

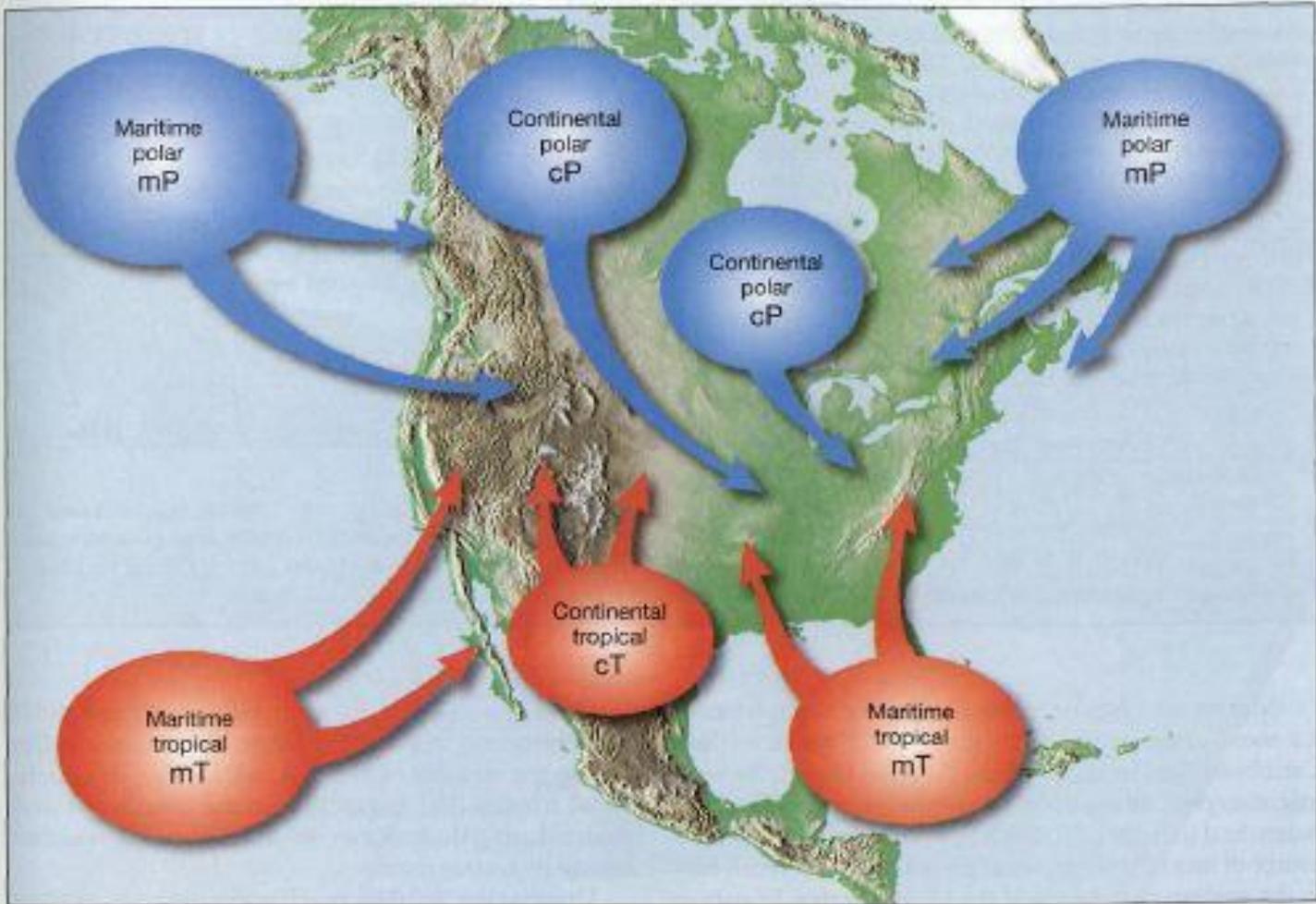
Weather

Chapter 3: Weather Fronts & Storms



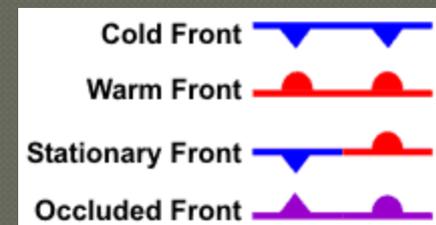
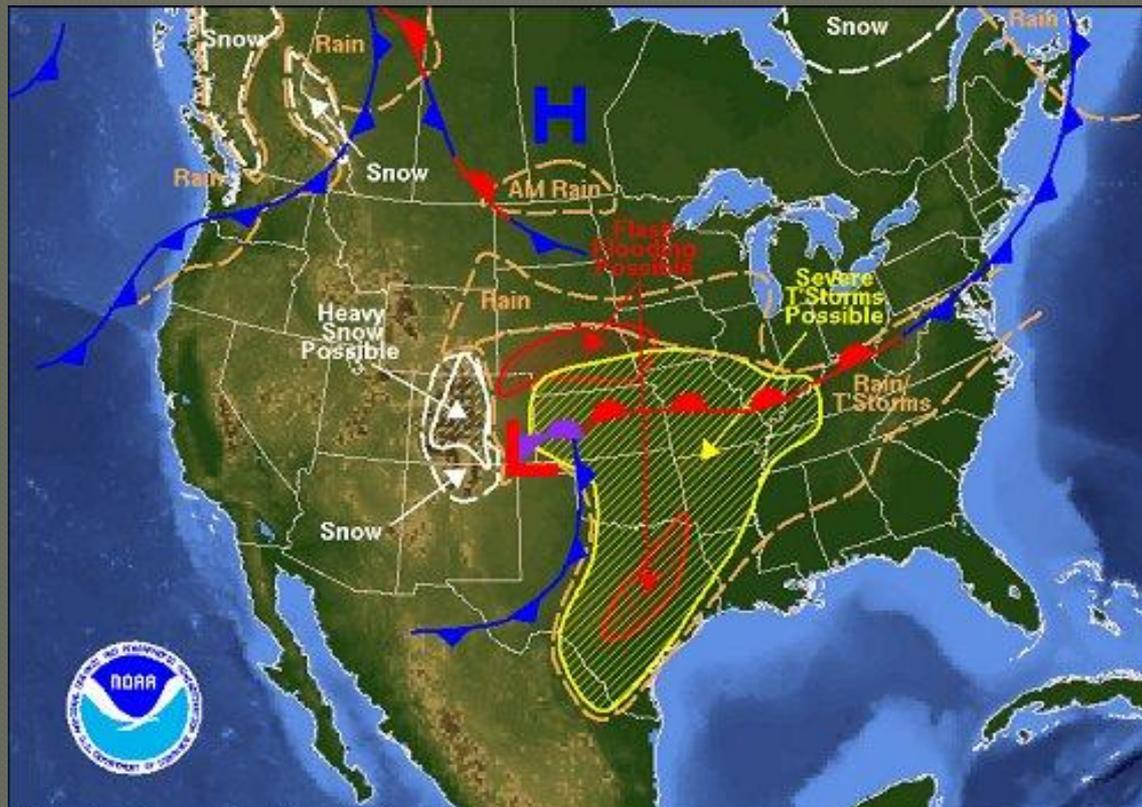
Air Masses

