

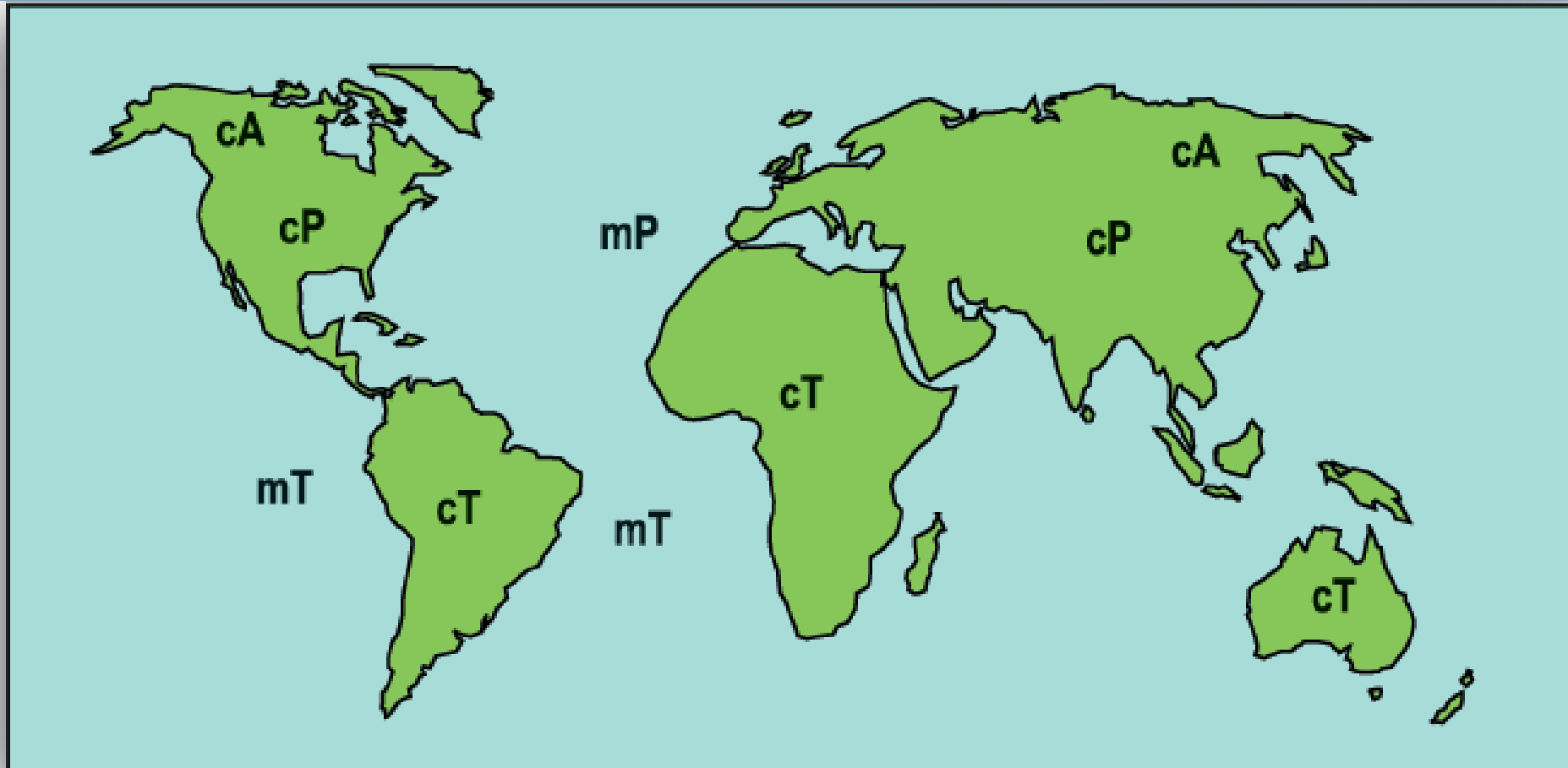


JOURNEY OF FLIGHT

Chapter 19

Weather Elements







Weather Fronts and their Movement

- Air Masses
- Characteristics
 - Over 1000 mi wide
 - Same temperature and moisture content
 - Origination determines type
- Types
 - Polar
 - Tropical
 - Maritime
 - Continental



