

Subject: Agro metrology

Class: 2nd Stage

Soil and Water Department

Salahaddin University

**Agricultural Engineering Science
College**

Lecture (4)

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ATMOSPHERIC LAYERS

Why is the Atmosphere Important?

- Weather exists because of the atmosphere.
- It makes the Earth suitable for living things.
- The atmosphere is the layer of gas that surrounds the planet.
- The atmosphere traps energy from the sun and keeps the Earth's surface warm enough for water to exist as a liquid.
- It protects the Earth from radiation and meteoroids.

The gases are found in the atmosphere

- Nitrogen,
- Oxygen,
- Water Vapor,
- Carbon Dioxide,
- Ozone,
- Other gases

? Why is the earth divided into four layers?

Composition of the Atmosphere

- Nitrogen: 78%
- Oxygen: 21%
- Other Gases: 1%
- Argon 0.93%
- Carbon Dioxide 0.036%
- Neon 0.0018%

- Helium 0.00052%
- Methane 0.00015%
- Krypton 0.00011%
- Hydrogen 0.00005%

The Layers of the Atmosphere

- a) Troposphere
- b) Stratosphere
- c) Mesosphere
- d) Thermosphere
- e) Ionosphere
- f) Exosphere

a) THE TROPOSPHERE

- This is where all living things live.
- It is the most important layer for living things because it contains over 80% of all the air in the atmosphere.

- It contains almost all the water vapor in the atmosphere, and water vapor produces WEATHER (like rain and clouds) and determines climate.
- Varies in thickness (9-16 km) and temperature
- As the altitude increases in the troposphere, the temperature decreases.

