SNS COLLEGE OF TECHNOLOGY

An Autonomous Institution
Coimbatore – 35

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Approved by AICTE , New Delhi and Affiliated to Anna University , Chennai.

DEPARTMENT OF AGRICULTURAL ENGINEERING

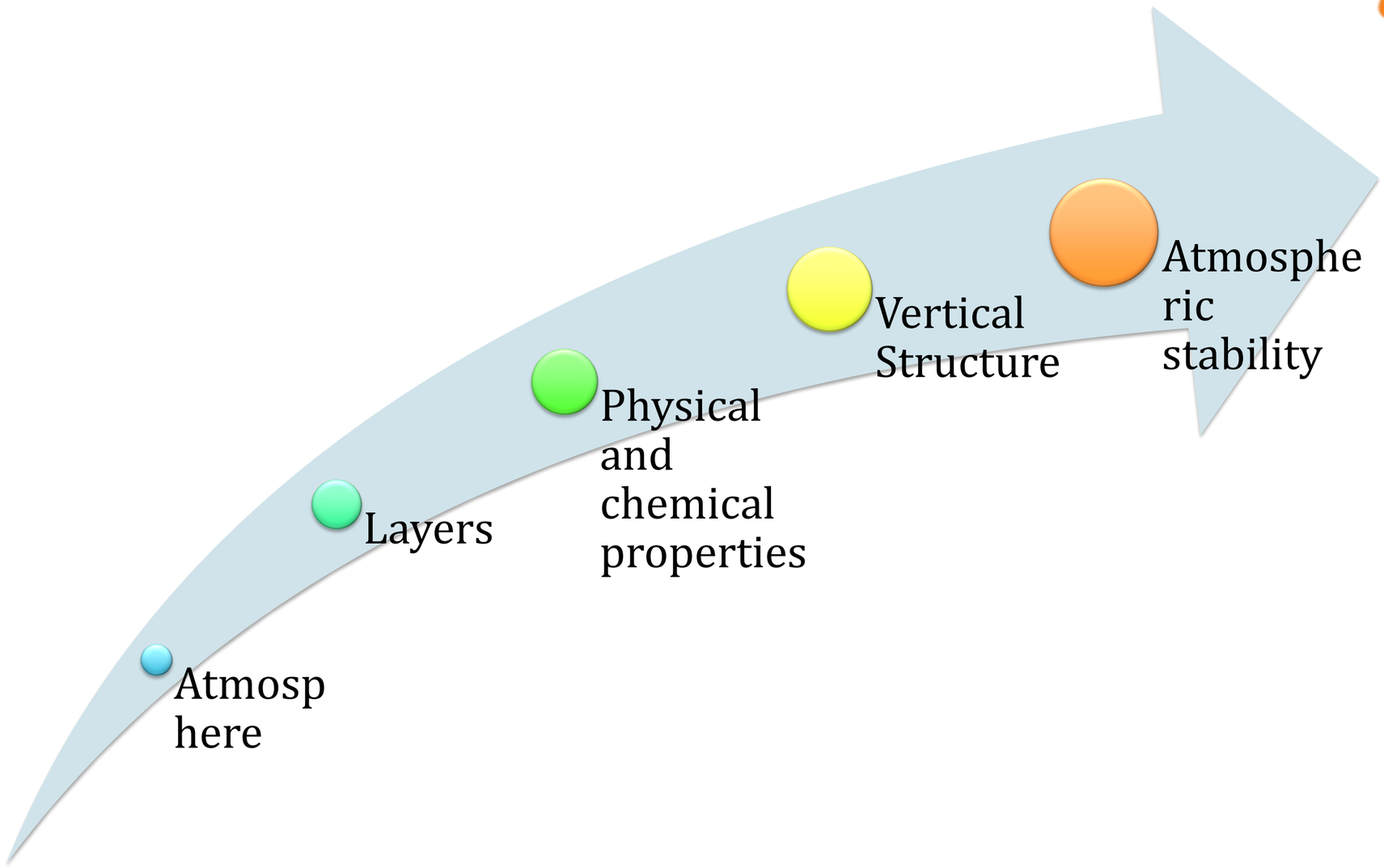
19AGE401 – CLIMATE CHANGE AND ADAPTATION