Fronts and their Movement

- Fronts

- Cold front
- Warm front
- Stationary front
- Occluded front

Clouds

Cumulus

Cirrus

Stratus

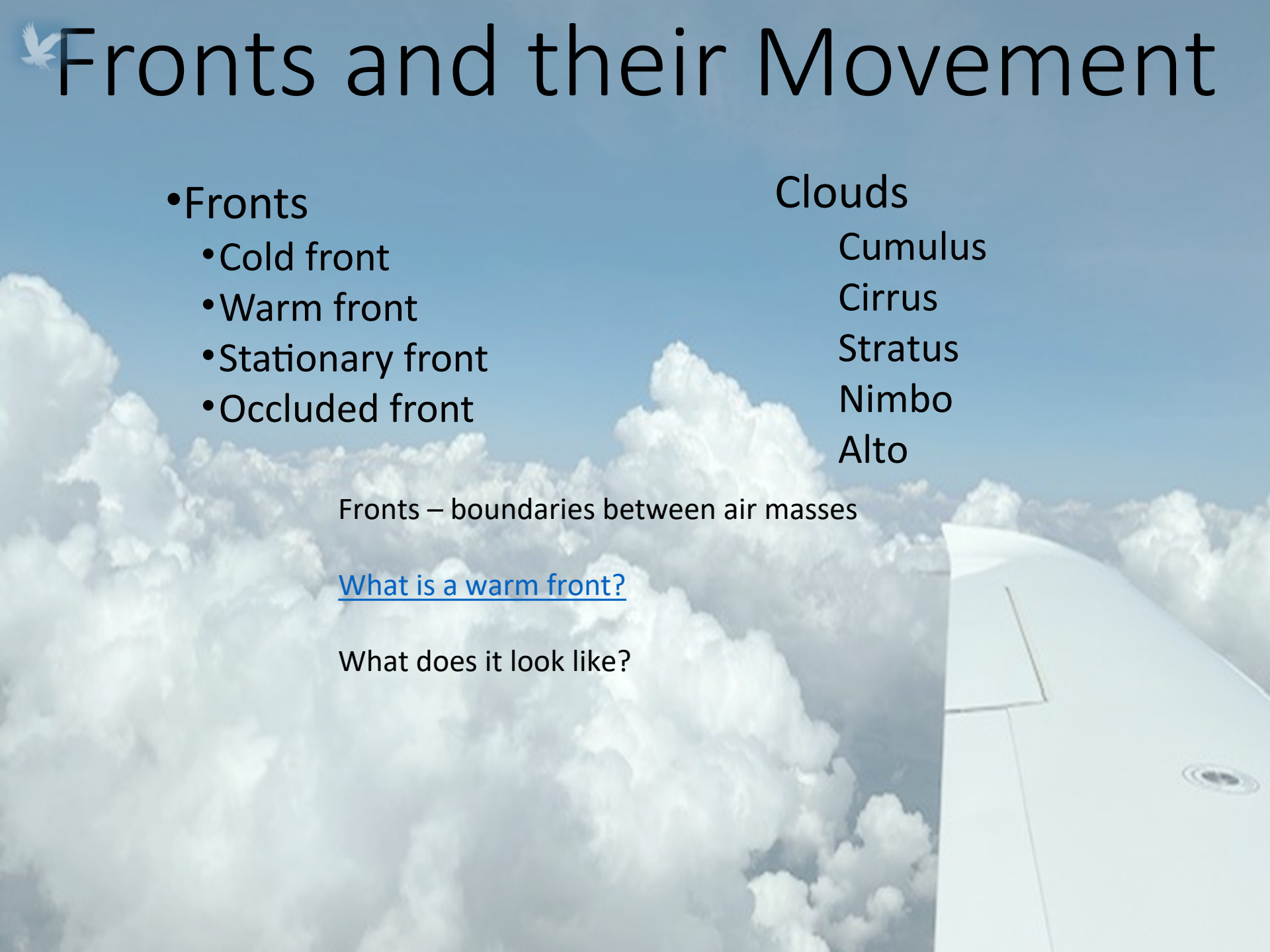
Nimbo

Alto

Fronts – boundaries between air masses

[What is a warm front?](#)

What does it look like?





Fronts and their Movement

- Cold Front



Hint: Looks like little icicles on a string.





Fronts and their Movement

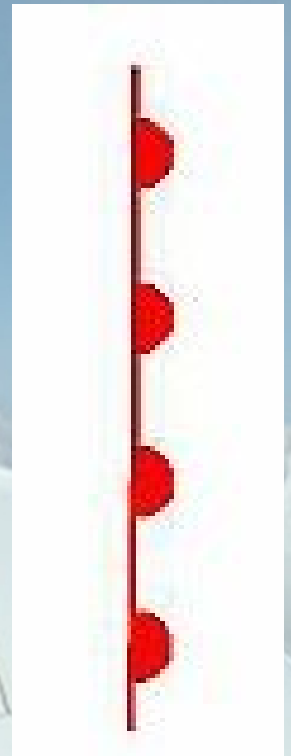
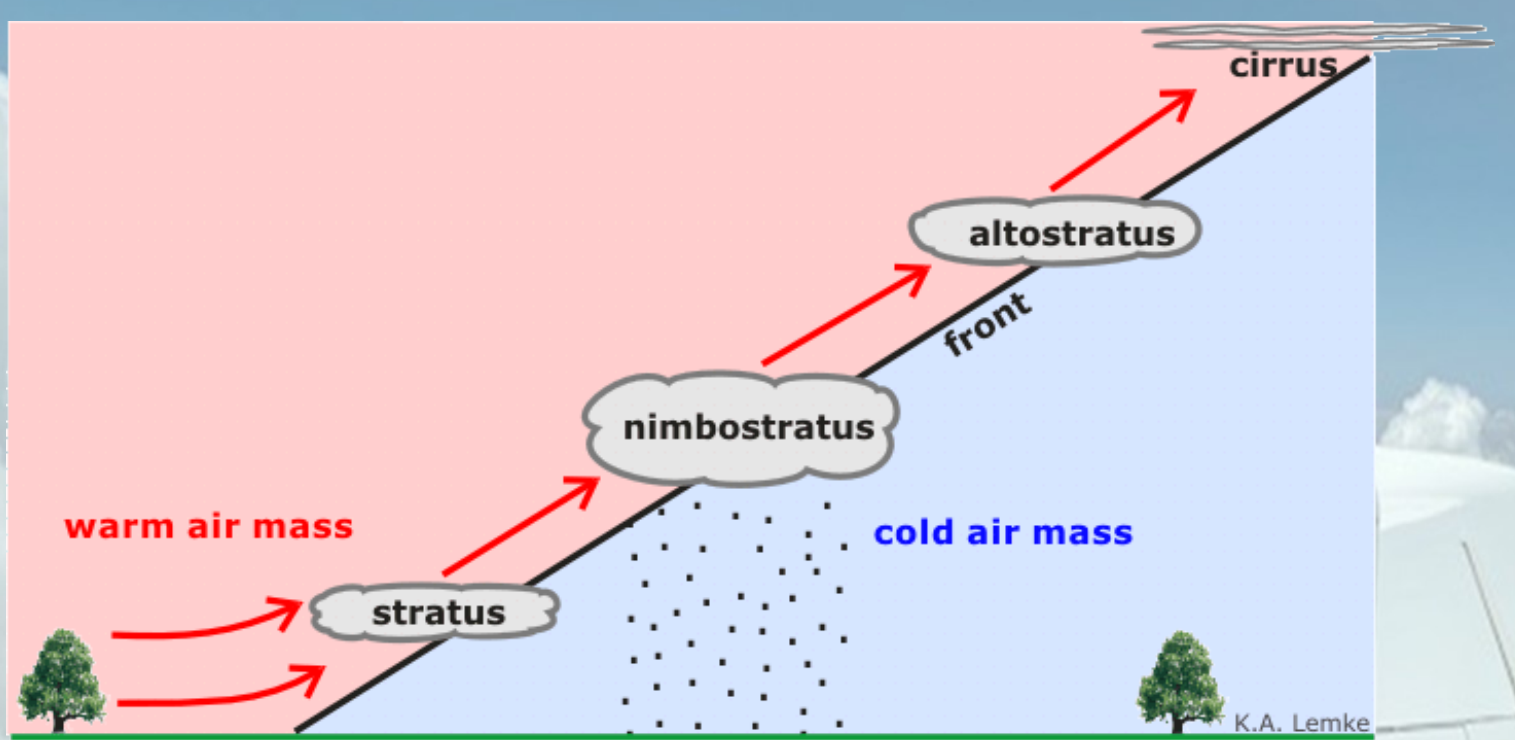
- Cold Front Characteristics

- Fast moving 25-30 mph
- Heavy, dense air
- Moves like a “snow plow” close to ground level
- Severe thunderstorms caused by rapidly rising warm air
- Squall line contains severe thunderstorms
- Front preceded by high dew point & falling barometer
- Clear skies and cold gusty winds from the west and northwest present after front passes

- <http://www.youtube.com/watch?v=huKYKyjcm0>

Fronts and their Movement

- Warm Front



Hint: Look like little sunshine's on a string.



