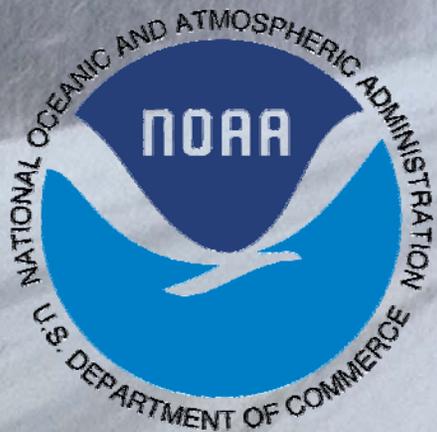


Winter Spotter Presentation

2015 – 2016

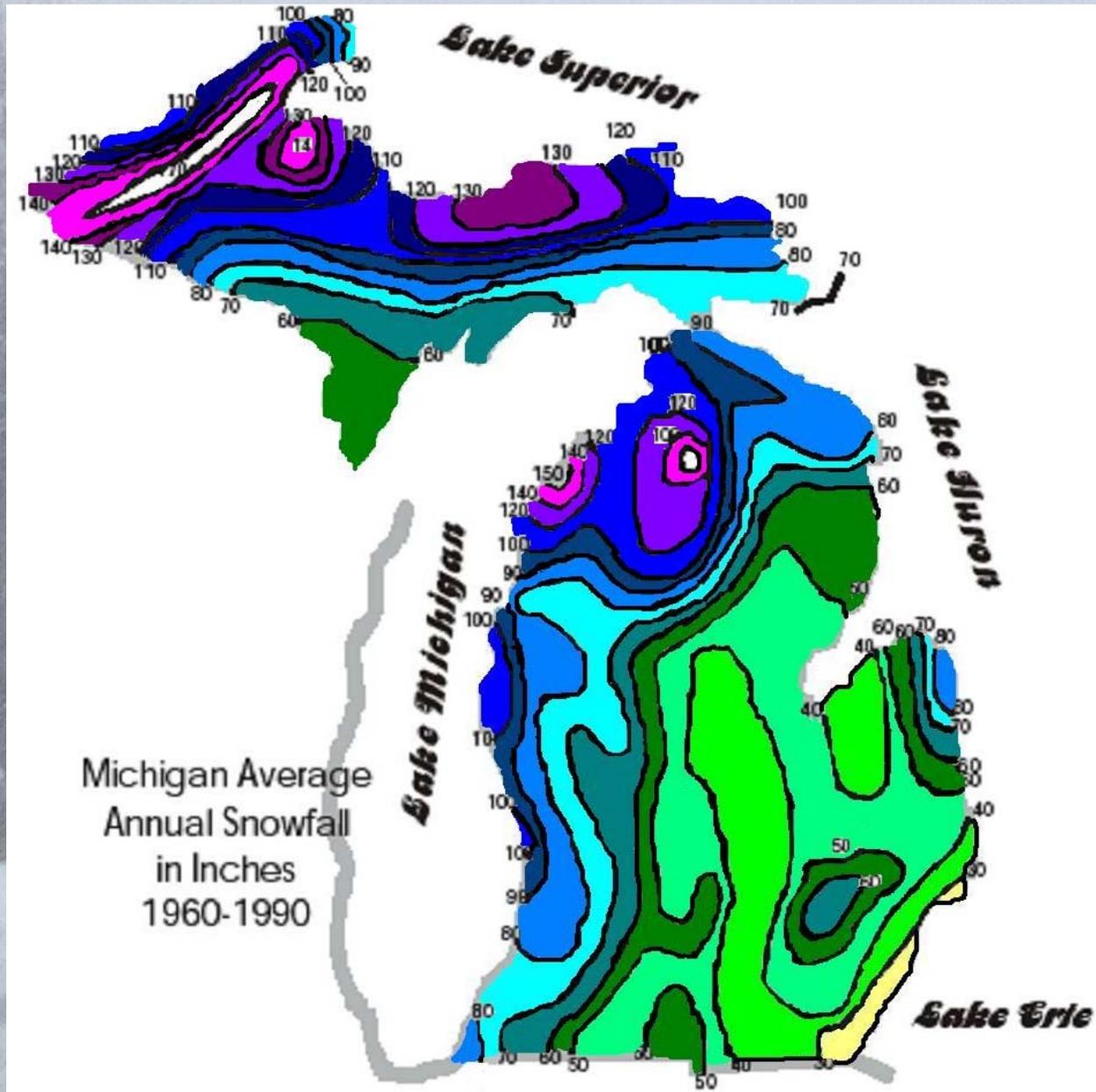
**National Weather Service
Detroit/Pontiac MI**





WINTER CLIMATOLOGY

Average Seasonal Snowfall



Detroit: 42.5"

Flint: 47.4"

Saginaw: 41.5"

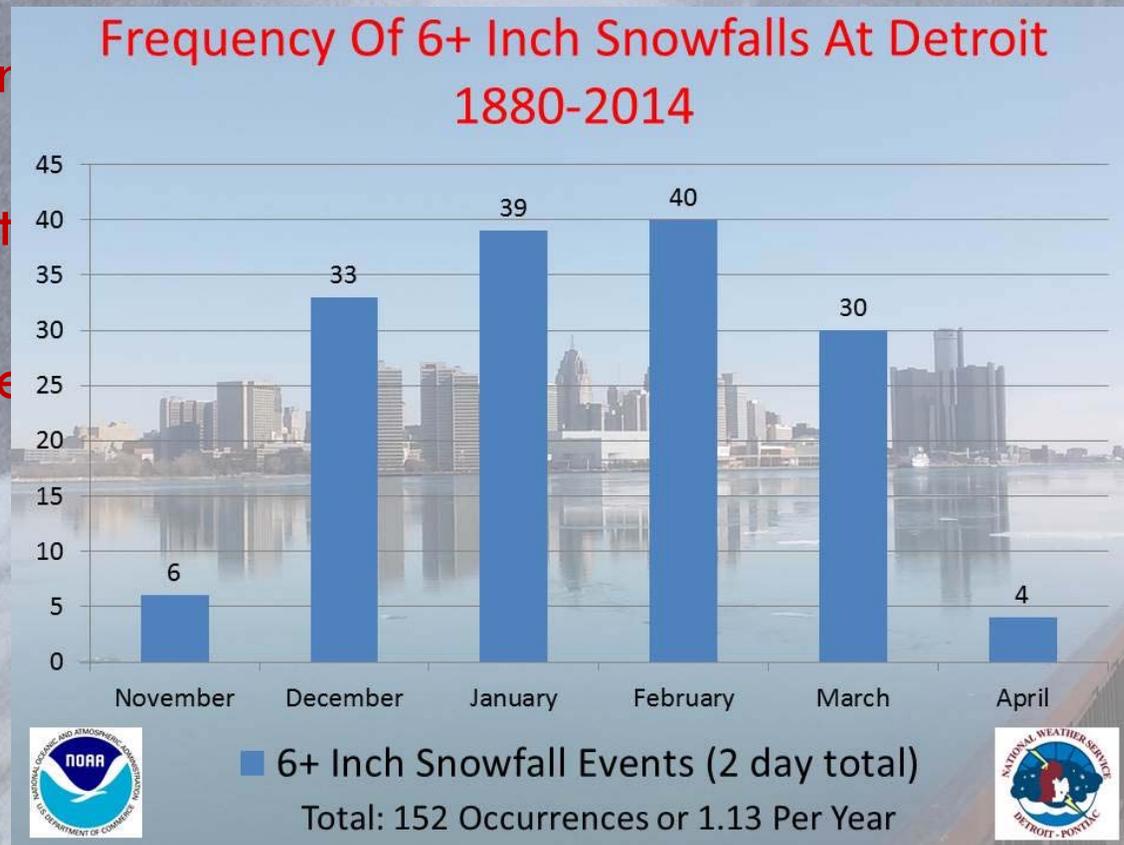
White Lake: ~60"

Biggest Snowstorms



	Detroit (since 1880)	Flint (since 1921)	Saginaw (since 1912)
1)	Apr 6, 1886 (24.5")	Jan 26–27, 1967 (22.7")	Jan 26–27, 1967 (23.8")
2)	Dec 1–2, 1974 (19.3")	Apr 2–3, 1975 (17.3")	Jan 26–27, 1978 (22.5")
3)	Feb 1–2, 2015 (16.7")	Jan 4–5, 2014 (17.1")	Mar 17, 1973 (21.3")

- Resulted in
- 2 days lat
- Recent eve



60 mb)



Coldest and Warmest Winters (Dec–Feb)

	Detroit (since 1874)	Flint (since 1921)	Saginaw (since 1912)
1)	1903–04 (18.8°)	1976–77 (16.7°)	1962–63 (15.7°)
2)	1874–75 (19.3°)	1962–63 (17.0°)	1917–18 (16.5°)
3)	1976–77 (19.7°)	1958–59 (17.8°)	1919–20 (16.6°)

	Detroit (since 1874)	Flint (since 1921)	Saginaw (since 1912)
2014–15	20 th (23.3°)	17 th (22.0°)	-- (21.8°)
2013–14	8 th (20.9°)	5 th (19.0°)	7 th (18.2°)

	Detroit (since 1874)	Flint (since 1921)	Saginaw (since 1912)
1)	1881–82 (36.9°)	1931–32 (33.4°)	1931–32 (33.3°)
2)	1931–32 (35.7°)	1982–83 (32.2°)	1997–98 (30.9°)
3)	1889–90 (35.2°)	2001–02 (31.7°)	2011–12 (30.6°)

	Detroit (since 1874)	Flint (since 1921)	Saginaw (since 1912)
2012–13	17 th (30.7°)	10 th (28.5°)	10 th (28.5°)
2011–12	6 th (33.0°)	5 th (31.2°)	3 rd (30.6°)

* Strong El Nino years of 1982–83 and 1997–98 were in top-10 warmest for all sites



WINTER 2014–15 REVIEW

Winter 2014–15 Review

- Top-15 Coldest November
- Mild December with little snow
 - 2nd least-snowy December on record, < 1” at all climate sites
- January near-normal snow, slightly below normal temps
- Frigid February
 - Detroit sets or ties 5 daily record lows
 - Flint ties or sets 6 daily record lows including a tie for lowest temp of all time (-25° on the 20th)
 - Top-5 coldest month of all time:

Detroit

Rank	Month	Temp
1	Feb 1875	12.2
2	Jan 1977	12.8
3	Jan 1912	13.1
4	Jan 1918	13.2
5	Feb 2015	14.1

