

WIND

Wind is defined as the moving air of atmosphere parallel to earth's surface (air in horizontal motion). All other masses of air in motion (vertical) should be called as Air Currents. Wind is an invisible weather element but the effect of wind can be seen from the movement of tree branches, dust particles and by feeling. The pattern and intensity of wind is affected by various factors.

Effect of Wind on crops

1. Increases transpiration under normal condition with increasing wind velocity. Layers of humid air adjacent to plant leaf surfaces are removed by wind and become mixed with dry air above. This keeps RH low and increases transpiration rate.
2. Wind increases the rate of Photosynthesis. Wind increases turbulence in atmosphere thus raising the supply of CO₂ to the plants and thereby increasing the rate of photosynthesis.
3. When the wind is hot it accelerates the drying of the plants by replacing humid air by dry air in the intercellular spaces.
4. Much damage is caused by hot dry winds at or near the time of flowering
5. Interferes pollination by insects. But mild wind will favour pollination by wind.
6. Depletes soil moisture.
7. Due to mechanical effect of wind the growth pattern and shape of trees are changed.
8. Cause fruit drops in plants.
9. Soil erosion occurs when the plant cover is not thick.
10. Salt deposition by wind is another phenomenon where wind from sea carries salts as spray on coastal area and makes it impossible to grow crops which are sensitive to excess salts.

Causes for the formation of the wind:

The principle cause for wind is difference in pressure. Air always moves from areas of high pressure to those of low pressure.

1. Due to variation in the atmospheric temperature, pressure etc., i.e. when the atmospheric temperature is very high the pressure will decrease correspondingly. Due to fall of the atmospheric pressure the air moves from high-pressure area to low-pressure area and this gradient decides the direction of wind.
2. Due to deflection of atmosphere air over the earth surface while it revolves and this deflectional force is called as Coriolis force.

Types of movement of air

Horizontal movement called wind

Vertical movement called Eddies, Convection currents, Convergent accents and Subsidence.

Wind Systems

There are three types of wind systems namely:

1. Primary wind system
2. Secondary wind system and
3. Special a type wind system.

The primary and secondary wind systems consist of Trade winds and monsoons respectively and special type consists of land and sea breezes.

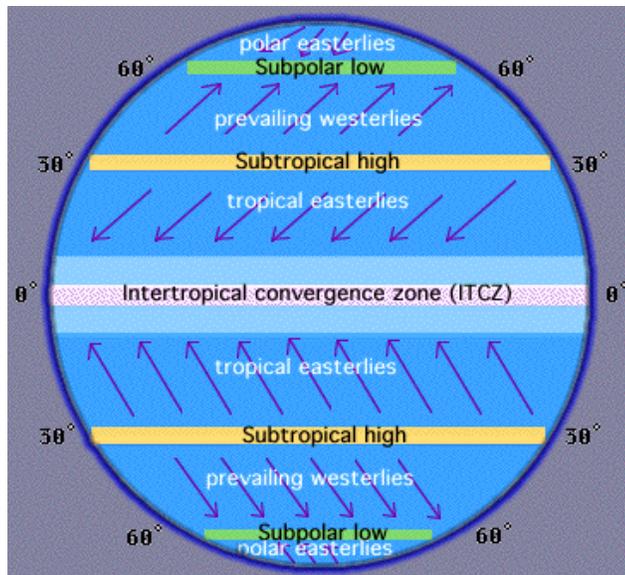
1. Trade winds

Trade winds are the winds of primary wind systems that blow from subtropical centers towards the equatorial side low between 30 and 350 and the winds on the equatorial side are called **Trade winds**. They are the most regular winds. Their steadiness has earned their name trade winds. They blow with greater strength and constantly in winter than in summer. They are regular and steady over the oceans. They blow away from the landmasses over continents. When the equatorial region gets heated, the air rises from the surface and passes to the upper layers. The pressure of the atmosphere near the surface decreases in due course. Air moves towards this low-pressure area from both north and south and this phenomenon continues throughout the year. The resulting wind takes the same course or track and is hence called **Trade winds or Tropical Easterlies**. As the hot air rises to the upper layers over the equator, the pressure is raised there in due course and the surplus air moves northwards and southwards in the lower layer. The movement is towards the equator from the north and south in the lower layers and from the equator towards north and south in the upper layers. The latter are called **Antitrade winds**.

Global Wind Patterns

The global wind pattern is also known as the "general circulation" and the surface winds of each hemisphere are divided into three wind belts:

- **Polar Easterlies:** From 60-90 degrees latitude.
- **Prevailing Westerlies:** From 30-60 degrees latitude (aka Westerlies).
- **Tropical Easterlies:** From 0-30 degrees latitude (aka Trade Winds).



The easterly trade winds of both hemispheres converge at an area near the equator called the "Intertropical Convergence Zone (ITCZ)", producing a narrow band of clouds and thunderstorms that encircle portions of the globe.

Seasonal and Local winds

The monsoons are the most important among seasonal winds. In this system, the direction of the winds changes seasonally. They are experienced over parts of North America and much of South Asia, including the Indian subcontinent. These winds are primarily a result of differential heating of land and sea. In summer, southern Asia develops a low pressure and airflows landwards from the Indian Ocean. This is known as the summer monsoon. In winter, the pressure over land is higher than over the sea and consequently the air starts flowing from land to sea. This is called the winter monsoon. The modern theories consider theories the monsoon a result of the shift in the pressure and wind belts.

Measurement of wind speed

The speed or velocity of wind is expressed in meters per second, kilometers per second, kilometers per hour, and miles per hour or knots per hour.

$$1 \text{ m/sec} = 3.6 \text{ km/hr}$$

Wind speed is measured by Robinson's cup anemometer.

In modern method wind vane and anemometers are used for measuring the direction and wind speed respectively.