

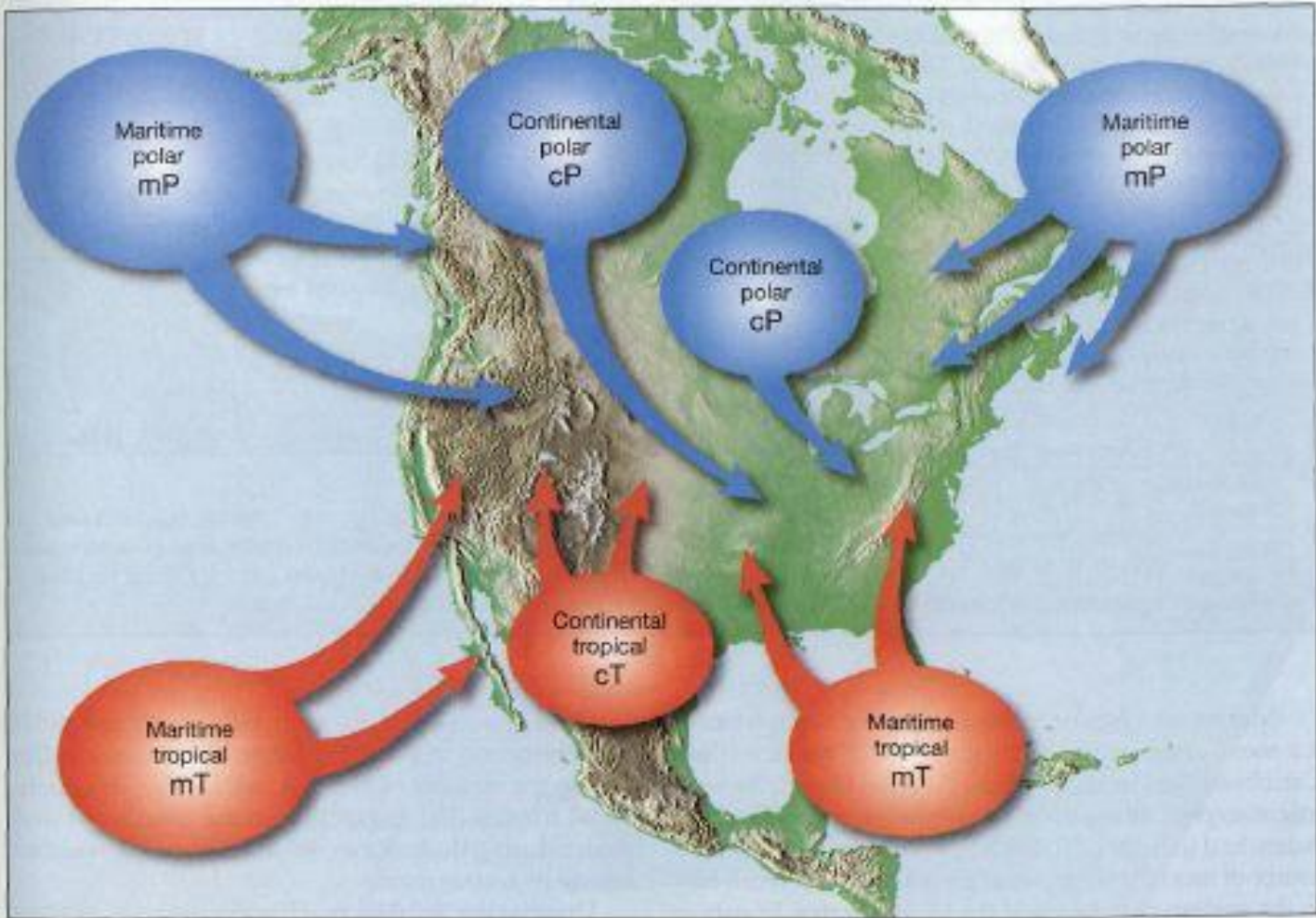
Weather

Chapter 3: Weather Fronts & Storms



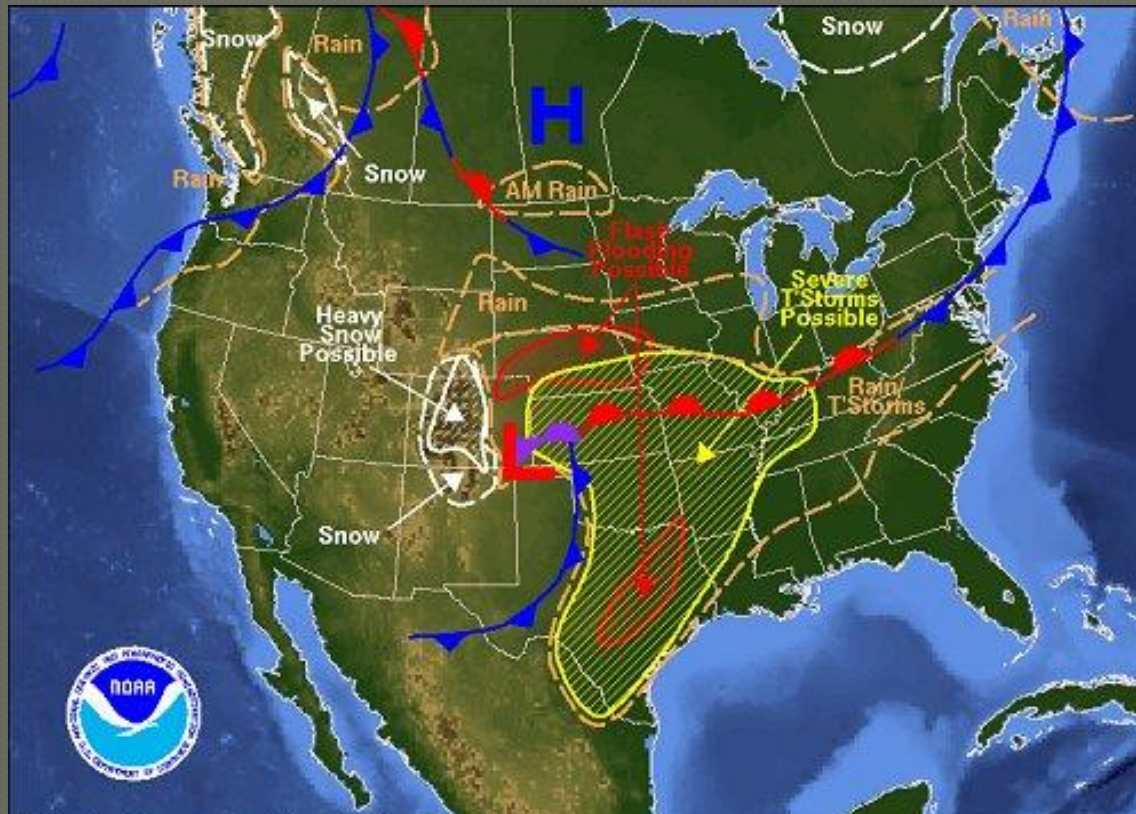
Air Masses

- An AIR MASS is a large body of air that has similar characteristics (temperature, humidity) throughout.
- Air masses can be massively large.
- Air masses are classified by location formed and temperature:
 - CONTINENTAL means it formed over land and is dry.
 - MARINE means it formed over water and is wet.
 - TROPICAL means it's warm.
