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**Atmospheric Transmittance/Radiance:
Computer Code LOWTRAN 6 Supplement:
Program Listings**

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1 August 1983

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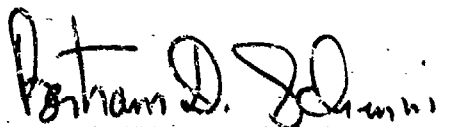
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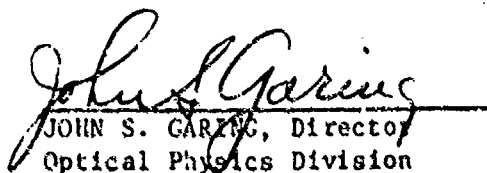
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| 21. ABSTRACT (Continue on reverse side if necessary and identify by block number) → This supplement lists the LOWTRAN 6 computer code for predicting atmospheric transmittance and the thermal radiation emitted by the atmosphere and earth, from 350 to 40,000 cm^{-1} at a spectral resolution of 20 cm^{-1} . The program is based on the LOWTRAN 5 (1980) computer code. Solar/lunar scattered radiation has been added to the code, as well as a new spherical refractive geometry subroutine and an improved water vapor continuum model. Other modifications to the code include a wind-dependent maritime aerosol model, a vertical structure aerosol model, a cirrus cloud model, and a | | |

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rain model.

The computer code contains representative (geographical and seasonal) atmospheric models and representative aerosol models with an option to replace them with user-derived or measured values. The program can be run in one of three modes, namely, to compute only atmospheric transmittance, to compute atmospheric transmittance and radiance, or to compute atmospheric transmittance, atmospheric radiance, and scattered solar/lunar background radiance for a given slant path geometry.

Two new programs now available with the LOWTRAN 6 package, the plot program and the filter function program, are listed in this supplement.

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Atmospheric Transmittance/Radiance: Computer Code LOWTRAN 6 Supplement: Program Listings

1. INTRODUCTION

This supplement contains a brief description of the program structure and a complete listing of the FORTRAN computer code for LOWTRAN 6. An index identifying the location of each subroutine and a short description of the function of each subroutine is included.

Section 3 contains the program structure and complete listing of the LOWTRAN 6 plot program. An index and a brief description of each subroutine is included.

Section 4 contains the program structure and complete listing of the LOWTRAN 6 filter function program. An index and brief description of each subroutine is also included.

The technical description of LOWTRAN 6 along with basic user instructions, sample input and output, and other specialized sections are detailed in the main report.

2. LOWTRAN 6 PROGRAM STRUCTURE

The three programs contained in this supplement adhere principally to ANSI standard FORTRAN 77. The major exception is the use of type HOLLERITH instead of type CHARACTER for character data.

(Received for publication 29 July 1983)

Figure 1 depicts the LOWTRAN code structure. The NSMDL, GEO, SSGEO, and TRANS subroutines are shown in Figures 2, 3, 4, and 5 respectively. Table 1 is a description of the main subroutines in LOWTRAN shown in Figure 1. Tables 2, 3, and 4 contain descriptions of the SSGEO, GEO and TRANS subroutines respectively. Table 5 has descriptions for the data subroutines.

The page number location for each subroutine is included in the above mentioned tables.

The complete listing of the LOWTRAN 6 computer code is in Table 6.

3. LOWTRAN PLOT: PROGRAM STRUCTURE

The plot program for LOWTRAN 6 is a separate program package available with LOWTRAN 6. The plot code structure is shown in Figure 6. Descriptions of each subroutine and page number location are shown in Table 7. (See Appendix A of the main LOWTRAN 6 report for possible differences in system plotting routines.)

Table 8 is the complete listing of the LOWTRAN 6 plot program.

4. FILTER FUNCTION: PROGRAM STRUCTURE

The filter function program is an independent program package available for use on LOWTRAN 6 Tape 7 output. The filter function code structure is shown in Figure 7. Descriptions of each subroutine and page number location are listed in Table 9.

Table 10 is the complete listing of the LOWTRAN 6 filter function program.

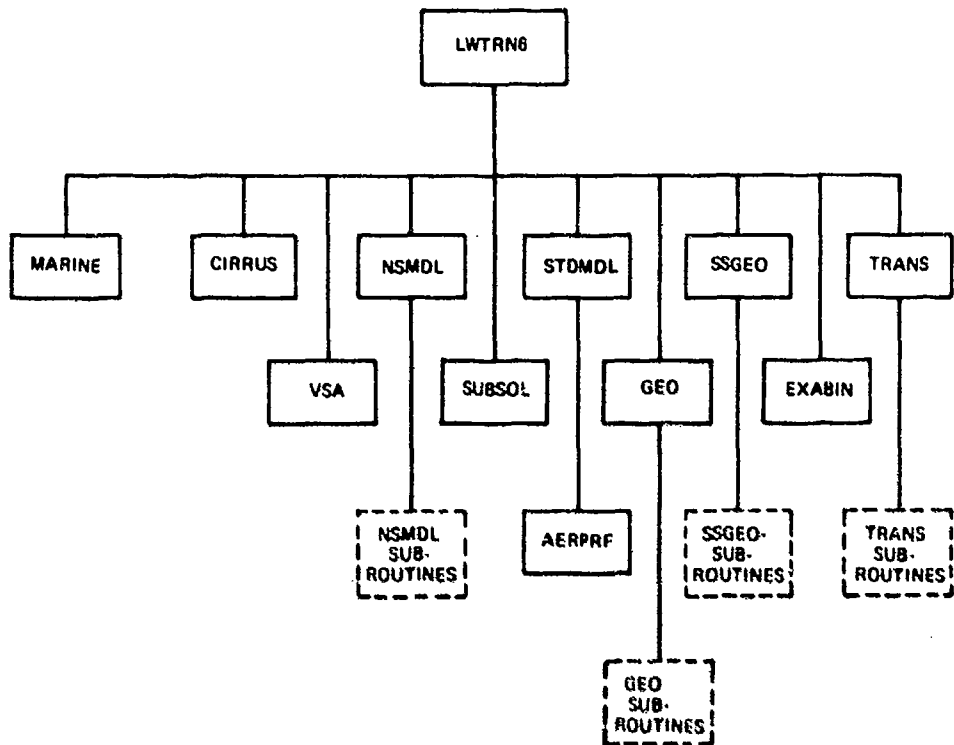


Figure 1. LOWTRAN 6 Main Program Structure. The boxes enclosed by dashes are modules of subroutines for the calculation of non-standard models, air mass geometry, single scattering geometry and transmittance

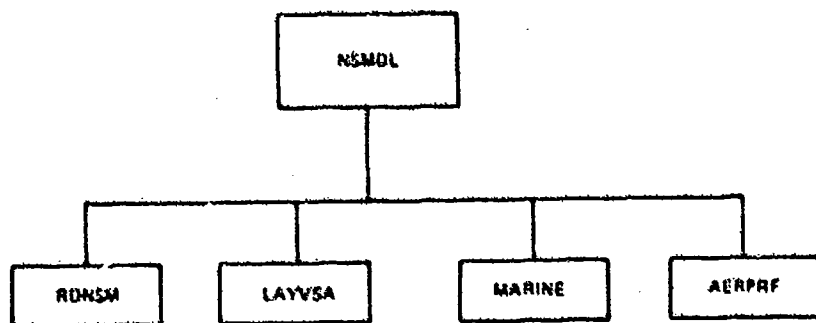


Figure 2. Program Structure for the Non-standard Model Subroutines

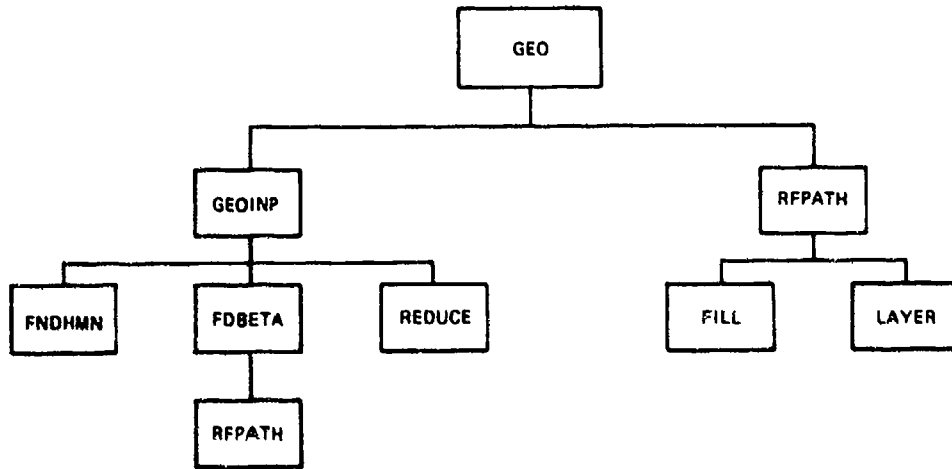


Figure 3. Program Structure for the Air Mass Subroutines

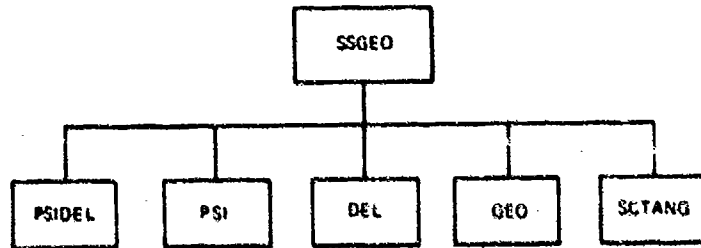


Figure 4. Program Structure for the Single Scattering Geometry Subroutines

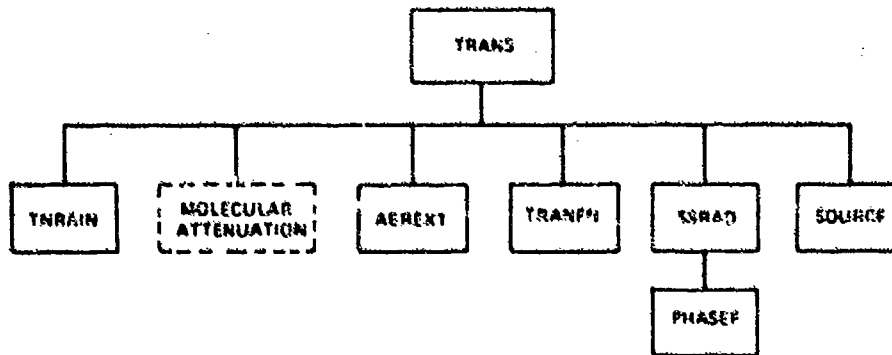


Figure 5. Program Structure for the Transmittance Subroutines. The dashed box labelled Molecular Attenuation includes the following subroutines: C1DTA, C2DTA, C3DTA, C4DTA, C6DTA, SLF296, SLF260, FRN296 and HNO3

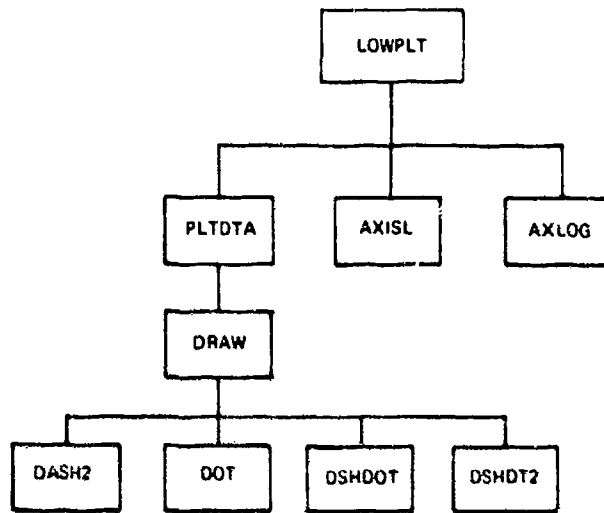


Figure 6. Plot Program Structure

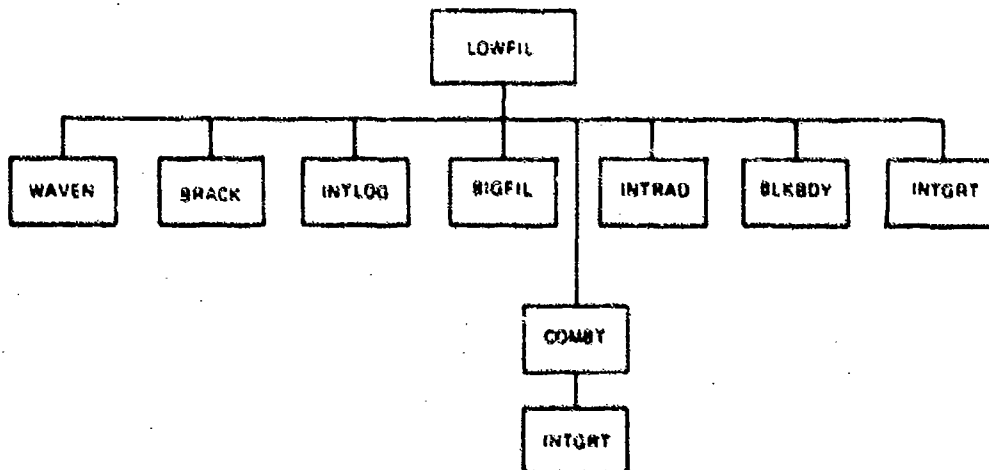


Figure 7. Filter Program Structure

Table 1. Description of LWTRN6 Subroutines

| | | Page No. |
|--------|--|----------|
| LWTRN6 | MAIN DRIVER PROGRAM. READS CONTROL CARDS. | 16 |
| MARINE | DETERMINES AEROSOL EXTINCTION AND ABSORPTION COEFFICIENTS FOR THE NAVY MARITIME MODEL. | 92 |
| CIRRUS | GENERATES ALTITUDE PROFILES OF CIRRUS CLOUD DENSITY. | 89 |
| RANDOM | CALLS MACHINE DEPENDENT FUNCTION RANF WHICH IS A UNIFORM RANDOM NUMBER GENERATOR. | 91 |
| VSA | ARMY VERTICAL STRUCTURE ALGORITHM OF AEROSOL EXTINCTION AND RELATIVE HUMIDITY FOR LOW VISIBILITY/LOW CEILING CONDITIONS. | 97 |
| NSMDL | FOR USER DEFINED ATMOSPHERIC OR AEROSOL PROFILES. | 33 |
| LAYVSA | RESTRUCTURES THE ATMOSPHERIC PROFILE FOR FINER LAYERING NEAR THE GROUND FOR USE WITH THE VSA OPTION. | 94 |
| RDNSM | READS MODEL 7 DATA FOR ARMY VERTICAL STRUCTURE ALGORITHM. | 96 |
| SUBSOL | CALCULATES THE SUBSOLAR POINT ANGLES BASED UPON TIME AND DAY. | 84 |
| STDMDL | SETS UP ATMOSPHERIC PROFILES OF ATTENUATOR DENSITIES. | 37 |
| AERPRF | COMPUTES SCALING FACTOR PROFILES FOR AEROSOLS. | 39 |
| GEO | DRIVER FOR AIR MASS SUBROUTINES. CALCULATES ATTENUATOR AMOUNTS FOR THE SLANT PATH. | 45 |
| SSGEO | OBTAINS ATTENUATOR AMOUNTS FROM SCATTERING POINTS ALONG OPTICAL PATH TO THE EXTRATERRESTRIAL SOURCE. | 73 |
| EXABIN | LOADS AEROSOL EXTINCTION AND ABSORPTION COEFFICIENTS FOR THE APPROPRIATE MODEL AND RELATIVE HUMIDITY. | 70 |
| TRANS | CALCULATES TRANSMITTANCE, ATMOSPHERIC RADIANCE, AND SOLAR/LUNAR SCATTERED RADIANCE FOR SLANT PATH. | 61 |

Table 2. Description of SSGEO Subroutines

| | | Page No. |
|--------|--|-------------|
| SSGEO | OBTAINS ATTENUATOR AMOUNTS FROM SCATTERING POINTS ALONG OPTICAL PATH TO THE EXTRATERRESTRIAL SOURCE. | 73 |
| PSIDEL | CALCULATES THE RELATIVE AZIMUTH BETWEEN THE LINE OF SIGHT AND THE DIRECT SOLAR/LUNAR PATH. | 77 |
| PSI | RETURNS SOLAR AZIMUTH RELATIVE TO LINE OF SIGHT AT CURRENT SCATTERING LOCATION. | 79 |
| DEL | RETURNS SOLAR ZENITH ANGLE AT ANY POINT ALONG OPTICAL PATH. | 80 |
| GEO | DRIVER FOR AIR MASS SUBROUTINES. CALCULATES ATTENUATOR AMOUNTS FOR THE SLANT PATH. | 41 |
| SCTANG | RETURNS THE SCATTERING ANGLE AT ANY POINT ALONG THE OPTICAL PATH. | 78 |

Table 3. Description of Air Mass Subroutines

| | | Page No. |
|--------|--|-------------|
| GEO | DRIVER FOR AIR MASS SUBROUTINES. CALCULATES ATTENUATOR AMOUNTS FOR THE SLANT PATH. | 41 |
| GEOINP | INTERPRETS GEOMETRY INPUT PARAMETERS INTO THE STANDARD FORM H1, H2, ANGLE, AND LEN. | 45 |
| FNDHMN | CALCULATES HMIN, THE MINIMUM ALTITUDE ALONG THE PATH AND PHI, THE ZENITH ANGLE AT H2. | 51 |
| REDUCE | ELIMINATES SLANT PATH SEGMENTS WHICH EXTEND BEYOND THE HIGHEST PROFILE ALTITUDE. | 48 |
| FDBETA | CALCULATES ANGLE, GIVEN H1, H2 AND BETA BY ITERATION. | 49 |
| RFPATH | DETERMINES THE REFRACTED PATH AND THE ABSORBER AMOUNTS THROUGH ALL THE LAYERS. | 54 |
| FILL | DEFINES THE BOUNDARIES OF THE SLANT PATH AND INTERPOLATES DENSITIES AT THESE BOUNDARIES. | 57 |
| LAYER | CALCULATES THE PATH AND AMOUNTS THROUGH ONE LAYER. | 58 |
| RADREF | COMPUTES RADIUS OF CURVATURE OF THE REFRACTED RAY FOR A HORIZONTAL PATH. | 53 |
| FINDSH | FINDS LAYER BOUNDARIES AND SCALE HEIGHT AT GROUND FOR INDEX OF REFRACTION. | 53 |
| SCALHT | CALCULATES SCALE HEIGHT OF INDEX OF REFRACTION. | 53 |
| ANDEX | COMPUTES INDEX OF REFRACTION AT A SPECIFIC HEIGHT. | 53 |
| EXPINT | PERFORMS EXPONENTIAL INTERPOLATIONS FOR THE GEOMETRY ROUTINES. | 51 |

Table 4. Description of TRANS Subroutines

| | | Page No. |
|--------|--|-------------|
| TRANS | CALCULATES TRANSMITTANCE, ATMOSPHERIC RADIANCE, AND SOLAR/LUNAR SCATTERED RADIANCE FOR SLANT PATH. | 61 |
| AEREXT | INTERPOLATES AEROSOL ATTENUATION COEFFICIENTS TO REQUIRED WAVENUMBER. | 72 |
| HNO3 | DETERMINES NITRIC ACID ABSORPTION COEFFICIENT TO REQUIRED WAVENUMBER. | 72 |
| TRANFN | CALCULATES TRANSMITTANCE FOR OZONE, UNIFORMLY MIXED GASES AND WATER VAPOR. | 68 |
| SOURCE | CONTAINS SOLAR INTENSITY DATA AND CALCULATES LUNAR INTENSITY. | 82 |
| TNRAIN | CALCULATES TRANSMITTANCE OF RAIN AS A FUNCTION OF RAIN RATE AND SLANT RANGE. | 88 |
| SSRAD | PERFORMS THE LAYER BY LAYER SINGLE SCATTERING RADIANCE SUM. | 81 |
| PHASEF | CHOOSES CORRECT PHASE FUNCTION BASED ON RELATIVE HUMIDITY, FREQUENCY, SCATTERING ANGLE AND MODEL. | 85 |
| INTERF | PERFORMS LINEAR OR LOGARITHMIC INTERPOLATION. | 88 |
| PF | RETURNS THE APPROPRIATE PHASE FUNCTION FROM THE STORED DATA BASE. | 88 |
| C1DTA | RETURNS WATER VAPOR BAND ABSORPTION COEFFICIENT AT REQUIRED WAVENUMBER. | 67 |
| C2DTA | RETURNS UNIFORMLY MIXED GASES ABSORPTION COEFFICIENT AT REQUIRED WAVENUMBER. | 67 |
| C3DTA | RETURNS OZONE BAND ABSORPTION COEFFICIENT AT REQUIRED WAVENUMBER. | 67 |
| C4DTA | RETURNS N ₂ CONTINUUM ABSORPTION COEFFICIENT AT REQUIRED WAVENUMBER. | 68 |
| C6DTA | RETURNS MOLECULAR SCATTERING ATTENUATION COEFFICIENT AT REQUIRED WAVENUMBER. | 68 |
| C8DTA | RETURNS OZONE U. V. AND VISIBLE ABSORPTION COEFFICIENT AT REQUIRED WAVENUMBER. | 68 |
| SLF296 | LOADS SELF BROADENED WATER VAPOR CONTINUUM AT 296° K. | 69 |
| SLF280 | LOADS SELF BROADENED WATER VAPOR CONTINUUM AT 280° K. | 69 |
| FRN296 | LOADS FOREIGN BROADENED WATER VAPOR CONTINUUM AT 296° K. | 69 |
| SINT | PERFORMS INTERPOLATION FOR WATER VAPOR CONTINUUM. | 69 |

Table 5. Description of Block Data Subroutines

| | | Page No. |
|--------|--|-------------|
| MDTA | MODEL ATMOSPHERIC DATA. | 102 |
| TITLE | TITLES FOR OUTPUT. | 105 |
| PRFDTA | AEROSOL PROFILE DATA. | 106 |
| EXTDTA | AEROSOL EXTINCTION AND ABSORPTION DATA. | 108 |
| SF296 | SELF BROADENED ABSORPTION COEFFICIENTS FOR WATER VAPOR CONTINUUM AT 296° K. | 114 |
| SF260 | SELF BROADENED ABSORPTION COEFFICIENTS FOR WATER VAPOR CONTINUUM AT 260° K. | 122 |
| BFH20 | FOREIGN BROADENED ABSORPTION COEFFICIENTS FOR WATER VAPOR CONTINUUM AT 296° K. | 130 |
| TRFN | LOWTRAN TRANSMITTANCE FUNCTIONS. | 138 |
| C1D | WATER VAPOR BAND MODEL ABSORPTION COEFFICIENTS. | 139 |
| C2D | UNIFORMLY MIXED GASES BAND MODEL ABSORPTION COEFFICIENTS. | 144 |
| C3D | OZONE BAND MODEL ABSORPTION COEFFICIENTS. | 147 |
| C4D | NITROGEN CONTINUUM ABSORPTION COEFFICIENTS AND UV OZONE ABSORPTION COEFFICIENTS. | 148 |
| MARDTA | NAVY MARINE AEROSOL EXTINCTION AND ABSORPTION DATA. | 149 |
| PHSDTA | 70 AVERAGED PHASE FUNCTIONS AND TRUTH TABLE IDENTIFYING CORRECT PHASE FUNCTION. | 153 |

Table 6. Listing of Computer Code LOWTRAN 6

Pages 15 to 163

| | | |
|---|--|---------|
| C | PROGRAM LWTRN6 | LWT 100 |
| C | PROGRAM LWTRN6(INPUT=140,OUTPUT=140,TAPE7=140,TAPE5=INPUT, | LWT 105 |
| C | 1 TAPE6=OUTPUT) | LWT 110 |
| C | | LWT 115 |
| C | LOWTRAN6 (LAST REVISED JUNE, 1983) | LWT 120 |
| C | | LWT 125 |
| C | AUTHORS | LWT 130 |
| C | F. X. KNEIZYS | LWT 135 |
| C | E. P. SHETTLE | LWT 140 |
| C | W. D. GALLERY | LWT 145 |
| C | J. H. CHETWYND JR. | LWT 150 |
| C | L. W. ABREU | LWT 155 |
| C | J. E. A. SELBY | LWT 160 |
| C | S. A. CLOUGH | LWT 165 |
| C | R. W. FENN | LWT 170 |
| C | | LWT 175 |
| C | | LWT 180 |
| C | PROGRAM LOWTRAN 6 CALCULATES THE TRANSMITTANCE AND/OR RADIANCE | LWT 185 |
| C | OF THE ATMOSPHERE FROM 350 CM-1 TO 40000 CM-1 (0.25 TO 28.57 | LWT 190 |
| C | MICRONS) AT 20 CM-1 SPECTRAL RESOLUTION ON A LINEAR | LWT 195 |
| C | WAVENUMBER SCALE. | LWT 200 |
| C | | LWT 205 |
| C | DETAILED MODEL AND PROGRAM DESCRIPTION CAN BE FOUND IN | LWT 210 |
| C | KNEIZYS, F. X., SHETTLE, E. P., GALLERY, W. D., CHETWYND, J. H., | LWT 215 |
| C | ABREU, L. W., SELBY, J. E. A., CLOUGH, S. A., FENN, R. W. | LWT 220 |
| C | (1983) ATMOSPHERIC TRANSMITTANCE/RADIANCE- COMPUTER CODE | LWT 225 |
| C | LOWTRAN 6 | LWT 230 |
| C | AFGL TECHNICAL REPORT (IN PREPARATION) | LWT 235 |
| C | | LWT 240 |
| C | | LWT 245 |
| C | THE FOLLOWING CARDS SHOULD BE KEYPUNCHED BY THE USER | LWT 250 |
| C | AND MAILED TO F. X. KNEIZYS, AFGL/OPI, HANSCOM AFB, MASS 01731 | LWT 255 |
| C | THE CARDS WILL BE USED TO UPDATE THE AFGL MAILING LIST | LWT 260 |
| C | AND FOR NOTIFICATION TO THE USER OF ERRORS IN THE CODE | LWT 265 |
| C | | LWT 270 |
| C | | LWT 275 |
| C | (USE COLUMNS 21 TO 72) | LWT 280 |
| C | LOWTG NAME | LWT 285 |
| C | LOWTG COMPANY | LWT 290 |
| C | LOWTG ADDRESS | LWT 295 |
| C | | LWT 300 |
| C | | LWT 305 |
| C | | LWT 310 |
| C | PROGRAM ACTIVATED BY SUBMISSION OF FIVE (OR MORE) | LWT 315 |
| C | CARD SEQUENCE AS FOLLOWS | LWT 320 |
| C | | LWT 325 |
| C | CARD 1 MODEL, I, TYPE, I, EMSCT, M1, M2, M3, IM, NOPRT, TBOUND, SALD | LWT 330 |
| C | FORMAT(8I5, 2F10.3) | LWT 335 |
| C | | LWT 340 |
| C | CARD 2 IMAZE, I, SEASN, IVULCN, ICSTL, ICIR, IVSA, VIS, WSS, WMM, RAINRT | LWT 345 |
| C | FORMAT(6I5, 4F10.3) | LWT 350 |
| C | | LWT 355 |
| C | CARD 2A CTHK, CALT, I, SEED (ICIR=1) | LWT 360 |
| C | FORMAT(2F10.3, I10) | LWT 365 |
| C | | LWT 370 |
| C | CARD 2B ZCVSA, ZTVSA, ZINVSA (IVSA=1) | LWT 375 |
| C | FORMAT(3F10.3) | LWT 380 |
| C | | LWT 385 |
| C | CARD 2C ML, TITLE (MODEL=7, IM=1) | LWT 390 |

| | | | |
|---|----------|--|-------------------|
| C | | FORMAT(15,18A4) | LWT 395 |
| C | | | LWT 400 |
| C | CARD 2C | (1 TO ML) Z,P,T,DP,RH,WH,WO,AHAZE,VIS1,IMA1,ISEL | LWT 405 |
| C | | FORMAT(3F10.3,2F5.1,3E10.3,F7.3,3I1) | LWT 410 |
| C | | | LWT 415 |
| C | CARD 2D | (1 TO 10)(DUMMY,EXTC(1,1),ABSC(1,1),I=1,40) | LWT 420 |
| C | | FORMAT(4(F6.2,2F7.5)) (IHAZE=7) | LWT 425 |
| C | | | LWT 430 |
| C | CARD 3 | H1,H2,ANGLE,RANGE,BETA,RO,LEN | FORMAT(6F10.3,15) |
| C | | | LWT 435 |
| C | CARD 3* | H1,P,T,DP,RH,WH,WO,RANGE (MODEL=0) | LWT 445 |
| C | | FORMAT(3F10.3,2F5.1,2E10.3,F10.3) | LWT 450 |
| C | | | LWT 455 |
| C | CARD 3A1 | IPARM,IPH,IDAY,ISOURC (IEMSCT=2) | LWT 460 |
| C | | FORMAT(4I5) | LWT 465 |
| C | | | LWT 470 |
| C | CARD 3A2 | PARM1,PARM2,PARM3,PARM4,TIME,PSIPO,ANGLEM,G | (IEMSCT=2) |
| C | | FORMAT(8F10.3) | LWT 475 |
| C | | | LWT 480 |
| C | | | LWT 485 |
| C | CARD 3B1 | NANGLS (IPH=1) | LWT 490 |
| C | | FORMAT(15) | LWT 495 |
| C | | | LWT 500 |
| C | CARD 3B2 | (1 TO NANGLS) (IPH=1) | LWT 505 |
| C | | (ANGF(I),F(1,1),F(2,1),F(3,1),F(4,1),I=1,NANGLS) | LWT 510 |
| C | | FORMAT(F10.3,4E10.3) | LWT 515 |
| C | | | LWT 520 |
| C | CARD 4 | V1, V2, DV | FORMAT(3F10.3) |
| C | | | LWT 525 |
| C | | | LWT 530 |
| C | CARD 5 | IRPT | FORMAT(15) |
| C | | | LWT 535 |
| C | | | LWT 540 |
| C | | | LWT 545 |
| C | | | LWT 550 |
| C | CARD 1 | MODEL,ITYPE,IEMSCT,M1,M2,M3,IM,NOPRT,TBOUND,SALB | LWT 555 |
| C | | FORMAT(8I5,2F10.3) | LWT 560 |
| C | | | LWT 565 |
| C | | MODEL SELECTS ONE OF SIX GEOGRAPHICAL MODEL ATMOSPHERES | LWT 570 |
| C | | OR SPECIFIES THAT USER-DEFINED METEOROLOGICAL | LWT 575 |
| C | | DATA ARE TO BE USED. | LWT 580 |
| C | | | LWT 585 |
| C | | | LWT 590 |
| C | MODEL=0 | IF METEOROLOGICAL DATA ARE SPECIFIED(HORIZONTAL PATH ONLY) | LWT 595 |
| C | 1 | TROPICAL ATMOSPHERE | LWT 600 |
| C | 2 | MIDLATITUDE SUMMER | LWT 605 |
| C | 3 | MIDLATITUDE WINTER | LWT 610 |
| C | 4 | SUBARTIC SUMMER | LWT 615 |
| C | 5 | SUBARTIC WINTER | LWT 620 |
| C | 6 | 1962 U.S. STANDARD ATMOSPHERE | LWT 625 |
| C | 7 | IF A NEW MODEL ATMOSPHERE(OR RADIOSONDE DATA) IS TO BE IN | LWT 630 |
| C | | | LWT 635 |
| C | | | LWT 640 |
| C | | ITYPE INDICATES THE TYPE OF ATMOSPHERIC PATH | LWT 645 |
| C | | | LWT 650 |
| C | ITYPE=1 | FOR A HORIZONTAL (CONSTANT-PRESSURE) PATH | LWT 655 |
| C | 2 | VERTICAL OR SLANT PATH BETWEEN TWO ALTITUDES | LWT 660 |
| C | 3 | FOR A VERTICAL PATH TO SPACE | LWT 665 |
| C | | | LWT 670 |
| C | | | LWT 675 |
| C | | | LWT 680 |
| C | | IEMSCT DETERMINES THE MODE OF EXECUTION OF THE PROGRAM | LWT 685 |
| C | | | LWT 690 |

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|---|------------|--|-----|-----|
| C | ISMSCT=0 | PROGRAM EXECUTION IN TRANSMITTANCE MODE. | LWT | 690 |
| C | 1 | PROGRAM EXECUTION IN RADIANCE MODE. | LWT | 695 |
| C | 2 | PROGRAM EXECUTION IN RADIANCE MODE WITH SOLAR/LUNAR | LWT | 700 |
| C | | SCATTERED RADIANCE INCLUDED. | LWT | 705 |
| C | | | LWT | 710 |
| C | | | LWT | 715 |
| C | | M1,M2,M3 ARE USED TO MODIFY OR SUPPLEMENT THE ALTITUDE | LWT | 720 |
| C | | PROFILES OF TEMPERATURE AND PRESSURE,WATER VAPOR,AND OZONE | LWT | 725 |
| C | | | LWT | 730 |
| C | M1=M2=M3=0 | FOR NORMAL OPERATION OF PROGRAM | LWT | 735 |
| C | | | LWT | 740 |
| C | M1=1 | TROPICAL TEMPERATURE AND PRESSURE PROFILES | LWT | 745 |
| C | 2 | MIDLATITUDE SUMMER.TEMPERATURE AND PRESSURE PROFILES | LWT | 750 |
| C | . | | LWT | 755 |
| C | . | | LWT | 760 |
| C | 6 | 1962 U.S. STANDARD TEMPERATURE AND PRESSURE PROFILES | LWT | 765 |
| C | | | LWT | 770 |
| C | M2=1 | TROPICAL WATER VAPOR PROFILE | LWT | 775 |
| C | 2 | MIDLATITUDE SUMMER WATER VAPOR PROFILE | LWT | 780 |
| C | . | | LWT | 785 |
| C | . | | LWT | 790 |
| C | 6 | 1962 U.S. STANDARD WATER VAPOR PROFILE | LWT | 795 |
| C | | | LWT | 800 |
| C | M3=1 | TROPICAL OZONE PROFILE | LWT | 805 |
| C | 2 | MIDLATITUDE SUMMER OZONE PROFILE | LWT | 810 |
| C | . | | LWT | 815 |
| C | . | | LWT | 820 |
| C | 6 | 1962 U.S. STANDARD OZONE PROFILE | LWT | 825 |
| C | | | LWT | 830 |
| C | IM=0 | FOR NORMAL OPERATION OF PROGRAM OR WHEN SUBSEQUENT | LWT | 835 |
| C | | CALCULATIONS ARE TO BE RUN WITH MODEL =7 | LWT | 840 |
| C | 1 | WHEN RADIOSONDE DATA ARE TO BE READ INITIALLY. | LWT | 845 |
| C | | | LWT | 850 |
| C | NOPRT=0 | FOR NORMAL OPERATION OF PROGRAM. | LWT | 855 |
| C | | | LWT | 860 |
| C | 1 | TO SUPPRESS PRINTING OF TRANSMITTANCE /OR RADIANCE TABLE | LWT | 865 |
| C | | AND ATMOSPHERIC PROFILES | LWT | 870 |
| C | | | LWT | 875 |
| C | | TBOUND USED IN RADIANCE MODE FOR SLANT PATHS WHICH | LWT | 880 |
| C | | INTERSECT THE EARTH. IF TBOUND IS LEFT BLANK, | LWT | 885 |
| C | | THE PROGRAM WILL USE THE TEMPERATURE OF THE FIRST | LWT | 890 |
| C | | ATMOSPHERIC LAYER AS THE BOUNDARY TEMPERATURE | LWT | 895 |
| C | | | LWT | 900 |
| C | TBOUND | =TEMPERATURE OF THE EARTH AT THE LOCATION AT WHICH THE | LWT | 905 |
| C | | CALCULATION IS TO BE PERFORMED. | LWT | 910 |
| C | | | LWT | 915 |
| C | SALB | = SURFACE ALBEDO OF THE EARTH AT THE LOCATION | LWT | 920 |
| C | | AND AVERAGE FREQUENCY OF THE CALCULATION (0 TO 1.) | LWT | 925 |
| C | | IF SALB IS LEFT BLANK THE PROGRAM ASSUMES | LWT | 930 |
| C | | THE SURFACE IS A BLACKBODY. | LWT | 935 |
| C | | | LWT | 940 |
| C | | | LWT | 945 |
| C | | | LWT | 950 |
| C | | | LWT | 955 |
| C | CARD 2 | IMAZE,ISEASN,IVULCN,ICSYL,ICIR,IVSA,VIS,WSS,WHM,RAINRT | LWT | 960 |
| C | | FORMAT(815,4F10.3) | LWT | 965 |
| C | | | LWT | 970 |
| C | | IMAZE SELECTS THE TYPE OF EXTINCTION AND A DEFAULT | LWT | 975 |
| C | | METEOROLOGICAL RANGE FOR THE BOUNDARY-LAYER AEROSOL MODEL | LWT | 980 |

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| C | (0 TO 2KM ALTITUDE) | LWT | 985 |
| C | IF VIS IS ALSO SPECIFIED ON CARD 2 IT WILL OVERRIDE THE | LWT | 990 |
| C | DEFAULT IHAZE VALUE | LWT | 995 |
| C | IHAZE=0 NO AEROSOL ATTENUATION INCLUDED IN CALCULATION. | LWT | 1000 |
| C | =1 RURAL EXTINCTION, 23-KM VIS. | LWT | 1005 |
| C | =2 RURAL EXTINCTION, 5-KM VIS. | LWT | 1010 |
| C | =3 NAVY MARITIME EXTINCTION,SETS OWN VIS. | LWT | 1015 |
| C | =4 MARITIME EXTINCTION, 23-KM VIS. (LOWTRAN 5 MODEL) | LWT | 1020 |
| C | =5 URBAN EXTINCTION, 5-KM VIS. | LWT | 1025 |
| C | =6 TROPOSPHERIC EXTINCTION, 50-KM VIS. | LWT | 1030 |
| C | =7 USER DEFINED (TEN CARDS) | LWT | 1035 |
| C | =8 FOG1 (ADVECTION FOG) EXTINCTION, 0.2-KM VIS. | LWT | 1040 |
| C | =9 FOG2 (RADIATION FOG) EXTINCTION, 0.5-KM VIS. | LWT | 1045 |
| C | | LWT | 1050 |
| C | ISEASN SELECTS THE SEASONAL DEPENDENCE OF THE PROFILES | LWT | 1055 |
| C | FOR BOTH THE TROPOSPHERIC (0 TO 10 KM) AND | LWT | 1060 |
| C | STRATOSPHERIC(10 TO 30 KM) AEROSOLS. | LWT | 1065 |
| C | | LWT | 1070 |
| C | ISEASN=0 DEFAULTS TO SEASON OF MODEL | LWT | 1075 |
| C | (MODEL 0,1,2,4,6,7) SUMMER | LWT | 1080 |
| C | (MODEL 3,5) WINTER | LWT | 1085 |
| C | =1 SPRING-SUMMER | LWT | 1090 |
| C | =2 FALL - WINTER | LWT | 1095 |
| C | | LWT | 1100 |
| C | IVULCN SELECTS BOTH THE PROFILE AND EXTINCTION TYPE | LWT | 1105 |
| C | FOR THE STRATOSPHERIC AEROSOLS AND DETERMINES TRANSITION | LWT | 1110 |
| C | PROFILES ABOVE THE STRATOSPHERE TO 100 KM. | LWT | 1115 |
| C | | LWT | 1120 |
| C | IVULCN=0 DEFAULT TO STRATOSPHERIC BACKGROUND | LWT | 1125 |
| C | =1 STRATOSPHERIC BACKGROUND | LWT | 1130 |
| C | =2 AGED VOLCANIC TYPE/MODERATE VOLCANIC PROFILE | LWT | 1135 |
| C | =3 FRESH VOLCANIC TYPE/HIGH VOLCANIC PROFILE | LWT | 1140 |
| C | =4 AGED VOLCANIC TYPE/HIGH VOLCANIC PROFILE | LWT | 1145 |
| C | =5 FRESH VOLCANIC TYPE/MODERATE VOLCANIC PROFILE | LWT | 1150 |
| C | | LWT | 1155 |
| C | ICSTL IS THE AIR MASS CHARATER(1 TO 10) ONLY USED WITH | LWT | 1160 |
| C | NAVY MARITIME MODEL(IHAZE=3) | LWT | 1165 |
| C | | LWT | 1170 |
| C | ICSTL = 1 OPEN OCEAN | LWT | 1175 |
| C | . | LWT | 1180 |
| C | . | LWT | 1185 |
| C | . | LWT | 1190 |
| C | 10 STRONG CONTINENTAL INFLUENCE | LWT | 1195 |
| C | | LWT | 1200 |
| C | ICIR DETERMINES THE INCLUSION OF CIRRUS CLOUD ATTENUATION | LWT | 1205 |
| C | | LWT | 1210 |
| C | ICIR=0 NO CIRRUS | LWT | 1215 |
| C | =1 USE CIRRUS PROFILE | LWT | 1220 |
| C | | LWT | 1225 |
| C | | LWT | 1230 |
| C | IVSA DETERMINES THE USE OF THE ARMY VERTICAL STRUCTURE | LWT | 1235 |
| C | ALGORITHM FOR AEROSOLS IN THE BOUNDARY LAYER. | LWT | 1240 |
| C | IVSA=0 NOT USED | LWT | 1245 |
| C | =1 VERTICAL STRUCTURE ALGORITHM | LWT | 1250 |
| C | | LWT | 1255 |
| C | VIS = METEOROLOGICAL RANGE (KM) (WHEN SPECIFIED,SUPSEDES | LWT | 1260 |
| C | DEFAULT VALUE SET BY IHAZE) | LWT | 1265 |
| C | | LWT | 1270 |
| C | WSS = CURRENT WIND SPEED (M/S). ONLY WITH (IHAZE=3) | LWT | 1275 |

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| C | WHH = | 24 HOUR AVERAGE WIND SPEED (M/S). ONLY WITH (HAZE=3) | LWT 1280 |
| C | | | LWT 1285 |
| C | RAINRT = | RAIN RATE (MM/HR). DEFAULT VALUE IS ZERO. | LWT 1290 |
| C | | | LWT 1295 |
| C | | | LWT 1300 |
| C | | | LWT 1305 |
| C | OPTIONAL INPUT CARDS AFTER CARD 2 | | LWT 1310 |
| C | SELECTED BY PARAMETERS ICIR,IVSA,MODEL,AND HAZE ON CARD 1 AND 2. | | LWT 1315 |
| C | | | LWT 1320 |
| C | | | LWT 1325 |
| C | CARD 2A | CTHIK,CALT,ISEED (ICIR=1) | LWT 1330 |
| C | | FORMAT(2F10.3,I10) | LWT 1335 |
| C | | INPUT CARD FOR CIRRUS ALTITUDE PROFILE | LWT 1340 |
| C | | SUBROUTINE WHEN ICIR = 1. | LWT 1345 |
| C | | | LWT 1350 |
| C | CMTIK | = CIRRUS THICKNESS (KM) | LWT 1355 |
| C | | 0 USE THICKNESS STATISTICS | LWT 1360 |
| C | | .NE. 0 USE DEFINED THICKNESS | LWT 1365 |
| C | CALT | = CIRRUS BASE ALTITUDE(KM) | LWT 1370 |
| C | | 0 USE CALCULATED VALUE | LWT 1375 |
| C | | .NE. 0 USE DEFINED BASE ALTITUDE | LWT 1380 |
| C | | | LWT 1385 |
| C | ISEED | = RANDOM NUMBER INITIALIZATION FLAG. | LWT 1390 |
| C | | 0 USE DEFAULT MEAN VALUES FOR CIRRUS | LWT 1395 |
| C | | .NE. 0 INITIAL VALUE OF SEED FOR RANF FUNCTION | LWT 1400 |
| C | | | LWT 1405 |
| C | | | LWT 1410 |
| C | | | LWT 1415 |
| C | | | LWT 1420 |
| C | CARD 2B | ZCVSA,ZTVSA,ZINVSA (IVSA=1) | LWT 1425 |
| C | | FORMAT(3F10.3) | LWT 1430 |
| C | | INPUT CARD FOR ARMY VERTICAL STRUCTURE | LWT 1435 |
| C | | ALGORITHM SUBROUTINE WHEN IVSA=1. | LWT 1440 |
| C | | | LWT 1445 |
| C | ZCVSA = | CLOUD CEILING HEIGHT (KM) =0 UNKNOWN HEIGHT | LWT 1450 |
| C | | ZCVSA LT 0 NO CLOUD CEILING | LWT 1455 |
| C | | ZCVSA GT 0 KNOWN CLOUD CEILING | LWT 1460 |
| C | | ZCVSA = 0 UNKNOWN CLOUD CEILING HEIGHT | LWT 1465 |
| C | | PROGRAM CALCULATES CLOUD HEIGHT | LWT 1470 |
| C | | | LWT 1475 |
| C | ZTVSA = | THICKNESS OF CLOUD OR FOG (KM), | LWT 1480 |
| C | | THICKNESS = 0 DEFAULTS TO 200 METERS | LWT 1485 |
| C | | | LWT 1490 |
| C | ZINVSA= | HEIGHT OF THE INVERSION (KM) | LWT 1495 |
| C | | = 0 DEFAULTS TO 100 METERS | LWT 1500 |
| C | | LT 0 NO INVERSION LAYER | LWT 1505 |
| C | | | LWT 1510 |
| C | | | LWT 1515 |
| C | | | LWT 1520 |
| C | CARD 2C | ML,TITLE (MODEL=7,IM=1) | LWT 1525 |
| C | | FORMAT(15,18A4) | LWT 1530 |
| C | | ADDITIONAL ATMOSPHERIC MODEL (MODEL=1) | LWT 1535 |
| C | | NEW MODEL ATMOSPHERE CAN BE INSERTED PROVIDED THE | LWT 1540 |
| C | | PARAMETERS MODEL AND IM ARE SET EQUAL TO 7 AND 1 | LWT 1545 |
| C | | RESPECTIVELY ON CARD 1. | LWT 1550 |
| C | | | LWT 1555 |
| C | ML= | NUMBER OF ATMOSPHERIC LEVELS TO BE INSERTED | LWT 1560 |
| C | | (MAXIMUM OF 34) | LWT 1565 |
| C | | | LWT 1570 |

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| C | TITLE= | IDENTIFICATION OF NEW MODEL ATMOSPHERE | LWT 1575 |
| C | | | LWT 1580 |
| C | | | LWT 1585 |
| C | CARD 2C | (1 TO ML) | LWT 1590 |
| C | | Z,P,T,DP,RH,WH,WO,AHAZE,VIS1,IHA1,ISEA1,IVUL1 | LWT 1595 |
| C | | FORMAT(3F10.3,2F5.1,3E10.3,F7.3,3I1) | LWT 1600 |
| C | Z = | ALTITUDE OF LAYER (KM) | LWT 1605 |
| C | P = | PRESSURE AT LAYER (MB) | LWT 1610 |
| C | T = | TEMPERATURE (C) | LWT 1615 |
| C | DP = | DEW POINT (C) | LWT 1620 |
| C | RH = | RELATIVE HUMIDITY PERCENT | LWT 1625 |
| C | WH = | WATER DENSITY (GM/M3) | LWT 1630 |
| C | WO = | OZONE DENSITY (GM/M3) | LWT 1635 |
| C | AHAZE= | AEROSOL NUMBER DENSITY(NORMALIZED BY THE USER TO THE REQUIRED METEOROLOGICAL RANGE USING THE LOWTRAN EXTINCTION COEFFICIENTS) | LWT 1640 |
| C | | | LWT 1645 |
| C | | | LWT 1650 |
| C | | | LWT 1655 |
| C | VIS1 = | METEOROLOGICAL RANGE (KM) FOR ALTITUDE,Z | LWT 1660 |
| C | IHA1 = | AEROSOL EXTINCTION AND METEOROLOGICAL RANGE CONTROL FOR THE ALTITUDE,Z | LWT 1665 |
| C | | | LWT 1670 |
| C | | | LWT 1675 |
| C | ISEA1 = | AEROSOL SEASON CONTROL FOR THE ALTITUDE,Z | LWT 1680 |
| C | IVUL1 = | AEROSOL PROFILE AND EXTINCTION CONTROL FOR ALTITUDE,Z | LWT 1685 |
| C | | | LWT 1690 |
| C | | | |
| C | | | LWT 1695 |
| C | | | LWT 1700 |
| C | CARD 2D | (DUMMY,EXTC(1,I),ABSC(1,I),I=1,40)(IHAZE=7) | LWT 1705 |
| C | | FORMAT(4(F6.2,2F7.8)) | LWT 1710 |
| C | | | LWT 1715 |
| C | | USER DEFINED AEROSOL EXTINCTION AND ABSORPTION COEFFICIENTS WHEN IHAZE = 7 ON CARD 2. | LWT 1720 |
| C | | | LWT 1725 |
| C | | | LWT 1730 |
| C | DUMMY | = WAVELENGTH OF AEROSOL COEFFICIENT (NOT USED BY PROGRAM BUT CORRESPONDING TO WAVELENGTHS DEFINED IN ARRAY VX2 IN SUBROUTINE EXTDA) | LWT 1735 |
| C | | | LWT 1740 |
| C | | | LWT 1745 |
| C | | | LWT 1750 |
| C | | | LWT 1755 |
| C | EXTC(1,I) = | AEROSOL EXTINCTION COEFFICIENT | LWT 1760 |
| C | ABSC(1,I) = | AEROSOL ABSORPTION COEFFICIENT | LWT 1765 |
| C | | | LWT 1770 |
| C | | | |
| C | | | LWT 1775 |
| C | | | LWT 1780 |
| C | CARD 3 | H1,H2,ANGLE,RANGE,BETA,RO,LEN FORMAT(5F10.3,15) | LWT 1785 |
| C | | USED TO DEFINE THE GEOMETRICAL PATH PARAMETERS FOR A GIVEN PROBLEM. | LWT 1790 |
| C | | | LWT 1795 |
| C | | | LWT 1800 |
| C | H1 = | INITIAL ALTITUDE(KM) | LWT 1805 |
| C | H2 = | FINAL ALTITUDE(KM) | LWT 1810 |
| C | | | LWT 1815 |
| C | | IN THE RADIANCE MODE OF THE PROGRAM EXECUTION H1, THE INITIAL ALTITUDE,ALWAYS DEFINES THE POSITION OF THE OBSERVER (OR SENSOR). | LWT 1820 |
| C | | | LWT 1825 |
| C | | | LWT 1830 |
| C | | | LWT 1835 |
| C | ANGLE = | INITIAL ZENITH ANGLE (DEGREES) AS MEASURED FROM H1 | LWT 1840 |
| C | RANGE = | PATH LENGTH (KM) | LWT 1845 |
| C | BETA = | EARTH CENTER ANGLE SUBTENDED BY H1 AND H2 (DEGREES) | LWT 1850 |
| C | | | LWT 1855 |
| C | RO = | RADIUS OF THE EARTH (KM) AT THE PARTICULAR GEOGRAPHICAL LOCATION AT WHICH THE CALCULATION IS TO BE PERFORMED. | LWT 1860 |
| C | | | LWT 1865 |

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C          IF RD BLANK PROGRAM USES RADIUS FOR APPROPATE MODEL          LWT 1870
C          ATMOSPHERE. (MODEL 0 OR 7 DEFAULT = 6371.23 KM)              LWT 1875
C                                                                           LWT 1880
C          LEN =0 FOR NORMAL OPERATION OF PROGRAM                       LWT 1885
C          =1 SELECTS THE DOWNWARD TYPE 2 LONG PATH                      LWT 1890
C                                                                           LWT 1895
C          IT IS NOT NECESSARY TO SPECIFY EVERY QUANTITY GIVEN ABOVE    LWT 1900
C          ONLY THOSE THAT ADEQUATELY DESCRIBE THE PROBLEM ACCORDING    LWT 1905
C          TO THE PARAMETER ITYPE                                       LWT 1910
C                                                                           LWT 1915
C          ITYPE=1 READ H1,RANGE                                         LWT 1920
C          =3 READ H1,ANGLE OR H1,HMIN                                   LWT 1925
C          =2 READ H1,H2,ANGLE OR H1,H2,RANGE OR H1,H2,BETA           LWT 1930
C          OR H1,ANGLE,RANGE                                             LWT 1935
C                                                                           LWT 1940
C          .....LWT 1945
C          CARD 3*  H1,P,T,DP,RH,WH,WO,RANGE (MODEL=0)                 LWT 1950
C          FORMAT(3F10.3,2F5.1,2E10.3,F10.3)                          LWT 1955
C          OPTIONAL CARD FOR HORIZONTAL PATHS (MODEL=0,ITYPE=1)        LWT 1960
C          IF METEOROLOGICAL DATA ARE TO BE USED FOR HORIZONTAL      LWT 1965
C          PATH ATMOSPHERIC TRANSMITTANCE CALCULATIONS, THEN          LWT 1970
C          SET MODEL = 0 ON CARD 1. (ALSO SET ITYPE=1)                LWT 1975
C          THE FOLLOWING PARAMETERS CAN THEN BE SPECIFIED ON           LWT 1980
C          CARD 3                                                         LWT 1985
C          CARD 3*  H1,P,T,DP,RH,WH,WO,RANGE (MODEL=0)                 LWT 1990
C          FORMAT(3F10.3,2F5.1,2E10.3,F10.3)                          LWT 1995
C          WHERE THE ABOVE PARAMETERS REFER TO ALTITUDE(KM),           LWT 2000
C          PRESSURE(MB),AMBIENT TEMP(C),DEW POINT TEMP(C),            LWT 2005
C          RELATIVE HUMIDITY(X),WATER VAPOR DENSITY(GM M-3),           LWT 2010
C          OZONE DENSITY(GM/M**3), AND PATH LENGTH (KM)                LWT 2015
C          .....LWT 2020
C          .....LWT 2025
C          .....LWT 2030
C          .....LWT 2035
C          CARD 3A1  IPARM,IPH,IDAY,ISOURC (IEMSC*2)                     LWT 2040
C          FORMAT(4I5)                                                  LWT 2045
C          INPUT CARD FOR SOLAR/LUNAR SCATTERED RADIATION WHEN        LWT 2050
C          IEMSC* 2                                                       LWT 2055
C          IPARM =0,1,2 AND CONTROLS THE METHOD OF SPECIFYING THE      LWT 2060
C          SOLAR/LUNAR GEOMETRY ON CARD 3A2.                             LWT 2065
C          IPH DETERMINES THE TYPE OF PHASE FUNCTION USED IN THE CALL   LWT 2070
C          .....LWT 2075
C          .....LWT 2080
C          .....LWT 2085
C          IPH=0  MENYEV-GREENSTEIN AEROSOL PHASE FUNCTION             LWT 2090
C          =1     USER SUPPLIED AEROSOL PHASE FUNCTION (SEE CARD 3B)    LWT 2095
C          =2     MIE GENERATED DATA BASE OF AEROSOL PHASE FUNCTIONS   LWT 2100
C          FOR LOWTRAN MODELS.                                           LWT 2105
C          IDAY=  DAY OF THE YEAR, I.E. FROM 1 TO 365 (REQUIRED)       LWT 2110
C          .....LWT 2115
C          .....LWT 2120
C          ISOURC=0 EXTRATERRESTRIAL SOURCE IS THE SUN                 LWT 2125
C          =1     EXTRATERRESTRIAL SOURCE IS THE MOON                   LWT 2130
C          .....LWT 2135
C          .....LWT 2140
C          .....LWT 2145
C          .....LWT 2150
C          CARD 3A2  PARM1,PARM2,PARM3,PARM4,TIME,PSIPO,ANGLEM,G       LWT 2155
C          FORMAT(3F10.3) (IEMSC*2)                                     LWT 2160

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| C | | INPUT CARD FOR SOLAR/LUNAR SCATTERED RADIATION WHEN | LWT 2165 |
| C | | IEMSCY = 2 | LWT 2170 |
| C | | DEFINITIONS OF PARM1, PARM2, PARM3, PARM4 DETERMINED BY | LWT 2175 |
| C | | VALUE OF IPARM ON CARD 3A1. | LWT 2180 |
| C | | | LWT 2185 |
| C | | FOR IPARM=0 | LWT 2190 |
| C | | | LWT 2195 |
| C | | PARM1= OBSERVER LATITUDE (-90 TO +90) | LWT 2200 |
| C | | NOTE- IF ABS(PARM1) IS GREATER THAN 89.5 THE OBSERVER IS | LWT 2205 |
| C | | ASSUMED TO BE AT EITHER THE NORTH OR THE SOUTH POLE. IN TH | LWT 2210 |
| C | | CASE THE PATH AZIMUTH IS UNDEFINED. THE DIRECTION OF LINE | LWT 2215 |
| C | | SIGHT MUST BE SPECIFIED AS THE LONGITUDE THAT THE PATH LIE | LWT 2220 |
| C | | THIS QUANTITY RATHER THAN THE USUAL AZIMUTH IS READ IN FOR | LWT 2225 |
| C | | PARM2= OBSERVER LONGITUDE (0 TO 360) | LWT 2230 |
| C | | PARM3= SOURCE (SUN OR MOON) LATITUDE, SEE NOTE REGARDING SUN | LWT 2235 |
| C | | PARM4= SOURCE (SUN OR MOON) LONGITUDE | LWT 2240 |
| C | | | LWT 2245 |
| C | | FOR IPARM=1 | LWT 2250 |
| C | | (TIME MUST BE SPECIFIED. CANNOT BE USED WITH ISOURC=1) | LWT 2255 |
| C | | | LWT 2260 |
| C | | | LWT 2265 |
| C | | PARM1= OBSERVER LATITUDE (-90 TO +90) | LWT 2270 |
| C | | PARM2= OBSERVER LONGITUDE (0 TO 360) | LWT 2275 |
| C | | PARM3, PARM4 ARE NOT REQUIRED | LWT 2280 |
| C | | | LWT 2285 |
| C | | FOR IPARM=2 | LWT 2290 |
| C | | | LWT 2295 |
| C | | PARM1= AZIMUTHAL ANGLE BETWEEN THE OBSERVER'S LINE OF SIGHT | LWT 2300 |
| C | | AND THE OBSERVER-TO-SUN PATH, MEASURED FROM THE LINE | LWT 2305 |
| C | | OF SIGHT, POSITIVE EAST OF NORTH, BETWEEN -180 AND 180 | LWT 2310 |
| C | | PARM2= THE SUN'S ZENITH ANGLE | LWT 2315 |
| C | | | LWT 2320 |
| C | | PARM3, PARM4 ARE NOT REQUIRED | LWT 2325 |
| C | | | LWT 2330 |
| C | | | LWT 2335 |
| C | | REMAINING CONTROL PARAMETERS | LWT 2340 |
| C | | | LWT 2345 |
| C | | TIME= GREENWICH TIME IN DECIMAL HOURS, I.E. 0845 AM IS 8.75, | LWT 2350 |
| C | | 5820 PM IS 17.33 ETC. | LWT 2355 |
| C | | | LWT 2360 |
| C | | PSIPO= PATH AZIMUTH (DEGREES EAST OF NORTH, I.E. DUE NORTH IS 0.0 | LWT 2365 |
| C | | DUE EAST IS 90.0 ETC. | LWT 2370 |
| C | | | LWT 2375 |
| C | | ANGLEM= PHASE ANGLE OF THE MOON, I.E. THE ANGLE FORMED | LWT 2380 |
| C | | BY THE SUN, MOON AND EARTH (REQUIRED IF ISOURC=1) | LWT 2385 |
| C | | | LWT 2390 |
| C | | Q= ASYMMETRY FACTOR FOR USE WITH H.O. PHASE FUNCTION | LWT 2395 |
| C | | | LWT 2400 |
| C | | | LWT 2405 |
| C | | CARD 3B1 HANGLS (IPM=1) | LWT 2410 |
| C | | FORMAT(15) | LWT 2415 |
| C | | | LWT 2420 |
| C | | INPUT CARD FOR USER DEFINED PHASE FUNCTIONS WHEN IPM=1. | LWT 2425 |
| C | | | LWT 2430 |
| C | | HANGLS= NUMBER OF ANGLES FOR THE USER DEFINED PHASE | LWT 2435 |
| C | | FUNCTIONS (MAXIMUM OF 80) | LWT 2440 |
| C | | | LWT 2445 |
| C | | | LWT 2450 |
| C | | | LWT 2455 |

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C CARD 3B2(1 TO NANGLS) (IPH=1) LWT 2460
C (ANGF(1),F(1,1),F(2,1),F(3,1),F(4,1),I=1,NANGLS) LWT 2465
C FORMAT(F10.3,4E10.3) LWT 2470
C INPUT CARD FOR USER DEFINED PHASE FUNCTION WHEN IPH=1, LWT 2475
C FOR AVERAGE FREQUENCY OF CALCULATION LWT 2480
C ANGF(I)= PHASE ANGLE IN DECIMAL DEGREES LWT 2485
C (0.0 TO 180.0) LWT 2490
C F(1,1)= USER DEFINED PHASE FUNCTION AT ANGF(1) LWT 2500
C BOUNDARY LAYER (0 TO 2KM)) LWT 2505
C LWT 2510
C F(2,1)= USER DEFINED PHASE FUNCTION AT ANGF(1) LWT 2515
C TROPOSPHERE(2 TO 10 KM) LWT 2520
C LWT 2525
C F(3,1)= USER DEFINED PHASE FUNCTION AT ANGF(1) LWT 2530
C STRATOSPHERE(10 TO 30 KM) LWT 2535
C LWT 2540
C F(4,1)= USER DEFINED PHASE FUNCTION AT ANGF(1) LWT 2545
C MESOSPHERE(30 TO 100 KM) LWT 2550
C LWT 2555
C LWT 2560
C..... LWT 2565
C CARD 4 V1, V2, DV FORMAT(3F10.3) LWT 2570
C THE SPECTRAL RANGE OVER WHICH DATA ARE REQUIRED AND LWT 2575
C THE SPECTRAL INCREMENTS AT WHICH THE DATA ARE TO BE LWT 2580
C PRINTED OUT IS DETERMINED BY CARD 4. LWT 2585
C V1 = INITIAL FREQUENCY (WAVENUMBER CM-1 ) LWT 2590
C V2 = FINAL FREQUENCY (WAVENUMBER CM-1 ) LWT 2595
C DV = FREQUENCY INCREMENT (OR STEP SIZE) (CM-1) LWT 2600
C NOTE DV MUST BE A MULTIPLE OF 5 CM-1 LWT 2605
C..... LWT 2610
C CARD 5 IRPT FORMAT(15) LWT 2615
C IRPT=0 TO END PROGRAM LWT 2620
C +1 READ ALL DATA CARDS (1,2,3,4,5) LWT 2625
C +2 NOT USED LWT 2630
C +3 READ CARD 3 THE GEOMETRY CARD AND CARD 5 LWT 2635
C +4 READ CARD 4 TO CHANGE FREQUENCY AND CARD 5 LWT 2640
C OF 4 OR IRPT=2 WILL CAUSE PROGRAM TO STOP LWT 2645
C..... LWT 2650
C COMMON HELMUM(34),MSTGR(34),ICR(4),VMI(6),YA(16),M(16) LWT 2655
C COMMON WPATH(60,16),IBBY(80) LWT 2660
C COMMON ABSC(4,40),ERIC(4,40),VA2(40) LWT 2665
C COMMON /IRPT/ IR0,IR1,IR2,IR3 LWT 2670
C COMMON /CARD1/ MODEL,TYPE,TEMSCT,M1,M2,M3,IM,NOPRNT,TBOUND,SAL0 LWT 2675
C COMMON /CARD2/ INAGE,ISEASH,IVULCH,ICSTL,ICID,IVBA,VIS,MSS,MMW, LWT 2680
C RAINRT LWT 2685
C COMMON /CARD3/ M1,M2,ANGLE,RANGE,BETA,RE,LEN LWT 2690
C COMMON /CARD4/ V1,V2,DV LWT 2695
C COMMON /CONSTS/ RI,CA,BEG,SEALR,BIGNUM,BIGEXP LWT 2700
C COMMON /DATA/ NMAX,N,INMAX,NL,ML,INLO,ISSGEG LWT 2705
C COMMON /MODELS/ SWI(24),SMI(24),YMI(24),WINDR(24),DENSITY(10,24) LWT 2710
C COMMON /SOLS/ AMI(60),ARM(60),WPATHS(60,16),PA(60),PR(60),ATHETA(30, LWT 2715
C 15),ADDBETA(35),LJ(60),JTURN,ANGSDUM LWT 2720

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COMMON /MARI/ RHH                                LWT 2755
COMMON /JSRDATA/ NANGLS.ANGF(50),F(4,50)          LWT 2760
COMMON /MDLZ/ HMDLZ(8)                             LWT 2765
COMMON /ZVSALY/ ZVSA(10),RHVSA(10),AHVSA(10),IHVSA(10) LWT 2770
COMMON /TITL/ HHAZE(F 10),HSEASN(5,2),HVULCN(5,5),BLANK,VSB(9), LWT 2775
X HMET(5,2),HMODEL(5,8),TFRAD(6,4)               LWT 2780
C*****HDATE AND HTIME CARRY -E DATA AND TIME AND MUST BE DOUBLE LWT 2785
C*****PRECISION ON A 32 BIT WORD COMPUTER        LWT 2790
C@ DOUBLE PRECISION HDATE,HTIME                  LWT 2795
DATA IRPT / 0 /                                    LWT 2800
C*****IRD, IPR, AND IPU ARE UNIT NUMBERS FOR INPUT, OUTPUT, AND LWT 2805
C*****TAPE7 RESPECTIVELY                          LWT 2810
IRD = 5                                             LWT 2815
IPR = 6                                             LWT 2820
IPU = 7                                             LWT 2825
C@ OPEN (IRD,FILE='INPUT')                          LWT 2830
C@ OPEN (IPR,FILE='OUTPUT')                          LWT 2835
C@ OPEN (IPU,FILE='TAPE7')                          LWT 2840
PI=2.0*ASIN(1.0)                                    LWT 2845
CA=PI/180.                                           LWT 2850
DEG= 1.0/CA                                          LWT 2855
C*****GCAIR IS THE GAS CONSTANT FOR AIR IN UNITS OF MB/(GM CM-3 K) LWT 2860
GCAIR = 2.87053E+3                                    LWT 2865
C*****BIGNUM AND BIGEXP ARE THE LARGEST NUMBER AND THE LARGEST ARGUMENT LWT 2870
C*****EXP ALLOWED AND ARE MACHINE DEPENDENT. THE NUMBERS USED HERE ARE LWT 2875
C*****A TYPICAL 32 BIT-WORD COMPUTER.            LWT 2880
BIGNUM = 1.0E38                                       LWT 2885
BIGEXP = 87.0                                          LWT 2890
KMAX=16                                              LWT 2895
C*****NL IS THE NUMBER OF BOUNDARIES IN THE STANDARD MODELS 1 TO 6 LWT 2900
C*****BCUNDARY 34 (AT 99999 KM) IS NO LONGER USED LWT 2905
NL = 33                                              LWT 2910
C*****CALL TIME AND DATE:                          LWT 2915
C*****THE USER MAY WISH TO INCLUDE SUBROUTINES FDATE AND FCLOCK WHICH LWT 2920
C*****RETURN THE DATE AND TIME IN MM/DD/YY AND HH.MM.SS FORMATS LWT 2925
C*****REACTIVELY. THE REQUIRED ROUTINES FOR A CDC 6600 ARE INCLUDED AT LWT 2930
C*****THE MAIN PROGRAM IN COMMENT CARDS.          LWT 2935
C@ CALL FDATE(HDATE)                                  LWT 2940
C@ CALL FCLOCK(HTIME)                                LWT 2945
C                                                    LWT 2950
C*****START CALCULATION                            LWT 2955
C                                                    LWT 2960
C                                                    LWT 2965
100 CONTINUE                                         LWT 2970
WRITE(IPR,1000)                                       LWT 2975
'DOC FORMAT('1',20X,'***** LOWTRAN 6 *****') LWT 2980
C@ WRITE(IPR,1010) HDATE,HTIME                       LWT 2985
1010 FORMAT('1',20X,'***** LOWTRAN 6 *****',10X,2(1X,AB,1X)) LWT 2990
C                                                    LWT 2995
C*****CARD 1                                       LWT 3000
C                                                    LWT 3005
READ(IRD,1110)MODEL,ITYPE,IEMSCT,M1,M2,M3,IM,NOPRNT,TBOUND,SALB LWT 3010
1110 FORMAT(8I5,2F10.3)                               LWT 3015
C                                                    LWT 3020
WRITE(IPR,1111)MODEL,ITYPE,IEMSCT,M1,M2,M3,IM,NOPRNT,TBOUND,SALB LWT 3025
1111 FORMAT('0 CARD 1 *****',8I5,2F10.3)          LWT 3030
M=MODEL                                              LWT 3035
NPR = NOPRNT                                         LWT 3040
C*****CARD 2 AEROSOL MODEL                          LWT 3045

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| | READ(IRD,1200)IHAZE,ISEASN,IVULCN,ICSTL,ICIR,IVSA,VIS,WSS,WHH, | LWT 3050 |
| | X RAINRT | LWT 3055 |
| 1200 | FORMAT(6I5,4F10.3) | LWT 3060 |
| | WRITE(IPR,1201)IHAZE,ISEASN,IVULCN,ICSTL,ICIR,IVSA,VIS,WSS,WHH, | LWT 3065 |
| | X RAINRT | LWT 3070 |
| 1201 | FORMAT('O CARD 2 *****',6I5,4F10.3) | LWT 3075 |
| C | | LWT 3080 |
| | IF(VIS.LE.0.0.AND.IHAZE.GT.0) VIS=VSB(IHAZE) | LWT 3085 |
| | RHH= 0. | LWT 3090 |
| | IF(MODEL.EQ.0.OR.MODEL.EQ.7) GO TO 205 | LWT 3091 |
| | IF((MODEL.EQ.3.OR.MODEL.EQ.5).AND.ISEASN.EQ.0) ISEASN=2 | LWT 3092 |
| C | | LWT 3093 |
| | IF(IHAZE.EQ.3) CALL MARINE(VIS,MODEL,WSS,WHH,ICSTL,EXTC,ABSC,1) | LWT 3095 |
| | ICH(1)=IHAZE | LWT 3105 |
| | ICH(2)=6 | LWT 3110 |
| | ICH(3)=9+IVULCN | LWT 3115 |
| 205 | IF(RAINRT.EQ.0) GO TO 210 | LWT 3120 |
| | WRITE(IPR,1205) RAINRT | LWT 3125 |
| 1205 | FORMAT('O RAIN MODEL CALLED. RAIN RATE = ',F9.2,' MM/HR') | LWT 3130 |
| 210 | ICH(4)=15 | LWT 3135 |
| | IF(ICH(1).LE.0) ICH(1)=1 | LWT 3140 |
| | IF(ICH(3).LE.9) ICH(3)=10 | LWT 3145 |
| | IPLGA=0 | LWT 3150 |
| | IPLGT=0 | LWT 3155 |
| | CTHIK=-99. | LWT 3160 |
| | CALT=-99. | LWT 3165 |
| | ISEED=-99 | LWT 3170 |
| | IF(ICIR.EQ.0) GO TO 230 | LWT 3175 |
| C**** | CARD 2A CIRRUS CLOUDS | LWT 3180 |
| | READ(IRD,1210)CTHIK,CALT,ISEED | LWT 3185 |
| 1210 | FORMAT(2F10.3,I10) | LWT 3190 |
| | WRITE(IPR,1211)CTHIK,CALT,ISEED | LWT 3195 |
| 1211 | FORMAT('O CARD 2A *****',2F10.3,I10) | LWT 3200 |
| | IF(CTHIK.NE.0) IPLGT=1 | LWT 3205 |
| | IF(CALT.NE.0) IPLGA=1 | LWT 3210 |
| | IF(ISEED.EQ.0) IPLGT=2 | LWT 3215 |
| | IF(ISEED.EQ.0) IPLGA=2 | LWT 3220 |
| | CALL CIRRUS(CTHIK,CALT,ISEED,CPR0B) | LWT 3225 |
| | WRITE(IPR,1220) | LWT 3230 |
| 1220 | FORMAT(15X,'CIRRUS ATTENUATION INCLUDED') | LWT 3235 |
| | IF(IPLGT.EQ.0) WRITE(IPR,1221) CTHIK | LWT 3240 |
| 1221 | FORMAT(15X,'CIRRUS ATTENUATION STATISTICALLY DETERMINED TO BE', | LWT 3245 |
| | X F10.3,'KM') | LWT 3250 |
| | IF(IPLGT.EQ.1) WRITE(IPR,1222) CTHIK | LWT 3255 |
| 1222 | FORMAT(15X,'CIRRUS THICKNESS USER DETERMINED TO BE',F10.3,'KM') | LWT 3260 |
| | IF(IPLGT.LO.2) WRITE(IPR,1223) CTHIK | LWT 3265 |
| 1223 | FORMAT(15X,'CIRRUS THICKNESS DEFAULTED TO MEAN VALUE OF', | LWT 3270 |
| | X F10.3,'KM') | LWT 3275 |
| | IF(IPLGA.EQ.0) WRITE(IPR,1224)CALT | LWT 3280 |
| 1224 | FORMAT(15X,'CIRRUS BASE ALTITUDE STATISTICALLY DETERMINED TO BE', | LWT 3285 |
| | X F10.3,' KM') | LWT 3290 |
| | IF(IPLGA.EQ.1) WRITE(IPR,1225) CALT | LWT 3295 |
| 1225 | FORMAT(15X,'CIRRUS BASE ALTITUDE USER DETERMINED TO BE', | LWT 3300 |
| | X F10.3,' KM') | LWT 3305 |
| | IF(IPLGA.EQ.2) WRITE(IPR,1226) CALT | LWT 3310 |
| 1226 | FORMAT(15X,'CIRRUS BASE ALTITUDE DEFAULTED TO MEAN VALUE OF', | LWT 3315 |
| | X F10.3,'KM') | LWT 3320 |
| | WRITE(IPR,1227)CPR0B | LWT 3325 |
| 1227 | FORMAT(15X,'PROBABILITY OF CLOUD OCCURRING IS',F7.1, | LWT 3330 |

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| | X ' PERCENT') | LWT 3335 |
| 230 | CONTINUE | LWT 3340 |
| C***** | CARD 2B VERTICAL STRUCTURE ALGORITHM | LWT 3345 |
| | ZCVSA=-99. | LWT 3350 |
| | ZTVSA=-99. | LWT 3355 |
| | ZINVSA=-99. | LWT 3360 |
| | IF(IVSA. EQ. 0) GO TO 240 | LWT 3365 |
| | READ (IRD,1230) ZCVSA,ZTVSA,ZINVSA | LWT 3370 |
| 1230 | FORMAT(3F10.3) | LWT 3375 |
| | WRITE(IPR,1231)ZCVSA,ZTVSA,ZINVSA | LWT 3380 |
| 1231 | FORMAT('O CARD 2B *****',3F10.3) | LWT 3385 |
| C | | LWT 3390 |
| | CALL VSA(IHAZE,VIS,ZCVSA,ZTVSA,ZINVSA,ZVSA,RHVSA,AHVSA,IHVSA) | LWT 3395 |
| C | | LWT 3400 |
| 240 | IF (MODEL.NE.7) ML=NL | LWT 3405 |
| | DO 250 I=1,5 | LWT 3410 |
| | IF(M.NE.0)HMODEL(I,7)=HMODEL(I,M) | LWT 3415 |
| 250 | IF(M.EQ.0)HMODEL(I,7)=HMODEL(I,8) | LWT 3416 |
| | IF (MODEL.NE.7.OR.IM.EQ.0) GO TO 260 | LWT 3420 |
| C | | LWT 3425 |
| C***** | CARD 2C1 USER SUPPLIED ATMOSPHERIC PROFILE | LWT 3430 |
| C | | LWT 3435 |
| | READ (IRD,1250) ML,(HMODEL(I,7),I=1,5) | LWT 3440 |
| 1250 | FORMAT(15,18A4) | LWT 3445 |
| | WRITE(IPR,1251)ML,(HMODEL(I,7),I=1,5) | LWT 3450 |
| 1251 | FORMAT('O CARD 2C1*****',15,18A4) | LWT 3455 |
| | CALL NSMDL | LWT 3460 |
| 260 | CONTINUE | LWT 3465 |
| C | | LWT 3470 |
| C | | LWT 3475 |
| C***** | CARD 2D | LWT 3480 |
| C | | LWT 3485 |
| | IF(IHAZE.NE.7) GO TO 300 | LWT 3490 |
| C***** | CARD 2D USER SUPPLIED AEROSOL EXTINCTION AND ABSORPTION | LWT 3495 |
| | READ(IRD,1260)(DUMMY,EXTC(1,I),ABSC(1,I),I=1,40) | LWT 3500 |
| 1260 | FORMAT(4(F6.2,2F7.5)) | LWT 3505 |
| | WRITE(IPR,1261)(EXTC(1,I),ABSC(1,I),I=1,40) | LWT 3510 |
| 1261 | FORMAT('O CARD 2D *****',4(6X,2F7.5)) | LWT 3515 |
| 300 | CONTINUE | LWT 3520 |
| C | | LWT 3525 |
| C | | LWT 3530 |
| C***** | CARD 3 GEOMETRY PARAMETERS | LWT 3535 |
| C | | LWT 3540 |
| | IF (MODEL.NE.0) GO TO 310 | LWT 3545 |
| C | | LWT 3550 |
| C***** | CARD 3* | LWT 3555 |
| C***** | HORIZONTAL PATH MODEL =0 | LWT 3560 |
| C | | LWT 3565 |
| | ML=1 | LWT 3570 |
| | LEN=0 | LWT 3575 |
| | CALL NSMDL | LWT 3580 |
| | GO TO 321 | LWT 3585 |
| C | | LWT 3590 |
| | 310 CONTINUE | LWT 3595 |
| C | | LWT 3600 |
| | IF(IVSA.EQ.0) GO TO 312 | LWT 3605 |
| C | | LWT 3610 |
| C***** | VSA OUTPUTS FINE LAYERING OF THE ATMOSPHERE NEAR THE GROUND | LWT 3615 |
| C | | LWT 3620 |

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| | M=7 | LWT 3625 |
| | IF(MODEL.NE.0.AND.MODEL.NE.7)CALL NSMDL | LWT 3630 |
| 312 | CONTINUE | LWT 3635 |
| C | | LWT 3640 |
| | IF (MODEL.EQ.0) GO TO 320 | LWT 3645 |
| C | | LWT 3650 |
| | C*****CARD 3 | LWT 3655 |
| C | | LWT 3660 |
| | IF(IEMSCT.EQ.3) GO TO 315 | LWT 3665 |
| | READ(IRD,1312)H1,H2,ANGLE,RANGE,BETA,RO,LEN | LWT 3670 |
| 1312 | FORMAT(8F10.3,I5) | LWT 3675 |
| | WRITE(IPR,1313)H1,H2,ANGLE,RANGE,BETA,RO,LEN | LWT 3680 |
| 1313 | FORMAT('O CARD 3 *****',8F10.3,I5) | LWT 3685 |
| | GO TO 320 | LWT 3690 |
| | C*****CARD 3 FOR DIRECTLY TRANSMITTED SOLAR RADIANCE (IEMSCT = 3) | LWT 3695 |
| | 315 CONTINUE | LWT 3700 |
| | READ(IRD,1316) H1,H2,ANGLE,IDAY,RO | LWT 3705 |
| 1316 | FORMAT(3F10.3,I5,5X,F10.3) | LWT 3710 |
| | WRITE(IPR,1317) H1,H2,ANGLE,IDAY,RO | LWT 3715 |
| 1317 | FORMAT('O CARD 3'' *****',3F10.3,I5,5X,F10.3) | LWT 3720 |
| | ITYPE = 3 | LWT 3725 |
| | RANGE = 0.0 | LWT 3730 |
| | BETA = 0.0 | LWT 3735 |
| | LEN = 0 | LWT 3740 |
| | C*****RO IS THE RADIUS OF THE EARTH | LWT 3745 |
| 320 | RE=6371.23 | LWT 3750 |
| | IF (MODEL.EQ.1) RE=6378.39 | LWT 3755 |
| | IF (MODEL.EQ.4) RE=6356.91 | LWT 3760 |
| | IF (MODEL.EQ.6) RE=6356.91 | LWT 3765 |
| | IF (RO.GT.0.0) RE=RO | LWT 3770 |
| C | | LWT 3775 |
| | 321 CONTINUE | LWT 3780 |
| | IPARM =-99 | LWT 3785 |
| | IPH =-99 | LWT 3790 |
| | IDAY =-99 | LWT 3795 |
| | ISOURC=-99 | LWT 3800 |
| C | | LWT 3805 |
| | PARM1 =-99. | LWT 3810 |
| | PARM2 =-99. | LWT 3815 |
| | PARM3 =-99. | LWT 3820 |
| | PARM4 =-99. | LWT 3825 |
| | TIME =-99. | LWT 3830 |
| | PSIPO =-99. | LWT 3835 |
| | ANGLEM=-99. | LWT 3840 |
| | G =-99. | LWT 3845 |
| C | | LWT 3850 |
| | IF (IEMSCT.NE.2) GO TO 330 | LWT 3855 |
| C | | LWT 3860 |
| | C*****CARD 3A1 | LWT 3865 |
| C | | LWT 3870 |
| | READ(IRD,1320) IPARM,IPH,IDAY,ISOURC | LWT 3875 |
| 1320 | FORMAT(4I5) | LWT 3880 |
| | WRITE(IPR,1321) IPARM,IPH,IDAY,ISOURC | LWT 3885 |
| 1321 | FORMAT('O CARD 3A1*****',4I5) | LWT 3890 |
| C | | LWT 3895 |
| | C*****CARD 3A2 | LWT 3900 |
| C | | LWT 3905 |
| | READ(IRD,1322)PARM1,PARM2,PARM3,PARM4,TIME,PSIPO,ANGLEM,G | LWT 3910 |
| 1322 | FORMAT(8F10.3) | LWT 3915 |

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| WRITE(IPR,1323)PARM1,PARM2,PARM3,PARM4,TIME,PSIPO,ANGLEM,G | LWT 3920 |
| 1323 FORMAT('O CARD 3A2*****'.8F10.3) | LWT 3925 |
| C | LWT 3930 |
| IF (IPH.NE.1) GO TO 330 | LWT 3935 |
| C | LWT 3940 |
| C*****CARD 3B1 USER DEFINED PHASE FUNCTION | LWT 3945 |
| C | LWT 3950 |
| C*****READ USER DEFINED PHASE FUNCTION | LWT 3955 |
| C | LWT 3960 |
| READ(IRD,1326)NANGLS | LWT 3965 |
| 1326 FORMAT(I5) | LWT 3970 |
| WRITE(IPR,1327)NANGLS | LWT 3975 |
| 1327 FORMAT(' CARD 3B1*****',I5) | LWT 3980 |
| C | LWT 3985 |
| C*****CARD 3B2 | LWT 3990 |
| C | LWT 3995 |
| READ(IRD,1328)(ANGF(I),F(1,I),F(2,I),F(3,I),F(4,I),I=1,NANGLS) | LWT 4000 |
| 1328 FORMAT(5E10.3) | LWT 4005 |
| WRITE(IPR,1329)(ANGF(I),F(1,I),F(2,I),F(3,I),F(4,I),I=1,NANGLS) | LWT 4010 |
| 1329 FORMAT('O CARD 3B2*****',5E10.3) | LWT 4015 |
| C | LWT 4020 |
| 330 CONTINUE | LWT 4025 |
| C | LWT 4030 |
| IF (IRPT.EQ.3) GO TO 500 | LWT 4035 |
| C | LWT 4040 |
| C*****CARD 4 WAVENUMBER | LWT 4045 |
| C | LWT 4050 |
| 400 CONTINUE | LWT 4055 |
| READ(IRD,1400)V1,V2,DV | LWT 4060 |
| 1400 FORMAT(3F10.3) | LWT 4065 |
| WRITE (IPR,1401) V1,V2,DV | LWT 4070 |
| 1401 FORMAT('O CARD 4 *****',3F10.3) | LWT 4075 |
| IF (IRPT.EQ.4) GO TO 560 | LWT 4080 |
| 500 CONTINUE | LWT 4085 |
| WRITE(IPR,1410) (HTRRAD(I1,IEMSC+1),I1=1,6) | LWT 4090 |
| 1410 FORMAT('O PROGRAM WILL COMPUTE ',6A4) | LWT 4095 |
| MDEL=MODEL | LWT 4100 |
| IF(MDEL.EQ.0)MDEL=8 | LWT 4105 |
| MM1=MDEL | LWT 4110 |
| MM2=MDEL | LWT 4115 |
| MM3=MDEL | LWT 4120 |
| IF(M1.NE.0)MM1=M1 | LWT 4125 |
| IF(M2.NE.0)MM2=M2 | LWT 4130 |
| IF(M3.NE.0)MM3=M3 | LWT 4135 |
| IF(MDEL.EQ.0) GO TO 510 | LWT 4140 |
| WRITE(IPR,1500) MM1,(HMODEL(I1,MM1),I1=1,5),MM2,(HMODEL(I2,MM2), | LWT 4145 |
| X I2=1,5),MM3,(HMODEL(I3,MM3),I3=1,5) | LWT 4150 |
| 1500 FORMAT('O ATMOSPHERIC MODEL',/, | LWT 4155 |
| X 10X,'TEMPERATURE = ',I4,5X,5A4,/, | LWT 4160 |
| X 10X,'WATER VAPOR = ',I4,5X,5A4,/, | LWT 4165 |
| X 10X,'OZONE = ',I4,5X,5A4) | LWT 4170 |
| C | LWT 4175 |
| 510 IF(N.EQ.7) GO TO 520 | LWT 4180 |
| IF(ISEASN.EQ.0)ISEASN=1 | LWT 4185 |
| IF(IVULCN.LE.0) IVULCN=1 | LWT 4190 |
| IHVUL=IVULCN+9 | LWT 4195 |
| IHMET=1 | LWT 4200 |
| IF(IVULCN.GT.1)IHMET=2 | LWT 4205 |
| IF(IHAZE.EQ.0) GO TO 520 | LWT 4210 |

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WRITE(IPR,1510)(HHAZE(I,IHAZE),I=1,5),VIS,(HHAZE(12,6),I2=1,5), LWT 4215
X (HHAZE(11,6),I1=1,5),(HSEASN(IA,ISEASN),IA=1,5), LWT 4220
X (HHAZE(I3,IHVUL),I3=1,5), LWT 4225
X (HVULCN(I8,IVULCN),I8=1,5),(HSEASN(IC,ISEASN),IC=1,5), LWT 4230
X (HHAZE(14,15),I4=1,5),(HMET(I5,IHMET),I5=1,5) LWT 4235
1510 FORMAT('O AEROSOL MODEL',/,10X,'REGIME', LWT 4240
A T35,'AEROSOL TYPE',T60,'PROFILE',T85,'SEASON',/,/, LWT 4245
B 10X,'BOUNDARY LAYER (0-2 KM)',T35,5A4,T60,F5.1, LWT 4250
C ' KM VIS AT SEA LEVEL',/,10X,'TROPOSPHERE (2-10KM)',T35, LWT 4255
D 5A4,T60,5A4,T85,5A4,/,10X,'STRATOSPHERE (10-30KM)', LWT 4260
E T35,5A4,T60,5A4,T85,5A4,/,10X,'UPPER ATMOS (30-100KM)', LWT 4265
F T35,5A4,T60,5A4) LWT 4270
520 CONTINUE LWT 4275
IF(ITYPE.EQ.1) WRITE(IPR,1515) H1,RANGE LWT 4280
1515 FORMAT('O HORIZONTAL PATH',/,10X,'ALTITUDE = ',F10.3,' KM',/, LWT 4285
1 10X,'RANGE = ',F10.3,' KM') LWT 4290
IF(ITYPE.EQ.2) WRITE(IPR,1516) H1,H2,ANGLE,RANGE,BETA,LEN LWT 4295
1516 FORMAT('O SLANT PATH, H1 TO H2',/, LWT 4300
1 10X,'H1 = ',F10.3,' KM',/,10X,'H2 = ',F10.3,' KM',/, LWT 4305
2 10X,'ANGLE = ',F10.3,' DEG',/,10X,'RANGE = ',F10.3,' KM',/, LWT 4310
3 10X,'BETA = ',F10.3,' DEG',/,10X,'LEN = ',I6) LWT 4315
IF(ITYPE.EQ.3) WRITE(IPR,1517) H1,H2,ANGLE LWT 4320
1517 FORMAT('O SLANT PATH TO SPACE',/, LWT 4325
1 10X,'H1 = ',F10.3,' KM',/,10X,'HMIN = ',F10.3,' KM',/, LWT 4330
2 10X,'ANGLE = ',F10.3,' DEG') LWT 4335
IF (IEMSCT.NE.2) GO TO 550 LWT 4340
C LWT 4345
C*****INTREPRET SOLAR SCATTERING PARAMETERS LWT 4350
C LWT 4355
C LWT 4360
IF (IPARM.EQ.1) CALL SUBSOL (PARM3,PARM4,TIME,1DAY) LWT 4365
C LWT 4370
WRITE (IPR,1530) LWT 4375
1530 FORMAT('O SINGLE SCATTERING CONTROL PARAMETERS SUMMARY '//) LWT 4380
IF(IPARM.NE.2) WRITE (IPR,1532) PARM1,PARM2,PARM3,PARM4,TIME,PSIPOLWT LWT 4385
1,1DAY LWT 4390
1532 FORMAT(10X,'OBSERVER LATITUDE = ',T35,F10.2,' DEG NORTH OF EQUATOR' LWT 4395
X,10X,'OBSERVER LONGITUDE = ',T35,F10.2,' DEG WEST OF GREENWICH',/, LWT 4400
X 10X,'SUBSOLAR LATITUDE = ',T35,F10.2,' NORTH OF EQUATOR',/, LWT 4405
X 10X,'SUBSOLAR LONGITUDE = ',T35,F10.2,' WEST OF GREENWICH',/, LWT 4410
X 10X,'TIME (<0 IS UNDEF) = ',T35,F10.3,' GREENWICH TIME',/, LWT 4415
X 10X,'PATH AZIMUTH = ',T35,F10.3,' DEG EAST OF NORTH',/, LWT 4420
X 10X,'DAY OF YEAR = ',T35,I10) LWT 4425
IF (IPARM.EQ.2) WRITE (IPR,1534)PARM1,PARM2,TIME,PSIPO,1DAY LWT 4430
1534 FORMAT(10X,'RELATIVE AZIMUTH = ',T35,F10.3,' DEG EAST OF NORTH',/, LWT 4435
X 10X,'SOLAR ZENITH = ',T35,F10.3,' DEG',/, LWT 4440
X 10X,'TIME (<0 UNDEF) = ',T35,F10.3,' GREENWICH TIME',/, LWT 4445
X 10X,'PATH AZIMUTH = ',T35,F10.3,' DEG EAST OF NORTH',/, LWT 4450
X 10X,'DAY OF THE YEAR = ',T35,I6) LWT 4455
IF (ISOURC.EQ.0) WRITE (IPR,1535) LWT 4460
1535 FORMAT('O EXTRATERRESTIAL SOURCE IS THE SUN') LWT 4465
IF (ISOURC.EQ.1) WRITE (IPR,1536) ANGLEM LWT 4470
1536 FORMAT('O EXTRATERRESTIAL SOURCE IS THE MOON, MOON PHASE ANGLE = ', LWT 4475
X F10.2,' DEG') LWT 4480
IF (IPH.EQ.0) WRITE (IPR,1538) Q LWT 4485
1538 FORMAT('O H-Q PHASE FUNCTION ,Q= ',F10.3) LWT 4490
IF (IPH.EQ.1) WRITE (IPR,1540) LWT 4495
1540 FORMAT('O USER SUPPLIED PHASE FUNCTION') LWT 4500
IF (IPH.EQ.2) WRITE (IPR,1542) LWT 4505

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| 1542 | FORMAT('0 PHASE FUNCTION FROM MIE DATA BASE') | LWT 4510 |
| 550 | CONTINUE | LWT 4515 |
| | V1 =FLOAT(INT(V1/5.0+0.1))*5.0 | LWT 4520 |
| | V2 =FLOAT(INT(V2/5.0+0.1))*5.0 | LWT 4525 |
| | ALAM1=10000./V1 | LWT 4530 |
| | ALAM2=10000./V2 | LWT 4535 |
| | IF(DV.LT.5.)DV=5. | LWT 4540 |
| | DV=FLOAT(INT(DV/5+0.1))*5.0 | LWT 4545 |
| | WRITE (IPR,1555) V1,ALAM1,V2,ALAM2,DV | LWT 4550 |
| 1555 | FORMAT('0 FREQUENCY RANGE '/,10X,' V1 = ',F12.1,' CM-1 (' | LWT 4555 |
| | X F10.2,' MICROMETERS)'/,10X,' V2 = ',F12.1,' CM-1 ('F10.2, | LWT 4560 |
| | X ' MICROMETERS)'/,10X,' DV = ',F12.1,' CM-1') | LWT 4565 |
| C | | LWT 4570 |
| C | *****LOAD ATMOSPHERIC PROFILE INTO /MODEL/ | LWT 4575 |
| C | | LWT 4580 |
| | CALL STOMDL | LWT 4585 |
| C | | LWT 4590 |
| C | *****TRACE PATH THROUGH THE ATMOSPHERE AND CALCULATE ABSORBER AMOUNTS | LWT 4595 |
| C | | LWT 4600 |
| | ISSGED=0 | LWT 4605 |
| | CALL GEO (IERROR,BENDNG) | LWT 4610 |
| C | | LWT 4615 |
| | IF(IERROR.GT.0) GO TO 630 | LWT 4620 |
| | IF(IEMSC.TEQ.3 .AND. IERROR.EQ. -5) GO TO 557 | LWT 4625 |
| | GO TO 558 | LWT 4630 |
| 557 | CONTINUE | LWT 4635 |
| | WRITE(IPR,1557) | LWT 4640 |
| 1557 | FORMAT('0 DIRECT PATH TO SUN INTERSECTS THE EARTH: SKIP TO ', | LWT 4645 |
| | 1 'NEXT CASE') | LWT 4650 |
| | GO TO 630 | LWT 4655 |
| 558 | CONTINUE | LWT 4660 |
| C | | LWT 4665 |
| | IF(IEMSC.TEQ.2) | LWT 4670 |
| | X CALL SSGEO(IERROR,IPH,IPARM,PARM1,PARM2,PARM3,PARM4,PSIPO,G) | LWT 4675 |
| | IF(IERROR.GT.0) GO TO 630 | LWT 4680 |
| C | | LWT 4685 |
| C | | LWT 4690 |
| C | *****LOAD AEROSOL EXTINCTION AND ABSORPTION COEFFICIENTS | LWT 4695 |
| C | | LWT 4700 |
| | CALL EXABIN | LWT 4705 |
| C | | LWT 4710 |
| C | *****WRITE HEADER DATA TO TAPE 7 | LWT 4715 |
| C | | LWT 4720 |
| 580 | WRITE(IPU,1110)MODEL,ITYPE,IEMSC,T,M1,M2,M3,IM,NOPRNT,TBOUND,SALB | LWT 4725 |
| | WRITE(IPU,1200)IHAZE,ISEASN,IVULCN,ICSTL,ICIR,IVSA,VIS,WSS,WHH, | LWT 4730 |
| | X RAINRT | LWT 4735 |
| | WRITE(IPU,1210) CTHIK,CALT,ISEED | LWT 4740 |
| | WRITE(IPU,1230)ZCVSA,ZTVSA,ZINVSA | LWT 4745 |
| | WRITE(IPU,1250) ML,(HMODEL(I,MODEL),I=1,8) | LWT 4750 |
| | IF(MODEL.NE.0)WRITE (IPU,1312) H1,H2,ANGLE,RANGE,BETA,RO,LEN | LWT 4755 |
| | IF(MODEL.EQ.0) WRITE(IPU,1560)(HMDLZ(K),K=1,8) | LWT 4760 |
| 1580 | FORMAT(3F10.3,2F5.1,2E10.3,2F10.3) | LWT 4765 |
| | WRITE(IPU,1320) IPARM,IPH,IDAY,ISOURC | LWT 4770 |
| | WRITE(IPU,1322) PARM1,PARM2,PARM3,PARM4,TIME,PSIPO,ANGLEM,G | LWT 4775 |
| | WRITE(IPU,1400) V1,V2,DV | LWT 4780 |
| | READ(IRD,1600)IRPT | LWT 4785 |
| 1600 | FORMAT(15) | LWT 4790 |
| | WRITE(IPU,1600) IRPT | LWT 4795 |
| C | | LWT 4800 |

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| IRAIN=0 | LWT 4805 |
| IF(RAINRT.GT.0) IRAIN=1 | LWT 4810 |
| C | LWT 4815 |
| CALL TRANS (IPH,ISOURC,IDAY,ANGLEM) | LWT 4820 |
| C | LWT 4825 |
| C*****WRITE END OF FILE ON TAPE 7 | LWT 4830 |
| 1610 CONTINUE | LWT 4835 |
| WRITE(IPU,1620) | LWT 4840 |
| 1620 FORMAT('-9999.') | LWT 4845 |
| 630 CONTINUE | LWT 4850 |
| C | LWT 4855 |
| WRITE(IPR,1630)IRPT | LWT 4860 |
| 1630 FORMAT('O CARD S *****',I5) | LWT 4865 |
| IF (IRPT.EQ.0) GO TO 900 | LWT 4870 |
| IF (IRPT.GT.4) GO TO 900 | LWT 4875 |
| GO TO (100,900,300,400), IRPT | LWT 4880 |
| 900 STOP | LWT 4885 |
| C@ | LWT 4890 |
| END | LWT 4895 |
| C@ THE FOLLOWING TIME AND DATE SUBROUTINES APPLY TO A CDC 6600 | LWT 4900 |
| C@ SUBROUTINE FDATE(HDATE) | LWT 4905 |
| C@ CALL DATE(GDATE) | LWT 4910 |
| C@ HDATE=SHIFT(GDATE,6) | LWT 4915 |
| C@ RETURN | LWT 4920 |
| C@ | LWT 4925 |
| END | LWT 4930 |
| C@ SUBROUTINE FCLOCK(HTIME) | LWT 4935 |
| C@ CALL CLOCK(GTIME) | LWT 4940 |
| C@ HTIME=SHIFT(GTIME,6) | LWT 4945 |
| C@ RETURN | |
| C@ | |
| END | |

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SUBROUTINE NSMOL
C*****
C USED FOR USER DEFINED ATMOSPHERIC MODELS (MODEL=0 OR 7)
C DEFINES ALTITUDE DEPENDENT VARIABLES Z,P,T,WH,WO AND HAZE
C LOADS HAZE INTO APPROPRIATE LOCATION
C*****
COMMON /IFIL/IRD,IPR,IPU,NPR
COMMON /CARD1/ MODEL,ITYPE,IEMSCT,M1,M2,M3,IM,NOPRNT,TBOUND,SALB
COMMON /CARD2/ IHAZE,ISEASN,IVULCN,ICSTL,ICIR,IVSA,VIS,WSS,WHH,
1 RAINRT
COMMON /CARD3/ H1,H2,ANGLE,RANGE,BETA,RE,LEN
COMMON /CARD4/ V1,V2,DV
COMMON /CNTRL/ KMAX,M,IKMAX,NL,ML,IKLO,ISSGEO
COMMON /MART/ RHH
COMMON /MDATA/ZM(34),P(34,7),T(34,7),WH(34,7),WO(34,7),
X HMIIX(34)
COMMON /MODEL/ Z(34),PM(34),TM(34),RFNDX(34),DENSTY(16,34)
COMMON RELHUM(34),HSTOR(34),ICH(4),VH(16),TX(16),W(16)
COMMON WPATH(68,16),TBBY(68)
COMMON ABSC(4,40),EXTC(4,40),VX2(40)
COMMON /ZVSALY/ ZVSA(10),RHVSA(10),AHVSA(10),IHVSA(10)
COMMON /MDLZ/HMDLZ(8)
COMMON /TITL/ HZ(5,15),SEASN(5,2),VULCN(5,5),BLANK,VSB(9),
X HMET(5,2),HMODEL(5,8)
DIMENSION AHOL1(5),AHOL2(5),AHOL3(5),AHAST(34),AHLVSA(5),AHUS(5),
1 ITY1(35),IH1(34),IS1(34),IVL1(34)
DATA AHLVSA/4HVSA,4HDEFI,4HNED,4H,4H /
DATA AHUS/4HUSER,4H DEF,4HINED,4H,4H /
C
C F(A) IS SATURATED WATER WAPOR DENSITY AT TEMP T,A=TZERO/T
C
F(A)=EXP(18.9766-14.9595*A-2.43882*A*A)*A
C
CALL DRYSTR
IF(MODEL.EQ.7.AND.IVSA.EQ.1)CALL RDNSM(ML,IM)
IF(MODEL.EQ.0) M=MODEL
ICL=0
T0=273.15
IC1=1
N=7
IF(IVULCN.LE.0) IVULCN=1
IF(ISEASN.LE.0) ISEASN=1
C
FOR MODEL EQ ZERO
IHA1=0
ISEA1=0
IVUL1=0
VIS1=0.
AHAZE=0.
C
END OF MODEL ZERO DEFAULT
IF (M.NE.0) WRITE(IPR,100)
K=0
C
C LOOP OVER LAYERS
C
1 K=K+1
IF(M.EQ.0)READ(IRD,85)H1,P(1,7),TMP,DP,RH,WH(K,7),WO(K,7),RANGE
IF(K.GT.1) GO TO 5
HMDLZ(1)=H1
HMDLZ(2)=P(1,7)
HMDLZ(3)=TMP
NSM 100
NSM 105
NSM 110
NSM 115
NSM 120
NSM 125
NSM 130
NSM 135
NSM 140
NSM 145
NSM 150
NSM 155
NSM 160
NSM 165
NSM *170
NSM 175
NSM *180
NSM 185
NSM 190
NSM 195
NSM 200
NSM 205
NSM 210
NSM 215
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NSM 320
NSM 325
NSM 330
NSM 335
NSM 340
NSM 345
NSM 350
NSM 355
NSM 360
NSM 365
NSM 370
NSM 375
NSM 380
NSM 385
NSM 390