IV – YEAR VII SEMESTER

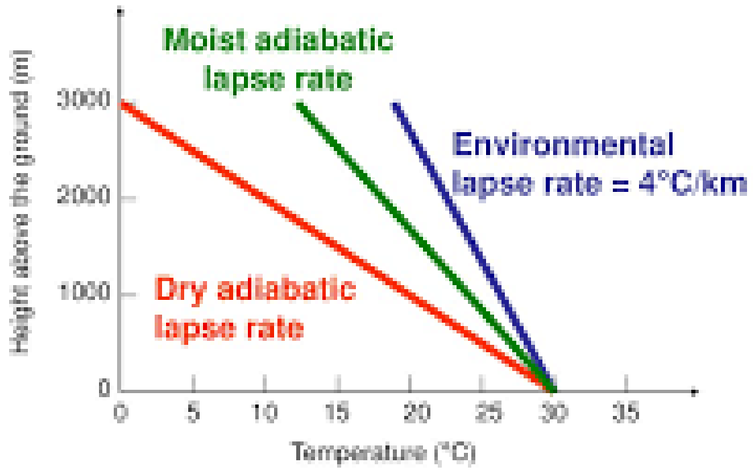
UNIT 2 – ATMOSPHERE AND ITS COMPONENTS

TOPIC 8 – TEMPERATURE INVERSION

Last Class Review



Environmental Lapse Rate



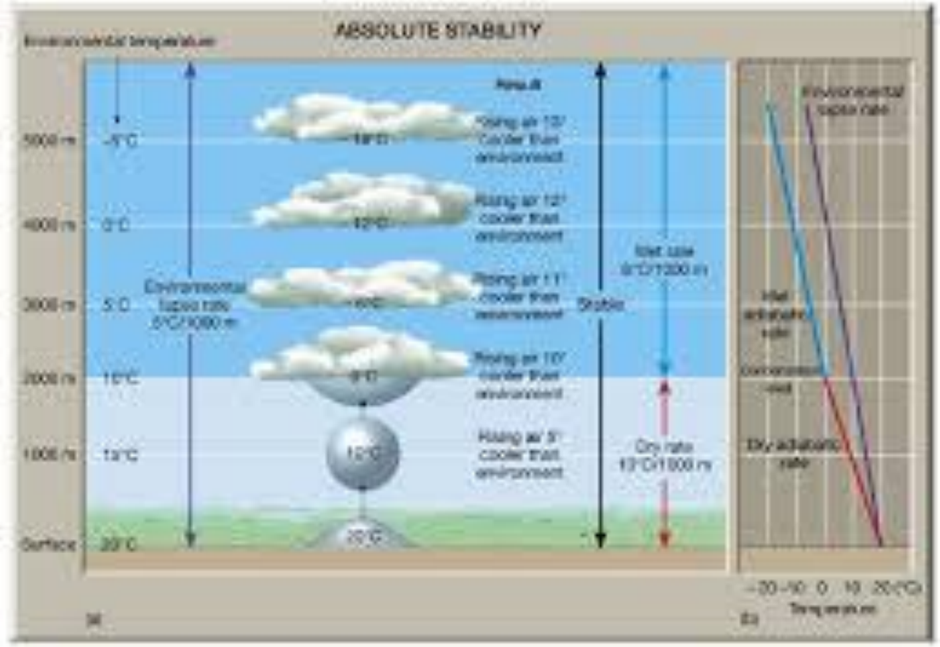
- The rate at which air temperature decreases with elevation
- This refers to the rate of temperatures decreasing when it is not being affected by the saturation of water vapour in the atmosphere
- However it can be affected by the stability of the air
- If the rising air parcel is colder than environment than its heavier and doesn't
- rise. Therefore it is stable
- Air is unstable when the air parcel is warmer and rises because it's lighter than its environment