 - POLAR means it's cold.
- As air masses move, they take their moisture and temperature (weather) with them.
- Air masses move with winds.
- Air masses usually move west to east.



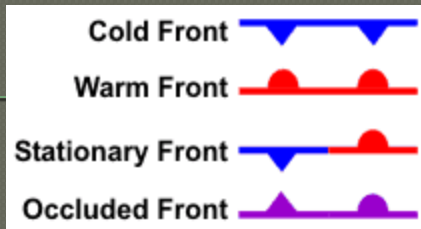
Fronts

- A FRONT is a boundary between air masses.

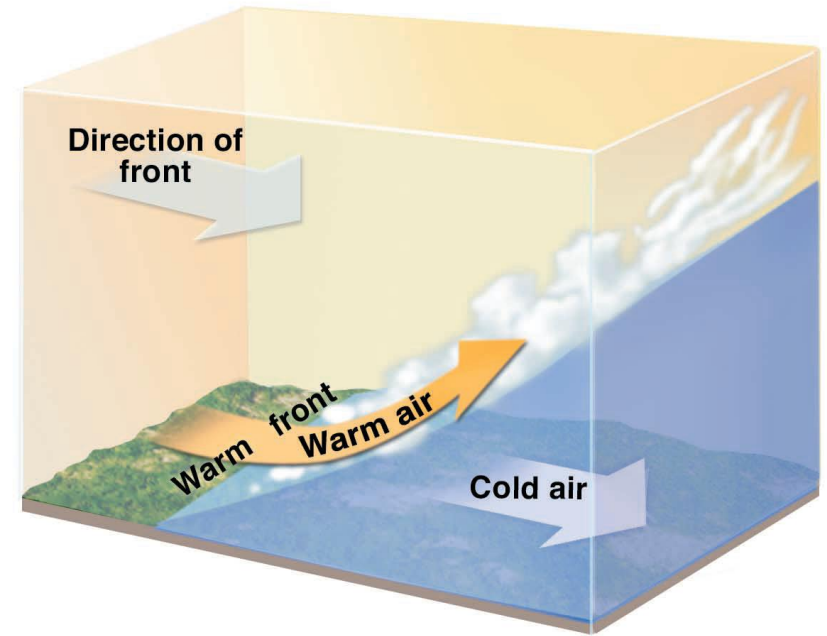


Cold Front	
Warm Front	
Stationary Front	
Occluded Front	

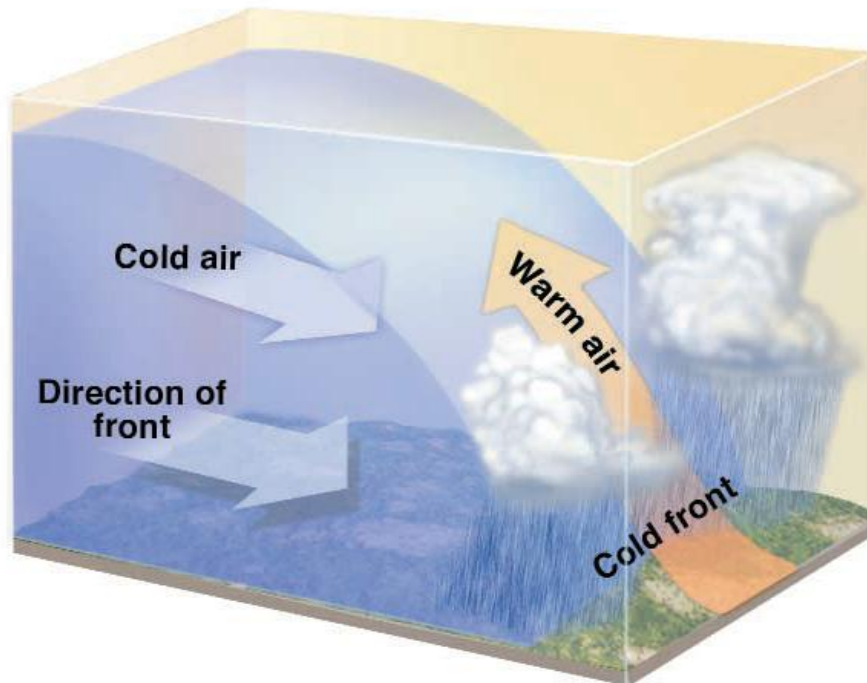
Remember: Warm air ALWAYS rises!!!