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|----|--|-----|-----|
| | HMDLZ(4)=DP | NSM | 395 |
| | HMDLZ(5)=RH | NSM | 400 |
| | HMDLZ(6)=WH(K,7) | NSM | 405 |
| | HMDLZ(7)=WO(K,7) | NSM | 410 |
| | HMDLZ(8)=RANGE | NSM | 415 |
| 5 | IF(M.EQ.0)WRITE(IPR,90)H1,P(1,7),TMP,DP,RH,WH(K,7),WO(K,7),RANGE | NSM | 420 |
| | IF(M.EQ.0)GO TO 8 | NSM | 425 |
| | IF(IVSA.EQ.1)GO TO 7 | NSM | 430 |
| | IF(M.EQ.7)READ(IRD,80)Z(K),P(K,7),TMP,DP,RH,WH(K,7),WO(K,7),AHAZE, | NSM | 435 |
| | 1VIS1,IHA1,ISEA1,IVUL1 | NSM | 440 |
| 7 | IF(IVSA.EQ.1)CALL LAYVSA(K,TMP,DP,RH,AHAZE,VIS1,IHA1,ISEA1,IVUL1) | NSM | 445 |
| | WRITE(IPR,95)Z(K),P(K,7),TMP,DP,RH,WH(K,7),WO(K,7),AHAZE,VIS1, | NSM | 450 |
| | 1 IHA1,ISEA1,IVUL1 | NSM | 455 |
| 8 | IF(M.EQ.0)Z(K)=H1 | NSM | 460 |
| | AHAST(K)=AHAZE | NSM | 465 |
| C | IHA1 IS IHAZE FOR THIS LAYER | NSM | 470 |
| C | ISEA1 IS ISEASN FOR THIS LAYER | NSM | 475 |
| C | IVUL1 IS IVULCN FOR THE LAYER | NSM | 480 |
| | IF(ISEA1.EQ.0)ISEA1=ISEASN | NSM | 485 |
| | IF(IHA1.GT.0.OR.IVUL1.GT.0)GO TO 10 | NSM | 490 |
| | ITYAER=IHAZE | NSM | 495 |
| | IF(Z(K).GT.2.0)ITYAER=6 | NSM | 500 |
| | IF(Z(K).GT.8.0)ITYAER=IVULCN+8 | NSM | 505 |
| | IF(Z(K).GT.30.0)ITYAER=15 | NSM | 510 |
| | IHA1=IHAZE | NSM | 515 |
| | IVUL1=IVULCN | NSM | 520 |
| | GO TO 15 | NSM | 525 |
| 10 | IF(IVUL1.GT.0)ITYAER=IVUL1+9 | NSM | 530 |
| | IF(IHA1.GT.0)ITYAER=IHA1 | NSM | 535 |
| | IF(ITYAER.GT.15)ITYAER=15 | NSM | 540 |
| | IF(IHA1.LE.0)IHA1=IHAZE | NSM | 545 |
| | IF(IVUL1.LE.0)IVUL1=IVULCN | NSM | 550 |
| 15 | IF(K.EQ.1)GO TO 20 | NSM | 555 |
| | IF(N.EQ.7.AND.ITYAER.EQ.8.AND.Z(K).GT.2.0)GO TO 17 | NSM | 560 |
| | IF(ITYAER.EQ.ICH(IC1))GO TO 20 | NSM | 565 |
| 17 | IC1=IC1+1 | NSM | 570 |
| | ICL=0 | NSM | 575 |
| | IF(RH.GT.0.)RHH=RH | NSM | 580 |
| | N=IC1+10 | NSM | 585 |
| | IF(IC1.LE.4)GO TO 20 | NSM | 590 |
| | IC1=4 | NSM | 595 |
| | N=14 | NSM | 600 |
| | ITYAER=ICH(IC1) | NSM | 605 |
| 20 | ICH(IC1)=ITYAER | NSM | 610 |
| | J=IFIX(Z(K)+1.0E-6)+1 | NSM | 615 |
| | IF(Z(K).GE.25.0)J=(Z(K)-25.0)/5.0+28. | NSM | 620 |
| | IF(Z(K).GE.50.0)J=(Z(K)-50.0)/20.0+31. | NSM | 625 |
| | IF(Z(K).GE.70.0)J=(Z(K)-70.0)/30.0+32. | NSM | 630 |
| | IF(J.GT.33)J=33 | NSM | 635 |
| | FAC=Z(K)-FLOAT(J-1) | NSM | 640 |
| | IF(J.LT.28)GO TO 25 | NSM | 645 |
| | FAC=(Z(K)-5.0+FLOAT(J-28)-25.)/5. | NSM | 650 |
| | IF(J.GE.31)FAC=(Z(K)-50.0)/20. | NSM | 655 |
| | IF(J.GE.32)FAC=(Z(K)-70.0)/30. | NSM | 660 |
| | IF(FAC.GT.1.0)FAC=1.0 | NSM | 665 |
| 25 | L=J+1 | NSM | 670 |
| | T(K,7)=TMP+TD | NSM | 675 |
| | IF(M1.GT.J)P(K,7)=P(J,M1)*(P(L,M1)/P(J,M1))*FAC | NSM | 680 |
| | IF(P(K,7).LE.0.)P(K,7)=3.0E-4 | NSM | 685 |

| | | |
|----|--|---------|
| | IF (M1.GT.0) T(K,7)=T(J,M1)*(T(L,M1)/T(J,M1))*FAC | NSM 690 |
| | IF (Z(K).GE.100.)WH(K,7)=0. | NSM 695 |
| | IF (Z(K).GE.100.)GO TO 35 | NSM 700 |
| | IF (M2.GT.0) WH(K,7)=WH(J,M2)*(WH(L,M2)/WH(J,M2))*FAC | NSM 705 |
| | IF (RH.GT.0.) WH(K,7)=0. | NSM 710 |
| | IF (WH(K,7).GT.0.0) GO TO 35 | NSM 715 |
| | IF (RH.GT.0.0) GO TO 30 | NSM 720 |
| | DPK=TO+DP | NSM 725 |
| | TT=TO/DPK | NSM 730 |
| | WH(K,7)=DPK*F(TT)/T(K,7) | NSM 735 |
| | GO TO 35 | NSM 740 |
| 30 | TA=TO/T(K,7) | NSM 745 |
| | WH(K,7)=F(TA)*0.01*RH | NSM 750 |
| 35 | CONTINUE | NSM 755 |
| | IF (M3.GT.0) WO(K,7)=WO(J,M3)*(WO(L,M3)/WO(J,M3))*FAC | NSM 760 |
| | HSTOR(K)=0. | NSM 765 |
| | IF (HMIX(J).LE.0.) GO TO 40 | NSM 770 |
| | IF (HMIX(L).LE.0.) GO TO 40 | NSM 775 |
| | HSTOR(K)=HMIX(J)*(HMIX(L)/HMIX(J))*FAC | NSM 780 |
| 40 | CONTINUE | NSM 785 |
| | DENSTY(7,K)=0. | NSM 790 |
| | DENSTY(12,K)=0. | NSM 795 |
| | DENSTY(13,K)=0. | NSM 800 |
| | DENSTY(14,K)=0. | NSM 805 |
| | DENSTY(15,K)=0. | NSM 810 |
| | PS=P(K,7)/1013.0 | NSM 815 |
| | TS=273.15/T(K,7) | NSM 820 |
| | WTEMP-WH(K,7) | NSM 825 |
| | RELHUM(K)=0. | NSM 830 |
| | IF (WTEMP.LE.0.) GO TO 45 | NSM 835 |
| | RELHUM(K) = 100.0*WTEMP/F(TS) | NSM 840 |
| | IF (RELHUM(K) .GT. 100.) RELHUM(K)=100. | NSM 845 |
| | IF (RELHUM(K) .LT. 0.) RELHUM(K)=0. | NSM 850 |
| 45 | RHH=RELHUM(K) | NSM 855 |
| | RH=RHH | NSM 860 |
| | IF (HAZE.EQ.0) GO TO 50 | NSM 865 |
| | IF (VIS1.LE.0.0) VIS1=VIS | NSM 870 |
| | IF (AHAZE.EQ.0.0) GO TO 47 | NSM 875 |
| | DENSTY(N,K)=AHAZE | NSM 880 |
| C | AHAZE IS IN LOWTRAN NUMBER DENSTY UNITS | NSM 885 |
| | GO TO 50 | NSM 890 |
| 47 | IF (ITYAER.EQ.3.AND.ICL.EQ.0)CALL MARINE(VIS1,MODEL,WSS,WHH,ICSTL, | NSM 895 |
| X | EXTC,ABSC,IC1) | NSM 898 |
| | IF (ITYAER.EQ.3.AND.ICL.EQ.0)VIS=VIS1 | NSM 900 |
| | ICL=1 | NSM 905 |
| | CALL AERPRF (J,VIS1,HAZ1,IHA1,ISEA1,IVUL1,NN) | NSM 910 |
| | CALL AERPRF (L,VIS1,HAZ2,IHA1,ISEA1,IVUL1,NN) | NSM 915 |
| | HAZE=0. | NSM 920 |
| | IF ((HAZ1.LE.0.0).OR.(HAZ2.LE.0.0)) GO TO 50 | NSM 925 |
| | HAZE=HAZ1*(HAZ2/HAZ1)*FAC | NSM 930 |
| | DENSTY(N,K)=HAZE | NSM 935 |
| 50 | ITY1(K)=ITYAER | NSM 940 |
| | IH1(K)=IHA1 | NSM 945 |
| | IF (AHAZE.NE.0)IH1(K)=-99 | NSM 950 |
| | IS1(K)=ISEA1 | NSM 955 |
| | IVL1(K)=IVUL1 | NSM 960 |
| | IF (K.LT.NL) GO TO 1 | NSM 965 |
| C | | NSM 970 |
| C | END OF LOOP | NSM 975 |

| | | |
|-----|---|----------|
| C | IF(ML.LT.20) WRITE (IPR,903) | NSM 980 |
| 903 | FORMAT('0') | NSM 985 |
| | IF(ML.GE.20) WRITE (IPR,900) | NSM 990 |
| 900 | FORMAT('1') | NSM 995 |
| | WRITE(IPR,905) | NSM 1000 |
| C | | NSM 1005 |
| 905 | FORMAT(T7,'Z',T17,'P',T26,'T',T32,'REL H', T41,'H2O', T52,'O3', | NSM 1010 |
| 1 | T80,'AEROSOL',/,T6,'(KM)',T16,'(MB)',T25,'(K)',T33,'(X)', | NSM 1015 |
| 2 | T39,'(GM M-3)',T49,'(GM M-3)',T59,'TYPE',T80,'PROFILE', | NSM 1020 |
| 3 | T101,'SEASON',/) | NSM 1025 |
| | DO 60 KK=1,ML | NSM 1030 |
| | DO 52 IJ=1,5 | NSM 1035 |
| | AHOL1(IJ)=BLANK | NSM 1040 |
| | AHOL2(IJ)=BLANK | NSM 1045 |
| 52 | AHOL3(IJ)=BLANK | NSM 1050 |
| | IF(IHAZE.EQ.0) GO TO 60 | NSM 1055 |
| | ITYAER=ITY1(KK) | NSM 1060 |
| | IHA1=IH1(KK) | NSM 1065 |
| | ISEA1=IS1(KK) | NSM 1070 |
| | IVUL1=IVL1(KK) | NSM 1075 |
| | DO 54 IJ=1,5 | NSM 1080 |
| | AHOL1(IJ)=HZ(IJ,ITYAER) | NSM 1085 |
| | AHOL2(IJ)=AHUS(IJ) | NSM 1090 |
| | IF(IVSA.EQ.1) AHOL2(IJ)=AHLVSA(IJ) | NSM 1095 |
| | IF(AHAST(KK).EQ.0) AHOL2(IJ)=AHOL1(IJ) | NSM 1100 |
| 54 | IF(Z(KK).GT.2.0) AHOL3(IJ)=SEASN(IJ,ISEA1) | NSM 1105 |
| 60 | WRITE(IPR,915)Z(KK),P(KK,7),T(KK,7),RELHUM(KK),WH(KK,7),WO(KK,7), | NSM 1110 |
| | X AHOL1,AHOL2,AHOL3 | NSM 1115 |
| 915 | FORMAT(2F10.3,2F8.2,1P2E10.3,2X,5A4,1X,5A4,1X,5A4) | NSM 1120 |
| 68 | IF(IC1.GE.4) GO TO 75 | NSM 1125 |
| | IC2=IC1+1 | NSM 1130 |
| | DO 70 KK=IC2,4 | NSM 1135 |
| 70 | ICH(KK)=ICH(KK-1) | NSM 1140 |
| 75 | CONTINUE | NSM 1145 |
| | M=7 | NSM 1150 |
| | IF(MODEL.EQ.0)WRITE(IPR,903) | NSM 1155 |
| | IF(MODEL.NE.0) MODEL=M | NSM 1160 |
| | RETURN | NSM 1165 |
| C | | NSM 1170 |
| 80 | FORMAT (3F10.3,2F5.1,2E10.3,E10.3,F7.3,3I1) | NSM 1175 |
| 85 | FORMAT (3F10.3,2F5.1,2E10.3,2F10.3) | NSM 1180 |
| 90 | FORMAT ('0 CARD 3* ****',3F10.3,2F5.1,1P2E10.3,0PF10.3, | NSM 1185 |
| | X 'MODEL ZERO INPUT') | NSM 1190 |
| 95 | FORMAT (3E10.3,2F5.1,3E10.3,F10.3,4I3.4(1X,2A4,A2)) | NSM 1195 |
| 100 | FORMAT (' MODEL ATMOSPHERE NO. 7') | NSM 1200 |
| | END | NSM 1205 |
| | | NSM 1210 |

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SUBROUTINE STDMOL                                STD 100
C.....STD 105
C THIS SUBROUTINE LOADS ONE OF THE 6 STANDARD ATMOSPHERIC PROFILES STD 110
C INTO COMMON/MODEL/ AND CALCULATES THE DENSITIES OF THE STD 115
C VARIOUS ABSORBING GASES AND AEROSOLS STD 120
C.....STD 125
COMMON /IFIL/IRD,IPR,IPU,NPR STD 130
COMMON /CARD1/ MODEL,ITYPE,IEMSC,M1,M2,M3,IM,NOPRNT,TBOUND,SALB STD 135
COMMON /CARD2/ IMAZE,ISEASN,IVULCN,ICSTL,ICIR,IVSA,VIS,WSS,WHH, STD 140
1 RAINRT STD 145
COMMON /CARD3/ H1,H2,ANGLE,RANGE,BETA,RE,LEN STD 150
COMMON /CARD4/ V1,V2,DV STD 155
COMMON /MDATA/ Z(34),P(34.7),T(34.7),WH(34.7),WD(34.7), STD 160
X HMI(34) STD 165
COMMON /CNSTNS/ P1,CA,DEG,GCAIR,BIGNUM,BIGEXP STD 170
COMMON /CNTRL/ KMAX,M,IKMAX,NL,ML,IKLO,ISSGEO STD 175
COMMON /MODEL/ ZH(34),PM(34),TM(34),RFNOX(34),DENSTY(16,34) STD 180
COMMON RELHUM(34),HSTOR(34),ICH(4),VII(16),TX(16),W(16) STD 185
COMMON WPATH(68,16),TBBY(68) STD 190
COMMON ABSC(4,40),EXTC(4,40),VK2(40) STD 195
C XLOSCH = LOSCHMIDT'S NUMBER, MOLECULES CM-2 KM-1 STD 200
DATA PZERO /1013.25/,TZERO/273.15/,XLOSCH/2.6868E24/ STD 205
C RV GAS CONSTANT FOR WATER IN MB/(GM M-3 K) STD 210
C CON CONVERTS WATER VAPOR FROM GM M-3 TO MOLECULES CM-2 KM-1 STD 215
DATA RV/4.6152E-3/,CON/3.3429E21/ STD 220
C CONSTANTS FOR INDEX OF REFRACTION, AFTER EDLEN, 1965 STD 225
DATA A0/83.42/,A1/185.08/,A2/4.11/, STD 230
X B1/1.140E5/,B2/6.24E4/,C0/43.49/,C1/1.70E4/ STD 235
C STD 240
C F(A) IS SATURATED WATER VAPOR DENSITY AT TEMP T,A=TZERO/T STD 245
F(A)=EXP(18.9766-14.9595*A-2.43882*A*A)+A STD 250
C H2O CONTINUUM IS STORED AT 296 K RHZERO IS AIR DENSITY AT 296 K STD 255
C IN UNITS OF LOSCHMIDT'S STD 260
C STD 265
C CALL DRYSTR STD 270
RHZERO=(273.15/296.0) STD 275
C STD 280
C LOAD ATMOSPHERE PROFILE INTO /MODEL/ STD 285
MM1=M STD 290
IF (M1.NE.0.AND.M.NE.7) MM1=M1 STD 295
MM2=M STD 300
IF (M2.NE.0.AND.M.NE.7) MM2=M2 STD 305
MM3=M STD 310
IF (M3.NE.0.AND.M.NE.7) MM3=M3 STD 315
IF (M.LT.7) ML=ML STD 320
DO 26 I=1,ML STD 325
IF (M.NE.7)ZM(I)=Z(I) STD 330
PM(I)=P(I,MM1) STD 335
TM(I)=T(I,MM1) STD 340
PP=PM(I) STD 345
TT=TM(I) STD 350
F1=(PP/PZERO)/((TT/TZERO) STD 355
F2=(PP/PZERO)+SQRT(TZERO/TT) STD 360
WTEMP=WH(I,MM2) STD 365
RELHUM(I)=0. STD 370
C RELHUM IS CALCULATED ONLY FOR THE BOUNDARY LAYER (0 TO 2 KM) STD 375
C STD 380
C SCALED H2O DENSITY STD 385
DENSITY(I,1)=0.1*WTEMP+F2**0.9 STD 390

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| | IF (ZM(1).GT.2.0) GO TO 15 | STD 395 |
| | TS = TZERO / TT | STD 400 |
| | RELHUM(1)=100.0*(WTEMP/F(TS)) | STD 405 |
| 15 | CONTINUE | STD 410 |
| C | UNIFORMLY MIXED GASES DENSITY | STD 415 |
| | DENSTY(2,1)=F1+F2*0.75 | STD 420 |
| C | UV OZONE | STD 425 |
| | DENSTY(8,1)=46.6667*WD(1,MM3) | STD 430 |
| C | IR OZONE | STD 435 |
| | DENSTY(3,1)= DENSTY(8,1)*F2*0.4 | STD 440 |
| C | N2 CONTINUUM | STD 445 |
| | DENSTY(4,1)=0.8*F1*F2 | STD 450 |
| C | SELF BROADENED WATER | STD 455 |
| | RHOAIR = F1 | STD 460 |
| | RHOH2O = CON *WTEMP/XLOSCH | STD 465 |
| | RHOFRN = RHOAIR - RHOH2O | STD 470 |
| | DENSTY(5,1)= XLOSCH*RHOH2O**2/RHZERO | STD 475 |
| C | FOREIGN BROADENED | STD 480 |
| | DENSTY(10,1)= XLOSCH*RHOH2O*RHOFRN/RHZERO | STD 485 |
| C | MOLECULAR SCATTERING | STD 490 |
| | DENSTY(6,1) = F1 | STD 495 |
| C | AEROSOL FOR 0 TO 2KM | STD 500 |
| | IF(N.EQ.7) GO TO 20 | STD 505 |
| | CALL AERPRF(1,VIS,HAZE,IMAZE,ISEASN,IVULCN,N) | STD 510 |
| | DENSTY(7,1)=0. | STD 515 |
| C | AEROSOL FOR 2 TO 9KM | STD 520 |
| | DENSTY(12,1)=0. | STD 525 |
| C | AEROSOL FOR 9 TO 30KM | STD 530 |
| | DENSTY(13,1)=0. | STD 535 |
| C | AEROSOL FOR ABOVE 30KM | STD 540 |
| | DENSTY(14,1)=0. | STD 545 |
| C | LOAD AEROSOLS | STD 550 |
| | DENSTY(N,1)=HAZE | STD 555 |
| | DENSTY(N,1)=HAZE | STD 560 |
| 20 | CONTINUE | STD 565 |
| C | RELATIVE HUMIDITY WEIGHTED BY BOUNDARY LAYER AEROSOL (0 TO 2 KM) | STD 570 |
| | DENSTY(15,1)=RELHUM(1)*DENSTY(7,1) | STD 575 |
| C | DENSITY (9,1) NO LONGER USED | STD 580 |
| | DENSTY(9,1)=0. | STD 585 |
| | IF(ICM1.GT.7) DENSTY(15,1)=RELHUM(1)*DENSTY(12,1) | STD 590 |
| C | MMO3 IN ATM + CM /KM | STD 595 |
| | DENSTY(11,1) = F1 * HMIX(1) * 1.0E-4 | STD 600 |
| | IF(MODEL.EQ.7) DENSTY(11,1)=F1*HMYOR(1)*1.0E-4 | STD 605 |
| C | CIRRUS CLOUD | STD 610 |
| | IF(ICIR.EQ.0) DENSTY(16,1) = 0. | STD 615 |
| C | RFRD = REFRACTIVITY INDEX OF REFRACTION | STD 620 |
| C | FROM EDLEN, 1950 | STD 625 |
| | PP=30*WTEMP*TT | STD 630 |
| | AVM=0.5*(V1+V2) | STD 635 |
| | RFRD(1)=(140-A1/(1-(AVM/B1)**2) +A2/(1.6-(AVM/B2)**2))* | STD 640 |
| | X ((PP/PZERG)*(TZERO+15.0)/TT-(50*(AVM/C1)**3)+PP/PZERG)*1.8-0 | STD 645 |
| 25 | CONTINUE | STD 650 |
| | IF(NP.EQ.1) GO TO 40 | STD 655 |
| | WRITE(1)PR,916) | STD 660 |
| | DO 28 I=1,ML | STD 665 |
| | WRITE(1)PR,909) (ZM(I),PM(I),TM(I),DENSTY(N,1),N=1,0),RFRD(I), | STD 670 |
| | X DENSTY(16,1) | STD 675 |
| 30 | CONTINUE | STD 680 |
| | WRITE(1)PR,916) | STD 685 |
| | DO 28 I=1,ML | STD 690 |
| | WRITE(1)PR,909) (ZM(I),PM(I),TM(I),DENSTY(N,1),N=10,11), | STD 695 |
| | X DENSTY(7,1),DENSTY(12,1),DENSTY(13,1),DENSTY(14,1),DENSTY(16,1), | STD 700 |
| | X DENSTY(10,1),RELHUM(1) | STD 705 |
| 35 | CONTINUE | STD 710 |
| 40 | CONTINUE | STD 715 |
| | RETURN | STD 720 |
| 905 | FORMAT(1) '18.0PPG, 2.50, 2.57, 1.05, 1000.0) | STD 725 |
| 910 | FORMAT(1) ' // ' ATMOSPHERIC PROFILES' // | STD 730 |
| | 1 20, 11, 110, 21, 110, 11, 120, 11, 120, 'MO3', 'HAZ', 'CO2', 'T56', '03', | STD 735 |
| | 2 'T68', 'H2O', 'T73', 'CONTMOL', 'T89', 'MOL SCAT', 'T95', 'M-1', 'T103, | STD 740 |
| | 3 'T117') // | STD 745 |
| | 4 'T117', 'T117', 'T117', 'T25', 'T117', 'T29', '(SCALED CSTRAN UNITS)', | STD 750 |
| | 5 'T70', '(MOL/CMD KM)', 'T84', '(1)', 'T85', '(1)', 'T100, | STD 755 |
| | 6 '(1)M CONTM)' // | STD 760 |
| 915 | FORMAT(1) ' // ' ATMOSPHERIC PROFILES' // | STD 765 |
| | 1 2A, 11, 110, 21, 110, 11, 120, 11, 120, 'CONTMFX', 'T45', 'MMO3', | STD 770 |
| | 2 'T53', 'AERDSDI 1', 'T63', 'AERDSDI 2', 'T73', 'AERDSDI 3', 'T83, | STD 775 |
| | 3 'AERDSDI 4', 'T83', 'AERDSDI 5', 'T103', 'CIRRUS', 'T110', 'MM'/ | STD 780 |
| | 4 'T9, '(MM)', 'T117', 'T117', 'T25', '(1)', 'T31', '(MOL/CMD KM)', 'T42, | STD 785 |
| | 5 'A1M ODP/N', 'T54', '(1)', 'T64', '(1)', 'T74', '(1)', 'T84', '(1)', 'T84, | STD 790 |
| | 6 '(1)', 'T104', '(1)', 'T113', '(PERCENT)' // | STD 795 |
| | END | STD 800 |


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SUBROUTINE AERPRF (I,VIS,HAZE,IHAZE,ISEASN,IVULCN,N)      AER 100
C*****AER 105
C WILL COMPUTE DENSITY PROFILES FOR AEROSOLS           AER 110
C*****AER 115
COMMON/PRFD /ZHT(34),HZ2K(34,5),FAW150(34),FAW123(34),SPSU50(34),AER 120
1SPSU23(34),BASTFW(34),VUMOFW(34),HIVUFW(34),EXVUFW(34),BASTSS(34),AER 125
2VUMOSS(34),HIVUSS(34),EXVUSS(34),UPNATM(34),VUTONO(34),AER 130
3VUTOEX(34),EXUPAT(34)AER 135
DIMENSION VS(5)AER 140
DATA VS/50.,23.,10.,5.,2./AER 145
HAZE=0.AER 150
N=7AER 155
IF (IHAZE.EQ.0) RETURNAER 160
IF (ZHT(I).GT.2.0) GO TO 15AER 165
DO 5 J=2,5AER 170
IF (VIS.GE.VS(J)) GO TO 10AER 175
5 CONTINUEAER 180
J=5AER 185
10 CONST=1./(1./VS(J)-1./VS(J-1))AER 190
HAZE=CONST*((HZ2K(I,J)-HZ2K(I,J-1))/VIS+HZ2K(I,J-1)/VS(J)-HZ2K(I,JAER 195
1)/VS(J-1))AER 200
RETURNAER 205
15 IF (ZHT(I).GT.9.0) GO TO 35AER 210
N=12AER 215
CONST=1./(1./23.-1./50.)AER 220
IF (ISEASN.GT.1) GO TO 25AER 225
IF (VIS.LE.23.) HAZE=SPSU23(I)AER 230
IF (VIS.LE.23.) RETURNAER 235
IF (ZHT(I).GT.4.0) GO TO 20AER 240
HAZE=CONST*((SPSU23(I)-SPSU50(I))/VIS+SPSU50(I)/23.-SPSU23(I)/50.)AER 245
RETURNAER 250
20 HAZE=SPSU50(I)AER 255
RETURNAER 260
25 IF (VIS.LE.23.) HAZE=FAW123(I)AER 265
IF (VIS.LE.23.) RETURNAER 270
IF (ZHT(I).GT.4.0) GO TO 30AER 275
HAZE=CONST*((FAW123(I)-FAW150(I))/VIS+FAW150(I)/23.-FAW123(I)/50.)AER 280
RETURNAER 285
30 HAZE=FAW150(I)AER 290
RETURNAER 295
35 IF (ZHT(I).GT.30.0) GO TO 75AER 300
N=13AER 305
HAZE=BASTSS(I)AER 310
IF (ISEASN.GT.1) GO TO 55AER 315
IF (IVULCN.EQ.0) HAZE=BASTSS(I)AER 320
IF (IVULCN.EQ.0) RETURNAER 325
GO TO (40,45,50,50,45), IVULCNAER 330
40 HAZE=BASTSS(I)AER 335
RETURNAER 340
45 HAZE=VUMOSS(I)AER 345
RETURNAER 350
50 HAZE=HIVUSS(I)AER 355
RETURNAER 360
55 IF (IVULCN.EQ.0) HAZE=BASTFW(I)AER 365
IF (IVULCN.EQ.0) RETURNAER 370
GO TO (60,65,70,70,65), IVULCNAER 375
60 HAZE=BASTFW(I)AER 380
RETURNAER 385
65 HAZE=VUMOFW(I)AER 390
RETURNAER 395
70 HAZE=HIVUFW(I)AER 400
RETURNAER 405
75 N=14AER 410
IF (IVULCN.GT.1) GO TO 80AER 415
HAZE=UPNATM(I)AER 420
RETURNAER 425
80 HAZE=VUTONO(I)AER 430
RETURNAER 435
ENDAER 440

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SUBROUTINE DRYSTR                                DRY 100
C.....DR/ 105
C THIS SUBROUTINE REPLACES THE STRATOSPHERIC (16 KM AND ABOVE) DRY 110
C WATER VAPOR PROFILE STORED IN MDLAIN WITH DR/ 115
C A "DRY" WATER VAPOR PROFILE CORRESPONDING TO DRY 120
C A CONSTANT MASS MIXING RATIO OF DRYMIX (DRYMIX=2.6 PPMM DRY 125
C FROM P. PENNORF 1978 ANALYSIS OF OZONE AND WATER VAPOR DRY 130
C FIELD MEASUREMENT DATA FAA-EE-78-29) DRY 135
C TO INCLUDE THE DRY PROFILE, THE USER MUST INCLUDE A CALL TO DRY 140
C DRYSTR IN THE MAIN PROGRAM DRY 145
C.....DR/ 150
COMMON /IFIL/ IRD,IPR,IPU,NPR DRY 155
COMMON /MDATA/ Z(34),P(34,7),T(34,7),WH(34,7),WO(34,7), DRY 160
1 HMIX(34) DRY 165
DATA DRYMIX /2.6E-6/,RV /2.8705E-3/ DRY 170
DO 10 I=1,6 DRY 175
DO 10 N=17,33 DRY 180
10 WH(N,1)=DRYMIX*P(N,1)/(RV*T(N,1)) DRY 185
WRITE(IPR,900) DRYMIX DRY 190
900 FORMAT(' WATER VAPOR PROFILE HAS BEEN REPLACED BY A',/, DRY 195
X' DRY WATER VAPOR PROFILE CORRESPONDING TO A MASS MIXING RATIO OF' DRY 200
X,1PE10.1) DRY 205
RETURN DRY 210
END DRY 215

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SUBROUTINE GEO( IERROR, BENDNG) GEO 100
C***** GEO 105
C THIS SUBROUTINE SERVES AS AN INTERFACE BETWEEN THE MAIN GEO 110
C LOWTRAN6 PROGRAM 'LWTRNG' AND THE NEW SET OF SUBROUTINES, GEO 115
C INCLUDING 'GEOINP', 'REDUCE', 'FDBETA', 'EXPINT', 'FNDHNN', GEO 120
C 'FINDSH', 'SCALHT', 'ANDEX', 'RADREF', 'RFPATH', 'FILL', GEO 125
C AND 'LAYER', WHICH CALCULATE THE ABSORBER GEO 130
C AMOUNTS FOR A REFRACTED PATH THROUGH THE ATMOSPHERE. GEO 135
C THE INPUT PARAMETERS ITYPE, H1, H2, ANGLE, RANGE, BETA, AND LEN GEO 140
C ALL FUNCTION IN THE SAME WAY IN THE NEW ROUTINES AS IN THE OLD. GEO 145
C***** GEO 150
COMMON RELHUM(34), HSTOR(34), ICH(4), VH(16), TX(16), W(16) GEO 155
COMMON NPATH(68,16), TBBY(68) GEO 160
COMMON ABSC(4,40), EXTC(4,40), VX2(40) GEO 165
COMMON /IFIL/IRD, IPR, IPU, NPR GEO 170
COMMON /CARD1/ MODEL, ITYPE, IEMSC, M1, M2, M3, IM, NOPRNT, TBOUND, SALB GEO 175
COMMON /CARD2/ IHAZE, ISEASN, IVULCN, ICSTL, ICIR, IVSA, VIS, WSS, WHH, GEO 180
1 RAINRT GEO 185
COMMON /CARD3/ H1, n2, ANGLE, RANGE, BETA, REE, LEN GEO 190
COMMON /CARD4/ V1, V2, DV GEO 195
COMMON /CNSTNS/ PI, CA, DEG, GCAIR, BIGNUM, BIGEXP GEO 200
COMMON /CNTRL/ KMAX, M, IMAX, NL, ML, IKLO, ISSGEO GEO 205
COMMON /MODEL/ ZM(34), PM(34), TM(34), RFNDX(34), DENSTY(16,34) GEO 210
COMMON /PARMTR/ RE, DELTAS, ZMAX, IMAX, IMOD, IBMAX, IPATH GEO 215
COMMON /RFRPTH/ ZP(35), PP(35), TP(35), RFNDXP(35), SP(35), GEO 220
1 PPSUM(35), TPSUM(35), RHOPSM(35), DENP(16,35), AMTP(16,35) GEO 225
COMMON /SOLS/ AH1(68), ARH(68), GEO 230
X NPATHS(68,16), PA(68), PR(68), ATHETA(35), ADBETA(35), LJ(69), JTURN, GEO 235
X ANGSUN GEO 240
DIMENSION KMOL(16) GEO 245
C***** KMOL(K) IS A POINTER USED TO REORDER THE AMOUNTS WHEN PRINTING GEO 250
DATA KMOL/1,2,3,11,8,5,9,10,4,6,7,12,13,14,16,15/ GEO 255
C***** INITIALIZE CONSTANTS AND CLEAR CUMULATIVE VARIABLES GEO 260
C***** DELTAS IS THE NOMINAL PATH LENGTH INCREMENT USED IN THE RAY TRACE GEO 265
DELTAS = 5.0 GEO 270
IERROR = 0 GEO 275
RE = REE GEO 280
IMOD = ML GEO 285
IMAX = ML GEO 290
C***** ZERO OUT CUMULATIVE VARIABLES GEO 295
DO 100 I=1,35 GEO 300
PPSUM(I) = 0.0 GEO 305
TPSUM(I) = 0.0 GEO 310
RHOPSM(I) = 0.0 GEO 315
DO 100 K=1,KMAX GEO 320
AMTP(K,I) = 0.0 GEO 325
100 CONTINUE GEO 330
ZMAX=ZM(IMAX) GEO 335
IF(MODEL.EQ.0) GO TO 145 GEO 340
IF(ISSGEO.EQ.1) GO TO 200 GEO 345
IF(ITYPE.GE.2) GO TO 200 GEO 350
C***** HORIZONTAL PATH, MODEL EQ 1 TO 7: INTERPOLATE PROFILE TO H1 GEO 355
DO 120 I=2,ML GEO 360
I2 = I GEO 365
IF(H1.LT.ZM(I)) GO TO 130 GEO 370
120 CONTINUE GEO 375
130 CONTINUE GEO 380
I1 = I2-1 GEO 385
FAC = (H1-ZM(I1))/(ZM(I2)-ZM(I1)) GEO 390

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|---|---------|
| ZP(1) = H1 | GEO 395 |
| CALL EXPINT(PP(1),PM(I1),PM(I2),FAC) | GEO 400 |
| TP(1) = TM(I1)+(TM(I2)-TM(I1))*FAC | GEO 405 |
| DO 140 K=1,KMAX | GEO 415 |
| CALL EXPINT(DENP(K,1),DENSTY(K,I1),DENSTY(K,I2),FAC) | GEO 420 |
| 140 CONTINUE | GEO 425 |
| C*****CALCULATE ABSORBER AMOUNTS FOR A HORIZONTAL PATH | GEO 430 |
| 145 WRITE(IPR,36) H1,RANGE,MODEL | GEO 435 |
| 36 FORMAT('HORIZONTAL PATH AT ALTITUDE = ',F10.3, | GEO 440 |
| 1 ' KM WITH RANGE = ',F10.3,' KM. MODEL = ',I3) | GEO 445 |
| IKMAX = 1 | GEO 450 |
| IF(MODEL.EQ.0) TP(1)=TM(1) | GEO 455 |
| TBBY(1) = TP(1) | GEO 456 |
| DO 160 K=1,KMAX | GEO 460 |
| IF(MODEL.EQ.0) DENP(K,1) = DENSTY(K,1) | GEO 465 |
| W(K) = DENP(K,1)*RANGE | GEO 470 |
| WPATH(1,K) = W(K) | GEO 475 |
| 160 CONTINUE | GEO 480 |
| WTEM = (296.0-TP(1))/(296.0-260.0) | GEO 485 |
| IF(WTEM.LT.0.)WTEM=0. | GEO 490 |
| IF(WTEM.GT.1)WTEM=1. | GEO 495 |
| W(9)=W(5)*WTEM | GEO 500 |
| WPATH(1,9) = W(9) | GEO 505 |
| GO TO 320 | GEO 510 |
| 200 CONTINUE | GEO 515 |
| C*****SLANT PATH SELECTED | GEO 520 |
| C*****INTERPRET SLANT PATH PARAMETERS | GEO 525 |
| CALL GEOINP(H1,H2,ANGLE,RANGE,BETA,ITYPE,LEN,HMIN,PHI,IERROR) | GEO 530 |
| IF(IERROR.EQ.0) GO TO 210 | GEO 535 |
| IF(ISSGEO.NE.1)WRITE(IPR,38) | GEO 540 |
| 38 FORMAT('GEO: IERROR NE 0! END THIS CALCULATION AND SKIP TO' | GEO 545 |
| 1 ' THE NEXT CASE') | GEO 550 |
| RETURN | GEO 555 |
| 210 CONTINUE | GEO 560 |
| C*****CALCULATE THE PATH THROUGH THE ATMOSPHERE | GEO 565 |
| IAMT = 1 | GEO 570 |
| CALL RFPATH(H1,H2,ANGLE,PHI,LEN,HMIN,IAMT,BETA,RANGE,BENDNG) | GEO 575 |
| C*****UNFOLD LAYER AMOUNTS IN AMTP INTO THE CUMULATIVE | GEO 580 |
| C*****AMOUNTS IN WPATH FROM H1 TO H2 | GEO 585 |
| DO 220 I=1,IPATH | GEO 590 |
| IF(H1.EQ.ZP(I)) IH1 = I | GEO 595 |
| IF(H2.EQ.ZP(I)) IH2 = I | GEO 600 |
| 220 CONTINUE | GEO 605 |
| JMAX = (IPATH-1)+LEN*(MINO(IH1,IH2)-1) | GEO 610 |
| IKMAX = JMAX | GEO 615 |
| C*****DETERMINE LJ(J), WHICH IS THE NUMBER OF THE LAYER IN AMTP(K,L). | GEO 620 |
| C*****STARTING FROM HMIN, WHICH CORRESPONDS TO THE LAYER J IN | GEO 625 |
| C*****WPATH(J,K), STARTING FROM H1 | GEO 630 |
| C*****INITIAL DIRECTION OF PATH IS DOWN | GEO 635 |
| L = IH1 | GEO 640 |
| LDEL = -1 | GEO 645 |
| IF(LEN.EQ.1 .OR. H1.GT.H2) GO TO 230 | GEO 650 |
| C*****INITIAL DIRECTION OF PATH IS UP | GEO 655 |
| L = 0 | GEO 660 |
| LDEL = 1 | GEO 665 |
| 230 CONTINUE | GEO 670 |
| JTURN = 0 | GEO 675 |
| JMAXP1=JMAX+1 | GEO 680 |
| DO 250 J=1,JMAXP1 | GEO 685 |

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| C*****TEST FOR REVERSING DIRECTION OF PATH FROM DOWN TO UP | GEO 690 |
| IF(L.NE.1 .OR. LDEL.NE.-1) GO TO 240 | GEO 695 |
| JTURN = J | GEO 700 |
| L = 0 | GEO 705 |
| LDEL = +1 | GEO 710 |
| 240 CONTINUE | GEO 715 |
| L = L+LDEL | GEO 720 |
| LJ(J) = L | GEO 725 |
| 250 CONTINUE | GEO 730 |
| C*****LOAD TBBY AND WPATH | GEO 735 |
| C*****TBBY IS DENSITY WEIGHTED MEAN TEMPERATURE | GEO 740 |
| AMTTOT=0. | GEO 745 |
| DO 255 K=1,KMAX | GEO 750 |
| 255 WPATH(1,K) = 0.0 | GEO 755 |
| DO 265 J=1,JMAX | GEO 760 |
| L = LJ(J) | GEO 765 |
| TBBY(J) = TPSUM(L)/RHOPSM(L) | GEO 770 |
| AMTTOT=AMTTOT+RHOPSM(L) | GEO 775 |
| J1 = J-1 | GEO 780 |
| IF(J1.EQ.0) J1 = 1 | GEO 785 |
| DO 260 K=1,KMAX | GEO 790 |
| IF(K.EQ.9) GO TO 260 | GEO 795 |
| WPATH(J,K) = WPATH(J1,K)+AMTP(K,L) | GEO 800 |
| 260 CONTINUE | GEO 805 |
| WTEM = (296.0-TBBY(J))/(296.0-260.0) | GEO 810 |
| IF(WTEM.LT.0.0) WTEM = 0. | GEO 815 |
| IF(WTEM.GT.1.0) WTEM = 1.0 | GEO 820 |
| WPATH(J,9) = WPATH(J1,9)+WTEM*AMTP(9,L) | GEO 825 |
| 265 CONTINUE | GEO 830 |
| DO 270 K=1,KMAX | GEO 835 |
| W(K) = WPATH(JMAX,K) | GEO 840 |
| 270 CONTINUE | GEO 845 |
| C*****INCLUDE BOUNDARY EMISSION IF: | GEO 850 |
| C***** 1. NON ZERO TBOUND IS READ IN ON CARD 1 | GEO 855 |
| C***** 2. SLANT PATH INTERSECTS THE EARTH (TBOUND | GEO 860 |
| C***** SET TO TEMPERATURE OF LOWEST BOUNDARY) | GEO 865 |
| IF(TBOUND.EQ.0.0.AND.H2.EQ.ZM(1)) TBOUND=TM(1) | GEO 870 |
| C*****PRINT CUMULATIVE ABSORBER AMOUNTS | GEO 875 |
| IF(NPR.EQ.1) GO TO 315 | GEO 880 |
| WRITE(IPR,42) | GEO 885 |
| 42 FORMAT(////, ' CUMULATIVE ABSORBER AMOUNTS FOR THE PATH FROM' | GEO 890 |
| 1 ' H1 TO Z', //, T3, 'J', T9, 'Z', T18, 'TBAR', T30, 'H2O', | GEO 895 |
| 2 T42, 'CO2', T54, 'O3', T66, 'HNO3', T77, 'O3 UV', T86, 'CNTMSLF1', | GEO 900 |
| + T98, 'CNTMSLF2', T111, 'CNTMFRN' | GEO 905 |
| 3 /, T8, '(KM)', T19, '(K)', T31, '(SCALED LOWTRAN UNITS)', | GEO 910 |
| 4 T62, '(ATM CM)', T74, '(ATM CM)', | GEO 915 |
| 5 T84, '(MOL CM-2)', T96, '(MOL CM-2)', T108, '(MOL CM-2)', /) | GEO 920 |
| C*****GOING DOWN, LP = 0, GOING UP, LP = 1 | GEO 925 |
| LP = 1 | GEO 930 |
| IF(L.NE.1 .OR. H1.GT.H2) LP = 0 | GEO 935 |
| DO 300 J=1,JMAX | GEO 940 |
| L = LJ(J) | GEO 945 |
| IF(J.EQ.JTURN) LP = 1 | GEO 950 |
| LZ = L+LP | GEO 955 |
| IF(NPR.NE.1)WRITE(IPR,44)J,ZP(LZ),TBBY(J),(WPATH(J,KMOL(K)),K= | GEO 960 |
| X 1,8) | GEO 965 |
| 44 FORMAT(I3,F9.3, F9.2,1P8E12.3) | GEO 970 |
| 300 CONTINUE | GEO 975 |
| IF(NPR.NE.1)WRITE(IPR,46) | GEO 980 |

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46 FORMAT(///,T3,'J',T09,'Z',T17,'N2 CONT',T28,'MOL SCAT',T43,      GEO 985
1  'AER 1',T55,'AER 2',T67,'AER 3',T79,'AER 4',T91,'CIRRUS',/      GEO 990
2  ,T8,'(KM)',/)      GEO 995
LP = 1      GEO 1000
IF(LEN.EQ.1 .OR. H1.GT.H2) LP = 0      GEO 1005
DO 310 J=1,JMAX      GEO 1010
L = LJ(J)      GEO 1015
IF(J.EQ.JTURN) LP = 1      GEO 1020
LZ = L+LP      GEO 1025
IF(NPR.NE.1)WRITE(IPR,48) J,ZP(LZ).(WPATH(J,KMOL(K)),K=9,15)      GEO 1030
48 FORMAT(I3,F9.3,1P7E12.3)      GEO 1035
310 CONTINUE      GEO 1040
C*****PRINT PATH SUMMARY      GEO 1045
315 IF(ISSGEO.EQ.1) GO TO 320      GEO 1050
WRITE(IPR,40)H1,H2,ANGLE,RANGE,BETA,PHI,HMIN,BENDNG,LEN      GEO 1055
40 FORMAT(//,'OSUMMARY OF THE GEOMETRY CALCULATION',//,      GEO 1060
1 10X,'H1' = ',F10.3,' KM',/,10X,'H2' = ',F10.3,' KM',/,      GEO 1065
110X,'ANGLE' = ',F10.3,' DEG',/,10X,'RANGE' = ',F10.3,' KM',/,      GEO 1070
310X,'BETA' = ',F10.3,' DEG',/,10X,'PHI' = ',F10.3,' DEG',/,      GEO 1075
4 10X,'HMIN' = ',F10.3,' KM',/,10X,'BENDING' = ',F10.3,' DEG',/,      GEO 1080
5 10X,'LEN' = ',I10)      GEO 1085
320 CONTINUE      GEO 1090
C*****CALCULATE THE AEROSOL WEIGHTED MEAN RH      GEO 1095
IF(W(7).GT.0.0 .AND. ICH(1).LE.7) W(15) = W(15)/W(7)      GEO 1100
IF(W(12).GT.0.0 .AND. ICH(1).GT.7) W(15) = W(15)/W(12)      GEO 1105
C*****PRINT TOTAL PATH AMOUNTS      GEO 1110
IF(ISSGEO.EQ.1) RETURN      GEO 1115
WRITE(IPR,50) (W(KMOL(K)),K=1,16)      GEO 1120
50 FORMAT(////,' EQUIVALENT SEA LEVEL TOTAL ABSORBER AMOUNTS',//,      GEO 1125
1 T18,'H2O',T30,'CO2+',T42,'O3',T54,'HNO3',T65,'O3 UV',      GEO 1130
2 T75,'CNTMSLF1',T87,'CNTMSLF2',T100,'CNTMFRN',      GEO 1135
+ /,T20,'(SCALED LOWTRAN UNITS)',      GEO 1140
3 T50,'(ATM CM)',T63,'(ATM CM)',T73,      GEO 1145
4 '(MOL CM-2)',T85,'(MOL CM-2)',T97,'(MOL CM-2)',      GEO 1150
+ //,10X,1P8E12.3,///,      GEO 1155
5 T15,'N2 CONT',T26,'MOL SCAT',T41,'AER 1', T53,'AER 2',      GEO 1160
6 T65,'AER 3',T77,'AER 4',T87,'CIRRUS',T99,'MEAN RH',/      GEO 1165
7 T99,'(PRCNT)',//,10X,1P7E12.3,0PF12.2)      GEO 1170
RETURN      GEO 1175
END      GEO 1180

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SUBROUTINE GEOINP(H1,H2,ANGLE,RANGE,BETA,ITYPE,LEN,HMIN,PHI,      GIN 100
1 IERROR)                                                       GIN 105
C*****GEOINP INTERPRETS THE ALLOWABLE COMBINATIONS OF INPUT PATH GIN 110
C PARAMETERS INTO THE STANDARD SET H1,H2,ANGLE,PHI,HMIN, AND LEN. GIN 115
C THE ALLOWABLE COMBINATIONS OF INPUT PARAMETERS ARE- FOR ITYPE = 2, GIN 120
C (SLANT PATH H1 TO H2) A. H1, H2, AND ANGLE, B. H1, ANGLE, AND GIN 125
C RANGE, C. H1, H2, AND RANGE, D. H1, H2, AND BETA - GIN 130
C FOR ITYPE = 3 (SLANT PATH H1 TO SPACE H2 = 100 KM), GIN 135
C A. H1 AND ANGLE, B. H1 AND HMIN (INPUT AS H2). GIN 140
C THE SUBROUTINE ALSO DETECTS BAD INPUT (IMPOSSIBLE GEOMETRY) AND GIN 145
C ITYPE = 2 CASES WHICH INTERSECT THE EARTH, AND RETURNS THESE GIN 150
C CASES WITH ERROR FLAGS. GIN 155
C THE SUBROUTINE FNDHMN IS CALLED TO CALCULATE HMIN, THE MINIMUM GIN 160
C HEIGHT ALONG THE PATH, AND PHI, THE ZENITH ANGLE AT H2, USING THE GIN 165
C ATMOSPHERIC PROFILE STORED IN /MODEL/ GIN 170
C*****GEOINP INTERPRETS THE ALLOWABLE COMBINATIONS OF INPUT PATH GIN 175
COMMON /IFIL/ IRD,IPR,IPU,NPR GIN 180
COMMON /PARMTR/ RE,DELTAS,ZMAX,IMAX,IMOD,IBMAX,IPATH GIN 185
COMMON /CNSTNS/ PI,CA,DEG,GCAIR,BIGNUM,BIGEXP GIN 190
ITER = 0 GIN 195
IF(ITYPE.NE.3) GO TO 120 GIN 200
C*****SLANT PATH TO SPACE GIN 205
C*****NOTE: IF BOTH HMIN AND ANGLE ARE ZERO, THEN ANGLE IS GIN 210
C*****ASSUMED SPECIFIED GIN 215
IF(H2.NE.0.0) GO TO 110 GIN 220
C*****CASE 3A: H1,SPACE,ANGLE GIN 225
IF(NPR.NE.1)WRITE(IPR,10) GIN 230
10 FORMAT(//,' CASE 3A: GIVEN H1,H2=SPACE,ANGLE') GIN 235
H2 = ZMAX GIN 240
CALL FNDHMN(H1,ANGLE,H2,LEN,ITER,HMIN,PHI,IERROR) GIN 245
IF(IERROR.EQ.-5) RETURN GIN 250
GO TO 200 GIN 255
110 CONTINUE GIN 260
C*****CASE 3B: H1,HMIN,SPACE GIN 265
IF(NPR.NE.1)WRITE(IPR,12) GIN 270
12 FORMAT(//,' CASE 3B: GIVEN H1, HMIN, H2=SPACE') GIN 275
HMIN = H2 GIN 280
H2 = ZMAX GIN 285
IF(H1.LT.HMIN) GO TO 9001 GIN 290
CALL FNDHMN(HMIN,90.0,H1,LEN,ITER,HMIN,ANGLE,IERROR) GIN 295
CALL FNDHMN(HMIN,90.0,H2,LEN,ITER,HMIN,PHI,IERROR) GIN 300
IF(HMIN.LT.H1) LEN = 1 GIN 305
GO TO 200 GIN 310
120 CONTINUE GIN 315
IF(ITYPE.NE.2) GO TO 9002 GIN 320
IF(RANGE.NE.0.0.OR.BETA.NE.0.0) GO TO 30 GIN 325
C*****CASE 2A: H1, H2, ANGLE GIN 330
IF(NPR.NE.1)WRITE(IPR,16) GIN 335
16 FORMAT(//,' CASE 2A: GIVEN H1, H2, ANGLE') GIN 340
IF(H1.GE.H2.AND.ANGLE.LE.90.0) GO TO 9004 GIN 345
IF(H1.EQ.0.0.AND.ANGLE.GT.90.0) GO TO 9007 GIN 350
IF(H2.LT.H1.AND.ANGLE.GT.90.0.AND.NPR.NE.1) WRITE(IPR,15) LEN GIN 355
15 FORMAT(//,' EITHER A SHORT PATH (LEN=0) OR A LONG PATH ', GIN 360
1 ' THROUGH A TANGENT HEIGHT: (LEN=1) IS POSSIBLE: LEN = ', GIN 365
2 I3) GIN 370
H2ST = H2 GIN 375
CALL FNDHMN(H1,ANGLE,H2,LEN,ITER,HMIN,PHI,IERROR) GIN 380
IF(H2.NE.H2ST) GO TO 9007 GIN 385

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| GO TO 200 | GIN 395 |
| 130 CONTINUE | GIN 400 |
| IF(BETA.EQ.0.0) GO TO 133 | GIN 405 |
| CALL FDBETA(H1,H2,BETA,ANGLE,PHI,LEN,HMIN,IERROR) | GIN 410 |
| GO TO 200 | GIN 415 |
| 133 CONTINUE | GIN 420 |
| IF(ANGLE.EQ.0.0) GO TO 140 | GIN 425 |
| C*****CASE 2B: H1, ANGLE, RANGE | GIN 430 |
| C*****ASSUME NO REFRACTION | GIN 435 |
| IF(NPR.NE.1)WRITE(IPR,18) | GIN 440 |
| 18 FORMAT(//,' CASE 2B: , GIVEN H1, ANGLE, RANGE',// | GIN 445 |
| 1 10X,'NOTE: H2 IS COMPUTED FROM H1, ANGLE, AND RANGE ', | GIN 450 |
| 2 'ASSUMING NO REFRACTION') | GIN 455 |
| R1 = RE+H1 | GIN 460 |
| R2 = SQRT(R1**2+RANGE**2+2.0*R1*RANGE*COS(+ANGLE/DEG)) | GIN 465 |
| H2 = R2-RE | GIN 470 |
| IF(H2.GE.0.0) GO TO 135 | GIN 475 |
| H2 = 0.0 | GIN 480 |
| R2 = RE+H2 | GIN 485 |
| RANGE = -R1*COS(ANGLE/DEG)-SQRT(R2**2-R1**2*(SIN(ANGLE/DEG))**2) | GIN 490 |
| IF(NPR.NE.1)WRITE(IPR,17) RANGE | GIN 495 |
| 17 FORMAT(//,10X,'CALCULATED H2 IS LESS THAN ZERO:',// | GIN 500 |
| 1 10X,'RESET H2 = 0.0 AND RANGE = ',F10.3) | GIN 505 |
| 135 CONTINUE | GIN 510 |
| C*****NOTE: GEOMETRIC PHI IS NEEDED TO DETERMINE LEN(0 OR 1). | GIN 515 |
| C*****PHI IS THEN RECOMPUTED IN FNDHMN | GIN 520 |
| PHI = 180.0-ACOS((R2**2+RANGE**2-R1**2)/(2.0*R2*RANGE))*DEG | GIN 525 |
| LEN = 0 | GIN 530 |
| IF(ANGLE.GT.90.0.AND.PHI.GT.90.0) LEN = 1 | GIN 535 |
| CALL FNDHMN(H1,ANGLE,H2,LEN,ITER,HMIN,PHI,IERROR) | GIN 540 |
| GO TO 200 | GIN 545 |
| 140 CONTINUE | GIN 550 |
| C*****CASE 2C: H1, H2, RANGE | GIN 555 |
| IF(NPR.NE.1)WRITE(IPR,19) | GIN 560 |
| 19 FORMAT(//,' CASE 2C: GIVEN H1, H2, RANGE',//, | GIN 565 |
| 1 10X,'NOTE: ANGLE IS COMPUTED FROM H1, H2, AND RANGE ', | GIN 570 |
| 2 'ASSUMING NO REFRACTION') | GIN 575 |
| IF(ABS(H1-H2).GT.RANGE) GO TO 9003 | GIN 580 |
| R1 = H1+RE | GIN 585 |
| R2 = H2+RE | GIN 590 |
| ANGLE = 180.0-ACOS((R1**2+RANGE**2-R2**2)/(2.0*R1*RANGE))*DEG | GIN 595 |
| PHI = 180.0-ACOS((R2**2+RANGE**2-R1**2)/(2.0*R2*RANGE))*DEG | GIN 600 |
| LEN = 0 | GIN 605 |
| IF(ANGLE.GT.90.0.AND.PHI.GT.90.0) LEN = 1 | GIN 610 |
| CALL FNDHMN(H1,ANGLE,H2,LEN,ITER,HMIN,PHI,IERROR) | GIN 615 |
| 200 CONTINUE | GIN 620 |
| C*****TEST IERROR AND RECHECK LEN | GIN 625 |
| IF(IERROR.NE.0) RETURN | GIN 630 |
| LEN = 0 | GIN 635 |
| IF(HMIN.LT.AMIN1(H1,H2)) LEN = 1 | GIN 640 |
| C*****REDUCE PATH ENDPOINTS ABOVE ZMAX TO ZMAX | GIN 645 |
| IF(HMIN.GE.ZMAX) GO TO 9008 | GIN 650 |
| IF(H1.GT.ZMAX ,OR. H2.GT.ZMAX) CALL REDUCE(H1,H2,ANGLE,PHI,ITER) | GIN 655 |
| C*****AT THIS POINT THE FOLLOWING PARAMETERS ARE DEFINED: | GIN 660 |
| C***** H1,H2,ANGLE,PHI,HMIN,LEN | GIN 665 |
| IF(NPR.NE.1)WRITE(IPR,20) H1,H2,ANGLE,PHI,HMIN,LEN | GIN 670 |
| 20 FORMAT(//,' SLANT PATH PARAMETERS IN STANDARD FORM',//, | GIN 675 |
| 1 10X,'H1 = ',F10.3,' KM',/,10X,'H2 = ',F10.3,' KM',/, | GIN 680 |
| 2 10X,'ANGLE = ',F10.3,' DEG',/,10X,'PHI = ',F10.3,' DEG',/, | GIN 685 |

| | | | |
|--------|--|-----|------|
| 3 | 10X,'HMIN = ',F10.3,' KM',/,10X,'LEN = ',110) | GIN | 890 |
| | RETURN | GIN | 895 |
| C***** | | GIN | 900 |
| C***** | ERROR MESAGES | GIN | 905 |
| C***** | | GIN | 910 |
| 9001 | CONTINUE | GIN | 915 |
| | WRITE(IPR,40) H1,HMIN | GIN | 920 |
| | 40 FORMAT('OGEOINP, CASE 3B (H1,HMIN,SPACE): ERROR IN INPUT DATA', | GIN | 925 |
| | 1 //,10X,'H1 = ',F12.6,' IS LESS THAN HMIN = ',F12.6) | GIN | 930 |
| | GO TO 9900 | GIN | 935 |
| 9002 | WRITE(IPR,42) ITYPE,ITYPE | GIN | 940 |
| | 42 FORMAT('OGEOINP: ERROR IN INPUT DATA, ITYPE NOT EQUAL TO ', | GIN | 945 |
| | 1 2, OR 3. ITYPE = ',I10,E23.14) | GIN | 950 |
| | GO TO 9900 | GIN | 955 |
| 9003 | WRITE(IPR,43) H1,H2,RANGE | GIN | 960 |
| | 43 FORMAT('OGEOINP, CASE 2C (H1,H2,RANGE): ERROR IN INPUT DATA',/, | GIN | 965 |
| | 110X,'ABS(H1-H2) GT RANGE: H1 = ',F12.6,' H2 = ',F12.6, | GIN | 970 |
| | 2 RANGE = ',F12.6) | GIN | 975 |
| | GO TO 9900 | GIN | 980 |
| 9004 | CONTINUE | GIN | 985 |
| | WRITE(IPR,44) H1,H2,ANGLE | GIN | 990 |
| | 44 FORMAT('OGEOINP, CASE 2A (H1,H2,ANGLE): ERROR IN INPUT DATA', | GIN | 995 |
| | 1 //,10X,'H1 = ',F12.6,' IS GREATER THAN OR EQUAL TO H2 = ', | GIN | 1000 |
| | 2 F12.6 ,/,10X,'AND ANGLE = ',F12.6,' IS LESS THAN OR ', | GIN | 1005 |
| | 3 'EQUAL TO 90.0') | GIN | 1010 |
| | GO TO 9900 | GIN | 1015 |
| 9007 | WRITE(IPR,48) | GIN | 1020 |
| | 48 FORMAT('OGEOINP, ITYPE = 2: SLANT PATH INTERSECTS THE EARTH', | GIN | 1025 |
| | 1 ' AND CANNOT REACH H2') | GIN | 1030 |
| | GO TO 9900 | GIN | 1035 |
| 9008 | WRITE(IPR,50) ZMAX,H1,H2,HMIN | GIN | 1040 |
| | 50 FORMAT('GEOINP- THE ENTIRE PATH LIES ABOVE THE TOP ZMAX ', | GIN | 1045 |
| | 1 'OF THE ATMOSPHERIC PROFILE',/,10X,'ZMAX = ',G12.6,5X, | GIN | 1050 |
| | 2 ' H1 = ',G12.6,5X,' H2 = ',G12.6,' HMIN = ',G12.6) | GIN | 1055 |
| 9900 | IERROR = 1 | GIN | 1060 |
| | RETURN | GIN | 1065 |
| | END | GIN | 1070 |

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SUBROUTINE REDUCE(H1,H2,ANGLE,PHI,ITER) RDU 100
C***** RDU 105
C ZMAX IS THE HIGHEST LEVEL IN THE ATMOSPHERIC PROFILE STORED IN RDU 110
C COMMON /MODEL/. IF H1 AND/OR H2 ARE GREATER THAN ZMAX, THIS RDU 115
C SUBROUTINE REDUCES THEM TO ZMAX AND RESETS ANGLE AND/OR PHI RDU 120
C AS NECESSARY. THIS REDUCTION IS NECESSARY, FOR EXAMPLE FOR RDU 125
C SATELLITE ALTITUDES, BECAUSE (1) THE DENSITY PROFILES ARE RDU 130
C POORLY DEFINED ABOVE ZMAX AND (2) THE CALCULATION TIME FOR RDU 135
C PATHS ABOVE ZMAX CAN BE EXCESSIVE ( EG. FOR GEOSYNCHRONOUS RDU 140
C ALTITUDES) RDU 145
C***** RDU 150
COMMON /IFIL/ IRD,IPR,IPU,NPR RDU 155
COMMON /PARMTR/ RE,DELTA,ZMAX,IMAX,IMOD,IBMAX,IPATH RDU 160
COMMON /CNSTNS/ PI,CA,DEG,GCAIR,BIGNUM,BIGEXP RDU 165
IF(H1.LE.ZMAX .AND. H2.LE.ZMAX) RETURN RDU 170
CALL FINDSH(H1,SH,GAMMA) RDU 175
CPATH = ANDEX(H1,SH,GAMMA)*(RE+H1)*SIN(ANGLE/DEG) RDU 180
CALL FINDSH(ZMAX,SH,GAMMA) RDU 185
CZMAX = ANDEX(ZMAX,SH,GAMMA)*(RE+ZMAX) RDU 190
ANGMAX = 180.0-ASIN(CPATH/CZMAX)*DEG RDU 195
IF(H1.LE.ZMAX) GO TO 120 RDU 200
H1 = ZMAX RDU 205
ANGLE = ANGMAX RDU 210
120 CONTINUE RDU 215
IF(H2.LE.ZMAX) GO TO 130 RDU 220
H2 = ZMAX RDU 225
PHI = ANGMAX RDU 230
130 CONTINUE RDU 235
WRITE(IPR,20) ZMAX,ANGMAX RDU 240
20 FORMAT(///,' FROM SUBROUTINE REDUCE: ',/, RDU 245
1 4X,'ONE OR BOTH OF H1 AND H2 ARE ABOVE THE TOP OF THE ', RDU 250
2 'ATMOSPHERIC PROFILE ZMAX = ',F10.3,' AND HAVE BEEN RESET ', RDU 255
3 'TO ZMAX',/,4X,'ANGLE AND/OR PHI HAVE ALSO BEEN RESET TO ', RDU 260
4 'THE ZENITH ANGLE AT ZMAX = ',F10.3,' DEG') RDU 265
200 CONTINUE RDU 270
RETURN RDU 275
END RDU 280

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SUBROUTINE FDBETA(H1,H2,BETA,ANGLE,PHI,LEN,HMIN,IERROR)      BET 100
C*****                                                    BET 105
C GIVEN H1,H2,AND BETA (THE EARTH CENTERED ANGLE) THIS SUBROUTINE BET 110
C CALCULATES THE INITIAL ZENITH ANGLE AT H1 THROUGH AN ITERATIVE BET 115
C PROCEDURE                                                    BET 120
C*****                                                    BET 125
COMMON /IFIL/ IRD,IPR,IPU,NPR                                BET 130
COMMON /PARMTR/ RE,DELTA3,ZMAX,IMAX,IMOD,IBMAX,IPATH         BET 135
COMMON /CNSTNS/ PI,CA,DEG,GCAIR,BIGNUM,BIGEXP              BET 140
DATA TOLRNC/1.0E-4/,ITERMX/10/                             BET 145
IFLAG = 0                                                    BET 150
IF(H1.GT.H2) GO TO 100                                       BET 155
IORDER = 1                                                  BET 160
HA = H1                                                      BET 165
HB = H2                                                      BET 170
GO TO 120                                                    BET 175
100 CONTINUE                                                 BET 180
IORDER = -1                                                 BET 185
HA = H2                                                      BET 190
HB = H1                                                      BET 195
120 CONTINUE                                                 BET 200
C*****SET PARAMETER TO SUPPRESS CALCULATION OF AMOUNTS    BET 205
IAMT = 2                                                    BET 210
C*****GUESS AT ANGLE, INTEGRATE TO FIND BETA, TEST FOR    BET 215
C*****CONVERGENCE, AND ITERATE                              BET 220
C*****FIRST GUESS AT ANGLE: USE THE GEOMETRIC SOLUTION(NO REFRACTION) BET 225
ITER = 1                                                    BET 230
RA = RE+HA                                                  BET 235
RB = RE+HB                                                  BET 240
SG = SQRT(RA**2+RB**2-2.0*RA*RB*COS(BETA/DEG))             BET 245
ANGLE1 = 180.0-ACOS((RA**2+SG**2-RB**2)/(2.0*RA*SG))*DEG   BET 250
HMIN = HA                                                    BET 255
I:(ANGLE1.GT.SG.0) HMIN = RA*SIN(ANGLE1/DEG)-RE           BET 260
IF(HMIN.GE.0.0) GO TO 310                                    BET 265
IFLAG = 1                                                    BET 270
HMIN = 0.0                                                  BET 275
CALL FNDHMN(HMIN,90.0,HA,LEN,ITER,HMIN,ANGLE1,IERROR)      BET 280
310 CONTINUE                                                BET 285
IF(NPR.NE.1)WRITE(IPR,24)                                    BET 290
24 FORMAT(///,' CASE 2D: GIVEN H1, H2, BETA:',//,           BET 295
1 ' ITERATE AROUND ANGLE UNTIL BETA CONVERGES',//,         BET 300
2 ' ITER ANGLE',T21,'BETA',T30,'DBETA',T40,'RANGE',       BET 305
3 T51,'HMIN',T61,'PHI',T70,'BENDING',//,                 BET 310
4 T10,'(DEG)',T21,'(DEG)',T30,'(DEG)',T41,'(KM)',        BET 315
5 T51,'(KM)',T60,'(DEG)',T71,'(DEG)',//)                  BET 320
LEN = 0                                                     BET 325
IF(ANGLE1.GT.90.0) LEN = 1                                   BET 330
CALL FNDHMN(HA,ANGLE1,HB,LEN,ITER,HMIN,PHI,IERROR)         BET 335
LEN = 0                                                     BET 340
IF(HMIN.LT.HA) LEN = 1                                       BET 345
CALL RFPATH(HA,HB,ANGLE1,PHI,LEN,HMIN,IAMT,BETA1,RANGE,BENDNG) BET 350
DBETA = BETA-BETA1                                          BET 355
IF(NPR.NE.1)WRITE(IPR,26)ITER,ANGLE1,BETA1,DBETA,RANGE,HMIN,PHI, BET 360
X BENDNG                                                    BET 365
26 FORMAT(15,3F10.4,2F10.3,2F10.4)                        BET 370
IF(IFLAG.EQ.1 .AND. BETA1.LT.BETA) GO TO 9005              BET 375
ITER = 2                                                    BET 380
DANG = (BETA/25.0)**2                                       BET 385
IF(DANG.LT.0.001) DANG = 0.001                             BET 390

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| | |
|--|---------|
| ANGLE2 = ANGLE1-DANG | BET 395 |
| IF(ANGLE2.LT.0.0) ANGLE2 = 0.0 | BET 400 |
| LEN = 0 | BET 405 |
| IF(ANGLE2.GT.90.0) LEN = 1 | BET 410 |
| CALL FNDHMN(HA,ANGLE2,HB,LEN,ITER,HMIN,PHI,IERROR) | BET 415 |
| LEN = 0 | BET 420 |
| IF(HMIN.LT.HA) LEN = 1 | BET 425 |
| CALL RFPATH(HA,HB,ANGLE2,PHI,LEN,HMIN,IAMT,BETA2,RANGE,BENDNG) | BET 430 |
| DBETA = BETA-BETA2 | BET 435 |
| IF(NPR.NE.1)WRITE(IPR,26)ITER,ANGLE2,BETA2,DBETA,RANGE,HMIN,PHI, | BET 440 |
| X BENDNG | BET 445 |
| ANGLE3 = ANGLE2 | BET 450 |
| BETA3 = BETA2 | BET 455 |
| IF(ABS(DBETA).LE.TOLRNC) GO TO 340 | BET 460 |
| 320 CONTINUE | BET 465 |
| ITER = ITER+1 | BET 470 |
| ANGLE3 = ANGLE2+(ANGLE2-ANGLE1)*(BETA-BETA2)/(BETA2-BETA1) | BET 475 |
| LEN = 0 | BET 480 |
| IF(ANGLE3.GT.90.0) LEN = 1 | BET 485 |
| CALL FNDHMN(HA,ANGLE3,HB,LEN,ITER,HMIN,PHI,IERROR) | BET 490 |
| LEN = 0 | BET 495 |
| IF(HMIN.LT.HA) LEN = 1 | BET 500 |
| CALL RFPATH(HA,HB,ANGLE3,PHI,LEN,HMIN,IAMT,BETA3,RANGE,BENDNG) | BET 505 |
| DBETA = BETA-BETA3 | BET 510 |
| IF(NPR.NE.1)WRITE(IPR,26)ITER,ANGLE3,BETA3,DBETA,RANGE,HMIN,PHI, | BET 515 |
| X BENDNG | BET 520 |
| IF(BETA3.LT.BETA.AND.HMIN.LT.0.0) GO TO 9005 | BET 525 |
| ANGLE1 = ANGLE2 | BET 530 |
| ANGLE2 = ANGLE3 | BET 535 |
| BETA1 = BETA2 | BET 540 |
| BETA2 = BETA3 | BET 545 |
| IF(ABS(BETA-BETA3).LT.TOLRNC) GO TO 340 | BET 550 |
| IF(ITER.GT.ITERMX) GO TO 9006 | BET 555 |
| GO TO 320 | BET 560 |
| 340 CONTINUE | BET 565 |
| IF(HMIN.LT.0.0) GO TO 9005 | BET 570 |
| C*****CONVERGED TO A SOLUTION | BET 575 |
| ANGLE = ANGLE3 | BET 580 |
| BETA = BETA3 | BET 585 |
| C*****ASSIGN ANGLE AND PHI TO PROPER M1 AND M2 | BET 590 |
| IF(IORDER.EQ.1) GO TO 350 | BET 595 |
| TEMP = PHI | BET 600 |
| PHI = ANGLE | BET 605 |
| ANGLE = TEMP | BET 610 |
| 350 CONTINUE | BET 615 |
| RETURN | BET 620 |
| C***** | BET 625 |
| C*****ERROR MESSAGES | BET 630 |
| C***** | BET 635 |
| 9005 CONTINUE | BET 640 |
| IF(NPR.NE.1)WRITE(IPR,45) | BET 645 |
| 45 FORMAT('OFDBETA, CASE 20(M1,M2,BETA): REFRACTED TANGENT ', | BET 650 |
| 1 HEIGHT IS LESS THAN ZERO-PATH INTERSECTS THE EARTH', | BET 655 |
| 2 //,10X,'BETA IS TOO LARGE FOR THIS M1 AND M2') | BET 660 |
| GO TO 9900 | BET 665 |
| 9006 CONTINUE | BET 670 |
| IF(NPR.NE.1)WRITE(IPR,46)M1,M2,BETA,ITER,ANGLE1,BETA1,ANGLE2, | BET 675 |
| 1 BETA2,ANGLE3,BETA3 | BET 680 |
| 46 FORMAT('OFDBETA, CASE 20 (M1,M2,BETA): SOLUTION DID NOT ', | BET 685 |
| 1 CONVERGE'//,10X,'M1 = ',F12.6,' M2 = ',F12.6, | BET 690 |
| 2 BETA = ',F12.6,' ITERATIONS = ',14,///, | BET 695 |
| 3 10X,'LAST THREE ITERATIONS ',///, | BET 700 |
| 4 10X,'ANGLE = ',F15.9,' BETA = ',F15.9)) | BET 705 |
| 9900 ERROR = 1 | BET 710 |
| RETURN | BET 715 |
| END | BET 720 |

```

SUBROUTINE EXPINT(X,X1,X2,A)
EXPONENTIAL INTERPOLATION
IF(X1.EQ.0.0 .OR. X2.EQ.0.0) GO TO 100
X = X1*(X2/X1)**A
RETURN
100 X = X1+(X2-X1)*A
RETURN
END

