



2019-20 Winter Outlook

**North & Central Georgia
Integrated Warning Team Workshop**

December 10, 2019

*David Nadler & Adam Baker
NWS Peachtree City/Atlanta*



2019-20 Winter Outlook

- **DISCLAIMER:** Long-range (> 14 days) outlooks are just that – outlooks. They are intended to **provide a big picture - probabilistic view of potential long-wave patterns** that could impact temperatures and precipitation across different regions of the world.

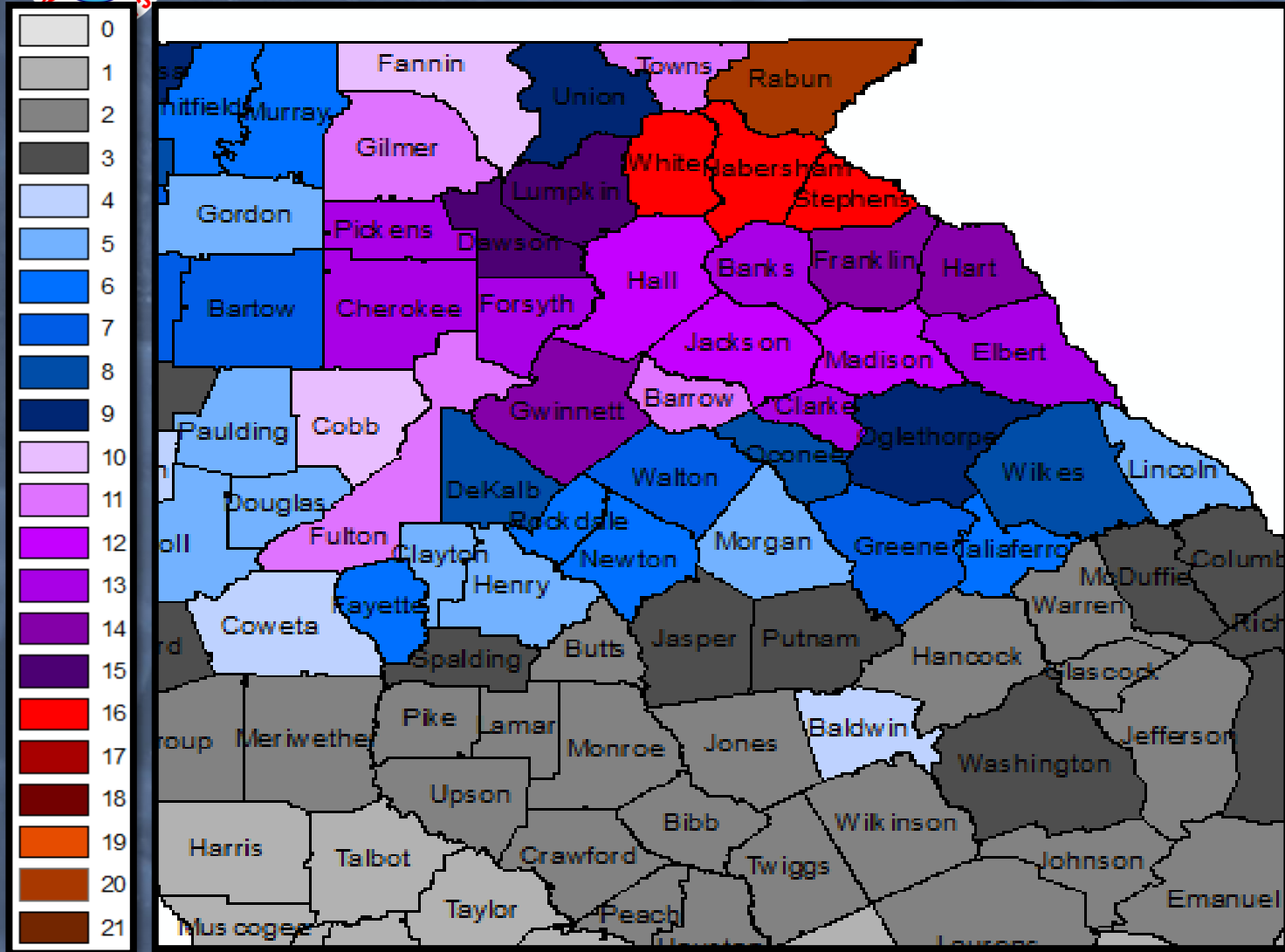
What it is NOT designed for:

- How many snow/ice storms will we see this winter?
- Will it snow 3" on Christmas day?
- Record cold temperatures in February?
- Early Spring?





Total Ice Events / North Georgia (2000-2017)



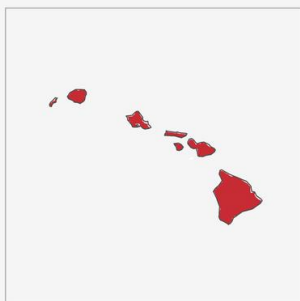
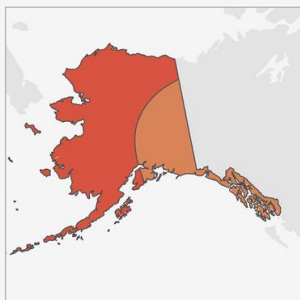
Most events occur in January & February *(Note: just a glaze of ice can create problems!)*



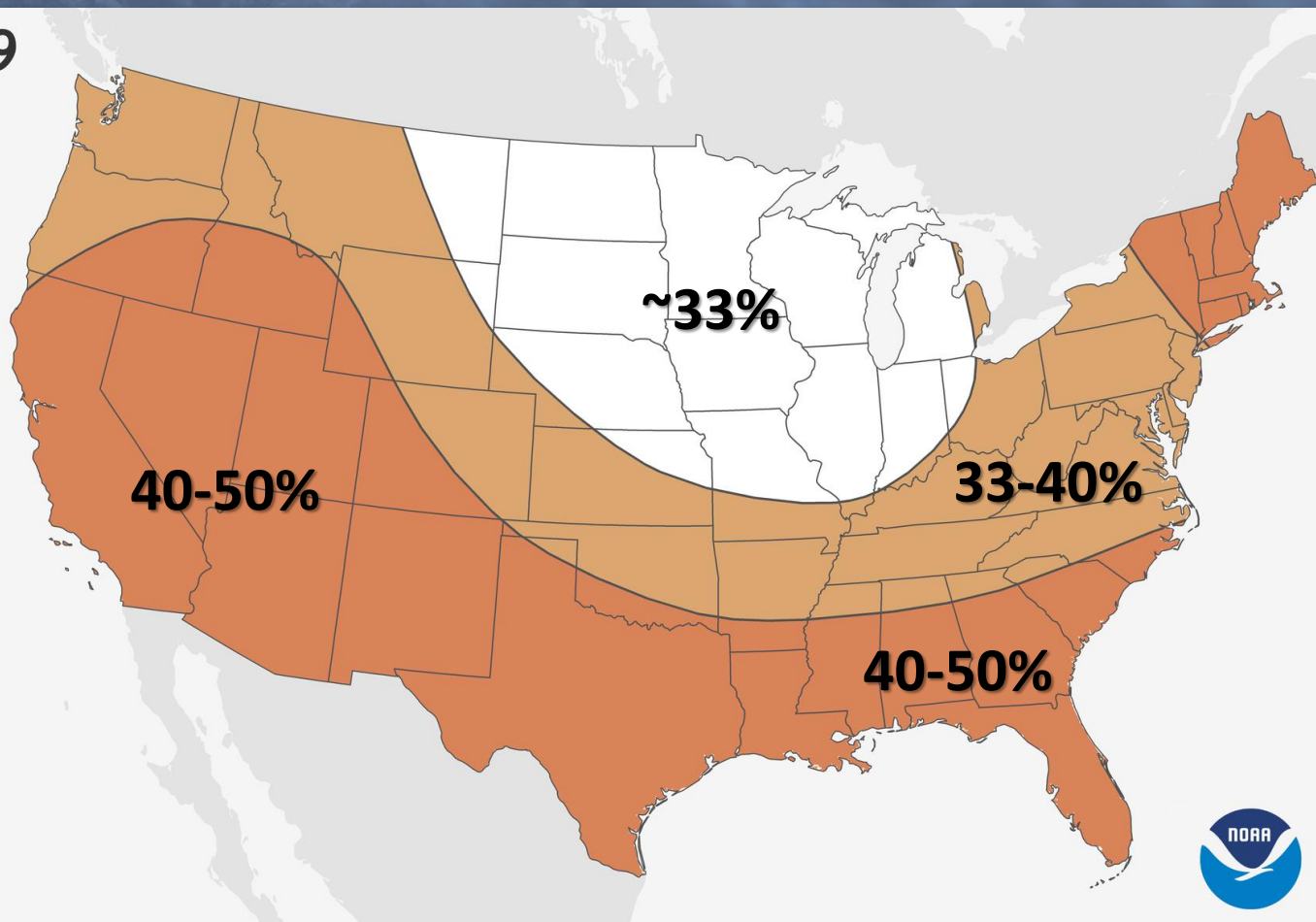
CPC (NOAA) Temperature Outlook (Dec/Jan/Feb)

Winter 2019

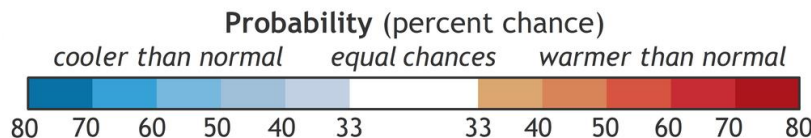
U.S. Temperature Outlook



AK and HI not to scale



Temperature Outlook
for December 2019 – February 2020
Issued 17 October 2019



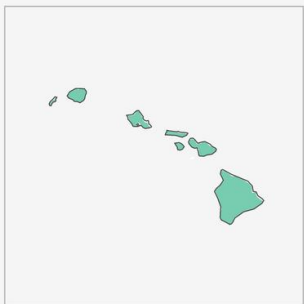
NWS Climate Prediction Center
Map by NOAA Climate.gov



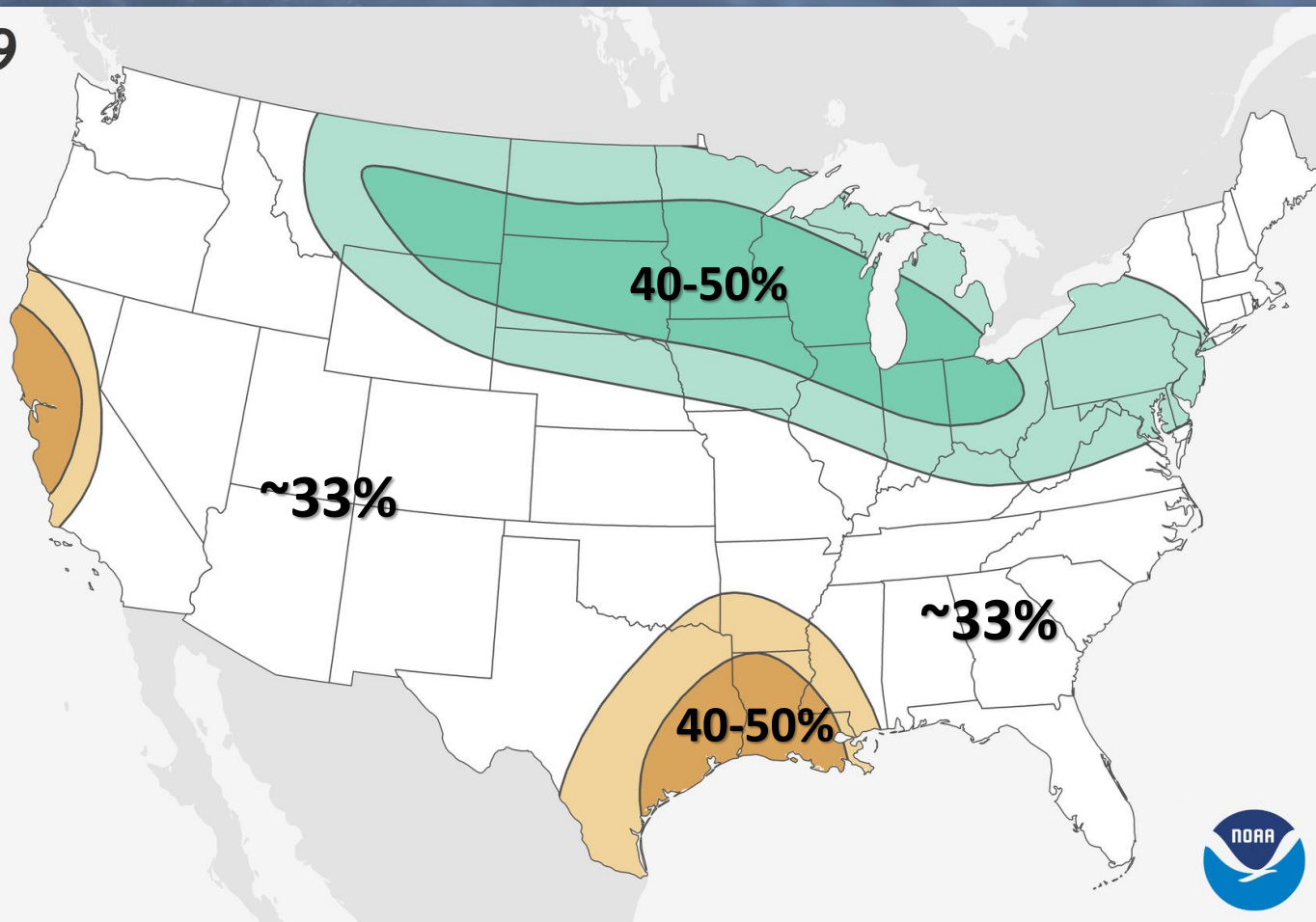
CPC (NOAA) Precipitation Outlook (Dec/Jan/Feb)

