SHAURYA SPARTANS

FOR NDA 2, 2024 ASPIRANTS

Geography

Lecture - 17

By – Rahul Parmar Sir

CHAPTER NAME

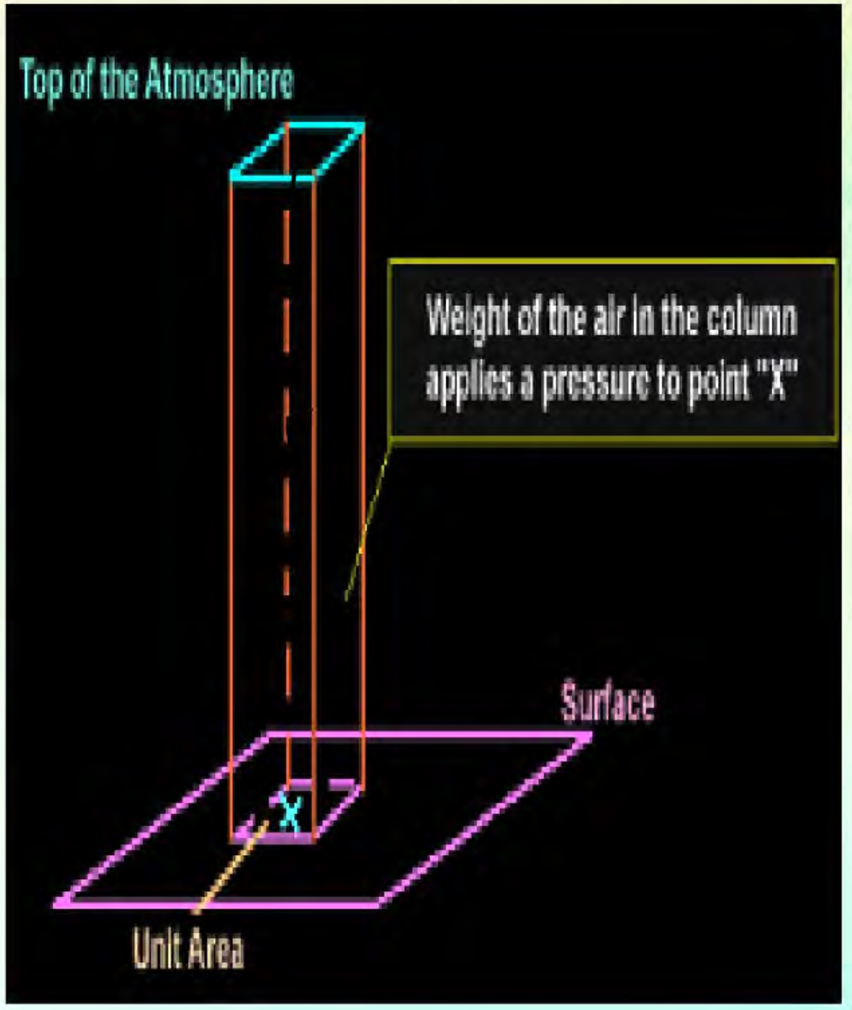
Pressure And Wind (Part - 02)

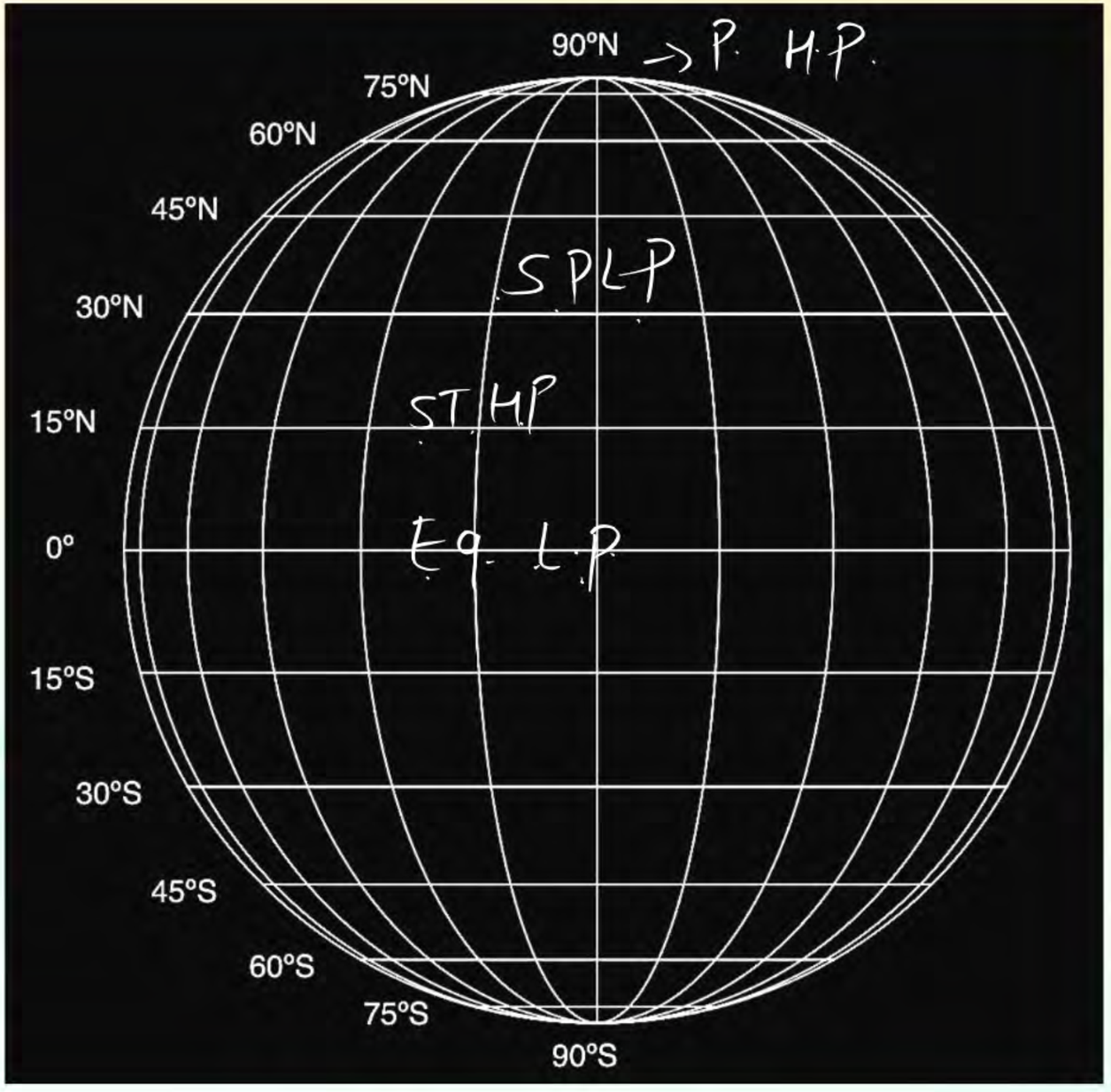
TOPICS to be covered

1. Winds
2. Primary Seasonal, Local winds.
3.
4.

Atmospheric Pressure

- A column of air exerts weight in terms of pressure on the surface of the earth.
- The weight of the column of air at a given place and time is called air pressure or atmospheric pressure
- And it is measured by Barometer
- Atmospheric pressure is measured as Force per Unit Area.
- Imaginary line Joining the places with equal pressure is called as Isobar line.
- The pressure exerted on a body by atmosphere at sea level 1013 mb




90°N
75°N
60°N
45°N
30°N
15°N
0°
15°S
30°S
45°S
60°S
75°S
90°S
→ P. H.P.
S P L P
S T H P
Eq. L.P.

