File Revision Date:
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Data Set Description:

PI: Terry Deshler
Instrument: ECC ozonesonde
Site: McMurdo Station, Antarctica (166.67 E, 77.85 S, 10 meters)
Measurement Quantities: Pressure, Temperature, RH, Geopotential height,
Ozone partial pressure.

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Reference Articles:
Nardi, B., W. Bellon, L. D. Oolman, and T. Deshler, Spring 1996 and 1997 ozonesonde measurements over McMurdo Station, Antarctica, Geophys. Res. Lett., 26, 723-726, 1999.

Nardi, B., T. Deshler, M. E. Hervig, and L. Oolman, Ozone measurements over McMurdo Station, Antarctica, during spring 1994 and 1995, Geophys. Res. Lett., 22, 285-288, 1997.

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Deshler, T., and D. J. Hofmann, Ozone profiles over McMurdo Station, Antarctica, during August, September, and October of 1986 - 1991. Proceedings of the 1992 Quadrennial Ozone Symposium, Charlottesville, 1993.

Deshler, T., A. Adriani, G.P. Gobbi, D. J. Hofmann, G. Di Donfrancesco, B. J. Johnson, Volcanic aerosol and ozone depletion within the Antarctic polar vortex during the austral spring of 1991, Geophys. Res. Lett., 19, 1819-1822, 1992.

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Deshler, T., D. J. Hofmann, J. V. Hereford, and C. B. Sutter, Ozone and temperature profiles over McMurdo Station, Antarctica, in the spring of 1989, Geophys. Res. Lett., 17, 151-154, 1990.

Instrument Description:
Project start date: August, 1986

Cathode: A 1% KI buffered solution was used for all years except 1999, when a 0.5% KI buffered solution was used.

Ozonesondes used: Science Pump 5A, 6A and ENSCI 1Z models.

Solution amounts: 3 ml of cathode solution, 1.5 ml of anode solution

Standard procedures followed for sonde preparation.

ECCs connected to Vaisala RS-80-15 type radiosondes using TMAX interface board.

The ground receiving station is an ICOM receiver and a KAM Plus programmable modem. The data are analyzed with University of Wyoming data acquisition and analysis software: TLMUW.bas and ANLOZ2.bas

Algorithm Description:
Ozone is calculated as a partial pressure. PTU data from the sonde is not used directly in the calculation except in the pump correction factor.

PPOZ(mPa) = 0.0004307 * i * t * Temperature * pcf(P)

where:
i = the current from the sensor - background in uA.
t = the time in seconds to pump 100 ml of air through the pump.
Temperature = the pump temperature (K).
pcf, a function of pressure (P), = the pump correction factor to account for loss in pump efficiency at lower pressures.

Background current is assumed to be constant. The value used is the value measured on filter just prior to release of the ozonesonde.

The average pump correction factor (pcf) table below is from an average of 640 ozonesonde flow rates measured at the University of Wyoming. The pump corrections are obtained by measuring the time required to evacuate a fixed volume in an environmental chamber, the so-called bag method.

Pressure (mb)	(pcf)
5.0	1.223
7.0	1.166
10.0	1.120
20.0	1.066
30.0	1.049
50.0	1.037
100.0	1.021
300.0	1.000
1000	1.000

Expected Precision/Accuracy of Instrument:
PTU values for RS 80 Radiosonde

Pressure:
Resolution 0.1 mb
Accuracy +/- 0.5 mb

Temperature:
Resolution 0.1 C
Accuracy +/- 0.2 C

Humidity:
Resolution 1% RH
Accuracy +/- 2% RH
only accurate for temperatures > about 240 K

Geopotential Height:
Calculated from pressure and temperature measurements.
Errors are due to uncertainty in these values.

Pump Temperature:
Resolution 0.1 C
Accuracy +/- 0.5 C

Ozone Partial Pressure:
Resolution 0.01 mPa

Accuracy +/- 10% or less depending on altitude (according to the JOSIE report on the ECC sonde. Smit H., et al., JOSIE: The 1996 WMO International Intercomparison of Ozonesondes under Quasi-flight Conditions in the Environmental Simulation Chamber at Julich, Proc. Quad. Ozone Symp., l'Aquila, Italy, 1996)

The main sources of error are the pump correction at high altitudes and background current in the troposphere.

Instrument History:

Measurements began in 1986 in response to concern about the ozone layer above Antarctica, and are funded by the U.S. National Science Foundation. Measurement procedures and instrument preparations have been very stable, even though a variety of personnel have been involved. Measurements are currently funded through October 2002.