

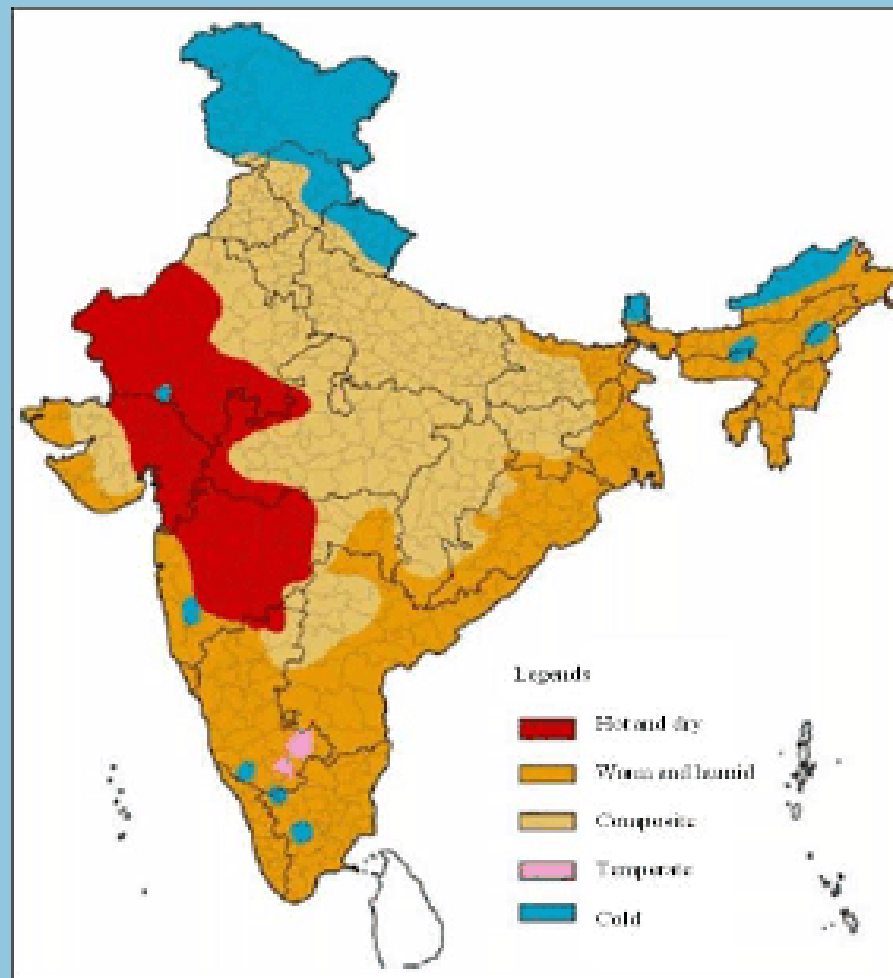
# THE INDIAN CLIMATE

Presented by  
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# WHAT IS CLIMATE?

It is sum total of weather conditions and variations over a large number of a long period of time (more than 30 years).

**EXAMPLE:** How is the weather of the hill station? Goa is good for a vacation on period of winter.



# WHAT IS WEATHER?

On simple term weather is momentary.

It refers to the state of the atmosphere over an area at any point of time.

**EXAMPLE:** What is the weather of today? Did it rain last night or is it going to be warm tomorrow?



# HOW IS CLIMATE DIFFER FROM WEATHER

CLIMATE	WEATHER
It is sum total of weather conditions and variations over a large number of a long period of time (more than 30 years).	the state of the atmosphere over an area at any point of time.
Climate is fixed	It is variable time to time, day to day.
Covered over a large area.	Relatively less covered area.

## Weather



can change within a few minutes or hours!



## Climate



takes very long time to change!

