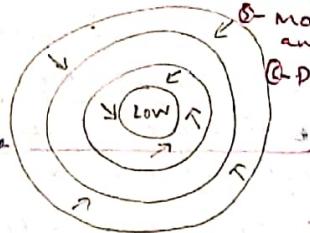


Tropical Cyclone

Tropical cyclones are warm core vertex of tropical origin with small diameter, circular shape, minimum surface pressure accompanied by high velocity winds spiralling inward from all directions. They are anticlockwise in N.H & clockwise in S.H. They lie between tropic of cancer & tropic of capricorn.

- ① - Definition
- ② - Characteristics
- ③ - Factors for origin
- ④ - Weather conditions
- ⑤ - Movement and Path
- ⑥ - Distribution



A cyclone.

Characteristics

1. On an average the diameter range between 80 km & 300 km.
2. They advance with varying velocity. Weak cyclone move at speed of 32 km/hr while hurricane attain a velocity of 180 km/hr.
3. Affect only coastal areas as it move with very high velocity over oceans, become feeble over land and dies out reaching interior of continent.
4. Isobars are circular & few in number. Centre has low pressure wind rush up towards it & attain gale velocity.
5. Not characterised by temperature variation in different parts because they do not have ^{some temp. throughout} different fronts.
6. No different rainfall cells, each part of cyclone yields rainfall. ^{same rainfall throughout}
7. Not always mobile, become stationary over a particular place for several days yield heavy rainfall causing flood.
8. Track vary, normally east to west upto 15° latitude from equator, poleward between 15°-30° latitudes & again westerly.
9. Confined to summer season.
10. Become disastrous natural hazard because of high wind speed of 180-400 km/hr, tidal surge, high rainfall intensity, very low atmospheric pressure which cause rise in sea level.

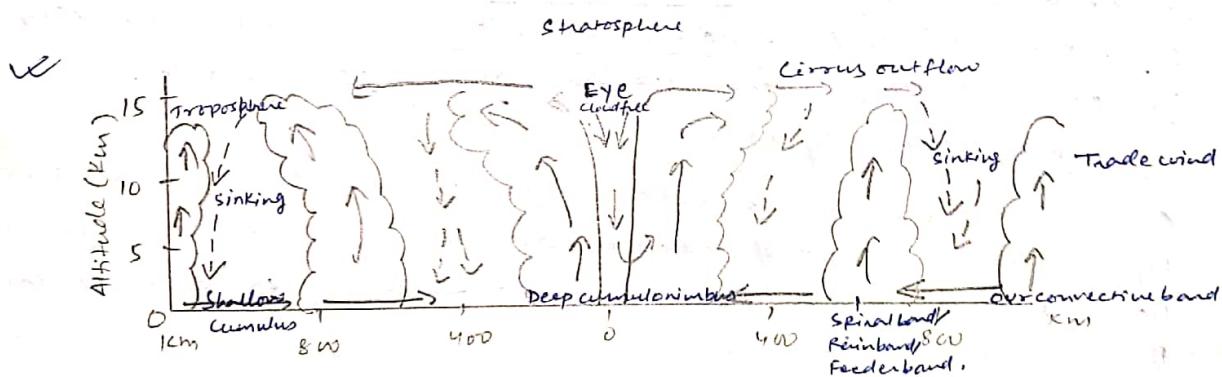
Origin of Tropical cyclone

A tropical cyclone is like a heat engine that is energised by the latent heat of condensation. There are certain basic requirements that must be fulfilled for development of a hurricane :-

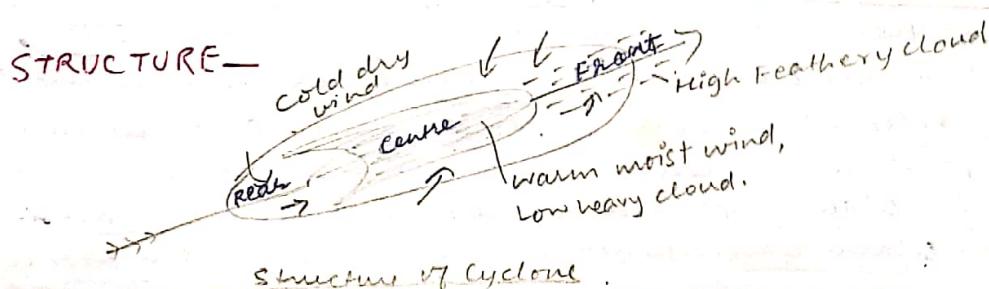
1. Large continuous supply of warm & moist air - Originate over warm tropical oceans of surface temperature 27°C, so lower layer has water vapour & latent heat is transported into storm, released in form of cloud & rain. Cold currents lower temperature in eastern part so tropical cyclone originate in high temperature of western part of ocean air summers. Warmer water should be from top to 60-70m depth.

