Outstanding Accomplishments in Research

Ozone

NOAA's Office of Oceanic & Atmospheric Research (OAR) is at the center of all NOAA services. Research helps improve weather forecasts, and enhances navigation and aviation safety, as well as a variety of coastal services.

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NOAA's Office of Oceanic and Atmospheric Research (OAR) plays a vital role in studying the stratospheric ozone layer, which provides protection from the Sun's harmful ultraviolet radiation.

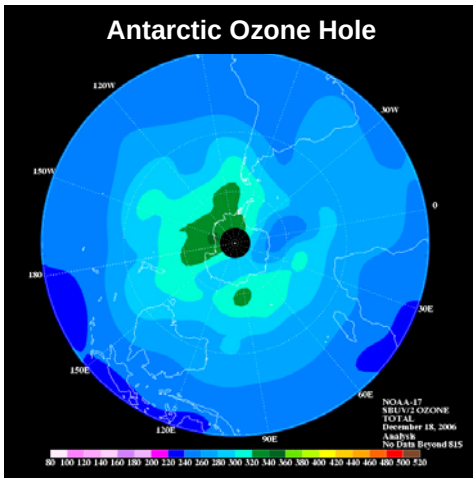
New Ozone Depleting Gas Index

Scientists at NOAA's Office of Oceanic and Atmospheric Research (OAR) Earth System Research Lab (ESRL) in Boulder, CO, developed a new Ozone Depleting Gas Index (ODGI). This simple index helps assess the decline in ozone-depleting gases from the maximum observed in the 1990s relative to the amount at which ozone-recovery is expected. The index allows policy-makers to better assess the effectiveness of the Montreal Protocol on Substances that Deplete the Ozone Layer to diminish atmospheric levels of ozone-depleting gases and enable the recovery of stratospheric ozone.

The ODGI is expressed as a number between 0 and 100 indicating the amount of ozone-depleting chlorine and bromine in the atmosphere relative to the peak observed (ODGI = 100) and the amount at which recovery is expected (ODGI = 0). Due to the very different stratospheric conditions found over mid-latitudes compared to over Antarctica, two indices are calculated.

The ODGI can be thought of as a 100-yard football field. For full recovery we have to run those 100 yards. The 2005 data indicate that we're still on our own 12-yard line, with 88 yards still to go, for Antarctic ozone hole recovery. For midlatitude ozone recovery, we've reached our own 23-yard line. Full recovery is not expected in the mid-latitude ozone layer until about 2045-2055 and full recovery of the ozone hole is not expected until 2075-2080.

The index is available online at: http://www.cmdl.noaa.gov/odgi/



NOAA Research Led the 2006 International Ozone Assessment

The 2006 International Ozone Assessment, led by ESRL tracked the outcomes of the Montreal Protocol and indicated the protocol is working. For the first time, the assessment shows ozone depleting substances in the atmosphere have decreased. This document represents a major contribution to NOAA's portfolio of climate science products. The assessment can be found at: http://esrl.noaa.gov/csd/assessments/2006/

Scientists Internationally Honored for Ozone-Depleting Research

Dr. Dan Albritton, Acting ESRL Director (retired) and Dr. Susan Solomon, also of ESRL, earned the United Nations Environment Program/ World Meteorological Organization (UNEP/WMO) Vienna Convention Award for their contributions for the protection of the ozone layer. Albritton is one the world's foremost experts on atmospheric science and co-chair of the Protocol's Science Assessment Panel since its inception; Solomon has led scientific expeditions to both the Antarctic and Arctic to investigate polar ozone depletion, and her research identified the cause of the Antarctic ozone hole.

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PREEMINENT RESEARCH

Launching an ozonesonde. This instrument measures a vertical profile of the ozone layer.

Taking Observations: NOAA researchers build and deploy instruments all over the world to measure ozone, as well as the trace gases and aerosol particles that affect its abundance. They also participate in many field experiments to study and document the processes that control atmospheric ozone. Research scientists take ozone measurements using instruments located on the ground and onboard aircraft, balloons, and satellites. The data from these instruments provide precise measurements that can be used to detect small regional ozone changes over long periods of time, provide global maps of ozone amounts and examine local ozone distributions.

Ozone Depletion: Certain industrial processes and consumer products result in the atmospheric emission of ozone-depleting gases, including chloroflourocarbons (CFCs), halons, bromine, and methyl bromide, which are known to be harmful to the ozone layer. In 1986, soon after the reported discovery of the ozone hole over Antarctica, OAR's Dr. Susan Solomon led a team of 16 scientists to Antarctica. The scientists took measurements of various trace gases and physical properties of the atmosphere. The data, along with additional findings from the following year, showed conclusively that human-produced trace gases were causing the ozone hole. ESRL has been measuring total column ozone at the South Pole Station from a ground based Dobson spectrophotometer since 1963, and monitoring the yearly Antarctic ozone hole since 1986 by launching balloon-borne ozonesondes.

Susan Solomon on Antarctic expedition in 1987 near McMurdo Station.

As a result of international regulations, ozone-depleting gases are being replaced in human activities with "ozone-friendly" gases that have much reduced potential to deplete ozone. NOAA researchers are also measuring these "substitute" gases as they accumulate in the atmosphere. Observing changes in both old and new gases emitted into the atmosphere allows researchers to improve our understanding of the fate of these gases after release and thereby improve our ability to predict future ozone changes.

Atmospheric Models : Another NOAA lab involved in studying stratospheric ozone depletion is the Geophysical Fluid Dynamics Laboratory (GFDL) in Princeton , NJ. GFDL conducts leading-edge research on stratospheric ozone depletion. For example, GFDL developed a 3-D atmospheric model tailored to study the interaction of chemistry, dynamics, and radiation in the stratosphere. Their extensive calculations were necessary for evaluating the simpler models used in the policy assessment studies, as well as for understanding the climatic impact of the Antarctic ozone hole.

VALUE TO SOCIETY

NOAA's activities are focused on ensuring a recovery of the ozone layer so it provides increased protection from the Sun's harmful ultraviolet radiation. These activities can guarantee efforts to heal the ozone layer stay on course. Through its meticulous monitoring of the atmospheric composition and scientific expertise in understanding processes and modeling, as well as the search for CFC alternatives, NOAA provides much of the global scientific foundation for understanding the ozone layer and its changes.

To Learn More, Visit These Sites:

NOAA Research Ozone Layer: http://www.research.noaa.gov/climate/t_ozonelayer.html
Earth Systems Research Lab: http://www.esrl.noaa.gov/research/themes/o3/
Geophysical Fluid Dynamics Lab: http://www.gfdl.gov/

To Work or Study at OAR, Visit These Sites:

Hollings Scholarships: http://www.orau.gov/noaa/HollingsScholarship/
NOAA Jobs and Programs: http://www.noaa.gov/jobs.html

OAR Mission's is to conduct research, develop products, provide scientific understanding and leadership and to conduct outreach towards fostering NOAA's evolving environmental and economic mission.