Winter 2019

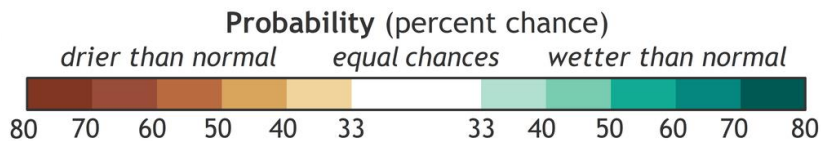
U.S. Precipitation Outlook



AK and HI not to scale



Precipitation Outlook
for December 2019 - February 2020
Issued 17 October 2019



NWS Climate Prediction Center
Map by NOAA Climate.gov



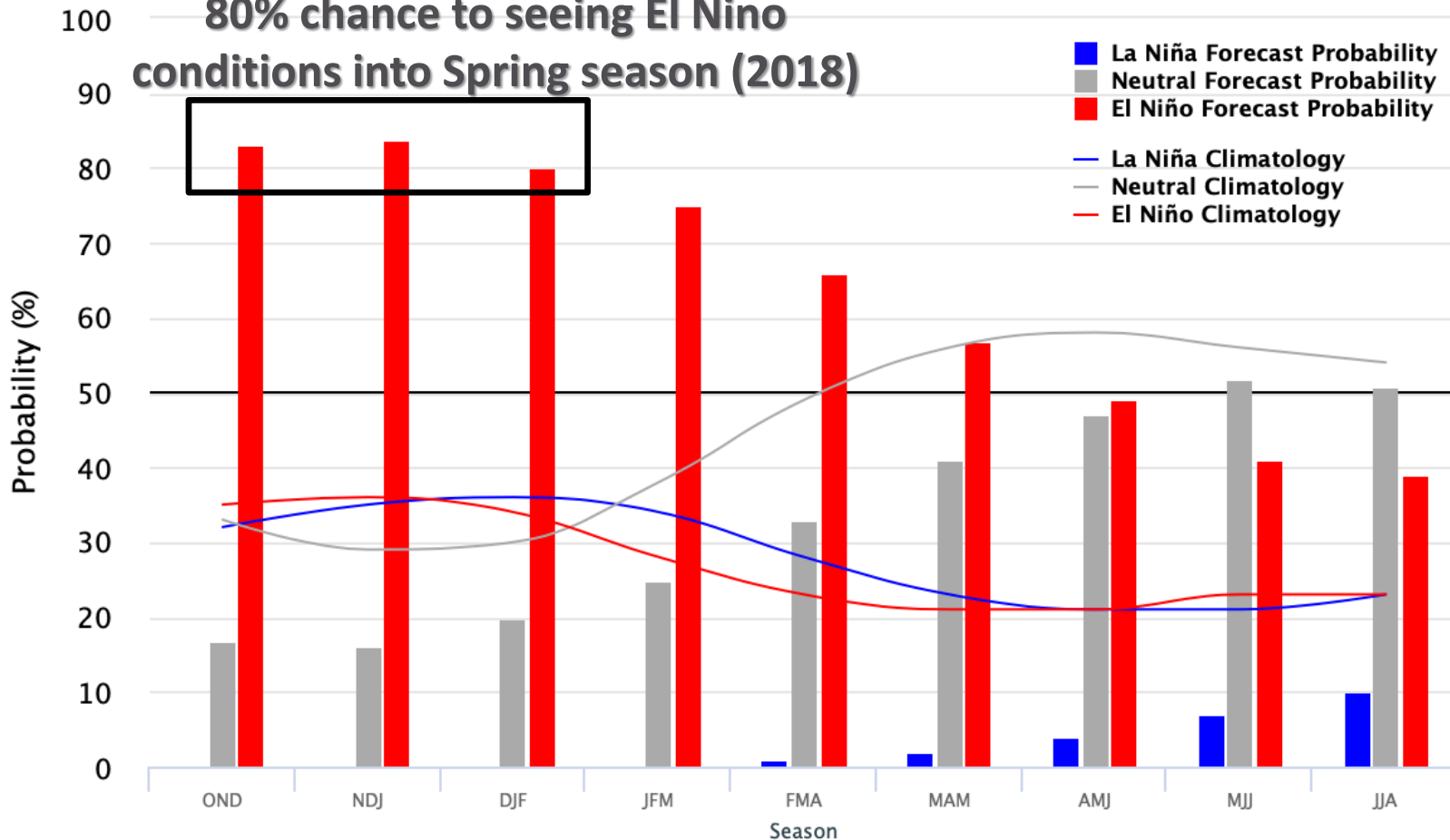
Looking back... 2018 ENSO

Early–November 2018 CPC/IRI Official Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly

Neutral ENSO: $-0.5\text{ }^{\circ}\text{C}$ to $0.5\text{ }^{\circ}\text{C}$

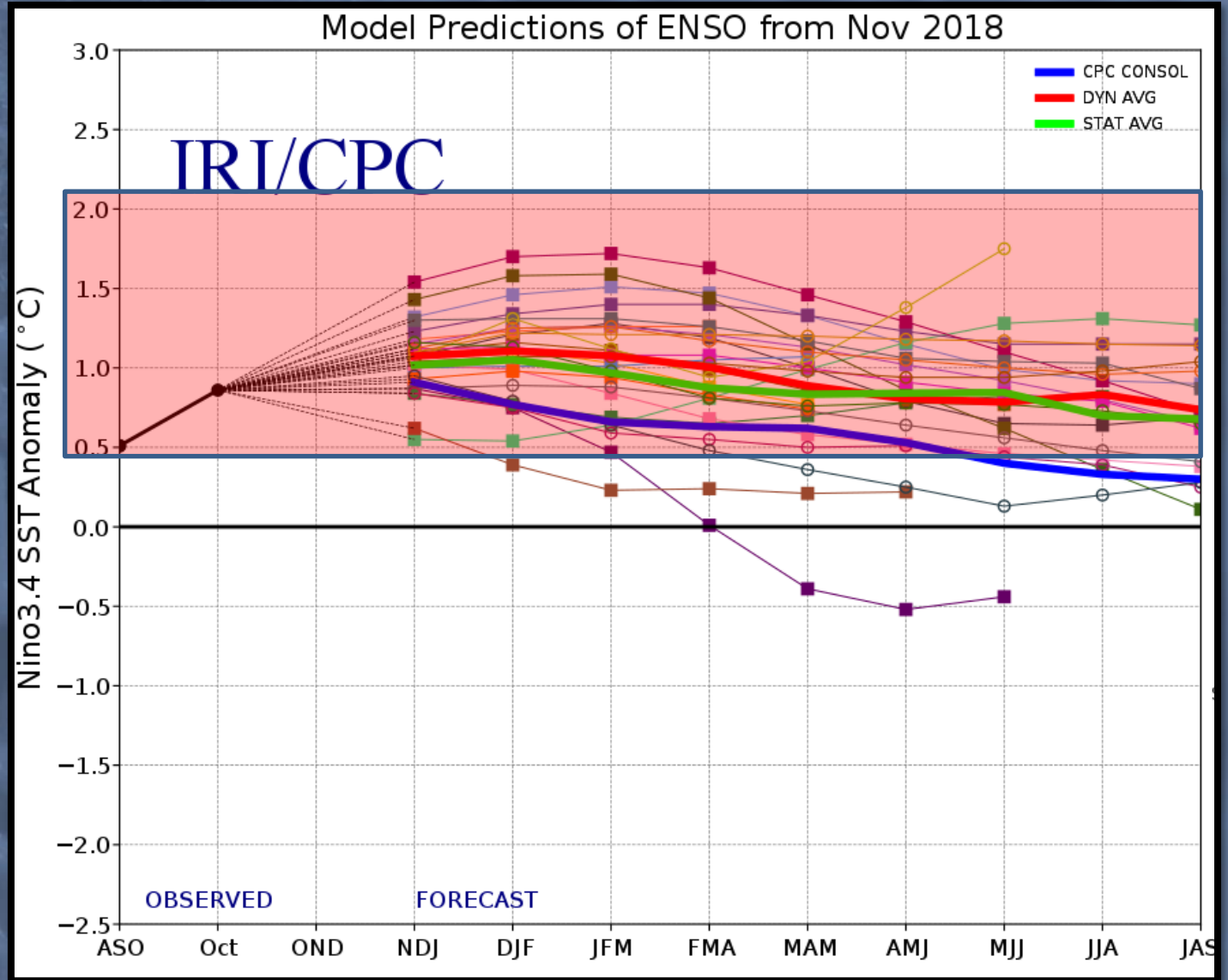
80% chance to seeing El Niño conditions into Spring season (2018)





Looking back... 2018 ENSO

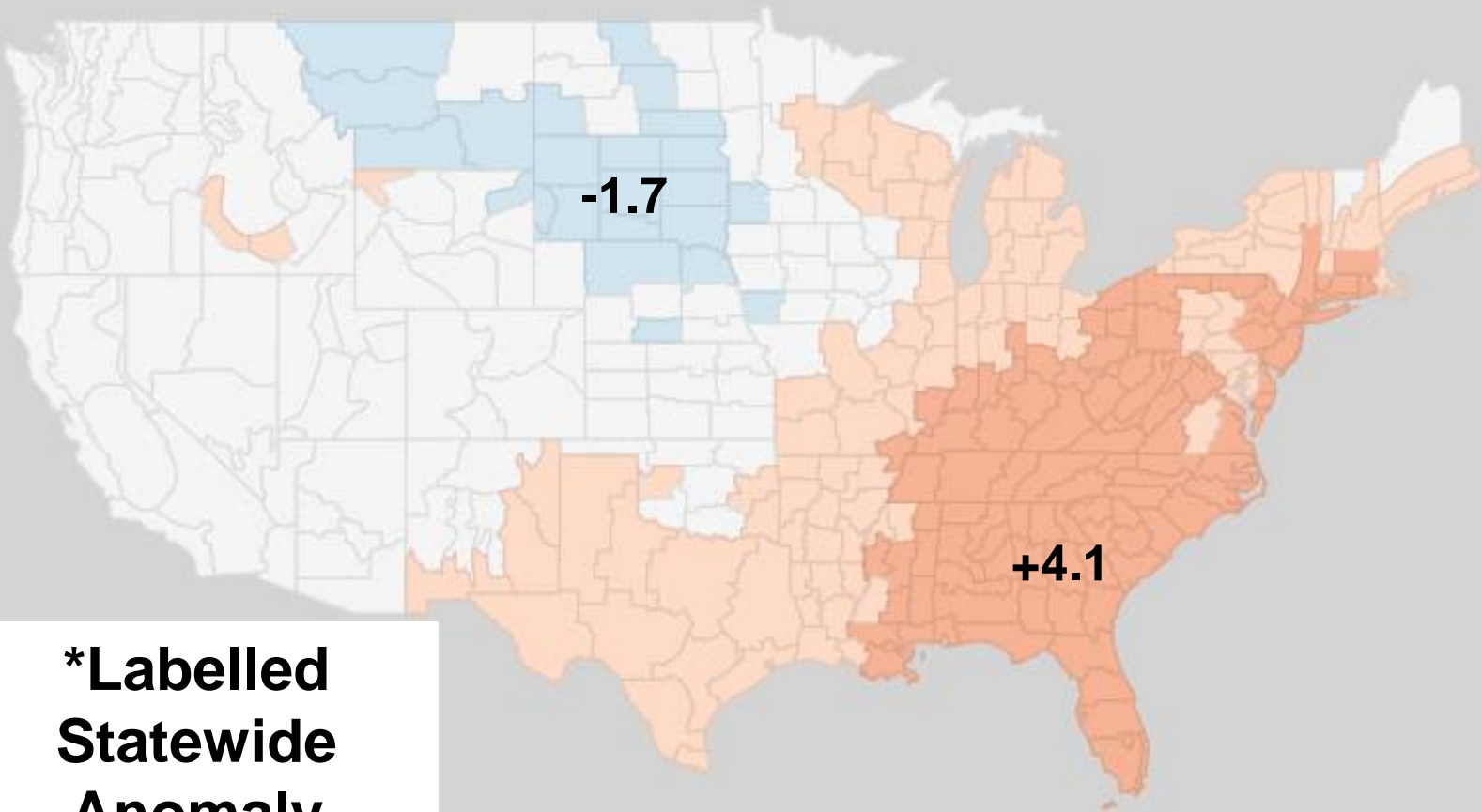
Red shaded area =
El Nino conditions





Last Winter - Temps

Divisional Avg Temp Anomalies (deg F),
Dec 2018-Feb 2019



***Labelled
Statewide
Anomaly**



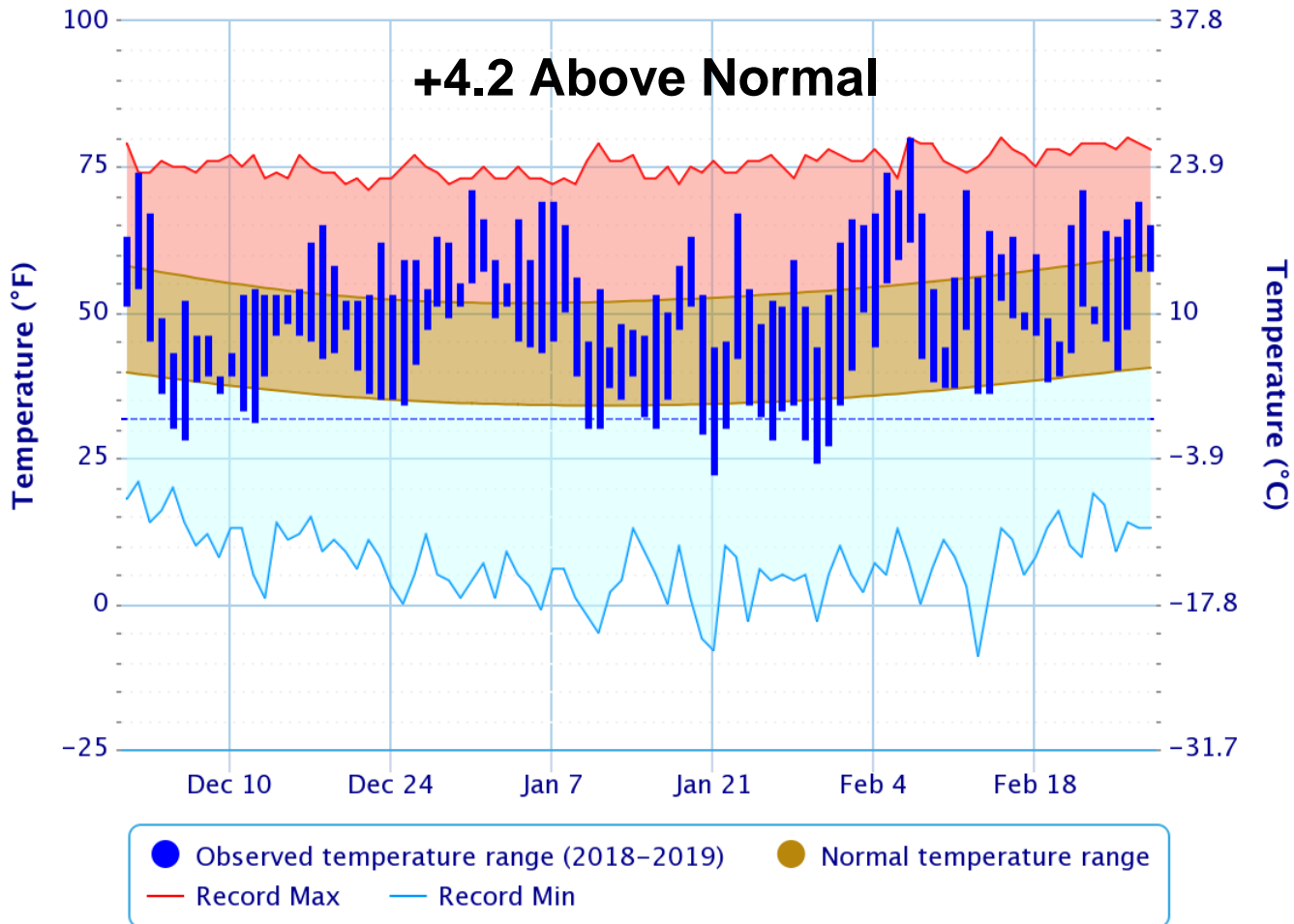


Last Winter - Temps



Daily Temperature Data – Atlanta Area, GA (ThreadEx)