Adiabatic Lapse Rate

✓Adiabatic lapse rate is basically the environmental lapse rate being affected by the saturation of the atmosphere

✓Air is moist when it is saturated by water vapor and dry when there isn't much water vapor

✓Like environmental, adiabatic can be affected when atmosphere is stable or not stable



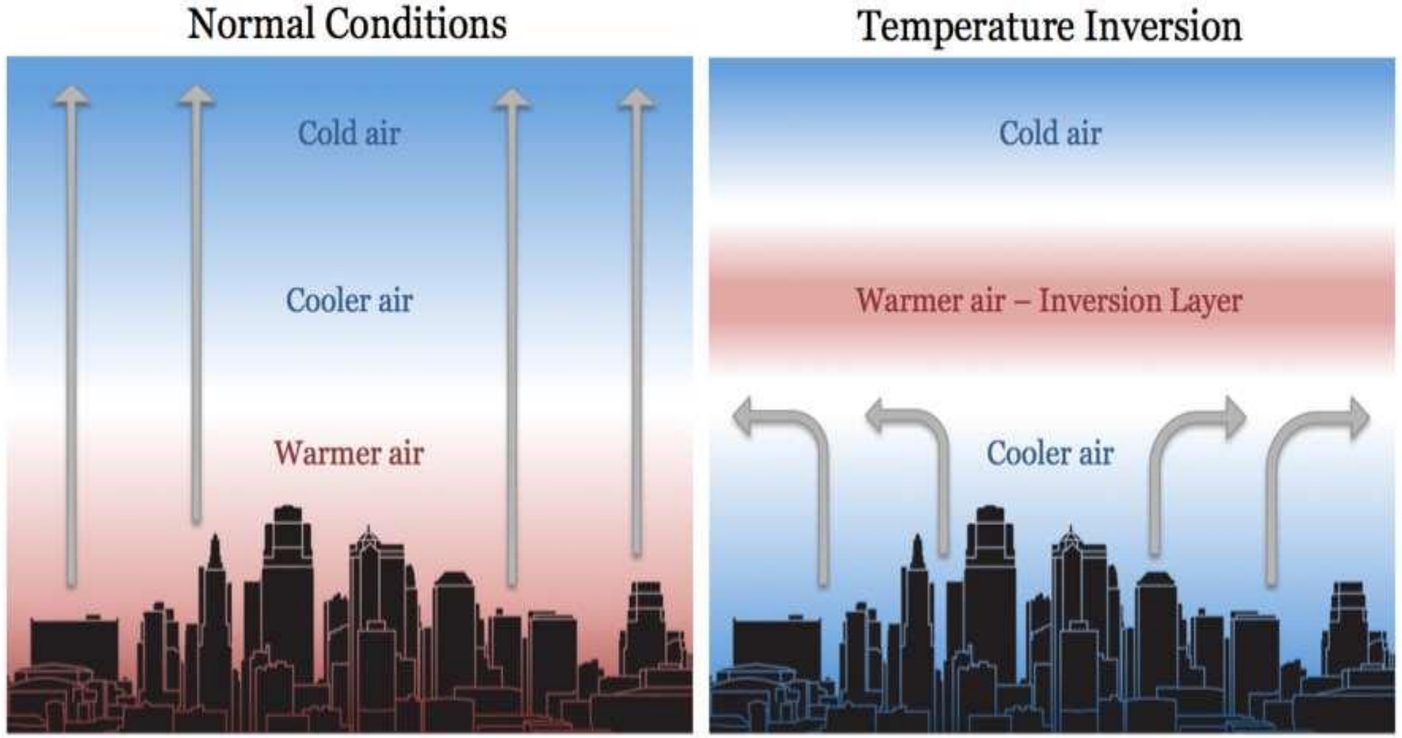
Assessment

- **What is the symbolic representation of Ozone**
- **Ozone layer depletion, is simply the wearing out (reduction) of the amount of ----------in the stratosphere**

WHAT IS TEMPERATUE INVERSION?