- 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.

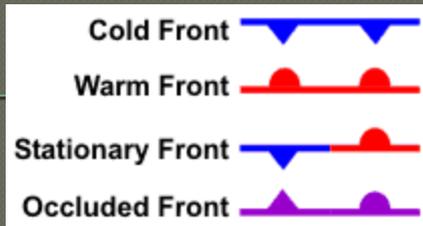


Fronts

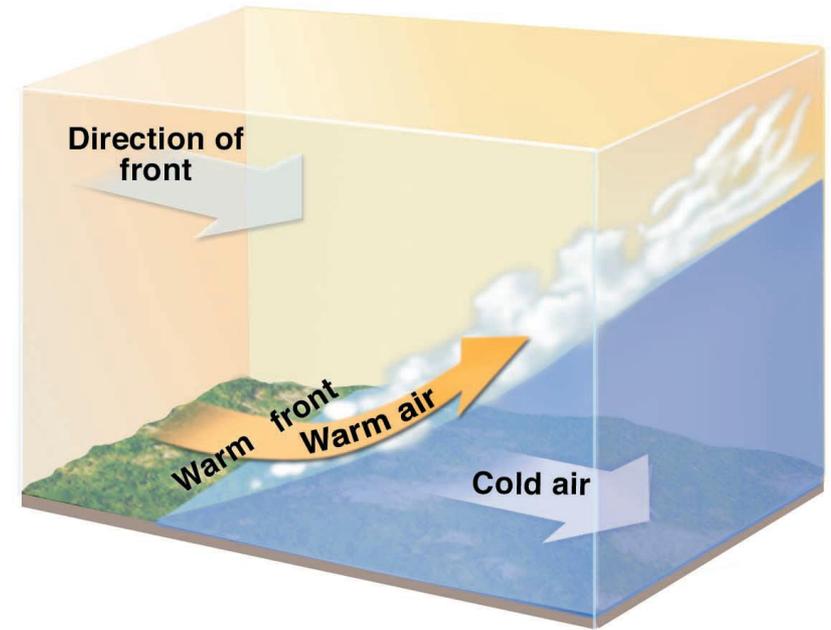
- A FRONT is a boundary between air masses.