```

| | | |
|--|-----|-----|
| | XIN | 100 |
| | XIN | 105 |
| | XIN | 110 |
| | XIN | 115 |
| | XIN | 120 |
| | XIN | 125 |
| | XIN | 130 |
| | XIN | 135 |

```

SUBROUTINE FNDHMN(H1,ANGLE,H2,LEN,ITER,HMIN,PHI,ERROR)
C*****
C THIS SUBROUTINE CALCULATES THE MINIMUM ALTITUDE HMIN ALONG
C THE REFRACTED PATH AND THE FINAL ZENITH ANGLE PHI.
C THE PARAMETER LEN INDICATES WHETHER THE PATH GOES THROUGH
C A TANGENT HEIGHT (LEN=1) OR NOT (LEN=0). IF ANGLE > 90 AND
C H1 > H2, THEN LEN CAN EITHER BE 1 OR 0, AND THE CHOICE IS
C LEFT TO THE USER.
C THE (INDEX OF REFRACTION ~ 1.0) IS MODELED AS AN EXPONENTIAL
C BETWEEN THE LAYER BOUNDARIES, WITH A SCALE HEIGHT SH AND AN
C AMOUNT AT THE GROUND GAMMA.
C CPATH IS THE REFRACTIVE CONSTANT FOR THIS PATH AND
C EQUALS INDEX(H1)*(RE+H1)*SIN(ANGLE).
C*****
COMMON /IFIL/ IRD,IPR,IPU,NPR
COMMON /PARMTR/ RE,DELTA,S,ZMAX,IMAX,IMOO,ISMAX,IPATH
COMMON /CNSTNS/ PI,CA,DEG,GCAIR,BIGNUM,BIGEXP
COMMON /CNTRL/ KMAX,M,IKMAX,NL,M,IKLO,ISSGEO
DATA DH/1.0/,ETA/5.0E-8/
C*****ETA MAY BE TOO SMALL FOR SOME COMPUTERS. TRY 1.0E-7 FOR 32 BIT
C*****WORD MACHINES
C CRFRCT IS REFRACTIVE CONSTANT FOR THE PATH
C
CRFRCT(H) = (RE+H)*ANOEX(H,SH,GAMMA)
N = 0
CALL FINDSH(H1,SH,GAMMA)
CPATH = CRFRCT(H1)*SIN(ANGLE/DEG)
CALL FINDSH(H2,SH,GAMMA)
CH2 = CRFRCT(H2)
IF(ABS(CPATH/CH2).GT.1.0) GO TO 200
IF(ANGLE.GT.90.0) GO TO 100
LEN = 0
HMIN = H1
GO TO 180
100 CONTINUE
IF(H1.LE.H2) LEN = 1
IF(LEN.EQ.1) GO TO 110
LEN = 0
HMIN = H2
GO TO 180
110 CONTINUE
C*****LONG PATH THROUGH A TANGENT HEIGHT.
C*****SOLVE ITERATIVELY FOR THE TANGENT HEIGHT HT.
C*****HT IS THE HEIGHT FOR WHICH INDEX(HT)*(RE+HT) = CPATH.
CALL FINDSH(G,SH,GAMMA)
CMIN = CRFRCT(G,0)
C*****FOR BETA CASES (ITER>0), ALLOW FOR HT < 0.0
IF(ITER.EQ.0 .AND. CPATH.LT.CMIN) GO TO 180
HT1 = (RE+H1)*SIN(ANGLE/DEG)-RE
CALL FINDSH(HT1,SH,GAMMA)
CT1 = CRFRCT(HT1)
HT2 = HT1-CH1
CALL FINDSH(HT2,SH,GAMMA)
CT2 = CRFRCT(HT2)
C*****ITERATE TO FIND HT
N = 2
120 CONTINUE
N = N+1
HT3 = HT2*(HT2-HT1)*(CPATH-CT2)/(CT2-CT1)

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| | | |
|--|------|-----|
| | HMIN | 100 |
| | HMIN | 105 |
| | HMIN | 110 |
| | HMIN | 115 |
| | HMIN | 120 |
| | HMIN | 125 |
| | HMIN | 130 |
| | HMIN | 135 |
| | HMIN | 140 |
| | HMIN | 145 |
| | HMIN | 150 |
| | HMIN | 155 |
| | HMIN | 160 |
| | HMIN | 165 |
| | HMIN | 170 |
| | HMIN | 175 |
| | HMIN | 180 |
| | HMIN | 185 |
| | HMIN | 190 |
| | HMIN | 195 |
| | HMIN | 200 |
| | HMIN | 205 |
| | HMIN | 210 |
| | HMIN | 215 |
| | HMIN | 220 |
| | HMIN | 225 |
| | HMIN | 230 |
| | HMIN | 235 |
| | HMIN | 240 |
| | HMIN | 245 |
| | HMIN | 250 |
| | HMIN | 255 |
| | HMIN | 260 |
| | HMIN | 265 |
| | HMIN | 270 |
| | HMIN | 275 |
| | HMIN | 280 |
| | HMIN | 285 |
| | HMIN | 290 |
| | HMIN | 295 |
| | HMIN | 300 |
| | HMIN | 305 |
| | HMIN | 310 |
| | HMIN | 315 |
| | HMIN | 320 |
| | HMIN | 325 |
| | HMIN | 330 |
| | HMIN | 335 |
| | HMIN | 340 |
| | HMIN | 345 |
| | HMIN | 350 |
| | HMIN | 355 |
| | HMIN | 360 |
| | HMIN | 365 |
| | HMIN | 370 |
| | HMIN | 375 |
| | HMIN | 380 |
| | HMIN | 385 |
| | HMIN | 390 |

| | | |
|---|-----|-----|
| CALL FINDSH(HT3,SH,GAMMA) | HMN | 395 |
| CT3 = CRFRCT(HT3) | HMN | 400 |
| DC = CPATH-CT3 | HMN | 405 |
| IF(ABS((CPATH-CT3)/CPATH).LT.ETA) GO TO 130 | HMN | 410 |
| IF(N.GT.15) GO TO 210 | HMN | 415 |
| HT1 = HT2 | HMN | 420 |
| CT1 = CT2 | HMN | 425 |
| HT2 = HT3 | HMN | 430 |
| CT2 = CT3 | HMN | 435 |
| GO TO 120 | HMN | 440 |
| 130 CONTINUE | HMN | 445 |
| HT = HT3 | HMN | 450 |
| HMIN = HT | HMN | 455 |
| GO TO 160 | HMN | 460 |
| 150 CONTINUE | HMN | 465 |
| IF(1SSGEO.EQ.0) GO TO 155 | HMN | 470 |
| IERROR=-5. | HMN | 475 |
| RETURN | HMN | 480 |
| 155 CONTINUE | HMN | 485 |
| C*****TANGENT PATH INTERSECTS EARTH | HMN | 490 |
| H2 = 0.0 | HMN | 495 |
| HMIN = 0.0 | HMN | 500 |
| LEN = 0 | HMN | 505 |
| CH2 = CMIN | HMN | 510 |
| IF(1SSGEO.NE.1)WRITE(IPR,22) H1,ANGLE | HMN | 515 |
| 22 FORMAT(///,' TANGENT PATH WITH H1 = ',F10.3,' AND ANGLE = ', | HMN | 520 |
| 1 F10.3,' INTERSECTS THE EARTH',//,10X,'H2 HAS BEEN RESET ', | HMN | 525 |
| 2 'TO 0.0 AND LEN TO 0') | HMN | 530 |
| 160 CONTINUE | HMN | 535 |
| C*****CALCULATE THE ZENITH ANGLE PHI AT H2 | HMN | 540 |
| PHI = ASIN(CPATH/CH2)*DEG | HMN | 545 |
| IF(ANGLE.LE.90.0 .OR. LEN.EQ.1) PHI = 180.0-PHI | HMN | 550 |
| RETURN | HMN | 555 |
| C*****H2 LT TANGENT HEIGHT FOR THIS H1 AND ANGLE | HMN | 560 |
| 200 CONTINUE | HMN | 565 |
| WRITE(IPR,20) | HMN | 570 |
| 20 FORMAT('H2 IS LESS THAN THE TANGENT HEIGHT FOR THIS PATH ', | HMN | 575 |
| 1 'AND CANNOT BE REACHED') | HMN | 580 |
| IERROR = 2 | HMN | 585 |
| RETURN | HMN | 590 |
| 210 CONTINUE | HMN | 595 |
| DC = CPATH-CT3 | HMN | 600 |
| WRITE(IPR,24) H,CPATH,CT3,DC,HT3 | HMN | 605 |
| 24 FORMAT(///,'OPROM SUBROUTINE FROMMN 1',//, | HMN | 610 |
| 1 10X,'THE PROCEEDURE TO FIND THE TANGENT HEIGHT DID NOT ', | HMN | 615 |
| 2 'CONVERG AFTER ',I3,' ITERATIONS',//, | HMN | 620 |
| 3 10X,'CPATH = ',F12.5,' KM',//,10X,'CT3 = ',F12.5,' KM', | HMN | 625 |
| 4 //,10X,'DC = ',F12.5,' KM',//, | HMN | 630 |
| 5 10X,'HT3 = ',F12.5,' KM') | HMN | 635 |
| STOP 20 | HMN | 640 |
| END | HMN | 645 |

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SUBROUTINE FINDSH(H,SH,GAMMA)                                SH 100
C*****GIVEN AN ALTITUDE H, THIS SUBROUTINE FINDS THE LAYER BOUNDARIES SH 105
C*****ZM(I1) AND ZM(I2) WHICH CONTAIN H, THEN CALCULATES THE SCALE SH 110
C*****HEIGHT (SH) AND THE VALUE AT THE GROUND (GAMMA+1) FOR THE SH 115
C*****INDEX OF REFRACTION SH 120
COMMON /PARMTR/ RE,DELTAS,ZMAX,IMAX,IMOD,IBMAX,IPATH SH 125
COMMON /CNSTNS/ PI,CA,DEG,GCAIR,BIGNUM,BIGEXP SH 130
COMMON /MDEL/ Z(34),P(34),T(34),RFNDX(34),DENSTY(16,34) SH 135
DO 100 IM=2,IMOD SH 140
I2 = IM SH 145
IF(Z(IM).GE.H) GO TO 110 SH 150
100 CONTINUE SH 155
I2 = IMOD SH 160
110 CONTINUE SH 165
I1 = I2-1 SH 170
CALL SCALHT(Z(I1),Z(I2),RFNDX(I1),RFNDX(I2),SH,GAMMA) SH 175
RETURN SH 180
END SH 185

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SUBROUTINE SCALHT(Z1,Z2,RFNDX1,RFNDX2,SH,GAMMA)            SCL 100
C*****SCL 105
C THIS SUBROUTINE CALCULATES THE SCALE HEIGHT SH OF THE (INDEX OF SCL 110
C REFRACTION-1.0) FROM THE VALUES OF THE INDEX AT THE ALTITUDES Z1 SCL 115
C AND Z2 ( Z1 < Z2). IT ALSO CALCULATES THE EXTRAPOLATED VALUE SCL 120
C GAMMA OF THE (INDEX-1.0) AT Z = 0.0 SCL 125
C*****SCL 130
RF1 = RFNDX1+1.0E-20 SCL 135
RF2 = RFNDX2+1.0E-20 SCL 140
RATIO = RF1/RF2 SCL 145
IF(ABS(RATIO-1.0).LT.1.0E-05) GO TO 100 SCL 150
SH = (Z2-Z1)/ALOG(RATIO) SCL 155
GAMMA = RF1*(RF2/RF1)**(-Z1/(Z2-Z1)) SCL 160
GO TO 110 SCL 165
100 CONTINUE SCL 170
C*****THE VARIATION IN THE INDEX OF REFRACTION WITH HEIGHT IS SCL 175
C*****INSIGNIFICANT OR ZERO SCL 180
SH = 0.0 SCL 185
GAMMA = RFNDX1 SCL 190
110 CONTINUE SCL 195
RETURN SCL 200
END SCL 205

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FUNCTION ANDEX(H,SH,GAMMA)                                  NDX 100
C*****NDX 105
C COMPUTES THE INDEX OF REFRACTION AT HEIGHT H, SH IS THE NDX 110
C SCALE HEIGHT, GAMMA IS THE VALUE AT H=0 OF THE REFRACTIVITY = NDX 115
C INDEX-1 NDX 120
C*****NDX 125
IF(SH.EQ.0.0) GO TO 10 NDX 130
ANDEX = 1.0+GAMMA*EXP(-H/SH) NDX 135
RETURN NDX 140
10 ANDEX = 1.0+GAMMA NDX 145
RETURN NDX 150
END NDX 155

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FUNCTION RADREF(H,SH,GAMMA)                                 REF 100
C*****REF 105
C COMPUTES THE RADIUS OF CURVATURE OF THE REFRACTED RAY FOR REF 110
C HORIZONTAL PATH: RADREF = ANDEX/D(ANDEX)/D(RADIUS) REF 115
C*****REF 120
COMMON /CNSTNS/ PI,CA,DEG,GCAIR,BIGNUM,BIGEXP REF 125
IF(SH.EQ.0.0) GO TO 20 REF 130
RADREF = SH*(1.0+EXP(H/SH)/GAMMA) REF 135
RETURN REF 140
20 RADREF = BIGNUM REF 145
RETURN REF 150
END REF 155

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SUBROUTINE RFPATH(H1,H2,ANGLE,PHI,LEN,HMIN,IAMT,BETA,RANGE,BENDNG) PTH 100
C***** PTH 105
C THIS SUBROUTINE TRACES THE REFRACTED RAY FROM H1 WITH A PTH 110
C INITIAL ZENITH ANGLE ANGLE TO H2 WHERE THE ZENITH ANGLE IS PHI, PTH 115
C AND CALCULATES THE ABSORBER AMOUNTS (IF IAMT.EQ.1) ALONG PTH 120
C THE PATH. IT STARTS FROM THE LOWEST POINT ALONG THE PATH PTH 125
C (THE TANGENT HEIGHT HMIN IF LEN = 1 OR HA = MIN(H1,H2) IF LEN = 0) PTH 130
C AND PROCEEDS TO THE HIGHEST POINT. BETA AND RANGE ARE THE PTH 135
C EARTH CENTERED ANGLE AND THE TOTAL DISTANCE RESPECTIVELY PTH 140
C FOR THE REFRACTED RAY FROM H1 TO H2 PTH 145
C***** PTH 150
COMMON /FIL/ IRD,IPR,IPU,NPR PTH 155
COMMON /PARMTR/ RE,DELTAS,ZMAX,IMAX,IMOD,IBMAX,IPATH PTH 160
COMMON /CNSTNS/ FI,CA,DEG,GCAIR,BIGNUM,BIGEXP PTH 165
COMMON /RFRPTH/ ZP(35),PP(35),TP(35),RFNDXP(35),SP(35), PTH 170
1 PPSUM(35),TPSUM(35),RHOPSM(35),DENP(16,35),AMTP(16,35) PTH 175
COMMON /SOLS/ AH1(68),ARH(68), PTH 180
X WPATHS(68,16),PA(68),PR(68),ATHETA(35),ADBETA(35),LJ(69),JTURN, PTH 185
X ANGSUN PTH 190
COMMON /CNTRL/ KMAX,M,IKMAX,NL,ML,IKLO,ISSGED PTH 195
DIMENSION HLOW(2) PTH 200
C0 CHARACTER*2 HLOW PTH 205
DATA HLOW/2HH1,2HH2/ PTH 210
IF(H1.GT.H2) GO TO 90 PTH 215
IORDER = 1 PTH 220
HA = H1 PTH 225
HB = H2 PTH 230
ANGLEA = ANGLE PTH 235
GO TO 95 PTH 240
90 CONTINUE PTH 245
IORDER = -1 PTH 250
HA = H2 PTH 255
HB = H1 PTH 260
ANGLEA = PHI PTH 265
95 CONTINUE PTH 270
JNEXT = 1 PTH 275
IF(IAMT.EQ.1 .AND. NPR.NE.1) WRITE(IPR,20) PTH 280
20 FORMAT('1CALCULATION OF THE REFRACTED PATH THROUGH THE ', PTH 285
1 'ATMOSPHERE',///, PTH 290
4 T3,'I',T11,'ALTITUDE',T27,'THETA',T34,'ORANGE',T44,'RANGE', PTH 295
5 T53,'DBETA',T63,'BETA',T72,'PHI',T80,'OBEND',T87,'BENDING', PTH 300
6 T 98,'RBAR',T106,'RBAR',T113,'RHOBAR',/, PTH 305
7 T02,'FROM',T18,'TO',/,T07,'(KM)',T17,'(KM)',T27,'(DEG)', PTH 310
8 T38,'(KM)',T45,'(KM)',T53,'(DEG)',T62,'(DEG)',T71,'(DEG)', PTH 315
9 T80,'(DEG)',T89,'(DEG)',T98,'(MB)',T106,'(K)', PTH 320
1 T111,'(GM CM-3)',/) PTH 325
IF(LEN.EQ.0) GO TO 100 PTH 330
C*****LONG PATH: FILL IN THE SYMMETRIC PART FROM THE TANGENT HEIGHT PTH 335
C*****TO HA PTH 340
CALL FILL(HMIN,HA,JNEXT) PTH 345
JNA = JNEXT PTH 350
100 CONTINUE PTH 355
C*****FILL IN THE REMAINING PATH FROM HA TO HB PTH 360
IF(HA.EQ.HB) GO TO 110 PTH 365
CALL FILL(HA,HB,JNEXT) PTH 370
110 CONTINUE PTH 375
JMAX = JNEXT PTH 380
IPATH = JMAX PTH 385
C*****INTEGRATE EACH SEGMENT OF THE PATH PTH 390

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| | |
|--|---------|
| C*****CALCULATE CPATH SEPERATELY FOR LEN = 0,1 | PTH 395 |
| IF(LEN.EQ.1) GO TO 115 | PTH 400 |
| CALL FINDSH(HA,SH,GAMMA) | PTH 405 |
| CPATH = (RE+HA)*ANDEX(HA,SH,GAMMA)*SIN(ANGLEA/DEG) | PTH 410 |
| GO TO 116 | PTH 415 |
| 115 CONTINUE | PTH 420 |
| CALL FINDSH(HMIN,SH,GAMMA) | PTH 425 |
| CPATH = (RE+HMIN)*ANDEX(HMIN,SH,GAMMA) | PTH 430 |
| 116 CONTINUE | PTH 435 |
| BETA = 0.0 | PTH 440 |
| S = 0.0 | PTH 445 |
| BENDNG = 0.0 | PTH 450 |
| IF(LEN.EQ.0) GO TO 140 | PTH 455 |
| C*****DO SYMETRIC PART, FROM TANGENT HEIGHT(HMIN) TO HA | PTH 460 |
| IHLW = 1 | PTH 465 |
| IF(IORDER.EQ.-1) IHLW = 2 | PTH 470 |
| IF(IAMT.EQ.1 .AND. NPR.NE.1) WRITE(IPR,24) HLOW(IHLW) | PTH 475 |
| 24 FORMAT(' ',T7,'TANGENT',T17,A2,/,T7,'HEIGHT',/) | PTH 480 |
| SINAI = 1.0 | PTH 485 |
| COSAI = 0.0 | PTH 490 |
| THETA = 90.0 | PTH 495 |
| J2 = JHA-1 | PTH 500 |
| OO 120 J=1,J2 | PTH 505 |
| CALL SCALHT(ZP(J),ZP(J+1),RFNDXP(J),RFNDXP(J+1),SH,GAMMA) | PTH 510 |
| CALL LAYER(J,SINAI,COSAI,CPATH,SH,GAMMA,IAMT,DS,DBEND) | PTH 515 |
| DBEND = DBEND*DEG | PTH 520 |
| PHI = ASIN(SINAI)*DEG | PTH 525 |
| OBETA = THETA-PHI+DBEND | PTH 530 |
| PHI = 180.0-PHI | PTH 535 |
| S = S+DS | PTH 540 |
| BENDNG = BENDNG+DBEND | PTH 545 |
| BETA = BETA+OBETA | PTH 550 |
| IF(IAMT.NE.1) GO TO 118 | PTH 555 |
| PBAR = PPSUM(J)/RHOPSM(J) | PTH 560 |
| TBAR = TPSUM(J)/RHOPSM(J) | PTH 565 |
| RHOBAR = RHOPSM(J)/DS | PTH 570 |
| IF(IAMT.EQ.1 .AND. NPR.NE.1) WRITE(IPR,22) J,ZP(J),ZP(J+1), | PTH 575 |
| 1 THETA,DS,S,OBETA,BETA,PHI,DBEND,BENDNG,PBAR,TBAR,RHOBAR | PTH 580 |
| 22 FORMAT(' ',I2,2F9.3,9F9.3,F8.2,1PE9.2) | PTH 585 |
| 118 CONTINUE | PTH 590 |
| IF(ISSGEO.EQ.1) GO TO 119 | PTH 595 |
| ATHETA(J)=THETA | PTH 600 |
| AOBETA(J)=OBETA | PTH 605 |
| 119 CONTINUE | PTH 610 |
| THETA = 180.0-PHI | PTH 615 |
| 120 CONTINUE | PTH 620 |
| C*****DOUBLE PATH QUANTITIES FOR THE OTHER PART OF THE SYMETRIC PATH | PTH 625 |
| BENDNG = 2.0*BENDNG | PTH 630 |
| BETA = 2.0*BETA | PTH 635 |
| S = 2.0*S | PTH 640 |
| IF(IAMT.EQ.1 .AND. NPR.NE.1) WRITE(IPR,28) S,BETA,BENDNG | PTH 645 |
| 28 FORMAT('0',T10,'DOUBLE RANGE, BETA, BENDING',/, | PTH 650 |
| 1 T10,'FOR SYMETRIC PART OF PATH',Y40,F9.3,Y50,F9.3, | PTH 655 |
| 2 T85,F9.3,/) | PTH 660 |
| JNEXT = JHA | PTH 665 |
| GO TO 150 | PTH 670 |
| 140 CONTINUE | PTH 675 |
| C*****SHORT PATH | PTH 680 |
| JNEXT = 1 | PTH 685 |

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|--|---------|
| C*****ANGLEA IS THE ZENITH ANGLE AT HA IN DEG | PTH 690 |
| C*****SINAI IS SIN OF THE INCIDENCE ANGLE | PTH 695 |
| C*****COSAI IS CARRIED SEPERATELY TO AVOID A PRECISION PROBLEM | PTH 700 |
| C*****WHEN SINAI IS CLOSE TO 1.0 | PTH 705 |
| THETA = ANGLEA | PTH 710 |
| IF(ANGLEA.GT.45.0) GO TO 145 | PTH 715 |
| SINAI = SIN(ANGLEA/DEG) | PTH 720 |
| COSAI = -COS(ANGLEA/DEG) | PTH 725 |
| GO TO 150 | PTH 730 |
| 145 CONTINUE | PTH 735 |
| SINAI = COS((90.0-ANGLEA)/DEG) | PTH 740 |
| COSAI = -SIN((90.0-ANGLEA)/DEG) | PTH 745 |
| 150 CONTINUE | PTH 750 |
| C*****DC PATH FROM HA TO HB | PTH 755 |
| IF(HA.EQ.HB) GO TO 170 | PTH 760 |
| J1 = JNEXT | PTH 765 |
| J2 = JMAX-1 | PTH 770 |
| IHLOW = 1 | PTH 775 |
| IF(IORDER.EQ.-1) IHLOW = 2 | PTH 780 |
| IHIGH = MOD(IHLOW,2)+1 | PTH 785 |
| IF(IAMT.EQ.1 .AND. NPR.NE.1) WRITE(IPR,28) HLOW(IHLOW), | PTH 790 |
| 1 HLOW(IHIGH) | PTH 795 |
| 20 FORMAT(' ',T11,A2,' TO ',A2,') | PTH 800 |
| DO 160 J=J1,J2 | PTH 805 |
| CALL SCALHT(ZP(J),ZP(J+1),RFNDXP(J),RFNDXP(J+1),SH,GAMMA) | PTH 810 |
| CALL LAYER(J,SINAI,COSAI,CPTH,SH,GAMMA,IAMT,DS,DBEND) | PTH 815 |
| DBEND = DBEND*DEG | PTH 820 |
| PHI = ASIN(SINAI)*DEG | PTH 825 |
| DBETA = THETA-PHI+DBEND | PTH 830 |
| PHI = 180.0-PHI | PTH 835 |
| S = S+DS | PTH 840 |
| BENDNG = BENDNG+DBEND | PTH 845 |
| BETA = BETA+DBETA | PTH 850 |
| IF(IAMT.NE.1) GO TO 158 | PTH 855 |
| PBAR = PPSUM(J)/RHOPSM(J) | PTH 860 |
| TBAR = TPSUM(J)/RHOPSM(J) | PTH 865 |
| RHQBAR = RHOPSM(J)/DS | PTH 870 |
| IF(IAMT.EQ.1 .AND. NPR.NE.1) WRITE(IPR,22) J,ZP(J),ZP(J+1), | PTH 875 |
| 1 THETA,DS,S,DBETA,BETA,PHI,DBEND,BENDNG,PBAR,TBAR,RHQBAR | PTH 880 |
| 158 CONTINUE | PTH 885 |
| IF(ISSGEO.EQ.1) GO TO 159 | PTH 890 |
| ADBETA(J)=DBETA | PTH 895 |
| ATHETA(J)=THETA | PTH 900 |
| 159 CONTINUE | PTH 905 |
| THETA = 180.0-PHI | PTH 910 |
| 160 CONTINUE | PTH 915 |
| 170 CONTINUE | PTH 920 |
| IF(ISSGEO.EQ.0) ATHETA(JMAX)=THETA | PTH 925 |
| IF(IORDER.EQ.-1) PHI = ANGLEA | PTH 930 |
| RANGE = S | PTH 935 |
| RETURN | PTH 940 |
| END | PTH 945 |

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|--|---------|
| SUBROUTINE FILL(HA,HB,JNEXT) | FLL 100 |
| C***** | FLL 105 |
| C THIS SUBROUTINE DEFINES THE ATMOSPHERIC BOUNDARIES OF THE PATH | FLL 110 |
| C FROM HA TO HB AND INTERPOLATES (EXTRAPOLATES) THE DENSITIES TO | FLL 115 |
| C THESE BOUNDARIES ASSUMING THE DENSITIES VARY EXPONENTIALLY | FLL 120 |
| C WITH HEIGHT | FLL 125 |
| C***** | FLL 130 |
| COMMON /FIL/ IRD,IPR,IPU,NPR | FLL 135 |
| COMMON /MODEL/ Z(34),P(34),T(34),RFNDX(34),DENSTY(16,34) | FLL 140 |
| COMMON /PARMTR/ RE,DELTAS,ZMAX,IMAX,IMOD,IBMAX,IPATH | FLL 145 |
| COMMON /CNSTNS/ PI,CA,DEG,GCAIR,BIGNUM,BIGEXP | FLL 150 |
| COMMON /CNTRL/ KMAX,M,IKMAX,NL,ML,IKLO,ISSGEO | FLL 155 |
| COMMON /RFRPTH/ ZP(35),PP(35),TP(35),RFNDXP(35),SP(35), | FLL 160 |
| 1 PPSUM(35),TPSUM(35),RHOPSM(35),DENP(16,35),AMTP(16,35) | FLL 165 |
| IF(HA.LT.HB) GO TO 90 | FLL 170 |
| WRITE(IPR,22) HA,HB,JNEXT | FLL 175 |
| 22 FORMAT('OSUBROUTINE FILL- ERROR, HA .GE. HB',//, | FLL 180 |
| 1 10X,'HA, HB, JNEXT = ',2E25.15,16) | FLL 185 |
| STOP | FLL 190 |
| 90 CONTINUE | FLL 195 |
| C*****FIND Z(IA): THE SMALLEST Z(I).GT.HA | FLL 200 |
| DO 100 I=1,IMAX | FLL 205 |
| IF(HA.GE.Z(I)) GO TO 100 | FLL 210 |
| IA = I | FLL 215 |
| GO TO 110 | FLL 220 |
| 100 CONTINUE | FLL 225 |
| IA = IMAX+1 | FLL 230 |
| IB = IA | FLL 235 |
| GO TO 130 | FLL 240 |
| C*****FIND Z(IB): THE SMALLEST Z(I).GE.HB | FLL 245 |
| 110 CONTINUE | FLL 250 |
| DO 120 I=IA,IMAX | FLL 255 |
| IF(HB.GT.Z(I)) GO TO 120 | FLL 260 |
| IB = I | FLL 265 |
| GO TO 130 | FLL 270 |
| 120 CONTINUE | FLL 275 |
| IB = IMAX+1 | FLL 280 |
| 130 CONTINUE | FLL 285 |
| C*****INTERPOLATE DENSITIES TO HA, HB | FLL 290 |
| ZP(JNEXT) = HA | FLL 295 |
| I2 = IA | FLL 300 |
| IF(I2.EQ.1) I2 = 2 | FLL 305 |
| IF(I2.GT.IMAX) I2 = IMAX | FLL 310 |
| I1 = I2-1 | FLL 315 |
| A = (HA-Z(I1))/(Z(I2)-Z(I1)) | FLL 320 |
| CALL EXPINT(PP(JNEXT),P(I1),P(I2),A) | FLL 325 |
| TP(JNEXT) = T(I1)+(T(I2)-T(I1))*A | FLL 330 |
| CALL EXPINT(RFNDXP(JNEXT),RFNDX(I1),RFNDX(I2),A) | FLL 335 |
| DO 140 K=1,KMAX | FLL 340 |
| CALL EXPINT(DENP(K,JNEXT),DENSTY(K,I1),DENSTY(K,I2),A) | FLL 345 |
| 140 CONTINUE | FLL 350 |
| IF(IA.EQ.IB) GO TO 160 | FLL 355 |
| C*****FILL IN DENSITIES BETWEEN HA AND HB | FLL 360 |
| I1 = IA | FLL 365 |
| I2 = IB-1 | FLL 370 |
| DO 150 I=I1,I2 | FLL 375 |
| JNEXT = JNEXT+1 | FLL 380 |
| ZP(JNEXT) = Z(I) | FLL 385 |
| PP(JNEXT) = P(I) | FLL 390 |

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TP(JNEXT) = T(I)
RFNDXP(JNEXT) = RFNDX(I)
DO 150 K=1,KMAX
DENP(K,JNEXT) = DENSTY(K,I)
150 CONTINUE
160 CONTINUE
C*****INTERPOLATE THE DENSITIES TO HB
JNEXT = JNEXT+1
ZP(JNEXT) = HB
I2 = IB
IF(I2.EQ.1) I2 = 2
IF(I2.GT.IMAX) I2 = IMAX
I1 = I2-1
A = (HB-Z(I1))/(Z(I2)-Z(I1))
CALL EXPINT(PP(JNEXT),P(I1),P(I2),A)
TP(JNEXT) = T(I1)+(T(I2)-T(I1))*A
CALL EXPINT(RFNDXP(JNEXT),RFNDX(I1),RFNDX(I2),A)
DO 170 K=1,KMAX
CALL EXPINT(DENP(K,JNEXT),DENSTY(K,I1),DENSTY(K,I2),A)
170 CONTINUE
RETURN
END
FLL 395
FLL 400
FLL 405
FLL 410
FLL 415
FLL 420
FLL 425
FLL 430
FLL 435
FLL 440
FLL 445
FLL 450
FLL 455
FLL 460
FLL 465
FLL 470
FLL 475
FLL 480
FLL 485
FLL 490
FLL 495
FLL 500

SUBROUTINE LAYER(J,SINAI,COSAI,CPTH,SH,GAMMA,IAMT,S,BEND)
C*****
C THIS SUBROUTINE CALCULATES THE REFRACTED PATH FROM Z1 TO Z2
C WITH THE SIN OF THE INITIAL INCIDENCE ANGLE SINAI
C*****
COMMON /PARNTR/ RE,DELTA,ZMAX,IMAX,IMOD,IBMAX,IPATH
COMMON /CNSTNS/ PI,CA,DEG,GCAIR,BIGNUM,BIGEXP
COMMON /CNTRL/ KMAX,M,IKMAX,NL,ML,IKLO,ISSGEO
COMMON /RFRPTH/ ZP(35),PP(35),TP(35),RFNDXP(35),SP(35),
1 PPSUM(35),TPSUM(35),RHOPSM(35),DENP(16,35),AMTP(16,35)
DIMENSION HDEN(20),DENA(20),DENB(20)
DATA EPSILN/1.0E-5/
C*****INITIALIZE LOOP
N = 0
Z1 = ZP(J)
Z2 = ZP(J+1)
H1 = Z1
R1 = RE+H1
DHMIN = DELTA**2/(2.0*R1)
SINAI1 = SINAI
COSAI1 = COSAI
Y1 = COSAI1**2/2.0+COSAI1**4/8.0+COSAI1**6*3.0/48.0
Y3 = 0.0
X1 = -R1*COSAI1
RATIO1 = R1/RADREF(H1,SH,GAMMA)
DSDX1 = 1.0/(1.0-RATIO1*SINAI1**2)
DBNDX1 = DSDX1*SINAI1*RATIO1/R1
S = 0.0
BEND = 0.0
IF(IAMT.EQ.2) GO TO 110
C*****INITIALIZE THE VARIABLES FOR THE CALCULATION OF THE
C*****ABSORBER AMOUNTS
PA = PP(J)
PB = PP(J+1)
TA = TP(J)
TB = TP(J+1)
RHOA = PA/(GCAIR*TA)
RHOB = PB/(GCAIR*TB)
DZ = ZP(J+1)-ZP(J)
HP = -DZ/ALOG(PB/PA)
IF(ABS(RHOB/RHOA-1.0).LT.EPSILN) GO TO 90
HRHO = -DZ/ALOG(RHOB/RHOA)
GO TO 95
90 HRHO = 1.0E30
95 CONTINUE
DO 105 K=1,KMAX
DENA(K) = DENP(K,J)
DENB(K) = DENP(K,J+1)
IF(DENA(K).EQ.0.0.OR.DENB(K).EQ.0.0) GO TO 100
IF(ABS(1.0-DENA(K)/DENB(K)).LE.EPSILN) GO TO 100
C*****USE EXPONENTIAL INTERPOLATION
HDEN(K) = -DZ/ALOG(DENB(K)/DENA(K))
GO TO 105
C*****USE LINEAR INTERPOLATION
100 HDEN(K) = 0.0
105 CONTINUE
110 CONTINUE
C*****
C*****LOOP THROUGH PATH
LAY 100
LAY 105
LAY 110
LAY 115
LAY 120
LAY 125
LAY 130
LAY 135
LAY 140
LAY 145
LAY 150
LAY 155
LAY 160
LAY 165
LAY 170
LAY 175
LAY 180
LAY 185
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LAY 345
LAY 350
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LAY 360
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LAY 370
LAY 375
LAY 380
LAY 385
LAY 390

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| C*****INTEGRATE PATH QUANTITIES USING QUADRATIC INTEGRATION WITH | LAY 395 |
| C*****UNEQUALLY SPACED POINTS | LAY 400 |
| C***** | LAY 405 |
| 115 CONTINUE | LAY 410 |
| N = N+1 | LAY 415 |
| DH = -DELTA* $\cos\alpha_1$ | LAY 420 |
| IF(DH.LT.DHMIN) DH = DHMIN | LAY 425 |
| H3 = H1+DH | LAY 430 |
| IF(H3.GT.Z2) H3 = Z2 | LAY 435 |
| DH = H3-H1 | LAY 440 |
| R3 = RE+H3 | LAY 445 |
| H2 = H1+DH/2.0 | LAY 450 |
| R2 = RE+H2 | LAY 455 |
| SINAI2 = CPATH/(ANDEX(H2,SH,GAMMA)+R2) | LAY 460 |
| SINAI3 = CPATH/(ANDEX(H3,SH,GAMMA)+R3) | LAY 465 |
| RATIO2 = R2/RADREF(H2,SH,GAMMA) | LAY 470 |
| RATIO3 = R3/RADREF(H3,SH,GAMMA) | LAY 475 |
| IF((1.0-SINAI2).GT.EPSILN) GO TO 116 | LAY 480 |
| C*****NEAR A TANGENT HEIGHT. $\cos\alpha_1 = -\sqrt{1-SINAI2^2}$ LOSES | LAY 485 |
| C*****PRECISION. USE THE FOLLOWING ALGORITHM TO GET $\cos\alpha_1$. | LAY 490 |
| Y3 = Y1+(SINAI1*(1.0-RATIO1)/R1+4.0*SINAI2*(1.0-RATIO2)/R2+ | LAY 495 |
| 1 SINAI3*(1.0-RATIO3)/R3)=DH/6.0 | LAY 500 |
| $\cos\alpha_1 = -\sqrt{2.0*Y3-Y3^2}$ | LAY 505 |
| X3 = -R3* $\cos\alpha_1$ | LAY 510 |
| DX = X3-X1 | LAY 515 |
| W1 = 0.5*DX | LAY 520 |
| W2 = 0.0 | LAY 525 |
| W3 = 0.5*DX | LAY 530 |
| GO TO 118 | LAY 535 |
| C***** | LAY 540 |
| 116 CONTINUE | LAY 545 |
| $\cos\alpha_2 = -\sqrt{1-SINAI2^2}$ | LAY 550 |
| $\cos\alpha_3 = -\sqrt{1-SINAI3^2}$ | LAY 555 |
| X2 = -R2* $\cos\alpha_2$ | LAY 560 |
| X3 = -R3* $\cos\alpha_3$ | LAY 565 |
| C*****CALCULATE WEIGHTS | LAY 570 |
| D31 = X3-X1 | LAY 575 |
| D32 = X3-X2 | LAY 580 |
| D21 = X2-X1 | LAY 585 |
| IF(D32.EQ.0.0 .OR. D21.EQ.0.0) GO TO 117 | LAY 590 |
| W1 = (2-D32/D21)*D31/6.0 | LAY 595 |
| W2 = D31**3/(D32*D21*6.0) | LAY 600 |
| W3 = (2.0-D21/D32)*D31/6.0 | LAY 605 |
| GO TO 118 | LAY 610 |
| 117 CONTINUE | LAY 615 |
| W1 = 0.5*D31 | LAY 620 |
| W2 = 0.0 | LAY 625 |
| W3 = 0.5*D31 | LAY 630 |
| C***** | LAY 635 |
| 118 CONTINUE | LAY 640 |
| DSOX2 = 1.0/(1.0-RATIO2+SINAI2**2) | LAY 645 |
| DSOX3 = 1.0/(1.0-RATIO3+SINAI3**2) | LAY 650 |
| DBNDX2 = DSOX2*SINAI2*RATIO2/R2 | LAY 655 |
| DBNDX3 = DSOX3*SINAI3*RATIO3/R3 | LAY 660 |
| C*****INTEGRATE | LAY 665 |
| DS = W1*DSOX1+W2*DSOX2+W3*DSOX3 | LAY 670 |
| S = S+DS | LAY 675 |
| DBEND = W1*DBNDX1+W2*DBNDX2+W3*DBNDX3 | LAY 680 |
| BEND = BEND+DBEND | LAY 685 |

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| IF(IAMT.EQ.2) GO TO 150 | LAY 690 |
| C*****CALCULATE AMOUNTS | LAY 695 |
| DSDZ = DS/DH | LAY 700 |
| PB = PA*EXP(-DH/HP) | LAY 705 |
| RHOB = RHOA*EXP(-DH/HRHO) | LAY 710 |
| IF((DH/HRHO).LT.EPSILN) GO TO 120 | LAY 715 |
| PPSUM(J) = PPSUM(J)+DSDZ*(HP/(1.0+HP/HRHO))*(PA*RHOA-PB*RHOB) | LAY 720 |
| TPSUM(J) = TPSUM(J)+DSDZ*HP*(PA-PB)/GCAIR | LAY 725 |
| RHOPSM(J) = RHOPSM(J)+DSDZ*HRHO*(RHOA-RHOB) | LAY 730 |
| GO TO 125 | LAY 735 |
| 120 CONTINUE | LAY 740 |
| PPSUM(J) = PPSUM(J)+0.5*DS*(PA*RHOA+PB*RHOB) | LAY 745 |
| TPSUM(J) = TPSUM(J)+0.5*DS*(PA+PB)/GCAIR | LAY 750 |
| RHOPSM(J) = RHOPSM(J)+0.5*DS*(RHOA+RHOB) | LAY 755 |
| 125 CONTINUE | LAY 760 |
| DO 140 K=1,KMAX | LAY 765 |
| IF(ABS(HDEN(K)).EQ.0.0)GO TO 130 | LAY 770 |
| IF((DH/HDEN(K)).LT.EPSILN) GO TO 130 | LAY 775 |
| C*****EXPONENTIAL INTERPOLATION | LAY 780 |
| DENB(K) = DENP(K,J)*EXP(-(H3-Z1)/HDEN(K)) | LAY 785 |
| AMTP(K,J) = AMTP(K,J)+DSDZ*HDEN(K)*(DENA(K)-DENB(K)) | LAY 790 |
| GO TO 140 | LAY 795 |
| 130 CONTINUE | LAY 800 |
| C*****LINEAR INTERPOLATION | LAY 805 |
| DENB(K) = DENP(K,J)+(DENP(K,J+1)-DENP(K,J))*(H3-Z1)/DZ | LAY 810 |
| AMTP(K,J) = AMTP(K,J)+0.5*(DENA(K)+DENB(K))*DS | LAY 815 |
| 140 CONTINUE | LAY 820 |
| PA = PB | LAY 825 |
| RHOA = RHOB | LAY 830 |
| DO 145 K=1,KMAX | LAY 835 |
| 145 DENA(K) = DENB(K) | LAY 840 |
| 150 CONTINUE | LAY 845 |
| IF(H3.GE.Z2) GO TO 160 | LAY 850 |
| H1 = H3 | LAY 855 |
| R1 = R3 | LAY 860 |
| SINAI1 = SINAI3 | LAY 865 |
| RATIO1 = R..TIO3 | LAY 870 |
| Y1=Y3 | LAY 875 |
| COSAI1 = COSAI3 | LAY 880 |
| X1 = X3 | LAY 885 |
| DSDX1 = DSDX3 | LAY 890 |
| DBHDX1 = DBNDX3 | LAY 895 |
| GO TO 115 | LAY 900 |
| 160 CONTINUE | LAY 905 |
| SINAI = SINAI3 | LAY 910 |
| COSAI = COSAI3 | LAY 915 |
| SP(J) = S | LAY 920 |
| RETURN | LAY 925 |
| END | LAY 930 |

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SUBROUTINE TRANS(IPH,ISOURC,IDAY,ANGLEM)          TRA 100
C*****TRA 105
C CALCULATES TRANSMITTANCE AND RADIANCE VALUES BETWEEN V1 AND V2 TRA 110
C   FOR A GIVEN ATMOSPHERIC SLANT PATH            TRA 115
C   K                                             TRA 125
C   1 WATER VAPOR BANDS                          TRA 130
C   2 UNIFORMLY MIXED GASSES CO2,NO2,CO,CH4     TRA 135
C   3 INFRARED OZONE                            TRA 140
C   4 N2 CONTINUUM                              TRA 145
C   5 H2O SELF BROADENED CONTINUUM AT 296       TRA 150
C   6 MOLECULAR (RAYLIEGH) SCATTERING          TRA 155
C   7 BOUNDARY LAYER AEROSOL (0 TO 2 KM)       TRA 160
C   (TX(7) IS TOTAL AEROSOL TRANSMITTANCE)     TRA 165
C   8 ULTRAVIOLET OZONE                         TRA 170
C   9 H2O SELF CONTINUUM 298-260 (TX(9) TOTAL TRANS) TRA 175
C   10 H2O FOREIGN CONTINUUM                   TRA 180
C   (TX(10) IS AEROSOL ABSORPTION)            TRA 185
C   11 HNO3 (NITRIC ACID)                     TRA 190
C   12 TROPOSPHERIC AEROSOL (2-10 KM)         TRA 195
C   13 STRATOSPHERIC AEROSOL (10-30)         TRA 200
C   14 UPPER STRATOPHERIC (ABOVE 30KM)        TRA 205
C   15 AEROSOL WEIGHTED RELATIVE HUMIDITY (0 TO 2 KM) TRA 210
C   16 CIRRRUS CLOUDS                         TRA 215
C*****TRA 220
COMMON /IFIL/IRD,IPR,IPU,NPR                   TRA 225
COMMON /CARD1/ MODEL,ITYPE,IENSCT,M1,M2,M3,IM,NOPRNT,TBOUND,SALB TRA 230
COMMON /CARD2/ IHAZE,ISEASN,IVULCN,ICSTL,ICIR,IVSA,VIS,WSS,WHW, TRA 235
1 RAINRT                                       TRA 240
COMMON /CARD3/ H1,H2,ANGLE,RANGE,BETA,RE,LEN   TRA 245
COMMON /CARD4/ V1,V2,DV                       TRA 250
COMMON /CNSTNS/ PI,CA,DEG,GCAIR,BIGNUM,BIGEXP TRA 255
COMMON /CNTRL/ KMAX,M,IKMAX,NL,ML,IKLO,ISSGEO TRA 260
COMMON RELHUM(34),HSTOR(34),ICH(4),VH(16),TX(16),W(16) TRA 265
COMMON WPATH(68,16),TBBY(68)                 TRA 270
COMMON ABSC(4,40),EXTC(4,40),VX2(40)        TRA 275
COMMON /AER/ XX1,XX2,XX3,XX4,YY1,YY2,YY3,YY4 TRA 280
COMMON /SOLS/ AH1(68),ARH(68),              TRA 285
X WPATHS(68,16),PA(68),PR(68),ATHETA(35),ADBETA(35),LJ(89),JTURN,TRA 290
X ANGSUN                                       TRA 295
COMMON /SRAD/ TEB1,TEB2,TASP1,TASP2,TMSP1,TMSP2,TEB2SV TRA 300
COMMON /ICLL/ ICALL,PPHS,FALB,FORBIT        TRA 301
DIMENSION ABB(16)                            TRA 305
DATA CF1/3.159E-28/,CF2/2.75E-04/          TRA 310
RADMIN=1.0E+30                               TRA 315
RADMAX=0.                                     TRA 320
TWOPI=PI*2.                                  TRA 325
EMISS=1.-SALB                                TRA 330
VRMIN=0.                                     TRA 335
VRMAX=0.                                     TRA 340
SUMA=0.                                       TRA 345
SUMS =-99.                                   TRA 350
SUMSSR=-99.                                  TRA 355
RFLS =-99.                                   TRA 360
RFLSOL=-99.                                  TRA 365
RADSUM=0.                                    TRA 370
STSOL = 0.0                                  TRA 375
SSOL = 0.0                                   TRA 380
FACTOR=0.5                                   TRA 385
IV1=V1/B.                                    TRA 390

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|---|----------|
| IV2=V2/5.+0.99 | TRA 395 |
| IV1=IV1*5 | TRA 400 |
| IV2=IV2*5 | TRA 405 |
| IF (IV1.LT.350) IV1=350 | TRA 410 |
| IF (IV2.GT.50000) IV2=50000 | TRA 415 |
| IF (DV.LT.5) DV=5 | TRA 420 |
| IDV=DV | TRA 425 |
| IV=IV1-IDV | TRA 430 |
| IKLO=1 | TRA 435 |
| ICOUNT=0 | TRA 440 |
| ICALL = 0 | TRA *441 |
| IEMISS = 0 | TRA 445 |
| ISCTTR = 0 | TRA 450 |
| IF(IEMSCCT.EQ.1 .OR. IEMSCCT.EQ.2) IEMISS = 1 | TRA 455 |
| IF(IEMSCCT.EQ.2) ISCTTR = 1 | TRA 460 |
| TRAIN=1. | TRA 465 |
| IF(RAINRT.NE.0) TRAIN=TNRAIN(RAINRT) | TRA 470 |
| TCRRIS = EXP(-WPATH(IKMAX,16)*2.) | TRA 475 |
| WRITE(IPU,234) TRAIN,TCRRIS | TRA 480 |
| 234 FORMAT(2F8.4) | TRA 485 |
| IF (IEMISS.EQ.0) IKMAX=IKLO | TRA 490 |
| C*****BEGINING OF FREQUENCY LOOP | TRA 500 |
| C | TRA 505 |
| 5 IV=IV+IDV | TRA 510 |
| ITZERO=0 | TRA 515 |
| IPATH=1 | TRA 520 |
| SUMV=0. | TRA 525 |
| TLQD=1. | TRA 530 |
| TSOLD=1. | TRA 535 |
| IF (ICOUNT.EQ.0) GO TO 15 | TRA 540 |
| IF (ICOUNT.EQ.50) GO TO 15 | TRA 545 |
| GO TO 20 | TRA 550 |
| 15 ICOUNT=0 | TRA 555 |
| IF(IEMSCCT.EQ.0) WRITE(IPR,900) | TRA 560 |
| IF(IEMSCCT.EQ.1) WRITE(IPR,910) | TRA 565 |
| IF(IEMSCCT.EQ.2) WRITE(IPR,920) | TRA 570 |
| IF(IEMSCCT.EQ.3) WRITE(IPR,930) | TRA 575 |
| 20 DO 25 K=1,KMAX | TRA 580 |
| TX(K)=0.0 | TRA 585 |
| IF (K.LT.4) TX(K)=1.0 | TRA 590 |
| 25 CONTINUE | TRA 595 |
| ICOUNT=ICOUNT+1 | TRA 600 |
| SUM=0.0 | TRA 605 |
| V=IV | TRA 610 |
| C***** WATER BAND ABSORPTION | TRA 615 |
| CALL C1DTA (ABB(1),V) | TRA 620 |
| C***** UNIFORMLY MIXED GASES | TRA 625 |
| CALL C2DTA (ABB(2),V) | TRA 630 |
| C***** OZONE | TRA 635 |
| CALL C3DTA (ABB(3),V) | TRA 640 |
| C***** N2 CONTINUUM | TRA 645 |
| C | TRA 650 |
| CALL C4DTA(ABB(4),V) | TRA 655 |
| C | TRA 660 |
| C***** WATER CONTINUUM | TRA 665 |
| CALL SLP296(V,SH2OT0) | TRA 670 |
| CALL SLP280(V,SH2OT1) | TRA 675 |
| CALL FRN296(V,FM20) | TRA 680 |
| TO=296. | TRA 685 |

| | |
|---|---------|
| T1=260. | TRA 690 |
| C*****PROTECT AGAINST EXPONENTIAL UNDERFLOW AT HIGH FREQUENCY | TRA 695 |
| IF(V/(T1*0.6952).GT.BIGEXP) GO TO 105 | TRA 700 |
| XD=EXP(-V/(T0*0.6952)) | TRA 705 |
| RADFNO=V*(1.-XD)/(1.+XD) | TRA 710 |
| XD=EXP(-V/(T1*0.6952)) | TRA 715 |
| RADFN1=V*(1.-XD)/(1.+XD) | TRA 720 |
| FDG=(CF1*EXP(-CF2*V)) | TRA 725 |
| GO TO 108 | TRA 730 |
| 105 CONTINUE | TRA 735 |
| RADFNO = V | TRA 740 |
| RADFN1 = V | TRA 745 |
| FDG = 0.0 | TRA 750 |
| 108 CONTINUE | TRA 755 |
| ABB(5)=SH2OT0+RADFNO | TRA 760 |
| CALL C6DTA(ABB(6),V) | TRA 765 |
| ABB(7)=0. | TRA 770 |
| CALL C8DTA(ABB(8),V) | TRA 775 |
| ABB(9)=(SH2OT1+RADFN1)-(SH2OT0+RADFNO) | TRA 780 |
| ABB(10)=(FH20+FDG)+RADFNO | TRA 785 |
| C*****HNO3 ABSORPTION CALCULATION | TRA 790 |
| CALL HNO3 (V,ABB(11)) | TRA 795 |
| CALL AERE3 (V) | TRA 800 |
| TEB1 =-99. | TRA 805 |
| TEB25V=-99. | TRA 810 |
| C***** | TRA 815 |
| C*****BEGINNING OF LAYER LOOP | TRA 820 |
| DO 210 IK=IKLO,IKMAX | TRA 825 |
| IF (IEMISS.EQ.0) GO TO 120 | TRA 830 |
| IF(ISCCTR.EQ.0) GO TO 116 | TRA 835 |
| 111 CONTINUE | TRA 840 |
| C*****LOAD APPROPRIATE ABSORBER AMOUNTS INTO W(K) | TRA 845 |
| IF(IPATH-2) 112,114,116 | TRA 850 |
| 112 CONTINUE | TRA 855 |
| C*****LOAD W(K) WITH WPATHS(1,K) TO OBTAIN THE FIRST | TRA 860 |
| C*****SUN PATH TRANSMITTANCE | TRA 865 |
| DO 113 K=1,KMAX | TRA 870 |
| 113 W(K)=WPATHS(1,K) | TRA 875 |
| IF(W(1).GE.0.0) GO TO 120 | TRA 880 |
| TX(6)=0.0 | TRA 885 |
| TX(7)=0.0 | TRA 890 |
| TX(9)=0.0 | TRA 895 |
| TX(10)=0.0 | TRA 900 |
| GO TO 208 | TRA 905 |
| 114 CONTINUE | TRA 910 |
| C*****LOAD W(K) WITH WPATH(1K,K)+WPATHS(1K+1,K) | TRA 915 |
| C*****TO OBTAIN L PATH TRANSMITTANCES | TRA 920 |
| IKP1=IK+1 | TRA 925 |
| DO 115 K=1,KMAX | TRA 930 |
| 115 W(K)=WPATH(1K,K)+WPATHS(1KP1,K) | TRA 935 |
| IF(WPATHS(1KP1,1).GE.0.0) GO TO 120 | TRA 940 |
| TX(6)=0.0 | TRA 945 |
| TX(7)=0.0 | TRA 950 |
| TX(9)=0.0 | TRA 955 |
| TX(10)=0.0 | TRA 960 |
| GO TO 208 | TRA 965 |
| 116 CONTINUE | TRA 970 |
| C*****LOAD W(K) WITH WPATH(1K,K) TO OBTAIN THE OPTICAL | TRA 975 |
| C*****PATH TRANSMITTANCES | TRA 980 |

| | | |
|-------|---|----------|
| 117 | DO 117 K=1, KMAX | TRA 985 |
| | W(K)=WPATH(IK,K) | TRA 990 |
| 120 | CONTINUE | TRA 995 |
| | SUM=0. | TRA 1000 |
| | DO 125 JK=4,11 | TRA 1005 |
| | X(JK)=ABB(JK)*W(JK) | TRA 1010 |
| 125 | : IM=SUM+TX(JK) | TRA 1015 |
| | L(5)=TX(5)+TX(10)+TX(9) | TRA 1020 |
| | TX(1)=TRANFN(W(1),ABB(1),1) | TRA 1025 |
| | TX(2)=TRANFN(W(2),ABB(2),1) | TRA 1030 |
| | TX(3)=TRANFN(W(3),ABB(3),2) | TRA 1035 |
| | TX(10)=YY1*W(7)+YY2*W(12)+YY3*W(13)+YY4*W(14) | TRA 1040 |
| | TX(7)=XX1*W(7)+XX2*W(12)+XX3*W(13)+XX4*W(14) | TRA 1045 |
| | SUM=SUM+TX(7) | TRA 1050 |
| | TX(16)=W(16)*2. | TRA 1055 |
| | SUM=SUM+TX(16) | TRA 1060 |
| | TX(9)=SUM | TRA 1065 |
| | DO 205 K=4, KMAX | TRA 1070 |
| | IF (TX(K).GT.BIGEXP) GO TO 200 | TRA 1075 |
| | TX(K)=EXP(-TX(K)) | TRA 1080 |
| | GO TO 205 | TRA 1085 |
| 200 | TX(K)=1.0/BIGNUM | TRA 1090 |
| 205 | CONTINUE | TRA 1095 |
| | TX(9)=TX(1)*TX(2)*TX(3)*TX(9)*TRAIN | TRA 1100 |
| | IF (ISCTTR.EQ.0) GO TO 209 | TRA 1105 |
| 206 | CALL SSRAD(IPH,IK,ITZERO,IPATH,V,SUMSSR) | TRA 1110 |
| | IF (IPATH.EQ.3) GO TO 208 | TRA 1115 |
| | IPATH=IPATH+1 | TRA 1120 |
| | GO TO 111 | TRA 1125 |
| 208 | IPATH=2 | TRA 1130 |
| 209 | IF (IV.GE.13000) TX(3)=TX(6) | TRA 1135 |
| | ALAM=1.0E+04/V | TRA 1140 |
| | IF (IEMSC.TEQ.0 .OR. IEMSC.TEQ.3) GO TO 220 | TRA 1145 |
| | BBIK=BBFN(TBDY(IK),V) | TRA 1150 |
| | TLNEW=(TX(9)+TX(10))/(TX(7)+TX(6)) | TRA 1155 |
| | TSNEW=(TX(7)+TX(6))/TX(10) | TRA 1160 |
| | DTAU=TLOLD-TLNEW | TRA 1165 |
| | IF (DTAU.LT.1.0E-5.AND.TLNEW.LT.1.0E-5) GO TO 220 | TRA 1170 |
| | IF (DTAU.LE.0.) DTAU=0. | TRA 1175 |
| | SUMV=SUMV+0.5*BBIK*DTAU*(TSOLD+TSNEW) | TRA 1180 |
| | TLOLD=TLNEW | TRA 1185 |
| | TSOLD=TSNEW | TRA 1190 |
| 210 | CONTINUE | TRA 1195 |
| 220 | CONTINUE. | TRA 1200 |
| C**** | END OF LAYER LOOP | TRA 1205 |
| | IF (IV.GT.IV1) FACTOR=1.0 | TRA 1210 |
| | IF (IV.GE.IV2) FACTOR=0.5 | TRA 1215 |
| | SUMA=SUMA+FACTOR*DV*(1.0-TX(9)) | TRA 1220 |
| | GO TO (300,400,400,600) (IEMSC+1) | TRA 1225 |
| 300 | CONTINUE | TRA 1230 |
| C**** | TRANSMITTANCE ONLY | TRA 1235 |
| | TX(10)=1.-TX(10) | TRA 1240 |
| | WRITE(IPR,908) V,ALAM,TX(9),(TX(K),K=1,7),TX(11),TX(10),SUMA | TRA 1245 |
| | WRITE(IPU,907) V,ALAM,TX(9),(TX(K),K=1,7),TX(11),TX(10),SUMA | TRA 1250 |
| | GO TO 700 | TRA 1255 |
| 400 | CONTINUE | TRA 1260 |
| C**** | ATMOSPHERIC RADIANCE ONLY | TRA 1265 |
| C**** | INCLUDE EMISSION OF BOUNDARY ATTENUATED BY TOTAL TRANSMISSION | TRA 1270 |
| | IF (TBOUND.LE.0.0) GO TO 405 | TRA 1275 |

| | |
|---|----------|
| BBG=BBFN(TBOUND,V)*TX(9)*EMISS | TRA 1280 |
| SUMV = SUMV + BBG | TRA 1285 |
| 405 SUMVV=SUMV | TRA 1290 |
| SUMV=(1.0E+04/V**2)*SUMV | TRA 1295 |
| IF(IEMSC.T.EQ.2) GO TO 500 | TRA 1300 |
| RADSUM=RADSUM+DV*FACTGR*SUMV | TRA 1305 |
| WRITE(IPR,91E) V,ALAM,SUMV,SUMVV,RADSUM,TX(9) | TRA 1310 |
| WRITE(IPU,917) V,ALAM,SUMV,SUMVV,RADSUM,TX(9) | TRA 1315 |
| SUMT=SUMV | TRA 1320 |
| SUMTT=SUMVV | TRA 1325 |
| GO TO 700 | TRA 1330 |
| 500 CONTINUE | TRA 1335 |
| C*****SOLAR SCATTERED RADIANCE | TRA 1340 |
| C*****MULTIPLY SUMSSR BY THE EXTRATERRESTRIAL SOURCE STRENGTH SS | TRA 1345 |
| CALL SOURCE(V,ISOURC,"DAY,ANGLEM,SS) | TRA 1350 |
| SUMSSR=SUMSSR*SS | TRA 1355 |
| C*****SUMSSR IS THE SCATTERED RADIANCE IN (W/CM2-STER-MICROMETER) | TRA 1360 |
| SUMS=(1.0E4/V**2)*SUMSSR | TRA 1365 |
| C*****RFLSOL IS GROUND-REFLECTED DIRECT SOURCE RADIANCE | TRA 1370 |
| RFLSOL=0. | TRA 1375 |
| RFLS=0. | TRA 1380 |
| IF(H2.GT.0.) GO TO 510 | TRA 1385 |
| IF(TEB1.LE.0.) GO TO 510 | TRA 1390 |
| IF(ANGSUN.GE.0.) RFLFAC=SALB*COS(ANGSUN+CA)/TWOPI | TRA 1395 |
| RFLSOL=RFLFAC*TEB1*SS | TRA 1400 |
| RFLS = 1.0E4/V**2*RFLSOL | TRA 1405 |
| 510 CONTINUE | TRA 1410 |
| SUMT=SUMV+SUMS+RFLS | TRA 1415 |
| SUMTT=SUMVV+SUMSSR+RFLSOL | TRA 1420 |
| RADSUM=RADSUM+DV*FACTOR*SUMT | TRA 1425 |
| WRITE(IPR,926) V,ALAM,SUMV,SUMVV,SUMS,SUMSSR,RFLS,RFLSOL, | TRA 1430 |
| X .SUMT,SUMTT,RADSUM,TX(9) | TRA 1435 |
| WRITE(IPU,927) V,ALAM,SUMV,SUMVV,SUMS,SUMSSR,RFLS,RFLSOL, | TRA 1440 |
| X .SUMT,SUMTT,RADSUM,TX(9),TEB1,T682SV | TRA 1445 |
| GO TO 700 | TRA 1450 |
| 600 CONTINUE | TRA 1455 |
| C*****DIRECTLY TRANSMITTED SOLAR IRRADIANCE | TRA 1460 |
| C*****SOLIL IS SOLAR IRRADIANCE IN WATTS/(CM2 MICROMETER) | TRA 1465 |
| CALL SOURCE(V,O.IDAY,O.O.SOLIL) | TRA 1470 |
| SOLIV = SOLIL*1.0E+4/V**2 | TRA 1475 |
| TSOLIV = SOLIV*TX(9) | TRA 1480 |
| TSOLIL = SOLIL*TX(9) | TRA 1485 |
| STSOL = TSOLIV+TSOLIV*DV*FACTOR | TRA 1490 |
| SSOL = SSOL+SOLIV*DV*FACTOR | TRA 1495 |
| WRITE(IPR,936) V,ALAM,TSOLIV,TSOLIL,SOLIV,SOLIL,STSOL,SSOL,TX(9) | TRA 1500 |
| WRITE(IPU,937) V,ALAM,TSOLIV,TSOLIL,SOLIV,SOLIL,STSOL,SSOL,TX(9) | TRA 1505 |
| SUMT = TSOLIV | TRA 1510 |
| RADSUM = STSOL | TRA 1515 |
| C***** | TRA 1520 |
| 700 CONTINUE | TRA 1525 |
| IF(IEMSC.T.EQ.0) GO TO 710 | TRA 1530 |
| IF(SUMT.GE.RADMAX) VRMAX = V | TRA 1535 |
| IF(SUMT.GE.RADMAX) RADMAX = SUMT | TRA 1540 |
| IF(SUMT.LE.RADMIN) VRMIN = V | TRA 1545 |
| IF(SUMT.LE.RADMIN) RADMIN = SUMT | TRA 1550 |
| 710 CONTINUE | TRA 1555 |
| IF (IV.LT.IV2) GO TO 5 | TRA 1560 |
| C*****END OF FREQUENCY LOOP | TRA 1565 |
| IF(ICIR.NE.0) WRITE(IPR,720) TX(16) | TRA 1570 |

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IF(RAINRT.GT.0.0) WRITE(IPR,730) TRAIN
AB=1.0-SUMA/FLOAT(IV-IV1)
WRITE(IPR,740) IV1,IV,SUMA,AB
IF(IEMSCT.EQ.0) GO TO 770
WRITE(IPR,750) RADSUM,RADMIN,VRMIN,RADMAX,VRMAX
IF(IEMSCT.EQ.3) GO TO 770
WRITE(IPR,760) TBOUND,EMISS
770 CONTINUE
RETURN
C*****
C*****FORMAT STATEMENTS FOR SPECTRAL DATA
C*****PAGE HEADERS
900 FORMAT (1H1,/ 1X,32H FREQ WAVELENGTH TOTAL H2O,5X,4HCO2+,5X,
1'OZONE N2 CONT H2O CONT MOL SCAT AEROSOL MNO3 ',
+'AEROSOL INTEGRATED'
2 /2X,14H CM-1 MICRONS,9(4X,5HTRANS),4X,17H ABS
3ABSORPTION,/)
910 FORMAT (1H1,20X,28HRADIANCE(WATTS/CM2-STER-XXX),
X /, 'O FREQ',T10,'WAVLEN',T19,'ATMOS RADIANCE',T39,
X ' INTEGRAL',T049,'TOTAL',/2X,'(CM-1)',T10,'(MICRN)',T19,'(CM-1)',
X T29,'(MICRN)',T39,'(CM-1)',T49,'TRANS',/)
920 FORMAT (1H1,45X,28HRADIANCE(WATTS/CM2-STER-XXX),
X /, 'O FREQ',T11,'WAVLEN',T21,'ATMOS RADIANCE',T41,
X ' PATH SCATTERED',T61,'GROUND REFLECTED',T85,'TOTAL',T98,
X ' INTEGRAL',T110,'TOTAL',/2X,'(CM-1)',T10,'(MICRN)',T20,'(CM-1)',
X T30,'(MICRN)',T40,'(CM-1)',T50,'(MICRN)',T60,'(CM-1)',T70,
X'(MICRN)',T80,'(CM-1)',T90,'(MICRN)',T100,'(CM-1)',T110,'TRANS',/)
930 FORMAT ('1',22X,'RADIANCE (WATTS/CM2-XXXX)',/
1 ' O FREQ',T11,'WAVLEN',T21,'TRANSMITTED',T45,
2 ' SOLAR',T61,'INTEGRATED',T80,'TOTAL',/
3 2X,'(CM-1)',T10,'(MICRN)',T20,'(CM-1)',T30,'(MICRN)',
4 T40,'(CM-1)',T50,'(MICRN)',T60,'TRANS',T70,'SOLAR',
5 T80,'TRANS')
C*****SPECTRAL DATA TO UNIT=IPR (=8)
906 FORMAT(1X,F7.0,F8.3,10F9.4,F12.3)
916 FORMAT(1X,F7.0,F8.3,10F9.4,F12.3)
926 FORMAT(1X,F7.0,F8.3,10F9.4,F12.3)
936 FORMAT(1X,F7.0,F8.3,10F9.4,F12.3)
C*****SPECTRAL DATA TO UNIT=IRU (=7)
907 FORMAT(F7.0,F8.3,10F9.4,F12.3)
917 FORMAT(F7.0,F8.3,10F9.4,F12.3)
927 FORMAT(F7.0,F8.3,10F9.4,F12.3)
937 FORMAT(F7.0,F8.3,10F9.4,F12.3)
C*****SUMMARY VALUES
720 FORMAT('O TRANSMISSION DUE TO CIRRUS = ',F10.4)
730 FORMAT('O TRANSMISSION DUE TO RAIN = ',F10.4)
740 FORMAT('O INTEGRATED ABSORPTION FROM ',F10.2, ' TO ',F10.2,
1' CM-1',/, ' AVERAGE TRANSMITTANCE = ',F8.4,/)
750 FORMAT('O INTEGRATED RADIANCE = ',F10.3, ' WATTS CM-2 STER-1',/,
X ' AT ',F10.1, ' CM-1',/,
X ' MAXIMUM RADIANCE = ',F10.3, ' WATTS CM-2 STER-1 (CM-1)-1',
X ' AT ',F10.1, ' CM-1',/)
760 FORMAT(' BOUNDARY TEMPERATURE = ',F10.2, ' K',/,
X ' BOUNDARY EMISSIVITY = ',F11.3)
END
TRA 1575
TRA 1580
TRA 1585
TRA 1590
TRA 1595
TRA 1600
TRA 1605
TRA 1610
TRA 1615
TRA 1620
TRA 1625
TRA 1630
TRA 1635
TRA 1640
TRA 1645
TRA 1650
TRA 1655
TRA 1660
TRA 1665
TRA 1670
TRA 1675
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TRA 1775
TRA 1780
TRA 1785
TRA 1790
TRA 1795
TRA 1800
TRA 1805
TRA 1810
TRA 1815
TRA 1820
TRA 1825
TRA 1830
TRA 1835
TRA 1840
TRA 1845
TRA 1850

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FUNCTION BFFN(T,V)
C*****
C BLANK BODY FUNCTION IN UNITS OF WATTS/(CM2 STER MICROMETER)
C*****
COMMON /CNSTNS/ PI,CA,DEG,GCAIR,BIGNUM,BIGEXP
BFFN = 0.0
X = .43879*V/T
C*****PROTECT AGAINST EXPONENTIAL OVERLOW
IF(X.GT.BIGEXP) RETURN
BFFN = 1.190956E-16*V**5/(EXP(X)-1.0)
RETURN
END

```

```

BFN 100
BFN 105
BFN 110
BFN 115
BFN 120
BFN 125
BFN 130
BFN 135
BFN 140
BFN 145
BFN 150
BFN 155

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SUBROUTINE C1DTA (C1L,V)
C RETURNS WATER VAPOR BAND ABSORPTION COEFFICIENT AT WAVENUMBER V
COMMON /C1/C1(2580)
C1L=-5.
IF(V.LT.350.) RETURN
IF(V.GT.14520.) RETURN
IV=V
L=(IV-350)/5+1
IF(IV.GT.9195.AND.IV.LT.9875) RETURN
IF(IV.GE.9875)L=(IV-9875)/5+1771
IF(IV.GT.12795.AND.IV.LT.13400) RETURN
IF(IV.GE.13400) L=(IV-13400)/5+2356
C1L=C1(L)
RETURN
END

```

```

C1D 100
C1D 105
C1D 110
C1D 115
C1D 120
C1D 125
C1D 130
C1D 135
C1D 140
C1D 145
C1D 150
C1D 155
C1D 160
C1D 165
C1D 170

```

```

SUBROUTINE C2DTA (C2L,V)
C ** UNIFORMLY MIXED GASSES
COMMON/C2/ C2(1575)
C2L=-5.
IF(V.LT.500.) RETURN
IF(V.GE.13190.) RETURN
IV=V
L=(IV-500)/5+1
IF(IV.GT.8070.AND.IV.LE.12970) RETURN
IF(IV.GE.12950) L=(IV-12950)/5+1516
C2L=C2(L)
RETURN
END

```

```

C2D 100
C2D 105
C2D 110
C2D 115
C2D 120
C2D 125
C2D 130
C2D 135
C2D 140
C2D 145
C2D 150
C2D 155
C2D 160

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SUBROUTINE C3DTA (C3L,V)
C ** OZONE
COMMON /C3/ C3(540)
C3L=-5.
IF(V.LT.575.) RETURN
IF(V.GT.3270.) RETURN
IV=V
L=(IV-575)/5+1
C3L=C3(L)
RETURN
END

```

```

C3D 100
C3D 105
C3D 110
C3D 115
C3D 120
C3D 125
C3D 130
C3D 135
C3D 140
C3D 145
C3D 150

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| | | |
|------|--|---------|
| C ** | SUBROUTINE C4DTA (C4L,V) | C4D 100 |
| | N2 CONTINUUM | C4D 105 |
| | COMMON /C4CB/ C4(133),CB(102) | C4D 110 |
| | C4L=0. | C4D 115 |
| | IF(V.LT.2080.) RETURN | C4D 120 |
| | IF(V.GT.2740.) RETURN | C4D 125 |
| | IV=V | C4D 130 |
| | L=(IV-2080)/5+1 | C4D 135 |
| | C4L=C4(L) | C4D 140 |
| | RETURN | C4D 145 |
| | END | C4D 150 |
| | | |
| C ** | SUBROUTINE C6DTA(C6L,V) | C6D 100 |
| | MOLECULAR SCATTERING | C6D 105 |
| | C6L=0. | C6D 110 |
| | IF(V.LE.3000.) RETURN | C6D 115 |
| | C6L=V**4/(9.28799E+18-1.07123E+09*V**2) | C6D 120 |
| | RETURN | C6D 125 |
| | END | C6D 130 |
| | | |
| C ** | SUBROUTINE C8DTA (C8L,V) | C8D 100 |
| | OZONE U.V + VISIBLE | C8D 105 |
| | COMMON /C4CB/ C4(133),CB(102) | C8D 110 |
| | C8L=0. | C8D 115 |
| | IF(V.LT.13000.) RETURN | C8D 120 |
| | IF(V.GT.50000.) RETURN | C8D 125 |
| | IV=V | C8D 130 |
| | IF(IV.GT.24200.AND.IV.LT.27500) RETURN | C8D 135 |
| | XI=(V-13000.0)/200.0+1. | C8D 140 |
| | IF(IV.GE.27500) XI=(V-27500.0)/500.+57. | C8D 145 |
| | N=XI+1.00 | C8D 150 |
| | XD=XI-FLUAT(N) | C8D 155 |
| | C8L=CB(N)+XD*(CB(N)-CB(N-1)) | C8D 160 |
| | RETURN | C8D 165 |
| | END | C8D 170 |
| | | |
| C | FUNCTION TRANFNW,ABS,K) | TRF 100 |
| C | LOWTRANS EMPIRICAL FUNCTION FOR BAND MODEL TRANSMITTANCE | TRF 105 |
| C | K = 1 WATER AND UNIFORMLY MIXED | TRF 110 |
| C | K = 2 INFRARED OZONE. | TRF 115 |
| | COMMON /TRFWFO/ TR(67),FW(67),FO(67) | TRF 120 |
| | DIMENSION C(2),D(2),F(67,2) | TRF 125 |
| | EQUIVALENCE (F(1,1),FW(1)) | TRF 130 |
| | DATA C/0.007787,0.055194/,D /1.855995, 2.367863/ | TRF 135 |
| | TRANFN=1. | TRF 140 |
| | IF(W.LT.1.0E-20.OR.ABS.LE.-6.) RETURN | TRF 145 |
| | X=ALOG10(W)+ABS | TRF 150 |
| | TRANFN=0. | TRF 155 |
| | IF(X.GT. F(67,K)) RETURN | TRF 160 |
| | IF(X.LT.F(1,K)) TRANFN= 1. - C(K)*EXP(D(K)*X) | TRF 165 |
| | IF(X.LT.F(1,K)) RETURN | TRF 170 |
| | K1=2 | TRF 175 |
| | IF(X.GT.F(32,K)) K1=33 | TRF 180 |
| | DO 20 J1=K1,67 | TRF 185 |
| | J=J1 | TRF 190 |
| | IF(X.LE. F(J,K)) GO TO 40 | TRF 195 |
| 20 | CONTINUE | TRF 200 |
| 40 | TRANFN=TR(J) + (TR(J-1)-TR(J))*(F(J,K)-X)/(F(J,K)-F(J-1,K)) | TRF 205 |
| | RETURN | TRF 210 |
| | END | TRF 215 |
| | | TRF 220 |

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|---|---------------------------------------|---------|
| C | SUBROUTINE SLF296(V1C,SH2OT0) | SLF 100 |
| | LOADS SELF CONTINUUM 296K | SLF 105 |
| | COMMON /SH2O/ V1,V2,DV,NPT,S296(2001) | SLF 110 |
| | CALL SINT(V1,V1C,DV,NPT,S296,SH2OT0) | SLF 115 |
| | RETURN | SLF 120 |
| | END | SLF 125 |

| | | |
|---|---------------------------------------|---------|
| C | SUBROUTINE SLF260(V1C,SH2OT1) | F60 100 |
| | LOADS SELF CONTINUUM 260K | F60 105 |
| | COMMON /S260/ V1,V2,DV,NPT,S260(2001) | F60 110 |
| | CALL SINT(V1,V1C,DV,NPT,S260,SH2OT1) | F60 115 |
| | RETURN | F60 120 |
| | END | F60 125 |

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|---|---------------------------------------|---------|
| C | SUBROUTINE FRN296(V1C, FH2O) | FRN 100 |
| | LOADS FOREIGN CONTINUUM 296K | FRN 105 |
| | COMMON /FH2O/ V1,V2,DV,NPT,F296(2001) | FRN 110 |
| | CALL SINT(V1,V1C,DV,NPT,F296,FH2O) | FRN 115 |
| | RETURN | FRN 120 |
| | END | FRN 125 |

| | | |
|----|--|---------|
| C | SUBROUTINE SINT(V1,V1C,DV,NPT,CONTI,CONTO) | INT 100 |
| C | INTERPOLATION FOR CONTINUUM WITH LOWTRAN | INT 105 |
| C | | INT 110 |
| | DIMENSION CONTI(2001) | INT 115 |
| | CONTO=0. | INT 120 |
| | I=(V1C-V1)/DV+1.00001 | INT 125 |
| | IF(1.GE.NPT)GO TO 10 | INT 130 |
| | CONTO=CONTI(I) | INT 135 |
| | IMOD=AMOD(V1C,10.) | INT 140 |
| | IF(IMOD.GT.0) CONTO=(CONTI(I)+CONTI(I+1))/2. | INT 145 |
| 10 | CONTINUE | INT 150 |
| | RETURN | INT 155 |
| | END | INT 160 |
| | | INT 165 |

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|---|---|---------|
| | SUBROUTINE EXABIN | EXA 100 |
| C | | EXA 105 |
| C | LOADS EXTINCTION AND ABSORPTION COEFFICIENTS FOR THE FOUR | EXA 110 |
| C | AEROSOL ALTITUDE REGIONS | EXA 115 |
| | | EXA 120 |
| | COMMON /CARD1/ MODEL, ITYPE, IEMSC, M1, M2, M3, IM, NOPRNT, TBOUND, SALB | EXA 125 |
| | COMMON /CARD2/ IHAZE, ISEASN, IVULCN, ICSTL, ICIR, IVSA, VIS, WSS, WHH, | EXA 130 |
| | 1 RAINRT | EXA 135 |
| | COMMON /CARD3/ H1, H2, ANGLE, RANGE, BETA, RE, LEN | EXA 140 |
| | COMMON /CARD4/ V1, V2, DV | EXA 145 |
| C | | EXA 150 |
| | COMMON RELHUM(34), HSTOR(34), ICH(4), VH(16), TX(16), W(16) | EXA 155 |
| | COMMON WPATH(68, 16), TBBY(68) | EXA 160 |
| | COMMON ABSC(4, 40), EXTC(4, 40), VX0(40) | EXA 165 |
| | COMMON /EXTV / VX2(40), RUREXT(40, 4), RURABS(40, 4), URBEXT(40, 4), | EXA 170 |
| | 1URBABS(40, 4), OCNEXT(40, 4), OCNABS(40, 4), TROEXT(40, 4), TROABS(40, 4), | EXA 175 |
| | 2FG1EXT(40), FG1ABS(40), FG2EXT(40), FG2ABS(40) | EXA 180 |
| | 3, BSTEXT(40), BSTABS(40), AVOEXT(40), AVGABS(40), FVOEXT(40 | EXA 185 |
| | 4), FVOABS(40), DMEEXT(40), DMEABS(40) | EXA 190 |
| | DIMENSION RHZONE(4) | EXA 195 |
| | DATA RHZONE/0., 70., 80., 99./ | EXA 200 |
| | DO 5 I=1, 40 | EXA 205 |
| | 5 VX0(I)=VX2(I) | EXA 210 |
| | I1=1 | EXA 215 |
| | IF (IHAZE.EQ.7) I1=2 | EXA 220 |
| | IF (IHAZE.EQ.3) I1=2 | EXA 225 |
| | DO 85 M=I1, 4 | EXA 230 |
| | ITA=ICH(M) | EXA 235 |
| | ITC=ICH(M)-7 | EXA 240 |
| | WRH=W(15) | EXA 245 |
| | IF (ICH(M).EQ.6.AND.M.NE.1) WRH=70. | EXA 250 |
| C | THIS CODING DOES NOT ALLOW TROP RH DEPENDENT ABOVE EM(7,1) | EXA 255 |
| C | DEFAULTS TO TROPOSPHERIC AT 70. PERCENT | EXA 260 |
| | DO 10 I=2, 4 | EXA 265 |
| | IF (WRH.LT.RHZONE(I)) GO TO 15 | EXA 270 |
| | 10 CONTINUE | EXA 275 |
| | I=4 | EXA 280 |
| | 15 I1=I-1 | EXA 285 |
| | IF (WRH.GT.0.0.AND.WRH.LT.99.) X=ALOG(100.0-WRH) | EXA 290 |
| | X1=ALOG(100.0-RHZONE(I1)) | EXA 295 |
| | X2=ALOG(100.0-RHZONE(I)) | EXA 300 |
| | IF (WRH.GE.99.0) X=X2 | EXA 305 |
| | IF (WRH.LE.0.0) X=X1 | EXA 310 |
| | DO 80 N=1, 40 | EXA 315 |
| | ABSC(N, N)=0. | EXA 320 |
| | EXTC(N, N)=0. | EXA 325 |
| | IF (ITA.GT.6) GO TO 45 | EXA 330 |
| | IF (ITA.LE.0) GO TO 80 | EXA 335 |
| C | RH DEPENDENT AEROSOLS | EXA 340 |
| | GO TO (20, 20, 25, 25, 30, 35), ITA | EXA 345 |
| | 20 Y2=ALOG(RUREXT(N, I)) | EXA 350 |
| | Y1=ALOG(RUREXT(N, I1)) | EXA 355 |
| | Z2=ALOG(RURABS(N, I)) | EXA 360 |
| | Z1=ALOG(RURABS(N, I1)) | EXA 365 |
| | GO TO 40 | EXA 370 |
| | 35 Y2=ALOG(OCNEXT(N, I)) | EXA 375 |
| | Y1=ALOG(OCNEXT(N, I1)) | EXA 380 |
| | Z2=ALOG(OCNABS(N, I)) | EXA 385 |
| | Z1=ALOG(OCNABS(N, I1)) | EXA 390 |

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| | GO TO 40 | EXA 395 |
| 30 | Y2=ALOG(URBEXT(N,I)) | EXA 400 |
| | Y1=ALOG(URBEXT(N,II)) | EXA 405 |
| | Z2=ALOG(URBABS(N,I)) | EXA 410 |
| | Z1=ALOG(URBABS(N,II)) | EXA 415 |
| | GO TO 40 | EXA 420 |
| 35 | Y2=ALOG(TROEXT(N,I)) | EXA 425 |
| | Y1=ALOG(TROEXT(N,II)) | EXA 430 |
| | Z2=ALOG(TROABS(N,I)) | EXA 435 |
| | Z1=ALOG(TROABS(N,II)) | EXA 440 |
| 40 | Y=Y1+(Y2-Y1)*(X-X1)/(X2-X1) | EXA 445 |
| | ZK=Z1+(Z2-Z1)*(X-X1)/(X2-X1) | EXA 450 |
| | ABSC(M,N)=EXP(ZK) | EXA 455 |
| | EXTC(M,N)=EXP(Y) | EXA 460 |
| | GO TO 80 | EXA 465 |
| 45 | IF (ITA.GT.14) GO TO 75 | EXA 470 |
| | IF (ITC.LT.1) GO TO 80 | EXA 475 |
| | GO TO (50,55,60,65,70,65,70), ITC | EXA 480 |
| 50 | ABSC(M,N)=FG1ABS(N) | EXA 485 |
| | EXTC(M,N)=FG1EXT(N) | EXA 490 |
| | GO TO 80 | EXA 495 |
| 55 | ABSC(M,N)=FG2ABS(N) | EXA 500 |
| | EXTC(M,N)=FG2EXT(N) | EXA 505 |
| | GO TO 80 | EXA 510 |
| 60 | ABSC(M,N)=BSTABS(N) | EXA 515 |
| | EXTC(M,N)=BSTEXT(N) | EXA 520 |
| | GO TO 80 | EXA 525 |
| 65 | ABSC(M,N)=AVOABS(N) | EXA 530 |
| | EXTC(M,N)=AVOEXT(N) | EXA 535 |
| | GO TO 80 | EXA 540 |
| 70 | ABSC(M,N)=FVOABS(N) | EXA 545 |
| | EXTC(M,N)=FVOEXT(N) | EXA 550 |
| | GO TO 80 | EXA 555 |
| 75 | ABSC(M,N)=DMEABS(N) | EXA 560 |
| | EXTC(M,N)=DMEEXT(N) | EXA 565 |
| 80 | CONTINUE | EXA 570 |
| 85 | CONTINUE | EXA 575 |
| | RETURN | EXA 580 |
| | | EXA 585 |
| | | EXA 590 |
| C | END | |

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| | SUBROUTINE AEREXT (V) | AEX 100 |
| C | | AEX 105 |
| C | INTERPOLATES AEROSOL EXTINCTION AND ABSORPTION COEFFICIENT | AEX 110 |
| C | FOR THE WAVENUMBER, V. | AEX 115 |
| | | AEX 120 |
| | COMMON /CARD1/ MODEL, ITYPE, IERSCT, M1, M2, M3, IM, NOPRNT, TBOUND, SALS | AEX 125 |
| | COMMON /CARD2/ IHAZE, ISEASN, IVULCH, ICSTL, ICIR, IVSA, VIS, WSS, WHW, | AEX 130 |
| 1 | RAINRT | AEX 135 |
| | COMMON /CARD3/ H1, H2, ANGLE, RANGE, BETA, RE, LEN | AEX 140 |
| | COMMON /CARD4/ V1, V2, DV | AEX 145 |
| | COMMON /CNTRL/ KMAX, M, IKMAX, NL, ML, IKLO, ISSGEO | AEX 150 |
| | COMMON RELHUM(34), HSTOR(34), ICH(4), VH(16), TX(16), W(16) | AEX 155 |
| | COMMON WPATH(68, 16), TBBY(68) | AEX 160 |
| | COMMON ABSC(4, 40), EXTC(4, 40), VX2(40) | AEX 165 |
| | COMMON /AER/ EXTV(4), ABSV(4) | AEX 170 |
| | DO 5 I=1, 4 | AEX 175 |
| | EXTV(I)=0. | AEX 180 |
| | ABSV(I)=0. | AEX 185 |
| 5 | CONTINUE | AEX 190 |
| | IF (IHAZE.EQ.0) RETURN | AEX 195 |
| | ALAM=1.0E+4/V | AEX 200 |
| | DO 10 N=1, 40 | AEX 205 |
| | XD=ALAM-VX2(N) | AEX 210 |
| | IF (XD) 18, 10, 10 | AEX 215 |
| 10 | CONTINUE | AEX 220 |
| | N=40 | AEX 225 |
| 15 | VXD=VX2(N)-VX2(N-1) | AEX 230 |
| | DO 20 I=1, 4 | AEX 235 |
| | EXTV(I)=(EXTC(I, N)-EXTC(I, N-1))*XD/VXD+EXTC(I, N) | AEX 240 |
| | ABSV(I)=(ABSC(I, N)-ABSC(I, N-1))*XD/VXD+ABSC(I, N) | AEX 245 |
| 20 | CONTINUE | AEX 250 |
| | RETURN | AEX 255 |
| | END | AEX 260 |

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| | SUBROUTINE HNO3 (V, HABS) | HNO3 100 |
| C | | HNO3 105 |
| C | HNO3 STATISTICAL BAND PARAMETERS | HNO3 110 |
| C | | HNO3 115 |
| | DIMENSION H1(16), H2(16), H3(13) | HNO3 120 |
| C | ARRAY H1 CONTAINS HNO3 ABS. COEF(CM-1ATM-1) FROM 850 TO 920 CM-1 | HNO3 125 |
| | DATA H1/2.197, 3.011, 6.154, 8.150, 9.217, 9.461, 11.58, 11.10, 11.17, 12.4 | HNO3 130 |
| | 10, 10.49, 7.509, 6.138, 4.899, 2.866/ | HNO3 135 |
| C | ARRAY H2 CONTAINS HNO3 ABS. COEF(CM-1ATM-1) FROM 1275 TO 1350 CM-1 | HNO3 140 |
| | DATA H2/2.828, 4.611, 6.755, 8.759, 10.81, 13.74, 16.00, 21.81, 23.09, 21.6 | HNO3 145 |
| | 10, 21.32, 16.82, 16.42, 17.87, 14.88, 8.718/ | HNO3 150 |
| C | ARRAY H3 CONTAINS HNO3 ABS. COEF(CM-1ATM-1) FROM 1675 TO 1735 CM-1 | HNO3 155 |
| | DATA H3/5.063, 8.803, 14.12, 19.83, 23.31, 23.58, 23.22, 21.09, 20.89, 20.8 | HNO3 160 |
| | 14, 24.79, 17.88, 9.420/ | HNO3 165 |
| | HABS=0. | HNO3 170 |
| | IF (V.GE.850.0.AND.V.LE.920.0) GO TO 5 | HNO3 175 |
| | IF (V.GE.1275.0.AND.V.LE.1350.0) GO TO 10 | HNO3 180 |
| | IF (V.GE.1675.0.AND.V.LE.1735.0) GO TO 15 | HNO3 185 |
| | RETURN | HNO3 190 |
| 5 | I=(V-849.)/5. | HNO3 195 |
| | HABS=H1(I) | HNO3 200 |
| | RETURN | HNO3 205 |
| 10 | I=(V-1270.)/5. | HNO3 210 |
| | HABS=H2(I) | HNO3 215 |
| | RETURN | HNO3 220 |
| 15 | I=(V-1670.)/5. | HNO3 225 |
| | HABS=H3(I) | HNO3 230 |
| | RETURN | HNO3 235 |
| | END | HNO3 240 |

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SUBROUTINE SSGEO( IERROR, IPH, IPARM, PARM1, PARM2, PARM3, PARM4, PSIPO, G) SSG 100
C SSG 105
C THIS ROUTINE DRIVES THE LOWTRAN GEOMETRY ROUTINES REPEATEDLY SSG 110
C TO OBTAIN THE ABSORBER AMOUNTS FROM THE SCATTERING POINTS ON SSG 115
C THE OPTICAL PATH TO THE EXTRATERRESTRIAL SOURCE, NECESSARY SSG 120
C TO DO THE LAYER BY LAYER SINGLE SCATTERING RADIANCE CALCULATION. SSG 125
C SSG 130
COMMON RELHUM(34), HSTOR(34), ICH(4), VH(16), TX(16), W(16) SSG 135
COMMON WPATH(68,16), TSBY(68) SSG 140
COMMON ABSC(4,40), EXTC(4,40), VX2(40) SSG 145
COMMON /SOLS/ AH1(68), ARH(68), SSG 150
X WPATHS(68,16), PA(68), PR(68), ATHETA(35), ADBETA(35), LJ(69), JTURN, SSG 155
X ANGSUN SSG 160
COMMON /IFIL/ IRD, IPR, IPU, NPR SSG 165
COMMON /CARD1/ MODEL, ITYPE, IEMSC, M1, M2, M3, IM, NOPRNT, TBOUND, SALB SSG 170
COMMON /CARD2/ IMAZE, ISEASN, IVULCN, ICSTL, ICIR, IVSA, VIS, WSS, WMM, SSG 175
1 RAINRT SSG 180
COMMON /CARD3/ H1, H2, ANGLE, RANGE, BETA, REE, LEN SSG 185
COMMON /CARD4/ V1, V2, DV SSG 190
COMMON /CNTRL/ KMAX, MM, IKMAX, NL, ML, IKLO, ISSGEO SSG 195
COMMON /MODEL/ ZM(34), PM(34), TM(34), RFNDX(34), DENSTY(16,34) SSG 200
COMMON /PARMTR/ RE, DELTAS, ZMAX, IMAX, IMOD, IBMAX, IPATH SSG 205
COMMON /CNSTNS/ PI, CA, DEG, GCAIR, SIGNUM, BIGEXP SSG 210
COMMON /RFRPTH/ ZP(35), PP(35), TP(35), RFNOXP(35), SP(35), SSG 215
1 PPSUM(35), TPSUM(35), RHOPSM(35), DENP(16,35), AMTP(16,35) SSG 220
COMMON /USRDTA/ NANGLS, ANGF(50), F(4,50) SSG 225
DIMENSION WPDUM(68,16), TDDUM(68), LJD(68), AZ(35), RHD(35) SSG 230
C MOLECULAR AND HENVEY-GREENSTEIN PHASE FUNCTIONS SSG 235
C NOTE: UNITS ARE (STER-1), X= COS(SCATTERING ANGLE) SSG 240
PFMDL(X)= .06085+.05708*X**2 SSG 245
PFHG(GG,X)= (1.0-GG**2)/(4.*PI*(1.0+GG**2-2.0*GG*X)**1.5) SSG 250
IKLO=1 SSG 255
NPR = 1 SSG 260
ISSGEO=1 SSG 265
C SPECIFY THE GEOMETRICAL CONFIGURATION SSG 270
IF(IPARM.EQ.2) GO TO 1 SSG 275
THETA=PARM1 SSG 280
PHI=PARM2 SSG 285
THETA=PARM3 SSG 290
PHI=PARM4 SSG 295
GO TO 2 SSG 300
1 CONTINUE SSG 305
PSI=PARM1 SSG 310
DELO=PARM2 SSG 315
2 IF(IPARM.NE.0) GO TO 5 SSG 320
IF(ABS(THETA).LT.89.5) GO TO 5 SSG 325
IF(THETA.GT.0.0) GO TO 4 SSG 330
C OBSERVER IS AT OR NEAR THE SOUTH POLE, REMAP TO EQUATOR SSG 335
WRITE(IPR,880) SSG 340
PSI=PSI-PHI SSG 345
THETA=0.0 SSG 350
PHI=0.0 SSG 355
THETA=0.0 SSG 360
PHI=90.-THETA SSG 365
GO TO 5 SSG 370
4 CONTINUE SSG 375
C OBSERVER IS AT OR NEAR THE NORTH POLE, REMAP TO EQUATOR SSG 380
WRITE(IPR,881) SSG 385
PSI=PHI-PSI SSG 390

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| | THETA0=0.0 | SSG 395 |
| | PHI0=0.0 | SSG 400 |
| | THETA5=0.0 | SSG 405 |
| | PHI5=90.-THETA5 | SSG 410 |
| 5 | CONTINUE | SSG 415 |
| | WRITE(IPR,900) | SSG 420 |
| C | | SSG 425 |
| C | SAVE OPTICAL PATH PARAMETERS AND AMOUNTS | SSG 430 |
| C | | SSG 435 |
| | JTURN=JTURN | SSG 440 |
| | IKMAXD=IKMAX+1 | SSG 445 |
| | H1D=H1 | SSG 450 |
| | H2D=H2 | SSG 455 |
| | ANGD=ANGLE | SSG 460 |
| | RNGD=RANGE | SSG 465 |
| | BETD=BETA | SSG 470 |
| | BETA=0. | SSG 475 |
| | LEND=LEN | SSG 480 |
| | ITD=ITYPE | SSG 495 |
| | IMAX=ML | SSG 490 |
| | DO 10 J=1,IMAX | SSG 495 |
| | AZ(J)=ZP(J) | SSG 500 |
| 10 | RHD(J)=RELHUM(J) | SSG 505 |
| | DO 11 J=1,IKMAXD | SSG 510 |
| | TBDUM(J)=TBBY(J) | SSG 515 |
| | LJD(J)=LJ(J) | SSG 520 |
| | IF(LJD(J).GT.IMAX)LJD(J)=IMAX | SSG 525 |
| | DO 11 K=1,KMAX | SSG 530 |
| 11 | WPDUM(J,K)=WPATH(J,K) | SSG 535 |
| | IMAX=IMAX-1 | SSG 540 |
| C | | SSG 545 |
| C | ESTABLISH PSIO AND DELO | SSG 550 |
| | IARBO=0 | SSG 555 |
| | IF(ANGLE.LT.0.01.OR.ANGLE.GT.179.99) IARBO=1 | SSG 560 |
| C | | SSG 565 |
| | IF(IPARM.NE.2) | SSG 570 |
| | ICALL PSIDEL(THETA5,PHI5,THETA0,PHI0,PSI0,PSI0,DELO,IARBO) | SSG 575 |
| C | INITIAL CONDITIONS AT THE OBSERVER | SSG 580 |
| | IARB=IARBO | SSG 585 |
| | BETAST=0.0 | SSG 590 |
| | IF(IARBO.EQ.0) PSIST=PSI0 | SSG 595 |
| | ANGLO=DELO | SSG 600 |
| C | | SSG 605 |
| C | LOOP OVER THE POINT TO SUN PATHS TO OBTAIN AMOUNTS | SSG 610 |
| C | | SSG 615 |
| | WRITE(IPR,950) | SSG 620 |
| | WRITE(IPR,952) | SSG 625 |
| 950 | FORMAT(' SCTTR SCTTR SUBTENDED SOLAR PATH RELATIVE SCTTR MOSSO | SSG 630 |
| | 1ECULAR ') | SSG 635 |
| 952 | FORMAT(' POINT ALT ANGLE ZENITH ZENITH AZIMUTH ANGLE PHSSO | SSG 640 |
| | 1ASE F '/') | SSG 645 |
| | DO 130 L=1,IKMAXD | SSG 650 |
| | IF(LEND.EQ.1.OR.JTURN.NE.0) GO TO 20 | SSG 655 |
| C | SHORT PATH, UP | SSG 660 |
| | H1=AZ(L) | SSG 665 |
| | RELH=RHD(L) | SSG 670 |
| | THPST=ATHETA(L) | SSG 675 |
| | IF(L.GE.2) BETAST=BETAST+ADDBETA(L-1) | SSG 680 |
| | GO TO 30 | SSG 685 |

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| 20 | CONTINUE | SSG 690 |
| C | LONG PATH, OR SHORT PATH DOWN | SSG 695 |
| | IF(L.GE.2) BETAST=BETAST+ADBETA(LJD(L-1)) | SSG 700 |
| | IF(L.GE.JTURND) GO TO 25 | SSG 705 |
| | LJP1=LJD(L)+1 | SSG 710 |
| | H1=AZ(LJP1) | SSG 715 |
| | RELH=RHD(LJP1) | SSG 720 |
| | THTST=180.-ATHETA(LJP1) | SSG 725 |
| | GO TO 30 | SSG 730 |
| 25 | LJDL=LJD(L) | SSG 735 |
| | H1=AZ(LJDL) | SSG 740 |
| | RELH=RHD(LJDL) | SSG 745 |
| | THTST=ATHETA(LJDL) | SSG 750 |
| | IF(L.EQ.JTURND)THTST=180.-ATHETA(LJDL) | SSG 755 |
| 30 | CONTINUE | SSG 760 |
| | AM1(L)=H1 | SSG 765 |
| | ARH(L)=RELH | SSG 770 |
| | IF(L.LY.2) GO TO 35 | SSG 775 |
| | PSIST=PSI(PSIO,DELO,BETAST,IARB,IARBO) | SSG 780 |
| | ANGLO=DEL(PSIO,DELO,BETAST,IARBO) | SSG 785 |
| 35 | CORR=0.0 | SSG 790 |
| C | RANGE=UNKNOWN | SSG 795 |
| | ITYPE=3 | SSG 800 |
| | DO 90 JITER=1,4 | SSG 805 |
| | H2 = 0.0 | SSG 810 |
| | ANGLE=ANGLO-CORR | SSG 815 |
| | LEN=0 | SSG 820 |
| | IF(ANGLE.LE.90.0) GO TO 40 | SSG 825 |
| | LEN=1 | SSG 830 |
| | WRITE(IPR,955) L | SSG 835 |
| 955 | FORMAT(' SUN PATH ',J3,' PASSES THROUGH A TANGENT HEIGHT') | SSG 840 |
| 40 | CONTINUE | SSG 845 |
| | HTOP=ZMAX | SSG 850 |
| | IF(H1.LT.HTOP.OR.LEN.EQ.1) GO TO 60 | SSG 855 |
| C | SCATTERING POINT IS AT OR ABOVE HTOP AND LEN=0. | SSG 860 |
| C | SET W(K)=0.0 AND CONTINUE | SSG 865 |
| | DO 50 K=1,KMAX | SSG 870 |
| 50 | W(K)=0.0 | SSG 875 |
| | GO TO 100 | SSG 880 |
| C | | SSG 885 |
| 60 | CALL GEO(IERROR,BENDNG) | SSG 890 |
| C | | SSG 895 |
| C | IERROR=-5 IF SCATTERING POINT IS IN THE SHADE, ALSO SET W(K)=-5.0 | SSG 900 |
| | IF(IERROR.NE.-5) GO TO 80 | SSG 905 |
| | WRITE(IPR,970) L | SSG 910 |
| 970 | FORMAT(' SCATTERING POINT ',J3,' IS IN THE SHADE') | SSG 915 |
| | DO 70 K=1,KMAX | SSG 920 |
| 70 | W(K)=-5.0 | SSG 925 |
| | IERROR=0 | SSG 930 |
| | GO TO 100 | SSG 935 |
| 80 | CONTINUE | SSG 940 |
| C | SOLAR ZENITH BENDING CORRECTION | SSG 945 |
| | IF(JITER.GT.1) WRITE(IPR,917) CORR | SSG 950 |
| | IF(ABS(CORR-BENDNG).LT.1) GO TO 100 | SSG 955 |
| 90 | CORR=BENDNG | SSG 960 |
| 100 | CONTINUE | SSG 965 |
| | SANGLE=ACTANG(ANGLE,THTST,PSIST,IARB) | SSG 970 |
| | COSANG=COS(CA+SANGLE) | SSG 975 |
| C | LOAD MOLECULAR PHASE FUNCTION ARRAY | SSG 980 |

| | | |
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| | PR(L)=PFMOL(COSANG) | SSG 985 |
| C | LOAD AEROSOL PHASE FUNCTION ARRAY | SSG 990 |
| C | HENVEY-GREENSTEIN | SSG 995 |
| | IF(IPH.NE.0) GO TO 105 | SSG 1000 |
| | PA(L)=PFHG(G,COSANG) | SSG 1005 |
| | GO TO 115 | SSG 1010 |
| 105 | CONTINUE | SSG 1015 |
| | IF(IPH.NE.1) GO TO 110 | SSG 1020 |
| C | USER SUPPLIED PHASE FUNCTION | SSG 1025 |
| C | DETERMINE ALTITUDE AND ANGLE INDICES | SSG 1030 |
| | M=4 | SSG 1035 |
| | IF(H1.LE.30.) M=3 | SSG 1040 |
| | IF(H1.LE.10.) M=2 | SSG 1045 |
| | IF(H1.LE.2.) M=1 | SSG 1050 |
| | DO 106 LL=1,NANGLS | SSG 1055 |
| | IF(ANGF(LL).EQ.SANGLE) GO TO 115 | SSG 1060 |
| | IF(ANGF(LL).GT.SANGLE) GO TO 107 | SSG 1065 |
| 106 | CONTINUE | SSG 1070 |
| 107 | LP1=LL | SSG 1075 |
| | LL=LL-1 | SSG 1080 |
| | CALL INTERP(2,SANGLE,ANGF(LL),ANGF(LP1),PA(L),F(M,LL),F(M,LP1)) | SSG 1085 |
| | GO TO 115 | SSG 1090 |
| 110 | CONTINUE | SSG 1095 |
| C | V DEPENDENT MIE DATA BASE, SAVE SCATTERING ANGLE INSTEAD | SSG 1100 |
| | PA(L)=SANGLE | SSG 1105 |
| 115 | CONTINUE | SSG 1110 |
| C | LOAD AMOUNTS FROM W(K) INTO WPATHS(L,K) | SSG 1115 |
| | DO 120 K=1,KMAX | SSG 1120 |
| 120 | WPATHS(L,K)=W(K) | SSG 1125 |
| C | REVERSE SIGN CONVENTION (TO + E OF N) FOR PRINTED OUTPUT | SSG 1130 |
| | PSIST2=-PSIST | SSG 1135 |
| | WRITE(IPR,951)L,H1,BETAST,ANGLE,THYST,PSIST2,SANGLE,PR(L) | SSG 1140 |
| 951 | FORMAT(1X,I3,6(1X,F7.2), (1X,E10.3)) | SSG 1145 |
| 130 | CONTINUE | SSG 1150 |
| C | | SSG 1155 |
| C | RESTORE OPTICAL PATH AMOUNTS | SSG 1160 |
| C | | SSG 1165 |
| | IKMAX=IKMAXD-1 | SSG 1170 |
| | H1=H1D | SSG 1175 |
| | H2=H2D | SSG 1180 |
| | ANGSUN=ANGLE | SSG 1185 |
| | ANGLE=ANGD | SSG 1190 |
| | RANGE=RNQD | SSG 1195 |
| | BETA=BETD | SSG 1200 |
| | LEN=LEND | SSG 1205 |
| | ITYPE=ITD | SSG 1210 |
| | DO 160 J=1,IKMAXD | SSG 1215 |
| | YBBY(J)=YDDUM(J) | SSG 1220 |
| | LJ(J)=LJD(J) | SSG 1225 |
| | DO 160 K=1,KMAX | SSG 1230 |
| 160 | WPATH(J,K)=WPDUM(J,K) | SSG 1235 |
| | NPR = NOPRNT | SSG 1240 |
| C | | SSG 1245 |
| C | FORMATS | SSG 1250 |
| C | | SSG 1255 |
| 900 | FORMAT(2X,/, ' SINGLE SCATTERING POINT TO SOURCE PATHS ') | SSG 1260 |
| 917 | FORMAT(' SOLAR ZENITH CORRECTION FOR BENDING * ',F10.3) | SSG 1265 |
| 920 | FORMAT(2X, '*** CUMULATIVE POINT-TO-SOURCE AMOUNTS ***') | SSG 1270 |
| 925 | FORMAT(/,2X,'L WPATHS(L,K) K=1,7') | SSG 1275 |

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930 FORMAT(1X,12,7(2X,E10.3)) SSG 1280
931 FORMAT(8E10.3) SSG 1285
940 FORMAT(2X,'L WPATHS(L,K) K=8,18') SSG 1290
980 FORMAT(2X,'THETAO < 89.5, OBSERVER ASSUMED TO BE AT THE SOUTH SSG 1295
1 POLE, PROBLEM HAS BEEN REMAPPED TO THE EQUATOR') SSG 1300
981 FORMAT(2X,'THETAO > 89.5, OBSERVER ASSUMED TO BE AT THE NORTH SSG 1305
1 POLE, PROBLEM HAS BEEN REMAPPED TO THE EQUATOR') SSG 1310
RETURN SSG 1315
END SSG 1320

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SUBROUTINE PSIDEL(THETAS,PHIS,THETAO,PHIO,PSIPO2,PSIO,DELO,IARBO) PSD 100
C PSD 105
C THIS ROUTINE CALCULATES PSIO (THE RELATIVE AZIMUTH BETWEEN THE PSD 110
C LINE OF SIGHT AND THE DIRECT SOLAR PATH, AT THE OBSERVER) PSD 115
C AND DELO (THE ANGLE SUBTENDED AT THE EARTH'S CENTER BY THE PSD 120
C OBSERVER AND THE SUBSOLAR POINT). PSD 125
C COMMON /PARMTR/ RE,DELTA, ZMAX,IMAX,IMOD,IBMAX,IPATH PSD 130
C COMMON /CNSTNS/ PI,CA,DEG,GCAIR,BIGNUM,BIGEXP PSD 135
C DATA EPSILN/1.0E-5/ PSD 140
C PSD 145
C CHANGE CONVENTION FOR PSIPO FROM (EAST OF NORTH) TO (NORTH OF EAST) PSD 150
C FOR COMPUTATIONAL PURPOSES. RANGE IS -180 TO +180. PSD 155
C PSIPO=90.0-PSIPO2 PSD 160
C IF(PSIPO.GT.180.0) PSIPO=PSIPO-360.0 PSD 165
C PSD 170
C DPHI=PHIS-PHIO PSD 175
C DTHT=THETAS-THETAO PSD 180
C THTS=THETAS/DEG PSD 185
C THTO=THETAO/DEG PSD 190
C DPH=DPHI/DEG PSD 195
C STS=SIN(THTS) PSD 200
C STO=SIN(THTO) PSD 205
C CTS=COS(THTS) PSD 210
C CTO=COS(THTO) PSD 215
C SOPHI=SIN(DPH) PSD 220
C COPHI=COS(DPH) PSD 225
C TTS=TAN(THTS) PSD 230
C TTO=TAN(THTO) PSD 235
C PSD 240
C CALCULATE DELO, CHECK FOR SPECIAL CASES PSD 245
C IF(ABS(DPHI).GT.EPSILN) GO TO 10 PSD 250
C COLONGITUDE PSD 255
C DELO=ABS(DTHT) PSD 260
C GO TO 30 PSD 265
C IF(ABS(DTHT).GT.EPSILN) GO TO 20 PSD 270
C COLATITUDE PSD 275
C DELO=ABS(DPHI) PSD 280
C GO TO 30 PSD 285
C GENERAL CASE PSD 290
C 20 DELO=DEG*ACOS(CTS*CTO+COPHI*STS*STO) PSD 295
C 30 IF(DELO.LE.EPSILN) DELO=0.0 PSD 300
C CALCULATE PSIO (=PSISO-PSIPO) PSD 305
C CHECK FOR SPECIAL CASES WHERE EITHER PSISO OR PSIPO ARE ARBITRARY PSD 310
C PSD 315
C VERTICAL OPTICAL PATH, PSIPO IS ARBITRARY, THIS CASE WAS FLAGGED PSD 320
C IN SSGED BY SETTING IARBO=1 PSD 325
C PSD 330
C OBSERVER AND SUBSOLAR POINT COINCIDE, PSISO IS ARBITRARY PSD 335
C IF(DELO.EQ.0.0) IARBO=IARBO+2 PSD 340
C IF(IARBO.EQ.0) GO TO 40 PSD 345
C IARBO=0,1,2,3 FOR PSIO DEFINITE, PSIPO ARBITRARY, PSISO ARBITRARY PSD 350
C BOTH PSIPO AND PSISO ARBITRARY, RESPECTIVELY. PSD 355
C RETURN PSD 360
C ANUMER=TTO+COPHI-TTS PSD 365
C DENOM=(1.-TTO+2)*CTO+SOPHI PSD 370
C IF(ABS(ANUMER).GT.EPSILN) GO TO 30 PSD 375
C NUMERATOR=0.0, GREAT CIRCLE CONTAINING THE OBSERVER AND THE SUBSOLAR PSD 380
C POINT IS DUE EAST-WEST AT THE OBSERVER PSD 385
C PSISO=0.0 PSD 390

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| | IF(DPHI.GT.0.0) PSISO=180.0 | PSD 395 |
| | GO TO 90 | PSD 400 |
| 80 | IF(ABS(DENOM).GT.EPSILN) GO TO 80 | PSD 405 |
| C | DENOMINATOR =0.0, ATAN(INFINITY)=+90 OR -90 | PSD 410 |
| | PSISO=90.0 | PSD 415 |
| | IF(DTHT.LT.0.0) PSISO=-90.0 | PSD 420 |
| | GO TO 90 | PSD 425 |
| C | GENERAL CASE | PSD 430 |
| 80 | PSISO=DEG*ATAN(ANUMER/DENOM) | PSD 435 |
| C | ATAN RETURNS ARGUMENTS BETWEEN -90 AND 90, MAY NEED TO CORRECT | PSD 440 |
| C | NO CORRECTION NECESSARY | PSD 445 |
| | IF(DPHI.LT.0.0) GO TO 90 | PSD 450 |
| C | CORRECTION NECESSARY | PSD 455 |
| | IF(DPHI.GT.0.0) GO TO 70 | PSD 460 |
| C | DPHI=0.0 | PSD 465 |
| | PSISO=90.0 | PSD 470 |
| | IF(DTHT.LT.0.0) PSISO=-90.0 | PSD 475 |
| | GO TO 90 | PSD 480 |
| C | DPHI.GT.0.0 | PSD 485 |
| 70 | IF(PSISO.GT.0.0) GO TO 80 | PSD 490 |
| | PSISO=PSISO+180.0 | PSD 495 |
| | GO TO 90 | PSD 500 |
| 80 | PSISO=PSISO-180.0 | PSD 505 |
| 90 | CONTINUE | PSD 510 |
| | PSIO=PSISO-PSIPO | PSD 515 |
| C | RANGE OF PSIO IS -180.0 TO 180.0, CORRECT IF NECESSARY | PSD 520 |
| | IF(PSIO.LT.-180.0) PSIO=PSIO+360.0 | PSD 525 |
| | IF(PSIO.GT. 180.0) PSIO=PSIO-360.0 | PSD 530 |
| C | RETURN | PSD 535 |
| | END | PSD 540 |
| | | PSD 545 |

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| | FUNCTION SCTANG(ANGLST,THYST,PSIST,IARB) | SCT 100 |
| C | | SCT 105 |
| C | FUNCTION SCTANG RETURNS THE SCATTERING ANGLE (THAT IS, THE | SCT 110 |
| C | ANGLE BETWEEN THE SUN'S RAYS AND THE LINE OF SIGHT) AT ANY | SCT 115 |
| C | POINT ALONG THE OPTICAL PATH. | SCT 120 |
| | COMMON /PARMTR/ RE,DELTA5,ZMAX,IMAX,IMOD,IRMAX,IPATH | SCT 125 |
| | COMMON /CNSTNS/ PI,CA,DEG,GCAIR,BIGNUM,BIGEXP | SCT 130 |
| C | | SCT 135 |
| | SUNZEN=ANGLST/DEG | SCT 140 |
| | PYNZEN=THYST/DEG | SCT 145 |
| | IF(IARB.EQ.0) GO TO 10 | SCT 150 |
| C | SPECIAL CASES IF PSI IS ARBITRARY | SCT 155 |
| | SCTANG=DEG*ACOS(COS(SUNZEN)*COS(PYNZEN)) | SCT 160 |
| | RETURN | SCT 165 |
| 10 | CONTINUE | SCT 170 |
| | PSI=PSIST/DEG | SCT 175 |
| C | GENERAL CASE | SCT 180 |
| | X=SIN(SUNZEN)*SIN(PYNZEN)*COS(PSI)+COS(SUNZEN)*COS(PYNZEN) | SCT 185 |
| | SCTANG=DEG*ACOS(X) | SCT 190 |
| | RETURN | SCT 195 |
| | END | SCT 200 |

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| | FUNCTION PSI(PSIO,DELO,BETA,IAR8,IAR80) | PSI 100 |
| C | | PSI 105 |
| C | FUNCTION PSI RETURNS THE VALUE OF SOLAR AZIMUTH RELATIVE TO | PSI 110 |
| C | THE LINE OF SIGHT, AT THE CURRENT SCATTERING LOCATION | PSI 115 |
| | COMMON /PARMTR/ RE,DELTA,S,ZMAX,IMAX,IMOD,IBMAX,IPATH | PSI 120 |
| | COMMON /CNSTNS/ PI,CA,DEG,GCAIR,BIGNUM,BIGEXP | PSI 125 |
| | DATA EPSILN/1.0E-5/ | PSI 130 |
| | DELO=DELO/DEG | PSI 135 |
| | BETAR=BETA/DEG | PSI 140 |
| | IF(IAR80.EQ.0) GO TO 5 | PSI 145 |
| C | SPECIAL CASES WHEN PSIO IS ARBITRARY | PSI 150 |
| | IAR8=IAR80 | PSI 155 |
| | IF(IAR80.EQ.1.OR.IAR80.EQ.3) RETURN | PSI 160 |
| | IF(BETA.LE.EPSILN) RETURN | PSI 165 |
| C | PSI=180.0 (MOVED OUT FROM UNDER THE SUN) | PSI 170 |
| | IAR8=0 | PSI 175 |
| | PSI=180.0 | PSI 180 |
| | RETURN | PSI 185 |
| S | CONTINUE | PSI 190 |
| C | GENERAL CASE | PSI 195 |
| | PSIOR=PSIO/DEG | PSI 200 |
| | IAR8=0 | PSI 205 |
| | ANUMER=SIN(DELO)*SIN(PSIOR) | PSI 210 |
| | DENOM=COS(BETAR)*SIN(DELO)*COS(PSIOR)-SIN(BETAR)*COS(DELO) | PSI 215 |
| C | SPECIAL CASES | PSI 220 |
| C | NUMERATOR DOES TO ZERO IN THE FOLLOWING 3 CASES | PSI 225 |
| C 1) | DELO=0.0 | PSI 230 |
| | IF(DELO.GT.EPSILN) GO TO 20 | PSI 235 |
| | IF(BETA.GT.EPSILN) GO TO 10 | PSI 240 |
| | IAR8=2 | PSI 245 |
| | RETURN | PSI 250 |
| 10 | PSI=180.0 | PSI 255 |
| | RETURN | PSI 260 |
| C 2) | PSIO=0.0 | PSI 265 |
| 20 | IF(ABS(PSIO).GT.EPSILN) GO TO 40 | PSI 270 |
| | IF(ABS(BETA-DELO).GE.EPSILN) GO TO 30 | PSI 275 |
| C | SCATTERING POINT IS DIRECTLY UNDER THE SUN | PSI 280 |
| | IAR8=2 | PSI 285 |
| | RETURN | PSI 290 |
| 30 | IF(BETA.LT.DELO) PSI=0.0 | PSI 295 |
| | IF(BETA.GT.DELO) PSI=180.0 | PSI 300 |
| | RETURN | PSI 305 |
| C 3) | PSIO=180.0 | PSI 310 |
| 40 | IF(ABS(PSIO).LT.(180.0-EPSILN)) GO TO 60 | PSI 315 |
| | PSI=180.0 | PSI 320 |
| | RETURN | PSI 325 |
| 60 | CONTINUE | PSI 330 |
| C | DENOMINATOR CAN GO TO ZERO FOR THE FOLLOWING 3 CASES | PSI 335 |
| C 1) | BETA=DELO AND PSIO=0.0 | PSI 340 |
| C | THIS CASE WAS HANDLED EARLIER | PSI 345 |
| C 2) | GENERAL CASE | PSI 350 |
| | IF(ABS(DENOM).GT.EPSILN) GO TO 80 | PSI 355 |
| | IF(PSIO.LT.0.0) PSI=-90.0 | PSI 360 |
| | IF(PSIO.GT.0.0) PSI=90.0 | PSI 365 |
| | RETURN | PSI 370 |
| 80 | CONTINUE | PSI 375 |
| | PSI=DEG*ATAN(ANUMER/DENOM) | PSI 380 |
| C | NOTE ATAN RETURNS ARGUMENTS BETWEEN -90 AND 90. PSI | PSI 385 |
| C | AND PSIO SHOULD BE OF THE SAME SIGN. | PSI 390 |
| | IF(PSIO.GT.0.0.AND.PSI.LT.0.0) PSI=-PSI+180. | PSI 395 |
| | IF(PSIO.LT.0.0.AND.PSI.GT.0.0) PSI=PSI-180. | PSI 400 |
| | RETURN | PSI 405 |
| | END | PSI 410 |

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| | FUNCTION DEL(PSIO,DELO,BETA,IARBO) | DEL 100 |
| C | | DEL 105 |
| C | FUNCTION DEL RETURNS THE VALUE OF THE SUN'S ZENITH ANGLE | DEL 110 |
| C | AT ANY POINT ALONG THE OPTICAL PATH BASED UPON STRAIGHT | DEL 115 |
| C | LINE GEOMETRY (NO REFRACTION). THIS ANGLE IS USED TO SPECIFY | DEL 120 |
| C | THE SCATTERING POINT TO SUN PATHS. THE BENDING DUE TO REFRACTION | DEL 125 |
| C | ALONG THIS PATH IS DETERMINED BY THE GEO ROUTINES. IF THE BENDING | DEL 130 |
| C | IS GREATER THAN ONE DEGREE THE ZENITH ANGLE IS CORRECTED ACCORDING | DEL 135 |
| C | AND THE PATH CALCULATION IS REPEATED. | DEL 140 |
| | COMMON /PARMTR/ RE,DELTA5,ZMAX,IMAX,IMOD,IBMAX,IPATH | DEL 145 |
| | COMMON /CONSTNS/ PI,CA,DEG,GCAIR,BIGNUM,BIGEXP | DEL 150 |
| | DATA EPSLN/1.0E-5/ | DEL 155 |
| C | | DEL 160 |
| | IF(IARBO.EQ.0) GO TO 10 | DEL 165 |
| C | SPECIAL CASES IF PSIO IS ARBITRARY | DEL 170 |
| | IF(IARBO.EQ.1) DEL=DELO | DEL 175 |
| | IF(IARBO.EQ.2) DEL=BETA | DEL 180 |
| | IF(IARBO.EQ.3) DEL=0.0 | DEL 185 |
| | RETURN | DEL 190 |
| 10 | CONTINUE | DEL 195 |
| | PSIOR=PSIO/DEG | DEL 200 |
| | DELOR=DELO/DEG | DEL 205 |
| | BETAR=BETA/DEG | DEL 210 |
| C | GENERAL CASE | DEL 215 |
| | $X = \cos(\text{DELOR}) * \cos(\text{BETAR}) + \sin(\text{DELOR}) * \sin(\text{BETAR}) * \cos(\text{PSIOR})$ | DEL 220 |
| | DEL=DEG*ACOS(X) | DEL 225 |
| | RETURN | DEL 230 |
| | END | DEL 235 |

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| | SUBROUTINE SSRAD(IPH,IK,ITZERC,IPATH,V,SUMSSR) | SSR 100 |
| C | | SSR 105 |
| C | SUBROUTINE SSRAD PERFORMS THE LAYER BY LAYER SINGLE SCATTERING | SSR 110 |
| C | RADIANCE SUM. | SSR 115 |
| C | | SSR 120 |
| | COMMON /CARD1/ MODEL, ITYPE, IEMSC, M1, M2, M3, IM, NOPRNT, TBOUND, SALB | SSR 125 |
| | COMMON /CARD2/ IHAZE, ISEASN, IVULCN, ICSTL, ICIR, IVSA, VIS, WSS, WHH, | SSR 130 |
| | 1 RAINRT | SSR 135 |
| | COMMON /CARD3/ H1, H2, ANGLE, RANGE, BETA, RE, LEN | SSR 140 |
| | COMMON RELHUM(34), HSTOR(34), ICH(4), VH(16), TX(16), N(16) | SSR 145 |
| | COMMON WPATH(68,16), TBBY(68) | SSR 150 |
| | COMMON ABSC(4,40), EXTC(4,40), VX2(40) | SSR 155 |
| | COMMON /SOLS/ AH1(68), ARH(68), | SSR 160 |
| | X WPATHS(68,16), PA(68), PR(68), ATHETA(35), ADBETA(35), LJ(69), JURN, | SSR 165 |
| | X ANGSUN | SSR 170 |
| | COMMON /SRAD/ TEB1, TEB2, TASP1, TASP2, TMSP1, TMSP2, TEB2SV | SSR 175 |
| | IF (ITZERO.EQ.1) GO TO 60 | SSR 180 |
| | TX6=TX(6) | SSR 185 |
| | TX7=TX(7) | SSR 190 |
| | TX9=TX(9) | SSR 195 |
| | TX10=TX(10) | SSR 200 |
| | IF (IPATH-2) 10,20,30 | SSR 205 |
| 10 | CONTINUE | SSR 210 |
| | ISKIP = 0 | SSR 215 |
| C | INITIAL CONDITIONS | SSR 220 |
| C | SINGLE SCATTERING RADIANCE SUM | SSR 225 |
| | SUMSSR=0.0 | SSR 230 |
| C | OPTICAL PATH TRANSMITTANCES | SSR 235 |
| | TASP2=1.0 | SSR 240 |
| | TMSP2=1.0 | SSR 245 |
| C | L PATH TRANSMITTANCE | SSR 250 |
| | TEB2=TX9 | SSR 255 |
| C | MOLECULAR AND AEROSOL PHASE FUNCTIONS | SSR 260 |
| | PMOL2=PR(IK) | SSR 265 |
| | PAER2=PA(IK) | SSR 270 |
| | IF (IPH.EQ.2) | SSR 275 |
| | 1 CALL PHASEF(V,AH1(IK),PA(IK),ARH(IK),PAER2) | SSR 280 |
| | RETURN | SSR 285 |
| 20 | CONTINUE | SSR 290 |
| C | CURRENT L PATH TRANSMITTANCE | SSR 295 |
| | TEB1=TX9 | SSR 300 |
| C | CURRENT MOLECULAR AND AEROSOL PHASE FUNCTIONS | SSR 305 |
| | PMOL1=PR(IK) | SSR 310 |
| | PAER1=PA(IK) | SSR 315 |
| | IF (IPH.EQ.2) | SSR 320 |
| | 1 CALL PHASEF(V,AH1(IK),PA(IK),ARH(IK),PAER1) | SSR 325 |
| | RETURN | SSR 330 |
| 30 | CONTINUE | SSR 335 |
| C | CURRENT OPTICAL PATH TRANSMITTANCES | SSR 340 |
| | TASP1=TX7/TX10 | SSR 345 |
| | TMSP1=TX8 | SSR 350 |
| C | SINGLE SCATTERING RADIANCE CALCULATION | SSR 355 |
| | IF (TASP1.EQ.0.0 .OR. TMSP1.EQ.0.0 .OR. TMSP2.EQ.0.0 .OR. | SSR 360 |
| | 1 TASP2.EQ.0.0) GO TO 50 | SSR 365 |
| | XA1=PAER1+TEB1/TASP1 | SSR 370 |
| | XA2=PAER2+TEB2/TASP2 | SSR 375 |
| | XM1=PMOL1+TEB1/TMSP1 | SSR 380 |
| | XM2=PMOL2+TEB2/TMSP2 | SSR 385 |
| | DTASP=TASP2-TASP1 | SSR 390 |
| | DTMSP=TMSP2-TMSP1 | SSR 395 |
| C | COULD ADD A CHECK FOR SMALL DTASP,DTMSP AND BYPASS CALCULATION | SSR 400 |
| | SUMSSR=SUMSSR+.5*(DTASP*(XA1+XA2)+DTMSP*(XM1+XM2)) | SSR 405 |
| C | RESET L AND OPTICAL PATH TRANSMITTANCES | SSR 410 |
| 50 | CONTINUE | SSR 415 |
| | TASP2=TASP1 | SSR 420 |
| | TEB2SV=TEB2 | SSR 425 |
| | TMSP2=TMSP1 | SSR 430 |
| | TEB2=TEB1 | SSR 435 |
| C | RESET PHASE FUNTION VALUES | SSR 440 |
| | PAER2=PAER1 | SSR 445 |
| | PMOL2=PMOL1 | SSR 450 |
| 60 | CONTINUE | SSR 455 |
| | RETURN | SSR 460 |
| | END | SSR 465 |

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SUBROUTINE SOURCE(VV,ISOURC,IDAY,ANGLE,SS) SRC 100
COMMON /ICLL/ ICALL,FPHS,FALB,FORBIT SRC *101
SUBROUTINE SOURCE CONTAINS THE SOLAR INTENSITY DATA AS A SRC 110
FUNCTION OF WAVELENGTH. THIS ROUTINE IS ALSO CAPABLE OF CALCULATING SRC 119
LUNAR INTENSITY BASED ON THE PHASE ANGLE BETWEEN THE SUN, MOON AND SRC 120
EARTH. CORRECTIONS ARE MADE FOR THE SUN'S ELLIPTIC ORBIT. SRC 125
SRC 130
DIMENSION NDAY(13),RAT(13),PHS(17),ALB(29),VSUN(210),ESUN(210) SRC 135
DATA NDAY/1,32,60,91,121,151,181,212,243,273,304,334,366/ SRC 140
DATA RAT/.034,1.030,1.019,1.001,.985,.972,.967,.971,.982, SRC 145
1 .998,1.015,1.029,1.034/ SRC 150
DATA PHS/100.,73.2,57.8,42.3,32.0,23.3,16.7,12.4,8.7,6.7, SRC 155
1 4.7,3.6,2.4,1.2,0.9,0.4,.002/ SRC 160
DATA ALB/.001,.01,.03,.075,1.,.13,.155,.17,.178,.185,.2,.211, SRC 165
1 .231,.25,.275,.289,.285,.287,.3,.29,.3,.31,.313,.319,.329 SRC 170
1 .339,.345,.350,.5/ SRC 175
C WAVELENGTH (MICROMETERS) AT WHICH SOLAR INTENSTY DATA IS STORED SRC 180
C SRC 185
DATA VSUN/.115,.120,.125,.130,.140,.150,.160, SRC 190
1 .170,.180,.190,.200,.210,.220,.225,.230,.235,.240,.245,.250, SRC 195
2 .255,.260,.265,.270,.275,.280,.285,.290,.295,.300,.305,.310, SRC 200
3 .315,.320,.325,.330,.335,.340,.345,.350,.355,.360,.365,.370, SRC 205
4 .375,.380,.385,.390,.395,.400,.405,.410,.415,.420,.425,.430, SRC 210
5 .435,.440,.445,.450,.455,.460,.465,.470,.475,.480,.485,.490, SRC 215
6 .495,.500,.505,.510,.515,.520,.525,.530,.535,.540,.545,.550, SRC 220
7 .555,.560,.565,.570,.575,.580,.585,.590,.595,.600,.605,.610, SRC 225
8 .620,.630,.640,.650,.660,.670,.680,.690,.700,.710,.720,.730, SRC 230
9 .740,.750,.760,.770,.780,.790,.800,.810,.820,.830,.840,.850, SRC 235
1 .860,.870,.880,.890,.900,.910,.920,.930,.940,.950,.960,.970, SRC 240
1 .980,.990,1.00,1.05,1.10,1.15,1.20,1.25,1.30,1.35,1.40,1.45, SRC 245
2 1.50,1.55,1.60,1.65,1.70,1.75,1.80,1.85,1.90,1.95,2.00,2.10, SRC 250
3 2.20,2.30,2.40,2.50,2.60,2.70,2.80,2.90,3.00,3.10,3.20,3.30, SRC 255
4 3.40,3.50,3.60,3.70,3.80,3.90,4.00,4.10,4.20,4.30,4.40,4.50, SRC 260
5 4.60,4.70,4.80,4.90,5.00,6.00,7.00,8.00,9.00,10.0,11.0,12.0, SRC 265
6 13.0,14.0,15.0,16.0,17.0,18.0,19.0,20.0,25.0,30.0,35.0,40.0, SRC 270
7 50.0,60.0,80.0,100.,120.,150.,200.,250.,300.,400.,1000./ SRC 275
C SOLAR INTENSITY IN UNITS OF WATTS M-2 MICROMETER-1 SRC 280
C SRC 285
DATA ESUN/.007,.9,.007,.007,.030,.070,.230,.630, SRC 290
1 1.25,2.71,10.7,22.9,57.6,64.9,66.7,59.3,63.0,72.3,70.4,104., SRC 295
2 130.,195.,232.,204.,222.,315.,482.,584.,514.,603.,689.,764., SRC 300
3 830.,975.,1059.,1081.,1074.,1069.,1093.,1083.,1068.,1132., SRC 305
4 1181.,1157.,1120.,1098.,1098.,1189.,1429.,1644.,1751.,1774., SRC 310
5 1747.,1693.,1639.,1663.,1810.,1922.,2006.,2057.,2068.,2048., SRC 315
3 2033.,2044.,2074.,1976.,1950.,1960.,1942.,1920.,1882.,1833., SRC 320
7 1833.,1852.,1842.,1818.,1783.,1754.,1725.,1720.,1695.,1705., SRC 325
8 1712.,1719.,1715.,1712.,1700.,1682.,1668.,1647.,1635.,1602.,157 SRC 330
9 0.,1544.,1511.,1486.,1456.,1427.,1402.,1396.,1344.,1314.,1290., SRC 335
1 1260.,1235.,1211.,1185.,1159.,1134.,1109.,1085.,1060.,1036., SRC 340
1 1013.,990.,968.,947.,926.,908.,891.,880.,869.,858.,847.,837., SRC 345
2 820.,803.,785.,767.,748.,668.,593.,535.,485.,438.,397.,358., SRC 350
3 337.,312.,288.,267.,245.,223.,202.,180.,159.,142.,126.,114., SRC 355
4 103.,90.,79.,69.,62.,55.,48.,43.,39.,35.,31.,26.,22.,19.,2, SRC 360
5 16.6,14.6,13.5,12.3,11.1,10.3,9.5,8.7,7.8,7.1,6.5,5.92,5.35, SRC 365
6 4.86,4.47,4.11,3.79,1.82,.99,.585,.367,.241,.168,.117,.0851, SRC 370
7 .0634,.0481,.0371,.0291,.0231,.0186,.0152,6.17E-3,2.97E-3, SRC 375
8 1.60E-3,9.42E-4,3.91E-4,1.90E-4,6.16E-5,2.57E-5,1.26E-5, SRC 380
9 5.23E-6,1.69E-6,7.00E-7,3.40E-7,1.10E-7,0.0/ SRC 385
VV=10000./VV SRC 390

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| | IF(ISOURC.NE.1) GO TO 50 | SRC 395 |
| | IF(ICALL.EQ.1) GO TO 20 | SRC 400 |
| C | | SRC 405 |
| C | MOON PHASE ANGLE FACTOR | SRC 410 |
| C | | SRC 415 |
| | FPHS=0.0 | SRC 420 |
| | IF(ANGLE.GT.160.) GO TO 20 | SRC 425 |
| | IP=ANGLE/10. | SRC 430 |
| | IF(FLOAT(IP*10).EQ.ANGLE) GO TO 10 | SRC 435 |
| | FPHS=PHS(IP+1)+(ANGLE-10.*IP)*(PHS(IP+2)-PHS(IP+1))/10. | SRC 440 |
| | GO TO 20 | SRC 445 |
| 10 | FPHS=PHS(IP+1) | SRC 450 |
| C | | SRC 455 |
| C | GEOMETRICAL ALBEDO OF THE MOON | SRC 460 |
| C | | SRC 465 |
| 20 | FALB=0.4 | SRC 470 |
| | IF(V.GE.5.) GO TO 40 | SRC 475 |
| | IF(V.GT.2.8) GO TO 30 | SRC 480 |
| | I1=V*10 | SRC 485 |
| | FALB=ALB(I1)+(ALB(I1+1)-ALB(I1))*(V-I1*0.1)*10. | SRC 490 |
| | GO TO 40 | SRC 495 |
| 30 | FALB=ALB(28)+(ALB(29)-ALB(28))*(V-2.8)/2.2 | SRC 500 |
| 40 | CONTINUE | SRC 505 |
| C | | SRC 510 |
| C | SUN ELLIPTIC ORBIT FACTOR | SRC 515 |
| C | | SRC 520 |
| 50 | IF(ICALL.EQ.1) GO TO 90 | SRC 525 |
| | FORBIT=0.0 | SRC 530 |
| | IF(IDAY.GT.0 .AND. IDAY.LT.367) GO TO 55 | SRC 535 |
| | FORBIT = 1.0 | SRC 540 |
| | GO TO 90 | SRC 545 |
| 55 | CONTINUE | SRC 550 |
| | DO 60 I=1,13 | SRC 555 |
| | IF(NDAY(I).EQ.IDAY) GO TO 60 | SRC 560 |
| | IF(NDAY(I).GT.IDAY) GO TO 70 | SRC 565 |
| 60 | CONTINUE | SRC 570 |
| 70 | FORBIT=RAT(I-1)+(IDAY-NDAY(I-1))*(RAT(I)-RAT(I-1))/(NDAY(I) | SRC 575 |
| | 1 -NDAY(I-1)) | SRC 580 |
| | GO TO 90 | SRC 585 |
| 80 | FORBIT=RAT(I) | SRC 590 |
| 90 | CONTINUE | SRC 595 |
| | ICALL*1 | SRC 600 |
| C | | SRC 605 |
| C | SOLAR INTENSITY | SRC 610 |
| C | | SRC 615 |
| | SS=0.0 | SRC 620 |
| | IF(V.LT.VSUN(1).OR.V.GE.VSUN(210)) RETURN | SRC 625 |
| | DO 100 I=1,210 | SRC 630 |
| | IF(VSUN(I).GE.V) GO TO 120 | SRC 635 |
| 100 | CONTINUE | SRC 640 |
| 120 | IF(VSUN(I).EQ.V) GO TO 130 | SRC 645 |
| | SS=(ESUN(I)-ESUN(I-1))*(V-VSUN(I-1))/(VSUN(I)-VSUN(I-1)) | SRC 650 |
| | +ESUN(I-1)*FORBIT | SRC 655 |
| | GO TO 140 | SRC 660 |
| 130 | SS=ESUN(I)*FORBIT | SRC 665 |
| 140 | IF(ISOURC.EQ.1) SS=SS*FPHS*FALB*2.04472E-7 | SRC 670 |
| C | CONVERT W/M-2-MICRON TO W/CM-2-MICRON | SRC 675 |
| | SS=SS*.0001 | SRC 680 |
| | RETURN | SRC 685 |
| | END | SRC 690 |

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SUBROUTINE SUBSOL(THETAS,PHIS,TIME,IDAY)                                SBS 100
C                                                                                   SBS 105
C SUBROUTINE SUBSOL CALCULATES THE SUBSOLAR POINT ANGLES                    SBS 110
C THETAS AND PHIS BASED UPON IDAY AND TIME. SINCE EACH                      SBS 115
C YEAR IS 365.25 DAYS LONG THE EXACT VALUE OF THE DECLINATION              SBS 120
C ANGLE CHANGES FROM YEAR TO YEAR. FOR PRECISE VALUES CONSULT           SBS 125
C ' THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC' PUBLISHED YEARLY         SBS 130
C BY THE U.S. GOVT. PRINTING OFFICE. ALSO, THE SOLAR POSITION               SBS 135
C IS CHARACTERIZED BY 25 POINTS BELOW; THIS SHOULD PREDICT THE SUBSOLARS  SBS 140
C ANGLES WITHIN ONE DEGREE. FOR INCREASED ACCURACY ADD MORE DATA         SBS 145
C POINTS                                                                    SBS 150
C                                                                                   SBS 155
C THE EQUATION OF TIME, EQT, IS IN MINUTES                                 SBS 160
C THE DECLINATION ANGLE, DEC IS IN DEGREES                                 SBS 165
C                                                                                   SBS 170
COMMON /MODEL/ ZM(34),PM(34),TM(34),RFNDX(34),DENSTY(16,34)           SBS 175
COMMON /IFIL/ IRD,IPR,IPU,NPR                                           SBS 180
DIMENSION NDAY(25),EQT(25),DEC(25)                                       SBS 185
DATA NDAY /1,9,21,32,44,60,91,121,141,152,160,172,182,                    SBS 190
1 190,202,213,244,274,305,309,325,335,343,355,366/                      SBS 195
DATA DEC /-23.07,-22.22,-20.08,-17.32,-13.62,-7.88,4.23,                SBS 200
1 14.83, 20.03,21.95,22.87,23.45,23.17,22.47,20.63,18.23,8.68,          SBS 205
2 -2.88,-14.18,-15.45,-19.75,-21.68,-22.75,-23.43,-23.07/           SBS 210
DATA EQT /-3.23,-6.83,-11.17,-13.57,-14.33,-12.63,-4.2,              SBS 215
1 2.83,3.57,2.45,1.10,-1.42,-3.52,-4.93,-6.25,-6.28,-0.25,           SBS 220
2 10.02,16.35,16.38,14.3,11.27,8.02,2.32,-3.23/                       SBS 225
IF(IDAY.LT.1.OR.IDAY.GT.366) GO TO 900                                    SBS 230
IF(TIME.LT.0.0.OR.TIME.GT.24.0) GO TO 910                                SBS 235
DO 10 I=1,25                                                            SBS 240
IF(NDAY(I).EQ.IDAY) GO TO 30                                           SBS 245
10 IF(NDAY(I).GT.IDAY) GO TO 20                                         SBS 250
20 I=I-1                                                                SBS 255
EQTIME=EQT(I)+(EQT(I+1)-EQT(I))*(IDAY-NDAY(I))/(NDAY(I+1)-NDAY(I))  SBS 260
DECANG=DEC(I)+(DEC(I+1)-DEC(I))*(IDAY-NDAY(I))/(NDAY(I+1)-NDAY(I))  SBS 265
GO TO 40                                                                SBS 270
30 EQTIME=EQT(I)                                                       SBS 275
DECANG=DEC(I)                                                           SBS 280
40 THETAS=DECANG                                                       SBS 285
EQTIME=EQTIME/60.0                                                     SBS 290
PHIS=15.0*(TIME+EQTIME)-180.0                                          SBS 295
IF(PHIS.LT.0.0) PHIS=PHIS+360.0                                        SBS 300
RETURN                                                                  SBS 305
900 WRITE(IPR,901) IDAY                                                SBS 310
901 FORMAT(' FROM SUBSOL - IDAY OUT OF RANGE, IDAY=',I6)             SBS 315
STOP                                                                    SBS 320
910 WRITE(IPR,902) TIME                                                SBS 325
902 FORMAT(' FROM SUBSOL - TIME OUT OF RANGE, TIME=',E12.5)          SBS 330
STOP                                                                    SBS 335
END                                                                      SBS 340

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SUBROUTINE PHASEF(V,ALT,ANGLE,RH,PHFA)                                PHS 100
C                                                                 PHS 105
C RETURNS THE AEROSOL PHASE FUNCTION FROM THE STORED DATA BASE    PHS 110
C                                                                 PHS 115
C                                                                 PHS 120
C THE TRUTH TABLE MNUM(27,26) STORED IN COMMON/MNMPHS/           PHS 125
C IN SUBROUTINE PHSOTA IS QUERIED TO DETERMINE THE PROPER PHASE   PHS 130
C FUNCTION NEEDED.                                               PHS 135
C THE 27 POSITIONS REPRESENT THE 27 SPECIFIC FREQUENCIES SHOWN IN PHS 140
C DATA STATEMENT WAVE .2-40 MICRONS.                            PHS 145
C THE NUMBERS STORED IN THESE 27 POSITIONS REPRESENT THE CORRECT PHS 150
C PHASE FUNCTIONS CHOSEN FROM THE DATA STATEMENT PHSFNC'S 1-70  PHS 155
C POSSIBLE CHOICES.                                             PHS 160
C THE 26 DATA STATEMENTS EACH HAVING 27 FREQUENCIES REPRESENT THE PHS 165
C FOLLOWING 26 MODELS;                                           PHS 170
C   1=RURAL   0%RH   2=RURAL   70%RH   3=RURAL   80%RH   PHS 175
C   4=RURAL   99%RH   5=MARITIME 0%RH   6=MARITIME 70%RH   PHS 180
C   7=MARITIME 80%RH   8=MARITIME 99%RH   9=URBAN   0%RH   PHS 185
C  10=URBAN   70%RH  11=URBAN   80%RH  12=URBAN   99%RH   PHS 190
C  13=OCEANIC 0%RH  14=OCEANIC 70%RH  15=OCEANIC 80%RH   PHS 195
C  16=OCEANIC 99%RH  17=TROPOSPH 0%RH  18=TROPOSPH 70%RH   PHS 200
C  19=TROPOSPH 80%RH  20=TROPOSPH 99%RH  21=STRATOSPHERIC PHS 205
C  22=AGED VOLCANIC 23=FRESH VOLCANIC 24=RADIATION FOG    PHS 210
C  25=ADVECTIVE FOG 26=METEORIC DUST                       PHS 215
C                                                                 PHS 220
C                                                                 PHS 225
C IN THE PRESENT VERSION THE 4 OCEANIC MODELS 13-16             PHS 230
C ARE NOT UTILIZED.                                           PHS 235
C                                                                 PHS 240
C COMMON /FIL/ IRD,IPR,IPU,NPR                                    PHS 245
C COMMON /CARD1/ MODEL,ITYPE,IEMSC,M1,M2,M3,IM,NOPRNT,TBOUND,SALB PHS 250
C COMMON /CARD2/ IHAZE,ISEASN,IVOLCN,ICSTL,ICIR,IVSA,VIS,WSS,WHM, PHS 255
C   RAINRT                                                       PHS 260
C COMMON/MNMPHS/ MNUM(27,26),PHSFNC(34,70)                       PHS 265
C DIMENSION RHPTS(4),WAVE(27),ANG(34)                            PHS 270
C DATA ANG /0.,2.,4.,8.,8.,10.,12.,16.,20.,24.,28.,32.,36.,40. PHS 275
C 1,50.,60.,70.,80.,90.,100.,110.,120.,125.,130.,135.,140.,145. PHS 280
C 2,150.,155.,160.,165.,170.,175.,180./                          PHS 285
C DATA WAVE /.2.,.3.,.55.,.6943,1.06,1.536,2.0,2.5,2.7,3.,3.2,3.39 PHS 290
C 1,5.,6.,7.2,7.9,8,7,9,2,10,0,10.59,12.5,15.0,17.2,18.5,21.3,30. PHS 295
C 2,40.0/                                                          PHS 300
C DATA RHPTS /0.0,70.0,80.0,99.0/                                PHS 305
C                                                                 PHS 310
C PHFA=0.0                                                         PHS 315
C ALAM=1.0E4/V                                                    PHS 320
C IF(ANGLE.LT.0.0.OR.ANGLE.GT.180.0) GO TO 900                  PHS 325
C IF(ALAM.LT.WAVE(1).OR.ALAM.GT.WAVE(27)) GO TO 910             PHS 330
C DETERMINE THE AEROSOL MODEL NUMBER                              PHS 335
C IF(ALT.GT.2.0) GO TO 95                                         PHS 340
C IF(IHAZE.EQ.7) WRITE(IPR,999)                                    PHS 345
C 999 FORMAT(' IHAZE=7 INACTIVE, CONTINUING WITH PHFA=0.0')     PHS 350
C IF(IHAZE.EQ.0.OR.IHAZE.EQ.7) GO TO 400                         PHS 355
C IF(IHAZE.GE.8) GO TO 90                                         PHS 360
C 0-2KM BOUNDARY LAYER MODELS, RH DEPENDENT                      PHS 365
C DO 50 I1=1,4                                                    PHS 370
C I=I1                                                            PHS 375
C IF(RHPTS(I).EQ.RH) GO TO 70                                     PHS 380
C IF(RHPTS(I).GT.RH) GO TO 60                                    PHS 385
C 50 CONTINUE                                                     PHS 390

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| 60 | IRHLO=I+1 | PHS 395 |
| | IRHHI=I | PHS 400 |
| | GO TO 80 | PHS 405 |
| 70 | IRHLO=I | PHS 410 |
| | IRHHI=I | PHS 415 |
| 80 | CONTINUE | PHS 420 |
| C | RURAL MODEL | PHS 425 |
| | IF(IHAZE.EQ.1.OR.IHAZE.EQ.2) NNO=0 | PHS 430 |
| C | MARITIME MODEL | PHS 435 |
| | IF(IHAZE.EQ.3.OR.IHAZE.EQ.4) NNO=4 | PHS 440 |
| C | URBAN MODEL | PHS 445 |
| | IF(IHAZE.EQ.5) NNO=8 | PHS 450 |
| C | TROPOSPHERIC MODEL | PHS 455 |
| | IF(IHAZE.EQ.6) NNO=16 | PHS 460 |
| | NN=NNO+IRHLO | PHS 465 |
| | GO TO 130 | PHS 470 |
| C | 0-2KM FOG MODELS, NO RH DEPENDENCE | PHS 475 |
| 90 | IF(IHAZE.EQ.8) NN=24 | PHS 480 |
| | IF(IHAZE.EQ.9) NN=26 | PHS 485 |
| | GO TO 130 | PHS 490 |
| 95 | IF(ALT.GT.10.) GO TO 110 | PHS 495 |
| C | 2-10KM TROPOSPHERIC MODEL | PHS 500 |
| | NN=18 | PHS 505 |
| | GO TO 130 | PHS 510 |
| 110 | IF(ALT.GT.30.) GO TO 120 | PHS 515 |
| C | 10-30KM STRATOSPHERIC MODELS | PHS 520 |
| C | BACKGROUND MODEL | PHS 525 |
| | IF(IVULCN.EQ.0.OR.IVULCN.EQ.1) NN=21 | PHS 530 |
| C | AGED VOLCANIC MODEL | PHS 535 |
| | IF(IVULCN.EQ.2.OR.IVULCN.EQ.4) NN=22 | PHS 540 |
| C | FRESH VOLCANIC | PHS 545 |
| | IF(IVULCN.EQ.3.OR.IVULCN.EQ.5) NN=23 | PHS 550 |
| | GO TO 130 | PHS 555 |
| C | 30-100KM METEORIC MODEL | PHS 560 |
| 120 | NN=26 | PHS 565 |
| 130 | IRH=0 | PHS 570 |
| C | | PHS 575 |
| C | DETERMINE THE BOUNDING ANGLE INDICES | PHS 580 |
| 140 | DO 210 I1=1,34 | PHS 585 |
| | I=I1 | PHS 590 |
| | IF(ANG(I).EQ.ANGLE) GO TO 230 | PHS 595 |
| | IF(ANG(I).GT.ANGLE) GO TO 220 | PHS 600 |
| 210 | CONTINUE | PHS 605 |
| 220 | IANG1=I-1 | PHS 610 |
| | IANG2=I | PHS 615 |
| | GO TO 240 | PHS 620 |
| 230 | IANG1=I | PHS 625 |
| | IANG2=I | PHS 630 |
| 240 | CONTINUE | PHS 635 |
| C | | PHS 640 |
| C | DETERMINE THE BOUNDING WAVELENGTH INDICES | PHS 645 |
| | DO 250 I1=1,27 | PHS 650 |
| | I=I1 | PHS 655 |
| | IF(WAVE(I).EQ.ALAM) GO TO 270 | PHS 660 |
| | IF(WAVE(I).GT.ALAM) GO TO 260 | PHS 665 |
| 250 | CONTINUE | PHS 670 |
| 260 | IWAV1=I-1 | PHS 675 |
| | IWAV2=I | PHS 680 |
| | GO TO 280 | PHS 685 |

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| 270 | IWAV1=I | PHS 690 |
| | IWAV2=I | PHS 695 |
| 280 | CONTINUE | PHS 700 |
| C | | PHS 705 |
| C | FUNCTION PF CHOOSES DESIRED PHASE FUNCTION FROM LOOK UP TABLE | PHS 710 |
| C | MNUM(IWAV,NN) WHERE IWAV IS FREQ. AND NN IS MODEL NO. | PHS 715 |
| C | | PHS 720 |
| C | WAVELENGTH INTERPOLATION ONLY USES PF11 AND PF21 | PHS 725 |
| C | ANGLE INTERPOLATION ONLY USES PF11 AND PF12 | PHS 730 |
| C | WAVELENGTH AND ANGLE INTERPOLATION USES PF11,PF21 AND PF12,PF22. | PHS 735 |
| C | | PHS 740 |
| | PF11=PF(NN,IWAV1,IANG1) | PHS 745 |
| | PF21=PF(NN,IWAV2,IANG1) | PHS 750 |
| | PF12=PF(NN,IWAV1,IANG2) | PHS 755 |
| | PF22=PF(NN,IWAV2,IANG2) | PHS 760 |
| C | INTERPOLATE IN WAVELENGTH THEN ANGLE | PHS 765 |
| | IF(IWAV1.EQ.IWAV2) GO TO 310 | PHS 770 |
| | IF(IANG1.EQ.IANG2) GO TO 290 | PHS 775 |
| C | BOTH INTERPOLATIONS ARE NECESSARY | PHS 780 |
| | CALL INTERP(2,ALAM,WAVE(IWAV1),WAVE(IWAV2),YANG1, | PHS 785 |
| | 1PF11,PF21) | PHS 790 |
| | CALL INTERP(2,ALAM,WAVE(IWAV1),WAVE(IWAV2),YANG2, | PHS 795 |
| | 1PF12,PF22) | PHS 800 |
| | CALL INTERP(2,ANGLE,ANG(IANG1),ANG(IANG2),Y,YANG1,YANG2) | PHS 805 |
| | GO TO 330 | PHS 810 |
| C | ONLY WAVELENGTH INTERPOLATION IS NECESSARY | PHS 815 |
| 290 | CALL INTERP(2,ALAM,WAVE(IWAV1),WAVE(IWAV2),Y,PF11, | PHS 820 |
| | 1PF21) | PHS 825 |
| | GO TO 330 | PHS 830 |
| 310 | IF(IANG1.EQ.IANG2) GO TO 320 | PHS 835 |
| C | ONLY ANGLE INTERPOLATION IS NECESSARY | PHS 840 |
| | CALL INTERP(2,ANGLE,ANG(IANG1),ANG(IANG2),Y,PF11, | PHS 845 |
| | 1PF12) | PHS 850 |
| | GO TO 330 | PHS 855 |
| C | NO INTERPOLATION IS NECESSARY | PHS 860 |
| 320 | Y=PF(NN,IWAV1,IANG1) | PHS 865 |
| 330 | CONTINUE | PHS 870 |
| | PHFA=Y | PHS 875 |
| C | | PHS 880 |
| C | HUMIDITY DEPENDENCE | PHS 885 |
| | IF(ALT.GT.2.0.OR.NN.GE.17.OR.IRHLO.EQ.IRHMI) GO TO 400 | PHS 890 |
| | IF(IRH.EQ.1) GO TO 340 | PHS 895 |
| | NN=NN0+IRHMI | PHS 900 |
| | PHFA1=PHFA | PHS 905 |
| | IRH=1 | PHS 910 |
| | GO TO 280 | PHS 915 |
| 340 | CONTINUE | PHS 920 |
| | PHFA2=PHFA | PHS 925 |
| | CALL INTERP(1,RH,RMPTS(IRHLO),RMPTS(IRHMI), | PHS 930 |
| | CPHFA,PHFA1,PHFA2) | PHS 935 |
| 400 | CONTINUE | PHS 940 |
| | RETURN | PHS 945 |
| 900 | WRITE(IPR,901) ANGLE | PHS 950 |
| 901 | FORMAT('OPROM PHASEF- SCATTERING ANGLE IS OUT OF RANGE, ' | PHS 955 |
| | ' , 'ANGLE = ',E12.5) | PHS 960 |
| | STOP | PHS 965 |
| 910 | WRITE(IPR,911) ALAM | PHS 970 |
| 911 | FORMAT('OPROM PHASEF- ALAM IS OUT OF RANGE, ALAM = ',E12.5) | PHS 975 |
| | STOP | PHS 980 |
| | END | PHS 985 |

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| | FUNCTION PF(NN,I,J) | PF | 100 |
| C | CALL THE APPROPRIATE PHASE FUNCTION | PF | 105 |
| | COMMON/MNMPHS/ MNUM(27,26),PHSFNC(34,70) | PF | 110 |
| | M=MNUM(I,NN) | PF | 115 |
| | PF=PHSFNC(J,M) | PF | 120 |
| | RETURN | PF | 125 |
| | END | PF | 130 |

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|-----|--|-----|-----|
| | SUBROUTINE INTERP(INTYPE,X,X1,X2,F,F1,F2) | INT | 100 |
| C | SUBROUTINE INTERP INTERPOLATES TO DETERMINE THE VALUE OF F | INT | 105 |
| C | AT X, GIVEN F1 AT X1 AND F2 AT X2. | INT | 110 |
| C | INTYPE=1 FOR LINEAR INTERPOLATION | INT | 115 |
| C | INTYPE=2 FOR LOGARITHMIC INTERPOLATION | INT | 120 |
| | ITYPE=INTYPE | INT | 125 |
| | IF(F1.LE.0.O.OR.F2.LE.0.O) ITYPE=1 | INT | 130 |
| | IF(ITYPE.EQ.2) GO TO 100 | INT | 135 |
| C | LINEAR INTERPOLATION | INT | 140 |
| | F=F1+(X-X1)*(F2-F1)/(X2-X1) | INT | 145 |
| | RETURN | INT | 150 |
| 100 | CONTINUE | INT | 155 |
| | A1=ALOG(F1) | INT | 160 |
| | A2=ALOG(F2) | INT | 165 |
| | A=A1+(X-X1)*(A2-A1)/(X2-X1) | INT | 170 |
| | F=EXP(A) | INT | 175 |
| | RETURN | INT | 180 |
| | END | INT | 185 |

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|-----|---|-----|-----|
| | FUNCTION TNRAIN(RR) | TNR | 100 |
| CCC | COMMON /CNSTNS/ PI,CA,DEG.CCAIR,BIGNUM,BIGEXP | TNR | 105 |
| | COMMON /CARDS/ H1,H2,ANGLE,RANGE,BETA,RE,LEN | TNR | 110 |
| CCC | CALCULATES TRANSMISSION DUE TO RAIN AS A FUNCTION OF | TNR | 115 |
| CCC | RR=RAIN RATE IN MM/HR | TNR | 120 |
| CCC | RANGE=SLANT RANGE KM | TNR | 125 |
| CCC | | TNR | 130 |
| CCC | ASSUMES A MARSHALL-PALMER RAIN DROP SIZE DISTRIBUTION | TNR | 135 |
| CCC | N(D)=NZERO*EXP(-A*D) | TNR | 140 |
| CCC | NZERO=8.53 (MM-1) (M-3) | TNR | 145 |
| CCC | A=41.*RR**(-0.21) | TNR | 150 |
| CCC | D=DROP DIAMETER (CM) | TNR | 155 |
| CCC | | TNR | 160 |
| CCC | REAL NZERO | TNR | 165 |
| | DATA NZERO /8000./ | TNR | 170 |
| CCC | | TNR | 175 |
| | A=41./RR**0.21 | TNR | 180 |
| CCC | | TNR | 185 |
| | IF(RR.LE.0)TNRAIN=1. | TNR | 190 |
| | IF(RR.LE.0)RETURN | TNR | 195 |
| CCC | | TNR | 200 |
| | TNRAIN=EXP(-PI*NZERO*RANGE/A**3) | TNR | 205 |
| | RETURN | TNR | 210 |
| | END | TNR | 215 |
| | | TNR | 220 |

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SUBROUTINE CIRRUS(CTHIK,CALT,ISEED,CPROB)
C*****
C* ROUTINE TO GENERATE ALTITUDE PROFILES OF CIRRUS DENSITY ** CIR 100
C* PROGRAMMED BY M.J. POST ** CIR 105
C* R.A. RICHTER NOAA/WPL ** CIR 110
C* BOULDER, COLORADO ** CIR 115
C* 01/27/1981 ** CIR 120
C* ** CIR 125
C* ** CIR 130
C* ** CIR 135
C* INPUTS! ** CIR 140
C* CTHIK - CIRRUS THICKNESS (KM) ** CIR 145
C* 0 = USE THICKNESS STATISTICS ** CIR 150
C* .NE. 0 = USER DEFINES THICKNESS ** CIR 155
C* ** CIR 160
C* CALT - CIRRUS BASE ALTITUDE (KM) ** CIR 165
C* 0 = USE CALCULATED VALUE ** CIR 170
C* .NE. 0 = USER DEFINES BASE ALTITUDE ** CIR 175
C* ** CIR 180
C* ICIR - CIRRUS PRESENCE FLAG ** CIR 185
C* 0 = NO CIRRUS ** CIR 190
C* .NE. 0 = USE CIRRUS PROFILE ** CIR 195
C* ** CIR 200
C* MODEL - ATMOSPHERIC MODEL ** CIR 205
C* 1-5 AS IN MAIN PROGRAM ** CIR 210
C* MODEL = 0,6,7 NOT USED SET TO 2 ** CIR 215
C* ** CIR 220
C* ISEED - RANDOM NUMBER INITIALIZATION FLAG. ** CIR 225
C* 0 = USE DEFAULT MEAN VALUES FOR CIRRUS ** CIR 230
C* .NE. 0 = INITIAL VALUE OF SEED FOR RAND ** CIR 235
C* FUNCTION. CHANGE SEED VALUE EACH RUN FOR ** CIR 240
C* DIFFERENT RANDOM NUMBER SEQUENCES. THIS ** CIR 245
C* PROVIDES FOR STATISTICAL DETERMINATION ** CIR 250
C* OF CIRRUS BASE ALTITUDE AND THICKNESS. ** CIR 255
C* ** CIR 260
C* OUTPUTS! ** CIR 265
C* CTHIK - CIRRUS THICKNESS (KM) ** CIR 270
C* CALT - CIRRUS BASE ALTITUDE (KM) ** CIR 275
C* DENSITY(16,1) - ARRAY, ALTITUDE PROFILE OF CIRRUS DENSITY ** CIR 280
C* CPROB - CIRRUS PROBABILITY ** CIR 285
C* ** CIR 290
C*****
C** CIR 295
C** CIR 300
COMMON /CARD1/ MODEL, ITYPE, IEMSCY, M1, M2, M3, IM, NOPRNY, TBOUND, SALE
C** CIR 305
COMMON /CARD2/ IHAZE, ISEASH, IVULCN, ICSTL, ICIR, IVSA, VIS, NSS, WWW,
1 RAINRT
C** CIR 310
COMMON RELHUM(34), H5TOR(34), ICH(4), VH(16), TX(16), W(16)
C** CIR 315
COMMON /CNTRL/ KMAX, M, IMAX, NL, ML, IKLO, I50GEO
C** CIR 320
COMMON /CARD4/ V1, V2, DV
C** CIR 325
COMMON /MODEL/ Z(34), PM(34), TM(34), RFNDX(34), DENSITY(16,34)
C** CIR 330
DIMENSION CBASE(5,2), TSTAT(11), PYAB(5), CAMEAN(5)
C** CIR 335
EQUIVALENCE (CBASE1(1), CBASE(1,1)), (CBASE2(1), CBASE(1,2))
C** CIR 340
C** CIR 355
DATA CAMEAN / 11.0, 10.0, 8.0, 7.0, 5.0 /
C** CIR 360
DATA PYAB / 0.5, 0.4, 0.5, 0.45, 0.4 /
C** CIR 365
DATA CBASE1 / 7.5, 7.3, 4.5, 4.5, 2.5 /
C** CIR 370
DATA CBASE2 / 16.5, 13.5, 14.0, 9.5, 10.0 /
C** CIR 375
DATA TSTAT / 0.0, .291, .509, .655, .764, .837, .892,
C** CIR 380
+ 0.920, 0.960, 0.982, 1.00 /
C** CIR 385
C** CIR 390

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| | | | |
|----|---|-----|-----|
| C | SET CIRRUS PROBABILITY AND PROFILE TO ALL ZEROES | CIR | 395 |
| C | | CIR | 400 |
| | CPROB = 0.0 | CIR | 405 |
| | MDL = MODEL | CIR | 410 |
| C | | CIR | 415 |
| | DO 10 I=1,34 | CIR | 420 |
| 10 | DENSITY(16,I)=0. | CIR | 425 |
| C | | CIR | 430 |
| C | CHECK IF USER WANTS TO USE A THICKNESS VALUE HE PROVIDES, CALCULATE | CIR | 435 |
| C | A STATISTICAL THICKNESS, OR USE A MEAN THICKNESS (ISEED = 0). | CIR | 440 |
| C | DEFAULTED MEAN CIRRUS THICKNESS IS 1.0 KM. | CIR | 445 |
| C | | CIR | 450 |
| | IF (CTHIK .GT. 0.0) GO TO 25 | CIR | 455 |
| | IF (ISEED .NE. 0) GO TO 15 | CIR | 460 |
| | CTHIK = 1.0 | CIR | 465 |
| | GO TO 25 | CIR | 470 |
| C | | CIR | 475 |
| C | CALCULATE CLOUD THICKNESS USING LOWTRAN CIRRUS THICKNESS STATISTICS | CIR | 480 |
| C | NOTE - THIS ROUTINE USES A UNIFORM RANDOM NUMBER GENERATOR | CIR | 485 |
| C | FUNCTION (RANF) WHICH RETURNS A NUMBER BETWEEN 0 AND 1. | CIR | 490 |
| C | THIS FEATURE IS MACHINE DEPENDENT!! | CIR | 495 |
| C | | CIR | 500 |
| 15 | CALL RANSET(ISEED) | CIR | 505 |
| | URN = RANDOM(IDUM) | CIR | 510 |
| | DO 20 I = 1, 10 | CIR | 515 |
| | IF (URN .GE. TSTAT(I) .AND. URN .LT. TSTAT(I+1)) CTHIK = I-1 | CIR | 520 |
| 20 | CONTINUE | CIR | 525 |
| | CTHIK = CTHIK / 2.0 + RANDOM(IDUM) / 2.0 | CIR | 530 |
| C | | CIR | 535 |
| C | DENCIR IS CIRRUS DENSITY IN KM-1 | CIR | 540 |
| C | | CIR | 545 |
| 25 | DENCIR = 0.07 * CTHIK | CIR | 550 |
| C | | CIR | 555 |
| C | BASE HEIGHT CALCULATIONS | CIR | 560 |
| C | | CIR | 565 |
| | IF (MODEL .LT. 1 .OR. MODEL .GT. 5) MDL = 2 | CIR | 570 |
| | CPRDB = 100.0 * PTAB(MDL) | CIR | 575 |
| C | | CIR | 580 |
| | HMAX = CBASE(MDL,2) - CTHIK | CIR | 585 |
| | BRANGE = HMAX - CBASE(MDL,1) | CIR | 590 |
| | IF (CALT .GT. 0.0) GO TO 27 | CIR | 595 |
| | IF (ISEED .NE. 0) GO TO 26 | CIR | 600 |
| | CALT = CAMEAN(MDL) | CIR | 605 |
| | GO TO 27 | CIR | 610 |
| 26 | CALT = BRANGE * RANDOM(IDUM) + CBASE(MDL,1) | CIR | 615 |
| C | | CIR | 620 |
| C | PUT CIRRUS DENSITY IN CORRECT ALTITUDE SENS. IF MODEL = 7. | CIR | 625 |
| C | INTERPOLATE RH(16,I) FOR NON-STANDARD ALTITUDE BOUNDARIES. | CIR | 630 |
| C | | CIR | 635 |
| 27 | IF(MODEL .EQ. 7) GO TO 60 | CIR | 640 |
| | IV1=INT(CALT) | CIR | 645 |
| | IV2=INT(CALT+CTHIK) | CIR | 650 |
| | DO 30 I = 2, 16 | CIR | 655 |
| | IF (I .GE. IV1 .AND. I .LE. IV2) DENSITY(16,I+1) = DENCIR | CIR | 660 |
| 30 | CONTINUE | CIR | 665 |
| C | | CIR | 670 |
| C | ADJUST FIRST AND LAST CIRRUS LEVEL IF CLOUD DOES NOT ENTIRELY | CIR | 675 |
| C | FILL EACH LEVEL. | CIR | 680 |
| C | | CIR | 685 |

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      IHGT1 = INT( CALT )
      IHGT2 = INT( CALT + CTHIK )
      IF( IHGT1 . NE . IHGT2 ) GO TO 35
      DENSTY(16,IHGT1+1) = DENSTY( 16,IHGT1+1)*CTHIK
      RETURN
35  PCT1 = 1.0 - ( CALT - IHGT1 )
      DENSTY(16,IHGT1+1) = DENSTY(16,IHGT1+1) * PCT1
      PCT2 = ( CALT + CTHIK ) - IHGT2
      DENSTY(16,IHGT2+1) = DENSTY(16,IHGT2+1) * PCT2
      RETURN
C
C  INTERPOLATE DENSTY(16,I) FOR USER SUPPLIED ALTITUDE BOUNDARIES
C
60  TOP = CALT + CTHIK
      BOTTOM = CALT
      IF (TOP .LT. Z(1)) RETURN
      IF (BOTTOM .GT. Z(ML)) RETURN
      IML = ML - 1
      DO 70 I=1,IML
          ZMIN = Z(I)
          ZMAX = Z(I+1)
          DENOM = ZMAX - ZMIN
          IF(BOTTOM.LE.ZMIN .AND. TOP.GE.ZMAX) DENSTY(16,I) = DENCIR
          IF(BOTTOM.GE.ZMIN .AND. TOP.LT.ZMAX)
      *   DENSTY(16,I) = DENCIR * CTHIK/DENOM
          IF(BOTTOM.GE.ZMIN .AND. TOP.GE.ZMAX .AND. BOTTOM.LT.ZMAX)
      +   DENSTY(16,I) = DENCIR * (ZMAX - BOTTOM)/ DENOM
          IF(BOTTOM.LT.ZMIN .AND. TOP.LE.ZMAX .AND.TOP.GT.ZMIN)
      +   DENSTY(16,I) = DENCIR * (TOP - ZMIN) / DENOM
70  CONTINUE
      RETURN
      END

      FUNCTION RANDOM(10UM)
      RANF IS A UNIFORM RANDOM NUMBER GENERATOR WHICH RETURNS A
      NUMBER BETWEEN 0 AND 1.0. RANF IS MACHINE DEPENDENT.
      RANDOM=RANF()
      RETURN
      END