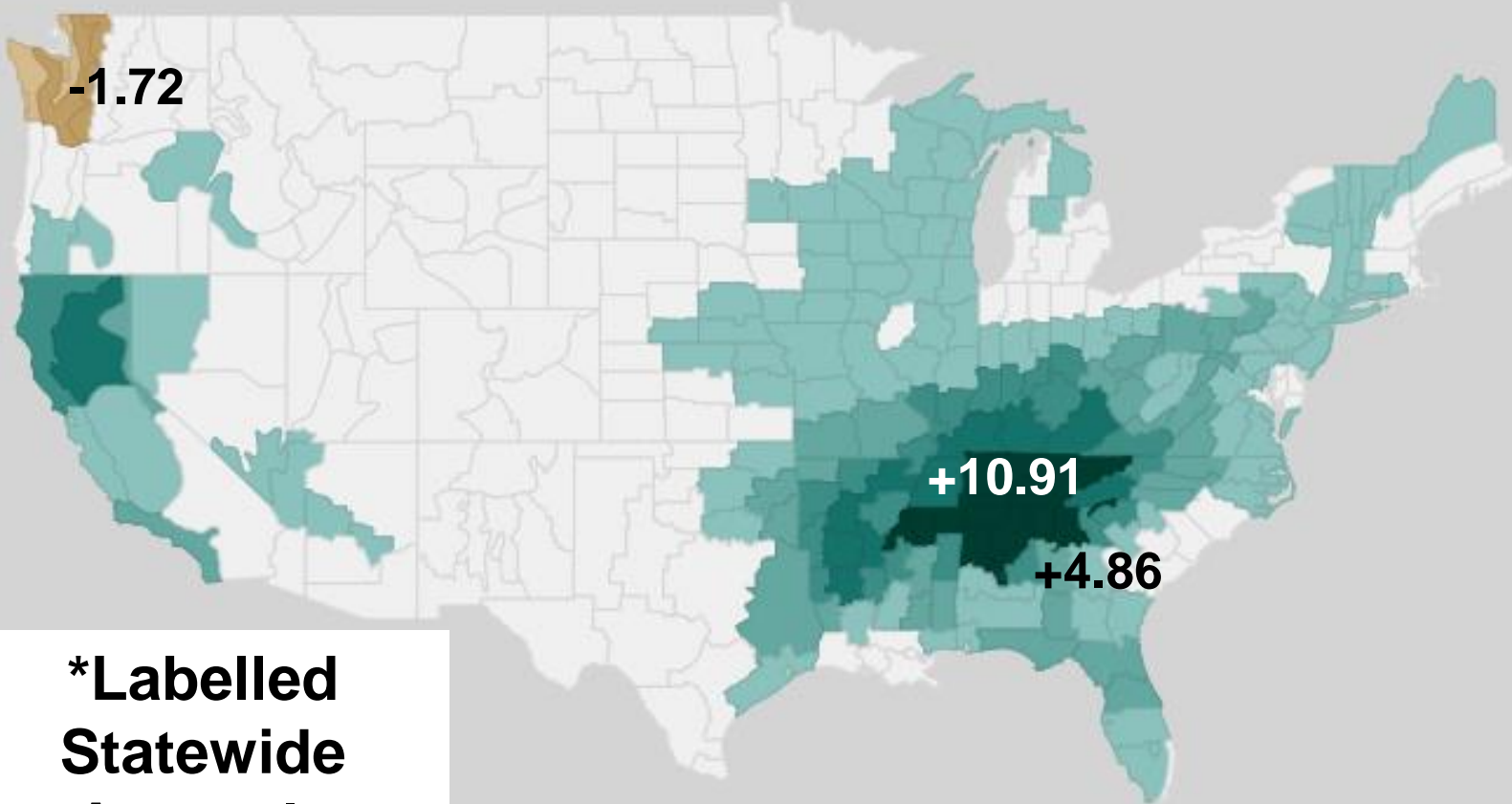
Period of Record – 1878-10-04 to 2019-03-07. Normals period: 1981-2010. Click and drag to zoom chart.





Last Winter - Precip

**Divisional Avg Precip Anomalies (Inches),
Dec 2018-Feb 2019**



***Labelled
Statewide
Anomaly**

-12 12

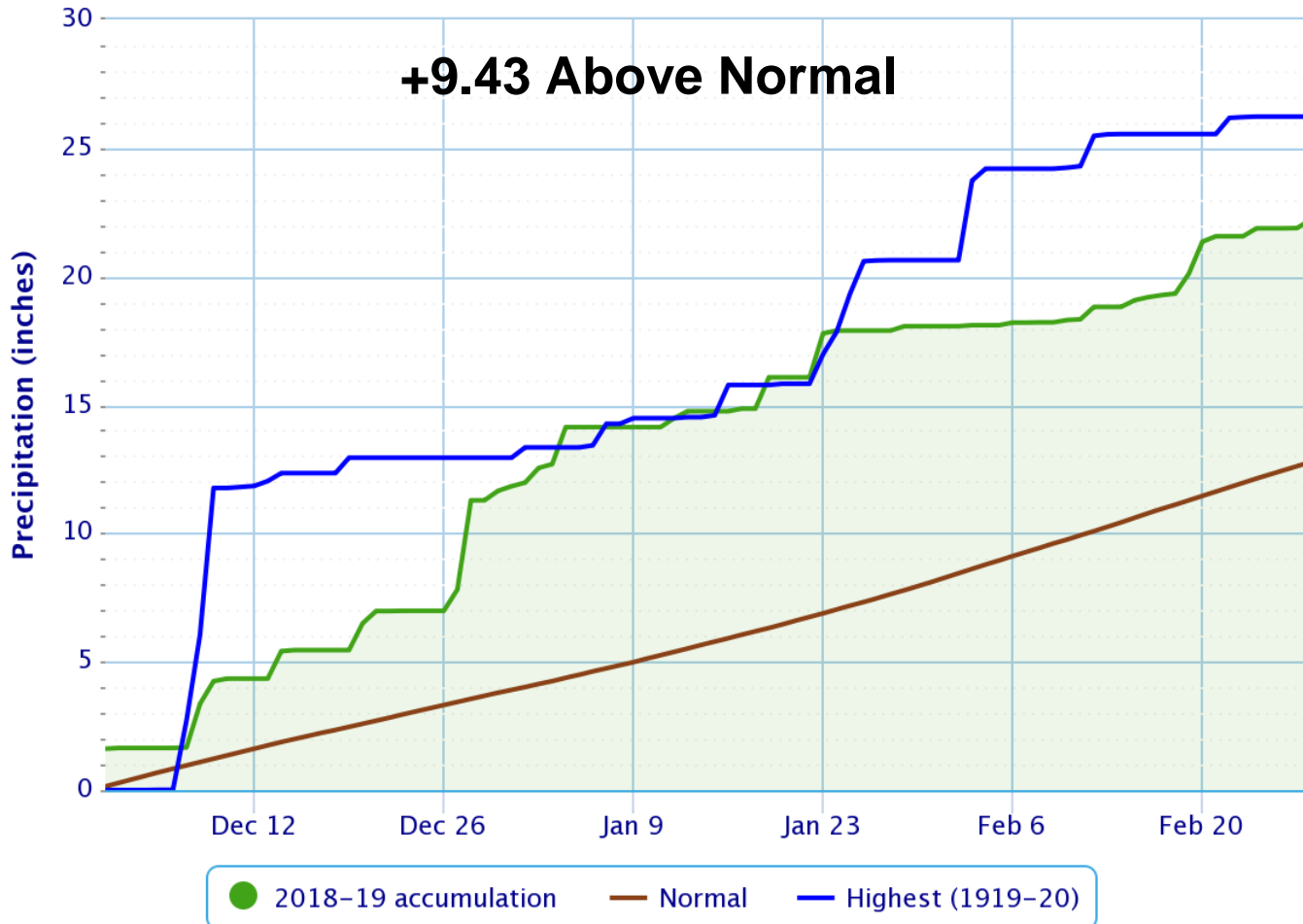


Last Winter - Precip



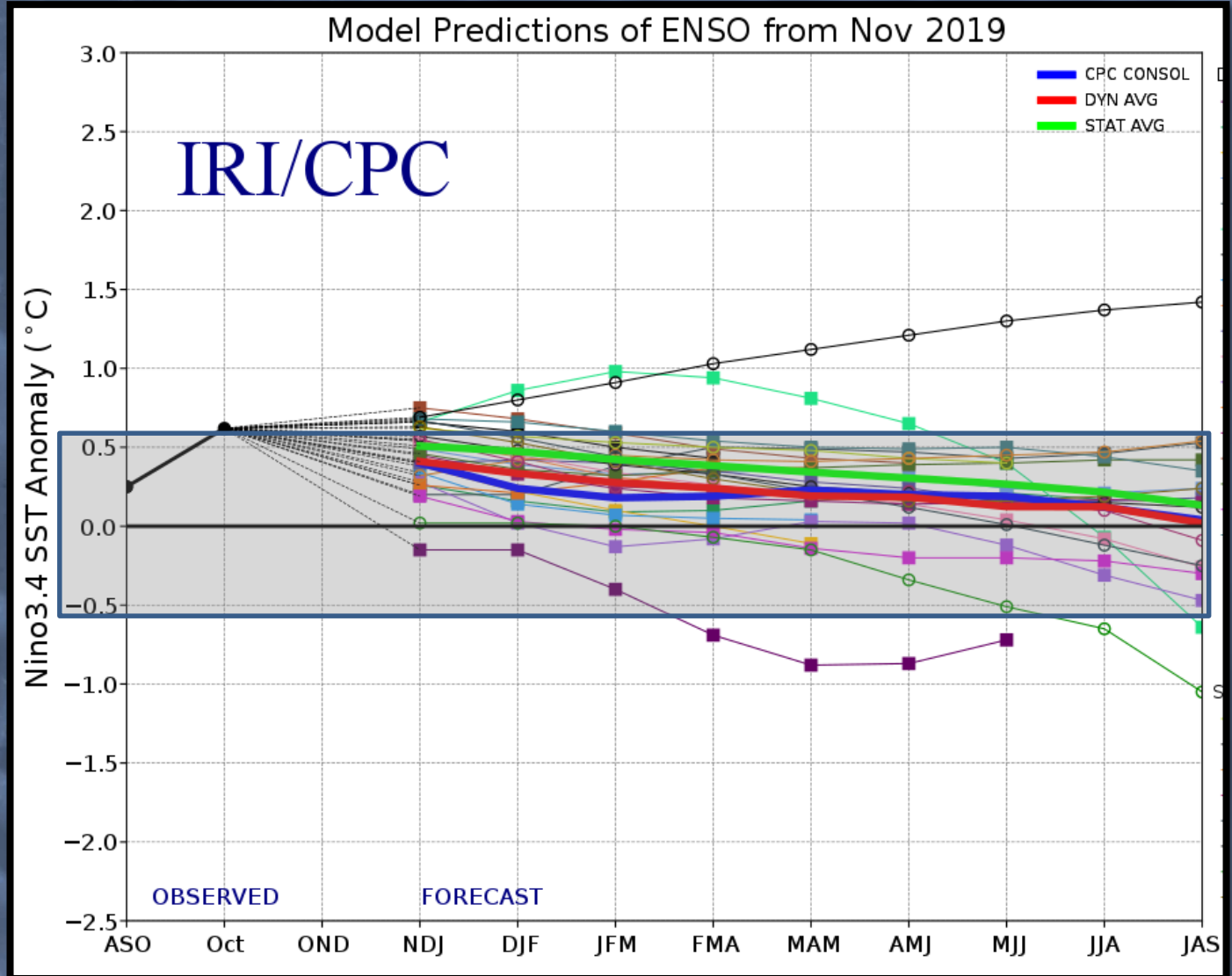
Accumulated Precipitation - Atlanta Area, GA (ThreadEx)

Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values





Latest 2019-20 ENSO Conditions



Gray shaded area = Neutral conditions

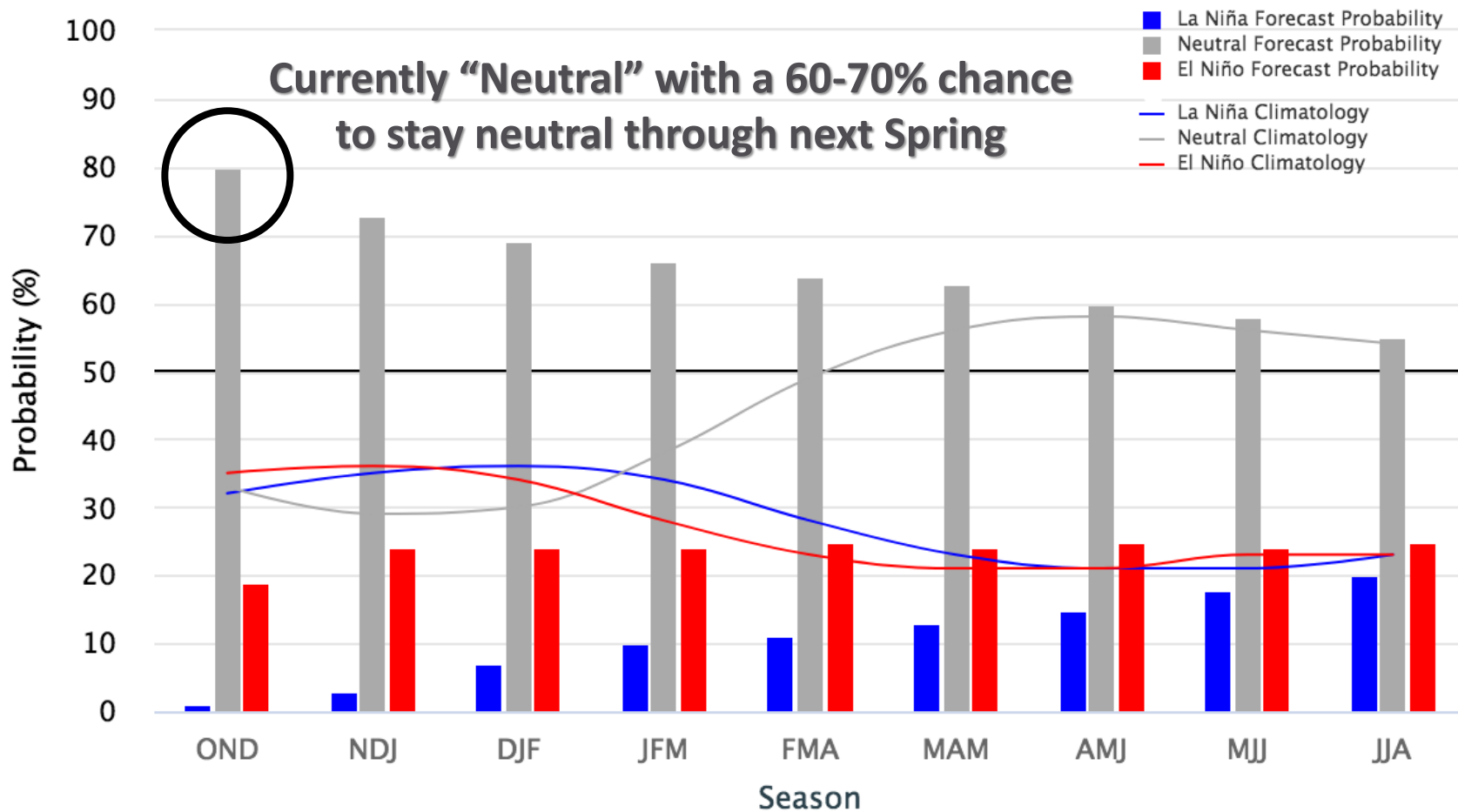


Latest 2019-20 ENSO Conditions

Early–November 2019 CPC/IRI Official Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly

