

# OZONE LAYER DEPLETION

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- The earth's atmosphere is composed of many layers, each playing a significant role.

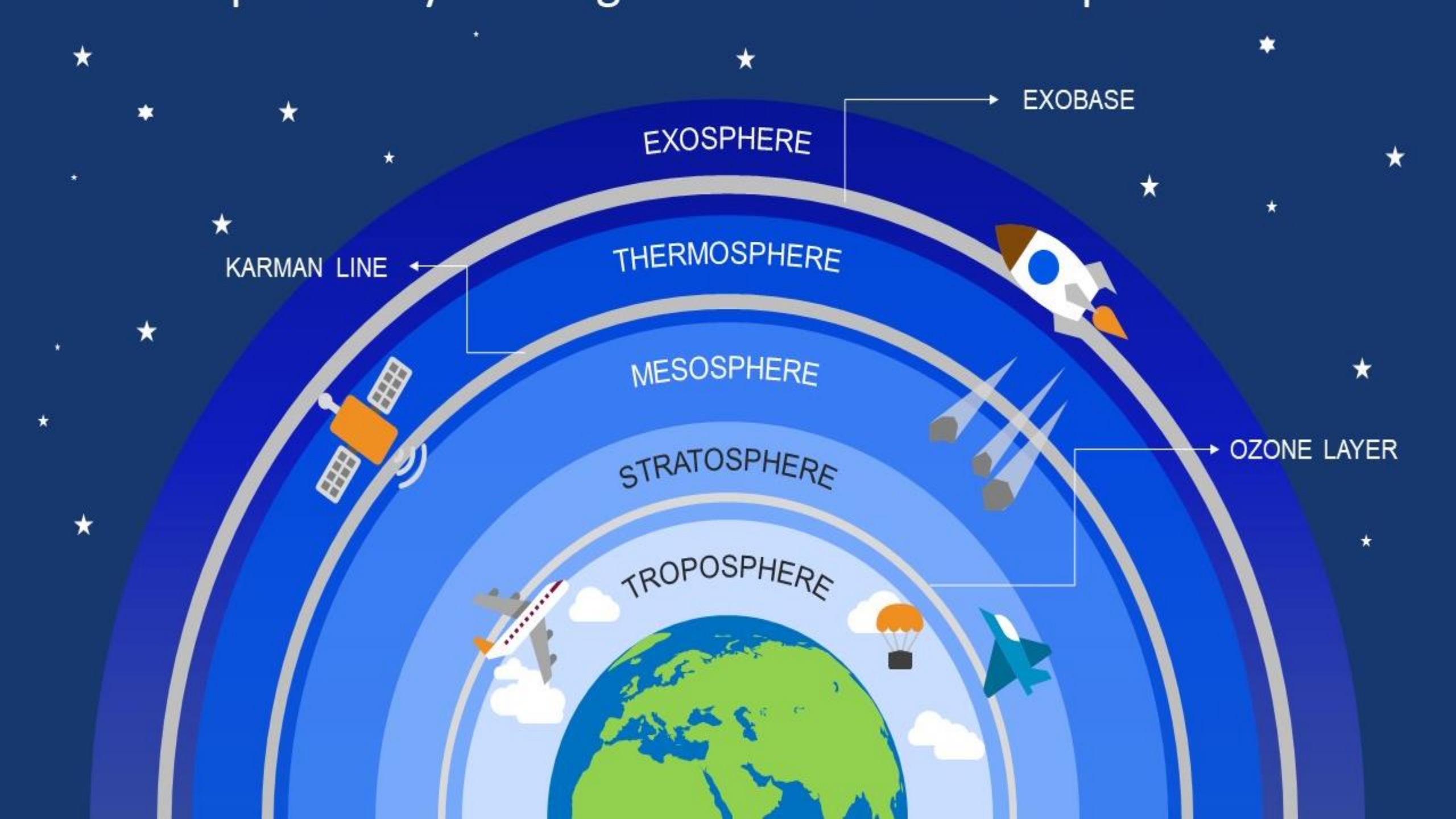
The first layer stretching approximately 10 kilometers upwards from the earth's surface is known as the troposphere.

A lot of human activities such as gas balloons, mountain climbing, and small aircraft flights take place within this region.

- The stratosphere is the next layer above the troposphere stretching approximately 15 to 60 kilometers.

The ozone layer sits in the lower region of the stratosphere from about 20-30 kilometers above the surface of the earth.





