of the least snowy winters at Buffalo.

8 of the 10 greatest 2-day snowfalls at Washington, DC.

El Niño Forecast

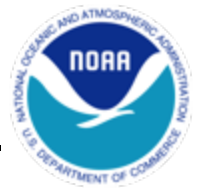


Mid-Jan IR/CPC Plume-Based Probabilistic ENSO Forecast



ENSO likely to continue strengthening and to last through the winter of 2015-16

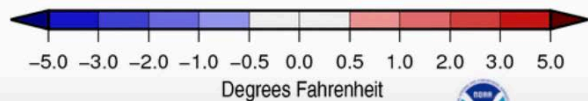
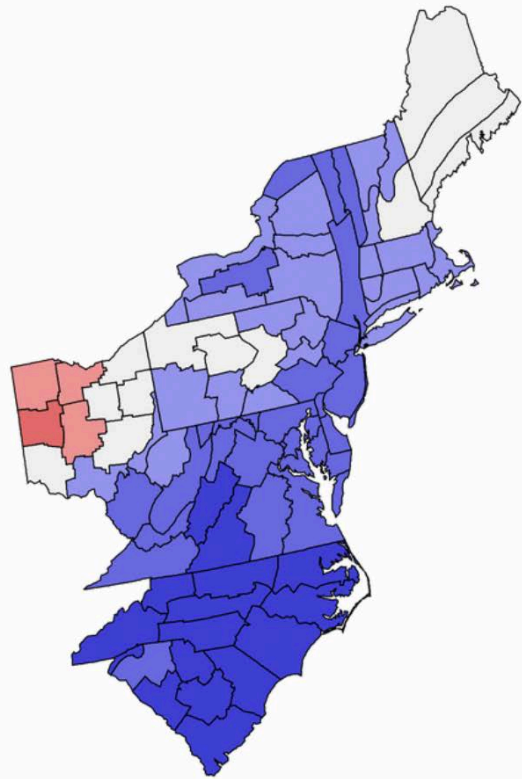
El Niño ... February during strong El Niño



Data Set: Variable:

Region: Time Period:

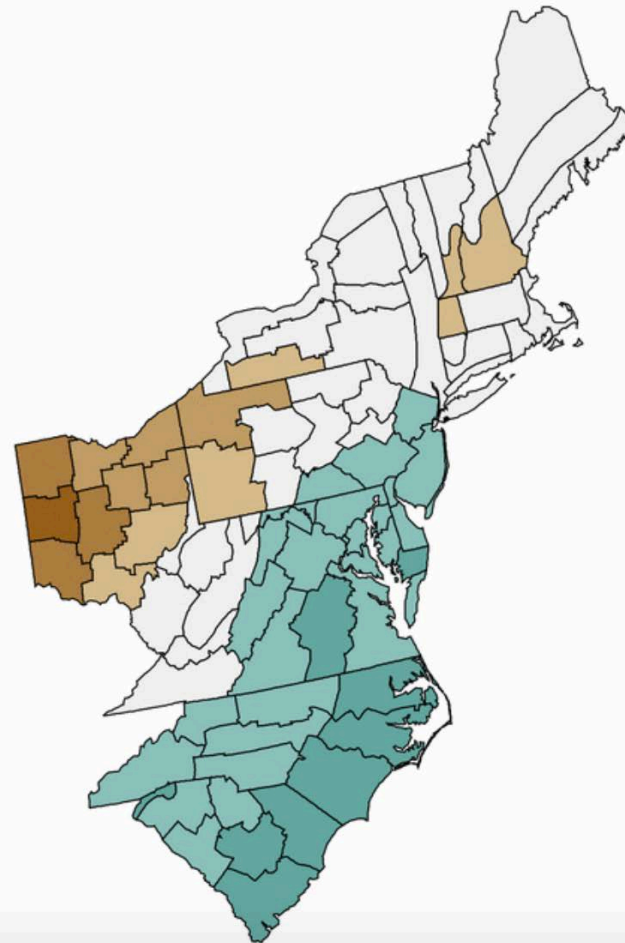
Strong El Niño Mean Temperature Departure from Average
National Weather Service Eastern Region
Composite: February 1958, 1966, 1973, 1983, 1992, 1998
Average Period: 1981–2010



Data Source: nClimDiv



Strong El Niño Precipitation Percent of Average
National Weather Service Eastern Region
Composite: February 1958, 1966, 1973, 1983, 1992, 1998
Average Period: 1981–2010