Fronts and their Movement

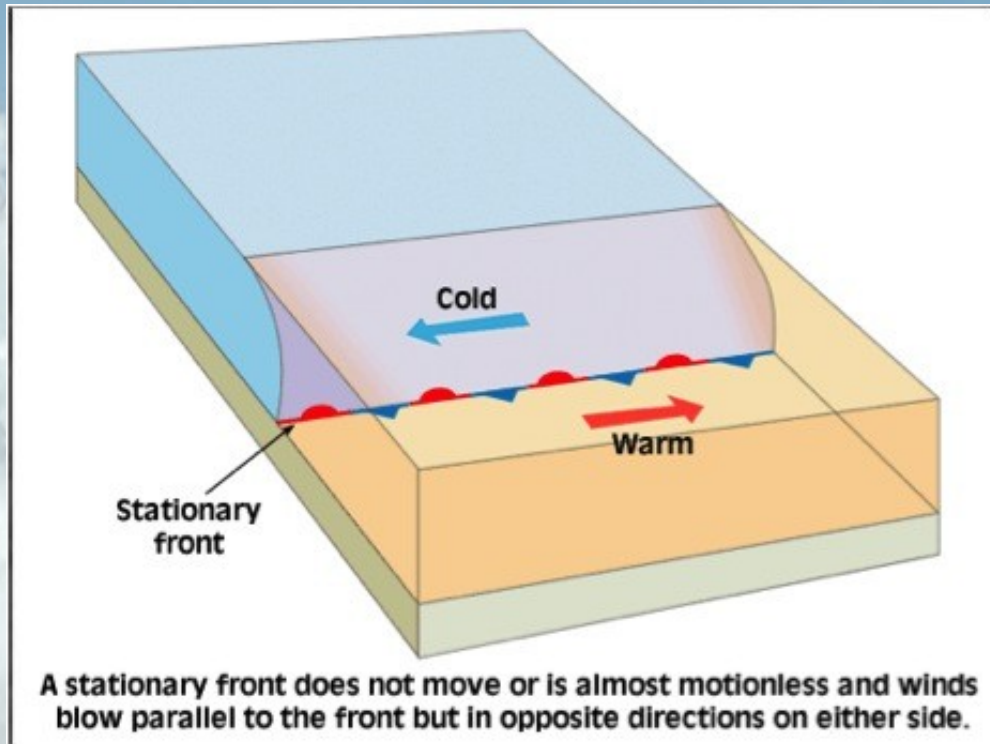
- Warm Front Characteristics

- Slow moving 10-25 mph
- Slope slides over cold front due to warmer air aloft, eventually pushing cold air out
- As warm air is lifted, temperature drops and precipitation forms – usually light and continuous
- Higher level cirrus and stratus clouds develop ahead of the front
- Visibility is generally poor but improves after frontal passage with a wind shift
- Winds are from the south to southwest



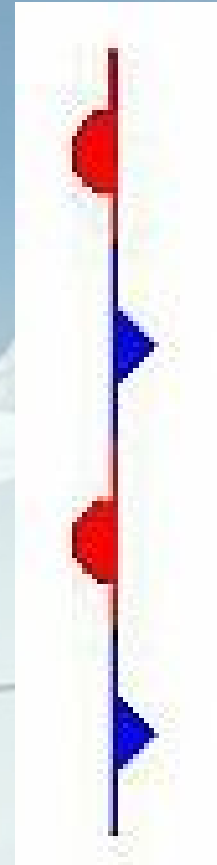
Fronts and their Movement

- Stationary Front



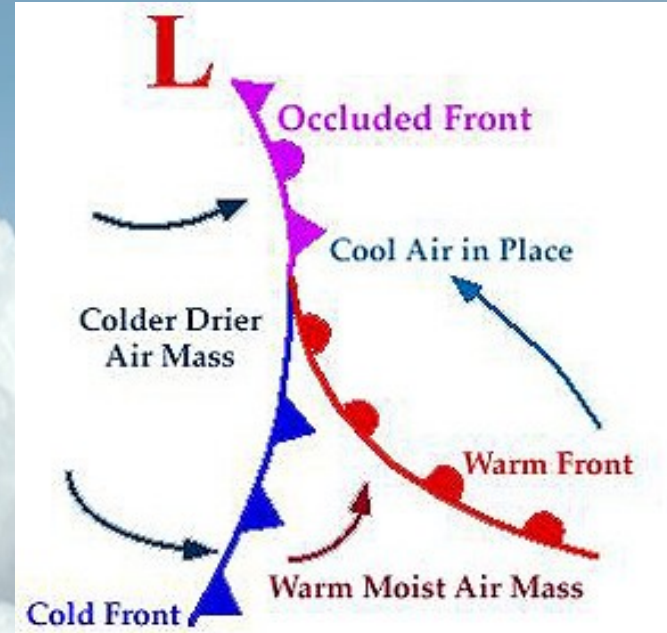
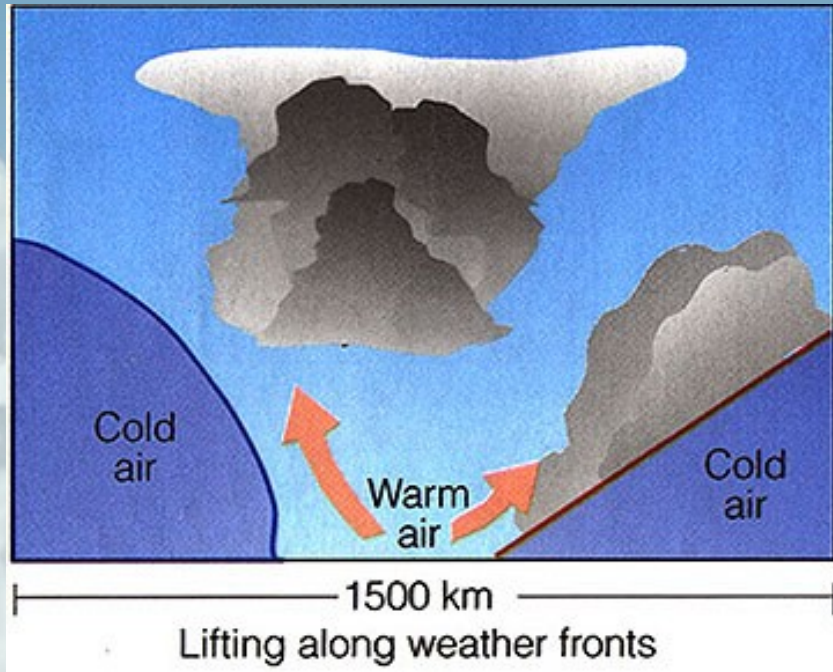
- Stationary Front Characteristics

