

# Vetrii's TNPSC Material Geography



## VETRII IAS STUDY CIRCLE

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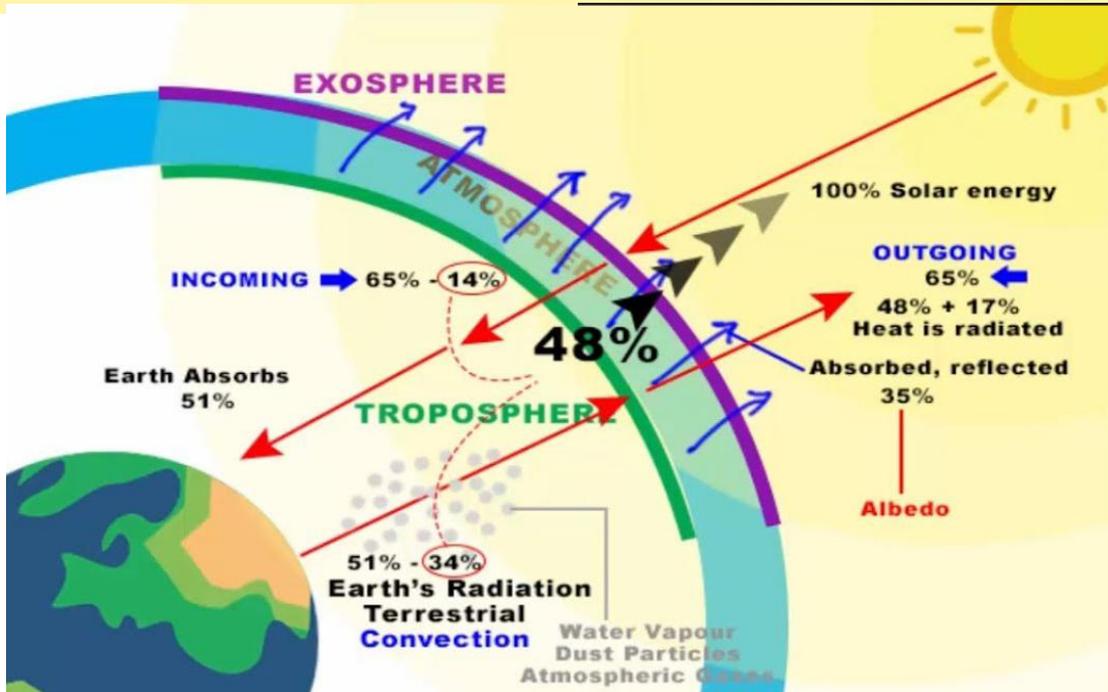
# TNPSC GEOGRAPHY

**VETRI I.A.S.**  
**STUDY CIRCLE**

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# CLIMATOLOGY



## 1.1 WEATHER AND CLIMATE:

Weather and Climate are two terms which uses in day-to-day life. This is because our daily routine is based on the prevailing weather conditions. Human activity of any region is determined by weather and climate. Our food habits, customs, traditions and even most of our common celebrations are associated with weather and climate.

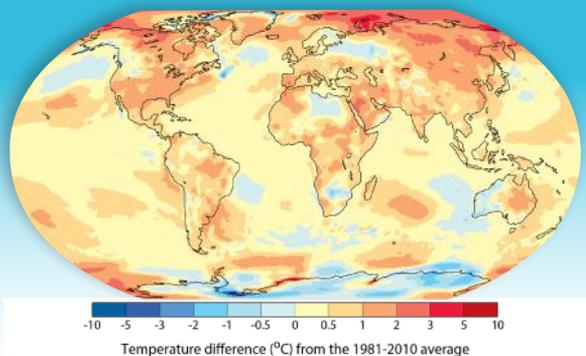
### Weather:

Weather refers to the physical state of the atmosphere within 24 hours, described by weather elements such as temperature,

atmospheric pressure, humidity, rainfall, cloudiness, wind speed and wind direction. These differences are the outcome of the angle of the sun at any particular spot, which vary by latitude of the tropics.

### Climate:

The word climate is defined as the weather averaged over a long period of time and over a large area. The standing average period is 30 years.



