IPWMAN Conference

Winter in Illinois

October 15, 2019

Jeremy Duensing

DTN

Today's Agenda

- 2018-2019 Winter Recap
- Winter in Illinois
- 2019-2020 Winter Outlook

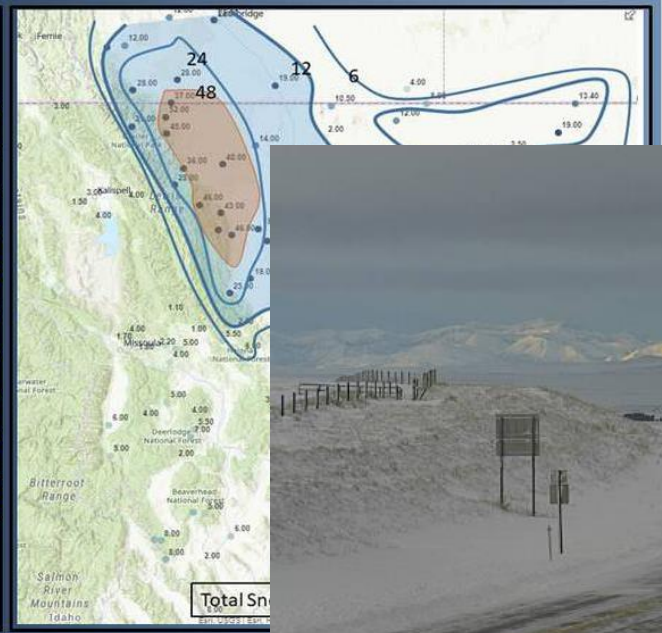
September Snowstorm

Snow Reports, Sept. 28-30, 2019

Latest Snowfall Reports
(11am Monday, September 29th)

Babb (Glacier)	52.0”
Browning (Glacier)	48.0”
25 SW Badger Pass (Pondera)	46.0”
17 WSW Bynum (Teton)	46.0”
St. Mary (Glacier)	45.0”
15 S Dupuyer Creek (Teton)	43.0”
East Glacier (Glacier)	36.0”
29W Choteau SNOTEL (Teton)	31.0”
Pike Creek SNOTEL (Glacier)	28.0”
15 SW Augusta (Lewis & Clark)	25.0”
Flattop SNOTEL (Flathead)	21.0”

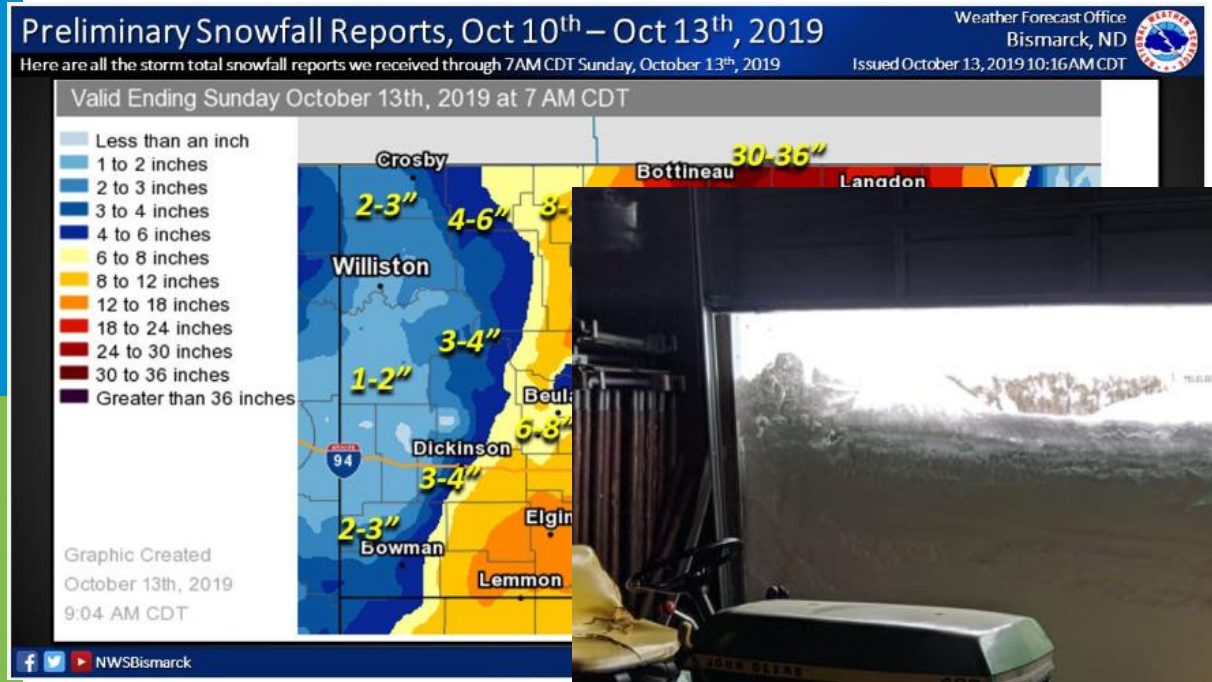
Please send us your snowfall reports! Include the amount of snow and your location (i.e. 19.3” 5 WSW Great Falls)



National Weather Service · Great Falls, Montana Updat

CARWAY AB	ALBERTA	E37.0 IN
WATERTON PARK AB	ALBERTA	E28.0 IN
CARDSTON AB	ALBERTA	E28.0 IN
MILK RIVER AB	ALBERTA	E21.0 IN
LETHBRIDGE AB	ALBERTA	E22.0 IN

October Blizzard



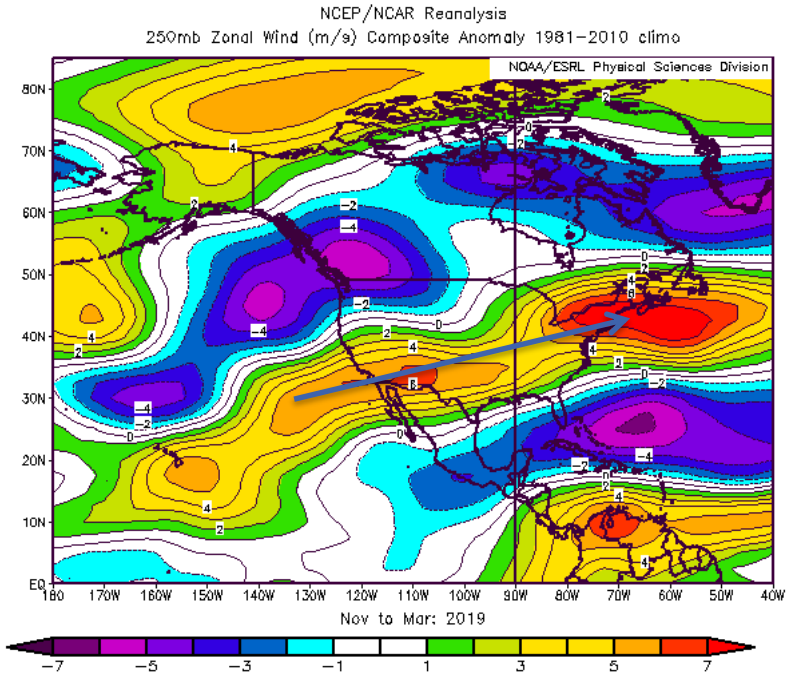
LOCATION	AMOUNT
VANG	29.0 IN
OLGA	28.0 IN
5 ESE PENN	28.0 IN
WALHALLA	27.0 IN
4 W BACKOO	21.0 IN
3 S MCCANNA	21.0 IN
CAVALIER	20.0 IN
LEROY	20.0 IN
3 W STUMP LAKE	20.0 IN
2 WSW CRYSTAL	18.0 IN
DEVILS LAKE	17.0 IN