- Typical mixture of weather found in both warm and cold fronts
- Winds blow in opposite directions parallel to the frontal boundary line
- Greatest hazard is flooding since the front does not move



Fronts and their Movement

- [Occluded Front](#)



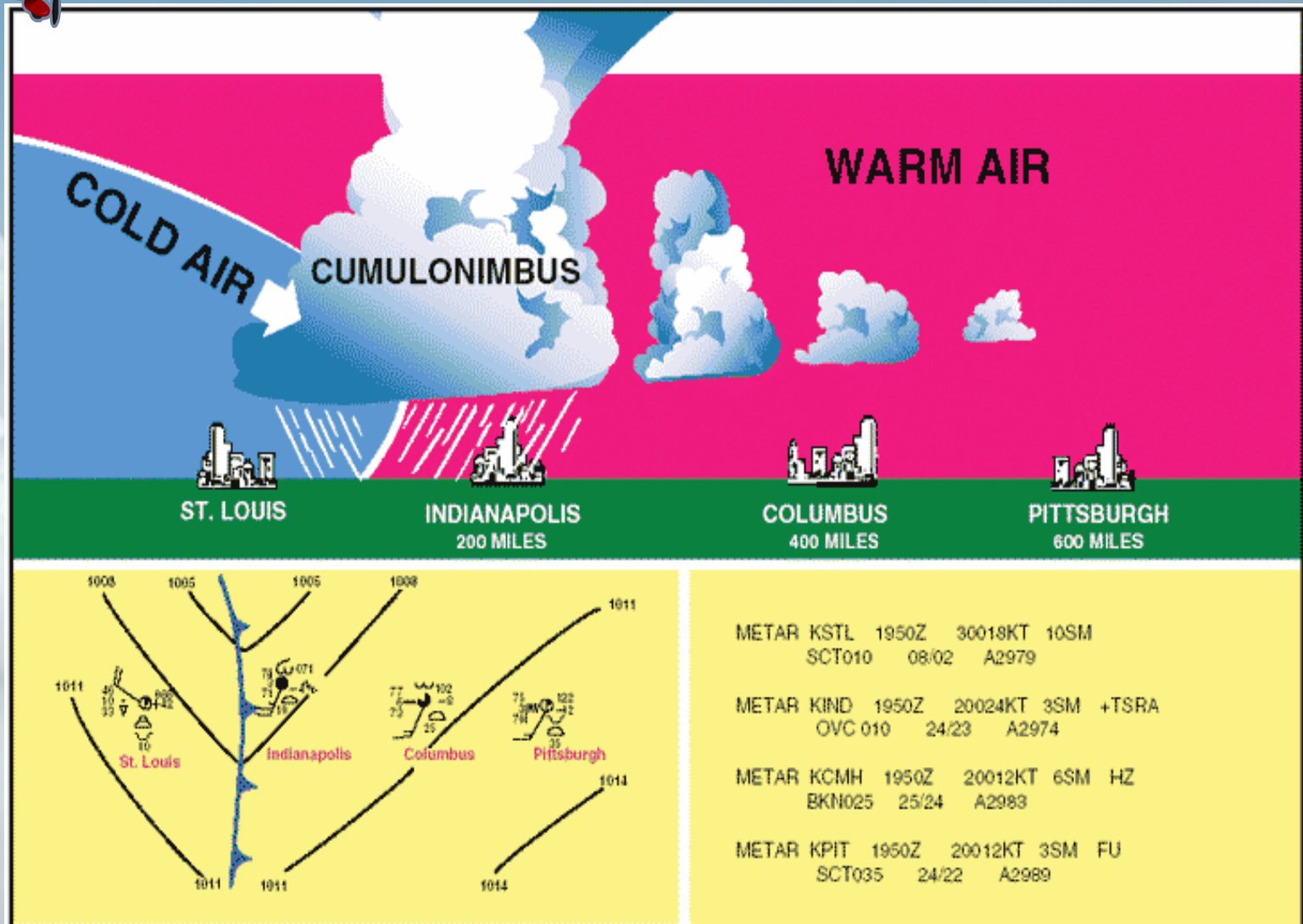
Occluded Front Characteristics

- Cold front occlusion
 - Fast moving cold front air is colder than the air of the cold air that is ahead of the warm front
 - Provides a mixture of weather that can be found in both warm and cold fronts
- Warm front occlusion
 - Air ahead of the warm front is colder than the air in the fast moving cold front that is behind the warm front
 - Produces some of the most severe weather with embedded thunderstorms, rain and fog