NOAA El Niño Resources & Coordination

Ellen Mecray

NOAA Regional Climate Services Director- Eastern Region

January 28, 2016

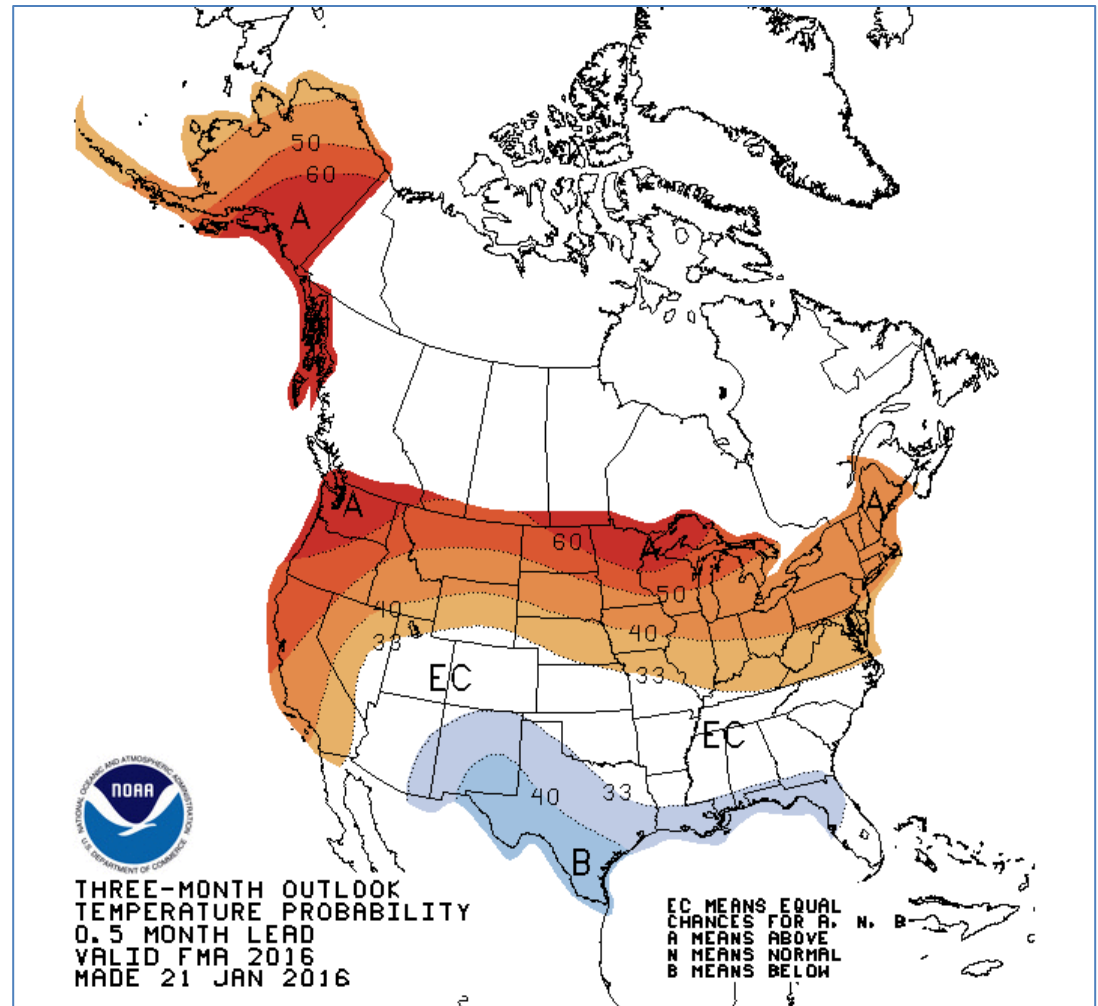
National and International Resources: Outlooks and Forecasts

(CPC) ENSO Diagnostic Discussion
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/index.shtml

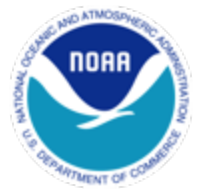
(CPC) El Nino – Southern Oscillation (ENSO)
<http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/enso.shtml>

(CPC) Monthly and Seasonal Temperature, Precipitation, and Drought Outlooks
<http://www.cpc.ncep.noaa.gov/>

IRI ENSO Forecast (International)
<http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/>



National Resources: Historical Context and General Information



National Center for Environmental Information (NCEI) A Historical Perspective

http://www.ncdc.noaa.gov/monitoring-references/dyk/el_nino-2015-2016

Pacific Marine Environmental Lab (PMEL) El Niño Theme Page

http://www.pmel.noaa.gov/tao/el_nino/nino-home.html

(PMEL) El Niño Observing Systems

<https://www.youtube.com/watch?v=nzBAWirHMvA&feature=youtu.be>

(CPC) General Questions about ENSO

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensofaq.shtml#general

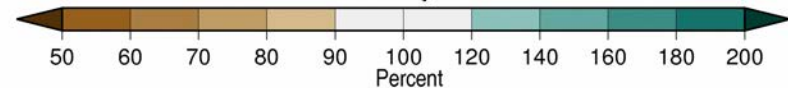
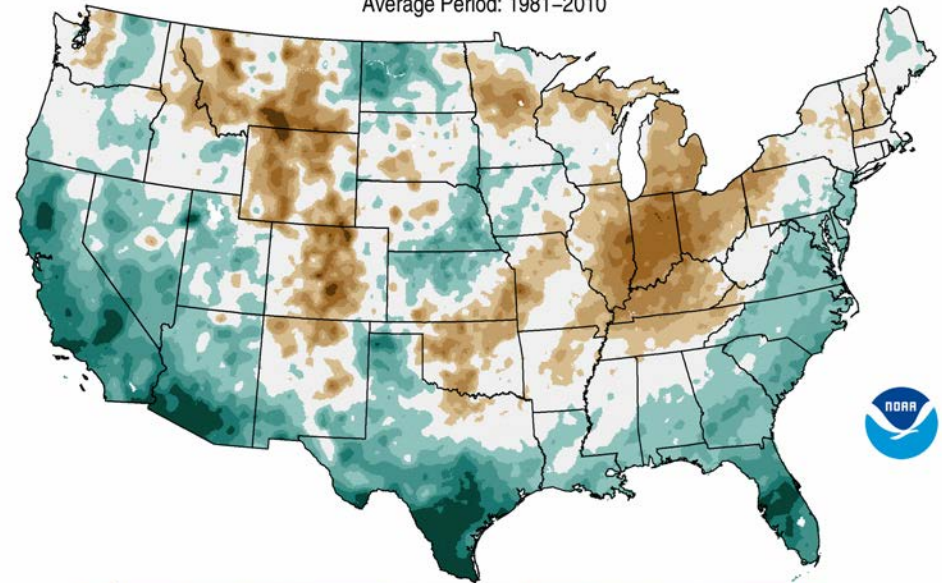
(PSD) Physical Sciences Division, risk of extremes during ENSO

<http://www.esrl.noaa.gov/psd/enso/climaterisks/>

Strong El Niño Precipitation Percent of Average

Composite: February 1958, 1966, 1973, 1983, 1992, 1998

Average Period: 1981–2010



Data Source: 5km Gridded Dataset (nClimGrid)

Created by: National Centers for Environmental Information

Regional Resources: North Atlantic Services

NCEI – Regional El Niño Impacts & Outlook Assessments

<http://www.ncdc.noaa.gov/news/regional-el-nino-impacts-outlooks-assessments>

Eastern U.S. Climate Summary and Outlook Webinars

<http://www.nrcc.cornell.edu/services/webinars/2015/12/index.html>

Regional Climate Centers: Northeast

<http://www.nrcc.cornell.edu/>

State Climatologists

<http://www.stateclimate.org>

NWS Weather Forecast Offices El Niño Webpages and Resources

e.g., Wichita
<http://www.weather.gov/ict/enso>

Quarterly Climate Summaries/Outlooks (2 page Summaries):

<http://www.drought.gov/drought/content/resources/reports>

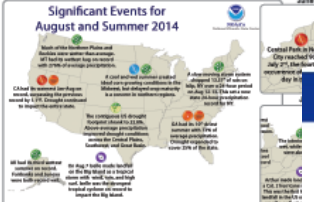
Climate Information Dashboard:

<http://www.gulfofmaine.org/dashboard/>

Quarterly Climate Impacts and Outlook

Eastern Region September 2014

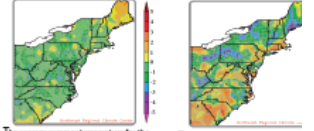
National - Significant Events for June–August 2014



During summer, the contiguous United States had an average temperature of 71.1°F, 0.8°F above century average. This made it the coolest summer since 2009. Summer precipitation in the contiguous States totaled 9.34 inches, 1.67 inches above average. This made it the 10th wettest summer on the wettest summer since 2006. The contiguous U.S. temperature-related energy demand was 10% above average during summer, based on NOAA's Residential Energy Demand Temperature Index.