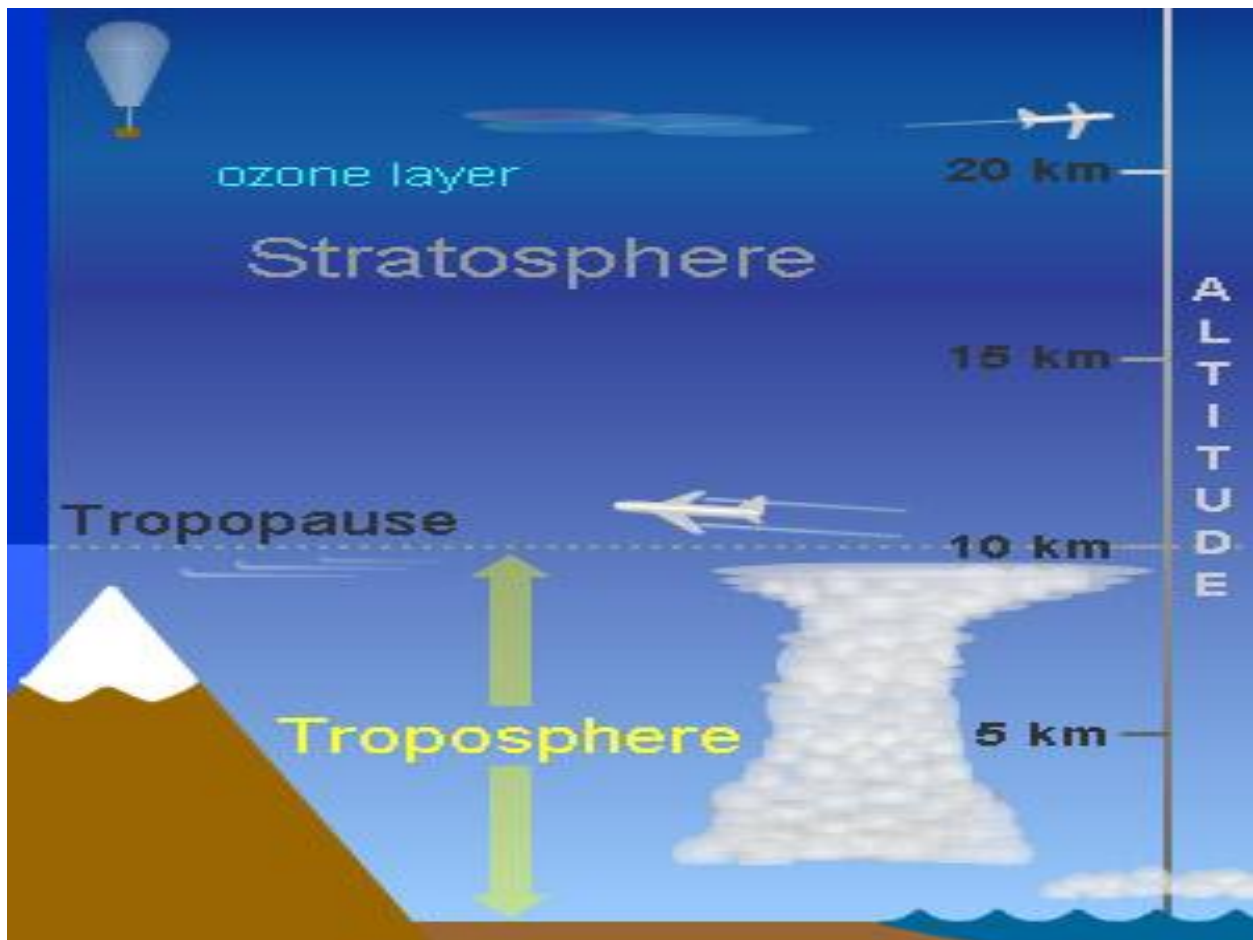


Fig.1. Troposphere

b) THE STRATOSPHERE

- Approximately 40km thick
- Located just above troposphere
- Large planes travel through this layer, just above cloud layer?

c) Ozone Layer

- The ozone layer is found there. WHAT IS THE OZONE LAYER?
- It is a layer of gas that absorbs the ultraviolet rays coming from the sun. It protects us from these rays, which cause skin cancer.
- The ultraviolet rays heat the atmosphere, the farther from earth the higher the temperature.

