
CHAPTER 4
CLIMATE
AJEET GEORGE

CLIMATE v/s WEATHER

CLIMATE

Sum total of weather conditions and variations over a large area for a long period of time.

- Weather condition more than thirty years.

WEATHER

State of the atmosphere over an area at any point of time.

-Day to Day phenomenon.

Elements that remain same:

- Temperature
- Atmospheric pressure
- Wind
- Humidity
- Precipitation

On the basis of the generalised monthly atmospheric conditions, the year is divided into seasons such as winter, summer or rainy seasons

INDIA --- Monsoon type of climate

- The word Monsoon is derived from the Arabic word 'Mausim' which literally means Season.

- Monsoon refers to the seasonal reversal in the wind direction during a year.

- Found in South and Southeast Asia.

-Despite an overall unity in the general pattern there are perceptible regional variation in climatic conditions.

Variation happens in

RAINFALL and TEMPRATURE

INDIA --- Monsoon type of climate

Summer in Kashmir and Rajasthan

Example: In summer, temperature at some parts of Rajasthan reaches up to 50 Degree C, whereas it remains around 20 Deg C in Pahalgam inKashmir.

Similarly, during winter nights, temperature at Drass in Kashmir may be as low as -45 Deg C. On the other hand, Thiruvananthapuram may have temperature of 22 Deg C.

INDIA --- Monsoon type of climate

Similarly, there are variations in the form and type of precipitation.

- Snowfall in the upper parts Of Himalayas.
- 400 cm in Meghalaya's.
- Less than 10 cm in Ladakh and western Rajasthan.
- Rainfall from June to September and on the other hand, 50 m parts receives rainfall during October and November. [Tamil Nadu]

- Variation in Seasonal impact between Coastal areas and Interior of thy
- Decrease in rainfall generally is East to West in the Northern plains.

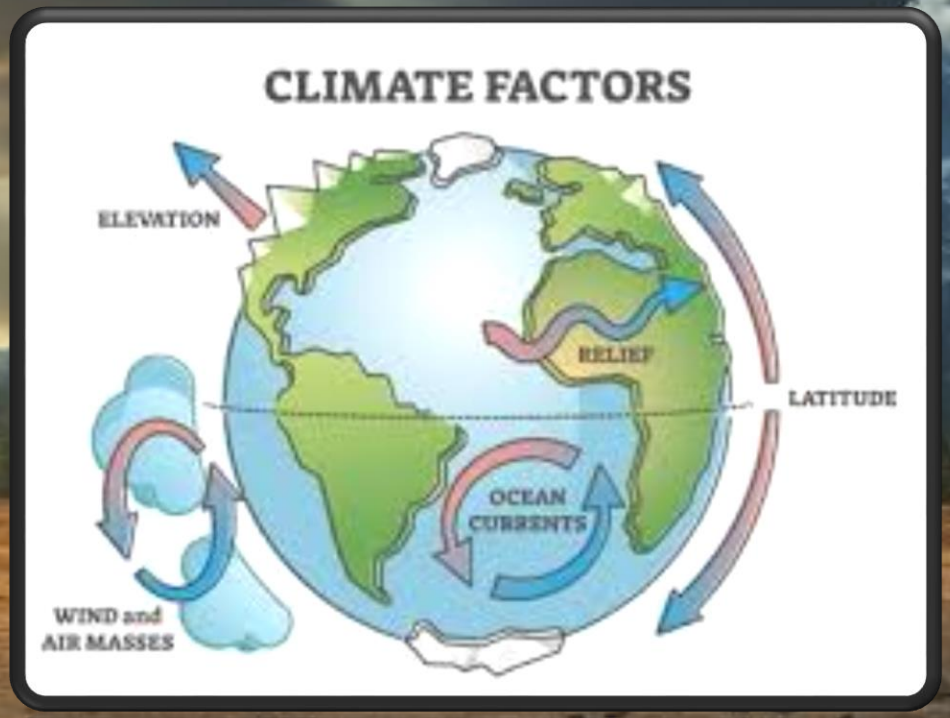
These variations have given rise to variety in lives of people, •

CLIMATE CONTROLS

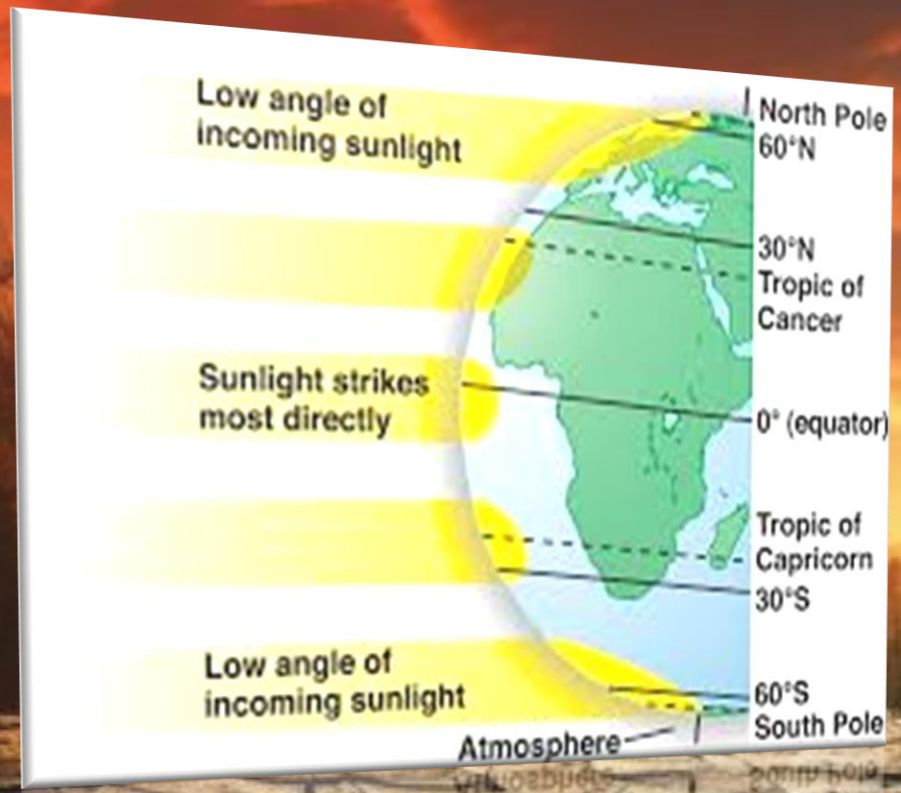
There are six major controls of the climate of any place.

- Latitude
- Altitude
- Pressure and Wind system
- Distance from the sea
- Ocean currents
- Relief features

Let us discuss how latitude controls the climate of any region.



CLIMATE CONTROLS- Latitude



What role does the Latitude play in this case?

How does this controls the climate? •

Due to the curvature of the earth, the amount of

solar energy received varies according to latitude.

