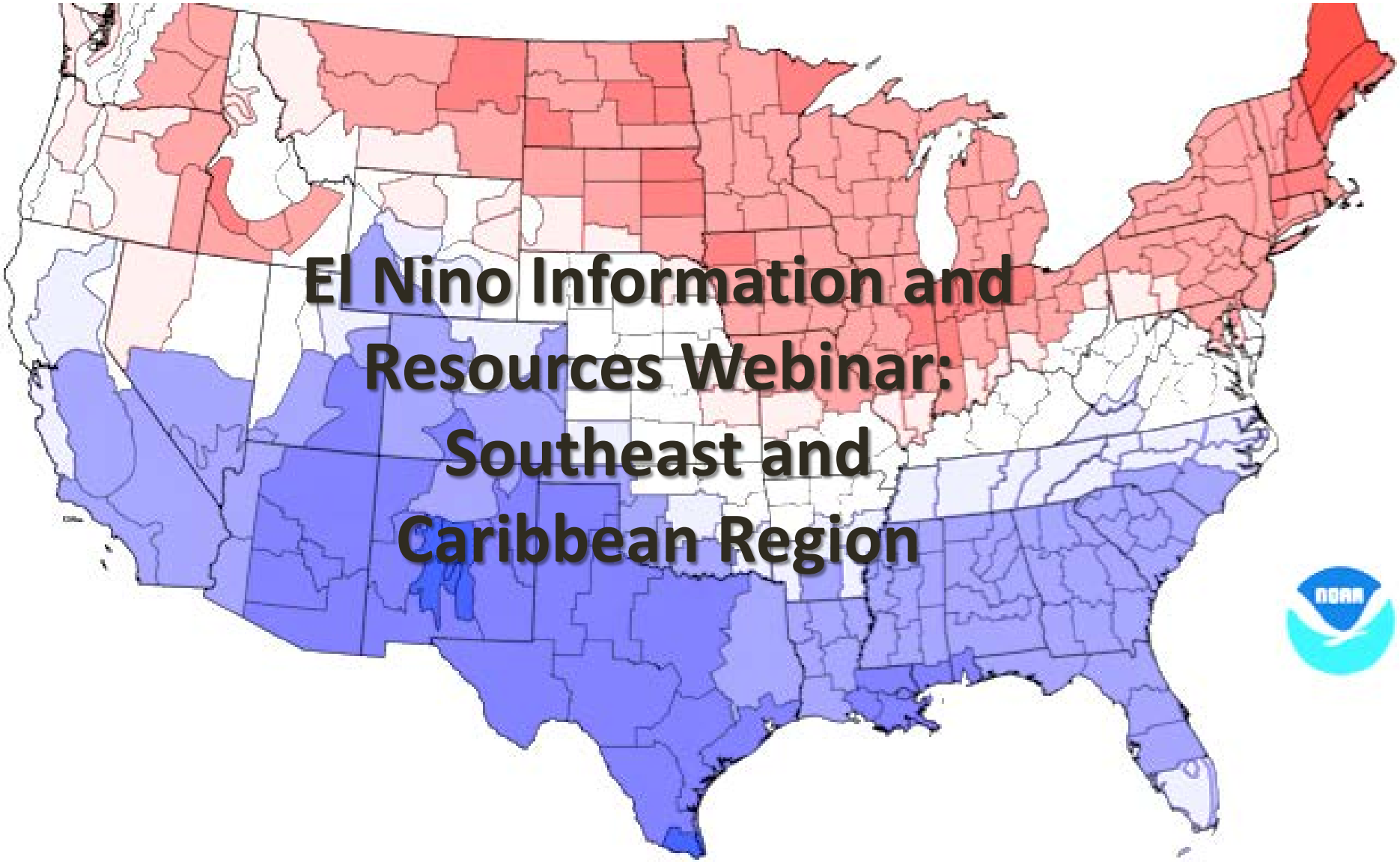
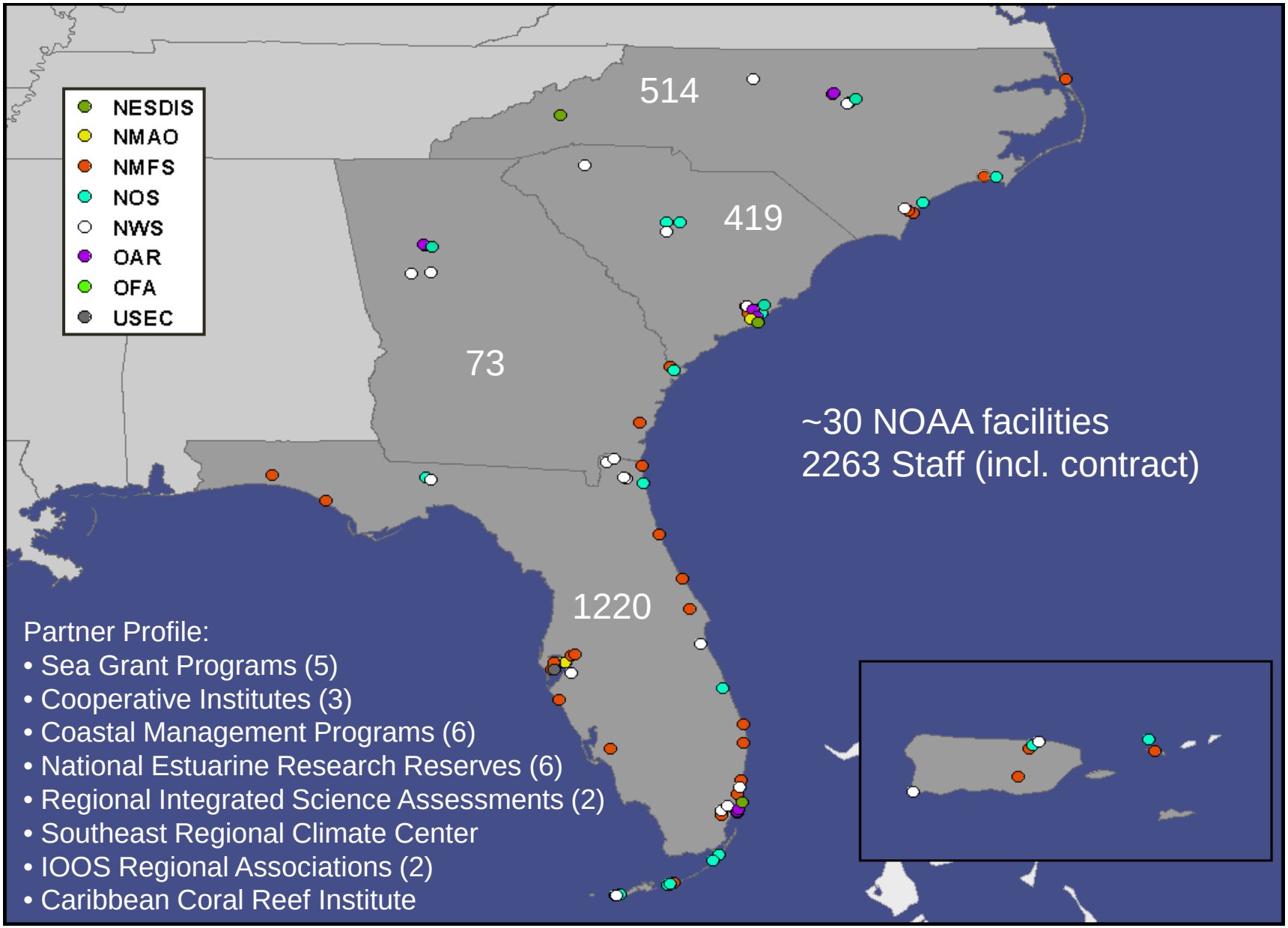


El Nino Information and Resources Webinar: Southeast and Caribbean Region

Hosted by the NOAA Southeast and Caribbean Regional Collaboration Team (SECART)

NOAA Assets


NESDIS
NMAO
NMFS
NOS
NWS
OAR
OFA
USEC
514
419
73
1220
~30 NOAA facilities
2263 Staff (incl. contract)
Partner Profile:
• Sea Grant Programs (5)
• Cooperative Institutes (3)
• Coastal Management Programs (6)
• National Estuarine Research Reserves (6)
• Regional Integrated Science Assessments (2)
• Southeast Regional Climate Center
• IOOS Regional Associations (2)
• Caribbean Coral Reef Institute

Outline

Welcome and Introduction
- Rich Bandy, Team Lead, NOAA Southeast and Caribbean Regional Collaboration Team

An Overview of the Recent Weather and Climate across the Southeast and the Caribbean
- Chip Konrad, Ph.D., Director, Southeast Regional Climate Center

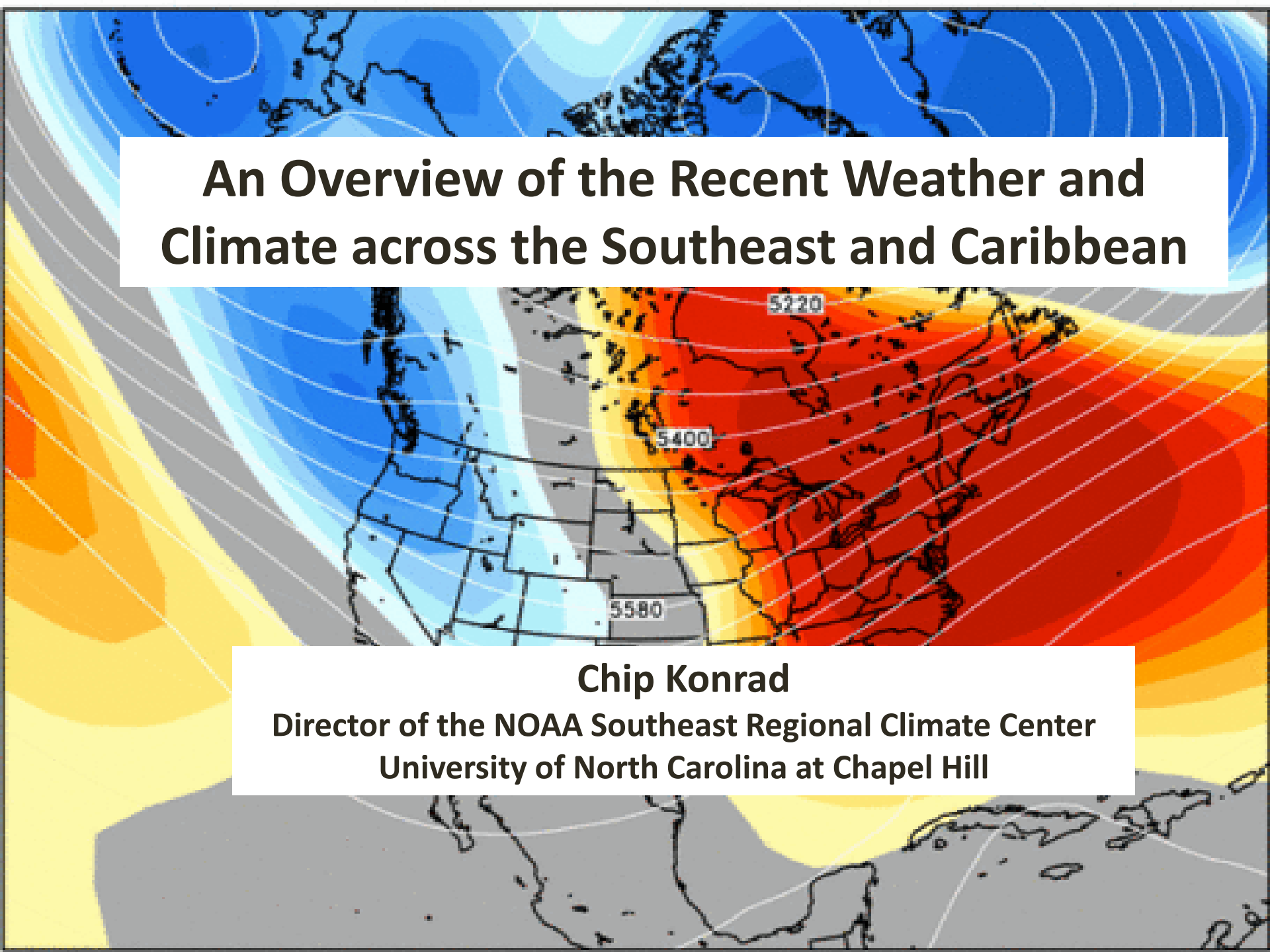
NOAA El Nino Resources for the Southeast and Caribbean Region
- David Brown, Ph.D., Regional Climate Services Director, NOAA Southern Region
- Ellen Mecray, Regional Climate Services Director, NOAA Eastern Region

SC State Climatology Office Response to El Niño Southern Oscillation Cold and Warm Event Cycles
- Hope Mizzell, Ph.D., South Carolina State Climatologist

WFO San Juan Climate Services: Role in the Caribbean Climate Outlook Forum and Decision Support Service during the current Caribbean Drought
- Odalys Martinez, Meteorologist, San Juan Weather Forecast Office, National Weather Service, NOAA

Understanding Coral Reef Resilience to El Nino Related Bleaching
- Derek Manzello, Ph.D., NOAA Atlantic Oceanographic and Meteorological Laboratory

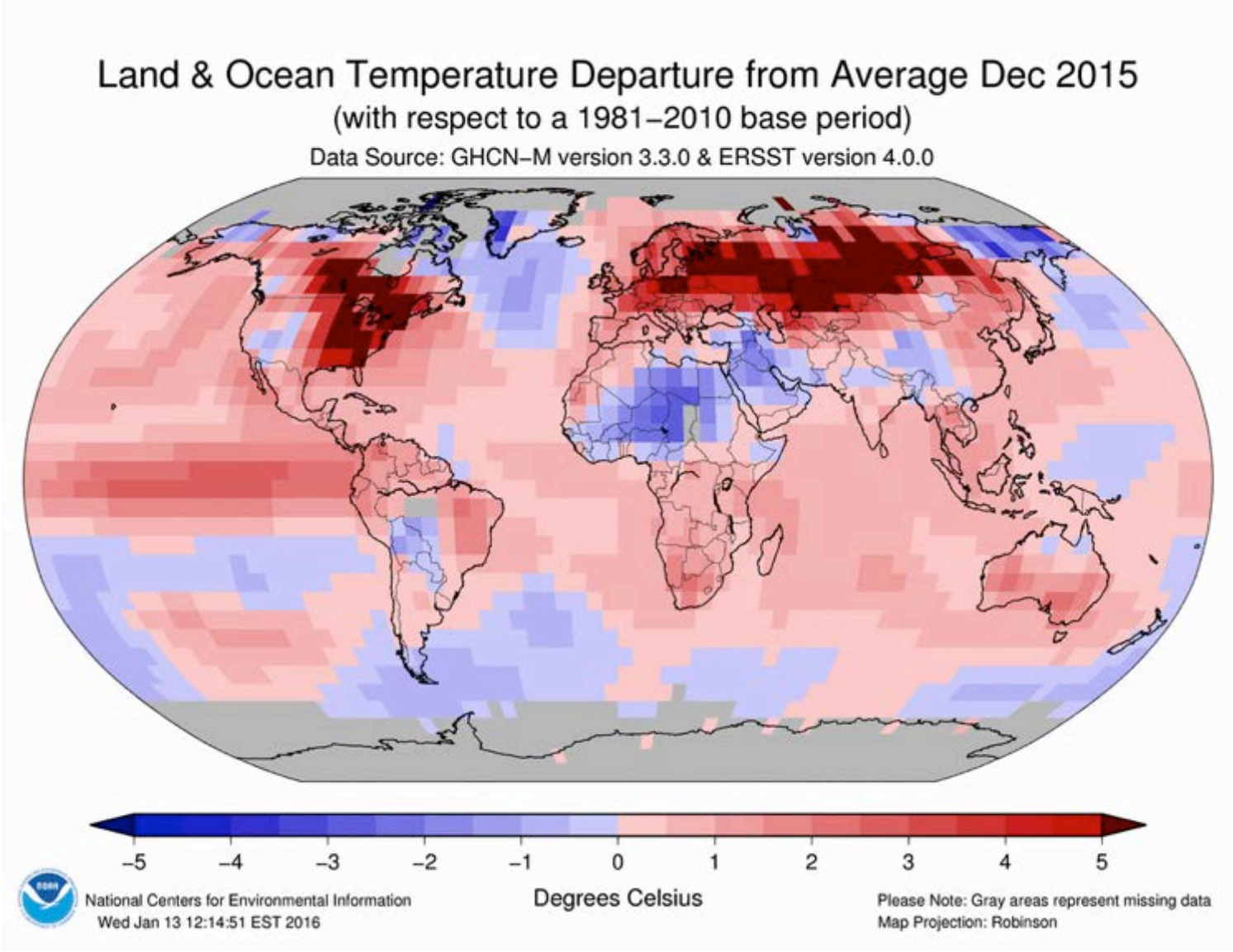
An Overview of the Recent Weather and Climate across the Southeast and Caribbean



Chip Konrad

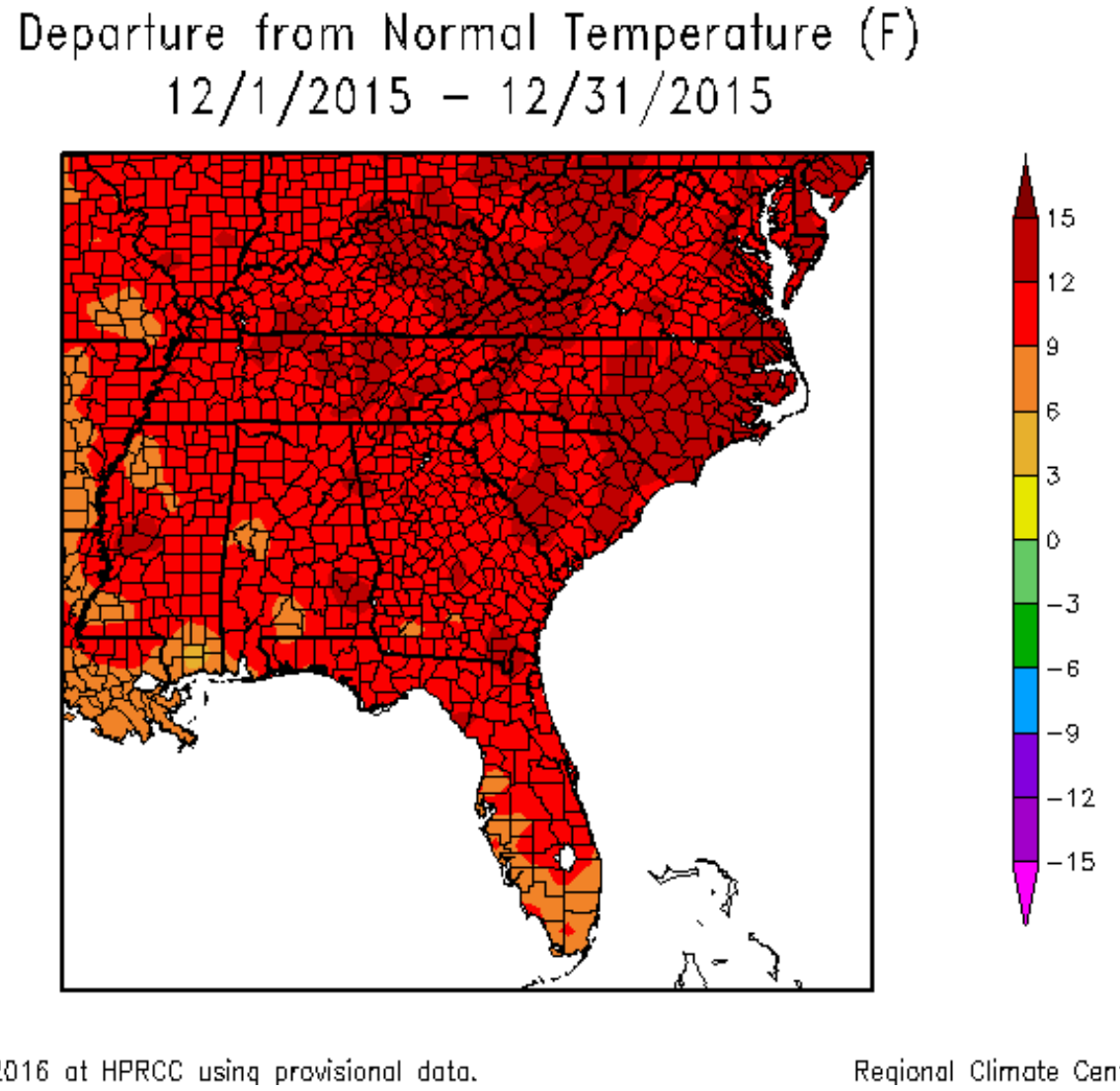
Director of the NOAA Southeast Regional Climate Center

