

File Revision Date:  
September 10, 2020

Data Set Description:

PI: Peter von der Gathen  
Instrument: ECC Ozonesondes  
Site(s): Ny-Aalesund, Spitsbergen/Norway  
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:

Contact Information:

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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: Oct 1991  
Start digital data acquisition: Oct 1991  
Data record: 1991-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:

19911016 - 19961115 SPC ECC-5A

19961120 - 19970114 SPC ECC-5A and ECC-6A (Serial numbers starting with 5A/5a or 6A/6a are given as auxilliary data in the NASA Ames formatted files.)

19970213 - current SPC ECC-6A

Radiosonde changes:

19911016 - 20030604: RS80

20020529 - 20030604: RS80 and RS90 (Serial numbers of RS80 begin with a digit.  
Serial numbers of RS90 begin with W, X, Y, or Z.  
Serial numbers are provided as auxilliary data in the NASA Ames formatted files.)

20030612 - 20070117: RS90

20070122 - 20170313: RS92

20170322 - 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