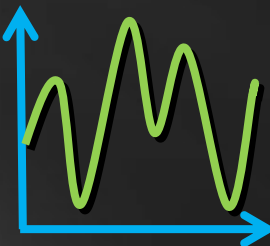

Neutral ENSO: $-0.5\text{ }^{\circ}\text{C}$ to $0.5\text{ }^{\circ}\text{C}$





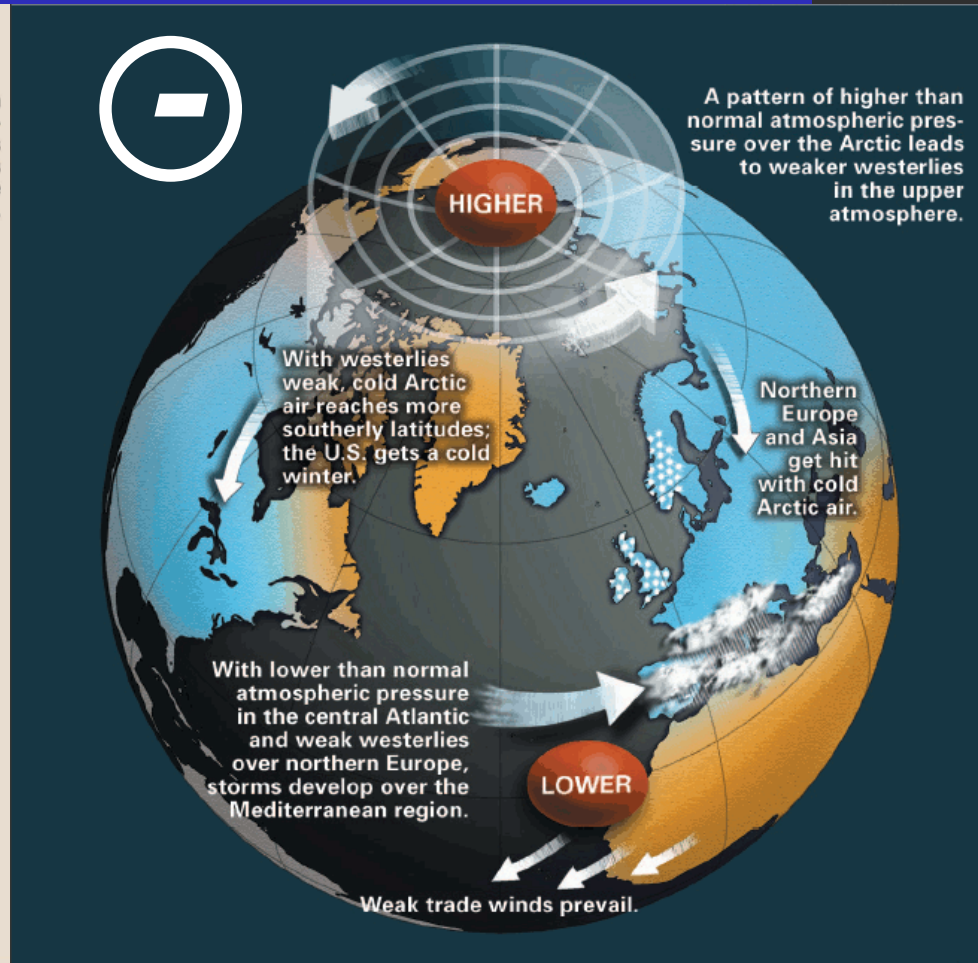
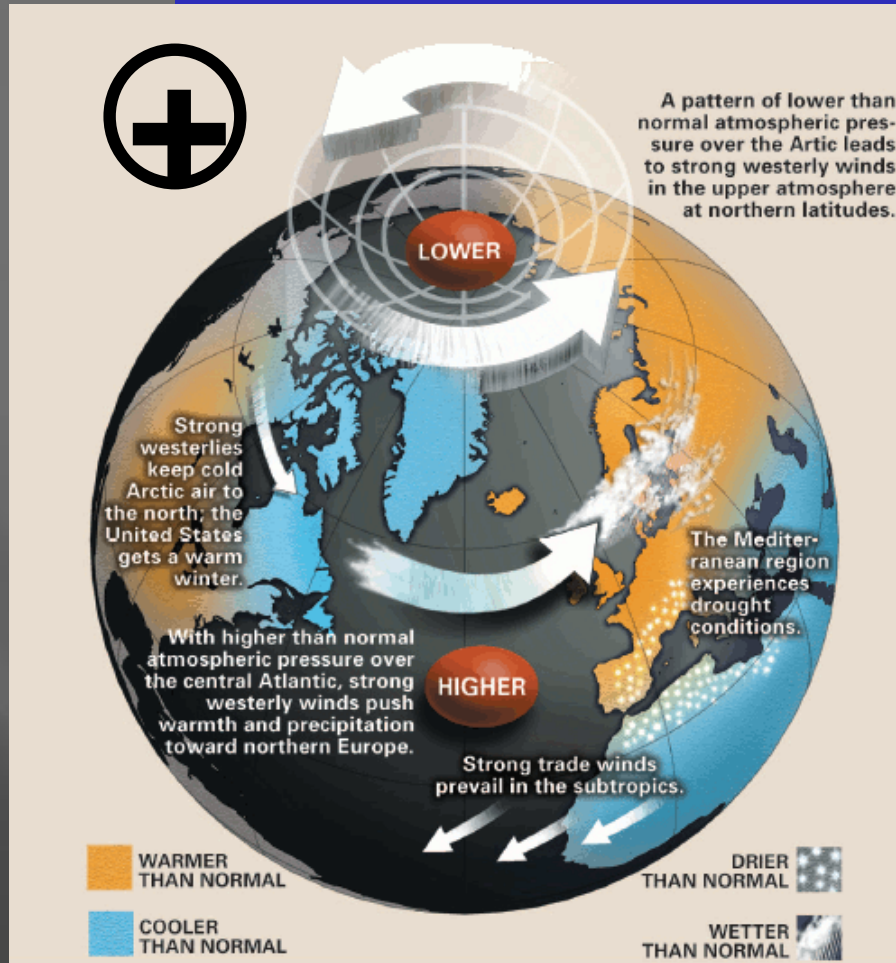
Neutral Conditions



- Likely to have more climate variability 
- More uncertainty in long term trends 
- Dependent on other shorter-lived patterns...

Other Influences

Arctic Oscillation (AO)



Negative phase has higher pressure weakening the polar vortex, which results in weaker westerlies and favors colder surges across the U.S.

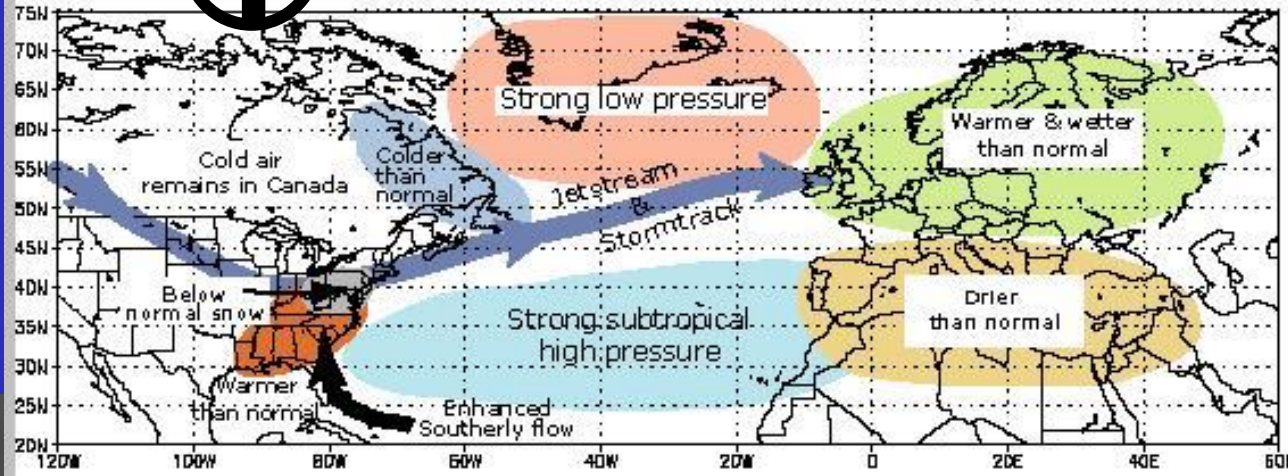
Other Influences

North Atlantic Oscillation (NAO)

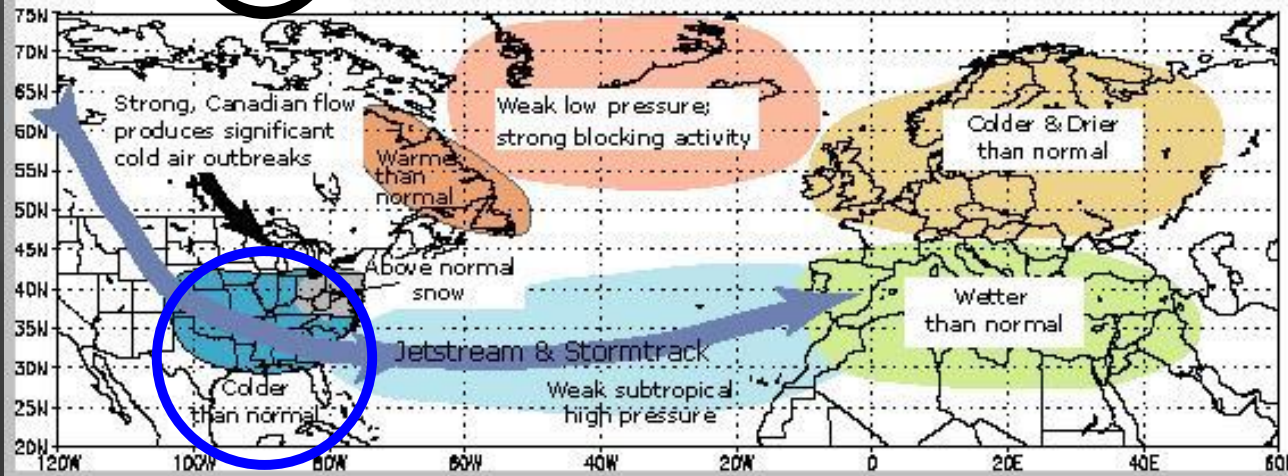
Negative: Strong blocking in North Atlantic allows further southward surges of Canadian airmass → colder and more active stormtrack in SE



Positive Phase of the Wintertime North Atlantic Oscillation (NAO)



Negative Phase of the Wintertime North Atlantic Oscillation (NAO)



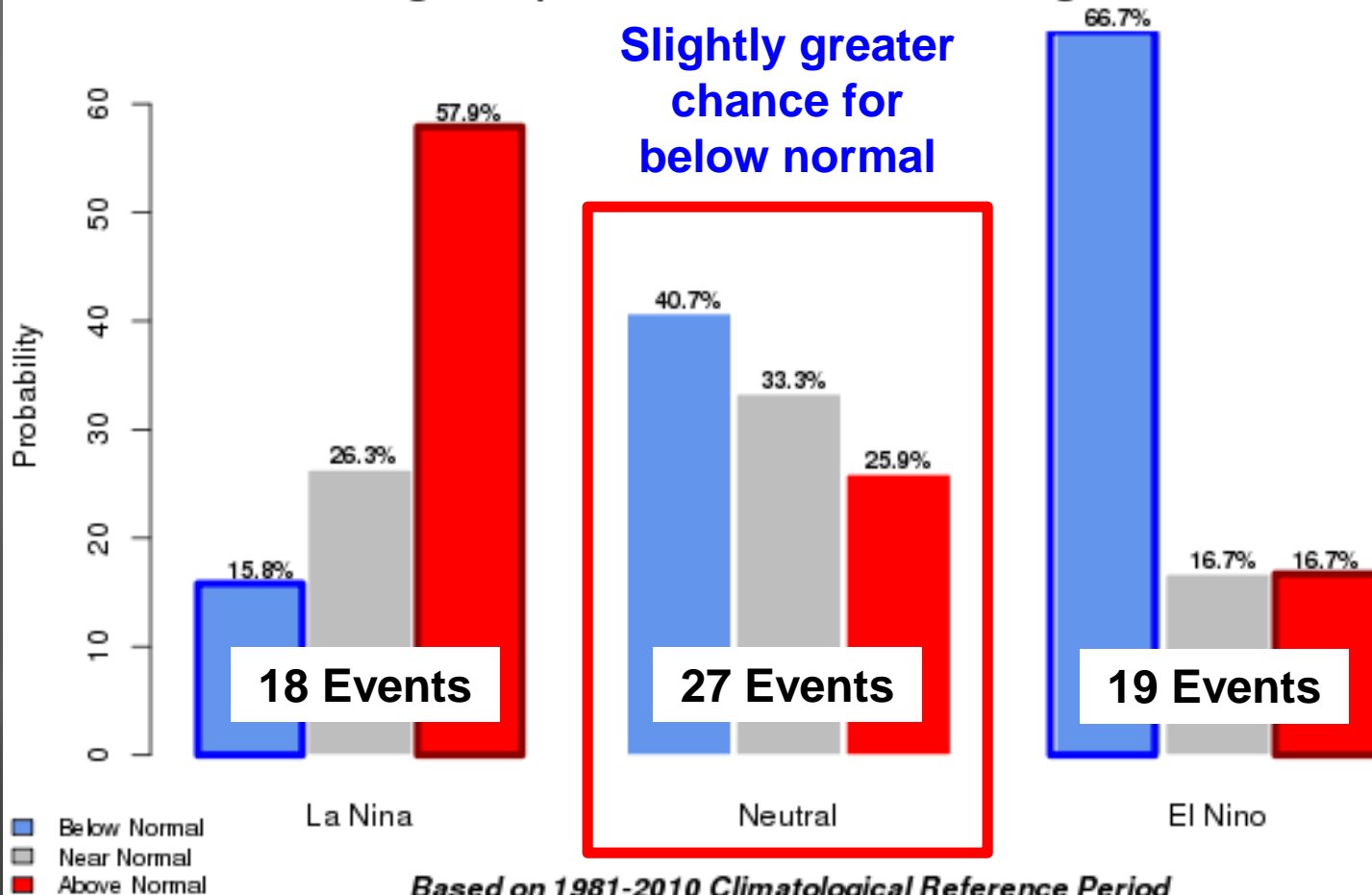


Neutral Conditions: Temps



North & Central GA

ENSO Probability Distribution [1950-2013] of January-February-March Average Temperature for CPC Forecast Regions ID #56



Based on 1981-2010 Climatological Reference Period
Bold borders indicate 90% statistical significance

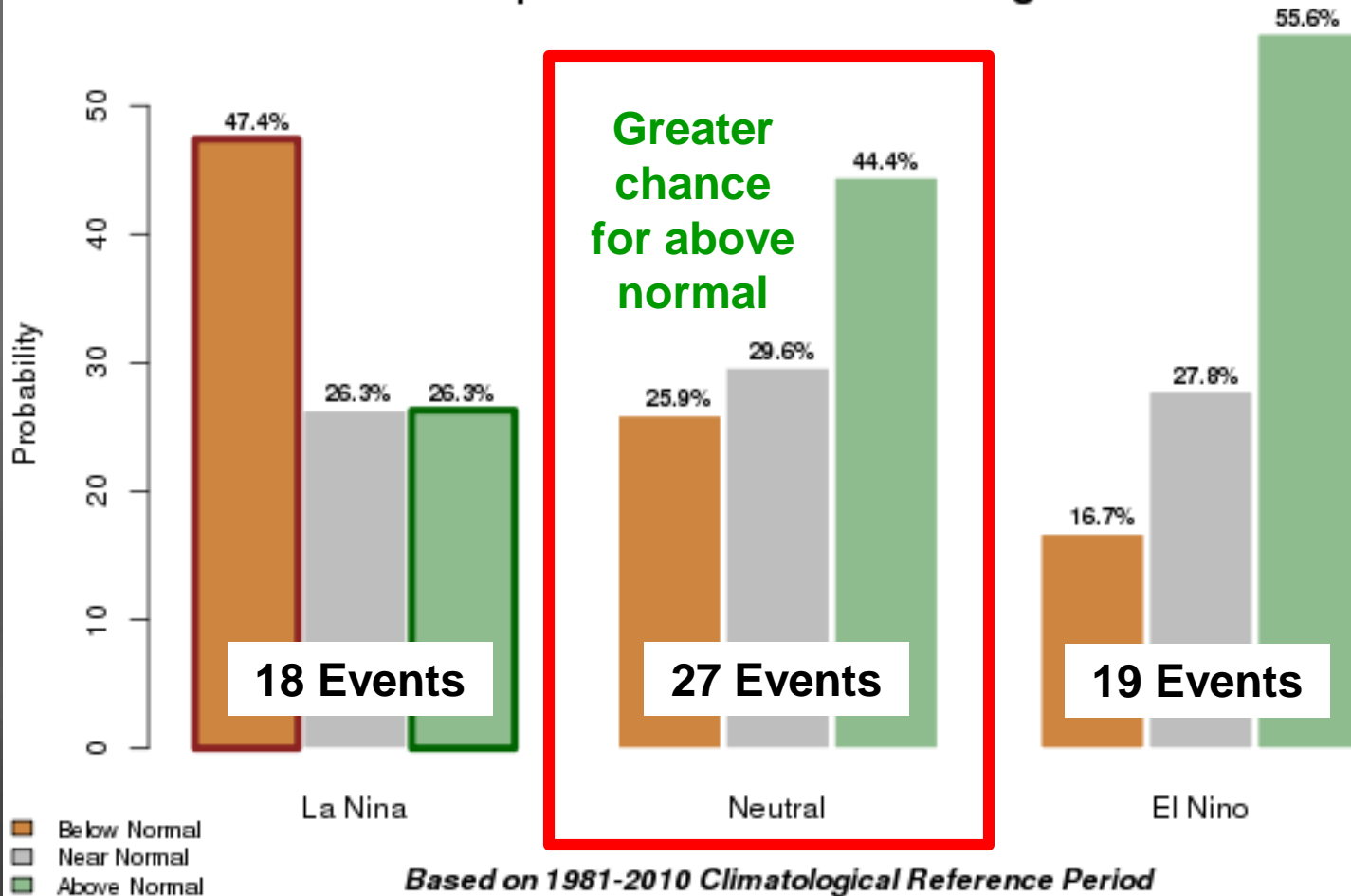


Neutral Conditions: Precip



North & Central GA

ENSO Probability Distribution [1950-2013] of January-February-March Total Precipitation for CPC Forecast Regions ID #56





