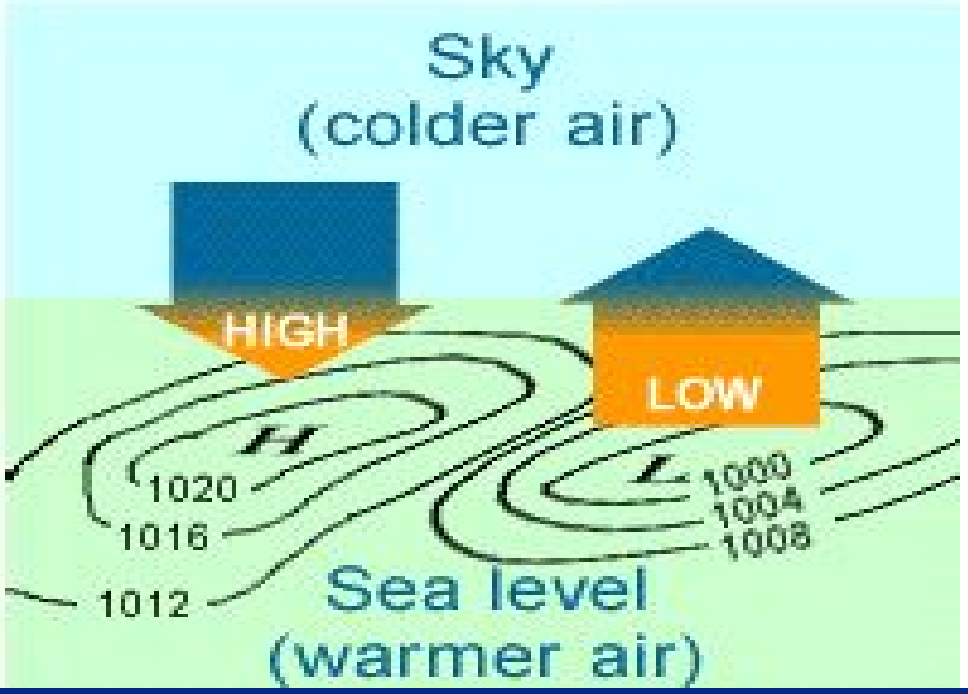
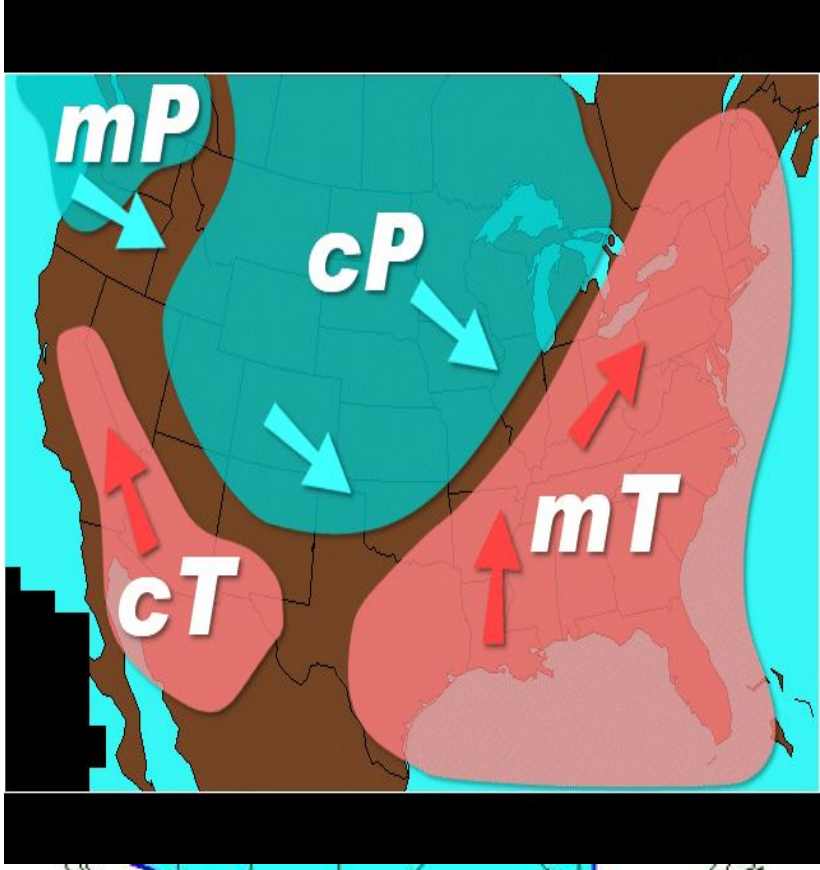