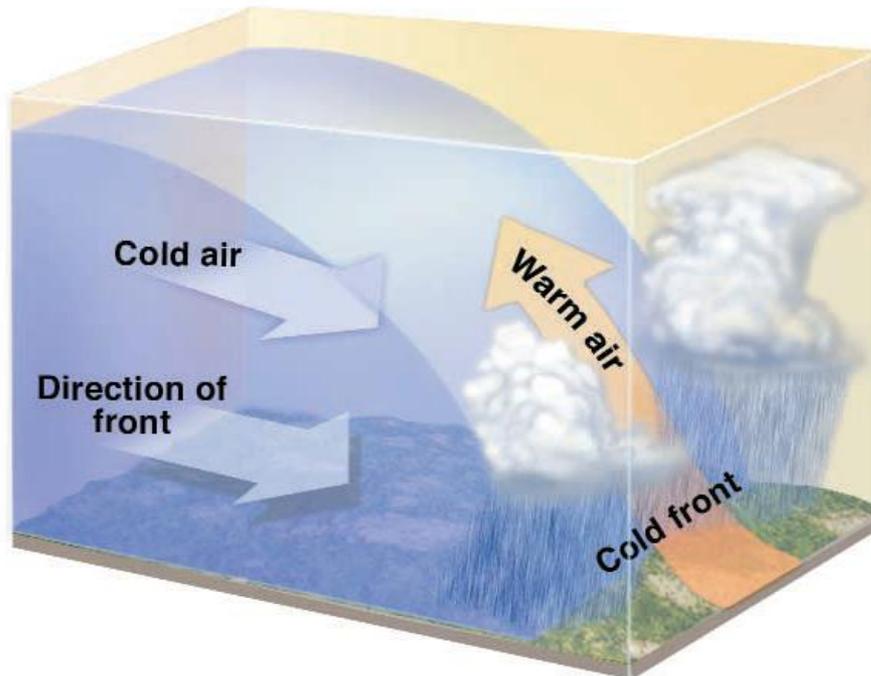
Remember: Warm air ALWAYS rises!!!



Warm Front



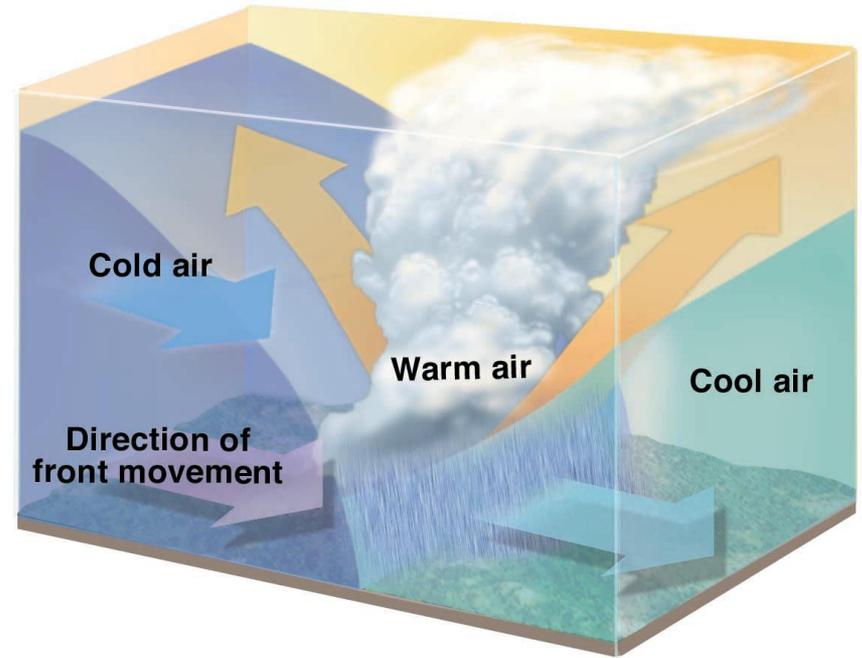
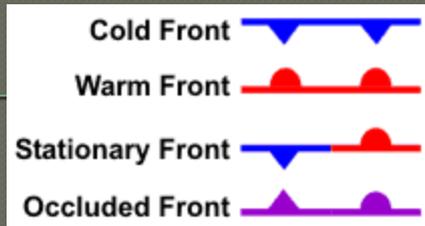
Cold Front



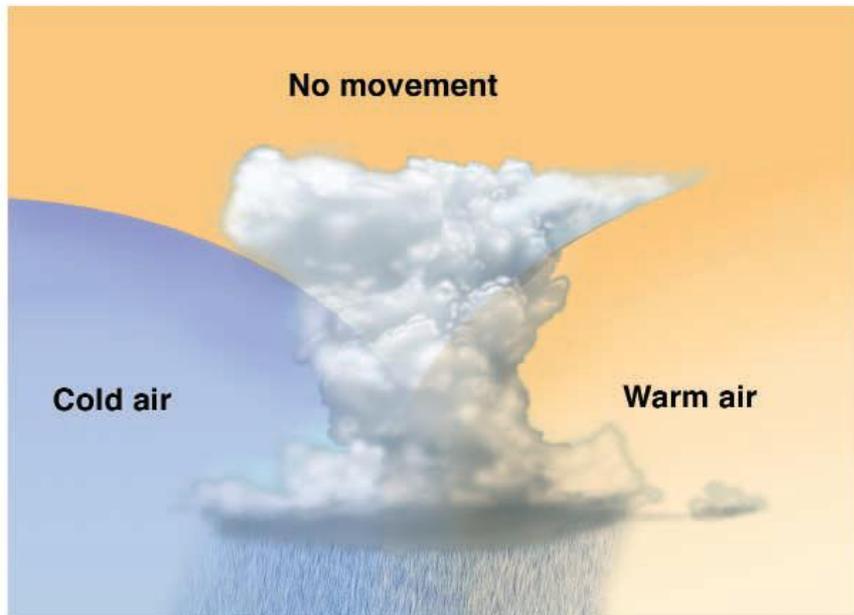
WARM FRONT: Warm air and cold air both pushing in same direction.