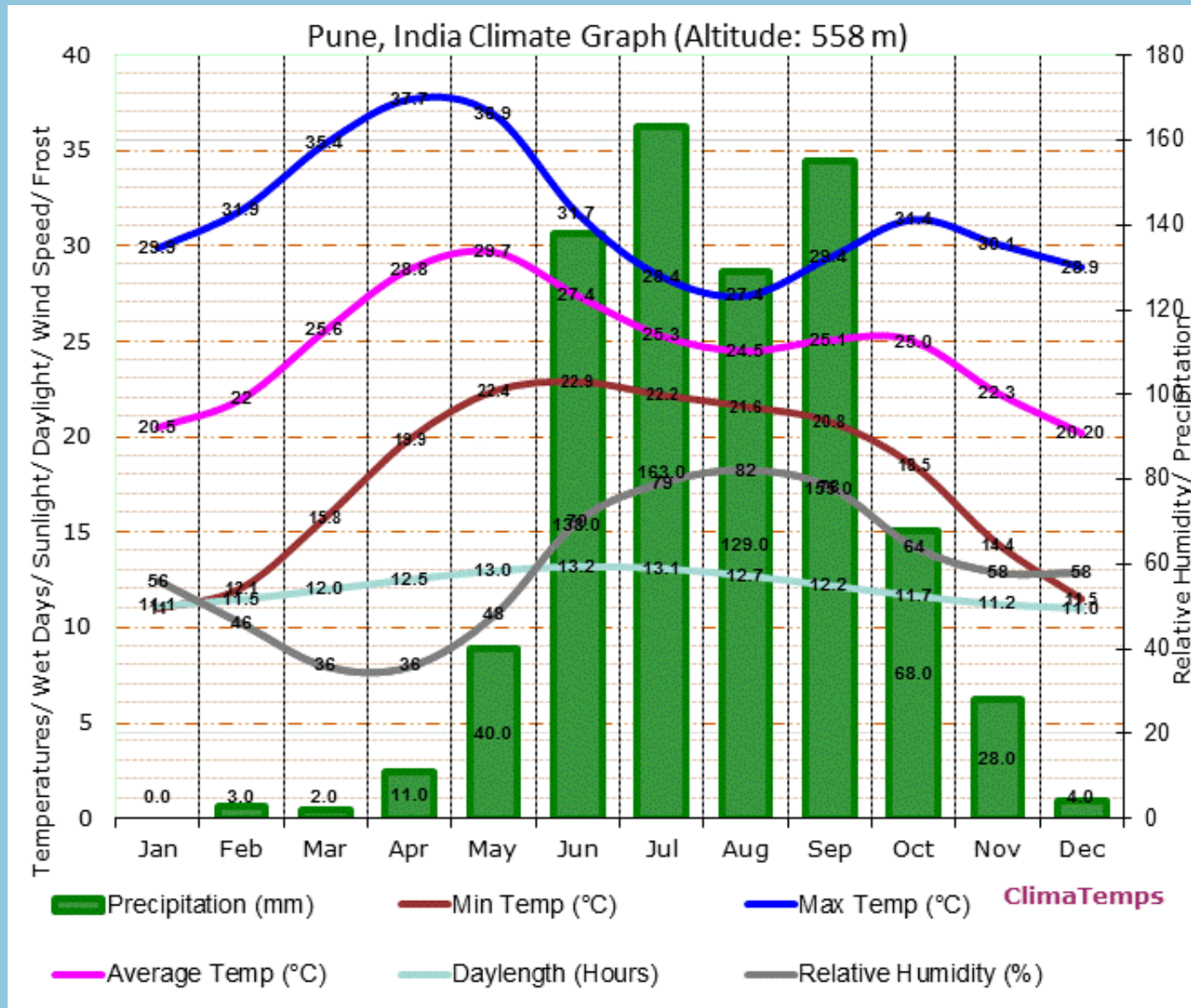


# ELEMENT OF WEATHER/CLIMATE

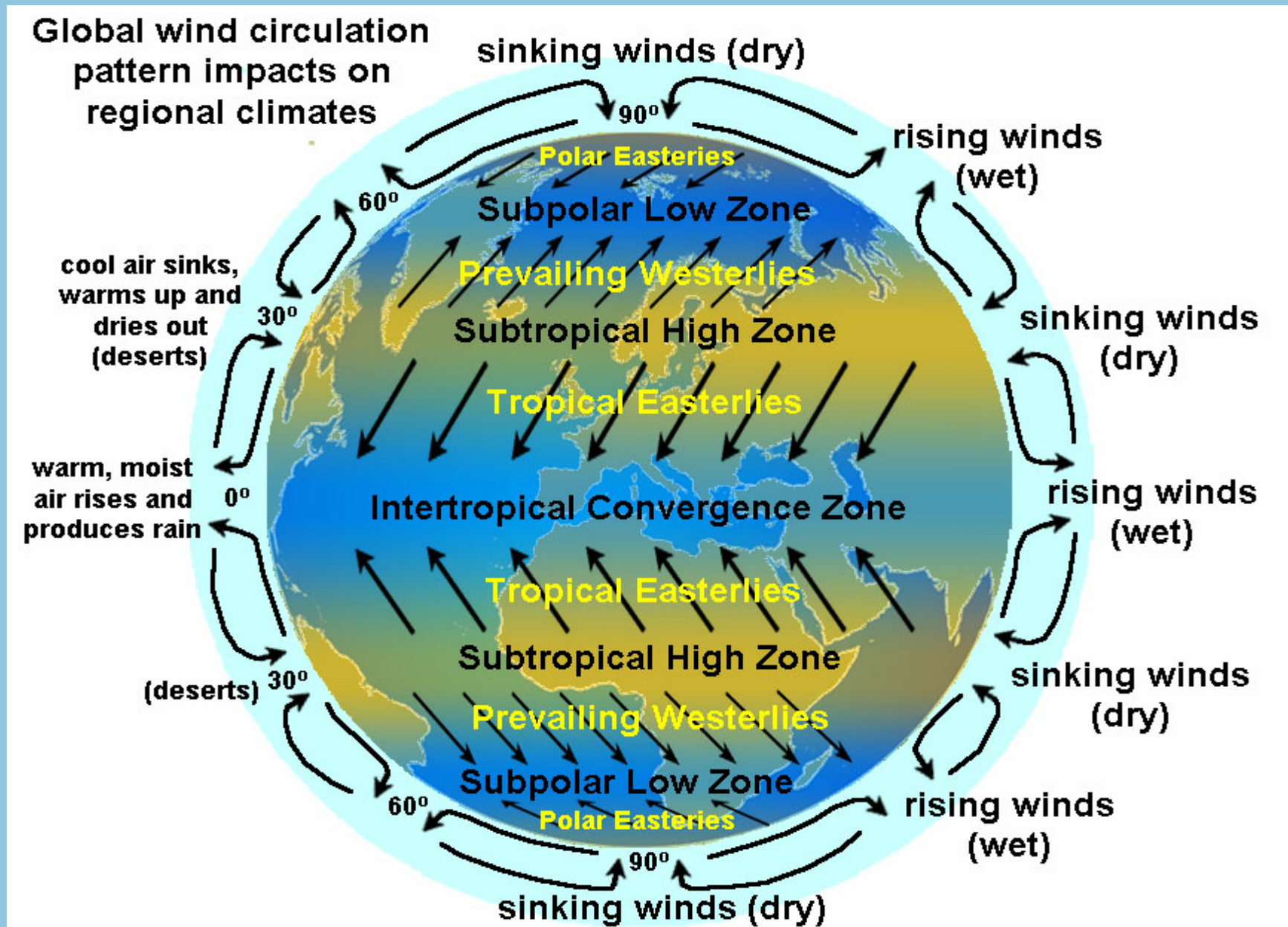
The elements of weather as well as climate are same.

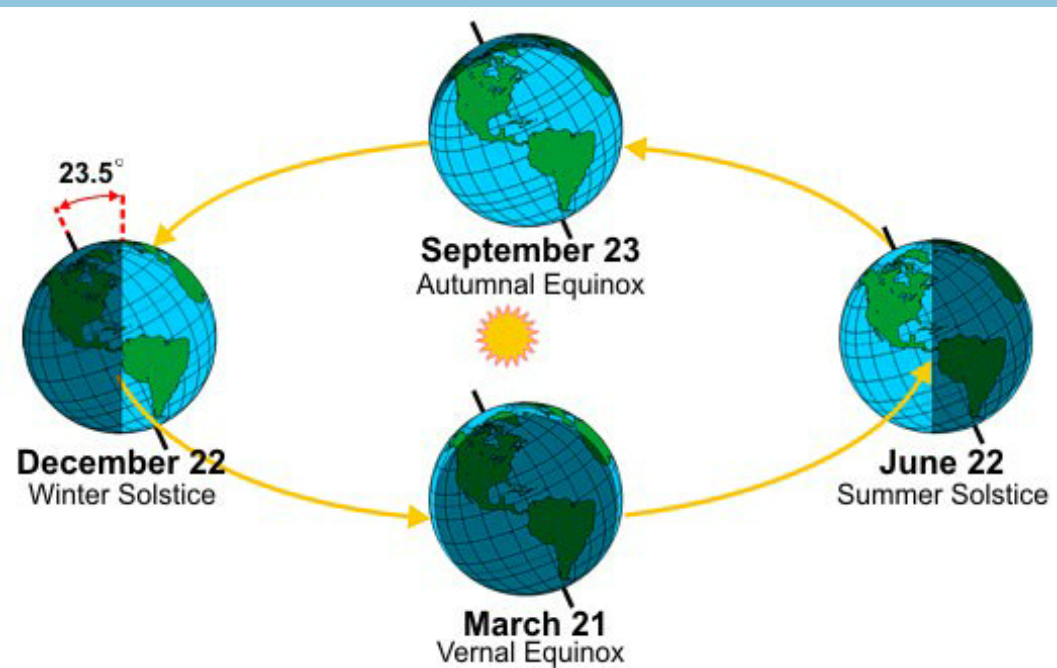
- Temperature
- Atmospheric pressure
- Humidity
- Wind
- Precipitation

# RELATION AMONG TEMPERATURE, PRECIPITATION AND HUMIDITY



# RELATION BETWEEN ATMOSPHERIC PRESSURE SYSTEM AND WIND SYSTEM





## What Is The Season?

- A Season is the division of the year marked by changes in weather, ecology and amount of daylight.
- It is result from earth's orbit around the sun and Earth's axial tilt relative to the ecliptic plane
- We have four season due to earth's revolution around the sun, but Indian subcontinent experiences a rainy season due to monsoon.