Air Pressure and Wind

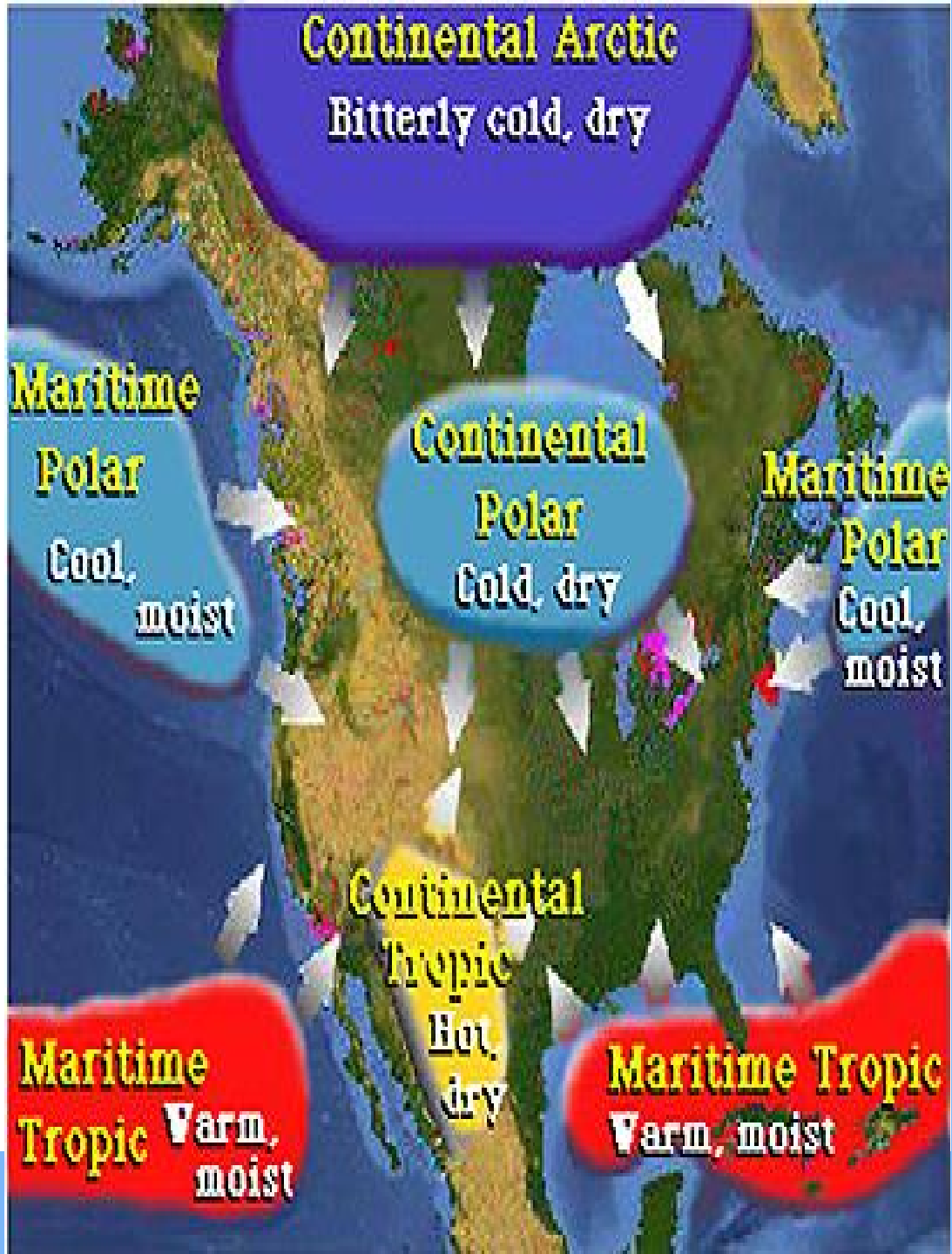
Air Mass

- **Air mass** is an immense body of air that is characterized by **similar temperatures and amounts of moisture** at any given altitude