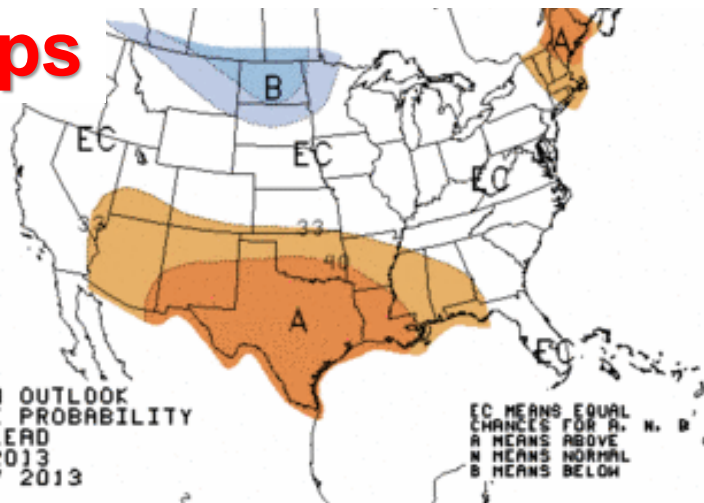
Last Neutral Fall into Winter



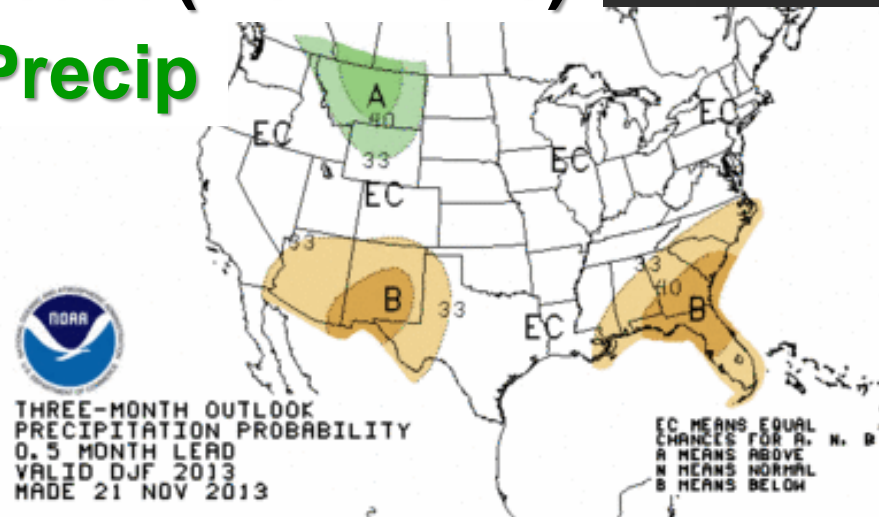
Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2010	1.5	1.3	0.9	0.4	-0.1	-0.6	-1.0	-1.4	-1.6	-1.7	-1.7	-1.6
2011	-1.4	-1.1	-0.8	-0.6	-0.5	-0.4	-0.5	-0.7	-0.9	-1.1	-1.1	-1.0
2012	-0.8	-0.6	-0.5	-0.4	-0.2	0.1	0.3	0.3	0.3	0.2	0.0	-0.2
2013	-0.4	-0.3	-0.2	-0.2	-0.3	-0.3	-0.4	-0.4	-0.3	-0.2	-0.2	-0.3
2014	-0.4	-0.4	-0.2	0.1	0.3	0.2	0.1	0.0	0.2	0.4	0.6	0.7
2015	0.6	0.6	0.6	0.8	1.0	1.2	1.5	1.8	2.1	2.4	2.5	2.6
2016	2.5	2.2	1.7	1.0	0.5	0.0	-0.3	-0.6	-0.7	-0.7	-0.7	-0.6
2017	-0.3	-0.1	0.1	0.3	0.4	0.4	0.2	-0.1	-0.4	-0.7	-0.9	-1.0
2018	-0.9	-0.8	-0.6	-0.4	-0.1	0.1	0.1	0.2	0.4	0.7	0.9	0.8
2019	0.8	0.8	0.8	0.8	0.6	0.5	0.3	0.1	0.1	0.3		

Archived CPC Forecast (Nov. 2013)

Temps



Precip





Last Neutral Fall into Winter



Winter of 2013-2014...





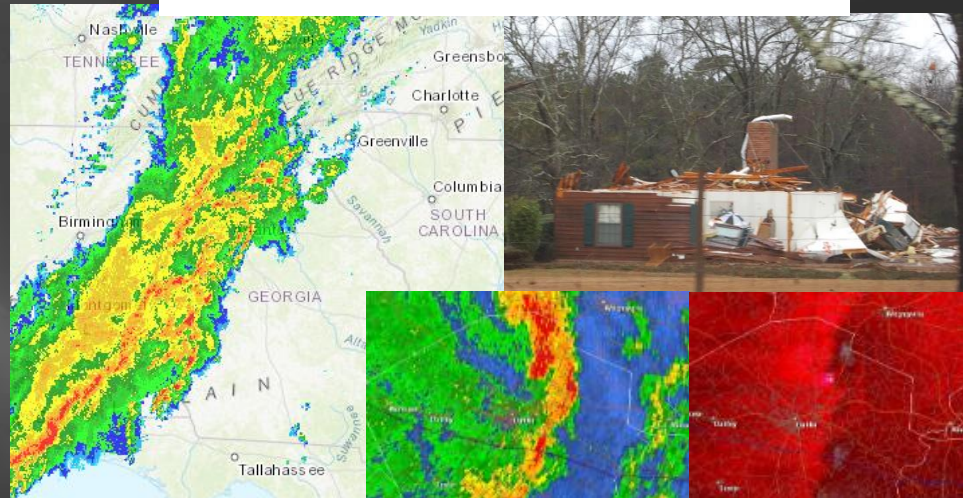
Winter of 2013-2014...



Jan 28-29 Winter Storm ("SnowJam")



Feb 21 Severe Weather

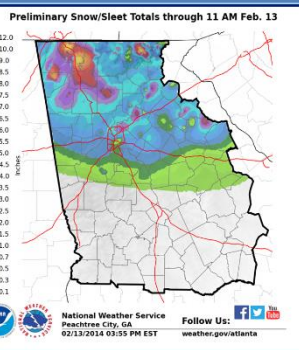


Feb 11-13 Heavy Snow/Ice Event

Comparison of Snow and Sleet Forecast vs. Observed Accumulations



Forecast

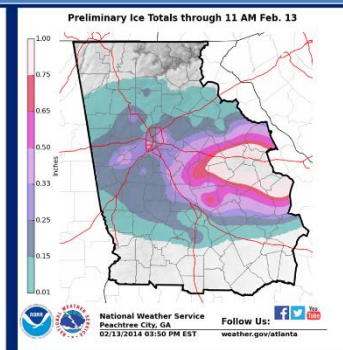


Observed

Comparison of Freezing Rain Forecast vs. Observed Accumulations



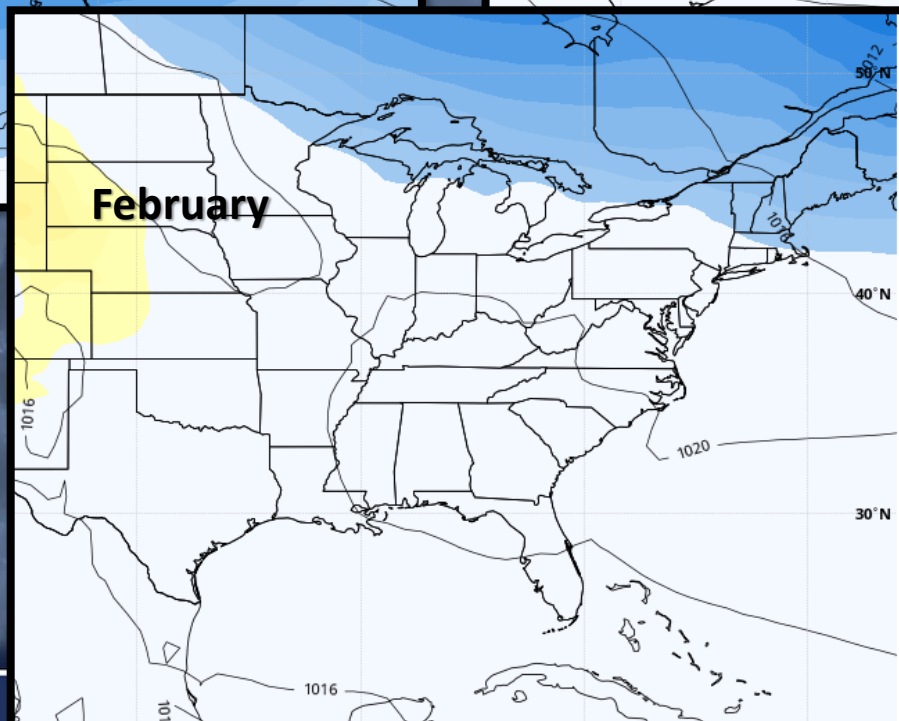
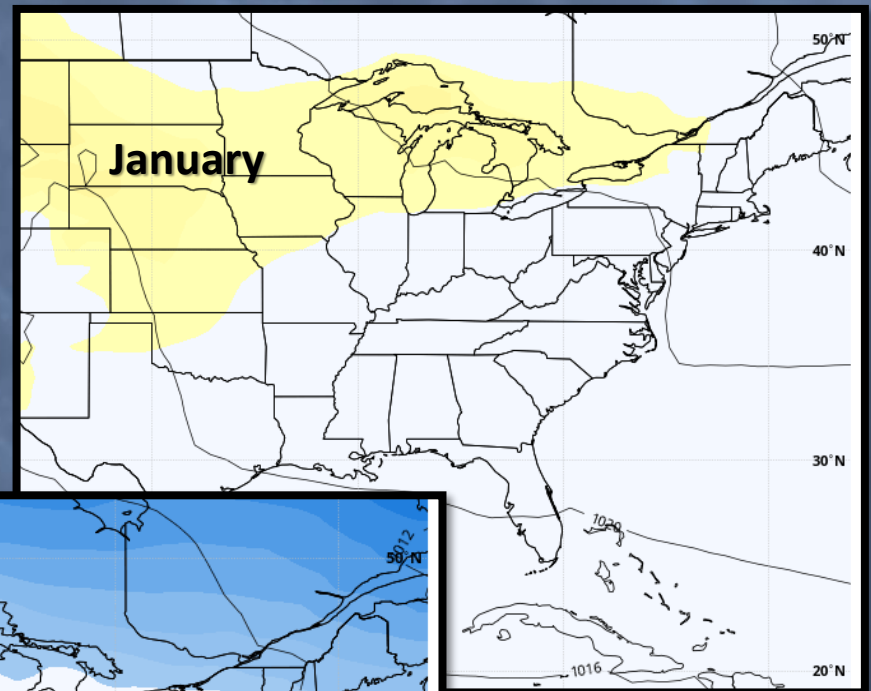
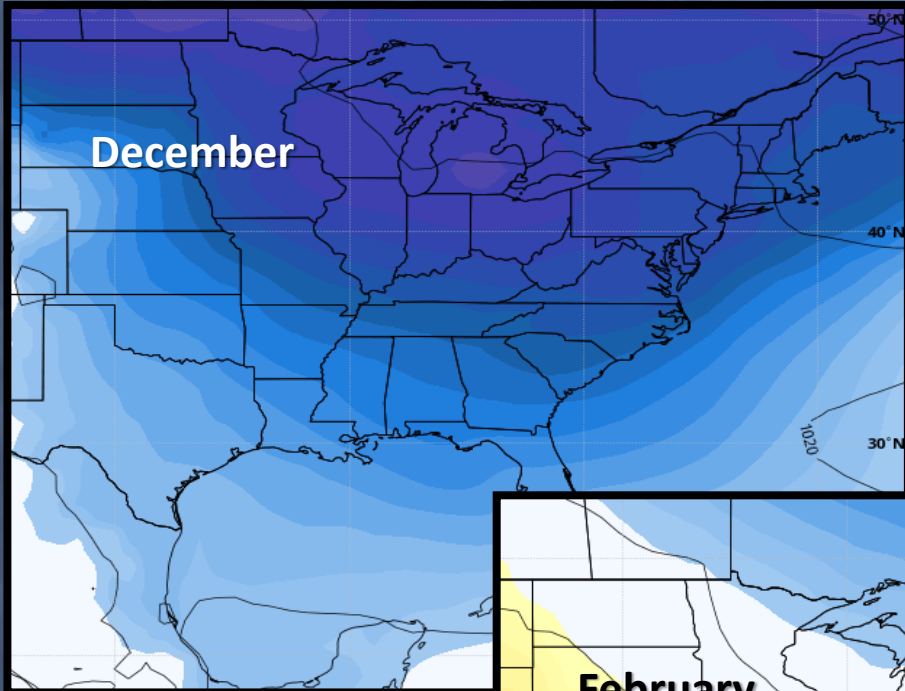
Forecast