Regional - Climate Overview for June–August 2014

Temperature and Precipitation Anomalies
Departure from Normal Temperature (°F) | Percent of Normal Precipitation



The average summer temperature for the Eastern Region was 70.2°F, 0.8°F cooler than normal. Sixteen of the sixteen states saw below-normal temperatures. Maine, however, had its 10th warmest summer on record. June was warmer than normal for all states, with the region 1.0°F above normal. The states were cooler than normal during July, with the region 1.2°F below normal. Ohio and West Virginia had their 3rd and 16th coolest July on record, respectively, while Rhode Island had its 19th warmest July. The region ended August 0.1°F below normal. Fifteen states were cooler than normal, with Virginia and North Carolina ending the month among their top 20 coolest.

Source: The Weather Channel, NOAA, and the National Oceanic and Atmospheric Administration

Highlights for the East

Severe storms struck the region throughout summer. Forty-eight tornadoes touched down, with the majority occurring in July. A tornado in Madison County on July 8 was the second deadliest tornado in the U.S. A tornado in Suffolk County, MA, on July 28 was the first.

El Niño Impacts and Outlook

Typical El Niño Winter Pattern



The image above shows the typical pattern during El Niño winters. The polar jet stream tends to stay to the south of much of the Eastern Region, while an active Pacific jet stream is present across the southern U.S. Since much of the Eastern region lies between the two storm tracks, temperature and precipitation patterns vary considerably from south to north. It is important to note that this is a schematic diagram representing general patterns and is not created from field data. For more information, please visit <http://www.elnino.gov/news/faq.html>.

Potential Winter Impacts

Coastal Storms

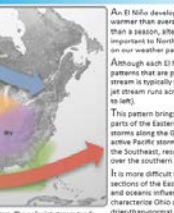


Several research studies have noted an increased frequency of East Coast storms during El Niño winters. These storms, known as nor'easters, have a number of coastal impacts, ranging from beach erosion and high winds to heavy snowfall and precipitation. Storms that follow a classic nor'easter track from south of Cape Hatteras along the East Coast are the main contributor to this increase. Metch et al. (2002) found an additional two storms with this track occur during El Niño winters compared to other winters. Strong El Niño events are particularly associated with this increase. Significant snow storms such as the Blizzard of '98 and a second March 1998 nor'easter occurred in conjunction with El Niño conditions. As did the February 2003 President's Day Storm. Storms such as the "Perfect Storm" occurred in 1991, resulting in 15 to 30 foot waves to coastal New England during a strong El Niño.

Source: The Weather Channel, NOAA, and the National Oceanic and Atmospheric Administration

Eastern Region October 2015

Typical El Niño Winter Pattern



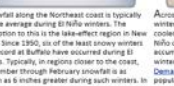
An El Niño develops when sea surface temperatures are warmer than average in the equatorial Pacific for more than a season, altering the atmospheric circulation. This is important to North America because El Niño has an impact on our weather patterns, most particularly in the winter. Although each El Niño is different, there are some general patterns that are predictable. For instance, the polar jet stream is typically further south than usual, while the Pacific jet stream runs across the southern United States (see figure below).

The pattern brings above-normal precipitation to southern parts of the Eastern Region, as the Pacific jet stream steers storms along the Gulf and southeast Atlantic coasts. The active Pacific storm track also promotes cloudy conditions in the Southeast, resulting in cooler-than-normal temperatures over the southern portions of the Eastern Region.

It is more difficult to define conditions in the northern sections of the Eastern Region because of other atmospheric and oceanic influences. The dry winter conditions that characterize Ohio and the Midwest extend eastward, with drier-than-normal conditions common in western New York and Pennsylvania, as dries often move off the coast during El Niño winters. The Eastern Seaboard generally experiences above-normal precipitation. Typically with strong El Niños, such as the one this year, warmer temperatures extend further into the Northeast than in the accompanying diagram.

Potential Winter Impacts

Snowfall



Snowfall along the Northeast coast is typically above average during El Niño winters. The exception to this is the lake-effect region in New York. Since 1950, six of the least snowy winters on record at Buffalo have occurred during El Niño. Typically, in regions closer to the coast, December through February snowfall is as much as 6 inches greater during such winters. However, individual storm tracks can influence where precipitation falls as rain versus snow. Heavy East Coast snowfalls have negative impacts on transportation and the economy. Based on the Northeast Snowfall Impact Scale, an index that offers societal impacts based on the geographical extent and amount of snowfall along with population data, seven of the nine storms classified as originating here occurred in conjunction with El Niño.

Source: The Weather Channel, NOAA, and the National Oceanic and Atmospheric Administration

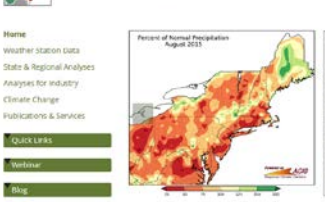
Energy Usage



Across a broad swath of the Southeast, El Niño winter temperatures average 1 to 2 degrees cooler than those that do not experience El Niño conditions. Therefore, heating degree day accumulations tend to be higher during El Niño winters in this region. The Residential Energy Demand Temperature Index (REDTI) provides a population-weighted view of heating degree day accumulation in a region, thus giving a measure of year-to-year fluctuations in energy demand for residential heating. In the Southeast, seven of the ten highest REDTI values since 1950 have occurred under El Niño conditions. Since energy consumption increases as the number of heating degree days increases, this winter's El Niño is likely to increase energy usage as the demand for heating will be above average. With warmer than normal temperatures more likely in the Northeast, energy consumption will likely be lower, which is reflected in historical REDTI values during El Niño in this region.