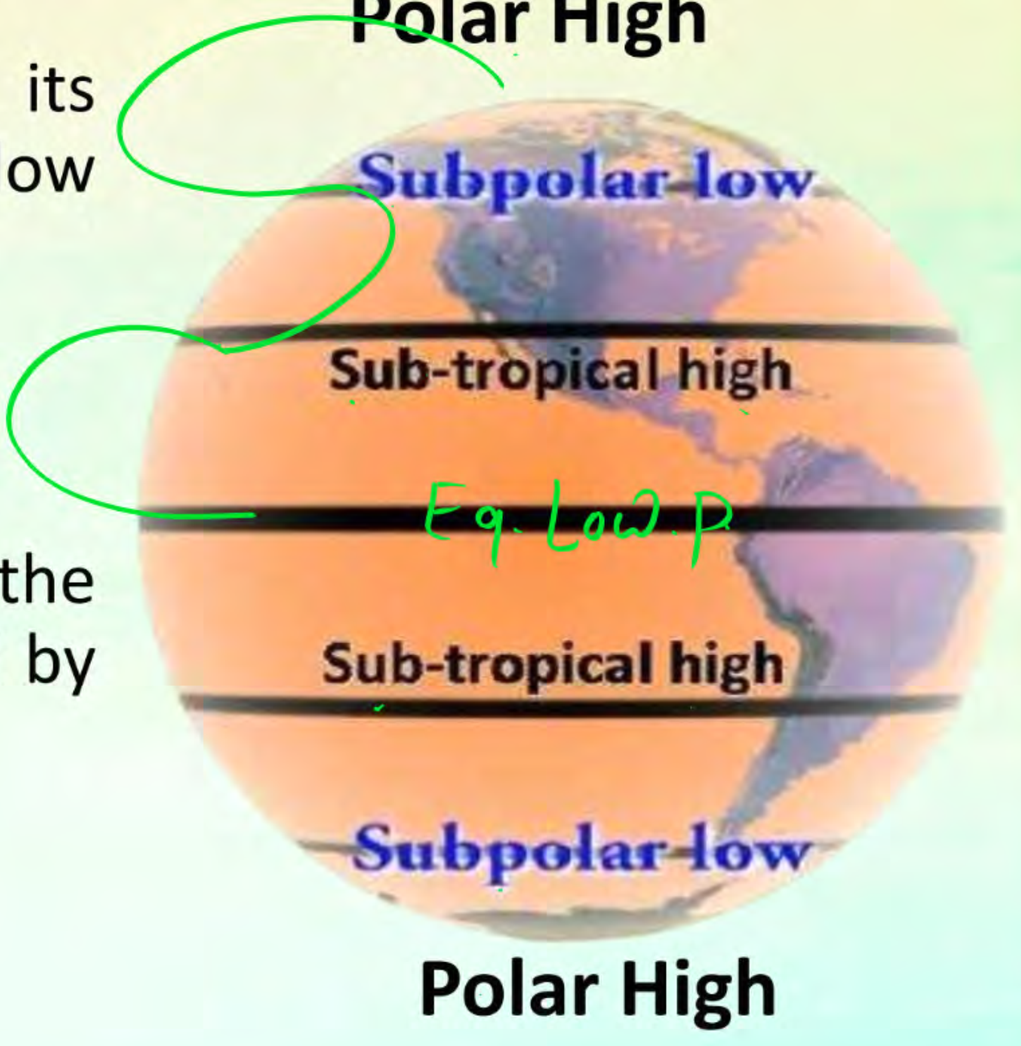
Factors Controlling Pressure System

Thermal Factors

When air is heated, it expands and, hence, its density decreases. This naturally leads to low pressure.

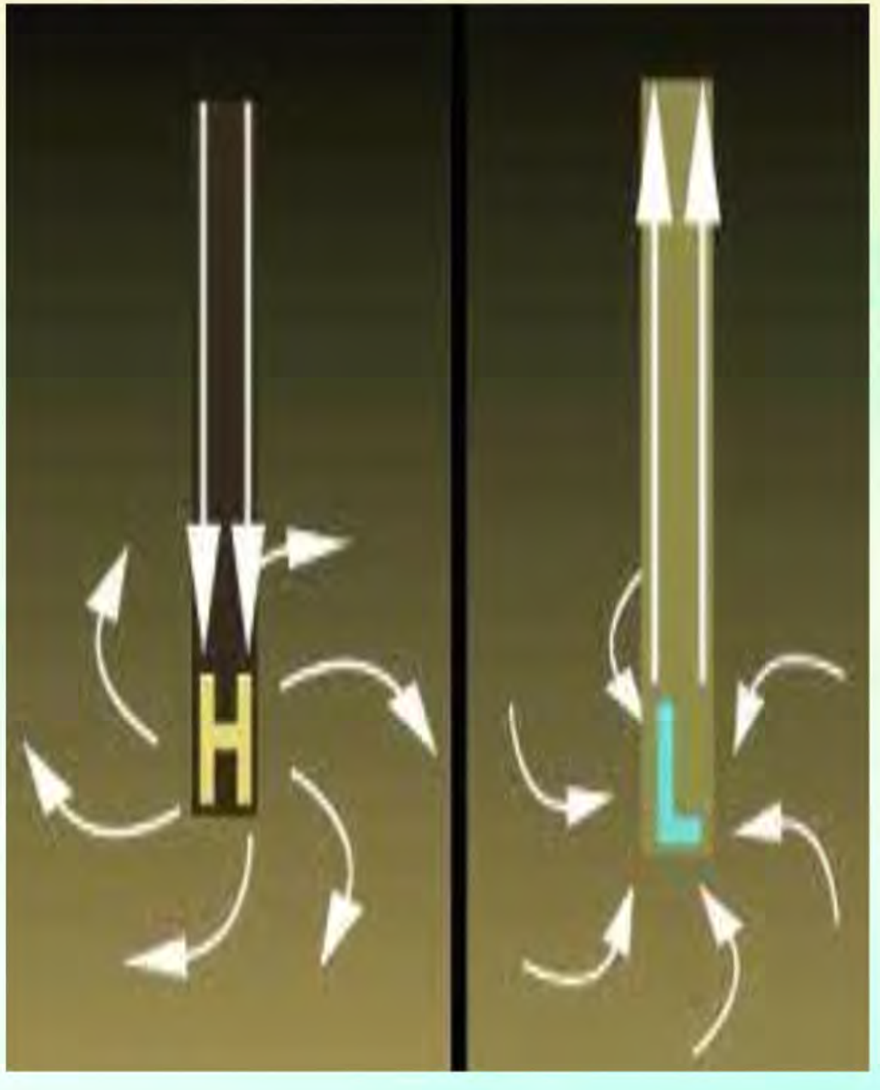
Dynamic Factors

Apart from variations of temperature, the formation of pressure belts may be explained by dynamic factor.



Pressure Gradient

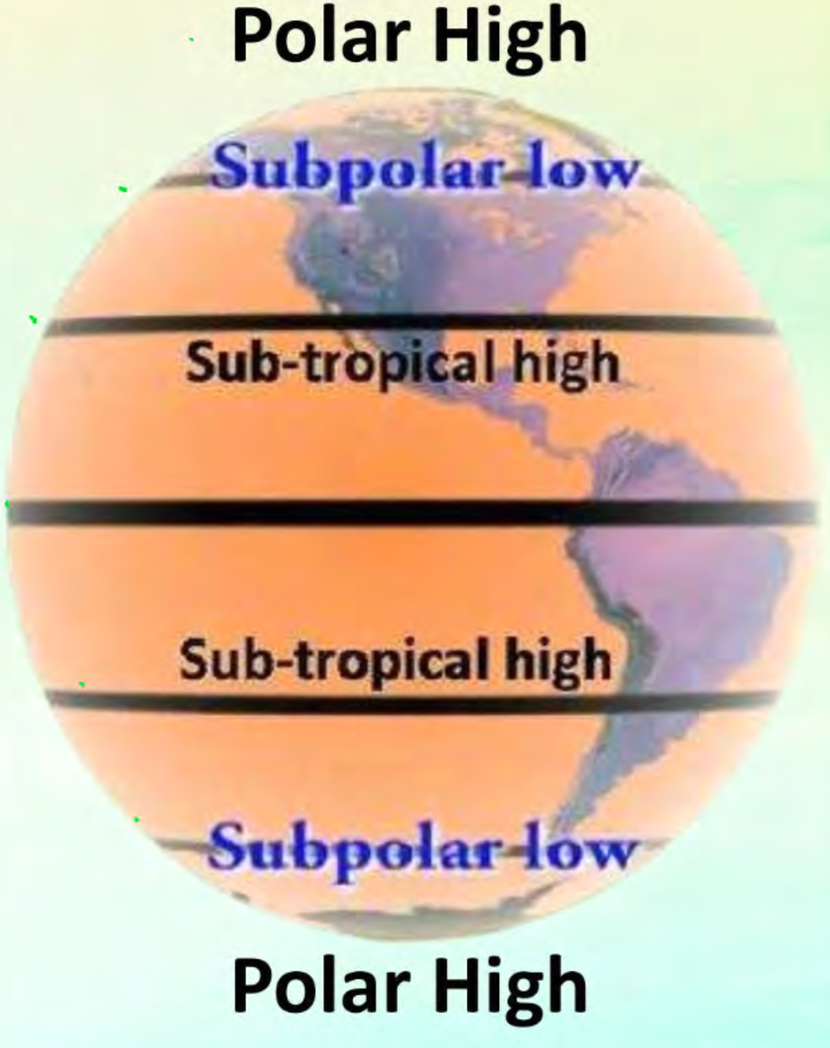
The rate of change of atmospheric pressure between two points on the earth's surface is called the pressure gradient. It leads to the movement of wind

