TITLE: COMBINED AEROSOL SIZE DISTRIBUTION (LDMA, TDMA, OPC, APS)

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1.0 DATA SET OVERVIEW AND INSTRUMENT DESCRIPTION:

Combined aerosol size distribution integral number, area and volume measured aboard NASA C-130 for the VOCALS Experiment by Differential Mobility Analyzer (DMA), Long Differential Mobility Analyzer (LDMA), Optical Particle Counter (OPC) and Aerodynamic Particle Sizer (APS) in the following diameter ranges (um) and time resolutions (sec):

Instrument	Dmin	Dmax	Dsub/coarse	Delta t
OPC	0.15	3	0.75	3
DMA	0.02	0.15		~85
LDMA	0.02	0.5		~85
APS	0.72	20		15

2.0 DATA COLLECTION AND PROCESSING:

Data have been corrected for the ambient temperature and pressure based on the ideal gas law. Data influenced by droplet shatter have been removed.

3.0 DATA FORMAT:

Data for each flight is supplied in its own file. Filenames are structured as (for example): SD_C130_20081025_R1.ict (measured parameter _ C130_date_version.file type).

For each time interval two lines of data are included: 1st line contains integrals, 2nd line - 151 data points of dN/dlogDp at 151 diameters Dp from 0.01um to 10um with 0.02 increment of the dlogD. Dp= 10^(log10(0.01):0.02:log10(10.0)) (see line in the comments below).

The columns in 1st lines are:
1.UTC Time;
2. UTC Matlab Time;
3. Start Time (UTC);
4. Stop Time (UTC);
5. Mid-point Time (UTC);
6. Dp_ArraySize;
7. Log10_Dp_Start;
8. Log10_Dp_Increment;
9. Total Number Concentration, (1/cm3)
10. Total Area Concentration, (um^2/cm3)
11. Total Volume Concentration, (um^3/cm3)
12. Submicron Number Concentration, (1/cm3)

13. Submicron Area Concentration, (um^2/cm3)
14. Submicron Volume Concentration, (um^3/cm3)
15. Supermicron Number Concentration, (1/cm3)
16. Supermicron Area Concentration, (um^2/cm3)
17. Supermicron Volume Concentration, (um^3/cm3)
18. Total Number Concentration @ 400C, (1/cm3)
19. Total Area Concentration @ 400C, (um^2/cm3)
20. Total Volume Concentration @ 400C, (um^3/cm3)
21. Submicron Number Concentration @ 400C, (1/cm3)
22. Submicron Area Concentration @ 400C, (um^2/cm3)
23. Submicron Volume Concentration @ 400C, (um^3/cm3)
24. Supermicron Number Concentration @ 400C, (1/cm3)
25. Supermicron Area Concentration @ 400C, (um^2/cm3)
26. Supermicron Volume Concentration @ 400C, (um^3/cm3)

The columns in 2^{d} lines are:
1-151. dN/dlogDp

Standard EOL data archive header information is first, followed by a NASA-NOAA style header precluded by “REMARKS =” identifier.

