

# Meteorology-I

Branch of science dealing with that of atmosphere is known as meteorology

"Meteoro" means 'above the earth's surface' (atmosphere) & "logy" means indicating science'.

## Agro-meteorology

A science concerned with the application of meteorology to the measurement and analysis of the physical environment in agricultural systems.

## Composition of atmosphere

The following all the different gases that are present in percentage by volume approximately.

Nitrogen ( $N_2$ ) = 78.08

Oxygen ( $O_2$ ) = 20.95

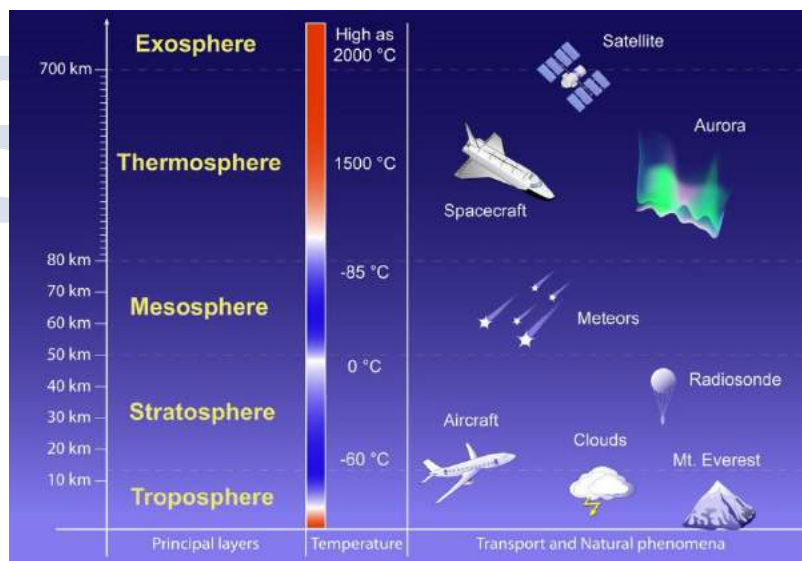
Argon (Ar) = 0.93

$CO_2$  = 0.03

Neon (Ne) = 0.0018

## Layers of atmosphere based on temperature

They are divided into 5 categories:





## 1. Troposphere

- The average height of this lower most layer of the atmosphere is about 18 km above the mean sea level; at the equator, it is 16-18 km and 7-8 km at the poles.
- The temperature at the tropopause is of the order of  $-80^{\circ}\text{C}$  over the equator and around  $-56^{\circ}\text{C}$  over the poles.
- The word "Trop" means mixing or turbulence and "sphere" means region.
- Various types of clouds, thunderstorms, cyclone and anticyclones occur in this sphere because of the concentration of almost all the water vapour and aerosols in it.
- At the top of the troposphere, there is a shallow layer separating it from the stratosphere which is known as the "Tropopause".

## 2. Stratosphere:

- This layer exists above the tropopause (around 20 km onwards) and extends to altitudes of about 50-55 km.
- This layer is called as "Seat of photochemical reactions".
- The temperature remains practically constant at around 20 km and is characterized as isothermal because air is thin, clear, cold and dry near tropopause.
- This rise in temperature is also due to the absorption of ultraviolet radiation in the ozone layer between, say, 20 and 50 km.

## 3. Mesosphere:

- The layer between 50 and 80 km is called as "Mesosphere". In this layer the temperature decreases with height.
- The upper boundary of this layer is called the "Mesopause".
- Mesosphere is the coldest region in the atmosphere with temperature reaching the lowest value of nearly  $-95^{\circ}\text{C}$  at the mesopause (80km).



#### 4. Thermosphere (Ionosphere):

- The thermosphere layer lies beyond the mesosphere at a height of about 80 km. above the earth's surface and extends up to 400 km.
- The atmosphere in the ionosphere is partly ionized enriched ion zones exist in the form of distinct ionized layers. So, this layer is called as the ionosphere.
- Temperatures rise rapidly above the mesopause, reaching nearly 1000°C by about 300km. This region is known as the thermosphere.

#### 5. Exosphere:

- The outer most layer of the earth's atmosphere is named as the exosphere and this layer lies between 400 and 1000 km.
- At an altitude of about 500 to 600 km the density of the atmosphere becomes so low that collisions between the natural particles become extremely rare.

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