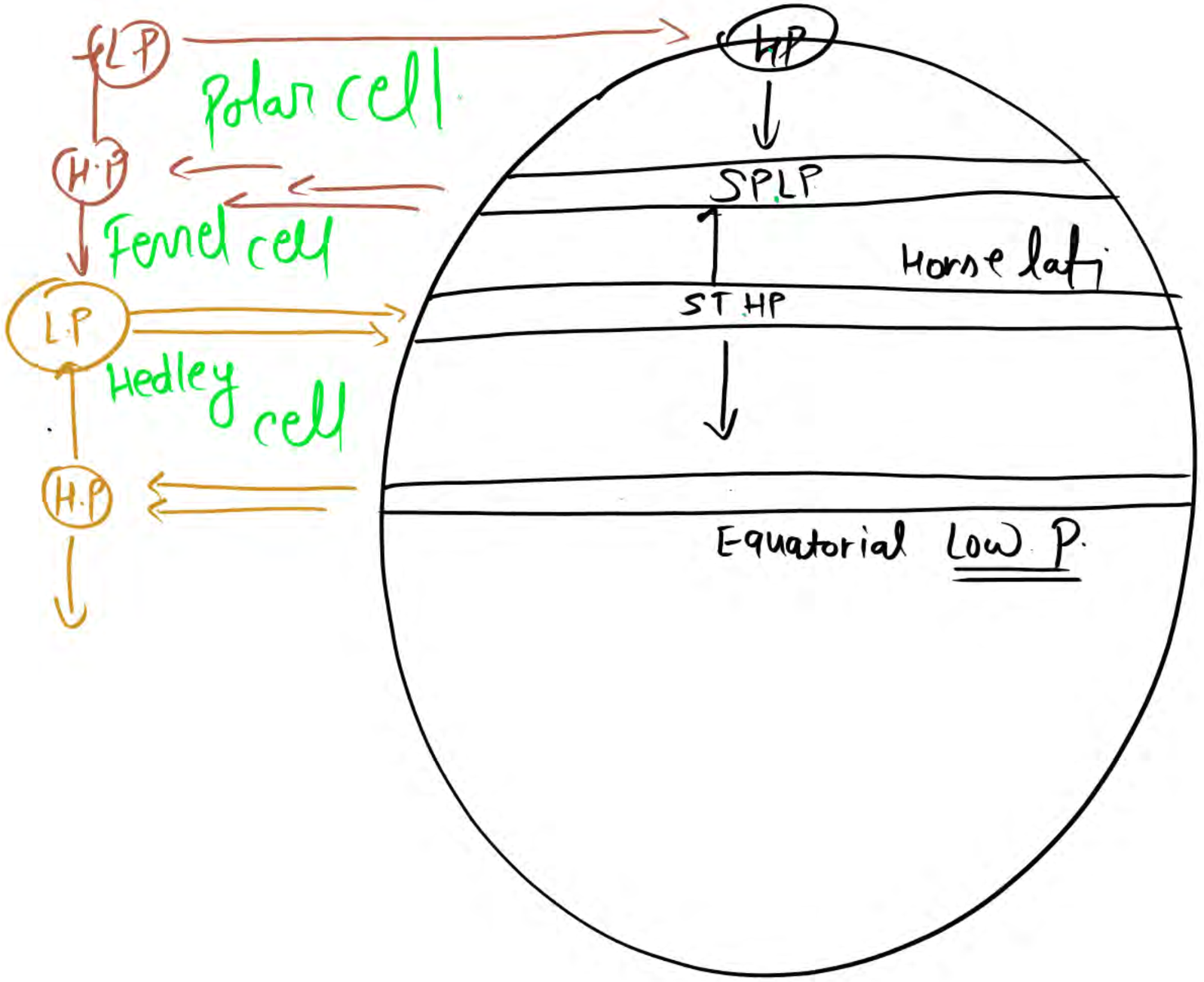


World Pressure Belt

- Equatorial Low Pressure Belts (Thermally Induced)
- Sub-Tropical High Pressure Belts
- Sub-Polar Low Pressure Belts
- Polar High Pressure Area

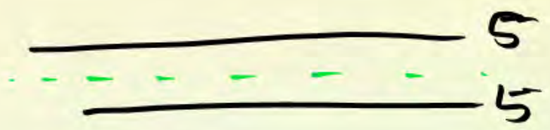
(~~Thermally induced~~)

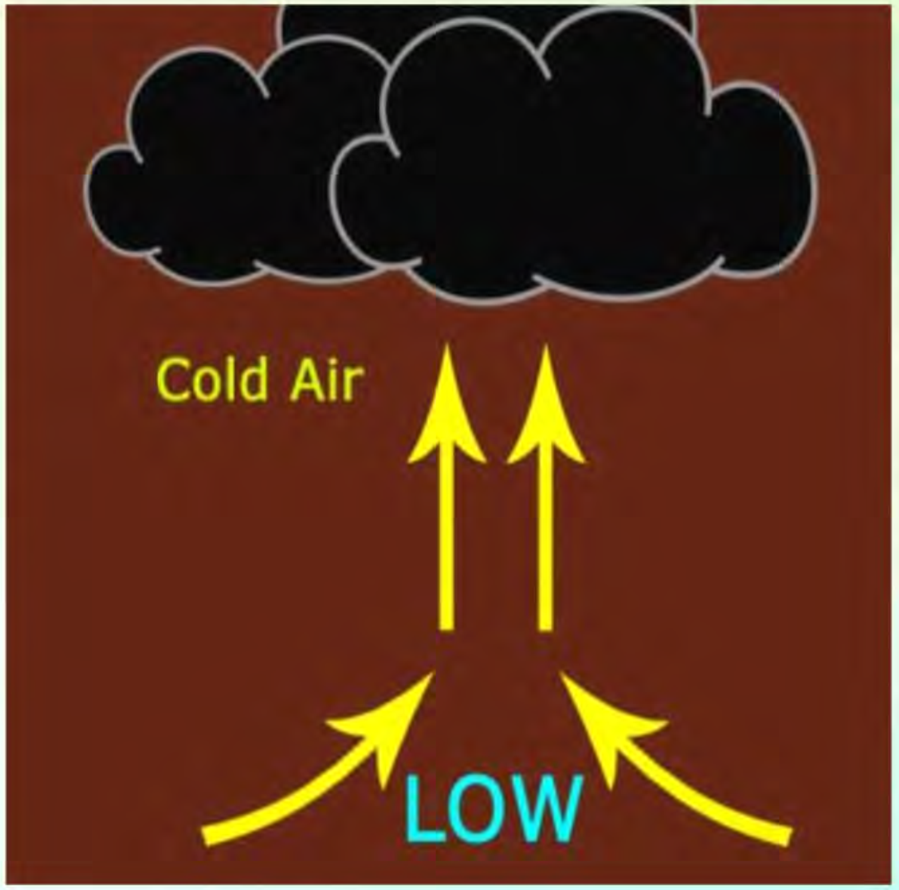



L.P
Polar cell
H.P
Ferrel cell
L.P
Hedley cell
H.P
HP
SPLP
Horse lati
ST HP
Equatorial Low P.

Equatorial Low-Pressure Belt

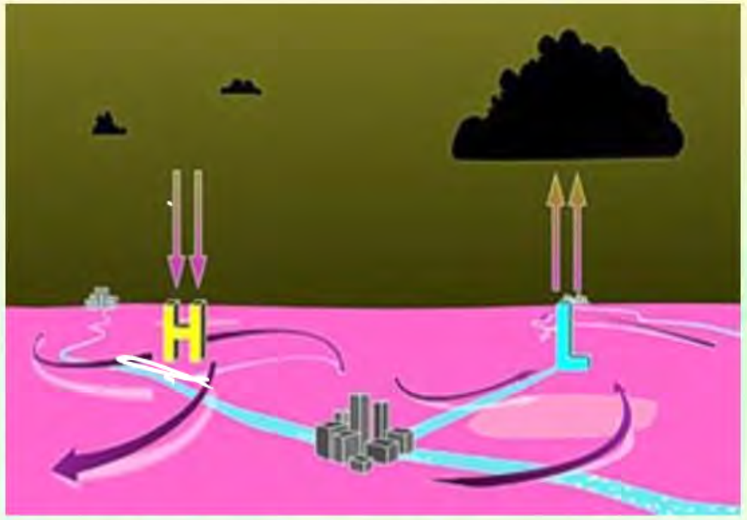
- This low-pressure belt extends from 0° to 5° North and South of the Equator.
- Due to the Vertical rays of the Sun here, there is intense heating. The air, therefore, expands and rises as Convection current causing low pressure to develop here.
- This low-pressure belt is also called as Doldrums because it is a zone of total Calm without any Breeze.