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!

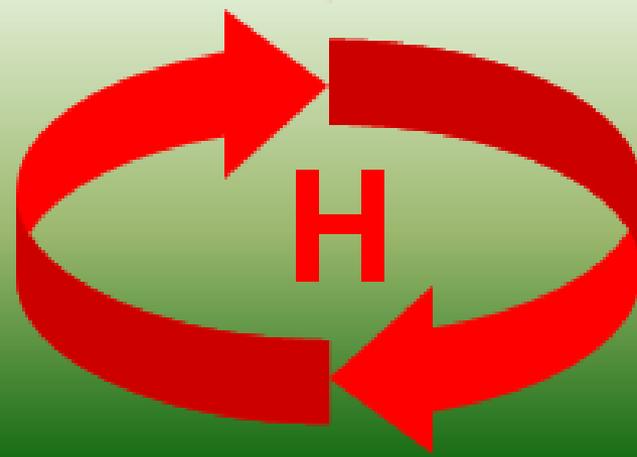
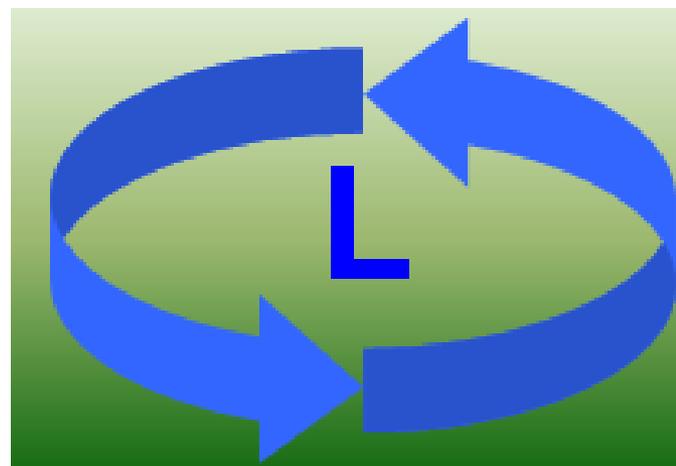
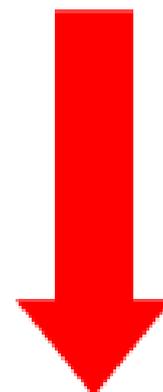
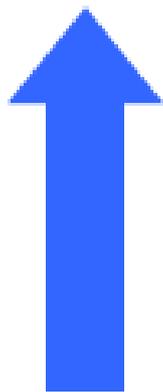
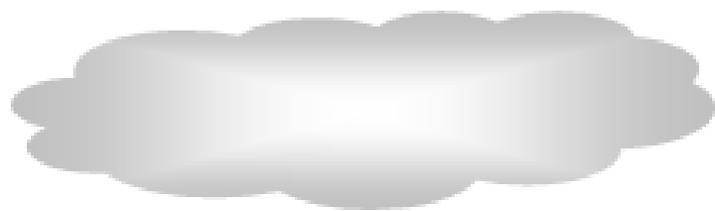
Pressure Systems