Source: The Weather Channel, NOAA, and the National Oceanic and Atmospheric Administration

Northeast Regional Climate Center



WEBSITE HIGHLIGHTS

January 2016 Blizzard
Snowfall map and 1-day and 2-day rankings.
[Read more in the NRCC Blog.](#)



El Niño Outlook

The Eastern Region El Niño Impacts and Outlook features an overview of typical El Niño winter weather patterns, potential impacts, winter temperature and precipitation outlooks, and a comparison of the 2015-16 El Niño event to previous events.
[Go to page.](#)

NOAA's Regional Climate Services Directors



Program Coordinator
Tamara G. Houston
NOAA's National Climatic Data Center
151 Patton Avenue
Asheville, NC 28801

New Services Resource:

[Climate.gov/enso](https://www.climate.gov/enso)

A new, primary entry point for agency El Niño resources and information

Includes both national and regional information, and links to resources throughout NOAA

Communications materials appropriate for non-technical audiences

e.g., What is ENSO?

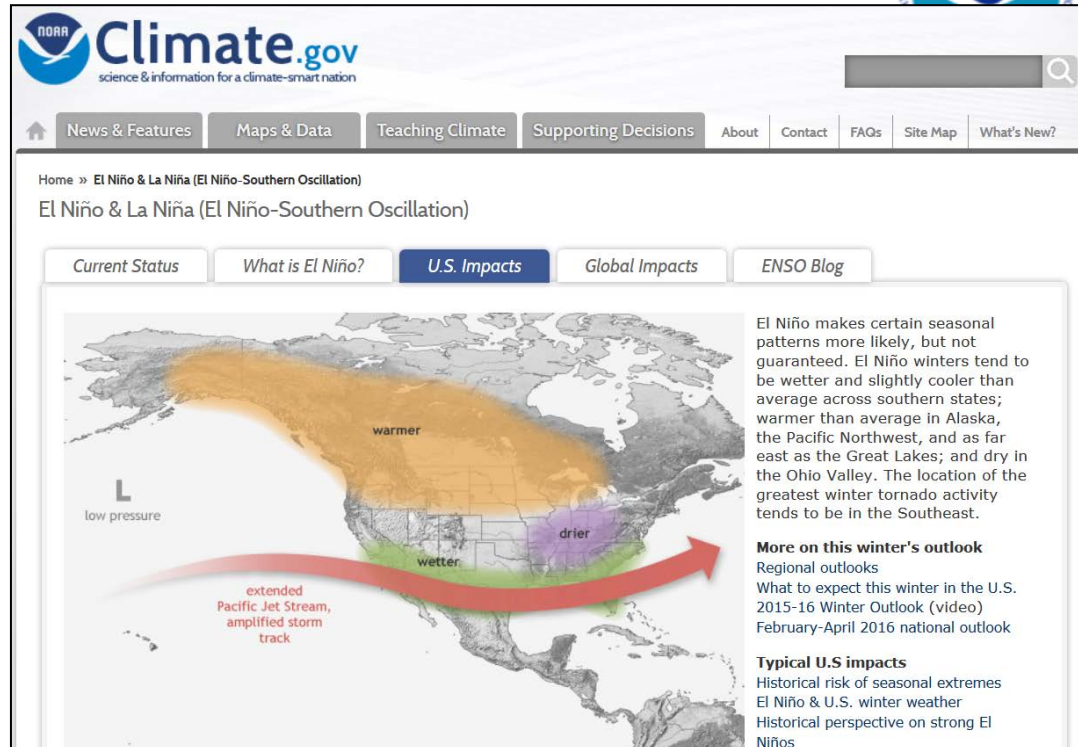
<https://www.climate.gov/news-features/blogs/enso/what-el-ni%C3%B1o%E2%80%93southern-oscillation-enso-nutshell>

e.g., Understanding El Niño

https://www.youtube.com/watch?v=Tuou_QcglxI
and
<http://oceantoday.noaa.gov/>

e.g., ENSO blog

<https://www.climate.gov/news-features/departments/8443/all>



Home » El Niño & La Niña (El Niño-Southern Oscillation)

El Niño & La Niña (El Niño-Southern Oscillation)

Current Status | What is El Niño? | **U.S. Impacts** | Global Impacts | ENSO Blog

warmer

low pressure

wetter

drier

extended Pacific Jet Stream, amplified storm track

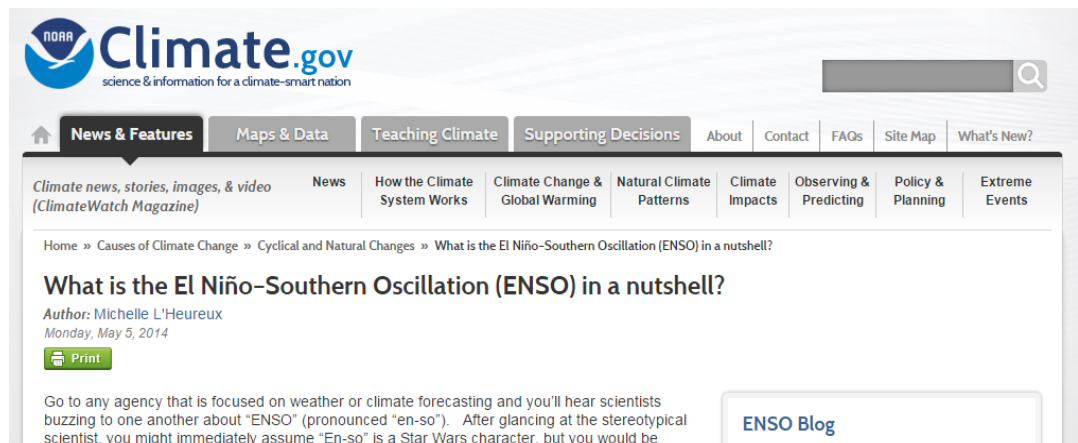
El Niño makes certain seasonal patterns more likely, but not guaranteed. El Niño winters tend to be wetter and slightly cooler than average across southern states; warmer than average in Alaska, the Pacific Northwest, and as far east as the Great Lakes; and dry in the Ohio Valley. The location of the greatest winter tornado activity tends to be in the Southeast.