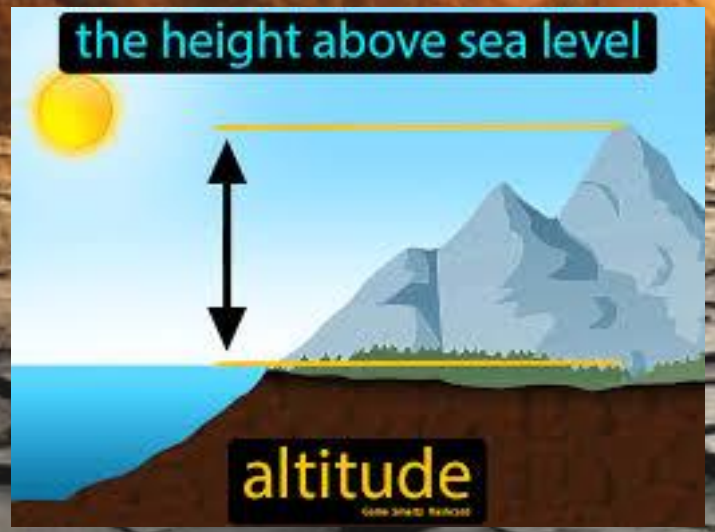
Lower latitudes = More solar rays

Higher latitudes = Less solar rays

Temperature at equator = High

Temperature at Poles = Low

CLIMATE CONTROLS- Altitude



What is Altitude?

- **Altitude is a distance measurement in vertical or up direction.**
- **No connections with Altitude and Longitude.**

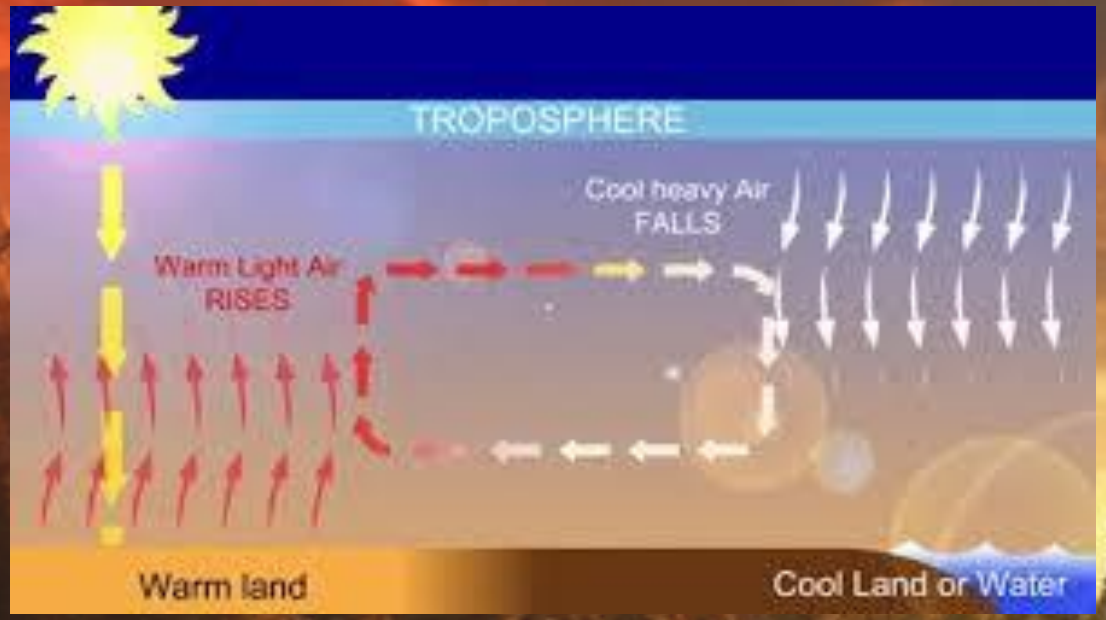
As we goes up from the surface of the earth to higher altitude, the atmosphere became less dense and temperature decreases. - Explain

- Observe the climate at hill station.

- Climate condition of places at the same latitude of Himalayas.

The climate conditions at higher altitude varies from that of lower altitude.

CLIMATE CONTROLS- Pressure and Wind



The pressure and wind system of any area depends on the latitude and altitude of the place.

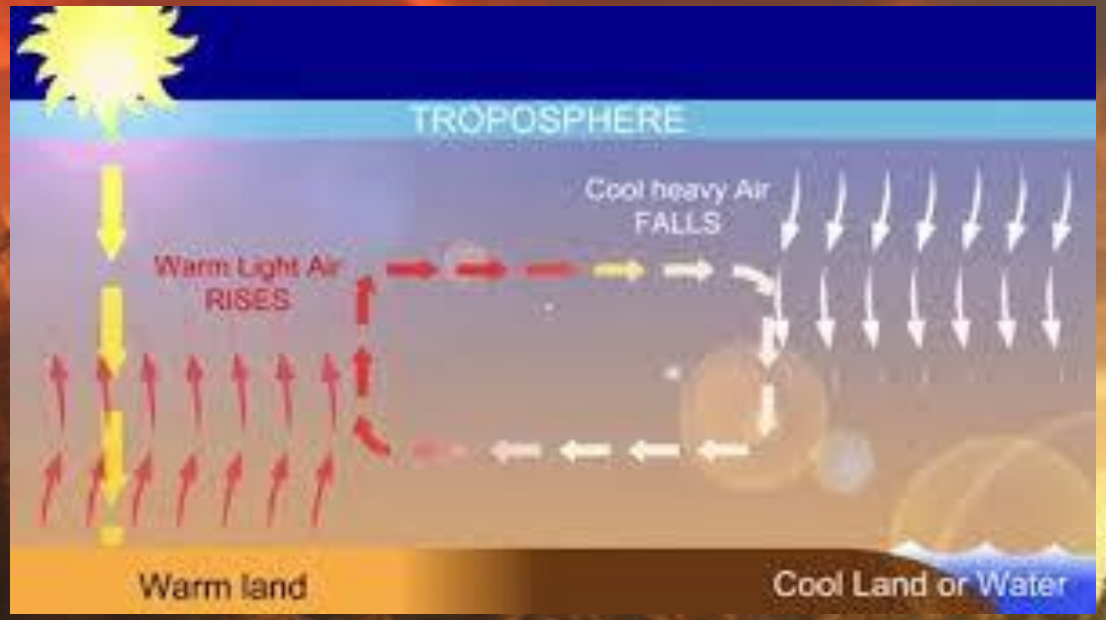
Low pressure and High pressure depends upon latitude [Sun rays]

- ***On Surface, winds move from high pressure to iow pressure.***

Low Pressure = ↑ air masses rises up ↑

High Pressure = ↓ air masses settle down ↓

CLIMATE CONTROLS- Pressure and Wind



The Low pressure and High pressure defines the direction of the wind.

E.g In India, during summer wind blows from South-West to North-East.

