

HUMIDITY:

- Amount of water vapour present in the air.

RELATIVE HUMIDITY:

- The ratio of water vapour present in the air compared to the amount the same volume could hold if it were saturated.
- If a given mass of air is heated and no new water vapour is added, the relative humidity decreases.

DEW POINT:

- The temperature to which air must be cooled, at a constant pressure, to become saturated.

SATURATION:

- When a mass of air is holding the maximum amount of water vapour it can hold, at a given temperature, it is saturated.

CONDENSATION:

- When invisible water vapour cools it condenses to the form of visible water droplets.

SUBLIMATION:

- The water vapour changes directly into ice crystals without passing through the visible water droplet stage.

EVAPORATION:

- When water droplets heat and form water vapour.

ISOTHERM:

Lines joining places of equal temperature.

FREEZING POINT:

Point at which water freezes (0°C)

BOILING POINT:

- The point at which water boils (100°C)

TEMPERATURE HAS AN EFFECT ON AIR DENSITY:

- Cold air is more dense (heavier)
- Warm air is less dense (lighter)

ATMOSPHERIC HEATING

The atmosphere is heated from below

Radiation – short wave radiation from the sun is absorbed by the earth's surface and re-radiated to the atmosphere in long waves. This long wave radiation heats the troposphere from below.

Advection – as cool air moves over a warmer surface it is heated by contact with this surface.

Compression – as air sinks it moves into an area of higher pressure and is compressed. As it compresses it heats up.

HEAT DISTRIBUTION ALOFT

Conduction – heat gradually diffuses through an object, moving from hot to cold. Plays a very minor role in weather.

Convection – when warm air rises colder air moves in to replace it causing a vertical circulation resulting in heat distribution.

Turbulence – friction between the earth's surface and the moving air causes mechanical turbulence which results in heat distribution.

ATMOSPHERIC COOLING

Advection: Warm air moves over a cooler surface and cools down by contact with this surface.

Expansion: As air is forced to rise it expands and cools.

Radiation: After sunset the earth continues to radiate its heat thus becoming cooler. Air in contact with this cooler surface becomes cooler.

VERTICAL DISTRIBUTION OF TEMPERATURE

- Decrease of temperature with altitude is known as lapse rate.
- Increase in temperature with altitude is known as an inversion.

TYPES OF LAPSE RATES:

- Dry Adiabatic:** 3.0°C / 1000'
Wet Adiabatic: 1.5°C / 1000'
ICAO Standard: 1.98°C / 1000'

STABILITY AND INSTABILITY
(stable and unstable)

Stability: The tendency of air to remain at its horizontal level when disturbed. It resists upward or downward displacement.

Instability: The tendency of air to continue to move away from its original horizontal level when disturbed.

- Unstable air is indicated by a steep lapse rate.
- Stable air is indicated by a shallow lapse rate.
- Heating from below causes instability
- Cooling from below causes stability

WEATHER CHARACTERISTICS:

Characteristic	Stable Air	Unstable Air
Lapse Rate	Shallow	Steep
Cloud	Stratus	Cumulus
Precipitation	Steady	Showers
Visibility	Poor	Good