Summer 2015
Newsletter

Environment Centre | Lancaster University

What's Happening in...
Environmental & Earth Science

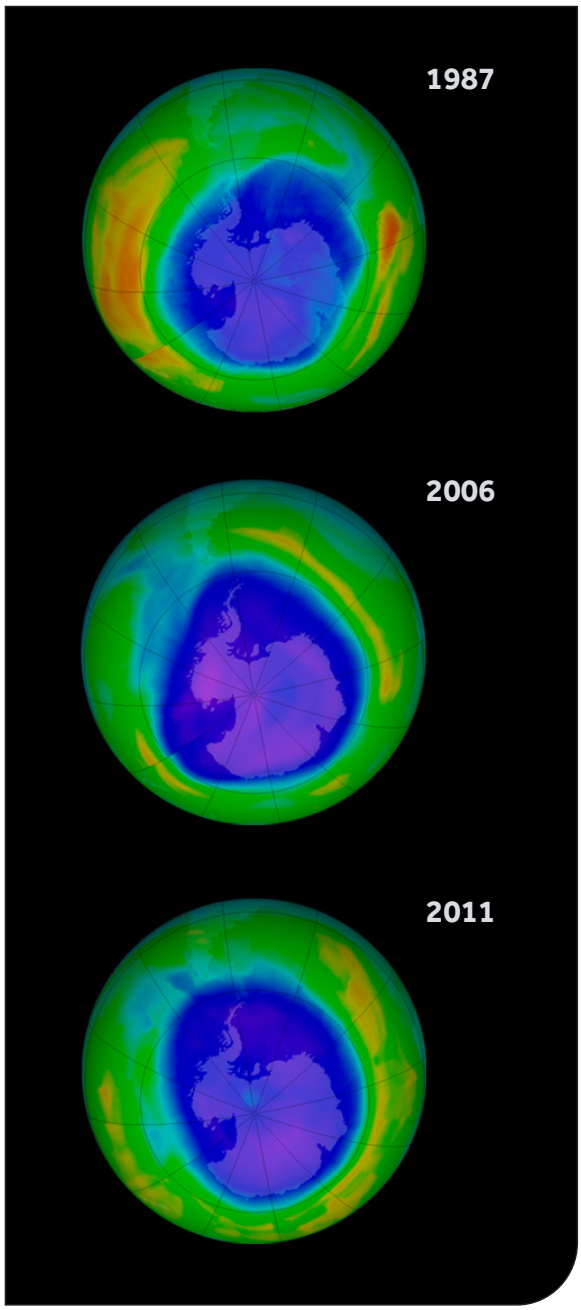
The hole in climate change: What is the impact of ozone depletion?

The ozone layer is a region of high concentrations of ozone in the stratosphere, about 15-50km above the Earth's surface. It absorbs biologically damaging UV light from the sun that would otherwise reach the surface and cause cancers, cataracts and damage plants. In the 1970s it was realised that emissions of chlorofluorocarbons (CFCs) and other ozone depleting substances (from fridges, aerosol cans and other sources) were a threat to the ozone layer and some countries began to phase them out. Thirty years ago scientists working for the British Antarctic Survey in Halley Bay, Antarctica made the surprising discovery of a "hole" in the ozone layer over Antarctica. This prompted a new urgency in efforts to control emissions of ozone depleting substances, culminating in the signing of the Montreal Protocol in 1987 to limit – and ultimately ban – their production globally. While the ozone hole still happens every year, it is expected to heal itself this century.

When the Montreal Protocol was signed, the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP) were tasked with delivering scientific reports every 4 years on the extent of ozone depletion and the impacts on human and environmental health. Scientists at Lancaster Environment Centre have co-chaired and co-authored these reports, drawing on their research on the science and environmental impacts of ozone depletion. One surprising result that we have explored recently is the extent to which the ozone hole has contributed to climate change in the Southern Hemisphere. The mechanisms for this are not fully understood, but it is thought to result from the change in temperature in the stratosphere from the ozone hole (ozone absorbs sunlight and heats the stratosphere), which affects the winds and rainfall potentially all the way to the subtropics.

Current research at Lancaster is exploring how the ozone hole is represented in climate models, and understanding how ozone recovery might impact future climate change in the Southern Hemisphere. LEC atmospheric scientists are also working with LEC biologists to consider what the world might have looked like if the Montreal Protocol had never come into force, especially how crops might have been destroyed and the carbon cycle disrupted.

Our three-and four-year environmental and Earth science degree programmes are built on the strong links between our research and teaching activities. Students learn about atmospheric science, weather and climate through lectures, laboratory activities and field work at our Hazelrigg Meteorological Station. They also have the opportunity to participate in our research activities in the UK and abroad during their dissertation projects. Linking research and teaching in this way provides our students with analytical and problem solving skills that are in high demand among employers.



A series of images (courtesy of **NASA**) showing the size and shape of the ozone hole in1987, 2006 and 2011. Smaller amounts of overhead ozone are shown in blue and purple, while larger amounts are shown in orange and yellow. The ozone hole of 2006 was particularly large.

For more details about the reports above or about Earth Science and Environmental Science programmes on offer at Lancaster University please contact the Environmental and Earth Science Admissions Staff,

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