More on this winter's outlook

Regional outlooks
What to expect this winter in the U.S.
2015-16 Winter Outlook (video)
February-April 2016 national outlook

Typical U.S. impacts

Historical risk of seasonal extremes
El Niño & U.S. winter weather
Historical perspective on strong El Niños



NOAA Climate.gov science & information for a climate-smart nation

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Climate news, stories, images, & video (ClimateWatch Magazine) | News | How the Climate System Works | Climate Change & Global Warming | Natural Climate Patterns | Climate Impacts | Observing & Predicting | Policy & Planning | Extreme Events

Home » Causes of Climate Change » Cyclical and Natural Changes » What is the El Niño-Southern Oscillation (ENSO) in a nutshell?

What is the El Niño-Southern Oscillation (ENSO) in a nutshell?

Author: Michelle L'Heureux
Monday, May 5, 2014

Print

Go to any agency that is focused on weather or climate forecasting and you'll hear scientists buzzing to one another about "ENSO" (pronounced "en-so"). After glancing at the stereotypical scientist, you might immediately assume "En-so" is a Star Wars character, but you would be

ENSO Blog



New York/New England perspective on ENSO impacts on precipitation and flood potential

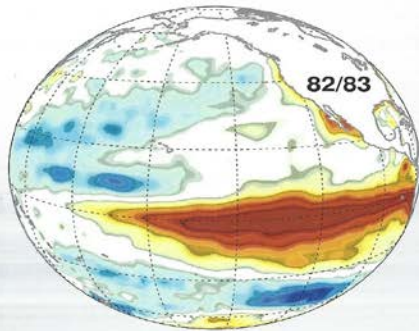
David Vallee, Hydrologist-in-Charge
NWS Northeast River Forecast Center
January 28, 2016



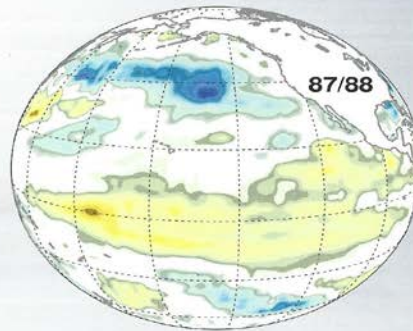
Local research initiative to better define possible sensible impacts on precipitation and flood potential (winter/spring) across the Northeast

- Premise: strongest possible correlations exist with the most significant ENSO events
- Examined the top 5 warmest El Nino events
- Calculated 3 month precipitation totals and departures from normal
- Found several common themes
 - Dry late summer/fall
 - Wet late winter/spring
 - Increased spring flood potential
- *One outlier year: 1965 – but the region was in the heart of its record 3 year drought!

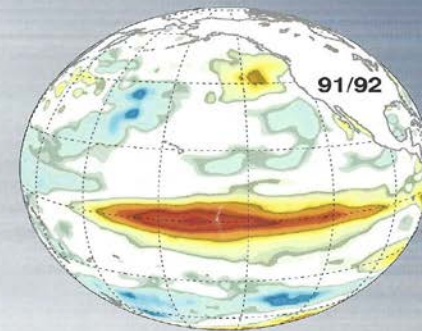
Lots of “Flavors” to ENSO



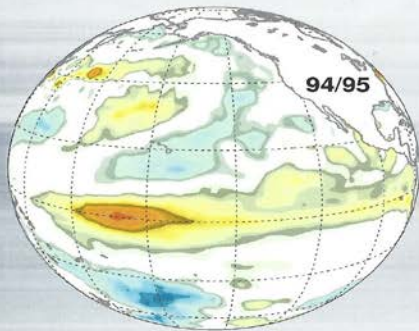
82/83



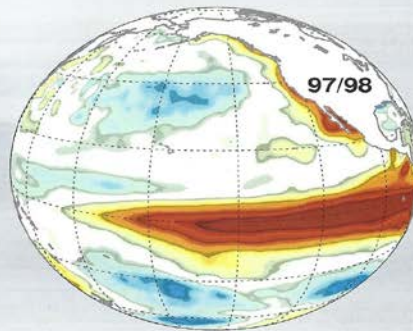
87/88



91/92

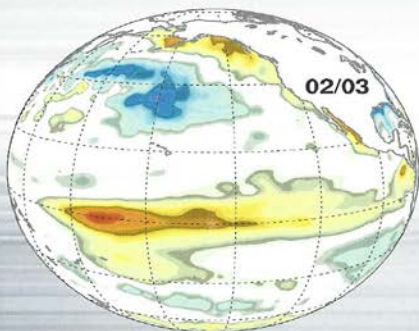


94/95

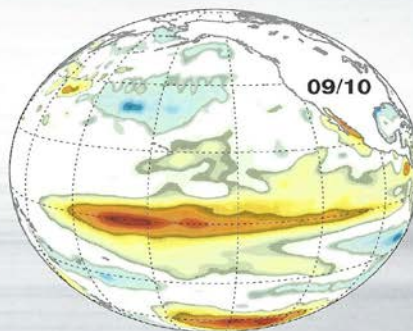


97/98

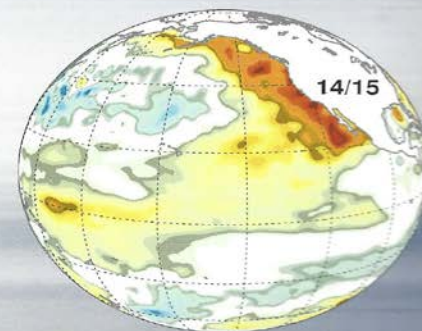
FACES
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02/03



