

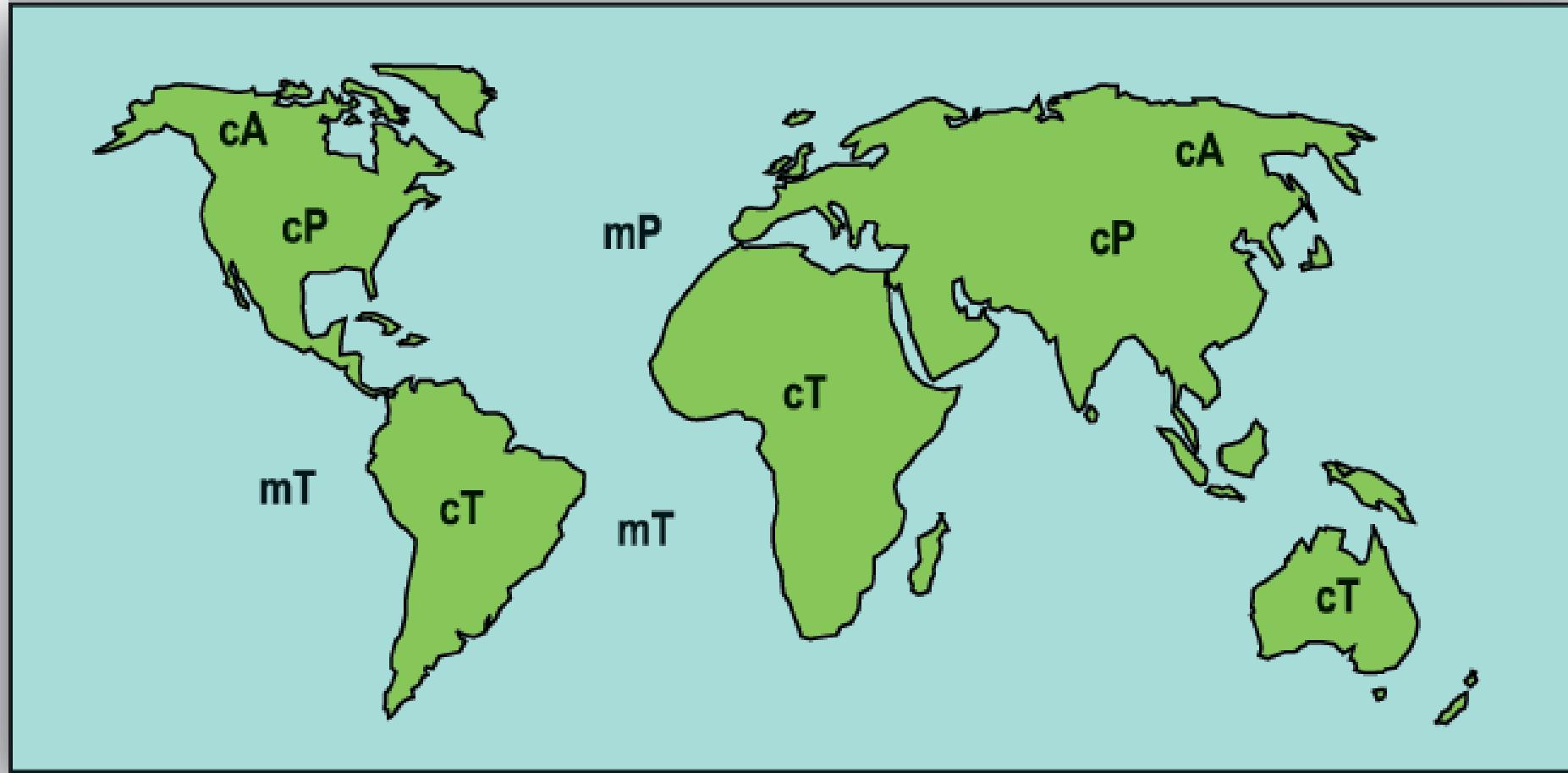


# JOURNEY OF FLIGHT

## 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

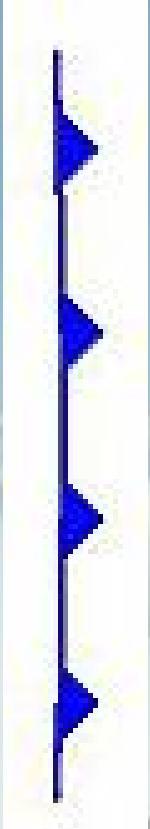
[What is a warm front?](#)

What does it look like?



# Fronts and their Movement

- Cold Front



Hint: Looks like little icicles on a string.