Winter 2018-2019 Recap

Highlights from Last Winter

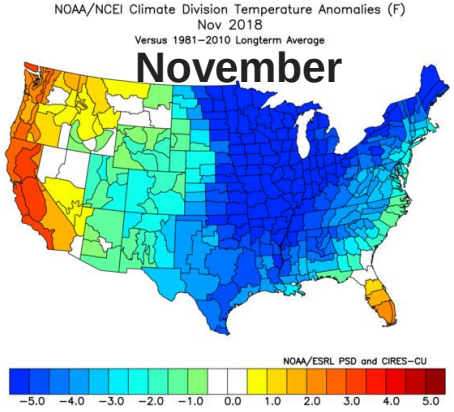
- Weak El Nino
- Main jet stream and storm track Southwest US through Midwest/Northeast
- Dividing line along jet between cold Northwest and warm Southeast
- Winter started early in November
- Winter lingered into March

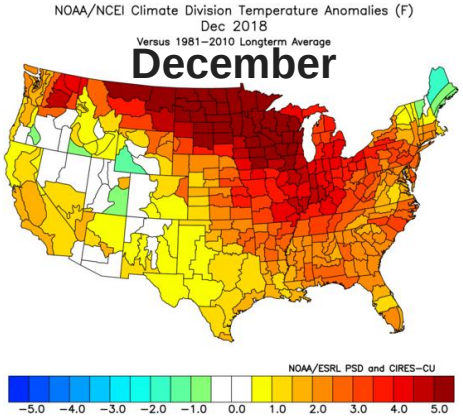
Winter Jet Stream

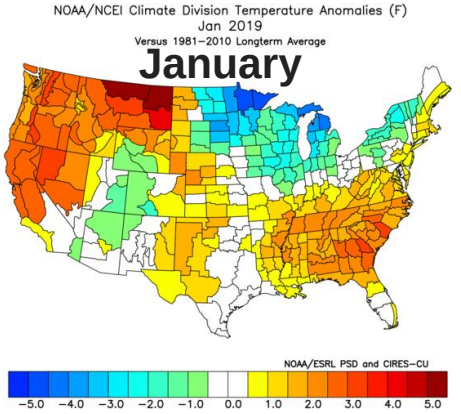


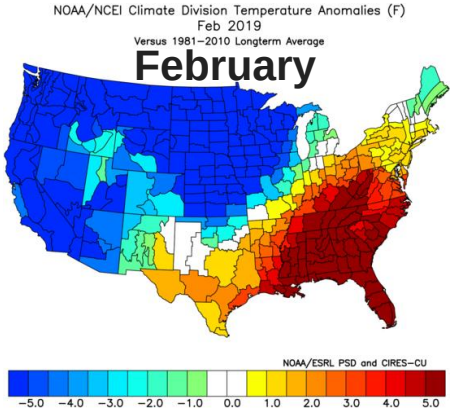
Jetstream: Stronger Southwest to Northeast

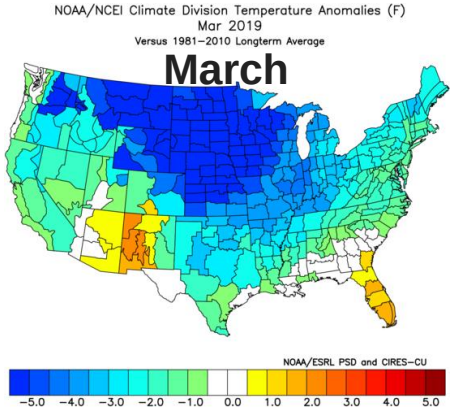
Monthly Temperature Departures











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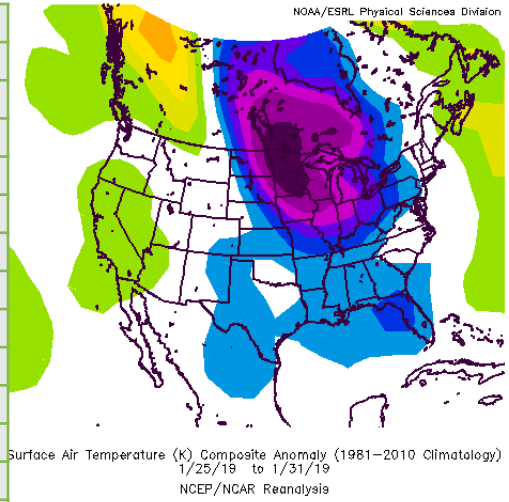
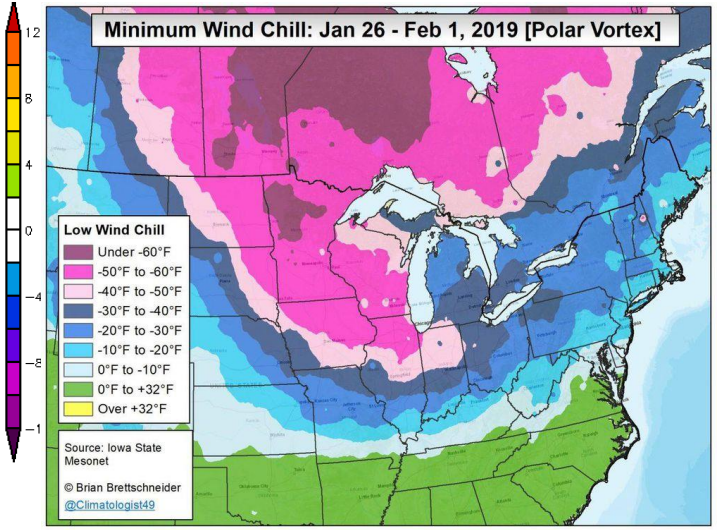
Historic Midwest Cold Snap

- Jan 25-31, 2019.
- Many record low temperatures were set. -56F at Cotton, MN.
- **Illinois set all time state record low of -38F at Mount Carroll, IL - Jan 31.**
- Peak of the extreme cold lasted 1-3 days for any one location.
- Strong winds > 40 mph accompanied the cold, producing extreme wind chill values.