EXOSPHERE

EXOBASE

THERMOSPHERE

KARMAN LINE

MESOSPHERE

STRATOSPHERE

OZONE LAYER

TROPOSPHERE

- The ozone layer was discovered in 1913 by the French Physicists Charles Fabry and Henri Buisson.
- The ozone layer is a deep blanket in the stratosphere made up of comparatively high concentration of the ozone. As a result of its chemical composition, ozone is regarded as a special type of oxygen as it contains three oxygen molecules ( $O_3$ ) as opposed to the usual two oxygen molecules ( $O_2$ ).



- i.e. Ozone layer contain ozone which is a naturally occurring molecule containing three oxygen atoms. The thickness of the ozone layer is about 3 to 5 mm, but it pretty much fluctuates depending on the season and geography.

## IMPORTANCE OF OZONE LAYER

- The ozone layer protects life on earth from strong ultraviolet radiation that comes from the sun.
- Ultraviolet rays are harmful rays that can drive up the risk of deadly disorders like skin cancer, cataracts and damage the immune system.
- It is calculated that every 1 percent decrease in ozone layer results in a 2-5 percent increase in the occurrence of skin cancer.

- Ultraviolet rays are also capable of destroying single cell organism, terrestrial plant life, and aquatic ecosystems.
- The ozone layer has the capability to absorb almost 97-99% of the harmful ultraviolet radiations that sun emit and which can produce long term devastating effects on humans beings as well as plants and animals.



# CAUSES OF OZONE LAYER DEPLETION-

## **Natural causes of depletion of ozone layer**

- Sun-spots and stratospheric winds
- major volcanic eruptions

## **Man-made causes of depletion of ozone layer**

- excessive release of chlorine and bromine from man-made compounds
- CFCs, HCFCs, Halons,  $\text{CH}_3\text{CCl}_3$  (Methyl chloroform),  $\text{CCl}_4$  (Carbon tetrachloride), methyl bromide, etc.
- ozone-depleting substances (ODS).




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Factories  
and homes  
spew out  
CFC's

Sunlight  
breaks down  
CFC's in the  
stratosphere

Breakdown  
products  
destroy  
ozone



# MAIN OZONE DEPLETING SUBSTANCES (ODS)

- **Chlorofluorocarbons (CFCs)**
- **Hydrofluorocarbons (HCFCs)**
- **Halons**

It's especially used in selected fire extinguishers in scenarios where the equipment or material could be devastated by water or extinguisher chemicals.



- **Carbon Tetrachloride**

Also used in selected fire extinguishers and solvents.

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- **Methyl Chloroform**

Commonly utilized in industries for cold cleaning, chemical processing, adhesives and some aerosols.

- (Aerosols- polluting agents, smoke, dusts, etc. present in atmosphere.)



# SERIOUS EFFECTS OF OZONE DEPLETION

- Damage to human health
- Devastation to environment

Many crops species are vulnerable to strong UV light and overexposure may well lead to minimal growth, photosynthesis and flowering.

Some of the crop species vulnerable to UV light include barley, wheat, corn, oats, rice, broccoli, tomatoes, cauliflower just to name a few. Forests equally bear the brunt of ozone depletion.



- Threat to marine life
  - Effect on animals:
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In domesticated animals, too much ultraviolet radiation could also lead to skin and eye cancer.

- Impacts certain materials:

Materials like plastics, wood, fabrics, rubber are massively degraded by too much ultraviolet radiation- quality may deteriorate.



# SOLUTIONS TO OZONE DEPLETION

- Desist from using pesticides-

Pesticides are great chemicals to rid your farm of pests and weeds, but they contribute enormously to ozone layer depletion. The surefire solution to get rid of pests and weeds is to apply natural methods. Just weed your farm manually and use alternative eco-friendly chemicals to alleviate pests.

- Discourage driving of private vehicles

These vehicles emit a lot of greenhouse gases that eventually form smog, a catalyst in the depletion of ozone layer.



- Utilize environmentally friendly cleaning products-
- ~~Most household cleaning products are loaded with harsh chemicals that find way to the atmosphere, eventually contributing to degradation of the ozone layer.~~ Use natural and environmentally friendly cleaning products to arrest this situation.



- Prohibit the use of harmful nitrous oxide-
- The Montreal protocol formed in 1989 helped a lot in the limitation of Chlorofluorocarbons (CFCs). However, the protocol never covered nitrous oxide, which is a known harmful chemical that can destroy the ozone layer. Nitrous oxide is still in use today. Governments must take action now and outlaw Nitrous Oxide use to reduce the rate of Ozone depletion.