Classifying Air Masses

- Air masses are classified by temperature and surface area over which they form



Classifying Air Masses

NAME	LOCATION	TEMPERATURE
P – Polar	**High** Latitudes towards the poles	**Cold** Temps
T – Tropical	**Low** Latitudes towards the equator	**Warm** Temps
C – Continental	Over **land** mass	Cold or warm, depending on the latitude
M – Maritime	Over **water**	Cold or warm, depending on the latitude

Four Basic Types of Air Masses

cP – Continental Polar • dry and cool • **cold and dry in winter and summer**	**cT** – Continental Tropical • dry and warm • **hot, <u>drought-like</u>** conditions
mT – Maritime Tropical • wet and warm • source of **<u>precipitation</u>** in the United States	**mP** – Maritime Polar • wet and cold • **mild, humid, <u>unstable</u>** cold air from Canada

Wind – What causes it?

- Wind is a result of horizontal differences in air pressure
- **Air flows from areas of high pressure to areas of lower pressure.**

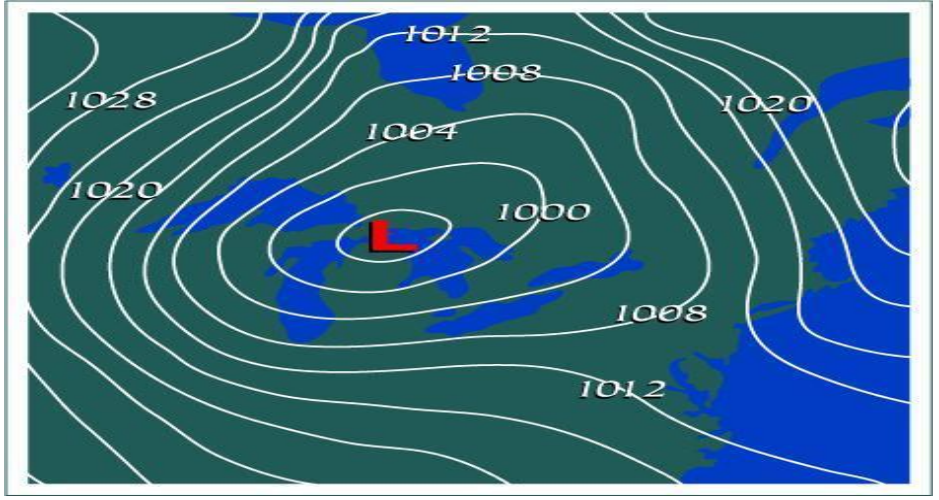
High and Low Pressure System

	Low Pressure Centers	High Pressure Centers
Air	Sinking	Rising
Pressure Behavior	Pressure drops Cyclone	Pressure increase Anticyclone
Wind Behavior	Winds blow **counterclockwise**	Winds blow **outward and clockwise**
Weather Associated	Severe and stormy	Fair and Sunny
Symbol	"L" that is RED	"H" that is BLUE

Pressure Differences

- **Isobars**
  - lines on a map that connect places of **equal air pressure**
- A **pressure gradient**
  - **The spacing of isobars indicates the amount of pressure change over a given time**