University of North Carolina at Chapel Hill



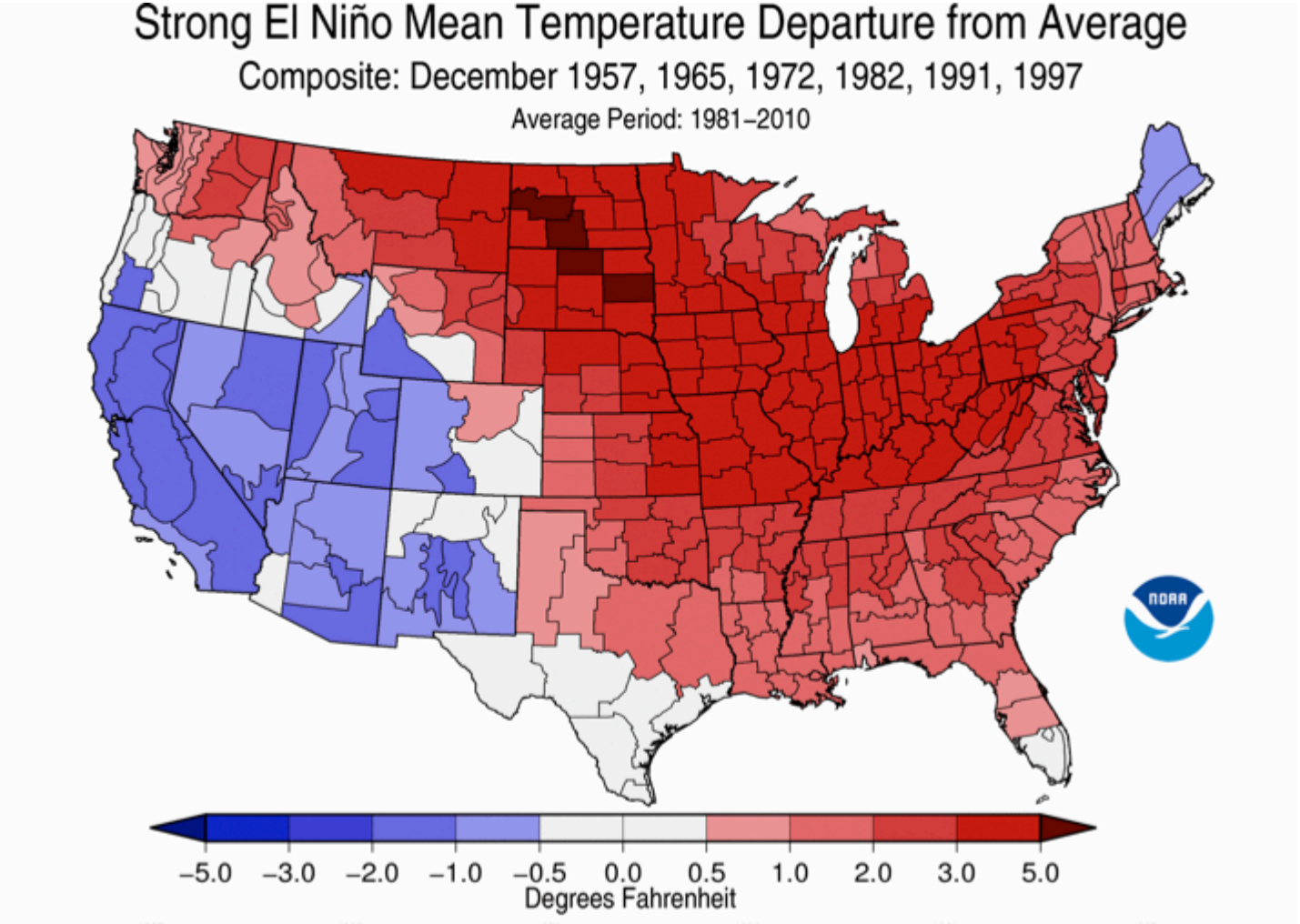
https://www.ncdc.noaa.gov/sotc/service/global/map-blended-mntp/201512.gif

December 2015 temperature departure from normal



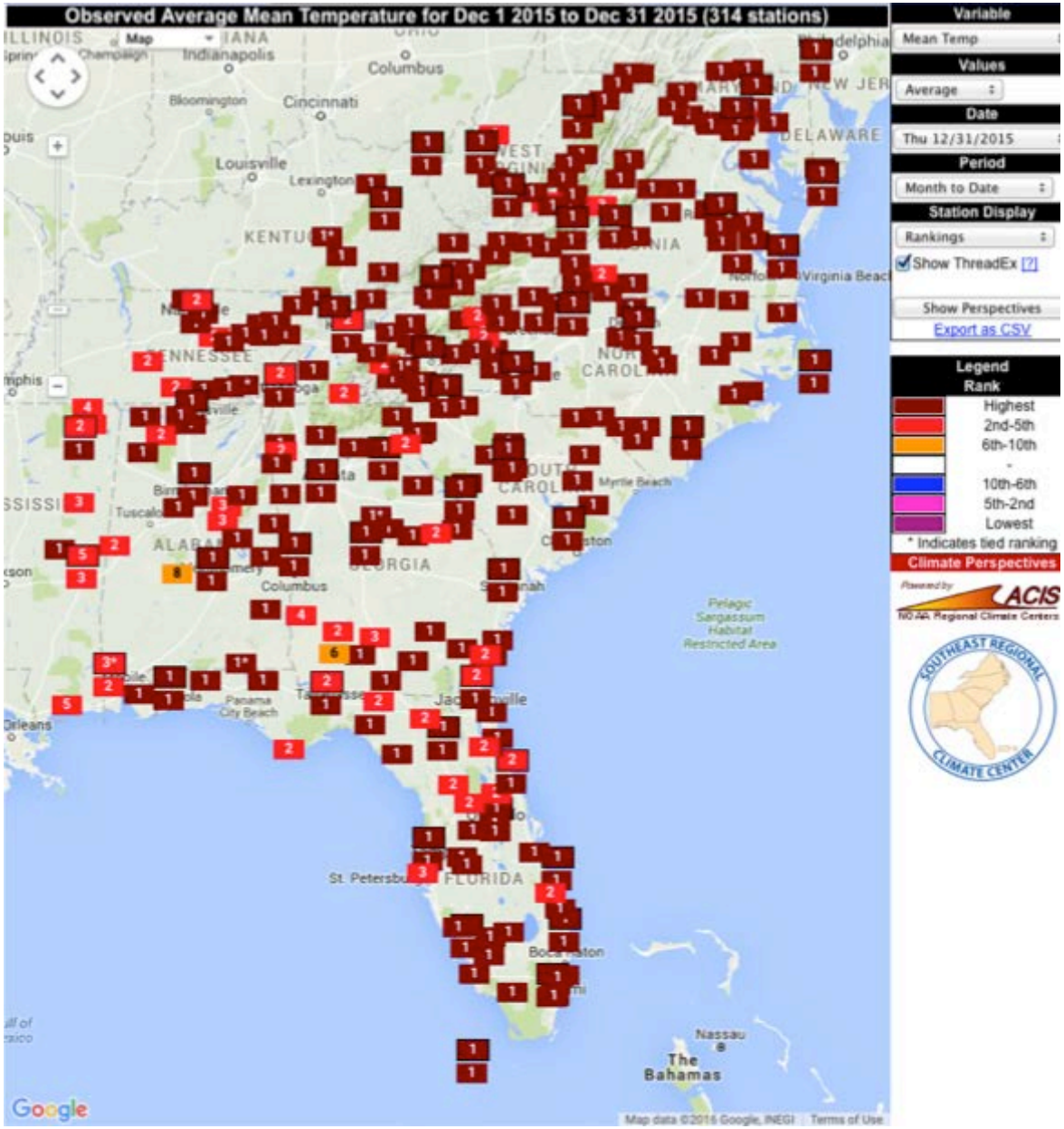
http://www.sercc.com/climateinfo/temp_maps

Average December temperature departure during a strong El Nino



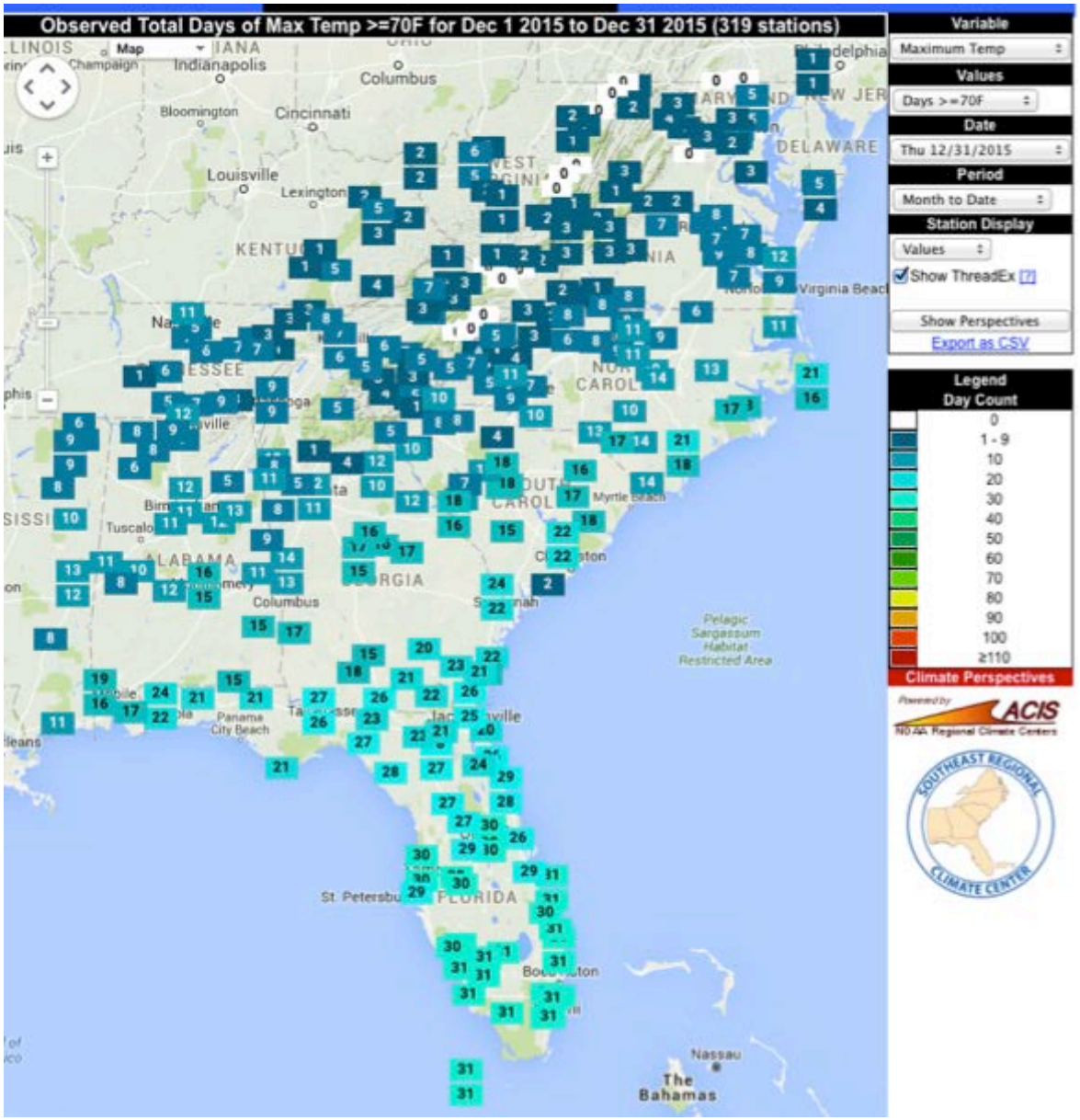
http://www.ncdc.noaa.gov/monitoring-references/dyk/elnino-2015-2016

December 2015 temperature ranks



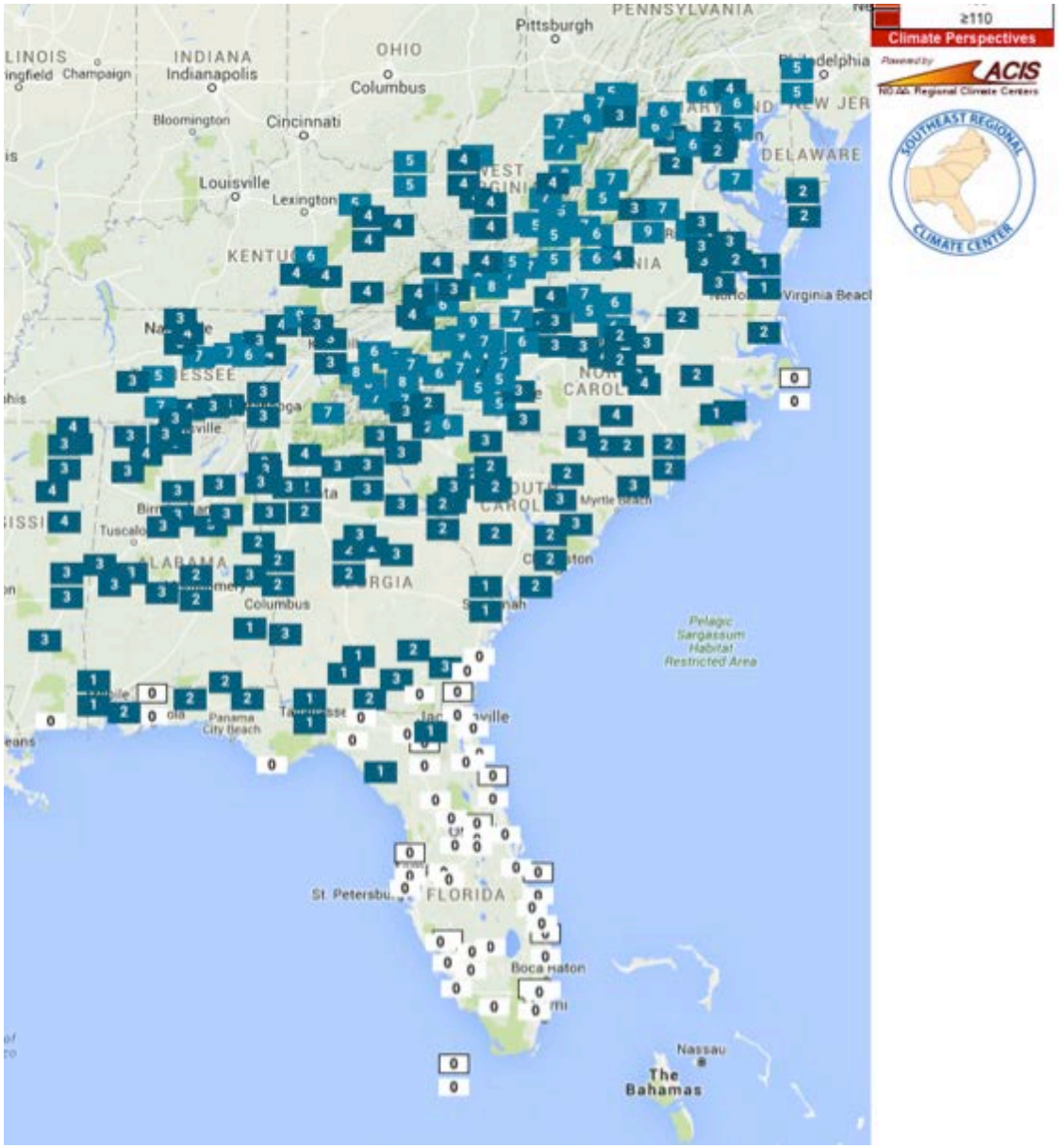
http://www.sercc.com/perspectives

December: Daily Frequency of T>=70 F



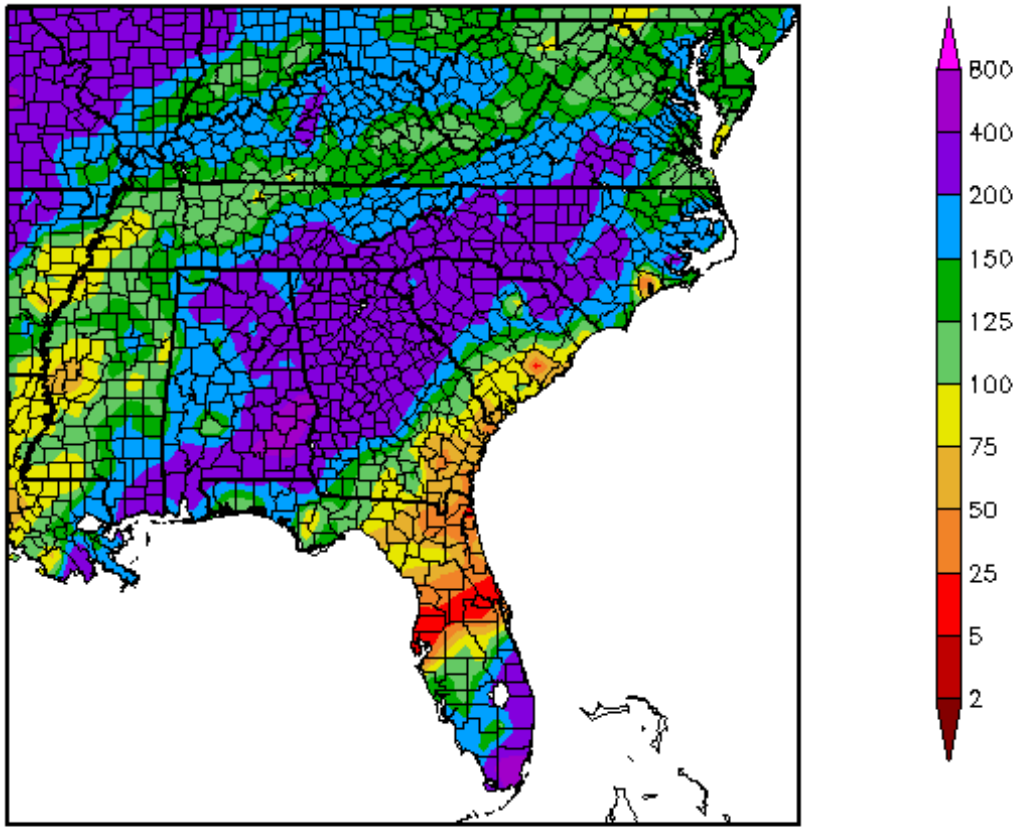
http://www.sercc.com/perspectives

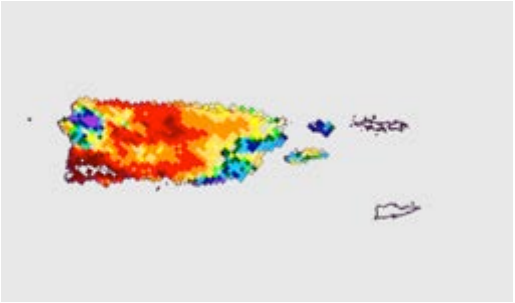
December: Daily Frequency of Tmin <=32 F



http://www.sercc.com/perspectives

December 2015 precipitation (percent of normal)





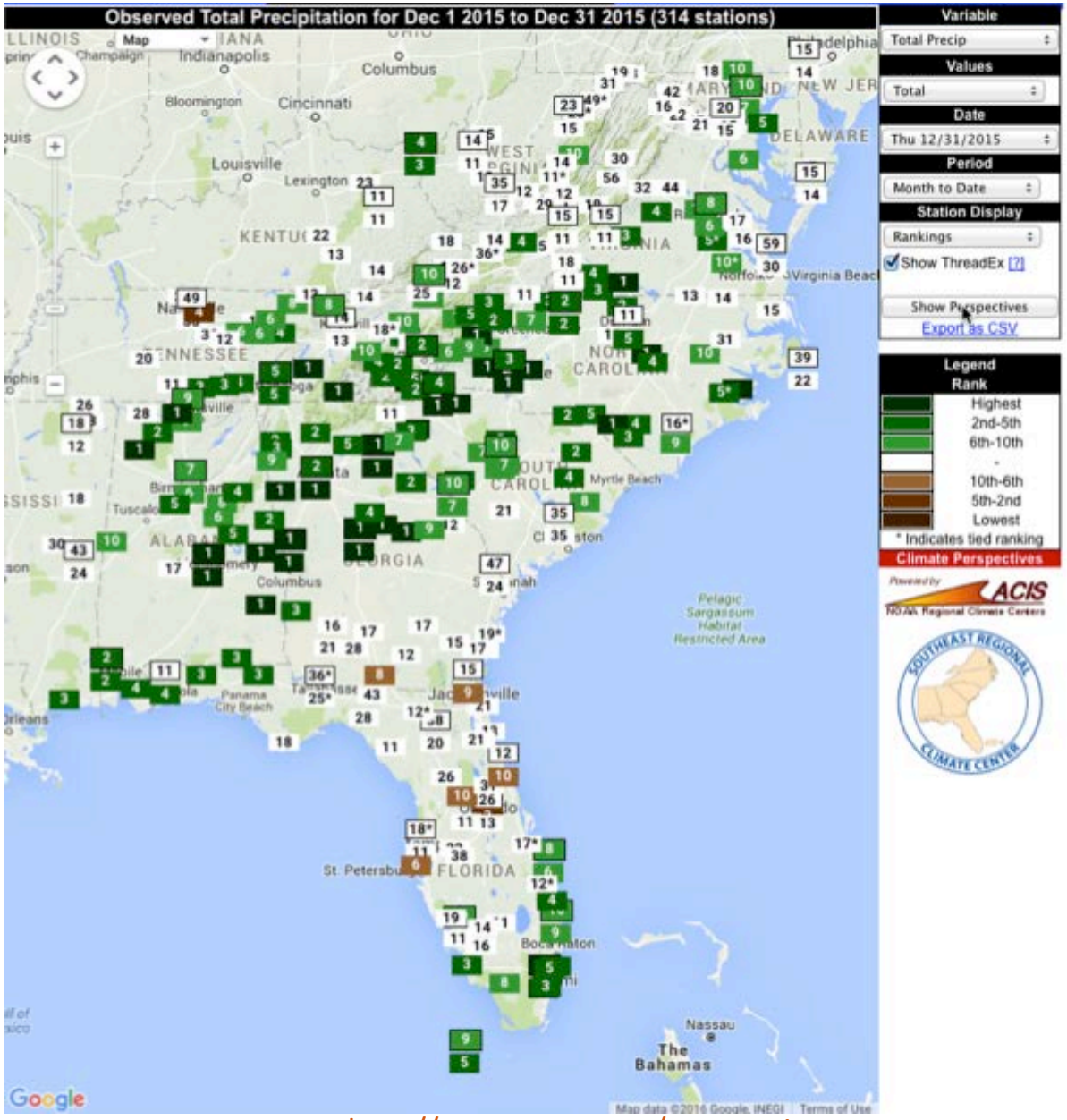
Generated 1/11/2016 at HPRCC using provisional data.

