

# Alexis Grasso

**UTSA** Senior Public Health

## Stratospheric Ozone

- What is SO and How is it Produced
- What does SO Do
- Depletion of SO and the "Ozone Hole"
- Dangers of SO depletion



Inside Outside  
Wellness Center | Medical School

# Alexis Grasso

**UTSA** Senior Public Health

## Stratospheric Ozone

- What is SO and How is it Produced
- What does SO Do
- Depletion of SO and the “Ozone Hole”
- Dangers of SO depletion





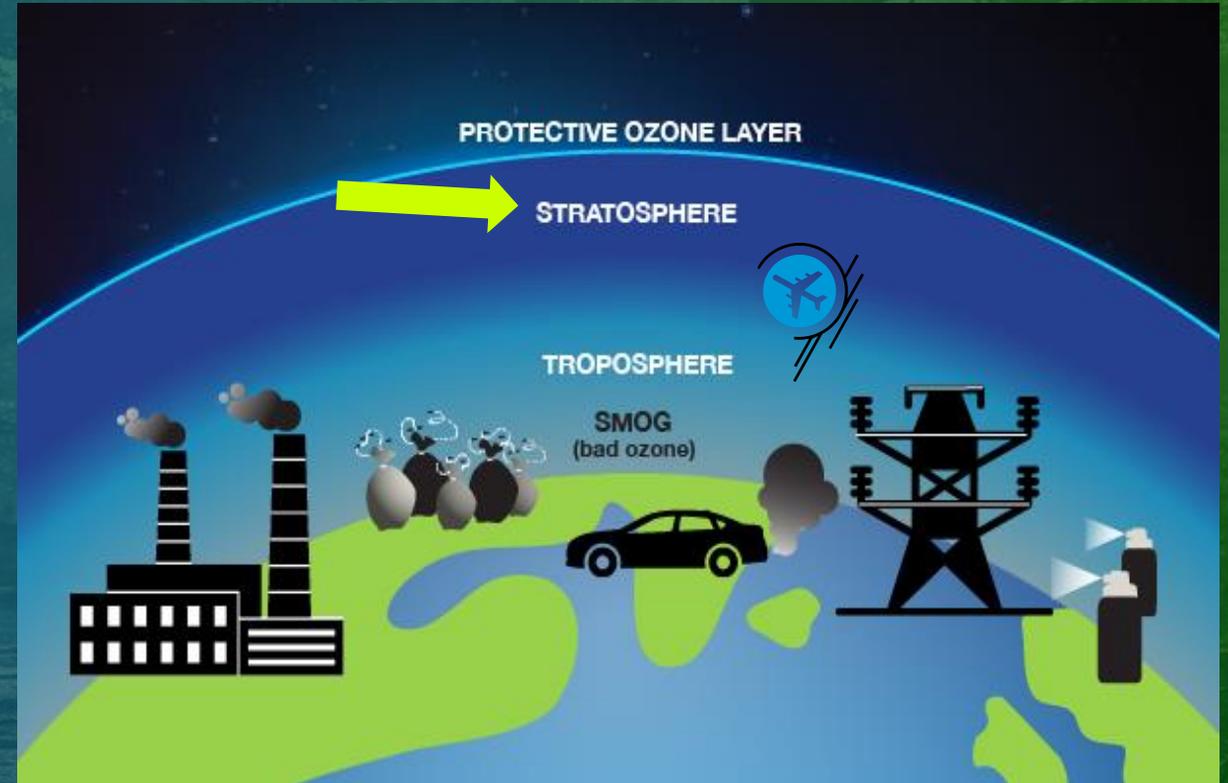
UCAR

# Introduction to Stratospheric Ozone (SO)



The stratosphere is the **topmost layer** of the Earth's atmosphere. It extends from around **6 miles to 31 miles** above Earth's surface. While most human activity takes place in lower atmospheres, you typically spend time in the lower stratosphere when flying on a plane.

Stratospheric Ozone (SO) is created when solar Ultraviolet (UV) radiation and oxygen molecules chemically react in the stratosphere.