Isobars



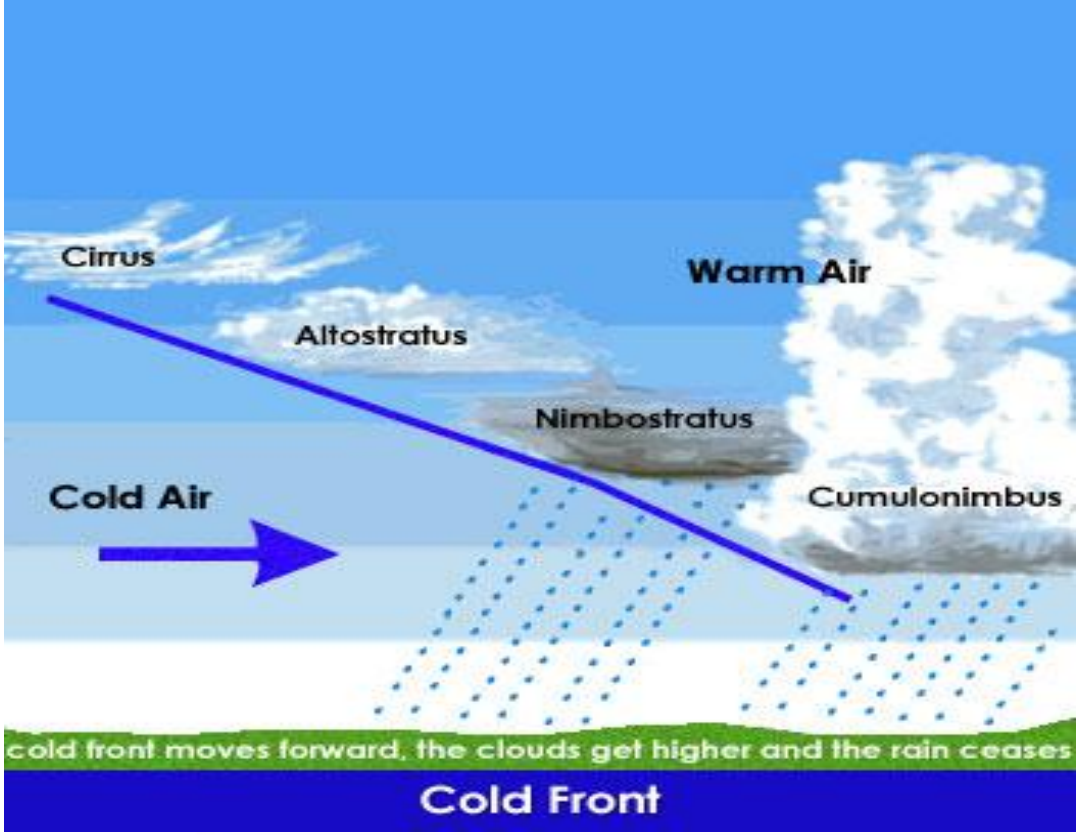
- **Closely spaced isobars:** indicate a steep pressure gradient and **high winds.**
- **Widely spaced isobars:** indicate a weak pressure gradient and **light winds.**

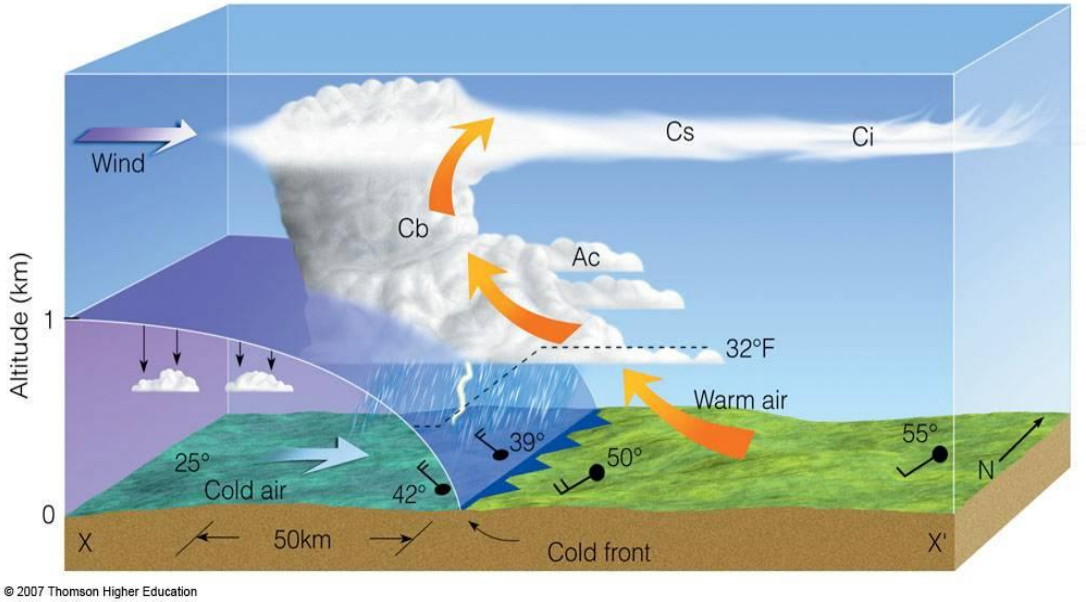
	Cold Front	Warm Front	Stationary Front	Occluded Front
Symbol				
Profile/ Description				
Weather				