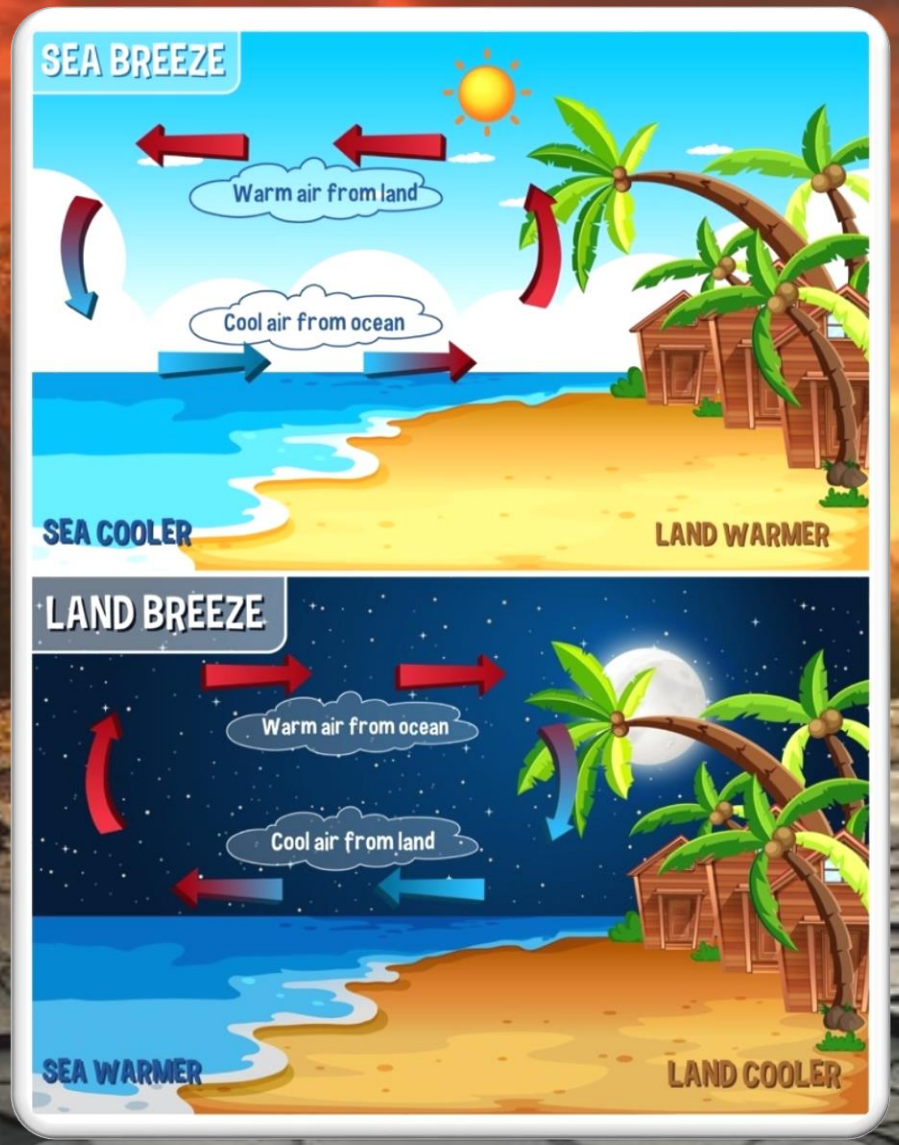
Carries moisture Causes Rainfall — Climate is influenced

Thus, Pressure and wind influences the temperature and rainfall Patte'

Low Pressure = ↑ air masses rises up ↑

High Pressure = ↓ air masses settle down ↓

CLIMATE CONTROLS- Distance from the Sea



We can say that sea exerts a moderating influence on climate.

- Coastal areas have moderate climate as compared to the interior land.

E.g Mumbai and Delhi

- As the distance from the sea increases, its moderating influence decreases and the people experience extreme weather conditions.

CLIMATE CONTROLS- Ocean Currents

What are Ocean Currents?

An ocean current is the continuous movement of ocean water in a pattern, the pattern may change also.

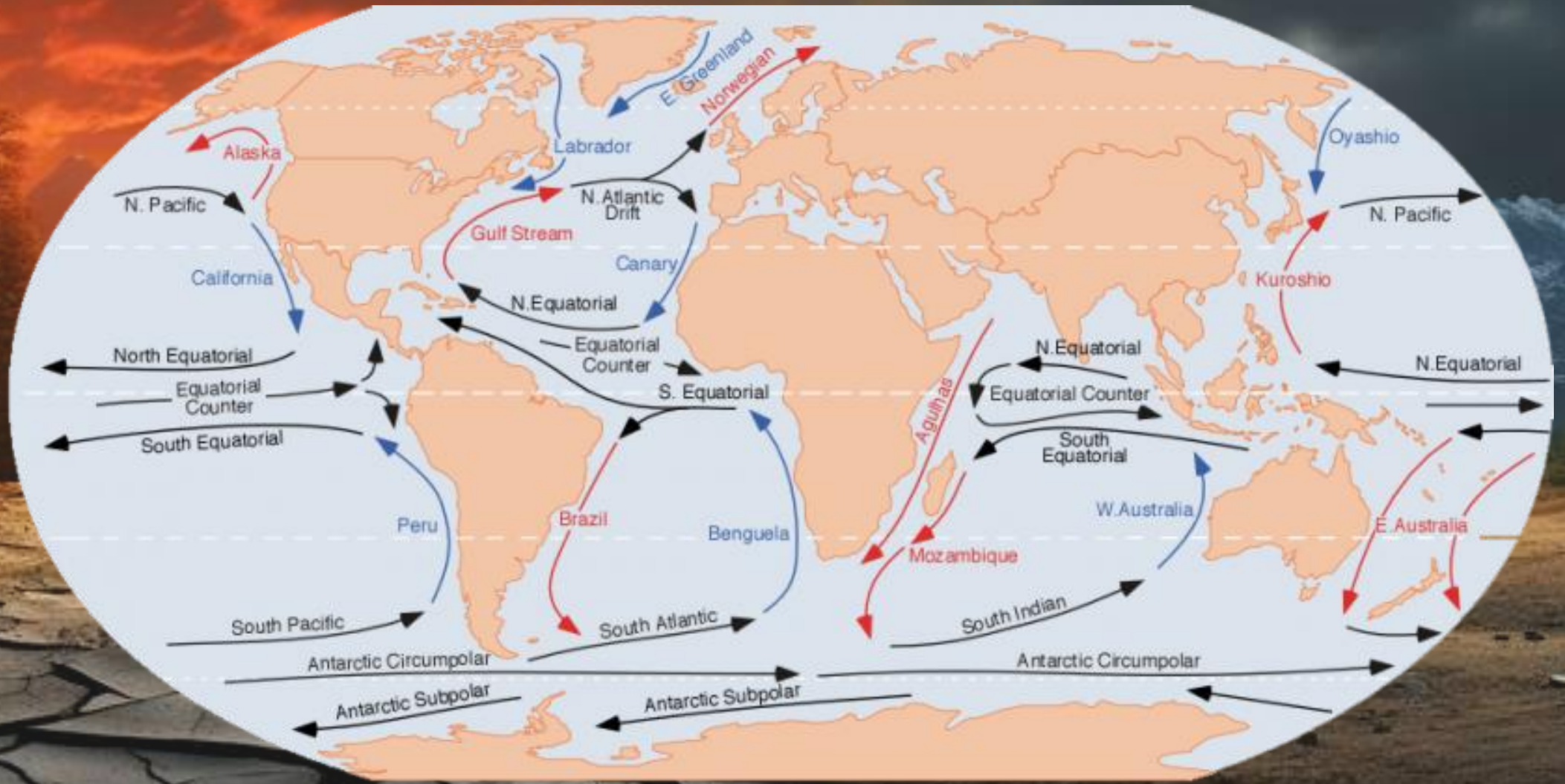
This massive movement of water is influence by a variety of different forces such as wind, waves, rotation of earth and slopes etc.

- These ocean currents are either cold or hot.

- Ocean currents along with onshore winds affect the climate Of the coastal area.

E.g. Western margins of continents in the subtropics have deserts.

