Government of Tamil Nadu

Department of Employment and Training

Course : TNPSC Combined Civil Services Examination - IV(Group IV / VAO)

Subject : Geography

Topic : WEATHER - CLIMATE - MONSOON - RAINFALL

It is a cost-free service provided to the job seekers who are preparing for Competitive Exams.

Commissioner,

Department of Employment and Training.

WEATHER - CLIMATE - MONSOON - RAINFALL

Weather

Weather refers to the physical state of the atmosphere within 24 hours.

Climate

The word climate is defined as the weather averaged over a long period of time and over a large area. India has tropical Monsoon type of Climate.

Factors determining Weather and Climate

1. Latitude

The equator receives vertical rays which fall over a small area. In contrast, the Polar Regions receive slanting sunrays and they fall over a wide area. As a result of this, places near the equator are hotter than the poles.

Normal Lapse Rate:

Temperature decreases as altitude increases.

This occurs at a rate of 6.5 degree Celsius per kilometer 1, which is 1 degree Celsius/ 165 meters.

Inversion of Temperature

At times, the situation is reversed and the normal lapse rate is inverted

2. Altitude

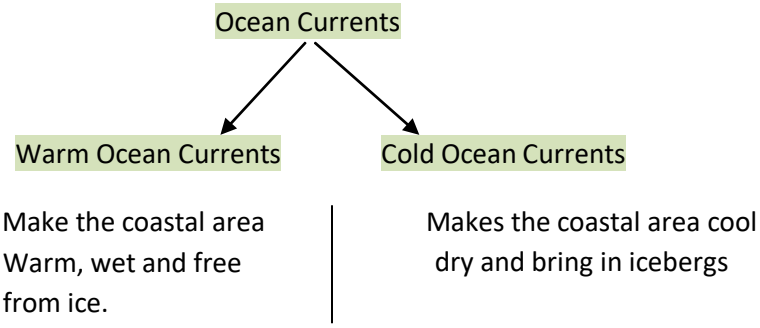
The places located on high altitudes are always colder than their counter parts in the lower altitudes. This is because the air becomes thinner as altitude increases and they absorb only less heat.

3. Distance from the sea

- Areas near to sea –experience maritime climate.
- Areas away from sea – experience Continental climate.

4. Ocean currents

Based on temperature, the ocean currents are classified.



5. Direction of prevailing winds

- The winds that blow from the sea to land contain more moisture so they are cool and wet.
- The winds blowing from land are warm and dry.

6. El Nino effect (The Christ child)

It is a narrow warm current, which occasionally appears of the coast of Peru in December.

★ **La Nina** : Reverse of El-Nino ,Harbinger of heavy monsoon showers in India.

7. Temperature

- The Incoming solar radiation is called Insolation.
- The Isotherms are lines joining places having equal temperature.

Diurnal range of temperature	Annual Range of Temperature
The differences between the maximum and minimum temperatures of a day.	The differences between the hottest and coldest months of a year.

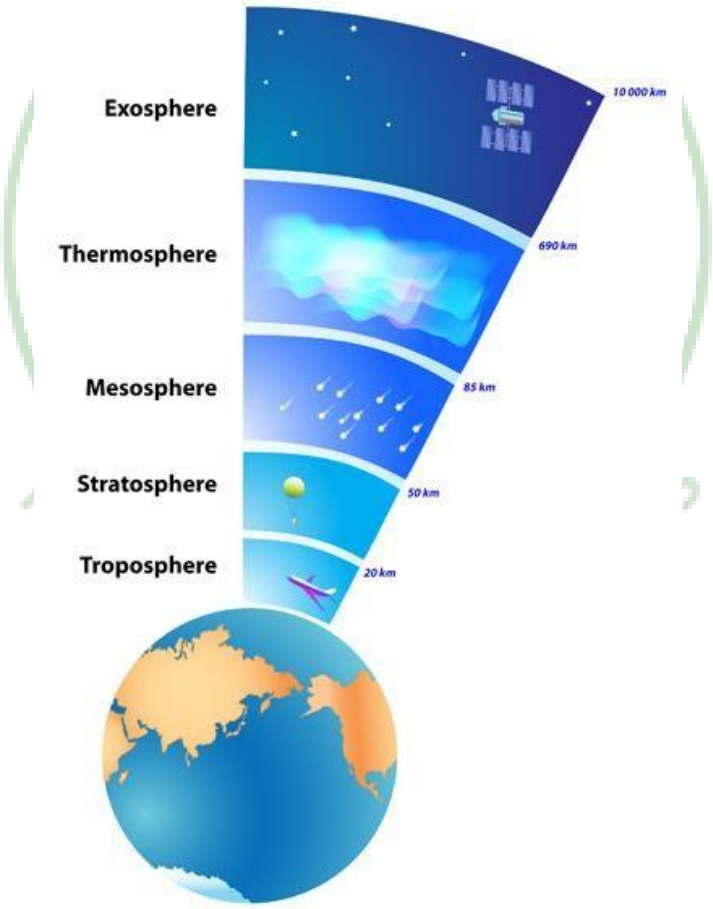
Earth's Atmosphere

Atmosphere is a thick gaseous envelope surrounding the earth. Almost 97% of atmosphere confines within 29km of earth surface.