Sub-Tropical High-Pressure Belt

- At about 30°North and South of the Equator lies the area where the ascending equatorial air currents descend. This area is thus an area of high pressure.
- It is also called as the Horse latitude.
- Wind from this region moves towards Equator and Sub-Polar region



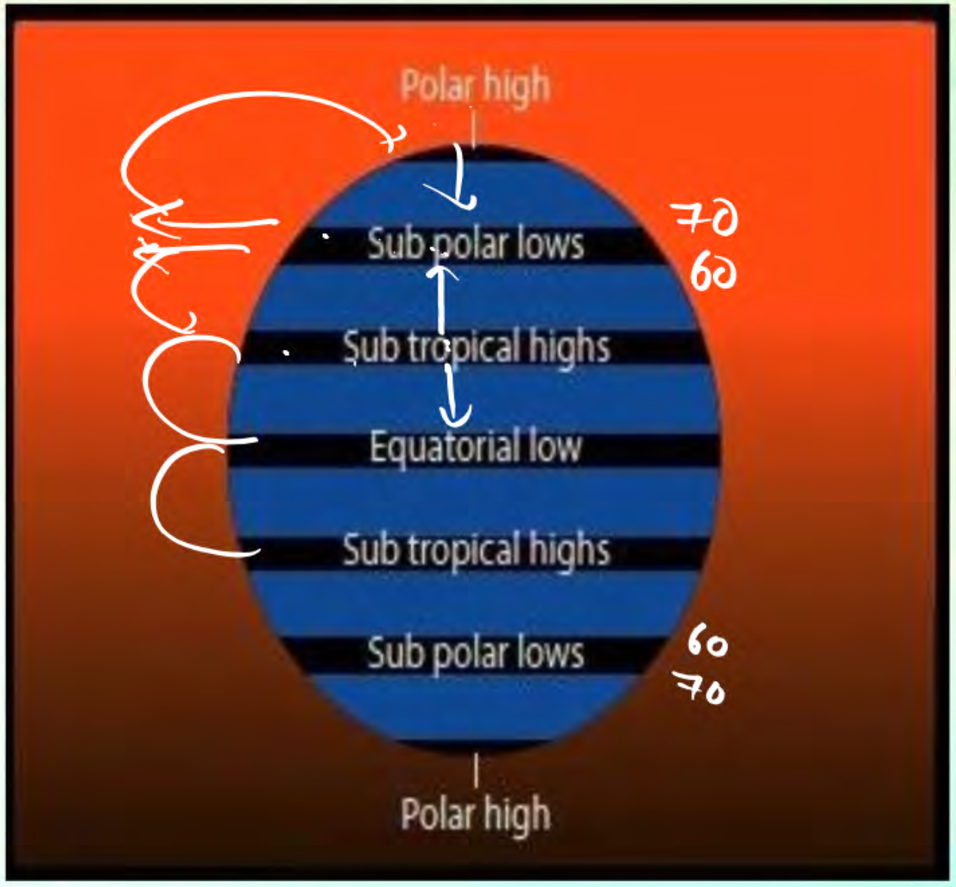
Sub-~~Tropical~~ Low-Pressure Belt

= Polar

- Like Sub-Tropical High-Pressure Belt, it is also dynamically induced . These belts located between 60° and 70°

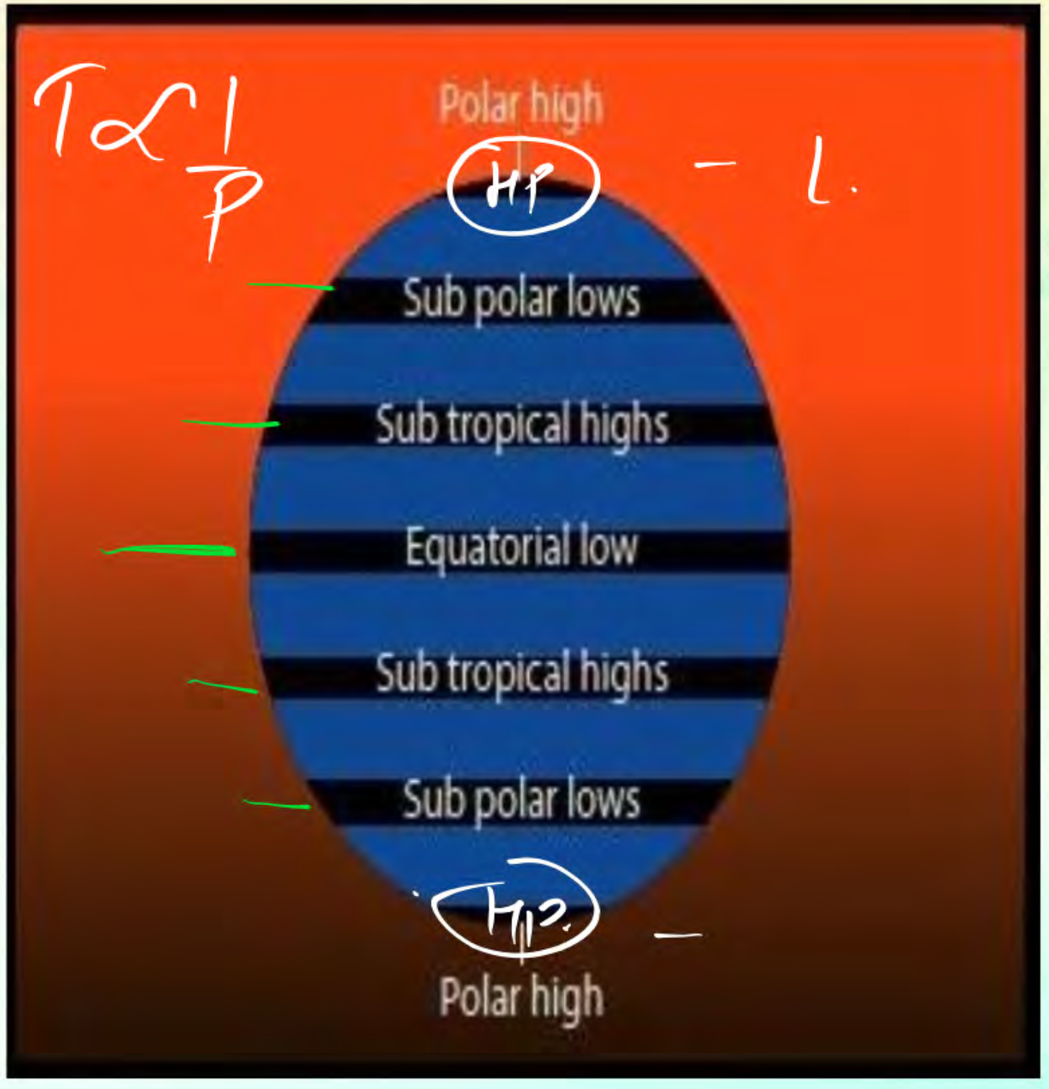
- As wind comes from Polar High-Pressure region and Sub-Tropical Low-Pressure region