Warm Front



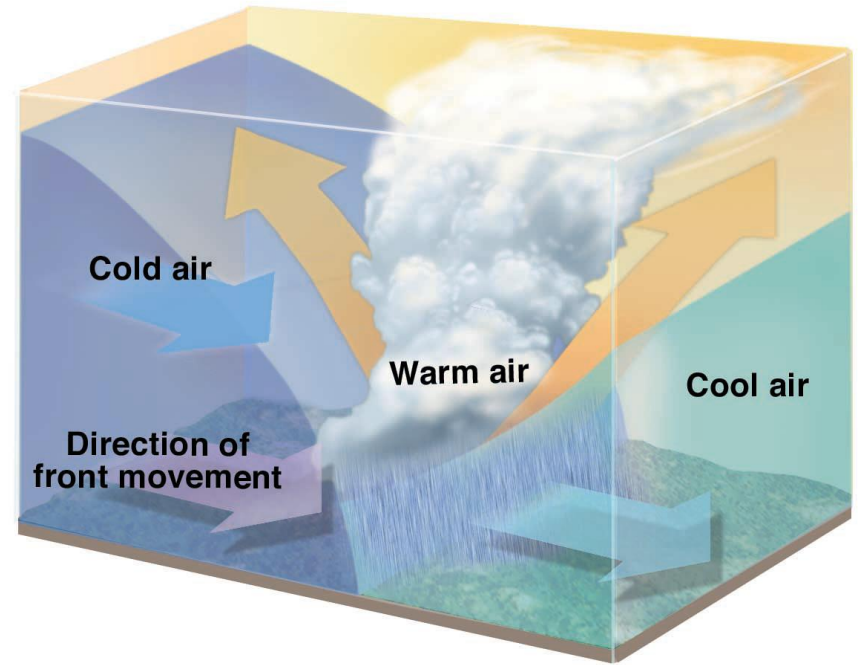
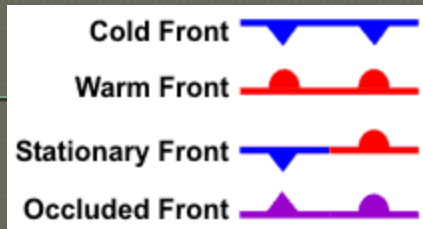
Cold Front



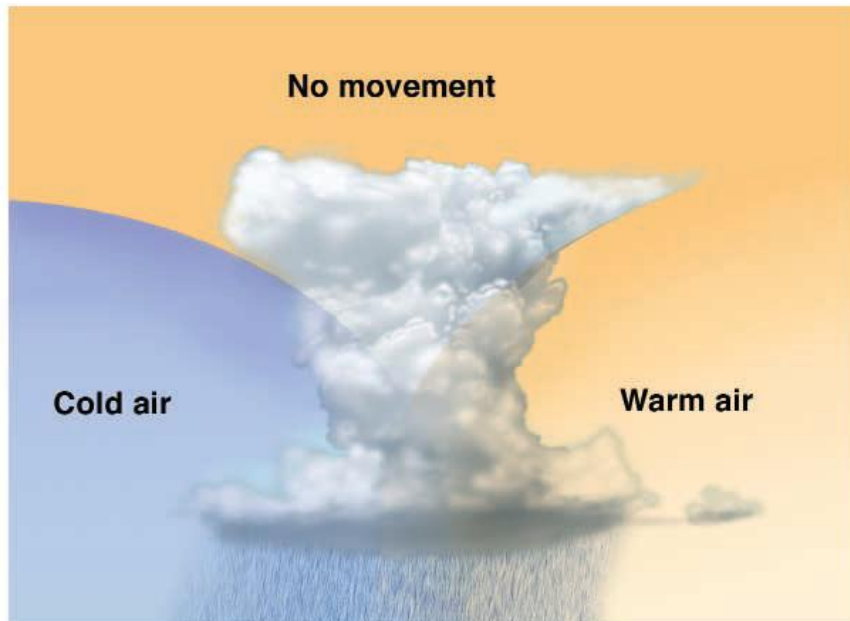
WARM FRONT: Warm air and cold air both pushing in same direction.

COLD FRONT: Warm air and cold air pushing in opposite directions.

Occluded Front



Stationary Front



OCCLUDED FRONT: Warm air is sandwiched in between two cold air masses.

STATIONARY FRONT: Warm air and cold air push equally in opposite directions. It's a standoff!