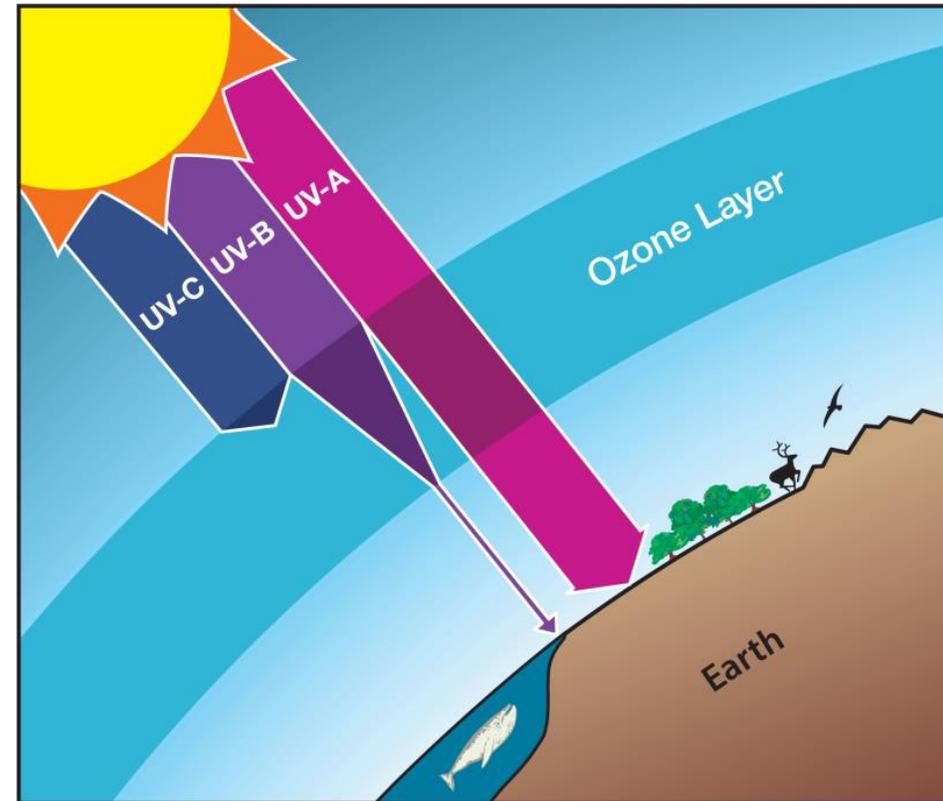
# Importance of Stratospheric Ozone



The Stratospheric Ozone layer provides protection by absorbing radiation from the sun before it reaches Earth's surface. Most notably, the stratospheric ozone absorbs a portion of UVB light.

UVB light has been an underlying cause of skin cancers and cataracts. UVB light also damages some crops and is harmful to some marine life. **Stratospheric Ozone is the Earth's sunscreen!**

UV Protection by the Stratospheric Ozone Layer

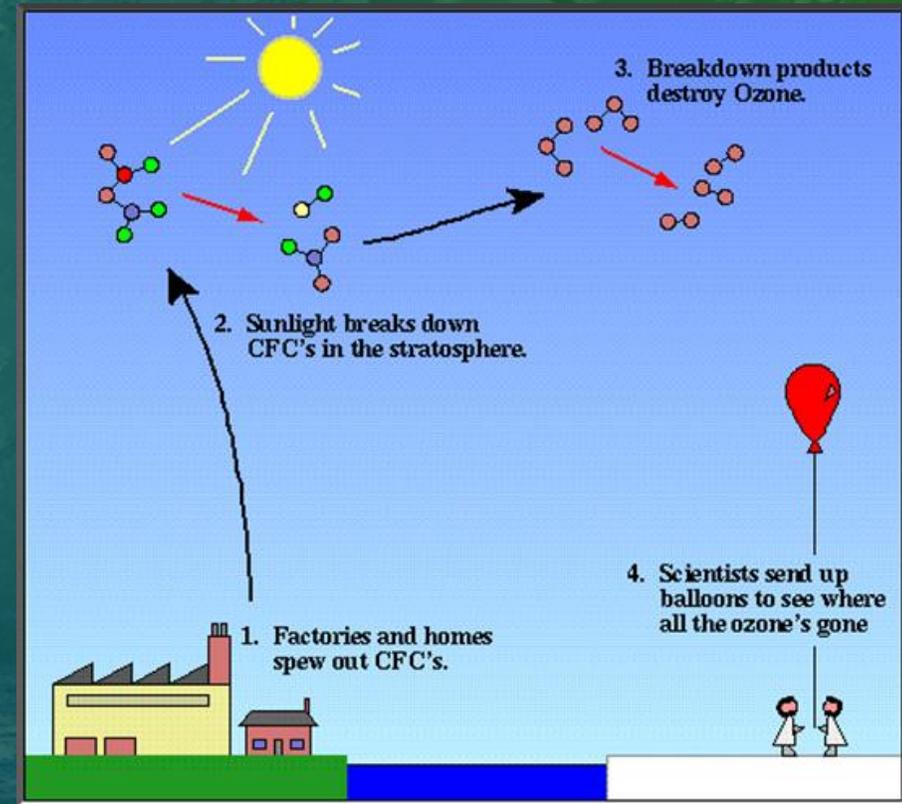




# Stratospheric Ozone Depletion

Unfortunately, the ozone is not immune to destruction, and the destruction happens quickly. When chlorine and bromine interact with the ozone in the stratosphere, the ozone molecules are destroyed.