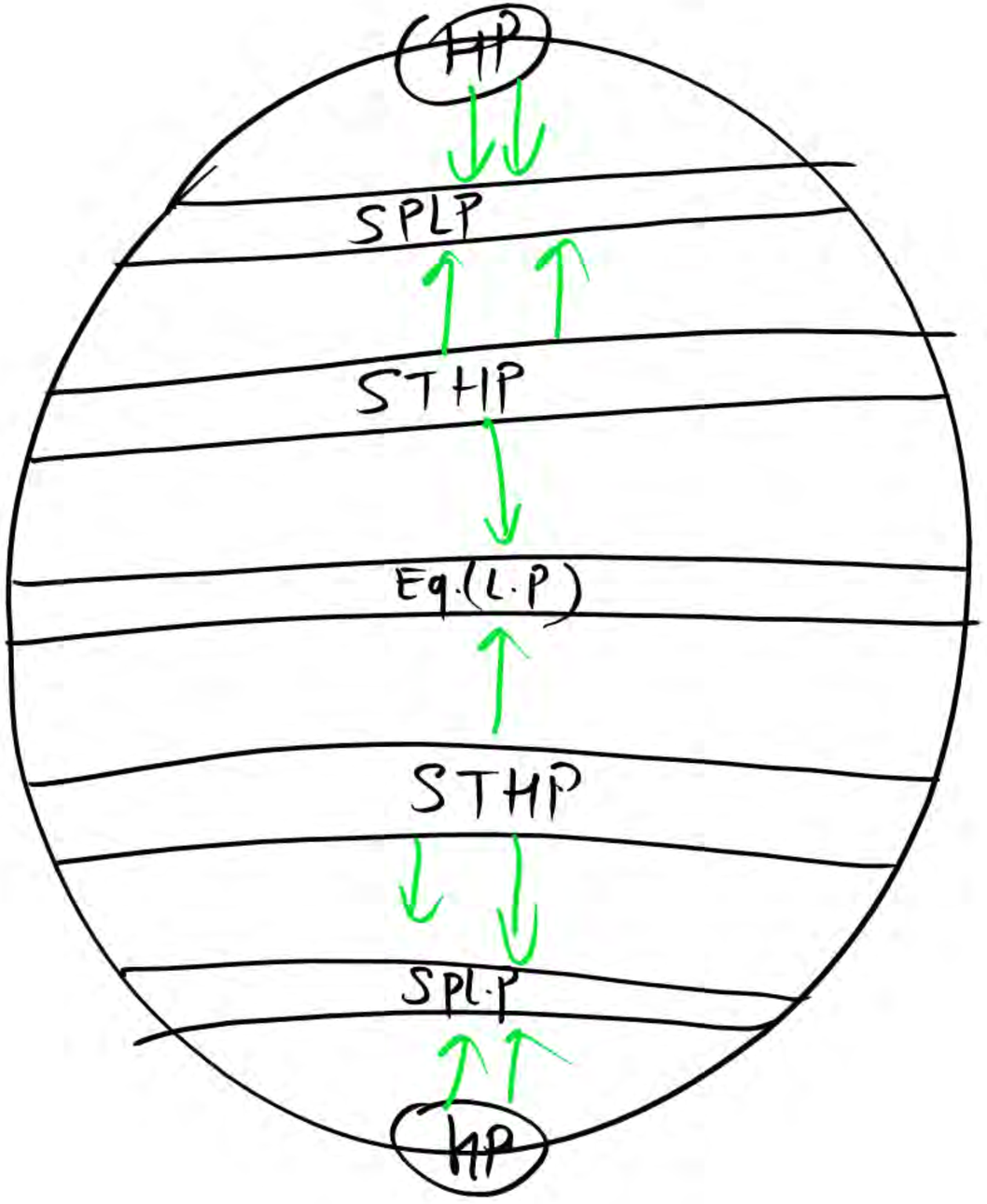
- Wind ascend from this region

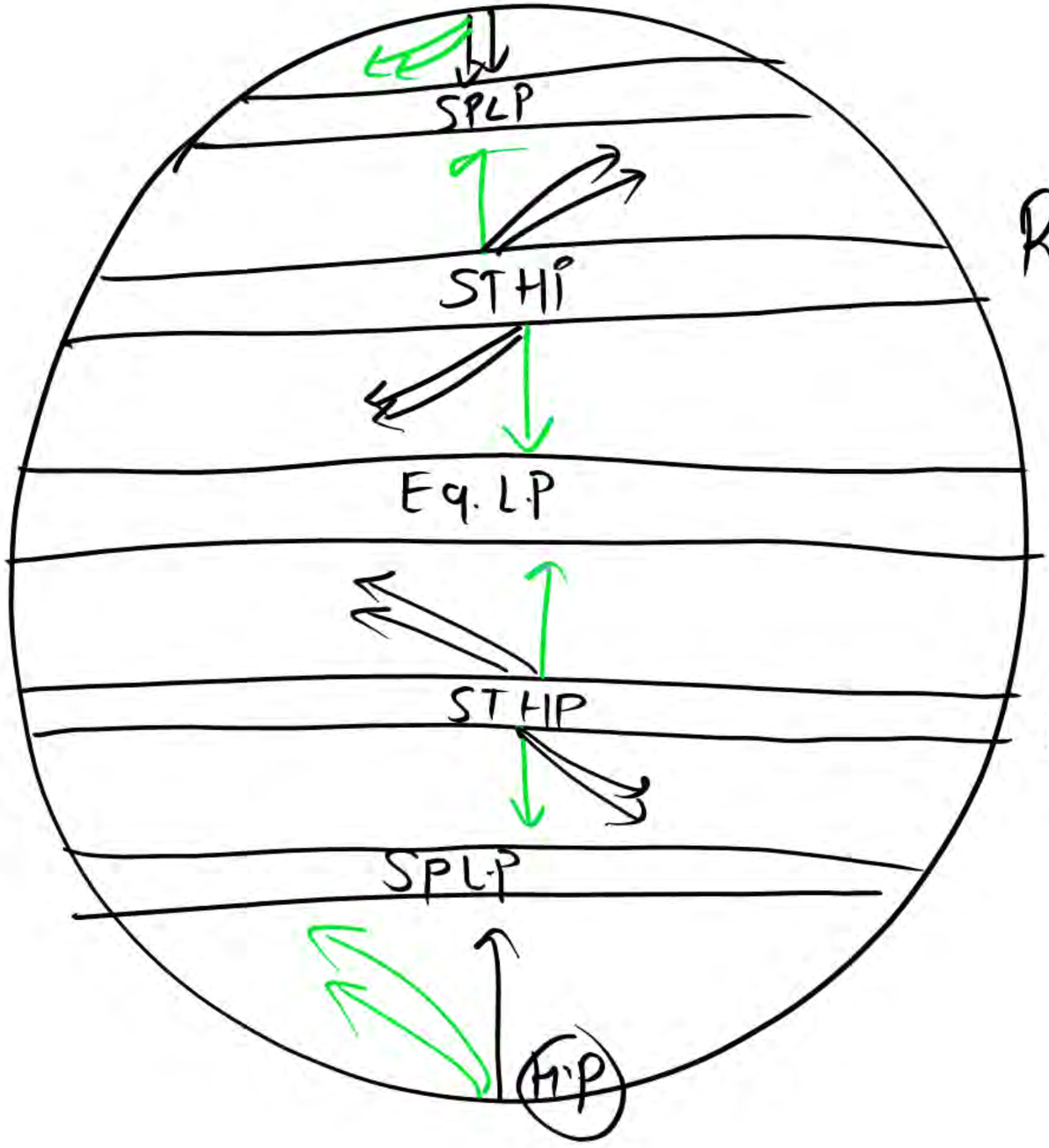


Polar High-Pressure Areas

- At the North and South Poles, between 75° to 90° North and South, the temperatures are always extremely low.
- It ~~is thermally Induced~~
- The cold air gives rise to High Pressures over the Poles.