EXAMPLE HEADER and 3 lines of data

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PI/DATA CONTACT = Antony Clarke, 1000 Pope Road, Honolulu, HI 96822; email: tclarke@soest.hawaii.edu; 808-956-6215
DATA COVERAGE = START: 20081021060318; STOP: 20081021142218 UTC
PLATFORM/SITE = C-130
INSTRUMENT = COMBINED AEROSOL SIZE DISTRIBUTION (LDMA, TDMA, OPC, APS)
LOCATION = mobile
DATA VERSION = 1.0 (20091001)
REMARKS = VAMOS Ocean-Cloud-Atmosphere-Land Study (VOCALS)
REMARKS = missing data NaN
REMARKS = NASA-NOAA HEADER INFORMATION FOLLOWS
REMARKS = 82      2310
REMARKS = Clarke, Antony
REMARKS = HiGEAR/University of Hawaii
REMARKS = Aerosol size distributions, inegral number, area and volume measured aboard NASA P3-B
REMARKS = VOCALS
REMARKS = 60
REMARKS = Log base 10 of geometric particle diameter, um
REMARKS = Start time of average UT seconds from 0 hours on day given by date, (seconds)
REMARKS = 1
REMARKS = 1.0
REMARKS = -999
REMARKS = Aerosol Number Size Distribution (dN/dLogDp), (cm-3)
REMARKS = 23
REMARKS = 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000
1.000 1.000 1.000 1.000 1.000
REMARKS = -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999
-9999 -9999 -9999 -9999 -9999
REMARKS = End time of average in UT seconds from 0 hours on day given by date, (seconds)
REMARKS = Mid time of average in UT seconds from 0 hours on day given by date, (seconds)
REMARKS = Number of values in distribution (151), (none)
REMARKS = Log base 10 of geometric particle diameter at which data begins (-2), (um)
REMARKS = Log base 10 of geometric particle diameter increment (0.02), (um)
REMARKS = Total Nuber Concentration, (1/cm3)
REMARKS = Total Area Concentration, (um^2/cm3)
REMARKS = Total Volume Concentration, (um^3/cm3)
REMARKS = Submicron Nuber Concentration, (1/cm3)
REMARKS = Submicron Area Concentration, (um^2/cm3)
REMARKS = Submicron Volume Concentration, (um^3/cm3)
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REMARKS = Supermicron Nuber Concentration, (1/cm3)
REMARKS = Supermicron Area Concentration, (um^2/cm3)
REMARKS = Supermicron Volume Concentration, (um^3/cm3)
REMARKS = Total Nuber Concentration @ 400C, (1/cm3)
REMARKS = Total Area Concentration @ 400C, (um^2/cm3)
REMARKS = Total Volume Concentration @ 400C, (um^3/cm3)
REMARKS = Submicron Nuber Concentration @ 400C, (1/cm3)
REMARKS = Submicron Area Concentration @ 400C, (um^2/cm3)
REMARKS = Submicron Volume Concentration @ 400C, (um^3/cm3)
REMARKS = Supermicron Nuber Concentration @ 400C, (1/cm3)
REMARKS = Supermicron Area Concentration @ 400C, (um^2/cm3)
REMARKS = Supermicron Volume Concentration @ 400C, (um^3/cm3)
REMARKS = 11
REMARKS = ---------- HIGEAR COMBINED AEROSOL SIZE DISTRIBUTIONS AND INTEGRAL CONCENTRATIONS) ----------
REMARKS = HiGEAR unheated size distributions are created by merging the TDMA (0.01-0.20um), LDMA (0.10-0.50um), OPC (0.12-8.0um) and APS (0.78-10.0um) size distributions.
REMARKS = Refractory distributions are created by merging the heated (400oC) TDMA and OPC size distributions.
REMARKS = Size distribution integrals range from 0.01-10.0 micrometers (total), 0.01-1.0 (submicron), and 1.0-10.0 (supermicron).
REMARKS = For each time interval two lines of data are included:
REMARKS = 1st line Start_UTC Stop_UTC Mid_UTC Dp_ArraySize Log10_Dp_Start Log10_Dp_Increment Nint_tot Aint_tot Vint_tot Nint_sub Aint_sub Vint_sub Nint_coa Aint_coa Vint_coa Nint_tot4 Aint_tot4 Vint_tot4 Nint_sub4 Aint_sub4 Vint_sub4 Nint_coa4 Aint_coa4 Vint_coa4