# Fronts and their Movement

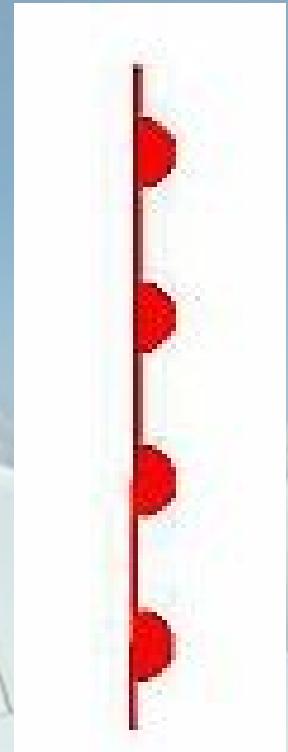
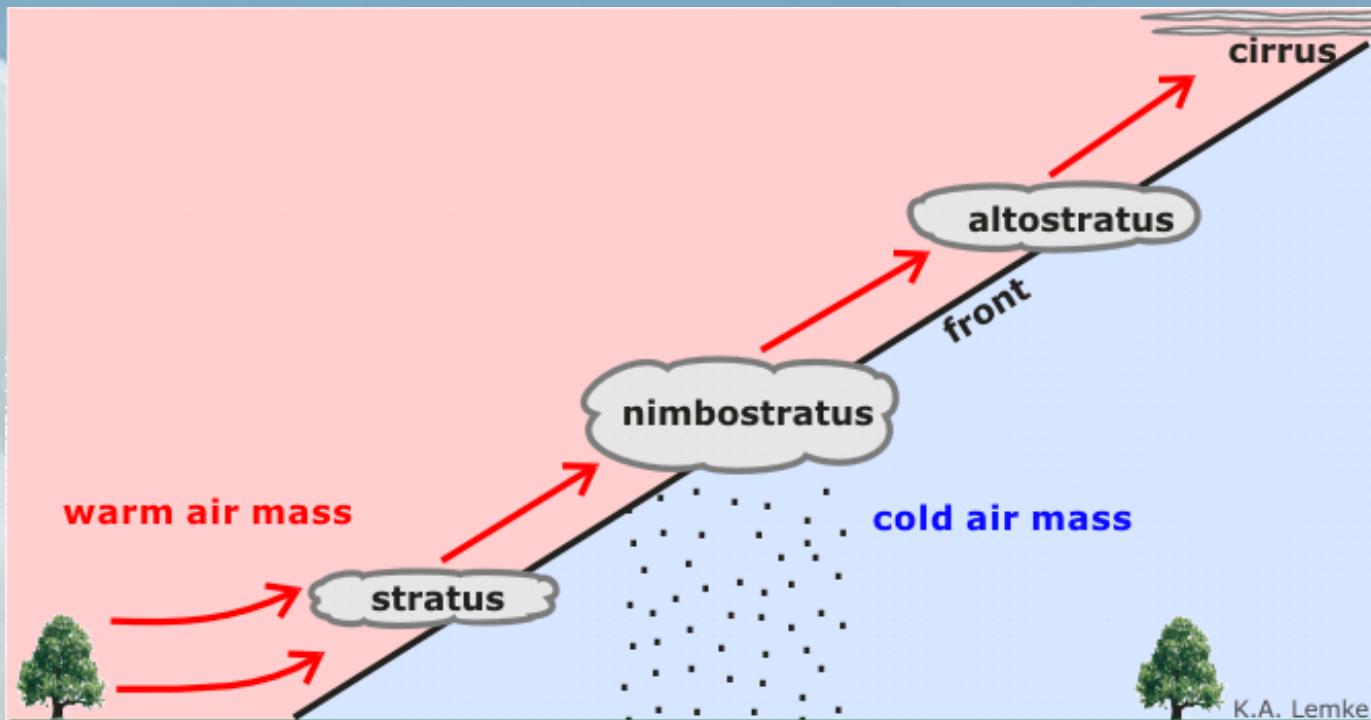
- Cold Front Characteristics

- 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=huKYKykjcm0>

# Fronts and their Movement

- Warm Front



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



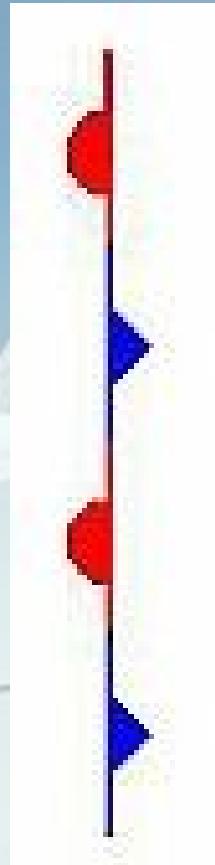
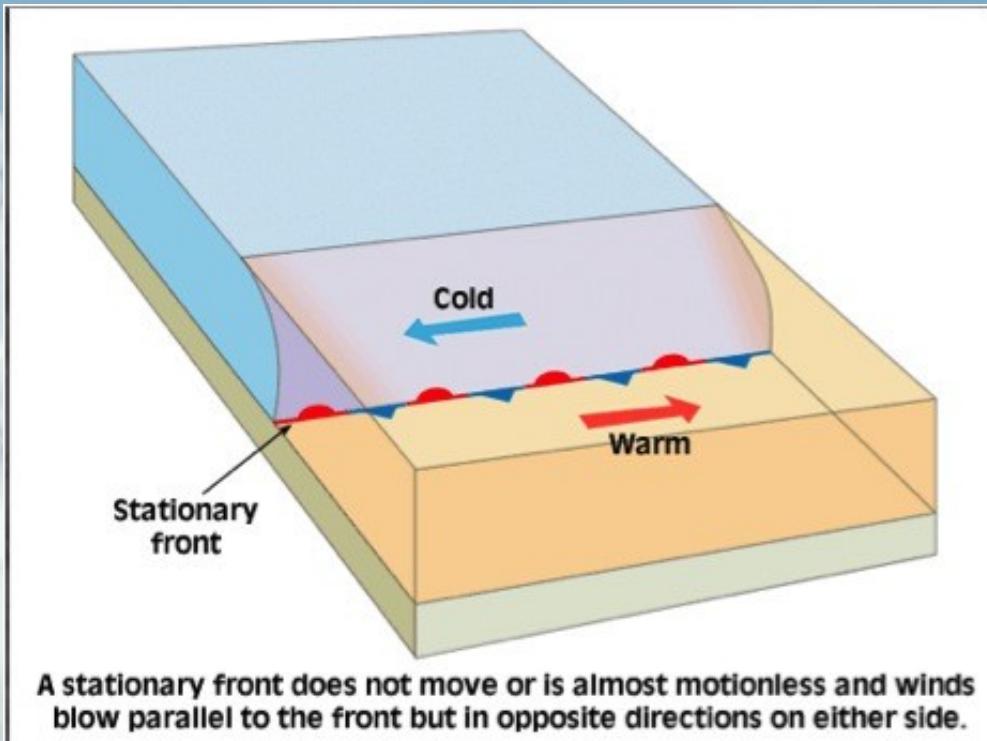
# Fronts and their Movement