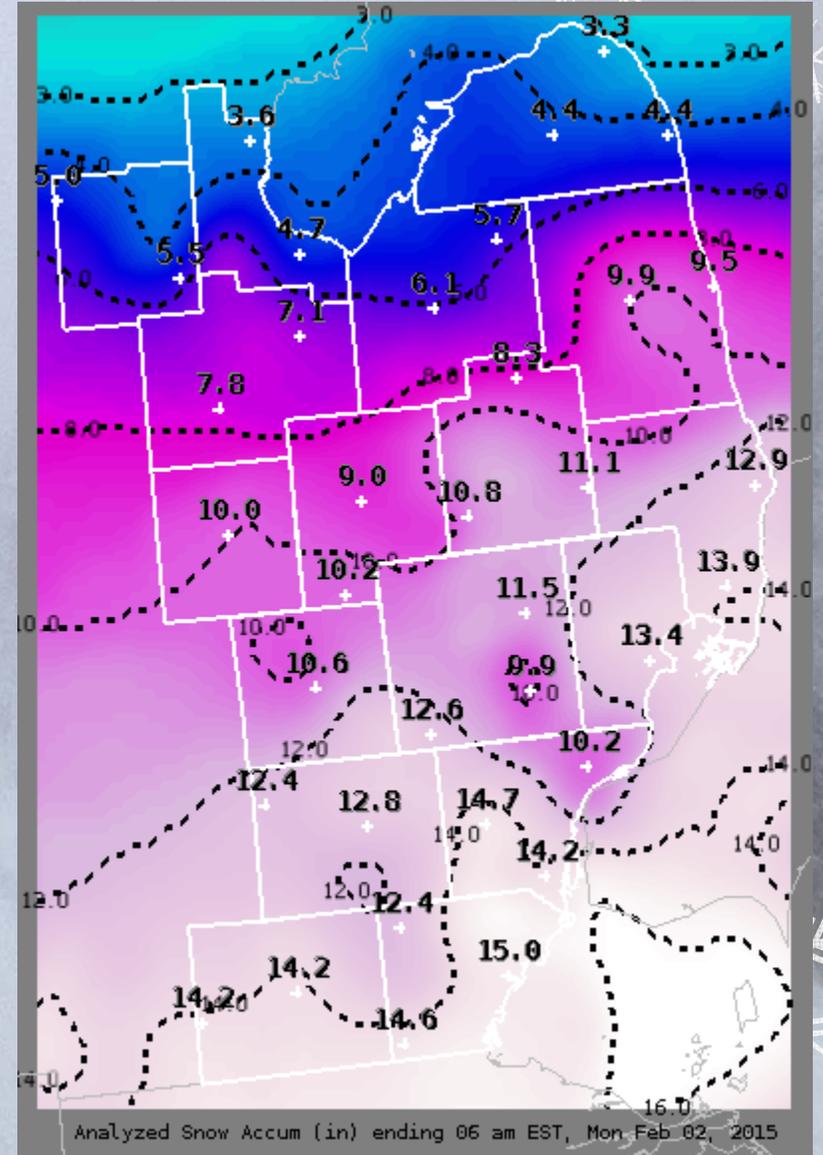
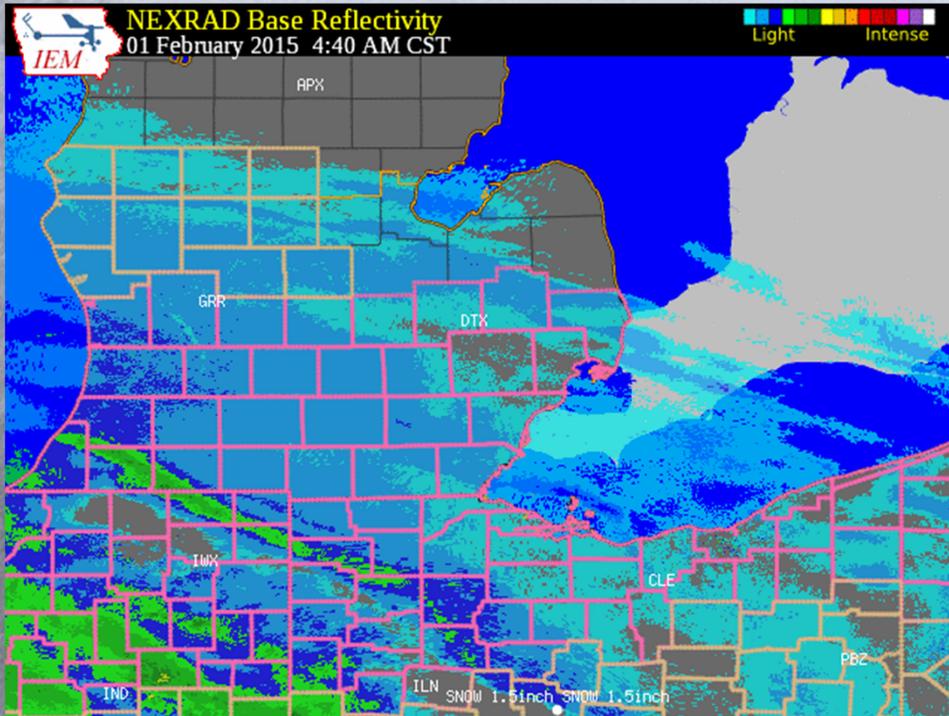
Flint

Rank	Month	Temp
1	Jan 1977	10.9
2	Feb 2015	11.3
3	Feb 1979	12.8
4	Jan 1963	13.1
5	Feb 1978	13.4

Saginaw

Rank	Month	Temp
1	Jan 1912	9.4
2	Jan 1918	10.4
3	Feb 2015	11.5
4	Jan 1963	11.6
5	Jan 1994	12.1

Feb 1-2 Snowstorm



Josh Halasy
Wyandotte

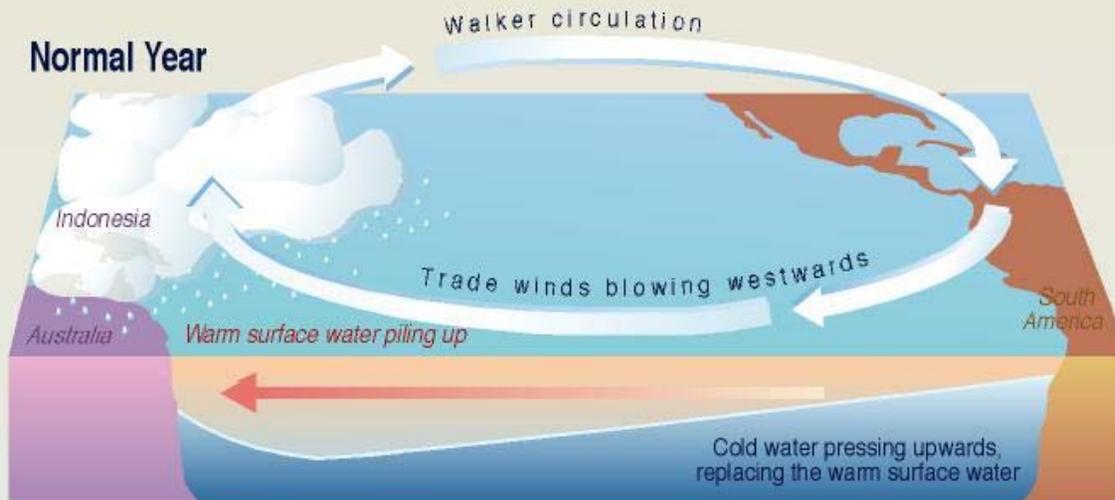
- 3rd largest snowstorm of all time at Detroit (16.7")
- Widespread 12-18" south of I-94



