

Humidity, Condensation and Evaporation

Humidity- It is moisture present in the air mass and it is of following types

1) Absolute Humidity: It is a total amount of invisible water vapour present in an air mass. It is measured as the weight of water vapour suspended in air mass.

2) Specific Humidity: It is a ratio of weight of water vapour to the weight of air mass

$WP/A. Mass = S. Humidity$

3) Relative humidity: It is a ratio of total amount of moisture present in the airmass to the total amount of moisture that time airmass can hold.

$R.H = \text{Weight of water vapour (Absolute Humidity)} / \text{Humidity Capacity (Moisture)}$

It is always expressed in Percentage

Humidity capacity is defined as total moisture that airmass can hold. It is dependent upon volume. With increase in temp R.H increases.

$RH = 800/1000 \times 1000 = 80\%$

Tropic of Cancer: It marks the northern most limit of Overhead Sun. Sunrays fall vertically on this parallel of latitude On 21st June Noon.

Tropic of Capricorn: It marks the southernmost limit of overhead the sun. Sunrays fall vertically on this parallel of latitude on 22nd December.

Arctic Circle- It is 66° half northern hemisphere. On this latitude we have 24 hours day light on 21st of June.

It is actually parallel of latitude from where North pole wards day duration begins to occur larger than 24 hours.

Antarctic Circle: On this parallel of latitude we have 24 hours day light on 22nd of December

It is a parallel of latitude from where south poles wards day duration begin to occur longer than 24 hours.

North Pole: It is northernmost point on earth which receives sun rays and this occurs when sunrays fall vertically on the tropic of Cancer.

South Pole: It is southern most point on earth which receives the sun rays and this occurs when the sunrays falls vertically at the tropic of Capricorn.

Evaporation: The process of turning from liquid into vapour

Factor Affecting the Rate of Evaporation

- 1) Temperature
- 2) Clouds
- 3) Size of Water Area
- 4) Dryness of Air- Dry air evaporation is more
- 5) Movement of Air- When air does not hold more water vapour

Saturated Air- Cannot hold more moisture

Unsaturated Air- Can hold more moisture

Movement of air replaces the saturated layers with unsaturated layer and this where as greater capacity of absorbing moisture. Hence greater the movement of air the greater is the evaporation.

Condensation

It is the change of state from gaseous to liquid or solid. When the moist air is cooled, its capacity to hold water vapors is increase by the actual water vapor present in it. The temperature at which saturation occurs (relative humidity is 100 Percent or water vapor change as dew point.

In free air condensation results from cooling around very small particles (dust particles) which are called as condensation nuclei. Particles of dust, smoke and salt from the oceans are particularly good nuclei because they absorb water. These particles are termed as hygroscopic nuclei (water seeking)-those particles which absorb water particles.

Condensation depends upon 2 factors

- 1) Amount of Cooling
- 2) Relative Humidity of the Air –RH increase and more than 100% then only rainfall

These two factors are associated with Volume, Temperature, Pressure and Humidity of Air.

Forms of Condensation

Dew and Frost= On the surface.

Fog and Mist=Near the Surface

Cloud= Above the Surface

Dew= Earth Surface heated during day time and it cools down in the night. Sometimes cooling is so much that the temperature of air touching the earth surface achieves the dew point and water

vapors present in the air condenses and it deposited in the form of droplets on cooler surface such as solid objects like grass, leaves and stones.

Frost-When dew point is below freezing point the water vapor will not condense into water droplet. However will accumulate on the earth surface in the form of small white ice particles.

The formation of these ice particles over a large area is called as frost. Frost is formed when the temperature of the air falls rapidly. So that the water vapor present in the air is directly turn into solid particles without turn into liquid state.

The condition for the formation of frost and dew are the same except that air temperature must be at freezing point or below freezing point.

Fog- For is a type of cloud with its base at or near the ground. It is form when the temperature of an air mass containing large amount of water vapors falls all of sudden and the condensation takes place around fine dust and smoke particles. The atmosphere becomes smoky and visibility is poor (often less than 1 km). It is generally form during winter night and disappears after sun rise.

Mist: Mist is also a kind of fog in which visibility is more than 1 km but less than 2 km. One more type is Haze.

Haze- When visibility is up to two km then it is smog (Smoke and Fog) together form the smoke. In smog visibility is near about zero and it is specially form near industrial area.