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



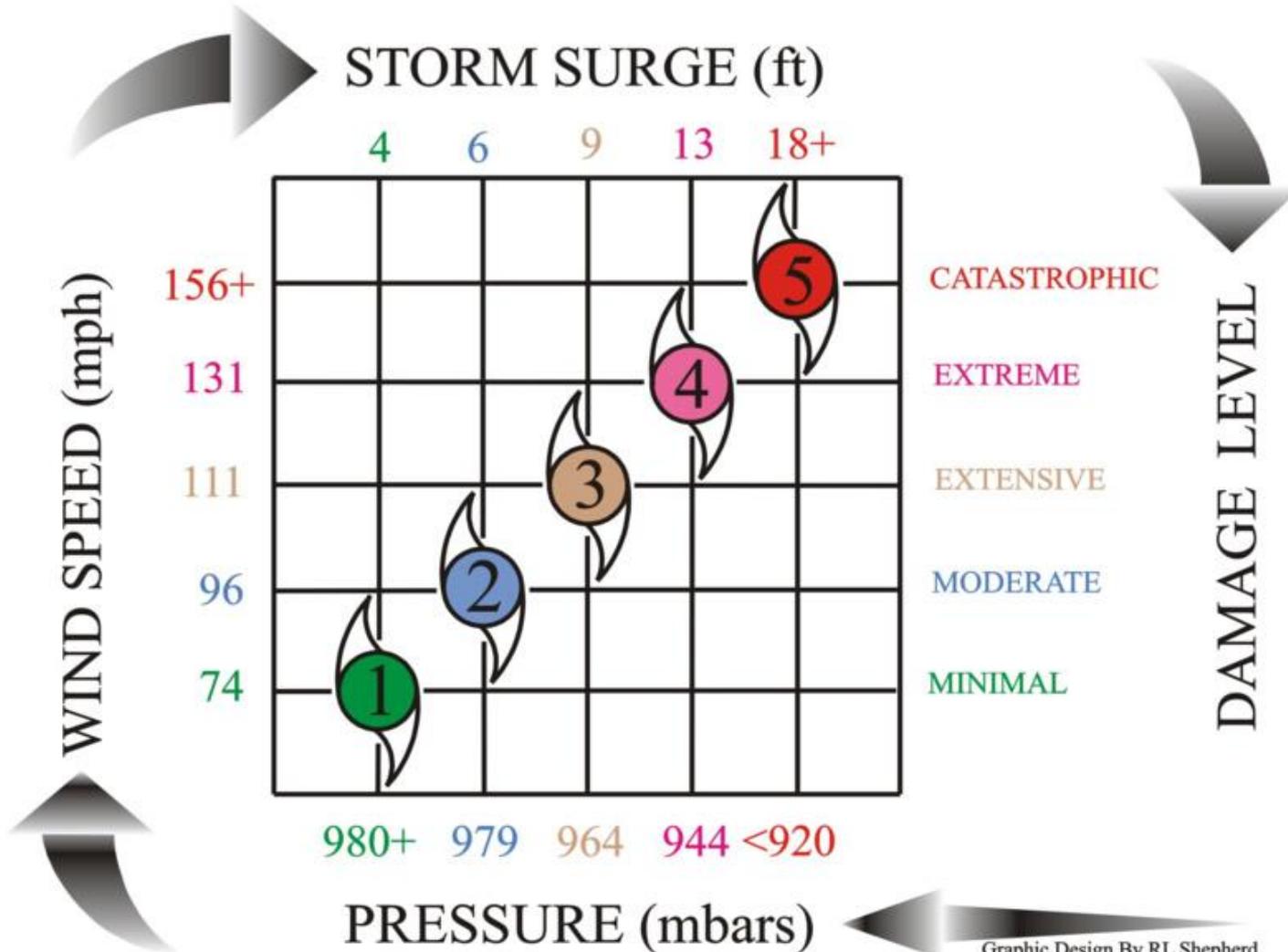
Ground

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

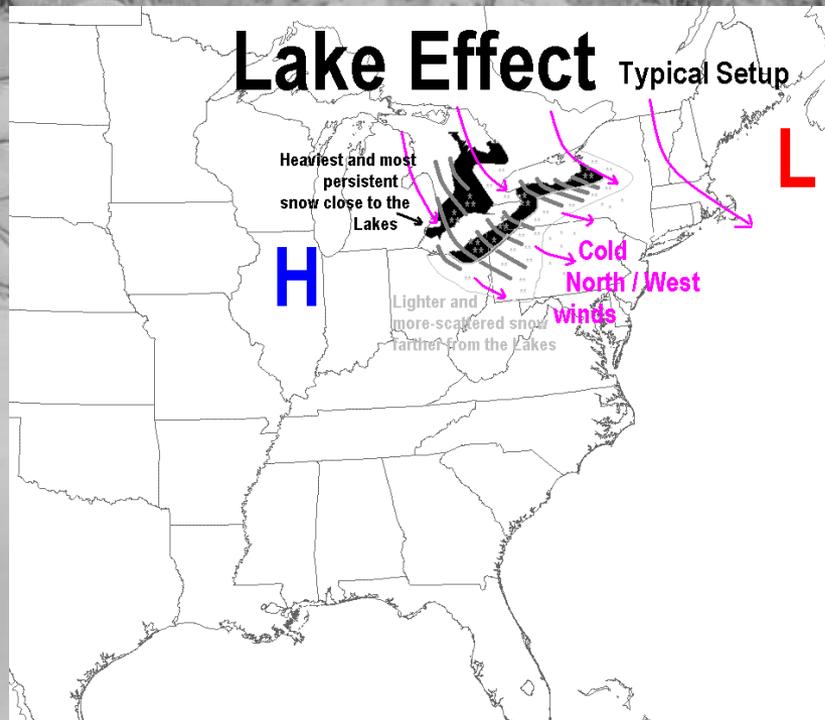
- ◎ The **EYE** is in the center and is 10-30 miles wide. It is calm here.
- ◎ The **EYE WALL** is just past the eye and contains a ring of destructive clouds bringing heavy winds and rainfall.
- ◎ The **STORM SURGE** is a wall of water that travels with the hurricane. This huge wave destroys lots of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