Summer

Rainy (Due to Monsoon)

Autumn

Winter

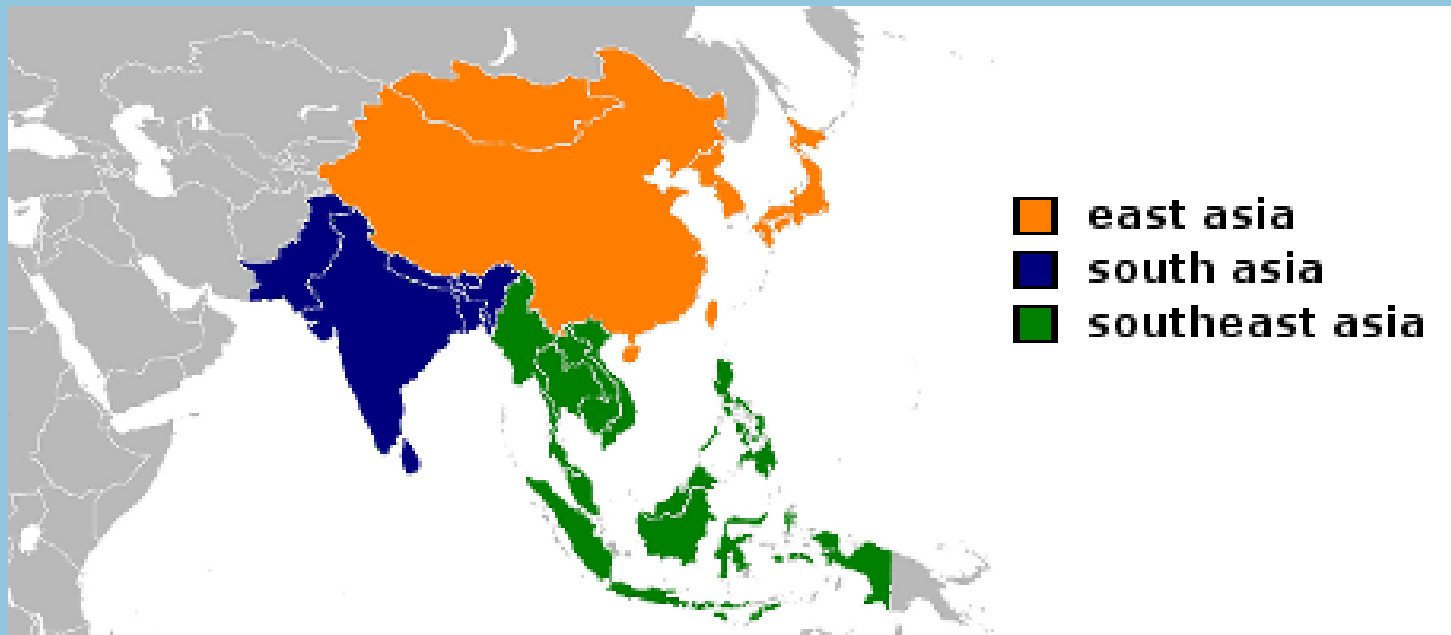
Spring





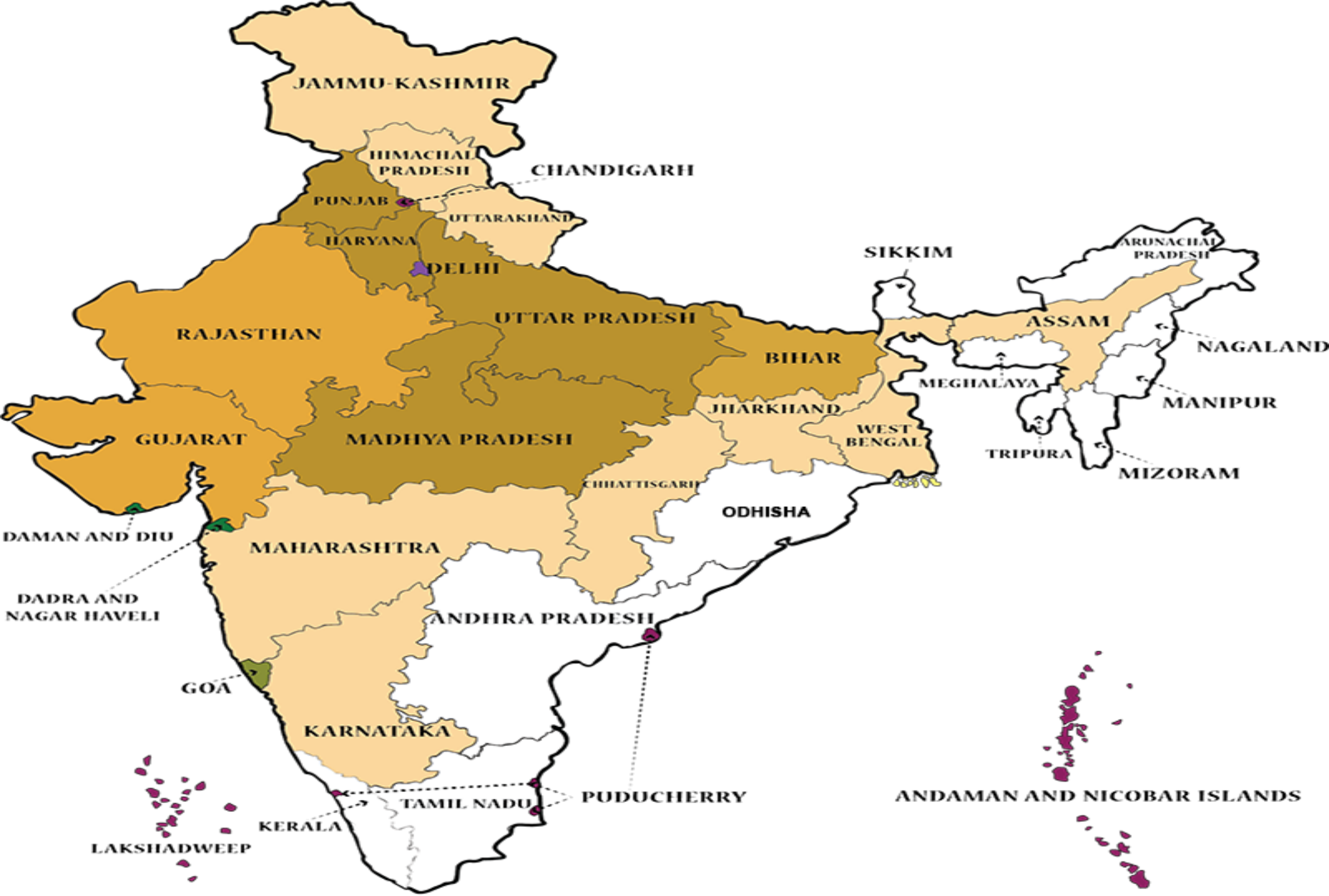
# CLAIMATE OF INDIA

- India has a climate i.e. Monsoon type.
- Monsoon means a lot of rainfall.
- 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.
- Founded in south and south-east Asia.



# REGIONAL VARIATION OF CLIMATE

- ❑ In **summer**, the mercury occasionally touches **50°C** in some parts of the **Rajasthan desert**, whereas it may be around **20°C** in **Pahalgam in Jammu and Kashmir**.
- ❑ On a **winter night**, temperature at **Drass in Jammu and Kashmir** may be as low as minus **45°C**. **Thiruvananthapuram**, on the other hand, may have a temperature of **22°C**.
- ❑ In certain places there is a wide difference between day and night temperatures. In the **Thar Desert** the **day** temperature may rise to **50°C**, and drop down to near **15°C** the **same night**.
- ❑ The annual **precipitation** varies from over **400 cm** in **Meghalaya** to less than **10 cm** in **Ladakh** and western **Rajasthan**.
- ❑ **coastal areas** experience **less contrasts** in temperature conditions. **Seasonal contrasts** are more in the **interior of the country**. There is decrease in **rainfall** generally from **east to west** in the **Northern Plains**.



# FACTORS AFFECTING INDIAN CLIMATE

## LATITUDE

❑ The Tropic of Cancer passes through the middle of the country from the Rann of Kuchchh in the west to Mizoram in the east.