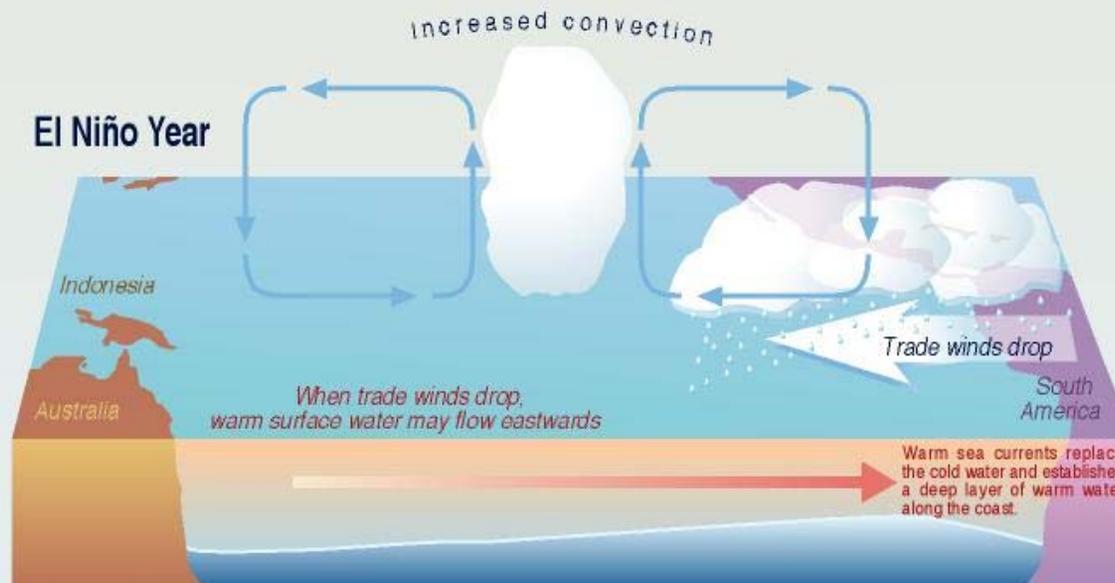
WINTER OUTLOOK

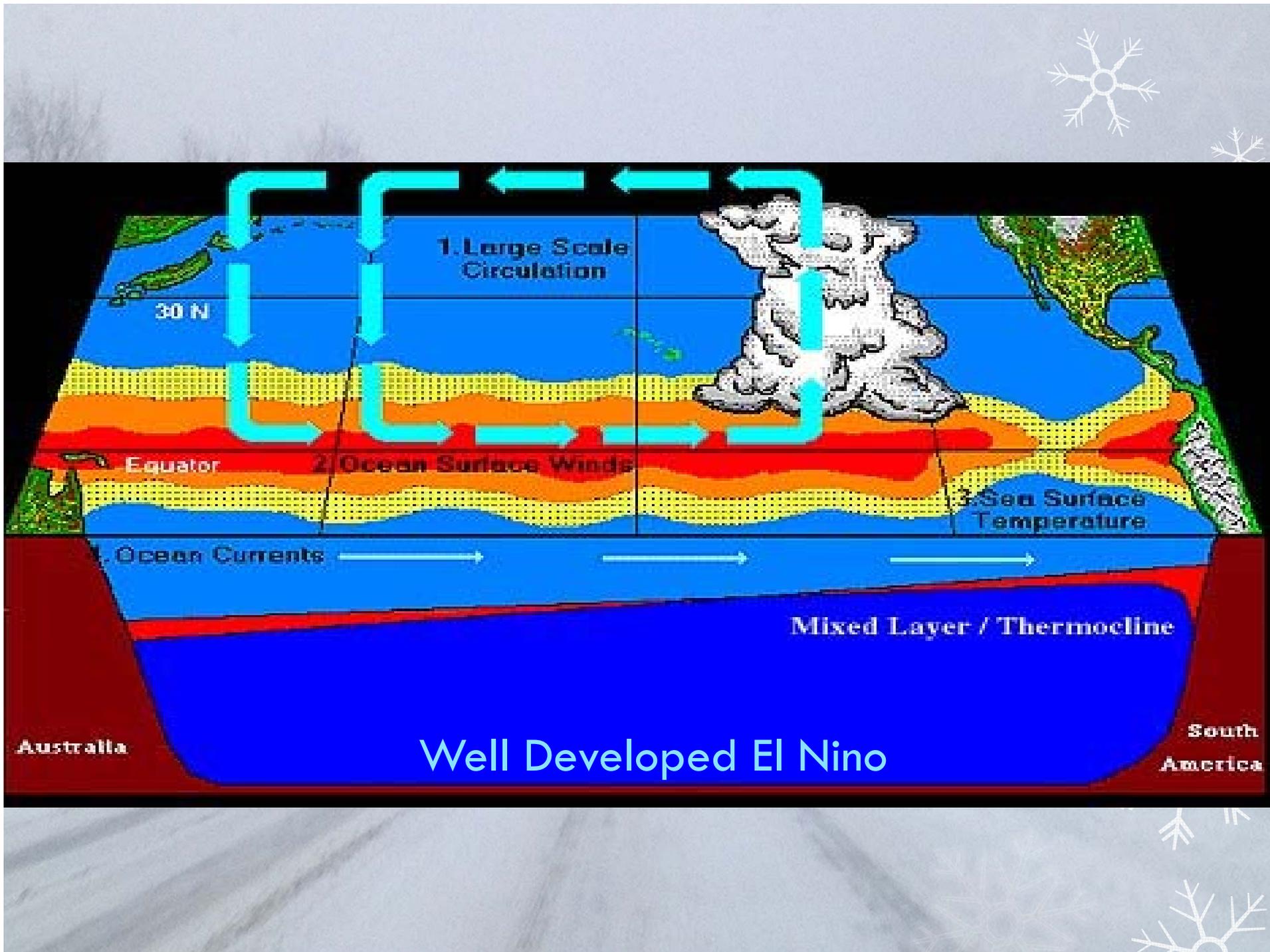
El Niño Phenomenon (ENSO)

Normal Year



El Niño Year

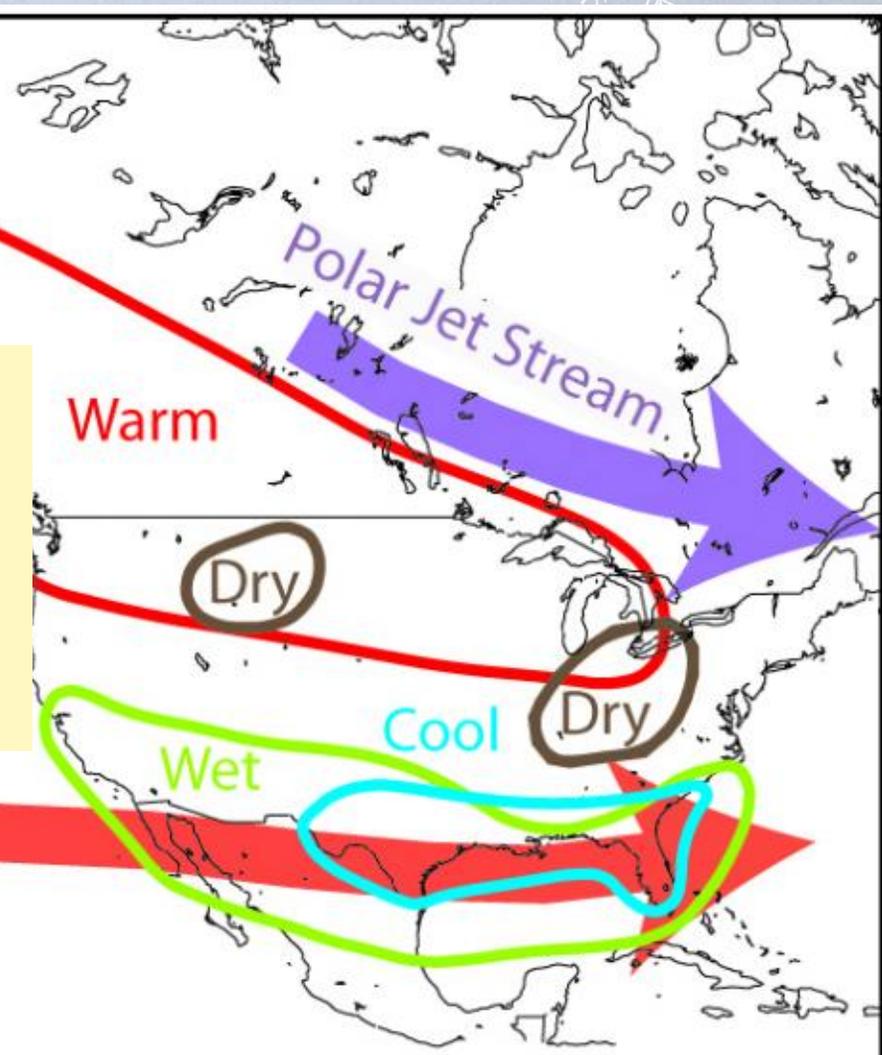


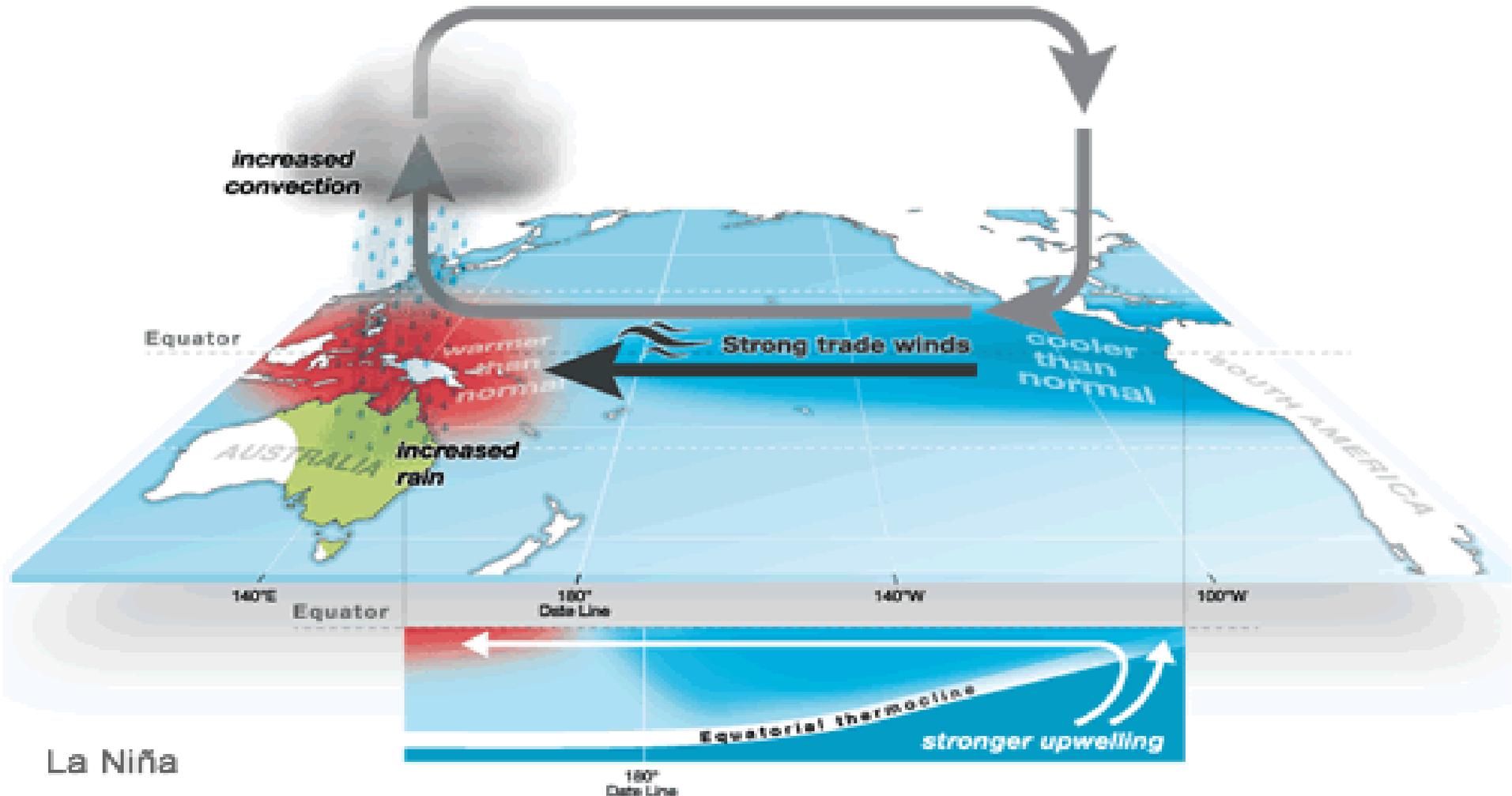
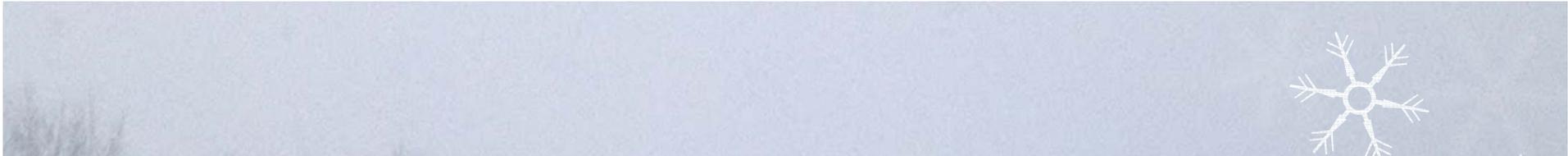


El Niño

We are in a strong El Niño going into this winter!

