

WMO Antarctic Ozone Bulletin #5/2004

Issued on 14 October 2004

Meteorological conditions: During the past two weeks, the Antarctic vortex has decreased in area by about 15% and is presently near 30 million square kilometres (M km²). Daily minimum stratospheric temperatures in the Antarctic lower stratosphere continue to increase, and at the upper altitudes, temperatures are now too high for the formation of polar stratospheric clouds (PSCs). As the sun rises higher over Antarctica during the coming weeks, the stratosphere will continue to warm, resulting in the complete disappearance of PSCs at all levels.

Ozone and UV observations: Ground-based measurements of column ozone in Antarctica show a wide station-to-station variability. For the past 10 days, only stations Belgrano, South Pole, Syowa, and San Martin have consistently reported daily values 30% to 50% below the 1964-76 pre ozone hole norms. Arrival Heights, Marambio, and Vernadsky have reported a few days with ozone values 30% below norms, while other reporting Antarctic stations (Dumont d'Urville and Zhong Shan) have measured total column ozone values, throughout the two week period, near their historical norms. Balloon ozone sonde measurements at South Pole continue to reveal low column ozone values, but now show that the layer that was very depleted in ozone two weeks ago, may be starting to recover. Satellite measurements of total column ozone indicate that the area with values more than 30% below norms is presently about 19 M km², while the area depleted at least 50% in ozone is about 2 M km². The GAW station Ushuaia, in the south of Argentina, has reported column ozone values during the past two weeks that are generally a nominal 10% below norms, but in recent days they have been as much as 30% below. Stations Comodoro Rivadavia, Kerguelen Island, and Macquarie Island, located near but outside the Antarctic region have all reported total column ozone values that are consistently within about 10% of the pre ozone hole norms. UV levels at all U.S. National Science Foundation's Monitoring stations in and near Antarctica were typical of those observed during early October in recent years.

Ozone hole: The ozone hole has decreased in size by about 25% from its maximum size in mid-September, and is presently centred over the Weddell Sea. Therefore much of the Antarctic continent, about half of its area, is no longer under the ozone hole. Except for year 2002, when the ozone hole split in two in late September, the October ozone hole this year has been the smallest observed in more than a decade. 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 ozone hole this year is quite small, the OMD has been relatively high during September and October. As pointed out in previous Bulletins, the year to year variations in the size and depth of the ozone hole are expected to occur and are primarily due to meteorology. Please visit the WMO 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.

Acknowledgements: These Bulletins use provisional data from the WMO Global Atmosphere Watch (GAW) stations operated within or near Antarctica by: Argentina (Comodoro Rivadavia, Ushuaia), Argentina/Finland (Marambio), Argentina/Italy/Spain (Belgrano, San Martin), Australia (Macquarie Is), China/Australia (Zhong Shan), France (Dumont D'Urville and Kerguelen Is), Japan (Syowa), New Zealand (Arrival Heights), Russia (Mirny, Novolazarevskaya, Vostok), Ukraine (Vernadsky), UK (Halley, Rothera), and USA (South Pole, McMurdo). Satellite ozone data are provided by NASA/TOMS, NOAA/TOVS and NOAA/SBUV/2. Potential vorticity maps are provided by ECMWF and their ERA-15 and daily T106 meteorological fields are analysed by the Norwegian Institute for Air Research (NILU) Kjeller, Norway, to provide vortex extent and extreme temperature information (<http://www.nilu.no/projects/nadir/o3hole>). Ozone data analyses are prepared in collaboration with the WMO World Ozone and Ultraviolet Data Centre (WOUDC) in Toronto, Canada through the co-operation and support of the Meteorological Service of Canada (<http://exp-studies.tor.ec.gc.ca/cgi-bin/selectMap>). UV data are provided by the U.S. National Science Foundation's (NSF) UV Monitoring Network.

Questions regarding the scientific content of this Bulletin should be addressed to
Dr. Michael Proffitt: e-mail MProffitt@wmo.int

END of WMO Antarctic Ozone Bulletin 5/2004