```

CIR 690
 CIR 695
 CIR 700
 CIR 705
 CIR 710
 CIR 715
 CIR 720
 CIR 725
 CIR 730
 CIR 735
 CIR 740
 CIR 745
 CIR 750
 CIR 755
 CIR 760
 CIR 765
 CIR 770
 CIR 775
 CIR 780
 CIR 785
 CIR 790
 CIR 795
 CIR 800
 CIR 805
 CIR 810
 CIR 815
 CIR 820
 CIR 825
 CIR 830
 CIR 835
 CIR 840
 CIR 845

R00 100
 R00 105
 R00 110
 R00 115
 R00 120
 R00 125

| | | | | |
|----|---|---|-----|-----|
| | SUBROUTINE | MARINE(VIS,MODEL,WS,WH,ICSTL,BEXT,BABS,NL) | MAR | 100 |
| C | | | MAR | 105 |
| C | | THIS SUBROUTINE DETERMINES AEROSOL EXT & ABS COEFFICIENTS | MAR | 110 |
| C | | FOR THE NAVY MARITIME MODEL | MAR | 115 |
| C | | CODED BY STJ GATHMAN - NRL | MAR | 120 |
| C | | | MAR | 125 |
| C | | INPUTS- | MAR | 130 |
| C | | WSS = CURRENT WIND SPEED (M/S) | MAR | 135 |
| C | | WHH = 24 HOUR AVERAGE WIND SPEED (M/S) | MAR | 140 |
| C | | RHH = RELATIVE HUMIDITY (PERCENTAGE) | MAR | 145 |
| C | | VIS = METEOROLOGICAL RANGE (KM) | MAR | 150 |
| C | | ICTL = AIR MASS CHARACTER 1 = OPEN OCEAN | MAR | 155 |
| C | | 10 = STRONG CONTINENTAL INFLUENCE | MAR | 160 |
| C | | MODEL = MODEL ATMOSPHERE | MAR | 165 |
| C | | | MAR | 170 |
| C | | OUTPUTS- | MAR | 175 |
| C | | BEXT = EXTINCTION COEFFICIENT (KM-1) | MAR | 180 |
| C | | BABS = ABSORPTION COEFFICIENT (KM-1) | MAR | 185 |
| C | | | MAR | 190 |
| | COMMON | /MART/ RHH | MAR | 195 |
| | COMMON | /IFIL/IRD,IPR,IPU,NPR | MAR | 200 |
| | COMMON | /CNSTNS/ PI,CA,DEG,GCAIR,DIGNUM,BIGEXP | MAR | 205 |
| | COMMON/A/Y1QEXT(40,4),T2QEXT(40,4),T3QEXT(40,4), | | MAR | 210 |
| | Y1QABS(40,4),Y2QABS(40,4),Y3QABS(40,4),ALAM(40),AREL(4) | | MAR | 215 |
| | COMMON/AER/A1, A2, A3 | | MAR | 220 |
| | DIMENSION WSPD(8), BEXT(4,40), BABS(4,40) | | MAR | 225 |
| | DIMENSION RHD(8) | | MAR | 230 |
| | DATA WSPD/6.9, 4.1, 4.1, 10.29, 6.89, 12.35, 7.2, 6.9/ | | MAR | 235 |
| | DATA RHD/80., 75.63, 76.2, 77.13, 75.24, 80.53, 45.89, 80./ | | MAR | 245 |
| | PISC = PI/1000.0 | | MAR | 245 |
| | WRITE(IPR,890) | | MAR | 250 |
| | | | MAR | 255 |
| C | | CHECK LIMITS OF MODEL VALIDITY | MAR | 260 |
| C | | | MAR | 265 |
| | RH = RHH | | MAR | 270 |
| | IF(RHH.GT.0.) GO TO 10 | | MAR | 275 |
| | RH=RHD(MODEL+1) | | MAR | 280 |
| 10 | IF(WS.GT.20.0) WS=20. | | MAR | 285 |
| | IF(WH.GT.20.0) WH = 20. | | MAR | 290 |
| | IF(RH.GT.98.0) RH = 98. | | MAR | 295 |
| | IF(RH.LT.50.0.AND.RH.GE.0.0) RH = 50. | | MAR | 300 |
| | IF(ICSTL.LT.1.OR.ICSTL.GT.10) ICSTL = 3 | | MAR | 305 |
| | | | MAR | 310 |
| C | | FIND SIZE DISTRIBUTION PARAMETERS FROM METEOROLOGY INPUT | MAR | 315 |
| C | | | MAR | 320 |
| | IF(WH.LE.0.) WRITE(IPR,920) | | MAR | 325 |
| | IF(WH.LE.0.0) WH = WSPD(MODEL + 1) | | MAR | 330 |
| | IF(WS.LE.0.) WRITE(IPR,930) | | MAR | 335 |
| | IF(WS.LE.0.0) WS=WH | | MAR | 340 |
| | WRITE(IPR,910)WS,WH,RH,ICSTL | | MAR | 345 |
| | | | MAR | 350 |
| C | | F IS A RELATIVE HUMIDITY DEPENDENT GROWTH CORRECTION | MAR | 355 |
| C | | TO THE ATTENUATION COEFFICIENT. | MAR | 360 |
| C | | | MAR | 365 |
| | F=(2.*RH/100.)/(6.*(1.-RH/100.))**.33333 | | MAR | 370 |
| | A1=2000.0*ICSTL*ICSTL | | MAR | 375 |
| | A2 = AMAX1(5.866*(WH-2.2), 0.5) | | MAR | 380 |
| | A3 = AMAX1(0.01927*(WS-2.2), 1.14E-5) | | MAR | 385 |
| C | | | MAR | 390 |

| | | | |
|-----|--|-----|-----|
| C | FIND EXTINCTION AT 0.55 MICRONS AND NORMALIZE TO 1. | MAR | 395 |
| C | | MAR | 400 |
| C | INTERPOLATE FOR RELATIVE HUMIDITY | MAR | 405 |
| C | | MAR | 410 |
| | DO 40 J=2,4 | MAR | 415 |
| | IF(RH.LE.AREL(J)) GO TO 42 | MAR | 420 |
| 40 | CONTINUE | MAR | 425 |
| 42 | DELRH=AREL(J)-AREL(J-1) | MAR | 430 |
| | DELRHV=RH-AREL(J-1) | MAR | 435 |
| | RATIO=DELRHV/DELRH | MAR | 440 |
| | QE1=T1QEXT(4,J-1)+(T1QEXT(4,J)-T1QEXT(4,J-1))*RATIO | MAR | 445 |
| | QE2=T2QEXT(4,J-1)+(T2QEXT(4,J)-T2QEXT(4,J-1))*RATIO | MAR | 450 |
| | QE3=T3QEXT(4,J-1)+(T3QEXT(4,J)-T3QEXT(4,J-1))*RATIO | MAR | 455 |
| | TOTAL = A1*10.**QE1 + A2*10.**QE2 + A3*10.**QE3 | MAR | 460 |
| | EXT55=PISC*TOTAL/F | MAR | 465 |
| C | | MAR | 470 |
| C | IF METEOROLOGICAL RANGE NOT SPECIFIED, FIND FROM METEOR DATA | MAR | 475 |
| C | | MAR | 480 |
| | IF(VIS.LE.0.) VIS=3.912/(EXT55+0.01159) | MAR | 485 |
| | C=(1./EXT55)*(PISC/F) | MAR | 490 |
| | A1=C*A1 | MAR | 495 |
| | A2=C*A2 | MAR | 500 |
| | A3=C*A3 | MAR | 505 |
| C | | MAR | 510 |
| C | CALCULATE NORMALIZED ATTENUATION COEFFICIENTS | MAR | 515 |
| C | | MAR | 520 |
| | DO 45 I=1,40 | MAR | 525 |
| | T1XV = T1QEXT(I,J-1) + (T1QEXT(I,J) - T1QEXT(I,J-1))*RATIO | MAR | 530 |
| | T2XV = T2QEXT(I,J-1) + (T2QEXT(I,J) - T2QEXT(I,J-1))*RATIO | MAR | 535 |
| | T3XV = T3QEXT(I,J-1) + (T3QEXT(I,J) - T3QEXT(I,J-1))*RATIO | MAR | 540 |
| | T1AV = T1QABS(I,J-1) + (T1QABS(I,J) - T1QABS(I,J-1))*RATIO | MAR | 545 |
| | T2AV = T2QABS(I,J-1) + (T2QABS(I,J) - T2QABS(I,J-1))*RATIO | MAR | 550 |
| | T3AV = T3QABS(I,J-1) + (T3QABS(I,J) - T3QABS(I,J-1))*RATIO | MAR | 555 |
| | BEXT(NL,I)=A1*10**(T1XV)+A2*10**(T2XV)+A3*10**(T3XV) | MAR | 560 |
| | BABS(NL,I)=A1*10**(T1AV)+A2*10**(T2AV)+A3*10**(T3AV) | MAR | 565 |
| 45 | CONTINUE | MAR | 570 |
| | WRITE(IPR,900) VIS | MAR | 575 |
| | RETURN | MAR | 580 |
| 890 | FORMAT('O MARINE AEROSOL MODEL USED') | MAR | 585 |
| 900 | FORMAT('O T10, VIS = ',F10.2,' KM') | MAR | 590 |
| 910 | FORMAT('O WIND SPEED = ',F8.2,' M/SEC',/,T10, | MAR | 595 |
| | 1 'WIND SPEED (24 HR AVERAGE) = ',F8.2,' M/SEC',/, | MAR | 600 |
| | 2 T10,'RELATIVE HUMIDITY = ',F8.2,' PERCENT',/, | MAR | 605 |
| | 3 T10,'AIRMASS CHARACTER = ',I3) | MAR | 610 |
| 920 | FORMAT('O NS NOT SPECIFIED, A DEFAULT VALUE IS USED') | MAR | 615 |
| 930 | FORMAT('O NH NOT SPECIFIED, A DEFAULT VALUE IS USED') | MAR | 620 |
| | END | MAR | 625 |

| | | |
|---|--|---------|
| C | SUBROUTINE LAYVSA(K,TMP,DP,RH,AHAZE,VIS1,IHA1,ISEA1,IVUL1) | LVS 100 |
| C | THIS SUBROUTINE RESTRUCTURES THE ATMOSPHERIC PROFILE | LVS 105 |
| C | TO PROVIDE FINER LAYERING NEAR THE GROUND FOR USE WITH | LVS 110 |
| C | THE V.S.A. OPTION - IT RETURNS PRESSURE,TEMPERATURE, | LVS 115 |
| C | AND AMOUNTS TO SUBROUTINE NSMDL | LVS 120 |
| C | CODEING BEFORE 100 CONTINUE IS FOR STANDARD MODELS | LVS 125 |
| C | | LVS 130 |
| C | CODEING AFTER 100 MERGES MODEL 7 WITH V.S.A. | LVS 135 |
| C | MODEL=0 AND IVSA=1 NOT ALLOWED | LVS 145 |
| C | COMMON /CNTRL/ KMAX,M,IKMAX,NL,ML,IKLO,ISSGEO | LVS 150 |
| C | COMMON /MODEL/ Z(34) | LVS 151 |
| C | COMMON /CARD1/ MODEL,IATYPE,IEMSC,T,M1,M2,M3,IM,NOPRNT,TBOUND,SALB | LVS 155 |
| C | COMMON /CARD2/ IHAZE,ISEASN,IVULCN,ICSTL,ICIR,IVSA,VIS,WSS,MWH, | LVS 160 |
| C | 1 RAINRT | LVS 165 |
| C | COMMON /MDATA/ZM(34),P(34,7),T(34,7),WH(34,7),NO(34,7), | LVS 170 |
| C | X HMIX(34) | LVS 175 |
| C | COMMON /ZVSALY/ ZVSA(10),RHVSA(10),AHVSA(10),IHVSA(10) | LVS 180 |
| C | COMMON /NSINP/AINP(7,24) | LVS 185 |
| C | COMMON /IFIL/IRD,IPR,IPU,NPR | LVS 190 |
| C | DIMENSION TMPN(34),DPN(34),RHN(34),IHN(34),AHAN(34) | LVS 195 |
| C | DIMENSION ZNEW(24) | LVS 200 |
| C | DATA ZNEW/1.,2.,3.,4.,5.,6.,7.,8.,9.,10.,11.,12., | LVS 205 |
| C | C 14.,16.,18.,20.,22.,25.,30.,35.,40.,50.,70.,100./ | LVS 210 |
| C | HMVSA=ZVSA(9) | LVS 215 |
| C | IF(MODEL.EQ.0.OR.MODEL.EQ.7) GO TO 100 | LVS 220 |
| C | P(K,7)=0. | LVS 225 |
| C | TMP=0. | LVS 230 |
| C | DP=0. | LVS 235 |
| C | RH=0. | LVS 240 |
| C | WH(K,7)=0. | LVS 245 |
| C | NO(K,7)=0. | LVS 250 |
| C | AHAZE=0. | LVS 255 |
| C | VIS1=0. | LVS 260 |
| C | ISEA=0 | LVS 265 |
| C | IVUL1=0 | LVS 270 |
| C | IF(N.EQ.9) GO TO 20 | LVS 275 |
| C | Z(N)=ZVSA(N) | LVS 280 |
| C | RH(N)=RHVSA(N) | LVS 285 |
| C | AHAZE=AHVSA(N) | LVS 290 |
| C | IHA1=IHVSA(N) | LVS 295 |
| C | IF(N1.EQ.0)M1=MODEL | LVS 300 |
| C | IF(N2.EQ.0)M2=MODEL | LVS 305 |
| C | IF(N3.EQ.0)M3=MODEL | LVS 310 |
| C | RETURN | LVS 315 |
| C | 10 ZN1=HMVSA*0.01 | LVS 320 |
| C | IF(HMVSA.LT.3.)M1=33 | LVS 325 |
| C | IF(HMVSA.LT.1.)M1=34 | LVS 330 |
| C | IF(HMVSA.EQ.2.)M1=32 | LVS 335 |
| C | MODEL=34-M1 | LVS 340 |
| C | IM=N-10-MDEL | LVS 345 |
| C | IF(IM.GE.1)Z(N)=ZNEW(IM) | LVS 350 |
| C | IF(N.EQ.10)Z(N)=ZN1 | LVS 355 |
| C | RETURN | LVS 360 |
| C | | LVS 365 |
| C | MODEL 7 CODEING | LVS 370 |
| C | OLD LAYERS AEROSOL RETURNED | LVS 375 |
| C | NEW LAYERS P,T,DP,AEROSOL | LVS 380 |
| C | 100 CONTINUE | LVS 385 |

| | | |
|-----|--|---------|
| | ZVSA(10)=ZVSA(9)+0.01 | LVS 395 |
| | RHVSA(10)=0. | LVS 400 |
| | AHVSA(10)=0. | LVS 405 |
| | IHVSA(10)=0 | LVS 410 |
| | JML=ML | LVS 415 |
| | IF(MODEL.EQ.0)WRITE (IPR,900) | LVS 420 |
| | IF(MODEL.EQ.0)RETURN | LVS 425 |
| | IF(K.GT.1) GO TO 200 | LVS 430 |
| | ML=ML+10 | LVS 435 |
| | IF(ML.GT.34)WRITE(IPR,910) | LVS 440 |
| | IF(ML.GT.34)ML=34 | LVS 445 |
| | J=1 | LVS 450 |
| | KN=1 | LVS 455 |
| | L=1 | LVS 460 |
| 110 | IF(KN.GT.10)GO TO 140 | LVS 465 |
| | JL=J-1 | LVS 470 |
| | IF(JL.LT.1)JL=1 | LVS 475 |
| | JP=JL+1 | LVS 480 |
| | IF(ZVSA(KN).EQ.AINP(1,JL))GO TO 150 | LVS 485 |
| | IF(ZVSA(KN).EQ.AINP(1,JP))GO TO 150 | LVS 490 |
| | IF(ZVSA(KN).GT.AINP(1,JL).AND.ZVSA(KN).LT.AINP(1,JP))GO TO 115 | LVS 495 |
| | GO TO 140 | LVS 500 |
| 115 | Z(L)=ZVSA(KN) | LVS 505 |
| | DIP=AINP(1,JP)-AINP(1,JL) | LVS 510 |
| | DZ=ZVSA(KN)-AINP(1,JL) | LVS 515 |
| | DLIN=DZ/DIP | LVS 520 |
| | P(L,7)=(AINP(2,JP)-AINP(2,JL))*DLIN+AINP(2,JL) | LVS 525 |
| | T(L,7)=0. | LVS 530 |
| | YMPN(L)=(AINP(3,JP)-AINP(3,JL))*DLIN+AINP(3,JL) | LVS 535 |
| | DPN(L)=(AINP(4,JP)-AINP(4,JL))*DLIN+AINP(4,JL) | LVS 540 |
| | RHN(L)=(AINP(5,JP)-AINP(5,JL))*DLIN+AINP(5,JL) | LVS 545 |
| | WH(L,7)=(AINP(6,JP)-AINP(6,JL))*DLIN+AINP(6,JL) | LVS 550 |
| | WD(L,7)=(AINP(7,JP)-AINP(7,JL))*DLIN+AINP(7,JL) | LVS 555 |
| | IHN(L)=IHVSA(KN) | LVS 560 |
| | AHAN(L)=AHVSA(KN) | LVS 565 |
| | FAC=(ZVSA(KN)-AINP(1,JL))/DIP | LVS 570 |
| | IF(AINP(2,JP).LE.0.0.OR.AINP(2,JL).LE.0.) GO TO 122 | LVS 575 |
| | P(L,7)=AINP(2,JL)*(AINP(2,JP)/AINP(2,JL))*FAC | LVS 580 |
| 122 | IF(AINP(3,JP).LE.0.0.OR.AINP(3,JL).LE.0.) GO TO 124 | LVS 585 |
| | YMPN(L)=AINP(3,JL)*(AINP(3,JP)/AINP(3,JL))*FAC | LVS 590 |
| 124 | IF(AINP(4,JP).LE.0.0.OR.AINP(4,JL).LE.0.) GO TO 126 | LVS 595 |
| | DPN(L)=AINP(4,JL)*(AINP(4,JP)/AINP(4,JL))*FAC | LVS 600 |
| 126 | IF(AINP(5,JP).LE.0.0.OR.AINP(5,JL).LE.0.) GO TO 128 | LVS 605 |
| | RHN(L)=AINP(5,JL)*(AINP(5,JP)/AINP(5,JL))*FAC | LVS 610 |
| 128 | IF(AINP(6,JP).LE.0.0.OR.AINP(6,JL).LE.0.) GO TO 130 | LVS 615 |
| | WH(L,7)=AINP(6,JL)*(AINP(6,JP)/AINP(6,JL))*FAC | LVS 620 |
| 130 | IF(AINP(7,JP).LE.0.0.OR.AINP(7,JL).LE.0.) GO TO 132 | LVS 625 |
| | WD(L,7)=AINP(7,JL)*(AINP(7,JP)/AINP(7,JL))*FAC | LVS 630 |
| 132 | CONTINUE | LVS 635 |
| | IF(L.EQ.ML) GO TO 200 | LVS 640 |
| | L=L+1 | LVS 645 |
| | KN=KN+1 | LVS 650 |
| | GO TO 110 | LVS 655 |
| 140 | Z(L)=AINP(1,J) | LVS 660 |
| | P(L,7)=AINP(2,J) | LVS 665 |
| | T(L,7)=0. | LVS 670 |
| | YMPN(L)=AINP(3,J) | LVS 675 |
| | DPN(L)=AINP(4,J) | LVS 680 |
| | RHN(L)=AINP(5,J) | LVS 685 |

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| | WH(L,7)=AINP(6,J) | LVS 690 |
| | WO(L,7)=AINP(7,J) | LVS 695 |
| | IHN(L)=0 | LVS 700 |
| | IF(KN.LE.9) IHN(L)=IHVSA(KN) | LVS 705 |
| | AHAN(L)=0. | LVS 710 |
| | IF(KN.LE.9) GO TO 180 | LVS 715 |
| 145 | IF(J.EQ.JML)GO TO 200 | LVS 720 |
| | IF(L.EQ.ML)GO TO 200 | LVS 725 |
| | L=L+1 | LVS 730 |
| | J=J+1 | LVS 735 |
| | GO TO 110 | LVS 740 |
| 150 | ML=ML-1 | LVS 745 |
| | J=J+1 | LVS 750 |
| | GO TO 115 | LVS 755 |
| 160 | KL=KN-1 | LVS 760 |
| | IF(KL.LE.0)KL=1 | LVS 765 |
| | KP=KL+1 | LVS 770 |
| | DIF=ZVSA(KP)-ZVSA(KL) | LVS 775 |
| | DZ=AINP(1,J)-ZVSA(KL) | LVS 780 |
| | DLIN=DZ/DIF | LVS 785 |
| | AHAN(L)=(AHVSA(KP)-AHVSA(KL))*DLIN+AHVSA(KL) | LVS 790 |
| | GO TO 145 | LVS 795 |
| 200 | TMP=TMPN(K) | LVS 800 |
| | VIS1=0. | LVS 805 |
| | ISEA1=0 | LVS 810 |
| | IVUL1=0 | LVS 815 |
| | DP=DPN(K) | LVS 820 |
| | RH=RHN(K) | LVS 825 |
| | IHA1=IHN(K) | LVS 830 |
| | AHAZE=AHAN(K) | LVS 835 |
| | RETURN | LVS 840 |
| 900 | FORMAT(' ERROR MODEL EQ 0 AND ARMY MODEL CANNOT MIX') | LVS 845 |
| 910 | FORMAT(' ERROR ML GT 24 AND ARMY MODEL TOP LAYER TRUNCATED') | LVS 850 |
| | END | LVS 855 |

| | | |
|----|---|---------|
| | SUBROUTINE RONSM(ML,IM) | ROM 100 |
| C | | ROM 105 |
| C | THIS SUBROUTINE READS MODEL 7 DATA WHEN ISVA EQ 1 | ROM 110 |
| C | | ROM 115 |
| | COMMON/NSINP/AINP(7,24) | ROM 120 |
| | COMMON /IFIL/IRD,IPR,IPU,NPH | ROM 125 |
| | DO 20 I=1,ML | ROM 130 |
| | READ(IRD,80)(AINP(J,I),J=1,7) | ROM 135 |
| | WRITE(IPR,80)(AINP(J,I),J=1,7) | ROM 140 |
| 20 | CONTINUE | ROM 145 |
| | IM=0 | ROM 150 |
| 80 | FORMAT(3F10.3,2F5.1,2E10.3,E10.3,FY.2) | ROM 155 |
| | RETURN | ROM 160 |
| | END | ROM 165 |

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C SUBROUTINE VSA(IHAZE,VIS,CEILHT,DEPTH,ZINVHT,Z,RH,HAZE,IH) VSA 100
C VERTICAL STRUCTURE ALGORITHM VSA 105
C FROM ATMOSPHERIC SCIENCES LAB (U.S. ARMY) VSA 110
C WHITE SANDS N.M. VSA 115
C CREATES A PROFILE OF AEROSOL DENSITY NEAR THE GROUND,INCLUDING VSA 120
C CLOUDS AND FOG VSA 125
C THESE PROFILES ARE AT 9 HEIGHTS BETWEEN 0 KM AND 2 KM VSA 130
C ***VISIBILITY IS ASSUMED TO BE THE SURFACE VISIBILITY*** VSA 135
C IHAZE = THE TYPE OF AEROSOL VSA 140
C VIS = VISIBILITY IN KM VSA 145
C CEILHT = THE CLOUD CEILING HEIGHT IN KM VSA 150
C DEPTH = THE CLOUD/FOG DEPTH IN KM VSA 155
C ZINVHT = THE HEIGHT OF INVERSION OR BOUNDARY LAYER IN KM VSA 160
C VARIABLES USED IN VSA VSA 165
C ZC = CLOUD CEILING HEIGHT IN M VSA 170
C ZT = CLOUD DEPTH IN M VSA 175
C ZINV = INVERSION HEIGHT IN M VSA 180
C SEE BELOW FOR MORE INFORMATION ABOUT ZC, ZT, AND ZINV VSA 185
C D = INITIAL EXTINCTION AT THE SURFACE (D=3.912/VIS) VSA 190
C ZALGO = THE DEPTH OF THE LAYER FOR THE ALGORITHM VSA 195
C OUTPUT FROM VSA: VSA 200
C Z = HEIGHT IN KM VSA 205
C RH = RELATIVE HUMIDITY AT HEIGHT Z IN PERCENT VSA 210
C HAZE = EXTINCTION AT HEIGHT Z IN KM**-1 VSA 215
C IH = AEROSOL TYPE FOR HEIGHT Z VSA 220
C HMAX = MAXIMUM HEIGHT IN KM USED IN VSA, NOT NECESSARILY 2.0 KM VSA 225
C THE SLANT PATH CALCULATION USES THE FOLLOWING FUNCTION: VSA 230
C EXT55=A*EXP(B*EXP(C*Z)) VSA 235
C WHERE 'Z' IS THE HEIGHT IN KILOMETERS, VSA 240
C 'A' IS A FUNCTION OF EXT55 AT Z=0.0 AND IS ALWAYS POSITIVE, VSA 245
C 'B' AND 'C' ARE FUNCTIONS OF CLOUD CONDITIONS AND THE SURFACE VSA 250
C VISIBILITY (EITHER A OR B CAN BE POSITIVE OR NEGATIVE), VSA 255
C 'EXT55' IS THE VISIBLE EXTINCTION COEFFICIENT IN KM**-1. VSA 260
C THEREFORE, THERE ARE 4 CASES DEPENDING ON THE SIGNS OF 'B' AND 'C' VSA 265
C CEILHT AND ZINVHT ARE USED AS SWITCHES TO DETERMINE WHICH CASE VSA 270
C TO USE. THE SURFACE EXTINCTION 'D' IS CALCULATED FROM THE VSA 275
C VISIBILITY USING D=3.912/VIS-0.012 THE FOUR CASES ARE AS FOLLOWS VSA 280
C CASE=1 FOG/CLOUD CONDITIONS VSA 285
C 'B' LT 0.0, 'C' LT 0.0 VSA 290
C 'D' GE 7.064 KM**-1 VSA 295
C FOR A CLOUD 7.064 KM**-1 IS THE BOUNDARY VALUE AT VSA 300
C THE CLOUD BASE AND 'Z' IS THE VERTICAL DISTANCE VSA 305

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C          INTO THE CLOUD. VSA 395
C          VARIABLE USED: DEPTH VSA 400
C          ** DEFAULT: DEPTH OF FOG/CLOUD IS 0.2 KM WHEN VSA 405
C                   'DEPTH' IS 0.0 VSA 410
C
C          *2 CLOUD CEILING PRESENT VSA 415
C          'B' GT 0.0, 'C' GT 0.0 VSA 420
C          'D' GT 0.398 KM**1 IS CASE 2 FOR HAZY/FOG VSA 425
C          SURFACE CONDITIONS VSA 430
C          'D' LE 0.398 KM**1 IS CASE 2' FOR CLEAR/HAZY VSA 435
C          SURFACE CONDITIONS VSA 440
C          VARIABLE USED: CEILHT (MUST BE GE 0.0) VSA 445
C          ** DEFAULTS: CASE 2 - CEILHT IS CALCULATED FROM VSA 450
C                   SURFACE EXTINCTION OR VSA 455
C                   CASE 2' - CEILHT IS 1.8 KM WHEN VSA 460
C                   'CEILHT' IS 0.0 VSA 465
C                   VSA 470
C                   VSA 475
C
C          *3 RADIATION FOG OR INVERSION OR BOUNDARY LAYER PRESENT VSA 480
C          'B' LT 0.0, 'C' GT 0.0 VSA 485
C          VIS LE 2.0 KM DEFAULTS TO A RADIATION FOG AT THE VSA 490
C          GROUND AND OVERRIDES INPUT BOUNDARY AEROSOL TYPE VSA 495
C          VIS GT 2.0 KM FOR AN INVERSION OR BOUNDARY LAYER VSA 500
C          WITH INPUT BOUNDARY AEROSOL TYPE VSA 505
C          ** IHAZE=9 (RADIATION FOG) ALWAYS DEFAULTS TO A VSA 510
C          RADIATION FOG NO MATTER WHAT THE VISIBILITY IS. VSA 515
C          SWITCH VARIABLE: CEILHT (MUST BE LT 0.0) VSA 520
C          VARIABLE USED: ZINVHT (MUST BE GE 0.0) VSA 525
C          ** CEILHT MUST BE LT 0.0 FOR ZINVHT TO BE USED ** VSA 530
C          HOWEVER, IF DEPTH IS GT 0.0 AND ZINVHT IS EQ 0.0. VSA 535
C          THE PROGRAM WILL SUBSTITUTE DEPTH FOR ZINVHT. VSA 540
C          ** DEFAULT: FOR A RADIATION FOG ZINVHT IS 0.2 KM VSA 545
C                   FOR AN INVERSION LAYER ZINVHT IS 2.0 KM VSA 550
C                   VSA 555
C
C          *4 NO CLOUD CEILING, INVERSION LAYER, OR BOUNDARY VSA 560
C          LAYER PRESENT, I.E. CLEAR SKIES VSA 565
C          EXTINCTION PROFILE CONSTANT WITH HEIGHT VSA 570
C                   VSA 575
C                   VSA 580
C                   VSA 585
C                   VSA 590
C                   VSA 595
C                   VSA 600
C                   VSA 605
C                   VSA 610
C                   VSA 615
C                   VSA 620
C                   VSA 625
C                   VSA 630
C                   VSA 635
C                   VSA 640
C                   VSA 645
C                   VSA 650
C                   VSA 655
C                   VSA 660
C                   VSA 665
C                   VSA 670
C                   VSA 675
C                   VSA 680
C                   VSA 685
COMMON /IFIL,IRD,IPR,IPU,NPR
DIMENSION Z(10),RH(10),AHAZE(10),IH(10)
DIMENSION AA(2),CC(2),EE(4),A(2),B(2),C(2),FAC1(8),FAC2(8)
REAL KMTOM
DATA AA/92.1,0.3981/,CC/-0.014,0.0125/,KMTOM/1000.0/
THE LAST 3 VALUES OF EE BELOW ARE EXTINCTIONS FOR VISIBILITIES
EQUAL TO 5.0, 23.0, AND 50.0 KM, RESPECTIVELY.
DATA EE/7.084,0.7024,0.17009,0.07824/
DATA FAC1/0.0,0.03,0.05,0.075,0.1,0.18,0.3,0.45,1.0/
DATA FAC2/0.0,0.03,0.1,0.18,0.3,0.45,0.8,0.78,1.0/
WRITE(IPR,599)
C
C          UPPER LIMIT ON VERTICAL DISTANCE = 2 KM VSA 640
C          ZHIGH=2000. VSA 645
C          NMAX=ZHIGH VSA 650
C          IF(VIS.GT.0.0)GO TO 5 VSA 655
C          DEFAULT FOR VISIBILITY DEPENDS ON THE VALUE OF IHAZE. VSA 660
C          IF(IHAZE.EQ.8)VIS=0.2 VSA 665
C          IF(IHAZE.EQ.9)VIS=0.5 VSA 670
C          IF(IHAZE.EQ.2.OR.IHAZE.EQ.5)VIS=5.0 VSA 675
C          IF(IHAZE.EQ.1.OR.IHAZE.EQ.4.OR.IHAZE.EQ.7)VIS=23.0 VSA 680
C          IF(IHAZE.EQ.6)VIS=50.0 VSA 685

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| C | IF(IHAZE.EQ.3)VIS=??????? | VSA | 690 |
| 5 | D=3.912/VIS-0.012 | VSA | 695 |
| C | ZC=CEILHT*KMTOM | VSA | 700 |
| | ZT=DEPTH*KMTOM | VSA | 705 |
| | ZINV=ZINVHT*KMTOM | VSA | 710 |
| C | IHAZE=9 (RADIATION FOG) IS ALWAYS CALCULATED AS A RADIATION FOG. | VSA | 715 |
| | IF(IHAZE.EQ.9)ZC=-1.0 | VSA | 720 |
| C | ALSO, CHECK TO SEE IF THE FOG DEPTH FOR A RADIATION FOG | VSA | 725 |
| C | WAS INPUT TO DEPTH INSTEAD OF THE CORRECT VARIABLE ZINVHT. | VSA | 730 |
| | IF(IHAZE.EQ.9.AND.ZT.GT.0.0.AND.ZINV.EQ.0.0)ZINV=ZT | VSA | 735 |
| C | | VSA | 740 |
| C | 'IC' DEFINES WHICH CASE TO USE. | VSA | 745 |
| | IC=2 | VSA | 750 |
| | IF(D.GE.EE(1).AND.ZC.GE.0.0)IC=1 | VSA | 755 |
| C | | VSA | 760 |
| | IF(ZC.LT.0.0.AND.IC.EQ.2)IC=3 | VSA | 765 |
| | IF(ZINV.LY.0.0.AND.IC.EQ.3)IC=4 | VSA | 770 |
| C | 'ICC' IS FOR THE TWO CASES: 2 AND 2'. | VSA | 775 |
| | ICC=0 | VSA | 780 |
| | IF(IC.EQ.2)ICC=1 | VSA | 785 |
| | IF(D.LE.AA(2).AND.IC.EQ.2)ICC=2 | VSA | 790 |
| | K=1 | VSA | 795 |
| | IF(ICC.EQ.2)GO TO 30 | VSA | 800 |
| | GO TO (10,20,40,60),IC | VSA | 805 |
| C | | VSA | 810 |
| C | CASE 1: DEPTH FOG/CLOUD: INCREASING EXTINCTION WITH HEIGHT FROM | VSA | 815 |
| C | CLOUD/FOG BASE TO CLOUD/FOG TOP. | VSA | 820 |
| 10 | CONTINUE | VSA | 825 |
| | IF(ZC.LT.HMAX.AND.IC.EQ.2)K=2 | VSA | 830 |
| C | IC=-1 WHEN A CLOUD IS PRESENT AND THE PATH GOES INTO IT. | VSA | 835 |
| C | USE CASE 2 OR 2' BELOW CLOUD AND CASE 1 INSIDE IT. | VSA | 840 |
| | IF(K.EQ.2)IC=(-1) | VSA | 845 |
| C | THE BASE OF THE CLOUD HAS AN EXTINCTION COEFFICIENT OF 7.064 KM ⁻¹ . | VSA | 850 |
| | IF(K.EQ.2)D=EE(1) | VSA | 855 |
| | A(K)=AA(1) | VSA | 860 |
| C | IF THE SURFACE EXTINCTION IS GREATER THAN THE UPPER LIMIT OF 92.1 | VSA | 865 |
| C | KM ⁻¹ , RUN THE ALGORITHM WITH AN UPPER LIMIT OF 'D*10'. | VSA | 870 |
| | IF(D.GE.AA(1))A(K)=D*10.0 | VSA | 875 |
| | C(K)=CC(1) | VSA | 880 |
| | IF(ZT.LE.0.0)WRITE(IPR ,603) | VSA | 885 |
| | IF(ZT.LE.0.0)WRITE(IPR ,604) | VSA | 890 |
| | IF(ZT.GT.0.0)WRITE(IPR ,611)ZT | VSA | 895 |
| C | IF THE DISTANCE FROM THE GROUND TO THE CLOUD/FOG TOP IS LESS | VSA | 900 |
| C | THAN 2.0 KM, VSA WILL ONLY CALCULATE UP TO THE CLOUD TOP. | VSA | 905 |
| | IF(ZT.LE.0.0)ZT=200. | VSA | 910 |
| | HMAX=AMINI(ZT-ZC,HMAX) | VSA | 915 |
| | GO TO 60 | VSA | 920 |
| C | | VSA | 925 |
| C | CASE 2: HAZY/LIGHTLY FOGGY: INCREASING EXTINCTION WITH HEIGHT | VSA | 930 |
| C | UP TO THE CLOUD BASE. | VSA | 935 |
| 20 | A(K)=AA(2) | VSA | 940 |
| | E=EE(1) | VSA | 945 |
| | IF(IC.EQ.0.0)WRITE(IPR ,602) | VSA | 950 |
| | IF(ZC.EQ.0.0)CEIL=ALOG(ALOG(E/A(K)))/(ALOG(D/A(K)))/CC(3) | VSA | 955 |
| | IF(ZC.EQ.0.0)WRITE(IPR ,602)CEIL | VSA | 960 |
| | IF(ZC.GT.0.0)WRITE(IPR ,610)ZC | VSA | 965 |
| | IF(ZC.EQ.0.0)ZC=CEIL | VSA | 970 |
| | GO TO 60 | VSA | 975 |
| | | VSA | 980 |

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| C | | VSA 985 |
| C | CASE 2: CLEAR/HAZY; INCREASING EXTINCTION WITH HEIGHT, BUT LESS | VSA 990 |
| C | SO THAN CASE 2, UP TO THE CLOUD BASE. | VSA 995 |
| 30 | A(K)=D*0.9 | VSA 1000 |
| | E=EE(1) | VSA 1005 |
| | IF(ZC.EQ.0.0)WRITE(IPR ,600) | VSA 1010 |
| | IF(ZC.EQ.0.0)WRITE(IPR ,618) | VSA 1015 |
| | IF(ZC.GT.0.0)WRITE(IPR ,610)ZC | VSA 1020 |
| | IF(ZC.EQ.0.0)ZC=1800. | VSA 1025 |
| | GO TO 80 | VSA 1030 |
| C | | VSA 1035 |
| C | CASE 3: NO CLOUD CEILING BUT A RADIATION FOG OR AN INVERSION | VSA 1040 |
| C | OR BOUNDARY LAYER PRESENT; DECREASING EXTINCTION WITH | VSA 1045 |
| C | HEIGHT UP TO THE HEIGHT OF THE FOG OR LAYER. | VSA 1050 |
| 40 | A(K)=D*1.1 | VSA 1055 |
| | E=EE(3) | VSA 1060 |
| | IF(IMAZE.EQ.2.OR.IMAZE.EQ.5)E=EE(2) | VSA 1065 |
| | IF(IMAZE.EQ.6.OR.(VIS.GT.2.0.AND.IMAZE.NE.9))E=EE(4) | VSA 1070 |
| | IF(E.GT.D)E=D*0.99999 | VSA 1075 |
| | IF(ZT.GT.0.0.AND.ZINV.EQ.0.0.AND.VIS.LE.2.0)ZINV=ZT | VSA 1080 |
| | IF(ZINV.EQ.0.0.AND.VIS.GT.2.0.AND.IMAZE.NE.9)WRITE(IPR ,601) | VSA 1085 |
| | IF(ZINV.EQ.0.0.AND.(VIS.LE.2.0.OR.IMAZE.EQ.9))WRITE(IPR ,605) | VSA 1090 |
| | IF(ZINV.EQ.0.0.AND.(VIS.LE.2.0.OR.IMAZE.EQ.9))WRITE(IPR ,604) | VSA 1095 |
| | IF(ZINV.GT.0.0.AND.VIS.GT.2.0.AND.IMAZE.NE.9)WRITE(IPR ,612)ZINV | VSA 1100 |
| | IF(ZINV.GT.0.0.AND.(VIS.LE.2.0.OR.IMAZE.EQ.9))WRITE(IPR ,614)ZINV | VSA 1105 |
| | IF(ZINV.EQ.0.0.AND.VIS.GT.2.0.AND.IMAZE.NE.9)ZINV=2000 | VSA 1110 |
| | IF(ZINV.EQ.0.0.AND.(VIS.LE.2.0.OR.IMAZE.EQ.9))ZINV=200 | VSA 1115 |
| | HMAX=AMIN1(ZINV,HMAX) | VSA 1120 |
| | ZC=0.0 | VSA 1125 |
| C | | VSA 1130 |
| C | CASE 4: NO CLOUD CEILING OR INVERSION LAYER; CONSTANT EXTINC- | VSA 1135 |
| C | TION WITH HEIGHT. | VSA 1140 |
| 80 | IF(IC.NE.4)B(K)=ALOG(D/A(K)) | VSA 1145 |
| | IF(IC.EQ.4)WRITE(IPR ,613) | VSA 1150 |
| | IF(IC.EQ.2)C(K)=ALOG(ALOG(E/A(K)))/B(K))/ZC | VSA 1155 |
| | IF(IC.EQ.3)C(K)=ALOG(ALOG(E/A(K)))/B(K))/ZINV | VSA 1160 |
| | IF(ZC.LT.HMAX.AND.K.EQ.1.AND.IC.EQ.2)GO TO 10 | VSA 1165 |
| | IF(IC.EQ.2)HMAX=AMIN1(ZC,HMAX) | VSA 1170 |
| | ZALGO=HMAX | VSA 1175 |
| | IF(IC.LT.0)ZALGO=ZC | VSA 1180 |
| | WRITE(IPR ,610) | VSA 1185 |
| | IF(IC.LT.0)N=1 | VSA 1190 |
| C | | VSA 1195 |
| | DO 70 I=1,9 | VSA 1200 |
| | IF(IC.LT.0.AND.I.EQ.5)N=2 | VSA 1205 |
| | IF(IC.LT.9.AND.I.EQ.9)ZALGO=HMAX-ZC | VSA 1210 |
| | Z(I)=ZALGO*(1.0-FAC2(10-I)) | VSA 1215 |
| | IF(IC.EQ.1)Z(I)=ZALGO*FAC1(I) | VSA 1220 |
| | IF(IC.EQ.4)Z(I)=ZALGO*FLOAT(I-1)/8.0 | VSA 1225 |
| | IF(IC.LT.0.AND.I.LT.5)Z(I)=ZALGO*(1.0-FAC2(11-2*I)) | VSA 1230 |
| | IF(IC.LT.0.AND.I.GE.5)Z(I)=ZALGO*FAC1(2*I-2) | VSA 1235 |
| C | IF(IC.LT.0.AND.(I.EQ.7.OR.I.EQ.8))Z(I)=ZALGO*FAC1(2*I-10) | VSA 1240 |
| | IF(IC.NE.4)AHAZE(I)=A(K)*EXP(B(K)*EXP(C(K)*Z(I))) | VSA 1245 |
| | IF(IC.EQ.4)AHAZE(I)=D | VSA 1250 |
| | IF(IC.LE.0.AND.I.GE.9)Z(I)=Z(I)+2C | VSA 1255 |
| | Z(I)=Z(I)/N*10 | VSA 1260 |
| | RH(I)=G.853*ALOG(AHAZE(I))+8.407 | VSA 1265 |
| | IF(AHAZE(I).GE.EE(1))RH(I)=100.0 | VSA 1270 |
| | VIS(I)=3.012/(AHAZE(I)+0.012) | VSA 1275 |

| | | |
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| | IH(I)=IHAZE | VSA 1280 |
| C | IF A RADIATION FOG IS PRESENT (I.E. VIS<=2.0 KM AND IC=3), | VSA 1285 |
| C | IH IS SET TO 9 FOR ALL LEVELS. | VSA 1280 |
| | IF(VISIB.LE.2.0.AND.IC.EQ.3)IH(I)=9 | VSA 1295 |
| C | FOR A DEPTH FOG/CLOUD CASE, IH=8 DENOTING AN ADVECTION FOG. | VSA 1300 |
| | IF(IC.EQ.1.OR.(IC.LT.9.AND.I.GE.8))IH(I)=8 | VSA 1305 |
| | WRITE(IPR ,820)Z(I),RH(I),AHAZE(I),VISIB,IH(I) | VSA 1310 |
| 70 | CONTINUE | VSA 1315 |
| | HMAX=HMAX/KMTOM | VSA 1320 |
| | RETURN | VSA 1325 |
| C | | VSA 1330 |
| 599 | FORMAT('O VERTICAL STRUCTURE ALGORITHM (VSA) USED') | VSA 1335 |
| 600 | FORMAT(1H ,50X,28H CLOUD CEILING HEIGHT UNKNOWN) | VSA 1340 |
| 601 | FORMAT(1H ,50X,42H INVERSION OR BOUNDARY LAYER HEIGHT UNKNOWN,/, | VSA 1345 |
| | 1 1H ,50X,39H VSA WILL USE A DEFAULT OF 2000.0 METERS,/)) | VSA 1350 |
| 605 | FORMAT(1H ,50X,27H RADIATION FOG DEPTH UNKNOWN) | VSA 1355 |
| 618 | FORMAT(1H ,50X,39H VSA WILL USE A DEFAULT OF 1800.0 METERS,/)) | VSA 1360 |
| 619 | FORMAT(5X,10H HEIGHT(KM),5X,7H R.H.(%),5X,16H EXTINCTION(KM-1), | VSA 1365 |
| | 1 5X,15H VIS(3.912/EXTN),5X,5H IHAZE,/)) | VSA 1370 |
| 620 | FORMAT(7X,F7.4,7X,F5.1,8X,E12.4,11X,F7.4,10X,I2) | VSA 1375 |
| 602 | FORMAT(1H ,39X,35H VSA WILL USE A CALCULATED VALUE OF ,F7.1, | VSA 1380 |
| | 1 7H METERS,/)) | VSA 1385 |
| 603 | FORMAT(1H ,50X,19H CLOUD DEPTH UNKNOWN) | VSA 1390 |
| 604 | FORMAT(1H ,50X,30H VSA WILL USE A DEFAULT OF 200.0 METERS,/)) | VSA 1395 |
| 610 | FORMAT(1H ,50X,24H CLOUD CEILING HEIGHT IS ,F9.1,7H METERS,/)) | VSA 1400 |
| 611 | FORMAT(1H ,50X,15H CLOUD DEPTH IS ,F14.1,7H METERS,/)) | VSA 1405 |
| 612 | FORMAT(1H ,50X,38H INVERSION OR BOUNDARY LAYER HEIGHT IS ,F7.1, | VSA 1410 |
| | 1 7H METERS,/)) | VSA 1415 |
| 614 | FORMAT(1H ,50X,26H DEPTH OF RADIATION FOG IS ,F7.1,7H METERS,/)) | VSA 1420 |
| 613 | FORMAT(1H ,50X,43H THERE IS NO INVERSION OR BOUNDARY LAYER OR | VSA 1425 |
| | 1 13H CLOUD PRESENT,/)) | VSA 1430 |
| | END | VSA 1435 |

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| | BLOCK DATA MDTA | MDT 100 |
| C | BLOCK DATA | MDT 105 |
| C | | MDT 110 |
| C | MODEL ATMOSPHERE DATA | MDT 115 |
| C | | MDT 120 |
| | COMMON /CNTRL/ KMAX,M,IKMAX,NL,ML,IKLO,ISSGEO | MDT 125 |
| C | NL IS NUMBER OF LAYERS IN PROFILES 1 TO 6 | MDT 130 |
| C | LAYER 34 (AT 99999KM) IS NO LONGER USED | MDT 135 |
| C | | MDT 140 |
| C | COMMON /MDATA/ Z(34),P(34,7),T(34,7),WH(34,7),WO(34,7), | MDT 145 |
| C | X HMIIX(34) | MDT 150 |
| | COMMON/MDATA/ZZ(34),P1(34),P2(34),P3(34),P4(34),P5(34),P6(34), | MDT 155 |
| X | P7(34),T1(34),T2(34),T3(34),T4(34),T5(34),T6(34),T7(34), | MDT 160 |
| X | WH1(34),WH2(34),WH3(34),WH4(34),WH5(34),WH6(34),WH7(34), | MDT 165 |
| X | WO1(34),WO2(34),WO3(34),WO4(34),WO5(34),WO6(34),WO7(34), | MDT 170 |
| X | HMIIX(34) | MDT 175 |
| C? | DATA NL /33/ | MDT 180 |
| | DATA ZZ/ | MDT 185 |
| 1 | 0., 1., 2., 3., 4., 5., 6., 7., 8., | MDT 190 |
| 2 | 9., 10., 11., 12., 13., 14., 15., 16., 17., | MDT 195 |
| 3 | 18., 19., 20., 21., 22., 23., 24., 25., 30., | MDT 200 |
| 4 | 35., 40., 45., 50., 70., 100.,99999./ | MDT 205 |
| | DATA P1/ | MDT 210 |
| 1 | 1.013E+03, 9.040E+02, 8.050E+02, 7.150E+02, 6.330E+02, 5.590E+02,MDT 215 | |
| 2 | 4.920E+02, 4.320E+02, 3.780E+02, 3.290E+02, 2.860E+02, 2.470E+02,MDT 220 | |
| 3 | 2.130E+02, 1.820E+02, 1.560E+02, 1.320E+02, 1.110E+02, 9.370E+01,MDT 225 | |
| 4 | 7.890E+01, 6.860E+01, 5.650E+01, 4.800E+01, 4.090E+01, 3.500E+01,MDT 230 | |
| 5 | 3.000E+01, 2.570E+01, 1.220E+01, 6.000E+00, 3.050E+00, 1.590E+00,MDT 235 | |
| 6 | 8.540E-01, 5.790E-02, 3.000E-04, 0. / | MDT 240 |
| | DATA P2, | MDT 245 |
| 1 | 1.013E+03, 9.020E+02, 8.020E+02, 7.100E+02, 6.280E+02, 5.540E+02,MDT 250 | |
| 2 | 4.870E+02, 4.200E+02, 3.720E+02, 3.240E+02, 2.810E+02, 2.430E+02,MDT 255 | |
| 3 | 2.090E+02, 1.799E+02, 1.530E+02, 1.300E+02, 1.110E+02, 9.500E+01,MDT 260 | |
| 4 | 8.120E+01, 6.950E+01, 5.950E+01, 5.100E+01, 4.370E+01, 3.760E+01,MDT 265 | |
| 5 | 3.220E+01, 2.770E+01, 1.320E+01, 6.520E+00, 3.330E+00, 1.760E+00,MDT 270 | |
| 6 | 9.510E-01, 6.710E-02, 3.000E-04, 0. / | MDT 275 |
| | DATA P3/ | MDT 280 |
| 1 | 1.018E+03, 8.973E+02, 7.897E+02, 6.938E+02, 6.081E+02, 5.313E+02,MDT 285 | |
| 2 | 4.627E+02, 4.016E+02, 3.473E+02, 2.993E+02, 2.568E+02, 2.199E+02,MDT 290 | |
| 3 | 1.892E+02, 1.611E+02, 1.378E+02, 1.178E+02, 1.007E+02, 8.610E+01,MDT 295 | |
| 4 | 7.360E+01, 6.280E+01, 5.370E+01, 4.580E+01, 3.910E+01, 3.340E+01,MDT 300 | |
| 5 | 2.860E+01, 2.440E+01, 1.110E+01, 6.180E+00, 2.530E+00, 1.290E+00,MDT 305 | |
| 6 | 8.830E-01, 4.870E-02, 3.000E-04, 0. / | MDT 310 |
| | DATA P4/ | MDT 315 |
| 1 | 1.010E+03, 8.860E+02, 7.929E+02, 7.000E+02, 6.160E+02, 5.410E+02,MDT 320 | |
| 2 | 4.740E+02, 4.130E+02, 3.590E+02, 3.108E+02, 2.677E+02, 2.300E+02,MDT 325 | |
| 3 | 1.977E+02, 1.700E+02, 1.480E+02, 1.280E+02, 1.080E+02, 9.280E+01,MDT 330 | |
| 4 | 7.980E+01, 6.800E+01, 5.900E+01, 5.070E+01, 4.360E+01, 3.750E+01,MDT 335 | |
| 5 | 3.228E+01, 2.780E+01, 1.340E+01, 6.810E+00, 3.400E+00, 1.820E+00,MDT 340 | |
| 6 | 9.370E-01, 7.070E-02, 3.000E-04, 0. / | MDT 345 |
| | DATA P5/ | MDT 350 |
| 1 | 1.013E+03, 8.878E+02, 7.772E+02, 6.798E+02, 5.932E+02, 5.158E+02,MDT 355 | |
| 2 | 4.267E+02, 3.853E+02, 3.303E+02, 2.829E+02, 2.418E+02, 2.067E+02,MDT 360 | |
| 3 | 1.786E+02, 1.510E+02, 1.291E+02, 1.103E+02, 9.431E+01, 8.058E+01,MDT 365 | |
| 4 | 8.892E+01, 5.875E+01, 5.014E+01, 4.277E+01, 3.647E+01, 3.109E+01,MDT 370 | |
| 5 | 2.649E+01, 2.258E+01, 1.020E+01, 4.701E+00, 2.243E+00, 1.113E+00,MDT 375 | |
| 6 | 5.719E-01, 4.118E-02, 3.000E-04, 0. / | MDT 380 |
| | DATA P6/ | MDT 385 |
| 1 | 1.013E+03, 8.888E+02, 7.950E+02, 7.012E+02, 6.166E+02, 5.405E+02,MDT 390 | |

