International Association of Meteorology and Atmospheric Sciences (IAMAS)

International Ozone Commission (IO_3C)

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Ozone statement
Quadriennal Ozone Symposium 2016

Every four years, the International Ozone Commission organizes a symposium to discuss ozone science and research. More than 300 scientists from all over the world will gather for the Quadrennial Ozone Symposium in Edinburgh (September 5 - 9, 2016) to discuss ozone research and the current status of atmospheric ozone, including the preliminary results from this year's ozone hole.

Despite its small abundance, ozone is an essential component of the atmosphere, protecting life on Earth by filtering out damaging solar ultraviolet radiation. When present at elevated concentrations at ground level, ozone is also a powerful oxidant, harmful to human health, crop production and natural ecosystems.

In the last third of the 20th century, ozone in the stratosphere (above 10 km) was depleted by human-produced chlorine and bromine gases emitted to the atmosphere. The most prominent feature of this depletion is the Antarctic ozone hole[1], which began to form in the early 1980s and is still recurrent today. Thanks to the Montreal Protocol signed in 1987, emissions of ozone depleting substances (ODSs) were halted and their concentrations are now slowly decreasing in the atmosphere.

Global stratospheric ozone amounts stopped decreasing in the late-1990s, and have stabilized at levels about 2-3 % less than those observed in 1980. The latest international assessment of stratospheric ozone (WMO, 2014)[2] has reported a small but statistically significant increase of ozone around 40 km, which has been attributed to both a decrease of ODSs and the cooling of the stratosphere by increased abundance of greenhouse gases. More recently, several studies have shown signs that total ozone may be starting to recover over Antarctica. Due to the long lifetimes of ODSs in the atmosphere, full stratospheric

[1] This phenomenon corresponds to an important decrease (larger than 40 %) of ozone total column during the springtime over an area larger than the Antarctic continent.
[2] http://ozone.unep.org/en/assessment-panels/scientific-assessment-panel

ozone recovery will take several decades. Stratospheric ozone recovery will also be impacted by climate change.

Concentrations of ozone in the troposphere (lower atmosphere) show great spatial variability. In all industrialized countries, elevated tropospheric ozone poses a direct threat to human health, crops, and ecosystems3. Tropospheric ozone is produced by reactions between organic compounds and nitrogen oxides. While tropospheric ozone can be produced naturally, man-made precursor emissions are still rising in rapidly developing regions, further increasing tropospheric ozone levels. The lifetime of tropospheric ozone is about three weeks which means all regions of the northern Hemisphere share similar background concentrations. There are now concerns that climate change will enhance natural precursor emissions, increase the stratospheric source of ozone to the troposphere, and reduce the uptake of ozone by vegetation.

Our ability to follow future ozone trends depends crucially on the satellite and ground-based ozone observing systems. The maintenance and continuation of observations of ozone and associated species are vital to improve our scientific understanding of the interactions between climate change and ozone in the stratosphere and troposphere, and to assess the success of the Montreal Protocol.