## Factors determining Weather and Climate:

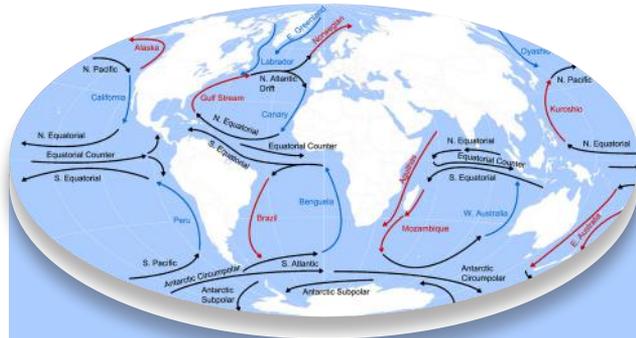
Day-to-day factors affect the weather element. The following factors affect the climate of the place.

**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 1 degree Celsius/ 165 meters, which is 6.5 degree Celsius per kilometer.

- 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:** The Sea absorbs and retains heat for long duration. The coastal areas experience the cool, wet air from the sea throughout the year along the coast to have uniform weather both in the winter and summer. This condition is said to be an equable climate or maritime climate. On the other hand, the land absorbs and loses heat quickly. The interior land areas experience warm dry air. They are very hot in summer and very cold in winter. This condition is said to be continental climate.
- 4. Ocean currents:** Based on temperature, the ocean currents are classified as warm ocean currents and cold ocean currents. Warm currents make the coastal area warm, wet, and free from ice. On the contrary, cold current makes the coastal area cool, dry and bring in icebergs.
- 5. Direction of prevailing winds:** The winds that blow from the sea to land

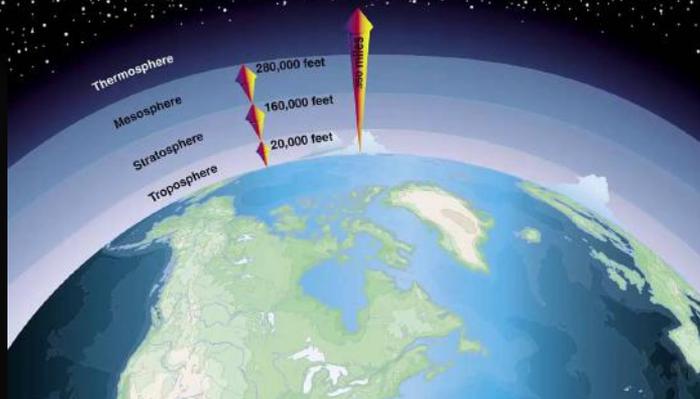


contain more moisture so they are cool and wet. On the other hand, the winds blowing from land are warm and dry.

- 6. El Nino effect:** El Nino is formed during Christmas time and continues for a few months. During this period, once in five or six years, **the temperature raises rapidly and a low pressure system is formed along the coast of Peru and Ecuador.** This low pressure system attracts the winds from all directions. So, the trade winds become weak over the Indian ocean and the Pacific ocean and these winds are deflected causing a prolonged dry periods in many parts of the world.
- 7. Human influence:** As a result of Industrial revolution, forest areas have been cleared and we have many types of transport facilities, concrete buildings and many industries. All these developments made our life easy and comfortable. On the other hand, their effects are felt in the name of global warming, greenhouse effect and pollution, which have increased the amount of CO<sub>2</sub>. Creation of urban heat island is also an effect of human influence. These islands occur in metropolitan areas, which are significantly warmer than their surrounding areas.

## 1.2 ATMOSPHERE

Air is essential to the survival of all organisms. Some organisms like humans can survive without food and water but not without breathing air. Atmosphere is a mixture of gases and it envelopes the earth all around. It contains life giving gases. The air is an integral part of the mass of the earth and 99% of the total mass of the atmosphere is confined to 32 Km from the earth's surface.



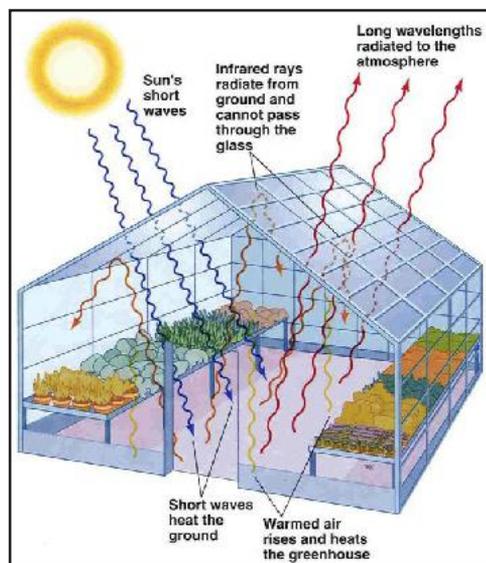
### Composition of the atmosphere:

The atmosphere is a mixture of gases, water vapour and dust particles. The proportion of gases changes in higher layers of the atmosphere. The quantity of oxygen is negligible as we go to the higher layers and similarly carbon dioxide and water is found only upto 90 km from the surface of the earth.