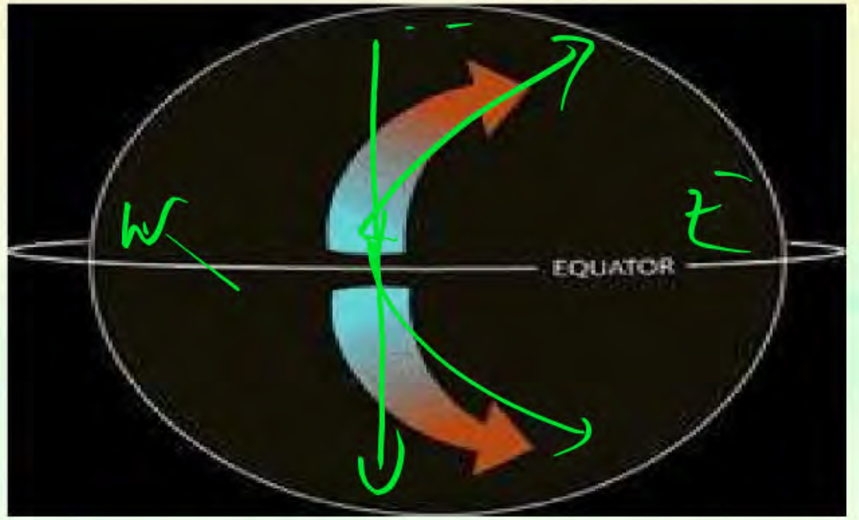



HP
SPLP
STHP
Eq.(L.P)
STHP
SPL.P
HP


SPLP
STHP
Right Hand
Eq. LP
STHP
Left Hand
SPLP
HP

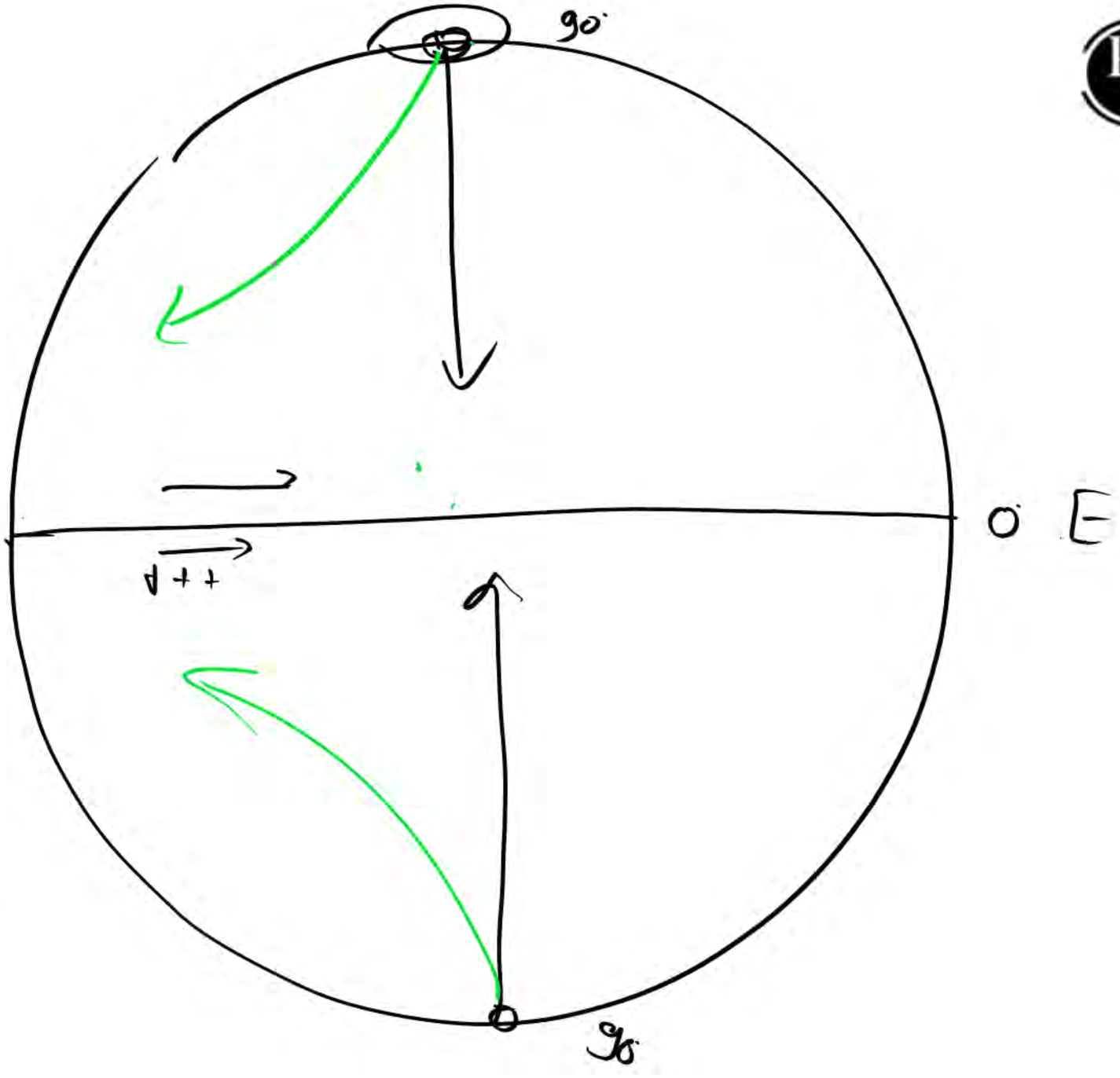
Coriolis Force

- An apparent force that arises because of the earth's rotation on its axis.
- When wind moves in northern hemisphere it deflect in right hand side.
- When wind moves in southern hemisphere it deflect in left hand side.



24 = 100KM.

24 = 40000 KM



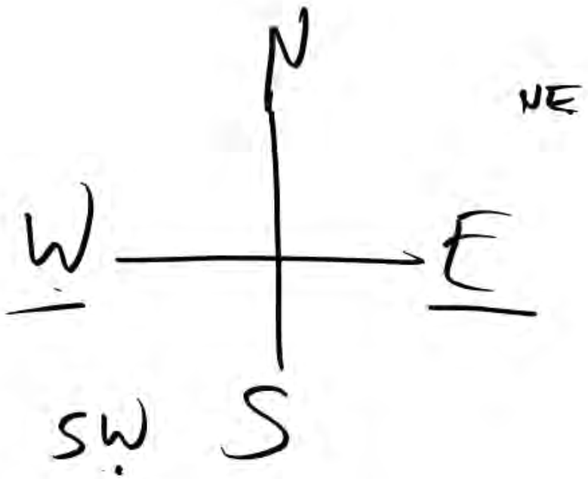
Atmospheric circulation (Wind)

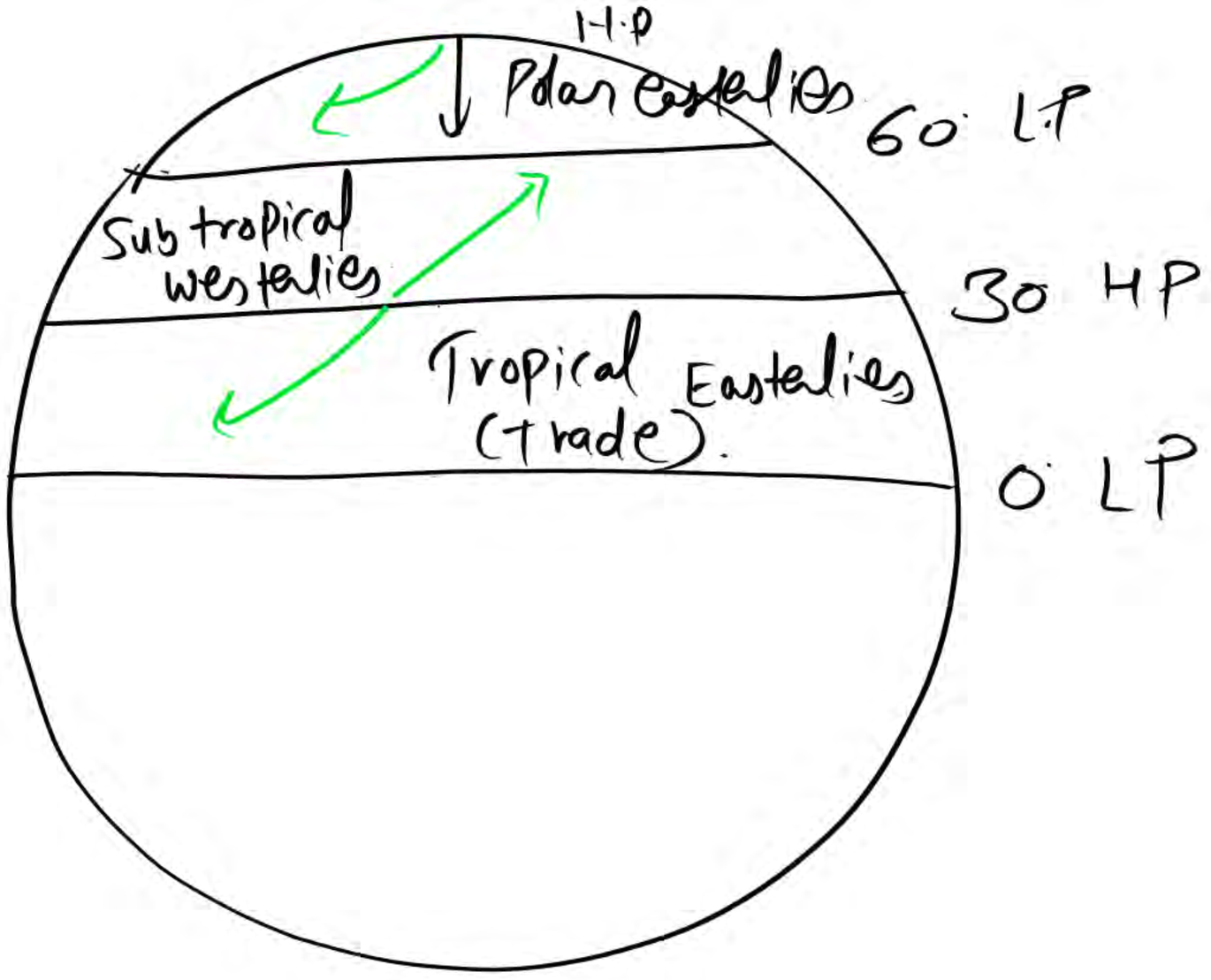
- Primary/Planetary wind: Trade Wind, Westerlies and Polar Easterlies

Rotation

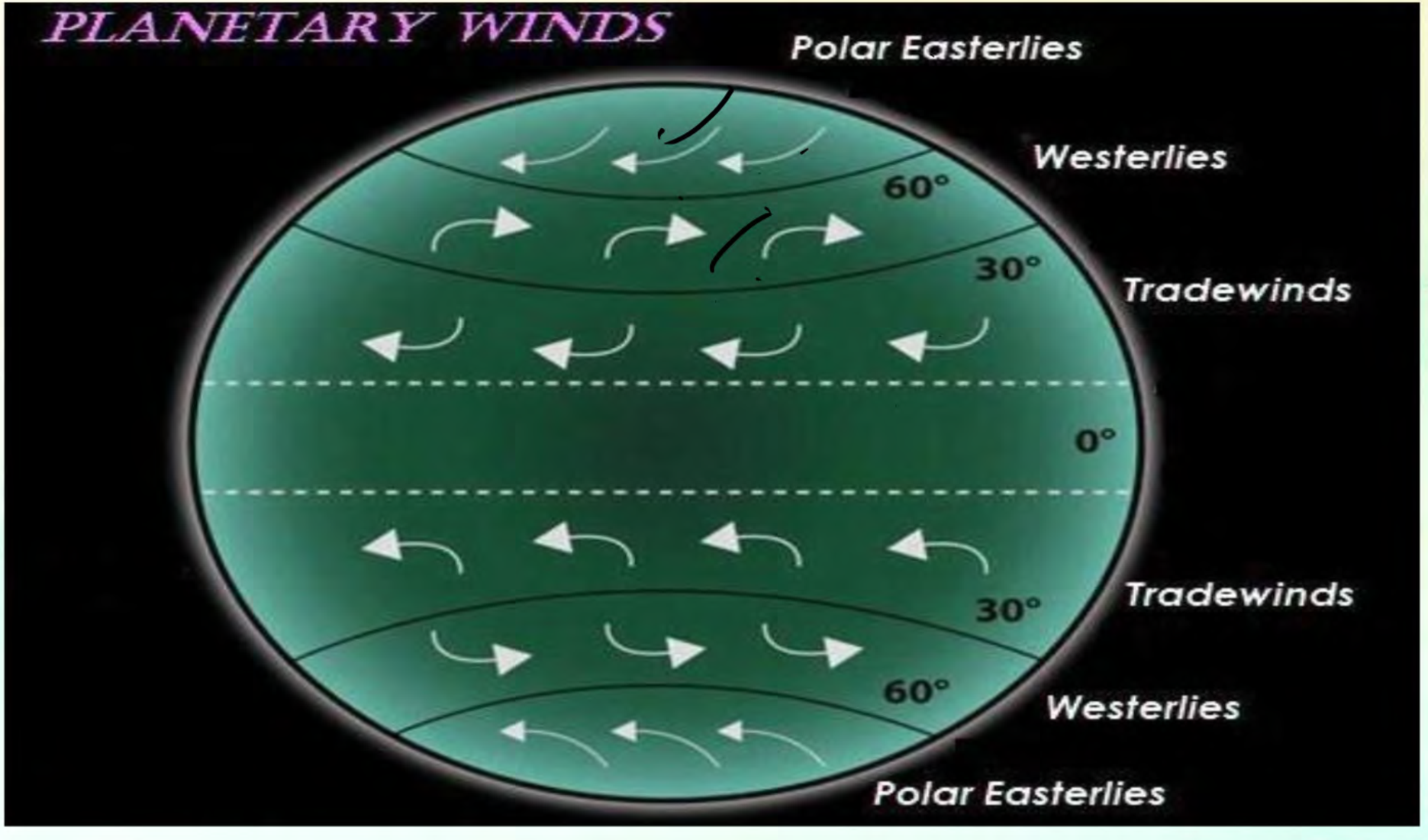
- Secondary wind / Seasonal: Monsoon and Cyclone