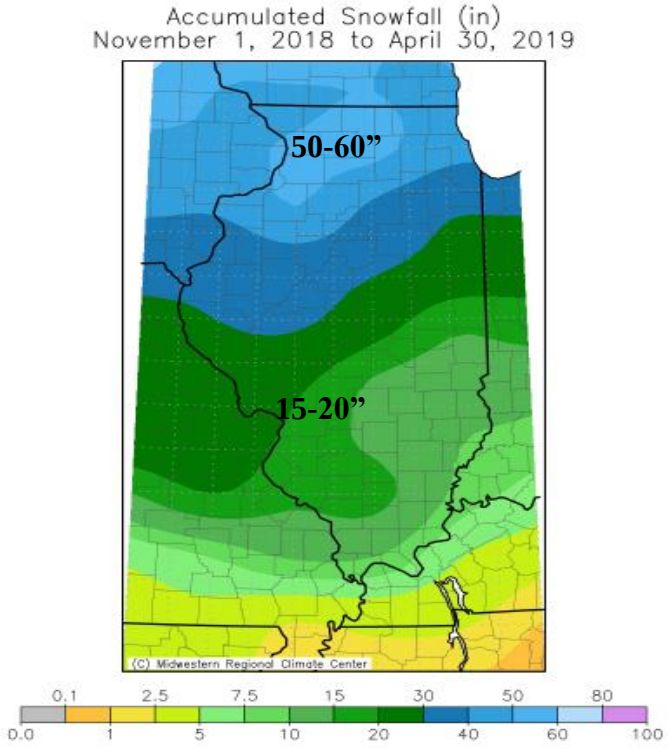
Low Temperatures for Select Cities		
City	Low temperature	Date
Minneapolis, MN	-25	1/29
Minneapolis, MN	-28	1/30
Minneapolis, MN	-23	1/31
Chicago, IL (ORD)	**-23**	**1/30**
Chicago, IL (ORD)	**-21**	**1/31**
St. Louis, MO	8	1/31
Des Moines, IA	-15	1/29
Des Moines, IA	-20	1/30
Detroit, MI	-13	1/30
Detroit, MI	-14	1/31
Indianapolis, IN	-11	1/30
Columbus, OH	-4	1/30
Columbus, OH	-4	1/31
New York, NY	2	1/31

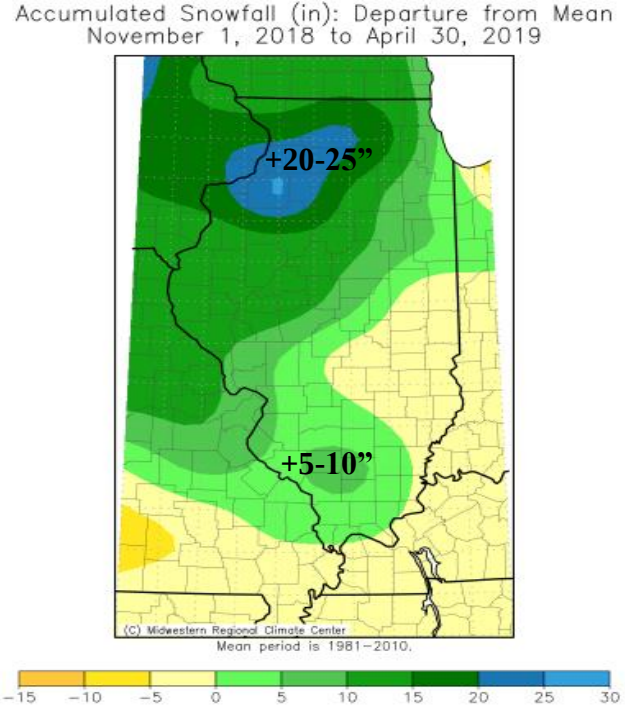




2018-2019 Winter Season Snapshot Summary

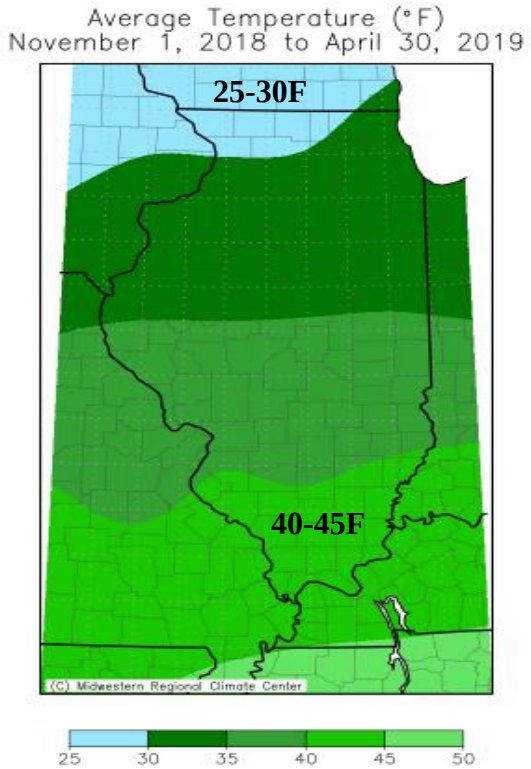
SNOWFALL - November to April: Above Normal West Through North

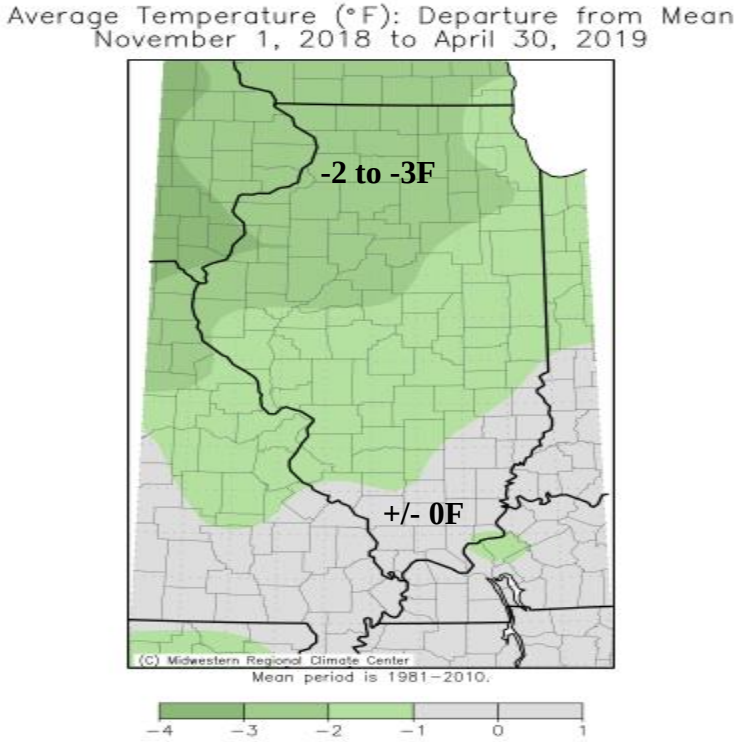




2018-2019 Winter Season Snapshot Summary

TEMPERATURES - November to April: Fairly Uniform Cold With Readings 1-3 Degrees Below Normal