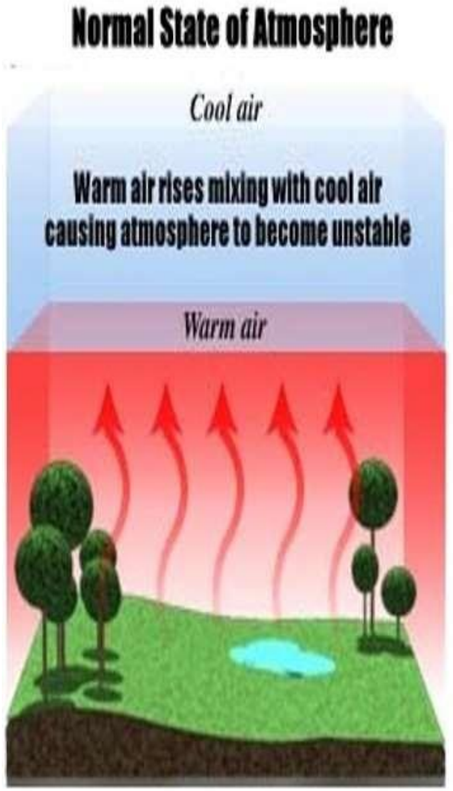
- Under most circumstances, the temperature of the atmosphere decreases with height, meaning it gets colder the higher you go.
- However, a temperature inversion occurs when the atmosphere actually becomes warmer as altitude increases.
- This typically occurs within a defined layer of the atmosphere.
- Temperature inversions, when they occur, have a major impact on air pollution and air quality.
- There are two types of inversions -- permanent and surface -- and each corresponds to a different impact.

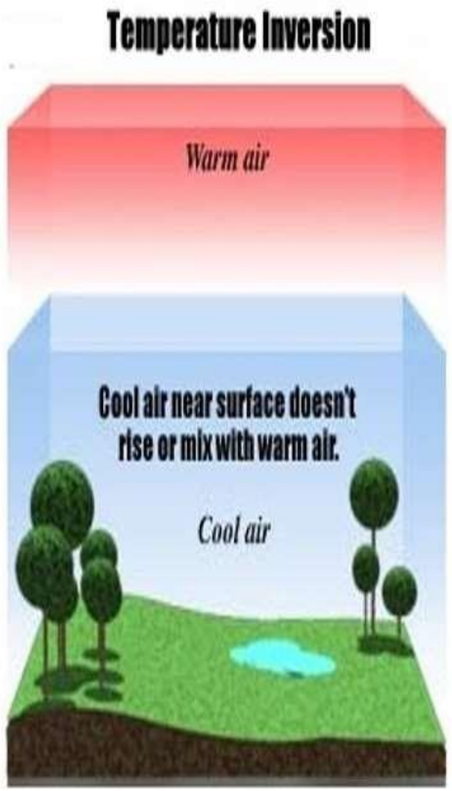
WHAT IS TEMPERATUE INVERSION?



Arrows show air flow in normal conditions on the left and during temperature inversion on the right. In normal conditions, warm air rises and normal convective patterns persist. During temperature inversion, the warm air acts as a cap, effectively shutting down convection and trapping smog over the city.

