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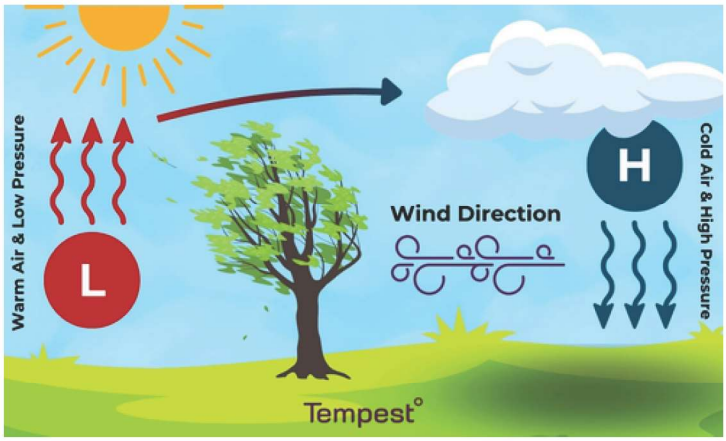
PARMAR GK BATCH 4.0

TOPIC - WINDS



Wind & Pressure Difference

- Wind blows due to differences in air pressure in the Earth's atmosphere often called as Pressure Gradient.
- Air moves from high pressure to low pressure.
- The sun heats the Earth unevenly, so some places get warmer than others.
- At the Equator, there is generally low air pressure due to the rising of warm and light air; while at the Poles, there is high air pressure because of the sinking of cold and dense air.

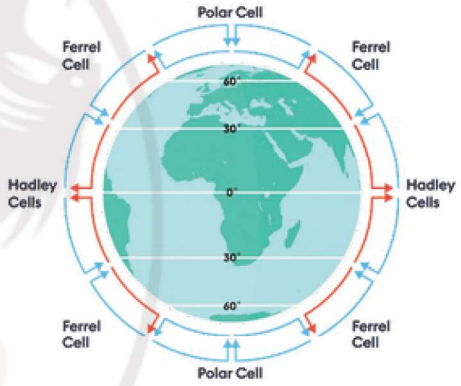


Types of Wind

1 Permanent Winds

Permanent winds, also known as planetary winds, are winds that blow consistently from the same direction throughout the year, moving air across large area of earth.
Three Division of Permanent Winds are : Trade Winds, Westerlies and Polar Easterlies.

- Trade winds are divided into Northern Easterlies and southern Easterlies



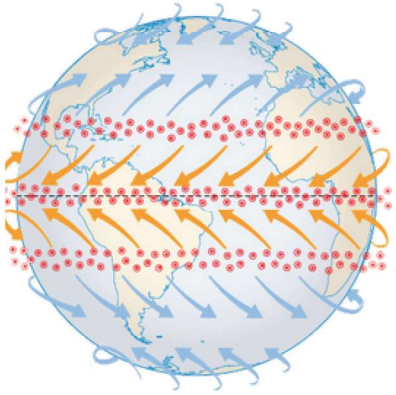
2 Local Winds

Local winds are winds that blow over short distances and are typically caused by local geographic features and temperature differences in specific areas.



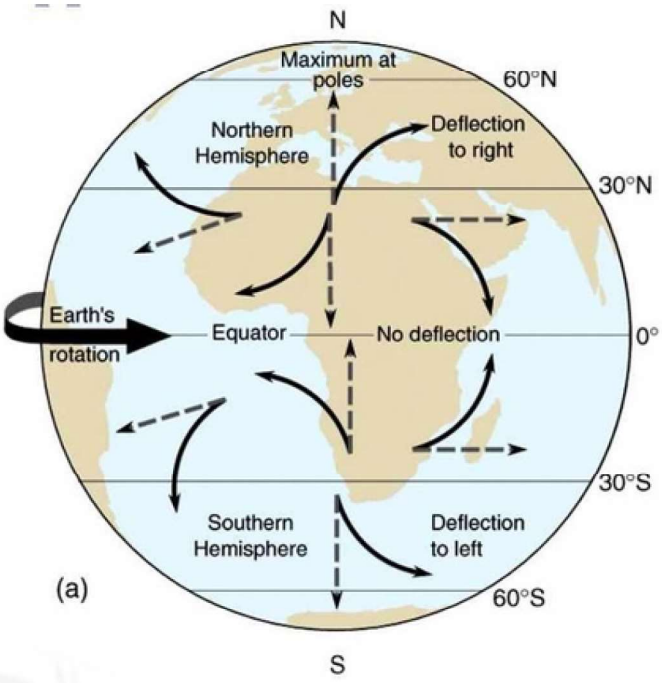
Easterlies & Westerlies

- A wind is named based on the direction from which it originates.
- If it originates from East and flows towards West, called Easterlies.
- If it originates from West and flows towards East, called Westerlies.