Fronts and their Movement

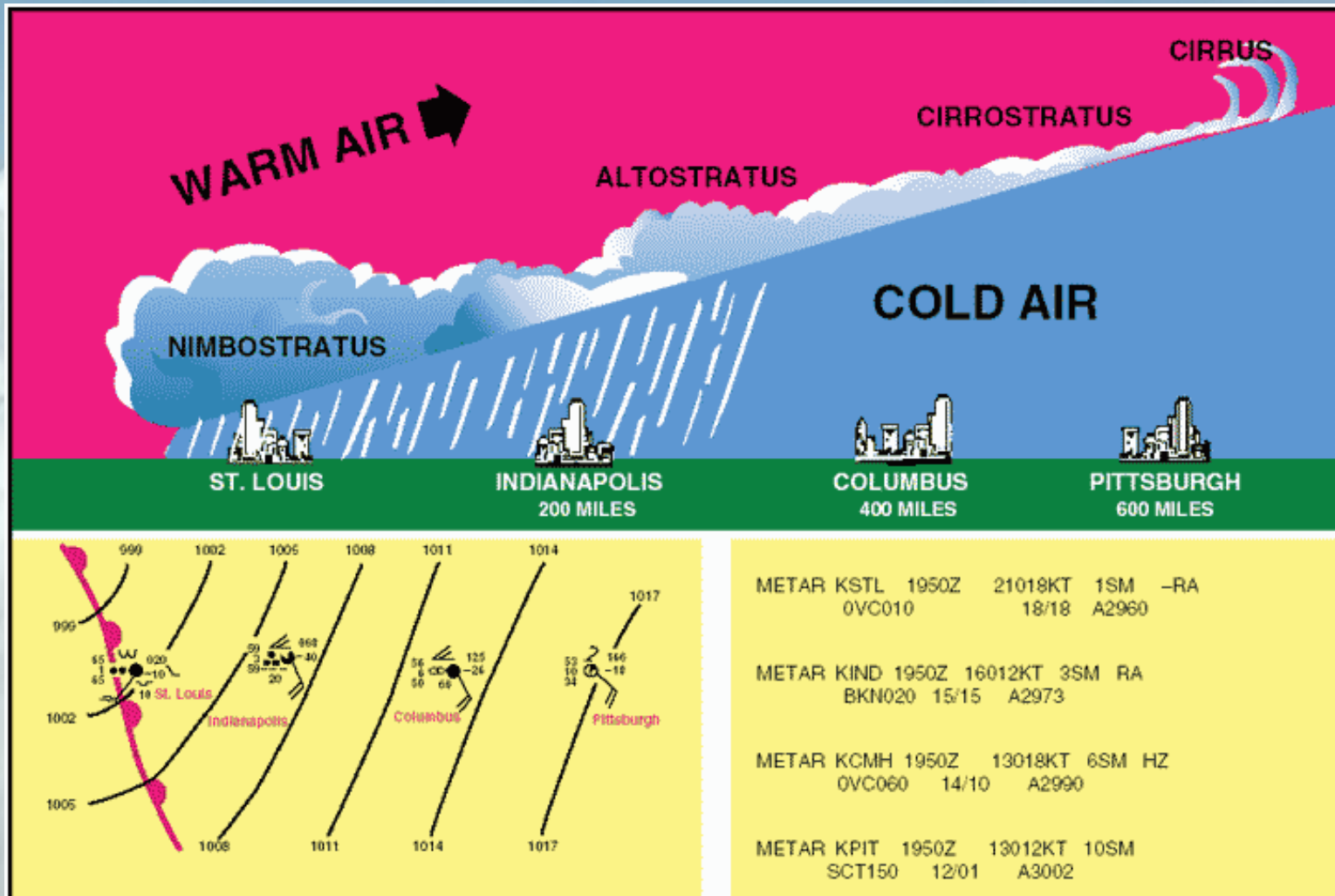


Advancing cold front



Fronts and their Movement

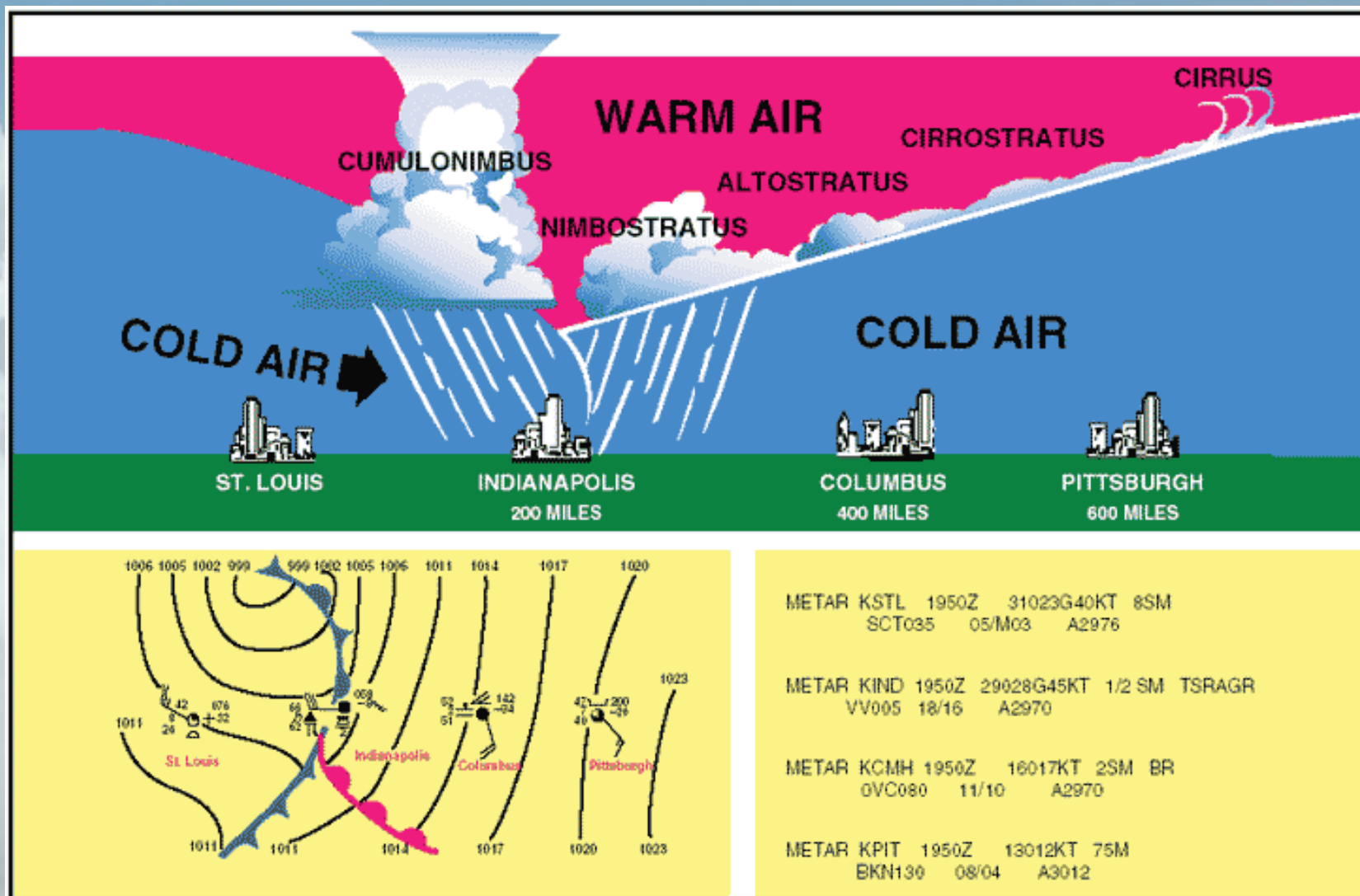
Advancing warm front





Fronts and their Movement

Occluded front

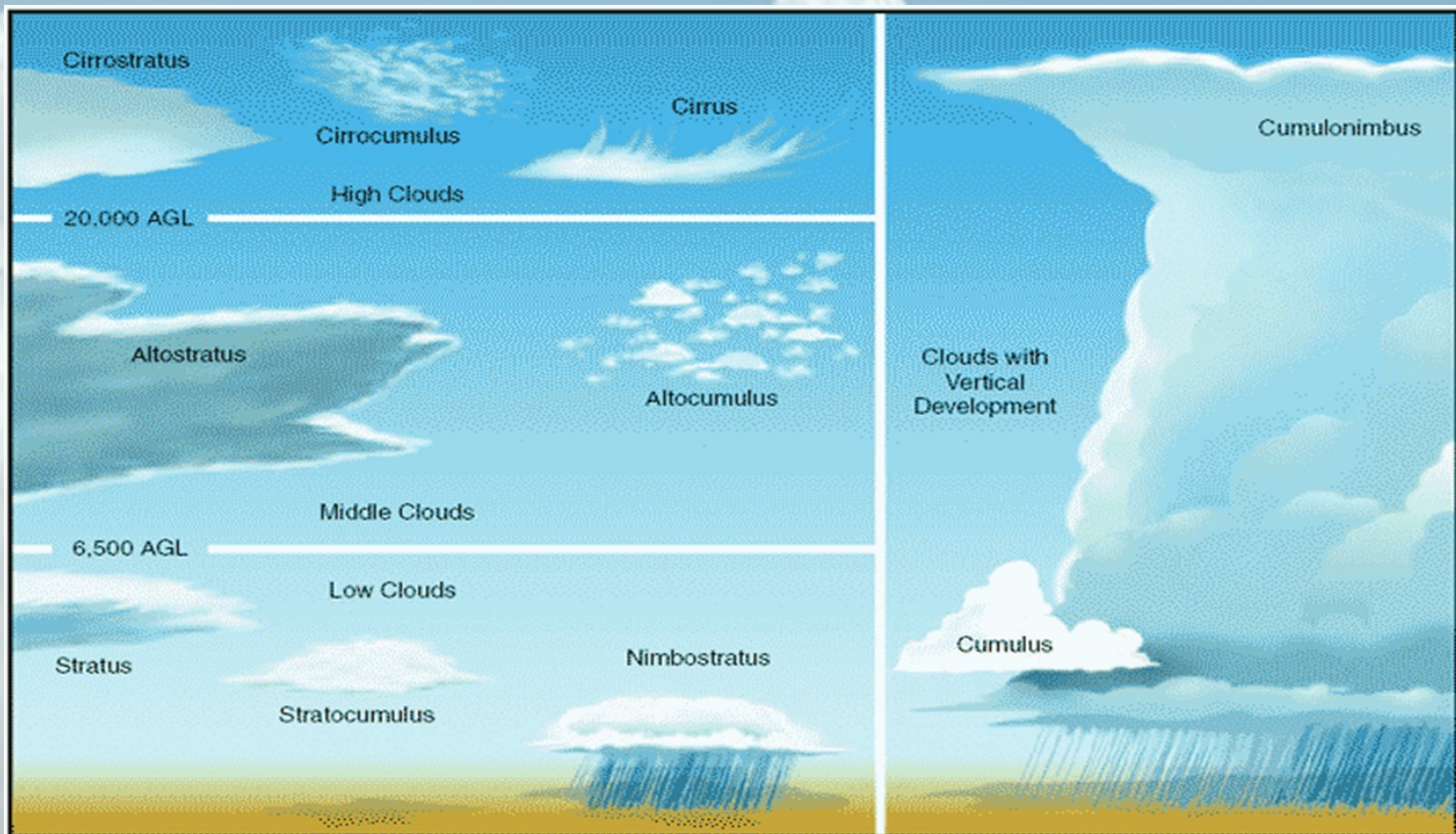




Clouds and Fog