CLIMATE CONTROLS- Ocean Currents



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CLIMATE CONTROLS- Relief

What are Relief?

Relief too plays a major role in determining the climate of a place.

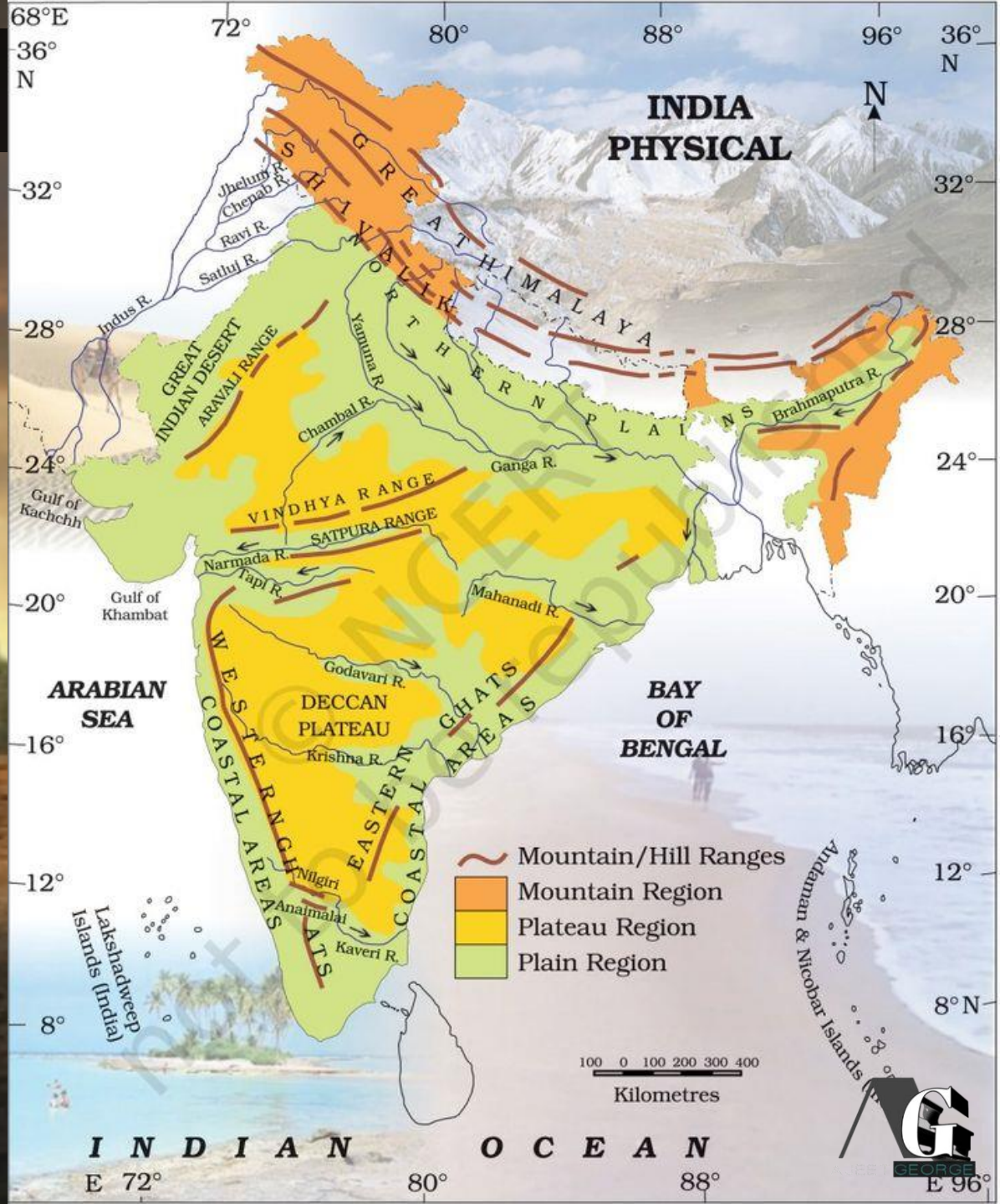
Physical features controls the climate of an area

Example:

- High Mountains act as barriers for cold or hot winds.

- Windward side cause precipitation.

- Leeward side of mountains remains relatively dry.

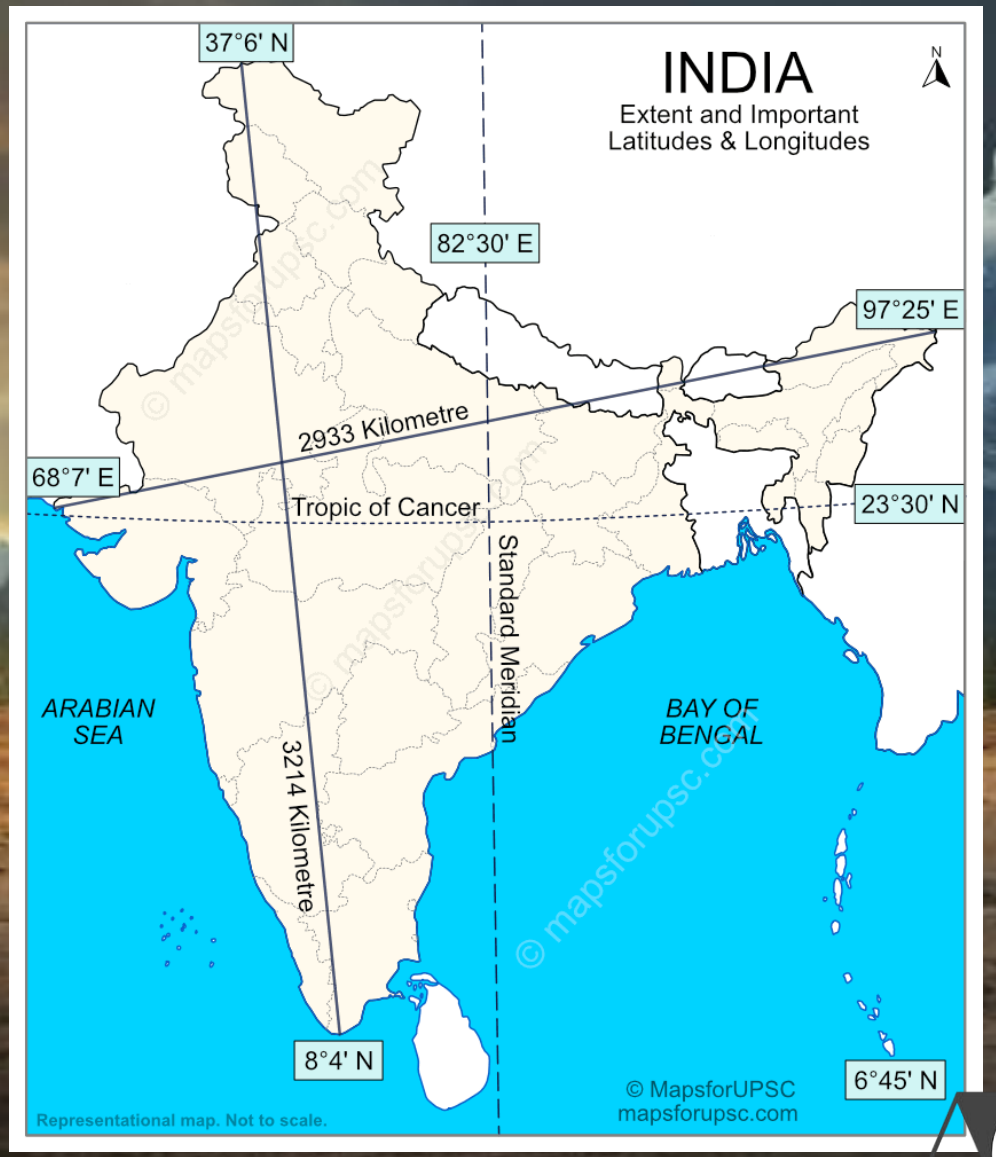


Factors affecting India's Climate: Latitude

- India's climate depends on its latitudinal extent.
- Tropic of cancer divides country into almost two halfs