- 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



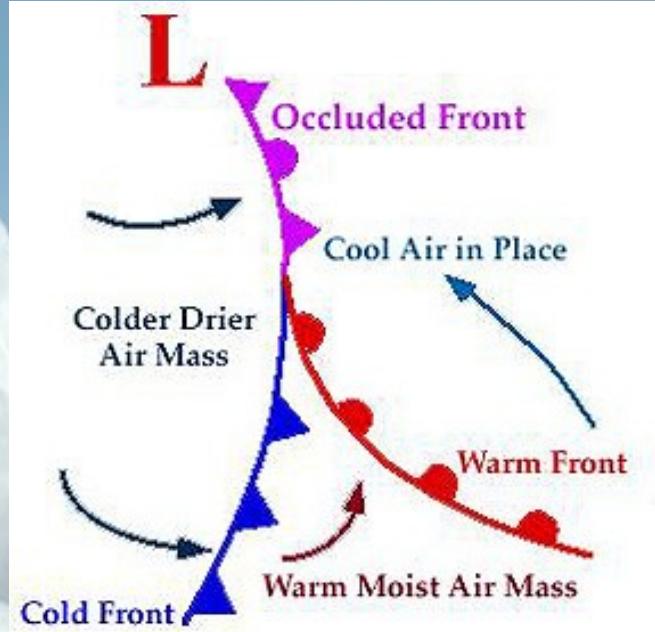
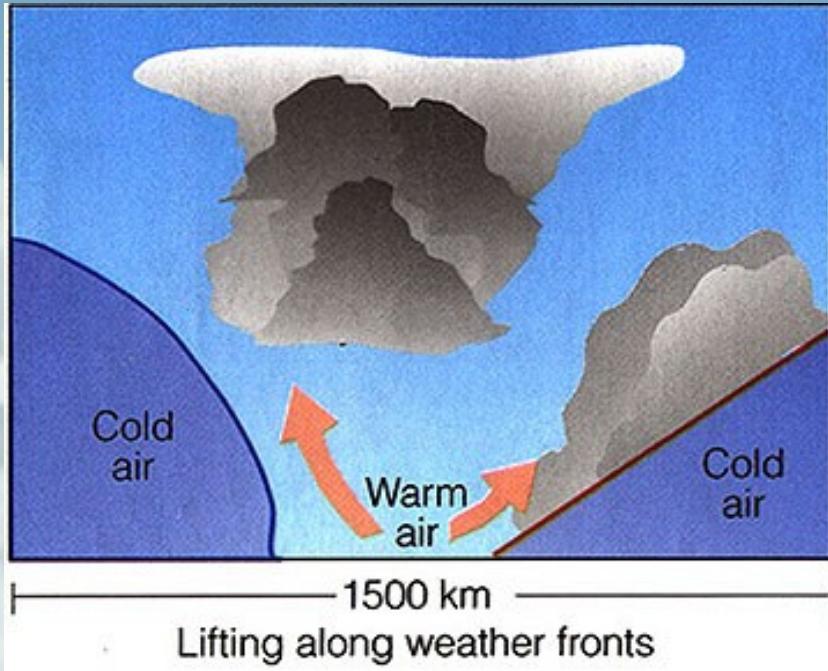
- Stationary Front Characteristics

- 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

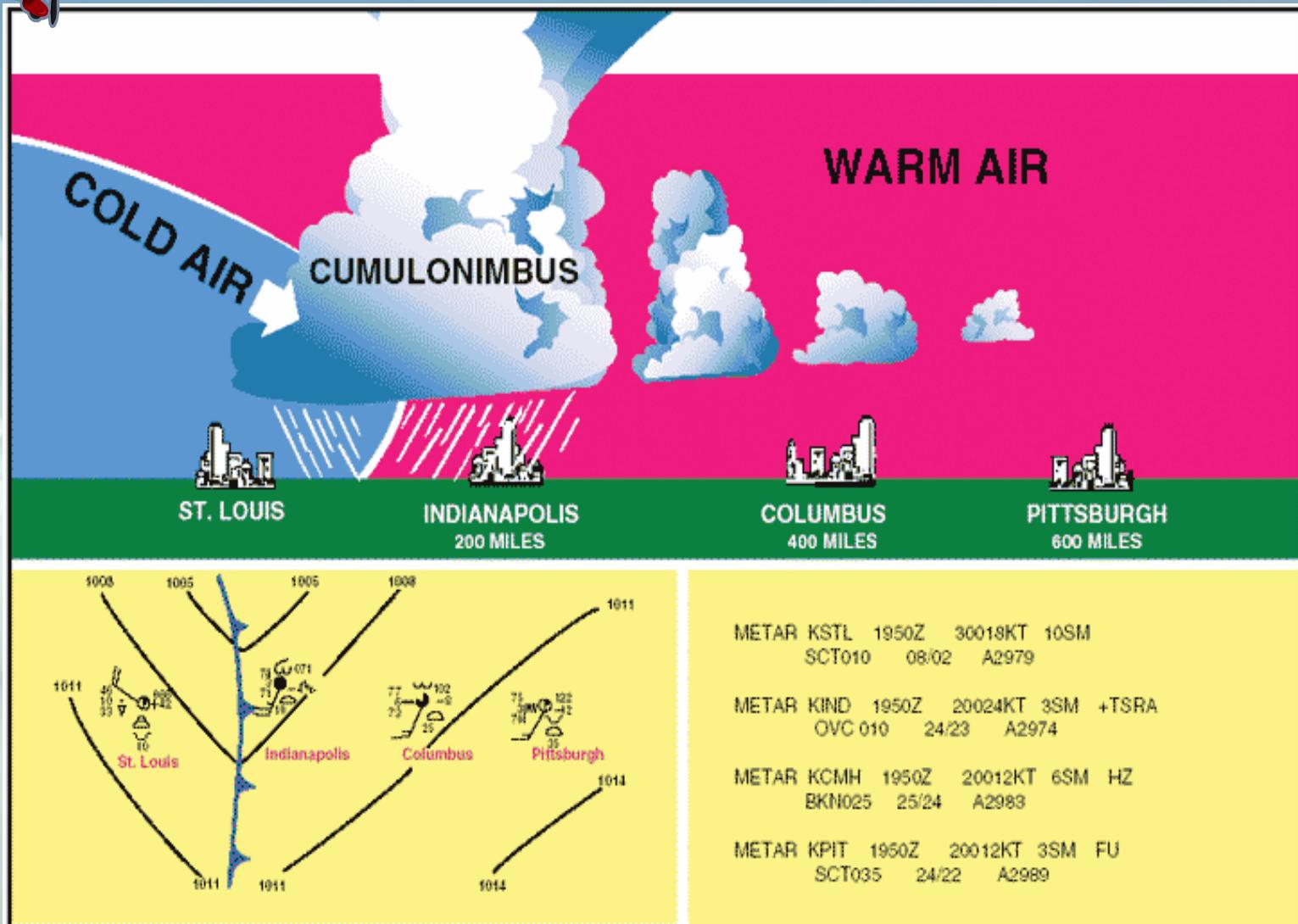
- Cold front occlusion
  - Fast moving cold front air is colder than the air of the cold air that is ahead of the warm front
  - Provides a mixture of weather that can be found in both warm and cold fronts