Persistent extended Pacific Jet Stream and amplified storm track



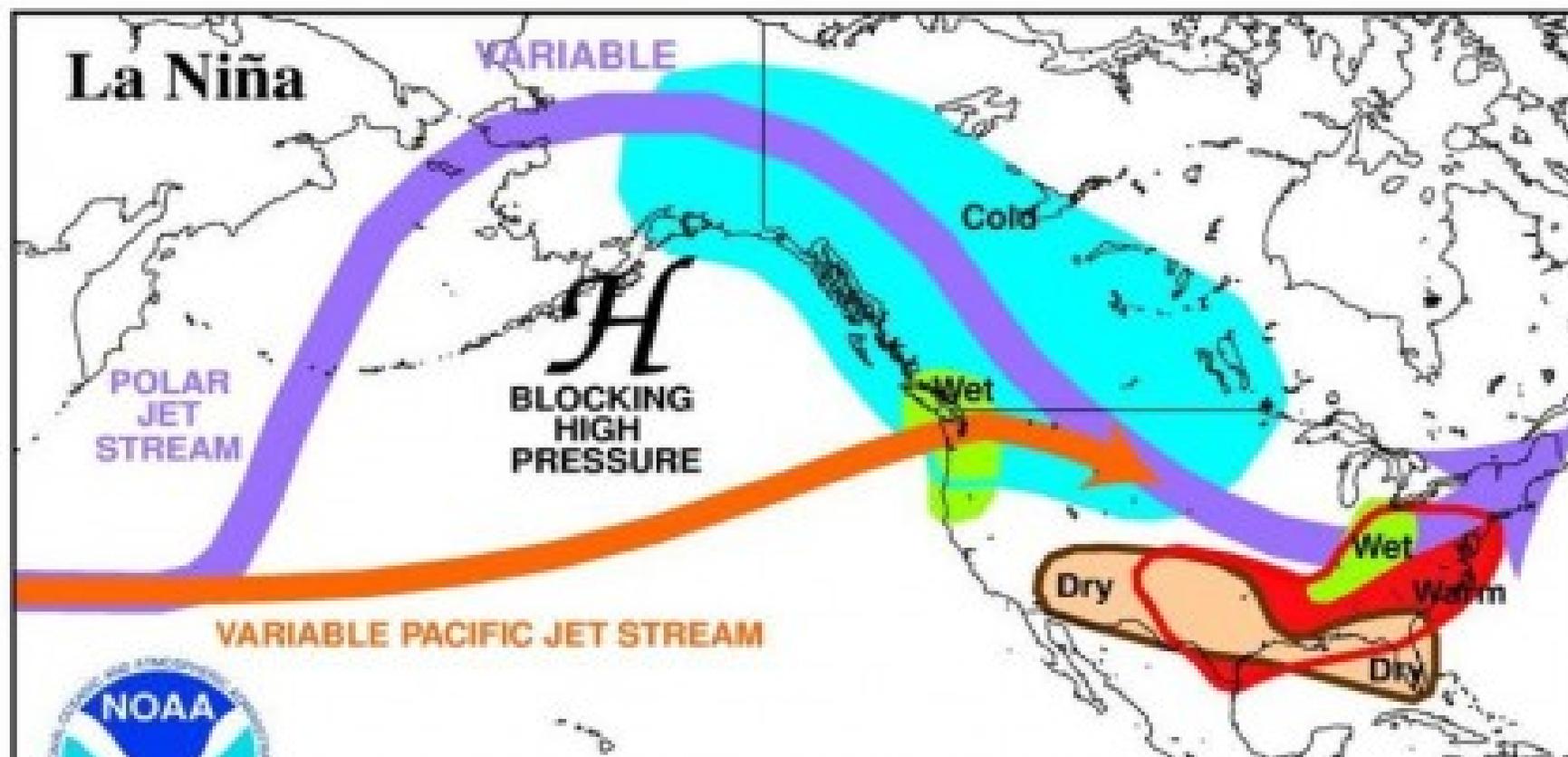


La Niña





DURING MODERATE TO STRONG LA NIÑA





**WINTER WEATHER METEOROLOGY
AND NATIONAL WEATHER SERVICE
WINTER FORECAST PRODUCTS**



OUTLOOK

A hazardous weather or hydrologic event is possible over the next seven days. An outlook raises awareness of the potential for significant weather that could threaten life or property and allows additional time for planning.

WATCH

The risk for a hazardous weather or hydrologic even has increased significantly, but its occurrence, location or timing is still uncertain. People should have a plan of action in case a storm threatens and they should listen for updated information and possible warnings.

WARNING

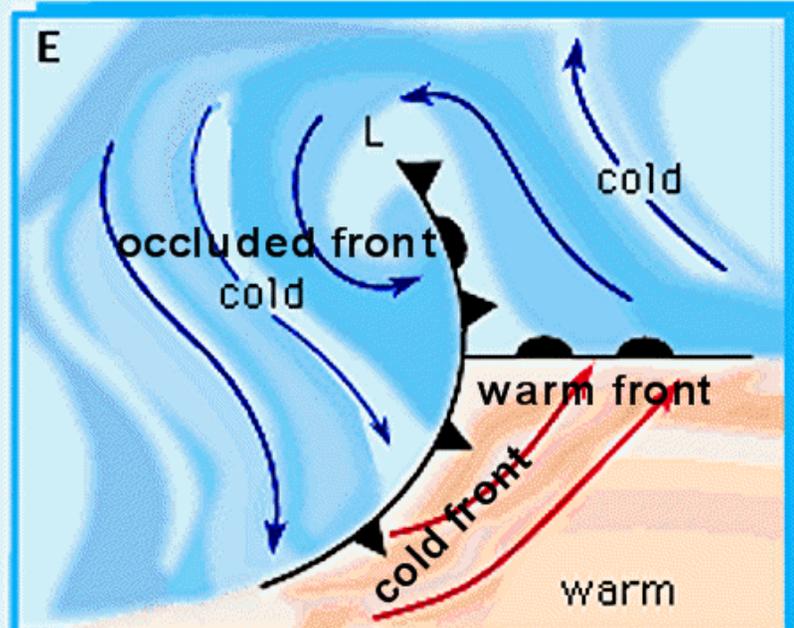
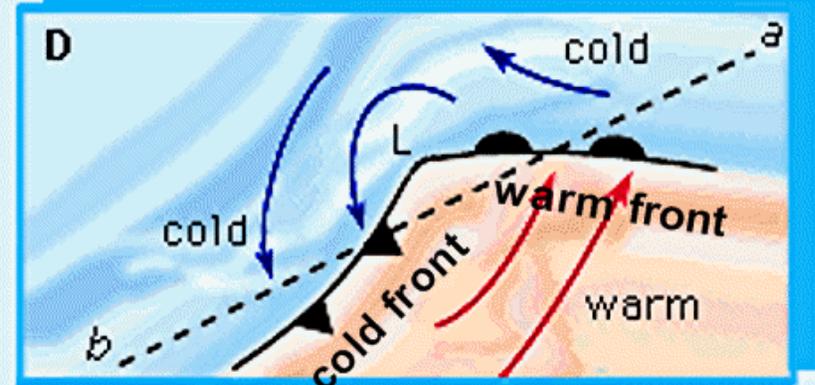
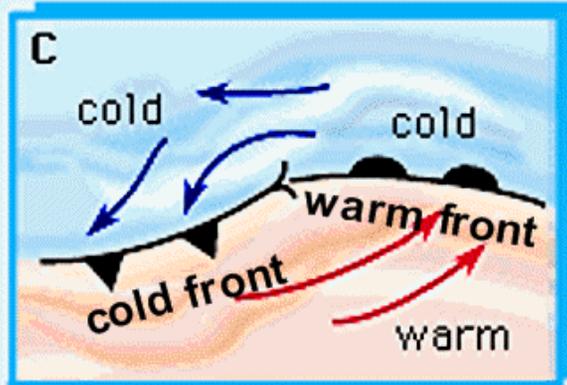
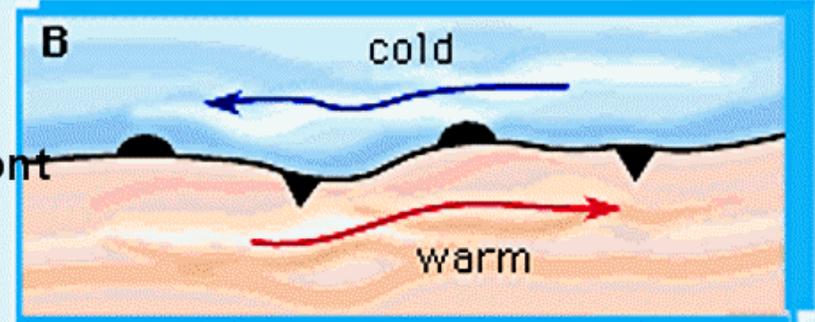
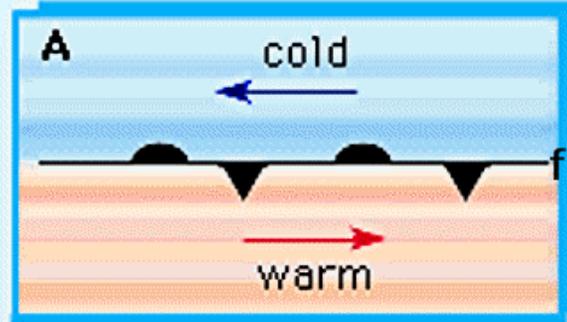
Issued when a hazardous weather or hydrologic even is imminent or occurring. A warning means weather conditions pose a threat to life and property. Protective action should be taken immediately.

ADVISORY

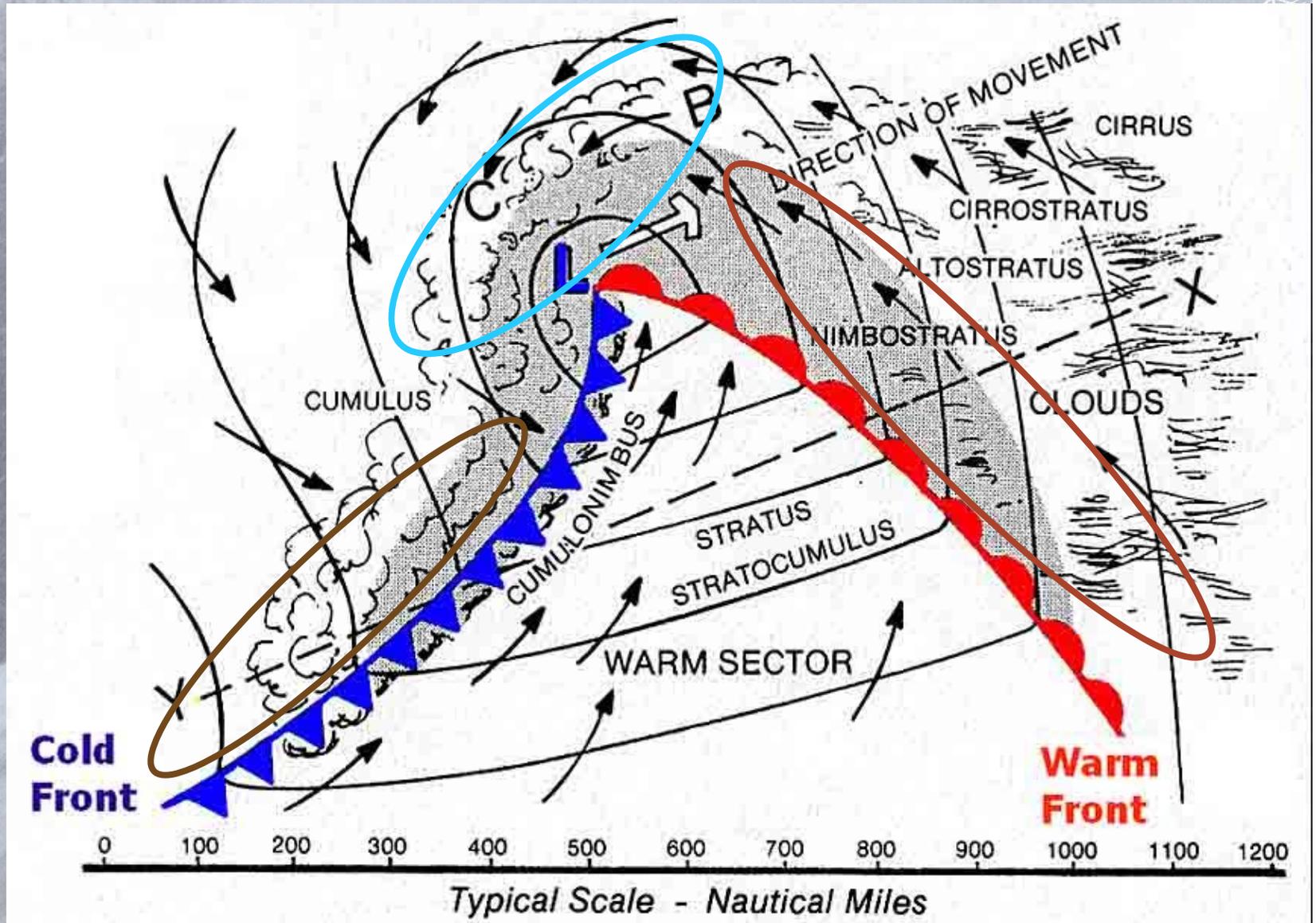
An advisory is issued when a hazardous weather is imminent or occurring, but for conditions that are less serious than warnings. Conditions will cause a significant inconvenience, and if caution is not exercised, could lead to situations that may threaten life or property.