Substances that contribute to the destruction are known as **ozone-depleting substances (ODS)**. These include chlorofluorocarbons (CFCs), and halons. The use of ODS has grown rapidly in refrigeration, foam insulation, fire suppression, and other applications.

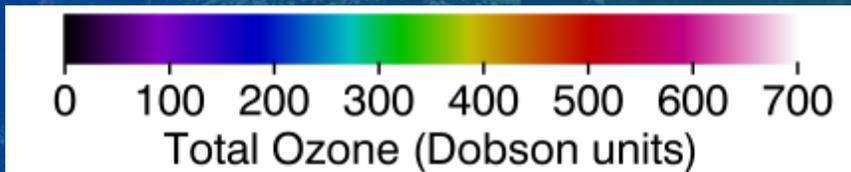
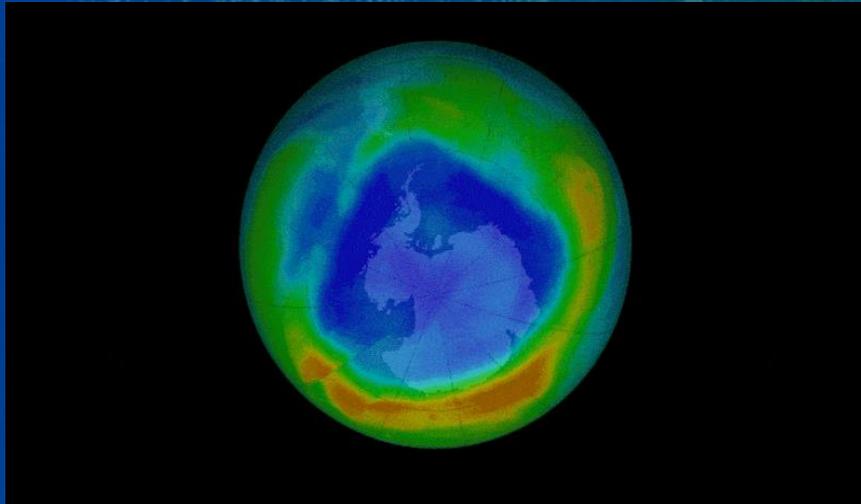


<https://www.epa.gov/ozone-layer-protection/basic-ozone-layer-science>

<https://discover.hubpages.com/education/what-is-stratospheric-ozone-layer-depletion-hole-causes-effects-tropospheric-cfc-cfcs-chlorofluorocarbon-global-warming>



# The Ozone Hole



The Ozone is measured in **Dobson Units (DU)**. It is standard practice that the Earth's area is enclosed by a line with a constant measurement of at least 220 DU. Less than 200 DU is cause of concern and in satellite imaging shows as a dark blue.

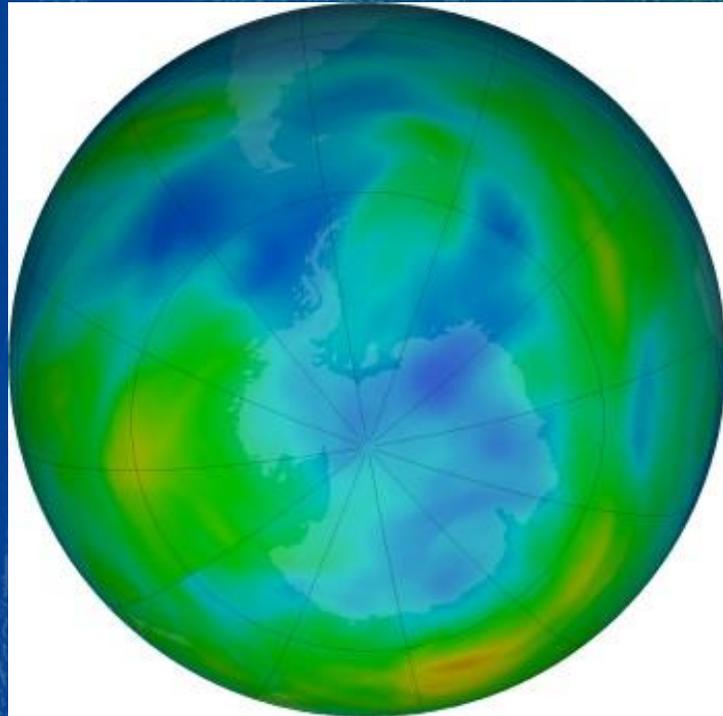
The Ozone Hole is an area of exceptionally depleted ozone occurring over the Antarctic. It typically occurs in August-October, when the southern hemisphere is in spring. The NASA satellite Aura, provides updates on the Ozone Hole.

