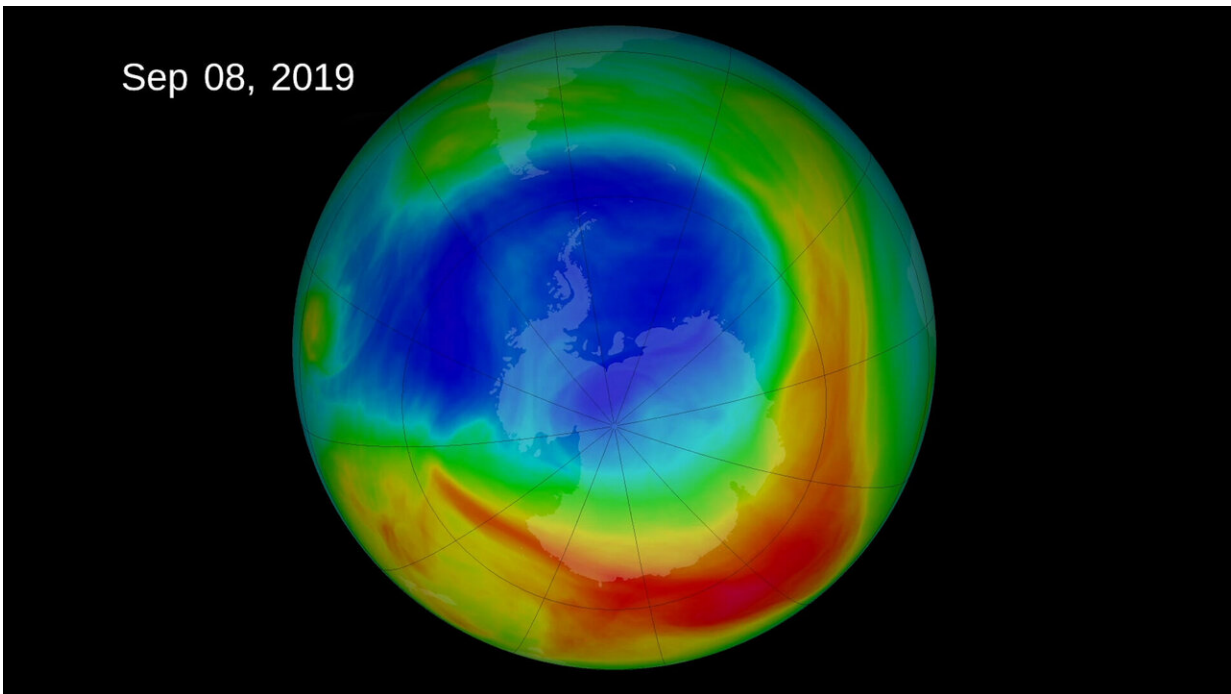


Experts reveal major holes in international ozone treaty

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The 2019 ozone hole. Credit: NASA

A new paper, co-authored by a University of Sussex scientist, has revealed major holes in an international treaty designed to help repair the ozone layer, putting human health at risk and increasing the speed of climate change.

Evidence amassed by scientists in the 1970s and 1980s showed that the

depletion of the [ozone layer](#) in the stratosphere was one of the first truly [global threats](#) to humanity.

Chemicals produced through [economic activity](#) were slowly drifting to the upper atmosphere where they were destroying the ozone layer, which plays an indispensable role in protecting humanity and ecosystems by absorbing harmful ultraviolet radiation from the sun.

In 1987, countries signed up to a treaty to take reparative action, known as the 'Montreal Protocol on Substances that Deplete the Ozone Layer, which was eventually ratified by all 197 UN member states.'

But in a paper published today in *Nature Communications*, experts have flagged major gaps in the treaty which must be addressed if the ozone layer is to be repaired and avert the risks posed to [human health](#) and the climate.

Professor Joseph Alcamo, Director of the Sussex Sustainability Research Programme and former Chief Scientist at UNEP, said: "The Montreal Protocol and its amendments have no doubt been an effective worldwide effort to control the toughest [substances](#) depleting the ozone. But our paper shows that the treaty has developed too many gaps to fully repair the ozone layer. It's time to plug the holes in the ozone hole treaty."

Professor Alcamo, along with lead author Professor Susan Solomon of Massachusetts Institute of Technology (MIT) and co-author Professor A. R. Ravishankara of Colorado State University, have identified several 'gaps' which consist of ozone depleting substances not covered in the treaty.

These include:

- Unaccounted for new sources of CFC and HFC emissions

recently detected in the atmosphere.

- Leakages of ozone depleting substances from old air conditioners, refrigerators and insulating foams.
- Inadvertent releases of ozone-depleting gases from some manufacturing processes.
- Emissions of the ozone-depleting gas, [nitrous oxide](#), stemming mostly from agricultural activities.

The authors have called for a range of solutions to plug the gaps including:

- A toughening of compliance with the treaty by using provisions that are already part of the Montreal Protocol.
- Boosting the effectiveness of the treaty by adding in regular environmental monitoring of ozone-depleting substances.
- Controlling the emissions of substances that have slipped through the treaty up to now, including nitrous oxide emissions from agriculture, and ozone-depleting substances leaking from old refrigerators and other equipment.
- In addition, because ozone-depleting substances and their substitutes contribute significantly to [global warming](#), the authors urge a faster phasing out of all of these substances as a way of combatting climate change.

The ozone layer absorbs harmful ultraviolet radiation from the sun but this protective layer is slowly destroyed by industrial gases that slowly drift up from the earth's surface including CFCs (chlorofluorocarbons) contained in refrigerants, foaming agents and, earlier, propellants in aerosol sprays.

Discovery of the 'ozone hole' above [high latitudes](#) in the 1980s provided final evidence of the importance of ozone depletion.

By 1985, countries had signed the Vienna Convention, which pledged to reduce CFCs and other ozone-depleting substances. Two years later, they signed the Montreal Protocol that laid out a plan of action.

During his time as the first Chief Scientist of UNEP, which hosts the Secretariat of the Montreal Protocol, Professor Alcamo coordinated groups of scientists in producing policy-oriented reports that addressed emerging ozone depletion issues.

UNEP reports that 98% of the chemicals targeted for removal in the Montreal Protocol had been phased out by 2009, avoiding hundreds of millions of cases of skin cancer and tens of millions of cases of cataracts. However, this new paper shows that some important sources were not targeted by the Protocol—and urgently need to be now.

Professor Alcamo said: "Since most ozone-depleting gases and their current substitutes are also potent greenhouse gases, it's time to use the Montreal Protocol to draw down these gases even faster to help avoid dangerous global warming.

"We won't be able to reach the global Sustainable Development Goals by 2030 without closing the gaps in the ozone treaty. It's hard to imagine, for example, how the global health and climate goals could be reached without drastically drawing down all [ozone](#)-depleting gases and their substitutes. If we fail, humanity will have to face a higher risk of skin cancers and more rapid climate change."

More information: Unfinished business after five decades of ozone-layer science and policy, *Nature Communications* (2020). [DOI: 10.1038/s41467-020-18052-0](https://doi.org/10.1038/s41467-020-18052-0)

Provided by University of Sussex

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