

Ozone: Changing Environmental Outcomes Through Discovery and Mitigation

Most of us know the phrase “ozone hole,” but what exactly is it? And how does it affect our lives? Dr. Susan Solomon is the OAR scientist qualified to provide you with answers.

Impact

Mandated cutbacks of chlorofluorocarbons (CFCs) that result in millions of U.S. lives saved

Solomon’s story began in the 1980s, when the scientific community first discovered that chlorofluorocarbons (CFCs) were becoming more prevalent in the atmosphere at the same time that ozone was lessening. This was distressing because the ozone layer protects the Earth from the Sun’s damaging ultraviolet-B (UVB) radiation. Too much UVB radiation can result in cancer. In 1986, Solomon and colleagues offered a theory for diminished ozone: Human-produced chlorine compounds interacting with stratospheric ice clouds. In the unique meteorological setting of the Earth’s polar regions, this interaction could produce extreme ozone losses. It was a remarkable insight and scientific breakthrough.

The U.S. Environmental Protection Agency estimates that actions to protect and restore the ozone layer will save 6.3 million U.S. lives that would have been lost to skin cancer.

Solomon and her colleagues were right. Together with colleagues from the international scientific community, NOAA scientists embarked on the National Ozone Expeditions of 1986 and 1987 to Antarctica. The data they collected confirmed their theory as the only explanation that fit the observations.

Recognizing the implications of the data, governments around the world agreed to the Montreal Protocol on Substances that Deplete the Ozone Layer on September 16, 1987. The

Montreal Protocol put policies in place to reduce production and consumption of man-made compounds that deplete atmospheric ozone.

In late 2008, a NOAA-led assessment of the global ozone layer found the United States has reduced by 97-98 percent the production of ozone damaging substances since the late 1980s.

Images, top to bottom: Dr. Susan Solomon and some new friends on Antarctic ozone expedition in 1987 near McMurdo Station; Twenty Questions and Answers About the Ozone Layer: 2006 Update, a joint publication of NOAA, NASA, the U.N. Environmental Program, and the World Meteorological Organization.

In 1999, Dr. Susan Solomon earned the U.S. National Medal of Science for “key insights in explaining the cause of the Antarctic ozone hole.”

As a result of this research, the Montreal Protocol put policies in place to reduce production and consumption of the man-made compounds that were depleting atmospheric ozone. Ratified by 180 nations, it is considered by many to be the most successful multilateral environmental agreement to date.