- 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 sever weather with embedded thunderstorms, rain and fog

# Fronts and their Movement



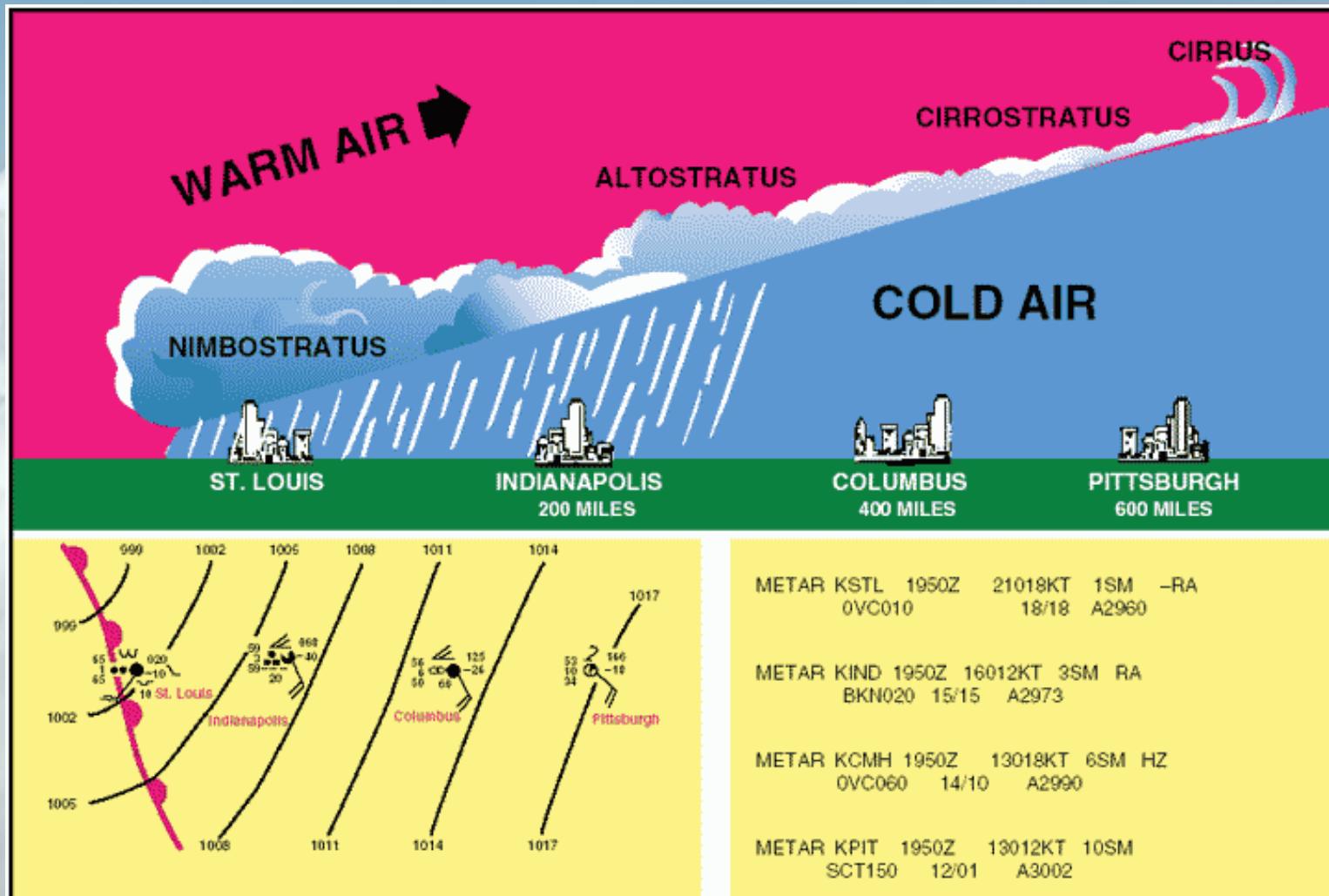
Advancing cold front