Coriolis Force

- Coriolis force is an apparent force that is caused due to rotation of Earth.
- The Coriolis force is responsible for deflecting winds towards the right in the Northern Hemisphere and towards the left in the Southern Hemisphere.
- Coriolis force is maximum at the Poles and zero at the Equator.
- The Coriolis force is directly dependent on the wind speed. The faster the wind moves, the stronger the Coriolis force becomes and greater is the wind deflection.



Trade Winds

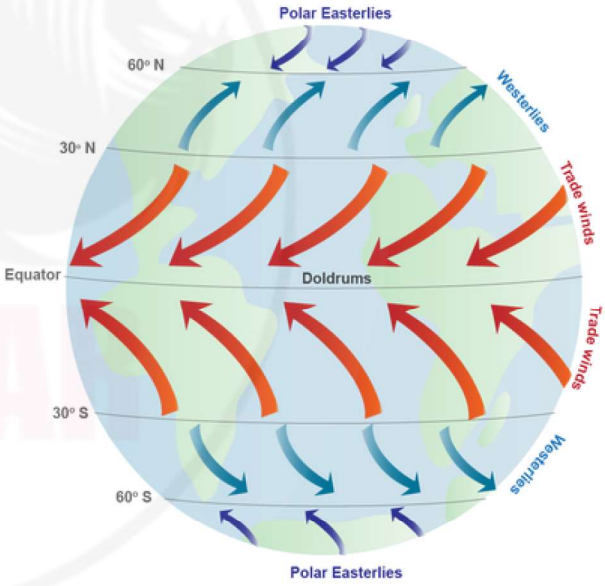
They are steady winds that blow from east to west near the Earth's equator.

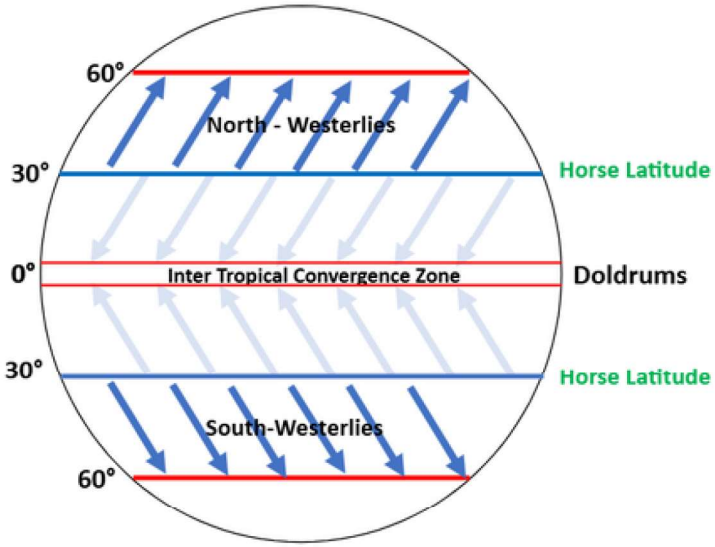
Location

- They are found between approximately 30° latitude (north and south) and the equator.
- They blow from northeast in the Northern Hemisphere and southeast in the Southern Hemisphere towards the equator.

Cause

- They are created due to Coriolis effect (rotation of the Earth) and the unequal heating of the Earth's surface.





Westerlies

Westerlies are winds that blow from west to east in the mid-latitudes.

Location

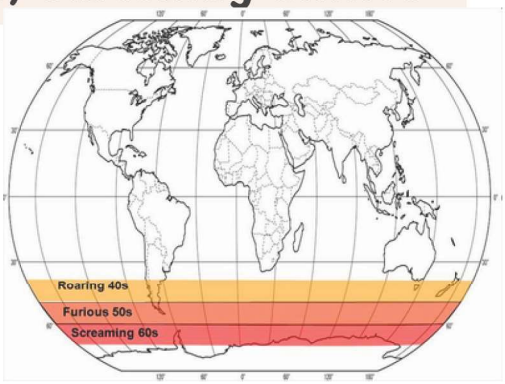
- They blow between 30° and 60° latitude (in both hemispheres).
- They come from the southwest in the Northern Hemisphere and the northwest in the Southern Hemisphere.

Cause

- The Coriolis effect causes these winds to deflect toward the east.