Cold Front

Cold air mass moves into an area **<u>occupied by warmer</u>** air.

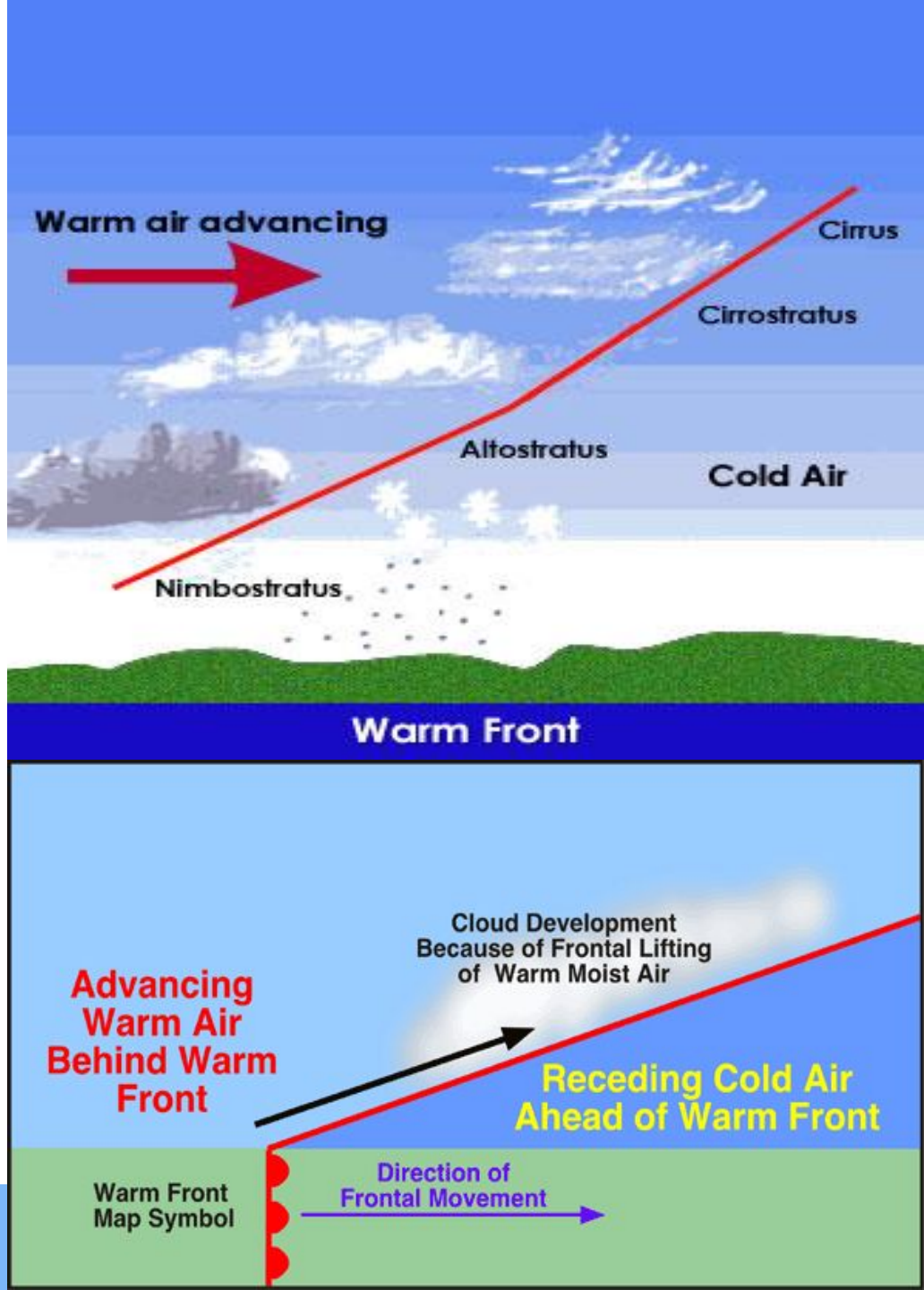
Weather Conditions: <u>Thunderstorms, Rain</u>