REMARKS = 2d line 151 data points of dN/dlogDp at 151 diameters Dp from 0.01um to 10um with 0.02 increment of the dlogD. Dp= 10^(log10(0.01):0.02:log10(10.0)) (see line below).
REMARKS = Dp = [0.01 0.010471 0.010965 0.011482 0.012023 0.012589 0.013183 0.013804 0.014454 0.015136 0.015849
0.016596 0.017378 0.018197 0.019055 0.019953 0.020893 0.021878 0.022909 0.023988 0.025119 0.026303 0.027542
0.028840 0.030200 0.031623 0.033113 0.034674 0.036308 0.038019 0.039811 0.041687 0.043652 0.045709 0.047863
0.050119 0.052481 0.054954 0.057544 0.060256 0.063096 0.066069 0.069183 0.072444 0.075858 0.079433 0.083176
0.087096 0.091201 0.095499 0.10000 0.10471 0.10965 0.11482 0.12023 0.12589 0.13183 0.13804 0.14454
0.15136 0.15849 0.16596 0.17378 0.18197 0.19055 0.19953 0.20893 0.21878 0.22909 0.23988 0.25119
0.26303 0.27542 0.28840 0.30200 0.31623 0.33113 0.34674 0.36308 0.38019 0.39811 0.41687 0.43652
0.45709 0.47863 0.50119 0.52481 0.54954 0.57544 0.60256 0.63096 0.66069 0.69183 0.72444 0.75858
0.79433 0.83176 0.87096 0.91201 0.95499 1.0000 1.0471 1.0965 1.1482 1.2023 1.2589 1.3183
1.3804 1.4454 1.5136 1.5849 1.6596 1.7378 1.8197 1.9055 1.9953 2.0893 2.1878 2.2909
2.3988 2.5119 2.6303 2.7542 2.8840 3.0200 3.1623 3.3113 3.4674 3.6308 3.8019 3.9811
4.1687 4.3652 4.5709 4.7863 5.0119 5.2481 5.4954 5.7544 6.0256 6.3096 6.6069 6.9183
7.2444 7.5858 7.9433 8.3176 8.7096 9.1201 9.5499 10.000];
REMARKS = This is a revised version of the merged data.
REMARKS = If the use identifies distributions or a series of distributions which look erroneous please contact the PI so that they can be screened from the final data.
REMARKS = 18
REMARKS = PI_CONTACT_INFO: Antony Clarke, 1000 Pope Road, Honolulu, HI 96822; email: tclarke@soest.hawaii.edu; 808-956-6215
REMARKS = PLATFORM: NASA P3B aircraft
REMARKS = LOCATION: Lat, Lon, and Elev data in a separate data file
REMARKS = ASSOCIATED_DATA: N/A
REMARKS = INSTRUMENT_INFO: Combined Aerosol Size Distributions are created by merging the TDMA (0.01-0.20), LDMA (0.10-0.50), OPC (0.12-8.0) and APS (0.78-10.0) data. Data influenced by droplet shatter have been removed. Size distributions reported at ambient temperature and pressure.
REMARKS = DATA_INFO: Units are #/cm3 for all dN/dlogDp and number integrals, um2/cm3 for area integrals and um3/cm3 for volume integrals.
REMARKS = UNCERTAINTY: N/A
REMARKS = ULOD_FLAG: -7777
REMARKS = ULOD_VALUE: N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
REMARKS = LLOD_FLAG: -8888
REMARKS = LLOD_VALUE: N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
REMARKS = DM_CONTACT_INFO: Vera Brekhovskikh or Vladimir Kapustin, Dept. of Oceanography, University of Hawaii at Manoa, 1000 Pope Road, Honolulu, Hawaii 96822; 808-956-7777; verab@soest.hawaii.edu; kapustin@soest.hawaii.edu
REMARKS = PROJECT_INFO: VOCALS Oct.-Nov. 2008;
REMARKS = STIPULATIONS_ON_USE: None
REMARKS = OTHER_COMMENTS: N/A
REMARKS = REVISION: R1 R0
REMARKS = R1: size distributions added; revised DMA calibration; OPC data screened
REMARKS = R0: No comments for this revision.
UTC MatlabTime Start_UTC Stop_UTC Mid_UTC Dp_ArraySize Log10_Dp_Start Log10_Dp_Increment Nint_tot Aint_tot Vint_tot Nint_sub Aint_sub Vint_sub Nint_coa Aint_coa Vint_coa Nint_tot4 Aint_tot4 Vint_tot4 Nint_sub4 Aint_sub4 Vint_sub4 Nint_coa4 Aint_coa4 Vint_coa4 ldma_trust tdma_trust tdma3_trust opc_trust opc4_trust aps_trust