Climate and Trends

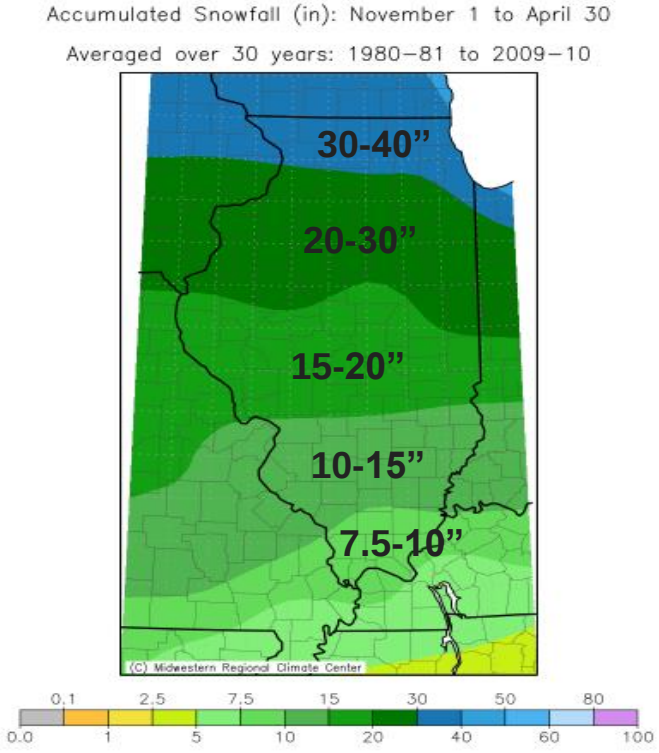
- What does an average winter look like in Illinois?

Winter Precipitation Types

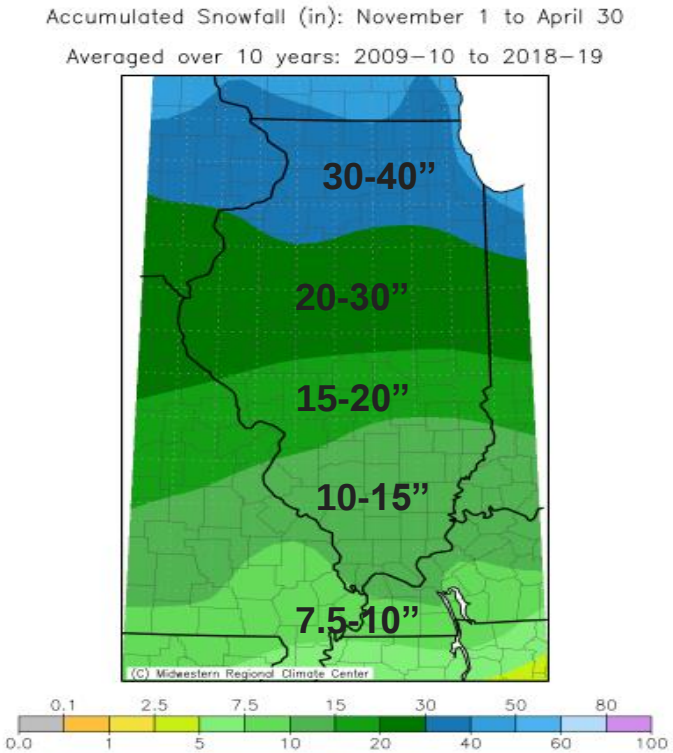
Rain	Freezing Rain	Sleet	Snow
Frozen precipitation falls through warm air and melts into rain.	Frozen precipitation falls through warm air and melts into rain which falls and freezes on cold surfaces, coating them in ice.	Frozen precipitation falls through warm air and melts, it then falls through another cold layer, refreezing into sleet before hitting the ground.	Snow falling through only cold air never melts.