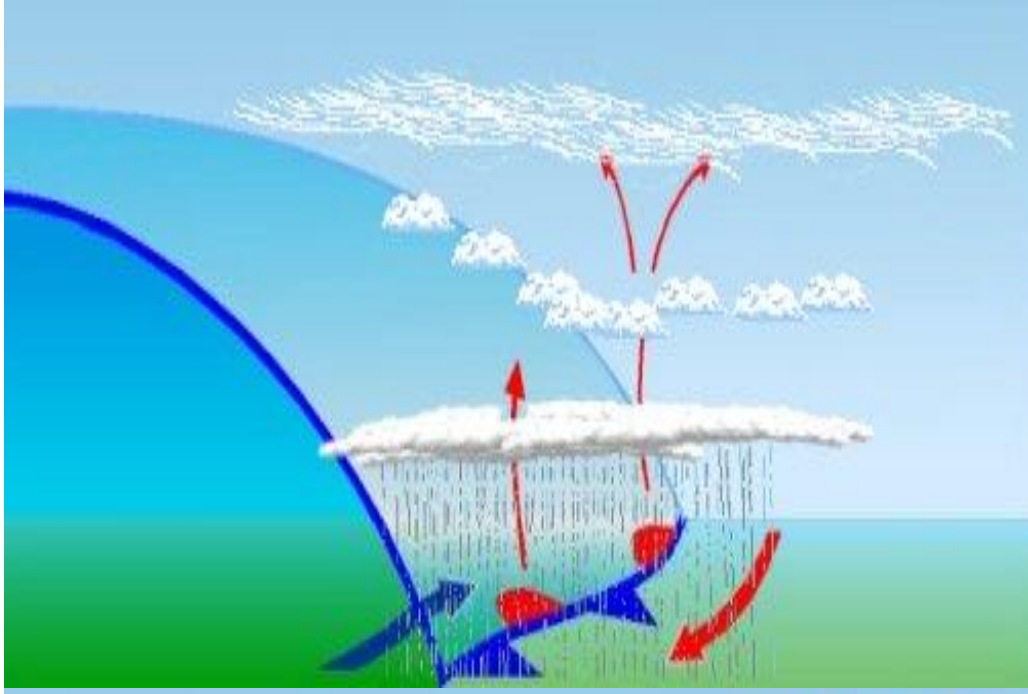
Warm Front

- A **warm front** – warm air moves into an area formerly covered by cooler air
- Warm air **glides up <u>over</u>** a cold, dense air mass
- **Weather Conditions: Light to moderate rain**

