WIND AND MONSOON

Wind

Air in horizontal motion is known as wind. Vertical movement is noticed but negligibly small compared to horizontal movement as the height of the atmosphere is only for few kilometers. However vertical movement or uplift of air only causes significant weather changes in cloud formation and rain.

Wind systems of the world

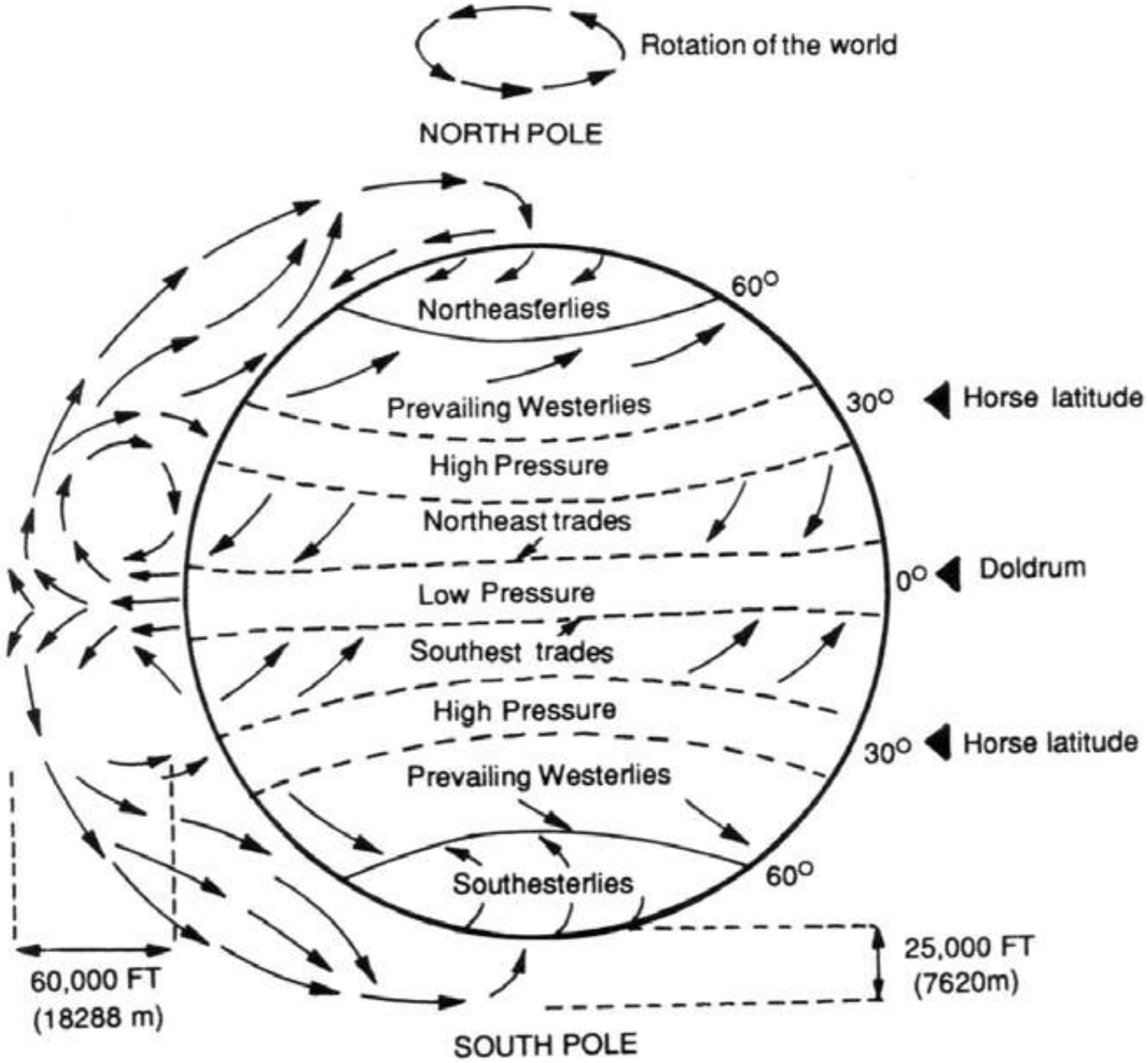
The wind belts found on earth's surface in each hemisphere are:

a. Trade wind/ tropical easterlies

b. Antitrade wind

c. Prevailing westerlies

c. Polar easterlies



GLOBAL WIND CIRCULATION

Doldrums

Owing to continuous heating of the earth by insolation, pressures are low and winds converge and rise near the equator. This intertropical convergent zone is known as ‘Doldrums’.

a) These are the equatorial belts of calms and variable winds.

b) The location is 5°S and 5°N latitudes.

c) Wind is light due to negligible pressure gradient.

d) Mostly, there are vertical movements in the atmosphere.

e) The atmosphere is hot and sticky.