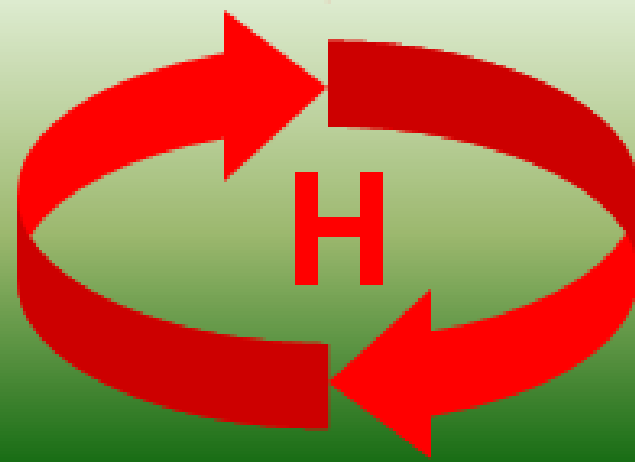
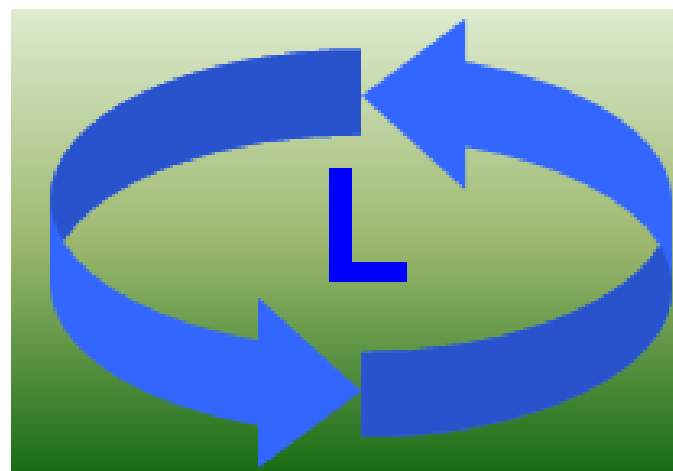
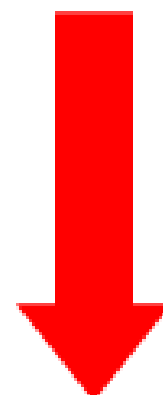
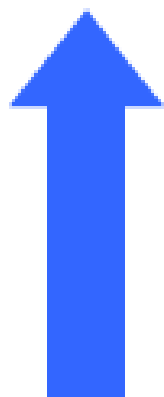
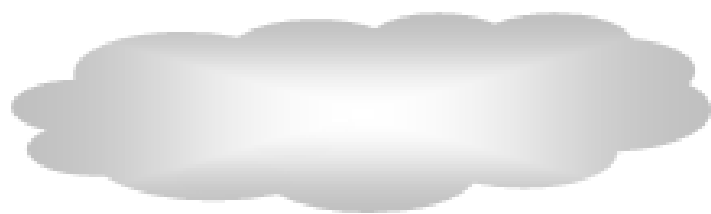
Pressure Systems

HIGH PRESSURE SYSTEM

- Air sinks.
- Air moves towards low pressure.
- Air moves clockwise due to the Coriolis Effect.
- Large
- Change slowly
- Nice weather
 - Clear skies, calm air, gentle breezes
 - Temperature warms up
 - Clouds disappear

LOW PRESSURE SYSTEM

- Air moves around and into low pressure then rises.
- Air moves counterclockwise.
- Occurs where cold and warm air masses meet
- Large
- Stormy weather