Cloud Types

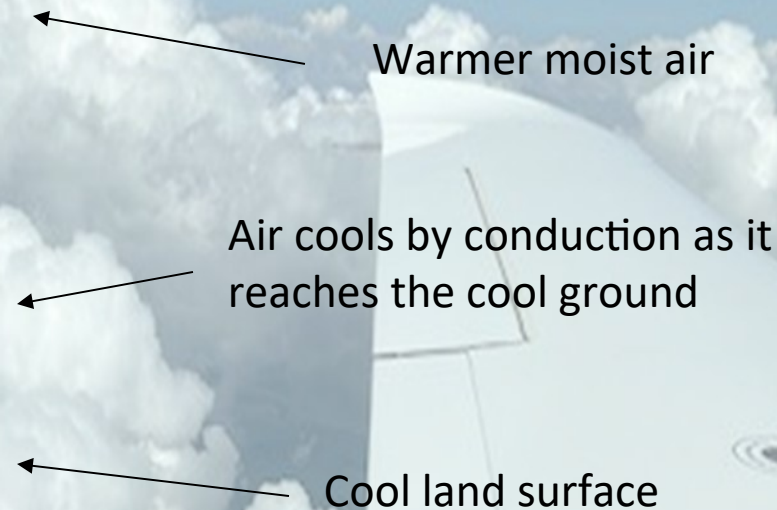
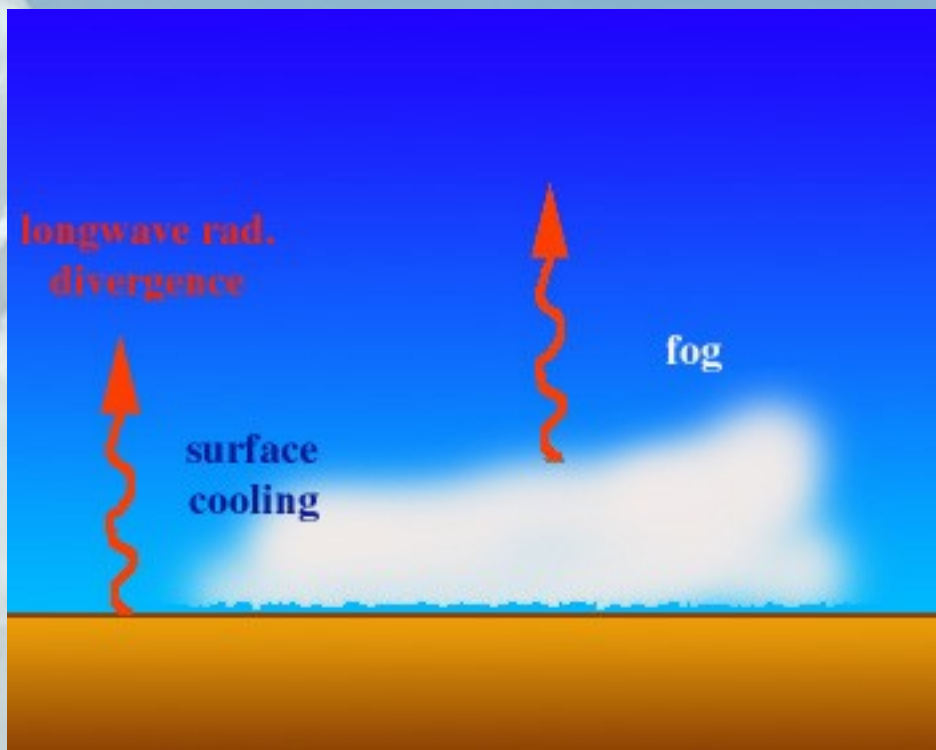
- Cumulous – puffy and piled up
- Cirrus – curly and fibrous very high
- Stratus – flat and layered
- Nimbo (or Nimbus) – rain or precipitation
- Alto – high (actually middle clouds – NOT the highest)





