

ICE-T NCAR C-130 FSSP300 Measurements of Coarse Mode Particle Concentration

AUTHOR(S):

Name: Jeff Snider

Address: University of Wyoming, Dept of Atmospheric Science, Dept. 3038 1000 East University Avenue, Laramie, WY 82071, 307 766 2637

E-mail: jsnider@uwyo.edu

1.0 DATA SET OVERVIEW:

Introduction: ICE-T NCAR C-130 FSSP300 Measurements of Coarse Mode Particle Concentration

Time period covered by the data: All ICE-T C-130 flights

Physical location: NCAR C-130

Data source if applicable (e.g., for operational data include agency): Not Applicable

WWW references:

http://www.atmos.uwyo.edu/~jsnider/snider_acp_2008.pdf

http://www.atmos.uwyo.edu/~jsnider/snider_iccp_2012.pdf

2.0 INSTRUMENT DESCRIPTION:

Brief text:

Files contain measurements of the concentration of particles with optical diameter larger than 0.5 μm . Values are written to ASCII files as 1 Hz samples. The basis for the calculation is 1 Hz C-130 data provided by EOL-NCAR in NetCDF format. Creation date of the C-130 EOL-NCAR NetCDF files is 2011-12-19.

Figures (or links), if applicable:

Please see links to WWW references

Table of specifications (i.e., accuracy, precision, frequency, resolution, etc.): These are provided in the WWW references

3.0 DATA COLLECTION AND PROCESSING:

Description of data collection:

Values reported in the EOL-NCAR NetCDF files were subject to a data processing step (C:\jeff\ccn_icet\pro4\f300_pcasped_dust_icet_v2.pro). The output of that processing is an ASCII file whose format is discussed below.

Description of derived parameters and processing techniques used:

Description of quality control procedures:

The concentration of particles with optical diameter larger than 0.5 μm was derived by summing the appropriate channels of the FSSP300. A particle refractive index = 1.59 was assumed. If the value of sum was associated with the presence of cloud, or precipitation, the value is reported as 'NAN.' Also, values of the sum coincident with C-130 true air speed smaller than 60 m/s, with relative humidity less than 0%, with invalid relative humidity, or with relative humidity greater than 100% were set to 'NAN.' The diameter of the particles associated with relative humidity greater than 50% was adjusted to a smaller size based on Köhler theory and an assumed hygroscopicity factor $\kappa=0.74$. Subsequent to size correction, the concentration of particles with diameter larger than 0.5 μm was evaluated. The relative humidity values used in the above-mentioned data quality checks, and the size correction, was derived using coincident dew point values obtained from the C-130's chilled-mirror hygrometer.

Data intercomparisons, if applicable:

Comparison to PCASP measurements of concentration (again $D > 0.5 \mu\text{m}$) is available on request. The sample area of the FSSP300 was adjusted to make the PCASP and FSSP300 averages agree, on average. The value used for the sample area is 0.0007 cm^2 . The latter, is about 50% smaller than the value used by EOL-NCAR in their processing of the ICE-T NetCDF data (0.0012 cm^2). Justification for this change will be reported in a peer-reviewed publication.

4.0 DATA FORMAT:

Data file structure and file naming conventions (e.g., column delimited ASCII, NetCDF, GIF, JPEG, etc.):
ASCII

Data format and layout (i.e., description of header/data records, sample records):

Time, seconds since start of GMT day

Time, GMT hhmmss

Ambient temperature, Kelvin

Ambient dew point temperature, Kelvin (C-130 chilled-mirror measurement)

Ambient pressure, Pa

Aircraft altitude, meter above sea level

Fractional relative humidity derived as $ew(\text{dew point}) / ew(\text{temperature})$

FSSP300 concentration for particles with optical diameter $> 0.5 \mu\text{m}$, # per actual cubic centimeter

FSSP300 average diameter (evaluated for particles $> 0.5 \mu\text{m}$), μm

List of parameters with units, sampling intervals, frequency, range:

Sample rate is 1 Hz.

Data version number and date:

EOL-NCAR NetCDF files is 2011-12-19

Description of flags, codes used in the data, and definitions (i.e., good, questionable, missing, estimated, etc.):

Invalid values of FSSP300 concentration and FSSP300 average diameter are set to NAN according to the selection criteria discussed above.

5.0 DATA REMARKS:

PI's assessment of the data (i.e., disclaimers, instrument problems, quality issues, etc.):

None at this time.

Missing data periods:

None that I am aware of.

Software compatibility (i.e., list of existing software to view/manipulate the data):

Programs/software that ingest ASCII input file (EXCEL, IDL, FORTRAN, etc.)

6.0 REFERENCES:

List of documents cited in this data set description: Please see links to WWW references