Snowfall: 30 Year Average Compared to the Last 10 Years

November to April: Last 10 Years Fairly Consistent With The 30 Year Average

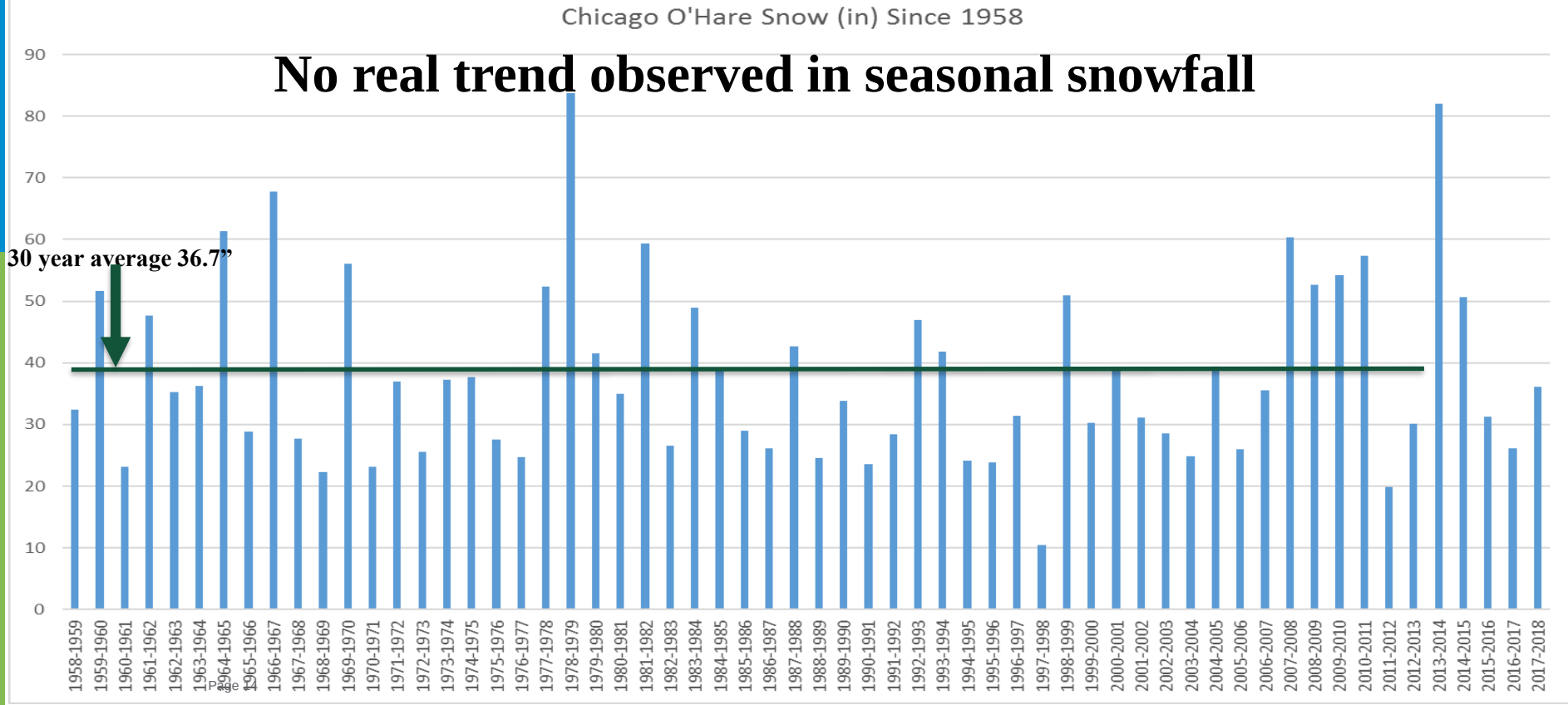


30 year Average

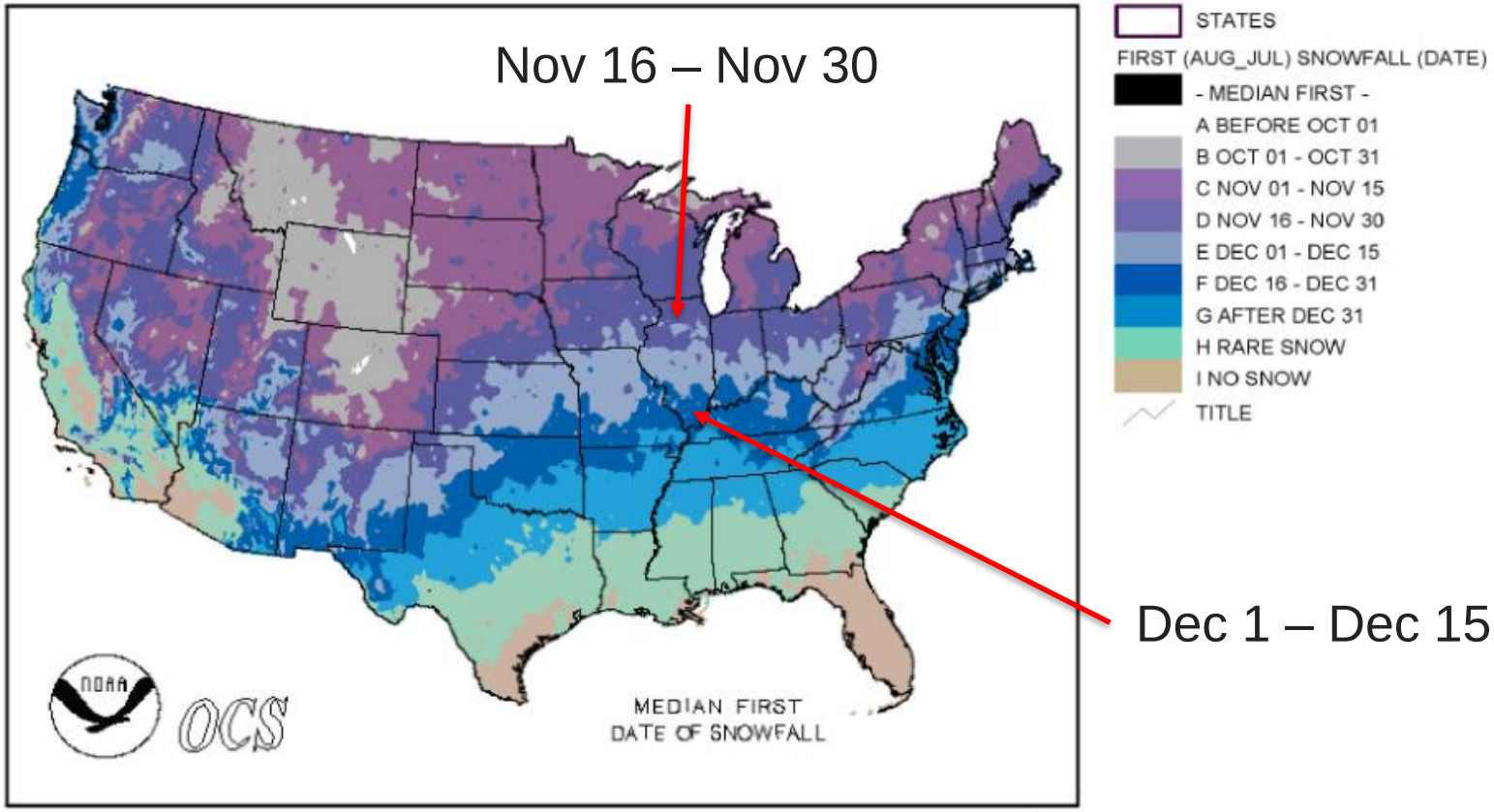


10 year Average

Trends in Annual Snowfall - Chicago

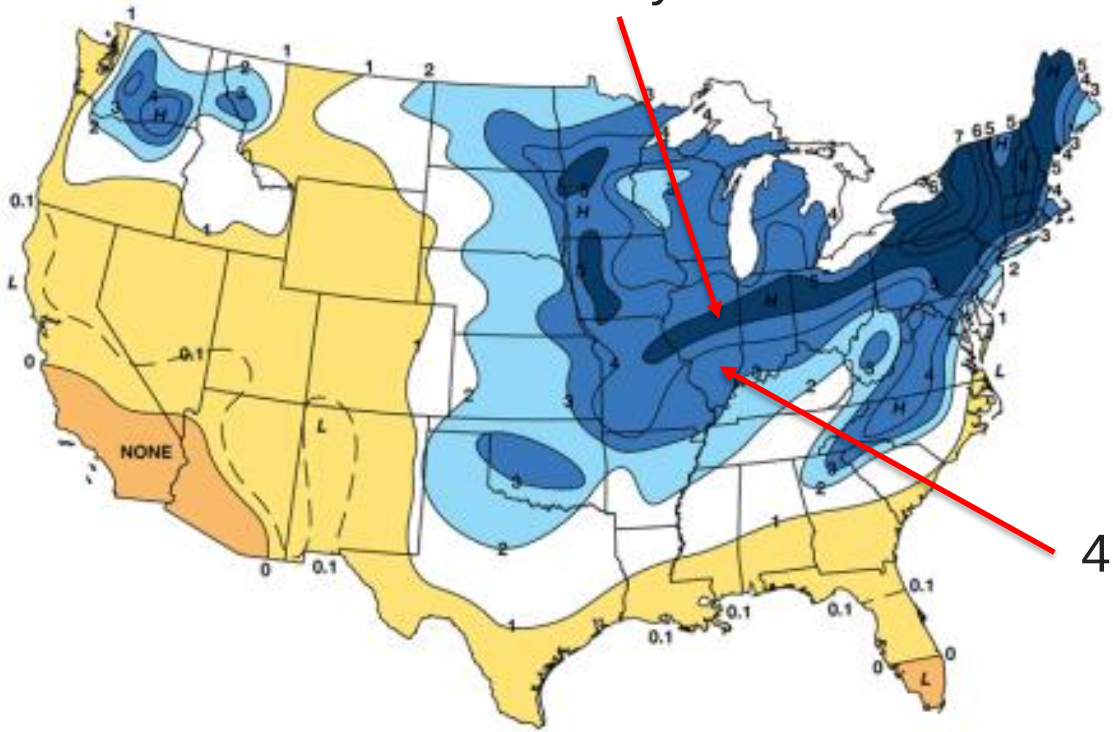


Median First Date Of Snowfall



Average Number of Days with Freezing Rain

6 days

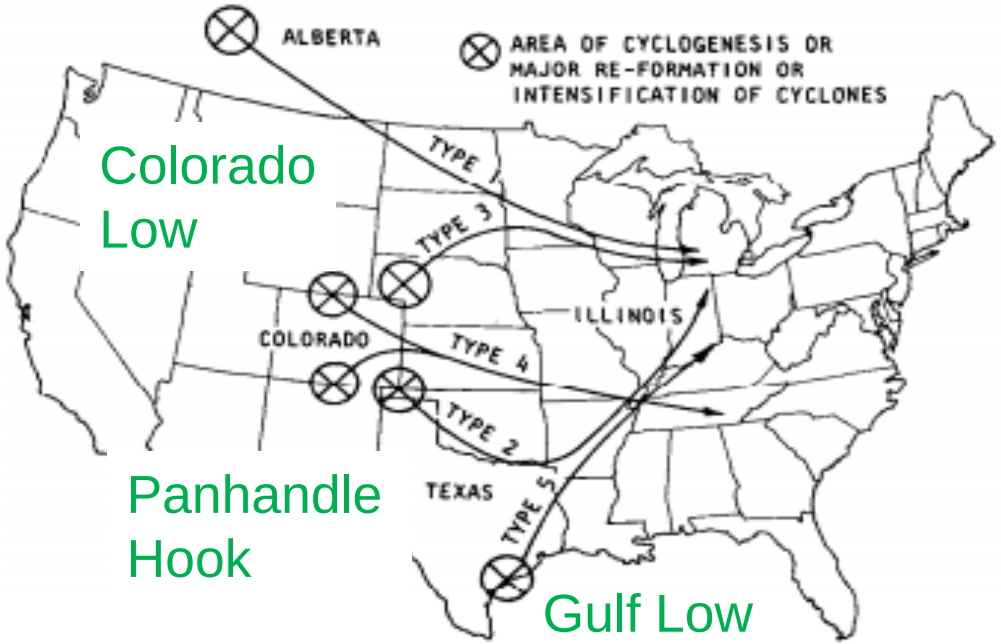


4 days

The average annual number of days with freezing rain, based on 1948-2000 data. *From Changnon and Karl, 2003.*