Clouds and Fog

- Radiation Fog

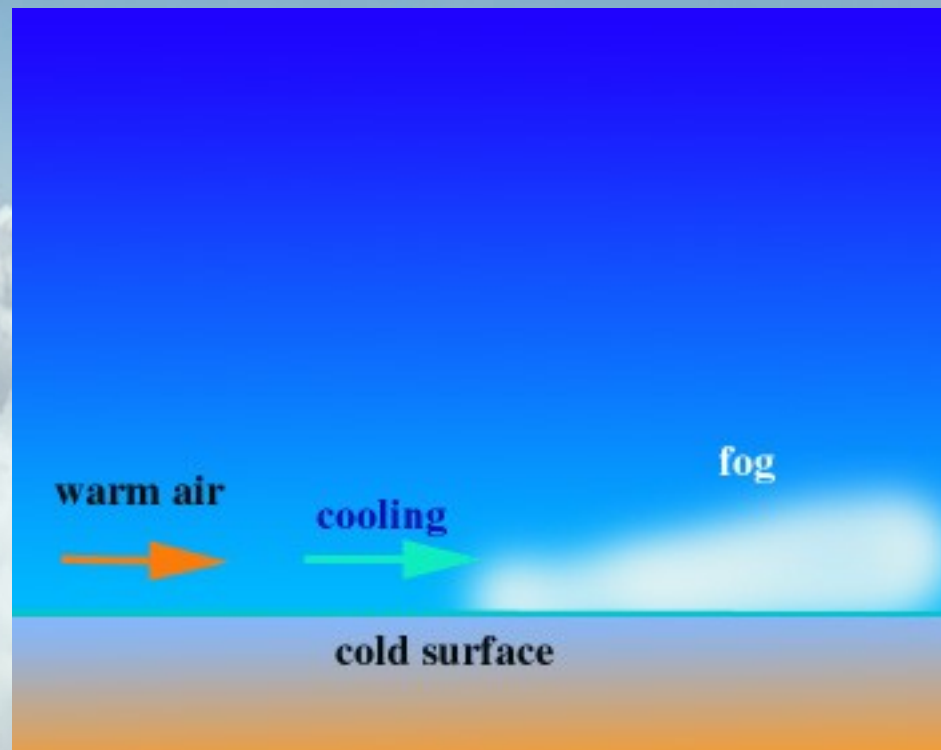




Clouds and Fog

- Advection Fog (remember advection = lateral movement)

Warm moist area



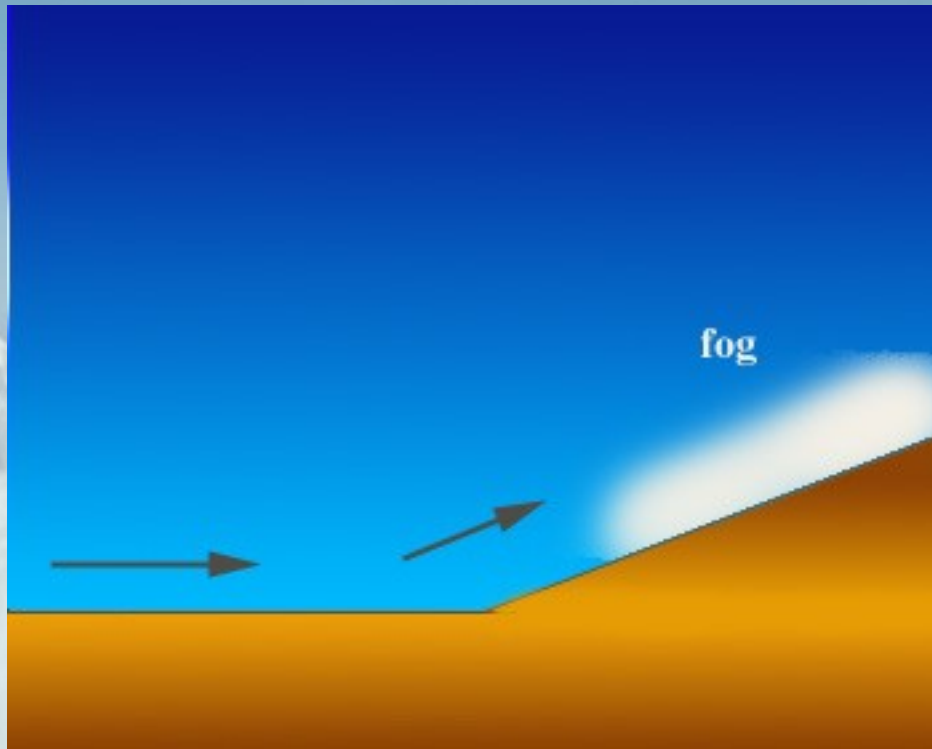
Air temperature reaches dew point and fog forms

