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Thursday, 26 October, 2000, 01:13 GMT 02:13 UK

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Arctic ozone damage 'likely by 2020'



BAS scientists pioneered Antarctic ozone research

By Alex Kirby, BBC News Online environment correspondent and presenter of Costing the Earth

One of the three British scientists who discovered the Antarctic ozone hole says similar damage is likely soon in the Arctic.

The scientist, Jonathan Shanklin, says the Earth's ozone layer is cooling, which makes its recovery more difficult.

The cooling is the result partly of ozone loss itself, and also of a little-noticed effect of global warming.

And although ozone-depleting gases are no longer increasing in the atmosphere, the damage is being maintained by a feedback mechanism.

The ozone layer protects all living creatures against harmful ultra-violet radiation from the Sun, which in humans can damage the eyes and the immune system and also cause skin cancer.

Cooling atmosphere

Dr Shanklin, who with Joseph Farman and Brian Gardiner of the British Antarctic Survey discovered the Antarctic ozone hole in 1985, was speaking to BBC Radio Four's environment programme Costing the Earth.

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He said: "The atmosphere is changing, and one of the key changes is that the ozone layer is getting colder.

"It's getting colder because of the greenhouse gases that are being liberated by all the emissions we have at the surface.



The Antarctic is an ideal laboratory

"And when it gets colder, particularly during the winter, we can get clouds actually forming in the ozone layer, and these clouds are the key factor.

"Chemistry can take place on them that activates the chlorine and makes it very much easier for it to destroy the ozone.

"We think that within the next 20 years we're likely to see an ozone hole perhaps as big as the present one over Antarctica, but over the North Pole."

Recovery delayed

This year's Antarctic hole, the largest recorded, reached as far as the Falkland Islands and the tip of South America, where people were warned to protect themselves against the Sun.

But while most of the area covered by the hole is uninhabited, a similar Arctic hole would affect parts of densely-populated Europe, Asia and North America.

The international ozone protection agreement, the Montreal Protocol, has succeeded in arresting the build-up of chlorofluorocarbons and other gases.

But although that should have been enough to allow the ozone to start gradually repairing itself, recovery still appears unlikely, because of a feedback.



Ozone loss at present affects mainly researchers

The World Meteorological Organisation says:
"Chemicals that result in ozone destruction are no longer increasing in the stratosphere, as the international controls on ozone-depleting chemicals continue to work.

"However, the continued general decrease of ozone in the lower stratosphere and the global increase in greenhouse gases are now believed to result in lower temperatures in the lower stratosphere.

"These decreases in temperature could expand the period of intense ozone loss during the ozone hole period."

Warming and cooling

Dr Michael Proffitt, WMO's senior scientific officer, says the ozone hole has intensified since 1995 - and something else has happened too.

"During this period, the area with temperatures low enough for polar stratospheric clouds that initiate rapid ozone destruction to form during October is double that found during any earlier five-year period," Dr Proffitt said.

Put simply, the stratosphere where the ozone has thinned is able to trap less incoming UV radiation, which cools it and makes further thinning more likely.

And while the greenhouse gases are warming the Earth's surface, climate models suggest they are having a corresponding cooling effect in the stratosphere.

In a final confounding of ozone depletion and global warming, some scientists believe that ozone depletion is helping to offset warming lower down, masking the real impact of the greenhouse gases.

Costing the Earth is broadcast on BBC Radio Four at 2100 BST on 26 October.

All photographs by courtesy of British Antarctic Survey.

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