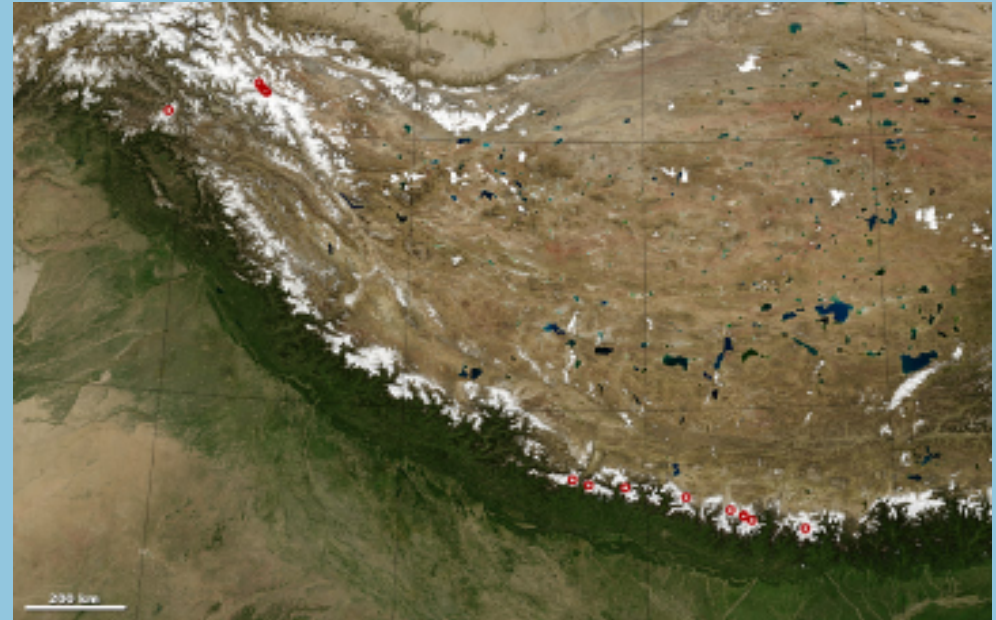
❑ Almost half of the country, lying south of the Tropic of Cancer, belongs to the tropical area. All the remaining area, north of the Tropic, lies in the sub-tropics.

❑ Therefore, India's climate has characteristics of tropical as well as subtropical climates.



## ALTITUDE:

- ❑ The Himalayas prevent the cold winds from Central Asia from entering the subcontinent. That's why subcontinent experiences comparatively milder winters as compared to central Asia.
- ❑ Due to Himalaya, south monsoon wind is prevented and deflected from east to west direction.
- ❑ And rainfall amount also varies from east to west, that's why Meghalaya gets more rainfall from Thar desert of Rajasthan.

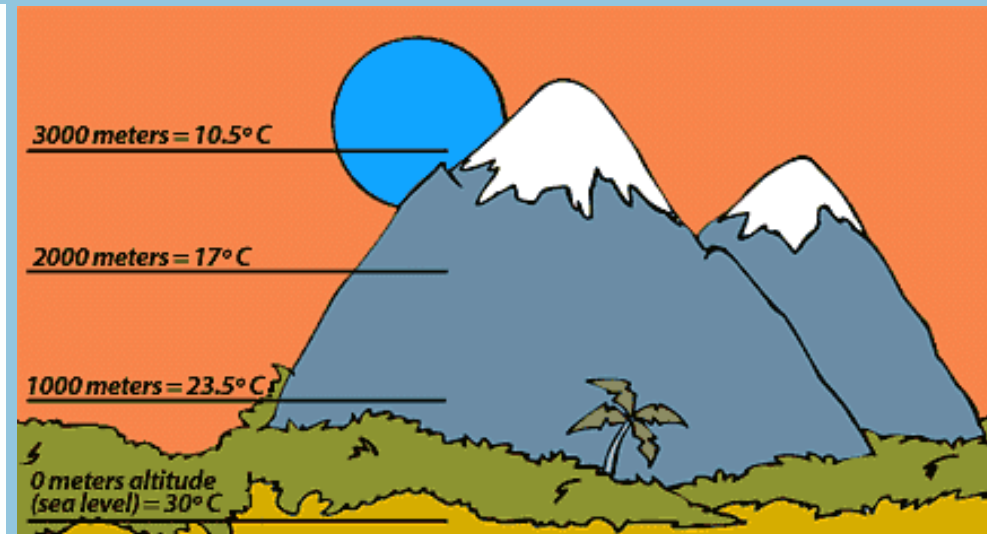
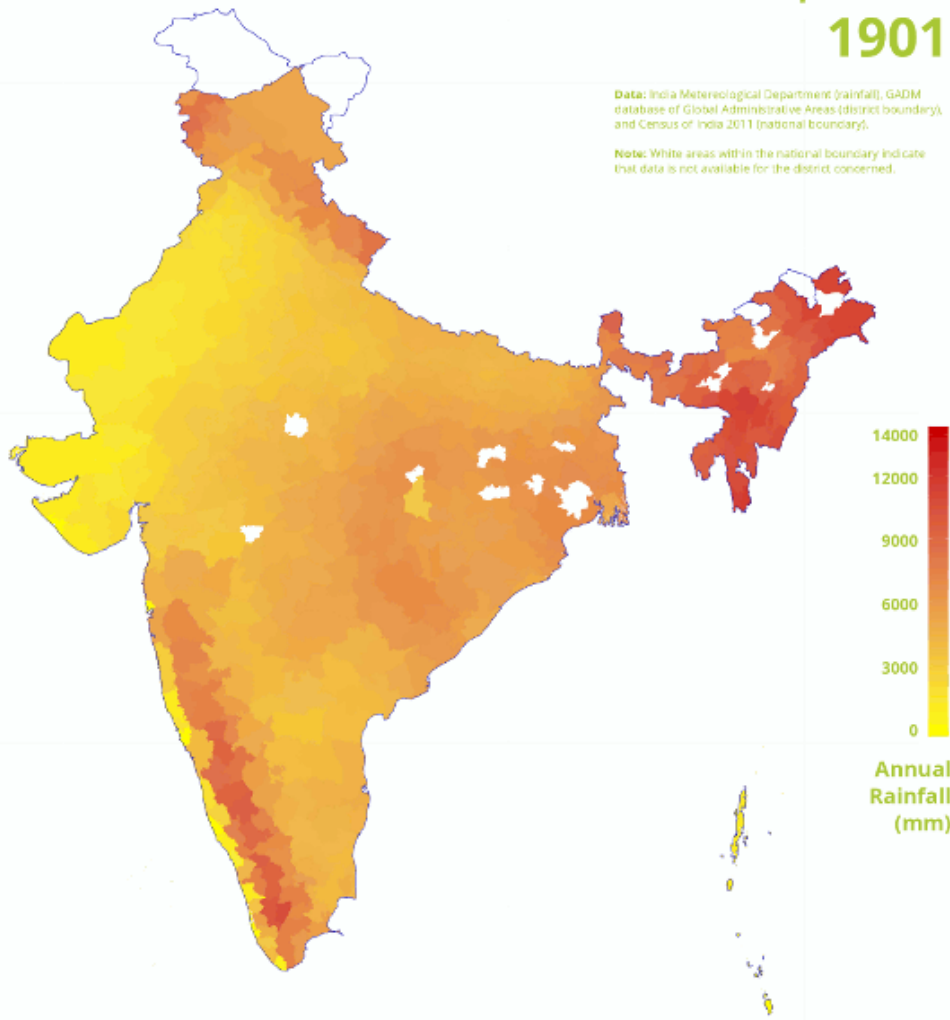


- we know that temperature is decreased with increasing height (6.4° c/1000m), that's why mountain areas are more cool rather than temperature.