1. Trade winds (Tropical Easterlies)

a) The regular high temperature at the equator results in a high pressure forming in the upper levels of the equator.

b) Then, the air is transferred to the northward and southward directions until 35° North and South in both the hemisphere.

c) Due to this reduction in surface pressure on the equator (doldrums) there is an increase in pressure at 35°N and 35°S which are known as horse latitude (sub-tropical high).

d) As a result, the winds flow from the horse latitude to the equatorial region.

e) While moving, these winds are deflected by Coriolis force to the right in northern hemisphere and to the left in southern hemisphere.

f) These winds flow from 35°N to the equator in NE direction in the northern hemisphere and from 35°S to the equator in SE direction in the southern hemisphere. These are known as ‘Trade winds’. These are known as ‘Tropical easterlies’.

g) These are most constant winds in force and direction and flow over nearly half the globe.

2. Anti-trade winds

a) This is a supplementary wind system of the earth which is effective at higher levels.

b) This system works in opposite direction to the surface winds.

c) The anti-trade winds mostly flow from land to ocean and brings no rain.

3. Prevailing Westerlies

a) The winds that flow from sub-tropical high to the low-pressure area about 60-70° latitudes in both the hemispheres are known as 'Prevailing westerlies'.

b) In the northern hemisphere the direction of Prevailing westerlies is SW and in southern hemisphere NW.

c) These winds are forceful and are irregular as compare to the trade winds in the tropical regions.

d) High precipitation zone

3. Polar Easterlies / Polar winds

b) A permanent high pressure exists on the poles.

c) From these high pressure polar regions, cold winds flow to areas at about 60-65° latitudes in both the hemispheres.

d) The winds flow in NE direction in the northern hemisphere and in SE direction in the southern hemisphere.

- **Monsoons**
- The term monsoon is derived from an Arabic word “Mausim” means “Season”.
- There are different concepts to explain Indian monsoons. Of them the “Thermal concept” proposed by Halley in 1636. The two types of distinguished monsoons over India are
- 1. South-West monsoon (SW)
- 2. North-East monsoon (NE)

1. South-West monsoon (SW)

1. In summer the land mass of India heats quickly and develops a strong low pressure centre, particularly over north-west India during April and it exists upto September.

2. As the pressure over the adjacent oceans is high, a sea to land pressure gradient is established.

3 Therefore, the surface air flow is from the high pressure areas over the oceans towards the low pressure areas over the heated land.

4. Eventhough India should have North east monsoon winds throughout the year due to its position in NE trade wind zone the SW winds predominate because of the low pressure through lesing along Ganges and upper India.