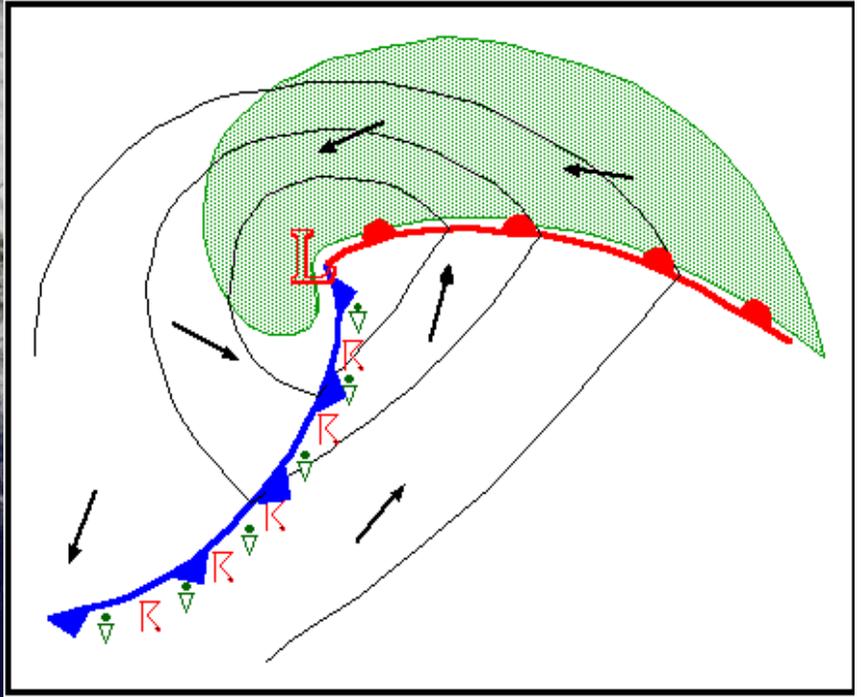
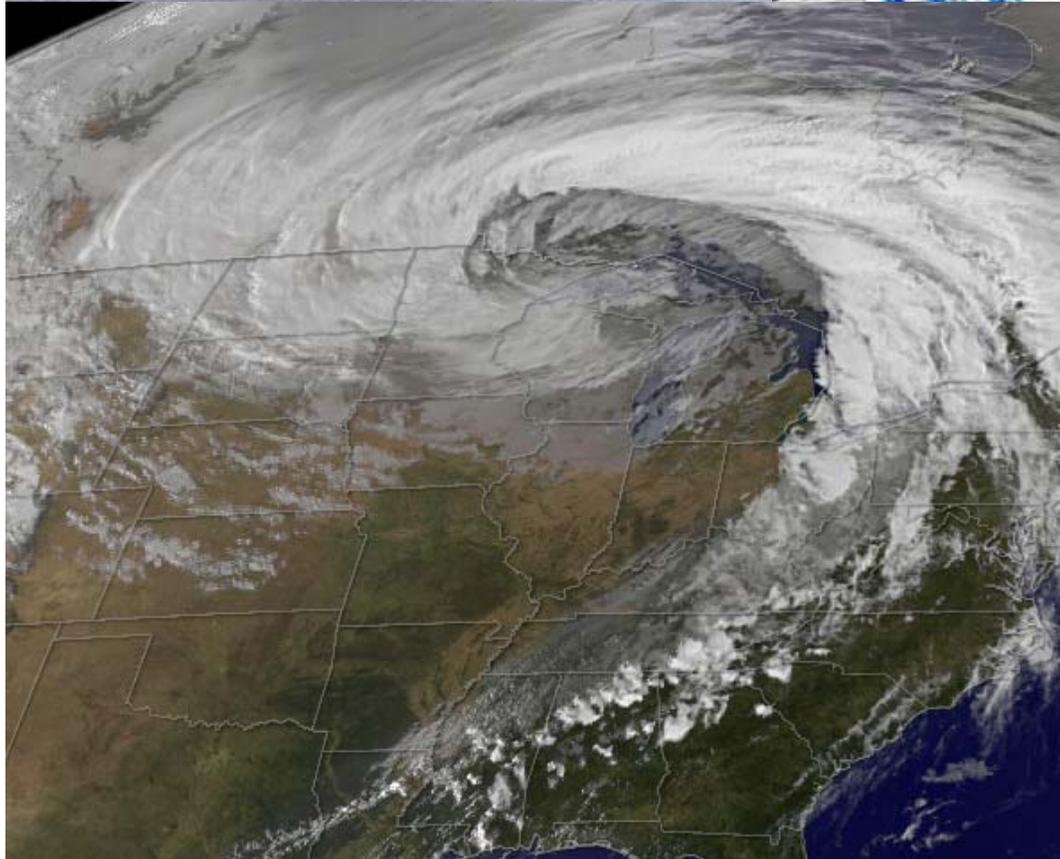
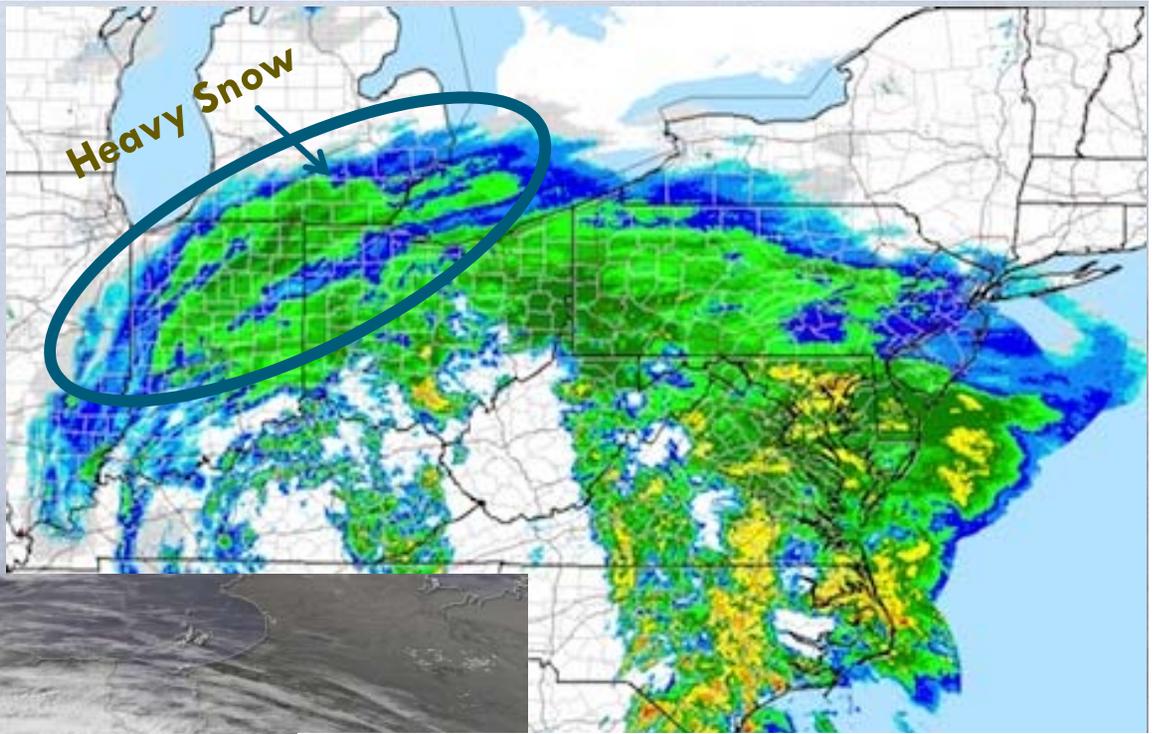
Winter Storms



Winter Storms



Winter Storms

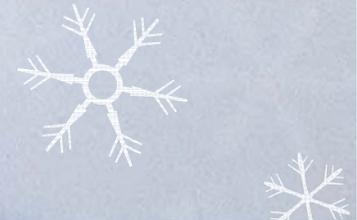


Winter Storms – Forecast Products

- **Hazardous Weather Outlook** – Discusses potential for accumulating snowfall out 7 days.
- **Winter Weather Advisory** – Issued for snow, sleet, freezing rain, or a combination of precipitation types expected to occur within the next 12 to 24 hours. Accumulations are forecast to remain below warning criteria, suggesting the main hazard will be to transportation.
- **Winter Storm Watch** – There is a 50 percent or greater forecast confidence in significant amounts of snow and/or ice accumulations in the next 12 to 48 hours.
- **Winter Storm Warning** – Snowfall accumulations around 6 inches or more in 6 hours and/or 8 inches or more in 12 hours, expected to occur within the next 12 to 24 hours.

Blizzard Forecast Products

- Hazardous Weather Outlook – Discusses potential for blizzard conditions out 7 days.
- Blizzard Warning – The combination of snow and blowing snow will reduce visibilities to less than a quarter mile for three hours or more. Blizzard warning are usually accompanied by significant snowfall accumulations. These are usually issued within 12 hours of the start of blizzard conditions.