Observed

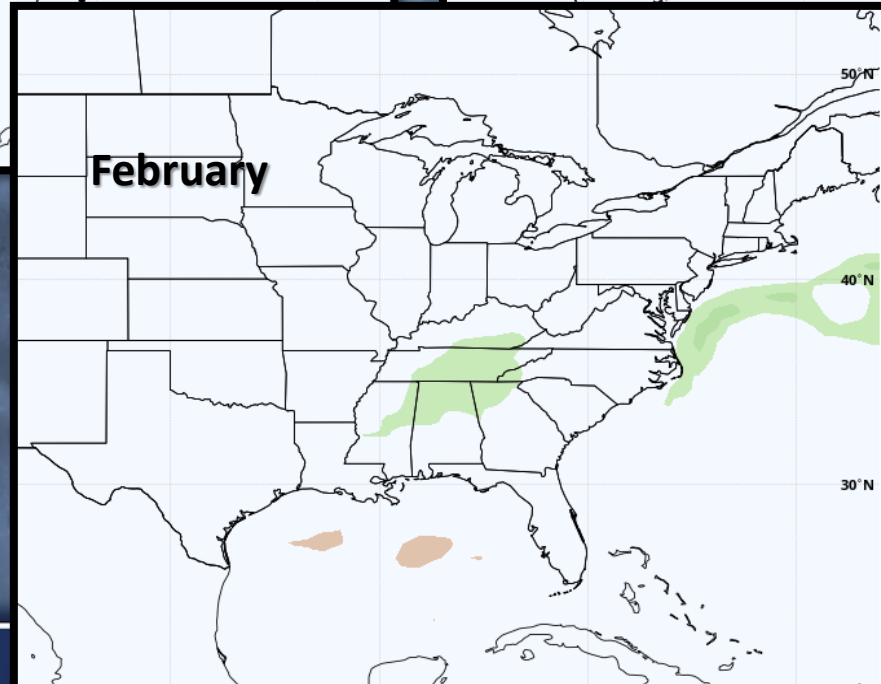
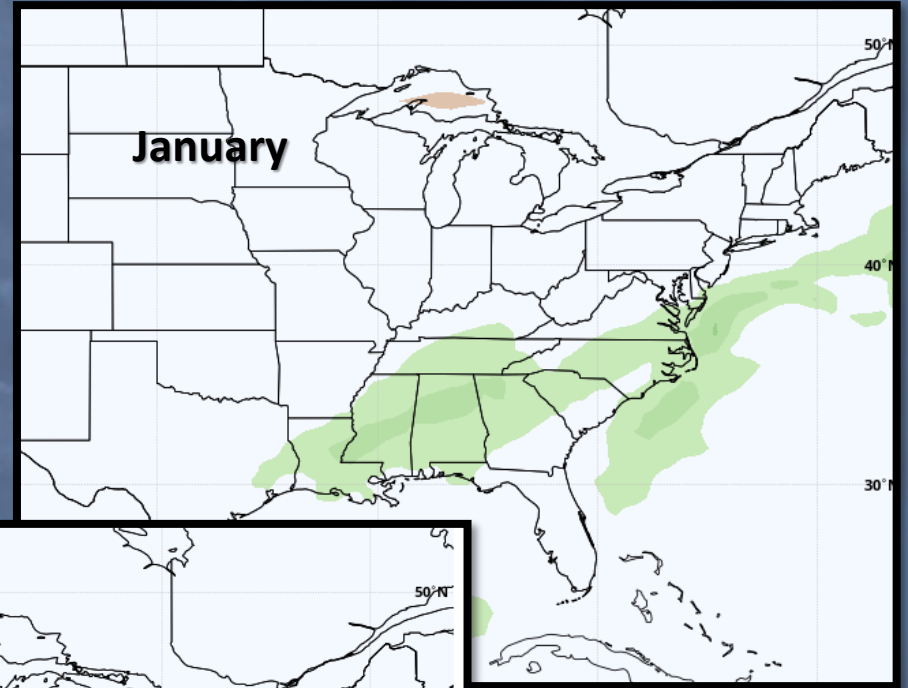
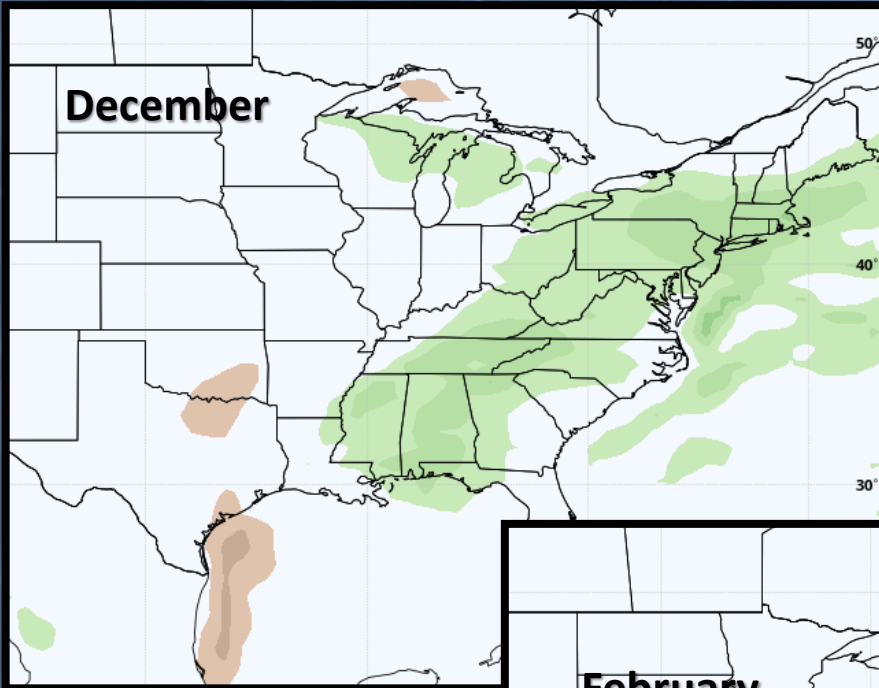


ECMWF Seasonal Outlook - Temperature





ECMWF Seasonal Outlook - Precipitation





Other “outlooks” – private weather groups

December 2019 - February 2020 Forecast

Temperature Anomaly
Published 11/27/2019

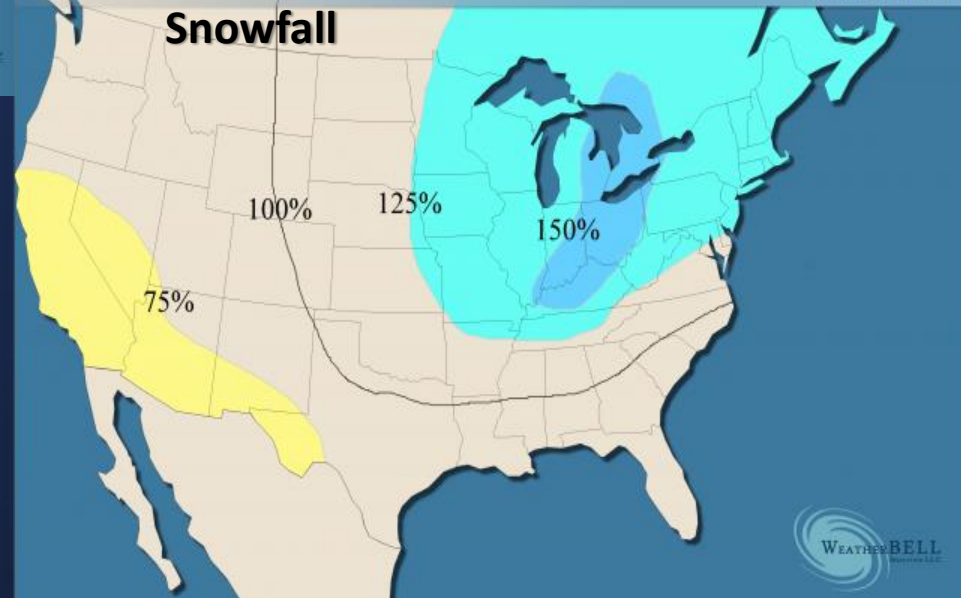
Temperatures



Winter 2019-2020 Forecast

Snowfall (as % of normal)
Published 8/29/2019

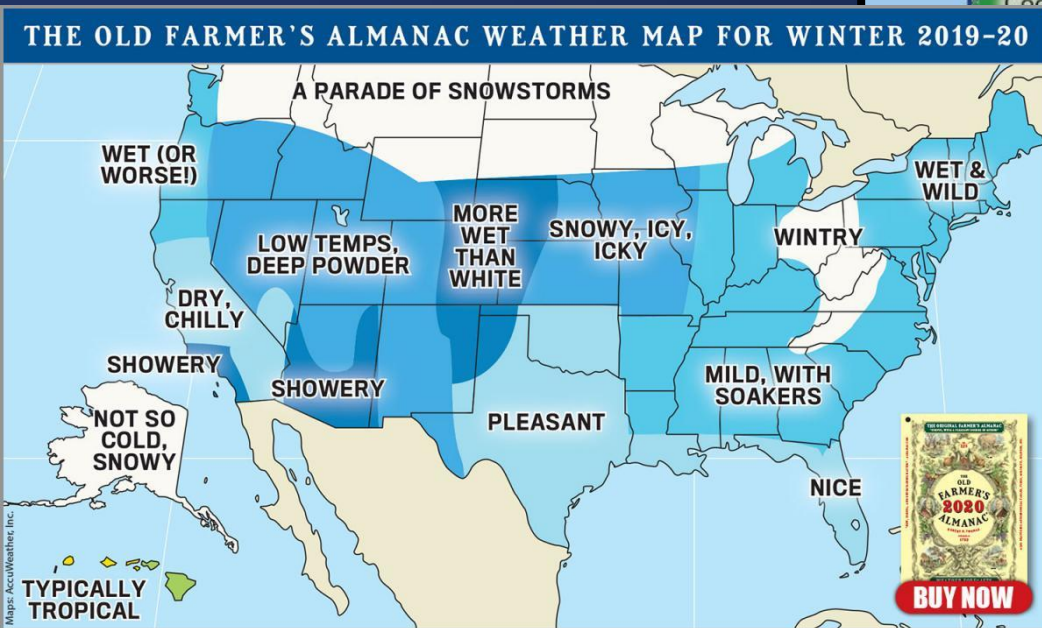
Snowfall





What does this all mean for our Winter?

- At this point... very little. 😊





Communication & Product Review



Connecting w/ our core Partners

- Emails / Special Weather Briefings
 - Winter briefing schedule:
11am, 4pm, 930pm, 330am (if necessary)
- Web graphics / Social Media
(www.weather.gov)
- NWSChat (2-way comms)
- Outreach & Training
 - StormReady
 - Preparedness Weeks
 - TTX / full-scale exercises





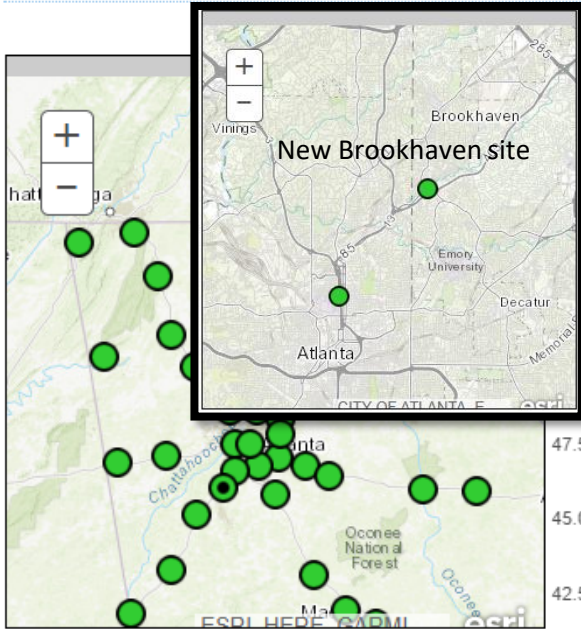
Real-time Weather Observations

55-60 GDOT Road Weather Sensors – www.weather.gov/ffc/gdot_rwis

RWIS data from GDOT

Weather.gov > [Peachtree City, GA](http://Peachtree_City_GA) > RWIS data from GDOT

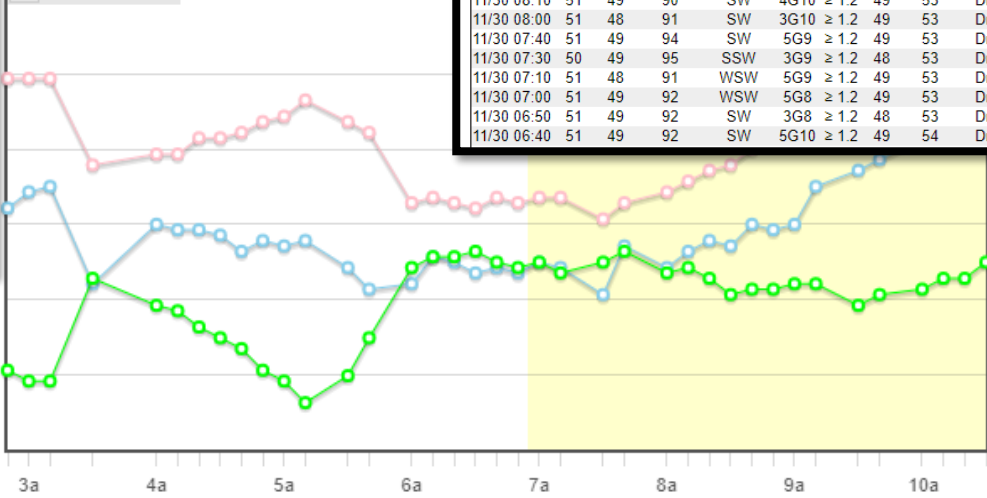
Current Hazards Current Conditions Radar Forecasts Rivers and Lakes Climate and Past Weather



(click on point to retrieve data for that station)

I-85 at SR74/Senoia Rd.

- Obs air temp
- Obs road temp
- Obs dewpt temp



data

AirTemp DewptTemp RoadTemp

Date (Local)	Temp (°F)	Dew Point (°F)	Relative Humidity (%)	Wind Direction	Wind Speed (kts)	Vsby (mi)	Road Temp (°F)	SubSfc Temp (°F)	Road Surface	1h Pcp (in)	12h Pcp (in)	24h Pcp (in)
11/30 10:30	58	49	73	SSW	3G8	≥ 1.2	55	53	Dry	0.0	0.0	0.0
11/30 10:20	57	48	73	SSW	4G8	≥ 1.2	54	53	Dry	0.0	0.0	0.0
11/30 10:10	57	48	73	SW	3G8	≥ 1.2	55	53	Dry	0.0	0.0	0.0
11/30 10:00	56	48	75	S	3G9	≥ 1.2	53	53	Dry	0.0	0.0	0.0
11/30 09:40	55	48	78	SSW	3G6	≥ 1.2	52	53	Dry	0.0	0.0	0.0
11/30 09:30	54	47	78	SW	4G9	≥ 1.2	52	53	Dry	0.0	0.0	0.0
11/30 09:10	53	48	83	SW	4G8	≥ 1.2	51	53	Dry	0.0	0.0	0.0
11/30 09:00	53	48	84	SW	5G9	≥ 1.2	50	53	Dry	0.0	0.0	0.0
11/30 08:50	53	48	84	SSW	3G9	≥ 1.2	50	53	Dry	0.0	0.0	0.0
11/30 08:40	53	48	84	SSW	3G10	≥ 1.2	50	53	Dry	0.0	0.0	0.0
11/30 08:30	52	48	85	SW	3G9	≥ 1.2	49	53	Dry	0.0	0.0	0.0
11/30 08:20	52	48	88	SW	4G9	≥ 1.2	49	53	Dry	0.0	0.0	0.0
11/30 08:10	51	49	90	SW	4G10	≥ 1.2	49	53	Dry	0.0	0.0	0.0
11/30 08:00	51	48	91	SW	3G10	≥ 1.2	49	53	Dry	0.0	0.0	0.0
11/30 07:40	51	49	94	SW	5G9	≥ 1.2	49	53	Dry	0.0	0.0	0.0
11/30 07:30	50	49	95	SSW	3G9	≥ 1.2	48	53	Dry	0.0	0.0	0.0
11/30 07:10	51	48	91	WSW	5G9	≥ 1.2	49	53	Dry	0.0	0.0	0.0
11/30 07:00	51	49	92	WSW	5G8	≥ 1.2	49	53	Dry	0.0	0.0	0.0
11/30 06:50	51	49	92	SW	3G8	≥ 1.2	48	53	Dry	0.0	0.0	0.0
11/30 06:40	51	49	92	SW	5G10	≥ 1.2	49	54	Dry	0.0	0.0	0.0

- Legend**
- Dry
 - Wet
 - Snow/Ice
 - Water/Snow
 - Dew
 - Melt. Snow
 - Ice
 - Black Ice