5. The air that is attracted into the centres of low pressure from over the oceans is “Warm and moist”.

6. This monsoon is active from June to September.

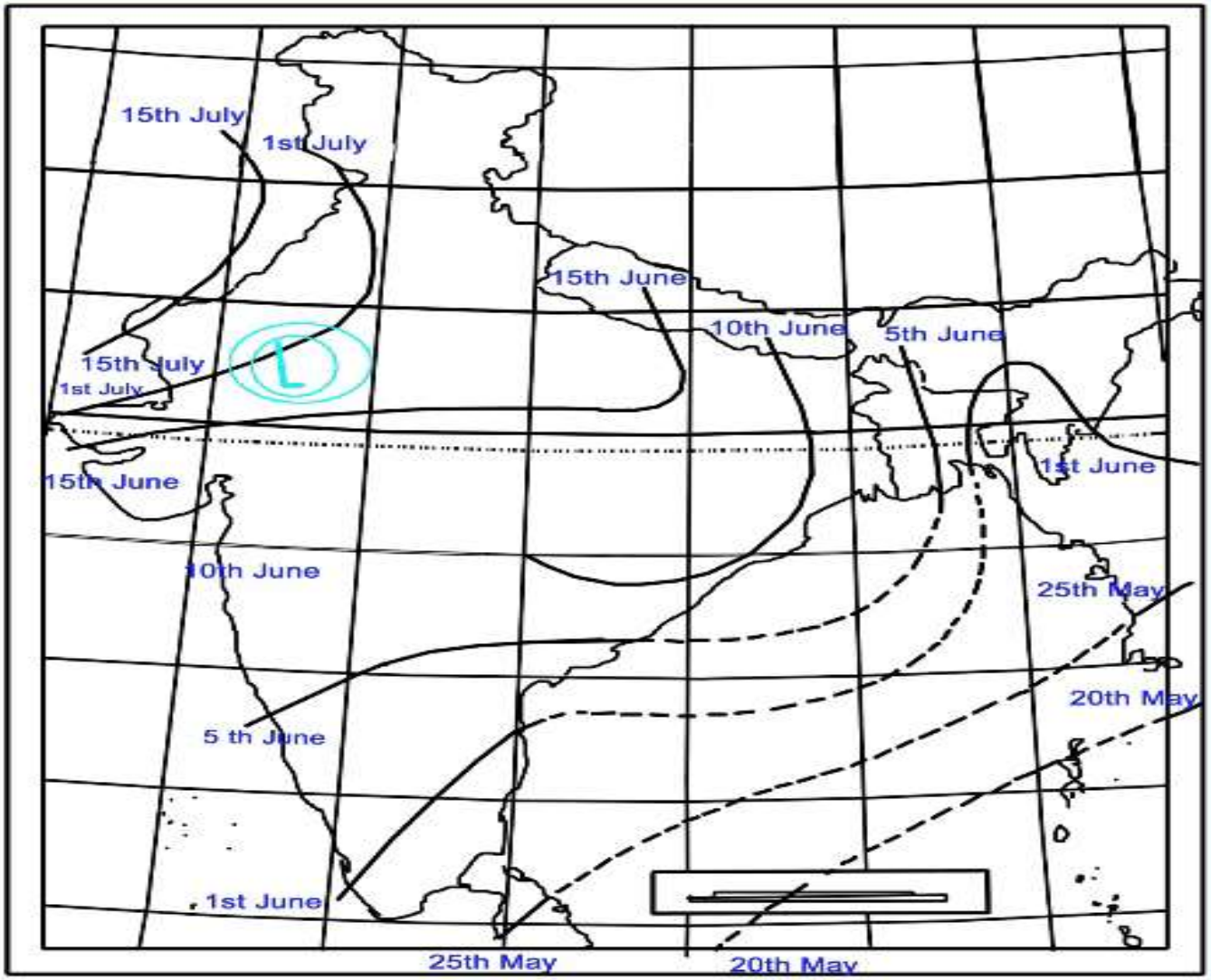
7. The rainfall received is 75 per cent of the total annual rainfall of India covering all parts.

8. This monsoon enters Kerala around 1st June and by 15 July reaches the northern most parts of the country (Fig...).

9. There are two branches of the South West Monsoon.

a. The Arabian Sea branch: This branch crosses Western ghats.