Regional Climate Centers

http://water.weather.gov/precip/

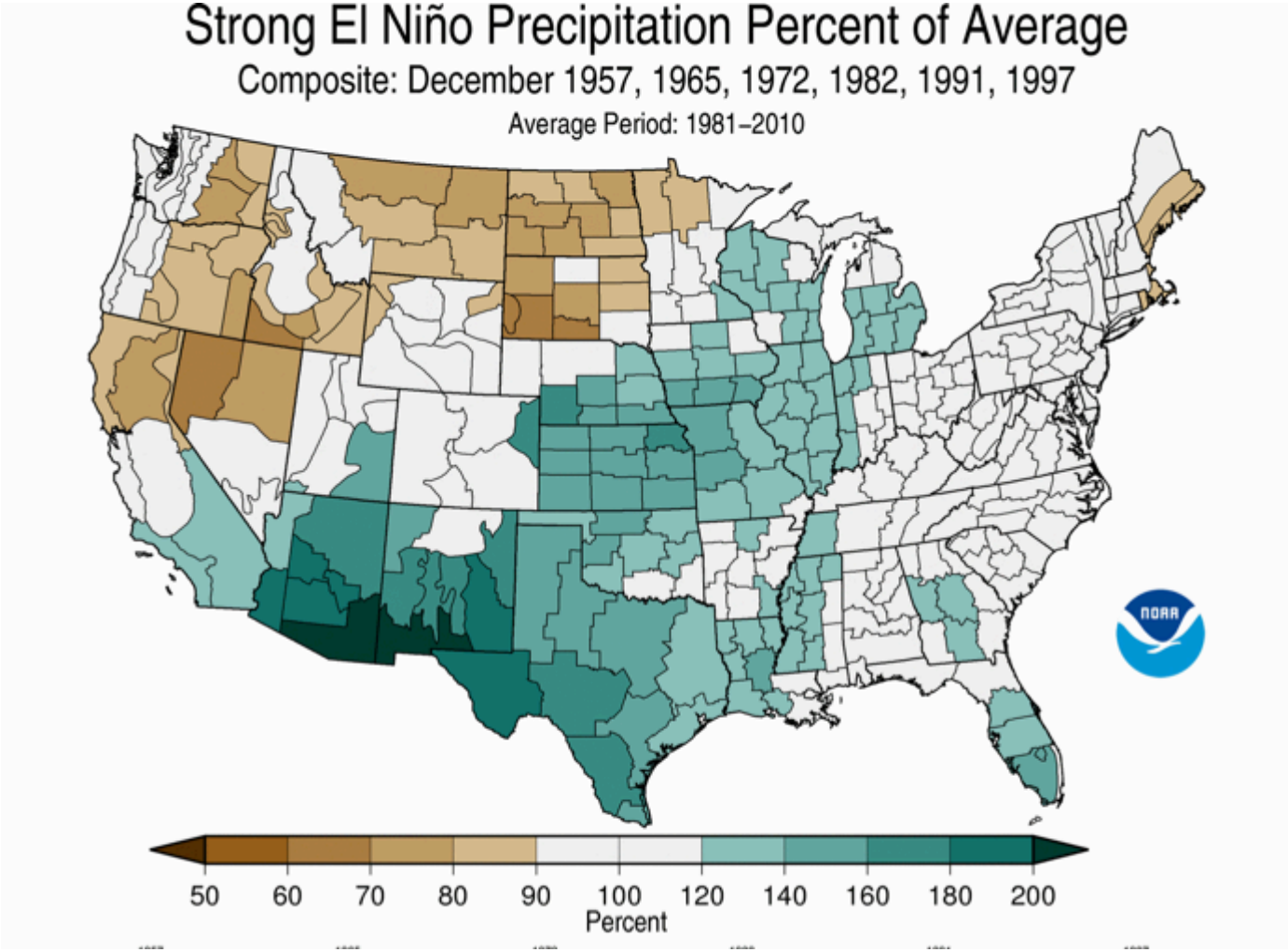
http://www.hprcc.unl.edu/maps.php?map=ACISClimateMaps

December 2015 precipitation ranks



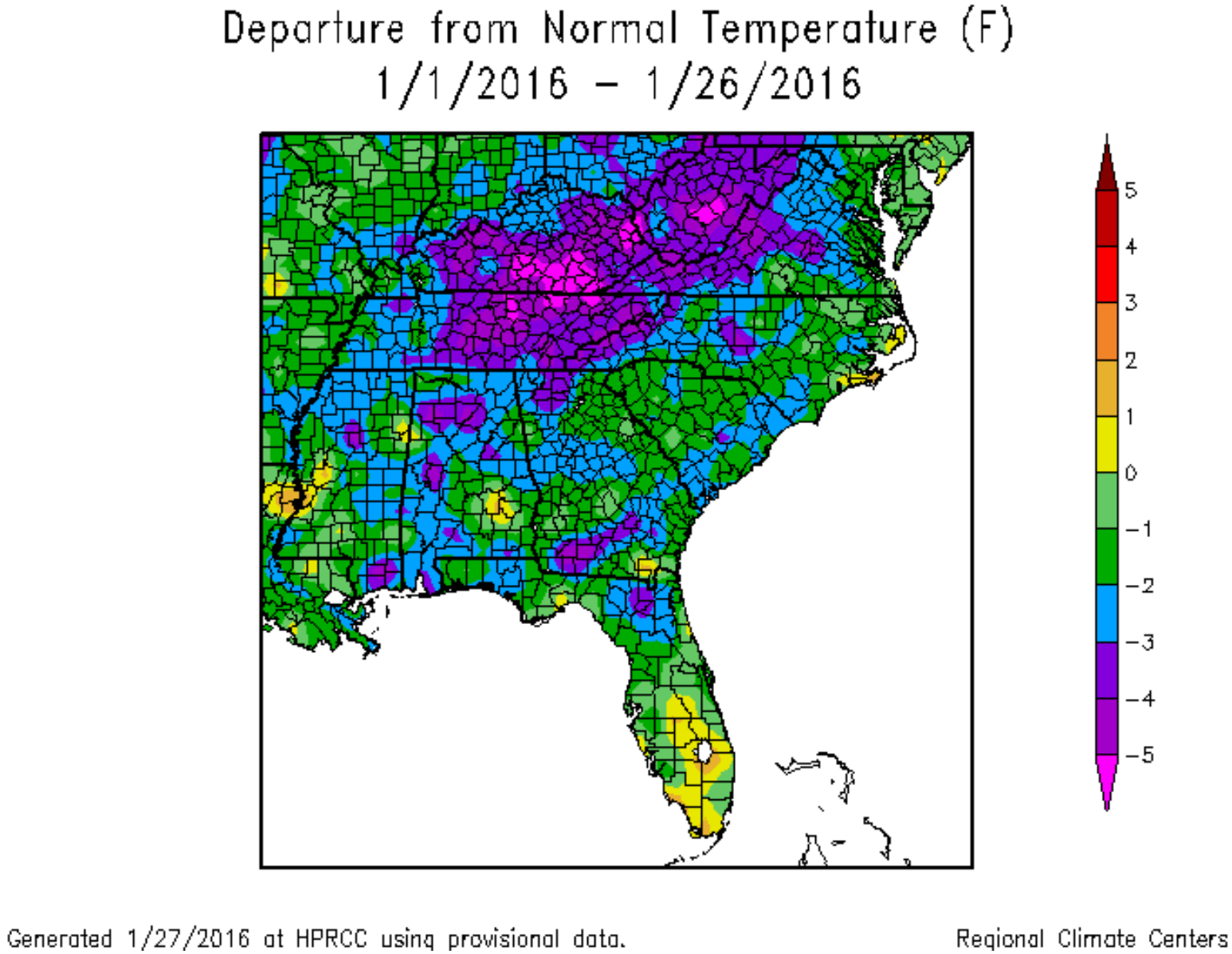
http://www.sercc.com/perspectives

Percent of normal December precipitation during a strong El Nino



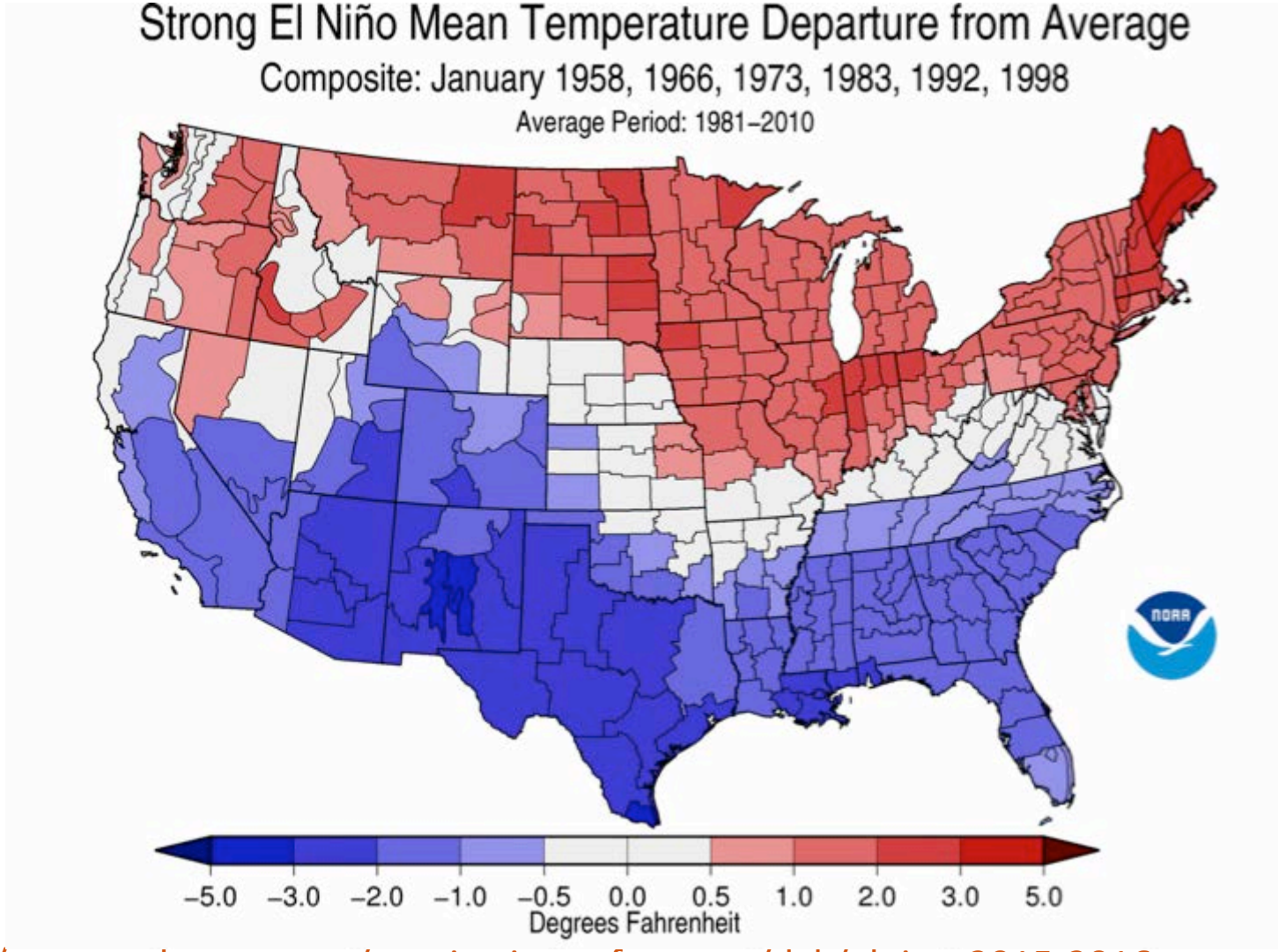
http://www.ncdc.noaa.gov/monitoring-references/dyk/elnino-2015-2016

January 2016 month to date temperature departure from normal



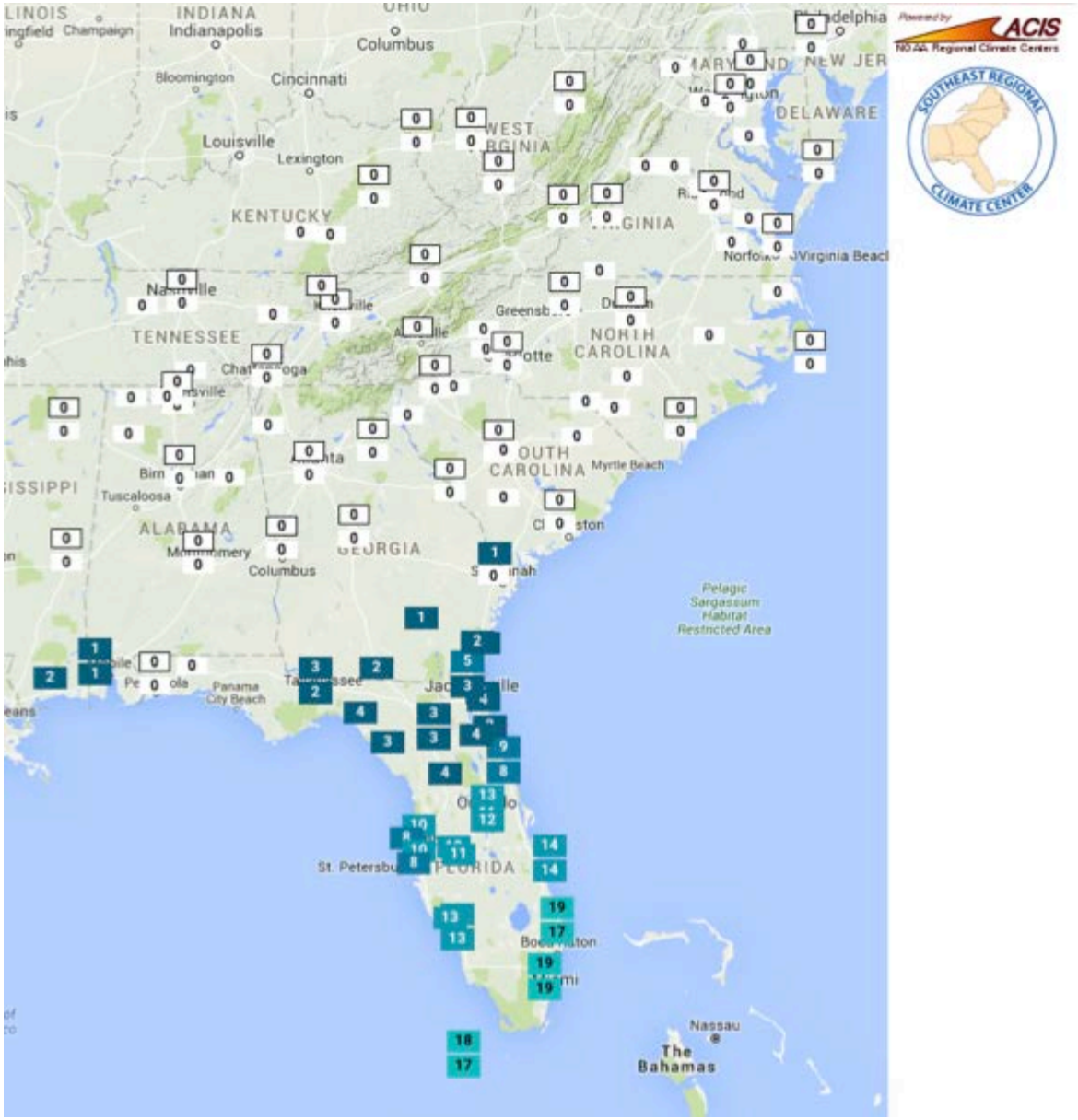
http://www.hprcc.unl.edu/maps.php?map=ACISClimateMaps

Average January temperature departure from average during a strong El Nino



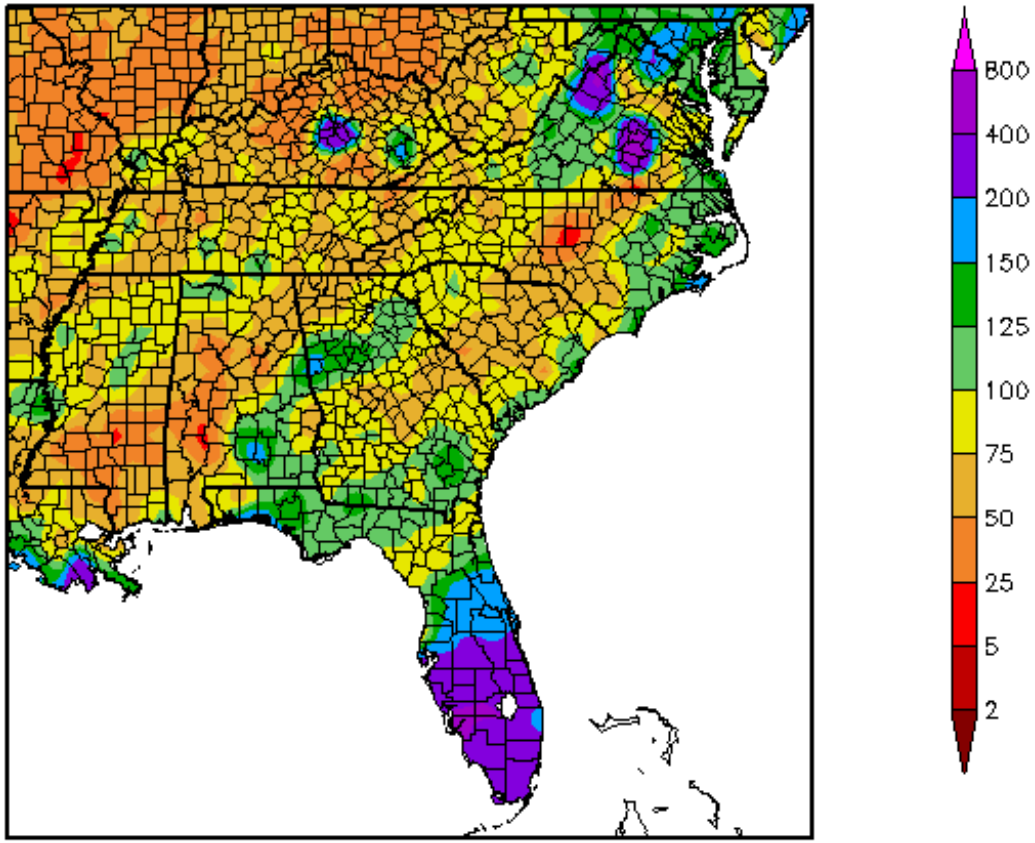
http://www.ncdc.noaa.gov/monitoring-references/dyk/elnino-2015-2016

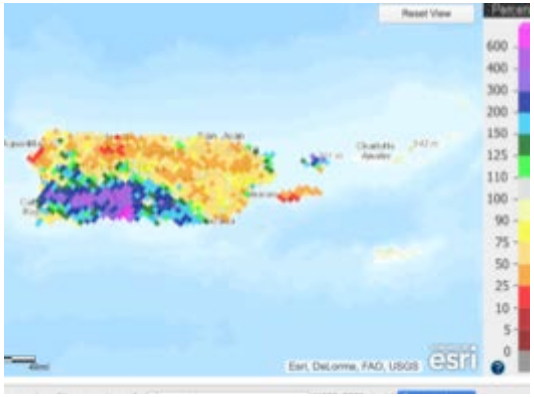
January month to day: Daily Frequency of T>=70 F



http://www.sercc.com/perspectives

January 2016 month to date precipitation (Percent of average)



