



Centurion
UNIVERSITY

LECTURE 2



Centurion
UNIVERSITY

ATMOSPHERE

• Atmosphere is a colourless, tasteless and odourless mixture of gases that surround the earth. Total mass of atmosphere has been calculated at about 56×10^{14} t.

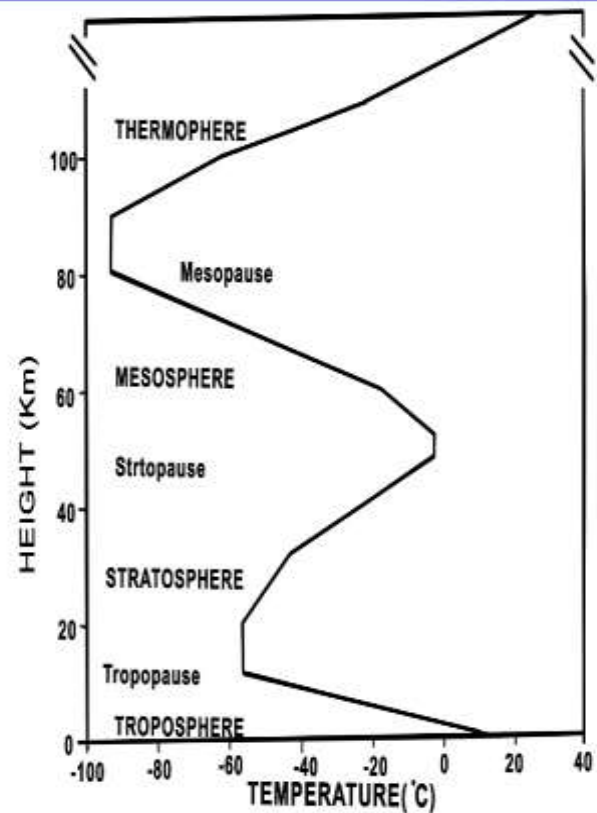
Composition of atmosphere

Constituent	Per cent by volume
Nitrogen	78.08 %
Oxygen	20.94 %
Argon	0.93 %
Carbon-dioxide	0.03 %

- There is no definite upper boundary layer to the atmosphere.
- The decrease of air(density) with altitude.
- However, 99% of the total mass of the atmosphere is within 40 km.
- The atmosphere is a mixture of many gases. In addition it contains large quantities of solid and liquid particles, collectively called aerosols.
- The lower part of the atmosphere contains water vapour from 0-4% by volume.
- Nitrogen and oxygen make up approximately to 99% and remaining 1% by other gases.
- The lower atmosphere also contains impurities like dust particles, salt crystals, bacteria, pollen etc.



Centurion
UNIVERSITY



STRUCTURE OF THE ATMOSPHERE & VERTICAL
TEMPERATURE DISTRIBUTION



Centurion
UNIVERSITY

I) Troposphere

The word “Tropo” means mixing or turbulence and “Sphere” means region.

The average height of this lower most layer of the atmosphere is about 8-18 km. All weather phenomena like clouds, fogs, dew, rain etc. occur in this layer. So this layer is called “Seat of weather phenomena”.

The wind velocity increases with height and attain the maximum at the top of this layer.

Another striking feature of troposphere is that there is a decrease of temperature with increasing elevation and the temperature at the boundary is -60°C.



Centurion
UNIVERSITY

- Most of the radiation received from the sun is absorbed by the earth's surface. So the troposphere is heated below.
- It is the densest part of the atmosphere and contains about 85% of total atmosphere's mass.
- At the top of the troposphere there is a shallow layer separating it from stratosphere which is known as tropopause.



Centurion
UNIVERSITY

(ii) Stratosphere

This layer exists above the tropopause (around 20 km onwards) and extends to altitudes of about 50-55 kilometers.

This layer is called as "Seat of photochemical reactions".

It is dust free and cloudless.

The temperature of this layer increases with height. It contains around 15% of total atmosphere's mass.

In the upper parts of the stratosphere the temperatures are almost as higher as those near the earth's surface, which is due to the fact that the ultra violet radiation from the sun is absorbed by ozone in this region.

It is also called as chemosphere or ozonosphere.

The upper boundary of stratosphere is stratopause



Centurion
UNIVERSITY

(iii) Mesosphere

The layer between 50 and 85 km is called mesosphere.

It is the layer where most of the meteors burn up during entering the atmosphere.

In this layer the temperature decrease to -100°C with height. It is the coldest layer.

The upper boundary of this layer is called mesosphere.

(iv) Thermosphere

The thermosphere starts just above the mesosphere and extends to 600 kilometers.

Temperature increases with altitude in the thermosphere

Aurora and satellites occur in this layer



Centurion
UNIVERSITY

Ionosphere: The ionosphere is an abundant layer of electrons and ionized atoms and molecules that stretches from about 48 kilometers above the surface to the edge of space at about 965 km, overlapping into the mesosphere and thermosphere. Long distance radio communication is made possible through this ionized layer.

(v)Exosphere

The outer most layer of the earth's atmosphere is named as exosphere. It extends from the top of thermosphere upto 10,000 kilometres.

At such a greater height the density of atoms in the atmosphere is extremely low. The density of the atmosphere becomes so low that collisions between neutral particles become extremely rare.

Hydrogen and Helium gases predominate in this outer most region



Centurion
UNIVERSITY