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|---|------------------|-----------|-----------|------------|-----------|-----------|-----|-----|
| 2 | 4.722E+02 | 4.111E+02 | 3.565E+02 | 3.080E+02 | 2.650E+02 | 2.270E+02 | MDT | 395 |
| 3 | 1.940E+02 | 1.658E+02 | 1.417E+02 | 1.211E+02 | 1.035E+02 | 8.850E+01 | MDT | 400 |
| 4 | 7.585E+01 | 6.467E+01 | 5.529E+01 | 4.729E+01 | 4.047E+01 | 3.467E+01 | MDT | 405 |
| 5 | 2.972E+01 | 2.549E+01 | 1.197E+01 | 5.748E+00 | 2.871E+00 | 1.491E+00 | MDT | 410 |
| 6 | 7.978E-01 | 5.520E-02 | 3.008E-04 | 0. | / | / | MDT | 415 |
| | DATA P7 /34=0. / | | | | | | MDT | 420 |
| | DATA T1/ | | | | | | MDT | 425 |
| 1 | 2.997E+02 | 2.937E+02 | 2.877E+02 | 2.837E+02 | 2.770E+02 | 2.703E+02 | MDT | 430 |
| 2 | 2.636E+02 | 2.570E+02 | 2.503E+02 | 2.436E+02 | 2.370E+02 | 2.301E+02 | MDT | 435 |
| 3 | 2.236E+02 | 2.170E+02 | 2.103E+02 | 2.037E+02 | 1.970E+02 | 1.948E+02 | MDT | 440 |
| 4 | 1.988E+02 | 2.027E+02 | 2.067E+02 | 2.107E+02 | 2.146E+02 | 2.170E+02 | MDT | 445 |
| 5 | 2.192E+02 | 2.214E+02 | 2.323E+02 | 2.431E+02 | 2.540E+02 | 2.648E+02 | MDT | 450 |
| 6 | 2.702E+02 | 2.189E+02 | 2.100E+02 | 2.100E+02/ | / | / | MDT | 455 |
| | DATA T2/ | | | | | | MDT | 460 |
| 1 | 2.942E+02 | 2.897E+02 | 2.852E+02 | 2.792E+02 | 2.732E+02 | 2.672E+02 | MDT | 465 |
| 2 | 2.612E+02 | 2.547E+02 | 2.482E+02 | 2.417E+02 | 2.353E+02 | 2.288E+02 | MDT | 470 |
| 3 | 2.223E+02 | 2.158E+02 | 2.157E+02 | 2.157E+02 | 2.157E+02 | 2.157E+02 | MDT | 475 |
| 4 | 2.168E+02 | 2.179E+02 | 2.192E+02 | 2.204E+02 | 2.216E+02 | 2.228E+02 | MDT | 480 |
| 5 | 2.239E+02 | 2.251E+02 | 2.337E+02 | 2.452E+02 | 2.575E+02 | 2.699E+02 | MDT | 485 |
| 6 | 2.757E+02 | 2.181E+02 | 2.100E+02 | 2.100E+02/ | / | / | MDT | 490 |
| | DATA T3/ | | | | | | MDT | 495 |
| 1 | 2.722E+02 | 2.687E+02 | 2.652E+02 | 2.617E+02 | 2.557E+02 | 2.487E+02 | MDT | 500 |
| 2 | 2.437E+02 | 2.377E+02 | 2.317E+02 | 2.257E+02 | 2.197E+02 | 2.192E+02 | MDT | 505 |
| 3 | 2.187E+02 | 2.182E+02 | 2.177E+02 | 2.172E+02 | 2.167E+02 | 2.162E+02 | MDT | 510 |
| 4 | 2.157E+02 | 2.152E+02 | 2.152E+02 | 2.152E+02 | 2.152E+02 | 2.152E+02 | MDT | 515 |
| 5 | 2.152E+02 | 2.152E+02 | 2.174E+02 | 2.279E+02 | 2.432E+02 | 2.585E+02 | MDT | 520 |
| 6 | 2.657E+02 | 2.307E+02 | 2.102E+02 | 2.100E+02/ | / | / | MDT | 525 |
| | DATA T4/ | | | | | | MDT | 530 |
| 1 | 2.872E+02 | 2.817E+02 | 2.763E+02 | 2.709E+02 | 2.655E+02 | 2.601E+02 | MDT | 535 |
| 2 | 2.531E+02 | 2.461E+02 | 2.392E+02 | 2.322E+02 | 2.252E+02 | 2.252E+02 | MDT | 540 |
| 3 | 2.252E+02 | 2.252E+02 | 2.252E+02 | 2.252E+02 | 2.252E+02 | 2.252E+02 | MDT | 545 |
| 4 | 2.252E+02 | 2.252E+02 | 2.252E+02 | 2.252E+02 | 2.252E+02 | 2.252E+02 | MDT | 550 |
| 5 | 2.266E+02 | 2.281E+02 | 2.351E+02 | 2.472E+02 | 2.621E+02 | 2.738E+02 | MDT | 555 |
| 6 | 2.772E+02 | 2.186E+02 | 2.100E+02 | 2.100E+02/ | / | / | MDT | 560 |
| | DATA T5/ | | | | | | MDT | 565 |
| 1 | 2.572E+02 | 2.591E+02 | 2.559E+02 | 2.527E+02 | 2.477E+02 | 2.409E+02 | MDT | 570 |
| 2 | 2.341E+02 | 2.273E+02 | 2.206E+02 | 2.172E+02 | 2.172E+02 | 2.172E+02 | MDT | 575 |
| 3 | 2.172E+02 | 2.172E+02 | 2.172E+02 | 2.172E+02 | 2.166E+02 | 2.160E+02 | MDT | 580 |
| 4 | 2.154E+02 | 2.140E+02 | 2.142E+02 | 2.138E+02 | 2.130E+02 | 2.124E+02 | MDT | 585 |
| 5 | 2.116E+02 | 2.112E+02 | 2.168E+02 | 2.223E+02 | 2.347E+02 | 2.470E+02 | MDT | 590 |
| 6 | 2.593E+02 | 2.457E+02 | 2.100E+02 | 2.100E+02/ | / | / | MDT | 595 |
| | DATA T6/ | | | | | | MDT | 600 |
| 1 | 2.882E+02 | 2.817E+02 | 2.732E+02 | 2.687E+02 | 2.622E+02 | 2.557E+02 | MDT | 605 |
| 2 | 2.492E+02 | 2.427E+02 | 2.362E+02 | 2.297E+02 | 2.232E+02 | 2.168E+02 | MDT | 610 |
| 3 | 2.167E+02 | 2.167E+02 | 2.167E+02 | 2.167E+02 | 2.167E+02 | 2.167E+02 | MDT | 615 |
| 4 | 2.167E+02 | 2.167E+02 | 2.167E+02 | 2.166E+02 | 2.166E+02 | 2.166E+02 | MDT | 620 |
| 5 | 2.208E+02 | 2.216E+02 | 2.255E+02 | 2.363E+02 | 2.504E+02 | 2.642E+02 | MDT | 625 |
| 6 | 2.707E+02 | 2.197E+02 | 2.100E+02 | 2.100E+02/ | / | / | MDT | 630 |
| | DATA T7 /34=0. / | | | | | | MDT | 635 |
| | DATA M1/ | | | | | | MDT | 640 |
| 1 | 1.900E-01 | 1.300E-01 | 9.300E-00 | 4.700E-00 | 2.300E-00 | 1.500E-00 | MDT | 645 |
| 2 | 8.500E-01 | 4.700E-01 | 2.500E-01 | 1.200E-01 | 5.000E-02 | 1.700E-02 | MDT | 650 |
| 3 | 8.000E-03 | 1.800E-03 | 1.000E-03 | 7.500E-04 | 5.400E-04 | 3.500E-04 | MDT | 655 |
| 4 | 5.000E-04 | 4.000E-04 | 4.500E-04 | 5.100E-04 | 5.100E-04 | 5.000E-04 | MDT | 660 |
| 5 | 8.000E-04 | 8.700E-04 | 3.800E-04 | 1.100E-04 | 4.300E-05 | 1.900E-05 | MDT | 665 |
| 6 | 8.300E-06 | 1.400E-07 | 1.000E-09 | 0. | / | / | MDT | 670 |
| | DATA M2/ | | | | | | MDT | 675 |
| 1 | 1.400E-01 | 8.330E-00 | 5.200E-00 | 3.300E-00 | 1.900E-00 | 1.000E-00 | MDT | 680 |
| 2 | 6.100E-01 | 3.700E-01 | 2.100E-01 | 1.200E-01 | 6.400E-02 | 2.200E-02 | MDT | 685 |

| | | | | | | | | | |
|--|-----------|-----------|-----------|-----------|-----------|-----------|-----|------|------|
| 3 | 6.000E-03 | 1.800E-03 | 1.000E-03 | 7.600E-04 | 6.400E-04 | 5.600E-04 | MOT | 690 | |
| 4 | 5.000E-04 | 4.900E-04 | 4.500E-04 | 5.100E-04 | 5.100E-04 | 5.400E-04 | MOT | 695 | |
| 5 | 6.000E-04 | 6.700E-04 | 3.600E-04 | 1.100E-04 | 4.300E-05 | 1.900E-05 | MOT | 700 | |
| 6 | 6.300E-06 | 1.400E-07 | 1.000E-09 | 0. | / | | MOT | 705 | |
| DATA NH3/ | | | | | | | | MOT | 710 |
| 1 | 3.500E+00 | 2.500E+00 | 1.800E+00 | 1.200E+00 | 6.600E-01 | 3.800E-01 | MOT | 715 | |
| 2 | 2.100E-01 | 8.500E-02 | 3.500E-02 | 1.600E-02 | 7.500E-03 | 6.900E-03 | MOT | 720 | |
| 3 | 6.000E-03 | 1.800E-03 | 1.000E-03 | 7.600E-04 | 6.400E-04 | 5.600E-04 | MOT | 725 | |
| 4 | 5.000E-04 | 4.900E-04 | 4.500E-04 | 5.100E-04 | 5.100E-04 | 5.400E-04 | MOT | 730 | |
| 5 | 6.000E-04 | 6.700E-04 | 3.600E-04 | 1.100E-04 | 4.300E-05 | 1.900E-05 | MOT | 735 | |
| 6 | 6.300E-06 | 1.400E-07 | 1.000E-09 | 0. | / | | MOT | 740 | |
| DATA NH4/ | | | | | | | | MOT | 745 |
| 1 | 9.100E+00 | 6.000E+00 | 4.200E+00 | 2.700E+00 | 1.700E+00 | 1.000E+00 | MOT | 750 | |
| 2 | 5.400E-01 | 2.900E-01 | 1.300E-01 | 4.200E-02 | 1.500E-02 | 9.400E-03 | MOT | 755 | |
| 3 | 8.000E-03 | 1.800E-03 | 1.000E-03 | 7.600E-04 | 6.400E-04 | 5.600E-04 | MOT | 760 | |
| 4 | 5.000E-04 | 4.900E-04 | 4.500E-04 | 5.100E-04 | 5.100E-04 | 5.400E-04 | MOT | 765 | |
| 5 | 6.000E-04 | 6.700E-04 | 3.600E-04 | 1.100E-04 | 4.300E-05 | 1.900E-05 | MOT | 770 | |
| 6 | 6.300E-06 | 1.400E-07 | 1.000E-09 | 0. | / | | MOT | 775 | |
| DATA NH5/ | | | | | | | | MOT | 780 |
| 1 | 1.200E+00 | 1.200E+00 | 9.400E-01 | 6.800E-01 | 4.100E-01 | 2.000E-01 | MOT | 785 | |
| 2 | 9.800E-02 | 5.400E-02 | 1.100E-02 | 8.400E-03 | 5.500E-03 | 3.800E-03 | MOT | 790 | |
| 3 | 2.600E-03 | 1.800E-03 | 1.000E-03 | 7.600E-04 | 6.400E-04 | 5.600E-04 | MOT | 795 | |
| 4 | 5.000E-04 | 4.900E-04 | 4.500E-04 | 5.100E-04 | 5.100E-04 | 5.400E-04 | MOT | 800 | |
| 5 | 6.000E-04 | 6.700E-04 | 3.600E-04 | 1.100E-04 | 4.300E-05 | 1.900E-05 | MOT | 805 | |
| 6 | 6.300E-06 | 1.400E-07 | 1.000E-09 | 0. | / | | MOT | 810 | |
| DATA NH6/ | | | | | | | | MOT | 815 |
| 1 | 5.900E+00 | 4.200E+00 | 2.900E+00 | 1.800E+00 | 1.100E+00 | 6.400E-01 | MOT | 820 | |
| 2 | 3.800E-01 | 2.100E-01 | 1.200E-01 | 4.600E-02 | 1.800E-02 | 8.200E-03 | MOT | 825 | |
| 3 | 3.700E-03 | 1.800E-03 | 6.400E-04 | 7.200E-04 | 6.100E-04 | 5.200E-04 | MOT | 830 | |
| 4 | 4.400E-04 | 4.400E-04 | 4.400E-04 | 4.800E-04 | 5.200E-04 | 5.700E-04 | MOT | 835 | |
| 5 | 6.100E-04 | 6.800E-04 | 3.800E-04 | 1.600E-04 | 6.700E-05 | 3.200E-05 | MOT | 840 | |
| 6 | 1.200E-05 | 1.500E-07 | 1.000E-09 | 0. | / | | MOT | 845 | |
| DATA NH7 /3400. / | | | | | | | | MOT | 850 |
| DATA NO1/ | | | | | | | | MOT | 855 |
| 1 | 5.600E-05 | 5.600E-05 | 5.400E-05 | 5.100E-05 | 4.700E-05 | 4.500E-05 | MOT | 860 | |
| 2 | 4.300E-05 | 4.100E-05 | 3.900E-05 | 3.900E-05 | 3.900E-05 | 4.100E-05 | MOT | 865 | |
| 3 | 4.300E-05 | 4.500E-05 | 4.200E-05 | 4.700E-05 | 4.700E-05 | 5.900E-05 | MOT | 870 | |
| 4 | 9.000E-05 | 1.400E-04 | 1.900E-04 | 2.400E-04 | 2.800E-04 | 3.200E-04 | MOT | 875 | |
| 5 | 3.100E-04 | 3.400E-04 | 2.400E-04 | 9.200E-05 | 4.100E-05 | 1.300E-05 | MOT | 880 | |
| 6 | 4.300E-06 | 6.600E-08 | 4.300E-11 | 0. | / | | MOT | 885 | |
| DATA NO2/ | | | | | | | | MOT | 890 |
| 1 | 6.000E-05 | 6.000E-05 | 6.000E-05 | 6.200E-05 | 6.400E-05 | 6.600E-05 | MOT | 895 | |
| 2 | 6.900E-05 | 7.500E-05 | 7.800E-05 | 8.600E-05 | 9.000E-05 | 1.100E-04 | MOT | 900 | |
| 3 | 1.200E-04 | 1.500E-04 | 1.800E-04 | 1.900E-04 | 2.100E-04 | 2.400E-04 | MOT | 905 | |
| 4 | 2.800E-04 | 3.200E-04 | 3.400E-04 | 3.600E-04 | 3.800E-04 | 3.400E-04 | MOT | 910 | |
| 5 | 3.200E-04 | 3.000E-04 | 2.000E-04 | 9.200E-05 | 4.100E-05 | 1.300E-05 | MOT | 915 | |
| 6 | 4.300E-06 | 6.600E-08 | 4.300E-11 | 0. | / | | MOT | 920 | |
| DATA NO3/ | | | | | | | | MOT | 925 |
| 1 | 6.000E-05 | 6.400E-05 | 4.900E-05 | 4.900E-05 | 4.900E-05 | 6.800E-05 | MOT | 930 | |
| 2 | 6.400E-05 | 7.700E-05 | 9.000E-05 | 1.200E-04 | 1.400E-04 | 2.100E-04 | MOT | 935 | |
| 3 | 2.600E-04 | 3.000E-04 | 3.300E-04 | 3.400E-04 | 3.600E-04 | 3.900E-04 | MOT | 940 | |
| 4 | 4.100E-04 | 4.300E-04 | 4.500E-04 | 4.300E-04 | 4.300E-04 | 3.900E-04 | MOT | 945 | |
| 5 | 3.600E-04 | 3.400E-04 | 1.900E-04 | 8.200E-05 | 4.100E-05 | 1.300E-05 | MOT | 950 | |
| 6 | 4.300E-06 | 6.600E-08 | 4.300E-11 | 0. | / | | MOT | 955 | |
| DATA NO4/ | | | | | | | | MOT | 960 |
| 1 | 4.900E-05 | 6.400E-05 | 5.800E-05 | 5.800E-05 | 6.000E-05 | 6.400E-05 | MOT | 965 | |
| 2 | 7.100E-05 | 7.300E-05 | 7.800E-05 | 1.100E-04 | 1.300E-04 | 1.800E-04 | MOT | 970 | |
| 3 | 2.100E-04 | 2.600E-04 | 2.800E-04 | 2.800E-04 | 3.400E-04 | 3.900E-04 | MOT | 975 | |
| 4 | 4.100E-04 | 4.100E-04 | 3.800E-04 | 3.800E-04 | 3.200E-04 | 3.000E-04 | MOT | 980 | |
| 5 | 2.800E-04 | 2.800E-04 | 1.400E-04 | 9.200E-05 | 4.100E-05 | 1.300E-05 | MOT | 985 | |
| 6 | 4.300E-06 | 6.600E-08 | 4.300E-11 | 0. | / | | MOT | 990 | |
| DATA NO5/ | | | | | | | | MOT | 995 |
| 1 | 4.100E-05 | 4.100E-05 | 4.100E-05 | 4.300E-05 | 4.500E-05 | 4.700E-05 | MOT | 1000 | |
| 2 | 4.900E-05 | 7.100E-05 | 9.600E-05 | 1.600E-04 | 2.100E-04 | 2.200E-04 | MOT | 1005 | |
| 3 | 4.300E-04 | 4.700E-04 | 4.900E-04 | 5.600E-04 | 6.200E-04 | 6.200E-04 | MOT | 1010 | |
| 4 | 6.200E-04 | 6.000E-04 | 5.600E-04 | 5.100E-04 | 4.700E-04 | 4.300E-04 | MOT | 1015 | |
| 5 | 3.600E-04 | 3.200E-04 | 1.500E-04 | 9.200E-05 | 4.100E-05 | 1.300E-05 | MOT | 1020 | |
| 6 | 4.300E-06 | 6.600E-08 | 4.300E-11 | 0. | / | | MOT | 1025 | |
| DATA NO6/ | | | | | | | | MOT | 1030 |
| 1 | 6.400E-05 | 6.400E-05 | 5.400E-05 | 5.000E-05 | 4.600E-05 | 4.600E-05 | MOT | 1035 | |
| 2 | 4.500E-05 | 4.900E-05 | 5.200E-05 | 7.100E-05 | 9.000E-05 | 1.300E-04 | MOT | 1040 | |
| 3 | 1.600E-04 | 1.700E-04 | 1.900E-04 | 2.100E-04 | 2.400E-04 | 2.800E-04 | MOT | 1045 | |
| 4 | 3.200E-04 | 3.500E-04 | 3.800E-04 | 3.800E-04 | 3.800E-04 | 3.800E-04 | MOT | 1050 | |
| 5 | 3.600E-04 | 3.400E-04 | 2.000E-04 | 1.100E-04 | 4.900E-05 | 1.700E-05 | MOT | 1055 | |
| 6 | 4.300E-06 | 6.600E-08 | 4.300E-11 | 0. | / | | MOT | 1060 | |
| DATA NO7 /3600. / | | | | | | | | MOT | 1065 |
| HMIX(1)-HMIX VOLUME MIXING RATIOS TIMES E=9 FROM EVANS PROFILE | | | | | | | | MOT | 1070 |
| DATA HMIX /8*0. 1.0E-30. | | | | | | | | MOT | 1075 |
| 0.1,0.33,0.8,1.2,1.4,1.6,1.8,1.9,2.0,2.1,2.3,3.0,3.3,MOT | | | | | | | | MOT | 1080 |
| 17,4.2,6.2,6.0,3.8,2.8,0.22,1.0E-30,5*0.0/ | | | | | | | | MOT | 1085 |
| END | | | | | | | | MOT | 1090 |

| | | | |
|---|---|-----|-----|
| | BLOCK DATA TITLE | TIT | 100 |
| | BLOCK DATA | TIT | 105 |
| C | TITLE INFORMATION | TIT | 110 |
| | COMMON /TITL/ HHAZE(5,15),HSEASN(5,2),HVULCN(5,5),BLANK,V58(9), | TIT | 115 |
| X | HMET(5,2),HMODEL(5,8),HTRRAD(6,4) | TIT | 120 |
| | DATA V58 /23.,5.,0.,23.,5.,50.,22.,0.2,0.5/ | TIT | 125 |
| | DATA BLANK/4H / | TIT | 130 |
| | DATA HHAZE / | TIT | 135 |
| | 1 4HRURA,4HL ,4H ,4H ,3H . | TIT | 140 |
| | 2 4HRURA,4HL ,4H ,4H ,4H . | TIT | 145 |
| | 3 4HNAVY,4H MAR,4HITIM,4HE ,4H . | TIT | 150 |
| | 4 4HMARI,4HTIME,4H ,4H ,4H . | TIT | 155 |
| | 5 4HURBA,4HN ,4H ,4H ,4H . | TIT | 160 |
| | 6 4HTROP,4HOSPH,4HERIC,4H ,4H . | TIT | 165 |
| | 7 4HUSER,4H DEF,4HINED,4H ,4H . | TIT | 170 |
| | 8 4HFOG1,4H (AD,4HVECT,4HTION,4H) | TIT | 175 |
| | 9 4HFOG2,4H(RAD,4HTATI,4HON) ,4H . | TIT | 180 |
| | A 4HBACK,4HGROU,4HND S,4HTRAT,4HO . | TIT | 185 |
| | B 4HAGED,4H VOL,4HCANI,4HC ,4H . | TIT | 190 |
| | C 4HFRES,4HM VO,4HLCAN,4HC ,4H . | TIT | 195 |
| | D 4HAGED,4H VOL,4HCANI,4HC ,4H . | TIT | 200 |
| | E 4HFRES,4HM VO,4HCANI,4HC ,4H . | TIT | 205 |
| | F 4HWETE,4HORIC,4H BUS,4HT ,4H / | TIT | 210 |
| | DATA HSEASN / | TIT | 215 |
| | 1 4HSPR1,4HNG-S,4HUMME,4HR ,4H . | TIT | 220 |
| | 2 4HFALL,4H-WIN,4HTER ,4H ,4H / | TIT | 225 |
| | DATA HVULCN / | TIT | 230 |
| | 1 4HBACK,4HGROU,4HND S,4HTRAT,4HO . | TIT | 235 |
| | 2 4HAGED,4H VOL,4HCANI,4HC-NO,4HDERA . | TIT | 240 |
| | 3 4HFRES,4HM VO,4HLCAN,4HC-H,4HIN . | TIT | 245 |
| | 4 4HAGED,4H VOL,4HCANI,4HC-MI,4HON . | TIT | 250 |
| | 5 4HFRES,4HM VO,4HCANI,4HC-NO,4HDE IA/ | TIT | 255 |
| | DATA HMET/ | TIT | 260 |
| | 1 4HNOH,4HAL ,4H ,4H ,4H . | TIT | 265 |
| | 2 4HTRAN,4HSITI,4HON ,4H ,4H / | TIT | 270 |
| | DATA HMODEL / | TIT | 275 |
| | 1 4HTROP,4HCAL,4H MOD,4HEL ,4H . | TIT | 280 |
| | 2 4HVIDL,4HATT,4HODE ,4HSUM,4HER . | TIT | 285 |
| | 3 4HVIDL,4HATT,4HODE ,4HSUM,4HER . | TIT | 290 |
| | 4 4HSUBA,4HARTI,4HC ,4HSUM,4HER . | TIT | 295 |
| | 5 4HSUBA,4HARTI,4HC ,4HSUM,4HER . | TIT | 300 |
| | 6 4H1982,4H U S,4H STR,4HODS,4HO . | TIT | 305 |
| | 7 4H ,4H ,4H ,4H ,4H . | TIT | 310 |
| | 8 4HODE,4HL NO,4HPORI,4HSONY,4HAL / | TIT | 315 |
| | DATA HTRRAD | TIT | 320 |
| | 1 4HTRCN,4HSMT,4HANC,4HS ,4H ,4H . | TIT | 325 |
| | 2 4HRAOI,4HANCE,4H ,4H ,4H ,4H . | TIT | 330 |
| | 3 4HRAOI,4HANCE,4HNSOL,4HAR S,4HCATT,4HERNG. | TIT | 335 |
| | 4 4HTRCN,4HSMT,4HNTD ,4HNSOLA,4HNR IR,4HRAG./ | TIT | 340 |
| | END | TIT | 345 |

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|-----|---|-----|-----|
| CCC | BLOCK DATA PRFDTA | PRF | 100 |
| C | BLOCK DATA | PRF | 105 |
| C | | PRF | 110 |
| C | AEROSOL PROFILE DATA | PRF | 115 |
| CCC | 0-2KM | PRF | 120 |
| CCC | HZ2K+5 VIS PROFILES- 50KM,23KM,10KM,5KM,2KM | PRF | 125 |
| CCC | >2-9KM | PRF | 130 |
| CCC | FAW150=FALL/WINTER 50KM VIS | PRF | 135 |
| CCC | FAW123=FALL/WINTER 23KM VIS | PRF | 140 |
| CCC | SPSUS0=SPRING/SUMMER 50KM VIS | PRF | 145 |
| CCC | SPSU23=SPRING/SUMMER 23KM VIS | PRF | 150 |
| CCC | >9-30KM | PRF | 155 |
| CCC | BASTFW=BACKGROUND STRATOSPHERIC FALL/WINTER | PRF | 160 |
| CCC | VUMOPW=MODERATE VOLCANIC FALL/WINTER | PRF | 165 |
| CCC | HIVUFW=HIGH VOLCANIC FALL/WINTER | PRF | 170 |
| CCC | EXVUFW=EXTREME VOLCANIC FALL/WINTER | PRF | 175 |
| CCC | BASTSS,VUMOSS,HIVUSS,EXVUSS= SPRING/SUMMER | PRF | 180 |
| CCC | >30-100KM | PRF | 185 |
| CCC | UPNATM=NORMAL UPPER ATMOSPHERIC | PRF | 190 |
| CCC | VUTONO=TRANSITION FROM VOLCANIC TO NORMAL | PRF | 195 |
| CCC | VUTOEX=TRANSITION FROM VOLCANIC TO EXTREME | PRF | 200 |
| CCC | EXUPAT=EXTREME UPPER ATMOSPHERIC | PRF | 205 |
| CCC | | PRF | 210 |
| CCC | COMMON/PRFD /ZMT(34),HZ2K(34,5),FAW150(34),FAW123(34),SPSUS0(34), | PRF | 215 |
| CCC | 1SPSU23(34),BASTFW(34),VUMOPW(34),HIVUFW(34),EXVUFW(34),BASTSS(34), | PRF | 220 |
| CCC | 2VUMOSS(34),HIVUSS(34),EXVUSS(34),UPNATM(34),VUTONO(34), | PRF | 225 |
| CCC | 3VUTOEX(34),EXUPAT(34) | PRF | 230 |
| CCC | DATA ZMT/ | PRF | 235 |
| CCC | • 0., 1., 2., 3., 4., 5., 6., 7., 8., | PRF | 240 |
| CCC | • 9., 10., 11., 12., 13., 14., 15., 16., 17., | PRF | 245 |
| CCC | • 18., 19., 20., 21., 22., 23., 24., 25., 30., | PRF | 250 |
| CCC | • 35., 40., 45., 50., 70., 100.,99999./ | PRF | 255 |
| CCC | DATA HZ2K(1,1),HZ2K(1,2),HZ2K(1,3),HZ2K(1,4),HZ2K(1,5)/ | PRF | 260 |
| CCC | 1 5.82E-02, 1.56E-01, 3.79E-01, 7.70E-01, 1.94E+00/ | PRF | 265 |
| CCC | DATA HZ2K(2,1),HZ2K(2,2),HZ2K(2,3),HZ2K(2,4),HZ2K(2,5)/ | PRF | 270 |
| CCC | 1 4.15E-02, 9.91E-02, 3.79E-01, 7.70E-01, 1.94E+00/ | PRF | 275 |
| CCC | DATA HZ2K(3,1),HZ2K(3,2),HZ2K(3,3),HZ2K(3,4),HZ2K(3,5)/ | PRF | 280 |
| CCC | 1 2.80E-02, 6.21E-02, 6.21E-02, 6.21E-02, 6.31E-02/ | PRF | 285 |
| CCC | DATA FAW150 /3*0./ | PRF | 290 |
| CCC | 1 1.14E-02, 6.43E-03, 4.85E-03, 3.54E-03, 2.31E-03, 1.41E-03, | PRF | 295 |
| CCC | 2 9.80E-04, 24*0./ | PRF | 300 |
| CCC | DATA FAW123 /3*0./ | PRF | 305 |
| CCC | 1 2.72E-02, 1.20E-02, 4.85E-03, 3.54E-03, 2.31E-03, 1.41E-03, | PRF | 310 |
| CCC | 2 9.80E-04, 24*0./ | PRF | 315 |
| CCC | DATA SPSUS0 /3*0./ | PRF | 320 |
| CCC | 1 1.46E-02, 1.02E-02, 9.31E-03, 7.71E-03, 6.23E-03, 3.37E-03, | PRF | 325 |
| CCC | 2 1.42E-03, 24*0./ | PRF | 330 |
| CCC | DATA SPSU23 /3*0./ | PRF | 335 |
| CCC | 1 3.46E-02, 1.68E-02, 9.31E-03, 7.71E-03, 6.23E-03, 3.37E-03, | PRF | 340 |
| CCC | 2 1.42E-03, 24*0./ | PRF | 345 |
| CCC | DATA BASTFW /10*0./ | PRF | 350 |
| CCC | 1 7.37E-04, 7.14E-04, 6.64E-04, 6.22E-04, 6.48E-04, 6.43E-04, | PRF | 355 |
| CCC | 2 4.41E-04, 6.04E-04, 6.62E-04, 4.81E-04, 4.22E-04, 3.52E-04, | PRF | 360 |
| CCC | 3 2.25E-04, 2.42E-04, 1.92E-04, 1.50E-04, 3.32E-05, 7*0./ | PRF | 365 |
| CCC | DATA VUMOPW /10*0./ | PRF | 370 |
| CCC | 1 1.38E-03, 1.79E-03, 2.31E-03, 2.75E-03, 2.69E-03, 2.63E-03, | PRF | 375 |
| CCC | 2 2.72E-03, 3.40E-03, 2.10E-03, 1.71E-03, 1.35E-03, 1.00E-03, | PRF | 380 |
| CCC | 3 8.80E-04, 5.60E-04, 3.15E-04, 4.00E-04, 7.60E-05, 7*0./ | PRF | 385 |
| CCC | DATA HIVUFW /10*0./ | PRF | 390 |

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|---|-----------|-----------|-----------|-----------|-----------|-----------|-----|-----|
| 1 | 1.71E-03, | 2.31E-03, | 3.25E-03, | 4.52E-03, | 6.40E-03, | 7.81E-03, | PRF | 395 |
| 2 | 9.42E-03, | 1.07E-02, | 1.10E-02, | 8.60E-03, | 5.10E-03, | 2.70E-03, | PRF | 400 |
| 3 | 1.48E-03, | 8.90E-04, | 5.80E-04, | 4.09E-04, | 7.60E-05, | 7*0./ | PRF | 405 |
| | DATA | EXVUFW | /10*0., | | | | PRF | 410 |
| 1 | 1.71E-03, | 2.31E-03, | 3.25E-03, | 4.52E-03, | 6.40E-03, | 1.01E-02, | PRF | 415 |
| 2 | 2.35E-02, | 6.10E-02, | 1.00E-01, | 4.00E-02, | 9.15E-03, | 3.13E-03, | PRF | 420 |
| 3 | 1.46E-03, | 8.90E-04, | 5.80E-04, | 4.09E-04, | 7.60E-05, | 7*0./ | PRF | 425 |
| | DATA | BASTSS | /10*0., | | | | PRF | 430 |
| 1 | 1.14E-03, | 7.99E-04, | 6.41E-04, | 5.17E-04, | 4.2E-04, | 3.95E-04, | PRF | 435 |
| 2 | 3.82E-04, | 4.25E-04, | 5.20E-04, | 5.81E-04, | 5.89E-04, | 5.02E-04, | PRF | 440 |
| 3 | 4.20E-04, | 3.00E-04, | 1.98E-04, | 1.31E-04, | 3.32E-05, | 7*0./ | PRF | 445 |
| | DATA | VUMOSS | /10*0., | | | | PRF | 450 |
| 1 | 1.85E-03, | 2.12E-03, | 2.45E-03, | 2.80E-03, | 2.89E-03, | 2.92E-03, | PRF | 455 |
| 2 | 2.73E-03, | 2.46E-03, | 2.10E-03, | 1.71E-03, | 1.35E-03, | 1.09E-03, | PRF | 460 |
| 3 | 8.60E-04, | 6.60E-04, | 5.15E-04, | 4.09E-04, | 7.60E-05, | 7*0./ | PRF | 465 |
| | DATA | HIVUSS | /10*0., | | | | PRF | 470 |
| 1 | 1.85E-03, | 2.12E-03, | 2.45E-03, | 2.80E-03, | 3.60E-03, | 5.23E-03, | PRF | 475 |
| 2 | 8.11E-03, | 1.20E-02, | 1.52E-02, | 1.53E-02, | 1.17E-02, | 7.09E-03, | PRF | 480 |
| 3 | 4.50E-03, | 2.40E-03, | 1.28E-03, | 7.76E-04, | 7.60E-05, | 7*0./ | PRF | 485 |
| | DATA | EXVUSS | /10*0., | | | | PRF | 490 |
| 1 | 1.85E-03, | 2.12E-03, | 2.45E-03, | 2.80E-03, | 3.60E-03, | 5.23E-03, | PRF | 495 |
| 2 | 8.11E-03, | 1.27E-02, | 2.32E-02, | 4.85E-02, | 1.00E-01, | 5.50E-02, | PRF | 500 |
| 3 | 6.10E-03, | 2.40E-03, | 1.28E-03, | 7.76E-04, | 7.60E-05, | 7*0./ | PRF | 505 |
| | DATA | UPNATM | /26*0., | | | | PRF | 510 |
| 1 | 3.32E-05, | 1.64E-05, | 7.99E-06, | 4.01E-06, | 2.10E-06, | 1.60E-07, | PRF | 515 |
| 2 | 9.31E-10, | 0. | | | | | PRF | 520 |
| | DATA | VUTOND | /26*0., | | | | PRF | 525 |
| 1 | 7.60E-05, | 2.45E-05, | 7.99E-06, | 4.01E-06, | 2.10E-06, | 1.60E-07, | PRF | 530 |
| 2 | 9.31E-10, | 0. | | | | | PRF | 535 |
| | DATA | VUTOEX | /26*0., | | | | PRF | 540 |
| 1 | 7.60E-05, | 7.20E-05, | 6.95E-05, | 6.60E-05, | 5.04E-05, | 1.03E-05, | PRF | 545 |
| 2 | 4.50E-07, | 0. | | | | | PRF | 550 |
| | DATA | EXUPAT | /26*0., | | | | PRF | 555 |
| 1 | 3.32E-05, | 4.25E-05, | 5.59E-05, | 6.60E-05, | 5.04E-05, | 1.03E-05, | PRF | 560 |
| 2 | 4.50E-07, | 0. | | | | | PRF | 565 |
| | END | | | | | | PRF | 570 |

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BLOCK DATA EXTDTA          EXT 100
BLOCK DATA                 EXT 105
CCC                          EXT 110
CCC ALTITUDE REGIONS FOR AEROSOL EXTINCTION COEFFICIENTS  EXT 115
CCC                          EXT 120
CCC                          EXT 125
CCC 0-2KM                    EXT 130
CCC RUREXT=RURAL EXTINCTION  RURABS=RURAL ABSORPTION      EXT 135
CCC URBEXT=URBAN EXTINCTION  URBAABS=URBAN ABSORPTION     EXT 140
CCC OCNEXT=MARITIME EXTINCTION OCNABS=MARITIME ABSORPTION EXT 145
CCC TROEXT=TROPOSPHER EXTINCTION TROABS=TROPOSPHER ABSORPTION EXT 150
CCC FG1EXT=FOG1 .2KM VIS EXTINCTION FG1ABS=FOG1 ABSORPTION EXT 155
CCC FG2EXT=FOG2 .5KM VIS EXTINCTION FG2ABS=FOG2 ABSORPTION EXT 160
CCC >2-9KM                   EXT 165
CCC TROEXT=TROPOSPHER EXTINCTION TROABS=TROPOSPHER ABSORPTION EXT 170
CCC >9-30KM                  EXT 175
CCC BSTEXT=BACKGROUND STRATOSPHERIC EXTINCTION            EXT 180
CCC BSTABS=BACKGROUND STRATOSPHERIC ABSORPTION           EXT 185
CCC AVOEXT=AGED VOLCANIC EXTINCTION                       EXT 190
CCC AVDABS=AGED VOLCANIC ABSORPTION                      EXT 195
CCC FVOEXT=FRESH VOLCANIC EXTINCTION                      EXT 200
CCC FVOABS=FRESH VOLCANIC ABSORPTION                     EXT 205
CCC >30-100KM                                                   EXT 210
CCC DMEEXT=METEORIC DUST EXTINCTION                      EXT 215
CCC DMEABS=METEORIC DUST ABSORPTION                      EXT 220
C AEROSOL EXTINCTION AND ABSORPTION DATA                EXT 225
C                                                            EXT 230
C                                                            EXT 235
C COMMON /EXTD /VX2(40),RUREXT(40,4),RURABS(40,4),URBEXT(40,4), EXT 240
C 1URBAABS(40,4),OCNEXT(40,4),OCNABS(40,4),TROEXT(40,4),TROABS(40,4), EXT 245
C 2FG1EXT(40),FG1ABS(40),FG2EXT(40),FG2ABS(40),           EXT 250
C 3 BSTEXT(40),BSTABS(40),AVOEXT(40),AVOABS(40),FVOEXT(40) EXT 255
C 4),FVOABS(40),DMEEXT(40),DMEABS(40)                     EXT 260
C COMMON /EXTD / VX2(40),RURE2(40),RURE3(40),RURE4(40), EXT 265
C X RURA1(40),RURA2(40),RURA3(40),RURA4(40),          EXT 270
C X URBE1(40),URBE2(40),URBE3(40),URBE4(40),            EXT 275
C X URBA1(40),URBA2(40),URBA3(40),URBA4(40),           EXT 280
C X OCNE1(40),OCNE2(40),OCNE3(40),OCNE4(40),           EXT 285
C X OCNA1(40),OCNA2(40),OCNA3(40),OCNA4(40),           EXT 290
C X TROE1(40),TROE2(40),TROE3(40),TROE4(40),           EXT 295
C X TROA1(40),TROA2(40),TROA3(40),TROA4(40),           EXT 300
C 2FG1EXT(40),FG1ABS(40),FG2EXT(40),FG2ABS(40),         EXT 305
C 3 BSTEXT(40),BSTABS(40),AVOEXT(40),AVOABS(40),FVOEXT(40), EXT 310
C 4 FVOABS(40),DMEEXT(40),DMEABS(40)                     EXT 315
C DATA VX2 /                                               EXT 320
C * .2000, .3000, .3371, .5500, .0943, 1.0600, 1.5360, EXT 325
C * 2.0000, 2.2500, 2.5000, 2.7000, 3.0000, 3.3923, 3.7500, EXT 330
C * 4.5000, 5.0000, 5.5000, 6.0000, 6.2000, 6.5000, 7.2000, EXT 335
C * 7.9000, 8.2000, 8.7000, 9.0000, 9.2000, 10.0000, 10.5910, EXT 340
C * 11.0000, 11.5000, 12.5000, 14.0000, 15.0000, 16.4000, 17.2000, EXT 345
C * 18.5000, 21.3000, 25.0000, 30.0000, 40.0000/        EXT 350
C DATA RURE1 /                                             EXT 355
C 1 2.09201, 1.74582, 1.80500, 1.00000, .75203, .41943, .24070, EXT 360
C 2 .14709, .13304, .12234, .13247, .11196, .10437, .09956, EXT 365
C 3 .09190, .08449, .07061, .07025, .07089, .07196, .07791, EXT 370
C 4 .04481, .04339, .12184, .12650, .12429, .09152, .08076, EXT 375
C 5 .07436, .08030, .09032, .04949, .05654, .06000, .06062, EXT 380
C 6 .05722, .06051, .05177, .04989, .04304/            EXT 385
C DATA RURE2 /                                             EXT 390

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|--------------|----------|----------|----------|----------|---------|---------|---------|---------|
| 1 | 2.09544, | 1.74165, | 1.59981, | 1.00000, | .75316, | .42171, | .24323, | EXT 395 |
| 2 | .15108, | .13808, | .12430, | .13222, | .13823, | .11076, | .10323, | EXT 400 |
| 3 | .09475, | .08728, | .08076, | .07639, | .07797, | .07576, | .07943, | EXT 405 |
| 4 | .04899, | .04523, | .12165, | .12741, | .12778, | .09032, | .07982, | EXT 410 |
| 5 | .07380, | .06880, | .06329, | .05791, | .06646, | .06639, | .07443, | EXT 415 |
| 6 | .06304, | .06443, | .05538, | .04867, | .04519/ | | | EXT 420 |
| DATA RURE3 / | | | | | | | | |
| 1 | 2.07082, | 1.71456, | 1.57982, | 1.00000, | .76095, | .43228, | .25348, | EXT 430 |
| 2 | .16456, | .14677, | .13234, | .13405, | .20316, | .12873, | .11506, | EXT 435 |
| 3 | .10481, | .09709, | .08918, | .09380, | .09709, | .08791, | .08601, | EXT 440 |
| 4 | .06247, | .05601, | .11905, | .12595, | .12348, | .08741, | .07703, | EXT 445 |
| 5 | .07266, | .07044, | .07443, | .08146, | .68810, | .08563, | .08962, | EXT 450 |
| 6 | .08051, | .07877, | .06658, | .05747, | .05184/ | | | EXT 455 |
| DATA RURE4 / | | | | | | | | |
| 1 | 1.66076, | 1.47886, | 1.40139, | 1.00000, | .80652, | .50595, | .32259, | EXT 465 |
| 2 | .23468, | .20772, | .18532, | .17348, | .35114, | .20006, | .17386, | EXT 470 |
| 3 | .16139, | .15424, | .14557, | .16215, | .16786, | .14994, | .14032, | EXT 475 |
| 4 | .12968, | .12601, | .13551, | .13582, | .13228, | .11070, | .09994, | EXT 480 |
| 5 | .09873, | .10418, | .13241, | .15924, | .16139, | .15949, | .15778, | EXT 485 |
| 6 | .15184, | .13848, | .12663, | .11076, | .09001/ | | | EXT 490 |
| DATA RURA1 / | | | | | | | | |
| 1 | .67198, | .11937, | .08506, | .05930, | .05152, | .05816, | .05006, | EXT 500 |
| 2 | .01968, | .02070, | .02101, | .05652, | .02785, | .01316, | .00867, | EXT 505 |
| 3 | .01462, | .01310, | .01627, | .02013, | .02186, | .02367, | .03538, | EXT 510 |
| 4 | .02823, | .03962, | .06778, | .07285, | .08120, | .04032, | .03177, | EXT 515 |
| 5 | .02557, | .02342, | .02177, | .02627, | .03943, | .03114, | .03696, | EXT 520 |
| 6 | .02956, | .03500, | .03241, | .03297, | .03380/ | | | EXT 525 |
| DATA RURA2 / | | | | | | | | |
| 1 | .82968, | .10816, | .07671, | .05380, | .04684, | .05335, | .04614, | EXT 535 |
| 2 | .01829, | .01899, | .01962, | .05525, | .06816, | .01552, | .00867, | EXT 540 |
| 3 | .01542, | .01373, | .01327, | .02832, | .02829, | .02532, | .03487, | EXT 545 |
| 4 | .02835, | .03854, | .06684, | .07272, | .08036, | .03987, | .03247, | EXT 550 |
| 5 | .02816, | .02816, | .03101, | .03741, | .04829, | .04032, | .04396, | EXT 555 |
| 6 | .03734, | .03956, | .03601, | .03525, | .03563/ | | | EXT 560 |
| DATA RURA3 / | | | | | | | | |
| 1 | .51899, | .08278, | .03816, | .04092, | .03570, | .04158, | .03620, | EXT 565 |
| 2 | .01813, | .01481, | .01633, | .03278, | .13890, | .02494, | .00886, | EXT 570 |
| 3 | .01804, | .01582, | .01677, | .04816, | .04367, | .03013, | .03443, | EXT 580 |
| 4 | .02930, | .01677, | .06209, | .06911, | .07475, | .03892, | .03494, | EXT 585 |
| 5 | .03513, | .03258, | .05152, | .08241, | .06537, | .08203, | .06216, | EXT 590 |
| 6 | .05614, | .05209, | .04608, | .04198, | .04095/ | | | EXT 595 |
| DATA RURA4 / | | | | | | | | |
| 1 | .21943, | .02848, | .01943, | .01342, | .01171, | .01437, | .01323, | EXT 605 |
| 2 | .01152, | .00898, | .01329, | .08108, | .24690, | .05323, | .01430, | EXT 610 |
| 3 | .03361, | .02940, | .02652, | .09437, | .08506, | .35348, | .04627, | EXT 615 |
| 4 | .04380, | .04557, | .05380, | .05715, | .05899, | .04881, | .05253, | EXT 620 |
| 5 | .08171, | .07437, | .16152, | .13019, | .12190, | .11734, | .11411, | EXT 625 |
| 6 | .10766, | .09487, | .08430, | .07348, | .08861/ | | | EXT 630 |
| DATA URRE1 / | | | | | | | | |
| 1 | 1.86816, | 1.63316, | 1.51807, | 1.00000, | .77785, | .47095, | .30006, | EXT 640 |
| 2 | .21392, | .19405, | .17886, | .18127, | .18133, | .14765, | .14000, | EXT 645 |
| 3 | .12715, | .11000, | .11234, | .10801, | .10500, | .10361, | .10342, | EXT 650 |
| 4 | .08760, | .08652, | .11937, | .12139, | .12297, | .09797, | .09057, | EXT 655 |
| 5 | .08595, | .08198, | .07563, | .08696, | .07209, | .08842, | .07177, | EXT 660 |
| 6 | .06354, | .06177, | .06373, | .04726, | .04051/ | | | EXT 665 |
| DATA URRE2 / | | | | | | | | |
| 1 | 1.95502, | 1.84094, | 1.83070, | 1.00000, | .77814, | .46836, | .29487, | EXT 675 |
| 2 | .21951, | .18943, | .17285, | .17209, | .21418, | .15354, | .14081, | EXT 680 |
| 3 | .12728, | .11861, | .11085, | .11329, | .11323, | .10569, | .10247, | EXT 685 |

| | | | | | | | | |
|--------------|---------|---------|---------|---------|---------|--------|--------|---------|
| 4 | .08698 | .06361 | .12013 | .12418 | .12304 | .09614 | .08842 | EXT 690 |
| 5 | .08487 | .08285 | .08361 | .08430 | .08880 | .08449 | .08601 | EXT 695 |
| 6 | .07825 | .07323 | .06367 | .05500 | .04747/ | | | EXT 700 |
| DATA URBE3 / | | | | | | | | |
| 1 | 1.96430 | 1.64032 | 1.52392 | 1.00000 | .77709 | .46253 | .28690 | EXT 705 |
| 2 | .20310 | .17981 | .16101 | .15614 | .26475 | .15456 | .13563 | EXT 710 |
| 3 | .12215 | .11361 | .10500 | .11715 | .11753 | .10392 | .09766 | EXT 715 |
| 4 | .08443 | .08057 | .10943 | .11342 | .11063 | .08703 | .08025 | EXT 720 |
| 5 | .07888 | .08032 | .09101 | .10070 | .10386 | .09943 | .09886 | EXT 725 |
| 6 | .09152 | .08247 | .07152 | .08089 | .05253/ | | | EXT 730 |
| DATA URBE4 / | | | | | | | | |
| 1 | 1.41266 | 1.33816 | 1.29114 | 1.00000 | .83646 | .55025 | .35342 | EXT 735 |
| 2 | .25285 | .21576 | .18310 | .16215 | .37854 | .20494 | .16665 | EXT 740 |
| 3 | .14778 | .13892 | .12943 | .15525 | .15709 | .13513 | .12481 | EXT 745 |
| 4 | .11759 | .11494 | .11487 | .11329 | .11108 | .09911 | .09209 | EXT 750 |
| 5 | .09342 | .10120 | .13177 | .15696 | .15766 | .15513 | .15203 | EXT 755 |
| 6 | .14532 | .13030 | .11785 | .10411 | .09101/ | | | EXT 760 |
| DATA URBA1 / | | | | | | | | |
| 1 | .78427 | .58975 | .54285 | .38184 | .29222 | .20886 | .15658 | EXT 765 |
| 2 | .12329 | .11462 | .10747 | .11797 | .10025 | .08759 | .08184 | EXT 770 |
| 3 | .07506 | .07008 | .06741 | .06601 | .06544 | .06449 | .06665 | EXT 775 |
| 4 | .06218 | .06949 | .07316 | .07462 | .08101 | .05753 | .05272 | EXT 780 |
| 5 | .04899 | .04734 | .04494 | .04443 | .05133 | .04348 | .04443 | EXT 785 |
| 6 | .03994 | .03981 | .03633 | .03468 | .03146/ | | | EXT 790 |
| DATA URBA2 / | | | | | | | | |
| 1 | .69032 | .49367 | .45165 | .29741 | .24070 | .17399 | .13146 | EXT 795 |
| 2 | .10354 | .09589 | .09025 | .10411 | .15101 | .07880 | .06949 | EXT 800 |
| 3 | .06570 | .06095 | .05829 | .07171 | .06797 | .05975 | .06013 | EXT 805 |
| 4 | .05509 | .06051 | .07139 | .07494 | .07956 | .05525 | .05184 | EXT 810 |
| 5 | .05089 | .05291 | .05888 | .06380 | .06880 | .06127 | .06019 | EXT 815 |
| 6 | .05525 | .05070 | .04500 | .04076 | .03741/ | | | EXT 820 |
| DATA URBA3 / | | | | | | | | |
| 1 | .54848 | .37101 | .33734 | .21949 | .17785 | .12968 | .09654 | EXT 825 |
| 2 | .07804 | .07165 | .06791 | .08563 | .19839 | .08722 | .05316 | EXT 830 |
| 3 | .05316 | .04886 | .04620 | .07570 | .06899 | .05291 | .05101 | EXT 835 |
| 4 | .04734 | .05025 | .06171 | .06570 | .06854 | .04892 | .04797 | EXT 840 |
| 5 | .05097 | .05655 | .07127 | .08095 | .08411 | .07728 | .07475 | EXT 845 |
| 6 | .06886 | .06019 | .05222 | .04538 | .04171/ | | | EXT 850 |
| DATA URBA4 / | | | | | | | | |
| 1 | .15975 | .10000 | .09013 | .05785 | .04871 | .03424 | .02633 | EXT 855 |
| 2 | .02525 | .01975 | .02354 | .06241 | .26690 | .05810 | .02285 | EXT 860 |
| 3 | .03910 | .03386 | .03044 | .09627 | .08557 | .05405 | .04576 | EXT 865 |
| 4 | .04392 | .04424 | .04671 | .04791 | .04861 | .04684 | .05177 | EXT 870 |
| 5 | .06158 | .07475 | .10342 | .12146 | .12177 | .11734 | .11335 | EXT 875 |
| 6 | .10608 | .09111 | .08063 | .08988 | .06475/ | | | EXT 880 |
| DATA DCNE1 / | | | | | | | | |
| 1 | 1.4578 | 1.32614 | 1.26171 | 1.00000 | .88133 | .70227 | .58487 | EXT 885 |
| 2 | .48008 | .42044 | .38310 | .35076 | .42268 | .32278 | .28810 | EXT 890 |
| 3 | .24905 | .21184 | .16734 | .14791 | .21332 | .18078 | .12087 | EXT 895 |
| 4 | .10039 | .10703 | .15070 | .15865 | .14639 | .10228 | .08387 | EXT 900 |
| 5 | .07373 | .06829 | .05044 | .04173 | .04982 | .06186 | .07703 | EXT 905 |
| 6 | .07234 | .06297 | .05431 | .05329 | .03741/ | | | EXT 910 |
| DATA DCNE2 / | | | | | | | | |
| 1 | 1.38924 | 1.28443 | 1.20835 | 1.00000 | .91367 | .77082 | .64997 | EXT 915 |
| 2 | .84886 | .66247 | .45038 | .36209 | .50589 | .43766 | .38076 | EXT 920 |
| 3 | .31858 | .27475 | .22215 | .21019 | .27570 | .21057 | .18949 | EXT 925 |
| 4 | .14208 | .14215 | .16956 | .17082 | .16625 | .11865 | .09759 | EXT 930 |
| 5 | .09218 | .09373 | .10532 | .12370 | .14000 | .13633 | .14291 | EXT 935 |
| 6 | .13808 | .11475 | .09658 | .08291 | .10349/ | | | EXT 940 |

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|--------------|---------|---------|---------|---------|--------|--------|--------|----------|
| DATA OCNE3 / | | | | | | | | |
| 1 | 1.22259 | 1.14627 | 1.11842 | 1.00000 | .94788 | .87538 | .80418 | EXT 985 |
| 2 | .72930 | .68582 | .62165 | .49982 | .67949 | .66468 | .59253 | EXT 990 |
| 3 | .49551 | .44871 | .37886 | .35924 | .43367 | .37019 | .30842 | EXT 995 |
| 4 | .26437 | .25228 | .24905 | .23975 | .22786 | .17804 | .15316 | EXT 1000 |
| 5 | .15373 | .16791 | .22361 | .28348 | .28677 | .29082 | .29038 | EXT 1005 |
| 6 | .27810 | .23867 | .20209 | .16430 | .14943 | | | EXT 1010 |
| DATA OCNE4 / | | | | | | | | |
| 1 | 1.09133 | 1.06601 | 1.05620 | 1.00000 | .97506 | .94791 | .94203 | EXT 1015 |
| 2 | .93671 | .92867 | .90411 | .80253 | .89222 | .94462 | .92146 | EXT 1020 |
| 3 | .85797 | .82595 | .76747 | .68646 | .78209 | .75266 | .68658 | EXT 1025 |
| 4 | .62722 | .60228 | .56335 | .53728 | .51861 | .43449 | .37196 | EXT 1030 |
| 5 | .35899 | .37316 | .46854 | .58234 | .58690 | .60348 | .60583 | EXT 1035 |
| 6 | .60000 | .55392 | .50367 | .43576 | .35949 | | | EXT 1040 |
| DATA OCNA1 / | | | | | | | | |
| 1 | .30987 | .04354 | .02880 | .01797 | .01468 | .01788 | .01582 | EXT 1045 |
| 2 | .00816 | .01146 | .01677 | .03310 | .03380 | .00715 | .00443 | EXT 1050 |
| 3 | .00500 | .00601 | .00753 | .01595 | .02943 | .00994 | .01367 | EXT 1055 |
| 4 | .01671 | .02538 | .03481 | .03405 | .03601 | .01608 | .01310 | EXT 1060 |
| 5 | .01152 | .01082 | .01070 | .01563 | .02063 | .03171 | .03810 | EXT 1065 |
| 6 | .03741 | .03804 | .03759 | .04209 | .07892 | | | EXT 1070 |
| DATA OCNA2 / | | | | | | | | |
| 1 | .23367 | .03127 | .02070 | .01297 | .01063 | .01285 | .01190 | EXT 1075 |
| 2 | .00937 | .00911 | .01576 | .05576 | .23487 | .03949 | .00905 | EXT 1080 |
| 3 | .02057 | .01816 | .01665 | .08025 | .08044 | .03677 | .03139 | EXT 1085 |
| 4 | .03190 | .03766 | .04532 | .04544 | .04715 | .03405 | .03614 | EXT 1090 |
| 5 | .04329 | .05424 | .07823 | .09728 | .10057 | .10247 | .10222 | EXT 1095 |
| 6 | .09551 | .08241 | .07158 | .06506 | .09203 | | | EXT 1100 |
| DATA OCNA3 / | | | | | | | | |
| 1 | .13025 | .01557 | .01013 | .00646 | .00532 | .00665 | .00722 | EXT 1105 |
| 2 | .01335 | .00728 | .01810 | .09835 | .37329 | .09703 | .01968 | EXT 1110 |
| 3 | .05114 | .04342 | .03709 | .17456 | .16468 | .08785 | .06980 | EXT 1115 |
| 4 | .06589 | .06791 | .07247 | .07329 | .07449 | .07025 | .07962 | EXT 1120 |
| 5 | .09899 | .12481 | .17867 | .32019 | .22228 | .22051 | .21595 | EXT 1125 |
| 6 | .20335 | .17278 | .14677 | .12171 | .12430 | | | EXT 1130 |
| DATA OCNA4 / | | | | | | | | |
| 1 | .03506 | .00323 | .00215 | .00139 | .00114 | .00171 | .00532 | EXT 1135 |
| 2 | .03682 | .01101 | .03741 | .20101 | .47608 | .21165 | .05234 | EXT 1140 |
| 3 | .12886 | .11215 | .09684 | .32810 | .31778 | .20513 | .18658 | EXT 1145 |
| 4 | .15956 | .15842 | .15405 | .15968 | .16051 | .16506 | .18323 | EXT 1150 |
| 5 | .21709 | .25652 | .33222 | .39639 | .39854 | .40297 | .40025 | EXT 1155 |
| 6 | .39025 | .35468 | .32006 | .27718 | .25348 | | | EXT 1160 |
| DATA TROE1 / | | | | | | | | |
| 1 | 2.21222 | 1.82753 | 1.67032 | 1.00000 | .72424 | .35272 | .15234 | EXT 1165 |
| 2 | .05165 | .03801 | .02494 | .04671 | .02462 | .01538 | .01146 | EXT 1170 |
| 3 | .01032 | .00816 | .00861 | .00994 | .01057 | .01139 | .01747 | EXT 1175 |
| 4 | .01494 | .02418 | .03165 | .03386 | .04247 | .01601 | .01215 | EXT 1180 |
| 5 | .00937 | .00861 | .00823 | .01139 | .01924 | .01234 | .01348 | EXT 1185 |
| 6 | .01114 | .01297 | .01266 | .01418 | .01487 | | | EXT 1190 |
| DATA TROE2 / | | | | | | | | |
| 1 | 2.21519 | 1.82260 | 1.68557 | 1.00000 | .72525 | .35481 | .15449 | EXT 1195 |
| 2 | .05475 | .04044 | .03082 | .04620 | .05272 | .01867 | .01288 | EXT 1200 |
| 3 | .01127 | .00886 | .00866 | .01449 | .01399 | .01228 | .01728 | EXT 1205 |
| 4 | .01475 | .02285 | .03215 | .03494 | .04285 | .01652 | .01304 | EXT 1210 |
| 5 | .01101 | .01120 | .01297 | .01753 | .02468 | .01741 | .01766 | EXT 1215 |
| 6 | .01513 | .01557 | .01456 | .01532 | .01862 | | | EXT 1220 |
| DATA TROE3 / | | | | | | | | |
| 1 | 2.19082 | 1.79462 | 1.64456 | 1.00000 | .73297 | .36443 | .16278 | EXT 1225 |
| 2 | .06468 | .04850 | .03399 | .04538 | .11892 | .02838 | .01648 | EXT 1230 |

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|---------------|----------|----------|----------|----------|----------|----------|----------|----------|
| 3 | .01386, | .01076, | .00988, | .02551, | .02222, | .01468, | .01680, | EXT 1280 |
| 4 | .01437, | .01994, | .03127, | .03513, | .04076, | .01722, | .01513, | EXT 1285 |
| 5 | .01519, | .01791, | .02538, | .03272, | .03816, | .03038, | .02886, | EXT 1290 |
| 6 | .02551, | .02228, | .01937, | .01804, | .01791/ | | | EXT 1295 |
| DATA TROE4 / | | | | | | | | |
| 1 | 1.75698, | 1.54829, | 1.45962, | 1.00000, | .77816, | .43139, | .21778, | EXT 1300 |
| 2 | .11329, | .08101, | .05506, | .04943, | .25291, | .06818, | .03703, | EXT 1305 |
| 3 | .02601, | .01888, | .01468, | .04982, | .04247, | .02234, | .01797, | EXT 1310 |
| 4 | .01532, | .01633, | .02259, | .02487, | .02595, | .01728, | .01892, | EXT 1315 |
| 5 | .02399, | .03247, | .05285, | .06462, | .06608, | .05930, | .05525, | EXT 1320 |
| 6 | .04861, | .03753, | .02968, | .02348, | .02165/ | | | EXT 1325 |
| DATA TROA1 / | | | | | | | | |
| 1 | .89671, | .09905, | .06563, | .04101, | .03354, | .03627, | .02810, | EXT 1330 |
| 2 | .00873, | .00918, | .00930, | .03215, | .01285, | .00513, | .00318, | EXT 1335 |
| 3 | .00557, | .00494, | .00646, | .00887, | .00937, | .01025, | .01646, | EXT 1340 |
| 4 | .01481, | .02418, | .02886, | .03070, | .04032, | .01494, | .01139, | EXT 1345 |
| 5 | .00873, | .00816, | .00797, | .01133, | .01911, | .01215, | .01329, | EXT 1350 |
| 6 | .01101, | .01291, | .01266, | .01418, | .01487/ | | | EXT 1355 |
| DATA TROA2 / | | | | | | | | |
| 1 | .85000, | .08791, | .05818, | .03652, | .02994, | .03278, | .02557, | EXT 1360 |
| 2 | .00810, | .00842, | .00867, | .03139, | .03949, | .00646, | .00318, | EXT 1365 |
| 3 | .00595, | .00519, | .00646, | .01304, | .01247, | .01095, | .01620, | EXT 1370 |
| 4 | .01449, | .02278, | .02932, | .03184, | .04063, | .01544, | .01234, | EXT 1375 |
| 5 | .01044, | .01076, | .01272, | .01741, | .02462, | .01722, | .01747, | EXT 1380 |
| 6 | .01506, | .01551, | .01456, | .01532, | .01582/ | | | EXT 1385 |
| DATA TROA3 / | | | | | | | | |
| 1 | .52804, | .06367, | .04158, | .02633, | .02184, | .02443, | .01937, | EXT 1390 |
| 2 | .00858, | .00846, | .00799, | .02949, | .10013, | .00968, | .00310, | EXT 1395 |
| 3 | .00677, | .00582, | .00646, | .02361, | .01994, | .01266, | .01544, | EXT 1400 |
| 4 | .01386, | .01968, | .02848, | .03203, | .03854, | .01620, | .01449, | EXT 1405 |
| 5 | .01462, | .01747, | .02513, | .03253, | .03797, | .03019, | .02861, | EXT 1410 |
| 6 | .02538, | .02215, | .01930, | .01797, | .01791/ | | | EXT 1415 |
| DATA TROA4 / | | | | | | | | |
| 1 | .19829, | .01842, | .01215, | .00791, | .00665, | .00778, | .00652, | EXT 1420 |
| 2 | .00361, | .00253, | .00399, | .02570, | .20890, | .01715, | .00318, | EXT 1425 |
| 3 | .00873, | .00728, | .00858, | .04481, | .03225, | .01646, | .01405, | EXT 1430 |
| 4 | .01310, | .01468, | .01958, | .02184, | .02387, | .01608, | .01816, | EXT 1435 |
| 5 | .02342, | .03203, | .05234, | .06399, | .06538, | .05887, | .05456, | EXT 1440 |
| 6 | .04810, | .03715, | .02949, | .02335, | .02158/ | | | EXT 1445 |
| DATA FO1EXT / | | | | | | | | |
| 1 | .98519, | .99158, | .99089, | 1.00000, | 1.00576, | 1.01747, | 1.03177, | EXT 1450 |
| 2 | 1.04146, | 1.04698, | 1.05323, | 1.05886, | 1.04899, | 1.06823, | 1.07804, | EXT 1455 |
| 3 | 1.09272, | 1.10367, | 1.11684, | 1.10430, | 1.11367, | 1.12899, | 1.14987, | EXT 1460 |
| 4 | 1.17209, | 1.18278, | 1.20133, | 1.21266, | 1.21949, | 1.22677, | 1.15589, | EXT 1465 |
| 5 | 1.05084, | .98291, | 1.01120, | 1.10911, | 1.11462, | 1.14871, | 1.16247, | EXT 1470 |
| 6 | 1.18544, | 1.21582, | 1.24614, | 1.26842, | 1.20500/ | | | EXT 1475 |
| DATA FG1ABS / | | | | | | | | |
| 1 | .00013, | 0.00000, | 0.00000, | 0.00000, | 0.00000, | .00095, | .01513, | EXT 1480 |
| 2 | .10861, | .03892, | .13272, | .47133, | .49696, | .45785, | .17918, | EXT 1485 |
| 3 | .37373, | .34601, | .31867, | .55190, | .55025, | .49987, | .46342, | EXT 1490 |
| 4 | .43943, | .45918, | .46089, | .46241, | .48398, | .47193, | .40905, | EXT 1495 |
| 5 | .51468, | .53101, | .55288, | .58685, | .50899, | .60387, | .61158, | EXT 1500 |
| 6 | .62335, | .64120, | .65627, | .66278, | .66392/ | | | EXT 1505 |
| DATA FO2EXT / | | | | | | | | |
| 1 | .94791, | .98215, | .97083, | 1.00000, | 1.00937, | 1.05177, | 1.12519, | EXT 1510 |
| 2 | 1.29570, | 1.39203, | 1.41120, | 1.04715, | 1.10916, | 1.43285, | 1.45272, | EXT 1515 |
| 3 | 1.19709, | 1.04307, | .92354, | .71747, | .92405, | .79342, | .60286, | EXT 1520 |
| 4 | .47877, | .43171, | .30734, | .32259, | .31184, | .24139, | .21801, | EXT 1525 |
| 5 | .24008, | .28818, | .42671, | .58861, | .57206, | .82089, | .57185, | EXT 1530 |

| | | | | | | | | | |
|---|---------------|----------|----------|----------|----------|----------|----------|--|----------|
| 6 | .54247, | .43981, | .34475, | .24905, | .19291/ | | | | EXT 1575 |
| | DATA FG2ABS / | | | | | | | | EXT 1580 |
| 1 | 0.00000, | 0.00000, | 0.00000, | 0.00000, | 0.00000, | .00013, | .00247, | | EXT 1585 |
| 2 | .01987, | .00620, | .02323, | .17209, | .57930, | .19810, | .03475, | | EXT 1590 |
| 3 | .09639, | .08000, | .06582, | .34589, | .32703, | .17025, | .12633, | | EXT 1595 |
| 4 | .11816, | .11827, | .11519, | .11538, | .11601, | .12329, | .14468, | | EXT 1600 |
| 5 | .18633, | .24057, | .35411, | .44886, | .45095, | .45215, | .44278, | | EXT 1605 |
| 6 | .41778, | .34430, | .27823, | .21063, | .17867/ | | | | EXT 1610 |
| | DATA BSTEXT / | | | | | | | | EXT 1615 |
| 1 | 1.48871, | 1.55462, | 1.51506, | 1.00000, | .70633, | .28867, | .09994, | | EXT 1620 |
| 2 | .04184, | .02728, | .01848, | .01335, | .06513, | .08930, | .06532, | | EXT 1625 |
| 3 | .04766, | .04278, | .05810, | .05367, | .04392, | .03342, | .04456, | | EXT 1630 |
| 4 | .11867, | .14709, | .12734, | .09291, | .08778, | .05019, | .04070, | | EXT 1635 |
| 5 | .05734, | .03576, | .01975, | .01892, | .01956, | .03665, | .04152, | | EXT 1640 |
| 6 | .01715, | .01620, | .00835, | .00633, | .00589/ | | | | EXT 1645 |
| | DATA BSTABS / | | | | | | | | EXT 1650 |
| 1 | 0.00000, | 0.00000, | 0.00000, | 0.00000, | 0.00000, | 0.00000, | .00019, | | EXT 1655 |
| 2 | .00127, | .00158, | .00291, | .00405, | .05860, | .08297, | .06019, | | EXT 1660 |
| 3 | .04519, | .04133, | .05703, | .05266, | .04304, | .03285, | .04437, | | EXT 1665 |
| 4 | .11816, | .14633, | .12639, | .09215, | .08722, | .04968, | .04044, | | EXT 1670 |
| 5 | .05709, | .03551, | .01962, | .01892, | .01949, | .03665, | .04146, | | EXT 1675 |
| 6 | .01709, | .01620, | .00835, | .00633, | .00589/ | | | | EXT 1680 |
| | DATA AVOEXT / | | | | | | | | EXT 1685 |
| 1 | 1.14880, | 1.19171, | 1.18013, | 1.00000, | .84873, | .53019, | .27968, | | EXT 1690 |
| 2 | .14551, | .11070, | .08633, | .07184, | .06076, | .04506, | .03399, | | EXT 1695 |
| 3 | .02095, | .01538, | .01266, | .01019, | .00994, | .01044, | .01381, | | EXT 1700 |
| 4 | .01791, | .02278, | .02918, | .03108, | .02234, | .03456, | .03184, | | EXT 1705 |
| 5 | .02772, | .02475, | .01715, | .01563, | .01665, | .01646, | .01734, | | EXT 1710 |
| 6 | .01772, | .01076, | .01051, | .01133, | .01329/ | | | | EXT 1715 |
| | DATA AVOABS / | | | | | | | | EXT 1720 |
| 1 | .44816, | .11259, | .08500, | .05272, | .04082, | .02449, | .01487, | | EXT 1725 |
| 2 | .01019, | .00867, | .00842, | .00842, | .00949, | .00741, | .00487, | | EXT 1730 |
| 3 | .00316, | .00335, | .00399, | .00449, | .00525, | .00665, | .01114, | | EXT 1735 |
| 4 | .01652, | .02177, | .02437, | .02506, | .02658, | .03006, | .02861, | | EXT 1740 |
| 5 | .02513, | .02285, | .01620, | .01532, | .01833, | .01820, | .01709, | | EXT 1745 |
| 6 | .01741, | .01057, | .01038, | .01127, | .01329/ | | | | EXT 1750 |
| | DATA FVOEXT / | | | | | | | | EXT 1755 |
| 1 | .88715, | .82532, | .94013, | 1.00000, | 1.03013, | 1.05975, | 1.01171, | | EXT 1760 |
| 2 | .88677, | .82538, | .76361, | .71563, | .67424, | .60589, | .55057, | | EXT 1765 |
| 3 | .45222, | .37646, | .32318, | .25519, | .22728, | .20525, | .17810, | | EXT 1770 |
| 4 | .14491, | .14152, | .37639, | .44551, | .44405, | .42222, | .36462, | | EXT 1775 |
| 5 | .32551, | .27519, | .16728, | .10627, | .10861, | .10886, | .11665, | | EXT 1780 |
| 6 | .13127, | .10108, | .08567, | .06411, | .05741/ | | | | EXT 1785 |
| | DATA FVOABS / | | | | | | | | EXT 1790 |
| 1 | .41582, | .32992, | .19108, | .14468, | .12475, | .09158, | .06601, | | EXT 1795 |
| 2 | .04943, | .04367, | .04342, | .04399, | .05076, | .04133, | .02829, | | EXT 1800 |
| 3 | .01924, | .01981, | .02297, | .02475, | .02778, | .03411, | .05335, | | EXT 1805 |
| 4 | .07133, | .08816, | .15342, | .18506, | .19384, | .20791, | .18449, | | EXT 1810 |
| 5 | .16101, | .13759, | .08456, | .06886, | .07278, | .07387, | .07958, | | EXT 1815 |
| 6 | .08785, | .06032, | .05747, | .05133/ | | | | | EXT 1820 |
| | DATA DMEEXT / | | | | | | | | EXT 1825 |
| 1 | 1.05019, | 1.05880, | 1.05259, | 1.00000, | .94949, | .81456, | .66051, | | EXT 1830 |
| 2 | .54366, | .49133, | .44677, | .41671, | .39093, | .34779, | .32804, | | EXT 1835 |
| 3 | .29722, | .27506, | .25082, | .22620, | .21632, | .20253, | .17286, | | EXT 1840 |
| 4 | .14905, | .14234, | .14082, | .13057, | .16399, | .23608, | .24491, | | EXT 1845 |
| 5 | .27791, | .25076, | .15272, | .09601, | .09458, | .14576, | .12373, | | EXT 1850 |
| 6 | .19348, | .12190, | .12924, | .08538, | .04100/ | | | | EXT 1855 |
| | DATA DMEABS / | | | | | | | | EXT 1860 |
| 1 | .00063, | .00152, | .00184, | .00306, | .00791, | .01829, | .03728, | | EXT 1865 |
| 2 | .06158, | .07538, | .08943, | .10051, | .11614, | .13310, | .14348, | | EXT 1870 |
| 3 | .14633, | .13728, | .12462, | .11184, | .10709, | .10076, | .09006, | | EXT 1875 |
| 4 | .08734, | .09000, | .10304, | .11605, | .13437, | .19551, | .20095, | | EXT 1880 |
| 5 | .22494, | .18418, | .09285, | .06665, | .06923, | .12329, | .10591, | | EXT 1885 |
| 6 | .16184, | .08635, | .10582, | .06759, | .03247/ | | | | EXT 1890 |
| | END | | | | | | | | EXT 1895 |

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|---|---|---------|
| | BLOCK DATA SF296 | 85F 100 |
| C | BLOCK DATA | 85F 105 |
| C | | 85F 110 |
| C | WATER VAPOR CONTINUUM - SELF BROADENED ABSORPTION COEFFICIENTS 29685F | 85F 115 |
| C | | 85F 120 |
| C | COMMON /SH20/ V1,V2,DV,NPT,S296(2001) | 85F 125 |
| C | COMMON /SH20/ V1,V2,DV,NPT,S0001(50),S0051(50),S0101(50),S0151(50) | 85F 130 |
| C | 1,S0201(50),S0251(50),S0301(50),S0351(50),S0401(50),S0451(50) | 85F 135 |
| C | 2,S0501(50),S0551(50),S0601(50),S0651(50),S0701(50),S0751(50) | 85F 140 |
| C | 3,S0801(50),S0851(50),S0901(50),S0951(50) | 85F 145 |
| C | 4,S1001(50),S1051(50),S1101(50),S1151(50),S1201(50),S1251(50) | 85F 150 |
| C | 5,S1301(50),S1351(50),S1401(50),S1451(50) | 85F 155 |
| C | 6,S1501(50),S1551(50),S1601(50),S1651(50),S1701(50),S1751(50) | 85F 160 |
| C | 7,S1801(50),S1851(50),S1901(50),S1951(50),S2001(1) | 85F 165 |
| C | | 85F 170 |
| C | DIMENSION S296(2001) | 85F 175 |
| C | EQUIVALENCE(S296(1),S0001(1)) | 85F 180 |
| C | | 85F 185 |
| C | DATA V1,V2,DV,NPT / | 85F 190 |
| C | 1 0.0, 20000.0, 10.0, 2001/ | 85F 195 |
| C | | 85F 200 |
| C | | 85F 205 |
| C | DATA S0001/ | 85F 210 |
| C | C 1.0162E-21, 1.0573E-21, 1.1109E-21, 1.2574E-21, 1.3499E-21, | 85F 215 |
| C | C 1.4327E-21, 1.5065E-21, 1.5184E-21, 1.5022E-21, 1.3877E-21, | 85F 220 |
| C | C 1.3115E-21, 1.2253E-21, 1.1271E-21, 1.0070E-21, 8.7495E-22, | 85F 225 |
| C | C 8.0118E-22, 6.9940E-22, 6.2034E-22, 5.6051E-22, 4.7663E-22, | 85F 230 |
| C | C 4.2450E-22, 3.6690E-22, 3.3441E-22, 3.0711E-22, 2.5205E-22, | 85F 235 |
| C | C 2.2113E-22, 1.8880E-22, 1.6653E-22, 1.4826E-22, 1.2085E-22, | 85F 240 |
| C | C 1.0709E-22, 9.1783E-23, 7.7274E-23, 6.7302E-23, 5.6184E-23, | 85F 245 |
| C | C 4.9089E-23, 4.1497E-23, 3.5823E-23, 3.1124E-23, 2.8414E-23, | 85F 250 |
| C | C 2.3107E-23, 2.0156E-23, 1.7829E-23, 1.5666E-23, 1.3928E-23, | 85F 255 |
| C | C 1.2338E-23, 1.0932E-23, 9.7939E-24, 8.8241E-24, 7.9173E-24/ | 85F 260 |
| C | DATA S0051/ | 85F 265 |
| C | C 7.1296E-24, 6.4179E-24, 5.8031E-24, 5.2647E-24, 4.7782E-24, | 85F 270 |
| C | C 4.3349E-24, 3.9355E-24, 3.5887E-24, 3.2723E-24, 2.9919E-24, | 85F 275 |
| C | C 2.7303E-24, 2.5013E-24, 2.2876E-24, 2.0924E-24, 1.9193E-24, | 85F 280 |
| C | C 1.7618E-24, 1.6188E-24, 1.4891E-24, 1.3717E-24, 1.2647E-24, | 85F 285 |
| C | C 1.1671E-24, 1.0786E-24, 9.9785E-25, 9.2350E-25, 8.5539E-25, | 85F 290 |
| C | C 7.9377E-25, 7.3701E-25, 6.8877E-25, 6.3993E-25, 5.9705E-25, | 85F 295 |
| C | C 5.5788E-25, 5.2196E-25, 4.8899E-25, 4.5866E-25, 4.3079E-25, | 85F 300 |
| C | C 4.0526E-25, 3.8182E-25, 3.6025E-25, 3.4038E-25, 3.2203E-25, | 85F 305 |
| C | C 3.0511E-25, 2.8049E-25, 2.7505E-25, 2.6170E-25, 2.4933E-25, | 85F 310 |
| C | C 2.3786E-25, 2.2722E-25, 2.1736E-25, 2.0819E-25, 1.9966E-25/ | 85F 315 |
| C | DATA S0101/ | 85F 320 |
| C | C 1.9178E-25, 1.8442E-25, 1.7760E-25, 1.7127E-25, 1.6541E-25, | 85F 325 |
| C | C 1.5997E-25, 1.5495E-25, 1.5034E-25, 1.4614E-25, 1.4230E-25, | 85F 330 |
| C | C 1.3883E-25, 1.3578E-25, 1.3304E-25, 1.3069E-25, 1.2876E-25, | 85F 335 |
| C | C 1.2732E-25, 1.2628E-25, 1.2558E-25, 1.2544E-25, 1.2604E-25, | 85F 340 |
| C | C 1.2719E-25, 1.2883E-25, 1.3164E-25, 1.3581E-25, 1.4187E-25, | 85F 345 |
| C | C 1.4866E-25, 1.5009E-25, 1.6717E-25, 1.8148E-25, 2.0288E-25, | 85F 350 |
| C | C 2.2466E-25, 2.5502E-25, 2.9183E-25, 3.3612E-25, 3.9986E-25, | 85F 355 |
| C | C 4.6929E-25, 5.5055E-25, 6.5897E-25, 7.8300E-25, 9.7213E-25, | 85F 360 |
| C | C 1.0046E-24, 1.1488E-24, 1.2943E-24, 1.5049E-24, 1.8973E-24, | 85F 365 |
| C | C 1.0711E-24, 2.0286E-24, 2.2823E-24, 2.6780E-24, 2.8766E-24/ | 85F 370 |
| C | DATA S0151/ | 85F 375 |
| C | C 3.1164E-24, 3.3540E-24, 3.6884E-24, 3.9158E-24, 3.8712E-24, | 85F 380 |
| C | C 3.7433E-24, 3.4803E-24, 3.1003E-24, 2.8027E-24, 2.5283E-24, | 85F 385 |
| C | C 2.3408E-24, 2.2036E-24, 2.4442E-24, 2.7521E-24, 2.9048E-24, | 85F 390 |

| | | | | | |
|---------------|-------------|-------------|-------------|-------------|---------|
| C 3.0489E-24, | 3.2646E-24, | 3.3880E-24, | 3.3492E-24, | 3.0987E-24, | BSF 395 |
| C 2.9482E-24, | 2.8711E-24, | 2.6068E-24, | 2.2683E-24, | 1.9996E-24, | BSF 400 |
| C 1.7788E-24, | 1.6101E-24, | 1.3911E-24, | 1.2013E-24, | 1.0544E-24, | BSF 405 |
| C 9.4224E-25, | 8.1258E-25, | 7.3667E-25, | 6.2233E-25, | 5.5906E-25, | BSF 410 |
| C 5.1619E-25, | 4.5140E-25, | 4.0273E-25, | 3.3268E-25, | 3.0258E-25, | BSF 415 |
| C 2.6440E-25, | 2.3107E-25, | 2.0749E-25, | 1.8258E-25, | 1.6459E-25, | BSF 420 |
| C 1.4097E-25, | 1.2052E-25, | 1.0759E-25, | 9.1400E-26, | 8.1432E-26/ | BSF 425 |
| DATA S0201/ | | | | | BSF 430 |
| C 7.1460E-26, | 6.4006E-26, | 5.6995E-26, | 4.9372E-26, | 4.4455E-26, | BSF 435 |
| C 3.9033E-26, | 3.4740E-26, | 3.1269E-26, | 2.8059E-26, | 2.5558E-26, | BSF 440 |
| C 2.2919E-26, | 2.0846E-26, | 1.8983E-26, | 1.7329E-26, | 1.5929E-26, | BSF 445 |
| C 1.4631E-26, | 1.3513E-26, | 1.2481E-26, | 1.1519E-26, | 1.0682E-26, | BSF 450 |
| C 9.9256E-27, | 9.2505E-27, | 8.6387E-27, | 8.0857E-27, | 7.5674E-27, | BSF 455 |
| C 7.0974E-27, | 6.6580E-27, | 6.2580E-27, | 5.8853E-27, | 5.5333E-27, | BSF 460 |
| C 5.2143E-27, | 4.9169E-27, | 4.6431E-27, | 4.3898E-27, | 4.1564E-27, | BSF 465 |
| C 3.9405E-27, | 3.7403E-27, | 3.5544E-27, | 3.3819E-27, | 3.2212E-27, | BSF 470 |
| C 3.0714E-27, | 2.9313E-27, | 2.8003E-27, | 2.6777E-27, | 2.5626E-27, | BSF 475 |
| C 2.4551E-27, | 2.3540E-27, | 2.2591E-27, | 2.1701E-27, | 2.0866E-27/ | BSF 480 |
| DATA S0251/ | | | | | BSF 485 |
| C 2.0082E-27, | 1.9349E-27, | 1.8665E-27, | 1.8027E-27, | 1.7439E-27, | BSF 490 |
| C 1.6894E-27, | 1.6400E-27, | 1.5953E-27, | 1.5557E-27, | 1.5195E-27, | BSF 495 |
| C 1.4808E-27, | 1.4603E-27, | 1.4337E-27, | 1.4093E-27, | 1.3828E-27, | BSF 500 |
| C 1.3569E-27, | 1.3270E-27, | 1.2984E-27, | 1.2714E-27, | 1.2541E-27, | BSF 505 |
| C 1.2399E-27, | 1.2102E-27, | 1.1878E-27, | 1.1728E-27, | 1.1644E-27, | BSF 510 |
| C 1.1491E-27, | 1.1305E-27, | 1.1235E-27, | 1.1228E-27, | 1.1224E-27, | BSF 515 |
| C 1.1191E-27, | 1.1151E-27, | 1.1098E-27, | 1.1068E-27, | 1.1109E-27, | BSF 520 |
| C 1.1213E-27, | 1.1431E-27, | 1.1826E-27, | 1.2322E-27, | 1.3025E-27, | BSF 525 |
| C 1.4066E-27, | 1.5657E-27, | 1.7214E-27, | 1.9449E-27, | 2.2862E-27, | BSF 530 |
| C 2.6953E-27, | 3.1723E-27, | 3.7028E-27, | 4.4482E-27, | 5.3852E-27/ | BSF 535 |
| DATA S0301/ | | | | | BSF 540 |
| C 6.2653E-27, | 7.2175E-27, | 7.7626E-27, | 8.7248E-27, | 9.6759E-27, | BSF 545 |
| C 1.0102E-26, | 1.0620E-26, | 1.1201E-26, | 1.2107E-26, | 1.2998E-26, | BSF 550 |
| C 1.3130E-26, | 1.3856E-26, | 1.4350E-26, | 1.4899E-26, | 1.0819E-26, | BSF 555 |
| C 1.0120E-26, | 9.4795E-27, | 9.2858E-27, | 9.8060E-27, | 1.0999E-26, | BSF 560 |
| C 1.1987E-26, | 1.2672E-26, | 1.3418E-26, | 1.3864E-26, | 1.4330E-26, | BSF 565 |
| C 1.4592E-26, | 1.4598E-26, | 1.4774E-26, | 1.4726E-26, | 1.4820E-26, | BSF 570 |
| C 1.5077E-26, | 1.4984E-26, | 1.5181E-26, | 1.5888E-26, | 1.6850E-26, | BSF 575 |
| C 1.7690E-26, | 1.9277E-26, | 2.1107E-26, | 2.3068E-26, | 2.5347E-26, | BSF 580 |
| C 2.8039E-26, | 3.1345E-26, | 3.5822E-26, | 3.9051E-26, | 4.3422E-26, | BSF 585 |
| C 4.8704E-26, | 5.5351E-26, | 6.3454E-26, | 7.2890E-26, | 8.2974E-26/ | BSF 590 |
| DATA S0351/ | | | | | BSF 595 |
| C 9.7609E-26, | 1.1237E-25, | 1.3187E-25, | 1.5940E-25, | 1.0784E-25, | BSF 600 |
| C 2.1894E-25, | 2.5487E-25, | 3.0092E-25, | 3.5385E-25, | 4.2784E-25, | BSF 605 |
| C 4.9313E-25, | 5.6800E-25, | 6.2868E-25, | 7.1080E-25, | 7.7699E-25, | BSF 610 |
| C 8.7210E-25, | 8.9335E-25, | 9.2151E-25, | 9.2779E-25, | 9.4643E-25, | BSF 615 |
| C 9.7978E-25, | 1.0008E-24, | 1.0702E-24, | 1.1026E-24, | 1.0826E-24, | BSF 620 |
| C 1.0850E-24, | 1.0432E-24, | 1.0428E-24, | 9.8980E-25, | 9.4902E-25, | BSF 625 |
| C 9.5159E-25, | 1.0050E-24, | 1.0738E-24, | 1.1550E-24, | 1.1229E-24, | BSF 630 |
| C 1.0590E-24, | 1.0602E-24, | 9.1742E-25, | 8.4492E-25, | 8.8099E-25, | BSF 635 |
| C 5.6295E-25, | 4.6502E-25, | 3.8071E-25, | 3.0721E-25, | 2.3297E-25, | BSF 640 |
| C 1.8088E-25, | 1.4830E-25, | 1.2049E-25, | 9.6754E-26, | 7.9192E-26/ | BSF 645 |
| DATA S0401/ | | | | | BSF 650 |
| C 6.6373E-26, | 5.6488E-26, | 4.8904E-26, | 4.2289E-26, | 3.6880E-26, | BSF 655 |
| C 3.2398E-26, | 2.8525E-26, | 2.5363E-26, | 2.2431E-26, | 1.9949E-26, | BSF 660 |
| C 1.7931E-26, | 1.6104E-26, | 1.4431E-26, | 1.2997E-26, | 1.1559E-26, | BSF 665 |
| C 1.0404E-26, | 9.4300E-27, | 8.4597E-27, | 7.6133E-27, | 6.8623E-27, | BSF 670 |
| C 8.2137E-27, | 5.6345E-27, | 5.1078E-27, | 4.8248E-27, | 4.1908E-27, | BSF 675 |
| C 3.8003E-27, | 3.4810E-27, | 3.1554E-27, | 2.8795E-27, | 2.6282E-27, | BSF 680 |
| C 2.3967E-27, | 2.1901E-27, | 2.0082E-27, | 1.8384E-27, | 1.6847E-27, | BSF 685 |

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| C 1.5459E-27, | 1.4204E-27, | 1.3068E-27, | 1.2036E-27, | 1.1095E-27, | BSF 690 |
| C 1.0237E-27, | 9.4592E-28, | 8.7530E-28, | 8.1121E-28, | 7.5282E-28, | BSF 695 |
| C 6.9985E-28, | 6.5189E-28, | 6.0874E-28, | 5.6999E-28, | 5.3530E-28/ | BSF 700 |
| DATA 50451/ | | | | | |
| C 5.0418E-28, | 4.7745E-28, | 4.5367E-28, | 4.3253E-28, | 4.1309E-28, | BSF 705 |
| C 3.9695E-28, | 3.8094E-28, | 3.6482E-28, | 3.4897E-28, | 3.3500E-28, | BSF 710 |
| C 3.2302E-28, | 3.0854E-28, | 2.9698E-28, | 2.8567E-28, | 2.7600E-28, | BSF 715 |
| C 2.6746E-28, | 2.5982E-28, | 2.5510E-28, | 2.5121E-28, | 2.4922E-28, | BSF 720 |
| C 2.4909E-28, | 2.5013E-28, | 2.5216E-28, | 2.5589E-28, | 2.6049E-28, | BSF 725 |
| C 2.6451E-28, | 2.6978E-28, | 2.7687E-28, | 2.8600E-28, | 2.9643E-28, | BSF 730 |
| C 3.0701E-28, | 3.2058E-28, | 3.3695E-28, | 3.5558E-28, | 3.7634E-28, | BSF 735 |
| C 3.9875E-28, | 4.2458E-28, | 4.5480E-28, | 4.8858E-28, | 5.2599E-28, | BSF 740 |
| C 5.7030E-28, | 6.2067E-28, | 6.7911E-28, | 7.4579E-28, | 8.1902E-28, | BSF 745 |
| C 8.9978E-28, | 9.9870E-28, | 1.1102E-27, | 1.2343E-27, | 1.3732E-27/ | BSF 750 |
| DATA 50501/ | | | | | |
| C 1.5394E-27, | 1.7318E-27, | 1.9383E-27, | 2.1819E-27, | 2.4666E-27, | BSF 755 |
| C 2.8109E-27, | 3.2236E-27, | 3.7760E-27, | 4.4417E-27, | 5.2422E-27, | BSF 760 |
| C 6.1941E-27, | 7.4897E-27, | 9.2041E-27, | 1.1574E-26, | 1.4126E-26, | BSF 765 |
| C 1.7197E-26, | 2.1399E-26, | 2.6266E-26, | 3.3424E-26, | 3.8418E-26, | BSF 770 |
| C 4.5140E-26, | 5.0653E-26, | 5.8485E-26, | 6.5856E-26, | 6.8937E-26, | BSF 775 |
| C 8.9121E-26, | 8.9005E-26, | 8.9861E-26, | 8.8200E-26, | 8.6089E-26, | BSF 780 |
| C 6.5809E-26, | 7.3498E-26, | 8.0311E-26, | 8.3186E-26, | 8.4260E-26, | BSF 785 |
| C 9.0644E-26, | 9.4965E-26, | 9.4909E-26, | 9.0160E-26, | 9.1494E-26, | BSF 790 |
| C 9.3629E-26, | 9.5944E-26, | 9.5459E-26, | 8.9919E-26, | 8.6040E-26, | BSF 795 |
| C 7.8613E-26, | 7.1567E-26, | 6.2677E-26, | 5.1899E-26, | 4.4188E-26/ | BSF 800 |
| DATA 50551/ | | | | | |
| C 3.7167E-26, | 3.0638E-26, | 2.5573E-26, | 2.0317E-26, | 1.6371E-26, | BSF 805 |
| C 1.3257E-26, | 1.0928E-26, | 8.8986E-27, | 7.4653E-27, | 6.1111E-27, | BSF 810 |
| C 5.1395E-27, | 4.3500E-27, | 3.7584E-27, | 3.2633E-27, | 2.8413E-27, | BSF 815 |
| C 2.4723E-27, | 2.1709E-27, | 1.9294E-27, | 1.7258E-27, | 1.5492E-27, | BSF 820 |
| C 1.3920E-27, | 1.2389E-27, | 1.1189E-27, | 1.0046E-27, | 9.0832E-28, | BSF 825 |
| C 8.2784E-28, | 7.4191E-28, | 6.7085E-28, | 6.0708E-28, | 5.4963E-28, | BSF 830 |
| C 4.9851E-28, | 4.5044E-28, | 4.0916E-28, | 3.7220E-28, | 3.3678E-28, | BSF 835 |
| C 3.0663E-28, | 2.7979E-28, | 2.5495E-28, | 2.3286E-28, | 2.1233E-28, | BSF 840 |
| C 1.9409E-28, | 1.7770E-28, | 1.6260E-28, | 1.4885E-28, | 1.3674E-28, | BSF 845 |
| C 1.2543E-28, | 1.1551E-28, | 1.0655E-28, | 9.8585E-29, | 9.1398E-29/ | BSF 850 |
| DATA 50601/ | | | | | |
| C 0.4806E-29, | 7.8899E-29, | 7.3547E-29, | 6.8670E-29, | 6.4131E-29, | BSF 855 |
| C 5.9930E-29, | 5.6096E-29, | 5.2592E-29, | 4.9352E-29, | 4.6354E-29, | BSF 860 |
| C 4.3722E-29, | 4.1250E-29, | 3.9081E-29, | 3.7118E-29, | 3.5372E-29, | BSF 865 |
| C 3.3882E-29, | 3.2499E-29, | 3.1324E-29, | 3.0313E-29, | 2.9438E-29, | BSF 870 |
| C 2.8688E-29, | 2.8050E-29, | 2.7545E-29, | 2.7149E-29, | 2.6907E-29, | BSF 875 |
| C 2.8724E-29, | 2.8649E-29, | 2.8642E-29, | 2.8729E-29, | 2.8871E-29, | BSF 880 |
| C 2.7058E-29, | 2.7307E-29, | 2.7701E-29, | 2.8368E-29, | 2.9067E-29, | BSF 885 |
| C 2.9952E-29, | 3.1020E-29, | 3.2253E-29, | 3.3347E-29, | 3.5232E-29, | BSF 890 |
| C 3.7037E-29, | 3.9076E-29, | 4.1385E-29, | 4.3927E-29, | 4.6861E-29, | BSF 895 |
| C 5.0218E-29, | 5.4027E-29, | 5.8303E-29, | 6.3200E-29, | 6.8878E-29/ | BSF 900 |
| DATA 50651/ | | | | | |
| C 7.5419E-29, | 8.3130E-29, | 9.1952E-29, | 1.0228E-28, | 1.1388E-28, | BSF 905 |
| C 1.2792E-28, | 1.4021E-28, | 1.6437E-28, | 1.8674E-28, | 2.1160E-28, | BSF 910 |
| C 2.4506E-28, | 2.8113E-28, | 3.2636E-28, | 3.7385E-28, | 4.2234E-28, | BSF 915 |
| C 4.9282E-28, | 5.7358E-28, | 6.0743E-28, | 7.0821E-28, | 8.284E-28, | BSF 920 |
| C 1.1543E-27, | 1.3604E-27, | 1.6337E-27, | 2.0056E-27, | 2.3253E-27, | BSF 925 |
| C 2.0127E-27, | 2.9211E-27, | 3.3894E-27, | 3.7397E-27, | 3.8203E-27, | BSF 930 |
| C 3.4810E-27, | 3.9499E-27, | 3.9508E-27, | 3.7652E-27, | 3.5059E-27, | BSF 935 |
| C 3.8198E-27, | 3.7071E-27, | 4.0925E-27, | 4.2717E-27, | 4.8241E-27, | BSF 940 |
| C 5.2008E-27, | 5.6530E-27, | 5.9531E-27, | 6.1994E-27, | 6.5080E-27, | BSF 945 |
| C 6.6355E-27, | 6.9133E-27, | 6.8930E-27, | 7.3058E-27, | 7.4678E-27/ | BSF 950 |
| DATA 50701/ | | | | | |
| | | | | | BSF 955 |

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| C 7.9193E-27 | 8.3627E-27 | 9.1267E-27 | 1.0021E-26 | 1.1218E-26 | BSF 985 |
| C 1.2899E-26 | 1.4447E-26 | 1.7268E-26 | 2.0025E-26 | 2.3139E-26 | BSF 990 |
| C 2.5999E-26 | 2.8920E-26 | 3.3059E-26 | 3.5425E-26 | 3.9522E-26 | BSF 995 |
| C 4.0551E-26 | 4.2818E-26 | 4.2892E-26 | 4.4210E-26 | 4.5614E-26 | BSF 1000 |
| C 4.6739E-26 | 4.9482E-26 | 5.1118E-26 | 5.0986E-26 | 4.9417E-26 | BSF 1005 |
| C 4.9022E-26 | 4.8449E-26 | 4.8694E-26 | 4.8111E-26 | 4.9378E-26 | BSF 1010 |
| C 5.3231E-26 | 5.7362E-26 | 6.2350E-26 | 6.0951E-26 | 5.7281E-26 | BSF 1015 |
| C 5.4585E-26 | 4.9032E-26 | 4.3009E-26 | 3.4778E-26 | 2.8108E-26 | BSF 1020 |
| C 2.2993E-26 | 1.7999E-26 | 1.3870E-26 | 1.0750E-26 | 8.5191E-27 | BSF 1025 |
| C 6.7951E-27 | 5.5336E-27 | 4.6439E-27 | 4.0243E-27 | 3.5368E-27 | BSF 1030 |
| DATA S0751/ | | | | | |
| C 3.1427E-27 | 2.7775E-27 | 2.4486E-27 | 2.1788E-27 | 1.9249E-27 | BSF 1035 |
| C 1.7162E-27 | 1.5115E-27 | 1.3478E-27 | 1.2236E-27 | 1.1139E-27 | BSF 1040 |
| C 1.0092E-27 | 9.0795E-28 | 8.2214E-28 | 7.4691E-28 | 6.7486E-28 | BSF 1045 |
| C 8.0414E-28 | 5.4564E-28 | 4.8754E-28 | 4.3501E-28 | 3.8767E-28 | BSF 1050 |
| C 3.4363E-28 | 3.0703E-28 | 2.7562E-28 | 2.4831E-28 | 2.2411E-28 | BSF 1055 |
| C 1.9939E-28 | 1.8049E-28 | 1.6368E-28 | 1.4863E-28 | 1.3460E-28 | BSF 1060 |
| C 1.2212E-28 | 1.1155E-28 | 1.0185E-28 | 9.3417E-29 | 8.5671E-29 | BSF 1065 |
| C 7.8292E-29 | 7.1749E-29 | 6.5856E-29 | 6.0588E-29 | 5.5835E-29 | BSF 1070 |
| C 5.1350E-29 | 4.7395E-29 | 4.3771E-29 | 4.0476E-29 | 3.7560E-29 | BSF 1075 |
| C 3.4861E-29 | 3.2427E-29 | 3.0240E-29 | 2.8278E-29 | 2.6531E-29 | BSF 1080 |
| DATA S0801/ | | | | | |
| C 2.4937E-29 | 2.3511E-29 | 2.2245E-29 | 2.1133E-29 | 2.0158E-29 | BSF 1085 |
| C 1.9330E-29 | 1.8669E-29 | 1.8152E-29 | 1.7852E-29 | 1.7752E-29 | BSF 1090 |
| C 1.7823E-29 | 1.8194E-29 | 1.8866E-29 | 1.9759E-29 | 2.0736E-29 | BSF 1095 |
| C 2.2083E-29 | 2.3587E-29 | 2.4984E-29 | 2.6333E-29 | 2.8160E-29 | BSF 1100 |
| C 3.0759E-29 | 3.3720E-29 | 3.6457E-29 | 4.0668E-29 | 4.4541E-29 | BSF 1105 |
| C 4.7976E-29 | 5.0908E-29 | 5.4811E-29 | 6.1394E-29 | 6.3689E-29 | BSF 1110 |
| C 6.5714E-29 | 6.8384E-29 | 7.1918E-29 | 7.3741E-29 | 7.2079E-29 | BSF 1115 |
| C 7.2172E-29 | 7.2572E-29 | 7.3912E-29 | 7.6188E-29 | 8.3291E-29 | BSF 1120 |
| C 8.7885E-29 | 9.2412E-29 | 1.0021E-28 | 1.0752E-28 | 1.1548E-28 | BSF 1125 |
| C 1.1807E-28 | 1.1949E-28 | 1.2346E-28 | 1.2516E-28 | 1.2826E-28 | BSF 1130 |
| DATA S0851/ | | | | | |
| C 1.3053E-28 | 1.3556E-28 | 1.4221E-28 | 1.5201E-28 | 1.6661E-28 | BSF 1135 |
| C 1.8385E-28 | 2.0585E-28 | 2.3674E-28 | 2.7928E-28 | 3.3901E-28 | BSF 1140 |
| C 4.1017E-28 | 4.9595E-28 | 6.0432E-28 | 7.6304E-28 | 9.0764E-28 | BSF 1145 |
| C 1.0798E-27 | 1.2442E-27 | 1.4404E-27 | 1.6331E-27 | 1.8338E-27 | BSF 1150 |
| C 2.0445E-27 | 2.2288E-27 | 2.3083E-27 | 2.3196E-27 | 2.3919E-27 | BSF 1155 |
| C 2.3339E-27 | 2.3502E-27 | 2.3444E-27 | 2.6395E-27 | 2.9928E-27 | BSF 1160 |
| C 3.0025E-27 | 3.0498E-27 | 3.1777E-27 | 3.4198E-27 | 3.4739E-27 | BSF 1165 |
| C 3.2696E-27 | 3.4100E-27 | 3.5405E-27 | 3.7774E-27 | 3.8285E-27 | BSF 1170 |
| C 3.6797E-27 | 3.5809E-27 | 3.2283E-27 | 2.9381E-27 | 2.4881E-27 | BSF 1175 |
| C 2.0599E-27 | 1.7121E-27 | 1.3841E-27 | 1.1111E-27 | 8.9413E-28 | BSF 1180 |
| DATA S0901/ | | | | | |
| C 7.3455E-28 | 6.2078E-28 | 5.2538E-28 | 4.5328E-28 | 3.9005E-28 | BSF 1185 |
| C 3.4772E-28 | 3.1203E-28 | 2.8132E-28 | 2.5250E-28 | 2.2371E-28 | BSF 1190 |
| C 2.0131E-28 | 1.7992E-28 | 1.6076E-28 | 1.4222E-28 | 1.2490E-28 | BSF 1195 |
| C 1.1401E-28 | 1.0249E-28 | 9.2279E-29 | 8.5954E-29 | 7.8227E-29 | BSF 1200 |
| C 6.9848E-29 | 6.2488E-29 | 5.7252E-29 | 5.3800E-29 | 4.8980E-29 | BSF 1205 |
| C 4.2194E-29 | 3.7746E-29 | 3.3913E-29 | 3.0656E-29 | 2.8883E-29 | BSF 1210 |
| C 2.4311E-29 | 2.1572E-29 | 1.8892E-29 | 1.7038E-29 | 1.4914E-29 | BSF 1215 |
| C 1.3277E-29 | 1.1894E-29 | 1.0391E-29 | 9.2779E-30 | 8.3123E-30 | BSF 1220 |
| C 7.4968E-30 | 6.8395E-30 | 6.2915E-30 | 5.7784E-30 | 5.2838E-30 | BSF 1225 |
| C 4.8382E-30 | 4.4543E-30 | 4.1155E-30 | 3.7158E-30 | 3.3731E-30 | BSF 1230 |
| DATA S0951/ | | | | | |
| C 3.0969E-30 | 2.8535E-30 | 2.6416E-30 | 2.4593E-30 | 2.2878E-30 | BSF 1235 |
| C 2.1379E-30 | 2.0073E-30 | 1.8907E-30 | 1.7888E-30 | 1.6938E-30 | BSF 1240 |
| C 1.6119E-30 | 1.5424E-30 | 1.4847E-30 | 1.4401E-30 | 1.4083E-30 | BSF 1245 |
| C 1.3937E-30 | 1.3943E-30 | 1.4281E-30 | 1.4766E-30 | 1.5701E-30 | BSF 1250 |

