

File Revision Date:

August 16, 2021

Data Set Description:

PI: Anne M. Thompson (after May 2021, PI: Ryan M. Stauffer)
Instrument: ECC Ozonesondes
Site: Wallops Island, Virginia, U.S.A. (NASA Goddard and Wallops Flight Facility)
Latitude: 37.93N
Longitude: 75.47W
Altitude: 11m amsl

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: V06 data reprocessed similarly to SHADOZ reprocessing/data homogenization.

Archived Data Record Start Date: July 25, 1995

Details of V06 reprocessing are in the reference below.

Contact Information:

Name: Dr. Anne M. Thompson
Address: NASA Goddard Space Flight Center (GSFC)
8800 Greenbelt Road, Mail Code 614
Greenbelt, Maryland 20771 U.S.A.
Email: anne.m.thompson@nasa.gov

Name: Dr. Ryan M. Stauffer
Address: NASA Goddard Space Flight Center (GSFC)
8800 Greenbelt Road, Mail Code 614
Greenbelt, Maryland 20771 U.S.A.
Phone: 1(301)614-5552
Email: ryan.m.stauffer@nasa.gov

Data Contact:

UAIRP Processing/QA:

Name: E. Thomas Northam
Address: NASA Goddard Space Flight Center / Wallops Flight Facility (Code 610.W)
34200 Fulton Street
Wallops Island, Virginia 23337 U.S.A.
Email: e.thomas.northam@nasa.gov

GSFC Processing:

Name: Debra E. Kollonige
Address: NASA Goddard Space Flight Center (Code 614)
8800 Greenbelt Road
Greenbelt, Maryland 20771 U.S.A.
Email: debra.e.kollonige@nasa.gov

DOI:

Not at this time.

Data License:

CC0

Reference Articles:

Witte, J. C., Thompson, A. M., Schmidlin, F. J., Northam, E. T., Wolff, K. R., & Brothers, G. B. (2019). The NASA Wallops Flight Facility digital ozonesonde record: Reprocessing, uncertainties, and dual launches. *Journal of Geophysical Research: Atmospheres*, 124, 3565–3582.
<https://doi.org/10.1029/2018JD030098>.

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: May 1970

Start digital data acquisition: July 1995

Data record: 1970-*present*

Data gaps: COVID-19 shutdown, 04/2020-09/2020

Ozone sensor:

Science Pump Corporation (SPC) ECC-5A (July 1995 to 1996; 38 records)

Science Pump Corporation (SPC) ECC-6A (1996 to current)

Environmental Science (EN-SCI) Corporation Z (120 records August 1996-January 2002)

Radiosonde:

Lockheed Martin Sippican - M2LORAN-C (1995-Jan 2003)

Lockheed Martin Sippican - VIZ GPS LOS-T (Jan 2003- mid 2006)

Lockheed Martin Sippican - Sip GPS LOS-T (mid 2006-present)

Sensing Solution Type (SST):

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

1% KI, 1.0x (full) buffer (120 records w/ EN-SCI, transfer function used to convert data to SPC)

1%, full buffer)

Launch Frequency:

Local Launch times 1200-1400, weekly

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 μA .

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:

"WMO/GAW Report 201"

https://library.wmo.int/doc_num.php?explnum_id=7167

All data have been reprocessed to comply with:

"O3S-DQA-Guidelines Homogenization-V2-19November2012.pdf"

http://www.das.uwyo.edu/~deshler/NDACC_O3Sondes/O3s_DQA/O3S-DQA-Guidelines%20Homogenization-V2-19November2012.pdf

Expected Precision/Accuracy of Instrument:

Ozonesonde:

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

Radiosonde:

Pressure Accuracy:

+/- 0.5 hPa

Instrument History:

ECC Ozonesondes:

Manufacturer:	Model #	Time Period Used	Design and Changes
Science Pump	5A	July 1995 to 1996	Digital data acquisition
Science Pump	6A	1996-present	Pump temp. thermistor inside of pump block
EN-SCI	1Z	Aug 1996-Jan 2002	Diff. manufacturer but same design as SPC 6A

Solution Recipe changes:

1995-present -> 1% KI, 1.0x (full) buffer (Entire record w/ SPC)

1996-2002-> 1% KI, 1.0x (full) buffer (120 records w/ EN-SCI, transfer function used to convert data to SPC 1%, full buffer)

Radiosonde changes:

1995-01/2003 -> Lockheed Martin Sippican - M2LORAN-C

01/2003 - mid 2006 -> Lockheed Martin Sippican - VIZ GPS LOS-T

mid 2006-present -> Lockheed Martin Sippican - Sip GPS LOS-T

Solution volume changes:

07/1995-02/2007 -> 2.5 cm^3 used, absorption efficiency correction applied dependent on Pressure (100 hPa < P < 1050 hPa)

03/2007 -present -> 3.0 cm^3 used, no correction needed