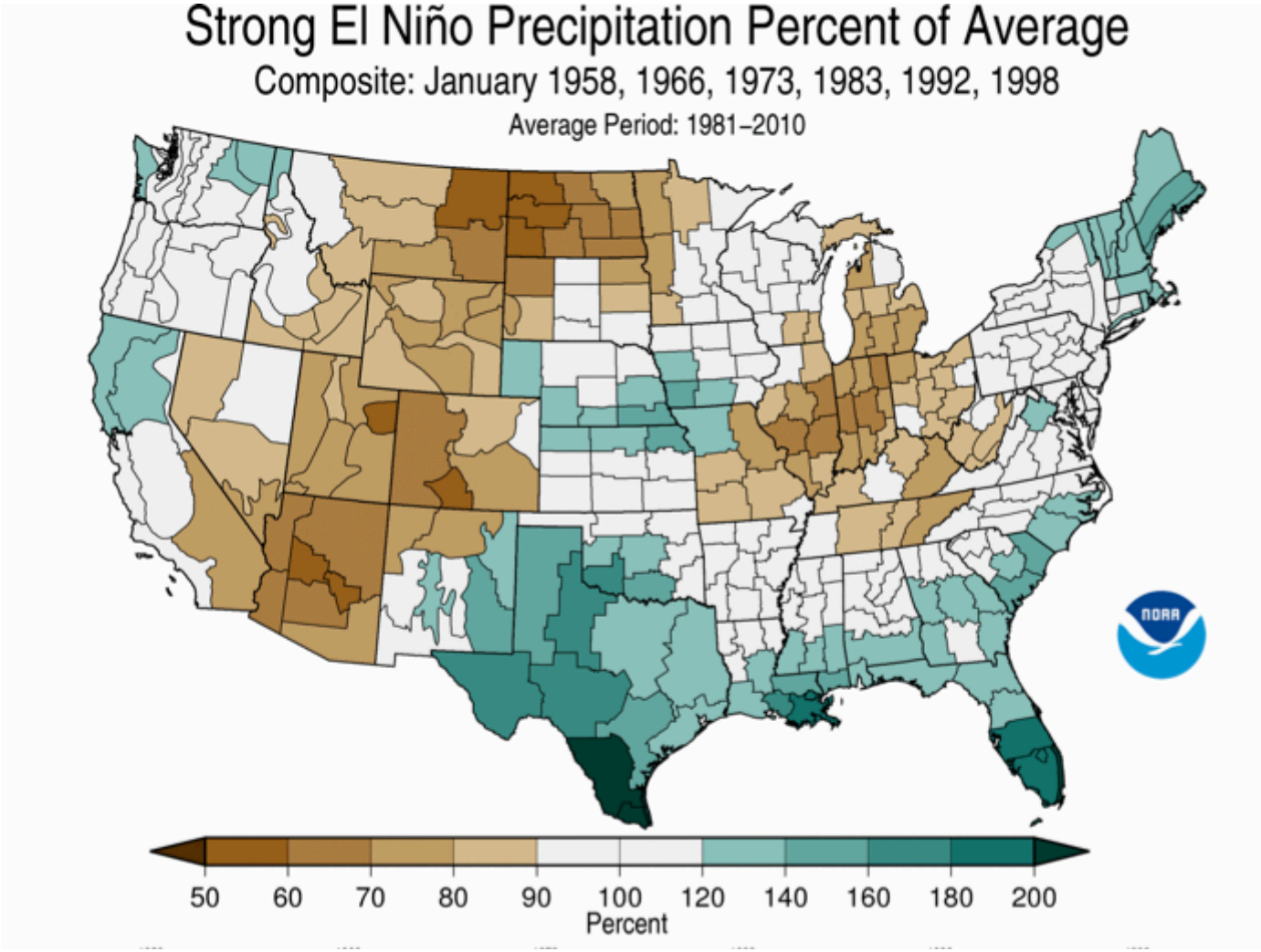


http://water.weather.gov/precip/

Generated 1/27/2016 at HPRCC using provisional data. Regional Climate Centers

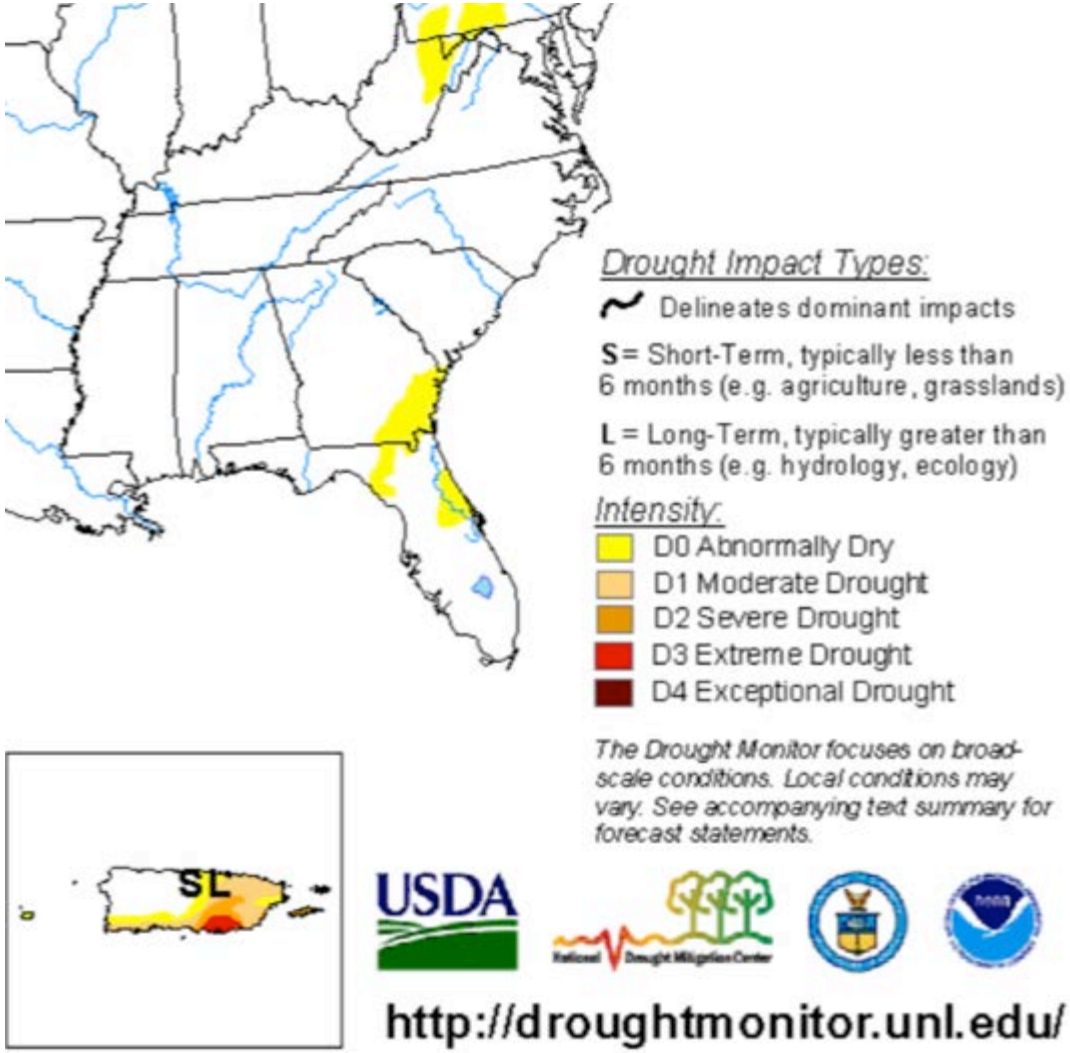
http://www.hprcc.unl.edu/maps.php?map=ACISClimateMaps

Percent of normal January precipitation during a strong El Nino



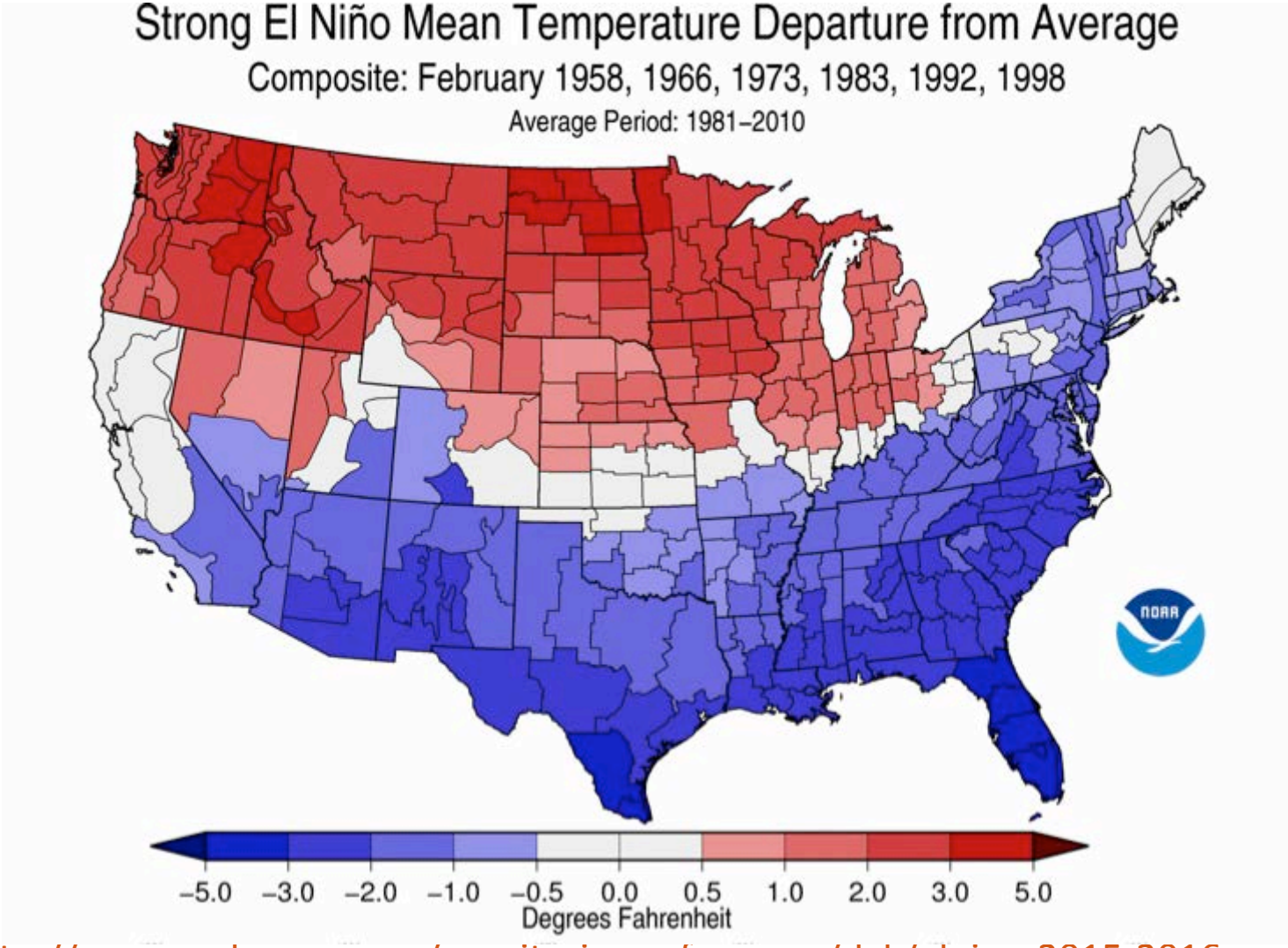
http://www.ncdc.noaa.gov/monitoring-references/dyk/elnino-2015-2016

Drought Conditions – US Drought Monitor



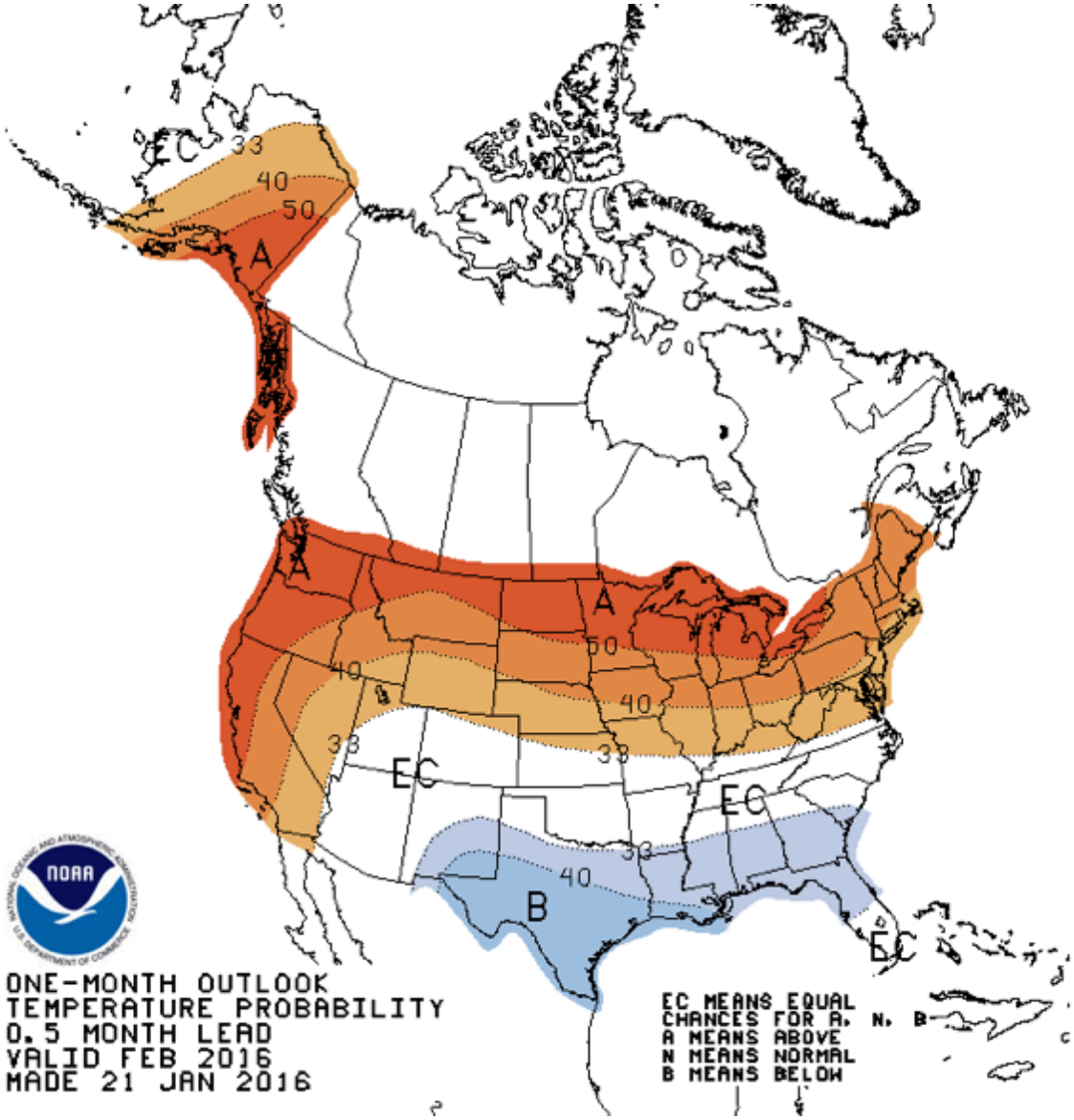
How about February?

Average February temperature during a strong El Nino



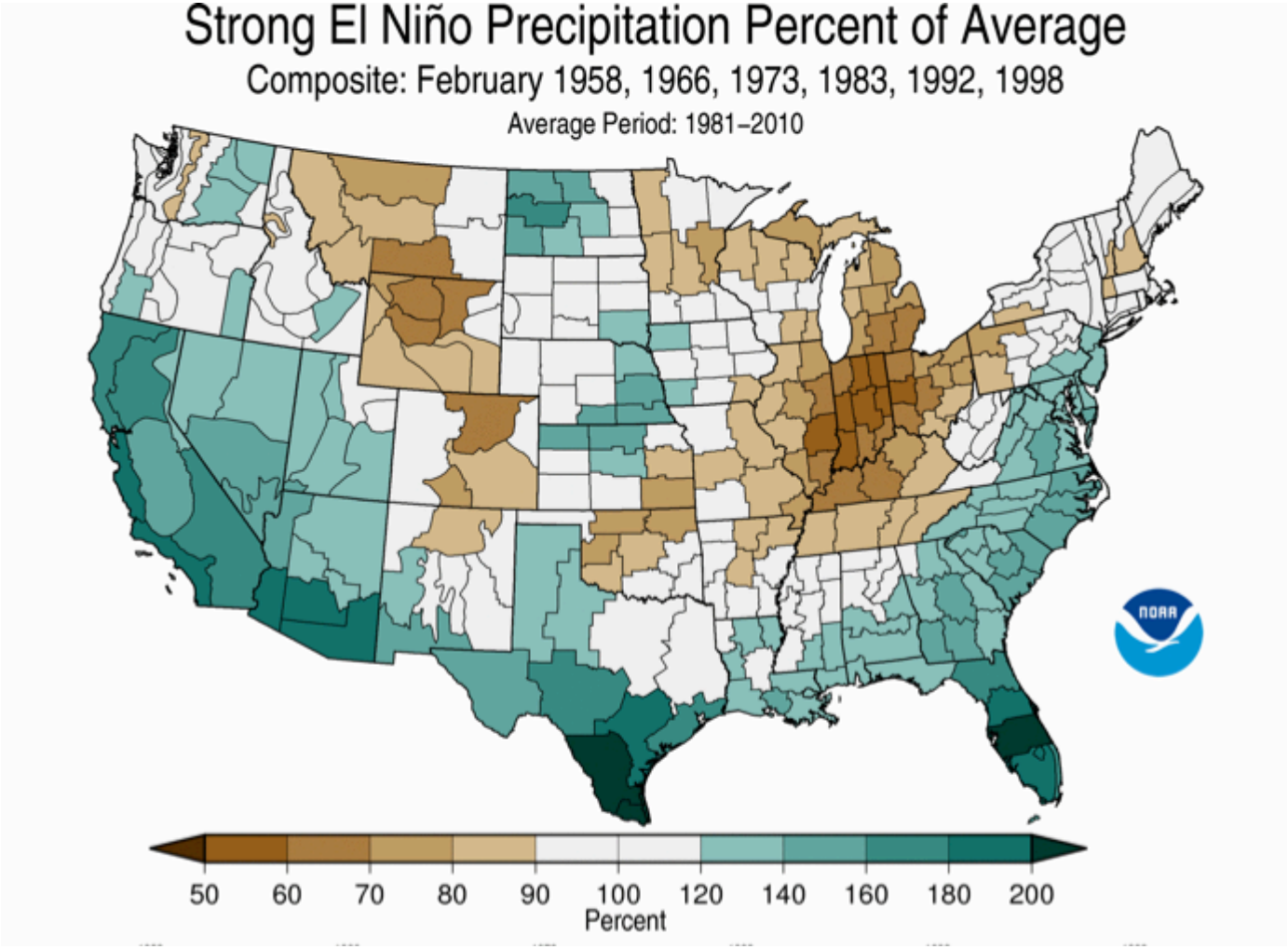
http://www.ncdc.noaa.gov/monitoring-references/dyk/elnino-2015-2016

NOAA Climate Prediction Center Monthly Temperature Outlook for February



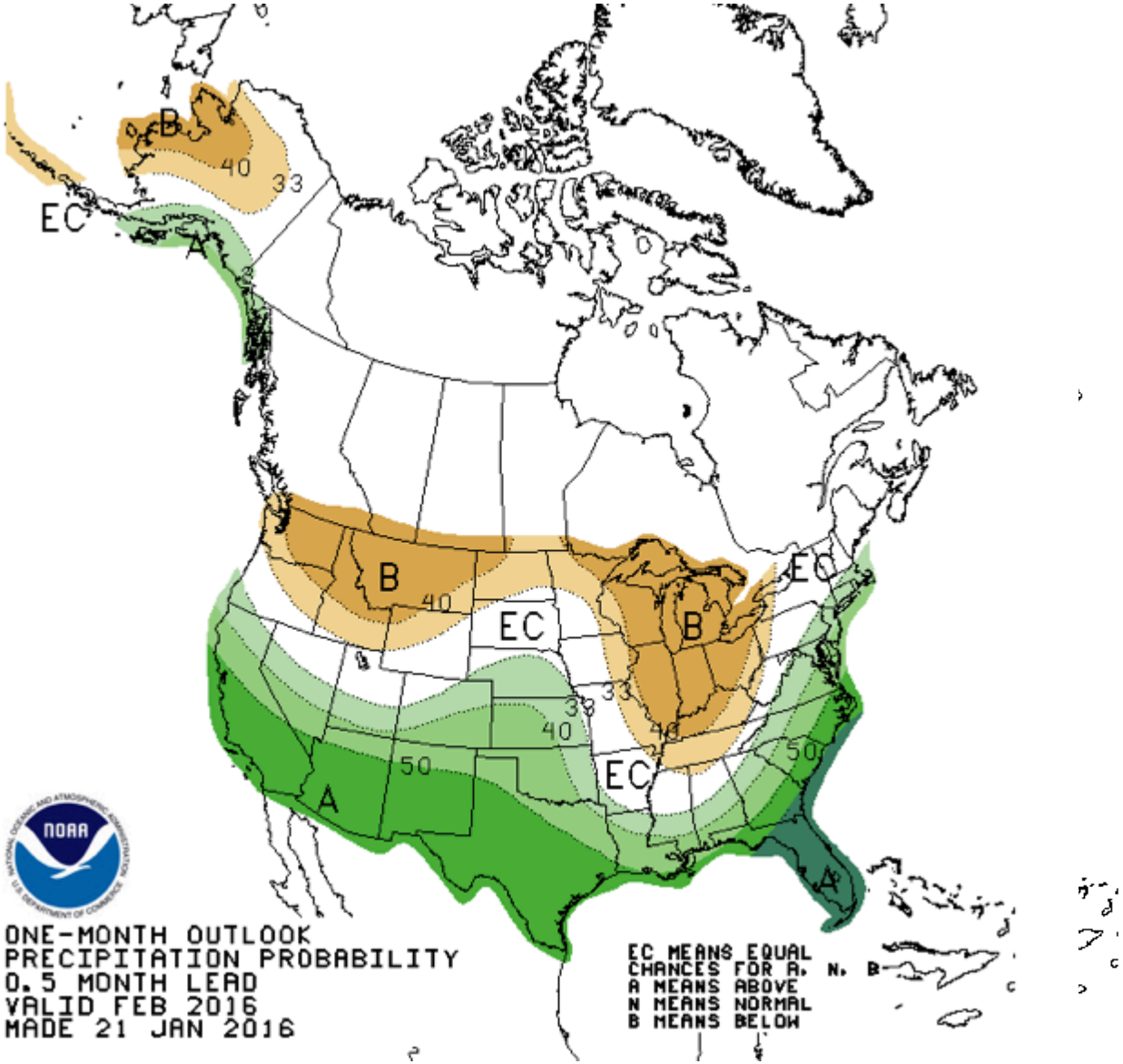
http://www.cpc.ncep.noaa.gov/products/predictions/30day/

Average February precipitation during a strong El Nino



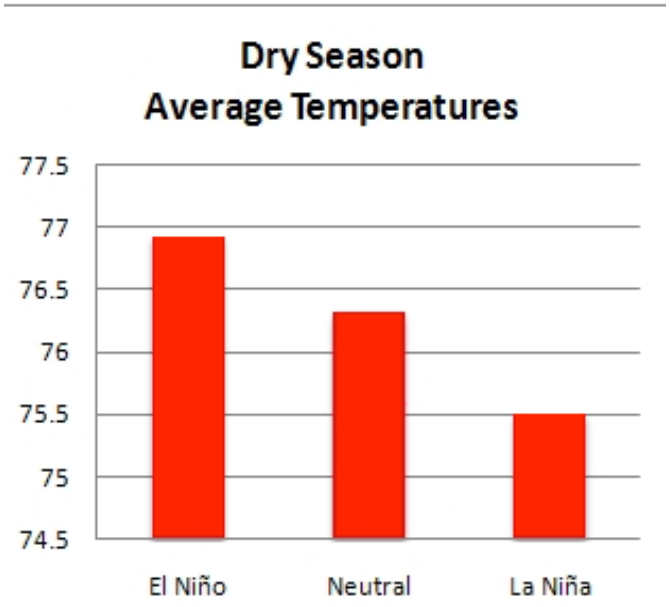
http://www.ncdc.noaa.gov/monitoring-references/dyk/elnino-2015-2016

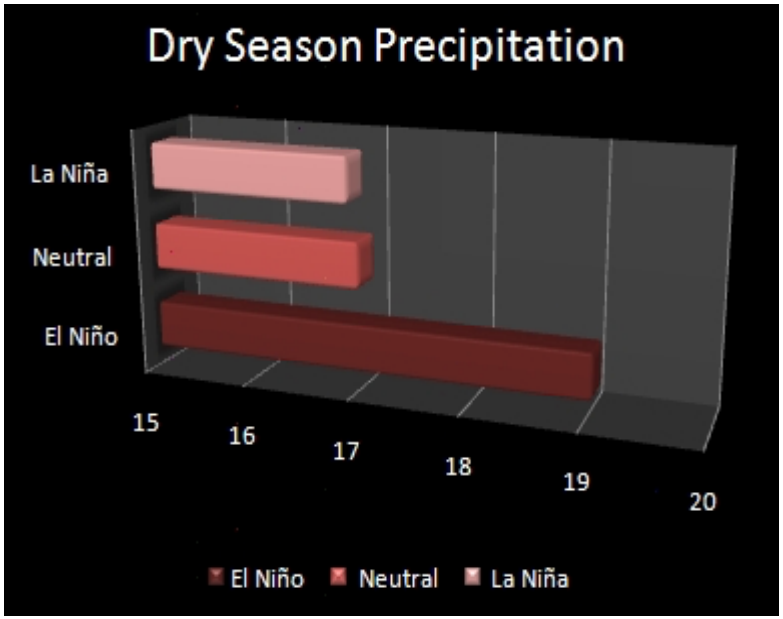
NOAA Climate Prediction Center Monthly Precipitation Outlook for February



http://www.cpc.ncep.noaa.gov/products/predictions/30day/

El Niño and the Caribbean





http://www.srh.noaa.gov/sju/?n=enso2010

Average temperature (°F) and precipitation (inches) during the dry season (December through April) for 16 observing stations across Puerto Rico and the U.S. Virgin Islands. Results are stratified by ENSO phase. Graphics provided by NOAA NWS San Juan.