Composition of gases

Nitrogen	78.08%
Oxygen	21%
Argon	0.93%
Co2	0.03%
Neon	0.0018%

Layers



Troposphere

- The layer closest to Earth's surface in which all weather occurs.
- This layer Temperature decreases with increase in height

Tropopause

The boundary between the stratosphere and troposphere.

Stratosphere

- **C**ontains the ozone layer;
- Temperature Inversion(Temp increases with increase in height) occurs here.
- Also called Isothermal Layer

Stratopause

The boundary between the mesosphere and the stratosphere.

Mesosphere

This layer Temperature decreases with increase in height.

Ionosphere

Ionosphere stretched from 80 kms- 500 kms. It is called ionosphere because in this part of the atmosphere the sun's radiations gets ionized

Mesopause

The boundary between the mesosphere and the thermosphere; the coldest place on Earth.

Thermosphere

- Temperature increases with height.
- The temperatures can rise to 1,500 degrees Celsius, but it would not feel warm because of the low air pressure in this layer.

Exobase

The lower boundary of the exosphere.

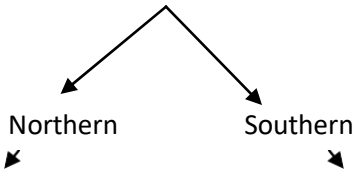
Exosphere

It contains few particles that move into and from space.

Heat Zones of Earth

1. Torrid zone – The zone between tropic of cancer and tropic of Capricorn.

2. **Temperate Zone**



The zone between tropic of cancer and arctic circle

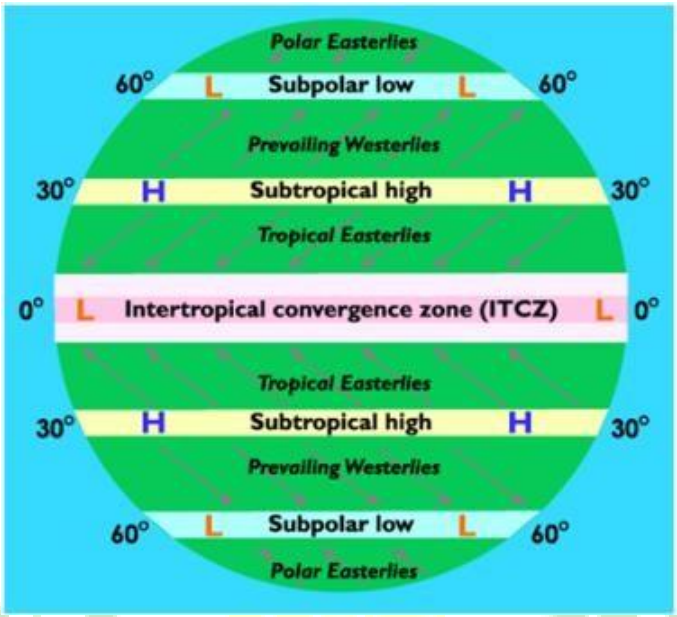
The zone between Tropic of Capricorn and Antarctic circle.

3. Frigid zone

- The Zone between Arctic Circle and North Pole.
- The Zone between Antarctic circle and South pole

Air Pressure

The pressure exerted by air due to its weight is called atmospheric pressure.



Equatorial Low Pressure Belts

This belt lies between 5 degree north and 5 degree south. The temperature is high here so low pressure prevails and this zone is otherwise called belt of calm or Doldrums.

Sub Tropical High Pressure belt

The Zone lies between 25 degree and 35 degree latitudes. In Ancient times merchants carrying horses have to throw few things into sea to lighten the ship hence called horse Latitudes.

