WMO Antarctic Ozone Bulletin #7/2003

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1. **Meteorological conditions:** The lower stratospheric vortex area has now decreased to less than 25 million square kilometres (M km^2) from its maximum size of 34 M km^2 reached in September, however continues to cover much of the Antarctic continent. The lower stratosphere over Antarctica has continued to warm, now with minimum temperatures too high to produce polar stratospheric clouds (PSCs). Gradual warming of the lower stratosphere during October and November is typical behaviour for this time of year, although in some years temperatures sufficiently cold for PSC formation continue into mid-November.

2. **Ozone observations:** A few of the GAW Antarctic stations have reported daily column ozone values for November that are consistently at or near the historical "normal" values observed more than 25 years ago. However, most stations have also reported a few daily values that are well below normal. This intermittent behaviour in column ozone is usual during November. Integrated satellite and ground-based measurements show that the area with ozone column more than 30% depleted has decreased from its maximum of 31 M km^2 in late September, to less than 10 M km^2 during the first half of November. The area more than 50% depleted has now disappeared, although in late September it was a record size of more than twice the area of the United States. Antarctic balloon-borne ozone measurements at Marambio station continue to indicate near normal ozone values during November while Syowa station has reported a gradual increase from the low ozone values reported last month.

3. **Ozone hole:** The ozone hole continued its October decrease from its maximum size of 28 M km^2 reached in late September, and finally disappeared during the past few days. The ozone hole size and persistence have developed similarly to the year 2000, with an early rapid growth observed during August, a record size observed in September and finally its disappearance in mid November. The rapid decrease in the size of the ozone hole during October and November apparently is a result of the ozone depleted air within the hole being gradually replaced by or diluted by ozone rich air from outside. The ozone hole has now disappeared, however the vortex remains intact although significantly smaller and weaker. Additionally, the ozone mass deficit, a measure of the depth of the ozone hole, is 30-50% of its maximum value reached in September. Column ozone has remained normal for November in the city of Ushuaia, Argentina, located on the southern tip of South America, and has not been under the ozone hole since early October. UV levels measured at Ushuaia and the Antarctic stations of McMurdo, Palmer, and South Pole were all below the long-term mean for those locations.

4. **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 and are also available through the Atmospheric Research and Environment Programme web page (www.wmo.int/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.

5. **Acknowledgements:** These Bulletins use provisional data from the WMO Global Atmosphere Watch stations operated within or near Antarctica by: Argentina (Comodoro Rivadavia, San Martin, Ushuaia), Argentina/Finland (Marambio), Argentina/Italy/Spain (Belgrano), China (Zhong Shan), France (Dumont D'Urville and Kerguelen Is), Germany (Neumayer), Japan (Syowa), New Zealand (Arrival Heights), Russia (Mirny, Novolazarevskaya), Ukraine (Vernadsky), UK (Halley, Rothera) and USA (McMurdo, South Pole). 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 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 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 UV Monitoring Network.

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