

# WMO Antarctic Ozone Bulletin #5/2003

Issued on 16 October 2003

- 1. Meteorological conditions:** The polar vortex has decreased in area by about 10% from the maximum size it reached in September, and is now about 31 million square kilometres ( $M \text{ km}^2$ ). The vortex is nearly circular and centred over the pole at the lower altitudes, although more elongated and skewed toward the Atlantic Ocean at altitudes of 20 km and above. Typical daily minimum stratospheric temperatures over Antarctica have continued to increase in the past two weeks, but are still sufficiently cold to produce polar stratospheric clouds (PSCs) over about  $10 M \text{ km}^2$  of the lower vortex. This represents a significant warming from the  $25 M \text{ km}^2$  PSC area reported for late September which will ultimately result in a decrease in ozone loss during the coming weeks.
- 2. Ozone observations:** Many of the WMO Global Atmosphere Watch (GAW) Antarctic stations have continued to observe very low values of column ozone, while others have observed higher values than they reported for late September. The GAW Antarctic stations of Belgrano, Halley, Novolazarevskaya, Rothera, South Pole, and Vernadsky have all continued to report ozone values 50-60% below the pre-ozone hole norms (i.e. ozone typical of the pre-ozone hole period of 1964-76). Integrated satellite and ground-based measurements show that the very large area with ozone values more than 50% below norms observed on 26 September ( $18 M \text{ km}^2$ ), has now decreased to less than  $3 M \text{ km}^2$ . Balloon-borne ozone measurements at Dumont D'Urville and Marambio indicate significant ozone recovery in recent days, while Neumayer, South Pole and Syowa stations continue to measure very low ozone values from 15 to 21 km.
- 3. Ozone hole:** As is usual, the area of the ozone hole decreased during the first two weeks of October, including a sharp decrease to less than  $18 M \text{ km}^2$  that occurred during the second week. This area is much smaller than the near record size of  $28 M \text{ km}^2$  observed during late September. The city of Ushuaia, Argentina, located on the southern tip of South America, has been under the ozone hole on four occasions this year. On 6 October, column ozone decreased to nearly 60% below norms resulting in very high UV levels, with a maximum measured UV Index of more than 9. While typical maximum UV Index values for this time of the year in Ushuaia are between 3 and 5, on one occasion in October 2000, an Index of 11 was observed when the ozone hole was also overhead and there were cloud free conditions.
- 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 (GTS) and are also available through the Atmospheric Research and Environment Programme web page at [www.wmo.int/web/arep/ozone.html](http://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 (GAW) stations operated within or near Antarctica by: Argentina (Comodoro Rivadavia, San Martin, Ushuaia), Argentina/Finland (Marambio), Argentina/Italy/Spain (Belgrano), Australia (Macquarie Is), 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 (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 (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.

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