Sub polar low pressure belt

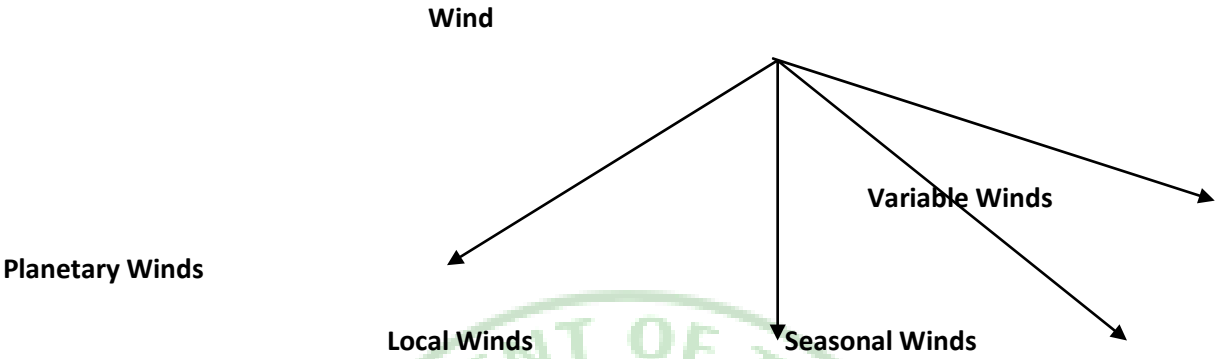
This zone lies between 60 to 65 degrees. The air spreads outwards from this zone due to rotation of earth hence low pressure prevails.

Polar High pressure belt

It persists at poles. The sun rays fall very slanting at the poles as a result the temperature is low and high pressure prevails.

Classification of Winds

Winds are classified on the basis of their origin and duration.



1. Trade Winds
2. Westerlies
3. Polar winds

1. Monsoon Winds
2. Land and Sea Breeze

- ★ The Imaginary line joining the points having same pressure is called isobars.
- ★ Coriolisis Force: It is generated due to the rotation of the earth. Absent at Equator. Increases progressively towards poles.
- ★ Ferrel's Law: The wind is deflected towards right in Northern hemisphere and Left in Southern hemisphere.

Sea Breeze

During Day Time the land becomes warmer than sea ,so low pressure prevails in land and high pressure in Sea As a result cool air from sea blows towards land in late evening.

Land Breeze

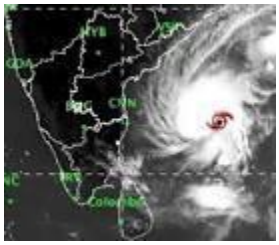
During night time the land becomes cooler than sea so high pressure prevails over land so cool and dry breeze blows from land towards sea.

Seasonal Winds

Seasonal Winds are caused due to the difference in heating and cooling of the surface of the earth.

Cyclones

Cyclones are the centre's of low pressure system ,they attract wind from all directions. Associated with heavy rain and high speed winds.



Northern Hemisphere

Air blows inward and anti clockwise direction**.**

Southern Hemisphere

Air blows outward and clockwise direction.

Cyclones are called by different name in different areas.

CYCLONE	REGION
Typhoons	China Sea
Tropical Cyclone	Indian Ocean
Hurricanes	Carribean Sea
Tornadoes	USA
Cyclone	Australia
Willy Willies	North America

- Centre of the cyclone is called Eye of the cyclone

Geography GK

Recent Cyclones that hit Tamil Nadu

- ★ Cyclone Gaja – December 2018
- ★ Cyclone Ockhi -2017
- ★ Cyclone Vardah - 2016

AntiCyclones

Anticyclones are the centres of high pressure system from which the wind movement takes place outward.

Cloud

A cloud can be defined as a mass of small water droplets or ice crystals formed by the condensation of water vapor in the atmosphere.

Cirrus clouds are high clouds

Nimbus clouds are vertical clouds

Cumulus clouds are often described as “puffy” or “cotton-like” in appearance which are medium clouds

Rainfall

The rainfall types are classified into three as :

1. **Convectional**
   Since the equatorial regions receive vertical sunrays they become hot, so that the hot air expands and rises vertically upwards. As the temperature reduces gradually, the air gets cooled and forms clouds. When the clouds reach the dew point, they cause rainfall. This is known as the convectional rainfall.

2. **Relief or Orographical**
   The winds that blow from the sea contain a lot of moisture. When the moisture laden winds from sea climbs the hills across the paths, the winds become cool causing heavy rainfall on the windward side. This is called as orographic rainfall

3. **Cyclonic**
   Due to Earth’s rotation, the wind gets deflected and a circular motion of wind develops. The air rises upward in the form of a funnel. The rising air gets cooled and condensation takes place. This brings heavy rainfall in the low pressure centres. This is called as cyclonic rainfall.

Four Important Seasons of India

1. Winter (December-February)
2. Hot weather summer (March-May)
3. Rainy southwestern monsoon (June-September)
4. Post-monsoon, also known as northeast monsoon in the southern Peninsula (October – November)

North-East Monsoon Season (October to November)

- Commonly known as winter monsoon ,
- Blows from land to sea

South-West Monsoon Season (June to September)

- known as summer monsoon
- blows from sea to land after
- The Southwest Monsoon is normally divided into two branches
    1. Arabian Sea branch
    2. Bay of Bengal branch.
- Brings most of the rainfall during a year in the country