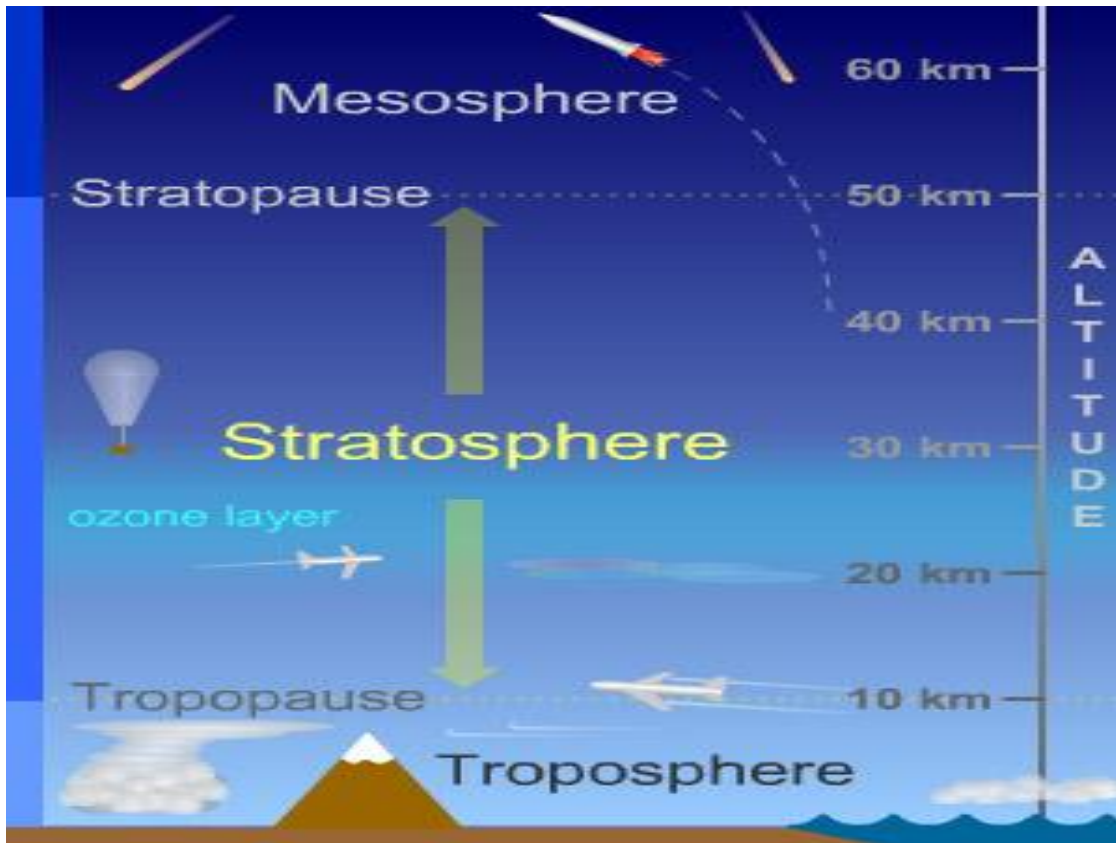


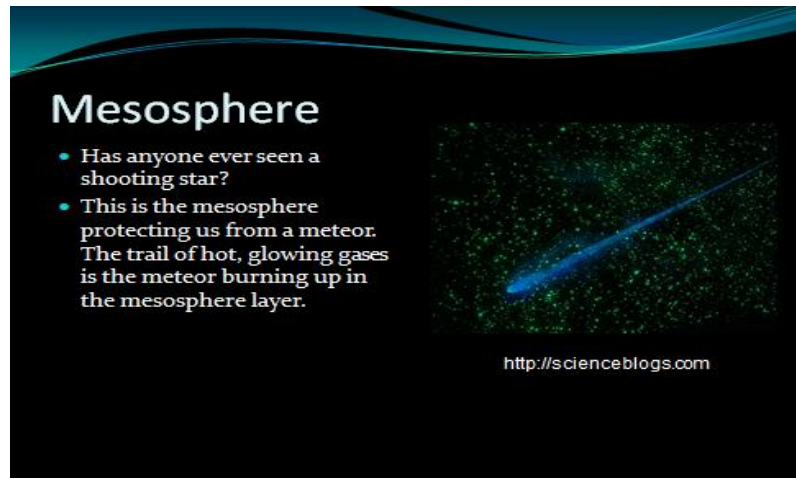
Fig.2. Stratosphere and Ozone layer

d) THE MESOSPHERE

- It is the third layer of the atmosphere.
- It is approximately 40km thick.
- There is a wide variety of temperatures because there aren't many air molecules and so they do not absorb

a lot of warmth from the sun. (Minimum= -120 degrees Celsius, Maximum from 0-27 degrees Celsius)

- The mesosphere protects Earth's surface from being hit by most meteoroids (chunks of stone and metal from space).