Common Winter Storm Types & Tracks

Alberta Clipper



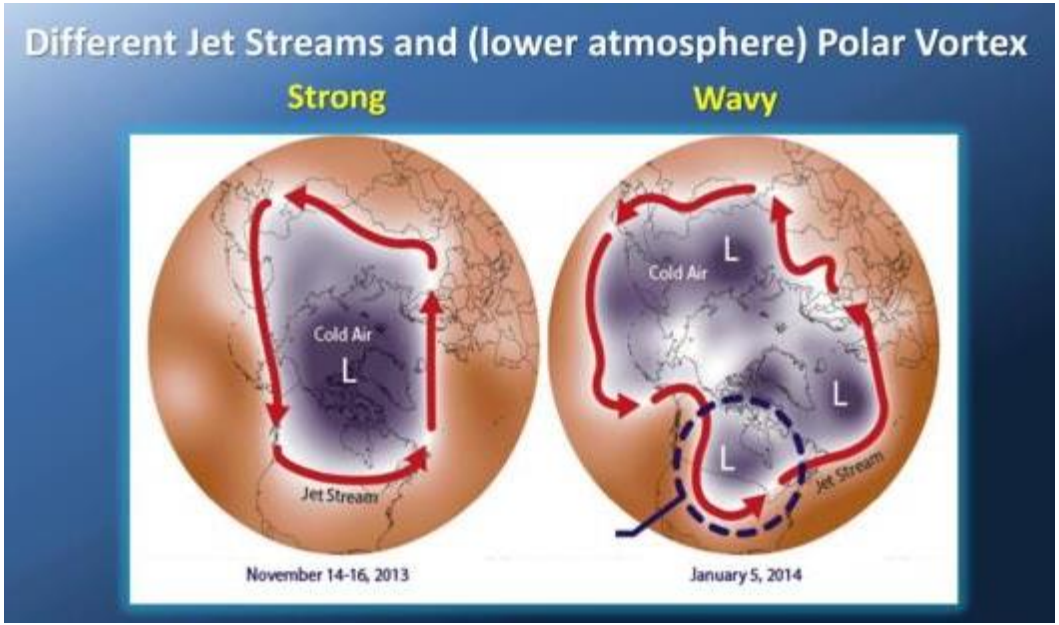
Colorado Low

Panhandle Hook

Gulf Low

Figure 15. Schematic of weather (cyclonic) types related to severe storms in Illinois

Polar Vortex Variations



- A Strong Polar Vortex is more circular, which keeps the coldest air at higher latitudes
- A Weak Polar Vortex often means it is broken into several smaller features, each with a pocket of very cold air
- Blocking ridge patterns help to determine where these cold pools will locate
- Extreme cold follows vortex
- Prediction time is limited to under 2 weeks