New sites: Brookhaven, Athens (2), Rome



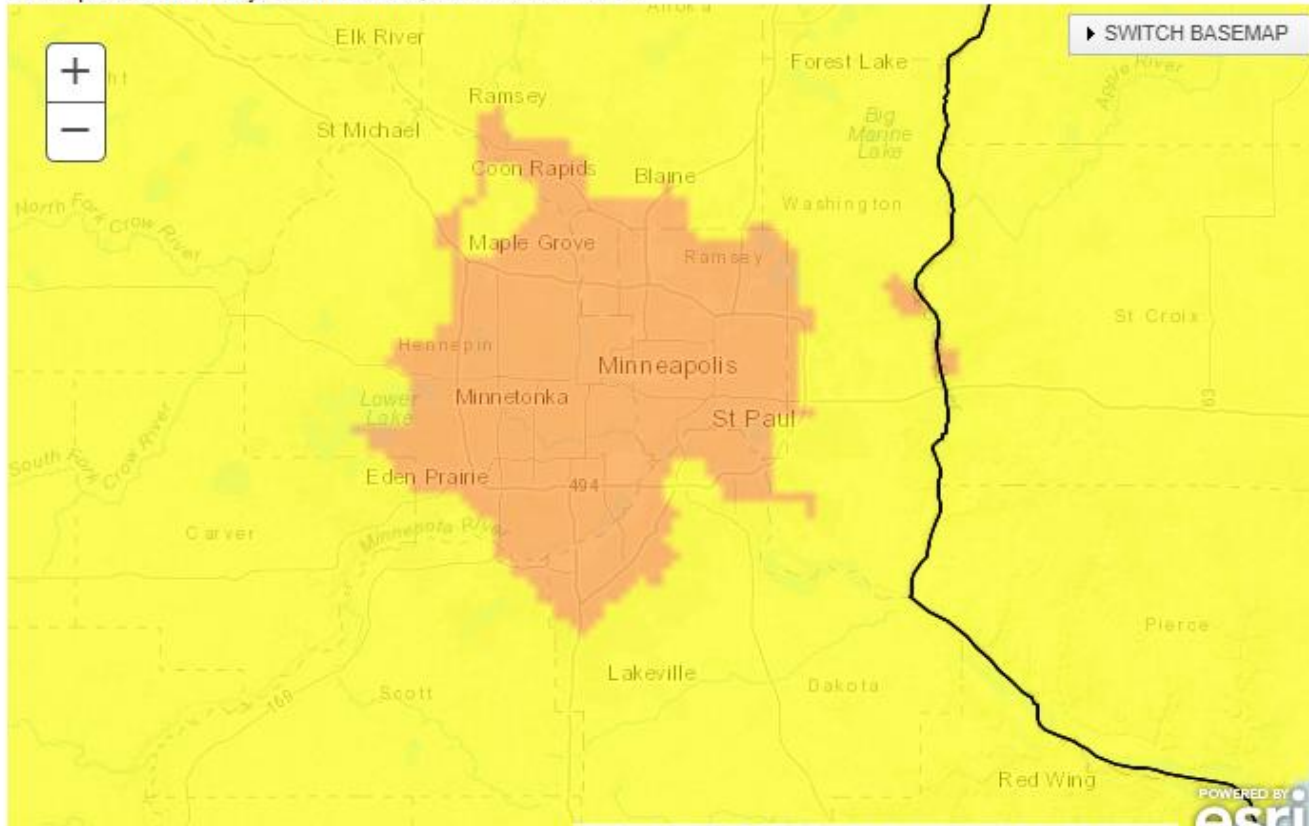
Winter Storm Severity Index

**** NOTE: Experimental Product (2nd year NWS Atlanta is participating)**

Select Zoom Area: [MPX] Twin Cities/Chanh ▾

Print Map

Winter Storm Severity Index - Effective From Mon, Dec 09, 2019 12 PM ET Through Wed, Dec 11, 2019 07 PM ET
Last Updated: Monday December 09, 2019 12:39 PM ET



Potential Winter Storm Impacts	
	<p>No Impacts Impacts not expected.</p>
	<p>Limited Impacts Rarely a direct threat to life and property. Typically results in little inconveniences.</p>
	<p>Minor Impacts Rarely a direct threat to life and property. Typically results in an inconvenience to daily life.</p>
	<p>Moderate Impacts Often threatening to life and property, some damage unavoidable. Typically results in disruptions to daily life.</p>
	<p>Major Impacts Extensive property damage likely, life saving actions needed. Will likely result in major disruptions to daily life.</p>
	<p>Extreme Impacts Extensive and widespread severe property damage, life saving actions will be needed. Results in extreme disruptions to daily life.</p>

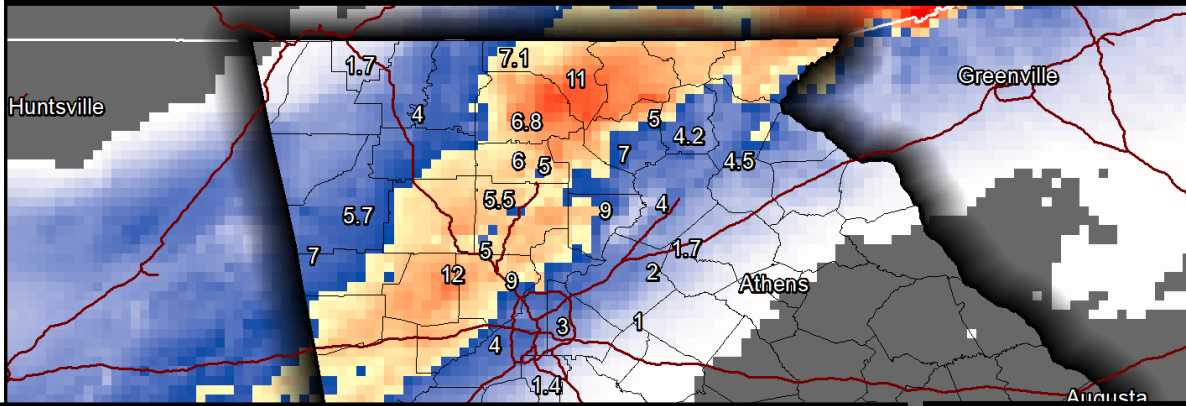


Winter Storm Severity Index

Looking back at the December 8, 2017 Heavy Snow event

Snowfall Totals From December 8th and 9th

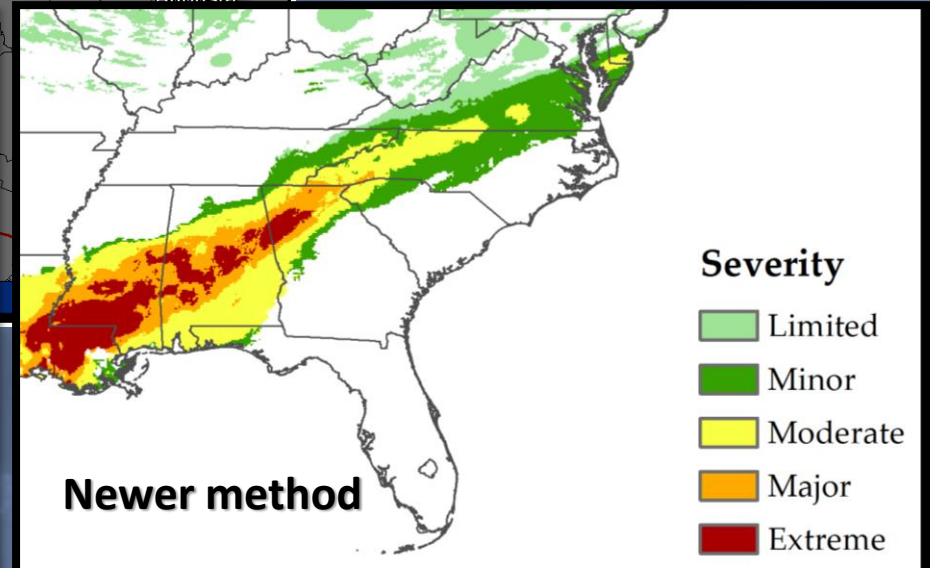
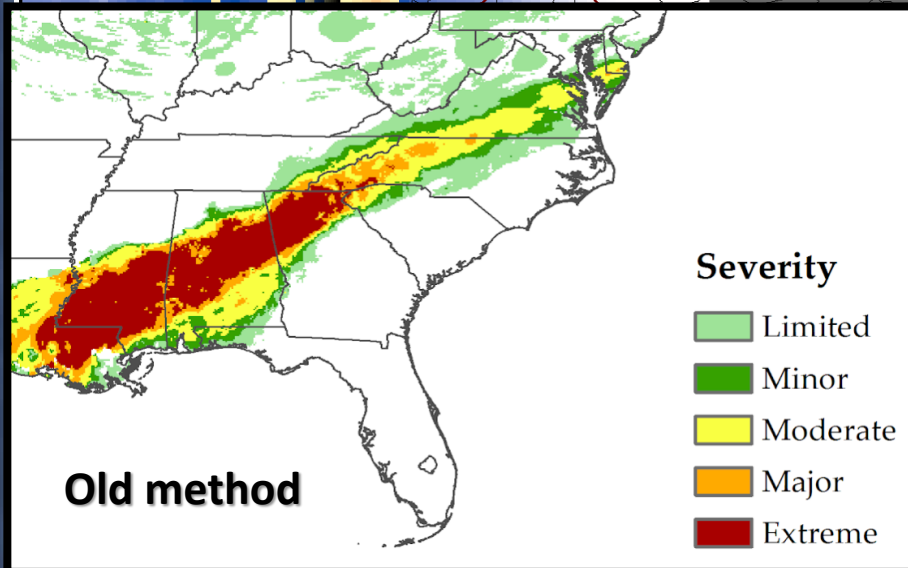
Weather Forecast Office
Atlanta, GA



Primary WSSI Components being weighed were:

- Snow amounts
- Snow load

Plus climatology (historical records)



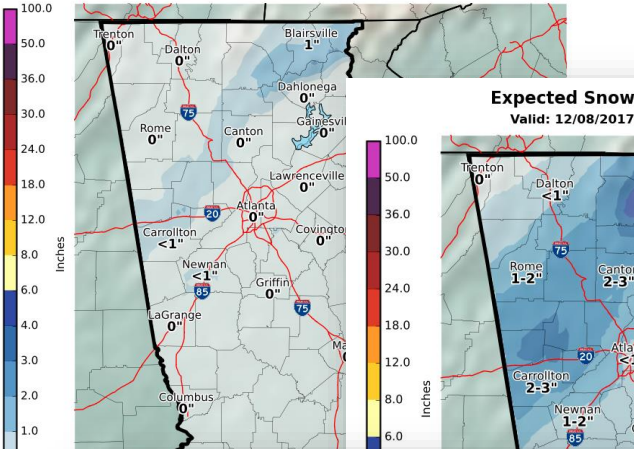


Winter Snow/Ice Probabilistic Forecasts

www.weather.gov/ffc/winter

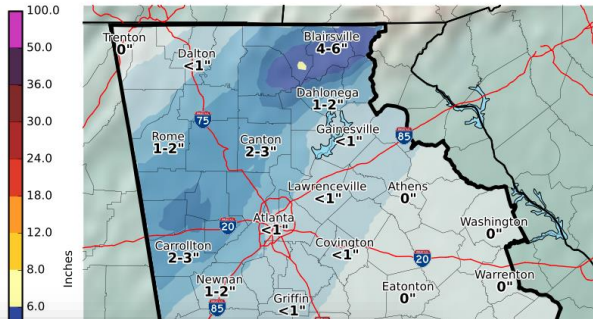
Low End Amount - 9 in 10 Chance (90%) Of Higher Snowfall

Valid: 12/08/2017 10:00 AM - 12/09/2017 07:00 AM



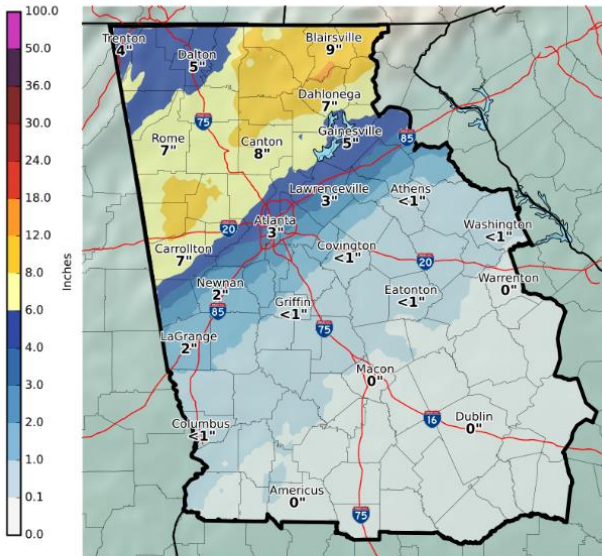
Expected Snowfall - Official NWS Forecast

Valid: 12/08/2017 10:00 AM - 12/09/2017 07:00 AM



High End Amount - 1 in 10 Chance (10%) Of Higher Snowfall

Valid: 12/08/2017 10:00 AM - 12/09/2017 07:00 AM



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weather.gov/atlanta/winter

- 4th year of “experiment” at FFC
- Create a cumulative probability distribution function with the official NWS snowfall forecast as the mode of the distribution (*not a worst case model forecast*)
- The 10th and 90th percentile values are communicated as the **minimum** (expect at least this much) and **maximum** (potential for this much) snowfall, respectively, while the official (e.g., NDFD) NWS WFO snowfall is messaged as the **most likely** amount
- Generated from an ensemble of ~45 Numerical Weather Prediction (NWP) snowfall forecasts + WPC forecast



National Weather Service
 Peachtree City, GA
 12/08/2017 10:12 AM EST

Follow Us: [f](#) [t](#) [v](#)
weather.gov/atlanta/winter

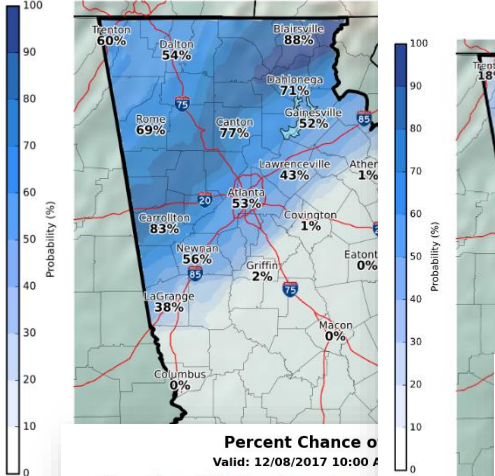


Winter Snow/Ice Probabilistic Forecasts

www.weather.gov/ffc/winter

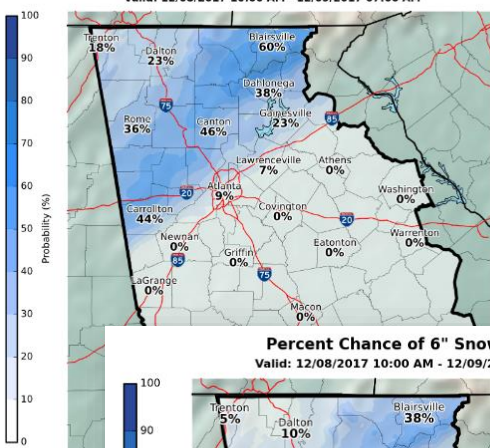
Percent Chance of 1" Snow or More

Valid: 12/08/2017 10:00 AM - 12/09/2017 07:00 AM



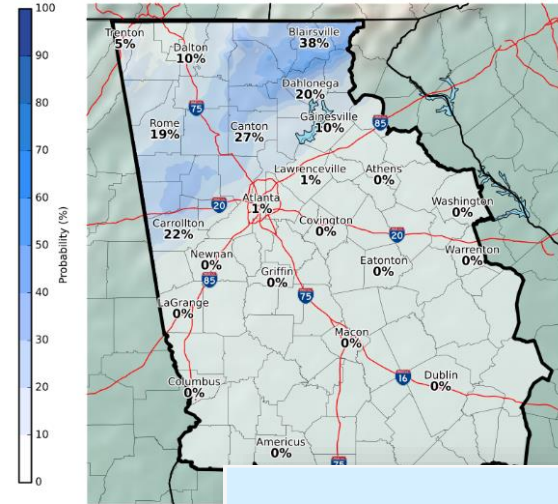
Percent Chance of 4" Snow or More

Valid: 12/08/2017 10:00 AM - 12/09/2017 07:00 AM



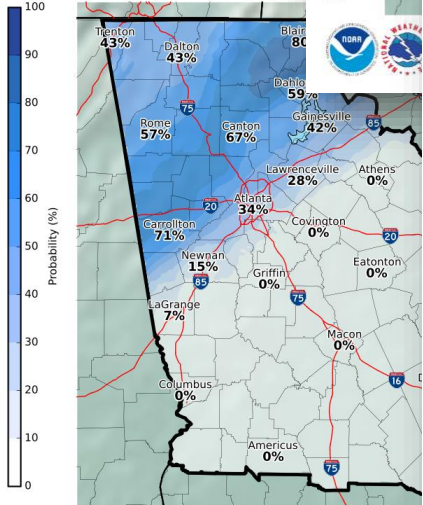
Percent Chance of 6" Snow or More

Valid: 12/08/2017 10:00 AM - 12/09/2017 07:00 AM



Percent Chance of 8" Snow or More

Valid: 12/08/2017 10:00 AM - 12/09/2017 07:00 AM



- Graphically displays probability (% chance) of seeing a certain amount of snow (i.e. 1", 2", 4" ... etc.)
- State level graphics available
- This is also shown in tabular format – can select county to get list of towns/cities



Snowfall Totals by Location

Experimental - Leave feedback
 11/22/2018 0700PM to 11/25/2018 0700PM
 What's this?

