

Understanding Planetary Winds

Planetary winds play a very important role in the global climate. They help to distribute heat and moisture around the planet.

Planetary winds are one of the most important aspects of a planet's atmosphere. They play a major role in the transfer of heat and momentum from the sun to the planet, and from the planet to space.

Meaning of Planetary Winds

Planetary winds are the Winds that blow on different planets. The speed and direction of these winds depend upon various factors like atmospheric pressure, temperature gradients etc. Planetary winds play an important role in maintaining the equilibrium temperature on a planet.

Factors Affecting Planetary Winds

- Planetary Winds are affected by various factors like atmospheric pressure, temperature, Coriolis force, Planetary rotation etc. Let us discuss these factors one by one:
- Atmospheric pressure: The air pressure on a planet is not uniform. There are low-pressure belts and high-pressure belts on every planet. The air from high-pressure belts flows towards the low-pressure belts. This movement of air is called Planetary Winds.
- Temperature: The temperature difference between the equator and poles also affects Planetary Winds. The air near the equator is warm and the air near the poles is cold. The warm air rises and the cold air sinks. This causes Planetary Winds.
- Coriolis force: The Coriolis force is caused by the rotation of a planet. It deflects the Planetary Winds to the right in the northern hemisphere and to the left in the southern hemisphere.
- Planetary rotation: The Planetary Winds flow from west to east on all the planets except Venus. On Venus, the Planetary Winds flow from east to west. This is because Venus rotates in the opposite direction to all the other planets.
- Planetary Winds play a very important role in the climate of a planet. They help to distribute heat around the planet and they also help to transport gases and particles in the atmosphere. Planetary Winds are an important part of the global climate system.

Types of Planetary Winds

- In the planetary wind system, there are three main types of planetary winds - The Trade Winds, The Westerlies, and The Easterlies.
- The Trade Winds--- The sun's rays fall vertically on the equator which causes the air to heat up, and it rises upwards. Due to the low upward pressure, the rising air has room to expand, resulting in cold and dense air. Due to the warm air on the ground, the cold air could not go straight down. As a result, air travels north and south through the upper atmosphere. At altitudes up to 30° , some of this air comes down and blows towards the low-pressure belt on the equator. This part of the air is known as the trade winds. According to Ferrell's Law, trade winds blow from the northeast in the northern hemisphere and from the southeast in the southern hemisphere. They are called tropical easterlies as well.

Points to remember

- The trade winds blow in a belt that lies between 5°N to 30°N in the northern hemisphere and 5°S to 30°S in the southern hemisphere.
- It is known to all that the wind travels from high pressure to low pressure. There is low pressure on the equator and high pressure on the subtropics. Hence, the air moves towards the equator from the subtropics. Because the earth's rotation generates a Coriolis effect, the wind moves from the left side in the southern hemisphere to the right side in the northern hemisphere.
- The latitude of 30°- 35°N and 30°- 35°S are the areas where the air is descending and is characterised by calm and light variable winds. These winds are comparatively dry and the weather condition is quiet and stable. This latitude zone is called Horse latitude.

The Westerlies

Some of the air from latitude 30° blows toward the poles on the surface of the earth, reaches latitude 60° and is then exposed to the cold, dense air coming from the poles. In comparison, warm, light air from the tropics rises above the dense, cold polar air and blows partially towards the polar low-pressure belt; this wind is called westerly wind. It blows from the southwest in the northern hemisphere and from the northwest in the southern hemisphere. Due to the large land area in the Northern Hemisphere, there are some local changes in air movement. However, in the Southern Hemisphere, the largest area is covered with water, so you can move unimpeded by the westerly wind. Westerlies speeds reach their highest between 40° S and 50° S. This area is called the Roaring Forties and the movement of air is known as Brave Westwinds.

Points to remember

- The westerlies blow in the latitude belt of 30° - 60° N and 30° - 60° S.
- The air streams that flow towards the poles from the subtropical high-pressure areas deflect towards the east in the northern hemisphere to form south-westerlies.
- The air streams that flow towards the poles from the subtropical high-pressure areas deflect towards the east in the southern hemisphere to form north westerlies.
- Contrary to the trade winds, the westerlies are very much variable in both force and direction, especially in the northern hemisphere.
- In the southern hemisphere, the westerlies blow with great strength and are regular throughout the year over the ocean. In the southern hemisphere, between the latitude 40° - 50° S, the westerlies have got the name of Roaring Forties.
- These winds sometimes give a roaring sound because of their high speed.