# Fronts and their Movement

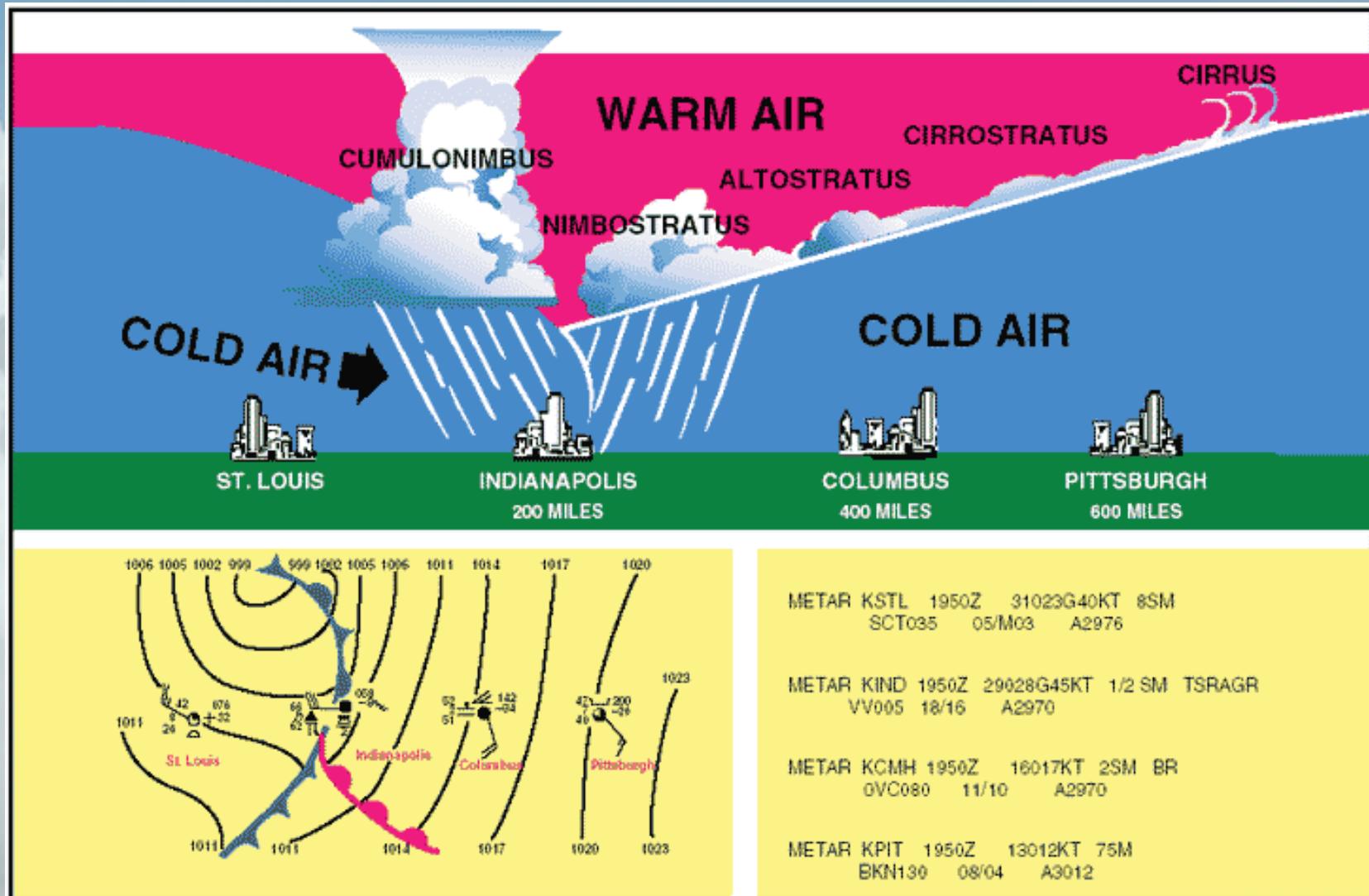
Advancing warm front





# Fronts and their Movement

## Occluded front

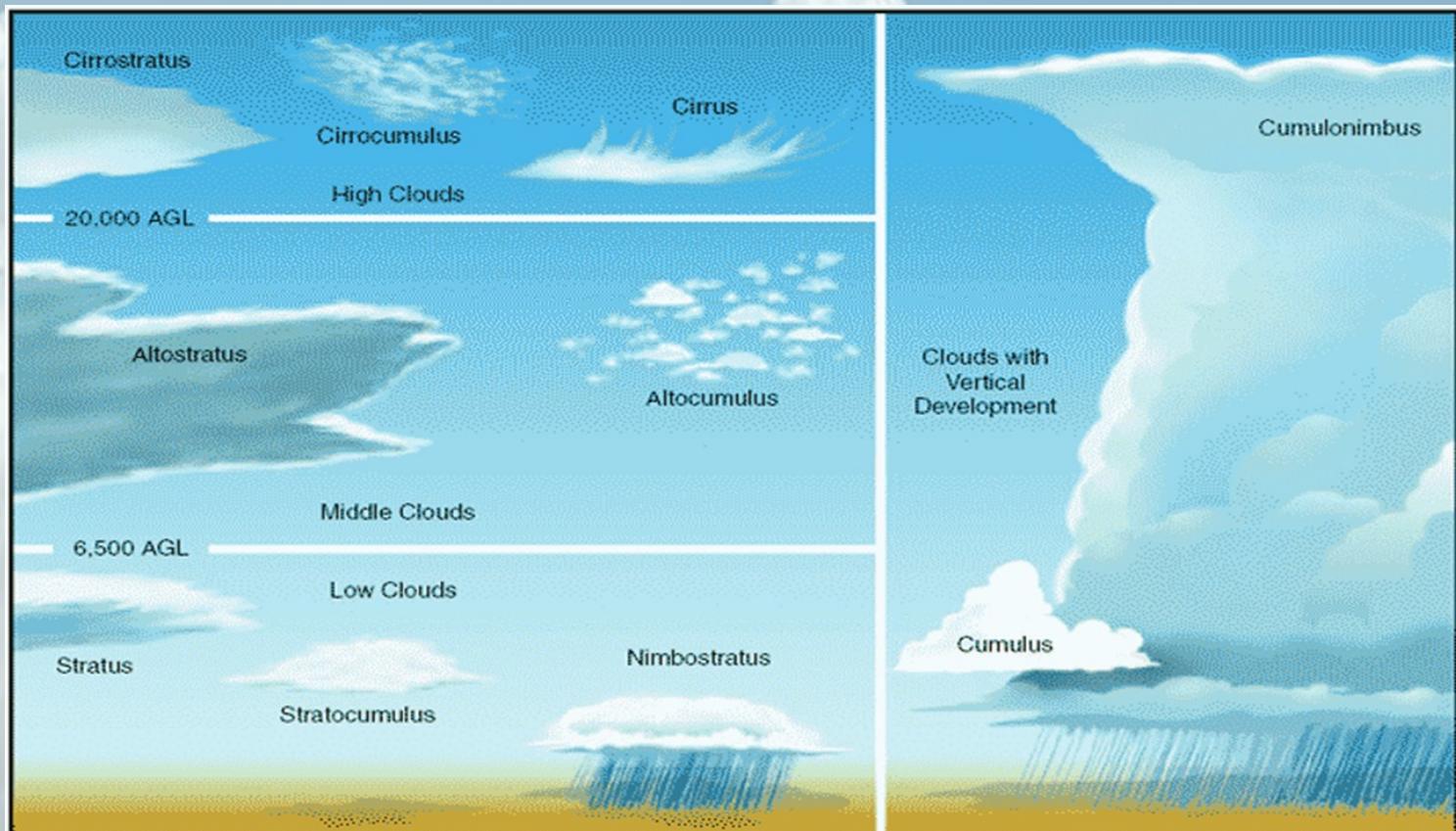




# Clouds and Fog

## Cloud Types

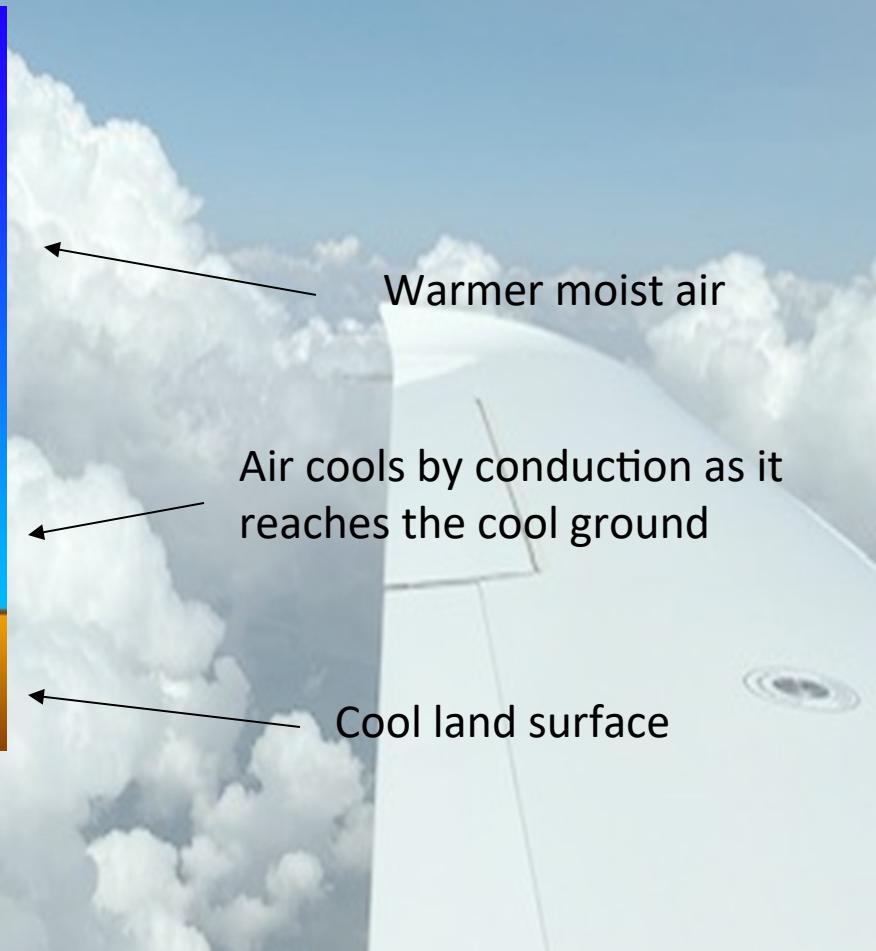
