

# STRUCTURE OF ATMOSPHERE

**DR INDRANIL GHOSH**

ASSOCIATE PROFESSOR

*“IT IS BETTER TO HAVE YOUR HEAD IN  
THE CLOUDS, AND KNOW WHERE YOU  
ARE... THAN TO BREATHE THE CLEARER  
ATMOSPHERE BELOW THEM, AND THINK  
THAT ~~YOU ARE IN PARADISE.~~”*

---

*— HENRY DAVID THOREAU*

- **INTRODUCTION** Earth's atmosphere is a protective thick layer of gases surrounding the planet Earth and retained by the Earth's gravity. It contains roughly (by molar content/volume) ~~78% nitrogen, 20.95% oxygen, 0.93% argon, 0.038% carbon dioxide, trace amounts~~ of other gases, and a variable amount (average around 1%) of water vapor. This mixture of gases is commonly known as **air**. The atmosphere protects life on Earth by absorbing ultraviolet solar radiation and reducing temperature extremes between day and night.



# DIVISION OF ATMOSPHERE ON THE BASIS OF CHEMICAL COMPOSITION

---

- From the Earth's surface upward to an altitude of about 80 – 85 km, the chemical composition of the atmosphere is highly uniform throughout in terms of its component of gases. Hence this part of the atmosphere is known as **homosphere**, while the overlying part is known as **heterosphere**, which is non-uniform in an arrangement of spherical shell.



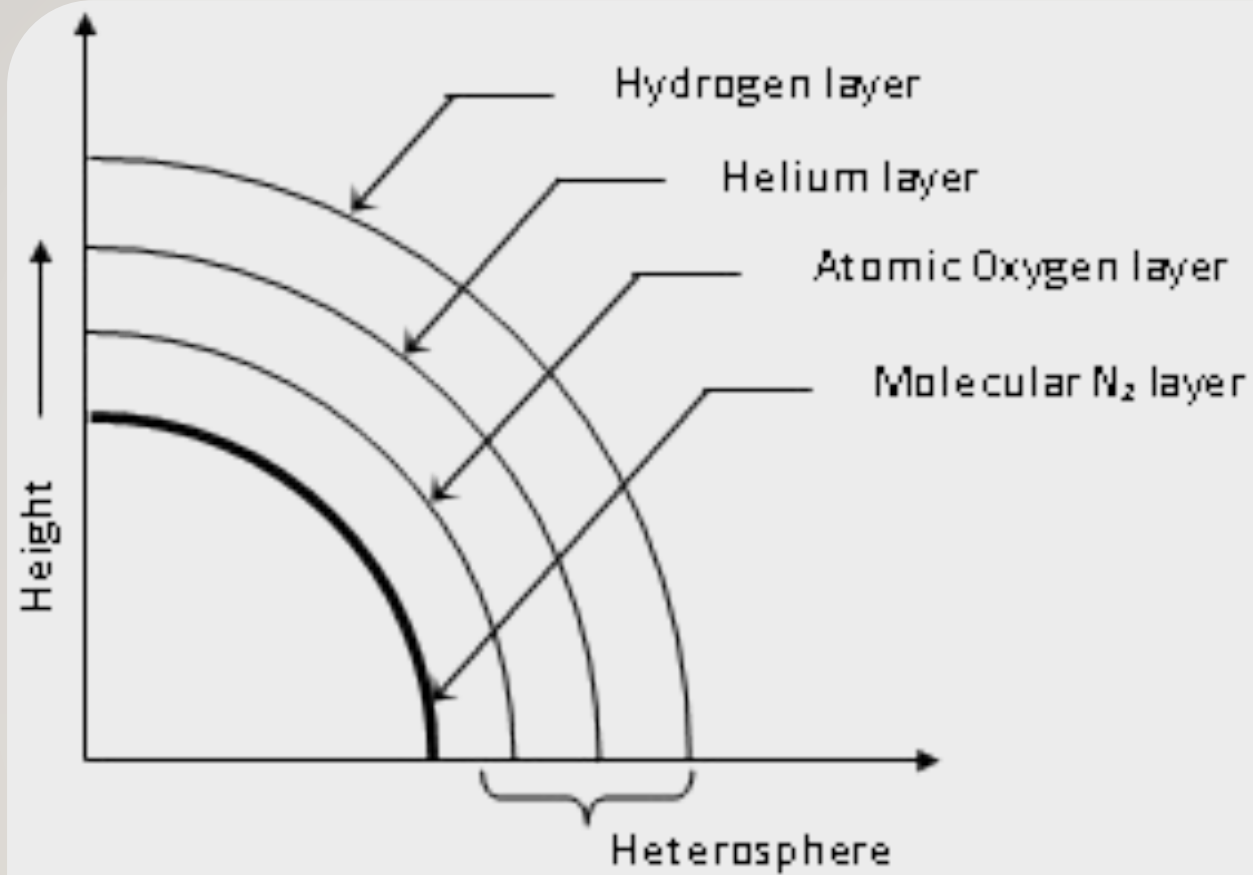


Fig: 3.1 Heterosphere

Fig: 3.1 Heterosphere

Heterosphere

# DIVISION OF ATMOSPHERE ON THE BASIS OF CHANGE OF TEMPERATURE WITH ALTITUDE

---

- Atmosphere is also divided into number of sub-spheres on the basis of the change of temperature with respect to height or altitude. According to this classification, there are four sub-spheres in the atmosphere. These are –