El Nino Resources

David Brown, Ph.D., Regional Climate Services Director, NOAA Southern Region
Ellen Mecray, Regional Climate Services Director, NOAA Eastern Region

National Resources: Outlooks and Forecasts

(CPC) ENSO Diagnostic Discussion

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

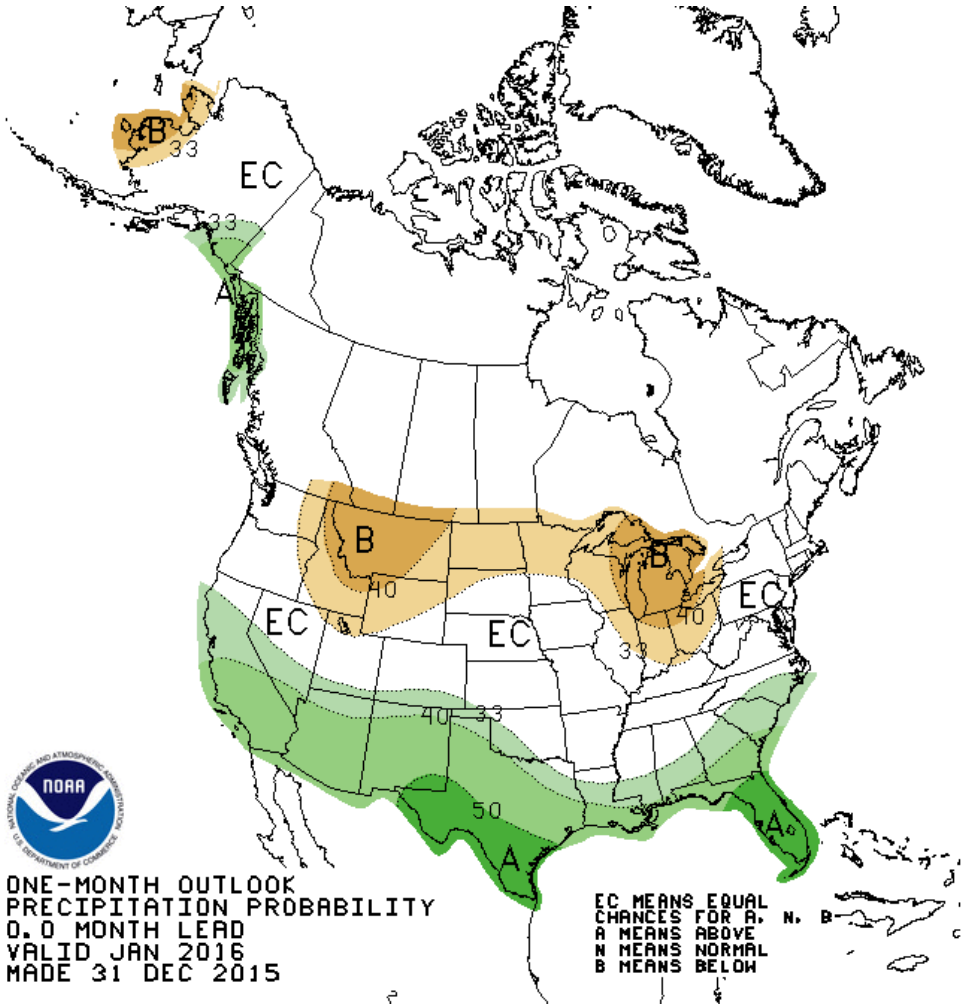
http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/enso.shtml

(CPC) Monthly and Seasonal Temperature, Precipitation, and Drought Outlooks

http://www.cpc.ncep.noaa.gov/

(CPC) U.S. Winter Outlook

http://www.noaanews.noaa.gov/stories2015/101515-noaa-strong-el-nino-sets-the-stage-for-2015-2016-winter-weather.htmlOutlook



National Resources: General Information

(NCEI) A Historical Perspective

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

(PMEL) El Niño Theme Page

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

(PMEL) El Niño Observing Systems

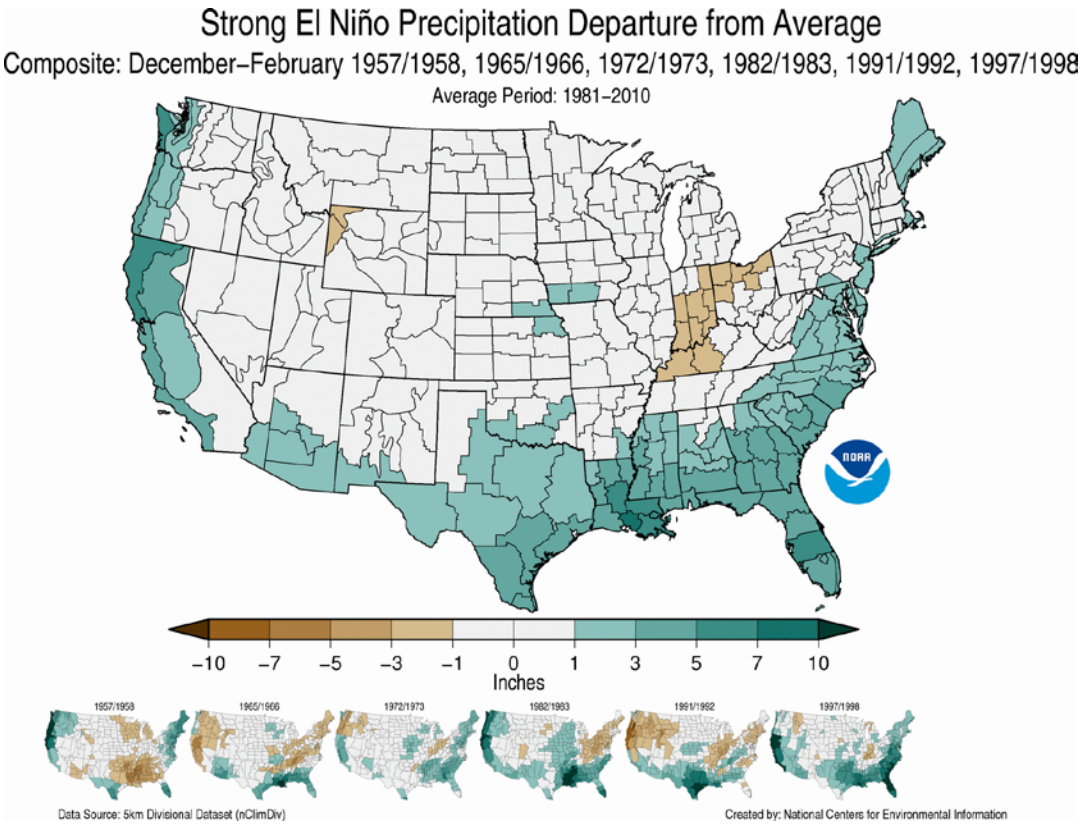
https://www.youtube.com/watch?v=nzBAWirHMvA&feature=youtu.be

(CPC) General Questions about ENSO

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

(AOML) ENSO Bibliography

http://www.aoml.noaa.gov/general/lib/lib1/nhclib/Bibs/ENSO-LaNinaBib-Final1.22.16.docx



Regional Resources: Southeast and Caribbean

NWS Weather Forecast Offices:

El Niño Webpages and Resources

e.g., Atlanta:
http://www.srh.noaa.gov/ffc/?n=elninoimpactsnorthandcentralga

e.g., Tampa:
http://www.srh.noaa.gov/tbw/?n=tampabayelninopage

Southeast Regional Climate Center:

El Niño Regional Outlooks and Impacts

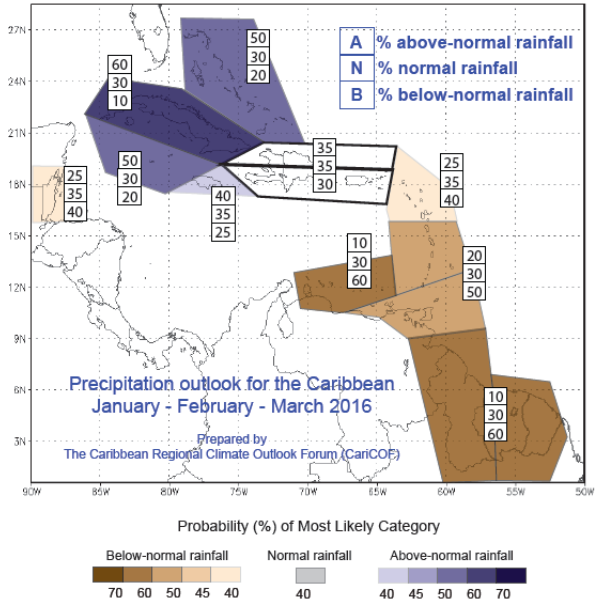
http://www.sercc.com/

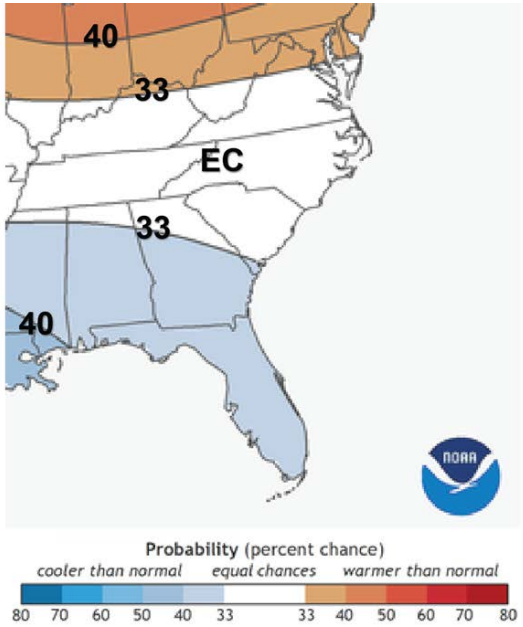
State Climatologists

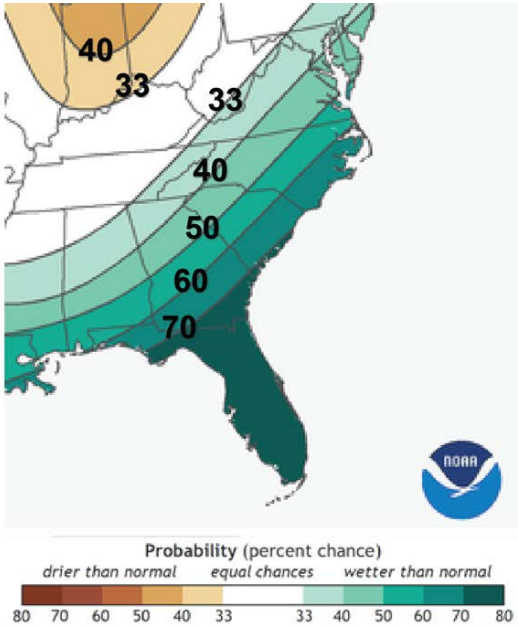
http://www.stateclimate.org

Caribbean Regional Climate Outlook Forum (CariCOF) Climate Outlooks

http://rcc.cimh.edu.bb/long-range-forecasts/caricof-climate-outlooks/







New Resources: Climate.gov/ElNino

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

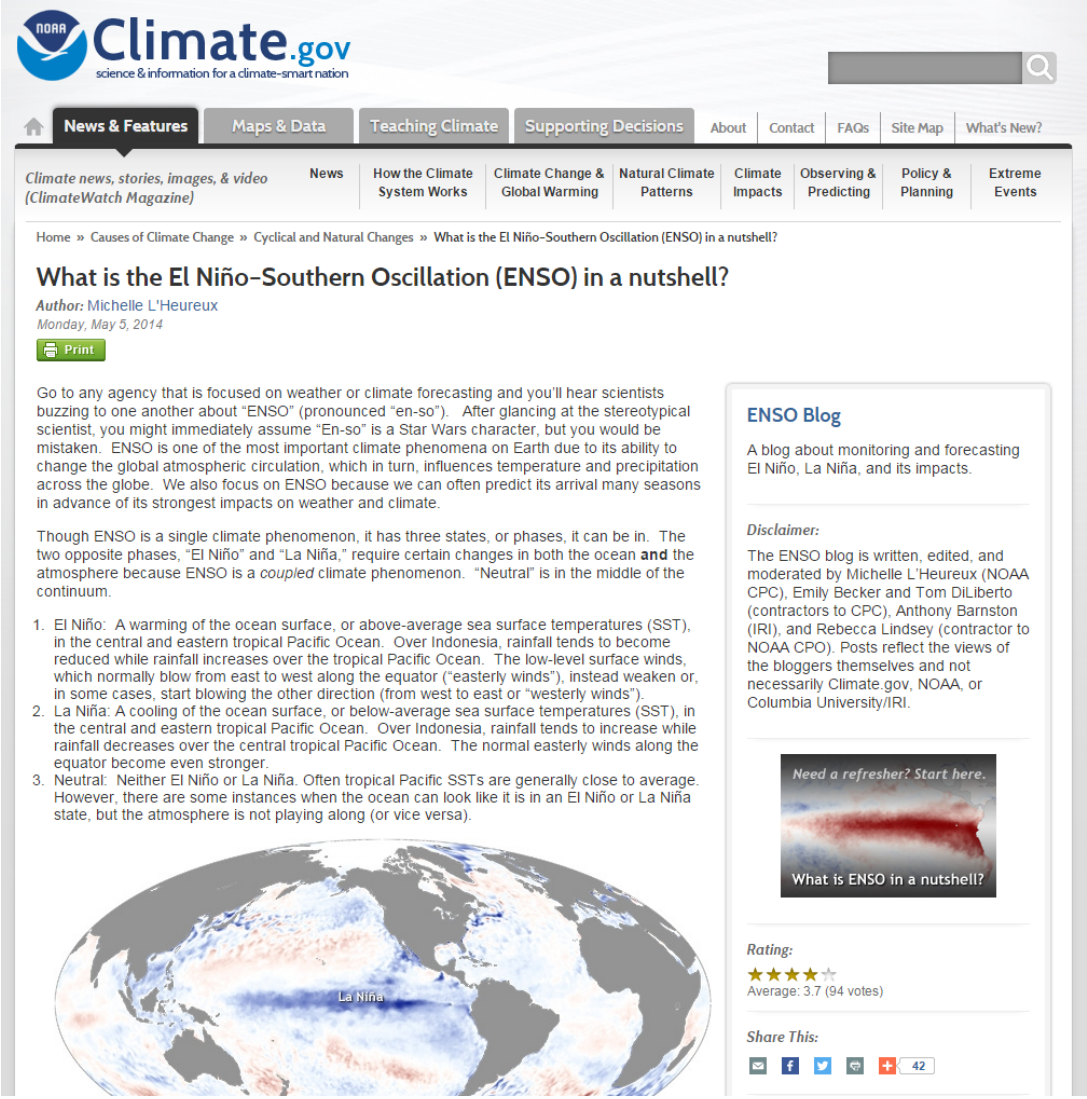
Includes both national and regional information, and links to resources throughout NOAA

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_Qcgxl

e.g., ENSO blog
https://www.climate.gov/news-features/department/8443/all

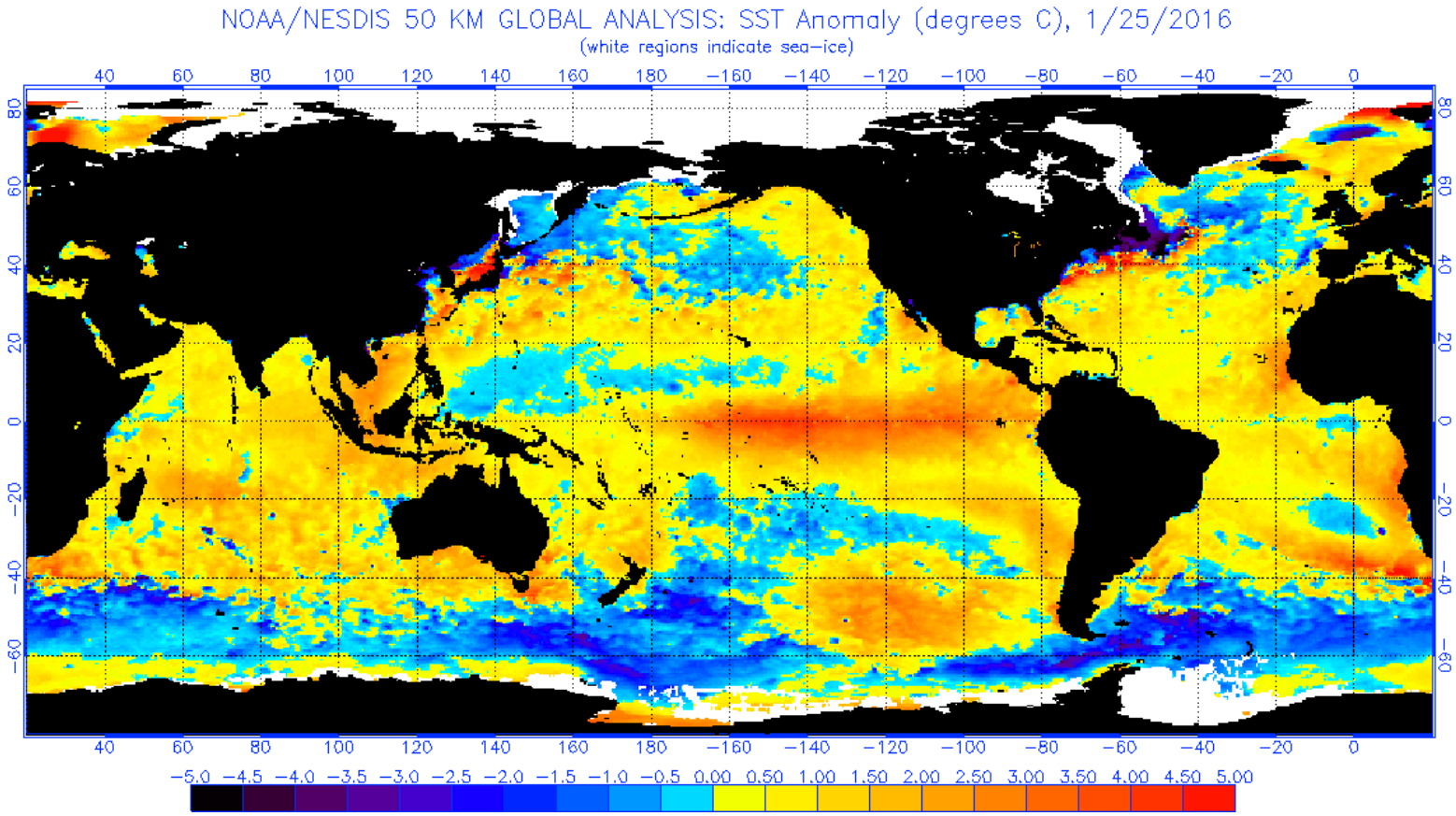


Regional El Niño Information & Resources Webinar

January 28, 2016

Hope Mizzell, Ph.D.