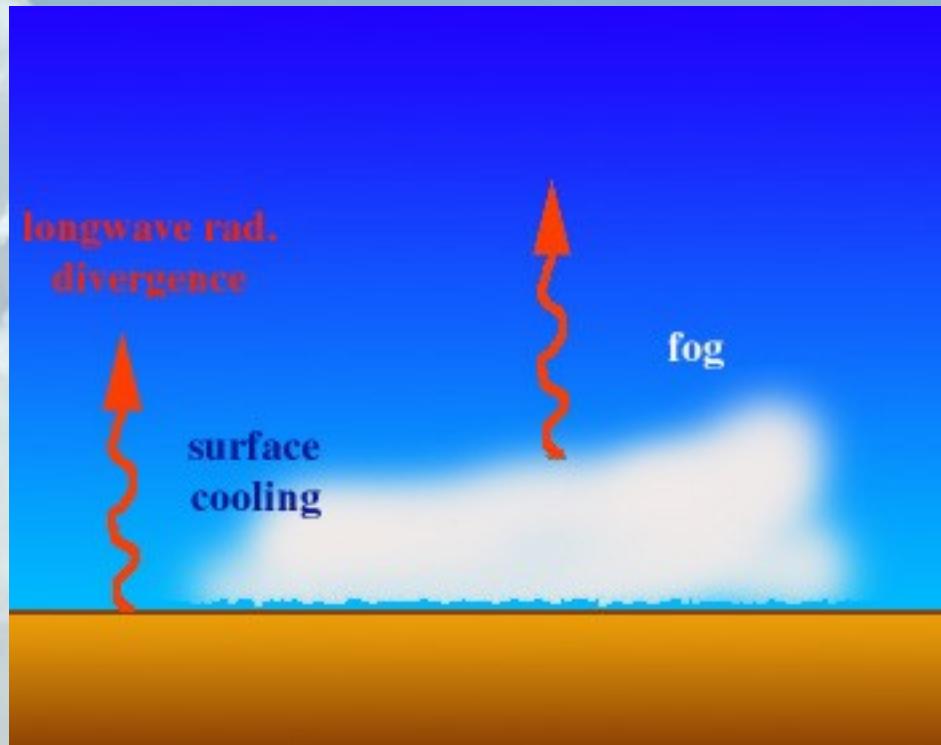
- Cumulous – puffy and piled up
- Cirrus – curly and fibrous very high
- Stratus – flat and layered
- Nimbo (or Nimbus) – rain or precipitation
- Alto – high (actually middle clouds – NOT the highest)