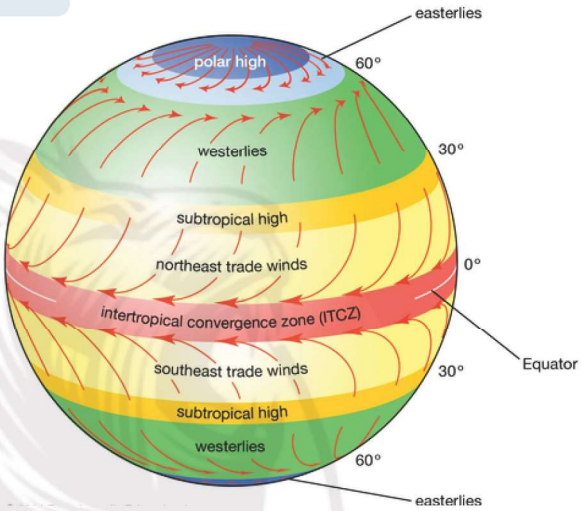
Roaring Forties, Furious Fifties, Shrieking Sixties

These are names given to strong Westerly winds in Southern Hemisphere that blow over the 40°S, 50°S, and 60°S latitudes. Reason for their high speed is less landmass in Southern Hemisphere.



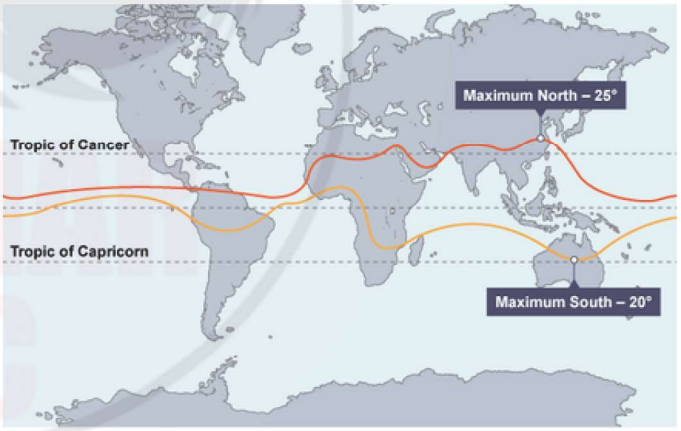
ITCZ (Intertropical Convergence Zone)

- The ITCZ forms where the northeast trade winds from the Northern Hemisphere meet the southeast trade winds from the Southern Hemisphere.
- It is typically found between the Tropic of Cancer and Tropic of Capricorn. In the month of July it is located at 20°N-25°N.



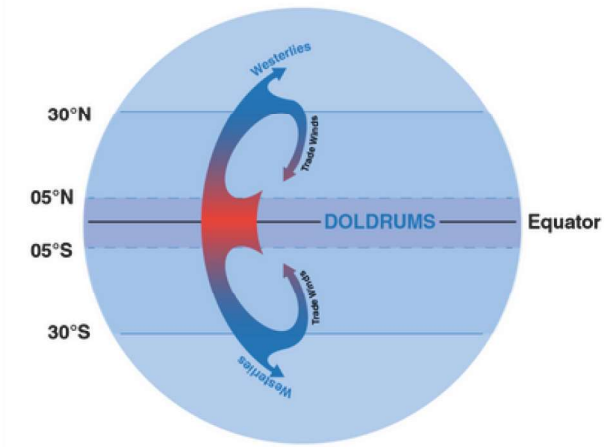
Movement of ITCZ

- The ITCZ moves seasonally, following the sun's position.
- In the Northern Hemisphere, it moves north in the summer and south in the winter.
- The ITCZ moves more north and south over land than over water because the ocean heats up more slowly as compared to land.

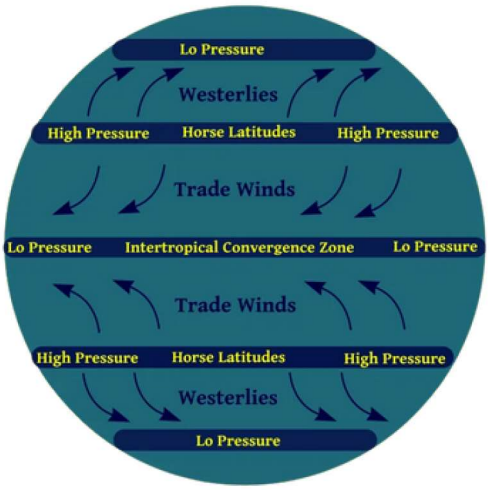


Doldrum

- The Doldrums is a low pressure area around the Equator where the prevailing winds are calm.
- They are found between 10°N and 10°S.
- The Doldrums overlap with the ITCZ region.



