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Air and Atmosphere

Earth is the only planet on which life is possible. The existence of life on earth is only because of its atmosphere. All kind of life forms, from a worm to a huge elephant exists only because of the atmosphere surrounding them.

Atmosphere :

The atmosphere is a thick blanket of air that surrounds the earth. The atmosphere provides us with oxygen to breathe as well as protects us from harmful radiation from the sun.

Composition of atmosphere:

- Nitrogen 78 %
- Oxygen 21 %
- Argon 0.9%
- Other gases (Carbon dioxide, nitrous oxide, methane, ozone) 1%

Structure of the Atmosphere:

There are five main layers of the atmosphere:

1. Troposphere:

It extends to a height of 8 km from the poles and 18 km from the equator. It is the lowest layer of the atmosphere where all the weather-related phenomena take place. The upper layer of the troposphere is called the tropopause.

2. Stratosphere:

It is the second-lowest layer of the earth and extends from the upper layer (tropopause) up to 50km. Ther is no weather up there and this is the zone which consists of the ozone layer. The stratosphere is otherwise known as Ozonosphere. At the lower layer of the stratosphere is where the aeroplanes fly.

3. Mesosphere:

This layer extends after stratosphere from 50km to 80km. It is located in between the stratosphere and the thermosphere. On reaching the mesosphere, the temperature decreases because of the increase in the altitude.

4. Thermosphere:

This layer of atmosphere extends between 80-400 km and it is suitable for the radio waves transmission. The radio waves are transmitted from this layer and reflected back to the earth.

5. Exosphere:

It is the topmost and thinnest layer of atmosphere. Hydrogen and helium gas floats in this layer.

Air Pressure:

It is the pressure exerted by the weight of wind on the surface of the earth. The pressure of the air decreases with height. The pressure of air is highest at sea level and the lowest in the mountains. Air pressure is divided into two types i.e., anticyclone (when the air pressure is high) or cyclone (when the air pressure is low). The pressure of air is measured by a barometer. Following are the main pressure belts found at globe are:

1. Equatorial Low-Pressure Belt (doldrums):

The air at the equator receives a high amount of heat throughout the year thus the heated air is light which creates a low-pressure belt at the equator. The low-pressure belt is located on either side of the equator in a zone extending between 5^{o} N and 5^{o} S. Due to low pressure and its calm condition this belt is known as 'a belt of calm' or doldrums.

2. Sub-tropical High-pressure belt:

High-pressure belt zone is also known as horse latitude. It is located 25^{o}-35^{o} in both the hemisphere. At this pressure belt as the earth rotates the air at the equator moves towards the poles which result in cooling and sinking down of air towards the 30^{o} N and 30^{o} S.

3. Sub Polar Low-Pressure Belt:

This belt is located 60^{O} – 65^{O} latitudes on both the hemisphere. At this belt on the subtropical region, the air gets divided into two parts. One part blows equatorial low-pressure belt and the other blows from the circumpolar low-pressure belt. At this region, warm air blows from subtropics over cold air from the poles. So, due to the rotation of earth low pressure is produced.

4. Polar high-pressure belt:

This belt is situated between 70^{o} and 90^{o} on both the poles. At this belt, the temperature is very low and thus creates very high pressure on both the poles.

Wind Belt:

1. Doldrums:

This belt is situated at the equator at 5° N and 5° S at this belt the temperature is very high which creates low pressure and also here two trade wind meets and this zone known as Inter-Tropical Convergence Zone (ITCZ).

2. Trade Wind Belt (Hadley):

These winds extend from 5 to 30 of latitudes on either side of the equatorial trough of low-pressure area.

3.Prevailing westerlies:

This belt is situated 30 N to 60 S on both the hemisphere. When these winds move on higher latitude they are diverted and become southwesterly and northwesterly.

4.Polar easterlies:

These winds are the dry cold wind that blows around the polar regions. These winds move out of the polar high towards the subpolar low-pressure belt.

Cyclones and Anticyclones:

Cyclones:

Cyclone is a system of wind which rotates at the centre of low atmospheric pressure belt in anticlockwise in the north of the equator and clockwise at the south of the equator.

Anticyclones:

It is the system of high atmospheric pressure where winds rotate in clockwise in the southern hemisphere and anticlockwise in the northern hemisphere. Anticyclones are formed due to cooling of air masses then their surrounding which makes the air heavy and dense. These dense airs create high pressure in the area. These may occur without any precipitation so the winds remain dry in anticyclones.