# Clouds and Fog

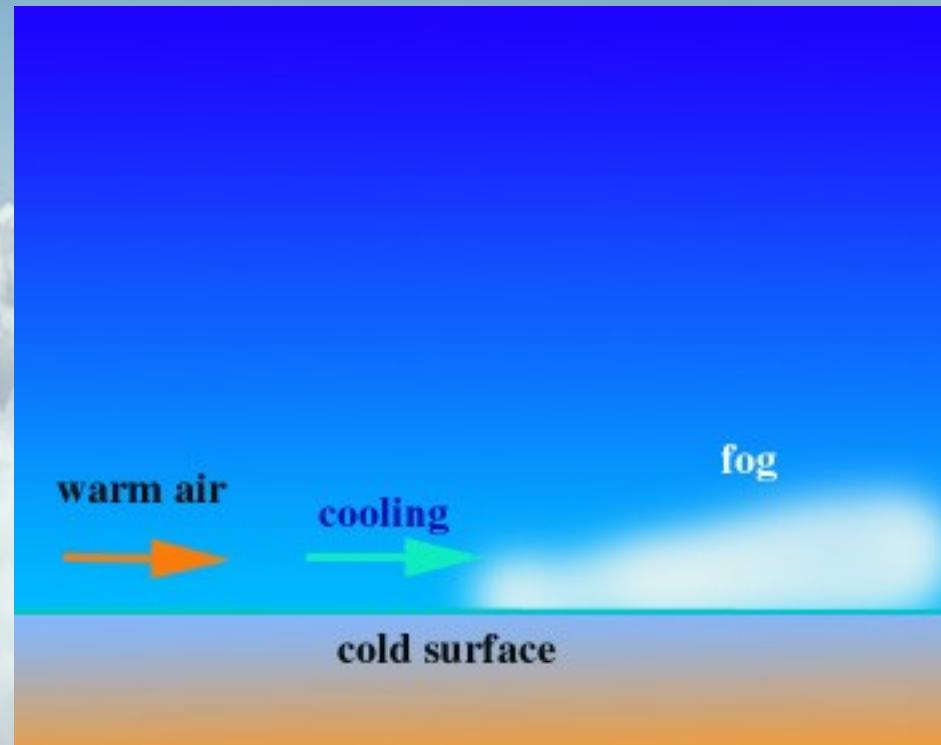
- Radiation Fog





# Clouds and Fog

- Advection Fog (remember advection = lateral movement)



Warm moist area

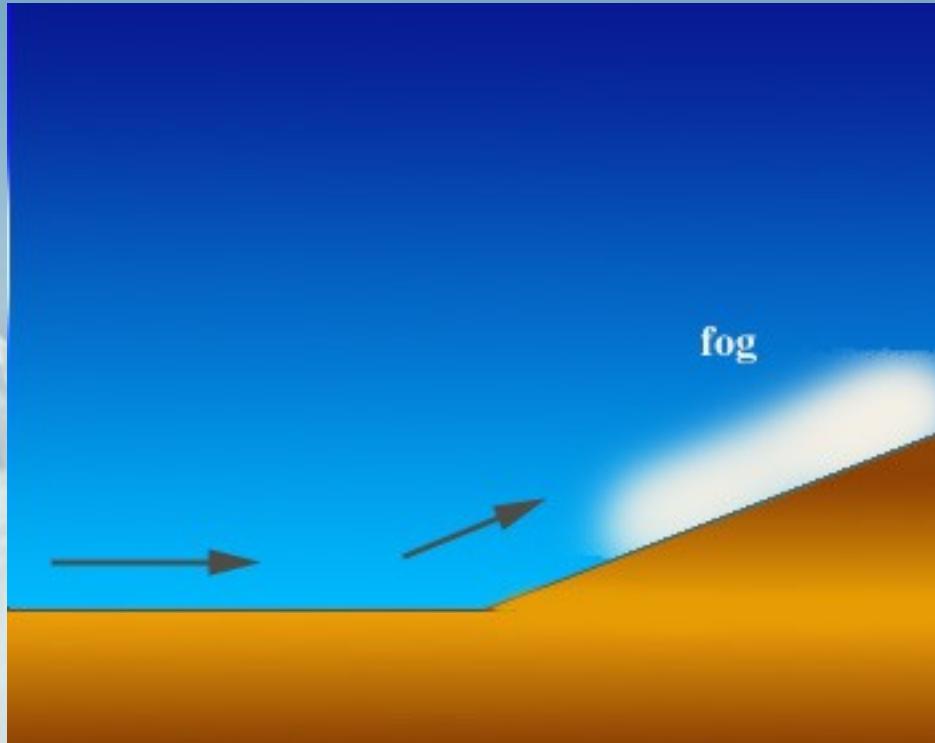
Air move laterally until it touches cold surface