Winter Outlook 2019-2020

Forecast Process

Global Climate

10-year Trends

Analogs

Seasonal Models

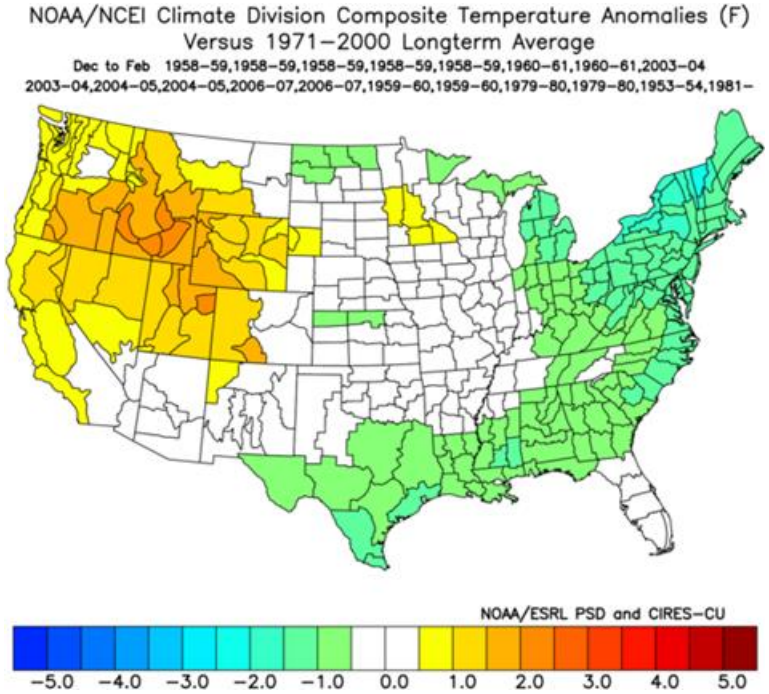
Final Forecast Solution

Analogs

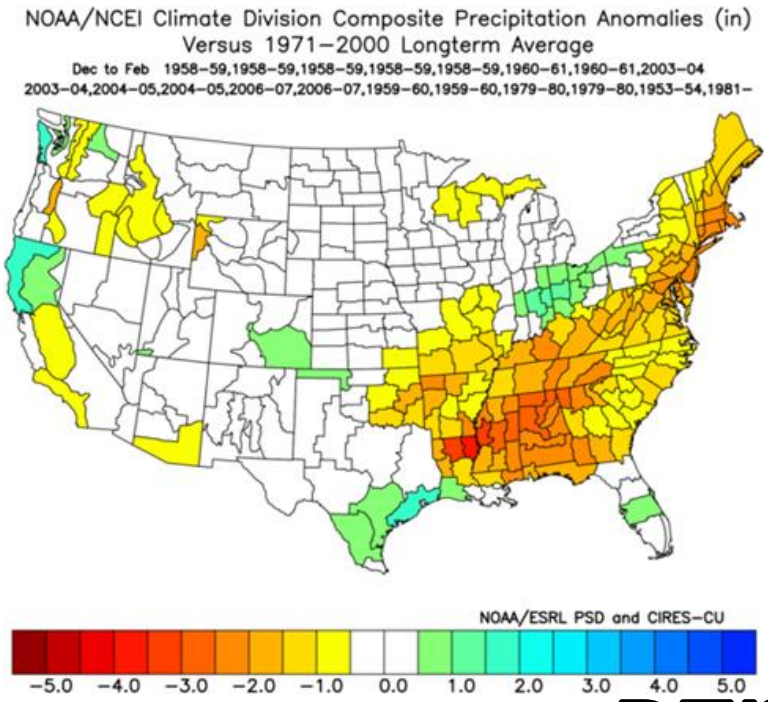
- Average weather conditions from previous years with similar ocean temperature patterns that are expected this year
- Use historical weather to assist in forecasting the future weather

Season Analogs (Dec - Feb)

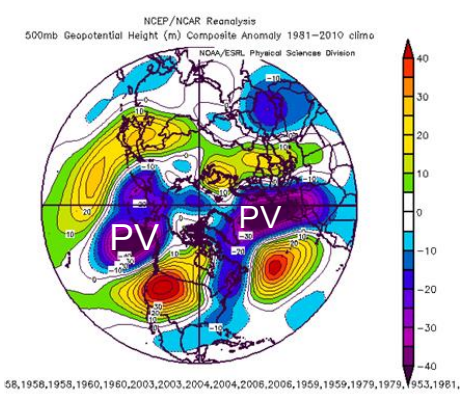
TEMPS



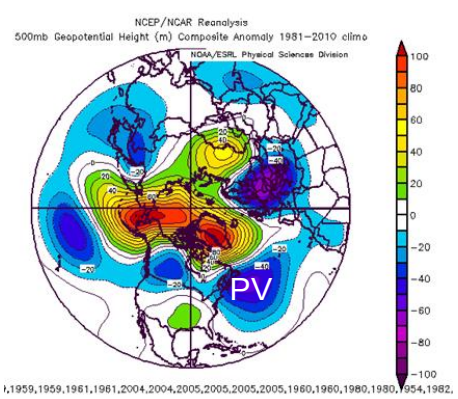
PRECIP



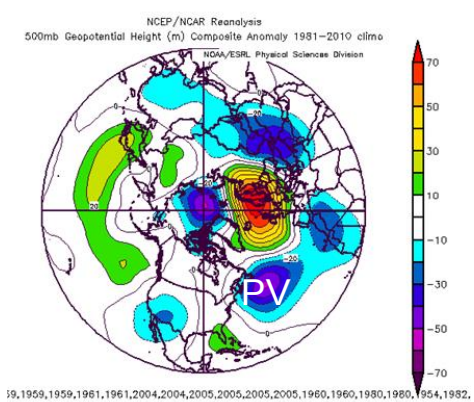
Winter Polar Vortex Analogs (Dec - Mar)



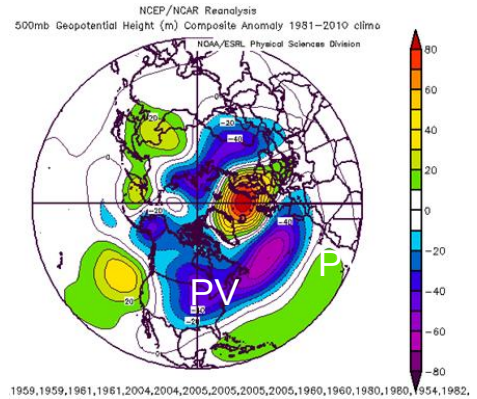
Dec



Jan



Feb



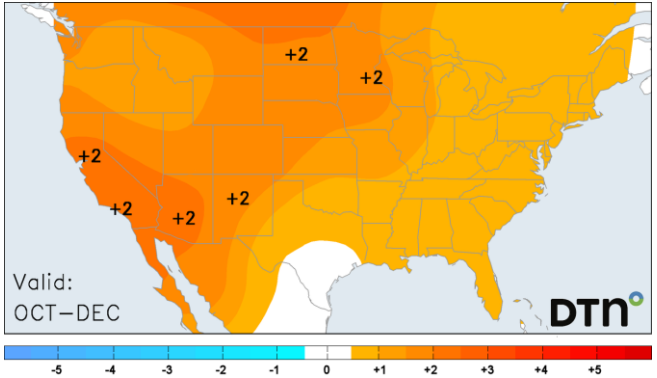
Mar

Potentially coldest weather compared to normal: January to March

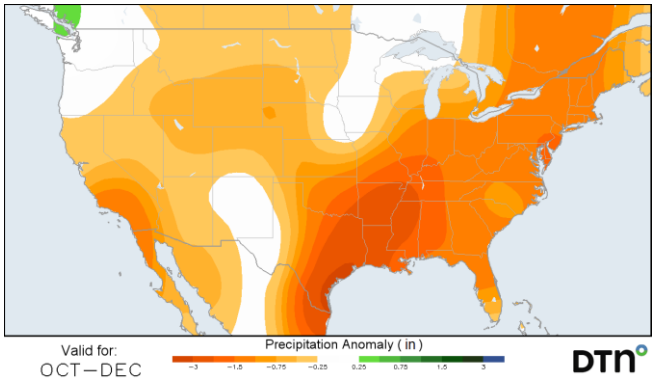
Predictability: Limited to about 2 weeks into the future

