File Revision Date:
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Data Set Description:
PI: Hans Fast
Instrument: ECC ozonesonde
Site: Eureka (weather station: 79.99 N, 85.90 W)
Measurement Quantities: Pressure, Temperature, RH, Wind speed and direction, Geopotential height,
                                 Ozone partial pressure, Box temperature

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Reference Articles:
Some recent articles describing the current Canadian ozonesonde program:

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

Tarasick, D.W., J. Davies, K. Anlauf and M. Watt, Response of ECC and Brewer-Mast Sondes to
Tropospheric Ozone, Proc. Quad. Ozone Symp., l'Aquila, Italy, 1996

Not so recent articles of more general interest:

Thornton, D.C. and N. Niazy, Sources of background current in the ECC ozonesonde: implications for
total ozone measurements. J. Geophys. Res., 87, 8943-8950, 1982

------MORE TO COME------

Instrument Description:
At Eureka the ECC type ozone sonde has been used exclusively since 1992. A detailed description of the
instrument and the preparation methods are given in the references (see JOSIE). The main points are:

Both Science Pump 5A, 6A and EN-SCI 1Z type ECC sondes are used and
are prepared the same way irrespective of the manufacturer.

The ECC's are connected to Vaisala RS-80-15 type radio sondes using he Vaisala RSA-11 interface card.

The ground receiving station is Vaisala running DigiCORAII/METGRAPH

A 1% KI solution is used (along with KBr and a pH buffer)

The preparation is essentially similar to the NOAA procedure but lets the sondes sit for about 12 hours after final preparation to allow for a low background current. This avoids some of the errors associated with background current.

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.

$PPOZ(nb) = 0.004307 * i * Temperature * t$

where: i is the current from the sensor - background in uA
          t is the time in seconds to pump 0.100 liters of air through the pump multiplied by the pump correction.

Background current is assumed to be proportional to pressure for consistency with earlier flights. Temperature is the Box temperature taken as the pump temperature. The thermister is close to but not touching the pump.

The pump correction is interpolated from the table:
(for 2.5 cc of cathode solution)

Pressure	Correction
2.0	1.160
3.0	1.124
5.0	1.087
10.0	1.054
20.0	1.033
30.0	1.024
50.0	1.015
100.0	1.010
200.0	1.007
300.0	1.005
500.0	1.002
1000.0	1.000

Note: No individual calibration of the pump correction is made

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

Geopotential Height:
Uses Pressure and Temperature profile.
Errors due to uncertainty in these values.

Box Temperature:
Measured but not currently reported, used in the calculation of ozone partial pressure
Resolution   0.1 C
Accuracy   +/- 0.5 C

Ozone Partial Pressure:
Resolution   0.01 mPa
Accuracy   +/- 10% or less depending on altitude (see the JOSIE report for more details)

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

Instrument History:
For the period of the NDSC records there have been no significant changes in the ozone instrument or algorithm. The winds will be calculated using GPS navaids instead of Omega after September 1997.