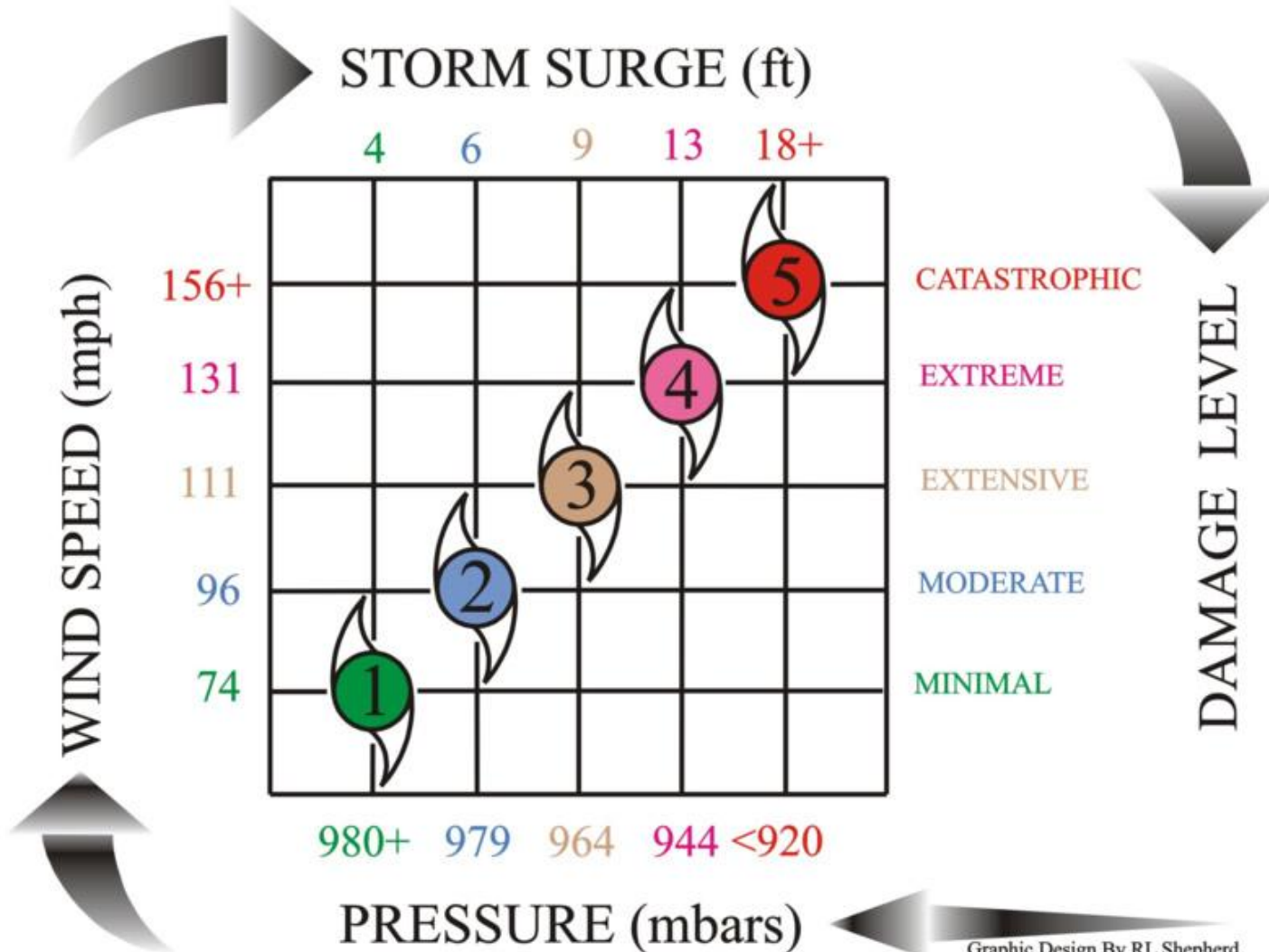
Ground

Hurricanes

- ◎ A TROPICAL STORM is a low pressure system starting near the equator with winds 40+ mph.
- ◎ A HURRICANE has winds 74+ mph.
- ◎ Hurricanes are also known as typhoons and cyclones depending on where they form.
- ◎ In the US, hurricane season is August to October.
- ◎ A hurricane's energy comes from warm water. Once on land, it loses energy quickly.

Hurricanes are measured using the ...

SAFFIR-SIMPSON HURRICANE SCALE



Parts of the Hurricane

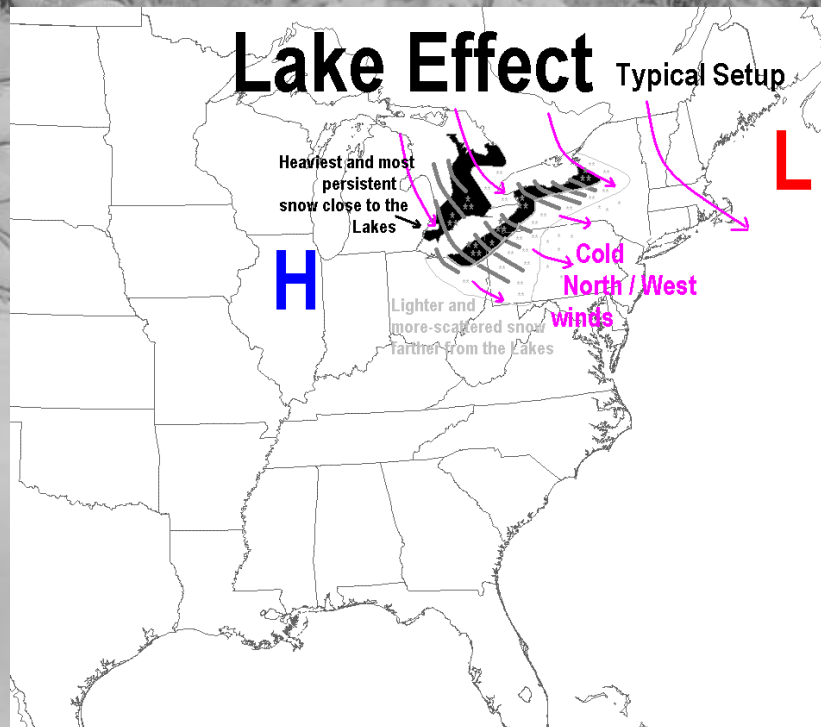
- ◎ The **EYE** is in the center and is 10-30 miles wide. It is calm here.
- ◎ The **EYE WALL** is just past the eye and contains a ring of destructive clouds bringing heavy winds and rainfall.
- ◎ The **STORM SURGE** is a wall of water that travels with the hurricane. This huge wave destroys lots of oceanfront property.

Winter Storms

- ◎ Usually from low pressure systems
- ◎ Form when two air masses collide
- ◎ A **BLIZZARD** is a snowstorm with wind speeds 35+ mph and very low temperatures (usually less than 20°F).
- ◎ An **ICE STORM** occurs when rain falls and then immediately freezes.
- ◎ Problems from winter storms . . .
 - Knock down trees
 - Break power lines (1/4 inch of ice can break a line)
 - Crush roofs
 - Little to no travel
 - Businesses and schools close for extended periods of time

Winter Storms

- ◎ LAKE-EFFECT SNOW is found near the Great Lakes.
- ◎ Air masses move over the Great Lakes, pick up moisture, and then dump large quantities of snow quickly.




Thunderstorms

A dramatic night scene of a town with a bright lightning bolt striking a dark, stormy sky. The town is illuminated by streetlights and house lights, creating a contrast with the dark, stormy sky. The lightning bolt is a bright, jagged line of light that strikes down from the clouds.