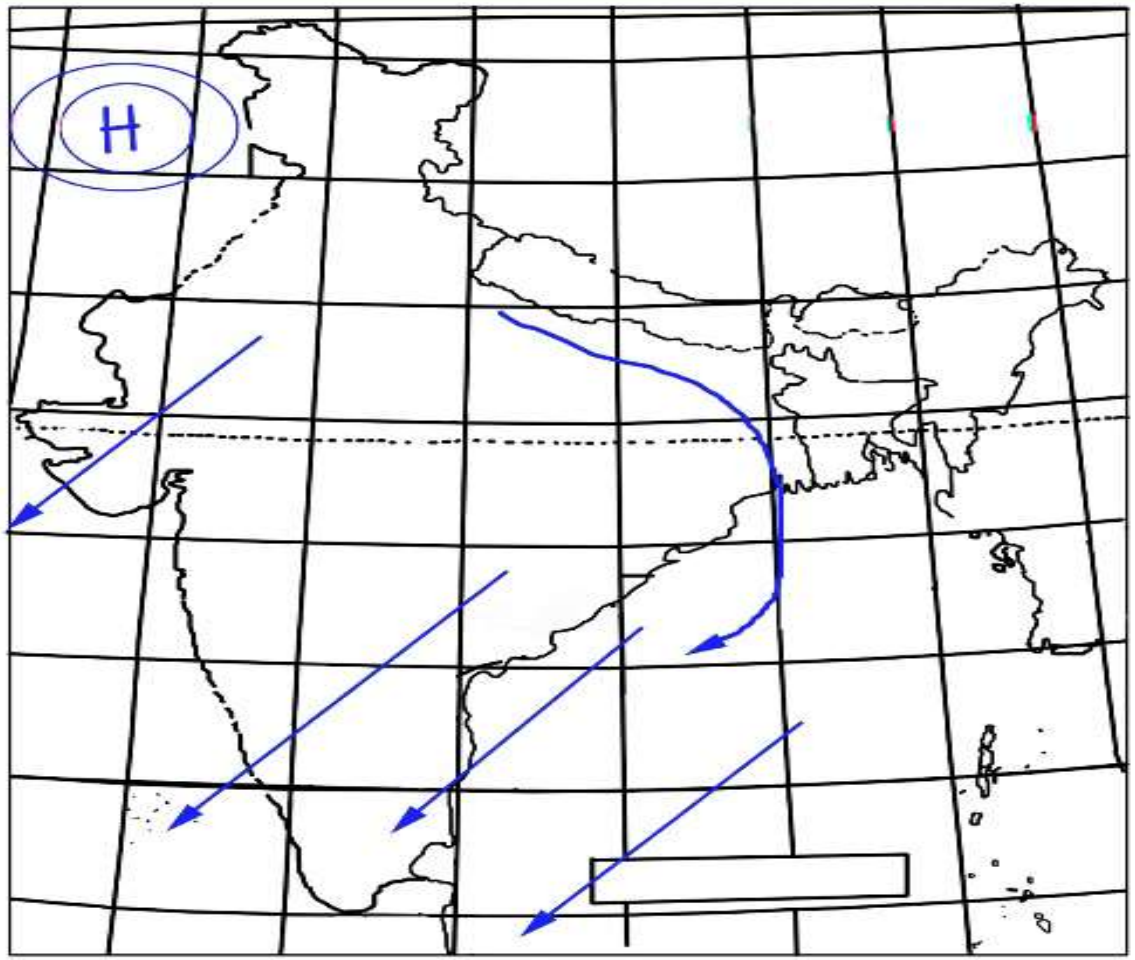
b. The Bay of Bengal branch: This branch crosses Gangetic plains.



NORMAL DATES OF ON SET OF SOUTH WEST MONSOON

North-East monsoon

1. A complete reversal of the South west monsoon winds takes place during winter.
2. In this season the land mass over India cools more rapidly than the surrounding oceans.
3. So, a strong high pressure centre develops over the continent.
4. On the other hand, the pressure over the adjacent oceans is relatively lower.
5. As a consequence, the pressure gradient is directed from land to sea and winds flow in North-East direction.
6. Therefore, there is an outflow of air from the continental land mass to the adjacent oceans.
7. The air flow brings “Cold dry” air towards low latitudes.
8. This monsoon is active from October to mid December.
9. The rainfall received is 10 to 20 per cent of the total annual rainfall of India covering parts of Andhra Pradesh (Nellore, Chittoor) and Tamil Nadu.



ON SET OF NORTH EAST MONSOON

Withdrawn of monsoon

1. **The monsoon withdraws from northern India around mid September.**
2. **The monsoon withdraws from extreme South of Indian Peninsula by December.**

Break and Active in monsoon

1 A period of lean rainfall occurs when “Trough” shifts towards foot hills of Himalayas which is known as break in the monsoon over Indian sub-continent.

2 When the “Trough” shifts south of its normal position, monsoon becomes active over India.

Influence of monsoon rains on agriculture

1. Nearly 54 per cent of population of the world depends on monsoon for their income.

2 .Monsoon rains are considered as life giving rains. Rice or paddy which is a major food crop depends on only rainfall for its yield. If rainfall is not uniformly distributed, it results in huge loss of rice crop in particular and all other crops in general.

3 .Heavy rain during harvesting causes lodging of crop and seed germination. If rainfall does not occur immediately after sowing, it results in germination failure.

4 . As in the case of other weather elements the amount and distribution of rainfall influence the crop yield considerably.

Example: Paddy and sugarcane require high amount of water as compared to groundnut and castor.

5. Timely and evenly distributed rainfall during the crop growth is more beneficial than heavy rainfall occurring at once.

6. Rainfall of 20 mm is necessary to wet the soil upto a depth of 15 cm which rainfall helps in decomposition of organic matter and also influences the fertility status of the soil by way of leaching of nutrients.

7. Many farm operations such as seed bed preparation, sowing, intercultivation etc. depend on rainfall.