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| C 1.7079E-30, | 1.8691E-30, | 2.0081E-30, | 2.1740E-30, | 2.4847E-30, | BSF 1280 |
| C 2.6463E-30, | 2.7087E-30, | 2.7313E-30, | 2.8352E-30, | 2.9511E-30, | BSF 1285 |
| C 2.8058E-30, | 2.7227E-30, | 2.7356E-30, | 2.8012E-30, | 2.8034E-30, | BSF 1290 |
| C 2.9031E-30, | 3.1030E-30, | 3.3745E-30, | 3.8152E-30, | 4.0822E-30, | BSF 1295 |
| C 4.2673E-30, | 4.3879E-30, | 4.5488E-30, | 4.7179E-30, | 4.6140E-30, | BSF 1300 |
| C 4.6339E-30, | 4.6716E-30, | 4.7024E-30, | 4.7931E-30, | 4.8503E-30/ | BSF 1305 |
| DATA S1001/ | | | | | |
| C 4.9589E-30, | 4.9499E-30, | 5.0363E-30, | 5.3184E-30, | 5.6451E-30, | BSF 1310 |
| C 6.0932E-30, | 6.6469E-30, | 7.4076E-30, | 8.3605E-30, | 9.4898E-30, | BSF 1315 |
| C 1.0935E-29, | 1.2593E-29, | 1.4913E-29, | 1.8099E-29, | 2.1842E-29, | BSF 1320 |
| C 2.7284E-29, | 3.2159E-29, | 3.7426E-29, | 4.5226E-29, | 5.3512E-29, | BSF 1325 |
| C 6.1787E-29, | 6.8237E-29, | 7.9421E-29, | 9.0002E-29, | 9.6841E-29, | BSF 1330 |
| C 9.9558E-29, | 1.0232E-28, | 1.0591E-28, | 1.0657E-28, | 1.0441E-28, | BSF 1335 |
| C 1.0719E-28, | 1.1526E-28, | 1.2962E-28, | 1.4336E-28, | 1.6150E-28, | BSF 1340 |
| C 1.8417E-28, | 2.0725E-28, | 2.3426E-28, | 2.5619E-28, | 2.7828E-28, | BSF 1345 |
| C 3.0563E-28, | 3.3438E-28, | 3.6317E-28, | 4.0400E-28, | 4.4556E-28, | BSF 1350 |
| C 5.0397E-28, | 5.3315E-28, | 5.9185E-28, | 6.5311E-28, | 6.9188E-28/ | BSF 1355 |
| DATA S1051/ | | | | | |
| C 7.7728E-28, | 7.9789E-28, | 8.6598E-28, | 8.7768E-28, | 9.1773E-28, | BSF 1360 |
| C 9.7533E-28, | 1.0007E-27, | 1.0650E-27, | 1.0992E-27, | 1.0864E-27, | BSF 1365 |
| C 1.0494E-27, | 1.0303E-27, | 1.0031E-27, | 1.0436E-27, | 1.0537E-27, | BSF 1370 |
| C 1.1184E-27, | 1.2364E-27, | 1.3651E-27, | 1.4881E-27, | 1.4723E-27, | BSF 1375 |
| C 1.4118E-27, | 1.3371E-27, | 1.1902E-27, | 1.0007E-27, | 7.9628E-28, | BSF 1380 |
| C 6.4362E-28, | 5.0243E-28, | 3.8133E-28, | 2.9400E-28, | 2.3443E-28, | BSF 1385 |
| C 1.9319E-28, | 1.6196E-28, | 1.4221E-28, | 1.2817E-28, | 1.1863E-28, | BSF 1390 |
| C 1.1383E-28, | 1.1221E-28, | 1.1574E-28, | 1.1661E-28, | 1.2157E-28, | BSF 1395 |
| C 1.2883E-28, | 1.3295E-28, | 1.4243E-28, | 1.4240E-28, | 1.4614E-28, | BSF 1400 |
| C 1.4529E-28, | 1.4685E-28, | 1.4974E-28, | 1.4790E-28, | 1.4890E-28/ | BSF 1405 |
| DATA S1101/ | | | | | |
| C 1.4704E-28, | 1.4142E-28, | 1.3374E-28, | 1.2746E-28, | 1.2172E-28, | BSF 1410 |
| C 1.2336E-28, | 1.2546E-28, | 1.3085E-28, | 1.4090E-28, | 1.5215E-28, | BSF 1415 |
| C 1.6540E-28, | 1.6144E-28, | 1.5282E-28, | 1.4358E-28, | 1.2849E-28, | BSF 1420 |
| C 1.0998E-28, | 8.6956E-29, | 7.0881E-29, | 5.5767E-29, | 4.2792E-29, | BSF 1425 |
| C 3.2733E-29, | 2.5020E-29, | 1.9985E-29, | 1.5834E-29, | 1.3015E-29, | BSF 1430 |
| C 1.0948E-29, | 9.4111E-30, | 8.1465E-30, | 7.1517E-30, | 6.2908E-30, | BSF 1435 |
| C 5.5756E-30, | 4.9805E-30, | 4.3961E-30, | 3.9181E-30, | 3.5227E-30, | BSF 1440 |
| C 3.1670E-30, | 2.8667E-30, | 2.5745E-30, | 2.3212E-30, | 2.0948E-30, | BSF 1445 |
| C 1.8970E-30, | 1.7239E-30, | 1.5659E-30, | 1.4301E-30, | 1.3104E-30, | BSF 1450 |
| C 1.2031E-30, | 1.1098E-30, | 1.0262E-30, | 9.6130E-31, | 8.8595E-31/ | BSF 1455 |
| DATA S1151/ | | | | | |
| C 8.2842E-31, | 7.7727E-31, | 7.3199E-31, | 6.9286E-31, | 6.5994E-31, | BSF 1460 |
| C 6.3316E-31, | 6.1244E-31, | 5.9869E-31, | 5.8843E-31, | 5.8832E-31, | BSF 1465 |
| C 5.9547E-31, | 6.1635E-31, | 6.4926E-31, | 7.0745E-31, | 7.8802E-31, | BSF 1470 |
| C 8.6774E-31, | 1.0052E-30, | 1.1575E-30, | 1.3626E-30, | 1.6126E-30, | BSF 1475 |
| C 1.6751E-30, | 1.9239E-30, | 2.1748E-30, | 2.2854E-30, | 2.2902E-30, | BSF 1480 |
| C 2.3240E-30, | 2.4081E-30, | 2.3930E-30, | 2.2378E-30, | 2.2476E-30, | BSF 1485 |
| C 2.2791E-30, | 2.4047E-30, | 2.5305E-30, | 2.8073E-30, | 3.1741E-30, | BSF 1490 |
| C 3.6892E-30, | 4.1499E-30, | 4.6865E-30, | 5.0990E-30, | 5.5807E-30, | BSF 1495 |
| C 6.1928E-30, | 6.6779E-30, | 7.3350E-30, | 8.1434E-30, | 8.8835E-30, | BSF 1500 |
| C 9.8678E-30, | 1.1283E-29, | 1.2899E-29, | 1.4688E-29, | 1.7642E-29/ | BSF 1505 |
| DATA S1201/ | | | | | |
| C 1.9608E-29, | 2.2008E-29, | 2.4601E-29, | 2.7218E-29, | 3.0375E-29, | BSF 1510 |
| C 3.1591E-29, | 3.2892E-29, | 3.2464E-29, | 3.3046E-29, | 3.2710E-29, | BSF 1515 |
| C 3.2601E-29, | 3.3308E-29, | 3.7446E-29, | 4.0795E-29, | 4.0284E-29, | BSF 1520 |
| C 4.0504E-29, | 4.1077E-29, | 4.5358E-29, | 4.4097E-29, | 4.2744E-29, | BSF 1525 |
| C 4.5449E-29, | 4.8147E-29, | 5.2858E-29, | 5.2476E-29, | 5.0275E-29, | BSF 1530 |
| C 4.7960E-29, | 4.3654E-29, | 3.9530E-29, | 3.2447E-29, | 2.8489E-29, | BSF 1535 |
| C 2.1795E-29, | 1.7880E-29, | 1.4309E-29, | 1.1256E-29, | 9.1903E-30, | BSF 1540 |
| C 7.6833E-30, | 6.3886E-30, | 5.6496E-30, | 4.9581E-30, | 4.5722E-30, | BSF 1545 |

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| C 4.3898E-30, | 4.3505E-30, | 4.3671E-30, | 4.5329E-30, | 4.6827E-30, | BSF 1575 |
| C 4.9334E-30, | 5.1122E-30, | 5.1649E-30, | 5.0965E-30, | 4.9551E-30/ | BSF 1580 |
| DATA S1251/ | | | | | |
| C 4.8928E-30, | 4.7947E-30, | 4.7986E-30, | 4.9071E-30, | 4.8867E-30, | BSF 1585 |
| C 4.7260E-30, | 4.5756E-30, | 4.5400E-30, | 4.5993E-30, | 4.4042E-30, | BSF 1590 |
| C 4.3309E-30, | 4.4182E-30, | 4.6735E-30, | 5.0378E-30, | 5.2204E-30, | BSF 1595 |
| C 5.6168E-30, | 4.6799E-30, | 4.3119E-30, | 3.8803E-30, | 3.3291E-30, | BSF 1600 |
| C 2.6289E-30, | 2.1029E-30, | 1.7011E-30, | 1.3345E-30, | 1.0224E-30, | BSF 1605 |
| C 7.8207E-31, | 6.2451E-31, | 5.0481E-31, | 4.1507E-31, | 3.5419E-31, | BSF 1610 |
| C 3.0582E-31, | 2.6900E-31, | 2.3778E-31, | 2.1343E-31, | 1.9182E-31, | BSF 1615 |
| C 1.7162E-31, | 1.5391E-31, | 1.3877E-31, | 1.2619E-31, | 1.1450E-31, | BSF 1620 |
| C 1.0461E-31, | 9.6578E-32, | 8.9579E-32, | 8.3463E-32, | 7.8127E-32, | BSF 1625 |
| C 7.3322E-32, | 6.9414E-32, | 6.6037E-32, | 6.3285E-32, | 6.1095E-32/ | BSF 1630 |
| DATA S1301/ | | | | | |
| C 5.9387E-32, | 5.8118E-32, | 5.7260E-32, | 5.6794E-32, | 5.6711E-32, | BSF 1635 |
| C 5.7003E-32, | 5.7670E-32, | 5.8717E-32, | 6.0151E-32, | 6.1984E-32, | BSF 1640 |
| C 6.4232E-32, | 6.6918E-32, | 7.0065E-32, | 7.3705E-32, | 7.7873E-32, | BSF 1645 |
| C 8.2612E-32, | 8.7972E-32, | 9.4009E-32, | 1.0079E-31, | 1.0840E-31, | BSF 1650 |
| C 1.1692E-31, | 1.2648E-31, | 1.3723E-31, | 1.4935E-31, | 1.6313E-31, | BSF 1655 |
| C 1.7905E-31, | 1.9740E-31, | 2.1898E-31, | 2.4419E-31, | 2.7426E-31, | BSF 1660 |
| C 3.0083E-31, | 3.4235E-31, | 3.7841E-31, | 4.1929E-31, | 4.6776E-31, | BSF 1665 |
| C 5.2123E-31, | 5.8497E-31, | 6.5294E-31, | 7.4038E-31, | 8.4793E-31, | BSF 1670 |
| C 9.6453E-31, | 1.1223E-30, | 1.2786E-30, | 1.4882E-30, | 1.7799E-30, | BSF 1675 |
| C 2.0766E-30, | 2.4523E-30, | 2.8591E-30, | 3.3386E-30, | 4.0531E-30/ | BSF 1680 |
| DATA S1351/ | | | | | |
| C 4.7663E-30, | 5.4858E-30, | 6.3377E-30, | 7.1688E-30, | 8.4184E-30, | BSF 1685 |
| C 9.5144E-30, | 1.0481E-29, | 1.1358E-29, | 1.2339E-29, | 1.3396E-29, | BSF 1690 |
| C 1.4375E-29, | 1.5831E-29, | 1.7323E-29, | 1.9671E-29, | 2.2976E-29, | BSF 1695 |
| C 2.6679E-29, | 3.0777E-29, | 3.4321E-29, | 3.8192E-29, | 4.2711E-29, | BSF 1700 |
| C 4.4903E-29, | 4.8931E-29, | 5.2253E-29, | 5.4040E-29, | 5.6387E-29, | BSF 1705 |
| C 5.6704E-29, | 6.0345E-29, | 6.1079E-29, | 6.2576E-29, | 6.4036E-29, | BSF 1710 |
| C 6.3776E-29, | 6.1878E-29, | 5.8616E-29, | 5.7036E-29, | 5.5840E-29, | BSF 1715 |
| C 5.6905E-29, | 5.8931E-29, | 6.2478E-29, | 6.8291E-29, | 7.4528E-29, | BSF 1720 |
| C 7.6078E-29, | 7.3098E-29, | 6.7573E-29, | 5.9827E-29, | 5.0927E-29, | BSF 1725 |
| C 4.0099E-29, | 3.1933E-29, | 2.4286E-29, | 1.8485E-29, | 1.4595E-29/ | BSF 1730 |
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| C 1.2017E-29, | 1.0164E-29, | 8.7433E-30, | 7.7108E-30, | 7.0048E-30, | BSF 1735 |
| C 6.5291E-30, | 6.1477E-30, | 5.9254E-30, | 5.8150E-30, | 5.7591E-30, | BSF 1740 |
| C 5.6498E-30, | 5.8887E-30, | 5.9636E-30, | 6.2408E-30, | 6.5478E-30, | BSF 1745 |
| C 7.0400E-30, | 7.2313E-30, | 7.5524E-30, | 8.0863E-30, | 8.3388E-30, | BSF 1750 |
| C 9.2342E-30, | 9.4754E-30, | 1.0293E-29, | 1.0895E-29, | 1.1330E-29, | BSF 1755 |
| C 1.2210E-29, | 1.2413E-29, | 1.2813E-29, | 1.2671E-29, | 1.2225E-29, | BSF 1760 |
| C 1.1602E-29, | 1.0991E-29, | 1.0000E-29, | 1.0570E-29, | 1.0818E-29, | BSF 1765 |
| C 1.1421E-29, | 1.2270E-29, | 1.3370E-29, | 1.4742E-29, | 1.4948E-29, | BSF 1770 |
| C 1.4322E-29, | 1.3210E-29, | 1.1749E-29, | 1.0051E-29, | 7.8387E-30, | BSF 1775 |
| C 8.1844E-30, | 4.8288E-30, | 3.4164E-30, | 2.9412E-30, | 1.9857E-30/ | BSF 1780 |
| DATA S1451/ | | | | | |
| C 1.5876E-30, | 1.2986E-30, | 1.0920E-30, | 9.4811E-31, | 8.3733E-31, | BSF 1785 |
| C 7.3908E-31, | 6.7259E-31, | 6.1148E-31, | 5.7119E-31, | 5.3548E-31, | BSF 1790 |
| C 4.8838E-31, | 4.4749E-31, | 4.1888E-31, | 3.7825E-31, | 3.4445E-31, | BSF 1795 |
| C 3.1018E-31, | 2.8109E-31, | 2.8610E-31, | 2.2858E-31, | 2.0490E-31, | BSF 1800 |
| C 1.8133E-31, | 1.5835E-31, | 1.3949E-31, | 1.2295E-31, | 1.0799E-31, | BSF 1805 |
| C 9.8544E-32, | 8.7597E-32, | 7.9989E-32, | 7.3973E-32, | 6.9035E-32, | BSF 1810 |
| C 6.4935E-32, | 6.1195E-32, | 5.8235E-32, | 5.5928E-32, | 5.4181E-32, | BSF 1815 |
| C 5.2993E-32, | 5.2338E-32, | 5.2272E-32, | 5.2923E-32, | 5.4252E-32, | BSF 1820 |
| C 5.8922E-32, | 5.9433E-32, | 6.3197E-32, | 6.9018E-32, | 7.8016E-32, | BSF 1825 |
| C 8.2885E-32, | 9.4050E-32, | 1.0605E-31, | 1.2267E-31, | 1.3822E-31/ | BSF 1830 |
| DATA S1501/ | | | | | |
| C 1.8353E-31, | 1.7543E-31, | 1.9808E-31, | 2.2197E-31, | 2.4066E-31, | BSF 1835 |

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| C 2.6777E-31, | 2.9751E-31, | 3.2543E-31, | 3.5536E-31, | 3.9942E-31, | BSF 1870 |
| C 4.6283E-31, | 5.4556E-31, | 6.5490E-31, | 7.6803E-31, | 9.0053E-31, | BSF 1875 |
| C 1.0852E-30, | 1.2946E-30, | 1.4916E-30, | 1.7748E-30, | 2.0073E-30, | BSF 1880 |
| C 2.2485E-30, | 2.5114E-30, | 2.7715E-30, | 3.1319E-30, | 3.3305E-30, | BSF 1885 |
| C 3.5059E-30, | 3.5746E-30, | 3.6311E-30, | 3.7344E-30, | 3.8574E-30, | BSF 1890 |
| C 3.7539E-30, | 3.9434E-30, | 4.3510E-30, | 4.3340E-30, | 4.2588E-30, | BSF 1895 |
| C 4.3977E-30, | 4.8062E-30, | 4.7687E-30, | 4.6457E-30, | 4.8578E-30, | BSF 1900 |
| C 5.2344E-30, | 5.6752E-30, | 5.8702E-30, | 5.6503E-30, | 5.3784E-30, | BSF 1905 |
| C 4.9181E-30, | 4.3272E-30, | 3.5681E-30, | 2.8814E-30, | 2.3320E-30/ | BSF 1910 |
| DATA S1551/ | | | | | |
| C 1.8631E-30, | 1.4587E-30, | 1.1782E-30, | 9.8132E-31, | 8.2528E-31, | BSF 1915 |
| C 6.9174E-31, | 6.1056E-31, | 5.3459E-31, | 4.7116E-31, | 4.1878E-31, | BSF 1920 |
| C 3.8125E-31, | 3.6347E-31, | 3.5071E-31, | 3.3897E-31, | 3.3541E-31, | BSF 1925 |
| C 3.3563E-31, | 3.5469E-31, | 3.8111E-31, | 3.8879E-31, | 4.1333E-31, | BSF 1930 |
| C 4.3475E-31, | 4.6476E-31, | 4.9761E-31, | 5.1380E-31, | 5.4135E-31, | BSF 1935 |
| C 5.3802E-31, | 5.5158E-31, | 5.6884E-31, | 5.9311E-31, | 6.3827E-31, | BSF 1940 |
| C 6.7893E-31, | 6.8230E-31, | 6.6694E-31, | 6.6018E-31, | 6.4863E-31, | BSF 1945 |
| C 8.5893E-31, | 6.3813E-31, | 6.4741E-31, | 6.8630E-31, | 7.0255E-31, | BSF 1950 |
| C 7.0687E-31, | 6.8810E-31, | 6.4104E-31, | 5.8130E-31, | 4.7242E-31, | BSF 1955 |
| C 3.7825E-31, | 3.1742E-31, | 2.5581E-31, | 1.8824E-31, | 1.3303E-31/ | BSF 1960 |
| DATA S1601/ | | | | | |
| C 9.6919E-32, | 7.5353E-32, | 6.0986E-32, | 5.0742E-32, | 4.5094E-32, | BSF 1965 |
| C 3.7190E-32, | 3.2520E-32, | 2.8756E-32, | 2.5680E-32, | 2.3139E-32, | BSF 1970 |
| C 2.1025E-32, | 1.9257E-32, | 1.7777E-32, | 1.6539E-32, | 1.5508E-32, | BSF 1975 |
| C 1.4657E-32, | 1.3968E-32, | 1.3417E-32, | 1.2998E-32, | 1.2700E-32, | BSF 1980 |
| C 1.2514E-32, | 1.2437E-32, | 1.2483E-32, | 1.2592E-32, | 1.2823E-32, | BSF 1985 |
| C 1.3157E-32, | 1.3596E-32, | 1.4144E-32, | 1.4806E-32, | 1.5588E-32, | BSF 1990 |
| C 1.6497E-32, | 1.7544E-32, | 1.8738E-32, | 2.0094E-32, | 2.1628E-32, | BSF 1995 |
| C 2.3354E-32, | 2.5297E-32, | 2.7483E-32, | 2.9941E-32, | 3.2708E-32, | BSF 2000 |
| C 3.5833E-32, | 3.9374E-32, | 4.3415E-32, | 4.8079E-32, | 5.3602E-32, | BSF 2005 |
| C 5.9916E-32, | 6.7436E-32, | 7.6368E-32, | 8.6812E-32, | 9.8747E-32/ | BSF 2010 |
| DATA S1651/ | | | | | |
| C 1.1350E-31, | 1.3181E-31, | 1.5408E-31, | 1.7868E-31, | 2.0651E-31, | BSF 2015 |
| C 2.4504E-31, | 2.9184E-31, | 3.4159E-31, | 3.9979E-31, | 4.8704E-31, | BSF 2020 |
| C 5.7856E-31, | 6.7576E-31, | 7.9103E-31, | 9.4370E-31, | 1.1224E-30, | BSF 2025 |
| C 1.3112E-30, | 1.5874E-30, | 1.9208E-30, | 2.0576E-30, | 2.3187E-30, | BSF 2030 |
| C 2.7905E-30, | 3.0059E-30, | 3.3423E-30, | 3.8958E-30, | 3.8737E-30, | BSF 2035 |
| C 4.2830E-30, | 4.5184E-30, | 4.8383E-30, | 5.3982E-30, | 5.8109E-30, | BSF 2040 |
| C 6.3741E-30, | 6.3874E-30, | 6.3870E-30, | 6.5918E-30, | 6.5056E-30, | BSF 2045 |
| C 6.5291E-30, | 6.3159E-30, | 6.3984E-30, | 6.4549E-30, | 6.5444E-30, | BSF 2050 |
| C 6.7038E-30, | 6.7665E-30, | 6.9124E-30, | 6.8451E-30, | 6.9255E-30, | BSF 2055 |
| C 6.9923E-30, | 7.0398E-30, | 6.7715E-30, | 6.0371E-30, | 5.3774E-30/ | BSF 2060 |
| DATA S1701/ | | | | | |
| C 4.6043E-30, | 3.7635E-30, | 2.9484E-30, | 2.2952E-30, | 1.8185E-30, | BSF 2065 |
| C 1.4191E-30, | 1.1471E-30, | 9.4790E-31, | 7.9813E-31, | 6.7989E-31, | BSF 2070 |
| C 5.9391E-31, | 6.2810E-31, | 4.7126E-31, | 4.2818E-31, | 3.8313E-31, | BSF 2075 |
| C 3.4886E-31, | 3.1669E-31, | 2.9110E-31, | 2.6871E-31, | 2.5074E-31, | BSF 2080 |
| C 2.4388E-31, | 2.3923E-31, | 2.4087E-31, | 2.4339E-31, | 2.4764E-31, | BSF 2085 |
| C 2.5823E-31, | 2.7177E-31, | 2.9227E-31, | 3.1593E-31, | 3.5730E-31, | BSF 2090 |
| C 4.0221E-31, | 4.3994E-31, | 4.8448E-31, | 5.3191E-31, | 5.8552E-31, | BSF 2095 |
| C 6.3458E-31, | 6.5333E-31, | 7.2457E-31, | 7.8091E-31, | 8.2334E-31, | BSF 2100 |
| C 8.7668E-31, | 8.7851E-31, | 8.2852E-31, | 8.6157E-31, | 9.5822E-31, | BSF 2105 |
| C 1.0128E-30, | 1.0116E-30, | 9.5577E-31, | 9.6633E-31, | 9.2291E-31/ | BSF 2110 |
| DATA S1751/ | | | | | |
| C 9.2215E-31, | 9.5584E-31, | 1.0064E-30, | 1.0909E-30, | 1.1455E-30, | BSF 2115 |
| C 1.2443E-30, | 1.3962E-30, | 1.2622E-30, | 1.1308E-30, | 1.0186E-30, | BSF 2120 |
| C 8.5893E-31, | 8.7893E-31, | 8.1521E-31, | 7.7780E-31, | 7.8842E-31, | BSF 2125 |
| C 2.2052E-31, | 1.7452E-31, | 1.4408E-31, | 1.1634E-31, | 1.0223E-31, | BSF 2130 |
| C 8.9844E-32, | 7.9088E-32, | 7.0678E-32, | 6.2222E-32, | 5.6051E-32, | BSF 2135 |

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| C 5.0502E-32, | 4.5578E-32, | 4.2630E-32, | 3.9461E-32, | 3.7599E-32, | BSF 2165 |
| C 3.5215E-32, | 3.2467E-32, | 3.0018E-32, | 2.6558E-32, | 2.3928E-32, | BSF 2170 |
| C 2.0707E-32, | 1.7575E-32, | 1.5114E-32, | 1.2941E-32, | 1.1004E-32, | BSF 2175 |
| C 9.5175E-33, | 8.2694E-33, | 7.3253E-33, | 6.5551E-33, | 5.9098E-33, | BSF 2180 |
| C 5.3548E-33, | 4.8697E-33, | 4.4413E-33, | 4.0600E-33, | 3.7188E-33, | BSF 2185 |
| DATA S1801/ | | | | | |
| C 3.4121E-33, | 3.1356E-33, | 2.8856E-33, | 2.6590E-33, | 2.4533E-33, | BSF 2190 |
| C 2.2663E-33, | 2.0960E-33, | 1.9407E-33, | 1.7990E-33, | 1.6695E-33, | BSF 2195 |
| C 1.5512E-33, | 1.4429E-33, | 1.3437E-33, | 1.2527E-33, | 1.1693E-33, | BSF 2200 |
| C 1.0927E-33, | 1.0224E-33, | 9.5767E-34, | 8.9816E-34, | 8.4335E-34, | BSF 2205 |
| C 7.9285E-34, | 7.4626E-34, | 7.0325E-34, | 6.6352E-34, | 6.2676E-34, | BSF 2210 |
| C 5.9274E-34, | 5.6121E-34, | 5.3195E-34, | 5.0479E-34, | 4.7953E-34, | BSF 2215 |
| C 4.5602E-34, | 4.3411E-34, | 4.1367E-34, | 3.9456E-34, | 3.7670E-34, | BSF 2220 |
| C 3.5996E-34, | 3.4427E-34, | 3.2952E-34, | 3.1566E-34, | 3.0261E-34, | BSF 2225 |
| C 2.9030E-34, | 2.7868E-34, | 2.6770E-34, | 2.5730E-34, | 2.4745E-34, | BSF 2230 |
| C 2.3809E-34, | 2.2921E-34, | 2.2076E-34, | 2.1271E-34, | 2.0504E-34, | BSF 2235 |
| DATA S1851/ | | | | | |
| C 1.9772E-34, | 1.9073E-34, | 1.8404E-34, | 1.7764E-34, | 1.7151E-34, | BSF 2240 |
| C 1.6564E-34, | 1.6000E-34, | 1.5459E-34, | 1.4939E-34, | 1.4439E-34, | BSF 2245 |
| C 1.3958E-34, | 1.3495E-34, | 1.3049E-34, | 1.2620E-34, | 1.2206E-34, | BSF 2250 |
| C 1.1807E-34, | 1.1422E-34, | 1.1050E-34, | 1.0691E-34, | 1.0345E-34, | BSF 2255 |
| C 1.0010E-34, | 9.6870E-35, | 9.3747E-35, | 9.0727E-35, | 8.7808E-35, | BSF 2260 |
| C 8.4986E-35, | 8.2257E-35, | 7.9617E-35, | 7.7064E-35, | 7.4594E-35, | BSF 2265 |
| C 7.2204E-35, | 6.9891E-35, | 6.7653E-35, | 6.5488E-35, | 6.3392E-35, | BSF 2270 |
| C 6.1363E-35, | 5.9399E-35, | 5.7499E-35, | 5.5659E-35, | 5.3878E-35, | BSF 2275 |
| C 5.2153E-35, | 5.0404E-35, | 4.8868E-35, | 4.7303E-35, | 4.5788E-35, | BSF 2280 |
| C 4.4322E-35, | 4.2902E-35, | 4.1527E-35, | 4.0196E-35, | 3.8907E-35, | BSF 2285 |
| DATA S1901/ | | | | | |
| C 3.7659E-35, | 3.6451E-35, | 3.5281E-35, | 3.4149E-35, | 3.3052E-35, | BSF 2290 |
| C 3.1991E-35, | 3.0963E-35, | 2.9967E-35, | 2.9004E-35, | 2.8071E-35, | BSF 2295 |
| C 2.7167E-35, | 2.6293E-35, | 2.5446E-35, | 2.4626E-35, | 2.3833E-35, | BSF 2300 |
| C 2.3064E-35, | 2.2320E-35, | 2.1600E-35, | 2.0903E-35, | 2.0228E-35, | BSF 2305 |
| C 1.9574E-35, | 1.8942E-35, | 1.8329E-35, | 1.7736E-35, | 1.7163E-35, | BSF 2310 |
| C 1.6607E-35, | 1.6069E-35, | 1.5548E-35, | 1.5044E-35, | 1.4557E-35, | BSF 2315 |
| C 1.4084E-35, | 1.3627E-35, | 1.3185E-35, | 1.2757E-35, | 1.2342E-35, | BSF 2320 |
| C 1.1941E-35, | 1.1552E-35, | 1.1177E-35, | 1.0813E-35, | 1.0461E-35, | BSF 2325 |
| C 1.0120E-35, | 9.7900E-36, | 9.4707E-36, | 9.1618E-36, | 8.8628E-36, | BSF 2330 |
| C 8.5734E-36, | 8.2933E-36, | 8.0223E-36, | 7.7600E-36, | 7.5062E-36, | BSF 2335 |
| DATA S1951/ | | | | | |
| C 7.2606E-36, | 7.0229E-36, | 6.7929E-36, | 6.5703E-36, | 6.3550E-36, | BSF 2340 |
| C 6.1466E-36, | 5.9449E-36, | 5.7498E-36, | 5.5610E-36, | 5.3783E-36, | BSF 2345 |
| C 5.2015E-36, | 5.0305E-36, | 4.8650E-36, | 4.7049E-36, | 4.5500E-36, | BSF 2350 |
| C 4.4002E-36, | 4.2552E-36, | 4.1149E-36, | 3.9792E-36, | 3.8479E-36, | BSF 2355 |
| C 3.7209E-36, | 3.5981E-36, | 3.4792E-36, | 3.3642E-36, | 3.2530E-36, | BSF 2360 |
| C 3.1454E-36, | 3.0413E-36, | 2.9406E-36, | 2.8432E-36, | 2.7490E-36, | BSF 2365 |
| C 2.6579E-36, | 2.5697E-36, | 2.4845E-36, | 2.4020E-36, | 2.3223E-36, | BSF 2370 |
| C 2.2451E-36, | 2.1705E-36, | 2.0984E-36, | 2.0286E-36, | 1.9611E-36, | BSF 2375 |
| C 1.8958E-36, | 1.8327E-36, | 1.7716E-36, | 1.7126E-36, | 1.6555E-36, | BSF 2380 |
| C 1.6003E-36, | 1.5469E-36, | 1.4952E-36, | 1.4453E-36, | 1.3970E-36, | BSF 2385 |
| DATA S2001/ | | | | | |
| C 1.3503E-36/ | | | | | BSF 2390 |
| | | | | | BSF 2395 |
| | | | | | BSF 2400 |
| | | | | | BSF 2405 |
| | | | | | BSF 2410 |
| | | | | | BSF 2415 |
| | | | | | BSF 2420 |
| | | | | | BSF 2425 |

C

END

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|---|---|-----|-----|
| | BLOCK DATA SF260 | 860 | 100 |
| | BLOCK DATA | 860 | 105 |
| C | | 860 | 110 |
| C | WATER VAPOR CONTINUUM - SELF BROADENED ABSORPTION COEFFICIENTS 260860 | 860 | 115 |
| C | | 860 | 120 |
| C | COMMON /S260/ V1,V2,DV,NPT,S260(2001) | 860 | 125 |
| | COMMON /S260/ V1,V2,DV,NPT,S0001(50),S0051(50),S0101(50),S0151(50) | 860 | 130 |
| | 1,S0201(50),S0251(50),S0301(50),S0351(50),S0401(50),S0451(50) | 860 | 135 |
| | 2,S0501(50),S0551(50),S0601(50),S0651(50),S0701(50),S0751(50) | 860 | 140 |
| | 3,S0801(50),S0851(50),S0901(50),S0951(50) | 860 | 145 |
| | 4,S1001(50),S1051(50),S1101(50),S1151(50),S1201(50),S1251(50) | 860 | 150 |
| | 5,S1301(50),S1351(50),S1401(50),S1451(50) | 860 | 155 |
| | 6,S1501(50),S1551(50),S1601(50),S1651(50),S1701(50),S1751(50) | 860 | 160 |
| | 7,S1801(50),S1851(50),S1901(50),S1951(50),S2001(1) | 860 | 165 |
| | | 860 | 170 |
| C | | 860 | 175 |
| C | DIMENSION S260(1) | 860 | 180 |
| | EQUIVALENCE (S260(1),S0001(1)) | 860 | 185 |
| | DATA V1,V2,DV,NPT / | 860 | 190 |
| | 1 3.0, 20000.0, 10.0, 2001/ | 860 | 195 |
| | | 860 | 200 |
| C | | 860 | 205 |
| C | | 860 | 210 |
| | DATA S0001/ | 860 | 215 |
| C | 1.6457E-21, 1.7045E-21, 1.7750E-21, 2.0036E-21, 2.1347E-21, | 860 | 220 |
| C | 2.2454E-21, 2.3428E-21, 2.3399E-21, 2.3022E-21, 2.0724E-21, | 860 | 225 |
| C | 1.9712E-21, 1.8317E-21, 1.6724E-21, 1.4780E-21, 1.2757E-21, | 860 | 230 |
| C | 1.1626E-21, 1.0098E-21, 8.9033E-22, 7.9770E-22, 6.7416E-22, | 860 | 235 |
| C | 5.9588E-22, 5.1117E-22, 4.6218E-22, 4.2179E-22, 3.4372E-22, | 860 | 240 |
| C | 2.9863E-22, 2.5252E-22, 2.2075E-22, 1.9209E-22, 1.5816E-22, | 860 | 245 |
| C | 1.3932E-22, 1.1943E-22, 1.0079E-22, 8.7667E-23, 7.4094E-23, | 860 | 250 |
| C | 6.4967E-23, 5.5111E-23, 4.8444E-23, 4.2552E-23, 3.6953E-23, | 860 | 255 |
| C | 3.2824E-23, 2.9121E-23, 2.6102E-23, 2.3370E-23, 2.1100E-23, | 860 | 260 |
| C | 1.9308E-23, 1.7145E-23, 1.5573E-23, 1.4206E-23, 1.2931E-23/ | 860 | 265 |
| | DATA S0051/ | 860 | 270 |
| C | 1.1803E-23, 1.0774E-23, 9.8616E-24, 9.0496E-24, 8.3071E-24, | 860 | 275 |
| C | 7.6319E-24, 7.0149E-24, 6.4637E-24, 5.9566E-24, 5.4987E-24, | 860 | 280 |
| C | 5.0768E-24, 4.6890E-24, 4.3317E-24, 4.0097E-24, 3.7064E-24, | 860 | 285 |
| C | 3.4325E-24, 3.1809E-24, 2.9501E-24, 2.7382E-24, 2.5430E-24, | 860 | 290 |
| C | 2.3630E-24, 2.1977E-24, 2.0452E-24, 1.9042E-24, 1.7740E-24, | 860 | 295 |
| C | 1.6544E-24, 1.5442E-24, 1.4425E-24, 1.3486E-24, 1.2618E-24, | 860 | 300 |
| C | 1.1817E-24, 1.1076E-24, 1.0391E-24, 9.7583E-25, 9.1608E-25, | 860 | 305 |
| C | 8.8272E-25, 8.1253E-25, 7.6607E-25, 7.2302E-25, 6.8311E-25, | 860 | 310 |
| C | 6.3613E-25, 6.1183E-25, 5.8001E-25, 5.5048E-25, 5.2307E-25, | 860 | 315 |
| C | 4.8761E-25, 4.7395E-25, 4.5197E-25, 4.3155E-25, 4.1256E-25/ | 860 | 320 |
| | DATA S0101/ | 860 | 325 |
| C | 3.9491E-25, 3.7849E-25, 3.6324E-25, 3.4908E-25, 3.3594E-25, | 860 | 330 |
| C | 3.2374E-25, 3.1244E-25, 3.0201E-25, 2.9240E-25, 2.8356E-25, | 860 | 335 |
| C | 2.7547E-25, 2.6814E-25, 2.6147E-25, 2.5531E-25, 2.5029E-25, | 860 | 340 |
| C | 2.4582E-25, 2.4203E-25, 2.3891E-25, 2.3663E-25, 2.3531E-25, | 860 | 345 |
| C | 2.3483E-25, 2.3516E-25, 2.3694E-25, 2.4032E-25, 2.4579E-25, | 860 | 350 |
| C | 2.5234E-25, 2.6032E-25, 2.7119E-25, 2.8631E-25, 3.0848E-25, | 860 | 355 |
| C | 3.3263E-25, 3.6036E-25, 4.0732E-25, 4.6923E-25, 5.3373E-25, | 860 | 360 |
| C | 6.1078E-25, 7.2031E-25, 8.5980E-25, 9.8642E-25, 1.1409E-24, | 860 | 365 |
| C | 1.3327E-24, 1.5390E-24, 1.7813E-24, 2.0665E-24, 2.3609E-24, | 860 | 370 |
| C | 2.6220E-24, 2.8877E-24, 3.2590E-24, 3.8224E-24, 4.1570E-24/ | 860 | 375 |
| | DATA S0151/ | 860 | 380 |
| C | 4.5207E-24, 4.9336E-24, 5.4500E-24, 6.0250E-24, 6.6866E-24, | 860 | 385 |
| C | 8.5477E-24, 9.3085E-24, 1.0202E-23, 1.1215E-23, 1.2343E-23, | 860 | 390 |
| C | 3.7863E-24, 3.7025E-24, 3.9637E-24, 4.4676E-24, 4.7072E-24, | 860 | 395 |

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| C 4.5473E-24, | 4.3952E-24, | 3.9614E-24, | 3.4086E-24, | 2.9733E-24, | 860 400 |
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| C 7.4788E-25, | 6.5438E-25, | 5.8248E-25, | 4.8078E-25, | 4.3488E-25, | 860 415 |
| C 3.7856E-25, | 3.3034E-25, | 2.9592E-25, | 2.6088E-25, | 2.3497E-25, | 860 420 |
| C 2.0279E-25, | 1.7526E-25, | 1.5714E-25, | 1.3553E-25, | 1.2145E-25/ | 860 425 |
| DATA S0201/ | | | | | |
| C 1.0802E-25, | 9.7681E-26, | 8.8196E-26, | 7.8291E-26, | 7.1335E-26, | 860 435 |
| C 6.4234E-26, | 5.8391E-26, | 5.3532E-26, | 4.9079E-26, | 4.5378E-26, | 860 440 |
| C 4.1716E-26, | 3.8649E-26, | 3.5893E-26, | 3.3406E-26, | 3.1199E-26, | 860 445 |
| C 2.9172E-26, | 2.7348E-26, | 2.5644E-26, | 2.4086E-26, | 2.2684E-26, | 860 450 |
| C 2.1359E-26, | 2.0159E-26, | 1.9051E-26, | 1.8031E-26, | 1.7074E-26, | 860 455 |
| C 1.6185E-26, | 1.5356E-26, | 1.4584E-26, | 1.3861E-26, | 1.3179E-26, | 860 460 |
| C 1.2545E-26, | 1.1951E-26, | 1.1395E-26, | 1.0873E-26, | 1.0384E-26, | 860 465 |
| C 9.9250E-27, | 9.4935E-27, | 9.0873E-27, | 8.7050E-27, | 8.3446E-27, | 860 470 |
| C 8.0046E-27, | 7.6834E-27, | 7.3800E-27, | 7.0931E-27, | 6.8217E-27, | 860 475 |
| C 6.5648E-27, | 6.3214E-27, | 6.0909E-27, | 5.8725E-27, | 5.6655E-27/ | 860 480 |
| DATA S0251/ | | | | | |
| C 5.4693E-27, | 5.2835E-27, | 5.1077E-27, | 4.9416E-27, | 4.7853E-27, | 860 485 |
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| C 4.0459E-27, | 3.9532E-27, | 3.8662E-27, | 3.7855E-27, | 3.7041E-27, | 860 500 |
| C 3.6254E-27, | 3.5420E-27, | 3.4617E-27, | 3.3838E-27, | 3.3212E-27, | 860 505 |
| C 3.2655E-27, | 3.1985E-27, | 3.1203E-27, | 3.0370E-27, | 3.0252E-27, | 860 510 |
| C 2.9749E-27, | 2.9184E-27, | 2.8795E-27, | 2.8501E-27, | 2.8202E-27, | 860 515 |
| C 2.7856E-27, | 2.7509E-27, | 2.7152E-27, | 2.6844E-27, | 2.6642E-27, | 860 520 |
| C 2.6548E-27, | 2.6617E-27, | 2.6916E-27, | 2.7372E-27, | 2.8094E-27, | 860 525 |
| C 2.9236E-27, | 3.1035E-27, | 3.2854E-27, | 3.5481E-27, | 3.9377E-27, | 860 530 |
| C 4.4692E-27, | 5.0761E-27, | 5.7715E-27, | 6.7723E-27, | 8.0668E-27/ | 860 535 |
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| C 9.3716E-27, | 1.0797E-26, | 1.1689E-26, | 1.3217E-26, | 1.4814E-26, | 860 540 |
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| C 2.2779E-26, | 2.2348E-26, | 2.2445E-26, | 2.3174E-26, | 2.4284E-26, | 860 570 |
| C 2.5290E-26, | 2.7340E-26, | 2.9720E-26, | 3.2332E-26, | 3.5392E-26, | 860 575 |
| C 3.9013E-26, | 4.3334E-26, | 4.9088E-26, | 5.3428E-26, | 5.9142E-26, | 860 580 |
| C 6.6106E-26, | 7.4709E-26, | 8.5019E-26, | 9.6835E-26, | 1.0984E-25/ | 860 585 |
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| C 1.2831E-25, | 1.4664E-25, | 1.7080E-25, | 2.0103E-25, | 2.4148E-25, | 860 590 |
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| C 6.8305E-25, | 7.6048E-25, | 8.7390E-25, | 1.0034E-24, | 1.1169E-24, | 860 600 |
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| C 1.6429E-24, | 1.6353E-24, | 1.6543E-24, | 1.5944E-24, | 1.5404E-24, | 860 615 |
| C 1.5458E-24, | 1.6287E-24, | 1.7277E-24, | 1.8307E-24, | 1.7822E-24, | 860 620 |
| C 1.6360E-24, | 1.6273E-24, | 1.3607E-24, | 1.2384E-24, | 9.7576E-25, | 860 625 |
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| C 4.8181E-27, | 4.2052E-27, | 3.9437E-27, | 3.5497E-27, | 3.3781E-27, | 860 670 |

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| C 3.1292E-27, | 2.9011E-27, | 2.6915E-27, | 2.4989E-27, | 2.3215E-27, | 860 890 |
| C 2.1582E-27, | 2.0081E-27, | 1.8700E-27, | 1.7432E-27, | 1.6264E-27, | 860 895 |
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| C 1.1056E-27, | 1.0451E-27, | 9.9060E-28, | 9.4135E-28, | 8.9608E-28, | 860 910 |
| C 8.5697E-28, | 8.1945E-28, | 7.8308E-28, | 7.4808E-28, | 7.1688E-28, | 860 915 |
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| C 5.1737E-28, | 5.1603E-28, | 5.1656E-28, | 5.1889E-28, | 5.2467E-28, | 860 930 |
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| C 7.2688E-28, | 7.6541E-28, | 8.0991E-28, | 8.5950E-28, | 9.1429E-28, | 860 945 |
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| C 6.4730E-29, | 7.1483E-29, | 7.7432E-29, | 8.0851E-29, | 8.5013E-29, | 860 1720 |
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| C 1.8536E-29, | 1.9785E-29, | 2.1334E-29, | 2.3237E-29, | 2.3259E-29, | 860 1790 |
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| C 5.0508E-31, | 4.5932E-31, | 4.1997E-31, | 3.7672E-31, | 3.3972E-31, | 860 1825 |
| C 3.0318E-31, | 2.6769E-31, | 2.3874E-31, | 2.1333E-31, | 1.9073E-31, | 860 1830 |
| C 1.7313E-31, | 1.5904E-31, | 1.4684E-31, | 1.3698E-31, | 1.2873E-31, | 860 1835 |
| C 1.2175E-31, | 1.1542E-31, | 1.1024E-31, | 1.0602E-31, | 1.0287E-31, | 860 1840 |
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| C 1.3372E-31, | 1.4841E-31, | 1.6457E-31, | 1.8681E-31, | 2.0580E-31/ | 860 1855 |
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| C 3.7629E-31, | 3.9300E-31, | 4.1829E-31, | 4.4808E-31, | 5.0534E-31, | 860 2110 |
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| C 1.6849E-32, | 1.4863E-32, | 1.3291E-32, | 1.2021E-32, | 1.0947E-32, | B60 2180 |
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| C 3.2621E-33, | 3.0520E-33, | 2.8578E-33, | 2.6782E-33, | 2.5120E-33, | B60 2200 |
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| C 1.0405E-35, | 1.0102E-35, | 9.8079E-36, | 9.5224E-36, | 9.2451E-36, | B60 2365 |
| C 8.9758E-36, | 8.7142E-36, | 8.4602E-36, | 8.2136E-36, | 7.9740E-36, | B60 2370 |
| C 7.7414E-36, | 7.5154E-36, | 7.2961E-36, | 7.0830E-36, | 6.8761E-36, | B60 2375 |
| C 6.6752E-36, | 6.4801E-36, | 6.2906E-36, | 6.1066E-36, | 5.9280E-36, | B60 2380 |
| C 5.7545E-36, | 5.5860E-36, | 5.4224E-36, | 5.2636E-36, | 5.1094E-36/ | B60 2385 |
| DATA S2001/ | | | | | |
| C 4.9996E-36/ | | | | | B60 2390 |
| | | | | | B60 2395 |
| | | | | | B60 2400 |
| | | | | | B60 2405 |
| | | | | | B60 2410 |
| | | | | | B60 2415 |
| | | | | | B60 2420 |
| | | | | | B60 2425 |

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END

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| | BLOCK DATA BFH20 | BFH 100 |
| | BLOCK DATA | BFH 105 |
| C | | BFH 110 |
| C | WATER VAPOR CONTINUUM - FOREIGN BROADENED ABSORPTION COEFFICIENTS | BFH 115 |
| C | | BFH 120 |
| C | COMMON /FH20/ V1,V2,DV,NPT,F296(2001) | BFH 125 |
| | COMMON /FH20/ V1,V2,DV,NPT,F0001(50),F0051(50),F0101(50),F0151(50) | BFH 130 |
| | 1,F0201(50),F0251(50),F0301(50),F0351(50),F0401(50),F0451(50) | BFH 135 |
| | 2,F0501(50),F0551(50),F0601(50),F0651(50),F0701(50),F0751(50) | BFH 140 |
| | 3,F0801(50),F0851(50),F0901(50),F0951(50) | BFH 145 |
| | 4,F1001(50),F1051(50),F1101(50),F1151(50),F1201(50),F1251(50) | BFH 150 |
| | 5,F1301(50),F1351(50),F1401(50),F1451(50) | BFH 155 |
| | 6,F1501(50),F1551(50),F1601(50),F1651(50),F1701(50),F1751(50) | BFH 160 |
| | 7,F1801(50),F1851(50),F1901(50),F1951(50),F2001(1) | BFH 165 |
| | COMMON /FRND/IENTER | BFH 170 |
| C | | BFH 175 |
| C | | BFH 180 |
| | DIMENSION F296(1) | BFH 185 |
| | EQUIVALENCE (F296(1),F0001(1)) | BFH 190 |
| | DATA V1,V2,DV,NPT / | BFH 195 |
| C | 1 0.0, 20000.0, 10.0, 2001/ | BFH 200 |
| C | | BFH 205 |
| C | | BFH 210 |
| | DATA F0001/ | BFH 215 |
| C | 1.1036E-22, 1.1715E-22, 1.2859E-22, 1.5326E-22, 1.6999E-22, | BFH 220 |
| C | 1.8321E-22, 1.9402E-22, 1.9570E-22, 1.9432E-22, 1.7572E-22, | BFH 225 |
| C | 1.6760E-22, 1.5480E-22, 1.3984E-22, 1.2266E-22, 1.0467E-22, | BFH 230 |
| C | 9.4526E-23, 8.0485E-23, 6.9484E-23, 6.1416E-23, 5.0941E-23, | BFH 235 |
| C | 4.4836E-23, 3.8133E-23, 3.4608E-23, 3.1487E-23, 2.4555E-23, | BFH 240 |
| C | 2.0977E-23, 1.7266E-23, 1.4920E-23, 1.2709E-23, 9.8081E-24, | BFH 245 |
| C | 8.5063E-24, 6.8822E-24, 5.3809E-24, 4.4679E-24, 3.3774E-24, | BFH 250 |
| C | 2.7979E-24, 2.1047E-24, 1.6511E-24, 1.2993E-24, 9.3033E-25, | BFH 255 |
| C | 7.4360E-25, 5.6428E-25, 4.5442E-25, 3.4675E-25, 2.7903E-25, | BFH 260 |
| C | 2.1374E-25, 1.6075E-25, 1.3022E-25, 1.0962E-25, 8.5959E-26/ | BFH 265 |
| | DATA F0051/ | BFH 270 |
| C | 6.9135E-26, 5.3808E-26, 4.3586E-26, 3.6394E-26, 2.9552E-26, | BFH 275 |
| C | 2.3547E-26, 1.8483E-26, 1.6036E-26, 1.3483E-26, 1.1969E-26, | BFH 280 |
| C | 1.0333E-26, 8.4484E-27, 6.7195E-27, 5.0947E-27, 4.2343E-27, | BFH 285 |
| C | 3.4453E-27, 2.7830E-27, 2.3063E-27, 1.9951E-27, 1.7087E-27, | BFH 290 |
| C | 1.4393E-27, 1.2575E-27, 1.0750E-27, 8.2325E-28, 5.7524E-28, | BFH 295 |
| C | 4.4482E-28, 3.8106E-28, 3.4315E-28, 2.9422E-28, 2.5089E-28, | BFH 300 |
| C | 2.2402E-28, 1.9349E-28, 1.6152E-28, 1.2208E-28, 8.9630E-29, | BFH 305 |
| C | 7.1322E-29, 6.1028E-29, 5.2938E-29, 4.5350E-29, 3.4977E-29, | BFH 310 |
| C | 2.9511E-29, 2.4734E-29, 2.0508E-29, 1.8507E-29, 1.6373E-29, | BFH 315 |
| C | 1.5171E-29, 1.3071E-29, 1.2462E-29, 1.2148E-29, 1.2590E-29/ | BFH 320 |
| | DATA F0101/ | BFH 325 |
| C | 1.3153E-29, 1.3301E-29, 1.4483E-29, 1.6944E-29, 2.0559E-29, | BFH 330 |
| C | 2.2954E-29, 2.6221E-29, 3.2606E-29, 4.2392E-29, 5.2171E-29, | BFH 335 |
| C | 6.2553E-29, 8.2548E-29, 9.5642E-29, 1.1280E-28, 1.3628E-28, | BFH 340 |
| C | 1.7635E-28, 2.1576E-28, 2.4835E-28, 3.0014E-28, 3.6485E-28, | BFH 345 |
| C | 4.7440E-28, 5.5202E-28, 7.0897E-28, 9.6678E-28, 1.3976E-27, | BFH 350 |
| C | 1.8391E-27, 2.3207E-27, 2.9960E-27, 4.0408E-27, 5.9260E-27, | BFH 355 |
| C | 7.8487E-27, 1.0047E-26, 1.4678E-26, 1.9325E-26, 2.6587E-26, | BFH 360 |
| C | 3.4534E-26, 4.4376E-26, 5.8061E-26, 7.0141E-26, 8.4937E-26, | BFH 365 |
| C | 1.0186E-25, 1.2034E-25, 1.3837E-25, 1.6595E-25, 1.9259E-25, | BFH 370 |
| C | 2.1820E-25, 2.3681E-25, 2.7064E-25, 3.2510E-25, 3.5480E-25/ | BFH 375 |
| | DATA F0151/ | BFH 380 |
| C | 3.9109E-25, 4.2891E-25, 4.7757E-25, 5.0981E-25, 5.0627E-25, | BFH 385 |
| C | 4.8618E-25, 4.4001E-25, 3.7882E-25, 3.2667E-25, 2.7794E-25, | BFH 390 |

| | | | | | |
|---------------|-------------|-------------|-------------|-------------|---------|
| C 2.4910E-25, | 2.4375E-25, | 2.7316E-25, | 3.2579E-25, | 3.5499E-25, | BFH 395 |
| C 3.8010E-25, | 4.1353E-25, | 4.3323E-25, | 4.3004E-25, | 3.9790E-25, | BFH 400 |
| C 3.7718E-25, | 3.6360E-25, | 3.2366E-25, | 2.7409E-25, | 2.3626E-25, | BFH 405 |
| C 2.0631E-25, | 1.8371E-25, | 1.5445E-25, | 1.2989E-25, | 1.1098E-25, | BFH 410 |
| C 9.8552E-26, | 8.0649E-26, | 7.2355E-26, | 5.9137E-26, | 5.2759E-26, | BFH 415 |
| C 4.8860E-26, | 4.1321E-26, | 3.5918E-26, | 2.7640E-26, | 2.4892E-26, | BFH 420 |
| C 2.1018E-26, | 1.7848E-26, | 1.5855E-26, | 1.3569E-26, | 1.1986E-26, | BFH 425 |
| C 9.4693E-27, | 7.4097E-27, | 6.3443E-27, | 4.8131E-27, | 4.0942E-27/ | BFH 430 |
| DATA F0201/ | | | | | |
| C 3.3316E-27, | 2.8488E-27, | 2.3461E-27, | 1.7397E-27, | 1.4684E-27, | BFH 435 |
| C 1.0953E-27, | 8.5398E-28, | 8.9261E-28, | 5.4001E-28, | 4.5430E-28, | BFH 440 |
| C 3.2791E-28, | 2.5995E-28, | 2.0225E-28, | 1.5710E-28, | 1.3027E-28, | BFH 445 |
| C 1.0229E-28, | 8.5277E-29, | 6.5249E-29, | 5.0117E-29, | 3.9906E-29, | BFH 450 |
| C 3.2332E-29, | 2.7847E-29, | 2.4570E-29, | 2.3359E-29, | 2.0599E-29, | BFH 455 |
| C 1.8436E-29, | 1.6559E-29, | 1.4910E-29, | 1.2794E-29, | 9.8229E-30, | BFH 460 |
| C 9.0054E-30, | 6.0769E-30, | 4.5648E-30, | 3.3111E-30, | 2.4428E-30, | BFH 465 |
| C 1.8007E-30, | 1.3291E-30, | 9.7974E-31, | 7.8271E-31, | 6.3833E-31, | BFH 470 |
| C 5.4425E-31, | 4.6471E-31, | 4.0209E-31, | 3.5227E-31, | 3.1212E-31, | BFH 475 |
| C 2.8840E-31, | 2.7762E-31, | 2.7935E-31, | 3.2012E-31, | 3.9525E-31/ | BFH 480 |
| DATA F0251/ | | | | | |
| C 5.0303E-31, | 6.8027E-31, | 9.3954E-31, | 1.2986E-30, | 1.8478E-30, | BFH 485 |
| C 2.5331E-30, | 3.4827E-30, | 4.6968E-30, | 6.2380E-30, | 7.9106E-30, | BFH 490 |
| C 1.0028E-29, | 1.2102E-29, | 1.4146E-29, | 1.6154E-29, | 1.7510E-29, | BFH 495 |
| C 1.8575E-29, | 1.8742E-29, | 1.8700E-29, | 1.8582E-29, | 1.9657E-29, | BFH 500 |
| C 2.1204E-29, | 2.0381E-29, | 2.0122E-29, | 2.0436E-29, | 2.1213E-29, | BFH 505 |
| C 2.0742E-29, | 1.9870E-29, | 2.0465E-29, | 2.1556E-29, | 2.2222E-29, | BFH 510 |
| C 2.1977E-29, | 2.1047E-29, | 1.9334E-29, | 1.7357E-29, | 1.5754E-29, | BFH 515 |
| C 1.4398E-29, | 1.4018E-29, | 1.5459E-29, | 1.7576E-29, | 2.1645E-29, | BFH 520 |
| C 2.9480E-29, | 4.4439E-29, | 5.8341E-29, | 8.0757E-29, | 1.1658E-28, | BFH 525 |
| C 1.6793E-28, | 2.2694E-28, | 2.9468E-28, | 3.9278E-28, | 5.2145E-28/ | BFH 530 |
| DATA F0301/ | | | | | |
| C 6.4378E-28, | 7.7947E-28, | 8.5321E-28, | 9.7848E-28, | 1.0999E-27, | BFH 535 |
| C 1.1489E-27, | 1.2082E-27, | 1.2822E-27, | 1.4053E-27, | 1.5238E-27, | BFH 540 |
| C 1.5454E-27, | 1.5018E-27, | 1.4048E-27, | 1.2359E-27, | 1.0858E-27, | BFH 545 |
| C 9.3486E-28, | 8.1638E-28, | 7.7690E-28, | 8.4625E-28, | 1.0114E-27, | BFH 550 |
| C 1.1430E-27, | 1.2263E-27, | 1.3084E-27, | 1.3380E-27, | 1.3573E-27, | BFH 555 |
| C 1.3441E-27, | 1.2962E-27, | 1.2638E-27, | 1.1934E-27, | 1.1371E-27, | BFH 560 |
| C 1.0871E-27, | 9.8843E-28, | 9.1877E-28, | 9.1050E-28, | 9.3213E-28, | BFH 565 |
| C 9.2929E-28, | 1.0155E-27, | 1.1263E-27, | 1.2370E-27, | 1.3636E-27, | BFH 570 |
| C 1.5400E-27, | 1.7656E-27, | 2.1329E-27, | 2.3048E-27, | 2.5811E-27, | BFH 575 |
| C 2.9261E-27, | 3.4259E-27, | 4.0770E-27, | 4.8771E-27, | 5.8081E-27/ | BFH 580 |
| DATA F0351/ | | | | | |
| C 7.2895E-27, | 8.7482E-27, | 1.0795E-26, | 1.3384E-26, | 1.7208E-26, | BFH 585 |
| C 2.0677E-26, | 2.5294E-26, | 3.1123E-26, | 3.7900E-26, | 4.7752E-26, | BFH 590 |
| C 5.6891E-26, | 6.6261E-26, | 7.6246E-26, | 8.7730E-26, | 9.8672E-26, | BFH 595 |
| C 1.0980E-25, | 1.1287E-25, | 1.1670E-25, | 1.1635E-25, | 1.1768E-25, | BFH 600 |
| C 1.2039E-25, | 1.2253E-25, | 1.3294E-25, | 1.4005E-25, | 1.3854E-25, | BFH 605 |
| C 1.3420E-25, | 1.3003E-25, | 1.2645E-25, | 1.1715E-25, | 1.1258E-25, | BFH 610 |
| C 1.1516E-25, | 1.2494E-25, | 1.3655E-25, | 1.4931E-25, | 1.4649E-25, | BFH 615 |
| C 1.3857E-25, | 1.3120E-25, | 1.1791E-25, | 1.0837E-25, | 8.2780E-26, | BFH 620 |
| C 6.5821E-26, | 5.1959E-26, | 4.0158E-26, | 3.0131E-26, | 2.0482E-26, | BFH 625 |
| C 1.4853E-26, | 1.0365E-26, | 7.3938E-27, | 4.9752E-27, | 3.4148E-27/ | BFH 630 |
| DATA F0401/ | | | | | |
| C 2.4902E-27, | 1.8363E-27, | 1.4591E-27, | 1.1380E-27, | 9.0589E-28, | BFH 635 |
| C 7.3697E-28, | 6.0252E-28, | 5.1888E-28, | 4.2800E-28, | 3.6183E-28, | BFH 640 |
| C 3.2512E-28, | 2.9258E-28, | 2.4208E-28, | 2.1209E-28, | 1.6362E-28, | BFH 645 |
| C 1.3871E-28, | 1.2355E-28, | 9.8940E-29, | 7.7735E-29, | 6.2278E-29, | BFH 650 |
| C 5.2282E-29, | 4.3799E-29, | 3.5545E-29, | 2.7527E-29, | 2.0950E-29, | BFH 655 |
| C 1.6344E-29, | 1.2689E-29, | 1.0403E-29, | 8.4880E-30, | 6.3461E-30, | BFH 660 |

| | | | | | |
|---------------|-------------|-------------|-------------|-------------|---------|
| C 4.7657E-30, | 3.5220E-30, | 2.7879E-30, | 2.3021E-30, | 1.6187E-30, | BFM 690 |
| C 1.1732E-30, | 8.9206E-31, | 7.0596E-31, | 5.8310E-31, | 4.4084E-31, | BFM 695 |
| C 3.1534E-31, | 2.5068E-31, | 2.2088E-31, | 2.2579E-31, | 2.2637E-31, | BFM 700 |
| C 2.5705E-31, | 3.2415E-31, | 4.6116E-31, | 6.5346E-31, | 9.4842E-31/ | BFM 705 |
| DATA F0451/ | | | | | BFM 710 |
| C 1.2809E-30, | 1.8211E-30, | 2.4052E-30, | 3.0270E-30, | 3.5531E-30, | BFM 715 |
| C 4.2402E-30, | 4.6730E-30, | 4.7942E-30, | 4.8813E-30, | 4.5997E-30, | BFM 720 |
| C 4.5788E-30, | 4.0311E-30, | 3.7367E-30, | 3.3149E-30, | 2.9281E-30, | BFM 725 |
| C 2.5231E-30, | 2.1152E-30, | 1.9799E-30, | 1.8636E-30, | 1.9085E-30, | BFM 730 |
| C 2.0786E-30, | 2.2464E-30, | 2.3785E-30, | 2.5684E-30, | 2.7499E-30, | BFM 735 |
| C 2.6962E-30, | 2.6378E-30, | 2.8297E-30, | 2.6903E-30, | 2.7035E-30, | BFM 740 |
| C 2.5394E-30, | 2.5655E-30, | 2.7184E-30, | 2.9013E-30, | 3.0585E-30, | BFM 745 |
| C 3.0791E-30, | 3.1687E-30, | 3.4343E-30, | 3.7365E-30, | 4.0269E-30, | BFM 750 |
| C 4.7280E-30, | 5.6584E-30, | 6.9791E-30, | 8.6569E-30, | 1.0393E-29, | BFM 755 |
| C 1.2067E-29, | 1.5047E-29, | 1.8583E-29, | 2.2357E-29, | 2.6498E-29/ | BFM 760 |
| DATA F0501/ | | | | | BFM 765 |
| C 3.2483E-29, | 3.9927E-29, | 4.6618E-29, | 5.5555E-29, | 6.6609E-29, | BFM 770 |
| C 8.2139E-29, | 1.0285E-28, | 1.3019E-28, | 1.8786E-28, | 2.5150E-28, | BFM 775 |
| C 3.3130E-28, | 4.5442E-28, | 6.3370E-28, | 9.0628E-28, | 1.2118E-27, | BFM 780 |
| C 1.5927E-27, | 2.1358E-27, | 2.7825E-27, | 3.7671E-27, | 4.4894E-27, | BFM 785 |
| C 5.4442E-27, | 6.2240E-27, | 7.3004E-27, | 8.3384E-27, | 8.7933E-27, | BFM 790 |
| C 8.8080E-27, | 8.6939E-27, | 8.8541E-27, | 8.2055E-27, | 7.7278E-27, | BFM 795 |
| C 7.5989E-27, | 8.6909E-27, | 9.7945E-27, | 1.0394E-26, | 1.0646E-26, | BFM 800 |
| C 1.1509E-26, | 1.2017E-26, | 1.1915E-26, | 1.1259E-26, | 1.1549E-26, | BFM 805 |
| C 1.1938E-26, | 1.2356E-26, | 1.2404E-26, | 1.1716E-26, | 1.1149E-26, | BFM 810 |
| C 1.0073E-26, | 8.9845E-27, | 7.6839E-27, | 6.1517E-27, | 5.0887E-27/ | BFM 815 |
| DATA F0551/ | | | | | BFM 820 |
| C 4.1269E-27, | 3.2474E-27, | 2.5698E-27, | 1.8893E-27, | 1.4009E-27, | BFM 825 |
| C 1.0340E-27, | 7.7724E-28, | 5.7302E-28, | 4.2178E-28, | 2.9603E-28, | BFM 830 |
| C 2.1945E-28, | 1.6301E-28, | 1.2806E-28, | 1.0048E-28, | 7.8970E-29, | BFM 835 |
| C 6.1133E-29, | 4.9034E-29, | 4.1985E-29, | 3.6944E-29, | 3.2586E-29, | BFM 840 |
| C 2.7382E-29, | 2.3647E-29, | 2.1249E-29, | 1.8172E-29, | 1.6224E-29, | BFM 845 |
| C 1.5158E-29, | 1.2361E-29, | 1.0682E-29, | 9.2312E-30, | 7.9220E-30, | BFM 850 |
| C 8.8174E-30, | 5.6147E-30, | 4.8268E-30, | 4.1534E-30, | 3.3108E-30, | BFM 855 |
| C 2.8275E-30, | 2.4584E-30, | 2.0742E-30, | 1.7840E-30, | 1.4664E-30, | BFM 860 |
| C 1.2390E-30, | 1.0497E-30, | 8.5038E-31, | 6.7008E-31, | 5.6355E-31, | BFM 865 |
| C 4.3323E-31, | 3.6914E-31, | 3.2262E-31, | 3.0749E-31, | 3.0318E-31/ | BFM 870 |
| DATA F0601/ | | | | | BFM 875 |
| C 2.9447E-31, | 2.9918E-31, | 3.0688E-31, | 3.1315E-31, | 3.0329E-31, | BFM 880 |
| C 2.8259E-31, | 2.6065E-31, | 2.3578E-31, | 2.0469E-31, | 1.6908E-31, | BFM 885 |
| C 1.4912E-31, | 1.1867E-31, | 9.9730E-32, | 8.1014E-32, | 6.7528E-32, | BFM 890 |
| C 6.3133E-32, | 5.8599E-32, | 6.0145E-32, | 6.5105E-32, | 7.0537E-32, | BFM 895 |
| C 7.4073E-32, | 7.8519E-32, | 8.5039E-32, | 9.1995E-32, | 1.0594E-31, | BFM 900 |
| C 1.1859E-31, | 1.2685E-31, | 1.3067E-31, | 1.3222E-31, | 1.2634E-31, | BFM 905 |
| C 1.1077E-31, | 9.6256E-32, | 8.3202E-32, | 7.4857E-32, | 6.8069E-32, | BFM 910 |
| C 6.7496E-32, | 7.3116E-32, | 8.0171E-32, | 8.8394E-32, | 9.2659E-32, | BFM 915 |
| C 1.0040E-31, | 1.0941E-31, | 1.2226E-31, | 1.3058E-31, | 1.3193E-31, | BFM 920 |
| C 1.8923E-31, | 2.3324E-31, | 2.8707E-31, | 3.6693E-31, | 4.6295E-31/ | BFM 925 |
| DATA F0651/ | | | | | BFM 930 |
| C 6.4260E-31, | 8.8209E-31, | 1.1865E-30, | 1.5961E-30, | 2.0605E-30, | BFM 935 |
| C 2.7349E-30, | 3.7193E-30, | 4.8216E-30, | 6.1968E-30, | 7.7150E-30, | BFM 940 |
| C 1.0145E-29, | 1.2659E-29, | 1.6535E-29, | 2.0316E-29, | 2.3912E-29, | BFM 945 |
| C 3.0114E-29, | 3.7495E-29, | 4.6304E-29, | 5.6145E-29, | 7.8640E-29, | BFM 950 |
| C 1.0304E-28, | 1.3010E-28, | 1.6441E-28, | 2.1476E-28, | 2.9892E-28, | BFM 955 |
| C 3.9780E-28, | 3.3820E-28, | 4.0007E-28, | 4.4898E-28, | 4.5763E-28, | BFM 960 |
| C 4.8131E-28, | 4.6239E-28, | 4.4849E-28, | 4.0729E-28, | 3.6856E-28, | BFM 965 |
| C 3.8184E-28, | 3.7608E-28, | 4.1457E-28, | 4.3750E-28, | 5.1150E-28, | BFM 970 |
| C 5.6054E-28, | 6.1690E-28, | 6.4521E-28, | 6.8494E-28, | 6.9024E-28, | BFM 975 |
| C 8.8853E-28, | 7.6001E-28, | 6.9760E-28, | 7.1489E-28, | 7.0740E-28/ | BFM 980 |

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| DATA F07C1/ | | | | | BFH 985 |
| C 7.3764E-28 | 7.6618E-28 | 8.4182E-28 | 9.3838E-28 | 1.0761E-27 | BFH 990 |
| C 1.2851E-27 | 1.4748E-27 | 1.8407E-27 | 2.2109E-27 | 2.6392E-27 | BFH 995 |
| C 2.9887E-27 | 3.4493E-27 | 4.0336E-27 | 4.3551E-27 | 4.9231E-27 | BFH 1000 |
| C 5.0720E-27 | 5.3781E-27 | 5.3285E-27 | 5.4498E-27 | 5.5707E-27 | BFH 1005 |
| C 5.6944E-27 | 6.1123E-27 | 6.4317E-27 | 6.4581E-27 | 6.1999E-27 | BFH 1010 |
| C 6.0191E-27 | 5.7762E-27 | 5.7241E-27 | 5.7013E-27 | 6.0160E-27 | BFH 1015 |
| C 6.6905E-27 | 7.4095E-27 | 8.2121E-27 | 8.0947E-27 | 7.6145E-27 | BFH 1020 |
| C 7.2193E-27 | 6.3722E-27 | 5.4316E-27 | 4.2186E-27 | 3.2528E-27 | BFH 1025 |
| C 2.5207E-27 | 1.8213E-27 | 1.2858E-27 | 8.6746E-28 | 6.0216E-28 | BFH 1030 |
| C 4.1122E-28 | 2.8899E-28 | 2.1740E-28 | 1.7990E-28 | 1.5593E-28 | BFH 1035 |
| DATA F0751/ | | | | | BFH 1040 |
| C 1.3970E-28 | 1.2238E-28 | 1.0539E-28 | 9.2386E-29 | 7.8481E-29 | BFH 1045 |
| C 6.8704E-29 | 5.7615E-29 | 5.0434E-29 | 4.6886E-29 | 4.3770E-29 | BFH 1050 |
| C 3.9768E-29 | 3.5202E-29 | 3.1854E-29 | 2.9009E-29 | 2.5763E-29 | BFH 1055 |
| C 2.2135E-29 | 1.9455E-29 | 1.6248E-29 | 1.3368E-29 | 1.0842E-29 | BFH 1060 |
| C 8.4254E-30 | 6.7414E-30 | 5.4867E-30 | 4.5005E-30 | 3.4932E-30 | BFH 1065 |
| C 2.6745E-30 | 2.2053E-30 | 1.8162E-30 | 1.4935E-30 | 1.1818E-30 | BFH 1070 |
| C 9.1888E-31 | 8.0872E-31 | 6.8748E-31 | 6.2688E-31 | 5.5715E-31 | BFH 1075 |
| C 4.5074E-31 | 3.7669E-31 | 3.2082E-31 | 2.8085E-31 | 2.4838E-31 | BFH 1080 |
| C 1.9791E-31 | 1.6964E-31 | 1.3887E-31 | 1.1179E-31 | 9.7499E-32 | BFH 1085 |
| C 7.8255E-32 | 6.3698E-32 | 5.3265E-32 | 4.6588E-32 | 4.4498E-32 | BFH 1090 |
| DATA F0801/ | | | | | BFH 1095 |
| C 3.9984E-32 | 3.7513E-32 | 3.7176E-32 | 3.9148E-32 | 4.2702E-32 | BFH 1100 |
| C 5.0090E-32 | 6.5801E-32 | 8.7787E-32 | 1.2718E-31 | 1.8375E-31 | BFH 1105 |
| C 2.5304E-31 | 3.5403E-31 | 4.8842E-31 | 6.4840E-31 | 8.0911E-31 | BFH 1110 |
| C 1.0136E-30 | 1.2311E-30 | 1.4203E-30 | 1.5869E-30 | 1.8093E-30 | BFH 1115 |
| C 2.1370E-30 | 2.5228E-30 | 2.8816E-30 | 3.4556E-30 | 3.9860E-30 | BFH 1120 |
| C 4.4360E-30 | 4.7760E-30 | 5.2357E-30 | 6.0827E-30 | 6.3635E-30 | BFH 1125 |
| C 6.5886E-30 | 6.8753E-30 | 7.2349E-30 | 7.2789E-30 | 8.8232E-30 | BFH 1130 |
| C 6.6981E-30 | 6.4232E-30 | 6.3485E-30 | 6.4311E-30 | 7.2235E-30 | BFH 1135 |
| C 7.7263E-30 | 8.1668E-30 | 9.0324E-30 | 9.7643E-30 | 1.0535E-29 | BFH 1140 |
| C 1.0195E-29 | 1.0194E-29 | 1.0156E-29 | 9.6792E-30 | 9.2725E-30 | BFH 1145 |
| DATA F0851/ | | | | | BFH 1150 |
| C 8.7347E-30 | 8.4484E-30 | 8.2647E-30 | 8.4363E-30 | 9.1261E-30 | BFH 1155 |
| C 1.0091E-29 | 1.1511E-29 | 1.4037E-29 | 1.8066E-29 | 2.4483E-29 | BFH 1160 |
| C 3.2739E-29 | 4.3194E-29 | 5.6902E-29 | 7.7924E-29 | 9.7376E-29 | BFH 1165 |
| C 1.2095E-28 | 1.4303E-28 | 1.6986E-28 | 1.9542E-28 | 2.2233E-28 | BFH 1170 |
| C 2.5186E-28 | 2.7777E-28 | 2.8943E-28 | 2.8873E-28 | 2.9417E-28 | BFH 1175 |
| C 2.7951E-28 | 2.7524E-28 | 2.7040E-28 | 3.1254E-28 | 3.6843E-28 | BFH 1180 |
| C 3.7797E-28 | 3.8713E-28 | 4.0135E-28 | 4.2824E-28 | 4.3004E-28 | BFH 1185 |
| C 4.0278E-28 | 4.2781E-28 | 4.5220E-28 | 4.8948E-28 | 5.0172E-28 | BFH 1190 |
| C 4.8499E-28 | 4.7182E-28 | 4.2204E-28 | 3.7701E-28 | 3.0972E-28 | BFH 1195 |
| C 2.4654E-28 | 1.9543E-28 | 1.4609E-28 | 1.1171E-28 | 8.3387E-29 | BFH 1200 |
| DATA F0901/ | | | | | BFH 1205 |
| C 6.3791E-29 | 5.0790E-29 | 4.0655E-29 | 3.3858E-29 | 2.7882E-29 | BFH 1210 |
| C 2.4749E-29 | 2.2287E-29 | 2.0217E-29 | 1.8191E-29 | 1.5897E-29 | BFH 1215 |
| C 1.4191E-29 | 1.2440E-29 | 1.0884E-29 | 9.3585E-30 | 7.9420E-30 | BFH 1220 |
| C 7.3214E-30 | 6.5008E-30 | 5.7549E-30 | 5.4369E-30 | 4.7251E-30 | BFH 1225 |
| C 4.3451E-30 | 3.8448E-30 | 3.5389E-30 | 3.4432E-30 | 2.8209E-30 | BFH 1230 |
| C 2.4020E-30 | 2.1278E-30 | 1.8405E-30 | 1.6314E-30 | 1.3261E-30 | BFH 1235 |
| C 1.1998E-30 | 9.8885E-31 | 7.8814E-31 | 6.6411E-31 | 5.0902E-31 | BFH 1240 |
| C 4.0827E-31 | 3.0478E-31 | 2.3230E-31 | 1.7707E-31 | 1.3548E-31 | BFH 1245 |
| C 1.0719E-31 | 9.3028E-32 | 8.7987E-32 | 8.3138E-32 | 7.3918E-32 | BFH 1250 |
| C 6.5283E-32 | 6.9243E-32 | 5.3595E-32 | 3.5268E-32 | 2.2571E-32 | BFH 1255 |
| DATA F0951/ | | | | | BFH 1260 |
| C 1.6190E-32 | 1.1413E-32 | 8.4998E-33 | 7.0803E-33 | 5.1747E-33 | BFH 1265 |
| C 4.0694E-33 | 3.6538E-33 | 3.3670E-33 | 3.1341E-33 | 2.9388E-33 | BFH 1270 |
| C 2.8080E-33 | 3.1283E-33 | 3.7294E-33 | 5.0194E-33 | 6.7815E-33 | BFH 1275 |

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| C 1.0455E-32, | 1.5230E-32, | 2.3932E-32, | 3.4231E-32, | 5.0515E-32, | 8FH 1280 |
| C 7.3193E-32, | 9.9406E-32, | 1.2193E-31, | 1.4742E-31, | 1.9269E-31, | 8FH 1285 |
| C 2.1816E-31, | 2.2750E-31, | 2.2902E-31, | 2.3088E-31, | 2.4902E-31, | 8FH 1290 |
| C 2.2160E-31, | 2.0381E-31, | 1.9903E-31, | 2.0086E-31, | 1.9304E-31, | 8FH 1295 |
| C 2.0023E-31, | 2.2244E-31, | 2.5450E-31, | 3.1226E-31, | 3.4560E-31, | 8FH 1300 |
| C 3.6923E-31, | 3.7486E-31, | 3.8124E-31, | 3.8317E-31, | 3.4737E-31, | 8FH 1305 |
| C 3.3037E-31, | 3.1724E-31, | 2.9840E-31, | 2.8301E-31, | 2.5857E-31/ | 8FH 1310 |
| DATA F1001/ | | | | | 8FH 1315 |
| C 2.3708E-31, | 1.8452E-31, | 1.6232E-31, | 1.5174E-31, | 1.4206E-31, | 8FH 1320 |
| C 1.4408E-31, | 1.5483E-31, | 1.8642E-31, | 2.3664E-31, | 3.0181E-31, | 8FH 1325 |
| C 4.0160E-31, | 5.2287E-31, | 7.2754E-31, | 1.0511E-30, | 1.4531E-30, | 8FH 1330 |
| C 2.0998E-30, | 2.6883E-30, | 3.3082E-30, | 4.2638E-30, | 5.3132E-30, | 8FH 1335 |
| C 6.3817E-30, | 7.1413E-30, | 8.5953E-30, | 9.9715E-30, | 1.0786E-29, | 8FH 1340 |
| C 1.0978E-29, | 1.1052E-29, | 1.1095E-29, | 1.0841E-29, | 9.7881E-30, | 8FH 1345 |
| C 9.6590E-30, | 1.0332E-29, | 1.1974E-29, | 1.3612E-29, | 1.5829E-29, | 8FH 1350 |
| C 1.8655E-29, | 2.1465E-29, | 2.4779E-29, | 2.7370E-29, | 2.9915E-29, | 8FH 1355 |
| C 3.3037E-29, | 3.8347E-29, | 3.9587E-29, | 4.4701E-29, | 5.0122E-29, | 8FH 1360 |
| C 5.8044E-29, | 6.1916E-29, | 6.9613E-29, | 7.7863E-29, | 8.2820E-29/ | 8FH 1365 |
| DATA F1051/ | | | | | 8FH 1370 |
| C 9.4359E-29, | 9.7387E-29, | 1.0656E-28, | 1.0746E-28, | 1.1210E-28, | 8FH 1375 |
| C 1.1905E-28, | 1.2194E-28, | 1.3145E-28, | 1.3738E-28, | 1.3634E-28, | 8FH 1380 |
| C 1.3011E-28, | 1.2511E-28, | 1.1805E-28, | 1.2159E-28, | 1.2390E-28, | 8FH 1385 |
| C 1.3625E-28, | 1.5678E-28, | 1.7886E-28, | 1.9933E-28, | 1.9885E-28, | 8FH 1390 |
| C 1.9000E-28, | 1.7812E-28, | 1.5521E-28, | 1.2593E-28, | 9.5335E-29, | 8FH 1395 |
| C 7.2987E-29, | 5.2489E-29, | 3.5673E-29, | 2.4205E-29, | 1.6977E-29, | 8FH 1400 |
| C 1.2456E-29, | 9.3744E-30, | 7.8379E-30, | 6.9960E-30, | 6.8451E-30, | 8FH 1405 |
| C 6.8521E-30, | 7.4234E-30, | 8.6658E-30, | 9.4972E-30, | 1.0791E-29, | 8FH 1410 |
| C 1.2359E-29, | 1.3363E-29, | 1.5025E-29, | 1.5368E-29, | 1.6152E-29, | 8FH 1415 |
| C 1.6184E-29, | 1.6557E-29, | 1.7035E-29, | 1.6916E-29, | 1.7237E-29/ | 8FH 1420 |
| DATA F1101/ | | | | | 8FH 1425 |
| C 1.7175E-29, | 1.6475E-29, | 1.5335E-29, | 1.4272E-29, | 1.3282E-29, | 8FH 1430 |
| C 1.3459E-29, | 1.4028E-29, | 1.5192E-29, | 1.7068E-29, | 1.9085E-29, | 8FH 1435 |
| C 2.1318E-29, | 2.1020E-29, | 1.8942E-29, | 1.8854E-29, | 1.8391E-29, | 8FH 1440 |
| C 1.3552E-29, | 1.0188E-29, | 7.8540E-30, | 5.7022E-30, | 3.9247E-30, | 8FH 1445 |
| C 2.5441E-30, | 1.6699E-30, | 1.1132E-30, | 6.8989E-31, | 4.5255E-31, | 8FH 1450 |
| C 3.1106E-31, | 2.3161E-31, | 1.7618E-31, | 1.4380E-31, | 1.1601E-31, | 8FH 1455 |
| C 9.7148E-32, | 8.4519E-32, | 6.5392E-32, | 5.4113E-32, | 4.7624E-32, | 8FH 1460 |
| C 4.0817E-32, | 3.6173E-32, | 2.8808E-32, | 2.2724E-32, | 1.7438E-32, | 8FH 1465 |
| C 1.3424E-32, | 1.0358E-32, | 7.3064E-33, | 5.4500E-33, | 4.0551E-33, | 8FH 1470 |
| C 2.8642E-33, | 2.1831E-33, | 1.6880E-33, | 1.2088E-33, | 1.0150E-33/ | 8FH 1475 |
| DATA F1151/ | | | | | 8FH 1480 |
| C 9.3550E-34, | 8.4105E-34, | 7.3051E-34, | 6.9798E-34, | 7.8949E-34, | 8FH 1485 |
| C 1.0742E-33, | 1.5639E-33, | 2.1308E-33, | 3.1226E-33, | 4.6853E-33, | 8FH 1490 |
| C 6.6917E-33, | 1.0088E-32, | 1.4824E-32, | 2.2763E-32, | 3.3917E-32, | 8FH 1495 |
| C 4.4585E-32, | 6.3187E-32, | 8.4188E-32, | 1.1302E-31, | 1.3431E-31, | 8FH 1500 |
| C 1.5878E-31, | 1.8044E-31, | 2.2463E-31, | 2.3805E-31, | 2.3818E-31, | 8FH 1505 |
| C 2.3509E-31, | 2.3805E-31, | 2.2549E-31, | 1.9304E-31, | 1.8382E-31, | 8FH 1510 |
| C 1.7795E-31, | 1.8439E-31, | 1.9148E-31, | 2.1948E-31, | 2.6108E-31, | 8FH 1515 |
| C 3.1893E-31, | 3.7872E-31, | 4.3866E-31, | 4.8769E-31, | 5.3284E-31, | 8FH 1520 |
| C 5.8705E-31, | 6.3746E-31, | 7.0165E-31, | 7.8114E-31, | 8.8287E-31, | 8FH 1525 |
| C 8.9726E-31, | 1.1498E-30, | 1.3700E-30, | 1.6145E-30, | 1.8913E-30/ | 8FH 1530 |
| DATA F1201/ | | | | | 8FH 1535 |
| C 2.2778E-30, | 2.6216E-30, | 2.9770E-30, | 3.2405E-30, | 3.7821E-30, | 8FH 1540 |
| C 3.9552E-30, | 4.1322E-30, | 4.0293E-30, | 4.0259E-30, | 3.8853E-30, | 8FH 1545 |
| C 3.7842E-30, | 3.8551E-30, | 4.4815E-30, | 5.0527E-30, | 5.6895E-30, | 8FH 1550 |
| C 5.1216E-30, | 5.1930E-30, | 5.8784E-30, | 5.3250E-30, | 5.2008E-30, | 8FH 1555 |
| C 5.8888E-30, | 6.1883E-30, | 6.9006E-30, | 6.9505E-30, | 6.8768E-30, | 8FH 1560 |
| C 6.3280E-30, | 5.8753E-30, | 6.6327E-30, | 3.8833E-30, | 3.1147E-30, | 8FH 1565 |
| C 2.4416E-30, | 1.8860E-30, | 1.3804E-30, | 8.8154E-31, | 7.3786E-31, | 8FH 1570 |

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| C 5.6048E-31, | 4.2457E-31, | 3.4505E-31, | 2.9881E-31, | 2.7865E-31, | BFH 1575 |
| C 7.8471E-31, | 3.1065E-31, | 3.4204E-31, | 3.9140E-31, | 4.3608E-31, | BFH 1580 |
| C 4.9075E-31, | 5.3069E-31, | 5.5236E-31, | 5.5309E-31, | 5.3832E-31/ | BFH 1585 |
| DATA F1251/ | | | | | |
| C 5.2183E-31, | 5.1783E-31, | 5.2042E-31, | 5.4422E-31, | 5.5656E-31, | BFH 1590 |
| C 5.4409E-31, | 5.2659E-31, | 5.1696E-31, | 5.1726E-31, | 4.8003E-31, | BFH 1595 |
| C 4.9050E-31, | 5.1700E-31, | 5.6818E-31, | 6.3129E-31, | 6.6542E-31, | BFH 1600 |
| C 6.4367E-31, | 5.3908E-31, | 5.4470E-31, | 4.7903E-31, | 3.9669E-31, | BFH 1605 |
| C 2.9651E-31, | 2.2286E-31, | 1.6742E-31, | 1.1827E-31, | 7.7739E-32, | BFH 1610 |
| C 4.8805E-32, | 3.1747E-32, | 2.0057E-32, | 1.2550E-32, | 8.7434E-33, | BFH 1615 |
| C 6.2755E-33, | 4.9752E-33, | 4.0047E-33, | 3.5602E-33, | 3.0930E-33, | BFH 1620 |
| C 2.4903E-33, | 1.9316E-33, | 1.4955E-33, | 1.2059E-33, | 8.7242E-34, | BFH 1625 |
| C 6.4511E-34, | 5.3300E-34, | 4.3741E-34, | 3.4916E-34, | 2.6560E-34, | BFH 1630 |
| C 1.6923E-34, | 1.1816E-34, | 6.7071E-35, | 3.6474E-35, | 2.0686E-35/ | BFH 1635 |
| DATA F1301/ | | | | | |
| C 1.1925E-35, | 6.8948E-36, | 3.9661E-36, | 2.2576E-36, | 1.2669E-36, | BFH 1640 |
| C 6.9908E-37, | 3.7896E-37, | 2.0280E-37, | 1.1016E-37, | 6.7816E-38, | BFH 1645 |
| C 6.0958E-38, | 8.9513E-38, | 1.7201E-37, | 3.4964E-37, | 7.0722E-37, | BFH 1650 |
| C 1.4020E-36, | 2.7167E-36, | 5.1478E-36, | 9.5500E-36, | 1.7376E-35, | BFH 1655 |
| C 3.1074E-35, | 5.4789E-35, | 9.5640E-35, | 1.6635E-34, | 2.9145E-34, | BFH 1660 |
| C 5.2179E-34, | 8.8554E-34, | 1.4764E-33, | 2.3331E-33, | 3.5936E-33, | BFH 1665 |
| C 5.2132E-33, | 6.3519E-33, | 7.3174E-33, | 8.3752E-33, | 9.8916E-33, | BFH 1670 |
| C 1.1515E-32, | 1.4034E-32, | 1.6594E-32, | 2.1021E-32, | 2.7416E-32, | BFH 1675 |
| C 3.4135E-32, | 4.5517E-32, | 5.5832E-32, | 7.2303E-32, | 9.9484E-32, | BFH 1680 |
| C 1.2724E-31, | 1.6478E-31, | 2.0588E-31, | 2.5543E-31, | 3.3625E-31/ | BFH 1685 |
| DATA F1351/ | | | | | |
| C 4.1788E-31, | 5.0081E-31, | 6.0144E-31, | 6.9599E-31, | 8.4408E-31, | BFH 1700 |
| C 9.7143E-31, | 1.0805E-30, | 1.1713E-30, | 1.2711E-30, | 1.3727E-30, | BFH 1705 |
| C 1.4539E-30, | 1.6049E-30, | 1.7680E-30, | 2.0557E-30, | 2.4987E-30, | BFH 1710 |
| C 3.0096E-30, | 3.5816E-30, | 4.0851E-30, | 4.6111E-30, | 5.2197E-30, | BFH 1715 |
| C 5.5043E-30, | 6.0324E-30, | 6.4983E-30, | 6.7498E-30, | 7.0545E-30, | BFH 1720 |
| C 7.0680E-30, | 7.5218E-30, | 7.5723E-30, | 7.7640E-30, | 8.0081E-30, | BFH 1725 |
| C 8.0213E-30, | 7.7271E-30, | 7.1676E-30, | 6.7819E-30, | 6.4753E-30, | BFH 1730 |
| C 6.5844E-30, | 7.0163E-30, | 7.7503E-30, | 8.8152E-30, | 9.9022E-30, | BFH 1735 |
| C 1.0229E-29, | 9.9296E-30, | 8.9911E-30, | 7.7813E-30, | 0.3785E-30, | BFH 1740 |
| C 4.7491E-30, | 3.5280E-30, | 2.4349E-30, | 1.6502E-30, | 1.1622E-30/ | BFH 1745 |
| DATA F1401/ | | | | | |
| C 8.6715E-31, | 6.7360E-31, | 5.3910E-31, | 4.5554E-31, | 4.1300E-31, | BFH 1750 |
| C 3.9728E-31, | 3.9000E-31, | 3.9803E-31, | 4.1514E-31, | 4.3374E-31, | BFH 1755 |
| C 4.6831E-31, | 4.8921E-31, | 5.1995E-31, | 5.7242E-31, | 6.2759E-31, | BFH 1760 |
| C 7.0801E-31, | 7.4555E-31, | 7.9754E-31, | 8.7616E-31, | 9.1171E-31, | BFH 1765 |
| C 1.0349E-30, | 1.1047E-30, | 1.2024E-30, | 1.2990E-30, | 1.3725E-30, | BFH 1770 |
| C 1.5005E-30, | 1.5268E-30, | 1.5535E-30, | 1.5623E-30, | 1.5009E-30, | BFH 1775 |
| C 1.4034E-30, | 1.3002E-30, | 1.2225E-30, | 1.1989E-30, | 1.2411E-30, | BFH 1780 |
| C 1.3612E-30, | 1.5225E-30, | 1.7202E-30, | 1.9471E-30, | 1.9931E-30, | BFH 1785 |
| C 1.9079E-30, | 1.7478E-30, | 1.5259E-30, | 1.2625E-30, | 9.3332E-31, | BFH 1790 |
| C 6.8706E-31, | 4.6466E-31, | 2.9723E-31, | 1.8508E-31, | 1.2106E-31/ | BFH 1795 |
| DATA F1451/ | | | | | |
| C 8.0142E-32, | 5.4066E-32, | 3.9329E-32, | 3.1665E-32, | 2.7420E-32, | BFH 1800 |
| C 2.3996E-32, | 2.3804E-32, | 2.3242E-32, | 2.4476E-32, | 2.5331E-32, | BFH 1805 |
| C 2.3595E-32, | 2.2575E-32, | 2.1298E-32, | 2.0986E-32, | 1.8263E-32, | BFH 1810 |
| C 1.8114E-32, | 1.4422E-32, | 1.2946E-32, | 1.0837E-32, | 9.1282E-33, | BFH 1815 |
| C 7.2359E-33, | 5.3307E-33, | 3.8837E-33, | 2.678E-33, | 1.6769E-33, | BFH 1820 |
| C 1.0826E-33, | 7.2364E-34, | 4.8201E-34, | 3.0808E-34, | 2.2377E-34, | BFH 1825 |
| C 1.7040E-34, | 9.2181E-35, | 5.2934E-35, | 3.5774E-35, | 3.1431E-35, | BFH 1830 |
| C 3.7647E-35, | 5.6428E-35, | 9.5139E-35, | 1.7322E-34, | 2.8829E-34, | BFH 1835 |
| C 4.7708E-34, | 6.9789E-34, | 9.7267E-34, | 1.4662E-33, | 1.9429E-33, | BFH 1840 |
| C 2.3998E-33, | 3.6636E-33, | 4.7960E-33, | 6.5128E-33, | 7.7638E-33/ | BFH 1845 |
| DATA F1501/ | | | | | |

| | | | | | |
|--------------|------------|------------|------------|------------|----------|
| C 9.3774E-33 | 1.1467E-32 | 1.3547E-32 | 1.5686E-32 | 1.6893E-32 | BFH 1870 |
| C 1.9069E-32 | 2.1352E-32 | 2.3071E-32 | 2.4759E-32 | 2.6247E-32 | BFH 1875 |
| C 3.4365E-32 | 4.3181E-32 | 5.6107E-32 | 7.0017E-32 | 8.6408E-32 | BFH 1880 |
| C 1.0974E-31 | 1.3742E-31 | 1.8337E-31 | 2.0157E-31 | 2.3441E-31 | BFH 1885 |
| C 2.6733E-31 | 3.0247E-31 | 3.3737E-31 | 3.8618E-31 | 4.1343E-31 | BFH 1890 |
| C 4.3870E-31 | 4.4685E-31 | 4.4881E-31 | 4.5526E-31 | 4.3628E-31 | BFH 1895 |
| C 4.4268E-31 | 4.6865E-31 | 5.3426E-31 | 5.4020E-31 | 5.3218E-31 | BFH 1900 |
| C 5.4587E-31 | 5.6360E-31 | 5.7740E-31 | 5.6426E-31 | 6.0399E-31 | BFH 1905 |
| C 6.6981E-31 | 7.4319E-31 | 7.7977E-31 | 7.5539E-31 | 7.1610E-31 | BFH 1910 |
| C 6.4606E-31 | 5.5498E-31 | 4.3944E-31 | 3.3789E-31 | 2.5771E-31 | BFH 1915 |
| DATA F1551/ | | | | | BFH 1920 |
| C 1.9162E-31 | 1.3698E-31 | 1.0173E-31 | 7.8925E-32 | 6.1938E-32 | BFH 1925 |
| C 4.7962E-32 | 4.0811E-32 | 3.3912E-32 | 2.8625E-32 | 2.4504E-32 | BFH 1930 |
| C 2.2188E-32 | 2.2139E-32 | 2.2499E-32 | 2.2763E-32 | 2.3985E-32 | BFH 1935 |
| C 2.5459E-32 | 2.9295E-32 | 3.4196E-32 | 3.6155E-32 | 4.0733E-32 | BFH 1940 |
| C 4.4610E-32 | 4.9372E-32 | 5.4372E-32 | 5.7304E-32 | 6.1640E-32 | BFH 1945 |
| C 6.1278E-32 | 6.2940E-32 | 6.4947E-32 | 6.8174E-32 | 7.5190E-32 | BFH 1950 |
| C 8.2608E-32 | 8.4971E-32 | 8.3484E-32 | 8.1888E-32 | 7.8552E-32 | BFH 1955 |
| C 7.8468E-32 | 7.5943E-32 | 7.9096E-32 | 8.6869E-32 | 9.1303E-32 | BFH 1960 |
| C 9.2547E-32 | 8.9322E-32 | 8.2177E-32 | 7.3408E-32 | 5.7956E-32 | BFH 1965 |
| C 4.4470E-32 | 3.5881E-32 | 2.6748E-32 | 1.7074E-32 | 9.6700E-33 | BFH 1970 |
| DATA F1601/ | | | | | BFH 1975 |
| C 5.2645E-33 | 2.9943E-33 | 1.7316E-33 | 1.0039E-33 | 5.7859E-34 | BFH 1980 |
| C 3.2968E-34 | 1.8499E-34 | 1.0192E-34 | 5.5015E-35 | 2.9040E-35 | BFH 1985 |
| C 1.4968E-35 | 7.5244E-36 | 3.6852E-36 | 1.7568E-36 | 8.1484E-37 | BFH 1990 |
| C 3.6717E-37 | 1.6076E-37 | 6.8341E-38 | 2.8195E-38 | 1.1286E-38 | BFH 1995 |
| C 4.3835E-39 | 1.6587E-39 | 6.3044E-40 | 2.9014E-40 | 2.7146E-40 | BFH 2000 |
| C 5.1708E-40 | 1.1957E-39 | 2.7853E-39 | 6.3427E-39 | 1.4070E-38 | BFH 2005 |
| C 3.0405E-38 | 6.4059E-38 | 1.3169E-37 | 2.6443E-37 | 5.1817E-37 | BFH 2010 |
| C 9.9785E-37 | 1.8802E-36 | 3.4788E-36 | 6.3328E-36 | 1.1370E-35 | BFH 2015 |
| C 2.0188E-33 | 3.5665E-35 | 6.3053E-35 | 1.1309E-34 | 2.1206E-34 | BFH 2020 |
| C 3.2858E-34 | 5.5165E-34 | 8.6231E-34 | 1.2776E-33 | 1.7780E-33 | BFH 2025 |
| DATA F1651/ | | | | | BFH 2030 |
| C 2.5286E-35 | 3.8254E-33 | 5.1398E-33 | 6.8289E-33 | 8.7481E-33 | BFH 2035 |
| C 1.1914E-32 | 1.6086E-32 | 2.0469E-32 | 2.5761E-32 | 3.4964E-32 | BFH 2040 |
| C 4.4980E-32 | 5.5358E-32 | 6.7863E-32 | 8.5720E-32 | 1.0700E-31 | BFH 2045 |
| C 1.2983E-31 | 1.6270E-31 | 1.9609E-31 | 2.2668E-31 | 2.5953E-31 | BFH 2050 |
| C 3.0918E-31 | 3.4930E-31 | 3.9330E-31 | 4.4208E-31 | 4.8431E-31 | BFH 2055 |
| C 5.1141E-31 | 5.4108E-31 | 5.8077E-31 | 6.5050E-31 | 7.2126E-31 | BFH 2060 |
| C 8.1064E-31 | 8.1973E-31 | 8.1694E-31 | 8.3081E-31 | 8.0240E-31 | BFH 2065 |
| C 7.9225E-31 | 7.6256E-31 | 7.8488E-31 | 8.0041E-31 | 8.1585E-31 | BFH 2070 |
| C 8.3405E-31 | 8.3774E-31 | 8.5870E-31 | 8.6104E-31 | 8.8516E-31 | BFH 2075 |
| C 9.0014E-31 | 9.2522E-31 | 8.8913E-31 | 7.8381E-31 | 6.8568E-31 | BFH 2080 |
| DATA F1701/ | | | | | BFH 2085 |
| C 6.6797E-31 | 4.4163E-31 | 3.2369E-31 | 2.3259E-31 | 1.6835E-31 | BFH 2090 |
| C 1.1733E-31 | 8.5273E-32 | 6.3805E-32 | 4.8483E-32 | 3.8831E-32 | BFH 2095 |
| C 3.2610E-32 | 2.8577E-32 | 2.5210E-32 | 2.2913E-32 | 2.0341E-32 | BFH 2100 |
| C 1.8107E-32 | 1.6395E-32 | 1.4890E-32 | 1.3518E-32 | 1.2542E-32 | BFH 2105 |
| C 1.2910E-32 | 1.3471E-32 | 1.4688E-32 | 1.5489E-32 | 1.6989E-32 | BFH 2110 |
| C 1.8843E-32 | 2.0502E-32 | 2.3874E-32 | 2.7294E-32 | 3.3353E-32 | BFH 2115 |
| C 4.0188E-32 | 4.8808E-32 | 5.2212E-32 | 5.8856E-32 | 6.5991E-32 | BFH 2120 |
| C 7.2505E-32 | 7.6837E-32 | 8.5113E-32 | 9.4832E-32 | 9.8678E-32 | BFH 2125 |
| C 1.0723E-31 | 1.0749E-31 | 1.1380E-31 | 1.1774E-31 | 1.1743E-31 | BFH 2130 |
| C 1.2443E-31 | 1.2559E-31 | 1.2332E-31 | 1.1782E-31 | 1.1086E-31 | BFH 2135 |
| DATA F1751/ | | | | | BFH 2140 |
| C 1.0948E-31 | 1.1178E-31 | 1.2083E-31 | 1.3037E-31 | 1.4730E-31 | BFH 2145 |
| C 1.6480E-31 | 1.7403E-31 | 1.7004E-31 | 1.5117E-31 | 1.3339E-31 | BFH 2150 |
| C 1.0844E-31 | 8.0916E-32 | 5.8615E-32 | 3.7198E-32 | 2.5194E-32 | BFH 2155 |
| C 1.6569E-32 | 1.1201E-32 | 8.2335E-33 | 6.0270E-33 | 4.8205E-33 | BFH 2160 |

| | | | | | |
|---------------|-------------|-------------|-------------|-------------|----------|
| C 4.1313E-33, | 3.6243E-33, | 3.2575E-33, | 2.7730E-33, | 2.5292E-33, | BFH 2165 |
| C 2.3062E-33, | 2.1126E-33, | 2.1556E-33, | 2.1213E-33, | 2.2103E-33, | BFH 2170 |
| C 2.1927E-33, | 2.0794E-33, | 1.9533E-33, | 1.6592E-33, | 1.4521E-33, | BFH 2175 |
| C 1.1393E-33, | 8.3772E-34, | 6.2077E-34, | 4.3337E-34, | 2.7165E-34, | BFH 2180 |
| C 1.6921E-34, | 9.5407E-35, | 5.3093E-35, | 3.0320E-35, | 1.7429E-35, | BFH 2185 |
| C 9.9828E-36, | 5.6622E-36, | 3.1672E-36, | 1.7419E-36, | 9.3985E-37, | BFH 2190 |
| DATA F1801/ | | | | | BFH 2195 |
| C 4.9658E-37, | 2.5652E-37, | 1.2942E-37, | 6.3695E-38, | 3.0554E-38, | BFH 2200 |
| C 1.4273E-38, | 6.4890E-39, | 2.8691E-39, | 1.2331E-39, | 5.1485E-40, | BFH 2205 |
| C 2.0875E-40, | 0. | 0. | 0. | 0. | BFH 2210 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2215 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2220 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2225 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2230 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2235 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2240 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2245 |
| DATA F1851/ | | | | | BFH 2250 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2255 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2260 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2265 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2270 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2275 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2280 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2285 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2290 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2295 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2300 |
| DATA F1901/ | | | | | BFH 2305 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2310 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2315 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2320 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2325 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2330 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2335 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2340 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2345 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2350 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2355 |
| DATA F1951/ | | | | | BFH 2360 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2365 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2370 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2375 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2380 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2385 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2390 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2395 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2400 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2405 |
| C 0. | 0. | 0. | 0. | 0. | BFH 2410 |
| DATA F2001/ | | | | | BFH 2415 |
| C 0. | | | | | BFH 2420 |
| | | | | | BFH 2425 |
| | | | | | BFH 2430 |