2. Coriolis force - High value of coriolis force is required. Cyclonic circulation is caused due to deflection in wind direction by coriolis force & it originates below 5° - 20° latitudes & absent in belt of 5° - 8° .
3. Existence of weak tropical disturbance - It intensifies & ultimately develop into high intensity, violent cyclone.
4. Upper-level outflow - There should be anti-cyclonic circulation at the height of 9000 - 15000m as it suck air from the ocean surface above & L.P at the centre of cyclone is intensified.
5. Minimal vertical wind shear - Tropical cyclone can only form when there is no significant wind changes with height. & westerly wind is easterly wind at the surface Asia & India when monsoons are peaking in July - August. So it is limited to latitudes equatorward of subtropical jetstream.
6. Small atmospheric vertices in ITCZ - Trade winds from both hemisphere meet at ITCZ, temperature contrast is there which is prerequisites for origin of violent tropical cyclone.

Weather condition associated with Tropical cyclone.
With the arrival of tropical cyclone there is sudden increase in air temperature & wind velocity, decrease in air pressure, appearance of cirrus clouds & high waves in ocean. Clouds are thickened & become cumulonimbus which yield heavy rain. Clouds are associated with thunder & lightning. If obstructed by relief barrier it gives heavy rain.



STRUCTURE—



Structure of cyclone .

visibility become zero due to thick and dark thunder cloud.

Centre or eye of the cyclone is characterised by calm breezes, clear sky, rainless fine & settled weather, low pressure at centre. Such weather conditions do not persists for more than half an hour.

Weather suddenly changes with the arrival of near portion of the cyclone as sky again becomes overcast, wind direction changes & pressure sharply goes up. There is heavy downpour with cloud thunder & lightning & storm become furious. This situation persists for several hours.

Slowly & slowly ferocity of cyclone starts declining & weather becomes calm after the cyclone has passed off.

Movement & path of Cyclone

After their formation they move westward & away from equator, steered by air aloft. Average speed is 15-30 km/hr. warm ocean currents affect

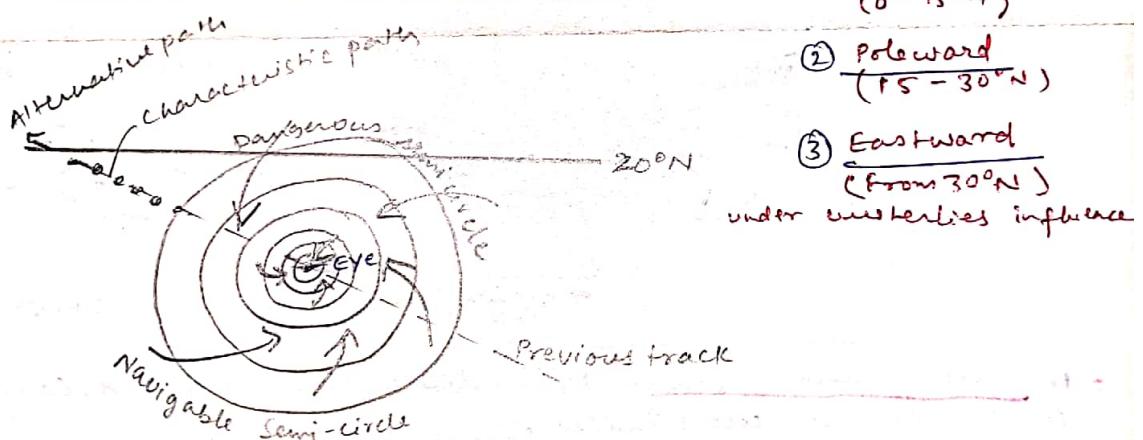
Movement & Path of tropical cyclone

$0 - 15^{\circ} \text{N}$.