dN/dlogDp_151
20081021060318.6450 733702.2522991211 21769 21829 21799 1.510e+002 -2.000e+000 2.000e-002 1.257e+003 5.727e+001 3.822e+000 1.257e+003 5.242e+001 2.102e+000 5.642e-001 4.850e+000 1.720e+000 NaN NaN NaN NaN NaN NaN NaN NaN NaN
9.021e+001 1.057e+002 1.227e+002 1.413e+002 1.616e+002 1.843e+002 2.101e+002 2.395e+002 2.730e+002 3.108e+002 3.527e+002 3.987e+002 4.483e+002 5.006e+002 5.543e+002 6.080e+002 6.598e+002 7.093e+002 7.576e+002 8.073e+002 8.619e+002 9.235e+002 9.913e+002 1.062e+003 1.130e+003 1.192e+003 1.245e+003 1.288e+003 1.325e+003 1.359e+003 1.395e+003 1.431e+003 1.464e+003 1.494e+003 1.517e+003 1.528e+003 1.522e+003 1.497e+003 1.456e+003 1.399e+003 1.332e+003 1.260e+003 1.189e+003 1.123e+003 1.065e+003 1.018e+003 9.836e+002 9.608e+002 9.452e+002 9.335e+002 9.238e+002 9.137e+002 9.015e+002 8.888e+002 8.791e+002 8.719e+002 8.635e+002 8.514e+002 8.352e+002 8.147e+002 7.907e+002 7.638e+002 7.333e+002 6.996e+002 6.646e+002 6.302e+002 5.977e+002 5.667e+002 5.344e+002 4.978e+002 4.565e+002 4.127e+002 3.675e+002 3.222e+002 2.782e+002 2.359e+002 1.962e+002 1.604e+002 1.294e+002 1.030e+002 8.192e+001 6.538e+001 5.273e+001 4.303e+001 3.523e+001 2.896e+001 2.330e+001 1.831e+001 1.407e+001 1.066e+001 8.068e+000 6.244e+000 5.040e+000 4.091e+000 3.658e+000 3.348e+000 3.133e+000 2.975e+000 2.846e+000 2.723e+000 2.587e+000 2.433e+000 2.260e+000 2.077e+000 1.897e+000 1.729e+000 1.580e+000 1.451e+000 1.341e+000 1.238e+000 1.133e+000 1.025e+000 9.173e-001 8.147e-001 7.195e-001 6.355e-001 5.648e-001 5.095e-001 4.640e-001 4.228e-001 3.844e-001 3.456e-001 3.048e-001 2.624e-001 2.206e-001 1.818e-001 1.478e-001 1.199e-001 9.818e-002 8.161e-002 6.829e-002 5.651e-002 4.491e-002 3.387e-002 2.441e-002 1.610e-002 9.561e-003 5.091e-003 2.336e-003 8.361e-004 1.897e-004 0.000e+000 0.000e+000 0.000e+000 0.000e+000 0.000e+000 0.000e+000 0.000e+000 0.000e+000 0.000e+000 0.000e+000
20081021060418.6450 733702.2529935655 21829 21889 21859 1.510e+002 -2.000e+000 2.000e-002 NaN NaN NaN NaN NaN NaN NaN NaN NaN NaN NaN NaN NaN NaN NaN NaN NaN
NaN NaN
20081021060518.6450 733702.2536880100 21889 21949 21919 1.510e+002 -2.000e+000 2.000e-002 NaN NaN NaN NaN NaN NaN NaN NaN NaN NaN NaN NaN NaN NaN NaN NaN NaN
NaN NaN

4.0 DATA REMARKS:

Combined size distributions added; revised DMA calibration; OPC data screened