Air move laterally until it touches cold surface



Clouds and Fog

- Up-slope Fog



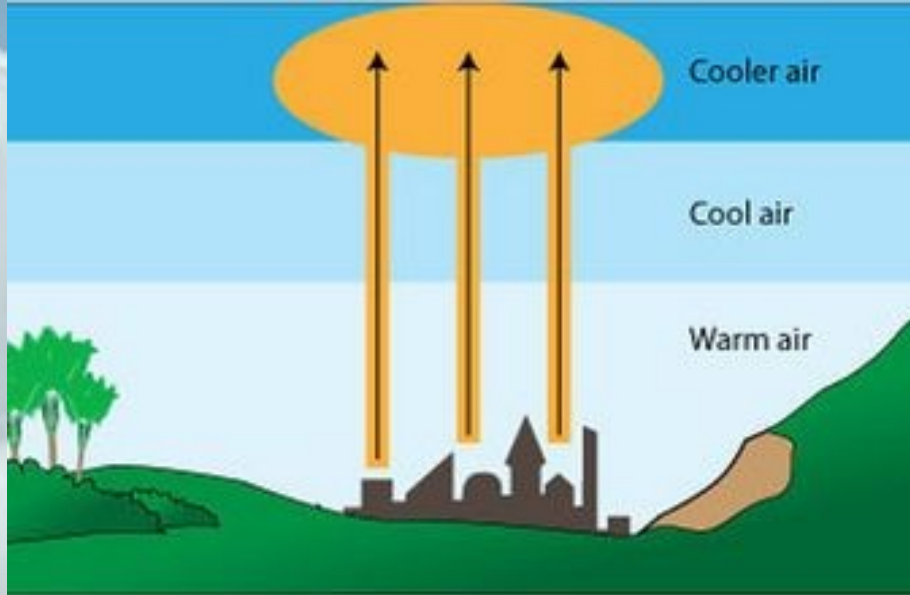
The air cools as it ascends until it reaches dew point and fog forms

Warm, moist air blows up the hill side

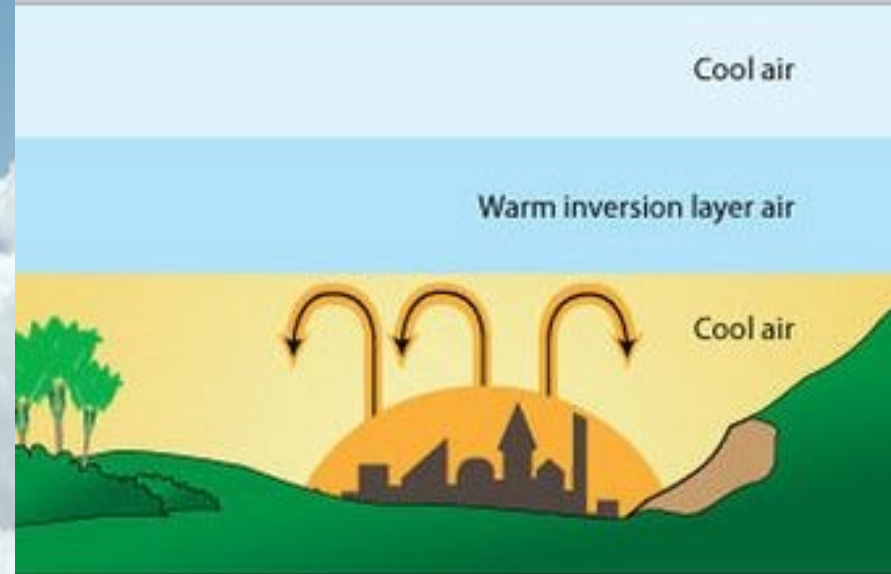


Clouds and Fog

- Temperature inversion – the basics



Normally, heat radiates upwards and is cooled as it ascends about $3.5^{\circ}\text{F}/1000'$

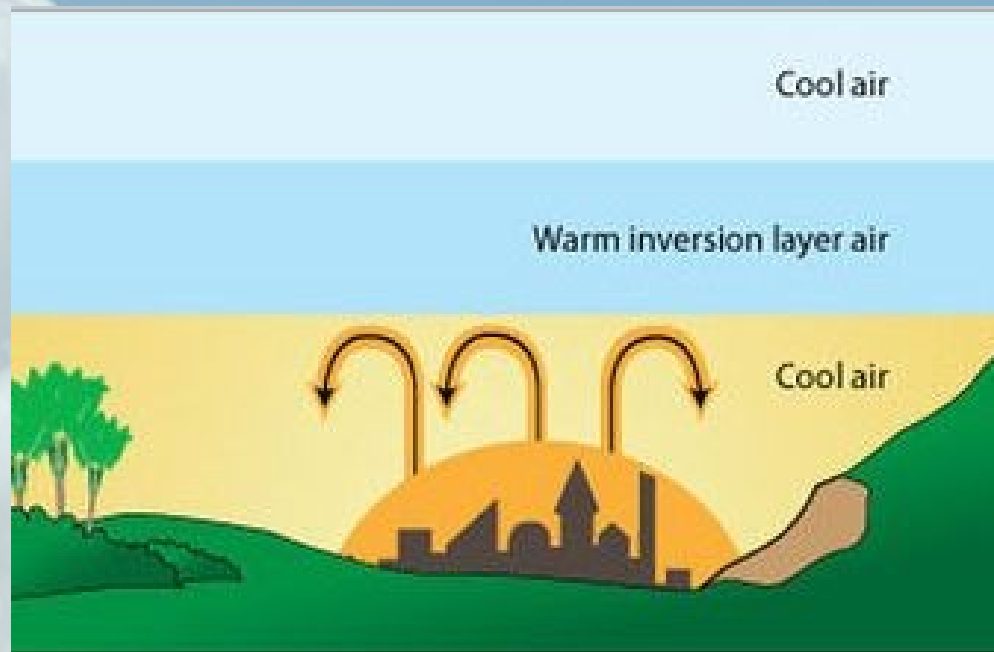


Temperature inversion occurs when cold, dense air replaces the warm air at a rapid rate and traps a layer of warm air between 2 cooler layers



Clouds and Fog

- High-inversion fog



Warm, moist air layer is trapped

Cool air cools the moist air to the dew point and fog forms

Cold, dense air rushes down the hillside