1) Troposphere

2) Stratosphere

3) Mesosphere

4) Thermosphere



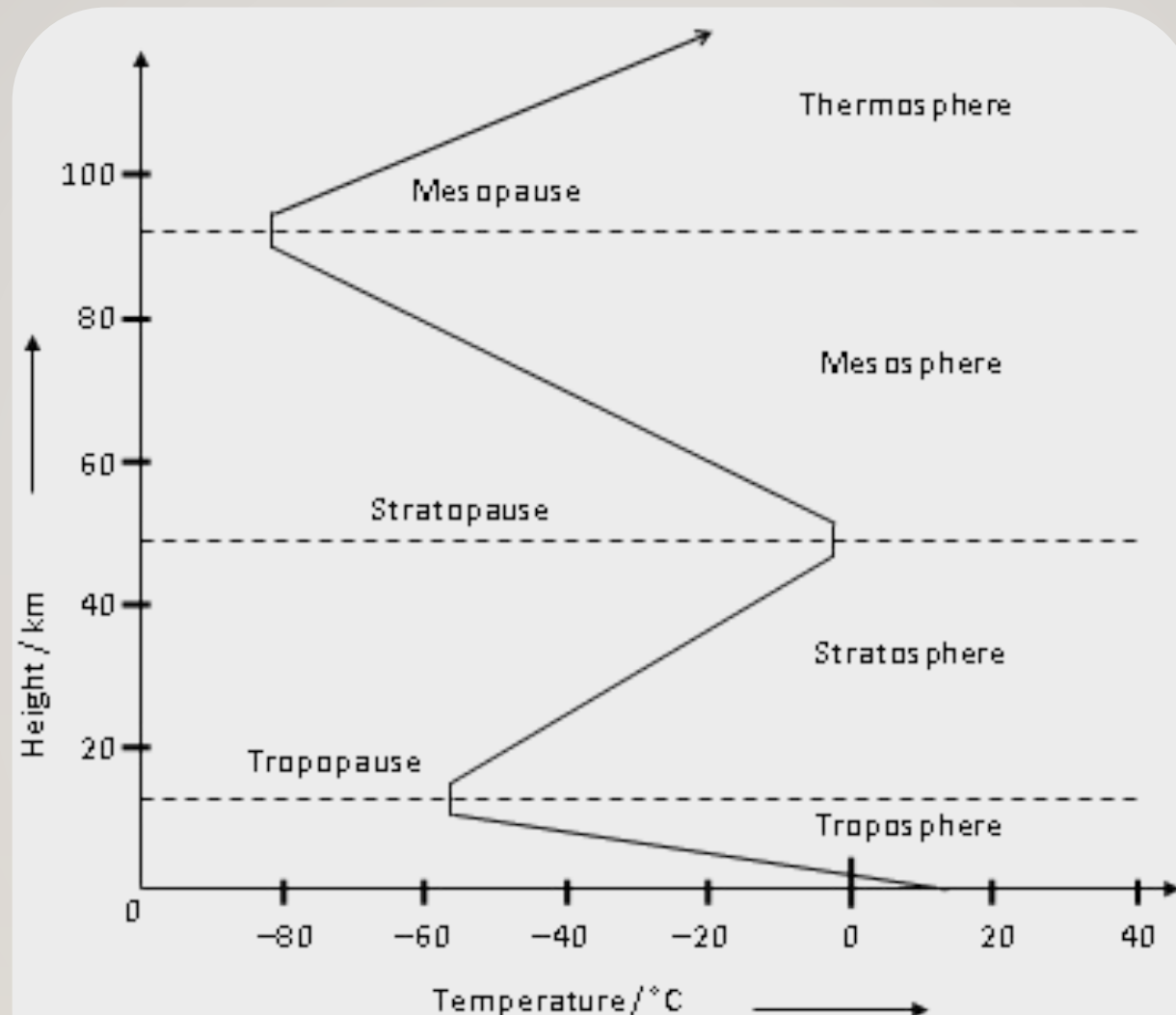


Fig: 3.2 Temperature profile curve of atmosphere

# DIFFERENT DATA OF SUB-SPHERE OF ATMOSPHERE

Region	Altitude/km	Temp/° C	Chemical Composition
Troposphere	0 – 11 km	15° C to -56°C	N <sub>2</sub> , O <sub>2</sub> , CO <sub>2</sub> , H <sub>2</sub> O etc
Stratosphere	11 – 50 km	-56° C to -2°C	O <sub>3</sub>
Mesosphere	50 – 85 km	-2° C to -92°C	O <sub>2</sub> <sup>+</sup> , NO <sub>2</sub> <sup>+</sup> , etc
Thermosphere	85 – 200 km	-92° C to 1200°C	O <sub>2</sub> <sup>+</sup> , NO <sub>2</sub> <sup>+</sup> , etc