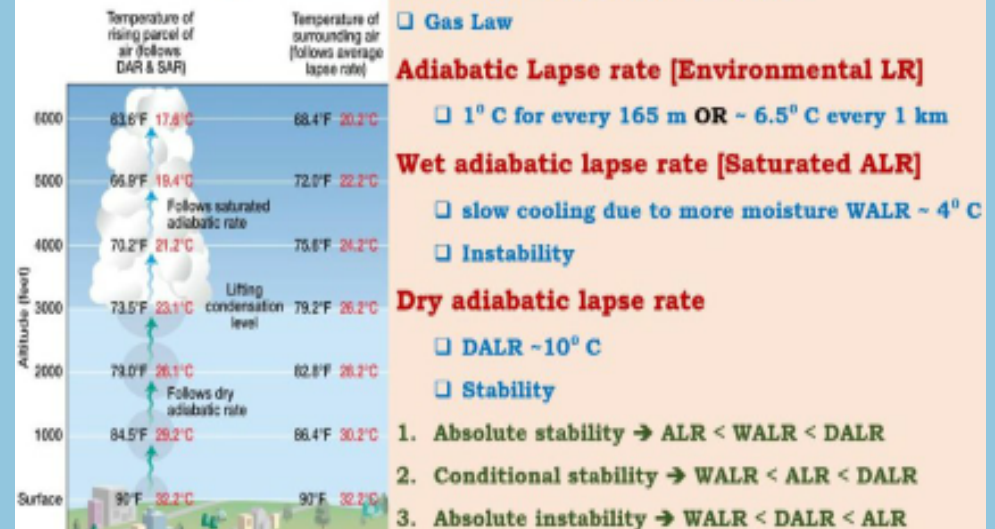
### Rainfall Map of India 1901

Data: India Meteorological Department (rainfall), GADM database of Global Administrative Areas (district boundary), and Census of India 2011 (national boundary).

Note: White areas within the national boundary indicate that data is not available for the district concerned.

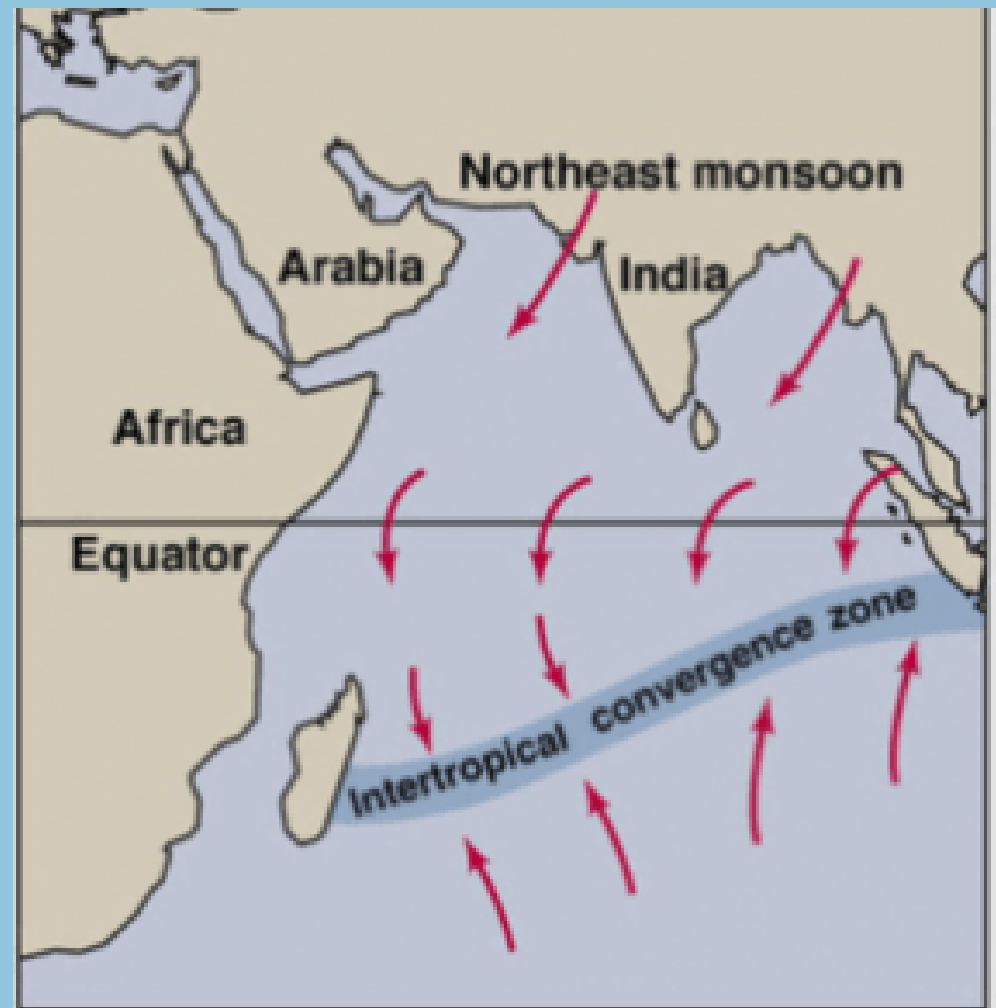


### Adiabatic lapse rate



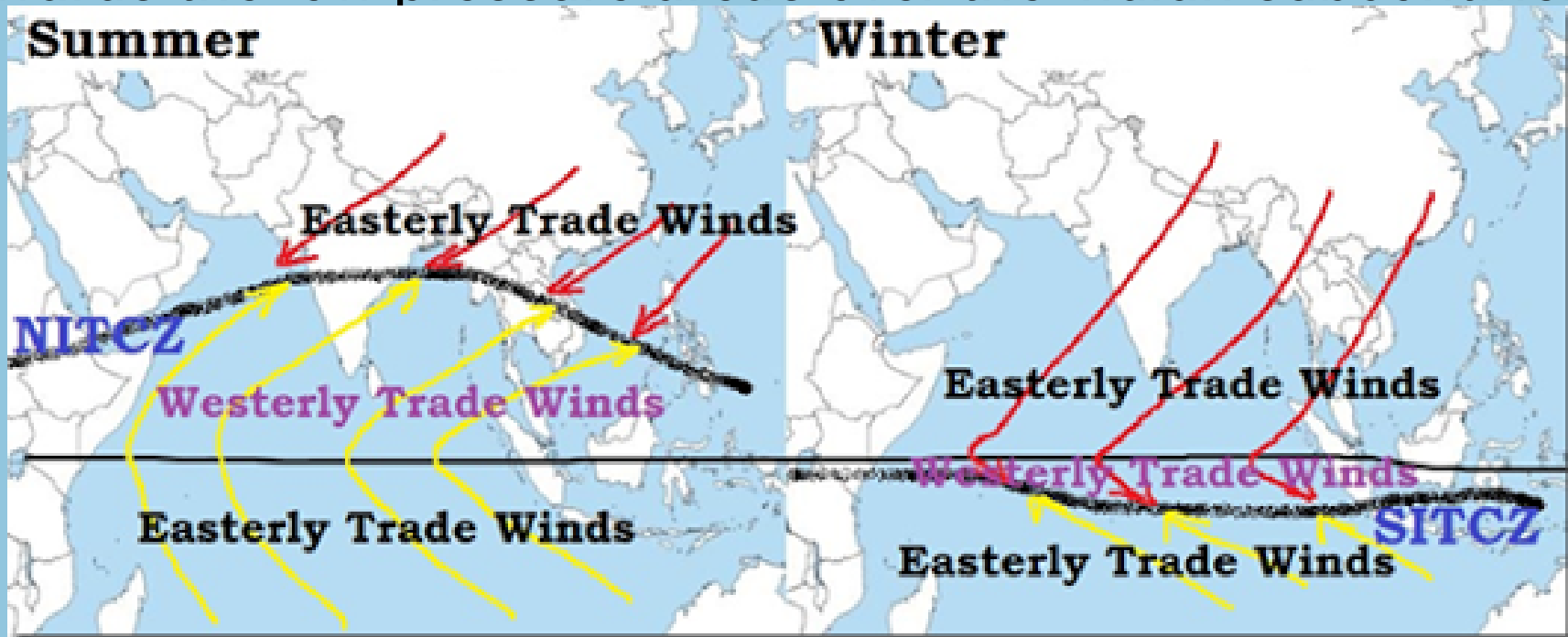
## PRESSURE AND SURFACE WINDS:

- ❑ India lies in the region of north easterly winds. These winds originate from the subtropical high-pressure belt of the northern hemisphere.
- ❑ They blow south, get deflected to the right due to the Coriolis force, and move on towards the equatorial low-pressure area.
- ❑ These winds carry very little moisture as they originate and blow over land. Therefore, they bring little or no rain.