South Carolina State Climatologist

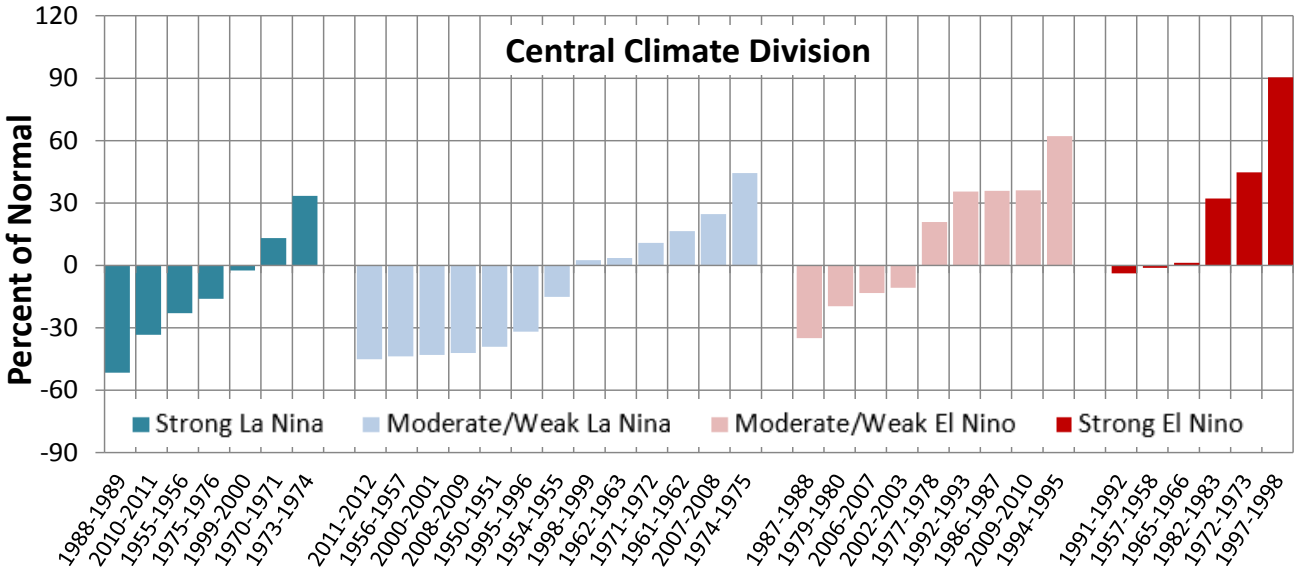


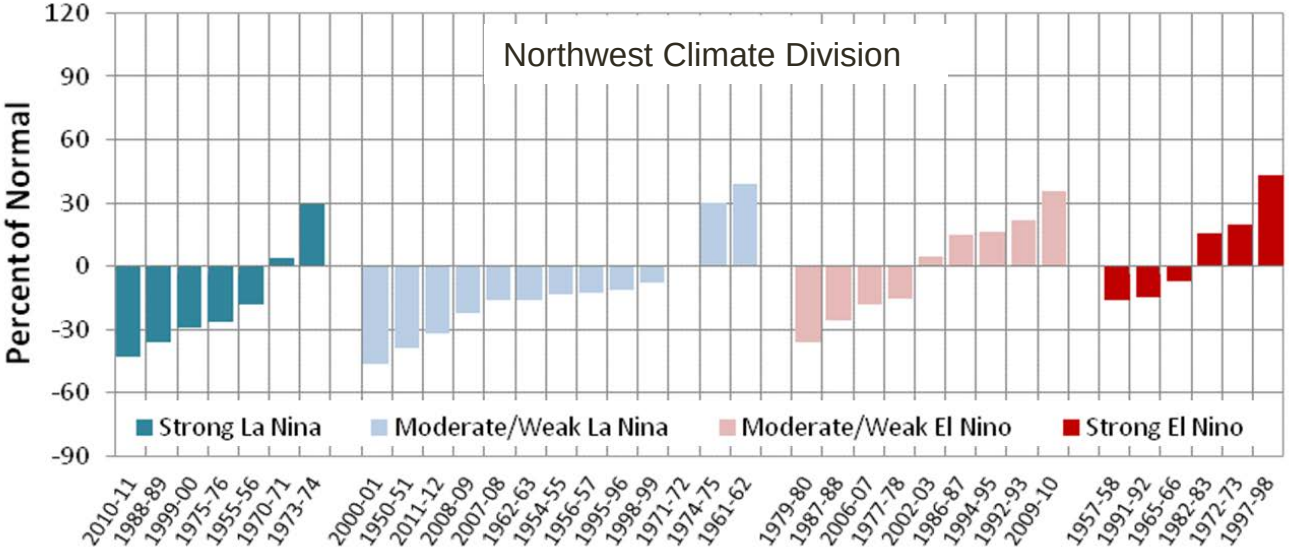
The Influence of the El Niño Southern Oscillation Cold and Warm Event Cycles on South Carolina's Seasonal Precipitation

Hope Mizzell, Ph.D., and Jennifer Simmons

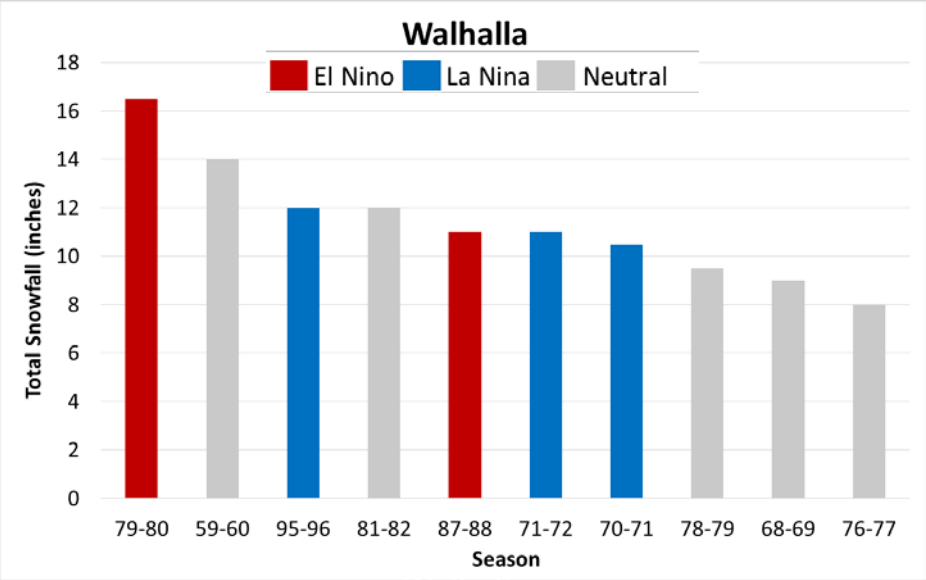
Journal of
South Carolina Water Resources
Volume 2, Issue 1 2015

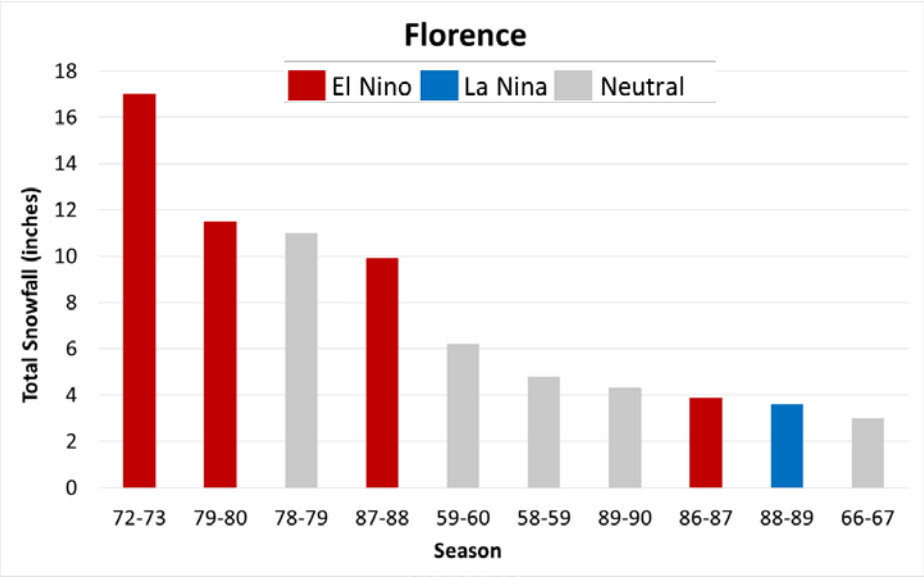
A Publication of the
South Carolina Water Resources Conference
www.scwaterconference.org

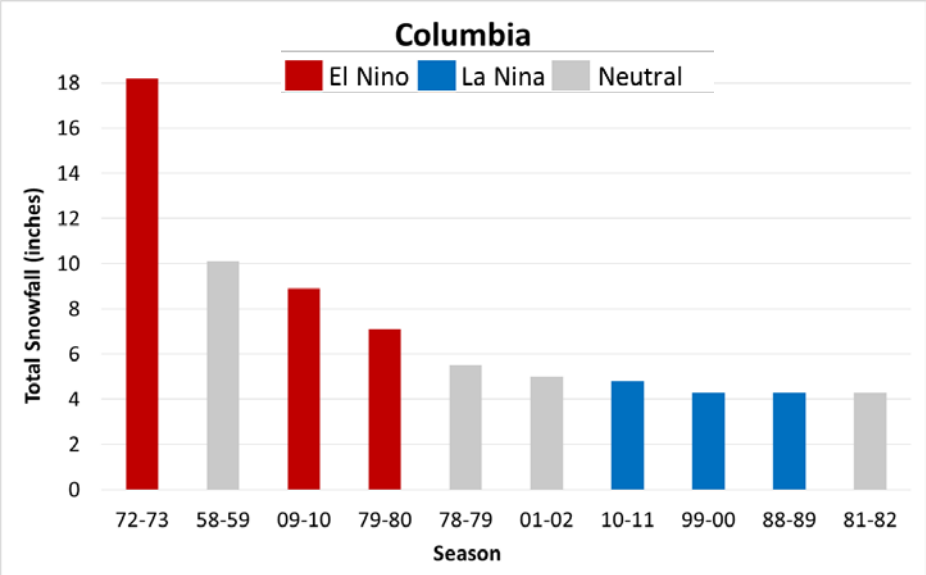


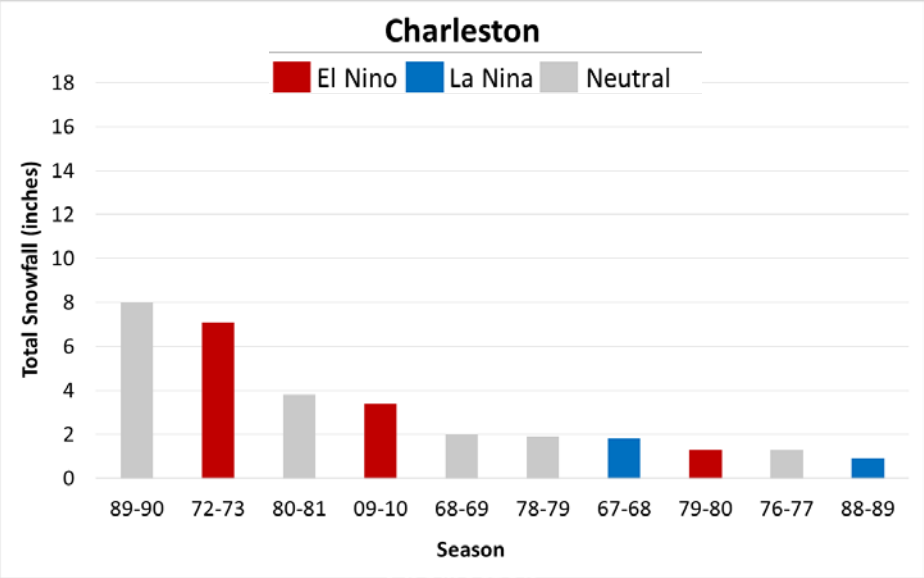


http://tigerprints.clemson.edu/jscwr/


Walhalla
El Nino
La Nina
Neutral
Total Snowfall (inches)
0
2
4
6
8
10
12
14
16
18
79-80
59-60
95-96
81-82
87-88
71-72
70-71
78-79
68-69
76-77
Season


Florence
El Nino
La Nina
Neutral
Total Snowfall (inches)
0
2
4
6
8
10
12
14
16
18
72-73
79-80
78-79
87-88
59-60
58-59
89-90
86-87
88-89
66-67
Season


Columbia
El Nino
La Nina
Neutral
Total Snowfall (inches)
0
2
4
6
8
10
12
14
16
18
72-73
58-59
09-10
79-80
78-79
01-02
10-11
99-00
88-89
81-82
Season


Charleston
El Nino
La Nina
Neutral
Total Snowfall (inches)
0
2
4
6
8
10
12
14
16
18
89-90
72-73
80-81
09-10
68-69
78-79
67-68
79-80
76-77
88-89
Season

Life's Better
Outdoors
South Carolina Department of Natural Resources

DNR

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Site map | SCDNR Home

Buy | Boating | Education | Fishing | Hunting | Land | Regulations | Water | Wildlife

Information

- Workshop Agenda
- Workshop Participants
- Workshop Presentations
- Research
- Monitoring for Climate Impacts
- Training and Events
- Final Workshop Series Report

Climate and SC Natural Resources

Working Towards Success

- Carolina's Climate List Serve
- Freshwater Fisheries SC Stream Asssessment
- Edisto Education Center-LEED Certified
- Gopher Tortoise Project
- Bird Island

Workshop Series

September 13, 2012

October 24, 2012

December 5, 2012

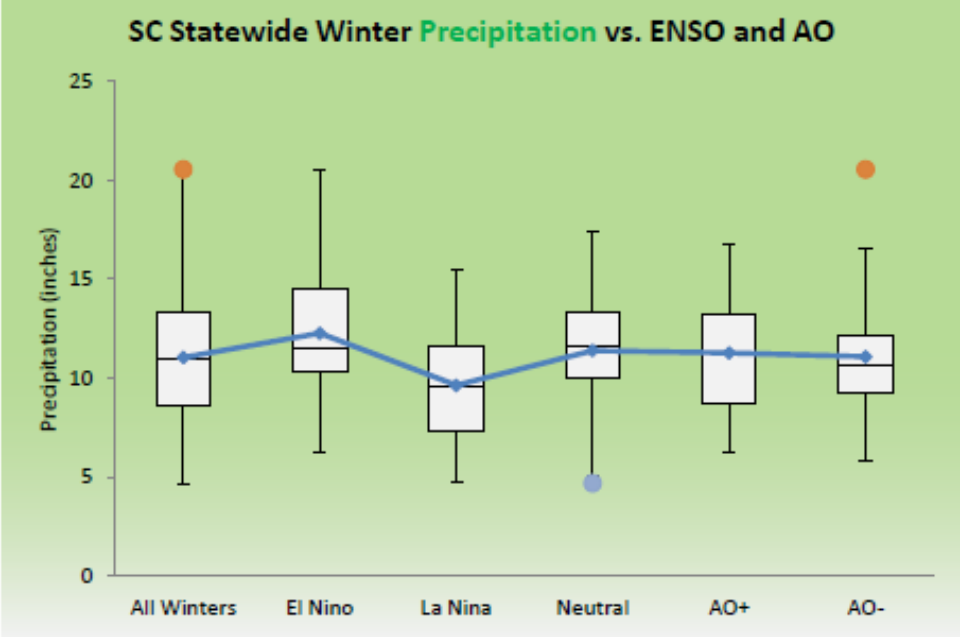
http://www.dnr.sc.gov/ccworkshops/

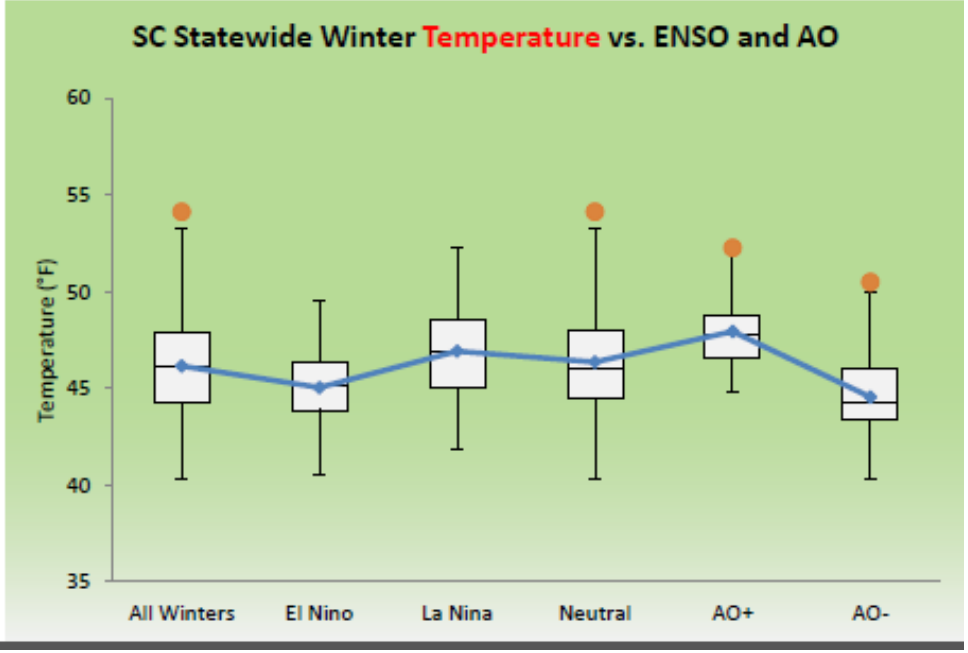
Box-and-whisker plots for the SC statewide total winter precipitation and average winter temperature, broken down into ENSO and AO phases for the period (1895-2012) for ENSO and (1950-2012) for AO.

SC La Niña winters are warmer and drier than El Niño winters.

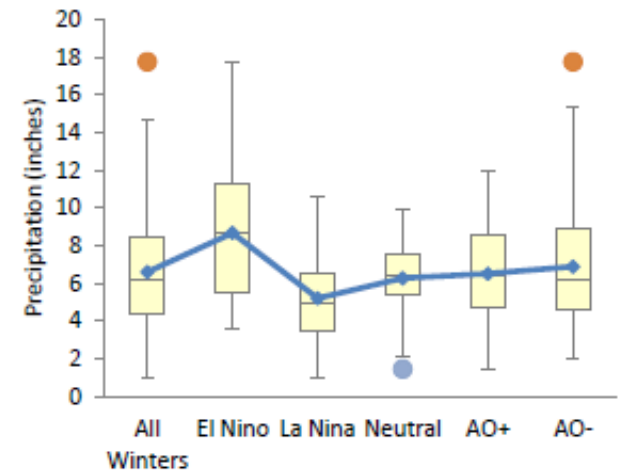
Winter temperatures were lower during the negative AO phase, whereas the AO phase did not seem to have an effect on winter precipitation.

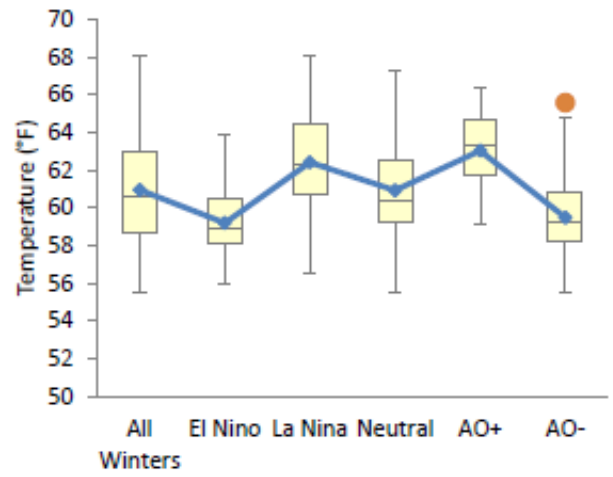
*orange (blue) circles on chart indicated upper (lower) outliers

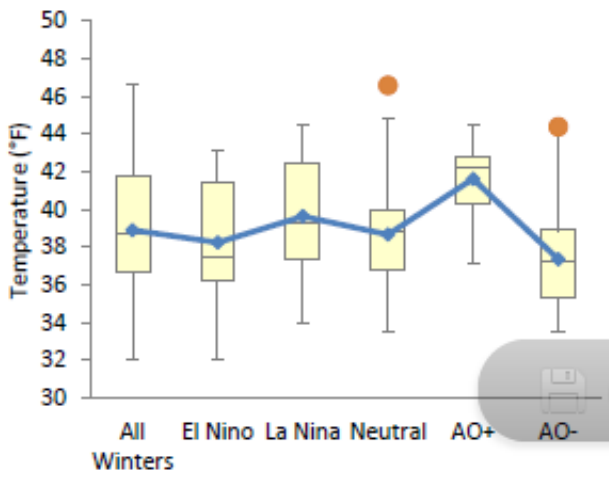




Charleston, SC: 1938-2012 (winter)



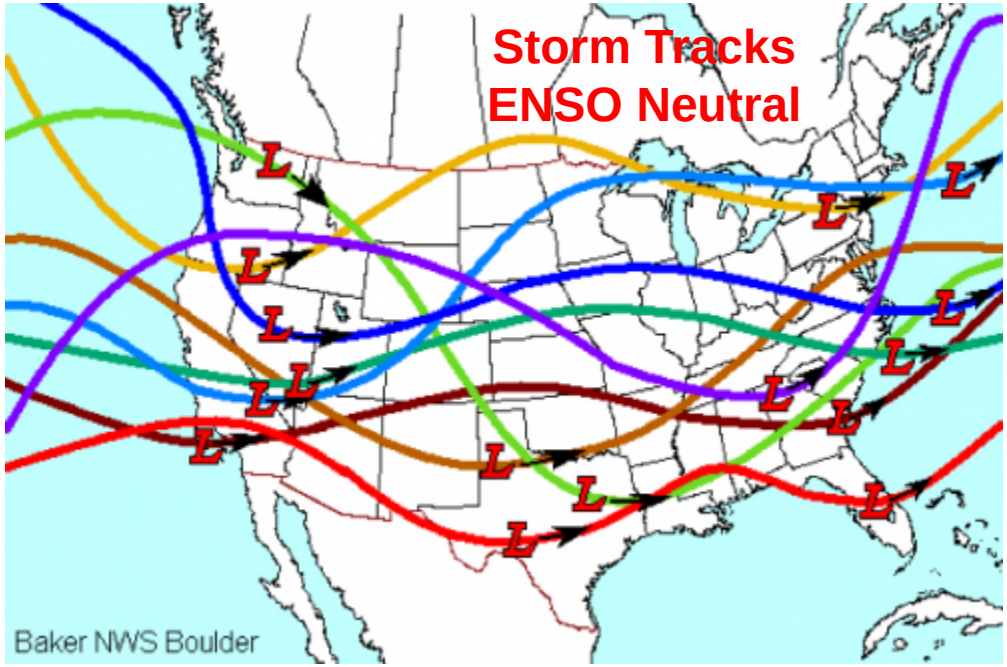


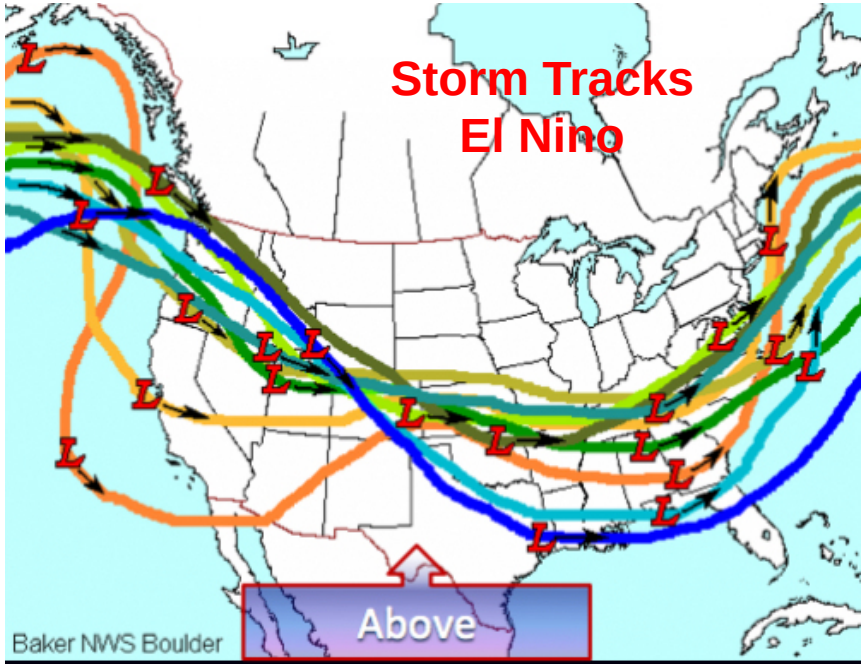


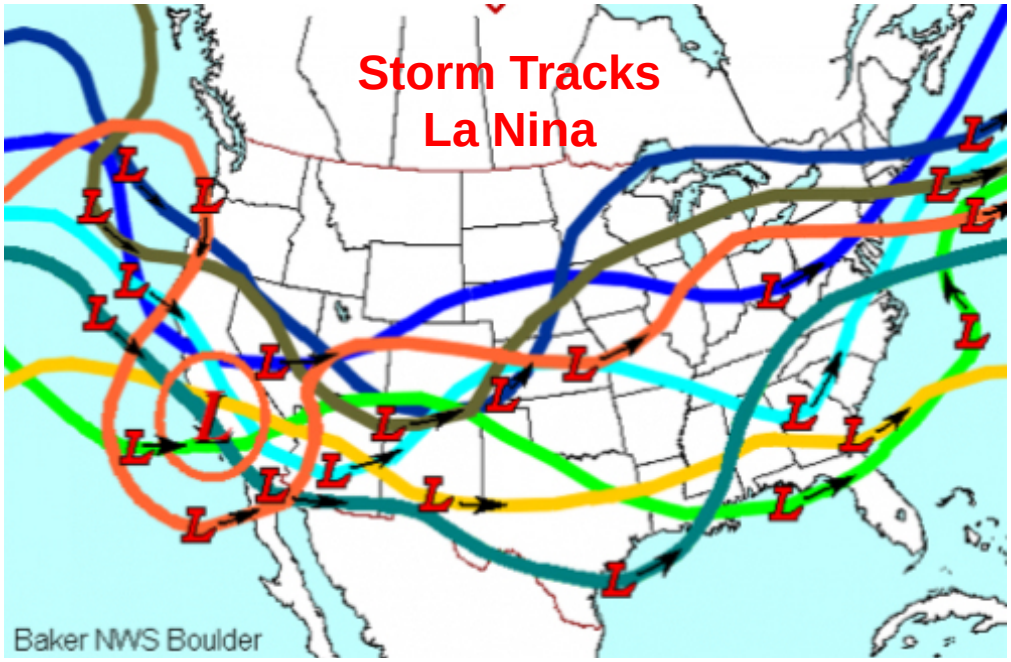
The max temp for Charleston shows a larger difference between El Niño and La Niña winters than the min temp.

