

# Vetrii's TNPSC Material Geography



## VETRII IAS STUDY CIRCLE

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# TNPSC GEOGRAPHY

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lapse rate. At times, the situation is reversed and the normal lapse rate is inverted. It is called inversion of temperature. Inversion is usually of short duration.

**A long winter night with clear skies and still air** is ideal situation of inversion. The heat of the day is radiated off during the nights and by early morning hours, the earth is cooler than the air above. Over polar areas, temperature inversion is normal throughout the year.

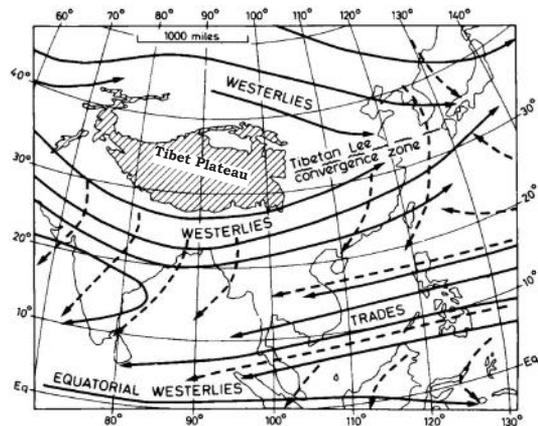
Surface inversion promotes stability in the lower layers of the atmosphere. Smoke and dust particles get collected beneath the inversion layer and spread horizontally to fill the lower strata of the atmosphere. Dense fogs in the mornings are common occurrences during the winter season. This lasts till the sun comes up and warms up the earth.

The inversion which takes place in hills and mountains is due to air drainage. Cold air at the hills and mountains, produced during night, flow under the influence of gravity. Being heavy and dense, the cold air moves down and piles up in the pockets and valley bottoms with warm air above. This is called **air drainage**. It protects plants from frost damages.

## 1.4 PRESSURE BELTS

Air pressure is defined as the pressure thrust by the weight of the air on the earth's surface. The average air pressure at the sea level is 1,013 millibars. The

horizontal distribution of the air pressure is highly influenced by the temperature of a given place. The atmospheric pressure is always inversely related to the atmospheric temperature. The high pressure belts are formed in the areas of low temperature.



### a) Equatorial Low Pressure Belt:

This belt lies between 5°N and 5°S. The sunrays are vertical over here throughout the year. Since temperature is high, the air become slighter and ascending. It causes low pressure conditions. This zone is otherwise called as “a belt of Calm” or “Doldrums”.

### b) Subtropical High Pressure Belt:

This zone lies between 25° and 35° latitudes in both the hemispheres. The ascended air from the tropics is getting cooled due to low temperature so the air descends at about 30°- 35° latitudes. In ancient times, the merchants carrying horses in their ships had to throw some of them

out while passing through this zone of the calm in order to lighten the ship. Hence, this zone is called “horse latitudes”.

- c) **Sub polar Low Pressure Belt:** This belt lies between 60°- 65° latitudes in both the hemispheres and the air spreads outward from this zone due to the rotation of the earth so the low pressure is produced.
- d) **Polar High Pressure Belt:** This pressure belt persists at the poles. The sunrays fall very slanting at the poles and as a result the temperature is low and heavy air accumulates and produces high pressure.

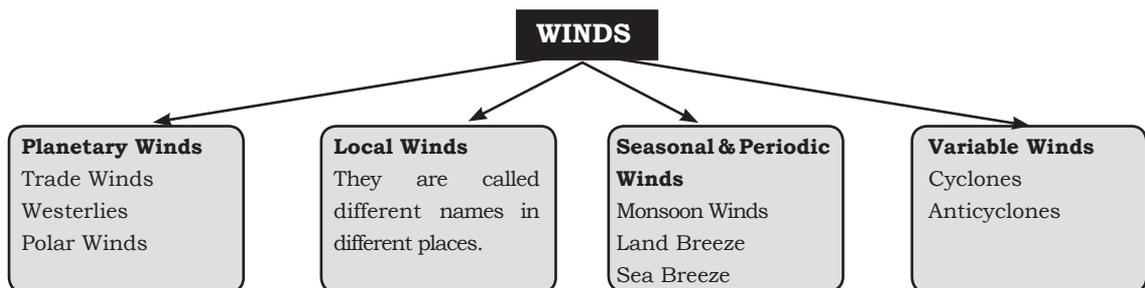
## 1.5 WINDS:

The air in horizontal motion is called wind. The air generally moves from high pressure area to the low pressure area. The speed of the wind is generally mentioned in kilometers or miles at land and in knots at sea.

The winds that blow from a particular direction throughout the year are known as the planetary winds. The pattern of the movement of the planetary winds is called the general circulation of the atmosphere. The general circulation of the atmosphere also sets in motion the ocean water circulation which influences the earth’s climate.

The pattern of planetary winds largely depends on:

- (i) Latitudinal variation of atmospheric heating;
- (ii) Emergence of pressure belts;
- (iii) The migration of belts following apparent path of the sun;
- (iv) The distribution of continents and oceans;
- (v) The rotation of earth.



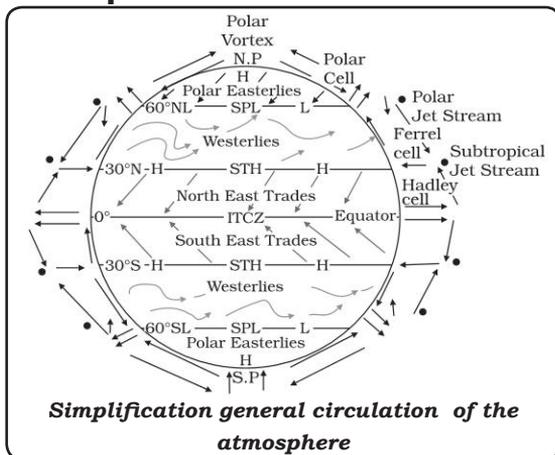
### 1.5.1 Planetary Winds:

#### Ferrel's law

- All moving bodies like wind and ocean currents get deflected from their normal paths towards right in the northern hemisphere and towards left in the southern hemisphere due to the rotation of the earth. (coriolis force)
- Coriolis force is zero in Equator.
- It is increasing from Equator to poles. So the rate of deflection also increases with the distance from the Equator.

The converged air rises along with the convective cell. It reaches the top of the troposphere up to an altitude of 14 km. and moves towards the poles. This causes accumulation of air at about 30 degree N and S. Part of the accumulated air sinks to the ground and forms a subtropical high. Another reason for sinking is the cooling of air when it reaches 30 degree N and S latitudes. Down below near the land surface the air flows towards the equator as the easterlies. The easterlies from either side of the equator converge in the Inter Tropical Convergence Zone (ITCZ). Such circulations from the surface upwards and vice-versa are called cells. Such a cell in the tropics is called *Hadley Cell*.

### General Circulation of the Atmosphere:



These three cells set the pattern for the general circulation of the atmosphere. The transfer of heat energy from lower latitudes to higher latitudes maintains the general circulation.

The air at the Inter Tropical Convergence Zone (ITCZ) rises because of convection caused by high insolation and a low pressure is created. The winds from the tropics converge at this low pressure zone.

In the middle latitudes the circulation is that of sinking cold air that comes from the poles and the rising warm air that blows from the subtropical high. At the surface these winds are called westerlies and the cell is known as the *Ferrel cell*.

At polar latitudes the cold dense air subsides near the poles and blows towards middle latitudes as the polar easterlies. This cell is called the *Polar cell*.