

# The ozone layer



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Ozone is one of the greenhouse gases that exist within our atmosphere. It is a triatomic molecule made up of three oxygen atoms. Ozone consists in low concentrations in the Earth's atmosphere, taking up only 0.6 parts per million of it. These gases absorb some of the harmful ultraviolet radiation from the sun and prevent it from reaching the Earth's surface. It has been thought that the depletion of ozone in the atmosphere has been a primary cause of climate change, but this is not entirely true.

Changes in the ozone layer have a significant effect on climate change, but it is small in comparison to the contribution of all the other greenhouse gases. The cause of ozone depletion seems to be the existence of a group of artificially manufactured chemicals called "ozone-depleting substances," or "ODS." ODS are extremely stable, non-toxic, and environmentally friendly in the lower atmosphere, which explains why they are very popular for use in products by humans. They cause harm, however, when they go up into the stratosphere. Their stability allows them to float up intact.

Once they are in the stratosphere, they become broken apart by ultraviolet light, which releases the chlorine and bromine in them. Chlorine and bromine are capable of destroying ozone at a very fast rate by removing an atom from an ozone molecule. They are very effective in destroying ozone because a single molecule of chlorine could break off thousands of molecules of ozone. Even worse is the fact that ODS have a long lifetime in our atmosphere. ODS that we have released within the past 80 years are still making their way into the stratosphere to add to ozone destruction.

The main ODS are chlorofluorocarbons (CFCs) and Halons (brominated fluorocarbons). CFCs cause over 80% of the total stratospheric ozone

depletion, making it the most widely used ODS. CFCs are often used as coolants in refrigerators, freezers and air conditioners in buildings and cars made before 1995. They are also found in industrial solvents as well as foam products such as soft-foam padding in cushions and mattresses and rigid foam in home insulation. Halons also play a big role in ozone depletion, because they cause greater damage to the ozone than CFCs do. They are used in some fire extinguishers.

Hydro fluorocarbons, or HFCs, have been developed to replace CFCs for things such as vehicle air conditioning. This has been done in attempt to lesson ozone destruction, because HFCs do not deplete ozone, but they are strong greenhouse gasses. This is still a better option than CFCs however, so HFCs are a better option to use until an even safer substitute is discovered. The Government has also made regulations disallowing certain uses of ODS to help society take steps toward improving the quality of the atmosphere and hopefully reduce ozone depletion. Around 190 nations signed an agreement to stop the production of CFCs and halons.

This agreement has been amended several times to includes newly discovered ODS that pose as a threat to the ozone. The depletion of ozone has had many negative impacts on humanity as well as wildlife and the environment. Holes in the ozone layer can cause more UV rays to reach earth, which for humans can cause serious health issues such as skin cancer, sunburn and premature aging of the skin. It can also cause cataracts, blindness and other eye diseases. It can even cause the weakening of the human immune system, which may explain the development of skin cancer for many.

UV rays also affect plant life such as wheat, rice, barley, oats, corn, soybeans, peas, tomatoes, cucumbers, cauliflower, broccoli, and carrots. They are vulnerable to increased UV, resulting in reduced growth and photosynthesis. UV rays also put plankton in danger, which threatens all marine life. Plankton are the first vital step in the aquatic food chain, so destroying them can cause a great effect on other sea life. This isn't the only thing in our environment affecting sea life, either. In the movie Food Inc. they talk about how the food they feed cows makes their poop non-biodegradable and the poop just piles up.

So when the rain water comes it washes the poops into streams and sewers and other water supplies, contaminating it and killing many animals and living things in the water. While scientists are coming up with new substances to avoid ozone depletion, and governments are making regulations, it's important for citizens themselves to take certain precautions to be sure they do not cause harm to the environment. In order to keep the ozone layer from depleting in the future, there are many things we could do. People should be sure they know the rules that the governments have made about CFCs and abide by them.

It's not legal to recharge refrigerators or home/vehicle air conditioners with CFCs. If you have an old vehicle with air conditioner, take it to be serviced by a technician who can make sure the CFC is recaptured and recycled if you don't use the air conditioner or if you are about to scrap the vehicle. It's also wise to never buy or use portable extinguishers that contain halons. It is also important to protect yourself from UV rays. While the sun has always

reached the earth, most of it has been filtered by the layers of greenhouse gases in the atmosphere.

It's smart to sit in the shade when it's sunny and use sunscreen during the summer, when radiation when is at its most intense point. Tanning is never healthy for you, despite popular belief. Caution is advised when one is out in the sun. Hopefully, if we abide by these new laws and regulations, the ozone layer depletion can eventually be halted. It's been said by scientists that the creation and destruction of ozone in the atmosphere naturally balances itself. If the new regulations are followed and there are no more released CFCs and/or halons, the ozone layer should be able to heal itself by an estimated time of around the year 2050.