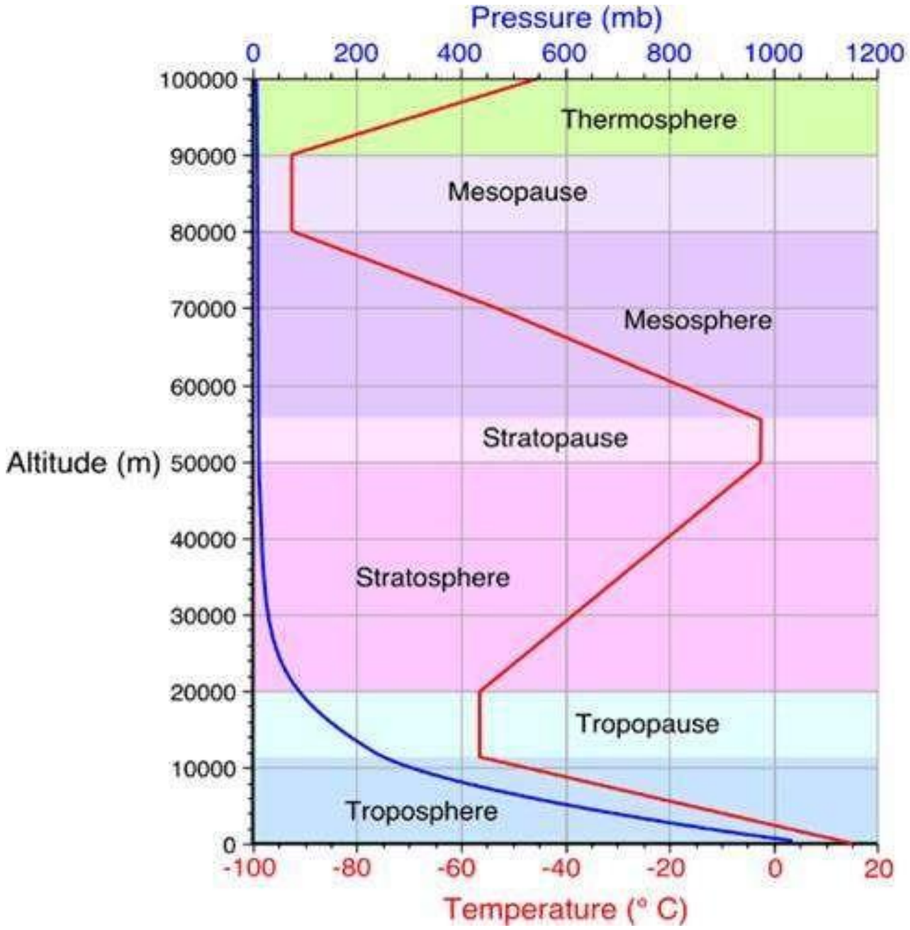
INVERSION OF TEMPERATURE IN LOWER ATMOSPHERE



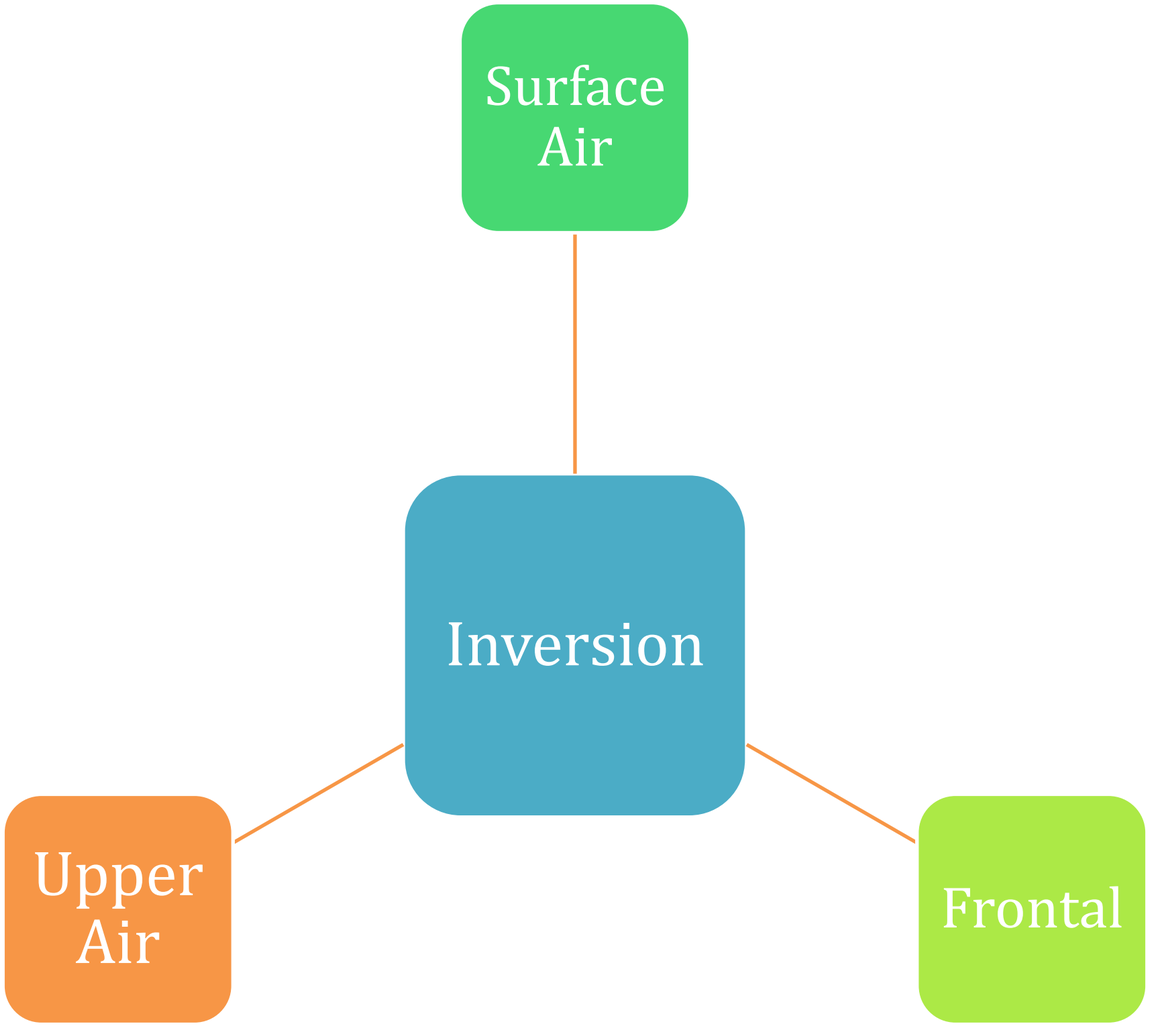


INVERSION OF TEMPERATURE

Temperature Inversion may occur near the surface or at various atmospheric levels.