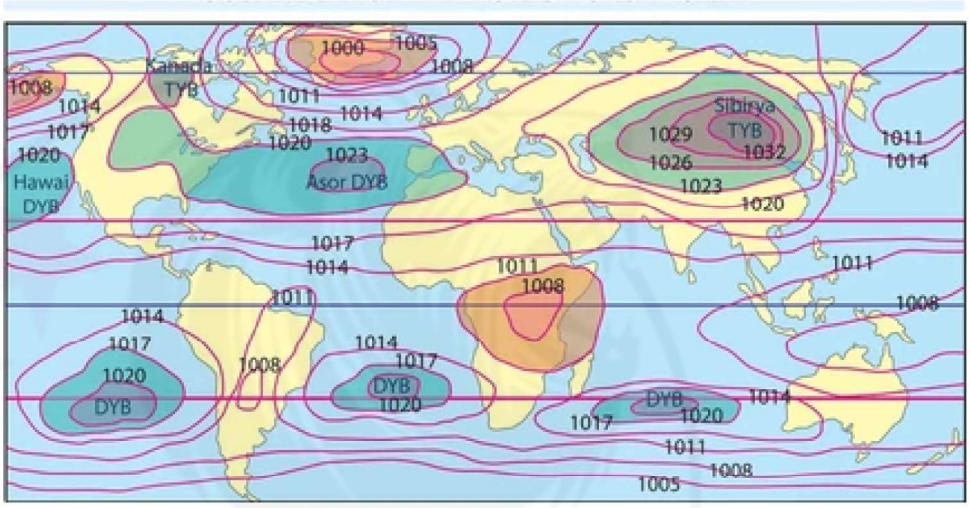
Horse Latitude



- Horse latitudes are regions located about 30°N and 30°S of the equator.
- It is an area of subtropical high.
- It is a high-pressure area at divergence of trade winds and westerlies.
- They are characterised by Sunny skies, calm winds, and a very little precipitation.

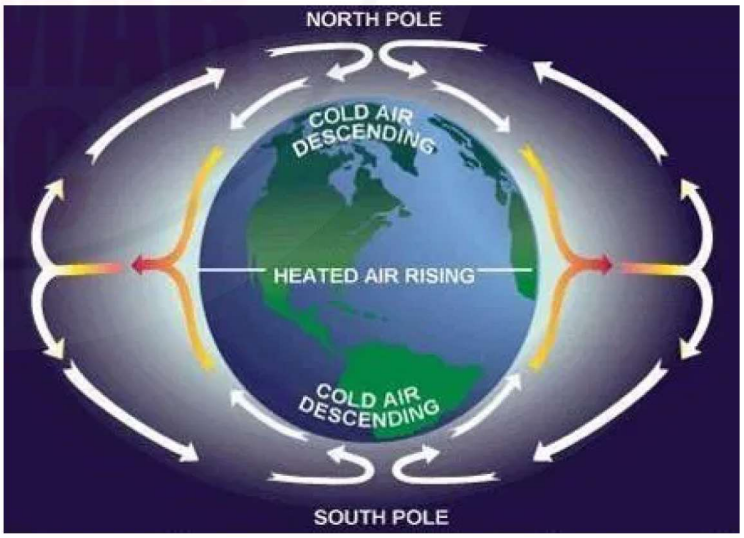
Isobars : Isobars are lines drawn on a weather map connecting points of equal atmospheric pressure.

Winds are blowing Perpendicular to Isobar and Parallel to Pressure Gradient Force.



