File Revision Date:
1 November 2024

Data Set Description:
PI: Matt Tully
Instrument: ECC Ozonesonde
Site(s): Macquarie Island
Measurement Quantities: Measurement Quantities: Ozone partial pressure, Pressure, Temperature, Relative humidity, Geopotential height, GPS Altitude, Latitude and Longitude of payload , Horizontal wind speed and direction

Data Version description:

Contact Information:
Name: Matt Tully
Address: GPO Box 1298, Melbourne, Victoria 3001, Australia
Phone: +61 3 9669 4139
FAX: +61 3 9669 4736
Email: matt.tully@bom.gov.au

Licence

DOI
Not at present time

Instrument Description:
The ECC Ozonesonde (Electrochemical Concentration Cell Ozonesonde) is a lightweight, balloon-borne instrument flown in conjunction with a meteorological radiosonde to 30+ km while transmitting data back to a ground station. The sensing component of the ozonesonde is an electrochemical concentration cell (ECC) that productes an electric current proportional to the number of ozone molecules per time reacting with a dilute solution of potassium iodide.

Program start date: December 1993 (but no flights from January 1995 - November 1996)

Ozone sensor:
Science Pump Corporation (SPC) ECC-5A 1993-1994
Science Pump Corporation (SPC) ECC-6A 1996 - 2020

Radiosonde:
Vaisala RS80 (December 1993 - April 2006)
Vaisala RS92 (April 2006 - October 2019)
Vaisala RS41 (October 2019 - present)

Sensing Solution Type (SST):
SST 1.0 : 1.0% KI & full buffer

Sensing Solution Volume:
3.0 cm^3

Launch Frequency:
Launch time: 23:15 (UTC) , weekly
(Flights are flown on Wednesday (local time = Tuesday UTC) subject to wind conditions)

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

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

where:
the constant is half the ratio of ideal gas constant to Faraday's constant.
i is the current from the sensor minus background in uA.
t is the time in seconds to pump 100 CCs of air through the pump.
Temperature is the pump temperature (K).
Pcf is the pump correction factor to account for loss in pump efficiency at lower pressures.

Pre-flight procedures are very close to GAW_201.
A constant background current is used (measured immediately prior to launch).
Pump correction factors used are Komhyr 1986.

Expected Precision/Accuracy of Instrument:
Ozonesonde:

Accuracy	Precision	Resolution
+/- 5%	+/- 4%	~150m

Instrument History:
The program began at the very end of 1993, followed by weekly flights in 1994, using ECC5A ozonesondes and RS80 radiosondes. There were no flights in 1995, but weekly flights resumed at the end of 1996, now using ECC6A ozonesondes.

The radiosonde used transitioned from the Vaisala RS80 to the Vaisala RS92 in April 2006, and then to the Vaisala RS41 in October 2019.

No changes have been made to the composition of the sensing solutions.

No correction has been applied so far for the radiosonde changes.