Lake Effect Snow

LAKE EFFECT SNOW FORMATION

- Ideal Conditions:**
- Unfrozen Lake
 - Air Temp $13^{\circ}\text{C} <$ Water Temp
 - Distance across Lake = 100+ km

WINDY

Cold Air

Warm Moist Air

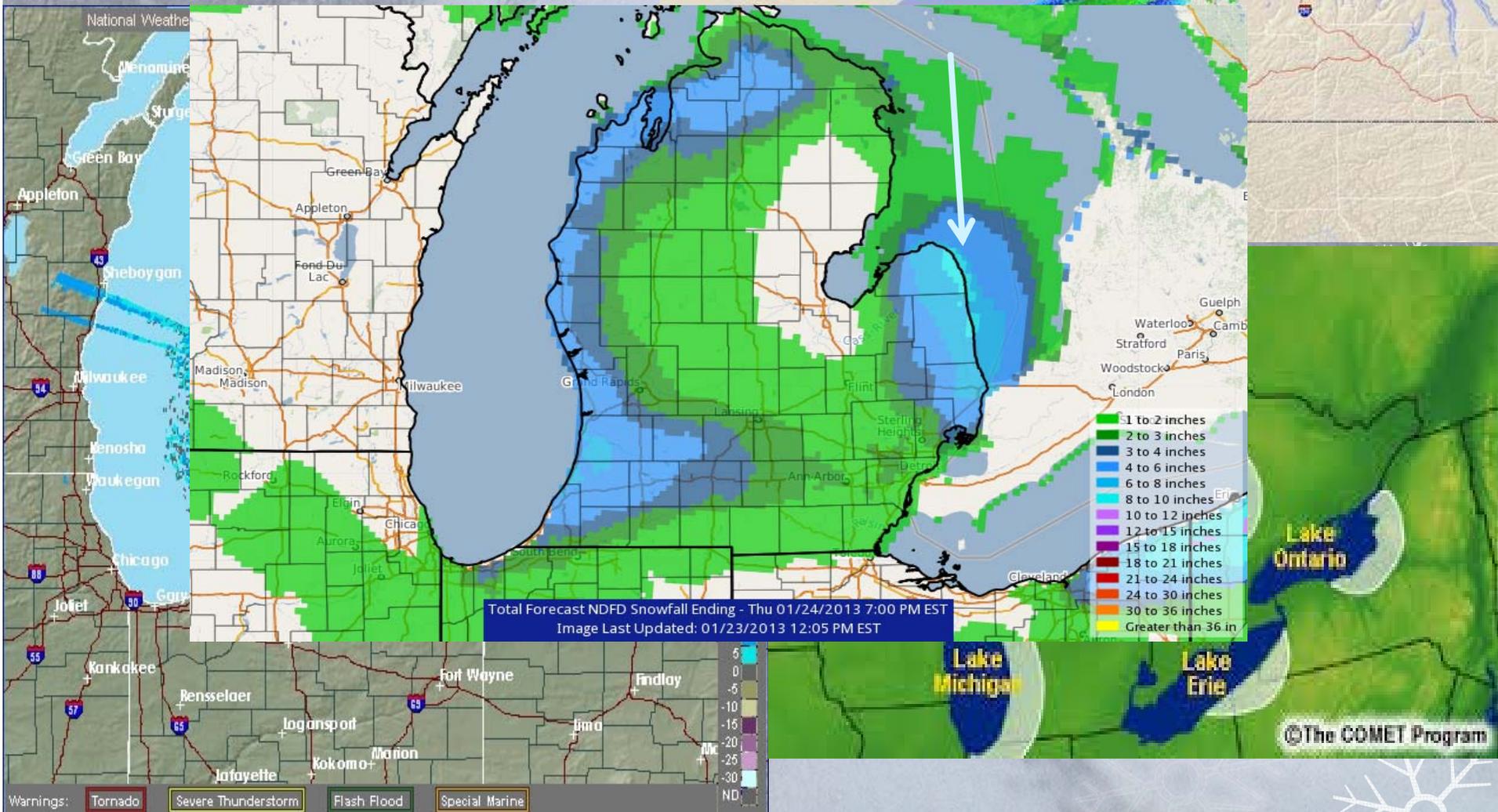
Steam Fog

SNOW

"Relatively" Warm Lake



Lake Effect Snow



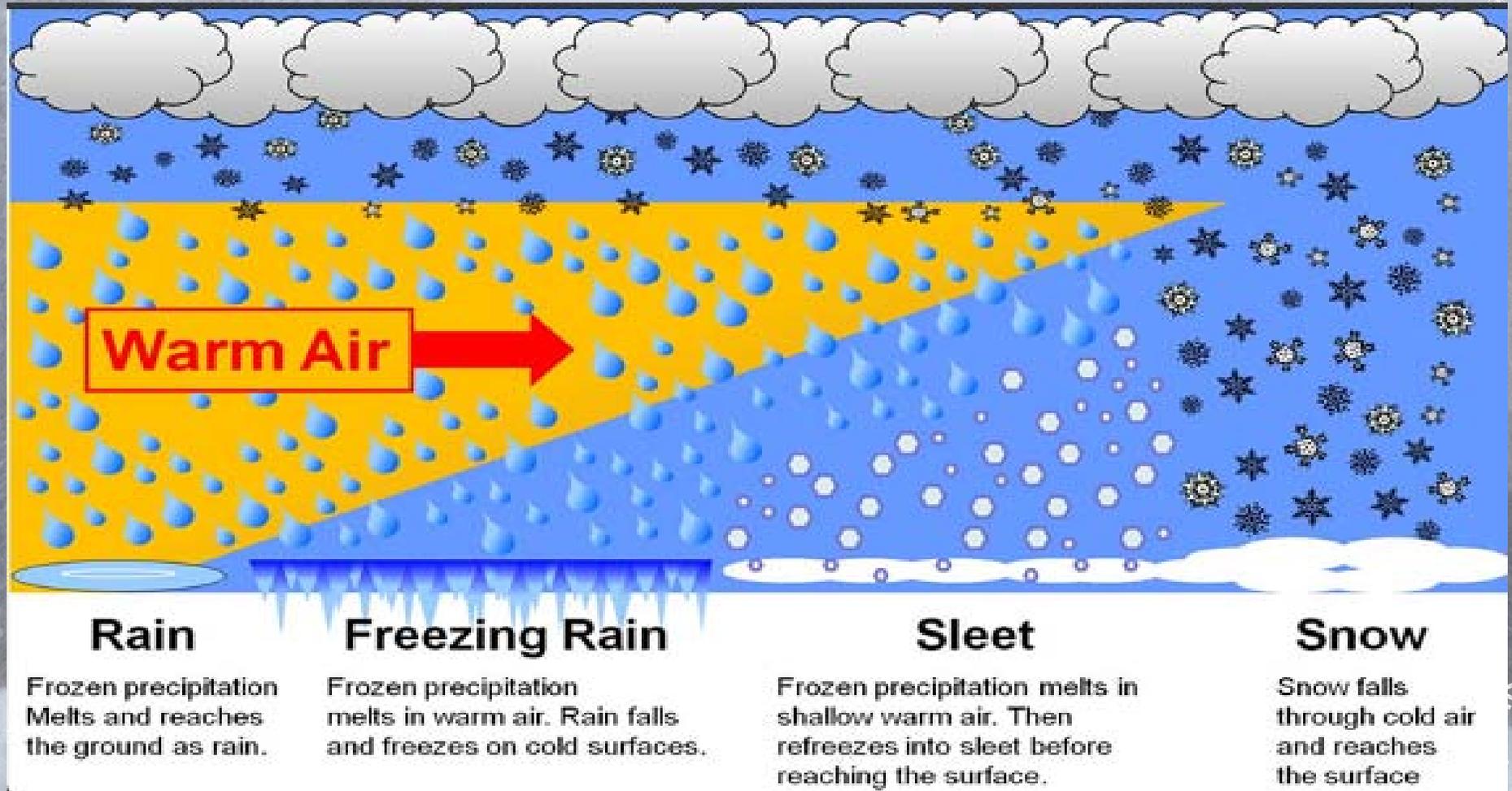
Lake Effect Snow



Lake Effect Snow – Forecast Products

- **Hazardous Weather Outlook** – Discusses potential for blizzard conditions out 7 days.
- **Lake Effect Snow Advisory** – Issued for lake effect snow expected to occur within the next 12 to 24 hours. Accumulations are forecast to remain below warning criteria. Lake effect implies wide fluctuations in snowfall amounts and visibilities.
- **Lake Effect Snow Watch** – There is a 50 percent or greater forecast confidence in significant amounts of lake effect accumulation in the next 12 to 48 hours.
- **Lake Effect Snow Warning** – Snowfall accumulations due to lake effect of around 6 inches or more in 6 hours and/or 8 inches or more in 12 hours, expected to occur within the next 12 to 24 hours. Again, the lake effect implies wide variability in snow amounts and occasional white out conditions.