## UPPER AIR CIRCULATION

- During winter, there is a high-pressure area north of the Himalayas due to **shifting of sub-tropical jet stream towards south**. Cold dry winds blow from this region to the low-pressure areas over the oceans to the south.
- In summer, a low-pressure area develops over interior Asia as well as over northwestern India due to **shifting of sub-tropical jet stream towards north of Himalaya**. Air moves from the high-pressure area over the southern Indian Ocean, in a south-easterly direction, crosses the equator, and turns right towards the low-pressure areas over the Indian subcontinent.

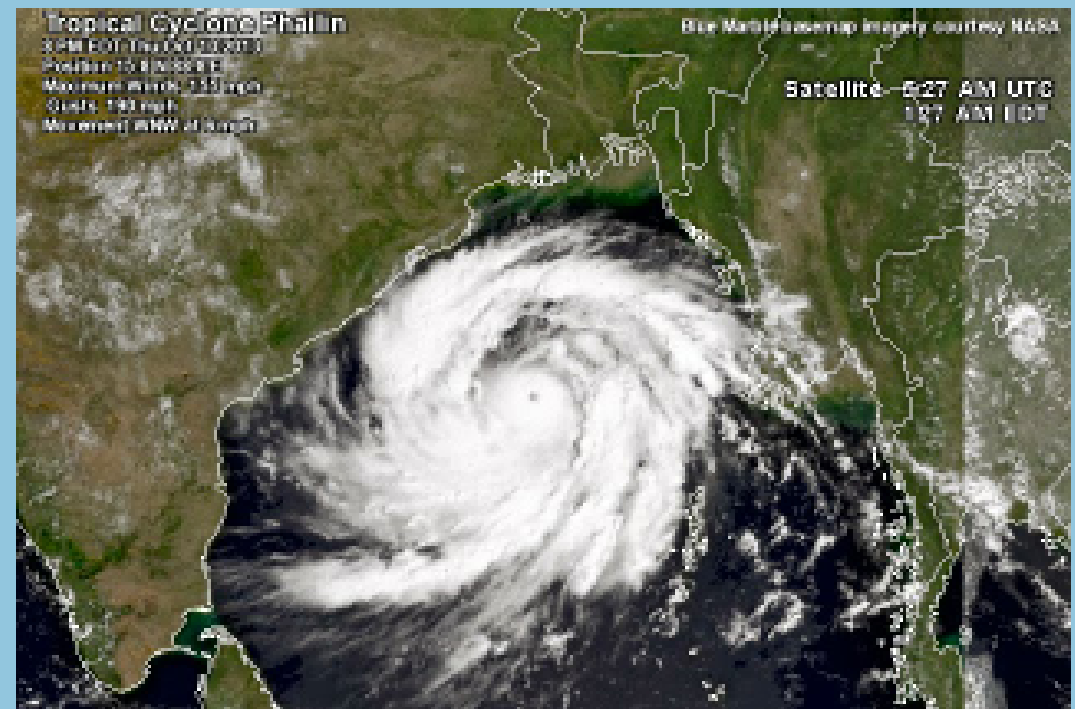
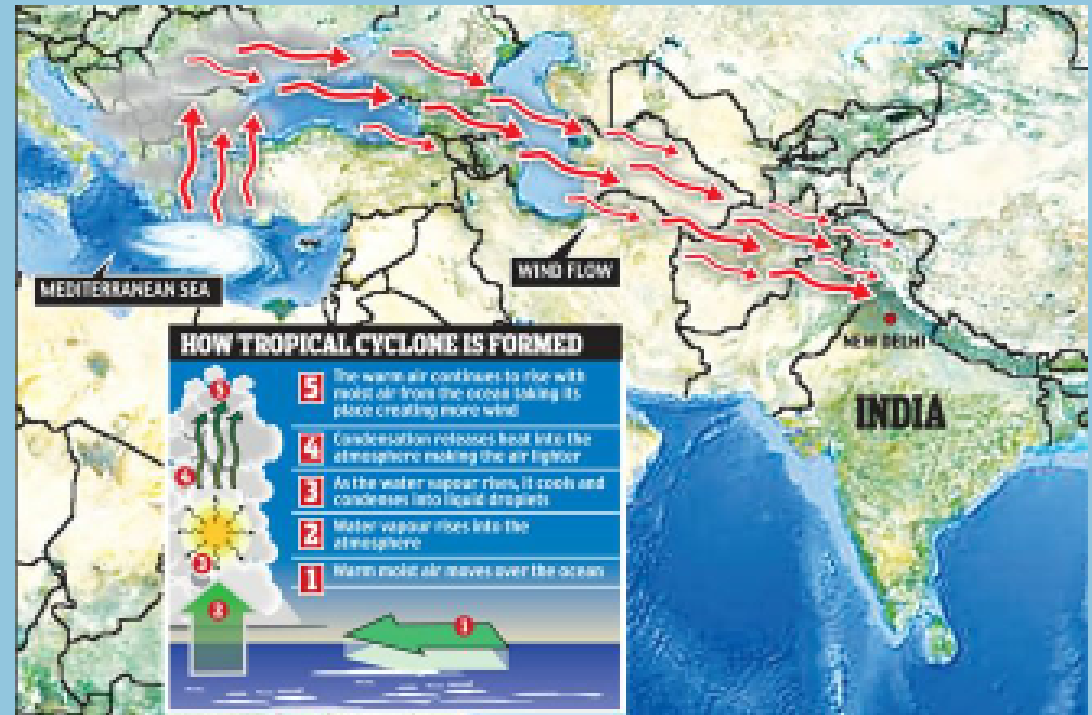




## WESTERN CYCLONIC DISTURBANCES AND TROPICAL CYCLONES

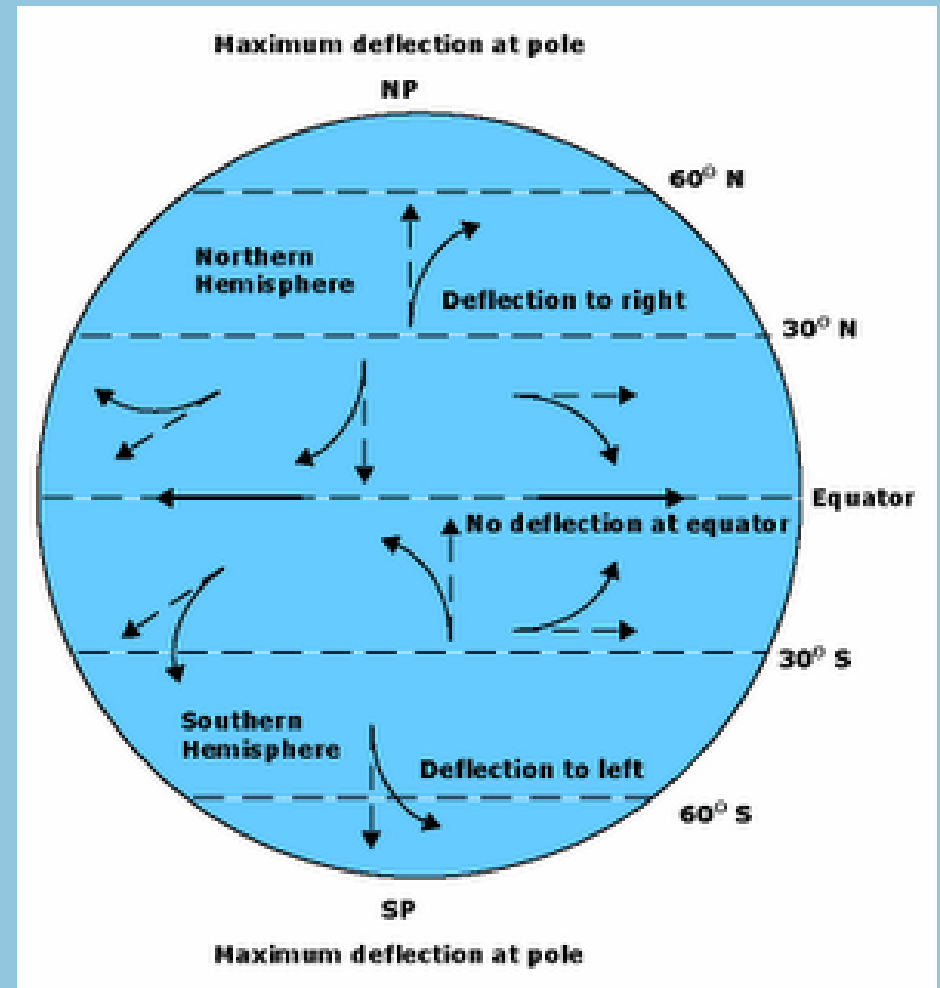
❑ The western cyclonic disturbances are weather phenomena of the winter months brought in by the westerly flow from the Mediterranean region. They usually influence the weather of the north and north-western regions of India.