- Tertiary wind : Local wind and Diurnal wind


N
NE
W
E
SW
S


H.P
Polar Easterlies
60° L.P
Sub tropical westerlies
30° H.P
Tropical Easterlies (Trade).
0° L.P

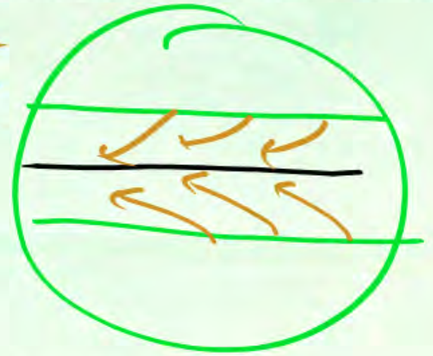
Planetary Wind



Planetary and Permanent Wind

- **Tropical easterlies** : Wind which blow from 30° North and 30° South. From Sub-Tropical High Pressure to Equatorial Low Pressure. The convergent of trade wind is known as ITCZ.
- **Westerlies** : Wind this winds blow from Sub-Tropical High Pressure to sub polar low 30° to 65°. Westerlies in southern hemisphere are stronger due to less wind barrier.
  - Roaring Forties 40°s
  - Furious Fifties 50°s
  - Shrinking Sixties 60°s
- Polar Easterlies: It blows from Polar High-Pressure to Sub Polar Low

Inter tropical convergent zone.




WEATHERWATCH.CO.NZ™
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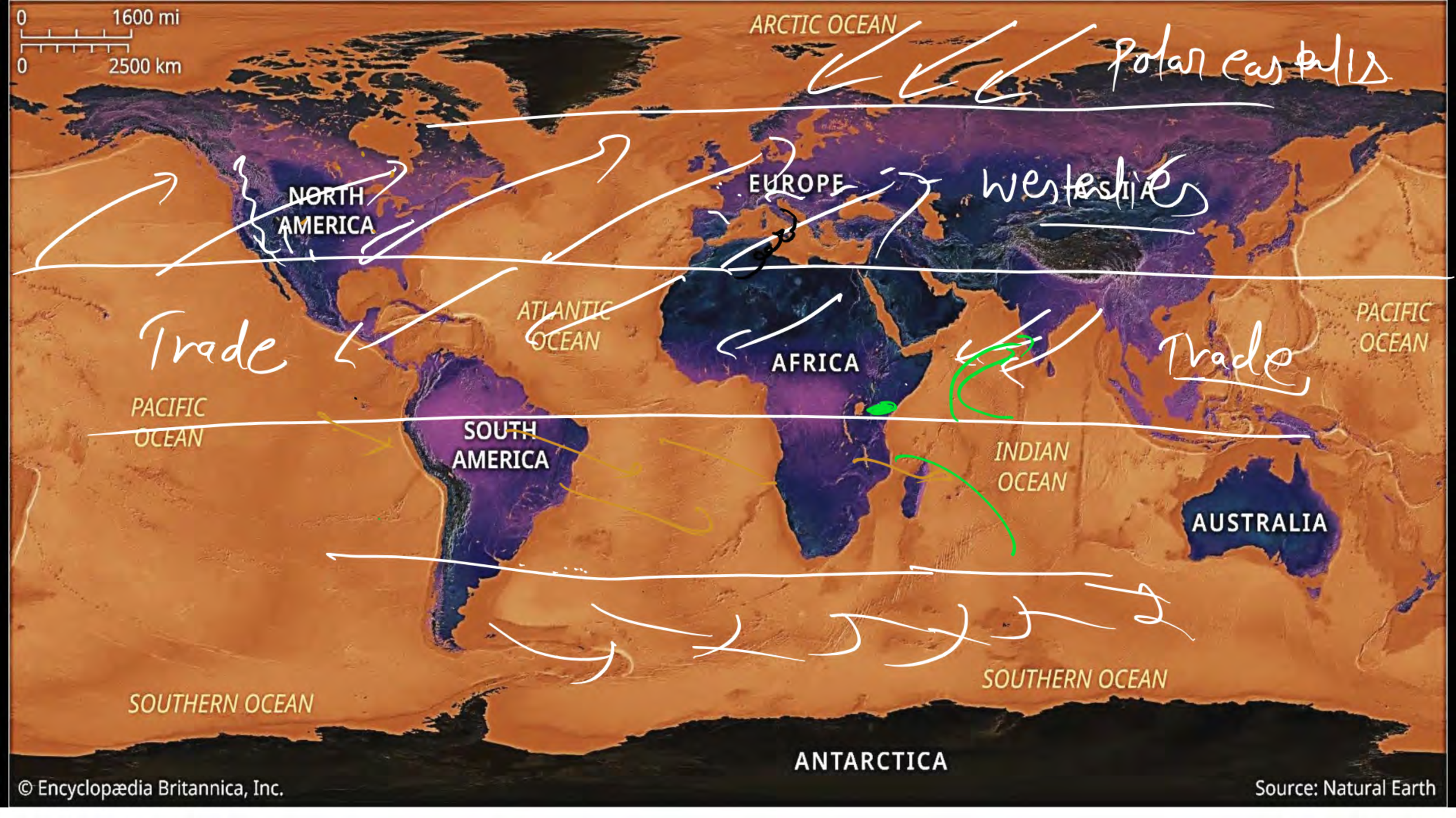
S30°
ROARING FORTIES
E130°
S50°
E150°
E110°
E170°
Antimeridian
FURIOUS FIFTIES
E 90°
W170°
E 70°
SCREAMING SIXTIES
W150°


0
1600 mi
0
2500 km
ARCTIC OCEAN
Polar easterlies
NORTH AMERICA
EUROPE
Westerlies
ASIA
ATLANTIC OCEAN
Trade
AFRICA
Trade
PACIFIC OCEAN
PACIFIC OCEAN
SOUTH AMERICA
INDIAN OCEAN
AUSTRALIA
SOUTHERN OCEAN
SOUTHERN OCEAN
ANTARCTICA
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Source: Natural Earth