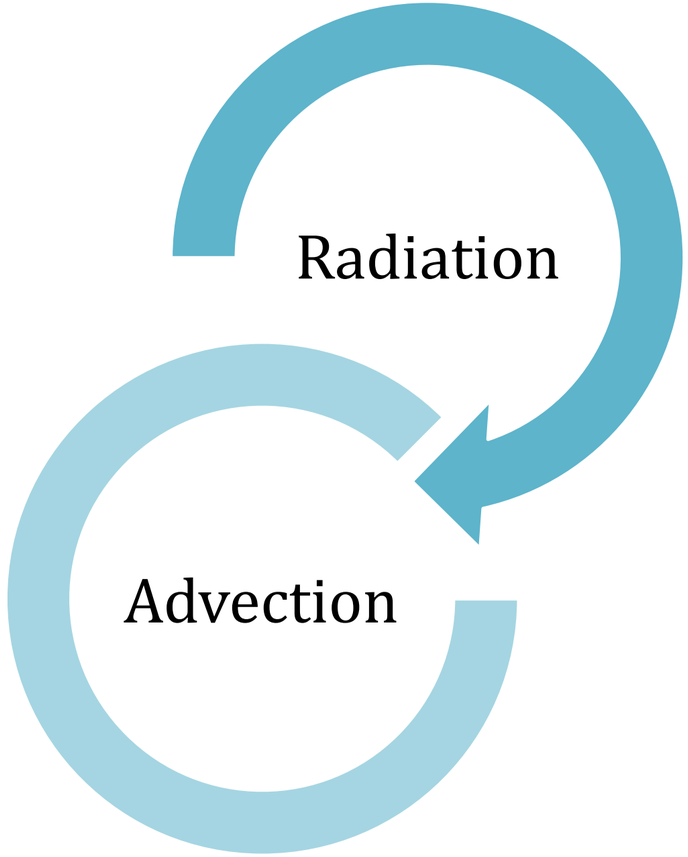


Types



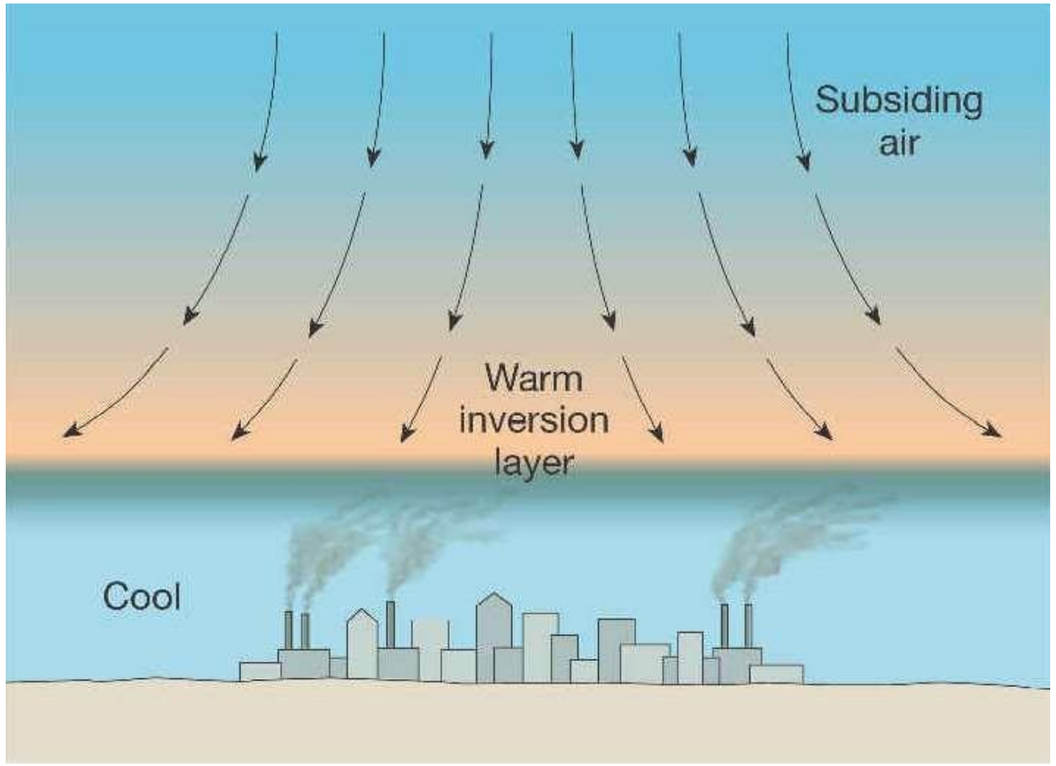
SURFACE INVERSION

- Inversion near the surface is of very short duration because the solar radiation heats the surface during day time, warms up the pre-existing cold air near the surface which soon disappears at night and hence the temperature inversion also disappears.
- Upper air inversion lasts for longer duration because the warming of cold air layer aloft through terrestrial radiation takes respectively longer period of time.



