German Aerospace Center

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Initial measurements from GOME-2: No substantial recovery in the ozone hole

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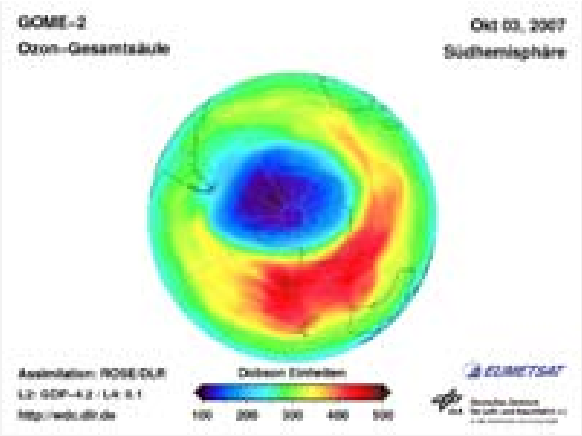


Current ozone layers over the Antarctic

Every year in the southern hemisphere spring, a considerable chemical reduction in ozone is observed in the lower and middle stratosphere, which extends from 10 to 15 kilometres high.

The term "ozone hole" was coined to describe this phenomenon. Its expansion shows strong annual progression. Its size has varied considerably over the years, but the ozone layer shows no signs of overall recovery. This was the discovery of scientists from the German Aerospace Center (DLR) when they analysed data from the EUMETSAT MetOp Earth monitoring satellite.

This year, the Antarctic ozone hole reached its maximum size in mid-September. This corresponded to a hole almost twice the size of Europe. The ozone hole is defined as a reduction in the amount of ozone to a value of less than 220 so-called Dobson units. The global average thickness of the ozone layer is about 300 Dobson units. The main cause of the reduction in ozone is the anthropogenic release of chlorofluorocarbons (CFCs).

DLR analyses the latest GOME-2 data

Again this year, the latest DLR analysis for the GOME-2/MetOp data on the ozone hole indicates no evidence of a significant recovery of the ozone layer. Typically, the ozone hole over the Antarctic closes until late in Spring, so is usually in evidence from August to December.

The Ozone hole between 1995 and 2007

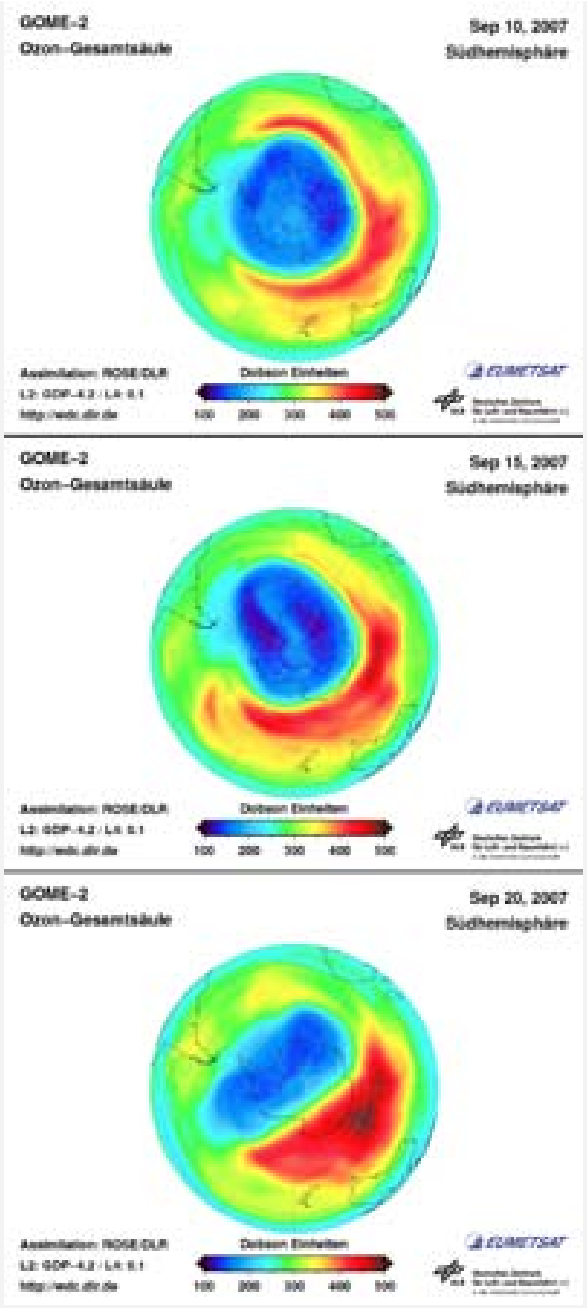
The ozone hole has now been observed for the first time by the new GOME-2 instrument (Global Ozone Monitoring Instrument 2). GOME-2 was onboard the EUMETSAT MetOp Earth observation satellite launched on 12 October 2006, and takes continuous measurements of the atmosphere.