Winter Storms

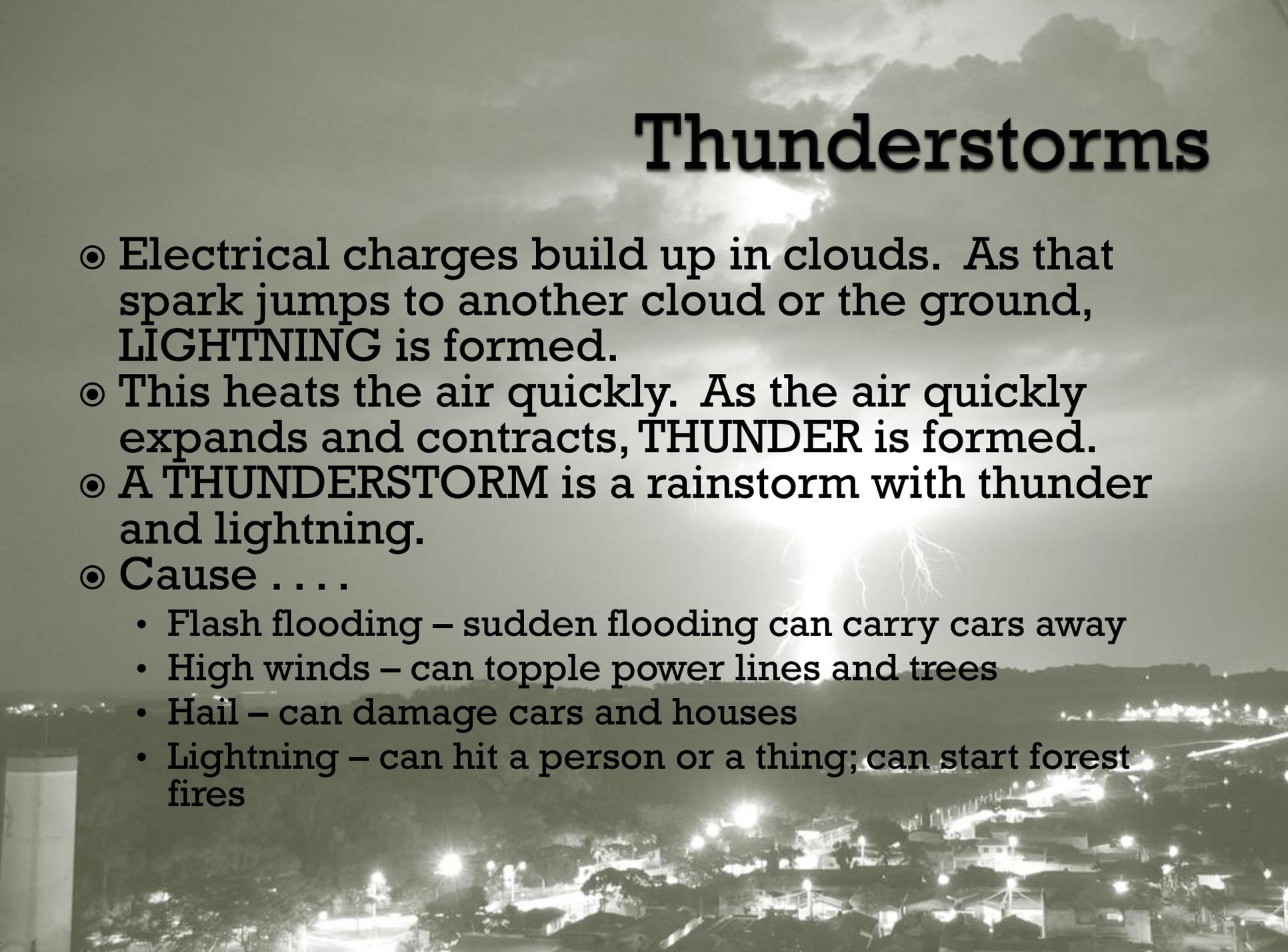
- ◎ Usually from low pressure systems
- ◎ Form when two air masses collide
- ◎ A **BLIZZARD** is a snowstorm with wind speeds 35+ mph and very low temperatures (usually less than 20°F).
- ◎ An **ICE STORM** occurs when rain falls and then immediately freezes.
- ◎ Problems from winter storms . . .
 - 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 lights are visible in the foreground, and the lightning bolt is the central focus of the image.