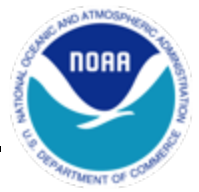
09/10



14/15

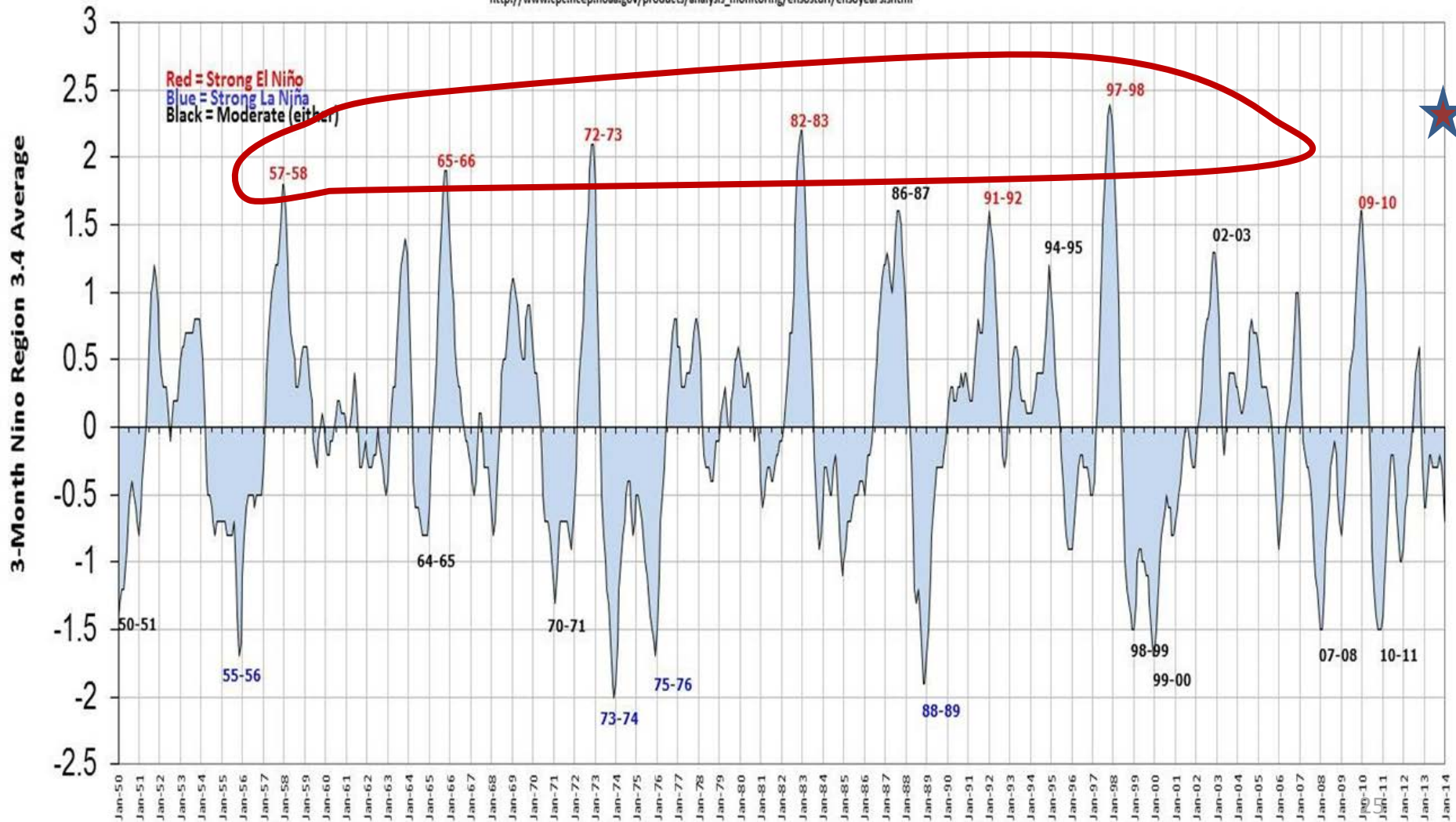
Capotondi, A., et al, 2015: Understanding ENSO Diversity. *Bull. Amer. Meteor. Soc.*, 96, 921-933.

The five most intense events

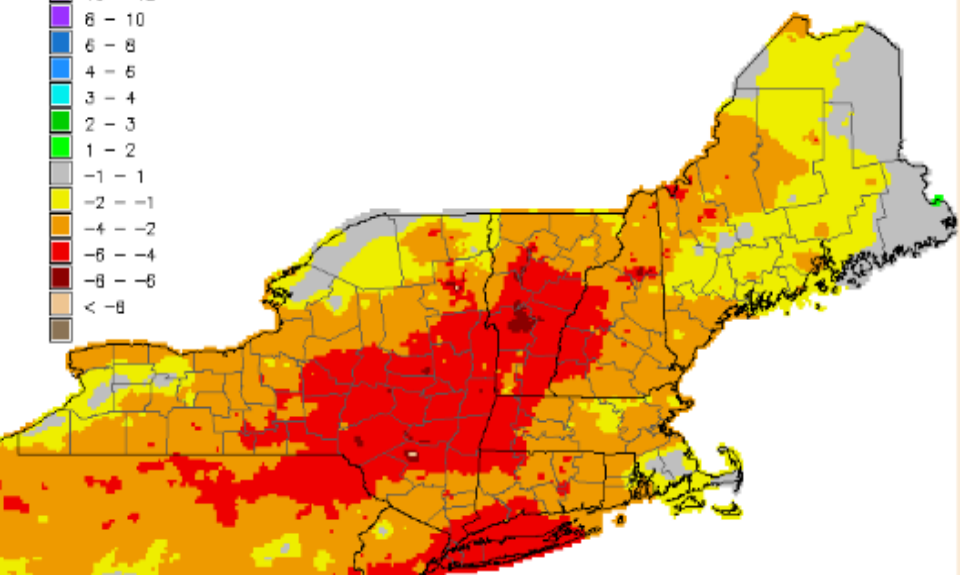


Oceanic Niño Index (ONI)

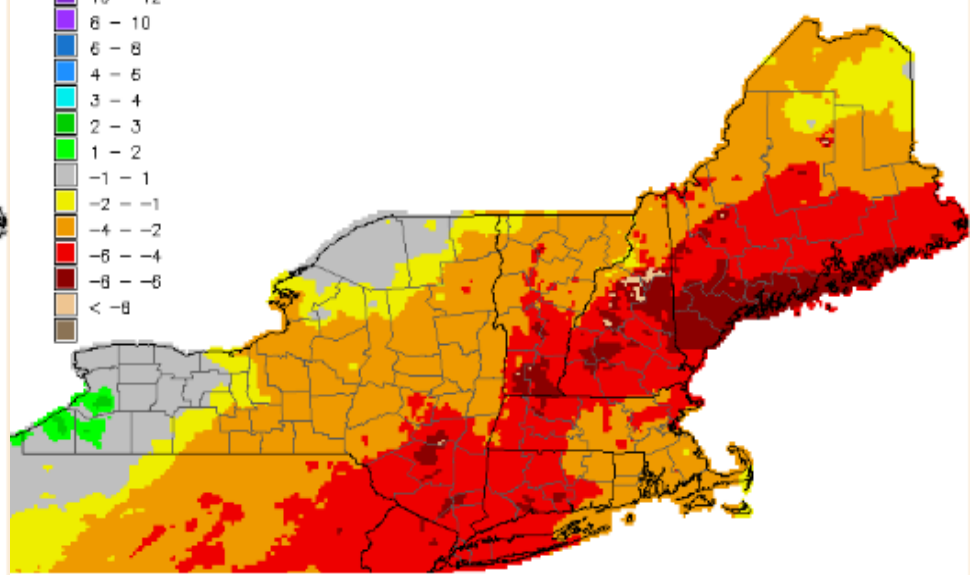
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensoyear.s.shtml