GOME-2 continues the series of ESA instruments GOME/ERS-2 and SCIAMACHY/ENVISAT which have been observing the ozone layer successfully since 1995 and 2002, respectively. The atmospheric data from GOME-2 measurements were derived at the request of EUMETSAT by DLR's Remote Sensing Technology Institute in Oberpfaffenhofen. Initial validation of GOME-2 ozone data by ground measurements confirmed the high quality of the satellite data. Thus, GOME-2 can be relied upon for analytical purposes.

Continually updated DLR ozone data online

As part of EUMETSAT project AGORA, the GOME-2 ozone data are regularly refined using data assimilation methods at DLR's German Remote Data Sensing Centre. There, the ozone data are combined with models which describe the meteorology, physics and chemistry of the atmosphere. This allows thorough mapping of the ozone layer and a prediction of ozone distribution. These models can also provide additional information not available from the measurements alone. One example is the determination of the chemical depletion rates of ozone. Up-to-date ozone data and ozone depletion rates are available daily in near real time on the Internet at the World Data Centre for Remote Sensing of the Atmosphere.

It was noticeable in mid-September this year that the spread of the ozone hole had undergone a strong reversal (red curve in illustration). This was caused by unusual meteorological conditions in the south polar stratosphere. The stratosphere extends to a height of about 10 to 50 kilometres. It contains most of the ozone that protects us from the carcinogenic UV rays of the Sun.



The ozone hole as seen from above in September 2007

Abnormal conditions affect the ozone layer this year

An unusually high intensity of planetary waves - which cause air circulation around the world - resulted in extremely ozone-deficient air masses being transported from polar to middle latitudes from 10 to 15 September. There, they contributed to the thinning of the ozone layer, especially over the south Atlantic and South America. At the same time, this meteorological situation led to a massive increase in the ozone layer over Australia until 20 September. As a result, the area in which ozone hole conditions prevailed until 20 September grew smaller and the ozone hole reached its minimum size on the same day. The latest analyses indicate a return to the "normal", symmetrical shape of the ozone hole. But because of the unusual meteorological circumstances, its size was less than average this year.

The measurements show that observation of ozone layer will remain an important subject in future as well. The reversal in ozone hole expansion since 15 September was the result of dynamic factors and does not necessarily mean that the ozone layer is recovering.

It was exactly 20 years ago that the Montreal Protocol decided as an international environmental protection treaty in favour of banning CFCs. Since then, 191 states have signed the protocol. In the meantime, other classes of substances, so-called partially halogenated CFCs, are being blamed for the

reduction in ozone. That is why UNEP (the United Nations Environment Programme) is committed to getting rid of these substances over the next decade.

About EUMETSAT

The European Organisation for the Exploitation of Meteorological Satellites is an intergovernmental organisation based in Darmstadt, Germany, currently with 20 European Member States (Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland, Turkey and the United Kingdom) and 10 Cooperating States (Bulgaria, Estonia, Hungary, Iceland, Latvia, Lithuania, Poland, Romania, Slovenia and the Czech Republic).

EUMETSAT is operating the geostationary satellites Meteosat-8 and -9 over Europe and Africa, and Meteosat-6 and -7 over the Indian Ocean. Metop-A, the first European polar-orbiting satellite, was launched in October 2006 and has been delivering operational data since 15 May 2007. The data, products and services from EUMETSAT's satellites make a significant contribution to weather forecasting and to the monitoring of the global climate.

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