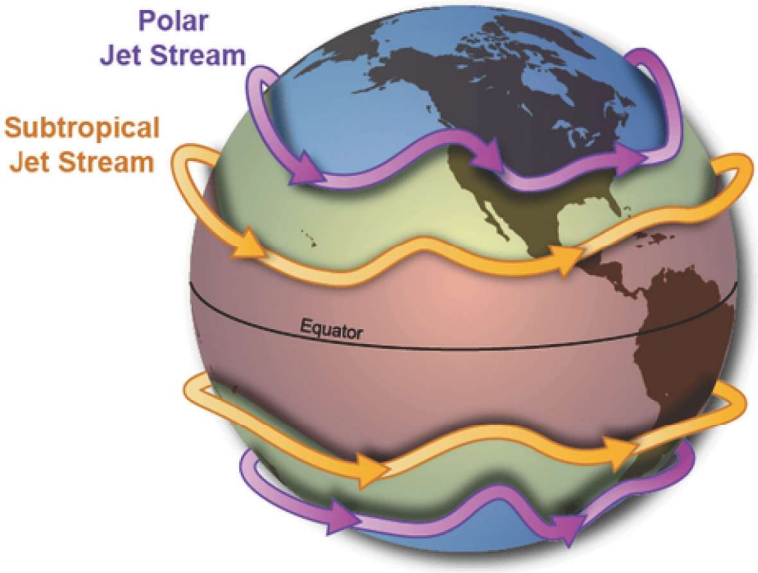
Geostrophic Wind

- Geostrophic wind is the wind that blows when two forces, the pressure difference and Earth's rotation, balance each other out.
- The wind moves parallel to isobars (isobars are lines on a weather map that connect areas with the same air pressure) or perpendicular to Pressure Gradient Force, without changing direction, usually higher up in the atmosphere where there's less friction.



Jet Stream

- A jet Stream is a narrow band of wind in the upper atmosphere, 30,000 feet (9,100 meters)
- Jet Stream shift north and South as they follow boundaries of hot and cold air.
- In Both Hemispheres, Jet streams blow west to east.



Land Breeze and Sea Breeze

Land Breeze and Sea Breeze are types of local winds that occur due to temperature difference between land and water.

Land Breeze



It occurs at night when land cools faster than sea, creating high-pressure over land and low pressure over the sea, causing air to move from land to sea; more common in autumn and winter.

- Specific Heat Capacity of Land is Less as compared to Sea.

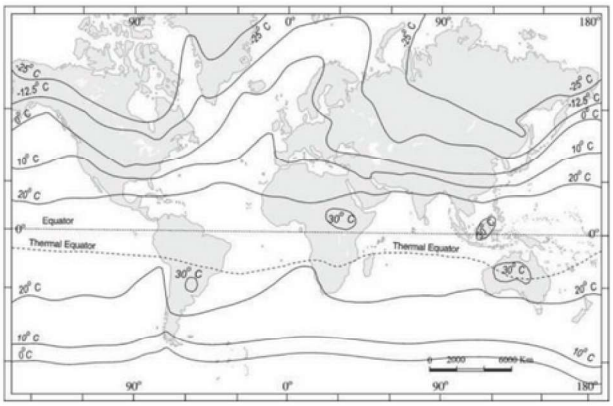


Sea Breeze

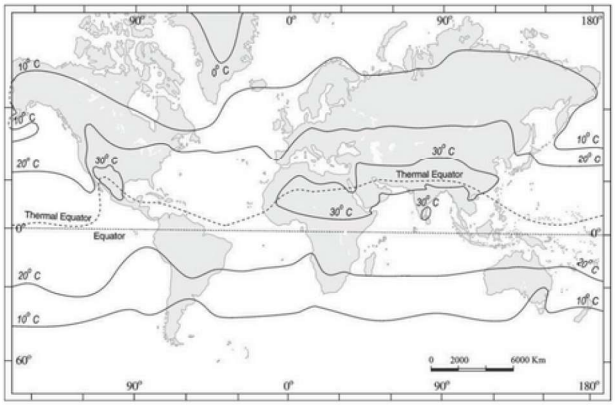
It occurs during the day when land heats up faster than the sea, creating low pressure over land and high-pressure over the sea, causing air to move from sea to land; more common in spring and summer.

- Specific Heat Capacity of Sea is More as compared to Land.

Distribution of Surface air Temperature



January



July

Local Winds



Local Winds (Hot)

Chinook

- Type: Hot, dry wind
- Blows in : The Rockies mountains
- Also Known as Snow Eater.

Sirocco

- Type: Hot, moist wind
- Blows in : Sahara to the Mediterranean Sea

Harmattan

- Type: Hot, dry wind
- Blows in : West Africa
- Also known as "Guinea Doctor"

Khamsin

- Type: Hot, dry wind
- Blows in : Egypt

Brickfielder

- Type: Hot, dry and Dusty wind
- Blows in : Australia

Foehn

- Type: Hot, dry wind
- Blows in : The Alps

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Local Winds (Cold)

Blizzard

- Type: Cold wind
- Blows in : Tundra region

Mistral

- Type: Cold Wind
- Blows in : The Alps and France

Bora

- Type: Cold, dry wind
- Blows in : Blows from Hungary to North Italy

Levanter

- Type: Cold WInd
- Blows in : Spain

Purga

- Type: Cold wind
- Blows in : Russia

Punas

- Type: Cold dry wind
- Blows in : The western side of Andes Mountain

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