- ◎ Electrical charges build up in clouds. As that spark jumps to another cloud or the ground, **LIGHTNING** is formed.
- ◎ This heats the air quickly. As the air quickly expands and contracts, **THUNDER** is formed.
- ◎ A **THUNDERSTORM** is a rainstorm with thunder and lightning.
- ◎ Cause
 - Flash flooding – sudden flooding can carry cars away
 - High winds – can topple power lines and trees
 - Hail – can damage cars and houses
 - Lightning – can hit a person or a thing; can start forest fires

Tornadoes

- ◎ A TORNADO is a violent, rotating column of air that stretches from the clouds to the ground.
 - ◎ Form when warm air masses from the Gulf of Mexico meet cold air masses on land.
 - ◎ Most tornadoes are small and last only a couple minutes.
 - ◎ Tornadoes are unpredictable. It is difficult to guess where they will go next.
 - ◎ Can pick up and touch down
 - ◎ Can lift items off the ground
 - ◎ Causes
 - Downed trees
 - Loss of power
 - Roofs to tear off
 - Livestock to be hurt
 - ◎ North America has more tornadoes than anywhere else in the world.
 - ◎ Tornado Alley is especially hard-hit. It extends from Texas to Iowa, Kansas, Nebraska and Ohio.
 - ◎ Only 20% of all tornadoes are strong enough to damage trees, lift cars, or pull off roofs. These can last several hours.
 - ◎ 1% of tornadoes can tear down a strong building.
- 

Tornadoes are measured using the Fujita scale.

FUJITA SCALE

	<u>Wind speed</u>	<u>Damage</u>
F0	40-73 mph	Light
F1	74-112 mph	Moderate
F2	113-157 mph	Considerable
F3	158-206 mph	Severe
F4	207-260 mph	Devastating
F5	261-318 mph	Incredible



F-0: (Light Damage) Chimneys are damaged, tree branches are broken, shallow-rooted trees are toppled.



F-1: (Moderate Damage) Roof surfaces are peeled off, windows are broken, some tree trunks are snapped, unanchored manufactured homes are overturned, attached garages may be destroyed.



F-2: (Considerable Damage) Roof structures are damaged, manufactured homes are destroyed, debris becomes airborne (missiles are generated), large trees are snapped or uprooted.



F-3: (Severe Damage) Roofs and some walls are torn from structures, some small buildings are destroyed, non-reinforced masonry buildings are destroyed, most trees in forest are uprooted.



F-4: (Devastating Damage) Well-constructed houses are destroyed, some structures are lifted from foundations and blown some distance, cars are blown some distance, large debris becomes airborne.



F-5: (Incredible Damage) Strong frame houses are lifted from foundations, reinforced concrete structures are damaged, automobile-sized debris becomes airborne, trees are completely debarked.