Neon	0.002
Helium	0.0005
Krypton	0.001
Xenon	0.00009
Hydrogen	0.00005

### Major Green House Gases in the Atmosphere:

- Water Vapour (H<sub>2</sub>O)
- Carbon Dioxide (CO<sub>2</sub>)
- Methane (CO<sub>2</sub>)
- Nitrous Oxide (N<sub>2</sub>O)
- Ozone (O<sub>3</sub>)
- Chlorofluoro Carbons (CFCs)
- Hydrofluoro Carbons



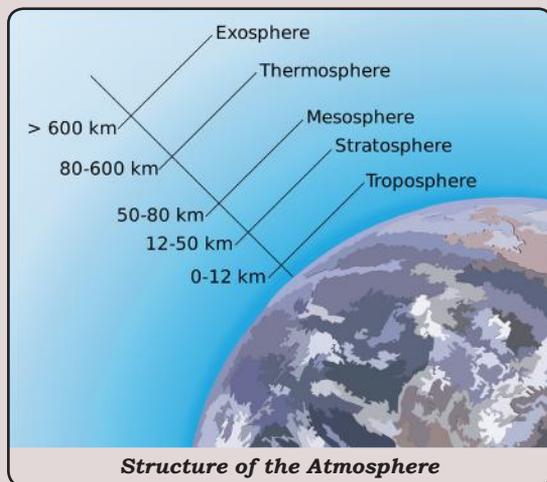
### Gases in Atmosphere (% wise)

Constituent	Percentage by volume
Nitrogen	78.08
Oxygen	20.95
Argon	0.93
Carbon dioxide	0.036

- Reflection of sunlight (or) Solar radiation is known as albedo.
- Harder the surface more absorption use Albedo for eg: Rock.
- Fresh snow has more reflection % it has 95%
- Earth's albedo value 0.35.

**There are four major layers of the atmosphere. They are troposphere, stratosphere, ionosphere and exosphere.**

**Troposphere:** Troposphere begins at the surface of the earth and extends up to 8 kms at the poles and 18 kms at the equator. This layer is known for all kind of weather changes such as temperature, pressure, winds, cloud formation and rainfall. In this layer alone, the temperature decreases with increasing height. The tropopause is a thin layer that lies between the troposphere and the stratosphere.



### Stratosphere:

Stratosphere extends approximately for about 50 km. Temperature increases with height. This is the layer where most jet planes fly, owing to the lack for weather phenomena. The top edge of the stratosphere is rich in Ozone (20-50). They capture the harmful ultraviolet rays from the sun, making the light reaching the earth's surface harmless. Since unfiltered radiation from the sun can destroy all animal tissue, Ozone is very important to

all living things on earth. This zone is also called isothermal layer and ozonosphere. After the stratosphere, there is again a buffer layer called stratopause.

**Mesosphere:** It extends approximately for about 80 km. Temperature decreases with height throughout the mesosphere. The coldest temperatures in Earth's atmosphere, about  $-90^{\circ}\text{C}$  are found near the top of this layer. Most meteors vaporize in the mesosphere.

It lies above the Stratosphere and extends from 50 to 90 km. Temperature decreases with height and falls down to  $110^{\circ}\text{C}$  at the height of 80 to 90 km. The upper limit of mesosphere is mesopause. The coldest temperature in Earth's atmosphere. Most meteoros Vaporize in the mesosphere.

**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**. It reflects the radio waves back to the earth which help in modern communications. The colorful display of auroras are called the **northern lights or aurora borealis** in the northern hemisphere and **southern lights or aurora australis** in the southern hemisphere.

**Exosphere:** The exosphere is the uppermost layer of the atmosphere. The main gases within the exosphere are the lighter gases, mainly hydrogen and helium. The exosphere is sometimes considered a part of outer space.

**Magnetosphere:** A Magnetosphere is that area of space, around a planet, that is controlled by the Planet's Magnetic field. It protects surface from changed particles of the solar wind.