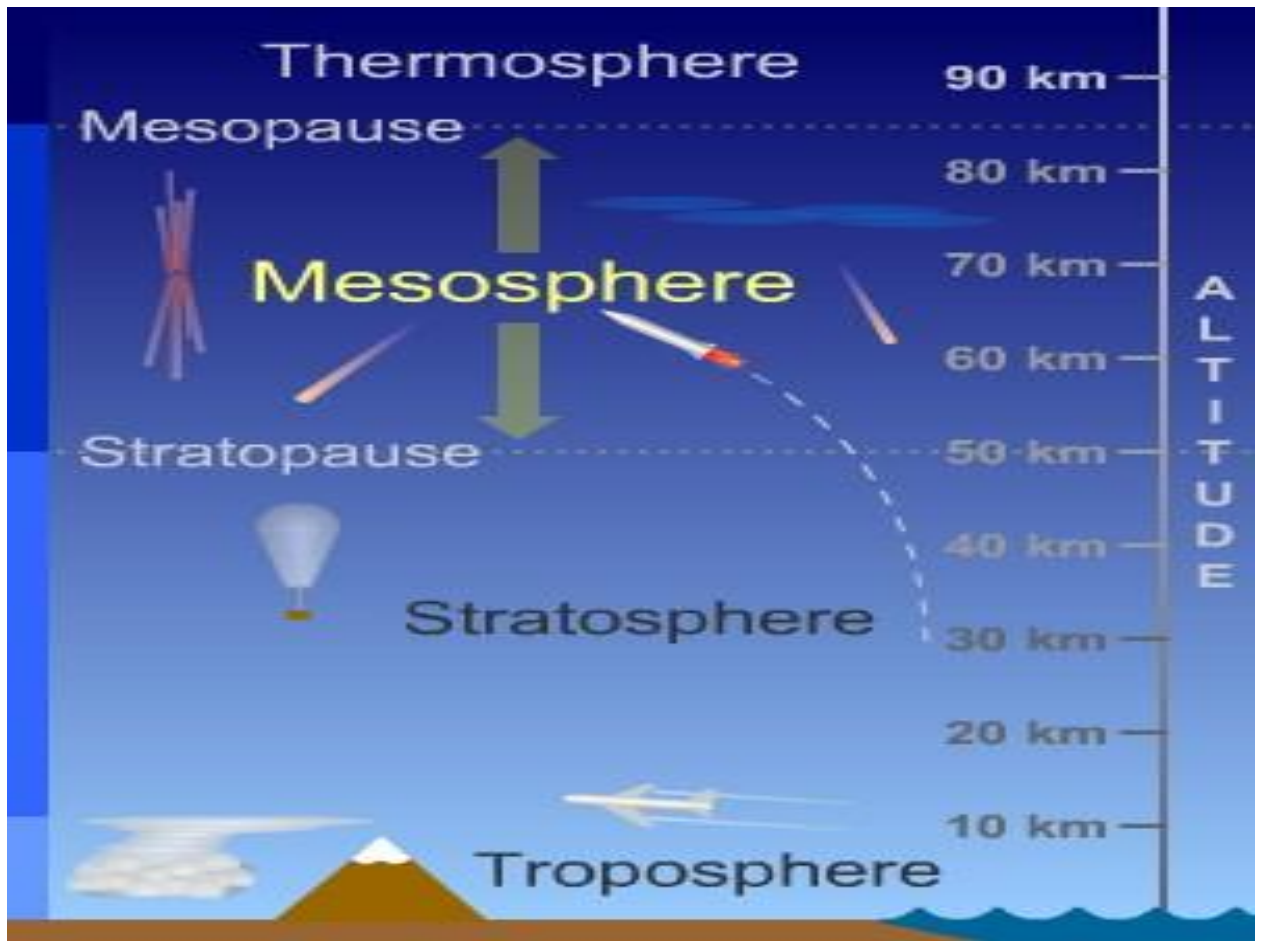


Fig.3. Mesosphere

e) THE THERMOSPHERE

- The fourth and last layer
- The thickest layer
- Measures over 90km
- Sun's rays are strong in this zone, and create high temperatures that exceed 1000 degrees Celsius.
- **Divided into two layers:**

Ionosphere

Exosphere

1. Ionosphere

- At an altitude of 90 to 300km the IONOSPHERE is found.
- It is useful from earth's communication system because it contains a lot of electrically charged particles. These particles bounce radio waves.
- The Northern Lights (Aurora Borealis) occurs in the ionosphere.

- The aurora borealis is caused by particles from the sun that enters the ionosphere near the North Pole. These particles strike oxygen and nitrogen atoms in the ionosphere causing them to glow.



Fig.4. Northern Lights (Aurora Borealis)

When Does This Occur?

- It occurs year round but that does not mean you'll be able to see it.
- The best time to see the Northern Lights is in December to March when the nights are the longest.
- Colors may vary from night to night (yellow, orange, green, red.....red being the rarest).
- The aurora occurs along ring shaped regions around the north and south geomagnetic poles

2. Exosphere

- It is the outer layer of the thermosphere.
- Satellites are found in this layer.