1. Part lying South of tropic of Cancer.
   - Tropical Climate

2. Tropical Climate lying North to tropic of Cancer.
   - Sub tropical Climate



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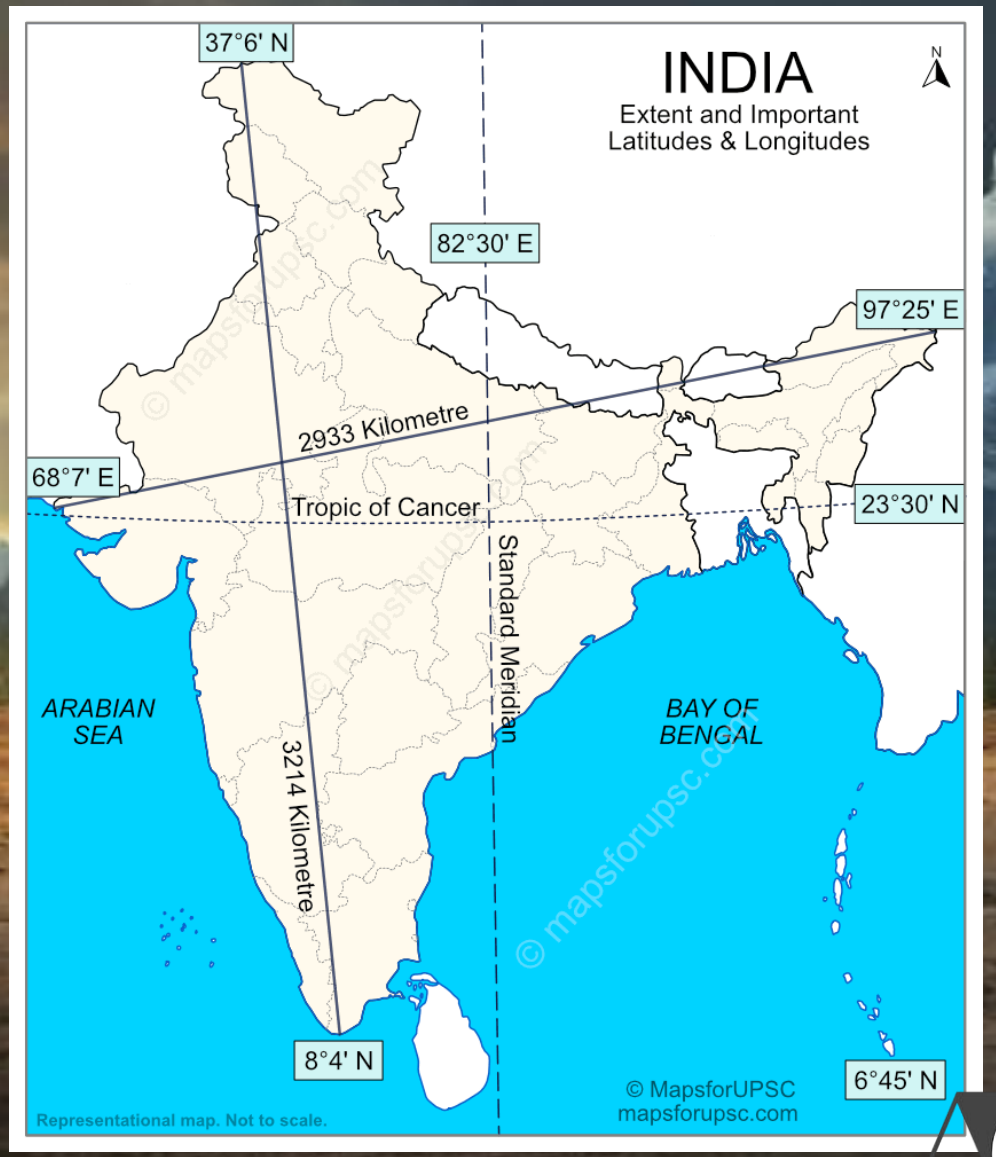

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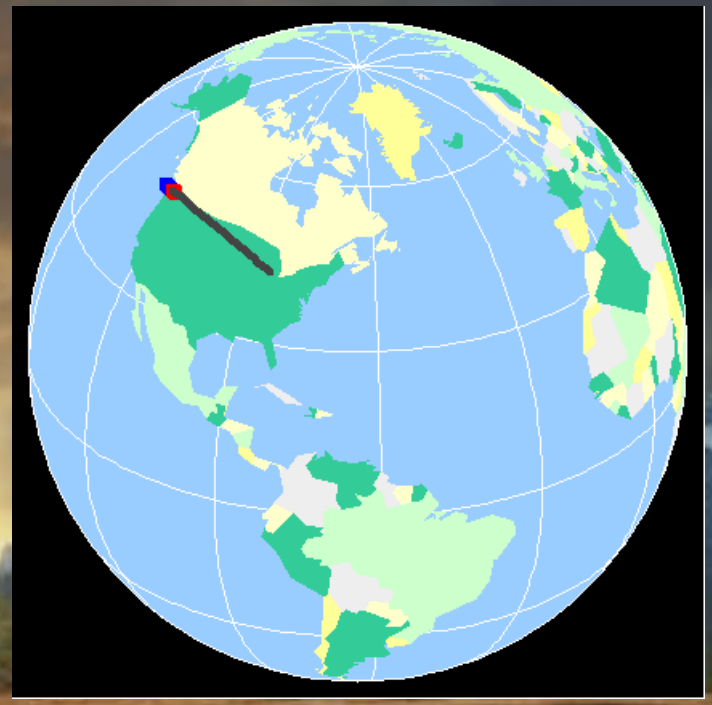
CORIOLIS FORCE

It is a force responsible for deflection of winds towards the right in the Northern hemisphere and towards and towards the left in the Southern hemisphere due to the difference in the linear velocity of earth's rotation and its atmosphere.



Inter Tropical Convergence Zone (ITCZ).

