# WMO Antarctic Ozone Bulletin #6/2004

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**Meteorological conditions:** The Antarctic vortex has weakened and again decreased in area by about 15%, to what is presently about 25 million square kilometres. Daily minimum stratospheric temperatures in the Antarctic lower stratosphere have increased to levels that are now too warm for the formation of polar stratospheric clouds (PSCs) except at the lowest vortex altitudes. Sufficient warming of the vortex interior causes the cessation of PSCs. This warming is observed first at the upper altitudes, then it gradually moves down into the lower altitudes. This year, the temperatures sufficiently low for the formation of PSCs ended about 2 to 3 weeks earlier than in most recent years.

**Ozone and UV observations:** During the past few days, WMO Global Atmosphere Watch (GAW) column ozone measurements at the Antarctic stations Arrival Heights, Dumont d'Urville, Mirny, Novolazarevskaya, South Pole, Syowa, Vostok and Zhong Shan have reported values about 40% below the 1964-76 pre ozone hole norms. In contrast on the South American side of the continent, the stations of Belgrano, Marambio, San Martin, and Venadsky, have reported daily values near, or in some cases, above their norms. These ground-based observations are confirmed by satellite measurements that show a general increase in column ozone over much of Antarctica during the past two weeks. The area that is more than 30% below norms has continued to decrease, and 50% depletions are observed over very limited regions. The GAW station near the Argentine city of Ushuaia, on the southern tip of South America, has reported column ozone measurements during the past week that are generally near or above the station norms. Balloon ozone sonde measurements also reveal that the very low column ozone values previously observed at Belgrano, Davis, Marambio, Neumayer, and South Pole, have generally increased, particularly at upper ozone hole altitudes where PSCs have disappeared.

**Ozone hole:** The ozone hole has decreased in size by more than 50% from its maximum in mid-September. Presently, the centre of the ozone hole is pushed well away from the South American side and off of the South Pole. The ozone hole continues to be much smaller than the average size over the past decade, and for late October, nearly as small as it was in 2002 after the ozone hole had split into two parts in late September. Based upon observations during the past decade, it appears that the ozone hole may not persist into late November or early December, but will dissipate somewhat earlier than usual. A measure of the depth of the ozone hole is the "ozone mass deficit" (OMD), and is estimated from the daily column ozone data available from satellites and ground based measurements. Although the area of the ozone hole this year is quite small, when comparing OMDs over the past decade, this year it has remained relatively high during all of September and October. UV levels at all Antarctic network sites were below the long-term average and are strongly influenced by the size and persistence of the ozone hole. As pointed out in previous Bulletins, year to year variations in the size, depth and persistence of the ozone hole will occur and are primarily due to changing meteorological conditions in the stratosphere. Please visit the GAW ozone webpage http://www.wmo.ch/web/arep/O3_summaries/ozone_background_sum.html for additional background information on the ozone hole and the parameters that affect its size, depth and persistence.

**The Secretariat of the World Meteorological Organization (WMO)** distributes Bulletins providing current Antarctic ozone hole conditions during August-December each year. Bulletins are distributed via the WMO-Global Telecommunication System (GTS) and are also available through the Atmospheric Research and Environment Programme web page (www.wmo.ch/web/arep/ozone.html). In addition to the National Meteorological Services, the information in these Bulletins should be made available to the national bodies representing their countries with UNEP and that support or implement the Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol.

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