



<i>President</i>	<i>Secretary</i>	<i>Vice President</i>
Dr. Sophie Godin-Beekmann	Dr. Irina Petropavlovskikh	Dr. Paul Newman
Tel: +33 1 80 28 54 99	Tel. +1 303 497 62 79	Tel: +1 301 614 59 85
Fax: +33 1 80 28 53 30	Fax; +1 303 497 55 90	Fax: +1 301 614 59 03
sophie.godin-beekmann@latmos.ipsl.fr	Irina.petro@noaa.gov	paul.a.newman@nasa.gov

Press Release

The International Ozone Commission, on the 31th anniversary of the Montreal Protocol, reports signs of healing of the ozone layer.

September 16th is International Day for the Preservation of the Ozone Layer, commemorating the 1987 anniversary of the signing of the Montreal Protocol on Substances that Deplete the Ozone Layer. Hailed as an example of exceptional international cooperation for the protection of the ozone layer, the Montreal Protocol became the first international treaty to achieve universal ratification. The Montreal Protocol expanded in October 2016 with the addition of the Kigali amendment. This amendment mitigates the impact on the Earth's climate by substitutes of ozone depleting substances that are powerful greenhouse gases.

The theme of the International Day for the Preservation of the Ozone Layer on 16 September 2018 is: "Keep Cool and Carry on"

The ozone layer is on the mend. A number of recent studies, as well as international reports on ozone trends indicate that ozone levels in the Antarctic ozone hole and in the upper stratosphere of the northern hemisphere are increasing.

In the Antarctic, several studies have reported total ozone increases since 2000 in early spring. While the ozone hole has reappeared in 2018, findings now show that on average, ozone holes are less deep and less extensive than since the period around the year 2000.

As mandated by the Montreal Protocol, a new Ozone Assessment will be released in December 2018. It assesses these signs of ozone layer recovery. Since the last WMO/UNEP Ozone assessment that was published in 2014, ground-based and satellite data records have been extended, and global datasets now cover several decades for assessing ozone recovery. The new SPARC report "Long-term Ozone Trends and Uncertainties in the Stratosphere (LOTUS)" will be released in Fall of 2018 and documents ozone increases since 2000 in the upper stratosphere. However, due to the long lifetimes of ODSs in the atmosphere, only certain regions are showing ozone increases, and full stratospheric ozone recovery will take several decades. Global ozone levels are expected to recover to 1980 levels in about 2050. Stratospheric ozone recovery will also be impacted by climate change. The recently published modeling results of the Chemistry Climate Model Initiative assessment provided updates for the dates of expected ozone recovery.

Stratospheric ozone increases are largely ascribed to decreasing atmospheric ODS levels thanks to the Montreal Protocol controls. Surface ground network observations are crucial to calculate the annual global emissions of atmospheric ODSs. Since the implementation of the Montreal Protocol controls, these ODS emissions have decreased as industries have transitioned to more ozone-safe compounds. However, Montzka et al. [2018]* reported that emissions of chlorofluorocarbon-11 (CFC-11 or CFC13), the second most abundant ozone-depleting gas, had unexpectedly increased in the 2014-2016 period from the 2002-2012 average level. CFC-11 is both an ODS (banned under the Montreal protocol since 2010), but it is also a powerful greenhouse gas. Some of this CFC-11 emission increase has been traced to east Asia, but regional emissions, production sources, and usages have not been quantified. Large ODS emission increases pose a new threat to the ozone layer.

Our ability to follow future ozone levels is crucially dependent on satellite, balloon, and ground-based ozone observing systems. The recent observations of the CFC-11 emission increases prove the necessity of high-quality observations for monitoring our atmosphere. The maintenance and continuation of ozone observations is necessary for improving our scientific understanding of interactions between climate change and ozone depletion, for making sure that the ozone layer indeed recovers as ozone depleting substances decline under the Montreal Protocol, and for observing the ozone layer under changing climate conditions. The International Ozone Commission (IO3C) of IAMAS-IUGG urges national and international agencies to continue their support of measurements of ozone and related species, in order to ascertain the success of the Montreal Protocol and to understand and observe the evolution of atmospheric ozone over the 21st century.

This text was last reviewed by the IO3C members on September 15th 2018

For more information: Dr. Irina Petropavlovskikh, Secretary of the International Ozone Commission, CIRES/NOAA, 325 Broadway R/GMD, Boulder, CO, 80305-3328, phone: 303-497-6279, fax: 303-497-5590, irina.petro@noaa.gov

- IO3C: <http://www.io3c.org>
- Ozone Hole Watch: <http://ozonewatch.gsfc.nasa.gov/>
- World Ozone and Ultraviolet Data Center: <http://www.woudc.org>
- Scientific Assessment of Ozone Depletion: 2014
http://www.wmo.int/pages/prog/arep/gaw/ozone_2014/ozone_asst_report.html
- Who is who in the Montreal Protocol: <http://web.unep.org/ozonaction/resources/montreal-protocol-whos-who>

*Montzka, S. A., G. S. Dutton, P. Yu, E. Ray, R. W. Portmann, J. S. Daniel, L. Kuijpers, B. D. Hall, D. Mondeel, C. Siso, J. D. Nance, M. Rigby, A. J. Manning, L. Hu, F. Moore, B. R. Miller, and J. W. Elkins (2018), An unexpected and persistent increase in global emissions of ozone-depleting CFC-11, *Nature*, 557, 413–417, doi:10.1038/s41586-018-0106-2.