The Easterlies or the Polar Easterlies

The polar easterlies are the dry, cold prevailing winds that blow from the high-pressure areas of the polar region and south poles towards low-pressure areas within the Westerlies at high latitudes. Cold air sinks to the poles, creating high pressures that allow the air to escape south (north of the Southern Hemisphere) toward the equator. They are very cold winds that do not cause rainfall. These prevailing winds then blow from east to west, as this outflow is diverted west by the Coriolis effect. The wind comes from the east, so it is called the easterlies. Unlike mid-latitude westerlies, polar easterlies are often weak and irregular.

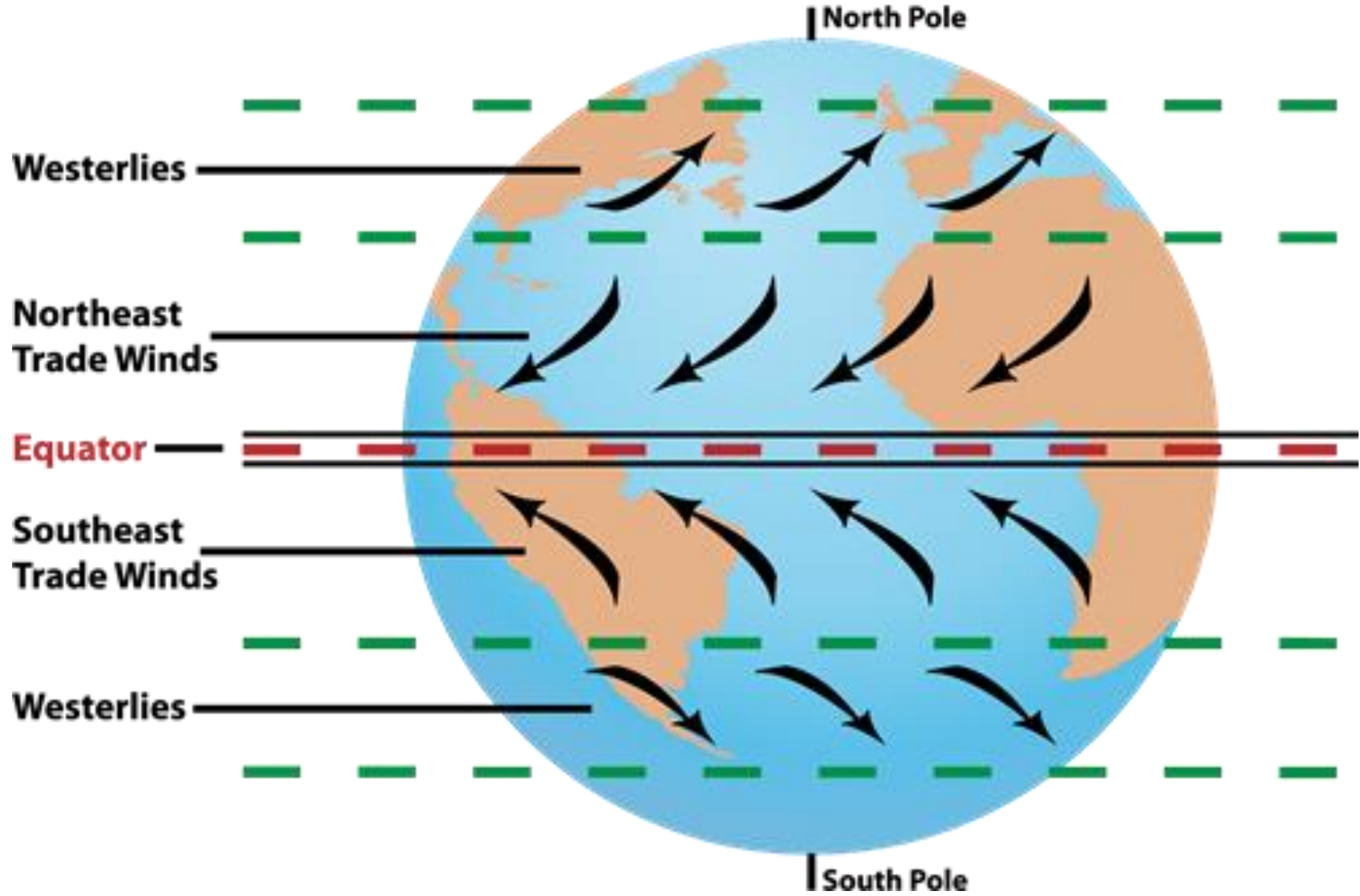
Points to remember

They blow from the Polar high-pressure area to the temperature low-pressure area. Towards the equator, they are deflected towards the west in the northern hemisphere to form north easterlies and in the southern hemisphere to form south easterlies.

Conclusion

The understanding of Wind and its type is an important aspect to doing social-sciences right. Conceptual clarity changes the learning procedure as well as a student's point of view on the subject matter.

Planetary Winds



Reference:-

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THANK YOU

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