Seasonal Wind

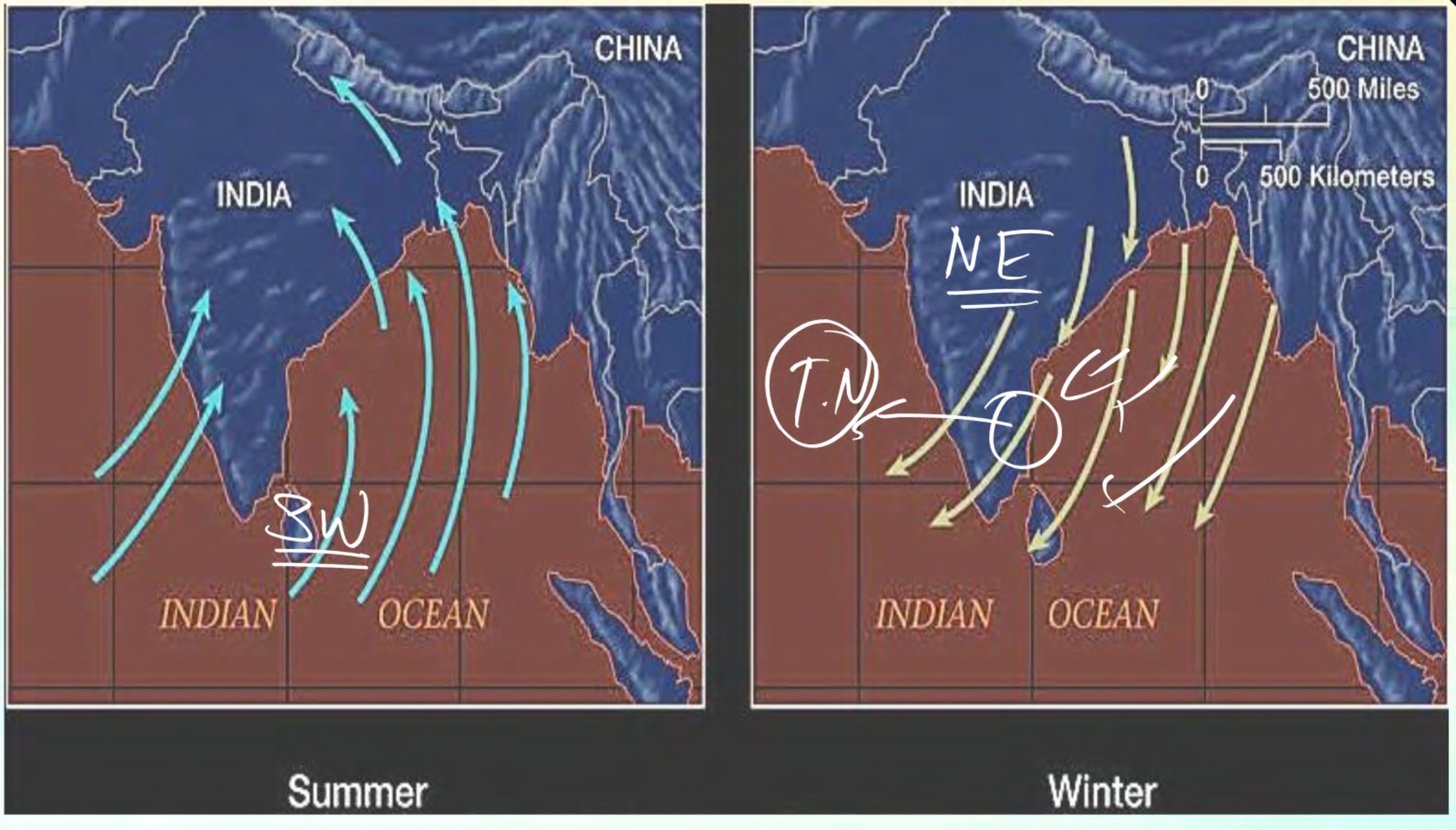
- **Monsoon**

June, July, August, September

- **Cyclone**

Pre_Monsoon

Post-Monsoon

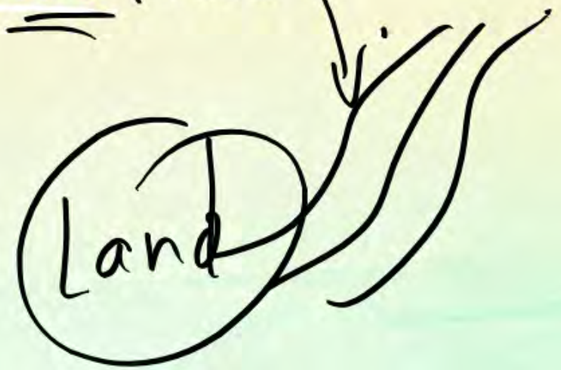

CHINA
INDIA
SW
INDIAN
OCEAN
Summer
CHINA
0
500 Miles
0
500 Kilometers
INDIA
NE
T.N
INDIAN
OCEAN
Winter

Local Wind

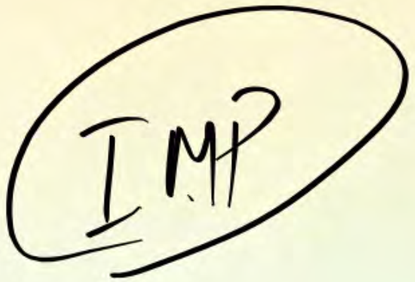
World Map

Advection

- Local winds are generated due to local climatic condition Ex- Loo (Also know as Kal Baisakhi in West Bengal)
- Simoom Hot Wind in Arabian Peninsula
- Sirocco Hot and Dry Wind known for Blood Rain Italy
- Levanter Cold wind in southern Spain
- Khamsin Warm and Dry wind in Egypt
- Mango Shower Pre monsoon shower in Kerala and Karnataka
- Chinook Warm and Dry in North America Snow Eater.
- Foehn Warm and Dry Wind in North Slope of Alps
- Harmattan Warm and Dry in Northeast Africa



- Bricks Fielder warm wind in Victorian Desert
- Shamal Wind Hot and Dry, Dusty Wind in Iraq
- Blizzard Cold Stormy Wind Siberia
- Mistral wind Cold Wind France and Spain
- Yoma Warm and Dry Japan
- Haboob Wind Dry Hot Stormy Wind Sudan
- Bise Wind France and Switzerland
- Black Roller Warm and Dry Dusty Winds North America



Diurnal Wind

Sea Breeze and Land Breeze

Mt Breeze and Valley Breeze

8:00 — 10:00

Day

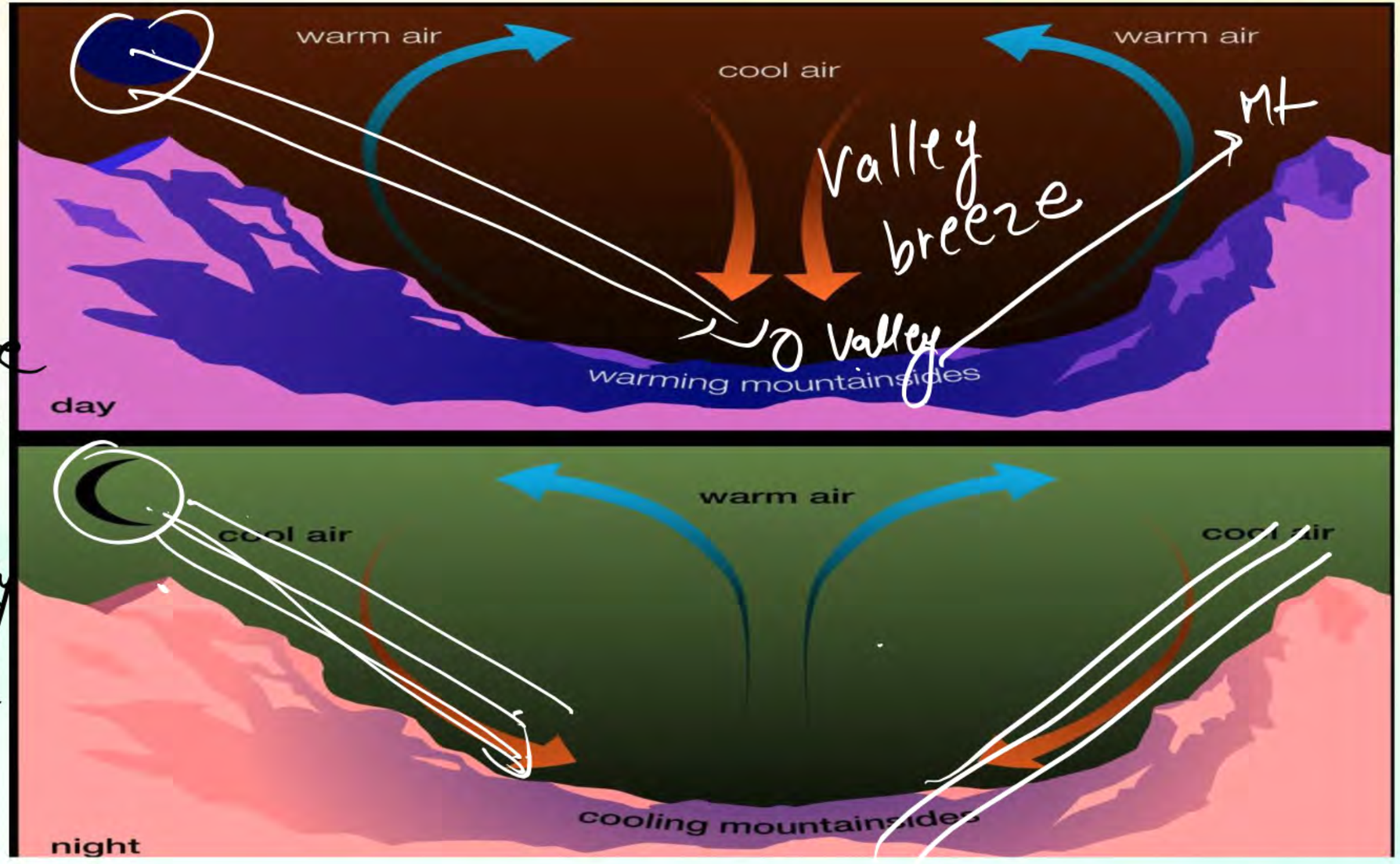
valley to Mt

valley breeze

Night

Mt → Valley

Mt. breeze




JAI
HIND