

File Revision Date:

September 10, 2020

Data Set Description:

PI: Peter von der Gathen

Instrument: ECC Ozonesondes

Site(s): Neumayer, Antarctica

Measurement Quantities: Ozone partial pressure, Ozone mixing ratio, Pressure, Temperature, Relative humidity, Geopotential height, GPS Altitude, Latitude and Longitude of payload, and Wind.

Data Version description:

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Reference Articles:

Instrument Description:

The ECC Ozonesonde (Electrochemical Concentration Cell Ozonesonde) is a lightweight, balloon-borne instrument mated to a meteorological radiosonde and flown to 30+ km while transmitting data back to a ground station. The heart of the ozonesonde is an electrochemical concentration cell (ECC) that senses ozone as it reacts with a dilute solution of potassium iodide to produce an electrical current proportional to the ozone concentration of the air.

Project start date: March 1992

Start digital data acquisition: March 1992

Data record: 1992-current

Data gaps: -

Ozone sensor:

Science Pump Corporation (SPC) ECC-5A/6A (Entire record)

Radiosonde:

VAISALA RS80/RS90/RS41 (Entire record)

Sensing Solution Type (SST):

1% KI, 1.0x (full) buffer (Entire record)

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.

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

where:

the constant is half the ratio of ideal gas constant to Faraday's constant.

i is the current from the sensor - 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 comply with the VAISALA handbook:

Expected Precision/Accuracy of Instrument:

Ozonesonde:

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

Instrument History:

ECC Ozonesondes changes:

19920322 - 19970920 SPC ECC-5A

19970920 - current SPC ECC-6A

Radiosonde changes:

19920322 - 20021231: RS80

20030106 - 20061005: RS90 with two exceptions:

20051229 - 20060104: RS92

20061011 - 20180523: RS92

20180530 - current: RS41

Changes in the location of the pump thermistor are related to the 5A or 6A ozonesonde type:

5A: taped near to the pump but not at the pump

6A: positioned in the decicated thermistor hole of the sonde