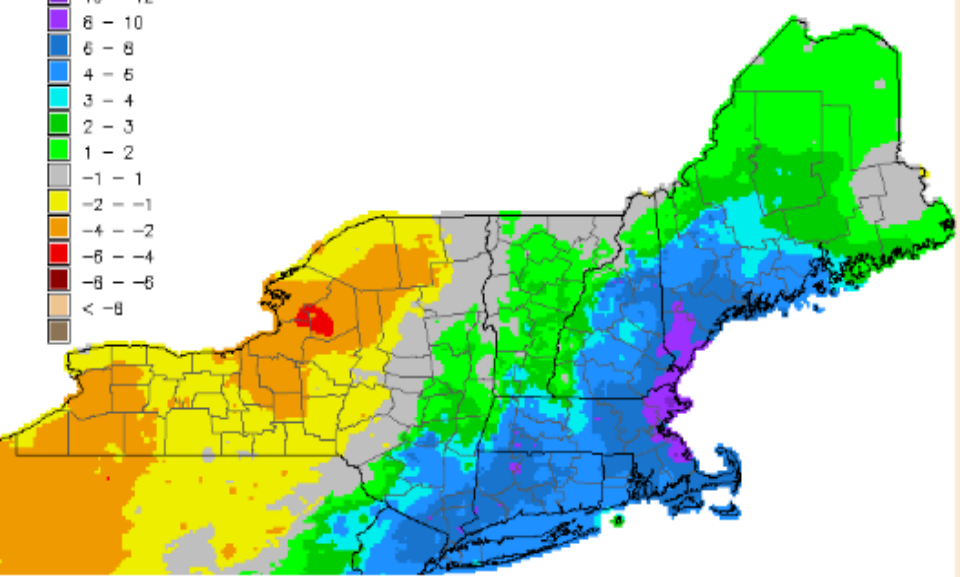
Jul-Aug-Sep 1982 Difference



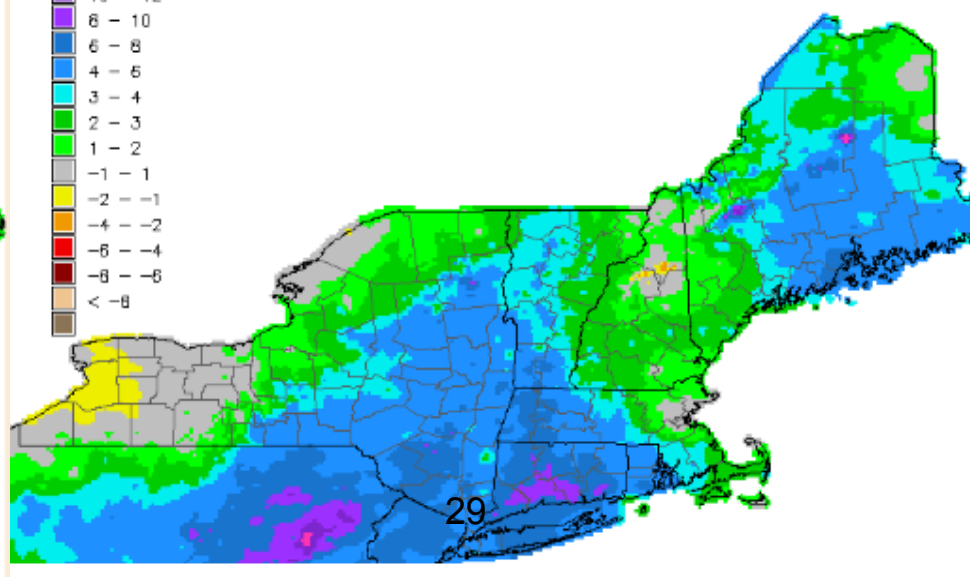
Oct-Nov-Dec 1982 Difference



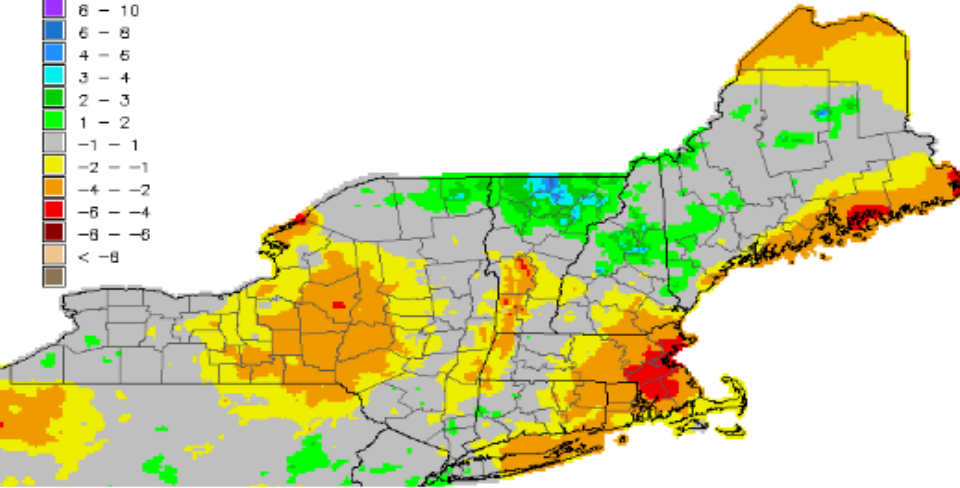
Jan-Feb-Mar 1983 Difference



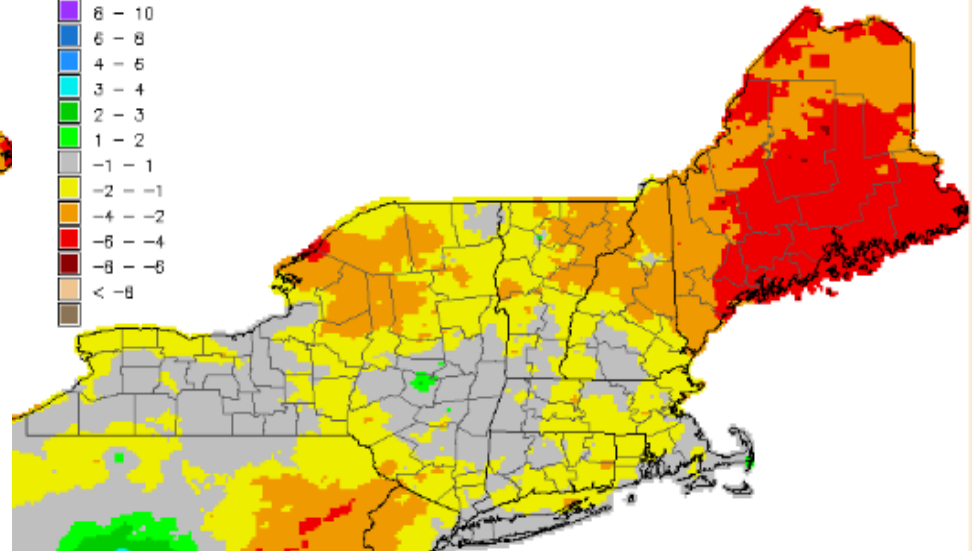
Apr-May-Jun 1983 Difference



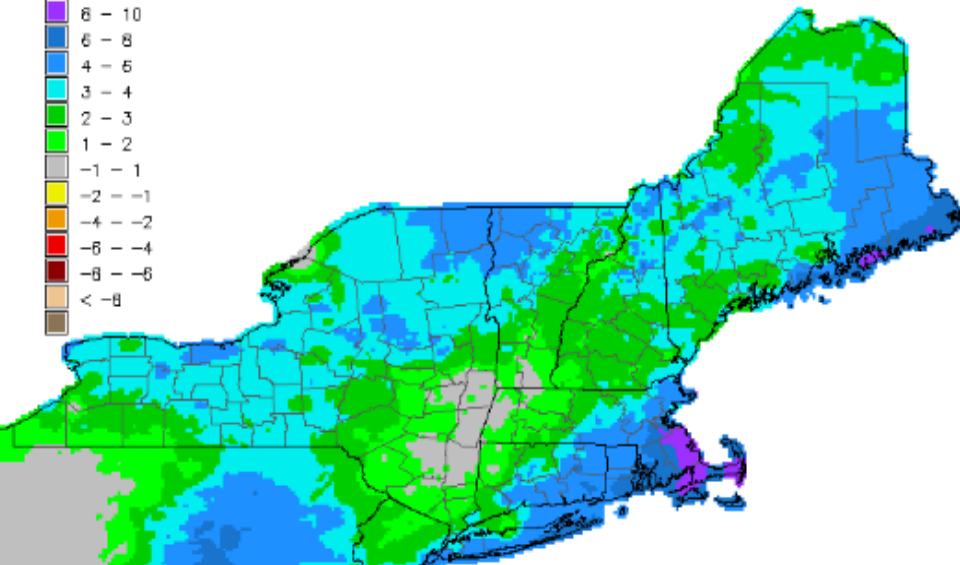
Jul-Aug-Sep 1997 Difference



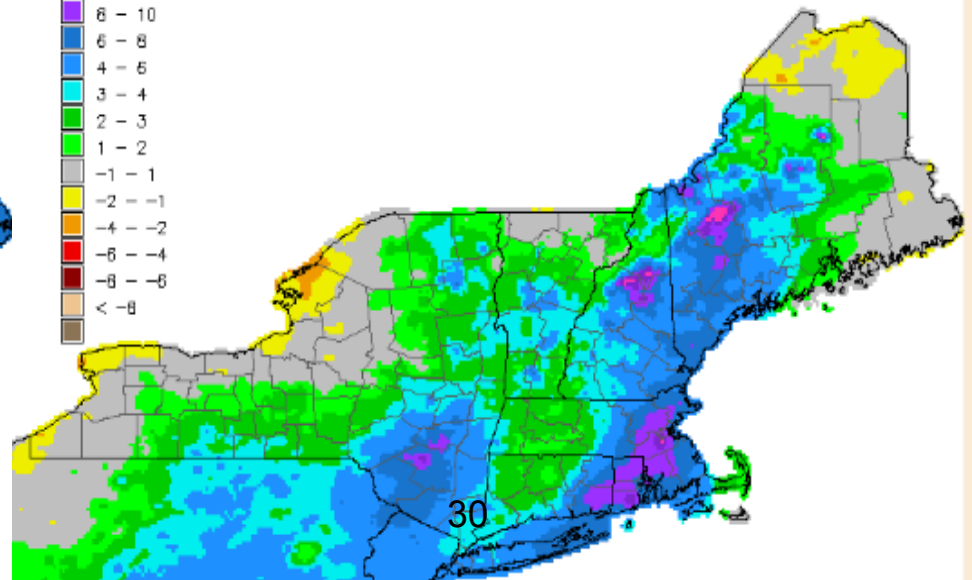
Oct-Nov-Dec 1997 Difference



Jan-Feb-Mar 1998 Difference



Apr-May-Jun 1998 Difference



Flood Potential



ENSO events with ONI ≥ 1.7

Basin	Flood Potential (all categories)	Most active flood season of major ENSOs
Great Lakes	Above	72-73
Hudson-Mohawk	Above	97-98
Champlain	Much above	97-98
Connecticut	Above	97-98
Southern New England	Much above	82-83 and 97-98
Merrimack	Above – lower Neutral – upper	97-98 72-73
Maine	West – Much Above East - Above	97-98 82-83

- **Notable events in the 1.5-1.7 range include 1986-87 and 2009-10**
- **Both 86-87 and 09-10 ENSO were “Modoki Events” – ie: central Pacific-based**
- **Both late winter/early spring experienced much above normal flooding**

Open Discussion



- Do you have an understanding of El Nino, it's origin and impacts?
- Do you know where to find information on El Nino, at national and regional scales?
- What additional information would you find beneficial for the current event?
- For the next event, what tools and resources would you like to see developed?



Thank you

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