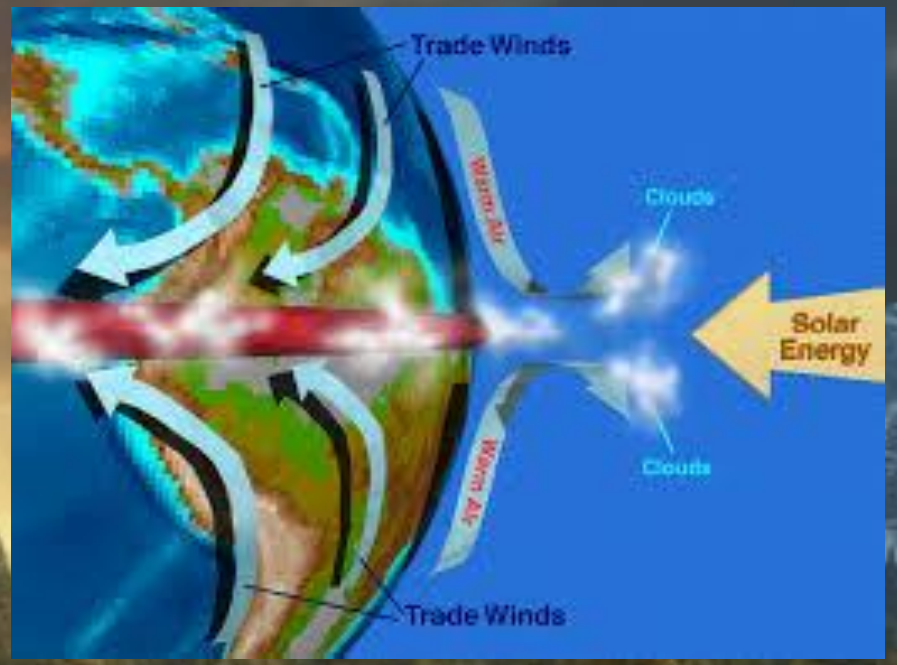
b. The shift of the position of Inter Tropical Convergence Zone (ITCZ).

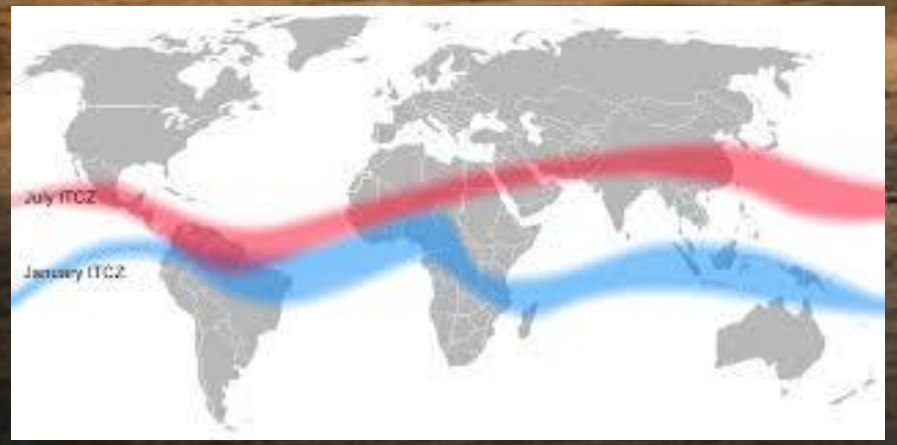
Inter Tropical Convergence Zone

- **The Inter Tropical Convergence Zone (ITCZ) is a broad trough of low pressure.**

This through (Belt) is formed due to convergence of Northeast and Southeast trade winds.

The ITCZ belt's normal position is a equatorial latitude but it moves North or South with the apparent movement of the sun.





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The Seasons

The Monsoon type of climate ---is characterised by a distinct seasonal pattern.

- **The weather condition generally change from one season to other.**
- **Mostly observed in the Interior part, the coastal areas do not experience much variations.**
- **On the basis of this, four main seasons can be identified in India.**

The Cold weather season [Winter]

The Hot weather season [Summer]

The Advancing monsoon season (Rainy)

The Retreating Monsoon Season (Transition)

The Seasons: The Cold Weather System (Winter)

- Begins from Mid-November, stays till February. [December-January are the coldest]

- Temperature decreases from South to the North.

- Northeast winds prevail over the country.

    - Dry season [Some amount of Rainfall Occurs on the Tamil Nadu Coast]

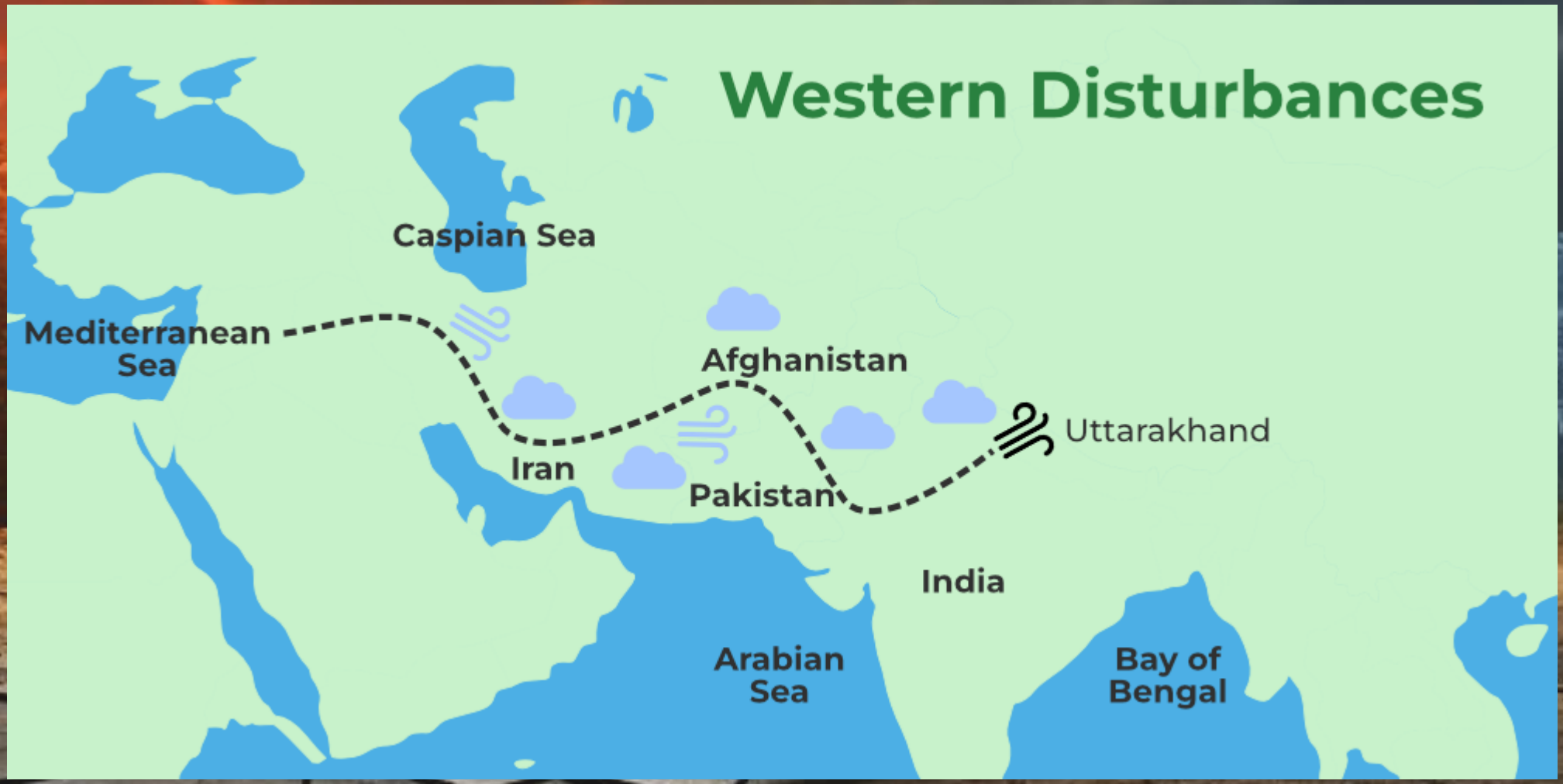
- Due to low pressure, winds blows from the surface [Interior land] —

Normally clear sky temperature and low humidity and feeble variable winds are the characteristic of this weather.