Late Autumn to Early Winter Forecast

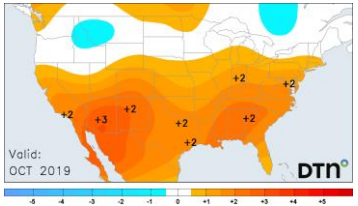
Oct-Dec Temperature Anomaly Forecast

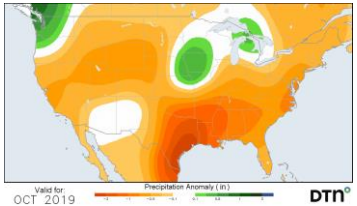


Oct-Dec Precipitation Anomaly Forecast

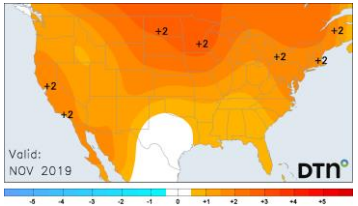


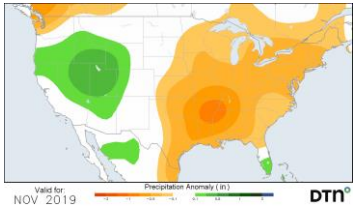
October Temperature and Precipitation Anomalies



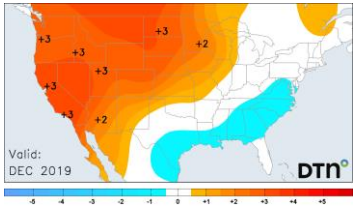


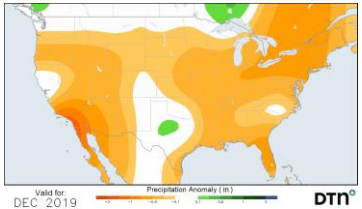
November Temperature and Precipitation Anomalies





December Temperature and Precipitation Anomalies





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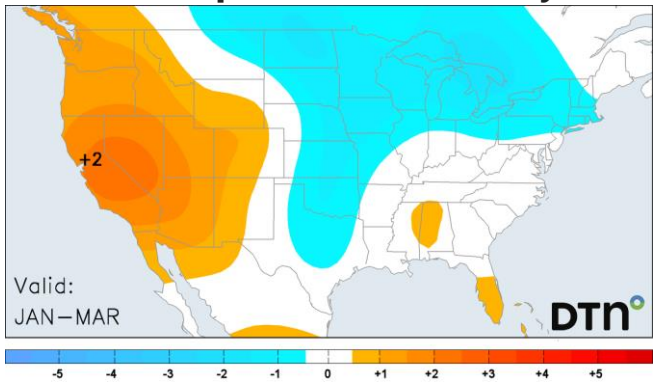
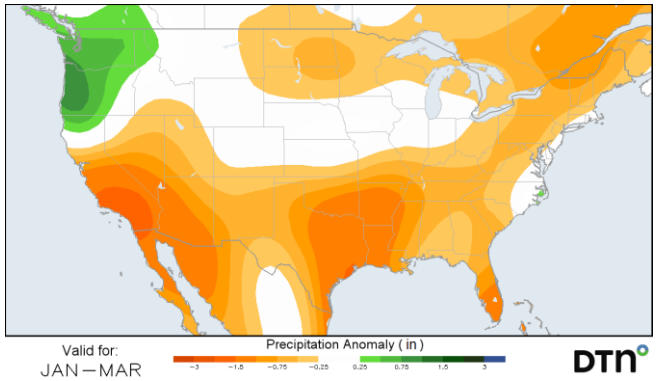
Winter Forecast

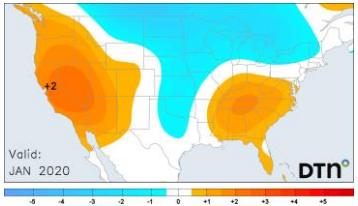
Jan-Mar Temperature Anomaly Forecast

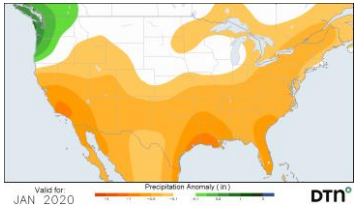


Jan-Mar Precipitation Anomaly Forecast

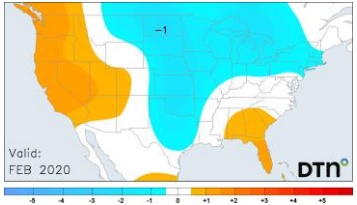


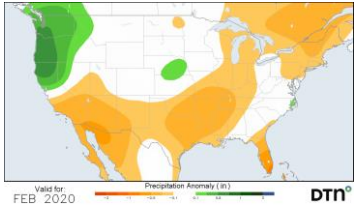
January Temperature and Precipitation Anomalies



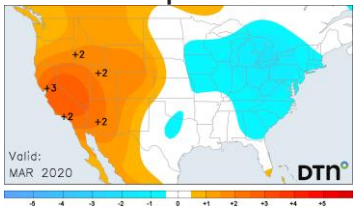


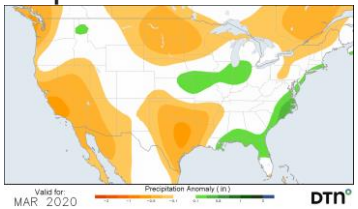
February Temperature and Precipitation Anomalies





March Temperature and Precipitation Anomalies





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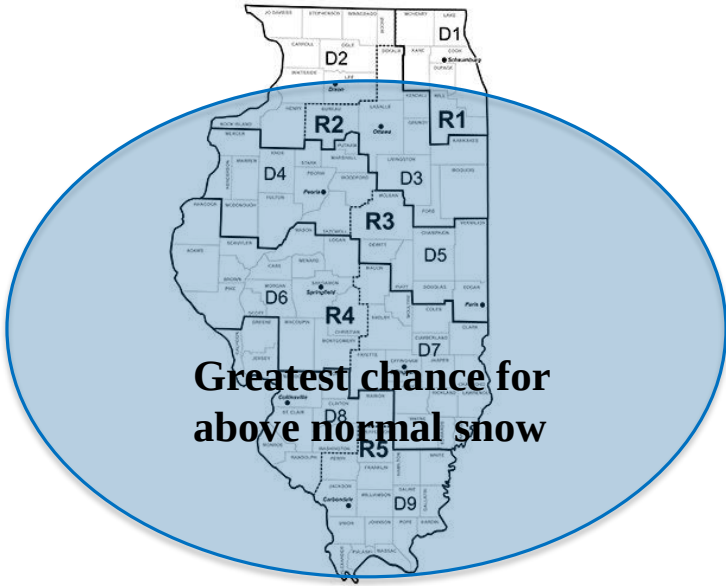
DTN's Illinois 2019-2020 Winter Outlook

- The main storm track will favor the southern U.S.
- Slightly reduced **precipitation** totals are expected for the winter.
- ***Snowfall totals will however be slightly greater than average*** values in Illinois. Best chances for above normal snow: central & southern Illinois.
- Snow risks could linger into early March due to lingering cold into late season.
- Greater risk for ***mixed precipitation types*** due to changeable temperature regimes.
- Temperatures will be near to ***slightly below normal*** for the winter:
  - Not as persistently cold as last winter.
  - Periods of milder air, especially early winter.
  - There will be periods of ***intense arctic cold, especially in late January and February.*** Still some cold in March.



	Chicago O'Hare	Springfield	Moline
Normal Snow	36.3"	20.9"	31.6"
Analog Average	38.4"	21.9"	34.9"

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Actionable insights to the Nth degree