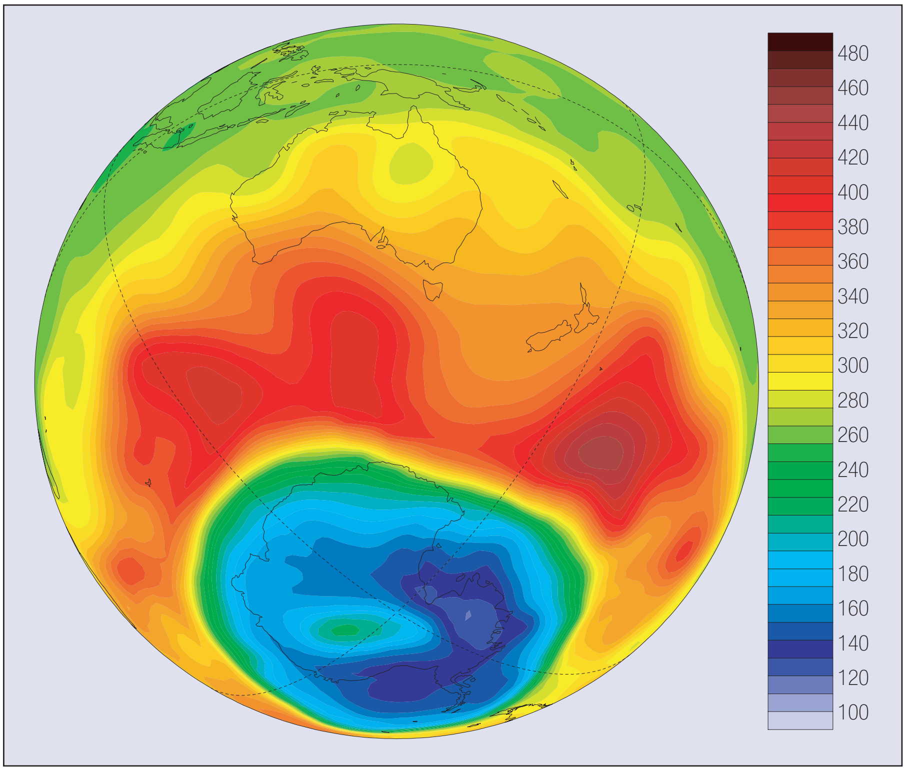
# What happened to our ozone?

**Most atmospheric ozone occurs in the lower stratosphere, between 15 and 30 km above Earth's surface, where it absorbs harmful ultraviolet radiation from the sun. The loss of two-thirds of the ozone above Antarctica is mainly a result of human-made gases being released into the atmosphere, including chlorofluorocarbons or CFCs (containing chlorine) and halons (containing bromine). These gases are chemically inert and don't dissolve in water, which means they resist removal in the lower atmosphere and can eventually migrate to the stratosphere.**

During winter above Antarctica, a polar vortex forms in the stratosphere in which temperatures drop as low as minus 85°C. Ice clouds forming in this vortex provide an environment for these human-made gases to convert to compounds able to destroy ozone. The destruction begins and rapidly accelerates with returning sunlight in spring, reaching a maximum in early October and slowly declining as the ice clouds disappear, returning to normal by the end of December.

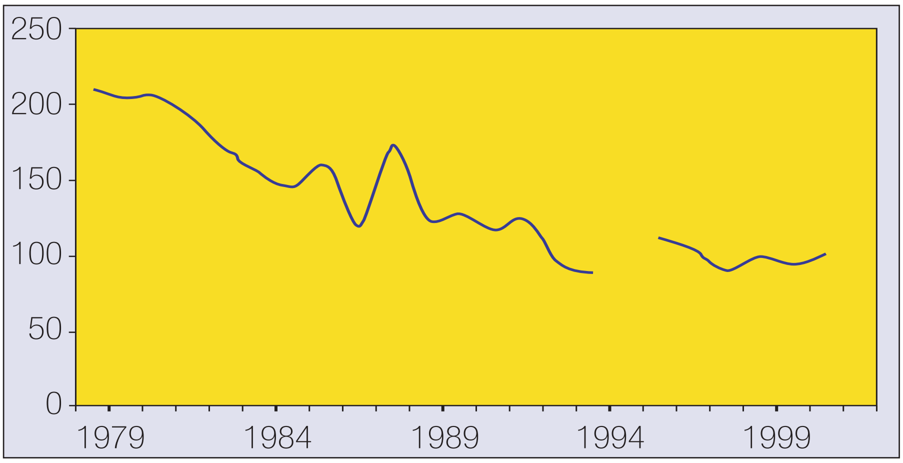
First detected in the early 1980s by British Antarctic scientists, depletion of stratospheric ozone has been happening for at least two decades. Globally averaged losses have been about five percent since the mid-1960s, with cumulative losses of about 10 percent in the austral winter and spring and five percent in the summer and autumn over locations such as Europe, North America, and Australia. Since the early 1990s Antarctic ozone holes have covered about 25 million square kilometers – about three times Australia's area.




*The Antarctic ozone hole in early spring can be seen here as the predominantly blue area over Antarctica. The scale on the right shows the amount of total column ozone in Dobson Units. Information interpolated by Bureau of Meteorology (Australia) from NOAA/NESDIS data.*

The Antarctic ozone hole has no direct northern hemisphere counterpart. The Arctic is warmer than the Antarctic because it is essentially oceanic, lacking the cold, stable continental conditions in which a circumpolar vortex can develop. With fewer ice clouds forming, ozone depletion is much less than in the Antarctic.

About two percent of sunlight is high-energy ultraviolet radiation, some of which (ultraviolet B) causes damage to living things, including sunburn, skin cancer, and eye damage. When skies are clear, decreased atmospheric ozone will mean higher ground-level ultraviolet radiation. Large increases in ultraviolet B have been observed in Antarctica during spring.




*The minimum values of total ozone recorded over the Antarctic since the early 1990s have been around 100 Dobson Units (DU), of which about half is in the upper stratosphere. This graph shows values observed by satellite each year since 1979.*

Stratospheric ozone losses have caused cooling of the lower stratosphere around the globe, resulting in less infrared radiation reaching the surface and lower atmosphere. Extrapolations based on observed ozone trends indicate that stratospheric ozone losses since 1980 may have offset about 30 percent of atmospheric warming due to greenhouse gases.

Future global ozone depletion would probably have been much greater without reduced human emissions of ozone-depleting gases. Worldwide compliance with current international agreements is rapidly reducing the yearly emissions of these compounds. The total amount of ozone-depleting compounds in the lower atmosphere peaked about 1994 and is now slowly declining. This trend will allow the ozone layer to recover, but the process will take decades because of the long times required for CFCs to be removed from the atmosphere.

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