County:

For cities in Baldwin, GA county

Location	Snow Amount Potential			Chance of Seeing More Snow Than						
	Low End Snowfall	Expected Snowfall	High End Snowfall	>=0.1"	>=1"	>=2"	>=4"	>=6"	>=8"	>=12"
Meriwether, GA	0	0	0	0%	0%	0%	0%	0%	0%	0%
Milledgeville, GA	0	0	0	0%	0%	0%	0%	0%	0%	0%

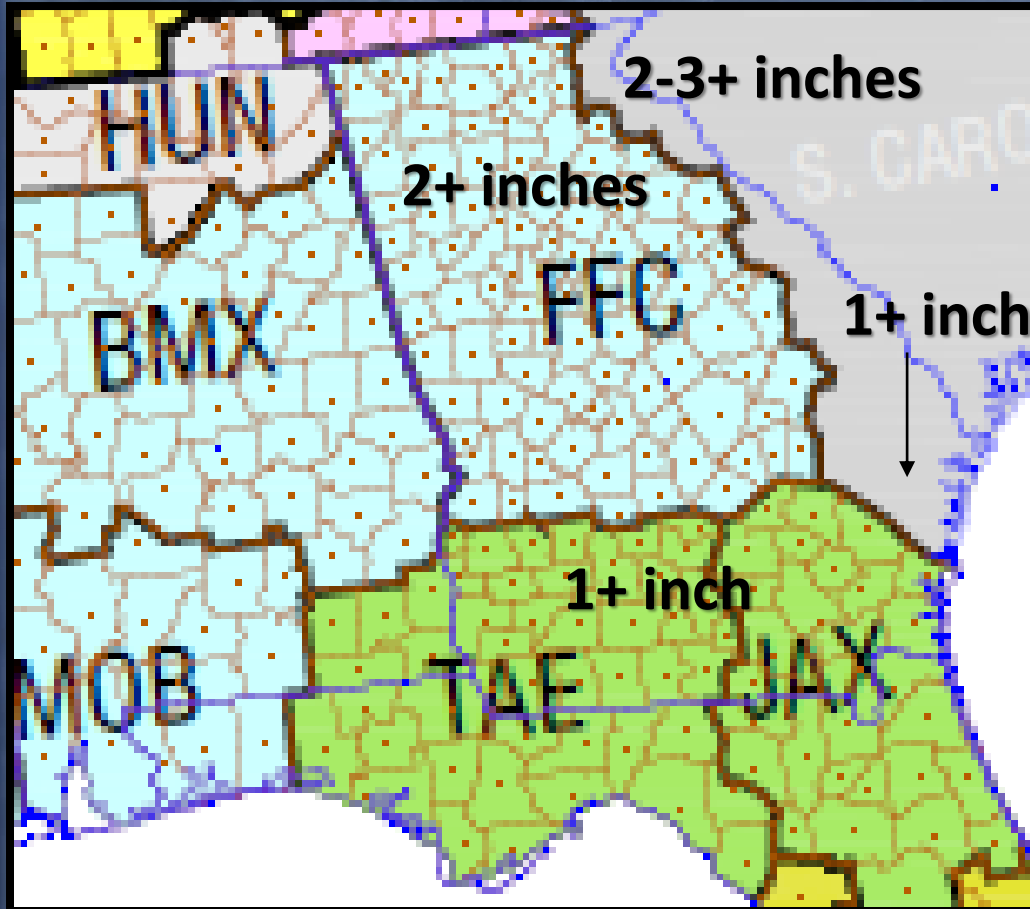
National Weather Service
 Peachtree City, GA
 12/08/2017 10:12 AM EST

Follow Us:
weather.gov/atlanta/winter

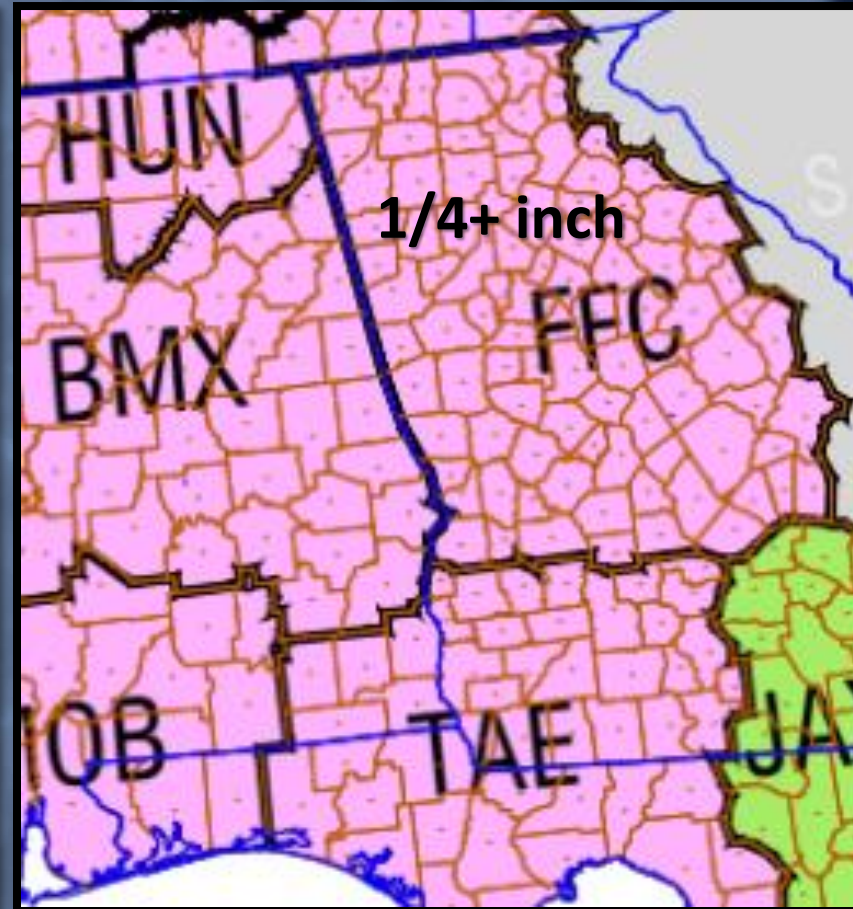


Winter Storm Warning criteria

SNOW and/or SLEET amounts



ICE amounts





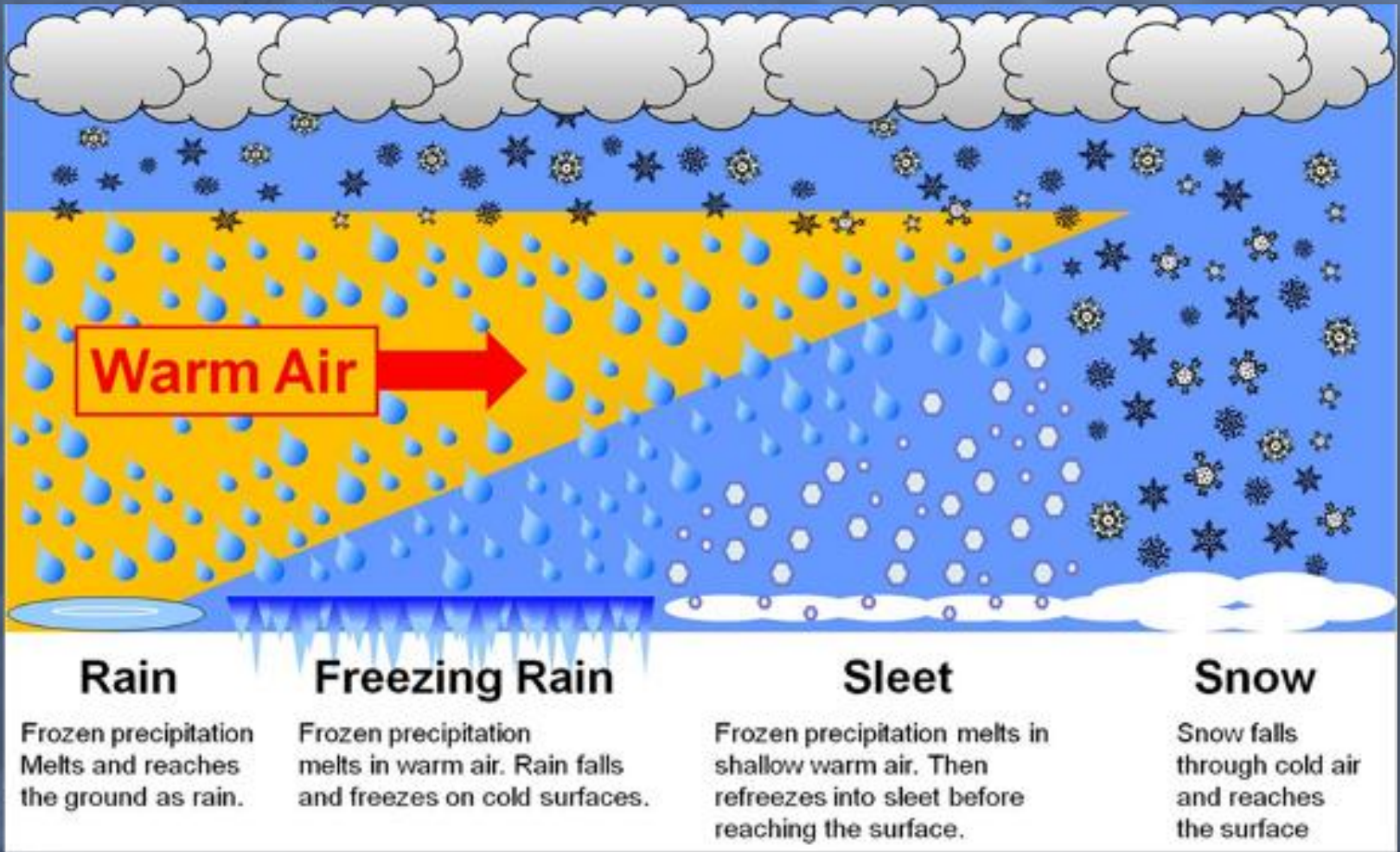
Winter Precipitation can be a big challenge

Just 1 or 2 degrees either way can all the difference

Cloud base
($< 3K$ feet
AGL)

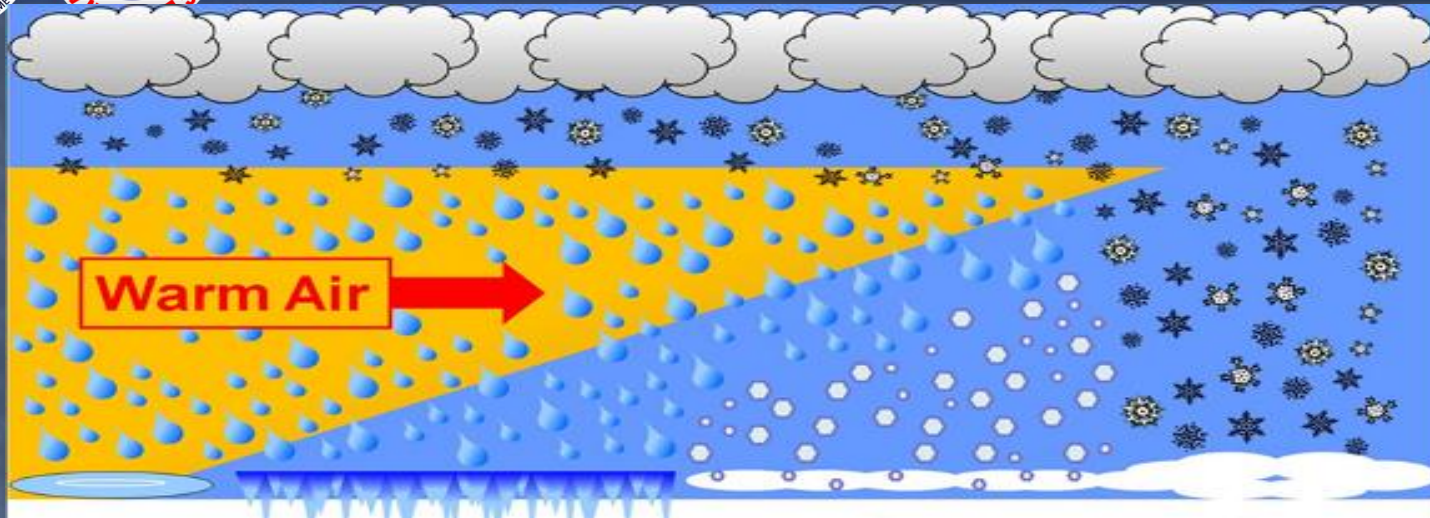


Ground

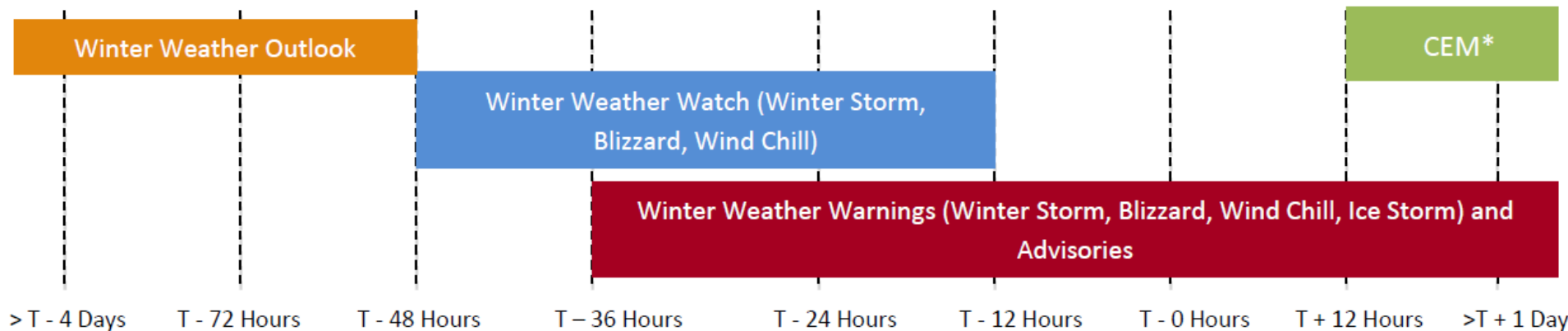




NWS Winter Products / Timeline



IMPACTS strongly considered



*CEM Civil Emergency Message could be used as a means of relaying treacherous road conditions and advising the public to stay off the roads.



Impacts vs. Amounts



34°

28°

2" of Snow

1/2" of Snow





For email updates, would you prefer information coming from specific forecaster or from a joint/standardized email account?

Specific NWS Meteorologist (the way we've been doing it)

Joint/group email account (i.e. sender = "NWS Atlanta Decision Support")



Questions?