UPPER AIRINVERSION

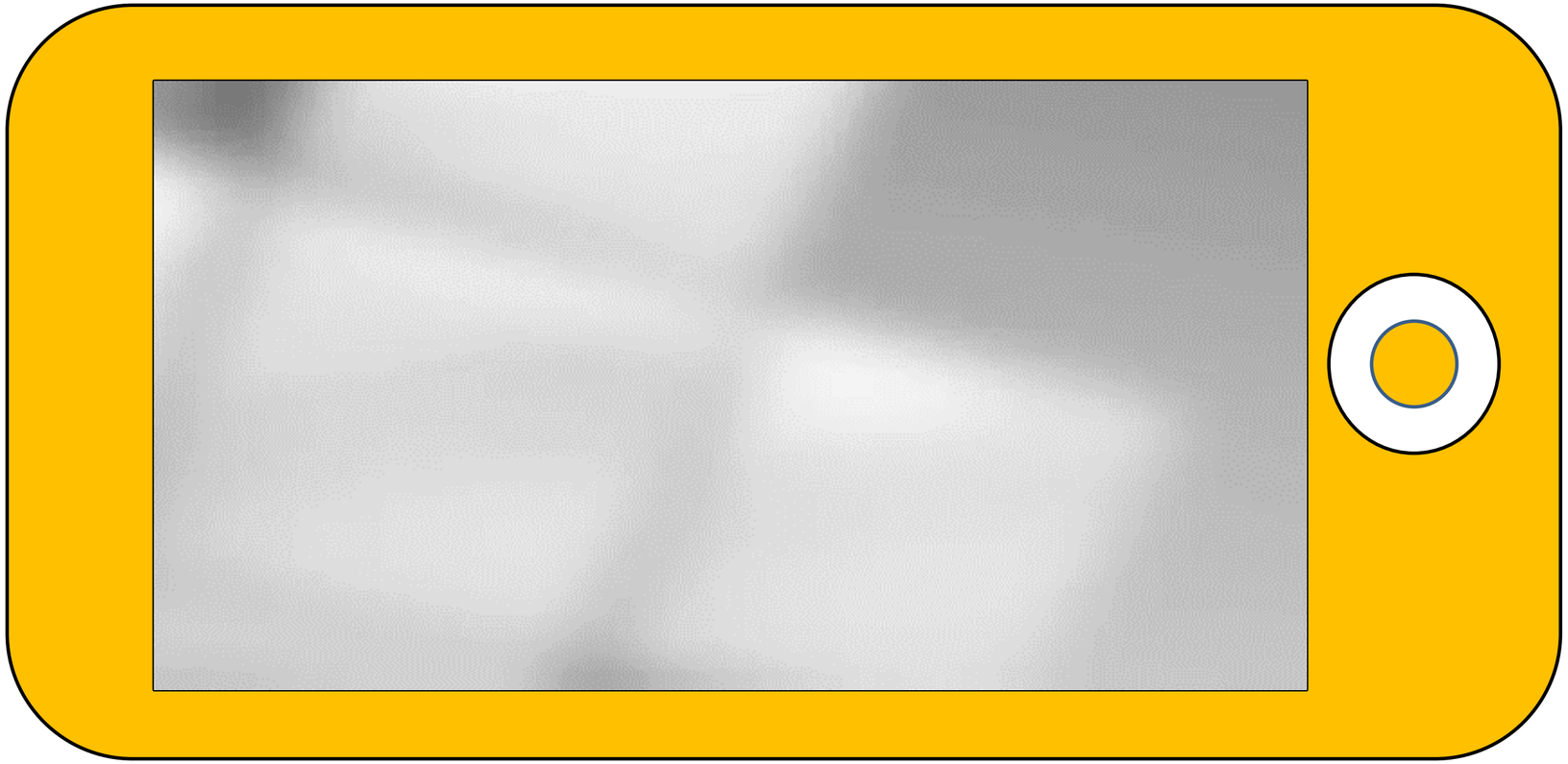
- Its of two types
- i) Thermal upper air inversion which is caused by presence of ozone layer in stratosphere.
- It absorbs most of the UV rays radiated from the sun increasing the temperature of the layer much higher than the layers below and above it.
- This occurs only when there is no vertical movement of air only ascent and descent of air.
- ii) Mechanical inversion is caused due to subsidence of air and Turbulence & Convection mechanism.



FRONTAL INVERSION

- Occurs when differing air masses converge.
- The warmer air being relatively higher tends to overlie the colder and denser air in a horizontal layer but however due to the coriolis force the boundary zone between these contrasting air masses is sloping.
- The frontal zone itself is converted into inversion layer in which the lapse rate is inverted

Reference Videos



See You at Next Class!!!!