- ◎ 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

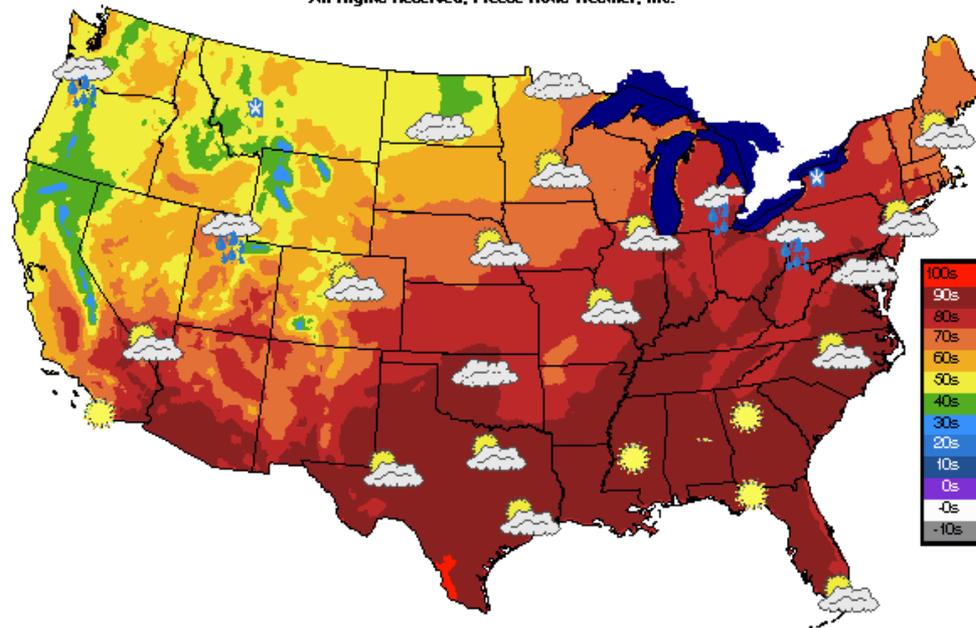
Weather Forecasting

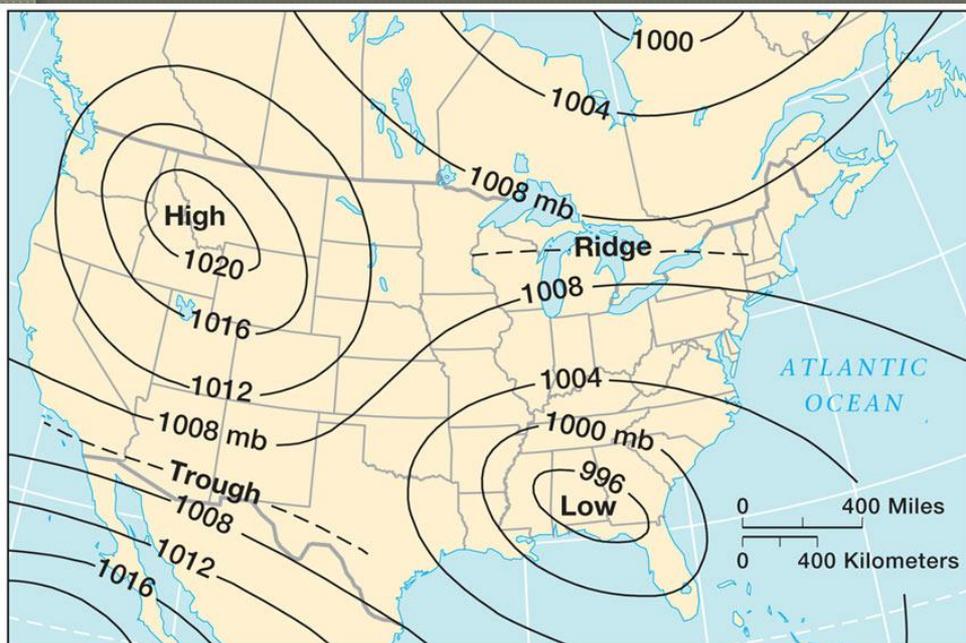
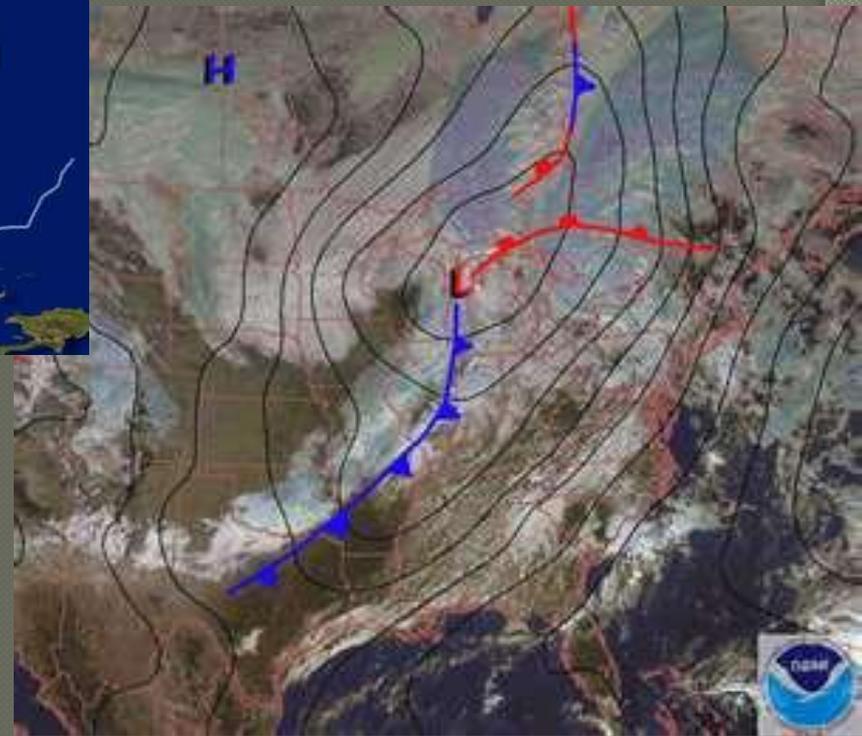
- “Meteorologists prognosticate and prevaricate.”
 - What does this mean?
- A METEOROLOGIST is a scientist who specializes in the weather.
 - Look at past and present weather conditions
 - Examine data
 - Make predictions
- National Oceanic & Atmospheric Administration (NOAA)