- Impact of Western Cyclonic disturbances? —Winter Rainfall [Mahawat] Useful for Rabi crops

- Impact on Peninsular Region?

The Seasons: The Cold Weather System (Winter)



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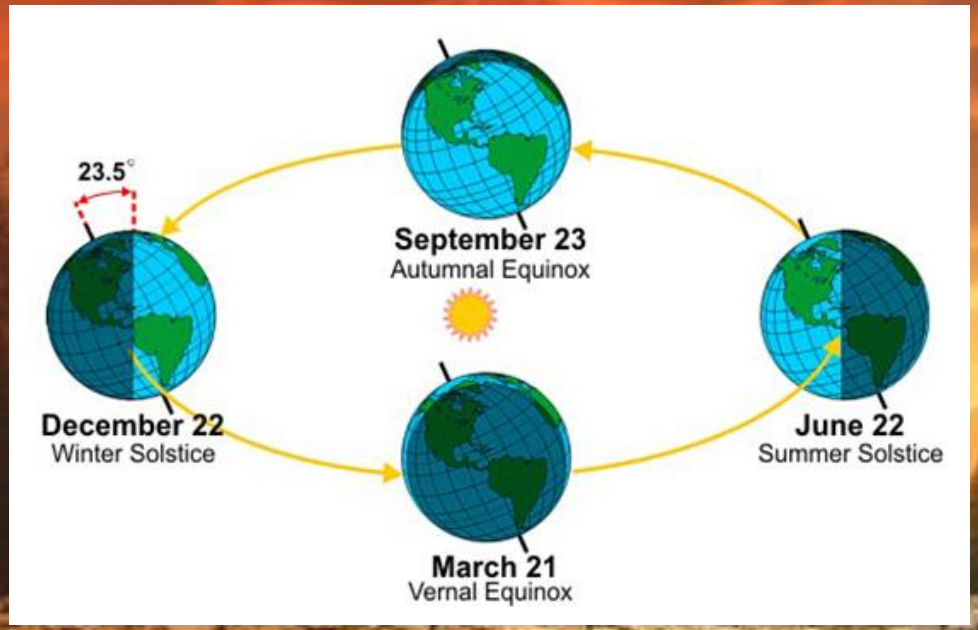
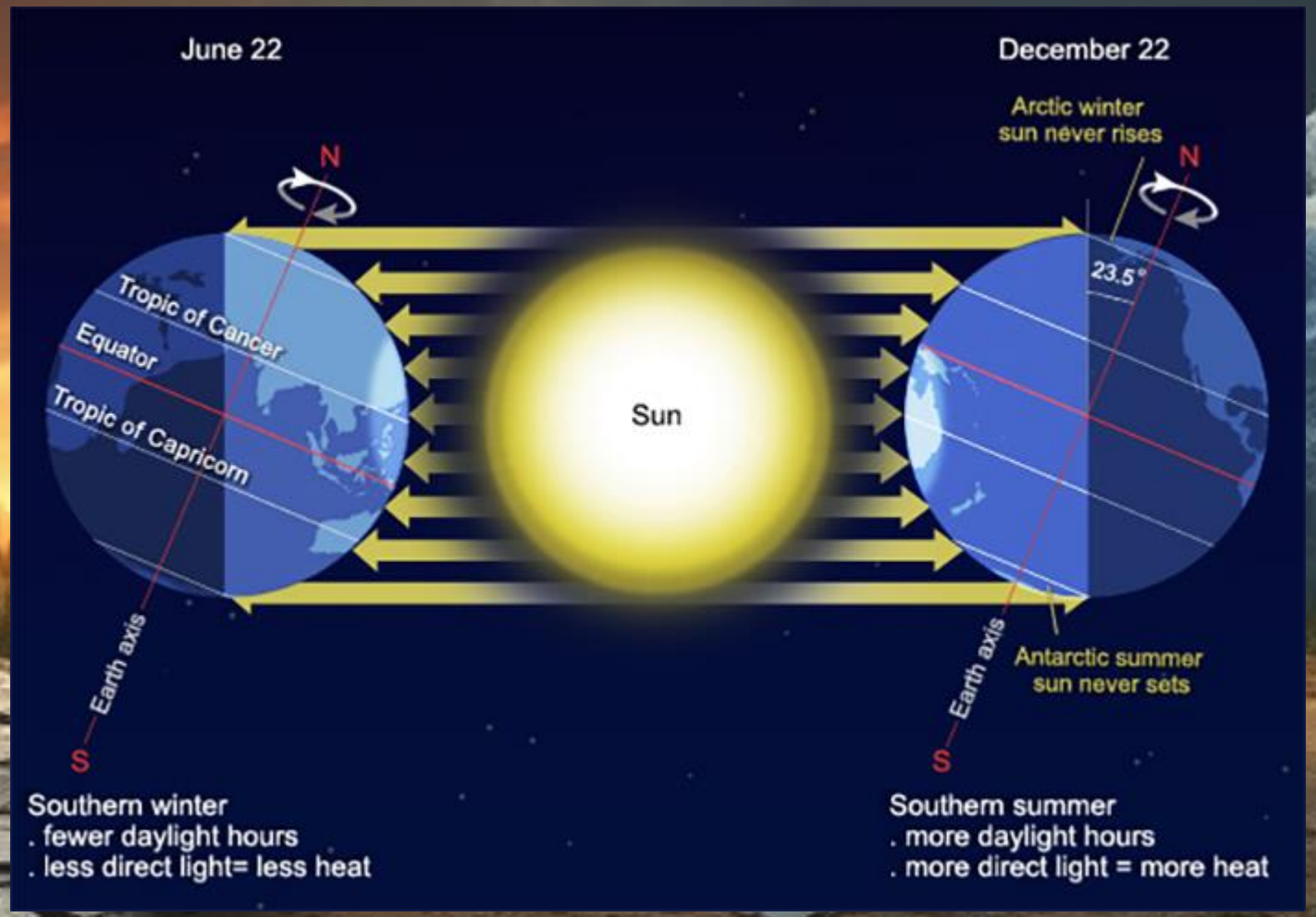




The Seasons: The Hot Weather System (Summer)

It begins from March to May. why?

- Due to the Northward movement of the Sun.

Northward shift of Pressure belt

Characteristic of the Hot weather Season -

- Increase in the temperature over the time. [exception Peninsular region]
- Formation of low pressure over the Indian land mass. [Mainly Ganga plain]
- Loo - These are strong, gusty, hot, dry winds blowing during the day over the North and North Western India.

Direct exposure tot ese win s may even prove to be fatal.

The Seasons: The Hot Weather System (Summer)

- Dust storms are very common in northern India during this time.
- At times, these storms bring temporary relief. Why?

  Lower the temperature and brings light Rain and cool breeze.

- During the end to this season, thunderstorms, violent winds, torrential downpours, often accompanied by hail are observed.
- Known as **Kalbaisakhi** in West Bengal.
- Pre Monsoon showers known as 'Mango shower.