There is an even greater difference between the AO positive and AO negative winter temperature signal for Charleston, with colder max and min temperatures in the negative AO phase.

The variations in Charleston precipitation between La Niña and El Niño are more pronounced than in Walhalla, with a substantial decrease in La Niña winters.


Storm Tracks
ENSO Neutral
Baker NWS Boulder


Storm Tracks
El Nino
Above
Baker NWS Boulder

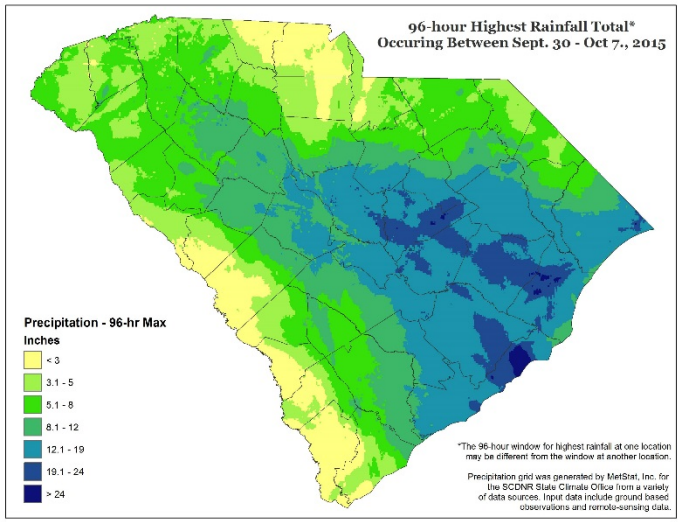

Storm Tracks
La Nina
Baker NWS Boulder

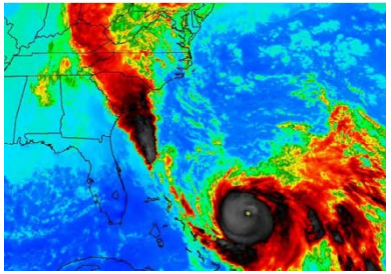
South Carolina Historic Rain and Flooding 2015

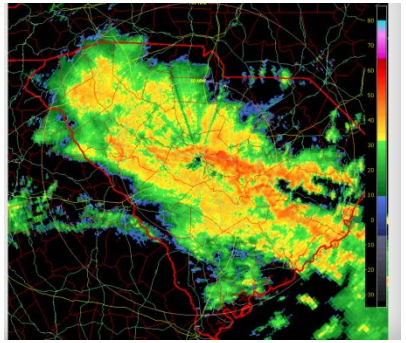
On-line Journal

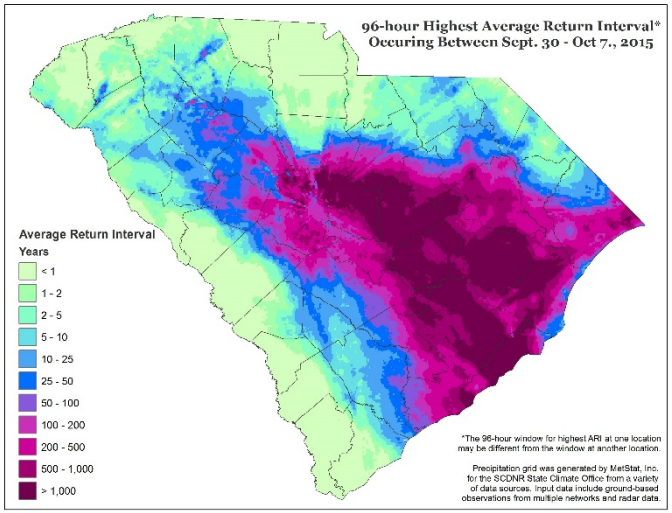
-Synoptic Discussion
-Chronological Description
-Meteorological, Climatological, Hydrological Significance
- Law Enforcement and Flood Mitigation Response

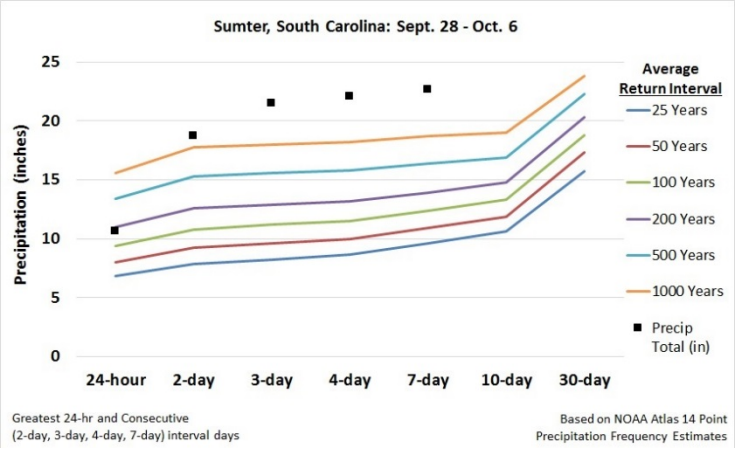
http://dnr.sc.gov/water/climate/sco/flood2015/

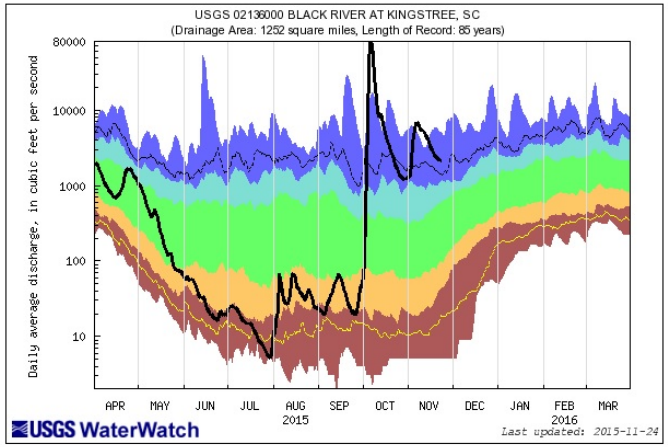

96-hour Highest Rainfall Total*
Occuring Between Sept. 30 - Oct 7., 2015
Precipitation - 96-hr Max
Inches
< 3
3.1 - 5
5.1 - 8
8.1 - 12
12.1 - 19
19.1 - 24
> 24
*The 96-hour window for highest rainfall at one location may be different from the window at another location.
Precipitation grid was generated by MetStat, Inc. for the SCDNR State Climate Office from a variety of data sources. Input data include ground based observations and remote-sensing data.






96-hour Highest Average Return Interval*
Occuring Between Sept. 30 - Oct 7., 2015
Average Return Interval
Years
< 1
1 - 2
2 - 5
5 - 10
10 - 25
25 - 50
50 - 100
100 - 200
200 - 500
500 - 1,000
> 1,000
*The 96-hour window for highest ARI at one location may be different from the window at another location.
Precipitation grid was generated by MetStat, Inc. for the SCDNR State Climate Office from a variety of data sources. Input data include ground-based observations from multiple networks and radar data.


Sumter, South Carolina: Sept. 28 - Oct. 6
Precipitation (inches)
25
20
15
10
5
0
24-hour
2-day
3-day
4-day
7-day
10-day
30-day
Average Return Interval
25 Years
50 Years
100 Years
200 Years
500 Years
1000 Years
Precip Total (in)
Greatest 24-hr and Consecutive (2-day, 3-day, 4-day, 7-day) interval days
Based on NOAA Atlas 14 Point Precipitation Frequency Estimates


USGS 02136000 BLACK RIVER AT KINGSTREE, SC
(Drainage Area: 1252 square miles, Length of Record: 85 years)
Daily average discharge, in cubic feet per second
80000
10000
1000
100
10
APR
MAY
JUN
JUL
AUG
2015
SEP
OCT
NOV
DEC
JAN
FEB
2016
MAR
USGS WaterWatch
Last updated: 2015-11-24

WFO San Juan Climate Services: Role in the Caribbean Climate Outlook Forum and Decision Support Service

Odalys Martínez-Sánchez
Lead Forecaster and Climate Team Leader WFO San Juan

Overview

- WFO SJU as part of CariCOF
  - Seasonal Forecast
  - Trainings
- WFO SJU Decision Support Service
  - Drought Task Force
  - Briefings
  - Online Support
- WFO SJU Spanish Translation - ENSO Diagnostic Discussion

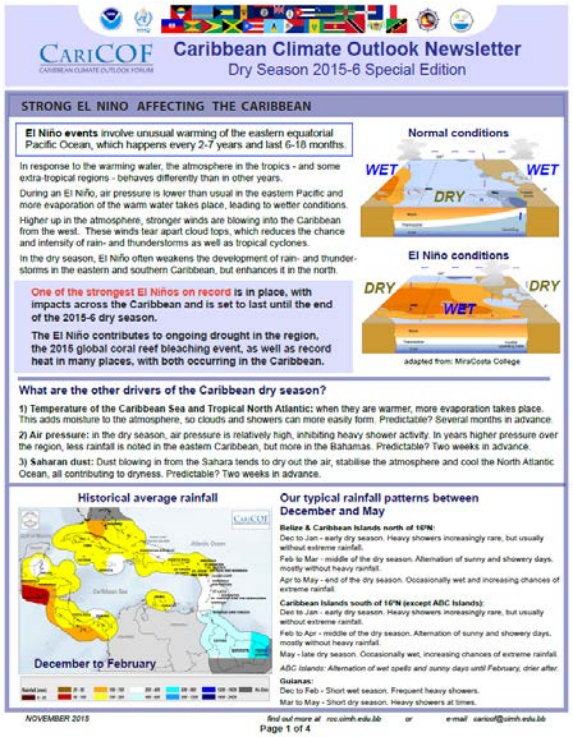
Role in the Caribbean Climate Outlook Forum

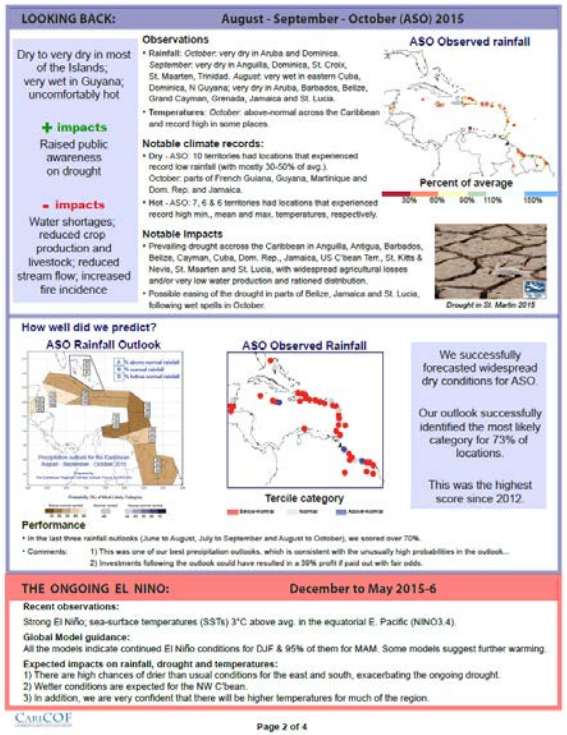
- Every month The Caribbean Regional Climate Outlook Forum (CariCOF) brings together National Weather Services (NWSs) from Caribbean territories under the coordination of the Caribbean Institute for Meteorology and Hydrology (CIMH) at Barbados.

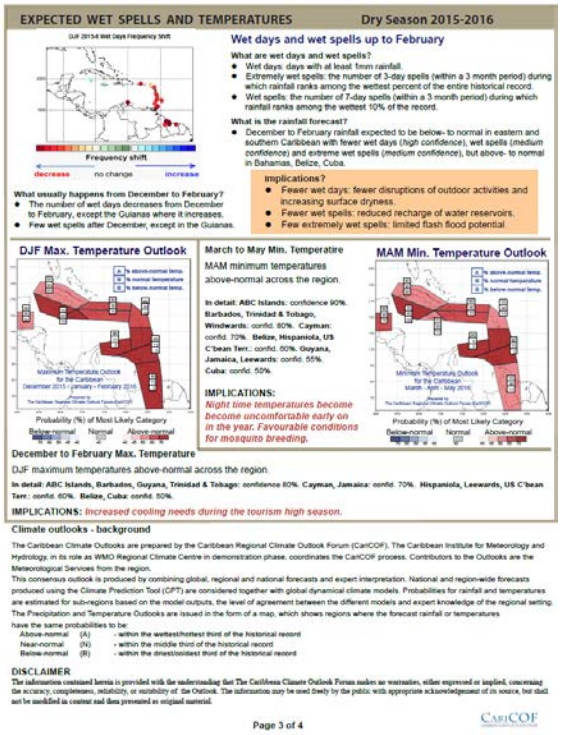
- Main goal is to produce region-wide three-month climate outlooks as well as to discuss current conditions.

- WFO SJU has been participating since 2013.

Role in the Caribbean Climate Outlook Forum







Newsletter includes:

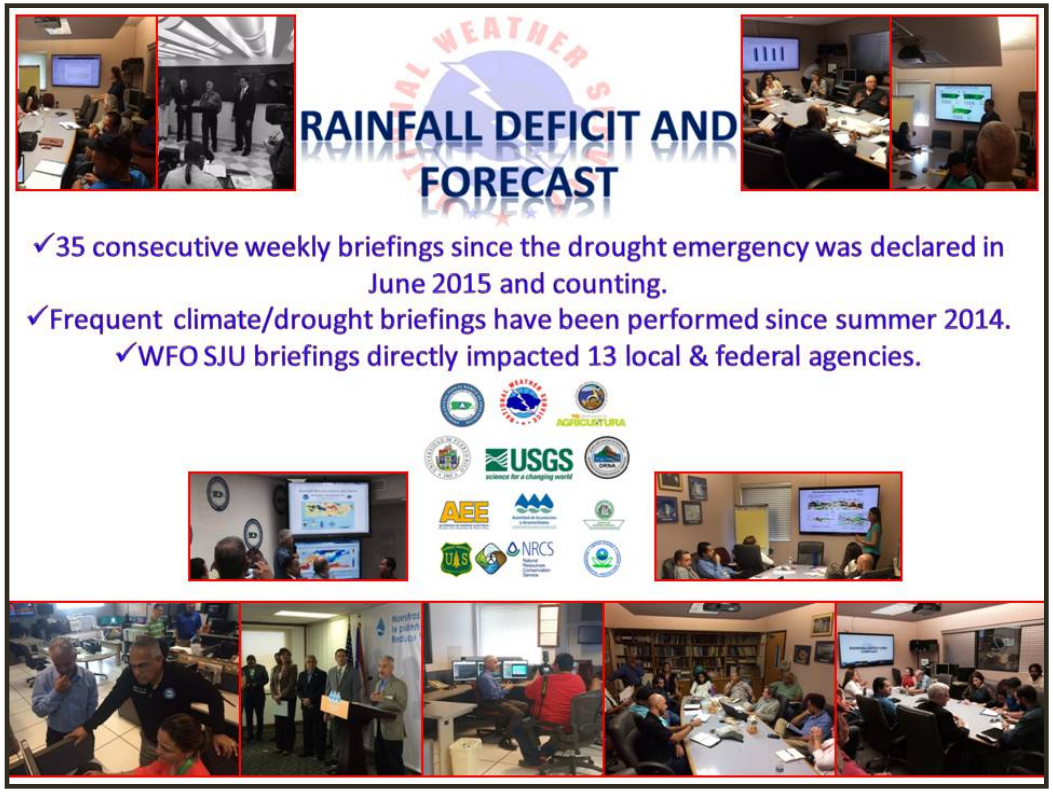
- Current conditions
- Climate Drivers
- Seasonal Forecast – Temperature and Rainfall

http://rcc.cimh.edu.bb/long-range-forecasts/caricof-climate-outlooks/

Role in the Caribbean Climate Outlook Forum

Decision Support Service

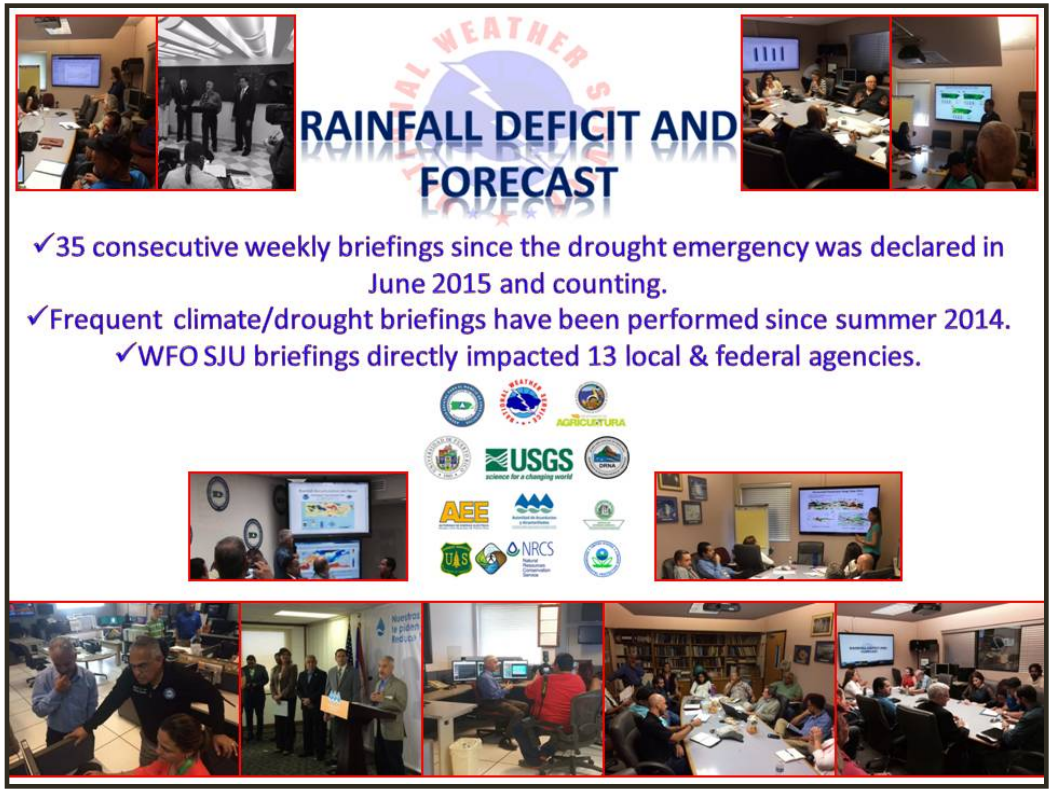
- WFO SJU as part of the PR Drought Task Force provides weekly briefing to local/federal agencies.
- Meetings are every Tuesday at 2pm in the WFO SJU conference room.
- Weekly meeting are performed as long as the task force is activated.
- The Drought Task Force was created in 2014, and WFO SJU has been part of it since then.