<https://ozonewatch.gsfc.nasa.gov/facts/hole.html>

<https://solarsystem.nasa.gov/resources/837/repairing-the-ozone-hole/>



# NASA Ozone Watch



The destruction of our ozone is threatening the overall health of our climate, crops, and community. Luckily, NASA keeps a close eye on the Ozone.

For updates, information on projects, and a center of information, visit:  
[aura.gsfc.nasa.gov/index/html](http://aura.gsfc.nasa.gov/index/html)

**Aura's latest Ozone Hole satellite snapshot was taken on July 26<sup>th</sup>, 2022 (shown on the left).**

<https://ozonewatch.gsfc.nasa.gov/facts/hole.html>

<https://solarsystem.nasa.gov/resources/837/repairing-the-ozone-hole/>



# Dangers of SO Depletion



## Human Dangers:

- Increased exposure to UVB leading to skin cancers and cataracts.

## Plant Dangers:

- Growth and development difference due to UVB increase.

## Marine Dangers:

- Risk of viability for phytoplankton.

## Biochemical Cycle Dangers:

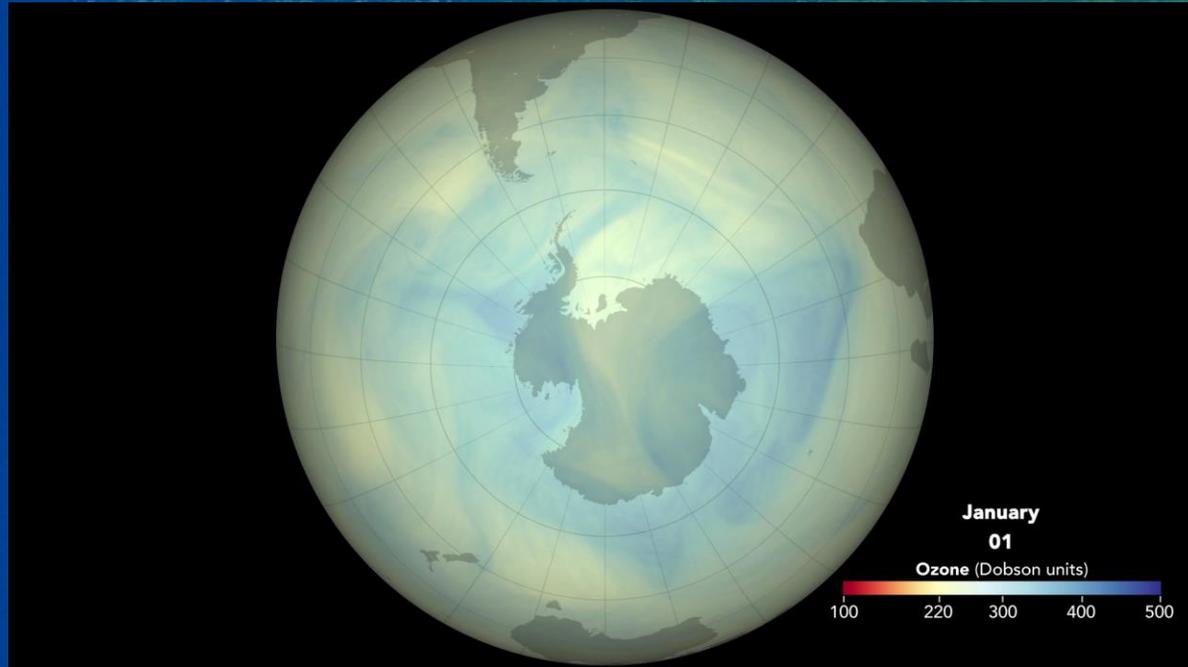
- Potential to alter sources and sinks of greenhouse and chemically important trace gases.

<https://www.pbs.org/show/ozone-hole-how-we-saved-planet/>

<https://www.epa.gov/ozone-layer-protection/health-and-environmental-effects-ozone-layer-depletion>



# Stratospheric Ozone Depletion: Closing the Gap



While the 2021 Antarctic ozone hole is larger than average due to colder-than-usual weather, it is substantially smaller than the 1990s and early 2000s.

Luckily, the ozone hole is **recovering** due to the **Montreal Protocol** and subsequent amendments banning the release of harmful ODS.

# Stratospheric Ozone Depletion: Healing the Ozone

Together, we can continue to help heal our Stratospheric Ozone.

It is encouraged that individuals implement the following steps to help our Ozone keep recovering:

- Minimize the use of cars for transportation.
- Maintain air conditioners and other appliances to avoid OSD leaks.
- Avoid the use of chemical cleaners when possible.