Weather Maps

Today's Weather Forecast--May 31, 2011

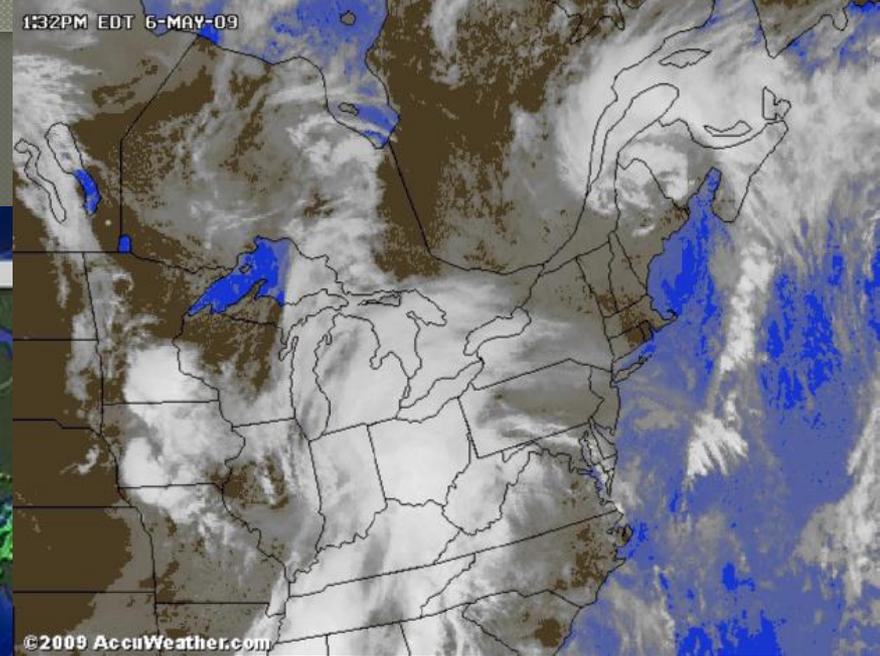
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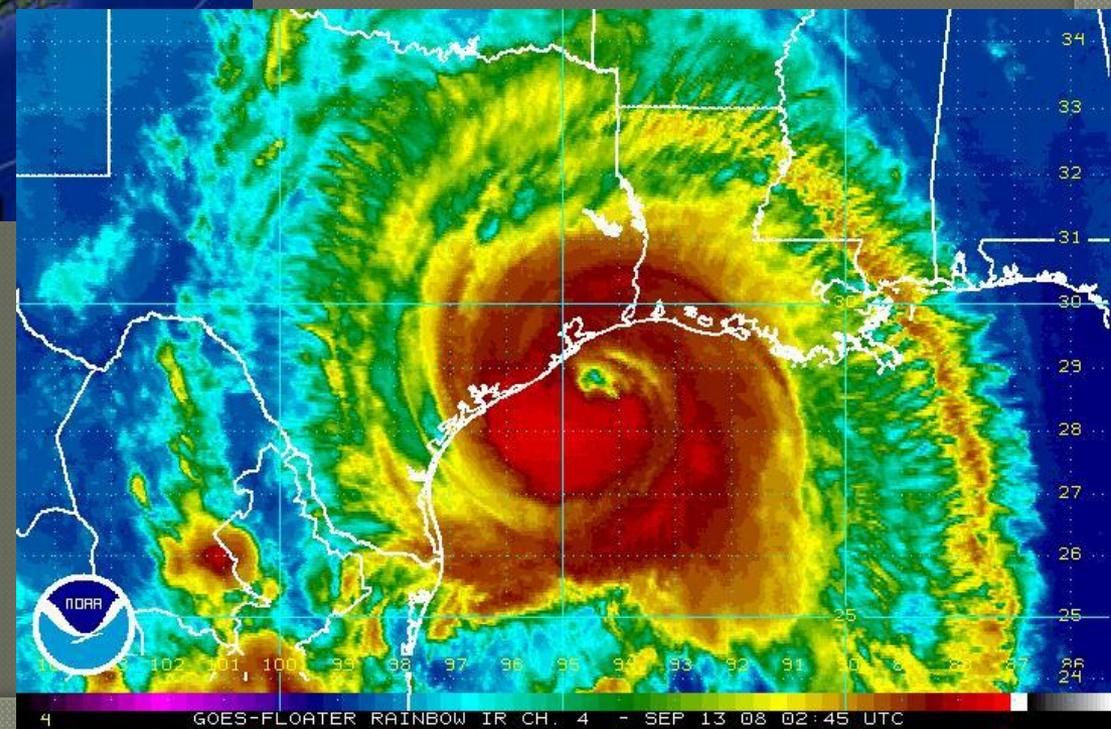
ISOBARS are lines that connect areas with identical air pressures. They help predict wind movements.

Satellite images show accumulation of water vapor in the air.



Current Surface

LT RAIN/DRIZZLE MOD/HVY RAIN RAIN/ICE/SNOW LT SNOW/FLUR MOD/HVY SNOW FOG



INFRARED satellite images show intensity of storms.