April 16, 2011 North Carolina Tornadoes



Downtown Raleigh







Lowes in Sanford



Raleigh



Apex



I-40





Holly Springs



Sanford



Holly Springs – Avent Ferry Road



Holly Springs



Holly Springs



Raleigh

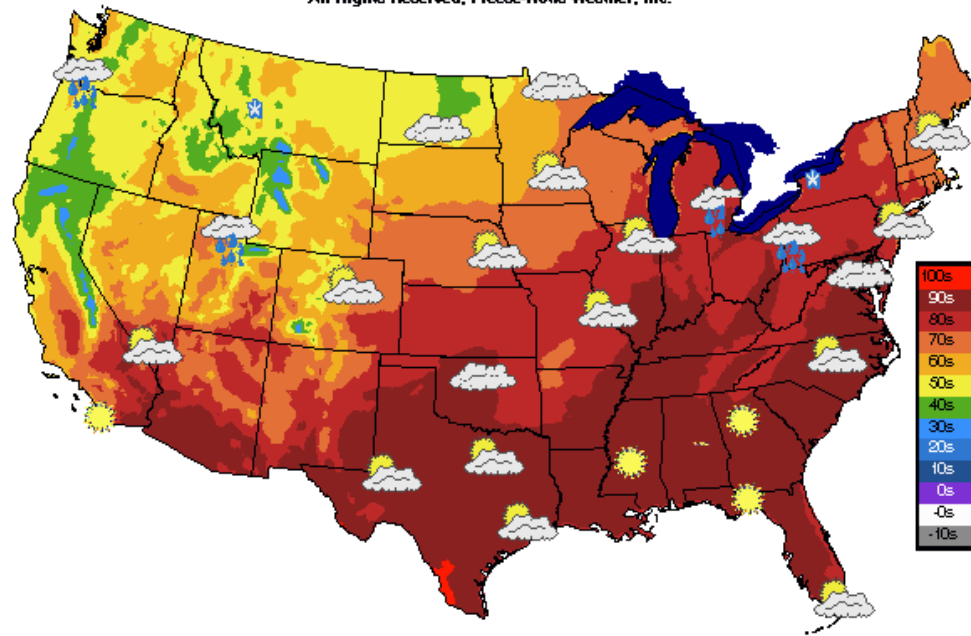
Weather Forecasting

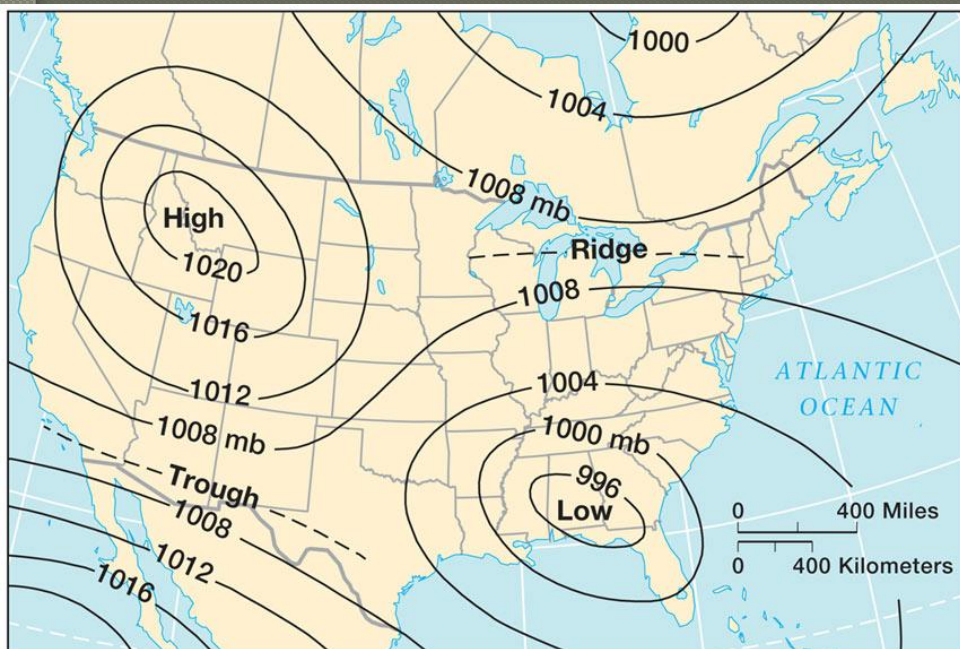
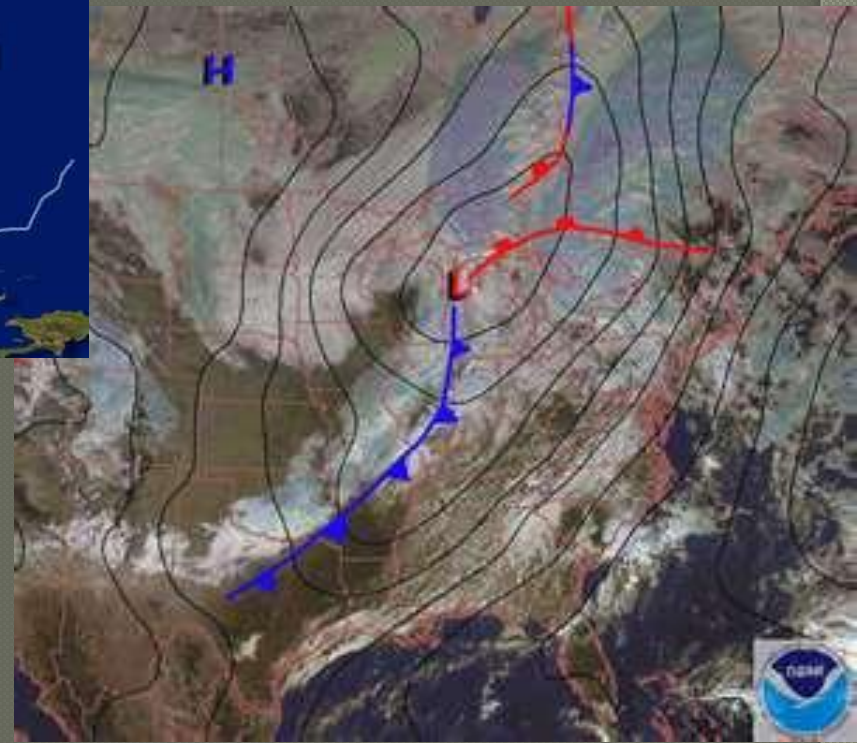
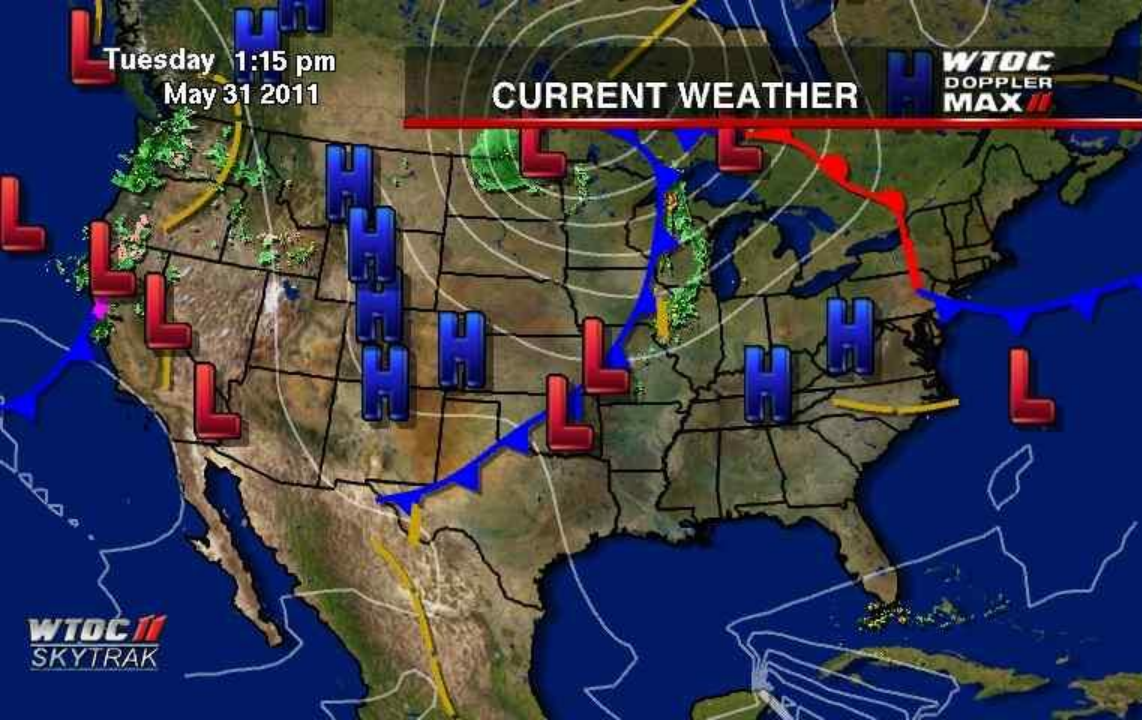
- “Meteorologists prognosticate and prevaricate.”
 - What does this mean?
- A METEOROLOGIST is a scientist who specializes in the weather.
 - Look at past and present weather conditions
 - Examine data
 - Make predictions
- National Oceanic & Atmospheric Administration (NOAA)