Air temperature reaches dew point and fog forms



# Clouds and Fog

- Up-slope Fog



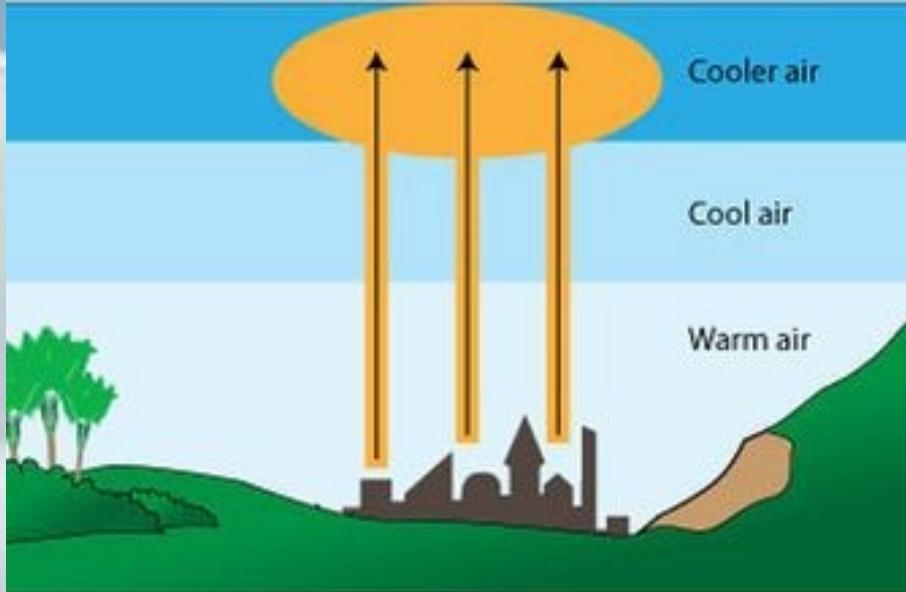
Warm, moist air blows up  
the hill side

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

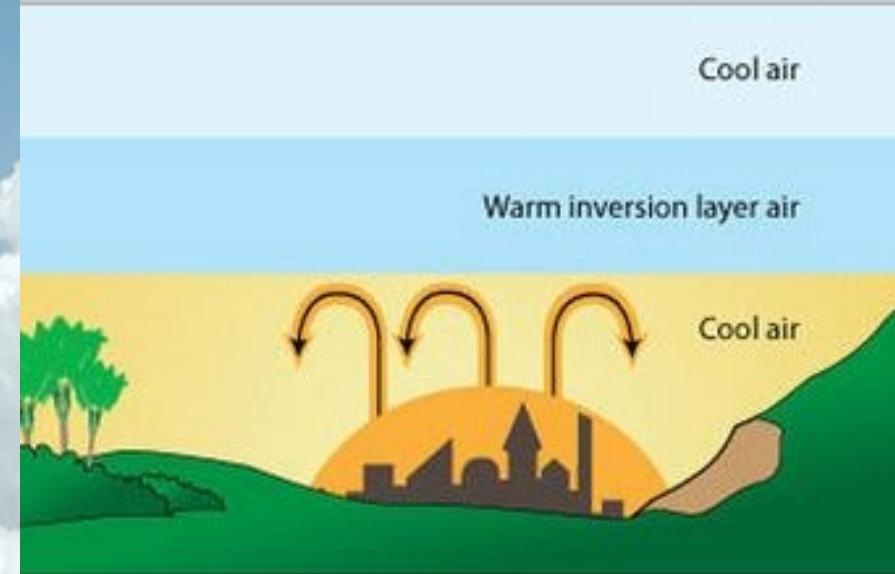


# Clouds and Fog

- Temperature inversion – the basics



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

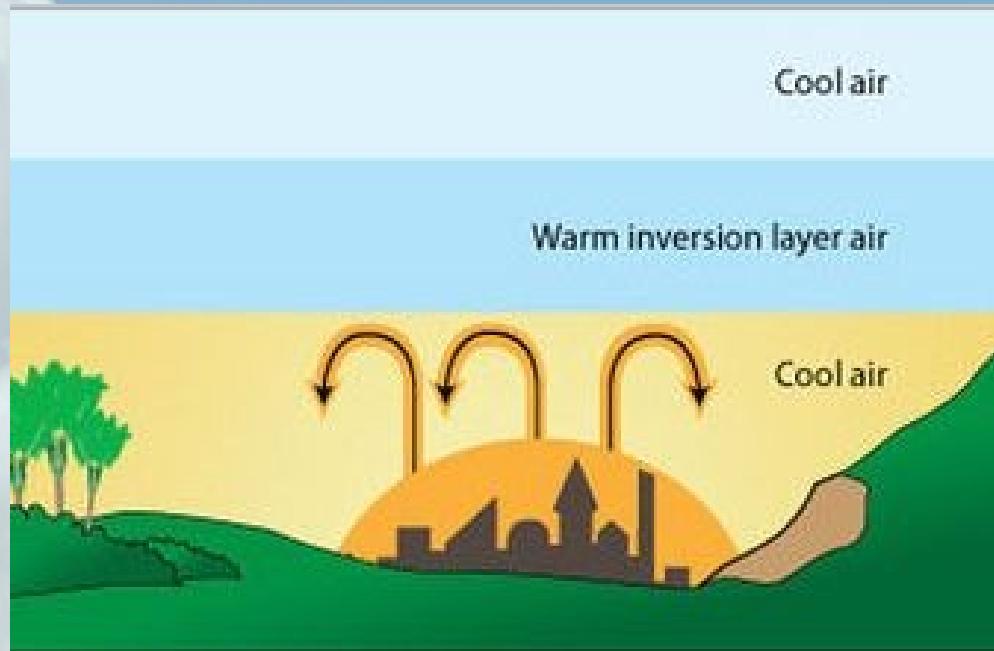


Temperature inversion occurs when cold, dense air replaces the warm air at a rapid rate and traps a layer of warm air between 2 cooler layers



# 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