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|-----|--|---------|
| | BLOCK DATA TRFN | TRE 100 |
| C* | BLOCK DATA | TRE 105 |
| C | LOWTRAN TRANSMITTANCE FUNCTIONS | TRE 110 |
| | COMMON /TRFWFO/ TR(67),FW(67),FO(67) | TRE 115 |
| | DATA TR/ | TRE 120 |
| 1 | .9988, .9980, .9960, .9940, .9920, .9900, .9800, .9700, | TRE 125 |
| 2 | .9600, .9500, .9400, .9300, .9200, .9100, .9000, .8800, | TRE 130 |
| 3 | .8600, .8400, .8200, .8000, .7800, .7600, .7400, .7200, | TRE 135 |
| 4 | .7000, .6800, .6600, .6400, .6200, .6000, .5800, .5600, | TRE 140 |
| 5 | .5400, .5200, .5000, .4800, .4600, .4400, .4200, .4000, | TRE 145 |
| 6 | .3800, .3600, .3400, .3200, .3000, .2800, .2600, .2400, | TRE 150 |
| 7 | .2200, .2000, .1800, .1600, .1400, .1200, .1000, .0800, | TRE 155 |
| 8 | .0600, .0400, .0300, .0200, .0150, .0100, .0080, .0060, | TRE 160 |
| 9 | .0040, .0020, .0010/ | TRE 165 |
| C | FW WATER VAPOR AND UNIFORMLY MIXED TRANSMITTANCE TABLE | TRE 170 |
| | DATA FW/ | TRE 175 |
| 1-2 | -.3468, -.20382, -1.6990, -1.4815, -1.3279, -1.2007, -.7825, -.5229, | TRE 180 |
| 2 | -.3468, -.1938, -.0655, .0414, .1553, .2430, .3324, .4838, | TRE 185 |
| 3 | .6128, .7243, .8251, .9191, 1.0000, 1.0792, 1.1461, 1.2122, | TRE 190 |
| 4 | 1.2672, 1.3284, 1.3892, 1.4409, 1.4955, 1.5441, 1.5966, 1.6435, | TRE 195 |
| 5 | 1.6857, 1.7340, 1.7782, 1.8261, 1.8692, 1.9191, 1.9638, 2.0086, | TRE 200 |
| 6 | 2.0607, 2.1038, 2.1461, 2.1875, 2.2304, 2.2788, 2.3263, 2.3717, | TRE 205 |
| 7 | 2.4183, 2.4698, 2.5159, 2.5740, 2.6284, 2.6902, 2.7559, 2.8261, | TRE 210 |
| 8 | 2.9031, 3.0000, 3.0607, 3.1461, 3.2041, 3.2718, 3.3054, 3.3444, | TRE 215 |
| 9 | 3.3979, 3.4914, 3.5682/ | TRE 220 |
| C | F INFRARED O OZONE TRANSMITTANCE TABLE | TRE 225 |
| | DATA FO/ | TRE 230 |
| 1 | -1.6778, -1.3980, -1.1192, -.9508, -.8239, -.7258, -.4318, -.2366, | TRE 235 |
| 2 | -.1074, 0.0000, .0969, .1761, .2304, .3010, .3522, .4624, | TRE 240 |
| 3 | .5563, .6435, .7243, .7924, .8573, .9191, .9731, 1.0253, | TRE 245 |
| 4 | 1.0719, 1.1173, 1.1614, 1.2095, 1.2480, 1.2900, 1.3263, 1.3617, | TRE 250 |
| 5 | 1.3979, 1.4393, 1.4698, 1.4983, 1.5314, 1.5682, 1.6021, 1.6335, | TRE 255 |
| 6 | 1.6721, 1.7076, 1.7482, 1.7924, 1.8325, 1.8665, 1.9395, 2.0000, | TRE 260 |
| 7 | 2.0607, 2.1206, 2.1903, 2.2652, 2.3388, 2.4313, 2.5185, 2.6435, | TRE 265 |
| 8 | 2.7853, 2.9777, 3.1072, 3.2553, 3.3617, 3.4771, 3.5563, 3.6233, | TRE 270 |
| 9 | 3.7076, 3.8325, 3.9345/ | TRE 275 |
| | END | TRE 280 |

| | | |
|----|---|---------|
| | BLOCK DATA C1D | DC1 100 |
| C | BLOCK DATA | DC1 105 |
| C | WATER VAPOR BAND MODEL ABSORPTION COEFFICIENTS | DC1 110 |
| C | C1 LOCATION 1 V = 350 CM-1 | DC1 115 |
| C | C1 LOCATION 1770 V = 9195 CM-1 | DC1 120 |
| C | C1 LOCATION 1771 V = 9875 CM-1 | DC1 125 |
| C | C1 LOCATION 2355 V = 12795 CM-1 | DC1 130 |
| C | C1 LOCATION 2356 V = 13400 CM-1 | DC1 135 |
| C | C1 LOCATION 2580 V = 14520 CM-1 | DC1 140 |
| C | COMMON /C1/C1(2580) | DC1 145 |
| | COMMON /C1/ C01(190),C191(190),C381(190),C571(190),C761(190), | DC1 150 |
| | X C951(190),C1141(190),C1331(190),C1521(190),C1711(190), | DC1 155 |
| | X C1901(190),C2091(190),C2281(190),C2471(110) | DC1 160 |
| | DATA C01/ | DC1 165 |
| 1 | 3.93, 3.72, 3.54, 3.42, 3.37, 3.37, 3.36, 3.33, 3.25, 3.13, | DC1 170 |
| 2 | 3.02, 2.96, 2.97, 3.00, 3.08, 3.12, 3.08, 3.03, 3.00, 3.01, | DC1 175 |
| 3 | 3.03, 3.07, 3.05, 3.01, 2.94, 2.83, 2.71, 2.62, 2.58, 2.57, | DC1 180 |
| 4 | 2.62, 2.67, 2.72, 2.71, 2.60, 2.46, 2.35, 2.26, 2.22, 2.23, | DC1 185 |
| 5 | 2.19, 2.17, 2.17, 2.20, 2.28, 2.34, 2.42, 2.39, 2.20, 2.01, | DC1 190 |
| 6 | 1.92, 1.83, 1.78, 1.79, 1.81, 1.84, 1.83, 1.80, 1.71, 1.51, | DC1 195 |
| 7 | 1.39, 1.30, 1.25, 1.18, 1.19, 1.18, 1.21, 1.33, 1.47, 1.53, | DC1 200 |
| 8 | 1.54, 1.38, 1.12, .89, .69, .49, .60, .71, .79, .99, | DC1 205 |
| 9 | .86, .73, .53, .43, .51, .52, .67, .73, .80, .83, | DC1 210 |
| \$ | .80, .63, .47, .32, -.08, -.21, -.29, -.21, -.01, .08, | DC1 215 |
| \$ | .16, .09, -.03, -.21, -.37, -.35, -.30, -.31, -.37, -.42, | DC1 220 |
| \$ | -.48, -.42, -.40, -.39, -.43, -.77, -.83, -.88, -.79, -.60, | DC1 225 |
| \$ | -.50, -.42, -.39, -.38, -.37, -.40, -.51, -.67, -.82, -.58, | DC1 230 |
| \$ | -.40, -.32, -.21, -.09, -.18, -.16, -.19, -.28, -.33, -.35, | DC1 235 |
| \$ | -.28, -.22, -.10, -.05, -.11, -.13, -.27, -.27, -.18, -.06, | DC1 240 |
| \$ | .11, .23, .26, .19, .11, 0.00, -.09, .02, .08, .12, | DC1 245 |
| \$ | .22, .28, .39, .54, .68, .75, .79, .79, .71, .69, | DC1 250 |
| \$ | .76, .88, 1.01, 1.16, 1.18, 1.14, 1.05, 1.02, 1.11, 1.23, | DC1 255 |
| \$ | 1.41, 1.75, 1.83, 1.99, 2.05, 2.03, 2.00, 1.96, 1.90, 1.86/ | DC1 260 |
| | DATA C191/ | DC1 265 |
| 1 | 1.91, 2.08, 2.24, 2.41, 2.63, 2.68, 2.67, 2.73, 2.79, 2.81, | DC1 270 |
| 2 | 2.91, 2.93, 3.02, 3.16, 3.23, 3.30, 3.34, 3.43, 3.57, 3.59, | DC1 275 |
| 3 | 3.59, 3.68, 3.57, 3.61, 3.71, 3.71, 3.69, 3.64, 3.60, 3.68, | DC1 280 |
| 4 | 3.80, 3.95, 4.05, 4.05, 4.02, 3.99, 3.96, 4.01, 4.13, 4.22, | DC1 285 |
| 5 | 4.35, 4.49, 4.58, 4.62, 4.63, 4.61, 4.57, 4.56, 4.56, 4.53, | DC1 290 |
| 6 | 4.49, 4.46, 4.40, 4.28, 4.14, 3.92, 3.63, 3.35, 3.16, 3.10, | DC1 295 |
| 7 | 3.24, 3.47, 3.66, 3.80, 3.93, 4.00, 4.04, 4.15, 4.23, 4.31, | DC1 300 |
| 8 | 4.35, 4.31, 4.23, 4.20, 4.24, 4.28, 4.35, 4.42, 4.42, 4.44, | DC1 305 |
| 9 | 4.48, 4.40, 4.30, 4.22, 4.13, 4.07, 4.12, 4.19, 4.22, 4.23, | DC1 310 |
| \$ | 4.16, 4.04, 3.99, 3.94, 3.93, 3.91, 3.88, 3.83, 3.80, 3.78, | DC1 315 |
| \$ | 3.70, 3.54, 3.40, 3.30, 3.31, 3.42, 3.52, 3.52, 3.49, 3.41, | DC1 320 |
| \$ | 3.21, 3.14, 3.10, 3.08, 3.11, 2.98, 2.88, 2.78, 2.74, 2.76, | DC1 325 |
| \$ | 2.72, 2.76, 2.82, 2.85, 2.86, 2.75, 2.64, 2.60, 2.61, 2.64, | DC1 330 |
| \$ | 2.56, 2.48, 2.37, 2.25, 2.14, 2.08, 2.11, 2.20, 2.31, 2.28, | DC1 335 |
| \$ | 2.15, 2.08, 1.98, 2.03, 2.05, 1.95, 1.84, 1.72, 1.64, 1.59, | DC1 340 |
| \$ | 1.57, 1.57, 1.60, 1.63, 1.61, 1.38, 1.07, .91, .87, .92, | DC1 345 |
| \$ | 1.04, 1.01, .92, .84, .92, .67, 1.01, 1.06, 1.10, 1.06, | DC1 350 |
| \$ | 1.01, .91, .79, .65, .47, .41, .39, .38, .34, .33, | DC1 355 |
| \$ | .38, .43, .48, .45, .38, .27, .21, .22, .29, .37/ | DC1 360 |
| | DATA C381/ | DC1 365 |
| 1 | .38, .37, .29, .19, .13, .11, .03, -.05, -.12, -.24, | DC1 370 |
| 2 | -.31, -.39, -.43, -.50, -.59, -.68, -.73, -.80, -.92, -1.06, | DC1 375 |
| 3 | -1.14, -1.22, -1.27, -1.28, -1.33, -1.32, -1.43, -1.51, -1.63, -1.74, | DC1 380 |
| 4 | -1.82, -1.88, -2.09, -2.21, -2.21, -2.24, -2.27, -2.36, -2.51, -2.65, | DC1 385 |
| 5 | -2.70, -2.83, -2.97, -2.98, -2.99, -2.67, -2.69, -2.87, -2.88, -2.82, | DC1 390 |

| | | | | | | | | | | | | |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-----|
| 6 | -2.52 | -2.42 | -2.29 | -2.14 | -2.00 | -1.87 | -1.71 | -1.51 | -1.39 | -1.27 | DC1 | 395 |
| 7 | -1.12 | -1.01 | -.89 | -.75 | -.68 | -.57 | -.47 | -.42 | -.32 | -.27 | DC1 | 400 |
| 8 | -.26 | -.19 | -.13 | -.11 | -.01 | .05 | .08 | .17 | .25 | .31 | DC1 | 405 |
| 9 | .41 | .43 | .44 | .43 | .36 | .35 | .31 | .25 | .25 | .22 | DC1 | 410 |
| \$ | .21 | .33 | .49 | .65 | .76 | .71 | .51 | .30 | .13 | .10 | DC1 | 415 |
| \$ | .17 | .24 | .31 | .38 | .45 | .51 | .56 | .60 | .63 | .62 | DC1 | 420 |
| \$ | .63 | .64 | .66 | .69 | .76 | .75 | .74 | .70 | .62 | .53 | DC1 | 425 |
| \$ | .46 | .39 | .38 | .37 | .38 | .42 | .47 | .50 | .58 | .69 | DC1 | 430 |
| \$ | .67 | .62 | .64 | .68 | .76 | .90 | 1.11 | 1.13 | 1.10 | .97 | DC1 | 435 |
| \$ | .98 | 1.17 | 1.38 | 1.52 | 1.70 | 1.76 | 1.84 | 1.92 | 1.90 | 1.87 | DC1 | 440 |
| \$ | 1.91 | 2.02 | 2.13 | 2.10 | 2.18 | 2.22 | 2.25 | 2.03 | 2.01 | 1.77 | DC1 | 445 |
| \$ | 1.93 | 2.19 | 2.28 | 2.14 | 2.15 | 2.22 | 2.01 | 2.14 | 2.26 | 2.36 | DC1 | 450 |
| \$ | 2.51 | 2.66 | 2.73 | 2.68 | 2.69 | 2.64 | 2.22 | 1.95 | 1.81 | 1.11 | DC1 | 455 |
| \$ | .88 | .83 | .89 | 1.20 | 1.62 | 1.82 | 1.99 | 2.01 | 2.14 | 2.16 | DC1 | 460 |
| DATA C571/ | | | | | | | | | | | | |
| 1 | 2.21 | 2.30 | 2.33 | 2.42 | 2.50 | 2.51 | 2.49 | 2.46 | 2.42 | 2.37 | DC1 | 465 |
| 2 | 2.37 | 2.33 | 2.31 | 2.43 | 2.56 | 2.61 | 2.63 | 2.60 | 2.50 | 2.38 | DC1 | 475 |
| 3 | 2.41 | 2.34 | 2.31 | 2.32 | 2.40 | 2.27 | 2.32 | 2.22 | 2.09 | 2.08 | DC1 | 480 |
| 4 | 2.17 | 2.41 | 2.77 | 2.68 | 2.49 | 2.29 | 2.23 | 2.42 | 2.61 | 2.58 | DC1 | 485 |
| 5 | 2.49 | 2.40 | 2.39 | 2.51 | 2.60 | 2.68 | 2.68 | 2.70 | 2.82 | 2.83 | DC1 | 490 |
| 6 | 2.82 | 2.81 | 2.84 | 2.86 | 2.91 | 2.96 | 3.03 | 3.08 | 3.21 | 3.30 | DC1 | 495 |
| 7 | 3.40 | 3.52 | 3.49 | 3.46 | 3.51 | 3.54 | 3.56 | 3.55 | 3.57 | 3.61 | DC1 | 500 |
| 8 | 3.71 | 3.80 | 3.92 | 3.99 | 4.06 | 4.02 | 4.06 | 4.12 | 4.28 | 4.30 | DC1 | 505 |
| 9 | 4.22 | 4.32 | 4.42 | 4.53 | 4.64 | 4.55 | 4.40 | 4.28 | 4.32 | 4.38 | DC1 | 510 |
| \$ | 4.37 | 4.24 | 4.13 | 4.14 | 4.20 | 4.25 | 4.32 | 4.35 | 4.31 | 4.27 | DC1 | 515 |
| \$ | 4.25 | 4.27 | 4.31 | 4.36 | 4.41 | 4.52 | 4.59 | 4.71 | 4.79 | 4.81 | DC1 | 520 |
| \$ | 4.73 | 4.61 | 4.42 | 4.28 | 4.08 | 4.00 | 3.98 | 3.88 | 3.92 | 3.98 | DC1 | 525 |
| \$ | 4.12 | 4.18 | 4.31 | 4.37 | 4.42 | 4.50 | 4.53 | 4.58 | 4.59 | 4.61 | DC1 | 530 |
| \$ | 4.61 | 4.59 | 4.53 | 4.49 | 4.44 | 4.41 | 4.40 | 4.34 | 4.30 | 4.26 | DC1 | 535 |
| \$ | 4.09 | 3.98 | 3.87 | 3.78 | 3.77 | 3.79 | 3.75 | 3.72 | 3.62 | 3.56 | DC1 | 540 |
| \$ | 3.51 | 3.48 | 3.32 | 3.18 | 3.07 | 2.96 | 2.87 | 2.80 | 2.68 | 2.58 | DC1 | 545 |
| \$ | 2.59 | 2.51 | 2.59 | 2.57 | 2.50 | 2.42 | 2.32 | 2.20 | 2.12 | 2.00 | DC1 | 550 |
| \$ | 1.92 | 1.79 | 1.63 | 1.60 | 1.69 | 1.78 | 2.04 | 2.00 | 1.81 | 1.70 | DC1 | 555 |
| \$ | 1.63 | 1.61 | 1.60 | 1.49 | 1.14 | 1.35 | 1.64 | 1.69 | 1.70 | 1.59 | DC1 | 560 |
| DATA C781/ | | | | | | | | | | | | |
| 1 | 1.45 | 1.29 | 1.19 | 1.08 | 1.02 | 1.04 | 1.10 | 1.16 | 1.20 | 1.23 | DC1 | 570 |
| 2 | 1.22 | 1.08 | 1.08 | 1.06 | .89 | .93 | .73 | .58 | .54 | .77 | DC1 | 575 |
| 3 | .81 | .74 | .71 | .57 | .49 | .43 | .38 | .12 | .10 | .20 | DC1 | 580 |
| 4 | .41 | .37 | .31 | .11 | -.13 | -.21 | -.32 | -.36 | -.39 | -.33 | DC1 | 585 |
| 5 | -.39 | -.45 | -.50 | -.56 | -.62 | -.68 | -.77 | -.84 | -.91 | -1.00 | DC1 | 590 |
| 6 | -1.11 | -1.19 | -1.28 | -1.31 | -1.38 | -1.43 | -1.48 | -1.52 | -1.57 | -1.60 | DC1 | 595 |
| 7 | -1.61 | -1.60 | -1.58 | -1.51 | -1.42 | -1.32 | -1.26 | -1.16 | -1.00 | -.83 | DC1 | 600 |
| 8 | -.71 | -.61 | -.52 | -.43 | -.36 | -.30 | -.21 | -.19 | -.17 | -.15 | DC1 | 605 |
| 9 | -.13 | -.17 | -.19 | -.12 | -.06 | -.01 | 0.00 | -.11 | -.23 | -.32 | DC1 | 610 |
| \$ | -.44 | -.51 | -.48 | -.47 | -.42 | -.40 | -.40 | -.39 | -.37 | -.35 | DC1 | 615 |
| \$ | -.48 | -.75 | -1.13 | -1.58 | -1.80 | -1.66 | -1.52 | -1.35 | -1.19 | -1.02 | DC1 | 620 |
| \$ | -.88 | -.66 | -.65 | -.63 | -.62 | -.66 | -.73 | -.79 | -.88 | -.84 | DC1 | 625 |
| \$ | -.70 | -.59 | -.43 | -.39 | -.50 | -.61 | -.74 | -.79 | -.78 | -.69 | DC1 | 630 |
| \$ | -.62 | -.59 | -.52 | -.48 | -.48 | -.42 | -.39 | -.38 | -.33 | -.29 | DC1 | 635 |
| \$ | -.26 | -.23 | -.22 | -.28 | -.37 | -.50 | -.60 | -.60 | -.51 | -.46 | DC1 | 640 |
| \$ | -.42 | -.43 | -.45 | -.35 | -.24 | -.14 | -.08 | -.08 | 0.00 | .11 | DC1 | 645 |
| \$ | .32 | .43 | .42 | .32 | .23 | .22 | .28 | .45 | .55 | .62 | DC1 | 650 |
| \$ | .65 | .71 | .75 | .80 | .83 | .85 | .87 | .90 | .93 | 1.00 | DC1 | 655 |
| \$ | 1.04 | 1.15 | 1.22 | 1.32 | 1.31 | 1.32 | 1.33 | 1.48 | 1.78 | 1.87 | DC1 | 660 |
| DATA C951/ | | | | | | | | | | | | |
| 1 | 2.01 | 1.92 | 1.86 | 1.89 | 1.92 | 1.98 | 2.03 | 2.39 | 2.31 | 2.48 | DC1 | 670 |
| 2 | 2.70 | 2.71 | 2.76 | 2.78 | 2.70 | 2.77 | 3.08 | 2.94 | 3.05 | 2.94 | DC1 | 675 |
| 3 | 3.23 | 3.20 | 3.19 | 3.32 | 3.11 | 3.41 | 3.31 | 3.36 | 3.46 | 3.36 | DC1 | 680 |
| 4 | 3.39 | 3.50 | 3.41 | 3.22 | 3.19 | 2.98 | 2.78 | 2.98 | 3.02 | 2.82 | DC1 | 685 |

| | |
|--|---------|
| 5 2.98, 2.86, 2.92, 2.92, 3.05, 3.22, 3.60, 3.78, 3.81, 3.96, | DC1 690 |
| 6 3.76, 3.62, 3.34, 3.08, 3.31, 3.16, 3.37, 3.41, 3.30, 3.33, | DC1 695 |
| 7 3.33, 3.51, 3.48, 3.43, 3.52, 3.31, 3.40, 3.58, 3.61, 3.49, | DC1 700 |
| 8 3.46, 3.42, 3.19, 3.18, 3.30, 3.00, 2.99, 3.21, 3.11, 3.14, | DC1 705 |
| 9 3.10, 2.72, 2.81, 2.95, 2.89, 2.73, 2.72, 2.47, 2.51, 2.60, | DC1 710 |
| \$ 2.42, 2.37, 2.73, 1.91, 1.87, 1.81, 1.78, 1.53, 1.51, 1.62, | DC1 715 |
| \$ 1.59, 1.50, 1.42, 1.32, 1.22, 1.12, 1.08, 1.02, .97, .92, | DC1 720 |
| \$.90, .87, .84, .82, .79, .78, .78, .75, .72, .71, | DC1 725 |
| \$.71, .70, .69, .67, .61, .59, .52, .48, .41, .39, | DC1 730 |
| \$.38, .33, .32, .30, .30, .30, .29, .28, .27, .26, | DC1 735 |
| \$.25, .23, .22, .21, .20, .18, .14, .13, .06, .01, | DC1 740 |
| \$ -.03, -.07, -.11, -.16, -.21, -.24, -.29, -.32, -.38, -.41, | DC1 745 |
| \$ -.45, -.50, -.54, -.61, -.69, -.76, -.84, -.90, -.97, -1.01, | DC1 750 |
| \$ -1.10, -1.13, -1.19, -1.22, -1.28, -1.30, -1.33, -1.36, -1.39, -1.43, | DC1 755 |
| \$ -1.48, -1.50, -1.52, -1.57, -1.61, -1.66, -1.70, -1.72, -1.78, -1.81/ | DC1 760 |
| DATA C1141/ | DC1 765 |
| 1 -1.89, -1.92, -2.00, -2.08, -2.16, -2.24, -2.31, -2.40, -2.48, -2.54, | DC1 770 |
| 2 -2.61, -2.71, -2.83, -2.95, -3.10, -5.00, -5.00, -5.00, -5.00, -5.00, | DC1 775 |
| 3 -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, | DC1 780 |
| 4 -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, | DC1 785 |
| 5 -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, | DC1 790 |
| 6 -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, | DC1 795 |
| 7 -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, | DC1 800 |
| 8 -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, | DC1 805 |
| 9 -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, | DC1 810 |
| \$ -3.78, -3.33, -3.01, -2.82, -2.68, -2.49, -2.30, -2.13, -2.00, -1.81, | DC1 815 |
| \$ -1.60, -1.41, -1.13, -.90, -.79, -.63, -.48, -.36, -.28, -.16, | DC1 820 |
| \$ -.06, .08, .20, .28, .41, .54, .69, .80, .92, 1.04, | DC1 825 |
| \$ 1.19, 1.19, 1.01, .98, 1.02, 1.19, 1.29, 1.30, 1.29, 1.38, | DC1 830 |
| \$ 1.19, 1.39, 1.42, 1.43, 1.70, 1.82, 1.54, 1.41, 1.53, 1.86, | DC1 835 |
| \$ 1.98, 1.97, 2.02, 2.01, 1.94, 1.94, 1.83, 2.03, 2.21, 2.42, | DC1 840 |
| \$ 2.30, 2.16, 2.02, 2.02, 2.02, 2.13, 1.90, 1.71, 2.01, 1.56, | DC1 845 |
| \$ 1.56, 1.51, 1.30, 1.53, 1.64, 1.67, 1.70, 2.22, 2.39, 2.38, | DC1 850 |
| \$ 2.30, 1.93, 2.39, 2.49, 2.52, 2.57, 2.21, 2.18, 2.40, 2.41, | DC1 855 |
| \$ 2.45, 2.51, 2.23, 2.49, 2.30, 2.61, 2.72, 2.52, 2.63, 2.56/ | DC1 860 |
| DATA C1331/ | DC1 865 |
| 1 2.51, 2.70, 2.62, 2.62, 2.80, 2.74, 2.79, 2.74, 2.70, 2.88, | DC1 870 |
| 2 2.81, 2.72, 2.76, 2.84, 2.92, 2.98, 2.88, 2.88, 3.02, 3.08, | DC1 875 |
| 3 3.26, 3.03, 3.14, 3.28, 3.03, 3.11, 3.15, 3.30, 3.31, 3.22, | DC1 880 |
| 4 3.00, 3.08, 3.34, 3.40, 3.37, 3.32, 3.08, 3.09, 3.09, 3.01, | DC1 885 |
| 5 3.07, 3.07, 3.31, 3.21, 3.31, 3.67, 3.58, 3.79, 3.70, 3.49, | DC1 890 |
| 6 3.39, 3.11, 3.13, 3.01, 3.10, 3.01, 3.18, 3.32, 3.43, 3.35, | DC1 895 |
| 7 3.40, 3.39, 3.39, 3.51, 3.54, 3.42, 3.50, 3.67, 3.59, 3.63, | DC1 900 |
| 8 3.66, 3.48, 3.39, 3.29, 3.31, 3.41, 3.23, 3.32, 3.12, 2.91, | DC1 905 |
| 9 2.91, 2.75, 2.78, 2.72, 2.62, 2.58, 2.32, 2.22, 2.00, 1.97, | DC1 910 |
| \$ 1.68, 1.62, 1.64, 1.53, 1.56, 1.51, 1.52, 1.48, 1.42, 1.42, | DC1 915 |
| \$ 1.40, 1.41, 1.43, 1.56, 1.52, 1.51, 1.52, 1.39, 1.39, 1.30, | DC1 920 |
| \$ 1.09, 1.18, 1.21, 1.20, 1.22, 1.20, 1.18, 1.20, 1.19, 1.17, | DC1 925 |
| \$ 1.10, 1.10, 1.09, 1.10, 1.11, 1.04, .98, .90, .88, .90, | DC1 930 |
| \$.90, .90, .86, .71, .79, .70, .71, .67, .62, .53, | DC1 935 |
| \$.42, .31, .20, .01, -.08, -.17, -.26, -.35, -.44, -.53, | DC1 940 |
| \$ -.63, -.73, -.83, -.93, -1.04, -1.14, -1.24, -1.34, -1.44, -1.54, | DC1 945 |
| \$ -1.64, -1.74, -1.84, -1.94, -2.04, -2.14, -2.24, -2.34, -2.44, -2.54, | DC1 950 |
| \$ -2.64, -2.74, -2.84, -2.94, -3.04, -3.14, -3.24, -3.34, -3.44, -3.54, | DC1 955 |
| \$ -3.64, -3.74, -3.84, -3.94, -4.04, -5.00, -5.00, -5.00, -5.00, -5.00/ | DC1 960 |
| DATA C1521/ | DC1 965 |
| 1 -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, | DC1 970 |
| 2 -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, | DC1 975 |
| 3 -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, -5.00, | DC1 980 |

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| 4-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC1 985 |
| 5-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC1 990 |
| 6-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC1 995 |
| 7-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC1 1000 |
| 8-4.15,-4.06,-3.97,-3.88,-3.79,-3.70,-3.61,-3.52,-3.43,-3.34, | DC1 1005 |
| 9-3.25,-3.16,-3.07,-2.98,-2.89,-2.80,-2.71,-2.62,-2.53,-2.44, | DC1 1010 |
| \$-2.35,-2.26,-2.18,-2.09,-2.00,-1.91,-1.82,-1.73,-1.64,-1.55, | DC1 1015 |
| \$-1.46,-1.37,-1.28,-1.19,-1.10,-1.01,-.92,-.83,-.74,-.65, | DC1 1020 |
| \$-.56,-.47,-.38,-.29,-.20,-.14,-.09,-.02,.03,.10, | DC1 1025 |
| \$.17,.22,.30,.35,.41,.45,.42,.40,.43,.46, | DC1 1030 |
| \$.50,.59,.71,.84,.93,1.01,1.06,1.07,1.02,1.01, | DC1 1035 |
| \$1.12,1.23,1.24,1.28,1.34,1.43,1.52,1.56,1.59,1.56, | DC1 1040 |
| \$1.51,1.61,1.50,1.70,1.82,1.92,1.94,1.89,1.81,1.45, | DC1 1045 |
| \$1.30,1.28,1.43,1.50,1.49,1.55,1.48,1.32,1.39,1.53, | DC1 1050 |
| \$1.82,2.23,2.61,2.51,2.20,1.86,1.61,1.19,1.32,1.52, | DC1 1055 |
| \$1.70,1.90,2.01,1.92,1.91,2.12,2.10,2.01,2.18,1.99/ | DC1 1060 |
| DATA C1711/ | DC1 1065 |
| 1 2.11, 2.28, 2.21, 2.13, 2.00, 1.91, 1.92, 1.97, 1.88, 1.91, | DC1 1070 |
| 2 1.91, 1.92, 1.93, 1.74, 1.61, 1.58, 1.27, 1.20, 1.18, 1.11, | DC1 1075 |
| 3 .99, .86, .71, .60, .44, .31, .19, .03, -.07, -.21, | DC1 1080 |
| 4 -.35, -.49, -.64, -.79, -.94,-1.11,-1.24,-1.41,-1.57,-1.73, | DC1 1085 |
| 5-1.91,-2.09,-2.27,-2.45,-2.63,-2.81,-2.99,-3.18,-3.37,-3.56, | DC1 1090 |
| 6-3.75,-3.94,-4.13,-4.31,-4.49,-4.66,-4.83,-4.99,-5.14,-5.28, | DC1 1095 |
| 7-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-4.68,-4.26, | DC1 1100 |
| 8-3.89,-3.57,-3.32,-3.11,-2.91,-2.89,-2.79,-2.74,-2.63,-2.47, | DC1 1105 |
| 9-2.29,-2.20,-2.17,-2.23,-2.27,-2.32,-2.12,-2.08,-2.07,-2.07, | DC1 1110 |
| \$-2.07,-1.98,-1.77,-1.70,-1.63,-1.60,-1.59,-1.43,-1.21,-1.15, | DC1 1115 |
| \$-1.09,-1.13,-1.29,-1.19,-.98,-.93,-.87,-.91,-.89,-.71, | DC1 1120 |
| \$-.62,-.59,-.58,-.63,-.58,-.39,-.22,-.14,-.06,-.01, | DC1 1125 |
| \$-.01,-.08,-.20,-.16,-.02,.18,.32,.42,.37,.23, | DC1 1130 |
| \$.12,.15,.28,.43,.59,.58,.53,.44,.39,.38, | DC1 1135 |
| \$.35,.23,.26,.19,.08,.10,.18,.27,.38,.43, | DC1 1140 |
| \$.32,.37,.58,.64,.87,.98,1.00,1.02,1.13,1.08, | DC1 1145 |
| \$1.08,1.16,1.16,1.30,1.41,1.40,1.32,1.32,1.37,1.42, | DC1 1150 |
| \$1.50,1.42,1.38,1.36,1.38,1.49,1.63,1.62,1.62,1.70, | DC1 1155 |
| \$1.68,1.60,1.56,1.56,1.63,1.64,1.56,1.49,1.49,1.52/ | DC1 1160 |
| DATA C1901/ | DC1 1165 |
| 1 1.58, 1.62, 1.62, 1.61, 1.61, 1.62, 1.63, 1.71, 1.72, 1.70, | DC1 1170 |
| 2 1.70, 1.67, 1.62, 1.66, 1.70, 1.67, 1.66, 1.49, 1.42, 1.38, | DC1 1175 |
| 3 1.25, 1.20, 1.13, 1.14, 1.19, 1.29, 1.50, 1.72, 1.86, 1.78, | DC1 1180 |
| 4 1.82, 1.88, 1.82, 1.89, 1.99, 2.00, 2.14, 2.04, 2.02, 2.02, | DC1 1185 |
| 5 1.98, 1.90, 1.83, 1.81, 1.72, 1.69, 1.69, 1.50, 1.36, 1.20, | DC1 1190 |
| 6 .98, .63, .43, .29, .16, .05, .02, .03, .03, .01, | DC1 1195 |
| 7 -.08, -.18, -.20, -.11, -.06, -.03, -.14, -.21, -.08, -.06, | DC1 1200 |
| 8 .10, .18, .11, .32, .42, .44, .38, .28, .42, .43, | DC1 1205 |
| 9 .41, .33, .32, .41, .50, .46, .31, .18, .08, .20, | DC1 1210 |
| \$.21,.34,.36,.28,.35,.39,.42,.38,.32,.30, | DC1 1215 |
| \$.16,-.01,-.23,-.41,-.52,-.48,-.58,-.61,-.48,-.23, | DC1 1220 |
| \$-.03,.21,.36,.39,.47,.44,.40,.51,.59,.53, | DC1 1225 |
| \$.69,.57,.48,.52,.62,.59,.55,.50,.32,.26, | DC1 1230 |
| \$.11,-.06,-.10,-.16,-.43,-.62,-.88,-1.09,-1.16,-1.31, | DC1 1235 |
| \$-1.45,-1.49,-1.78,-1.91,-2.01,-1.97,-1.97,-1.97,-1.97,-2.28, | DC1 1240 |
| \$-2.20,-2.01,-1.89,-2.00,-2.04,-2.37,-2.49,-2.44,-2.36,-2.32, | DC1 1245 |
| \$-2.19,-2.10,-2.25,-2.18,-2.36,-2.44,-2.40,-2.49,-2.48,-2.43, | DC1 1250 |
| \$-2.40,-2.36,-2.40,-2.49,-2.59,-2.68,-2.69,-3.28,-3.51,-3.74, | DC1 1255 |
| \$-3.97,-4.20,-4.43,-4.66,-4.89,-5.00,-5.00,-5.00,-5.00,-5.00/ | DC1 1260 |
| DATA C2091/ | DC1 1265 |
| 1-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC1 1270 |
| 2-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC1 1275 |

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| 3-5.00,-5.00,-5.00,-5.00,-5.00,-5.20,-5.00,-5.00,-5.00,-5.00, | DC1 1280 |
| 4-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC1 1285 |
| 5-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC1 1290 |
| 6-5.00,-5.00,-5.00,-5.00,-5.00,-3.71,-3.56,-3.40,-3.21,-3.06, | DC1 1295 |
| 7-2.90,-2.74,-2.60,-2.46,-2.32,-2.17,-2.03,-1.87,-1.79,-1.74, | DC1 1300 |
| 8-1.83,-1.82,-1.71,-1.59,-1.49,-1.46,-1.46,-1.49,-1.49,-1.25, | DC1 1305 |
| 9-1.24,-1.08,-.90,-1.08,-.91,-.91,-1.01,-.99,-.87,-.92, | DC1 1310 |
| \$ -.79,-.42,-.54,-.38,-.42,-.46,-.34,-.27,-.17,-.28, | DC1 1315 |
| \$ -.38,-.22,-.30,-.08,-.01,-.20,-.06,-.10,-.06,-.14, | DC1 1320 |
| \$ -.12,-.02,-.02,-.13,-.11,-.10,-.06,-.05,-.04,-.10, | DC1 1325 |
| \$ -.04,-.06,-.21,-.38,-.61,-.40,-.31,-.42,-.58,-.57, | DC1 1330 |
| \$ -.54,-.24,-.11,-.51,-.81,-.79,-.62,-.26,-.31,-.67, | DC1 1335 |
| \$ -.80,-.88,-.50,-.39,-.10,-.09,-.06,-.08,-.16,-.21, | DC1 1340 |
| \$.13,-.32,-.35,-.51,-.60,-.51,-.51,-.40,-.40,-.43, | DC1 1345 |
| \$.42,-.33,-.43,-.34,-.22,-.13,-.11,-.31,-.31,-.41, | DC1 1350 |
| \$ -.41,-.39,-.53,-.69,-.84,-.88,-1.01,-1.10,-1.19,-1.29, | DC1 1355 |
| \$-1.45,-1.49,-1.67,-1.87,-1.51,-1.68,-1.60,-1.69,-1.83,-1.51/ | DC1 1360 |
| DATA C2201/ | DC1 1365 |
| 1-1.42,-1.40,-1.24,-1.38,-1.31,-1.30,-1.30,-1.28,-1.39,-1.33, | DC1 1370 |
| 2-1.40,-1.35,-1.37,-1.39,-1.41,-1.49,-1.48,-1.56,-1.47,-1.46, | DC1 1375 |
| 3-1.41,-1.42,-1.48,-1.41,-1.31,-1.15,-1.13,-1.20,-1.41,-1.88, | DC1 1380 |
| 4-2.08,-2.08,-2.22,-2.35,-2.35,-1.98,-1.92,-1.78,-1.57,-1.69, | DC1 1385 |
| 5-1.70,-1.70,-1.66,-1.84,-1.50,-1.56,-1.42,-1.29,-1.38,-1.28, | DC1 1390 |
| 6-1.48,-1.58,-1.44,-1.53,-1.48,-1.48,-1.58,-1.58,-1.69,-1.79, | DC1 1395 |
| 7-2.00,-2.16,-1.99,-2.23,-2.04,-2.04,-2.39,-2.74,-3.09,-3.44, | DC1 1400 |
| 8-3.79,-4.14,-4.49,-4.84,-5.19,-2.46,-2.26,-1.99,-2.01,-2.14, | DC1 1405 |
| 9-2.31,-2.15,-2.01,-1.99,-2.14,-2.41,-2.12,-1.99,-1.84,-1.79, | DC1 1410 |
| \$-1.71,-1.78,-1.72,-1.68,-1.78,-1.52,-1.38,-1.29,-1.22,-.91, | DC1 1415 |
| \$ -.90,-1.01,-.76,-.90,-.90,-.90,-1.19,-1.00,-.79,-.68, | DC1 1420 |
| \$ -.68,-.73,-.85,-.85,-.61,-.61,-.48,-.51,-.92,-.63, | DC1 1425 |
| \$ -.61,-.41,-.29,-.29,-.61,-.74,-.19,-.18,0.00,-.18, | DC1 1430 |
| \$ -.10,-.20,-.20,-.02,-.20,-.01,-.18,-.28,-.11,0.00, | DC1 1435 |
| \$ -.37,-.10,-.02,-.16,-.20,0.00,-.09,-.09,-.09,-.07, | DC1 1440 |
| \$.22,-.11,-.11,-.21,-.09,-.21,-.20,-.37,-.28,-.07, | DC1 1445 |
| \$.09,-.29,-.69,-.69,-.74,-.88,-1.01,-.88,-.54,-.19, | DC1 1450 |
| \$.19,-.23,-.21,-.29,-.28,-.29,-.52,-.54,-.51,-.60, | DC1 1455 |
| \$.40,-.49,-.48,-.46,-.49,-.27,-.06,-.33,-.81,-1.17/ | DC1 1460 |
| DATA C2471/ | DC1 1465 |
| 1-1.11,-1.37,-1.52,-1.54,-1.94,-2.06,-2.06,-2.14,-1.98,-2.00, | DC1 1470 |
| 2-2.00,-2.08,-2.23,-2.31,-2.31,-2.53,-2.31,-2.31,-2.31,-2.28, | DC1 1475 |
| 3-2.34,-2.34,-1.91,-1.82,-1.69,-1.56,-1.84,-1.91,-1.75,-1.83, | DC1 1480 |
| 4-1.76,-1.54,-1.98,-1.60,-1.68,-1.89,-1.56,-1.60,-1.71,-1.36, | DC1 1485 |
| 5-1.38,-1.44,-1.48,-1.40,-1.48,-1.36,-1.45,-1.49,-1.85,-1.39, | DC1 1490 |
| 6-1.23,-1.18,-1.18,-1.34,-1.38,-1.23,-1.23,-1.37,-1.30,-1.40, | DC1 1495 |
| 7-1.28,-1.27,-1.37,-1.32,-1.32,-1.22,-1.28,-1.38,-1.69,-2.07, | DC1 1500 |
| 8-2.42,-2.59,-2.58,-3.80,-2.58,-2.43,-1.88,-1.80,-1.26,-1.18, | DC1 1505 |
| 9-1.23,-1.10,-1.23,-1.10,-.83,-.80,-.80,-.80,-.98,-.97, | DC1 1510 |
| \$ -.97,-.91,-.92,-1.13,-1.24,-1.50,-1.89,-2.18,-2.32,-2.63, | DC1 1515 |
| \$-3.81,-4.20,-4.49,-4.78,-5.07,-5.07,-5.07,-5.07,-5.07,-5.07/ | DC1 1520 |
| END | DC1 1525 |

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| C | BLOCK DATA C2D | DC2 | 100 |
| C | BLOCK DATA | DC2 | 105 |
| C | UNIFORMLY MIXED GASES BAND MODEL ABSORPTION COEFFICIENTS | DC2 | 110 |
| C | INCLUDING CO2,CO,N2O,CH4 | DC2 | 115 |
| C | C2 LOCATION 1 V = 500 CM-1 | DC2 | 120 |
| C | C2 LOCATION 1515 V = 8070 CM-1 | DC2 | 125 |
| C | C2 LOCATION 1516 V = 12950 CM-1 | DC2 | 130 |
| C | C2 LOCATION 1575 V = 13245 CM-1 | DC2 | 135 |
| C | COMMON/C2/ C2(1575) | DC2 | 140 |
| C | COMMON /C2/C001(190),C191(190),C381(190),C571(190),C761(190), | DC2 | 145 |
| C | X C951(190),C1141(190),C1331(190),C1521(55) | DC2 | 150 |
| C | DATA C001 / | DC2 | 155 |
| C | 1-4.25,-3.70,-3.20,-2.75,-1.90,-1.73,-1.51,-1.29,-1.11,-.91, | DC2 | 160 |
| C | 2-.71,-.51,-.30,-.06,.22,.49,.76,1.08,1.29,1.56, | DC2 | 165 |
| C | 3 1.76,1.91,2.08,2.23,2.36,2.51,2.72,2.90,3.12,3.37, | DC2 | 170 |
| C | 4 3.56,3.69,3.79,3.86,3.88,3.86,3.73,3.58,3.38,3.17, | DC2 | 175 |
| C | 5 2.86,2.73,2.52,2.31,2.17,2.01,1.89,1.77,1.63,1.47, | DC2 | 180 |
| C | 6 1.21,.92,.53,.23,-.17,-.53,-.74,-.81,-.84,-.88, | DC2 | 185 |
| C | 7-1.00,-1.18,-1.42,-1.61,-1.86,-2.10,-2.29,-2.51,-2.72,-2.91, | DC2 | 190 |
| C | 8-3.14,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC2 | 195 |
| C | 9-5.00,-2.68,-2.47,-2.19,-1.97,-1.71,-1.50,-1.32,-1.21,-1.13, | DC2 | 200 |
| C | \$-1.09,-1.11,-1.10,-1.09,-1.01,-1.01,-1.11,-1.33,-1.66,-2.13, | DC2 | 205 |
| C | \$-2.51,-2.83,-2.71,-2.39,-2.09,-1.78,-1.59,-1.33,-1.18,-1.01, | DC2 | 210 |
| C | \$-.96,-.91,-.90,-.87,-.80,-.79,-.86,-1.07,-1.28,-1.69, | DC2 | 215 |
| C | \$-2.11,-2.74,-3.09,-3.50,-3.03,-2.58,-2.23,-1.89,-1.54,-1.28, | DC2 | 220 |
| C | \$-1.13,-1.11,-1.16,-1.20,-1.23,-1.21,-1.17,-1.12,-1.15,-1.19, | DC2 | 225 |
| C | \$-1.20,-1.17,-1.02,-.89,-.68,-.42,-.24,-.01,.18,.40, | DC2 | 230 |
| C | \$-.57,-.77,-.96,1.07,1.13,1.11,1.08,1.15,1.27,1.33, | DC2 | 235 |
| C | \$ 1.44,1.40,1.13,.89,.63,.54,.65,.78,.81,.86, | DC2 | 240 |
| C | \$.82,.68,.47,.14,-.12,-.48,-.82,-1.43,-1.89,-2.32, | DC2 | 245 |
| C | \$-2.81,-5.00,-5.00,-5.00,-3.14,-2.47,-2.00,-1.71,-1.59,-1.61/ | DC2 | 250 |
| C | DATA C191 / | DC2 | 255 |
| C | 1-1.69,-1.82,-1.87,-1.90,-1.94,-2.04,-2.10,-2.23,-2.32,-2.46, | DC2 | 260 |
| C | 2-2.71,-2.88,-3.09,-2.99,-2.43,-2.00,-1.69,-1.42,-1.38,-1.49, | DC2 | 265 |
| C | 3-1.70,-2.01,-2.41,-2.64,-2.63,-2.49,-2.38,-2.27,-2.16,-2.05, | DC2 | 270 |
| C | 4-1.94,-1.83,-1.76,-1.71,-1.70,-1.72,-1.81,-1.92,-2.03,-2.27, | DC2 | 275 |
| C | 5-2.61,-3.21,-4.01,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC2 | 280 |
| C | 6-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC2 | 285 |
| C | 7-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC2 | 290 |
| C | 8-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-4.30,-3.42,-3.17,-2.98, | DC2 | 295 |
| C | 9-2.83,-2.71,-2.67,-2.67,-2.68,-2.58,-2.33,-2.01,-1.64,-1.32, | DC2 | 300 |
| C | \$-.97,-.76,-.63,-.59,-.60,-.63,-.69,-.67,-1.08,-1.26, | DC2 | 305 |
| C | \$-1.53,-1.87,-1.81,-1.93,-2.02,-2.21,-2.48,-2.80,-3.08,-3.11, | DC2 | 310 |
| C | \$-3.09,-2.83,-2.76,-2.39,-2.01,-1.69,-1.36,-.99,-.63,-.28, | DC2 | 315 |
| C | \$ 0.00,.08,.11,.12,.12,.07,.01,-.08,-.23,-.40, | DC2 | 320 |
| C | \$-.51,-.53,-.57,-.60,-.61,-.73,-.81,-.95,-1.06,-1.02, | DC2 | 325 |
| C | \$-.91,-.68,-.41,-.09,.18,.41,.76,1.00,1.18,1.39, | DC2 | 330 |
| C | \$ 1.51,1.58,1.68,1.71,1.80,1.91,2.02,2.18,2.32,2.50, | DC2 | 335 |
| C | \$ 2.61,2.69,2.81,2.89,2.96,3.04,3.14,3.27,3.41,3.55, | DC2 | 340 |
| C | \$ 3.72,3.90,4.03,4.22,4.42,4.61,4.71,4.73,4.65,4.63, | DC2 | 345 |
| C | \$ 4.72,4.78,4.79,4.50,3.62,3.28,2.79,2.30,1.86,1.35/ | DC2 | 350 |
| C | DATA C381 / | DC2 | 355 |
| C | 1 .32,-.24,-1.69,-2.18,-2.01,-1.79,-1.53,-1.32,-1.20,-1.15, | DC2 | 360 |
| C | 2-1.12,-1.18,-1.25,-1.28,-1.20,-1.17,-1.20,-1.32,-1.54,-1.84, | DC2 | 365 |
| C | 3-2.18,-2.30,-2.26,-2.01,-1.71,-1.38,-1.06,-.81,-.61,-.49, | DC2 | 370 |
| C | 4 -.45,-.47,-.49,-.46,-.37,-.31,-.34,-.49,-.75,-1.11, | DC2 | 375 |
| C | 6-1.43,-2.01,-2.60,-2.89,-2.87,-2.74,-2.51,-2.42,-2.38,-2.39, | DC2 | 380 |
| C | 6-2.42,-2.46,-2.48,-2.48,-2.43,-2.43,-2.46,-2.53,-2.65,-2.74, | DC2 | 385 |
| C | 7-2.82,-2.87,-2.83,-2.82,-2.79,-2.71,-2.66,-2.49,-2.40,-2.32, | DC2 | 390 |

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| 8-2.26,-2.23,-2.20,-2.09,-2.02,-1.96,-1.88,-1.84,-1.86,-1.86, | DC2 395 |
| 9-1.87,-1.83,-1.79,-1.73,-1.68,-1.64,-1.69,-1.74,-1.79,-1.87, | DC2 400 |
| \$-1.78,-1.63,-1.50,-1.37,-1.21,-1.00,-.83,-.69,-.53,-.41, | DC2 405 |
| \$-.30,-.19,-.09,-.04,.02,.10,.16,.18,.23,.26, | DC2 410 |
| \$.27,.26,.24,.22,.17,.12,.07,-.01,-.07,-.09, | DC2 415 |
| \$.32,.72,.91,1.12,1.03,.67,.18,-.11,-.38,-.29, | DC2 420 |
| \$-.17,-.08,0.00,.09,.13,.18,-.24,.27,.29,.30, | DC2 425 |
| \$.29,.26,.23,.21,.13,.09,.02,-.04,-.18,-.32, | DC2 430 |
| \$-.51,-.72,-.98,-1.18,-1.50,-1.62,-1.81,-2.04,-2.29,-2.49, | DC2 435 |
| \$-2.62,-2.87,-3.03,-3.21,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC2 440 |
| \$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-4.01,-3.38,-3.01,-2.63, | DC2 445 |
| \$-2.32,-2.09,-1.98,-1.94,-2.00,-2.14,-2.26,-2.20,-2.02,-1.82/ | DC2 450 |
| DATA C571 / | DC2 455 |
| 1-1.59,-1.43,-1.38,-1.46,-1.64,-1.90,-2.09,-2.54,-2.91,-3.28, | DC2 460 |
| 2-3.61,-3.72,-3.64,-3.50,-3.41,-3.37,-3.30,-3.18,-3.01,-2.76, | DC2 465 |
| 3-2.51,-2.20,-1.80,-1.49,-1.22,-.97,-.72,-.49,-.20,.03, | DC2 470 |
| 4 .20,.36,.51,.61,.67,.83,1.00,1.22,1.38,1.56, | DC2 475 |
| 5 1.70,1.88,2.01,2.20,2.31,2.47,2.61,2.78,2.92,3.01, | DC2 480 |
| 6 3.05,3.02,2.98,2.98,3.01,3.03,2.97,2.78,2.44,2.13, | DC2 485 |
| 7 1.83,1.59,1.49,1.50,1.67,1.94,2.22,2.50,2.71,2.93, | DC2 490 |
| 8 3.12,3.18,3.17,3.15,3.21,3.26,3.19,2.98,2.59,2.14, | DC2 495 |
| 9 1.70,1.22,.55,-.27,-1.09,-2.54,-3.00,-2.94,-2.78,-2.68, | DC2 500 |
| \$-2.61,-2.60,-2.63,-2.60,-2.57,-2.53,-2.57,-2.64,-2.77,-3.04, | DC2 505 |
| \$-3.38,-3.98,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC2 510 |
| \$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC2 515 |
| \$-5.00,-4.00,-3.73,-3.62,-3.59,-3.53,-3.56,-3.57,-3.53,-3.51, | DC2 520 |
| \$-3.45,-3.37,-3.26,-3.21,-3.18,-3.27,-3.36,-3.60,-3.96,-5.00, | DC2 525 |
| \$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC2 530 |
| \$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC2 535 |
| \$-5.00,-5.00,-5.00,-5.00,-4.62,-4.07,-3.89,-3.76,-3.87,-3.56, | DC2 540 |
| \$-3.42,-3.35,-3.20,-3.10,-3.14,-3.11,-3.09,-3.10,-3.12,-3.23, | DC2 545 |
| \$-3.30,-3.38,-3.37,-3.29,-3.14,.3.08,-3.00,-2.93,-2.89,-2.91/ | DC2 550 |
| DATA C731 / | DC2 555 |
| 1-3.00,-3.08,-3.16,-3.31,-3.48,-3.71,-3.98,-5.00,-5.00,-5.00, | DC2 560 |
| 2-5.00,-4.52,-3.98,-3.69,-3.42,-3.18,-2.95,-2.77,-2.61,-2.48, | DC2 565 |
| 3-2.41,-2.41,-2.40,-2.38,-2.34,-2.27,-2.21,-2.31,-2.48,-2.73, | DC2 570 |
| 4-3.21,-4.13,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC2 575 |
| 5-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC2 580 |
| 6-5.00,-5.00,-4.13,-4.02,-3.99,-3.96,-3.87,-3.73,-3.51,-3.29, | DC2 585 |
| 7-3.13,-2.99,-2.84,-2.73,-2.69,-2.68,-2.69,-2.65,-2.62,-2.59, | DC2 590 |
| 8-2.57,-2.62,-2.81,-3.04,-3.21,-3.39,-3.42,-3.36,-3.21,-3.03, | DC2 595 |
| 9-2.93,-2.80,-2.64,-2.51,-2.37,-2.28,-2.20,-2.13,-2.07,-2.02, | DC2 600 |
| \$-1.96,-1.08,-1.78,-1.63,-1.44,-1.31,-1.20,-1.08,-.96,-.94, | DC2 605 |
| \$-.89,-.76,-.52,-.31,-.08,.13,.30,.37,.36,.36, | DC2 610 |
| \$.35,.35,.39,.46,.48,.41,.23,-.08,-.38,-.67, | DC2 615 |
| \$-.98,-.96,-.98,-.87,-.87,-.36,-.12,.14,.44,.68, | DC2 620 |
| \$.90,1.11,1.19,1.24,1.25,1.26,1.27,1.51,1.59,1.50, | DC2 625 |
| \$ 1.28,.71,.11,-.28,-.67,-1.32,-1.61,-1.58,-1.42,-1.18, | DC2 630 |
| \$-.21,-.59,-.27,-.00,.29,.57,.73,.92,.81,.73, | DC2 635 |
| \$.79,.91,1.01,1.03,.88,.72,.63,.38,.12,-.21, | DC2 640 |
| \$-.47,-.67,-1.23,-1.67,-2.31,-2.76,-3.24,-3.49,-3.51,-3.47, | DC2 645 |
| \$-3.39,-3.37,-3.43,-3.53,-3.60,-3.36,-3.18,-3.07,-2.96,-3.08/ | DC2 650 |
| DATA C951 / | DC2 655 |
| 1-3.14,-3.12,-3.23,-3.07,-2.83,-2.47,-2.23,-2.07,-1.91,-1.78, | DC2 660 |
| 2-1.63,-1.46,-1.27,-1.23,-1.26,-1.40,-1.67,-1.98,-2.28,-2.67, | DC2 665 |
| 3-3.74,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC2 670 |
| 4-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC2 675 |
| 5-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC2 680 |
| 6-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00, | DC2 685 |

| | |
|---|---------|
| 7-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 690 |
| 8-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 695 |
| 9-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 700 |
| \$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 705 |
| \$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 710 |
| \$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 715 |
| \$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 720 |
| \$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 725 |
| \$-5.00,-5.00,-4.91,-4.79,-4.61,-4.46,-4.40,-4.29,-4.17,-3.90 | DC2 730 |
| \$-3.73,-3.59,-3.62,-3.72,-3.73,-3.69,-3.31,-3.12,-2.91,-2.63 | DC2 735 |
| \$-2.41,-2.27,-2.16,-2.11,-2.20,-2.20,-2.21,-2.06,-1.91,-1.99 | DC2 740 |
| \$-2.27,-2.59,-2.98,-3.35,-3.69,-3.79,-3.68,-3.53,-3.46,-3.39 | DC2 745 |
| \$-3.31,-3.18,-2.97,-2.69,-2.39,-2.11,-1.83,-1.58,-1.49,-1.22/ | DC2 750 |
| DATA C1141 / | DC2 755 |
| 1-1.08,-.89,-.68,-.54,-.71,-.79,-.76,-.66,-.49,-.54 | DC2 760 |
| 2-.86,-1.37,-2.08,-2.44,-3.46,-3.72,-3.74,-3.59,-3.22,-2.98 | DC2 765 |
| 3-2.52,-2.21,-1.64,-1.34,-1.08,-.86,-.72,-.61,-.70,-.72 | DC2 770 |
| 4-.67,-.57,-.38,-.51,-.97,-1.36,-1.89,-2.74,-3.18,-4.21 | DC2 775 |
| 5-4.57,-4.62,-4.78,-4.87,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 780 |
| 6-4.93,-4.46,-3.99,-3.45,-2.99,-2.63,-2.30,-2.09,-2.02,-2.12 | DC2 785 |
| 7-2.18,-2.13,-2.04,-1.78,-1.83,-2.08,-2.28,-2.31,-3.01,-3.15 | DC2 790 |
| 8-3.22,-3.29,-3.58,-3.89,-4.46,-4.88,-5.00,-5.00,-5.00,-5.00 | DC2 795 |
| 9-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 800 |
| \$-4.81,-4.52,-4.11,-3.69,-3.09,-2.99,-2.91,-2.89,-3.19,-3.20 | DC2 805 |
| \$-3.38,-3.62,-3.89,-3.92,-3.73,-3.53,-3.37,-3.19,-3.02,-2.79 | DC2 810 |
| \$-2.52,-2.36,-2.24,-2.19,-2.32,-2.41,-2.29,-2.06,-2.00,-2.18 | DC2 815 |
| \$-2.47,-2.91,-3.57,-4.69,-5.00,-5.00,-5.00,-5.00,-5.00,-4.61 | DC2 820 |
| \$-4.18,-3.89,-3.57,-3.30,-3.02,-2.74,-2.51,-2.20,-1.98,-1.73 | DC2 825 |
| \$-1.57,-1.38,-1.21,-1.11,-.98,-.87,-.78,-.60,-.37,-.18 | DC2 830 |
| \$.04,-.04,-.06,-.15,-.18,-.19,-.23,-.45,-1.02,-1.97 | DC2 835 |
| \$-2.70,-3.71,-4.01,-4.20,-4.35,-4.58,-4.73,-4.81,-5.00,-5.00 | DC2 840 |
| \$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 845 |
| \$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00/ | DC2 850 |
| DATA C1331 / | DC2 855 |
| 1-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 860 |
| 2-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 865 |
| 3-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 870 |
| 4-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 875 |
| 5-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 880 |
| 6-5.00,-5.00,-5.00,-4.71,-4.31,-3.99,-3.88,-3.50,-3.34,-3.22 | DC2 885 |
| 7-3.23,-3.25,-3.24,-3.18,-3.10,-3.07,-3.16,-3.41,-3.67,-4.12 | DC2 890 |
| 8-4.68,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-4.51,-4.18 | DC2 895 |
| 9-3.73,-3.48,-3.17,-2.88,-2.73,-2.63,-2.58,-2.59,-2.57,-2.49 | DC2 900 |
| \$-2.42,-2.38,-2.48,-2.62,-3.02,-3.49,-4.16,-5.00,-5.00,-5.00 | DC2 905 |
| \$-3.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-4.87,-4.50 | DC2 910 |
| \$-4.21,-3.90,-3.66,-3.56,-3.51,-3.51,-3.51,-3.49,-3.41,-3.34 | DC2 915 |
| \$-3.34,-3.47,-3.60,-3.87,-4.23,-4.59,-5.00,-5.00,-5.00,-5.00 | DC2 920 |
| \$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-4.92 | DC2 925 |
| \$-4.51,-4.10,-3.78,-3.32,-3.03,-2.74,-2.43,-2.08,-1.83,-1.59 | DC2 930 |
| \$-1.29,-1.02,-.81,-.70,-.73,-.90,-1.08,-1.19,-1.35,-1.47 | DC2 935 |
| \$-1.57,-1.66,-1.80,-1.91,-2.04,-2.18,-2.33,-2.47,-2.61,-2.78 | DC2 940 |
| \$-2.97,-3.10,-3.28,-3.44,-3.63,-3.81,-3.98,-4.15,-4.32,-4.61 | DC2 945 |
| \$-4.71,-4.80,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-4.32/ | DC2 950 |
| DATA C1521 / | DC2 955 |
| 1-3.24,-2.59,-2.12,-1.82,-1.57,-1.34,-1.18,-1.02,-.62,-.64 | DC2 960 |
| 2-.48,-.33,-.14,-.06,.08,.21,.39,.62,.61,.72 | DC2 965 |
| 3.85,.98,1.02,1.12,1.16,1.21,1.17,1.08,.88,.80 | DC2 970 |
| 4.97,1.13,1.37,1.58,1.74,1.70,1.48,1.13,.73,.22 | DC2 975 |
| 5-.51,-1.57,-3.48,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00 | DC2 980 |
| 6-5.00,-5.00,-5.00,-5.00,-5.00/ | DC2 985 |
| END | DC2 990 |

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BLOCK DATA C3D
BLOCK DATA
C OZONE BAND MODEL ABSORPTION COEFFICIENTS
C C3 LOCATION 1 V = 575 CM-1
C C3 LOCATION 510 V = 3270 CM-1
C COMMON /C3/ C3(540)
COMMON /C3/ COO1(190),C191(190),C381(180)
DATA COO1 /
1-4.15,-3.51,-3.00,-2.54,-2.12,-1.76,-1.50,-1.21,-.86,-.49,
2 -.29,-.10,.02,.12,.24,.32,.43,.52,.58,.65,
3 .72,.79,.76,.72,.68,.64,.68,.79,.82,.83,
4 .80,.78,.68,.56,.49,.42,.34,.26,.14,.02,
5 -.14,-.35,-.51,-.74,-.88,-1.17,-1.40,-1.59,-2.11,-2.47,
6-2.83,-3.24,-3.59,-3.94,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,
7-5.00,-5.00,-5.00,-5.00,-5.00,-4.46,-4.00,-3.50,-3.14,-2.78,
8-2.41,-2.10,-1.78,-1.49,-1.20,-.20,.15,.35,.57,.78,
9 .95,1.20,1.40,1.65,1.80,1.97,2.10,2.21,2.31,2.38,
$ 2.40,2.42,2.58,2.52,2.20,2.48,2.54,2.45,2.30,2.00,
$ 1.20,.95,.92,.90,.90,.89,.90,.92,.94,.95,
$ .98,.95,.90,.80,.68,.55,.40,.30,.19,.08,
$ -.02,-.11,-.22,-.41,-.56,-.71,-.89,-1.03,-1.18,-1.33,
$-1.60,-1.76,-1.90,-2.02,-2.21,-2.40,-2.59,-2.79,-3.00,-3.22,
$-3.61,-4.18,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,
$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,
$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,
$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,
$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00/
DATA C191 /
1-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,
2-5.00,-5.00,-5.00,-5.00,-4.18,-3.91,-3.86,-3.41,-3.05,-2.69,
3-2.44,-2.19,-2.03,-1.86,-1.71,-1.56,-1.48,-1.39,-1.26,-1.13,
4 -.97,-.81,-.65,-.48,-.35,-.22,-.14,-.06,-.02,-.09,
5 -.18,-.14,.06,.26,-.02,-.42,-.80,-.82,-.80,-.74,
6 -.74,-.79,-.84,-.89,-.85,-.81,-.76,-.70,-.68,-.64,
7 -.65,-.66,-.72,-.78,-.84,-.90,-1.02,-1.14,-1.24,-1.33,
8-1.47,-1.61,-1.77,-1.92,-1.98,-2.04,-2.08,-3.09,-2.08,-2.03,
9-1.98,-1.93,-1.87,-1.82,-1.76,-1.71,-1.65,-1.59,-1.51,-1.44,
$-1.38,-1.28,-1.18,-1.08,-.98,-.89,-.78,-.69,-.59,-.49,
$ -.37,-.25,-.18,-.10,.00,.16,.27,.39,.57,.75,
$ .93,1.11,1.20,1.33,1.44,1.46,1.48,1.48,1.64,1.58,
$ 1.49,1.23,.66,.38,-.33,-.71,-.86,-.58,-.49,-.44,
$ -.40,-.40,-.46,-.53,-.64,-.76,-.89,-1.01,-1.14,-1.26,
$-1.40,-1.55,-1.69,-1.83,-1.98,-2.13,-2.28,-2.43,-2.64,-2.88,
$-3.07,-3.28,-3.50,-3.72,-3.94,-5.00,-5.00,-5.00,-5.00,-5.00,
$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,
$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,
$-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00/
DATA C381 /
1-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,
2-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,
3-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,-5.00,
4-5.00,-5.00,-5.00,-4.18,-3.97,-3.77,-3.58,-3.38,-3.07,-2.75,
5-2.44,-2.12,-1.85,-1.57,-1.30,-1.07,-.93,-.84,-.89,-.85,
6 -.81,-.77,-.72,-.68,-.63,-.59,-.53,-.49,-.41,-.34,
7 -.28,-.19,-.17,-.18,-.19,-.26,-.29,-.12,-.14,-.17,
8-2.38,-2.07,-3.57,-4.16,-5.00,-5.00,-5.00,-4.16,-3.80,-3.63,
9-3.37,-3.10,-2.79,-2.47,-2.15,-1.84,-1.73,-1.63,-1.52,-1.41,
$-1.33,-1.25,-1.17,-1.09,-1.02,-.96,-.89,-.82,-.73,-.68,
$ -.64,-.42,-.27,-.12,.03,.16,.25,.31,.39,.47,
$ .48,.49,.50,.50,.48,.48,.33,.01,-.11,-.33,
$ -.55,-.77,-.83,-.89,-.94,-.92,-.91,-.90,-.89,-.80,
$ -.78,-.71,-.69,-.67,-.66,-.65,-.65,-.64,-.67,-.68,
$ -.70,-.72,-.82,-.93,-1.03,-1.14,-1.24,-1.34,-1.51,-1.68,
$-2.13,-2.57,-2.92,-3.28,-3.71,-4.18,-5.00,-5.00,-5.00,-5.00/
END

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DC3 100
DC3 105
DC3 110
DC3 115
DC3 120
DC3 125
DC3 130
DC3 135
DC3 140
DC3 145
DC3 150
DC3 155
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DC3 345
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DC3 355
DC3 360
DC3 365
DC3 370
DC3 375
DC3 380
DC3 385
DC3 390
DC3 395
DC3 400
DC3 405
DC3 410
DC3 415
DC3 420

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|----|--|---------|
| | BLOCK DATA C40 | DC4 100 |
| CB | BLOCK DATA | DC4 105 |
| | COMMON /C4CB/ C401(114),C4115(19),CB(102) | DC4 110 |
| C | N2 CONTINUUM ABSORPTION COEFFICIENTS | DC4 115 |
| C | C4 LOCATION 1 V = 2080 CM-1 | DC4 120 |
| C | C4 LOCATION 133 V = 2740 CM-1 | DC4 125 |
| | DATA C401 / | DC4 130 |
| | 1 2.93E-04, 3.86E-04, 5.09E-04, 6.56E-04, 8.85E-04, 1.08E-03, | DC4 135 |
| | 2 1.31E-03, 1.73E-03, 2.27E-03, 2.73E-03, 3.36E-03, 3.95E-03, | DC4 140 |
| | 3 5.48E-03, 7.19E-03, 9.00E-03, 1.13E-02, 1.36E-02, 1.68E-02, | DC4 145 |
| | 4 1.96E-02, 2.16E-02, 2.36E-02, 2.63E-02, 2.90E-02, 3.15E-02, | DC4 150 |
| | 5 3.40E-02, 3.68E-02, 3.92E-02, 4.26E-02, 4.60E-02, 4.95E-02, | DC4 155 |
| | 6 5.30E-02, 5.65E-02, 6.00E-02, 6.30E-02, 6.60E-02, 6.89E-02, | DC4 160 |
| | 7 7.18E-02, 7.39E-02, 7.60E-02, 7.84E-02, 8.08E-02, 8.39E-02, | DC4 165 |
| | 8 8.70E-02, 9.13E-02, 9.56E-02, 1.08E-01, 1.20E-01, 1.36E-01, | DC4 170 |
| | 9 1.52E-01, 1.60E-01, 1.69E-01, 1.60E-01, 1.51E-01, 1.37E-01, | DC4 175 |
| | \$ 1.23E-01, 1.19E-01, 1.16E-01, 1.14E-01, 1.12E-01, 1.12E-01, | DC4 180 |
| | \$ 1.11E-01, 1.11E-01, 1.12E-01, 1.14E-01, 1.13E-01, 1.12E-01, | DC4 185 |
| | \$ 1.09E-01, 1.07E-01, 1.02E-01, 9.90E-02, 9.50E-02, 9.00E-02, | DC4 190 |
| | \$ 8.65E-02, 8.20E-02, 7.65E-02, 7.05E-02, 6.50E-02, 6.10E-02, | DC4 195 |
| | \$ 5.50E-02, 4.95E-02, 4.50E-02, 4.00E-02, 3.75E-02, 3.50E-02, | DC4 200 |
| | \$ 3.10E-02, 2.65E-02, 2.50E-02, 2.20E-02, 1.95E-02, 1.75E-02, | DC4 205 |
| | \$ 1.60E-02, 1.40E-02, 1.20E-02, 1.05E-02, 9.50E-03, 9.00E-03, | DC4 210 |
| | \$ 8.00E-03, 7.00E-03, 6.50E-03, 6.00E-03, 5.50E-03, 4.75E-03, | DC4 215 |
| | \$ 4.00E-03, 3.75E-03, 3.50E-03, 3.00E-03, 2.50E-03, 2.25E-03, | DC4 220 |
| | \$ 2.00E-03, 1.85E-03, 1.70E-03, 1.60E-03, 1.50E-03, 1.50E-03/ | DC4 225 |
| | DATA C4115 / | DC4 230 |
| | 1 1.94E-03, 1.50E-03, 1.47E-03, 1.34E-03, 1.25E-03, 1.06E-03, | DC4 235 |
| | 2 9.06E-04, 7.53E-04, 6.41E-04, 5.09E-04, 4.04E-04, 3.38E-04, | DC4 240 |
| | 3 2.86E-04, 2.32E-04, 1.94E-04, 1.57E-04, 1.31E-04, 1.02E-04, | DC4 245 |
| | 4 8.07E-05/ | DC4 250 |
| | 4M H2O CONTINUUM | DC4 255 |
| | OZONE U.V. + VISIBLE BAND MODEL ABSORPTION COEFF | DC4 260 |
| C | CB LOCATION 1 V = 13000 CM-1 | DC4 265 |
| C | CB LOCATION 56 V = 24200 CM-1 | DC4 270 |
| C | DV = 200 CM-1 | DC4 275 |
| C | CB LOCATION 87 V = 27500 CM-1 | DC4 280 |
| C | CB LOCATION 102 V = 30000 CM-1 | DC4 285 |
| C | DV = 500 CM-1 | DC4 290 |
| | DATA CB / | DC4 295 |
| | 1 4.50E-03, 8.00E-03, 1.07E-02, 1.10E-02, 1.27E-02, 1.71E-02, | DC4 300 |
| | 2 2.00E-02, 2.45E-02, 3.07E-02, 3.84E-02, 4.79E-02, 5.67E-02, | DC4 305 |
| | 3 8.54E-02, 7.82E-02, 9.15E-02, 1.00E-01, 1.09E-01, 1.20E-01, | DC4 310 |
| | 4 1.28E-01, 1.12E-01, 1.11E-01, 1.16E-01, 1.19E-01, 1.13E-01, | DC4 315 |
| | 6 1.03E-01, 9.24E-02, 8.28E-02, 7.57E-02, 7.07E-02, 6.58E-02, | DC4 320 |
| | 6 5.56E-02, 4.77E-02, 4.06E-02, 3.87E-02, 3.82E-02, 3.84E-02, | DC4 325 |
| | 7 2.09E-02, 1.80E-02, 1.91E-02, 1.66E-02, 1.77E-02, 1.70E-02, | DC4 330 |
| | 8 6.10E-03, 8.50E-03, 6.10E-03, 3.70E-03, 3.20E-03, 3.10E-03, | DC4 335 |
| | 9 2.55E-03, 1.98E-03, 1.40E-03, 8.25E-04, 2.50E-04, 0. | DC4 340 |
| | 8 0. | DC4 345 |
| | 8 4.98E-02, 1.18E-01, 2.46E-01, 5.16E-01, 1.02E+00, 1.95E+00, | DC4 350 |
| | 8 3.79E+00, 8.63E+00, 1.24E+01, 2.22E+01, 3.87E+01, 5.95E+01, | DC4 355 |
| | 8 8.50E+01, 1.28E+02, 1.69E+02, 2.06E+02, 2.42E+02, 2.71E+02, | DC4 360 |
| | 8 3.91E+02, 3.02E+02, 3.03E+02, 3.84E+02, 2.77E+02, 2.64E+02, | DC4 365 |
| | 8 2.28E+02, 1.55E+02, 1.55E+02, 1.44E+02, 1.17E+02, 9.78E+01, | DC4 370 |
| | 8 7.63E+01, 6.04E+01, 4.42E+01, 3.46E+01, 2.52E+01, 2.00E+01, | DC4 375 |
| | 8 1.57E+01, 1.20E+01, 1.00E+01, 8.83E+00, 8.20E+00, 8.60E+00/ | DC4 380 |
| | END | DC4 385 |

C
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BLOCK DATA MARDTA
BLOCK DATA

MARINE AEROSOL EXTINCTION AND ABSORPTION DATA
CODED BY STU GATHMAN - NRL

DMA 100
DMA 105
DMA 110
DMA 115
DMA 120
DMA 125
DMA 130
DMA 135
DMA 140
DMA 145
DMA 150
DMA 155
DMA 160
DMA 165
DMA 170
DMA 175
DMA 180
DMA 185
DMA 190
DMA 195
DMA 200
DMA 205
DMA 210
DMA 215
DMA 220
DMA 225
DMA 230
DMA 235
DMA 240
DMA 245
DMA 250
DMA 255
DMA 260
DMA 265
DMA 270
DMA 275
DMA 280
DMA 285
DMA 290
DMA 295
DMA 300
DMA 305
DMA 310
DMA 315
DMA 320
DMA 325
DMA 330
DMA 335
DMA 340
DMA 345
DMA 350
DMA 355
DMA 360
DMA 365
DMA 370
DMA 375
DMA 380
DMA 385
DMA 390

COMMON/A/T1QEXT(40,4),T2QEXT(40,4),T3QEXT(40,4),
T1QABS(40,4),T2QABS(40,4),T3QABS(40,4),ALAM(40),AREL(4)
DIMENSION A1(40),A2(40),A3(40),A4(40)
DIMENSION B1(40),B2(40),B3(40),B4(40)
DIMENSION C1(40),C2(40),C3(40),C4(40)
DIMENSION D1(40),D2(40),D3(40),D4(40)
DIMENSION E1(40),E2(40),E3(40),E4(40)
DIMENSION F1(40),F2(40),F3(40),F4(40)
EQUIVALENCE (A1(1), T1QEXT(1,1)), (A2(1), T1QEXT(1,2)),
+ (A3(1), T1QEXT(1,3)), (A4(1), T1QEXT(1,4))
EQUIVALENCE (B1(1), T2QEXT(1,1)), (B2(1), T2QEXT(1,2)),
+ (B3(1), T2QEXT(1,3)), (B4(1), T2QEXT(1,4))
EQUIVALENCE (C1(1), T3QEXT(1,1)), (C2(1), T3QEXT(1,2)),
+ (C3(1), T3QEXT(1,3)), (C4(1), T3QEXT(1,4))
EQUIVALENCE (D1(1), T1QABS(1,1)), (D2(1), T1QABS(1,2)),
+ (D3(1), T1QABS(1,3)), (D4(1), T1QABS(1,4))
EQUIVALENCE (E1(1), T2QABS(1,1)), (E2(1), T2QABS(1,2)),
+ (E3(1), T2QABS(1,3)), (E4(1), T2QABS(1,4))
EQUIVALENCE (F1(1), T3QABS(1,1)), (F2(1), T3QABS(1,2)),
+ (F3(1), T3QABS(1,3)), (F4(1), T3QABS(1,4))
DATA ALAM/
* .2000, .3000, .3371, .5500, .6943, 1.0000, 1.5380,
* 2.0000, 2.2500, 2.5000, 2.7000, 3.0000, 3.3923, 3.7500,
* 4.5000, 5.0000, 5.5000, 6.0000, 6.2000, 6.5000, 7.2000,
* 7.9000, 8.2000, 8.7000, 9.0000, 9.2000, 10.0000, 10.5910,
* 11.0000, 11.5000, 12.5000, 14.8000, 15.0000, 16.4000, 17.2000,
* 18.5000, 21.3000, 25.0000, 30.0000, 40.0000/
DATA AREL/50.,85.,95.,98./
DATA A1/
* -3.3075, -3.4388, -3.4988, -3.8225, -4.0134, -4.4214, -4.8412,
* -5.1635, -5.3158, -5.4223, -5.0061, -4.5105, -5.3517, -5.7325,
* -5.7705, -5.8315, -5.8432, -5.1790, -5.2918, -5.6851, -5.6307,
* -5.6737, -5.6064, -5.5378, -5.5214, -5.5150, -5.6582, -5.6047,
* -5.5235, -5.3876, -5.1767, -5.0918, -5.0916, -5.1300, -5.1459,
* -5.1980, -5.3116, -5.4009, -5.4889, -5.4794/
DATA A2/
* -2.8367, -2.9363, -2.9800, -3.2310, -3.3906, -3.7440, -4.1271,
* -4.4371, -4.6037, -4.7610, -4.3752, -3.8438, -4.6259, -4.9386,
* -5.0863, -5.1774, -5.2542, -4.5523, -4.6578, -4.9749, -5.0864,
* -5.1210, -5.0976, -5.0614, -5.0535, -5.0398, -5.0783, -4.0779,
* -4.8738, -4.7253, -4.5080, -4.4250, -4.4269, -4.4640, -4.4902,
* -4.5465, -4.6661, -4.7701, -4.8804, -4.9063/
DATA A3/
* -2.3685, -2.4287, -2.4534, -2.6258, -2.7481, -3.0376, -3.3752,
* -3.6604, -3.8213, -3.9963, -3.7279, -3.2000, -3.8573, -4.1858,
* -4.3378, -4.4459, -4.5631, -3.9208, -4.0099, -4.3220, -4.4654,
* -4.6059, -4.6055, -4.4942, -4.4890, -4.4811, -4.4716, -4.3569,
* -4.2468, -4.0955, -3.8765, -3.7923, -3.7948, -3.8304, -3.8560,
* -3.9176, -4.3997, -4.1491, -4.2678, -4.3079/
DATA A4/
* -1.6952, -1.6992, -1.7007, -1.7688, -1.8314, -2.0198, -2.2704,
* -2.5113, -2.6490, -2.8160, -2.7278, -2.2528, -2.6939, -3.0477,
* -3.1498, -3.2625, -3.4079, -2.9515, -2.9968, -3.2674, -3.4312,

| | | | | | | | |
|-----------|---------|---------|---------|---------|---------|---------|---------|
| * -3.4956 | -3.5142 | -3.5311 | -3.5369 | -3.5377 | -3.5240 | -3.4172 | DMA 395 |
| * -3.3106 | -3.1626 | -2.9455 | -2.8564 | -2.8588 | -2.8915 | -2.9211 | DMA 400 |
| * -2.9782 | -3.1016 | -3.2146 | -3.3390 | -3.3886 | | | DMA 405 |
| DATA B1/ | | | | | | | DMA 410 |
| * -0.5741 | -0.5495 | -0.5407 | -0.5337 | -0.5059 | -0.5367 | -0.6309 | DMA 415 |
| * -0.7237 | -0.7859 | -0.8664 | -0.9424 | -0.7780 | -0.8613 | -0.9585 | DMA 420 |
| * -1.0927 | -1.1616 | -1.2559 | -1.2119 | -1.1776 | -1.2870 | -1.4164 | DMA 425 |
| * -1.4649 | -1.5231 | -1.4562 | -1.4176 | -1.4141 | -1.5730 | -1.6324 | DMA 430 |
| * -1.6417 | -1.5982 | -1.4677 | -1.3923 | -1.3911 | -1.4067 | -1.4207 | DMA 435 |
| * -1.4667 | -1.5804 | -1.6833 | -1.7932 | -1.8237 | | | DMA 440 |
| DATA B2/ | | | | | | | DMA 445 |
| * -0.1808 | -0.1611 | -0.1540 | -0.1458 | -0.1069 | -0.1254 | -0.1608 | DMA 450 |
| * -0.2204 | -0.2730 | -0.3485 | -0.4413 | -0.2715 | -0.3017 | -0.3917 | DMA 455 |
| * -0.5277 | -0.5937 | -0.6966 | -0.6662 | -0.6037 | -0.7099 | -0.8351 | DMA 460 |
| * -0.9055 | -0.9551 | -0.9551 | -0.9511 | -0.9598 | -1.0824 | -1.1186 | DMA 465 |
| * -1.1017 | -1.0291 | -0.8689 | -0.7683 | -0.7673 | -0.7772 | -0.7922 | DMA 470 |
| * -0.8307 | -0.9352 | -1.0393 | -1.1631 | -1.2354 | | | DMA 475 |
| DATA B3/ | | | | | | | DMA 480 |
| * 0.2478 | 0.2556 | 0.2585 | 0.2629 | 0.3062 | 0.3021 | 0.3207 | DMA 485 |
| * 0.2935 | 0.2573 | 0.2006 | 0.1027 | 0.2291 | 0.2511 | 0.1858 | DMA 490 |
| * 0.0701 | 0.0141 | -0.0792 | -0.0844 | -0.0062 | -0.0893 | -0.1973 | DMA 495 |
| * -0.2739 | -0.3153 | -0.3508 | -0.3700 | -0.3873 | -0.4950 | -0.5325 | DMA 500 |
| * -0.5142 | -0.4411 | -0.2820 | -0.1710 | -0.1693 | -0.1718 | -0.1827 | DMA 505 |
| * -0.2117 | -0.3013 | -0.3962 | -0.5177 | -0.6123 | | | DMA 510 |
| DATA B4/ | | | | | | | DMA 515 |
| * 0.9239 | 0.9234 | 0.9233 | 0.9221 | 0.9536 | 0.9578 | 1.0162 | DMA 520 |
| * 1.0193 | 1.0076 | 0.9877 | 0.9061 | 0.9596 | 1.0192 | 0.9964 | DMA 525 |
| * 0.9306 | 0.8965 | 0.8359 | 0.7859 | 0.8642 | 0.8244 | 0.7549 | DMA 530 |
| * 0.6907 | 0.6597 | 0.6125 | 0.5825 | 0.5612 | 0.4578 | 0.3987 | DMA 535 |
| * 0.3974 | 0.4483 | 0.5830 | 0.6954 | 0.6983 | 0.7068 | 0.7036 | DMA 540 |
| * 0.6899 | 0.6286 | 0.5576 | 0.4560 | 0.3481 | | | DMA 545 |
| DATA C1/ | | | | | | | DMA 550 |
| * 2.1467 | 2.1504 | 2.1518 | 2.1518 | 2.1601 | 2.1671 | 2.1870 | DMA 555 |
| * 2.1925 | 2.2131 | 2.2110 | 2.2005 | 2.1968 | 2.2282 | 2.2326 | DMA 560 |
| * 2.2514 | 2.2518 | 2.2426 | 2.2225 | 2.2368 | 2.2431 | 2.2464 | DMA 565 |
| * 2.2800 | 2.2349 | 2.2426 | 2.2489 | 2.2491 | 2.2426 | 2.2085 | DMA 570 |
| * 2.1734 | 2.1401 | 2.1221 | 2.1400 | 2.1514 | 2.1749 | 2.1771 | DMA 575 |
| * 2.1778 | 2.1613 | 2.1333 | 2.0841 | 2.0095 | | | DMA 580 |
| DATA C2/ | | | | | | | DMA 585 |
| * 2.5481 | 2.5503 | 2.5511 | 2.5446 | 2.5522 | 2.5752 | 2.5831 | DMA 590 |
| * 2.3795 | 2.5987 | 2.6080 | 2.5956 | 2.5878 | 2.6117 | 2.6242 | DMA 595 |
| * 2.6334 | 2.6345 | 2.6273 | 2.6104 | 2.6289 | 2.6391 | 2.6620 | DMA 600 |
| * 2.6606 | 2.6452 | 2.6438 | 2.6469 | 2.6415 | 2.6010 | 2.5591 | DMA 605 |
| * 2.5268 | 2.4991 | 2.5098 | 2.5841 | 2.5871 | 2.5662 | 2.5918 | DMA 610 |
| * 2.5979 | 2.5925 | 2.5793 | 2.5493 | 2.4884 | | | DMA 615 |
| DATA C3/ | | | | | | | DMA 620 |
| * 2.9792 | 2.9801 | 2.9805 | 2.9768 | 2.9837 | 2.9969 | 3.0095 | DMA 625 |
| * 3.0130 | 3.0119 | 3.0248 | 3.0201 | 3.0128 | 3.0290 | 3.0428 | DMA 630 |
| * 3.0476 | 3.0449 | 3.0468 | 3.0416 | 3.0480 | 3.0620 | 3.0903 | DMA 635 |
| * 3.0036 | 3.0733 | 3.0840 | 3.0592 | 3.0548 | 3.0320 | 2.9982 | DMA 640 |
| * 2.9678 | 2.9424 | 2.8601 | 3.0119 | 3.0146 | 3.0301 | 3.0382 | DMA 645 |
| * 3.0439 | 3.0459 | 3.0435 | 3.0304 | 2.9884 | | | DMA 650 |
| DATA C4/ | | | | | | | DMA 655 |
| * 3.6518 | 3.6528 | 3.6533 | 3.6540 | 3.6574 | 3.6607 | 3.6752 | DMA 660 |
| * 3.6806 | 3.6728 | 3.6814 | 3.6873 | 3.6771 | 3.6873 | 3.6982 | DMA 665 |
| * 3.6997 | 3.6944 | 3.6980 | 3.6998 | 3.7009 | 3.7121 | 3.7340 | DMA 670 |
| * 3.7281 | 3.7210 | 3.7155 | 3.7142 | 3.7157 | 3.7187 | 3.6988 | DMA 675 |
| * 3.8737 | 3.8511 | 3.6603 | 3.6958 | 3.6977 | 3.7088 | 3.7138 | DMA 680 |
| * 3.7209 | 3.7202 | 3.7246 | 3.7287 | 3.7230 | | | DMA 685 |

| | | | | | | | | |
|------------|----------|----------|----------|----------|----------|----------|---------|---------|
| DATA D1/ | | | | | | | | DMA 690 |
| * -7.7608, | -7.8138, | -7.8353, | -7.8363, | -7.7777, | -7.5148, | -6.9697, | DMA 695 | |
| * -6.3980, | -6.3271, | -6.0085, | -5.0856, | -4.5455, | -5.6074, | -6.2374, | DMA 700 | |
| * -5.9767, | -5.9873, | -5.9406, | -5.1920, | -5.3128, | -5.6178, | -5.6515, | DMA 705 | |
| * -5.6911, | -5.6171, | -5.5477, | -5.5451, | -5.5248, | -5.6661, | -5.6094, | DMA 710 | |
| * -5.5265, | -5.3892, | -5.1776, | -5.0924, | -5.0922, | -5.1306, | -5.1465, | DMA 715 | |
| * -5.1965, | -5.2120, | -5.4012, | -5.4891, | -5.4795/ | | | DMA 720 | |
| DATA D2/ | | | | | | | | DMA 725 |
| * -7.5897, | -7.6463, | -7.6693, | -7.6720, | -7.6085, | -7.2880, | -6.6040, | DMA 730 | |
| * -5.9094, | -6.0402, | -5.6344, | -4.4682, | -3.8933, | -4.9653, | -5.7235, | DMA 735 | |
| * -5.3670, | -5.4040, | -5.4134, | -4.5697, | -4.6896, | -5.0266, | -5.1251, | DMA 740 | |
| * -5.1500, | -5.1186, | -5.0787, | -5.0697, | -5.0543, | -5.0873, | -4.9824, | DMA 745 | |
| * -4.8765, | -4.7268, | -4.5091, | -4.4280, | -4.4280, | -4.4651, | -4.4912, | DMA 750 | |
| * -4.5475, | -4.6669, | -4.7708, | -4.8807, | -4.9065/ | | | DMA 755 | |
| DATA D3/ | | | | | | | | DMA 760 |
| * -7.3839, | -7.4591, | -7.4907, | -7.5015, | -7.4267, | -6.9782, | -6.1115, | DMA 765 | |
| * -5.3320, | -5.6308, | -5.1375, | -3.8595, | -3.2737, | -4.3476, | -5.1330, | DMA 770 | |
| * -4.7424, | -4.7905, | -4.8257, | -3.9497, | -4.0652, | -4.4132, | -4.5402, | DMA 775 | |
| * -4.5603, | -4.5492, | -4.5280, | -4.5184, | -4.5071, | -4.4858, | -4.3836, | DMA 780 | |
| * -4.2507, | -4.0979, | -3.8786, | -3.7946, | -3.7972, | -3.8328, | -3.8622, | DMA 785 | |
| * -3.9198, | -4.0415, | -4.1504, | -4.2687, | -4.3082/ | | | DMA 790 | |
| DATA D4/ | | | | | | | | DMA 795 |
| * -6.9467, | -7.0906, | -7.1590, | -7.2396, | -7.1295, | -6.3047, | -5.2250, | DMA 800 | |
| * -4.3913, | -4.8138, | -4.2512, | -2.9555, | -2.3736, | -3.3713, | -4.1797, | DMA 805 | |
| * -3.7845, | -3.8391, | -3.8898, | -3.0159, | -3.1187, | -3.4677, | -3.6117, | DMA 810 | |
| * -3.6326, | -3.6324, | -3.6235, | -3.6153, | -3.6070, | -3.5613, | -3.4348, | DMA 815 | |
| * -3.3208, | -3.1692, | -2.9518, | -2.8642, | -2.8666, | -2.8995, | -2.9291, | DMA 820 | |
| * -2.9861, | -3.1082, | -3.2197, | -3.3425, | -3.3900/ | | | DMA 825 | |
| DATA E1/ | | | | | | | | DMA 830 |
| * -4.1705, | -4.1963, | -4.2063, | -4.1266, | -4.0441, | -3.7452, | -3.1712, | DMA 835 | |
| * -2.5983, | -2.5294, | -2.2355, | -1.4984, | -1.0273, | -1.7948, | -2.4098, | DMA 840 | |
| * -2.1791, | -2.1972, | -2.1647, | -1.5024, | -1.5747, | -1.8526, | -1.9156, | DMA 845 | |
| * -1.957, | -1.9055, | -1.8233, | -1.8050, | -1.7853, | -1.8447, | -1.9098, | DMA 850 | |
| * -1.8438, | -1.7270, | -1.5405, | -1.4544, | -1.4532, | -1.4763, | -1.4894, | DMA 855 | |
| * -1.5359, | -1.6463, | -1.7393, | -1.8354, | -1.8422/ | | | DMA 860 | |
| DATA E2/ | | | | | | | | DMA 865 |
| * -4.0384, | -4.0927, | -4.0729, | -4.0213, | -3.9061, | -3.5498, | -2.8358, | DMA 870 | |
| * -2.1337, | -2.2627, | -1.8618, | -0.9846, | -0.5166, | -1.2001, | -1.8993, | DMA 875 | |
| * -1.5831, | -1.6215, | -1.6451, | -0.9323, | -0.9859, | -1.2771, | -1.3921, | DMA 880 | |
| * -1.4241, | -1.4077, | -1.3685, | -1.3568, | -1.3446, | -1.3974, | -1.3197, | DMA 885 | |
| * -1.2384, | -1.1127, | -0.9289, | -0.8348, | -0.8343, | -0.8503, | -0.8670, | DMA 890 | |
| * -0.9084, | -1.0118, | -1.1094, | -1.2214, | -1.2647/ | | | DMA 895 | |
| DATA E3/ | | | | | | | | DMA 900 |
| * -3.8578, | -3.9117, | -3.9336, | -3.8643, | -3.7519, | -3.2484, | -2.3765, | DMA 905 | |
| * -1.5840, | -1.6758, | -1.4045, | -0.4651, | -0.0282, | -0.6885, | -1.3211, | DMA 910 | |
| * -0.9739, | -1.0177, | -1.0654, | -0.3653, | -0.4032, | -0.6817, | -0.8120, | DMA 915 | |
| * -0.8409, | -0.8395, | -0.8254, | -0.8183, | -0.8125, | -0.8151, | -0.7274, | DMA 920 | |
| * -0.6426, | -0.5262, | -0.3544, | -0.2571, | -0.2563, | -0.2648, | -0.2788, | DMA 925 | |
| * -0.3124, | -0.4027, | -0.4930, | -0.6036, | -0.6605/ | | | DMA 930 | |
| DATA E4/ | | | | | | | | DMA 935 |
| * -3.4282, | -3.8621, | -3.0245, | -3.6194, | -3.5032, | -2.6505, | -1.5096, | DMA 940 | |
| * -3.6912, | -1.0979, | -0.5564, | 0.3125, | 0.6827, | 0.2590, | -0.4128, | DMA 945 | |
| * -0.0613, | -0.1030, | -0.1588, | 0.4690, | 0.4489, | 0.2105, | 0.0870, | DMA 950 | |
| * 0.0612, | 0.0563, | 0.0507, | 0.0567, | 0.0620, | 0.0792, | 0.1597, | DMA 955 | |
| * 0.2339, | 0.3320, | 0.4751, | 0.5877, | 0.5695, | 0.5709, | 0.5638, | DMA 960 | |
| * 0.5435, | 0.4788, | 0.4093, | 0.3163, | 0.2577/ | | | DMA 965 | |
| DATA F1/ | | | | | | | | DMA 970 |
| * -0.5489, | -0.5783, | -0.5894, | -0.5104, | -0.4212, | -0.0980, | 0.4863, | DMA 975 | |
| * 1.0326, | 1.0997, | 1.3537, | 1.7043, | 1.8943, | 1.6604, | 1.2520, | DMA 980 | |

| | | | | | | | |
|------------|----------|----------|----------|----------|---------|---------|----------|
| * 1.4563, | 1.4532, | 1.4784, | 1.8461, | 1.8293, | 1.7005, | 1.6725, | DMA 985 |
| * 1.6570, | 1.6811, | 1.7406, | 1.7614, | 1.7751, | 1.6857, | 1.6983, | DMA 990 |
| * 1.7261, | 1.7763, | 1.8487, | 1.8987, | 1.8012, | 1.9135, | 1.9154, | DMA 995 |
| * 1.9104, | 1.8848, | 1.8572, | 1.8166, | 1.8043/ | | | DMA 1000 |
| DATA F2/ | | | | | | | DMA 1005 |
| * -0.4215, | -0.4483, | -0.4587, | -0.4073, | -0.3085, | 0.0696, | 0.7952, | DMA 1010 |
| * 1.4548, | 1.3737, | 1.6860, | 2.0995, | 2.2816, | 2.1301, | 1.6978, | DMA 1015 |
| * 1.9564, | 1.9399, | 1.9260, | 2.2741, | 2.2680, | 2.1606, | 2.1128, | DMA 1020 |
| * 2.1004, | 2.1074, | 2.1349, | 2.1447, | 2.1515, | 2.1204, | 2.1504, | DMA 1025 |
| * 2.1811, | 2.2215, | 2.2777, | 2.3246, | 2.3268, | 2.3387, | 2.3420, | DMA 1030 |
| * 2.3435, | 2.3329, | 2.3179, | 2.2891, | 2.2719/ | | | DMA 1035 |
| DATA F3/ | | | | | | | DMA 1040 |
| * -0.2341, | -0.2834, | -0.3033, | -0.2717, | -0.0633, | 0.3366, | 1.2184, | DMA 1045 |
| * 1.9791, | 1.7218, | 2.1368, | 2.5364, | 2.6979, | 2.6050, | 2.2107, | DMA 1050 |
| * 2.4693, | 2.4531, | 2.4300, | 2.7168, | 2.7144, | 2.6374, | 2.5939, | DMA 1055 |
| * 2.5855, | 2.5871, | 2.5971, | 2.6015, | 2.6044, | 2.6010, | 2.6295, | DMA 1060 |
| * 2.6533, | 2.6812, | 2.7190, | 2.7572, | 2.7592, | 2.7705, | 2.7749, | DMA 1065 |
| * 2.7799, | 2.7602, | 2.7767, | 2.7627, | 2.7525/ | | | DMA 1070 |
| DATA F4/ | | | | | | | DMA 1075 |
| * 0.1750, | 0.0418, | -0.0203, | -0.0789, | 0.0501, | 0.9248, | 2.0179, | DMA 1080 |
| * 2.7921, | 2.4415, | 2.9025, | 3.2424, | 3.3513, | 3.3148, | 3.0046, | DMA 1085 |
| * 3.2303, | 3.2194, | 3.2001, | 3.3884, | 3.3859, | 3.3494, | 3.3241, | DMA 1090 |
| * 3.3215, | 3.3223, | 3.3260, | 3.3279, | 3.3303, | 3.3364, | 3.3547, | DMA 1095 |
| * 3.3666, | 3.3776, | 3.3917, | 3.4141, | 3.4155, | 3.4248, | 3.4284, | DMA 1100 |
| * 3.4382, | 3.4458, | 3.4537, | 3.4572, | 3.4608/ | | | DMA 1105 |
| END | | | | | | | DMA 1110 |