Weather Maps

Today's Weather Forecast--May 31, 2011

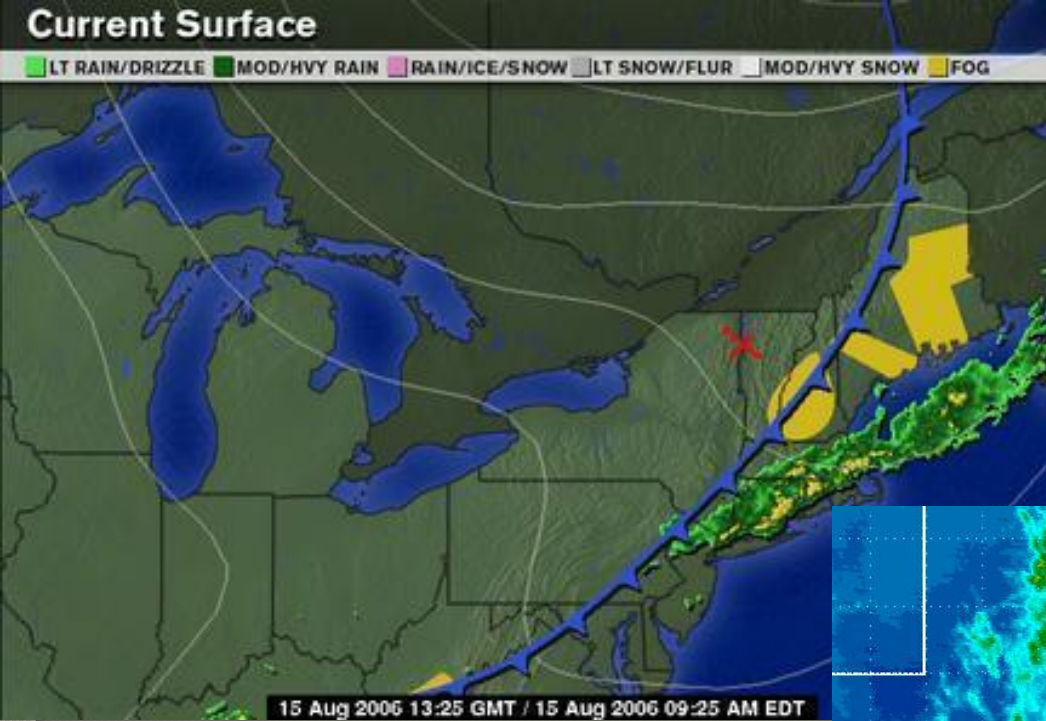
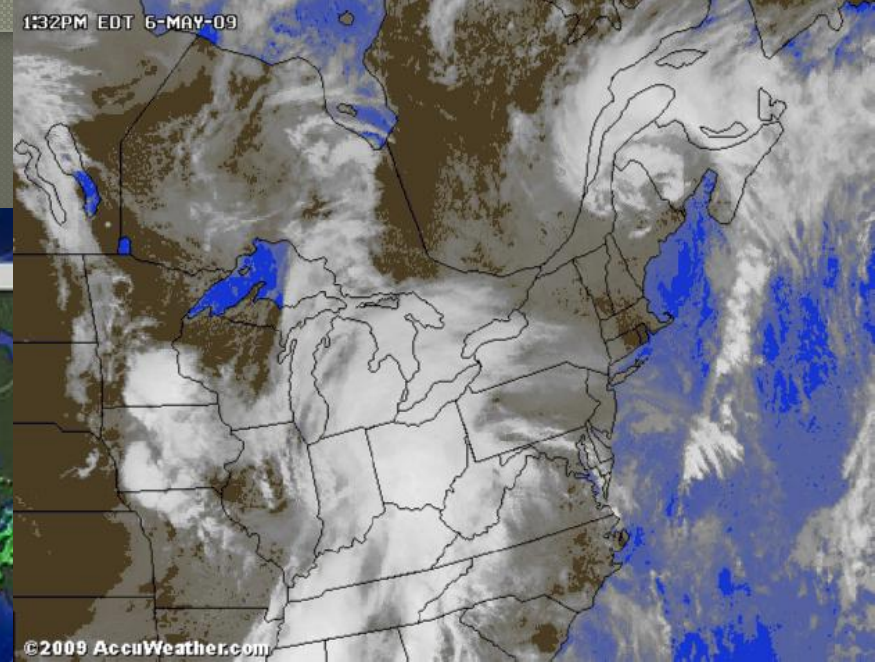
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ISOBARS are lines that connect areas with identical air pressures. They help predict wind movements.

Satellite images show accumulation of water vapor in the air.



INFRARED satellite images show intensity of storms.