❑ Tropical cyclones occur during the monsoon as well as in October - November, and are part of the easterly flow. These disturbances affect the coastal regions of the country.



# CORIOLIS FORCE:

- ❑ An apparent force caused by the earth's rotation.
- ❑ The Coriolis force is responsible for deflecting winds towards the right in the northern hemisphere and towards the left in the southern hemisphere.
- ❑ This is also known as 'Ferrel's Law'.
- ❑ Its less at equator and increasing towards the pole



## **DISTANCE FROM THE SEA**

The distance from any water body (whether it is a lake/ sea) have a major impact on climate of any location. Greater distant locations have lesser impact of sea in controlling the climatic conditions.

## **OCEAN CURRENTS**

They affect the climate of the coastal areas with the onshore winds.

## **RELIEF**

High mountains act as barriers for cold/hot winds, may also cause precipitation if they are high enough and lie in the path of rain bearing winds. The leeward side of the mountains remains dry.

## Why the houses in Rajasthan have thick walls and flat roofs?

Houses of Rajasthan have thick walls and flat roofs. Because.....

- ❑ The thick walls do not allow the heat to get into the houses
- ❑ The flat roofs help to retain the little water that comes as rain in the desert.



## Why is it that the houses in the Tarai region and in Goa and Mangalore have sloping roofs?

- ❑ Those region get heavy rainfall during monsoon.
- ❑ Sloping roofs are seen as a solution to this problem, as the water does not collect anywhere on the roof, and flows down freely.



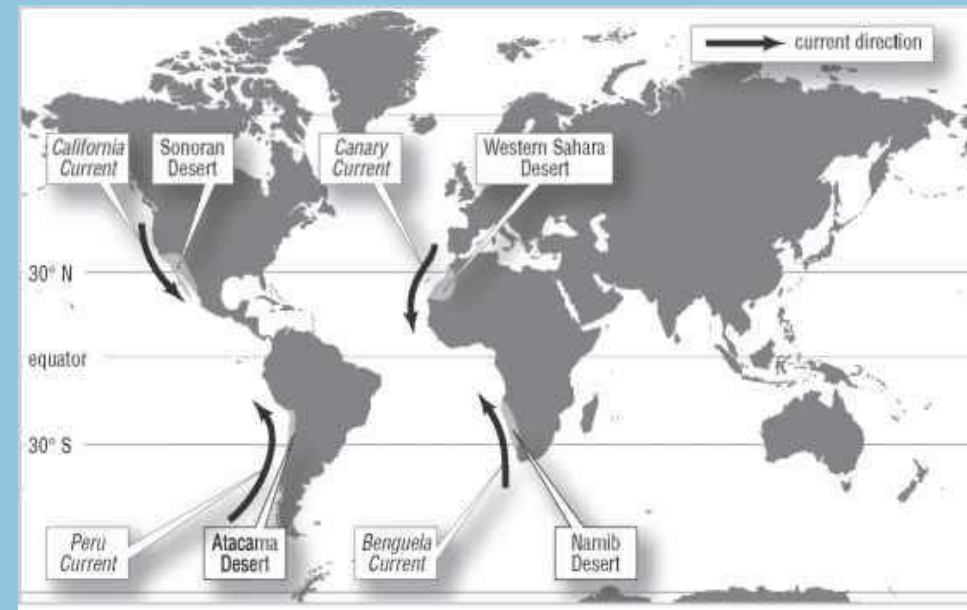
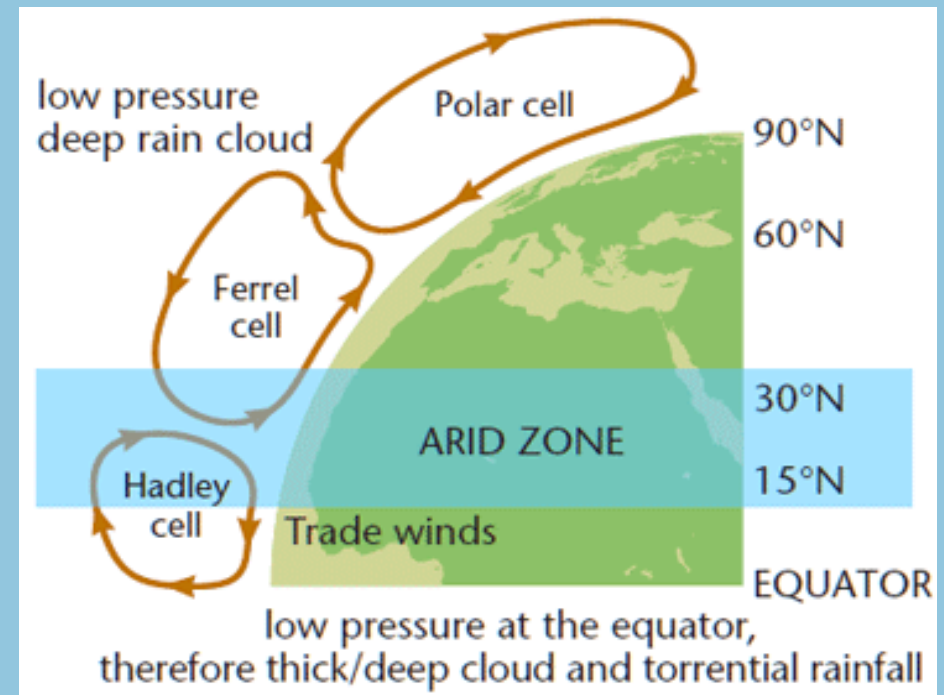
## Why houses in Assam are built on stilts?

- ❑ We often find houses on stilts in areas which experience periodic flooding.
- ❑ The stilts raise the main floor level of the house above the expected flood level to keep the house and its occupants dry and safe.