Mixed Precip

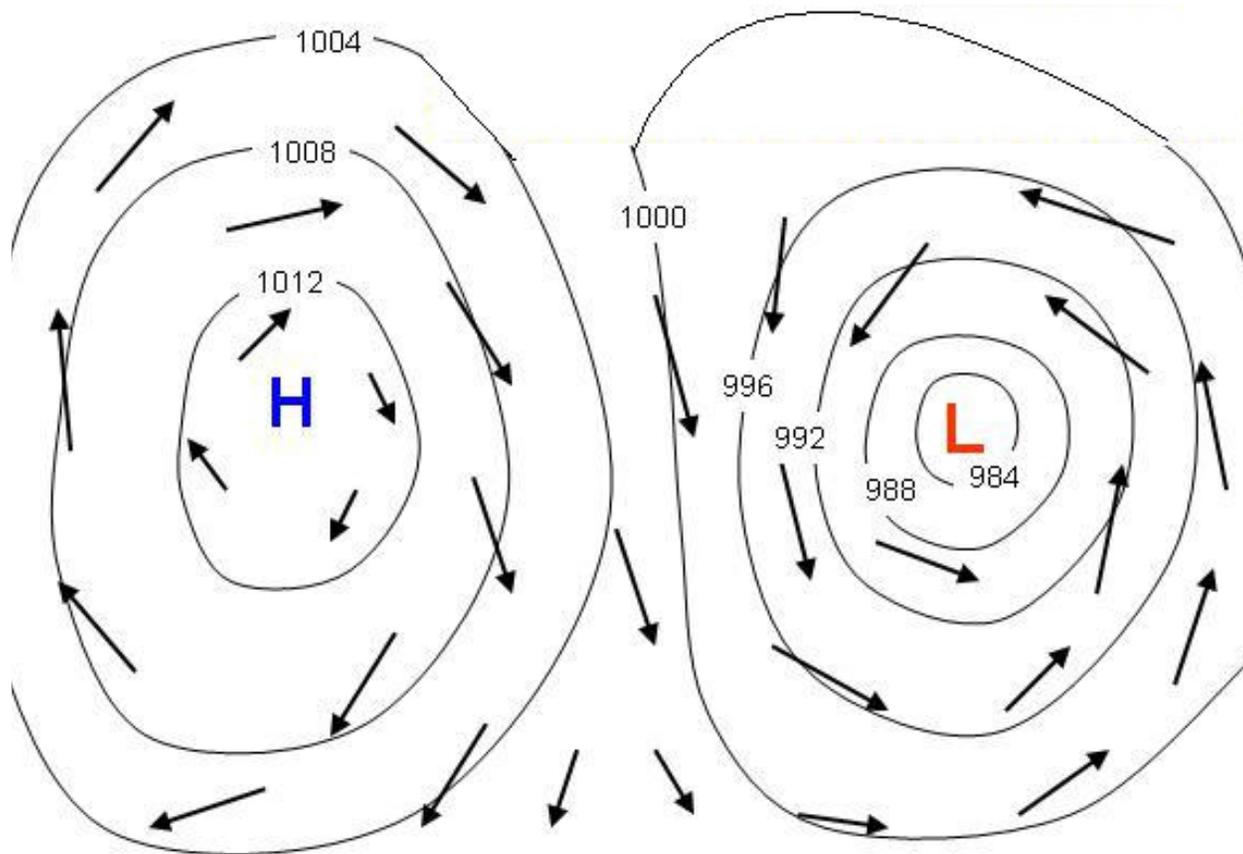
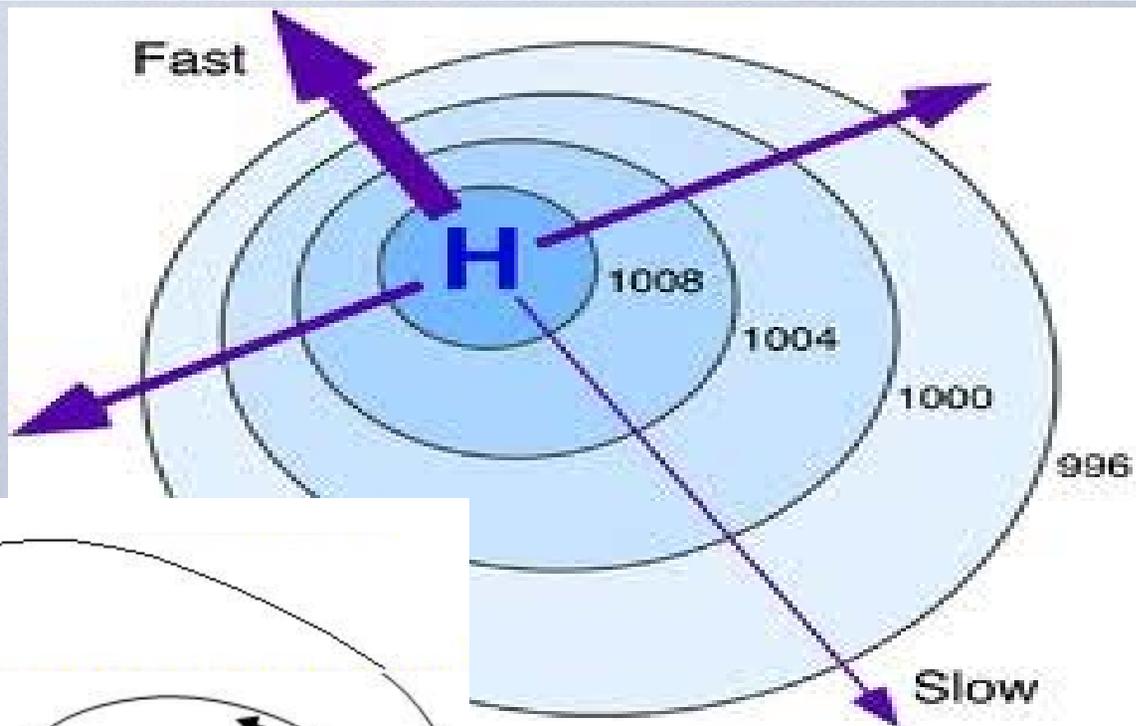


Freezing Rain – Forecast Products

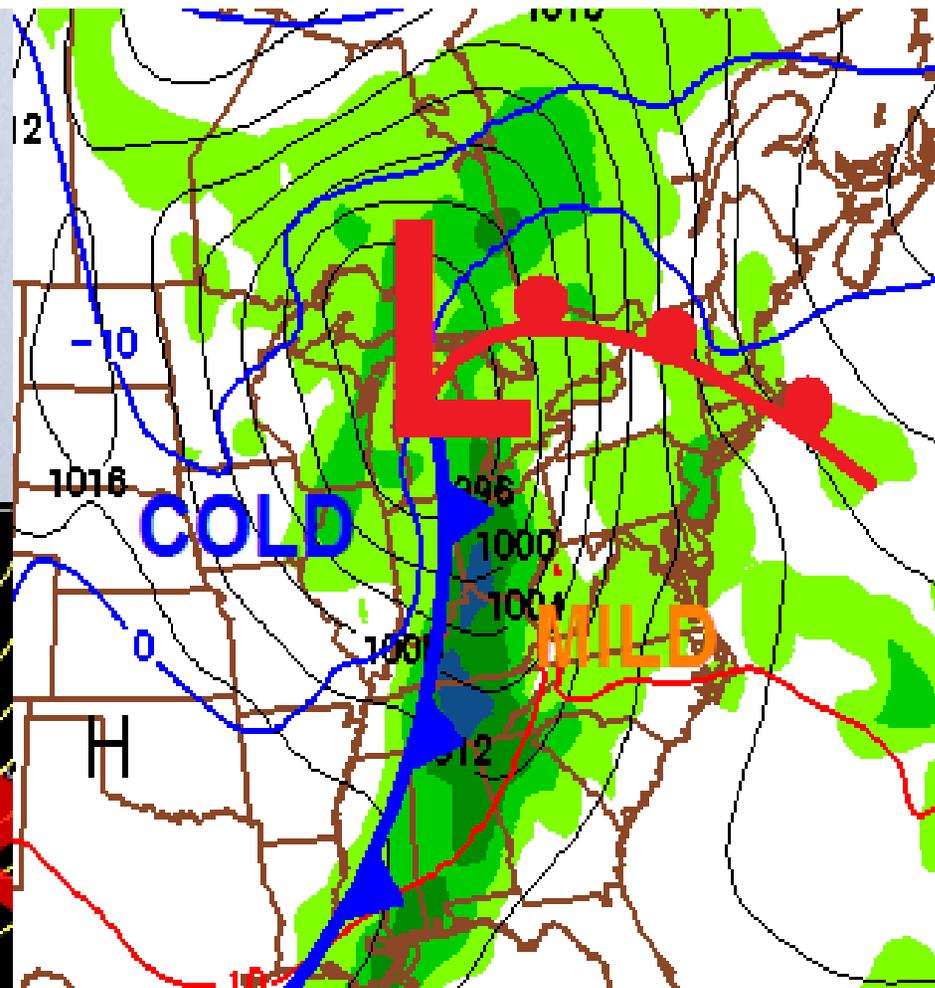
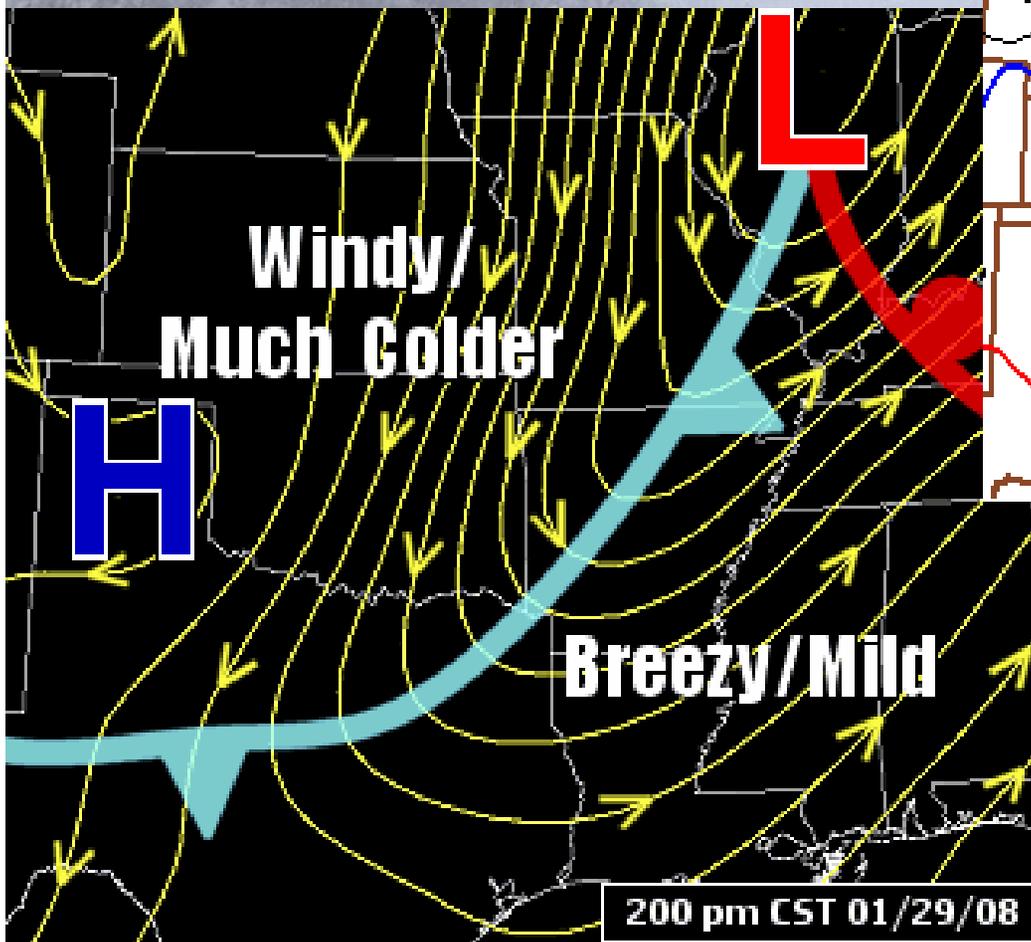


- **Hazardous Weather Outlook** – Discusses potential for blizzard conditions out 7 days.
- **Winter Weather Advisory for Freezing Rain** – Issued for freezing rain expected to occur within the next 12 to 24 hours. Accumulations are forecast to remain below warning criteria, suggesting the main hazard will be to transportation.
- **Winter Storm Watch** – There is a 50 percent or greater forecast confidence in significant amounts of snow and/or ice accumulations in the next 12 to 48 hours.
- **Ice Storm Warning** – Ice accumulations of a quarter inch or greater are expected to occur within the next 12 to 24 hours.

Strong Winds



Strong Winds



Strong Winds – Forecast Products

- **Hazardous Weather Outlook** – Discusses potential for blizzard conditions out 7 days.
- **Wind Advisory** – Issued when sustained winds at or greater than 30 MPH and/or gusts to 45 MPH are forecast within the next 12 to 24 hours.
- **High Wind Watch** – There is a 50 percent or greater forecast confidence in sustained winds at or greater than 40 MPH and/or wind gusts to 58 MPH 12 to 48 hours out.
- **High Wind Warning** – Sustained winds of 40 MPH or greater and or wind gusts to 58 MPH are forecast within the next 12 to 24 hours.