Decision Support Service

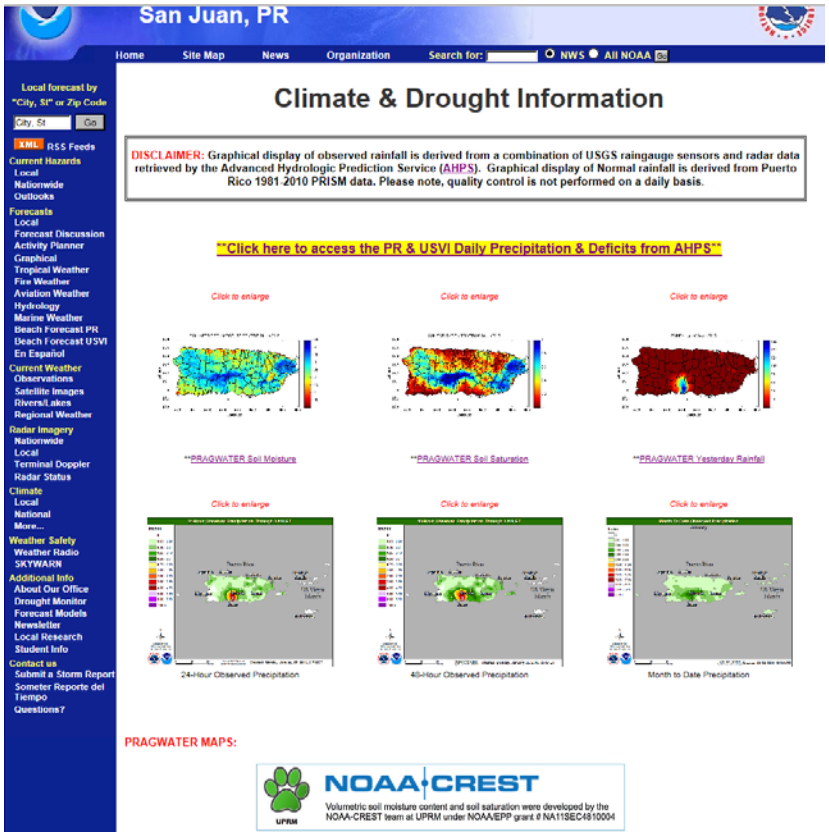
Briefings include:

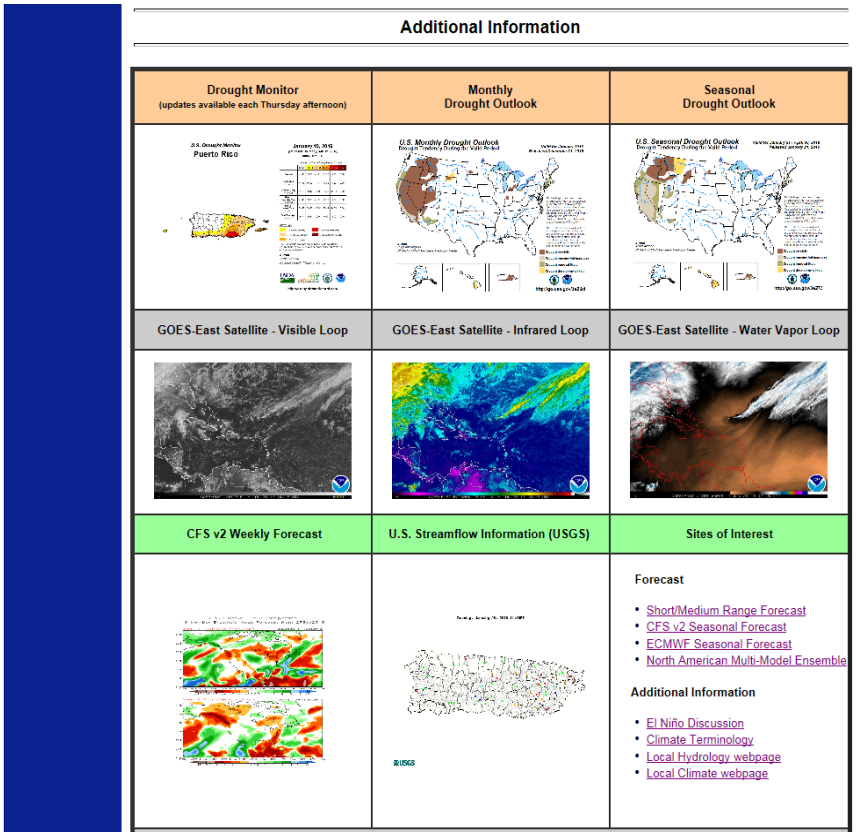
- An overview of the latest observed and expected weather
- Maps with the latest 7 and 30-day estimated rainfall over Puerto Rico highlighting the areas and basins of most concern
- Rainfall deficit and model guidance
- Precipitation outlooks from the Caribbean Regional Climate Forum (CariCOF)
- U.S. Drought Monitor and ENSO information



Decision Support Service

- ✓ Local webpage created by WFO SJU staff – online support





http://www.srh.noaa.gov/sju/?n=climo_dss

Spanish Translations - ENSO

✓ Diagnostic Discussion

EL NIÑO/OSCILACIÓN DEL SUR (ENSO por sus siglas en inglés)
DISCUSIÓN DIAGNÓSTICA

Emitida por el

CENTRO DE PREDICCIONES CLIMÁTICAS/NCEP/NWS
y el Instituto Internacional de Investigación para el Clima y la Sociedad
Traducción cortesía del: NWS-WFO SAN JUAN, PUERTO RICO
14 de enero de 2016

Estatus del Sistema de alerta del ENSO: Advertencia de El Niño

Sinopsis: Se espera que El Niño Fuerte comience a debilitarse gradualmente a través de la primavera del 2016, y comience la transición a un ENSO-neutral durante la culminación de la primavera o a inicios del verano 2016.

Un El Niño fuerte continuó durante diciembre de 2015, con temperaturas bien por encima del promedio de las temperaturas de la superficie del océano (SST, por sus siglas en inglés) a través del centro y este del Océano Pacífico (Fig. 1). Todos los índices semanales de El Niño disminuyeron un poco respecto al mes anterior (Fig. 2). Las anomalías en las temperaturas de la sub-superficie en el Pacífico central y oriental, aunque continúan mucho más calientes que el promedio (Fig. 3), se debilitaron debido a la surgencia de una onda ecuatorial de Kelvin (Fig. 4). Anomalías significativas de los vientos provenientes del oeste en los niveles bajos y en los vientos del este en los niveles superiores continúan sobre gran parte del Pacífico tropical. Durante la pasada semana, otra aumento repentino de vientos del oeste se produjo en el Pacífico central-oriental. El Índice de Oscilación del Sur (SOI, por sus siglas en inglés) tradicional y ecuatorial continúan negativos fuertemente. También, la convección continuó fuerte sobre el este-central del Pacífico y fue suprimida sobre Indonesia (Fig. 5). Colectivamente, estas anomalías atmosféricas y oceánicas reflejan la continuación de un episodio fuerte de El Niño.

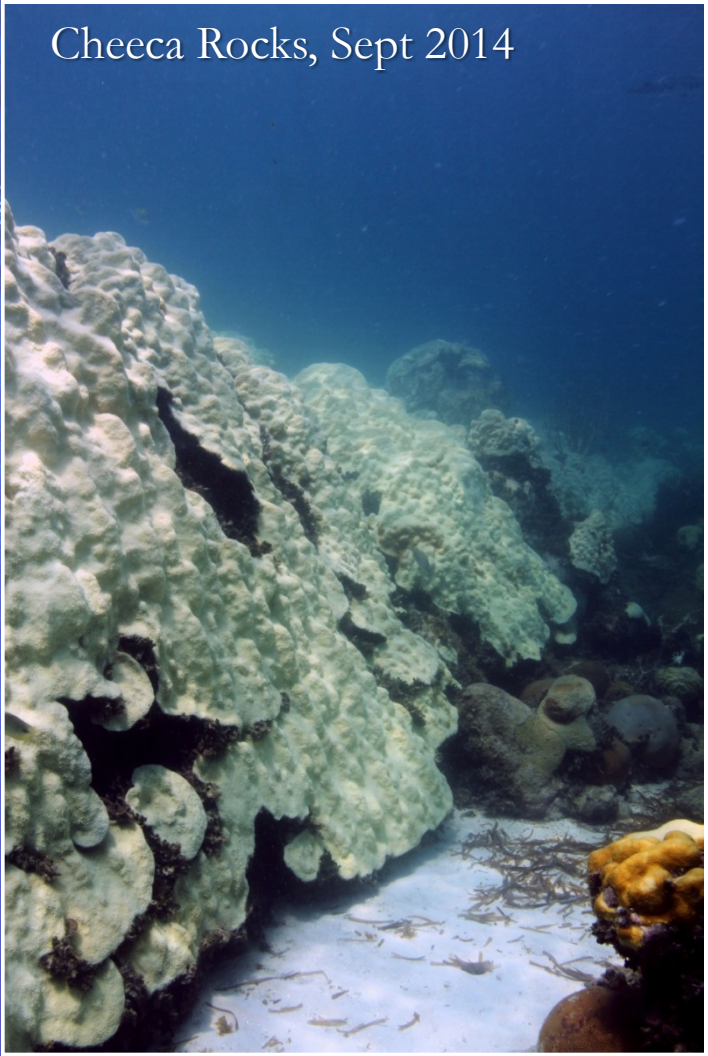
La mayoría de los modelos indican que El Niño fuerte se debilitará con una transición a un ENSO-neutral durante la culminación de la primavera o comienzos del verano (Fig. 6). Los pronosticadores están en acuerdo con el consenso de los modelos, aunque el momento exacto de la transición es difícil de determinar. Se espera que El Niño fuerte se debilite gradualmente durante de la primavera de 2016, y cambiando a un ENSO-neutral durante la culminación de la primavera o comienzos del verano (oprima para las probabilidades de periodos de 3-meses Consenso del Pronóstico de CPC/IRI).

El Niño ya ha producido impactos globales significativos y se espera que afecte los patrones de las temperaturas y de precipitación a través de los Estados Unidos durante los próximos meses (la perspectiva de 3-meses para la temporada será actualizada el jueves, 21 de enero). La perspectiva de la temporada de enero-marzo indicó un aumento de la probabilidad de precipitación por encima de la media en toda la parte sur de los Estados Unidos y precipitación por debajo de la mediana sobre la parte norte de los Estados Unidos. Temperaturas sobre el promedio son favorecidas en el oeste y mitad norte de los Estados Unidos con temperaturas inferiores a la media favorecidas en las planicies del sur y a lo largo de la costa del Golfo.

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

Understanding Coral Reef Resilience to El Niño Related Bleaching in the Florida Keys

- Its gotten **really hot** over past 40 years and its **getting hotter**
- Unprecedented warming in Florida Keys
- 2014 and 2015 were warmest years on record
  - Previous warmest years were 1997-98, coincident with most recent extreme ENSO



Derek Manzello, Ph.D.
NOAA/AOML
ENSO Webinar, 28Jan2016

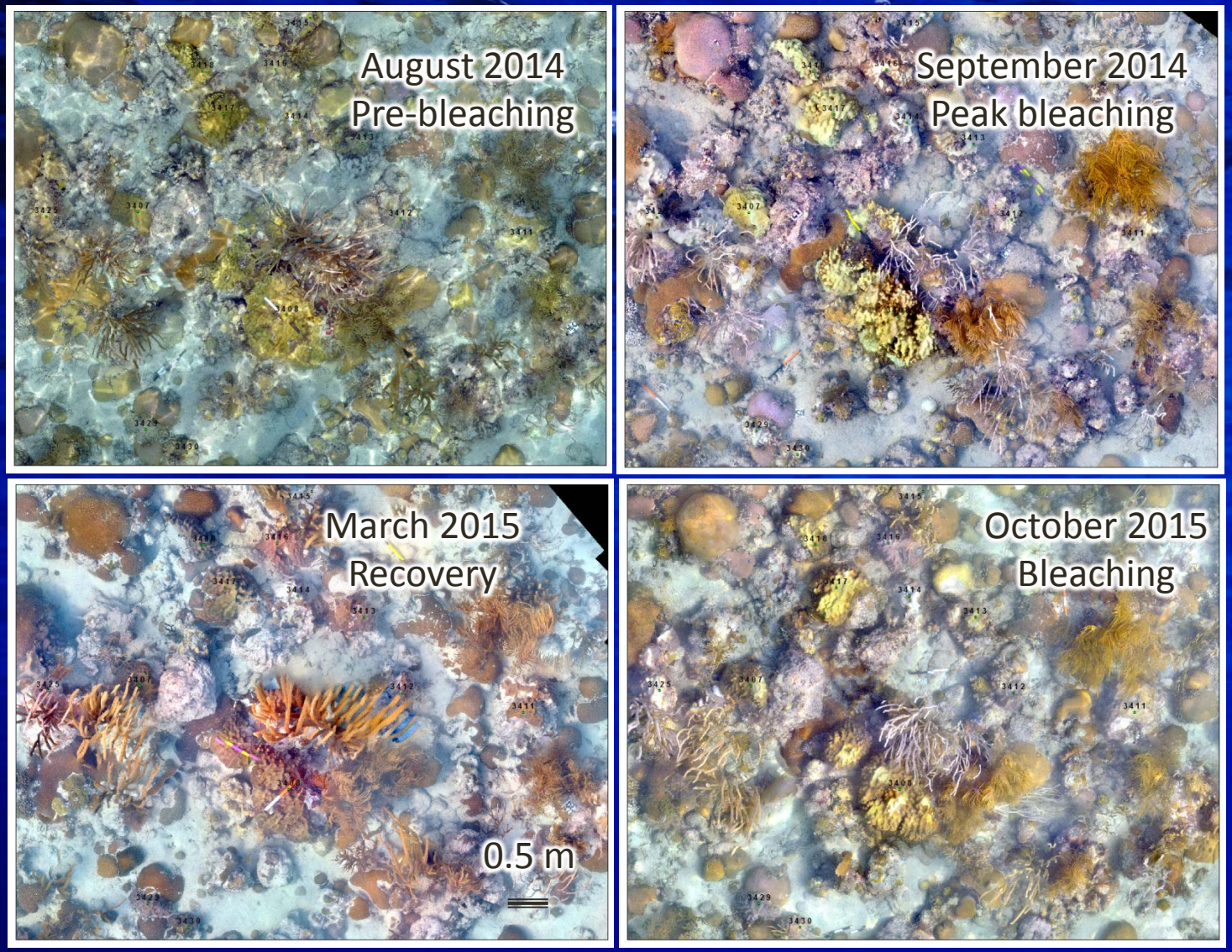
NOAA CORAL REEF CONSERVATION PROGRAM

OAP NOAA OCEAN ACIDIFICATION PROGRAM

Moving Beyond the *"Its too hot and all corals are doomed"* mantra

- **The good news**
  - Inshore patch reefs resilient to rapid deterioration seen offshore since late 1970s
  - Many inshore reefs still have high coral cover (15-40% vs ≤ 5% offshore)
  - Low coral mortality after back-to-back bleaching in 2014 and 2015
- **AOML Genomics initiative: Why can these corals survive when so many have died?**
  - **Five hypotheses:**
    - Are these corals acclimatized/adapted to heat stress?
    - Do they possess heat-tolerant symbionts?
    - Is it the elevated pH because of CO_2 uptake by seagrasses?
    - Are corals shaded because of high turbidity ?
    - Do the corals feed more with high turbidity?

Coral Bleaching Patterns: 2014-2015



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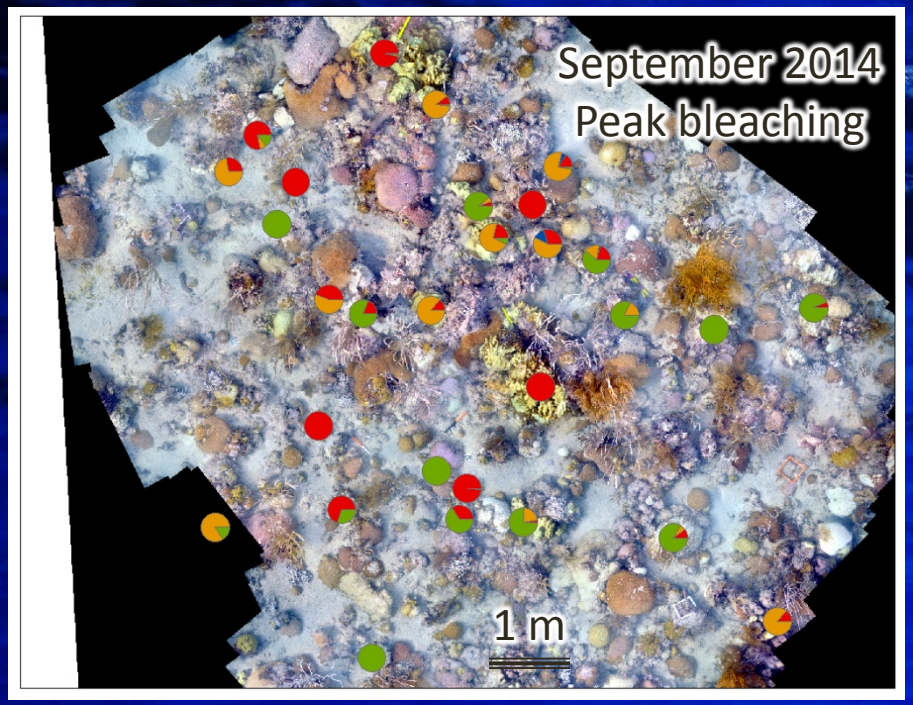
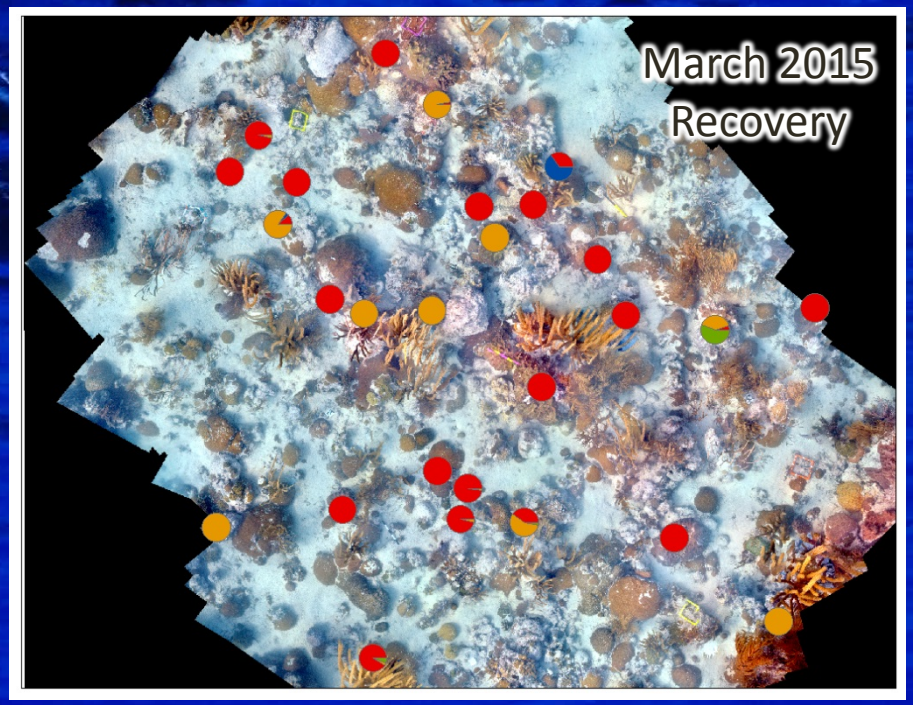
Relative abundance of algal symbiont types during bleaching and recovery





Pie charts show relative abundance of symbionts from clades A B C D

Preliminary results

- Clades B and D increased, whereas A decreased
- Clade D known to be heat tolerant

Next steps

- Repeat sampling during recovery from 2015 bleaching
- Determine if clade type and flexibility correlates with mortality
- Ongoing field study assessing all 5 hypotheses in tandem

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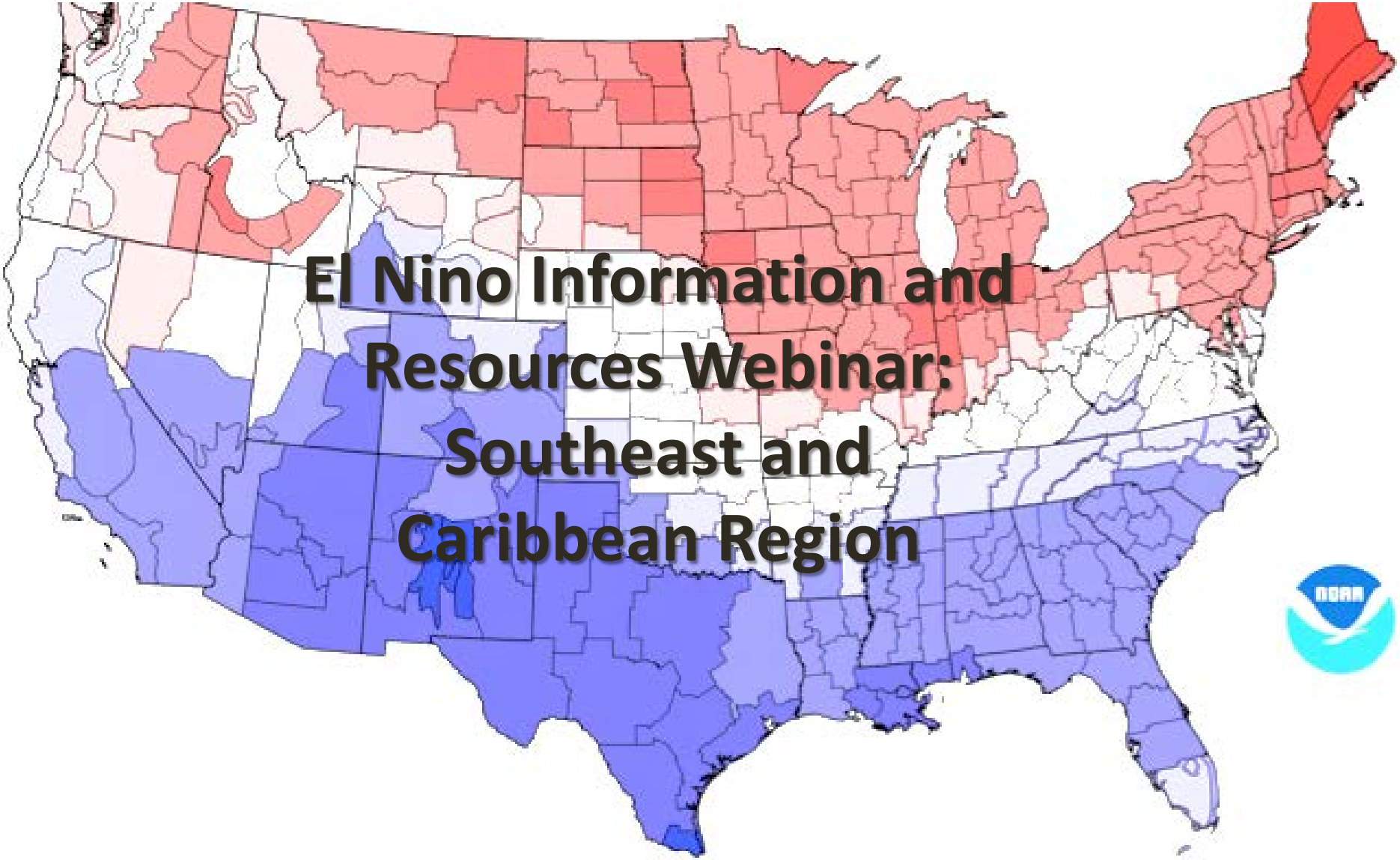

El Nino Information and Resources Webinar: Southeast and Caribbean Region

Thank you for your participation!

Webinar will be posted at: Regions.noaa.gov/secar