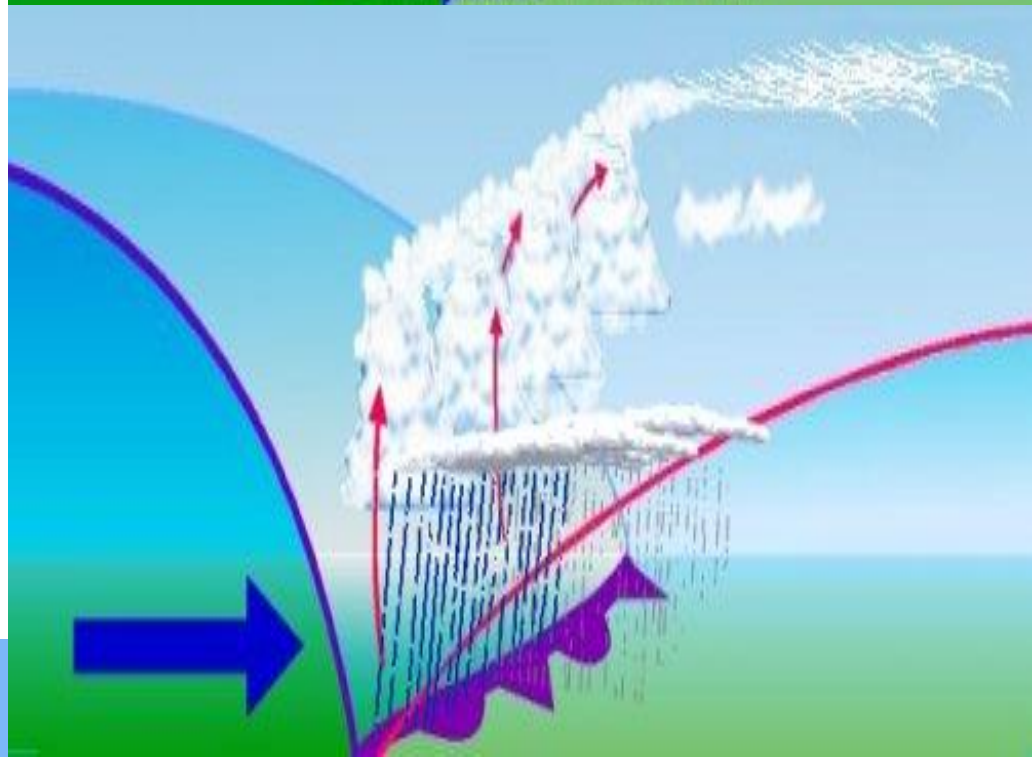


Stationary and Occluded Fronts

- **stationary front:** The **<u>surface position</u>** of the front does not move
- Weather: **steady rain for days**



- **occluded front:** when an active cold front **<u>overtakes</u>** a warm front
- Weather: **stormy**



Thunderstorms

- Is a storm that generates **<u>thunder</u>** and **<u>lightning</u>**
- Frequently produces **gusty winds, heavy rain, and hail**
- Associated with **<u>cumulonimbus</u> clouds**

- **Lightning**: results from the build-up and discharge of **electric energy** between **positively (ground) and negatively (clouds) charged area**
- **Thunder:** the sound of **rapidly expanding gases** usually associated with lightning

Occurrence and Development of Thunderstorms

- **Occurrence**
  - At any given time, there are an estimated 200 thunderstorms in progress on Earth
  - **Mostly in the <u>tropics</u>**
- **Development**
  - Thunderstorms form when **<u>warm, humid</u> air** rises in an **<u>unstable</u> environment**
    - **Three Stages**
      - **Cumulus:** build-up of clouds and moisture
      - **Mature: Heavy rain fall,** most active time
      - **Dissipating:** light rain, **storm is calming down**

- **Tornadoes -** violent **low pressure** windstorms that take the form of a rotating column of air **(vortex).**
- The vortex extends downward from a **cumulonimbus cloud** producing **rain and hail**
- Move **counterclockwise**

Occurrence, Development, and Intensity of Tornadoes

- **Occurrence**
  - **770** occur each year
- **Tornado Season**
  - **April to June**
  - Associated with severe thunderstorms
- **Intensity**
  - **Fujita Tornado scale**
  - Based on the amount of damage

Fujita Tornado Scale

Category	Winds (MPH)	Winds (KPH)	Damage
F0	<73	<116	Light damage
F1	73-112	116-180	Moderate Damage
F2	113-157	181-254	Considerable Damage
F3	158-206	254-332	Severe Damage
F4	**207-260**	**333-419**	**Devastating Damage**
F5	**>260**	**>419**	**Incredible and Speechless Damage**

Tornado Warnings vs. Watches

- **Watches** : Possibility of a tornado to be developed in the area

- **Warning:** Tornado has been seen by people or indicated by radar