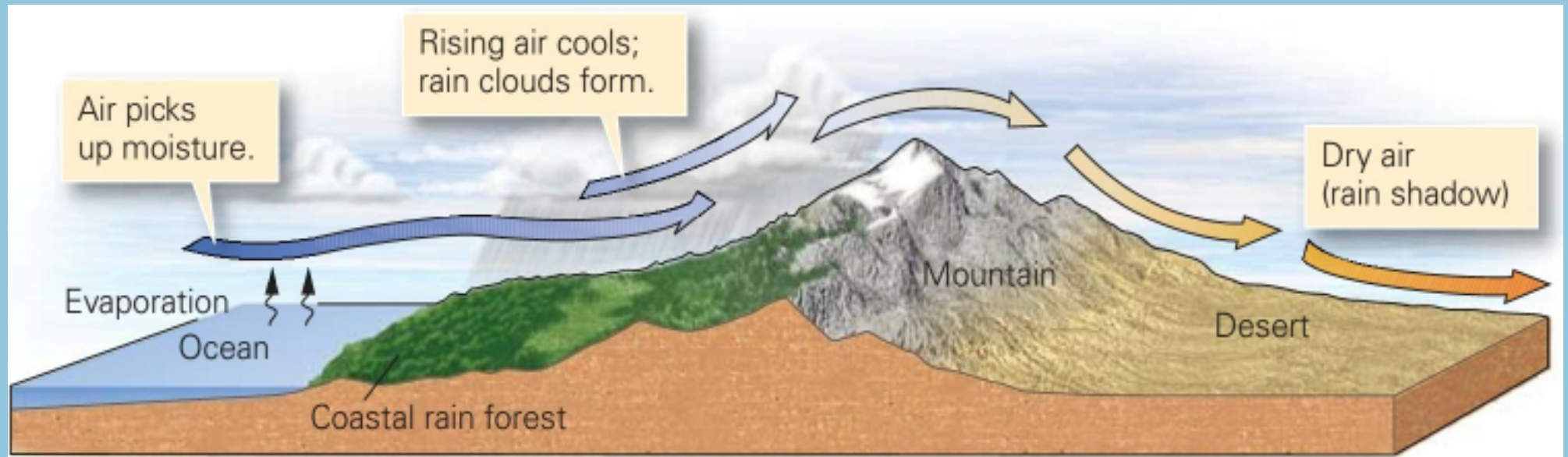
## Why most of the world's deserts are located in the western margins of continents in the subtropics?

- ❑ Most of the world's desert found in tropics ( $15^{\circ}$  -  $30^{\circ}$ )
- ❑ Western part of the countries in the tropics has been experienced by tropical high pressure belt. Sinking air mass and dry by compression, that's why no cloud, no rainfall.
- ❑ Most of the cold current flow from polar region to equatorial region through western part of the countries.



□ Mountain peaks along the coastal regions force the moisture laden clouds to ascend and shed their moisture in the windward region itself (Orographic rainfall). The descending air on the other side of the mountains i.e., leeward side is totally dry creating arid conditions.

Eg: The Andes mountains have created Atacama desert

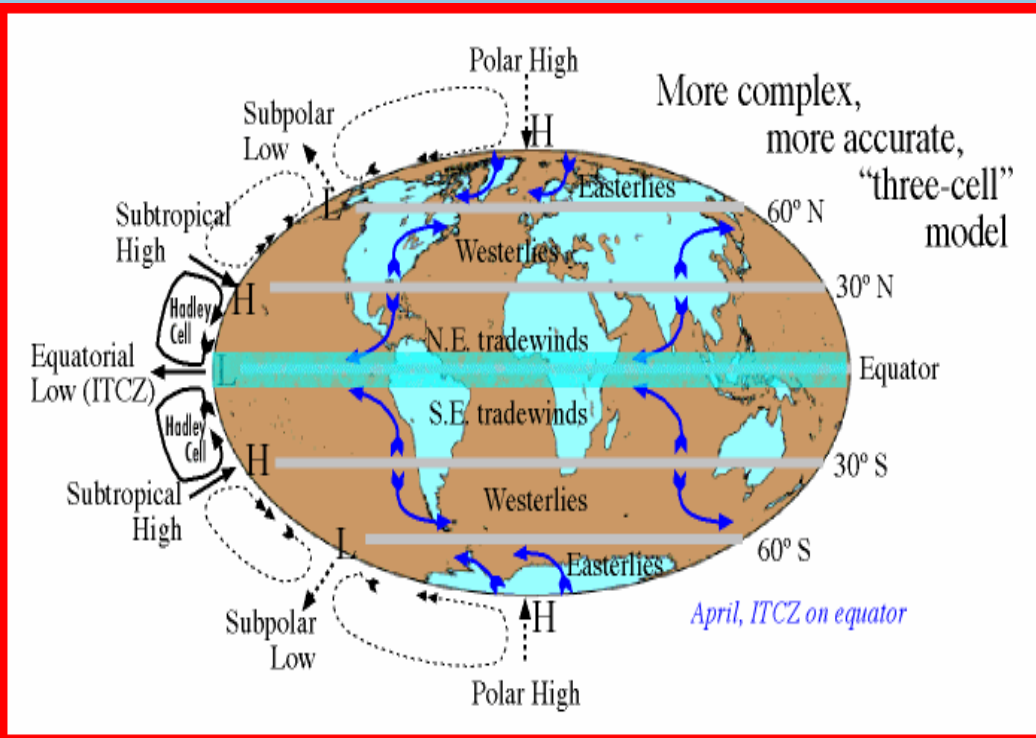


## Inter Tropical Convergence Zone

The Inter Tropical Convergence Zone (ITCZ,) is a broad trough of low pressure in equatorial latitudes. This is where the northeast and the southeast trade winds converge. This convergence zone lies more or less parallel to the equator but moves north or south with the apparent movement of the sun.

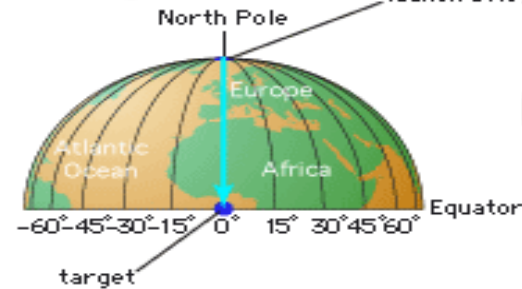
## Coriolis force

An apparent force caused by the earth's rotation. The Coriolis force is responsible for deflecting winds towards the right in the northern hemisphere and towards the left in the southern hemisphere. This is also known as 'Ferrel's Law'.

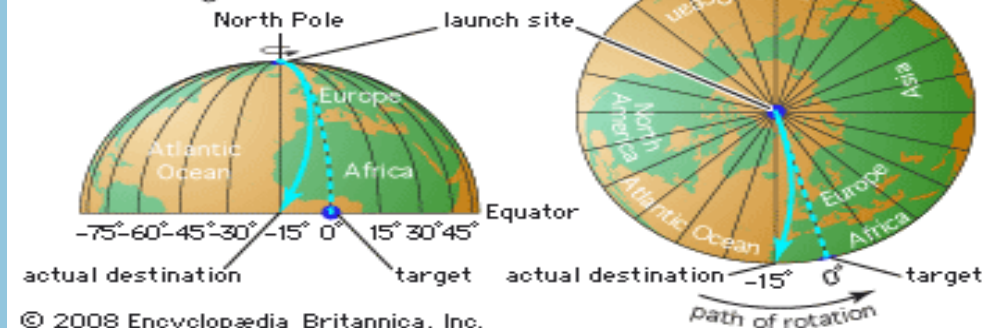


### The effect of the Coriolis force

#### Nonrotating Earth



#### Earth rotating 15° each hour





# THE INDIAN MONSOON

- ❑ Derived from Arabic word Mousim which literally means season.
- ❑ The climate of India is strongly influenced by monsoon wind. And the history tell us the Sailors who came to India and witness of monsoon.
- ❑ Monsoon are experienced in the tropical area roughly between 30°N and 30°S.

## Indian ocean winds - monsoon



June-August (SW monsoon)



December-March (NE monsoon)