Flooding – Forecast Products

- **Types and Causes**

- **Flash Flood – Prolonged heavy rain from thunderstorms.**
- **Areal Flood – Prolonged flooding in low lying areas due to recent heavy rainfall and/or rapid snowmelt.**
- **River Flood – Flooding along the river due to heavy rain and/or snow melt or ice jam.**

- **Forecast Products**

- **Flash Flood Watch/Warning**
- **Flood Watch/Warning**
- **River Flood Warning**

Wind Chill and Fog Products



- Wind Chill Advisory – When wind chill readings are forecast to drop to -15 to -24 degrees Fahrenheit.
- Wind Chill Warning – When wind chill readings are forecast to drop to -25 degrees Fahrenheit or lower.
- Dense Fog Advisory – When widespread visibilities in fog will be one quarter mile or lower.

Temperature (°F)

Wind (mph)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times ■ 30 minutes ■ 10 minutes ■ 5 minutes

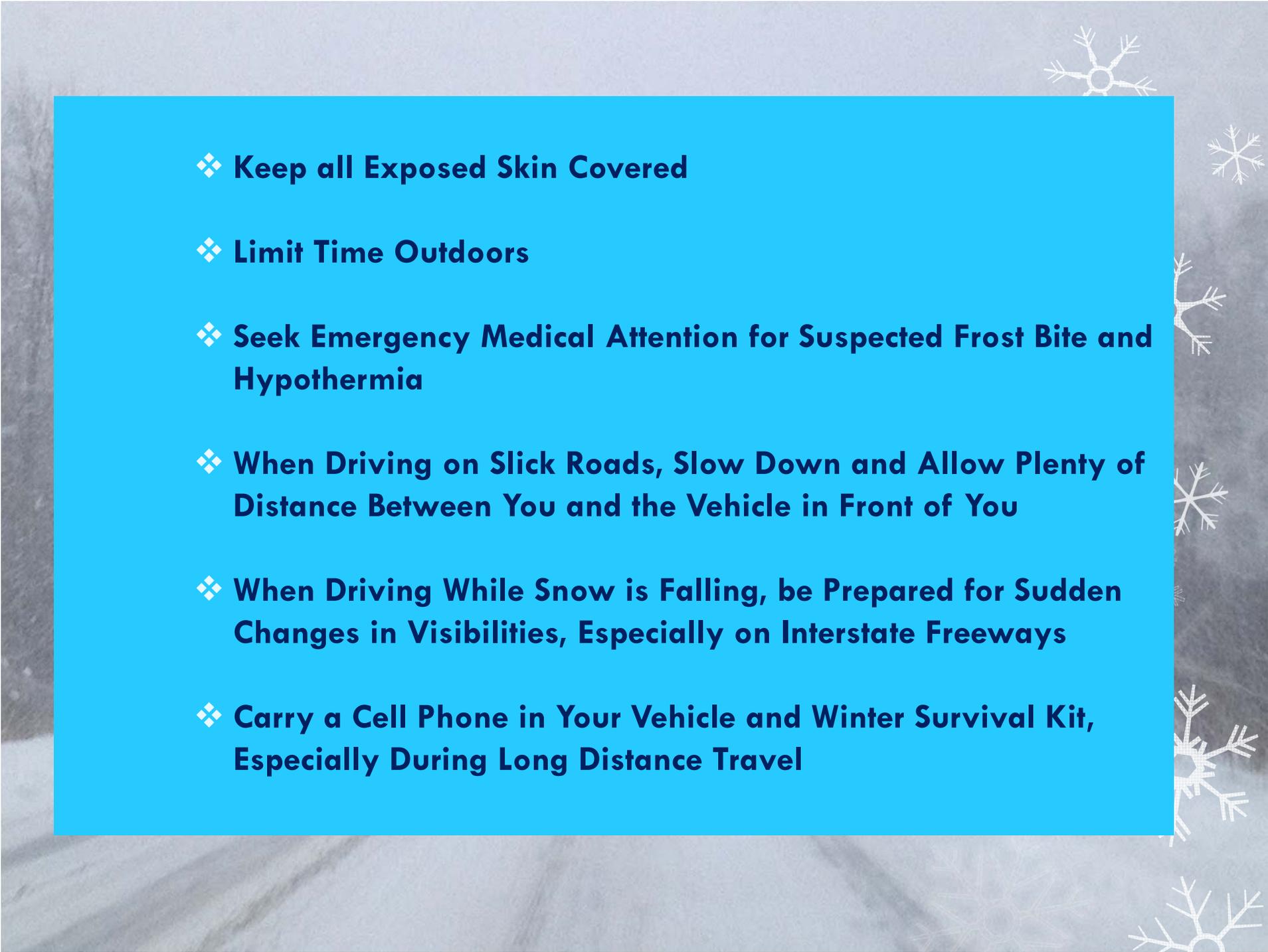
$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

A photograph of a two-lane road covered in snow, flanked by snow-covered trees. A sign is visible on the right side of the road. The image is overlaid with several white snowflake graphics of various sizes and orientations. The text "WINTER WEATHER SAFETY" is centered in a bold, dark blue font.

WINTER WEATHER SAFETY

- 
- ❖ **Keep all Exposed Skin Covered**
 - ❖ **Limit Time Outdoors**
 - ❖ **Seek Emergency Medical Attention for Suspected Frost Bite and Hypothermia**
 - ❖ **When Driving on Slick Roads, Slow Down and Allow Plenty of Distance Between You and the Vehicle in Front of You**
 - ❖ **When Driving While Snow is Falling, be Prepared for Sudden Changes in Visibilities, Especially on Interstate Freeways**
 - ❖ **Carry a Cell Phone in Your Vehicle and Winter Survival Kit, Especially During Long Distance Travel**



MEASURING SNOW AND REPORTING CRITERIA

PREFERRED WAY TO MEASURE SNOW

❖ A DESIGNATED SNOW BOARD



SNOW BOARDS/PLACEMENT

THEY SHOULD:

- ❖ MEASURE ROUGHLY 16 X 24 INCHES
- ❖ BE PAINTED WHITE TO AVOID HEAT ABSORPTION
- ❖ BE PLACED WHERE SNOW COLLECTION CAN BE BEST OBTAINED:
 - ❖ BEST LOCATION IS AN OPEN AREA THAT IS PROTECTED ON ALL SIDES
 - ❖ AN AREA THAT IS FREE FROM DRIFTING
 - ❖ AWAY FROM TREES...OVERHANGS...AND FENCES THAT CAN OBSTRUCT SNOWFALL
 - ❖ AWAY FROM BUILDINGS WHERE WIND EDDIES CAN BLOW SNOW OFF THE BOARD...OR ONTO BOARD AND INFLATE READINGS.



SNOW BOARDS/PLACEMENT continued:



- ❖ LOCATE THE BEST PLACEMENT FOR THE SNOW BOARD **BEFORE** THE SNOW FALLS
- ❖ BE SURE TO FLAG THE LOCATION OF THE BOARD WITH EASY TO SPOT MARKERS
- ❖ CLEAR THE SNOW FROM THE BOARD AFTER EACH READING AND PLACE BACK ON TOP OF SNOW

IF YOU DON'T HAVE A SNOW BOARD:

- ❖ **PICK A UNIFORM AREA THAT WAS PREVIOUSLY CLEARED OF SNOW...SUCH AS A PICNIC TABLE.**
- ❖ **DO NOT MEASURE OFF YOUR PATIO OR VEHICLES.**
 - ❖ **PATIO AREAS CAN INFLATE SNOW MEASUREMENTS DUE TO DRIFTED SNOW FROM WIND EDDIES AROUND THE HOUSE...OR SNOW BLOWING OFF ROOF ONTO PORCH**
 - ❖ **VEHICLES CAN BE WARM FROM ENGINE HEAT WHICH CAN MELT INITIAL SNOWFALL AND CREATE LOW MEASUREMENTS.**

REPORTING SNOWFALL

REPORT THE FOLLOWING:

- ❖ The **FIRST INCH** of new snow
- ❖ Each **ADDITIONAL TWO INCHES** of New Snowfall
- ❖ **12 HR TOTALS** (each morning/evening)
- ❖ **STORM TOTAL** (Snowfall for the entire event)



MEASURE NEW SNOWFALL:

- ❖ **TO THE NEAREST TENTH OF AN INCH**
- ❖ **USING A DESIGNATED SNOW BOARD IF AVAILABLE**
- ❖ **AS SOON AS THE EVENT ENDS**
 - ❖ **SO YOU DON'T LOSE SNOW TO WIND OR MELTING**

FREEZING RAIN



- ❖ **RAIN FREEZES INSTANTLY TO COLD SURFACES**
- ❖ **ACCUMULATION IS GENERALLY ONE QUARTER INCH OR LESS.**
- ❖ **MEASURE ICE THICKNESS WITH A RULER AND ONLY IF SAFE TO DO SO.**
- ❖ **TELL US IF YOUR REPORT MEASURED OR ESTIMATED.**
- ❖ **REPORT ANY OCCURRENCE**
 - ❖ **DAMAGE/INJURIES DUE TO FREEZING RAIN**

ICE STORMS



- ❖ **THEY ARE BASICALLY A HEAVY FREEZING RAIN EVENT (>0.25 Inches of ice)**
- ❖ **RESULTS IN DAMAGE TO TREES AND POWER LINES**
- ❖ **SERVE AS A GREAT THREAT FOR ANY TYPE OF SAFE TRAVEL**
- ❖ **REPORT ALL HEAVY ICING AND ANY DAMAGE OR INJURIES**

Road Conditions



- ❖ **SLIPPERY ROADS DUE TO SNOW AND/OR ICE**
- ❖ **FLASH FREEZING LEADING TO RAPIDLY DETERIORATING ROAD CONDITIONS**
- ❖ **POOR VISIBILITIES DUE TO SNOW AND/OR BLOWING SNOW**
- ❖ **RAPIDLY FLUCTATING VISIBILITIES IN SNOW**

Rain, Flooding, Wind, Fog



- ❖ RAINFALL OF ONE INCH OR MORE IN 24 HOURS OR LESS
- ❖ ANY FLOODING THAT THREATENS PROPERTY
- ❖ ICE JAMS ON RIVERS OR STREAMS
- ❖ WIND GUSTS 40 MPH OR GREATER
- ❖ ANY DAMAGE DUE TO HIGH WINDS
- ❖ FOG REDUCING VISIBILITIES TO A QUARTER MILE OR LESS



WAYS TO REPORT

SPOTTER PHONE LINE: 800-808-0006

STORM REPORT VIA NWS DETROIT/PONTIAC WEB PAGE:

www.weather.gov/dtx

Under CURRENT HAZARDS select “RECENT STORM and PRECIP REPORTS” to get to form.

FACEBOOK: www.facebook.com/NWSDetroit

TWITTER: www.twitter.com/NWSDetroit

COMMUNITY COLLABORATIVE RAIN, HAIL AND SNOW NETWORK (CoCoRaHS)

VOLUNTEER TO BECOME A CoCoRaHS OBSERVER
TO REPORT YOUR PRECIPITATION AND SNOWFALL

www.cocorahs.org

SEE FLYER FOR MORE INFORMATION ON THIS PROGRAM



A PICTURE IS WORTH A THOUSAND WORDS

**IF YOU HAVE A CAMERA
TAKE A PHOTO!
SUBMIT VIA
FACEBOOK...TWITTER OR EMAIL**