① Westward
 $(0 - 15^{\circ} \text{N})$
warm ocean current

② Poleward
 $(15 - 30^{\circ} \text{N})$

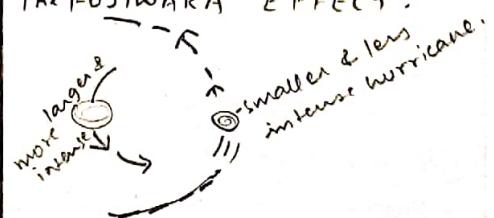
③ Eastward
 $(From 30^{\circ} \text{N})$
under westerlies influence



Path of cyclones to a large extent. After reaching western part of tropical ocean they curve towards poles very sharply below 20° & 30°N lat. & then curve east under influence of upper westerlies. At some instances it has reversed direction completely & struck same place twice, many times happened in Japan, Taiwan, Philippines.

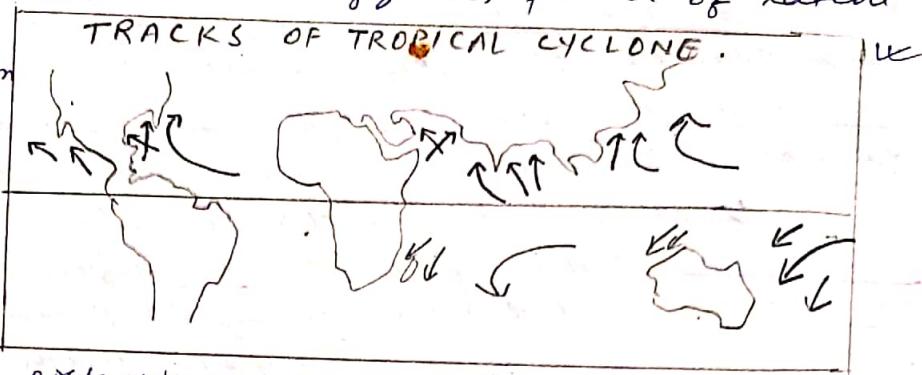
Sometimes two cyclones come closer & revolve around each other, smaller & less intense cyclone move more rapidly. This type of behaviour is known as Fujimara effect.

THE FUJIWARA EFFECT.



Away from the tropical ocean their source of supply of warm & moist air is cut off & in absence of required energy its form of latent heat of condensation

tropical cyclone loose all its characteristics & become

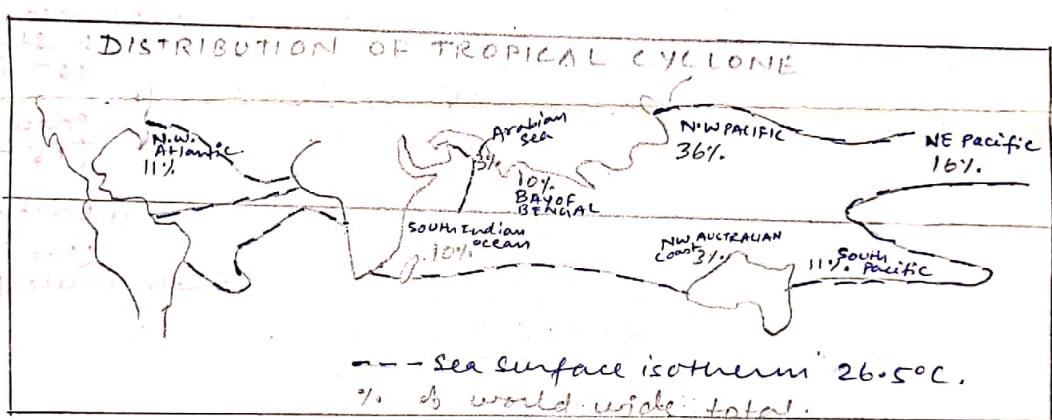


ordinary extratropical cyclones. Tropical cyclone loose its severity as moves on land because source of moisture is cut off.

Over North Indian Ocean these storms are superimposed upon monsoon circulation & move in north-easterly direction. Over Caribbean sea it move westward in Texas & Mexico.

Distribution of Tropical cyclone

Tropical cyclones mostly develop over ocean surface b/w 5° - 15° lat. There are 6 major region : -



- 1. North Atlantic ocean - It includes SE coast of USA, Caribbean sea, Gulf of Mexico, West Indies.
- 2. NE Pacific Ocean - It includes western coast of Mexico, California, Hawaii island.
- 3. NW Pacific Ocean - It includes China sea, Philippines island, South Japan.
- 4. South Pacific ocean - It includes east of Society Island, Samoa & Fiji Island, NE coast of Australia.
- 5. North Indian Ocean - It includes coasts of Arabian sea & Bay of Bengal.
- 6. South Indian Ocean - It includes coasts of Reunion, Madagascar, Mauritius islands.

Vibhushan Kumar
Asst. Professor
S. Sinha College
Aurangabad