The Seasons: Advancing Monsoon [The Rainy Season]

It begins by June ---- Bringing rainfall for the whole country.

Characteristics of Advancing Monsoon

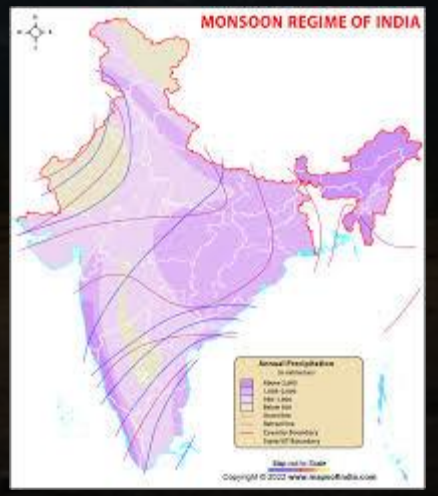
- Southwest winds, flowing with an average velocity of 30 km per hour.

Brings a total change in the weather &

Rainfall

Amount of Rainfall received may vary from region to region.

- Monsoon have a 'break' in rainfall
- Impact of the uncertainties of Monsoon



The Seasons: Retreating/ Post monsoon [The Transition Season]

- Beings October-November with the apparent movement of the sun towards the south.

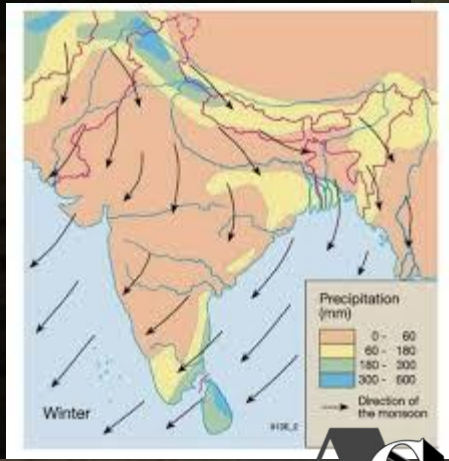
- Gradually replacement of low pressure with high pressure and the monsoon winds also withdraws from the country.

Period of transition---- [Hot Rainy Season to Dry Winter Conditions]

- Phenomenon of **October heat**

  Due to the condition of High temperature and humidity the oppressive weather is felt during October.

- This shift in the pressure condition is associated with the occurrence of Cyclones. ----------along with destructions



Do You Know?

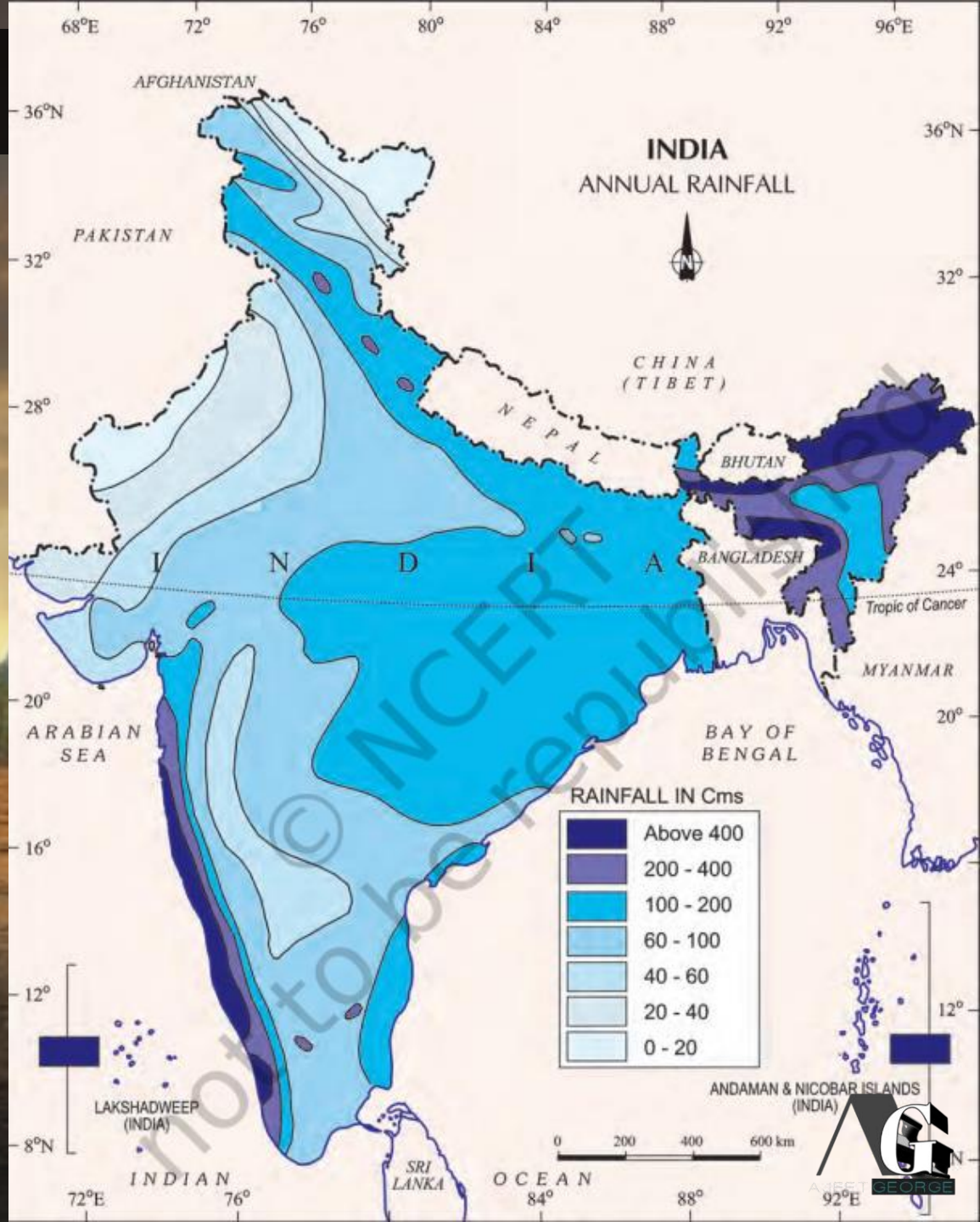
Mawsynram, the wettest place on the earth is also reputed for its stalagmite and stalactite caves.

Distribution of Rainfall

The Rainfall over India is unevenly distributed.

- Western coast and Northeastern parts receive over about 400 cm rainfall.
- Where as the parts of Western Rajasthan and adjoining areas receives less than 60 cm of rainfall.
- The rainfall is equally low in the interior part of the Deccan plateau.
- Similarly, the part of Ladakh also receives less rainfall.
- Rest part of the country receives moderate rainfall, snowfall is restricted to the Himalayan region.

Along with the uneven distribution, the annual rainfall is also highly variable.



Monsoon as a Unifying Bond

- Physical features -----helps in the Monsoonal type of Climate -----Leads to rhythmic cycle of season

Monsoon ------

- Entire phenomenon such as landscapes, animal and plant life revolves around the monsoon.
- Whole agriculture calendar depends on monsoon.
- The life of the people including their festival revolves around the monsoon.
- Whole country eagerly await for the arrival of the monsoon.
- It provides water to river and ponds which unites the whole nation.