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| | BLOCK DATA PHSOTA | PHD 100 |
| C* | BLOCK DATA | PHD 105 |
| CCC | | PHD 110 |
| CCC | ROUTINE TO STORE TABLE TO CALL UP PROPER PHASE FUNCTION | PHD 115 |
| CCC | AND 70 AVERAGE PHASE FUNCTIONS | PHD 120 |
| CCC | | PHD 125 |
| C | COMMON/MNMPHS/ MNUM(27,26),PHSFNC(34,70) | PHD 130 |
| | COMMON/MNMPHS/MUM1(27),MUM2(27),MUM3(27),MUM4(27),MUM5(27), | PHD 135 |
| | 1MUM6(27),MUM7(27),MUM8(27),MUM9(27),MUM10(27),MUM11(27),MUM12(27), | PHD 140 |
| | 2MUM13(27),MUM14(27),MUM15(27),MUM16(27),MUM17(27),MUM18(27), | PHD 145 |
| | 3MUM19(27),MUM20(27),MUM21(27),MUM22(27),MUM23(27),MUM24(27), | PHD 150 |
| | 4MUM25(27),MUM26(27),PHSF1(34),PHSF2(34),PHSF3(34),PHSF4(34), | PHD 155 |
| | 5PHSF5(34),PHSF6(34),PHSF7(34),PHSF8(34),PHSF9(34), | PHD 160 |
| | 6PHSF10(34),PHSF11(34),PHSF12(34),PHSF13(34),PHSF14(34),PHSF15(34), | PHD 165 |
| | 7PHSF16(34),PHSF17(34),PHSF18(34),PHSF19(34),PHSF20(34),PHSF21(34), | PHD 170 |
| | 8PHSF22(34),PHSF23(34),PHSF24(34),PHSF25(34),PHSF26(34),PHSF27(34), | PHD 175 |
| | 9PHSF28(34),PHSF29(34),PHSF30(34),PHSF31(34),PHSF32(34),PHSF33(34), | PHD 180 |
| | 0PHSF34(34),PHSF35(34),PHSF36(34),PHSF37(34),PHSF38(34),PHSF39(34), | PHD 185 |
| | 1PHSF40(34),PHSF41(34),PHSF42(34),PHSF43(34),PHSF44(34),PHSF45(34), | PHD 190 |
| | 2PHSF46(34),PHSF47(34),PHSF48(34),PHSF49(34),PHSF50(34),PHSF51(34), | PHD 195 |
| | 3PHSF52(34),PHSF53(34),PHSF54(34),PHSF55(34),PHSF56(34),PHSF57(34), | PHD 200 |
| | 4PHSF58(34),PHSF59(34),PHSF60(34),PHSF61(34),PHSF62(34),PHSF63(34), | PHD 205 |
| | 5PHSF64(34),PHSF65(34),PHSF66(34),PHSF67(34),PHSF68(34),PHSF69(34), | PHD 210 |
| | 6PHSF70(34) | PHD 215 |
| | DATA MUM1/ 3, 5, 4, 4, 4, 6, 8, 22, 21, 22, 26, 26, | PHD 220 |
| | C26, 27, 29, 1, 34, 34, 34, 34, 33, 33, 36, 36, 36, 36, 23/ | PHD 225 |
| | DATA MUM2/ 3, 5, 4, 4, 4, 6, 8, 22, 21, 21, 22, 26, | PHD 230 |
| | C26, 27, 29, 1, 34, 33, 33, 33, 46, 46, 34, 34, 36, 36, 23/ | PHD 235 |
| | DATA MUM3/ 3, 5, 5, 5, 19, 6, 8, 21, 7, 21, 22, 8, | PHD 240 |
| | C26, 1, 27, 1, 46, 46, 46, 29, 29, 46, 34, 34, 34, 36, 23/ | PHD 245 |
| | DATA MUM4/ 58, 58, 62, 62, 62, 63, 63, 63, 60, 64, 64, 64, | PHD 250 |
| | C21, 70, 65, 65, 65, 65, 66, 66, 66, 65, 27, 29, 46, 33, 34/ | PHD 255 |
| | DATA MUM5/ 59, 11, 11, 11, 20, 20, 20, 28, 28, 16, 16, 16, | PHD 260 |
| | C16, 37, 37, 37, 32, 36, 32, 32, 32, 36, 23, 23, 23, 38, 25/ | PHD 265 |
| | DATA MUM6/ 9, 59, 11, 13, 13, 26, 26, 26, 27, 29, 46, 28, | PHD 270 |
| | C28, 29, 28, 28, 37, 37, 37, 37, 34, 36, 36, 36, 23, 23, 38/ | PHD 275 |
| | DATA MUM7/ 9, 9, 14, 14, 14, 15, 15, 15, 66, 65, 27, 26, | PHD 280 |
| | C29, 27, 29, 29, 29, 29, 29, 28, 46, 34, 36, 36, 36, 23, 23/ | PHD 285 |
| | DATA MUM8/ 57, 57, 59, 59, 59, 68, 68, 68, 81, 70, 60, 21, | PHD 290 |
| | C 7, 66, 1, 1, 1, 1, 66, 66, 1, 29, 46, 46, 33, 34, 36/ | PHD 295 |
| | DATA MUM9/ 2, 18, 18, 19, 19, 6, 22, 22, 22, 22, 22, 22, | PHD 300 |
| | C29, 29, 46, 29, 34, 34, 34, 34, 34, 34, 36, 36, 36, 23, 23/ | PHD 305 |
| | DATA MUM10/ 2, 3, 18, 18, 19, 6, 22, 22, 21, 22, 22, 22, | PHD 310 |
| | C27, 27, 29, 27, 33, 33, 46, 46, 46, 33, 34, 34, 36, 36, 23/ | PHD 315 |
| | DATA MUM11/ 2, 3, 18, 18, 19, 6, 22, 21, 7, 22, 22, 22, | PHD 320 |
| | C27, 27, 27, 46, 29, 29, 29, 29, 46, 33, 34, 34, 36, 36/ | PHD 325 |
| | DATA MUM12/ 58, 58, 62, 62, 62, 62, 63, 63, 60, 64, 64, 64, | PHD 330 |
| | C21, 60, 7, 65, 65, 65, 66, 67, 65, 7, 27, 27, 29, 46, 33/ | PHD 335 |
| | DATA MUM13/ 10, 59, 11, 11, 13, 20, 20, 28, 28, 16, 16, 16, | PHD 340 |
| | C16, 37, 37, 37, 32, 36, 32, 32, 32, 36, 23, 23, 23, 38, 25/ | PHD 345 |
| | DATA MUM14/ 10, 10, 14, 14, 13, 13, 26, 26, 27, 29, 29, 28, | PHD 350 |
| | C28, 29, 28, 28, 37, 37, 37, 37, 33, 32, 36, 36, 23, 23, 38/ | PHD 355 |
| | DATA MUM15/ 10, 69, 14, 14, 14, 15, 15, 7, 66, 65, 27, 26, | PHD 360 |
| | C29, 1, 29, 29, 29, 29, 29, 29, 46, 34, 36, 36, 36, 23, 23/ | PHD 365 |
| | DATA MUM16/ 47, 57, 69, 69, 69, 68, 68, 68, 61, 70, 60, 21, | PHD 370 |
| | C 7, 66, 1, 1, 1, 1, 66, 66, 1, 29, 46, 46, 33, 34, 36/ | PHD 375 |
| | DATA MUM17/ 29, 16, 32, 32, 36, 36, 23, 23, 23, 38, 38, 38, | PHD 380 |
| | C25, 25, 25, 25, 25, 25, 25, 25, 35, 35, 35, 35, 40, 39/ | PHD 385 |
| | DATA MUM18/ 29, 16, 32, 32, 32, 36, 23, 23, 23, 38, 38, | PHD 390 |

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| C38,25,25,25,25,25,25,25,35,35,35,35,35,40,39/ | | | | | PHD 395 |
| DATA MUM19/29,28,37,37,32,36,36,23,23,23,23, | | | | | PHD 400 |
| C38,25,25,25,25,25,25,25,35,35,35,35,35,40,40/ | | | | | PHD 405 |
| DATA MUM20/15,26,28,28,37,37,32,32,32,23,23,23, | | | | | PHD 410 |
| C23,38,38,38,38,25,25,25,25,35,35,35,35,40/ | | | | | PHD 415 |
| DATA MUM21/20,20,37,37,24,23,38,25,25,35,35,35, | | | | | PHD 420 |
| C40,40,39,39,39,39,39,39,39,39,39,39,39,39/ | | | | | PHD 425 |
| DATA MUM22/ 7,20,16,37,32,32,24,23,23,23,38,38, | | | | | PHD 430 |
| C25,25,35,35,35,25,35,35,40,40,40,40,39,39/ | | | | | PHD 435 |
| DATA MUM23/17,51,13,13,20,20,28,28,37,37,37,37, | | | | | PHD 440 |
| C32,32,24,24,23,23,38,38,38,38,38,25,35/ | | | | | PHD 445 |
| DATA MUM24/47,30,55,55,55,13,15,12,42,12, 1,26, | | | | | PHD 450 |
| C44,52,44,44,45,45,45,45,24,23,38,38,38,25,35/ | | | | | PHD 455 |
| DATA MUM25/48,63,31,31,31,41,41,41,49,17,17,17, | | | | | PHD 460 |
| C56,50,43,43,67,61,42,54,42,12,12,12,12, 1,44/ | | | | | PHD 465 |
| DATA MUM26/59,59,11,11,20,20,28,28,46,46,46,46, | | | | | PHD 470 |
| C33,33,34,34,34,34,36,36,36,36,23,23,23,38,38/ | | | | | PHD 475 |
| DATA PHSF1/ | | | | | PHD 480 |
| C 4.81387, 4.26047, 3.42600, 2.74953, 2.21493, PHD 485 | | | | | |
| C 1.78847, 1.44553, .94765, .62704, .42183, PHD 490 | | | | | |
| C .28987, .20375, .14632, .10720, .05307, PHD 495 | | | | | |
| C .02882, .01703, .01093, .00784, .00582, PHD 500 | | | | | |
| C .00482, .00431, .00418, .00411, .00409, PHD 505 | | | | | |
| C .00412, .00419, .00428, .00436, .00442, PHD 510 | | | | | |
| C .00443, .00433, .00421, .00435/ | | | | | PHD 515 |
| DATA PHSF2/ | | | | | PHD 520 |
| C 100.88000, 4.36700, 2.73687, 2.10587, 1.68067, PHD 525 | | | | | |
| C 1.36333, 1.11900, .77513, .55317, .40393, PHD 530 | | | | | |
| C .30047, .22690, .17367, .13437, .07407, PHD 535 | | | | | |
| C .04350, .02714, .01795, .01266, .00958, PHD 540 | | | | | |
| C .00780, .00683, .00656, .00639, .00633, PHD 545 | | | | | |
| C .00636, .00649, .00669, .00682, .00671, PHD 550 | | | | | |
| C .00626, .00582, .00606, .00646/ | | | | | PHD 555 |
| DATA PHSF3/ | | | | | PHD 560 |
| C 75.07600, 3.77580, 2.33100, 1.82620, 1.49120, PHD 565 | | | | | |
| C 1.23720, 1.03680, .74470, .54766, .41000, PHD 570 | | | | | |
| C .31120, .23880, .18508, .14476, .08148, PHD 575 | | | | | |
| C .04851, .03047, .02022, .01431, .01085, PHD 580 | | | | | |
| C .00886, .00785, .00763, .00756, .00762, PHD 585 | | | | | |
| C .00780, .00809, .00843, .00868, .00861, PHD 590 | | | | | |
| C .00813, .00790, .00871, .00848/ | | | | | PHD 595 |
| DATA PHSF4/ | | | | | PHD 600 |
| C 14.11167, 3.29400, 1.88300, 1.07677, .85635, PHD 605 | | | | | |
| C .73207, .64758, .52827, .43880, .36565, PHD 610 | | | | | |
| C .30452, .25337, .21070, .17523, .11108, PHD 615 | | | | | |
| C .07169, .04755, .03263, .02385, .01855, PHD 620 | | | | | |
| C .01557, .01420, .01396, .01397, .01424, PHD 625 | | | | | |
| C .01473, .01545, .01641, .01758, .01894, PHD 630 | | | | | |
| C .01999, .02139, .02376, .02512/ | | | | | PHD 635 |
| DATA PHSF5/ | | | | | PHD 640 |
| C 31.33400, 3.01280, 1.83600, 1.27260, 1.08020, PHD 645 | | | | | |
| C .94204, .83026, .65320, .51696, .40994, PHD 650 | | | | | |
| C .32558, .25926, .20702, .16590, .09733, PHD 655 | | | | | |
| C .05921, .03764, .02834, .01809, .01382, PHD 660 | | | | | |
| C .01155, .01059, .01051, .01070, .01115, PHD 665 | | | | | |
| C .01192, .01303, .01447, .01610, .01727, PHD 670 | | | | | |
| C .01730, .01838, .02091, .02258/ | | | | | PHD 675 |
| DATA PHSF6/ | | | | | PHD 680 |
| C 13.63333, 8.76067, 2.86717, 1.73300, 1.19267, PHD 685 | | | | | |

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| C | .89500, | .71377, | .50818, | .39290, | .31612, | PHD | 690 |
| C | .25947, | .21512, | .17950, | .15035, | .09782, | PHD | 695 |
| C | .06489, | .04418, | .03128, | .02336, | .01072, | PHD | 700 |
| C | .01625, | .01521, | .01510, | .01520, | .01550, | PHD | 705 |
| C | .01600, | .01670, | .01758, | .01860, | .01958, | PHD | 710 |
| C | .02003, | .01962, | .01969, | .02072/ | | PHD | 715 |
| DATA PHSF7/ | | | | | | | |
| C | 10.69213, | 7.32563, | 4.66850, | 3.15175, | 2.23700, | PHD | 725 |
| C | 1.85050, | 1.25550, | .77671, | .51188, | .35194, | PHD | 730 |
| C | .24998, | .18219, | .13585, | .10291, | .05530, | PHD | 735 |
| C | .03232, | .02036, | .01381, | .01015, | .00813, | PHD | 740 |
| C | .00711, | .00672, | .00671, | .00680, | .00698, | PHD | 745 |
| C | .00723, | .00753, | .00783, | .00813, | .00841, | PHD | 750 |
| C | .00864, | .00843, | .00793, | .00865/ | | PHD | 755 |
| DATA PHSF8/ | | | | | | | |
| C | 10.29225, | 5.75700, | 3.34100, | 2.19450, | 1.56850, | PHD | 765 |
| C | 1.18950, | .94123, | .64033, | .46530, | .35098, | PHD | 770 |
| C | .27068, | .21203, | .16803, | .13445, | .07989, | PHD | 775 |
| C | .04975, | .03251, | .02247, | .01687, | .01344, | PHD | 780 |
| C | .01198, | .01148, | .01166, | .01210, | .01265, | PHD | 785 |
| C | .01392, | .01522, | .01656, | .01776, | .01897, | PHD | 790 |
| C | .02003, | .01932, | .01776, | .02043/ | | PHD | 795 |
| DATA PHSF9/ | | | | | | | |
| C | 232.30000, | 13.73667, | 3.92300, | 1.97167, | 1.29767, | PHD | 805 |
| C | .97050, | .77753, | .55393, | .41583, | .31763, | PHD | 810 |
| C | .24957, | .13523, | .15503, | .12260, | .06875, | PHD | 815 |
| C | .04015, | .02414, | .01485, | .01040, | .00803, | PHD | 820 |
| C | .00674, | .00589, | .00549, | .00550, | .00615, | PHD | 825 |
| C | .00775, | .01205, | .01820, | .02141, | .02076, | PHD | 830 |
| C | .02123, | .02409, | .03397, | .05439/ | | PHD | 835 |
| DATA PHSF10/ | | | | | | | |
| C | 266.85000, | 20.19500, | 5.34175, | 2.25050, | 1.24273, | PHD | 845 |
| C | .81960, | .60855, | .40505, | .30698, | .24148, | PHD | 850 |
| C | .19903, | .16210, | .13158, | .10705, | .06313, | PHD | 855 |
| C | .03807, | .02275, | .01373, | .00983, | .00704, | PHD | 860 |
| C | .00512, | .00400, | .00412, | .00401, | .00456, | PHD | 865 |
| C | .00580, | .00954, | .01947, | .03101, | .03784, | PHD | 870 |
| C | .04018, | .04524, | .06312, | .08295/ | | PHD | 875 |
| DATA PHSF11/ | | | | | | | |
| C | 15.36571, | 6.08614, | 3.15543, | 1.98500, | 1.39671, | PHD | 885 |
| C | 1.05749, | .84297, | .58904, | .44120, | .34216, | PHD | 890 |
| C | .27140, | .21837, | .17689, | .14371, | .08723, | PHD | 895 |
| C | .05498, | .03568, | .02444, | .01753, | .01339, | PHD | 900 |
| C | .01087, | .00986, | .00983, | .01019, | .01094, | PHD | 905 |
| C | .01243, | .01473, | .01871, | .02423, | .03204, | PHD | 910 |
| C | .03592, | .03792, | .04492, | .05004/ | | PHD | 915 |
| DATA PHSF12/ | | | | | | | |
| C | 5.64100, | 5.44440, | 4.90680, | 4.15680, | 3.34180, | PHD | 925 |
| C | 2.57840, | 1.93040, | 1.03104, | .54702, | .30330, | PHD | 930 |
| C | .18028, | .11514, | .07816, | .05557, | .02729, | PHD | 935 |
| C | .01547, | .00986, | .00897, | .00542, | .00457, | PHD | 940 |
| C | .00413, | .00392, | .00387, | .00385, | .00385, | PHD | 945 |
| C | .00385, | .00385, | .00388, | .00391, | .00401, | PHD | 950 |
| C | .00400, | .00368, | .00352, | .00365/ | | PHD | 955 |
| DATA PHSF13/ | | | | | | | |
| C | 8.90311, | 6.06467, | 3.93056, | 2.63178, | 1.82978, | PHD | 965 |
| C | 1.32733, | 1.00856, | .65342, | .46637, | .34863, | PHD | 970 |
| C | .26062, | .20709, | .13222, | .12811, | .07347, | PHD | 975 |
| C | .04425, | .02794, | .01867, | .01336, | .01033, | PHD | 980 |

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| C | .00874, | .00818, | .00837, | .00894, | .01001, | PHD 985 |
| C | .01171, | .01423, | .01759, | .02129, | .02494, | PHD 990 |
| C | .02767, | .02690, | .02656, | .03550/ | | PHD 995 |
| | DATA PHSF14/ | | | | | PHD 1000 |
| C | 41.20875, | 11.84363, | 5.00750, | 2.73850, | 1.74425, | PHD 1005 |
| C | 1.23475, | .93516, | .60986, | .43641, | .32733, | PHD 1010 |
| C | .24819, | .19145, | .14831, | .11555, | .06356, | PHD 1015 |
| C | .03649, | .02176, | .01390, | .00974, | .00759, | PHD 1020 |
| C | .00657, | .00643, | .00671, | .00741, | .00906, | PHD 1025 |
| C | .01210, | .01818, | .01839, | .01979, | .02104, | PHD 1030 |
| C | .02356, | .02652, | .02694, | .04004/ | | PHD 1035 |
| | DATA PHSF15/ | | | | | PHD 1040 |
| C | 7.98100, | 5.58389, | 3.81067, | 2.75011, | 2.05900, | PHD 1045 |
| C | 1.58178, | 1.24011, | .80424, | .55144, | .39021, | PHD 1050 |
| C | .28203, | .20701, | .15369, | .11570, | .05985, | PHD 1055 |
| C | .03329, | .01999, | .01295, | .00920, | .00726, | PHD 1060 |
| C | .00645, | .00646, | .00683, | .00743, | .00833, | PHD 1065 |
| C | .00942, | .01038, | .01112, | .01187, | .01290, | PHD 1070 |
| C | .01451, | .01415, | .01176, | .01846/ | | PHD 1075 |
| | DATA PHSF16/ | | | | | PHD 1080 |
| C | 1.52473, | 1.44645, | 1.30800, | 1.16736, | 1.03716, | PHD 1085 |
| C | .92088, | .81802, | .64725, | .51405, | .40964, | PHD 1090 |
| C | .32742, | .26255, | .21129, | .17075, | .10236, | PHD 1095 |
| C | .06361, | .04130, | .02819, | .02041, | .01563, | PHD 1100 |
| C | .01330, | .01222, | .01213, | .01235, | .01288, | PHD 1105 |
| C | .01373, | .01491, | .01635, | .01784, | .01806, | PHD 1110 |
| C | .02003, | .02225, | .02715, | .03082/ | | PHD 1115 |
| | DATA PHSF17/ | | | | | PHD 1120 |
| C | 143.02500, | 55.03750, | 11.00250, | 3.10675, | 1.29675, | PHD 1125 |
| C | .67675, | .40423, | .18580, | .10582, | .06884, | PHD 1130 |
| C | .04883, | .03665, | .02858, | .02291, | .01418, | PHD 1135 |
| C | .00942, | .00664, | .00497, | .00397, | .00337, | PHD 1140 |
| C | .00302, | .00283, | .00277, | .00273, | .00272, | PHD 1145 |
| C | .00275, | .00283, | .00298, | .00314, | .00324, | PHD 1150 |
| C | .00332, | .00347, | .00373, | .00359/ | | PHD 1155 |
| | DATA PHSF18/ | | | | | PHD 1160 |
| C | 26.74167, | 3.70000, | 1.73800, | 1.24150, | 1.02157, | PHD 1165 |
| C | .88398, | .78022, | .62040, | .49727, | .39937, | PHD 1170 |
| C | .32113, | .25863, | .20880, | .16910, | .10153, | PHD 1175 |
| C | .06289, | .04050, | .02733, | .01952, | .01491, | PHD 1180 |
| C | .01225, | .01083, | .01046, | .01025, | .01017, | PHD 1185 |
| C | .01020, | .01030, | .01043, | .01053, | .01059, | PHD 1190 |
| C | .01061, | .01071, | .01107, | .01136/ | | PHD 1195 |
| | DATA PHSF19/ | | | | | PHD 1200 |
| C | 16.76800, | 4.67840, | 2.10000, | 1.29420, | .94964, | PHD 1205 |
| C | .76794, | .65496, | .51386, | .41986, | .34756, | PHD 1210 |
| C | .28898, | .24060, | .20054, | .16730, | .10712, | PHD 1215 |
| C | .06978, | .04668, | .03245, | .02379, | .01863, | PHD 1220 |
| C | .01572, | .01429, | .01397, | .01384, | .01389, | PHD 1225 |
| C | .01407, | .01438, | .01481, | .01529, | .01572, | PHD 1230 |
| C | .01603, | .01613, | .01637, | .01668/ | | PHD 1235 |
| | DATA PHSF20/ | | | | | PHD 1240 |
| C | 3.35750, | 2.77033, | 2.20467, | 1.77208, | 1.43950, | PHD 1245 |
| C | 1.10167, | .98083, | .69731, | .51368, | .38864, | PHD 1250 |
| C | .29989, | .23472, | .18552, | .14785, | .08880, | PHD 1255 |
| C | .05339, | .03443, | .02340, | .01689, | .01308, | PHD 1260 |
| C | .01097, | .01015, | .01022, | .01052, | .01145, | PHD 1265 |
| C | .01389, | .01512, | .01829, | .02228, | .02560, | PHD 1270 |
| C | .02615, | .02523, | .02990, | .03617/ | | PHD 1275 |

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|--------------|-----------|----------|----------|----------|-------------------|
| DATA PHSF21/ | | | | | PHD 1280 |
| C | 13.35245, | 7.86691, | 4.51555, | 2.89018, | 1.99645, PHD 1285 |
| C | 1.45864, | 1.10655, | .89522, | .47093, | .33483, PHD 1290 |
| C | .24620, | .18557, | .14266, | .11148, | .06369, PHD 1295 |
| C | .03890, | .02523, | .01742, | .01294, | .01044, PHD 1300 |
| C | .00921, | .00851, | .00886, | .00906, | .00940, PHD 1305 |
| C | .00985, | .01039, | .01098, | .01163, | .01232, PHD 1310 |
| C | .01277, | .01220, | .01131, | .01247/ | .01232, PHD 1315 |
| DATA PHSF22/ | | | | | PHD 1320 |
| C | 9.49578, | 6.01133, | 3.71372, | 2.49106, | 1.77633, PHD 1325 |
| C | 1.32572, | 1.02483, | .66094, | .45784, | .33265, PHD 1330 |
| C | .25044, | .19334, | .15224, | .12179, | .07358, PHD 1335 |
| C | .04717, | .03185, | .02271, | .01730, | .01421, PHD 1340 |
| C | .01264, | .01208, | .01207, | .01220, | .01245, PHD 1345 |
| C | .01280, | .01321, | .01365, | .01405, | .01436, PHD 1350 |
| C | .01447, | .01422, | .01407, | .01456/ | .01436, PHD 1355 |
| DATA PHSF23/ | | | | | PHD 1360 |
| C | .45555, | .45332, | .44686, | .43683, | .42405, PHD 1365 |
| C | .40929, | .39319, | .35887, | .32388, | .28985, PHD 1370 |
| C | .25771, | .22804, | .20101, | .17671, | .12722, PHD 1375 |
| C | .09162, | .06691, | .05037, | .03979, | .03345, PHD 1380 |
| C | .03009, | .02875, | .02860, | .02871, | .02902, PHD 1385 |
| C | .02946, | .03000, | .03059, | .03120, | .03179, PHD 1390 |
| C | .03232, | .03276, | .03305, | .03315/ | .03315, PHD 1395 |
| DATA PHSF24/ | | | | | PHD 1400 |
| C | .51072, | .50922, | .50476, | .49744, | .48752, PHD 1405 |
| C | .47514, | .46072, | .42698, | .38990, | .34888, PHD 1410 |
| C | .30902, | .27072, | .23504, | .20254, | .13652, PHD 1415 |
| C | .09070, | .06070, | .04188, | .03042, | .02372, PHD 1420 |
| C | .02000, | .01816, | .01773, | .01753, | .01753, PHD 1425 |
| C | .01767, | .01792, | .01826, | .01866, | .01907, PHD 1430 |
| C | .01948, | .01984, | .02009, | .02019/ | .02019, PHD 1435 |
| DATA PHSF25/ | | | | | PHD 1440 |
| C | .21327, | .21298, | .21208, | .21060, | .20856, PHD 1445 |
| C | .20606, | .20305, | .19588, | .18741, | .17798, PHD 1450 |
| C | .18793, | .15754, | .14702, | .13659, | .11191, PHD 1455 |
| C | .09060, | .07388, | .06147, | .05381, | .05020, PHD 1460 |
| C | .04990, | .05207, | .05380, | .05581, | .05801, PHD 1465 |
| C | .08028, | .06253, | .06488, | .06664, | .06834, PHD 1470 |
| C | .06973, | .07077, | .07140, | .07161/ | .07161, PHD 1475 |
| DATA PHSF26/ | | | | | PHD 1480 |
| C | 4.10720, | 3.38127, | 2.61113, | 2.06147, | 1.66320, PHD 1485 |
| C | 1.36400, | 1.13140, | .79725, | .57362, | .41947, PHD 1490 |
| C | .31103, | .23368, | .17766, | .13659, | .07413, PHD 1495 |
| C | .04288, | .02647, | .01753, | .01255, | .00978, PHD 1500 |
| C | .00837, | .00791, | .00800, | .00831, | .00888, PHD 1505 |
| C | .00974, | .01087, | .01219, | .01347, | .01448, PHD 1510 |
| C | .01468, | .01320, | .01237, | .01467/ | .01467, PHD 1515 |
| DATA PHSF27/ | | | | | PHD 1520 |
| C | 4.37885, | 3.78265, | 2.97685, | 2.33720, | 1.85900, PHD 1525 |
| C | 1.49815, | 1.22035, | .83140, | .58200, | .41624, PHD 1530 |
| C | .30308, | .22426, | .16839, | .12816, | .06844, PHD 1535 |
| C | .03932, | .02424, | .01607, | .01161, | .00884, PHD 1540 |
| C | .00753, | .00684, | .00669, | .00661, | .00661, PHD 1545 |
| C | .00668, | .00679, | .00692, | .00708, | .00715, PHD 1550 |
| C | .00715, | .00705, | .00703, | .00721/ | .00721, PHD 1555 |
| DATA PHSF28/ | | | | | PHD 1560 |
| C | 1.99282, | 1.84588, | 1.62814, | 1.42585, | 1.24733, PHD 1565 |
| C | 1.09157, | .95572, | .73438, | .56567, | .43899, PHD 1570 |

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|--------------|-------------|-----------|----------|----------|----------|----------|
| C | .33874, | .26371, | .20635, | .16235, | .09181, | PHD 1575 |
| C | .05440, | .03397, | .02253, | .01601, | .01230, | PHD 1580 |
| C | .01031, | .00946, | .00938, | .00951, | .00985, | PHD 1585 |
| C | .01043, | .01123, | .01222, | .01328, | .01405, | PHD 1590 |
| C | .01405, | .01340, | .01391, | .01521/ | | PHD 1595 |
| DATA PHSF29/ | | | | | | |
| C | 2.72707, | 2.52017, | 2.15725, | 1.81463, | 1.52555, | PHD 1600 |
| C | 1.28665, | 1.08932, | .78963, | .58023, | .43161, | PHD 1605 |
| C | .32473, | .24695, | .18977, | .14727, | .08150, | PHD 1610 |
| C | .04783, | .02980, | .01981, | .01414, | .01091, | PHD 1615 |
| C | .00911, | .00819, | .00796, | .00784, | .00781, | PHD 1620 |
| C | .00787, | .00708, | .00812, | .00825, | .00831, | PHD 1625 |
| C | .00830, | .00829, | .00847, | .00868/ | | PHD 1630 |
| DATA PHSF30/ | | | | | | |
| C | 183.60000, | 32.48000, | 3.18400, | 1.30100, | .85020, | PHD 1635 |
| C | .63540, | .54470, | .41140, | .33110, | .26080, | PHD 1640 |
| C | .20850, | .16570, | .12700, | .09546, | .04755, | PHD 1645 |
| C | .02460, | .01160, | .00650, | .00370, | .00264, | PHD 1650 |
| C | .00234, | .00355, | .00326, | .00308, | .00528, | PHD 1655 |
| C | .01403, | .02285, | .01565, | .01398, | .01362, | PHD 1660 |
| C | .01240, | .01544, | .02607, | .04655/ | | PHD 1665 |
| DATA PHSF31/ | | | | | | |
| C | 1565.50000, | 9.96867, | 1.73233, | .92547, | .70240, | PHD 1670 |
| C | .59477, | .52513, | .42173, | .33793, | .26700, | PHD 1675 |
| C | .20973, | .16157, | .11973, | .09043, | .04400, | PHD 1680 |
| C | .01947, | .00793, | .00346, | .00177, | .00138, | PHD 1685 |
| C | .00168, | .00254, | .00438, | .00358, | .00653, | PHD 1690 |
| C | .02988, | .01362, | .01200, | .00992, | .00867, | PHD 1695 |
| C | .00765, | .00818, | .00986, | .05756/ | | PHD 1700 |
| DATA PHSF32/ | | | | | | |
| C | .79503, | .78714, | .76605, | .73601, | .70017, | PHD 1705 |
| C | .66092, | .61994, | .53736, | .45896, | .38796, | PHD 1710 |
| C | .32563, | .27238, | .22676, | .18879, | .11979, | PHD 1715 |
| C | .07727, | .05125, | .03541, | .02586, | .02025, | PHD 1720 |
| C | .01717, | .01576, | .01552, | .01551, | .01571, | PHD 1725 |
| C | .01607, | .01656, | .01713, | .01784, | .01814, | PHD 1730 |
| C | .01872, | .01965, | .02093, | .02164/ | | PHD 1735 |
| DATA PHSF33/ | | | | | | |
| C | 1.56125, | 1.49306, | 1.34900, | 1.19444, | 1.05048, | PHD 1740 |
| C | .92302, | .81176, | .63177, | .49621, | .39304, | PHD 1745 |
| C | .31378, | .25238, | .20435, | .16659, | .10271, | PHD 1750 |
| C | .06594, | .04424, | .03123, | .02338, | .01868, | PHD 1755 |
| C | .01692, | .01439, | .01392, | .01360, | .01339, | PHD 1760 |
| C | .01325, | .01315, | .01310, | .01308, | .01314, | PHD 1765 |
| C | .01330, | .01355, | .01381, | .01392/ | | PHD 1770 |
| DATA PHSF34/ | | | | | | |
| C | 1.22457, | 1.18085, | 1.08010, | .98059, | .87944, | PHD 1775 |
| C | .78798, | .70433, | .56565, | .45677, | .37107, | PHD 1780 |
| C | .30321, | .24916, | .20585, | .17099, | .11000, | PHD 1785 |
| C | .07323, | .05066, | .03866, | .02794, | .02253, | PHD 1790 |
| C | .01924, | .01727, | .01683, | .01614, | .01577, | PHD 1795 |
| C | .01550, | .01532, | .01522, | .01523, | .01538, | PHD 1800 |
| C | .01682, | .01596, | .01827, | .01840/ | | PHD 1805 |
| DATA PHSF35/ | | | | | | |
| C | .15944, | .15931, | .15893, | .15825, | .15734, | PHD 1810 |
| C | .16620, | .15479, | .15131, | .14701, | .14199, | PHD 1815 |
| C | .13639, | .13030, | .12389, | .11727, | .10865, | PHD 1820 |
| C | .08527, | .07280, | .06322, | .05742, | .05521, | PHD 1825 |
| C | .08792, | .06222, | .06606, | .06617, | .07146, | PHD 1830 |

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|--------------|------------|-----------|----------|----------|----------|----------|
| C | .07479, | .07805, | .08112, | .08390, | .08631, | PHD 1870 |
| C | .08826, | .08970, | .09058, | .09088/ | | PHD 1875 |
| DATA PHSF36/ | | | | | | |
| C | .72999, | .72086, | .69632, | .86227, | .62369, | PHD 1885 |
| C | .58366, | .54390, | .46850, | .40091, | .34178, | PHD 1890 |
| C | .29081, | .24724, | .21025, | .17893, | .12047, | PHD 1895 |
| C | .08253, | .05810, | .04253, | .03276, | .02688, | PHD 1900 |
| C | .02352, | .02183, | .02142, | .02122, | .02118, | PHD 1905 |
| C | .02127, | .02146, | .02171, | .02202, | .02235, | PHD 1910 |
| C | .02273, | .02314, | .02351, | .02367/ | | PHD 1915 |
| DATA PHSF37/ | | | | | | |
| C | 1.15457, | 1.13481, | 1.08637, | 1.02208, | .95035, | PHD 1925 |
| C | .87581, | .80158, | .66139, | .53812, | .43402, | PHD 1930 |
| C | .34834, | .27905, | .22360, | .17950, | .10538, | PHD 1935 |
| C | .06398, | .04056, | .02712, | .01935, | .01490, | PHD 1940 |
| C | .01250, | .01143, | .01126, | .01130, | .01153, | PHD 1945 |
| C | .01191, | .01242, | .01301, | .01357, | .01399, | PHD 1950 |
| C | .01422, | .01450, | .01526, | .01585/ | | PHD 1955 |
| DATA PHSF38/ | | | | | | |
| C | .31056, | .30982, | .30766, | .30415, | .29944, | PHD 1965 |
| C | .29365, | .28698, | .27149, | .25411, | .23575, | PHD 1970 |
| C | .21708, | .19865, | .18081, | .16385, | .12623, | PHD 1975 |
| C | .09621, | .07365, | .05766, | .04714, | .04092, | PHD 1980 |
| C | .03792, | .03722, | .03748, | .03804, | .03881, | PHD 1985 |
| C | .03972, | .04071, | .04172, | .04270, | .04358, | PHD 1990 |
| C | .04433, | .04490, | .04526, | .04539/ | | PHD 1995 |
| DATA PHSF39/ | | | | | | |
| C | .12377, | .12369, | .12346, | .12308, | .12254, | PHD 2005 |
| C | .12185, | .12102, | .11893, | .11632, | .11324, | PHD 2010 |
| C | .10974, | .10592, | .10181, | .09752, | .08850, | PHD 2015 |
| C | .07613, | .06762, | .06192, | .05964, | .06097, | PHD 2020 |
| C | .06565, | .07304, | .07747, | .08219, | .08708, | PHD 2025 |
| C | .09196, | .09670, | .10114, | .10516, | .10862, | PHD 2030 |
| C | .11144, | .11349, | .11477, | .11519/ | | PHD 2035 |
| DATA PHSF40/ | | | | | | |
| C | .13400, | .13391, | .13367, | .13321, | .13259, | PHD 2045 |
| C | .13180, | .13085, | .12842, | .12541, | .12188, | PHD 2050 |
| C | .11785, | .11344, | .10872, | .10383, | .09125, | PHD 2055 |
| C | .07940, | .06955, | .06267, | .05932, | .05961, | PHD 2060 |
| C | .06323, | .06951, | .07336, | .07751, | .08181, | PHD 2065 |
| C | .08613, | .09032, | .09428, | .09782, | .10091, | PHD 2070 |
| C | .10339, | .10522, | .10634, | .10673/ | | PHD 2075 |
| DATA PHSF41/ | | | | | | |
| C | 227.93333, | 32.03000, | 4.13167, | 1.54367, | .95123, | PHD 2085 |
| C | .71613, | .58840, | .43330, | .33043, | .25093, | PHD 2090 |
| C | .18920, | .14303, | .10800, | .08045, | .03915, | PHD 2095 |
| C | .01854, | .00866, | .00431, | .00239, | .00166, | PHD 2100 |
| C | .00157, | .00266, | .00434, | .00724, | .01132, | PHD 2105 |
| C | .01476, | .00983, | .00835, | .00785, | .00711, | PHD 2110 |
| C | .00717, | .00803, | .01265, | .02951/ | | PHD 2115 |
| DATA PHSF42/ | | | | | | |
| C | 10.12187, | 9.39467, | 7.61833, | 5.58200, | 3.87533, | PHD 2125 |
| C | 2.62733, | 1.78200, | .85247, | .43620, | .23983, | PHD 2130 |
| C | .14137, | .08952, | .05950, | .04118, | .01854, | PHD 2135 |
| C | .00956, | .00552, | .00354, | .00251, | .00195, | PHD 2140 |
| C | .00163, | .00145, | .00139, | .00134, | .00129, | PHD 2145 |
| C | .00128, | .00122, | .00120, | .00120, | .00120, | PHD 2150 |
| C | .00120, | .00115, | .00105, | .00106/ | | PHD 2155 |
| DATA PHSF43/ | | | | | | |
| | | | | | | PHD 2160 |

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| C | 23.70500, | 19.81000, | 12.14500, | 6.16400, | 2.96850, | PHD 2165 |
| C | 1.51300, | .7715, | .39850, | .24525, | .17225, | PHD 2170 |
| C | .12825, | .0609, | .07598, | .05932, | .03272, | PHD 2175 |
| C | .01871, | .01111, | .00710, | .00485, | .00363, | PHD 2180 |
| C | .00303, | .0028, | .00290, | .00302, | .00318, | PHD 2185 |
| C | .00334, | .00345, | .00349, | .00354, | .00388, | PHD 2190 |
| C | .00510, | .00600, | .00344, | .00472/ | | PHD 2195 |
| DATA PHSF44/ | | | | | | |
| C | 1.13310, | 1.12586, | 1.10518, | 1.07182, | 1.02708, | PHD 2200 |
| C | .97348, | .91266, | .77952, | .64406, | .51826, | PHD 2205 |
| C | .40884, | .31800, | .24506, | .18784, | .09626, | PHD 2210 |
| C | .05060, | .02819, | .01701, | .01126, | .00818, | PHD 2215 |
| C | .00651, | .00563, | .00539, | .00526, | .00522, | PHD 2220 |
| C | .00525, | .00538, | .00551, | .00571, | .00595, | PHD 2225 |
| C | .00624, | .00656, | .00681, | .00692/ | | PHD 2230 |
| DATA PHSF45/ | | | | | | |
| C | .61443, | .61273, | .60783, | .59967, | .58847, | PHD 2235 |
| C | .57447, | .55783, | .51803, | .47153, | .42127, | PHD 2240 |
| C | .36970, | .31913, | .27140, | .22780, | .14030, | PHD 2245 |
| C | .08293, | .04868, | .02942, | .01892, | .01327, | PHD 2250 |
| C | .01027, | .00875, | .00834, | .00811, | .00800, | PHD 2255 |
| C | .00801, | .00810, | .00824, | .00842, | .00861, | PHD 2260 |
| C | .00879, | .00893, | .00903, | .00906/ | | PHD 2265 |
| DATA PHSF46/ | | | | | | |
| C | 2.06615, | 1.93640, | 1.69345, | 1.45610, | 1.24945, | PHD 2270 |
| C | 1.07421, | .92677, | .69739, | .53175, | .41021, | PHD 2275 |
| C | .31969, | .25144, | .19943, | .15944, | .09421, | PHD 2280 |
| C | .05837, | .03804, | .02624, | .01931, | .01523, | PHD 2285 |
| C | .01288, | .01180, | .01123, | .01099, | .01084, | PHD 2290 |
| C | .01077, | .01073, | .01072, | .01070, | .01068, | PHD 2295 |
| C | .01069, | .01078, | .01095, | .01105/ | | PHD 2300 |
| DATA PHSF47/ | | | | | | |
| C | 1988.10000, | 18.32500, | 2.35900, | 1.00950, | .67300, | PHD 2305 |
| C | .53970, | .48415, | .37245, | .30310, | .24865, | PHD 2310 |
| C | .20715, | .15820, | .13160, | .10710, | .05669, | PHD 2315 |
| C | .02778, | .01325, | .00679, | .00344, | .00306, | PHD 2320 |
| C | .00420, | .00189, | .00154, | .00137, | .00145, | PHD 2325 |
| C | .00265, | .01227, | .03321, | .02025, | .01971, | PHD 2330 |
| C | .01869, | .02153, | .03188, | .09376/ | | PHD 2335 |
| DATA PHSF48/ | | | | | | |
| C | 18500.00000, | 2.83400, | .85070, | .58200, | .49050, | PHD 2340 |
| C | .44240, | .40380, | .35560, | .31400, | .25730, | PHD 2345 |
| C | .19510, | .17010, | .12770, | .10750, | .05190, | PHD 2350 |
| C | .02954, | .01105, | .00385, | .00203, | .00200, | PHD 2355 |
| C | .00370, | .00118, | .00112, | .00112, | .00113, | PHD 2360 |
| C | .00113, | .00549, | .02603, | .02019, | .01751, | PHD 2365 |
| C | .01439, | .01308, | .01407, | .07220/ | | PHD 2370 |
| DATA PHSF49/ | | | | | | |
| C | 190.80000, | 80.01000, | 8.56500, | 2.26800, | .98870, | PHD 2375 |
| C | .55520, | .36100, | .19580, | .12640, | .08822, | PHD 2380 |
| C | .06383, | .04893, | .03478, | .02590, | .01284, | PHD 2385 |
| C | .00642, | .00348, | .00208, | .00143, | .00120, | PHD 2390 |
| C | .00124, | .00131, | .00123, | .00108, | .00097, | PHD 2395 |
| C | .00092, | .00090, | .00089, | .00091, | .00098, | PHD 2400 |
| C | .00107, | .00138, | .00251, | .00246/ | | PHD 2405 |
| DATA PHSF50/ | | | | | | |
| C | 44.01000, | 33.47000, | 16.38000, | 4.54800, | 2.68800, | PHD 2410 |
| C | 1.24800, | .88028, | .27930, | .14870, | .08818, | PHD 2415 |
| C | .98760, | .03977, | .02850, | .02111, | .01087, | PHD 2420 |

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|--------------|-------------|-----------|-----------|----------|----------|----------|
| C | .00620, | .00387, | .00265, | .00198, | .00161, | PHD 2460 |
| C | .00141, | .00129, | .00125, | .00122, | .00120, | PHD 2465 |
| C | .00119, | .00118, | .00117, | .00117, | .00117, | PHD 2470 |
| C | .00118, | .00118, | .00113, | .00113/ | | PHD 2475 |
| DATA PHSF51/ | | | | | | |
| C | 45.72000, | 22.68000, | 8.45200, | 3.88600, | 1.88400, | PHD 2480 |
| C | 1.11400, | .72990, | .39640, | .26220, | .19430, | PHD 2485 |
| C | .15350, | .12410, | .10220, | .08533, | .05455, | PHD 2490 |
| C | .03546, | .02333, | .01580, | .01103, | .00801, | PHD 2495 |
| C | .00615, | .00530, | .00517, | .00509, | .00547, | PHD 2500 |
| C | .00614, | .00763, | .01038, | .01534, | .02235, | PHD 2505 |
| C | .02692, | .02902, | .03071, | .03320/ | | PHD 2510 |
| DATA PHSF52/ | | | | | | |
| C | 1.33800, | 1.34900, | 1.32400, | 1.28300, | 1.22900, | PHD 2520 |
| C | 1.16200, | 1.08730, | .91840, | .74460, | .78190, | PHD 2525 |
| C | .44060, | .32530, | .23580, | .16900, | .07319, | PHD 2530 |
| C | .03392, | .01766, | .01037, | .00676, | .00484, | PHD 2535 |
| C | .00377, | .00317, | .00298, | .00284, | .00274, | PHD 2540 |
| C | .00269, | .00267, | .00268, | .00274, | .00283, | PHD 2545 |
| C | .00294, | .00306, | .00314, | .00317/ | | PHD 2550 |
| DATA PHSF53/ | | | | | | |
| C | 8232.00000, | 3.82700, | .95120, | .65890, | .52640, | PHD 2555 |
| C | .49710, | .52530, | .38980, | .33700, | .25360, | PHD 2560 |
| C | .21110, | .16430, | .12260, | .09209, | .04939, | PHD 2565 |
| C | .01954, | .00754, | .00272, | .00161, | .00134, | PHD 2570 |
| C | .00166, | .00334, | .00393, | .00124, | .00127, | PHD 2575 |
| C | .01906, | .01831, | .01420, | .01077, | .00904, | PHD 2580 |
| C | .00782, | .00667, | .00690, | .04228/ | | PHD 2585 |
| DATA PHSF54/ | | | | | | |
| C | 13.90000, | 12.72000, | 9.87700, | 6.74400, | 4.24600, | PHD 2590 |
| C | 2.58600, | 1.58500, | .66190, | .32580, | .18150, | PHD 2595 |
| C | .10950, | .06977, | .04630, | .03174, | .01380, | PHD 2600 |
| C | .00662, | .00376, | .00228, | .00153, | .00111, | PHD 2605 |
| C | .00086, | .00073, | .00066, | .00064, | .00061, | PHD 2610 |
| C | .00059, | .00057, | .00056, | .00055, | .00055, | PHD 2615 |
| C | .00056, | .00054, | .00050, | .00050/ | | PHD 2620 |
| DATA PHSF55/ | | | | | | |
| C | 36.42000, | 23.44353, | 8.32800, | 3.11067, | 1.40100, | PHD 2625 |
| C | .61783, | .87807, | .46263, | .34257, | .26417, | PHD 2630 |
| C | .26297, | .15540, | .12417, | .09463, | .05233, | PHD 2635 |
| C | .00703, | .01629, | .00950, | .00563, | .00472, | PHD 2640 |
| C | .00038, | .00459, | .00534, | .00777, | .01141, | PHD 2645 |
| C | .01545, | .01058, | .01880, | .01607, | .01696, | PHD 2650 |
| C | .01907, | .03025, | .03881, | .05215/ | | PHD 2655 |
| DATA PHSF56/ | | | | | | |
| C | 45.49000, | 31.83000, | 12.30000, | 4.18500, | 1.72400, | PHD 2660 |
| C | .91950, | .89560, | .34070, | .23500, | .17450, | PHD 2665 |
| C | .13450, | .10490, | .08291, | .06559, | .03717, | PHD 2670 |
| C | .02135, | .01292, | .00762, | .00480, | .00346, | PHD 2675 |
| C | .00283, | .00279, | .00305, | .00366, | .00484, | PHD 2680 |
| C | .00584, | .00670, | .00683, | .00610, | .00651, | PHD 2685 |
| C | .00840, | .01245, | .01103, | .01440/ | | PHD 2690 |
| DATA PHSF57/ | | | | | | |
| C | 1696.00000, | 15.47000, | 3.11967, | 1.46900, | .97403, | PHD 2695 |
| C | .76303, | .62317, | .46653, | .38270, | .28193, | PHD 2700 |
| C | .22163, | .17297, | .13357, | .10470, | .05409, | PHD 2705 |
| C | .02789, | .01298, | .00794, | .00479, | .00399, | PHD 2710 |
| C | .00409, | .00407, | .00383, | .00324, | .00464, | PHD 2715 |
| C | .01060, | .01026, | .01957, | .01689, | .01547, | PHD 2720 |

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|--------------|------------|-----------|----------|----------|-------------------|
| C | .01597, | .01678, | .02321, | .05917/ | PHD 2755 |
| DATA PHSF58/ | | | | | PHD 2760 |
| C | 525.35000, | 5.54850, | 3.39200, | 2.40225, | 1.79275, PHD 2765 |
| C | 1.38725, | 1.10400, | .74203, | .52213, | .37803, PHD 2770 |
| C | .27970, | .20945, | .15915, | .12258, | .08615, PHD 2775 |
| C | .03783, | .02289, | .01510, | .01074, | .00837, PHD 2780 |
| C | .00717, | .00653, | .00661, | .00699, | .00781, PHD 2785 |
| C | .00922, | .01127, | .01364, | .01588, | .01743, PHD 2790 |
| C | .01838, | .01583, | .01491, | .02015/ | PHD 2795 |
| DATA PHSF59/ | | | | | PHD 2800 |
| C | 58.57000, | 10.86983, | 4.30450, | 2.32817, | 1.48817, PHD 2805 |
| C | 1.05608, | .80615, | .53590, | .39175, | .30123, PHD 2810 |
| C | .23833, | .19167, | .15528, | .12653, | .07717, PHD 2815 |
| C | .04870, | .03126, | .02128, | .01493, | .01091, PHD 2820 |
| C | .00858, | .00765, | .00767, | .00787, | .00840, PHD 2825 |
| C | .00973, | .01199, | .01623, | .02446, | .03802, PHD 2830 |
| C | .04421, | .04801, | .05991, | .06067/ | PHD 2835 |
| DATA PHSF60/ | | | | | PHD 2840 |
| C | 37.27000, | 14.69200, | 6.78420, | 3.81000, | 2.39800, PHD 2845 |
| C | 1.82640, | 1.16200, | .66076, | .41350, | .27594, PHD 2850 |
| C | .19292, | .13976, | .10406, | .07926, | .04328, PHD 2855 |
| C | .02568, | .01635, | .01116, | .00822, | .00657, PHD 2860 |
| C | .00569, | .00527, | .00516, | .00510, | .00508, PHD 2865 |
| C | .00511, | .00518, | .00528, | .00537, | .00537, PHD 2870 |
| C | .00527, | .00528, | .00536, | .00549/ | PHD 2875 |
| DATA PHSF61/ | | | | | PHD 2880 |
| C | 24.80333, | 14.28000, | 8.35167, | 5.06833, | 3.14833, PHD 2885 |
| C | 2.03700, | 1.38367, | .72373, | .42163, | .26167, PHD 2890 |
| C | .16947, | .11343, | .07807, | .05503, | .02512, PHD 2895 |
| C | .01283, | .00726, | .00455, | .00317, | .00247, PHD 2900 |
| C | .00214, | .00196, | .00187, | .00177, | .00160, PHD 2905 |
| C | .00159, | .00153, | .00150, | .00151, | .00161, PHD 2910 |
| C | .00185, | .00209, | .00188, | .00188/ | PHD 2915 |
| DATA PHSF62/ | | | | | PHD 2920 |
| C | 101.15286, | 5.39637, | 2.28843, | 1.62671, | 1.32757, PHD 2925 |
| C | 1.13054, | .97696, | .73870, | .56023, | .42529, PHD 2930 |
| C | .32319, | .24639, | .18874, | .14550, | .07827, PHD 2935 |
| C | .04428, | .02552, | .01699, | .01182, | .00901, PHD 2940 |
| C | .00763, | .00715, | .00718, | .00742, | .00797, PHD 2945 |
| C | .00961, | .01007, | .01036, | .01076, | .01129, PHD 2950 |
| C | .01176, | .01204, | .01243, | .01444/ | PHD 2955 |
| DATA PHSF63/ | | | | | PHD 2960 |
| C | 48.02800, | 10.67620, | 3.98180, | 2.14360, | 1.42080, PHD 2965 |
| C | 1.06302, | .85178, | .60524, | .45430, | .34880, PHD 2970 |
| C | .26996, | .21070, | .16526, | .13048, | .07416, PHD 2975 |
| C | .04280, | .02714, | .01784, | .01271, | .00998, PHD 2980 |
| C | .00877, | .00871, | .00917, | .00990, | .01088, PHD 2985 |
| C | .01174, | .01200, | .01185, | .01202, | .01230, PHD 2990 |
| C | .01377, | .01588, | .01523, | .01609/ | PHD 2995 |
| DATA PHSF64/ | | | | | PHD 3000 |
| C | 34.21833, | 12.88500, | 4.94933, | 3.57963, | 1.86550, PHD 3005 |
| C | 1.05695, | .77238, | .48407, | .34588, | .26490, PHD 3010 |
| C | .21097, | .17168, | .14155, | .11773, | .07509, PHD 3015 |
| C | .05058, | .03467, | .02483, | .01884, | .01536, PHD 3020 |
| C | .01352, | .01278, | .01267, | .01273, | .01293, PHD 3025 |
| C | .01328, | .01371, | .01427, | .01491, | .01553, PHD 3030 |
| C | .01593, | .01535, | .01513, | .01573/ | PHD 3035 |
| DATA PHSF65/ | | | | | PHD 3040 |
| C | 8.59757, | 8.79429, | 4.60071, | 3.22457, | 2.36214, PHD 3045 |

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|--------------|------------|-----------|----------|----------|----------|----------|
| C | 1.77586, | 1.36529, | .84849, | .55343, | .37399, | PHD 3050 |
| C | .25995, | .18501, | .13442, | .09951, | .05039, | PHD 3055 |
| C | .02794, | .01684, | .01103, | .00787, | .00614, | PHD 3060 |
| C | .00521, | .00476, | .00465, | .00460, | .00460, | PHD 3065 |
| C | .00464, | .00470, | .00479, | .00490, | .00502, | PHD 3070 |
| C | .00509, | .00498, | .00479, | .00491/ | | PHD 3075 |
| DATA PHSF66/ | | | | | | |
| C | 7.73378, | 6.31989, | 4.61211, | 3.41189, | 2.56922, | PHD 3085 |
| C | 1.96389, | 1.51900, | .93560, | .59521, | .38946, | PHD 3090 |
| C | .26146, | .17967, | .12618, | .09038, | .04241, | PHD 3095 |
| C | .02194, | .01241, | .00766, | .00519, | .00386, | PHD 3100 |
| C | .00314, | .00278, | .00267, | .00259, | .00254, | PHD 3105 |
| C | .00251, | .00251, | .00252, | .00256, | .00261, | PHD 3110 |
| C | .00268, | .00274, | .00268, | .00273/ | | PHD 3115 |
| DATA PHSF67/ | | | | | | |
| C | 13.24333, | 11.06100, | 7.42300, | 4.70567, | 3.98533, | PHD 3125 |
| C | 1.97200, | 1.37267, | .75370, | .45857, | .29573, | PHD 3130 |
| C | .19823, | .13693, | .09689, | .07004, | .05369, | PHD 3135 |
| C | .01789, | .01040, | .00660, | .00460, | .00353, | PHD 3140 |
| C | .00298, | .00273, | .00268, | .00266, | .00260, | PHD 3145 |
| C | .00265, | .00265, | .00266, | .00270, | .00282, | PHD 3150 |
| C | .00308, | .00319, | .00262, | .00275/ | | PHD 3155 |
| DATA PHSF68/ | | | | | | |
| C | 37.10000, | 12.65667, | 5.63100, | 3.16800, | 2.05233, | PHD 3165 |
| C | 1.45750, | 1.09982, | .69772, | .47482, | .33515, | PHD 3170 |
| C | .24170, | .17635, | .13072, | .09747, | .04922, | PHD 3175 |
| C | .02644, | .01502, | .00935, | .00640, | .00503, | PHD 3180 |
| C | .00462, | .00549, | .00635, | .00767, | .00953, | PHD 3185 |
| C | .01124, | .01140, | .01090, | .01055, | .01125, | PHD 3190 |
| C | .01355, | .01701, | .01486, | .02554/ | | PHD 3195 |
| DATA PHSF69/ | | | | | | |
| C | 256.51429, | 19.73571, | 5.24714, | 2.30771, | 1.36100, | PHD 3205 |
| C | .94431, | .72756, | .50319, | .37583, | .28504, | PHD 3210 |
| C | .22174, | .17010, | .13151, | .10155, | .05367, | PHD 3215 |
| C | .02848, | .01561, | .00902, | .00592, | .00443, | PHD 3220 |
| C | .00434, | .00493, | .00535, | .00629, | .00897, | PHD 3225 |
| C | .01636, | .01849, | .01647, | .01539, | .01486, | PHD 3230 |
| C | .01673, | .02178, | .02754, | .05075/ | | PHD 3235 |
| DATA PHSF70/ | | | | | | |
| C | 27.44667, | 14.67667, | 7.63033, | 4.46200, | 2.82633, | PHD 3245 |
| C | 1.89500, | 1.32600, | .71323, | .41983, | .26377, | PHD 3250 |
| C | .17420, | .11977, | .08514, | .06224, | .03144, | PHD 3255 |
| C | .01785, | .01118, | .00766, | .00573, | .00466, | PHD 3260 |
| C | .00407, | .00377, | .00368, | .00363, | .00360, | PHD 3265 |
| C | .00359, | .00360, | .00361, | .00363, | .00365, | PHD 3270 |
| C | .00366, | .00367, | .00367, | .00369/ | | PHD 3275 |
| END | | | | | | |
| | | | | | | PHD 3280 |

Table 7. Descriptions of Plot Program Subroutines

| | | Page No. |
|--------|---|-------------|
| LOWPLT | MAIN DRIVER PROGRAM. READS 4 CONTROL CARDS. | 166 |
| AXISL | PLOTS A LABELED LINEAR AXIS. | 174 |
| AXLOG | PLOTS A LABELED LOGARITHMIC AXIS. | 177 |
| PLTDTA | READS LOWTRAN DATA FROM TAPE 7. DETERMINES WHICH VARIABLE TO PLOT. | 173 |
| DRAW | SETS UP DATA TO BE PLOTTED. DETERMINES WHICH TYPE OF LINE TO PLOT. | 180 |
| DASH2 | PLOTS A DASHED LINE. | 184 |
| DOT | PLOTS A DOTTED LINE. | 181 |
| DSHDOT | PLOTS A LINE WITH ALTERNATING DASHES AND DOTS. | 183 |
| DSHDT2 | PLOTS A LINE WITH ALTERNATING DASH AND TWO DOTS. | 182 |

Table 8. Listing of LOWTRAN 6 Plot Code

Pages 165 to 184

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PROGRAM LOWPLT(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE7,
1TAPE39)
CCC
CCC
***** LOWTRAN SIX PLOT PROGRAM *****
CCC
PROGRAM WRITTEN BY
CCC          FRANCIS X. KNEIZYS      OPI/AFGL
CCC          JAMES H. CHETWYND JR.  OPI/AFGL
CCC          LEONARD W. ABREU       OPI/AFGL
CCC          ERIC P. SHETTLE        OPA/AFGL
CCC
CCC
THE PLOT PROGRAM WILL PLOT SEVERAL FILES OF OUTPUT DATA FROM
TAPE 7 AS OUTPUT FROM STANDARD LOWTRAN SIX RUNS.
TO INITIATE PROGRAM AN IDENTIFICATION CARD OF 30 HOLERITH
CHARACTERS IS READ IN FOLLOWED BY TWO CARDS DEFINING THE
AXIS, WAVELENGTHS, DELTA, LENGTH OF X AXIS AND Y AXIS AND
TYPE OF PLOT DESIRED.
THE FOURTH INPUT CARD IS READ IN SUBROUTINE PLTDTA
AND IT CONTROLS THE PLOTTING OF THE VARIOUS VARIABLES
OUTPUT BY LOWTRAN SIX
THE FIFTH INPUT CARD IS READ AFTER PLOTTING AND
IT DETERMINES WHETHER PLOTTING ON THE SAME PLOT IS DESIRED
AND ALSO DETERMINES WHETHER TO REWIND AND PLOT THE SAME FILE
TO PLOT MULTIPLE FILES FROM TAPE 7;
THE FOUR INPUT CARDS MUST BE INPUT FOR EACH FILE TO BE PLOTTED
TO END PLOTS;
SET XSIZE NEGATIVE ON LAST INPUT CARD.
*****
COMMON /DXDY/ DX,ADY, PFRBEG, YRMIN, IXAXIS, IYAXIS, PFREND, YRMAX,
C IYYP, IYPWR, IEMSC
DIMENSION PROGID(3)
DIMENSION ACRD1(8), ACRD2(8), ACRD2A(8), ACRD2B(8), ACRD2C(8)
DIMENSION ACRD3(8), ACRD30(8), ACRD3A1(8), ACRD3A2(8), ACRD4(8)
DIMENSION DUMMY(8)
DIMENSION RADC(4), RADM(4), RADCLG(3), RADMLG(3), WAVL(2)
DIMENSION WAVN(2), TRAN(2)
DIMENSION CARD1(5), CARD2(8), CARD2A(2), CARD2B(2), CARD3(3)
DIMENSION CARD30(3), CRD3A1(5), CRD3A2(5)
DATA RADC/10HRADIANCE(1,10M0 WATTS/10CM2-STER-C,4MM-1)/
DATA RADM/10HRADIANCE(1,10M0 WATTS/10CM2-STER-M,4MICR)/
DATA RADCLG/10HRADIANCE(M,10MATT/CM2-S,8HTER-CM-1)/
DATA RADMLG/10HRADIANCE(M,10MATT/CM2-S,8HTER-MICR)/
DATA WAVL/10MWAVELENGTH,10H (MICRON) /
DATA WAVN/10MWAVENUMBER,10H (CM-1) /
DATA TRAN/10HTRANSMI(TA,3HNCE/
DATA CARD1/10HMODEL, IYYP,10HE, IEMSC, M,10H1, M2, M3, IM,
110H, NOPRT, TBO, 8HUND, SALR/
DATA CARD2/10HINAZE, ISEA, 10HNS, IVULCN, 10HICSTL, ICIR,
110H, IVSA, VIS, 10HWSS, WHH, RA, 4MINRT/
DATA CARD2A/10HCTHIN, CALT, 8H, ISEED/
DATA CARD2B/10HZCVSA, ZTVS, 8HA, ZINVSA/
DATA CARD3/10HM1, M2, ANGL, 10HE, RANGE, BE, 8HTA, RO, LEN/

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PLT 100
PLT 105
PLT 110
PLT 115
PLT 120
PLT 125
PLT 130
PLT 135
PLT 140
PLT 145
PLT 150
PLT 155
PLT 160
PLT 165
PLT 170
PLT 175
PLT 180
PLT 185
PLT 190
PLT 195
PLT 200
PLT 205
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PLT 300
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PLT 310
PLT 315
PLT 320
PLT 325
PLT 330
PLT 335
PLT 340
PLT 345
PLT 350
PLT 355
PLT 360
PLT 365
PLT 370
PLT 375
PLT 380
PLT 385
PLT 390

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| | DATA CARD30/10HH1,P,T,DP.,10HRH,WH,W0,R,4HANGE/ | PLT 395 |
| | DATA CRD3A1/10HIPARM,IPH.,10HIDAY,ISOUR,2HC / | PLT 400 |
| | DATA CRD3A2/10HPARM1,PARM,10H2,PARM3,PA,10HRM4,TIME,P, | PLT 405 |
| | 110HSIPO,ANGLE,3HM,G4 | PLT 410 |
| CCC | | PLT 415 |
| CCC | ITYP=0 RADIANCE PER MICRON VS MICRONS | PLT 420 |
| CCC | ITYP=1 RADIANCE PER CM-1 VS CM-1 | PLT 425 |
| CCC | ITYP=2 TRANSMITTANCE VS MICRONS | PLT 430 |
| CCC | ITYP=3 TRANSMITTANCE VS CM-1 | PLT 435 |
| CCC | | PLT 440 |
| CCC | IXAXIS=0 X-AXIS WILL BE LINEAR | PLT 445 |
| CCC | IXAXIS=1 X-AXIS WILL BE LOG10 | PLT 450 |
| CCC | IYAXIS=0 Y-AXIS WILL BE LINEAR | PLT 455 |
| CCC | IYAXIS=1 Y-AXIS WILL BE LOG10 | PLT 460 |
| CCC | | PLT 465 |
| | IEOF=0 | PLT 470 |
| | ISAMPT=0 | PLT 475 |
| | IRPT=1 | PLT 480 |
| | READ (5,80) (PROGID(I),I=1,3),SCALE | PLT 485 |
| | WRITE (6,85) (PROGID(I),I=1,3),SCALE | PLT 490 |
| | CALL PLOTID3(PROGID,900.0,11.0,SCALE,4) | PLT 495 |
| | CALL PLOT(1.0,1.0,-3) | PLT 500 |
| CCC | | PLT 505 |
| CCC | XSIZE=LENGTH OF X-AXIS IN INCHES | PLT 510 |
| CCC | PFRBEG=BEGINNING FREQUENCY ON PLOT IN CM-1 OR MICRONS | PLT 515 |
| CCC | PFREND=ENDING FREQUENCY ON PLOT IN CM-1 OR MICRONS | PLT 520 |
| CCC | DX=(PFREND-PFRBEG)/XSIZE | PLT 525 |
| CCC | ADV=NO. OF DIVISIONS IN TEN INCHES OF PAPER | PLT 530 |
| CCC | YRMIN AND YRMAX ARE LOGARITHMS BASE 10 OF MINIMUM AND MAXIMUM | PLT 535 |
| CCC | RADIATION VALUES WHICH CAN BE PLOTTED | PLT 540 |
| CCC | IN PLOTTING TRANSMITTANCE OR RADIANCE LINEARLY | PLT 545 |
| CCC | YRMIN AND YRMAX BECOME THE LIMITING VALUES OF THE YAXIS. | PLT 550 |
| CCC | NMYDEC SPECIFIES THE NUMBER OF DECIMAL PLACES ON A LINEAR YAXIS | PLT 555 |
| CCC | | PLT 560 |
| | REWIND 7 | PLT 565 |
| 5 | READ (5,88) XSIZE,PFRBEG,PFREND,DELTAX,ITYP,IXAXIS,NUMFIL | PLT 570 |
| | IF(XSIZE.LE.0.) GO TO 999 | PLT 575 |
| | WRITE (6,90) XSIZE,PFRBEG,PFREND,DELTAX,ITYP,IXAXIS,NUMFIL | PLT 580 |
| | DX=(PFREND-PFRBEG)/XSIZE | PLT 585 |
| | ANUMX=(PFREND-PFRBEG)/DELTAX | PLT 590 |
| | NUMX=ANUMX+.5 | PLT 595 |
| | DEVLX=XSIZE/ANUMX | PLT 600 |
| | READ (5,89) YSIZE,YRMIN,YRMAX,DELTAY,ICRV,IYAXIS,NMYDEC | PLT 605 |
| | IF(DELTAY.LE.0.0) DELTAY=1.0 | PLT 610 |
| | ADY=(YRMAX-YRMIN)/YSIZE | PLT 615 |
| | ANUMY=(YRMAX-YRMIN)/DELTAY | PLT 620 |
| | NUMY=ANUMY+.5 | PLT 625 |
| | DIVLY=YSIZE/ANUMY | PLT 630 |
| | WRITE (6,92) YSIZE,YRMIN,YRMAX,DELTAY,ICRV,IYAXIS,NMYDEC | PLT 635 |
| CCC | | PLT 640 |
| CCC | NUMFIL CONTROLS SPEC:FIL FILE NO. OF LOWTRAN TAPE 7 DATA | PLT 645 |
| CCC | TO BE PLOTTED. | PLT 650 |
| CCC | | PLT 655 |
| CCC | IF NUMFIL=0 IT WILL PLOT THE NEXT AVAILABLE FILE OF DATA. | PLT 660 |
| CCC | IF NUMFIL>0 IT WILL PLOT FROM THE NUMBERED FILE | PLT 665 |
| CCC | SPECIFIED BY NUMFIL. | PLT 670 |
| CCC | | PLT 675 |
| | IF(NUMFIL.GT.0) IEOF=NUMFIL-1 | PLT 680 |
| | IF(NUMFIL.LT.1) GO TO 12 | PLT 685 |

| | | |
|-----|--|---------|
| | REWIND 7 | PLT 690 |
| | NNF=1 | PLT 695 |
| | IF(NUMFIL.EQ.NNF) GO TO 12 | PLT 700 |
| 8 | GO 9 I=1,10 | PLT 705 |
| | READ (7,101) DUMMY | PLT 710 |
| 9 | CONTINUE | PLT 715 |
| 11 | READ (7,99) DUM | PLT 720 |
| | IF(DUM.NE.-9999.) GO TO 11 | PLT 725 |
| | NNF=NNF+1 | PLT 730 |
| | IF(NUMFIL.EQ.NNF) GO TO 12 | PLT 735 |
| | GO TO 8 | PLT 740 |
| 12 | CONTINUE | PLT 745 |
| CCC | | PLT 750 |
| CCC | THE LOWTRAN SIX PLOT PROGRAM EXPECTS TEN INPUT CARDS ON TAPE 7 | PLT 755 |
| CCC | WHICH WAS GENERATED FROM A LOWTRAN RUN. | PLT 760 |
| CCC | THERE CAN BE SEVERAL SETS OF DATA AND INPUT CARDS SEPERATED BY | PLT 765 |
| CCC | AN END OF FILE, WHICH IS CODED -9999. IN COL. 1-8 | PLT 770 |
| CCC | THE INPUT CARDS ARE AS LISTED IN THE LOWTRAN INSTRUCTIONS | PLT 775 |
| CCC | THE MANDATORY CARDS OUTPUT TO TAPE 7 ARE | PLT 780 |
| CCC | CARD1,CARD2,CARD2A,CARD2B,CARD2C,CARD3, OR OPTIONAL CARDS | PLT 785 |
| CCC | (MODEL=0), CARD3A1,CARD3A2,CARD4 AND CARDS. | PLT 790 |
| CCC | IN A GIVEN RUN SEVERAL OF THESE CARDS MAY NOT BE UTILIZED | PLT 795 |
| CCC | IN THAT EVENT THEIR VARIABLES WILL BE REPRESENTED BY -99 | PLT 800 |
| CCC | | PLT 805 |
| CCC | IN THE OUTPUT DATA ON TAPE 7 DURING A NORMAL EMISSION RUN FOR | PLT 810 |
| CCC | EXAMPLE SEVERAL OF THE VARIABLES ARE NOT UTILIZED IN THIS CASE | PLT 815 |
| CCC | THEIR VARIABLES WILL BE REPRESENTED BY -99 ALSO. | PLT 820 |
| CCC | | PLT 825 |
| CCC | | PLT 830 |
| CCC | READING AND WRITING INPUT CARDS TO THE PLOT | PLT 835 |
| CCC | | PLT 840 |
| CCC | | PLT 845 |
| | IF(ISAMPT.GT.0) GO TO 13 | PLT 850 |
| | READ (7,100) MODEL,ITYPE,IEMSCY,M1,M2,M3,IM,NOPRT,TBOUND,SALB | PLT 855 |
| | BACKSPACE 7 | PLT 860 |
| | READ (7,101) ACRD1 | PLT 865 |
| | IF(IEMSCY.EQ.0) WRITE (6,102) | PLT 870 |
| | IF(IEMSCY.EQ.1) WRITE (6,103) | PLT 875 |
| | IF(IEMSCY.EQ.2) WRITE (6,104) | PLT 880 |
| | IF(IEMSCY.EQ.3) WRITE (6,105) | PLT 881 |
| | WRITE (6,100) MODEL,ITYPE,IEMSCY,M1,M2,M3,IM,NOPRT,TBOUND,SALB | PLT 885 |
| | YT=7.0 | PLT 890 |
| | XT=1. | PLT 895 |
| | CALL SYMBOL(XT,YT,0.12,CARD1,0.0,48) | PLT 900 |
| | YT=YT-0.2 | PLT 905 |
| | CALL SYMBOL(XT,YT,0.12,ACRD1,0.0,80) | PLT 910 |
| | READ (7,101) ACRD2 | PLT 915 |
| | WRITE (6,101) ACRD2 | PLT 920 |
| | YT=YT-0.4 | PLT 925 |
| | CALL SYMBOL(XT,YT,0.12,CARD2,0.0,54) | PLT 930 |
| | YT=YT-0.2 | PLT 935 |
| | CALL SYMBOL(XT,YT,0.12,ACRD2,0.0,80) | PLT 940 |
| | READ (7,101) ACRD2A | PLT 945 |
| | WRITE (6,101) ACRD2A | PLT 950 |
| | YT=YT-0.4 | PLT 955 |
| | CALL SYMBOL(XT,YT,0.12,CARD2A,0.0,16) | PLT 960 |
| | YT=YT-0.2 | PLT 965 |
| | CALL SYMBOL(XT,YT,0.12,ACRD2A,0.0,80) | PLT 970 |
| | READ (7,101) ACRD2B | PLT 975 |

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| WRITE (6,101) ACRD2B | PLT 980 |
| YT=YT-0.4 | PLT 985 |
| CALL SYMBOL(XT,YT,0.12,CARD2B,0.0,18) | PLT 990 |
| YT=YT-0.2 | PLT 995 |
| CALL SYMBOL(XT,YT,0.12,ACRD2B,0.0,80) | PLT 1000 |
| READ (7,101) ACRD2C | PLT 1005 |
| WRITE (6,101) ACRD2C | PLT 1010 |
| YT=YT-0.4 | PLT 1015 |
| CALL SYMBOL(XT,YT,0.12,SHML,TITLE,0.0,8) | PLT 1020 |
| YT=YT-0.2 | PLT 1025 |
| CALL SYMBOL(XT,YT,0.12,ACRD2C,0.0,80) | PLT 1030 |
| IF(MODEL.NE.0) READ (7,101) ACRD3 | PLT 1035 |
| IF(MODEL.NE.0) WRITE (6,101) ACRD3 | PLT 1040 |
| IF(MODEL.EQ.0) READ (7,101) ACRD30 | PLT 1045 |
| IF(MODEL.EQ.0) WRITE (6,101) ACRD30 | PLT 1050 |
| YT=YT-0.4 | PLT 1055 |
| IF(MODEL.NE.0) CALL SYMBOL(XT,YT,0.12,CARD3,0.0,29) | PLT 1060 |
| IF(MODEL.EQ.0) CALL SYMBOL(XT,YT,0.12,CARD30,0.0,24) | PLT 1065 |
| YT=YT-0.2 | PLT 1070 |
| IF(MODEL.NE.0) CALL SYMBOL(XT,YT,0.12,ACRD3,0.0,80) | PLT 1075 |
| IF(MODEL.EQ.0) CALL SYMBOL(XT,YT,0.12,ACRD30,0.0,80) | PLT 1080 |
| READ (7,101) ACD3A1 | PLT 1085 |
| WRITE (6,101) ACD3A1 | PLT 1090 |
| YT=YT-0.4 | PLT 1095 |
| CALL SYMBOL(XT,YT,0.12,CRD3A1,0.0,21) | PLT 1100 |
| YT=YT-0.2 | PLT 1105 |
| CALL SYMBOL(XT,YT,0.12,ACD3A1,0.0,80) | PLT 1110 |
| READ (7,101) ACD3A2 | PLT 1115 |
| WRITE (6,101) ACD3A2 | PLT 1120 |
| YT=YT-0.4 | PLT 1125 |
| CALL SYMBOL(XT,YT,0.12,CRD3A2,0.0,43) | PLT 1130 |
| YT=YT-0.2 | PLT 1135 |
| CALL SYMBOL(XT,YT,0.12,ACD3A2,0.0,80) | PLT 1140 |
| READ (7,101) ACRD4 | PLT 1145 |
| WRITE (6,101) ACRD4 | PLT 1150 |
| YT=YT-0.4 | PLT 1155 |
| CALL SYMBOL(XT,YT,0.12,GMV1,V2,DV,0.0,8) | PLT 1160 |
| YT=YT-0.2 | PLT 1165 |
| CALL SYMBOL(XT,YT,0.12,ACRD4,0.0,80) | PLT 1170 |
| READ (7,500) IRPT | PLT 1175 |
| BACKSPACE 7 | PLT 1180 |
| READ (7,501) ACRD5 | PLT 1185 |
| WRITE (6,501) ACRD5 | PLT 1190 |
| YT=YT-0.4 | PLT 1195 |
| CALL SYMBOL(XT,YT,0.12,4HIRPT,0.0,4) | PLT 1200 |
| YT=YT-0.2 | PLT 1205 |
| CALL SYMBOL(XT,YT,0.12,ACRD5,0.0,5) | PLT 1210 |
| CCC | PLT 1215 |
| SET UP TO PLOT | PLT 1220 |
| CCC | PLT 1225 |
| CALL PLOT(10.0,0.0,-3) | PLT 1230 |
| CALL PLOT(0.0,YSIZE,3) | PLT 1235 |
| CALL PLOT(XSIZE,YSIZE,2) | PLT 1240 |
| CALL PLOT(XSIZE,0.0,2) | PLT 1245 |
| CALL PLOT(0.0,2) | PLT 1250 |
| CALL PLOT(0.,YSIZE,3) | PLT 1255 |
| CALL PLOT(0.,YSIZE,3) | PLT 1260 |
| CCC | PLT 1265 |
| SET UP TO DRAW AXIS | PLT 1270 |
| CCC | |

CCC

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IYPWR=ALOG10(DELTA)
IF((ITYP.EQ.0.OR.ITYP.EQ.1) .AND. IYAXIS.EQ.0) SFY=10.**(-IYPWR)
NUMCX=PFREND-PFRBEG
CYCLX=XSIZE/FLOAT(NUMCX)
NUMCY=YRMAX-YRMIN
CYCLY=YSIZE/FLOAT(NUMCY)
IF((ITYP.EQ.0.OR.ITYP.EQ.2) .AND. IXAXIS.EQ.0)
XCALL AXISL(0.0,0.0,WAVL,-20,NUMX,DIVLX,1,
X PFRBEG,DELTA,1,0.,.125,1.0,0.0,0)
IF((ITYP.EQ.0.OR.ITYP.EQ.2) .AND. IXAXIS.EQ.1)
XCALL AXLOG(0.0,0.0,WAVL,-20,NUMCX,CYCLX,
X PFRBEG,0.0,0.125,1.0,0.0,0)
IF((ITYP.EQ.1.OR.ITYP.EQ.3) .AND. IXAXIS.EQ.0)
XCALL AXISL(0.0,0.0,WAVN,-20,NUMX,DIVLX,1,
X PFRBEG,DELTA,-1,0.,.125,1.0,0.0,0)
IF((ITYP.EQ.1.OR.ITYP.EQ.3) .AND. IXAXIS.EQ.1)
XCALL AXLOG(0.0,0.0,WAVN,-20,NUMCX,CYCLX,
X PFRBEG,0.0,0.125,1.0,0.0,0)
IF(ITYP.EQ.0 .AND. IYAXIS.EQ.0)
XCALL AXISL(0.,0.,RADM,34,NUMY,
XDIVLY, 3,YRMIN*SFY,DELTA*SFY,NMYDEC,90.,0.15,1.1,0.0,0)
IF(ITYP.EQ.0 .AND. IYAXIS.EQ.1)
XCALL AXLOG(0.,0.,RADMLG,29,NUMCY,CYCLY,
X YRMIN,90.,0.15,1.1,2.0,0)
IF(ITYP.EQ.1 .AND. IYAXIS.EQ.0)
XCALL AXISL(0.,0.,RADC,34,NUMY,
XDIVLY, 3,YRMIN*SFY,DELTA*SFY,NMYDEC,90.,0.15,1.1,0.0,0)
IF(ITYP.EQ.1 .AND. IYAXIS.EQ.1)
XCALL AXLOG(0.,0.,RADCLG,29,NUMCY,CYCLY,
X YRMIN,90.,.15,1.1,2.0,0)
IF((ITYP.EQ.2.OR.ITYP.EQ.3) .AND. IYAXIS.EQ.0)
XCALL AXISL(0.,0.,TRAN,13,NUMY,DIVLY,2,YRMIN,DELTA,
XNMYDEC,90.0.,.125,1.1,2.0,0)
IF((ITYP.EQ.2.OR.ITYP.EQ.3) .AND. IYAXIS.EQ.1)
XCALL AXLOG(0.,0.,TRAN,13,NUMCY,CYCLY,YRMIN,
X 90.0.,.125,1.1,0.0,0)
IF(ITYP.EQ.0 .AND. IYAXIS.EQ.0)
XCALL AXISL(XSIZE,0.,RADM,-34,
XNUMY, DIVLY,3,YRMIN*SFY,DELTA*SFY,NMYDEC,90.,.15,1.1,0.0,0)
IF(ITYP.EQ.0 .AND. IYAXIS.EQ.1)
XCALL AXLOG(XSIZE,0.,RADMLG,-29,NUMCY,
X CYCLY,YRMIN,90.,.15,1.1,2.0,0)
IF(ITYP.EQ.1 .AND. IYAXIS.EQ.0)
XCALL AXISL(XSIZE,0.,RADC,-34,
XNUMY, DIVLY,3,YRMIN*SFY,DELTA*SFY,NMYDEC,90.,.15,1.1,0.0,0)
IF(ITYP.EQ.1 .AND. IYAXIS.EQ.1)
XCALL AXLOG(XSIZE,0.,RADCLG,-29,NUMCY,
X CYCLY,YRMIN,90.,.15,1.1,2.0,0)
IF((ITYP.EQ.2.OR.ITYP.EQ.3) .AND. IYAXIS.EQ.0)
XCALL AXISL(XSIZE,0.,TRAN,-13,NUMY,DIVLY,2,YRMIN,
XDELTA,NMYDEC,90.0.,.125,1.1,2.0,0)
IF((ITYP.EQ.2.OR.ITYP.EQ.3) .AND. IYAXIS.EQ.1)
XCALL AXLOG(XSIZE,0.,TRAN,-13,NUMCY,CYCLY,YRMIN,
X 90.0.,.125,1.1,0.0,0)
GO TO 10
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PLT 1275
PLT 1280
PLT 1285
PLT 1290
PLT 1295
PLT 1300
PLT 1305
PLT 1310
PLT 1315
PLT 1320
PLT 1325
PLT 1330
PLT 1335
PLT 1340
PLT 1345
PLT 1350
PLT 1355
PLT 1360
PLT 1365
PLT 1370
PLT 1375
PLT 1380
PLT 1385
PLT 1390
PLT 1395
PLT 1400
PLT 1405
PLT 1410
PLT 1415
PLT 1420
PLT 1425
PLT 1430
PLT 1435
PLT 1440
PLT 1445
PLT 1450
PLT 1455
PLT 1460
PLT 1465
PLT 1470
PLT 1475
PLT 1480
PLT 1485
PLT 1490
PLT 1495
PLT 1500
PLT 1505
PLT 1510
PLT 1515
PLT 1520
PLT 1525
PLT 1530
PLT 1535
PLT 1540
PLT 1545
PLT 1550
PLT 1555
PLT 1560
PLT 1565

CCC
CCC
CCC

READ AROUND HEADER RECORDS AS FILE IS PLOTTED ON SAME PLOT

| | | |
|-----|---|----------|
| 13 | GO 14 I=1,10 | PLT 1570 |
| | READ (7,101) DUMMY | PLT 1575 |
| | WRITE (8,101) DUMMY | PLT 1580 |
| 14 | CONTINUE | PLT 1585 |
| 18 | CONTINUE | PLT 1590 |
| CCC | | PLT 1595 |
| CCC | READ IN DATA TO BE PLOTTED | PLT 1600 |
| CCC | | PLT 1605 |
| CCC | ITRP CONTROLS THE PLOT OF TRANSMISSION VARIABLES | PLT 1610 |
| CCC | ITRP=0 PLOTS TOTAL TRANSMISSION | PLT 1615 |
| CCC | ITRP=1-7 PLOTS H2O,CO2,OZONE,N2CONT,H2OCONT,MOLSCT,AERTRN | PLT 1620 |
| CCC | | PLT 1625 |
| | XT=0. | PLT 1630 |
| CCC | | PLT 1635 |
| CCC | SUBROUTINE PLTDTA IS CALLED TO IMPLEMENT THE READING | PLT 1640 |
| CCC | IN AND PLOTTING OF TRANSMISSION AND OR EMISSION VALUES | PLT 1645 |
| CCC | FROM TAPE7. | PLT 1650 |
| CCC | | PLT 1655 |
| | CALL PLTDTA(ICRV,IEOF) | PLT 1660 |
| CCC | | PLT 1665 |
| CCC | ISAMFL=0 NORMAL ADVANCE TO NEXT FILE | PLT 1670 |
| CCC | ISAMFL=1 REWIND AND GO TO SAME FILE | PLT 1675 |
| CCC | | PLT 1680 |
| CCC | ISAMPT=0 NORMAL ADVANCE TO NEXT PLOT | PLT 1685 |
| CCC | ISAMPT=1 PLOT ON SAME PLOT | PLT 1690 |
| CCC | | PLT 1695 |
| CCC | ISAMFL AND ISAMPT ARE SET TO HANDLE THE NEXT FILE OF DATA | PLT 1700 |
| CCC | TO BE PLOTTED. | PLT 1705 |
| CCC | | PLT 1710 |
| | READ (5,94) ISAMFL,ISAMPT | PLT 1715 |
| | WRITE (6,94) ISAMFL,ISAMPT | PLT 1720 |
| | IF(ISAMFL.GT.0) GO TO 63 | PLT 1725 |
| 61 | IF(ISAMPT.GT.0) GO TO 62 | PLT 1730 |
| | XT=XSIZE+2.0 | PLT 1735 |
| | CALL PLOT(XT,0.0,-3) | PLT 1740 |
| 62 | CONTINUE | PLT 1745 |
| CCC | | PLT 1750 |
| CCC | RECYCLE TO PLOT THE NEXT FILE OF DATA | PLT 1755 |
| CCC | | PLT 1760 |
| | GO TO 5 | PLT 1765 |
| 63 | CONTINUE | PLT 1770 |
| | IF(IEOF.NE.1) GO TO 64 | PLT 1775 |
| | REWIND 7 | PLT 1780 |
| | GO TO 61 | PLT 1785 |
| 64 | NEOF=1 | PLT 1790 |
| | REWIND 7 | PLT 1795 |
| 65 | DO 66 I=1,10 | PLT 1800 |
| | READ (7,101) DUMMY | PLT 1805 |
| 66 | CONTINUE | PLT 1810 |
| 67 | READ (7,99) DUM | PLT 1815 |
| | IF(DUM.NE.-9999.) GO TO 67 | PLT 1820 |
| | NEOF=NEOF+1 | PLT 1825 |
| | IF(IEOF.EQ.NEOF) GO TO 69 | PLT 1830 |
| | GO TO 65 | PLT 1835 |
| 69 | IEOF=IEOF-1 | PLT 1840 |
| | GO TO 61 | PLT 1845 |
| CCC | | PLT 1850 |
| CCC | PLOTTING OVER GO TO 640 | PLT 1855 |
| CCC | | PLT 1860 |

| | | |
|-----|---|----------|
| 999 | CONTINUE | PLT 1866 |
| | CALL PLOT(XT,0.0,-3) | PLT 1870 |
| CCC | | PLT 1875 |
| CCC | | PLT 1880 |
| 80 | FORMAT(3A10,F10.4) | PLT 1885 |
| 85 | FORMAT(1H1,5X,3A10,F10.4//) | PLT 1890 |
| 88 | FORMAT(4F10.4,3I5) | PLT 1895 |
| 89 | FORMAT(F10.4,3E10.2,3I5) | PLT 1900 |
| 90 | FORMAT(//4F10.4,3I5) | PLT 1905 |
| 92 | FORMAT(F10.4,3E10.2,3I5//) | PLT 1910 |
| 94 | FORMAT(2I5) | PLT 1915 |
| 99 | FORMAT(F7.0) | PLT 1920 |
| 100 | FORMAT(8I5,2F10.3) | PLT 1925 |
| 101 | FORMAT(8A10) | PLT 1930 |
| 102 | FORMAT(10X,14H TRANSMISSION //) | PLT 1935 |
| 103 | FORMAT(10X,10H RADIANCE //) | PLT 1940 |
| 104 | FORMAT(10X,32H RADIANCE WITH SOLAR SCATTERING //) | PLT 1945 |
| 105 | FORMAT(10X,25H DIRECT SOLAR IRRADIANCE //) | PLT 1946 |
| 500 | FORMAT(I5) | PLT 1950 |
| 501 | FORMAT(A5) | PLT 1955 |
| | CALL ENDPLT | PLT 1960 |
| | STOP | PLT 1965 |
| | END | PLT 1970 |

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| | SUBROUTINE PLDTA(ICRV,IEOF) | DTA 100 |
| CCC | ROUTINE TO READ TAPE7 EMISSIONS AND TRANSMISSIONS | DTA 105 |
| CCC | AND PLOT VARIOUS VALUES. | DTA 110 |
| CCC | ITRP=0 PLOTS TOTAL TRANSMISSION | DTA 115 |
| CCC | ITRP=1-7 PLOTS H2O,CO2,OZONE,N2CONT,H2OCONT,MOLSCCT,AERTRN | DTA 120 |
| CCC | ITRP=8-10 PLOTS HNO3,AERABS OR INTEG. ABS | DTA 125 |
| CCC | | DTA 130 |
| CCC | COMMON /DXDY/ DX,ADY,PFRBEG,YRMIN,IXAXIS,IYAXIS,PFREND,YRMAX, | DTA 135 |
| | C IYYP,IYPR,IEMSCT | DTA 140 |
| | DIMENSION RAD(400),V(400),TRM(10),RADVAL(9) | DTA 141 |
| CCC | IRAD AND ITRP=0 PLOTS TOTAL TRANSMITTANCE | DTA 145 |
| CCC | | DTA 150 |
| CCC | IF IEMSCT=1 | DTA 155 |
| CCC | IRAD=1 PLOTS ATMOSPHERIC RADIANCE PER CM-1 VS CM-1 | DTA 158 |
| CCC | IRAD=2 PLOTS ATMOSPHERIC RADIANCE PER MICRONS VS MICRONS | DTA 160 |
| CCC | | DTA 161 |
| CCC | IF IEMSCT=2 | DTA 162 |
| CCC | IRAD=1 TO 8 PLOTS ATMOSPHERIC,SCATTERED,REFLECTED AND TOTAL | DTA 163 |
| CCC | RADIANCE PER CM-1 VS CM-1 AND MICRONS VS MICRONS RESPECTIVELY | DTA 165 |
| CCC | | DTA 170 |
| CCC | IF IEMSCT=3 | DTA 171 |
| CCC | IRAD=1 TO 4 PLOTS TRANSMITTED SOLAR IRRADIANCE AND INCIDENT | DTA 172 |
| CCC | SOLAR IRRADIANCE PER CM-1 VS CM-1 AND MICRONS VS MICRONS | DTA 175 |
| CCC | RESPECTIVELY | DTA 180 |
| CCC | | DTA 181 |
| CCC | | DTA 185 |
| CCC | | DTA 190 |
| CCC | | DTA 195 |
| | TRANS=0. | DTA 200 |
| | READ (5.94) IRAD,ITRP | DTA 210 |
| | WRITE (6.94) IRAD,ITRP | DTA 215 |
| | J=1 | DTA 220 |
| | READ (7.900) RAIN,CIRRUS | DTA 225 |
| | WRITE (8.900) RAIN,CIRRUS | DTA 230 |
| 20 | IF(IEMSCT.GT.0) READ (7.1000) FREQ,ALAM,(RADVAL(K),K=1,9), | DTA 235 |
| | ITRANS | DTA 240 |
| | IF(IEMSCT.EQ.0) READ (7.1100) FREQ,ALAM,TRANS,(TRM(I),I=1,10) | DTA 245 |
| | IF(FREQ.EQ.-9999.) GO TO 50 | DTA 250 |
| | CONTINUE | DTA 255 |
| | JWT=J | DTA 260 |
| | JFNU=J | DTA 265 |
| | V(J)=ALAM | DTA 270 |
| | IF(ITRP.EQ.0) RAD(J)=TRANS | DTA 275 |
| | IF(ITRP.GT.0) RAD(J)=TRM(ITRP) | DTA 280 |
| | IF(IYYP.EQ.1,OR,IYYP.EQ.3) V(J)=FREQ | DTA 285 |
| | IF(V(J).LT.PFRREQ) GO TO 20 | DTA 290 |
| | IF(V(J).GT.PFREND) GO TO 20 | DTA 300 |
| | IF(IEMSCT.GT.0 .AND. IRAD.GT.0) RAD(J)=RADVAL(IRAD) | DTA 305 |
| | IF(J.GE.399) GO TO 40 | DTA 310 |
| | J=J+1 | DTA 315 |
| | GO TO 20 | DTA 320 |
| CCC | | DTA 400 |
| CCC | PLOT DATA | DTA 410 |
| CCC | | DTA 415 |
| CCC | TYPE OF LINE PLOTTED IS CONTROLLED BY THE VALUE OF ICRV | DTA 420 |
| CCC | SUBROUTINE DRAW EXPLAINS THE USE OF ICRV IN OBTAINING | DTA 425 |
| CCC | VARIOUS TYPES OF PLOTTED LINES | DTA 430 |
| CCC | | DTA 435 |
| CCC | | DTA 440 |
| 40 | CALL DRAW(V,RAD,JFNU,ICRV) | DTA 445 |

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| | WRITE (6,2000) V(1),RAD(1),V(JFNU),RAD(JFNU) | DTA 450 |
| | IF(J.LT.399) GO TO 60 | DTA 455 |
| | V(1)=V(399) | DTA 460 |
| | RAD(1)=RAD(399) | DTA 465 |
| | J=2 | DTA 470 |
| 50 | GO TO 20 | DTA 475 |
| | CONTINUE | DTA 480 |
| | IEDF=IEDF+1 | DTA 485 |
| | JWT=J-1 | DTA 490 |
| | JFNU=J-1 | DTA 495 |
| | IF(JWT.LE.1) GO TO 60 | DTA 500 |
| | GO TO 40 | DTA 505 |
| 60 | CONTINUE | DTA 510 |
| 94 | FORMAT(5I5) | DTA 515 |
| 900 | FORMAT(2F9.4) | DTA 520 |
| 1000 | FORMAT(F7.0,F8.3,9E9.2,F8.4) | DTA 525 |
| 1100 | FORMAT(F7.0,F8.3,10F8.4,F12.4) | DTA 530 |
| 2000 | FORMAT(2(F10.3,E10.3)) | DTA 535 |
| | RETURN | DTA 540 |
| | END | DTA 545 |

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|---|---|
| | SUBROUTINE AXIS1(X, Y, BCD, N, NUMDIV, DIVLEN, NUMSUB, BEGNUM, AXL 100 |
| | 1 DELNUM, NUMDEC, THETA, HEIGHT, NRPT,NTURN , NOEND, LSUPR, LTURN)AXL 105 |
| C | MODIFIED VERSION OF AXISL AXL 110 |
| C | AXL 115 |
| C | WRITTEN BY RICHARD L. TAYLOR RADC/ET EEC NOVEMBER 1980 AXL 120 |
| C | AXL 125 |
| C | ROUTINE TO PLOT A LABELLED LINEAR AXIS AXL 130 |
| C | AXL 135 |
| C | AXL 140 |
| C | AXL 145 |
| C | X AND Y ARE THE STARTING COORDINATES OF THE AXIS RELATIVE TO THE AXL 150 |
| C | CURRENT ORIGIN AXL 155 |
| C | AXL 160 |
| C | BCD IS THE LABEL OF THE AXIS EXPRESSED AS A HOLLERITH CONSTANT AXL 165 |
| C | AXL 170 |
| C | N IS THE NUMBER OF CHARACTERS IN THE LABEL AXL 175 |
| C | AXL 180 |
| C | AXL 185 |
| C | NEGATIVE N PLACES THE LABEL ON THE CLOCKWISE SIDE OF THE AXIS AXL 190 |
| C | AXL 195 |
| C | POSITIVE N PLACES THE LABEL ON THE COUNTERCLOCKWISE SIDE AXL 200 |
| C | AXL 205 |
| C | NUMDIV IS THE NUMBER OF MAJOR DIVISIONS AXL 210 |
| C | AXL 215 |
| C | DIVLEN IS THE LENGTH IN INCHES OF A MAJOR DIVISION AXL 220 |
| C | AXL 225 |
| C | NUMSUB IS THE NUMBER OF MINOR DIVISIONS PER MAJOR DIVISION AXL 230 |
| C | AXL 235 |
| C | 1 GIVES NO SUBDIVISION TICS, 2 GIVES ONE SUBDIVISION TIC, ETC. AXL 240 |
| C | AXL 245 |
| C | BEGNUM IS THE NUMBER FOR THE BEGINNING OF THE AXIS AXL 250 |
| C | AXL 255 |
| C | DELNUM IS THE DELTA NUMBER FOR A MAJOR DIVISION AXL 260 |
| C | AXL 265 |
| C | NUMDEC IS THE NUMBER OF DECIMAL PLACES DESIRED AXL 270 |
| C | AXL 275 |
| C | NUMDEC EQUAL TO -1 SUPPRESSES THE DECIMAL POINT AXL 280 |
| C | AXL 285 |
| C | THETA IS THE ANGLE OF THE AXIS IN DEGREES (0.0 FOR X, 90.0 FOR Y) AXL 290 |
| C | AXL 295 |
| C | HEIGHT IS THE HEIGHT OF THE NUMBERS IN INCHES AXL 300 |
| C | AXL 305 |
| C | NRPT IS THE REPEAT FACTOR FOR THE SCALE NUMBERS (USUALLY INTEGER 1) AXL 310 |
| C | AXL 315 |
| C | WHEN NRPT IS ZERO THE SCALE NUMBERS WILL BE SUPPRESSED; AXL 320 |
| C | AXL 325 |
| C | WHEN NRPT = 2, EVERY 2ND SCALE NUMBER WILL BE PRODUCED; ETC. AXL 330 |
| C | AXL 335 |
| C | NTURN EQUAL TO 1 TURNS THE AXIS NUMBERS BY 90 DEGREES CLOCKWISE, AXL 340 |
| C | -1 TURNS NUMBERS BY 90 DEGREES COUNTERCLOCKWISE, 0 FOR NO TURN AXL 345 |
| C | AXL 350 |
| C | NOEND EQUAL TO 1 SUPPRESSES THE NUMBERS AT EITHER END OF THE AXIS. AXL 355 |
| C | AXL 360 |
| C | 2 SUPPRESSES THE BEGINNING NUMBER, 3 THE ENDING NUMBER AXL 365 |
| C | AXL 370 |
| C | LSUPR EQUAL TO 1 SUPPRESSES THE LABEL AXL 375 |
| C | LTURN NOT USED AXL 380 |
| C | AXL 385 |
| C | COMMON/TITLOC/KPOS, YPOS AXL 390 |

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| | COMMON /DXDY/ DX,ADY,PFRBEG,YRMIN,IXAXIS,IYAXIS,PFPEND,YRMAX, | AXL 390 |
| | C ITYP,IYPWR,IEMSC | AXL 395 |
| | DIMENSION BCD(1) | AXL 405 |
| | THETA1=THETA-90.*NTURN | AXL 410 |
| | PI = 2. * ASIN(1.) | AXL 415 |
| | ANGLE = (PI/180.) * THETA | AXL 420 |
| | SINANG = SIN(ANGLE) | AXL 425 |
| | COSANG = COS(ANGLE) | AXL 430 |
| | SIGNAX = FLOAT(ISIGN(1,N)) | AXL 435 |
| | SIZMAJ = 0.25 * HEIGHT + 0.05 | AXL 440 |
| | OFFST=HEIGHT*1.5 | AXL 445 |
| | DXMAJ = -SIZMAJ * SINANG * SIGNAX | AXL 450 |
| | DYMAJ = SIZMAJ * COSANG * SIGNAX | AXL 455 |
| | DXMIN = 0.5 * DXMAJ | AXL 460 |
| | DYMIN = 0.5 * DYMAJ | AXL 465 |
| | NSUB = NUMSUB | AXL 470 |
| | IF(NUMSUB .LT. 1) NSUB = 1 | AXL 475 |
| | SUBDIV = DIVLEN / FLOAT(NSUB) | AXL 480 |
| | BCDSIZ = 1.25 * HEIGHT | AXL 485 |
| | YBIAS = (-0.50 + SIGN(1.25, SIGNAX)) * HEIGHT + DYMAJ | AXL 490 |
| | NABS = IABS(N) | AXL 495 |
| | BCDLEN = (FLOAT(NABS) - 0.4) * BCDSIZ | AXL 500 |
| | S = DIVLEN * FLOAT(NUMDIV) | AXL 505 |
| | DIVCOS = DIVLEN * COSANG | AXL 510 |
| | DIVSIN = DIVLEN * SINANG | AXL 515 |
| | SIZMAX = HEIGHT | AXL 520 |
| | | AXL 525 |
| | | AXL 530 |
| | DRAW DIVISION NUMBERS | AXL 535 |
| | | AXL 540 |
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| | | AXL 850 |
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| | | AXL 900 |
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| | | AXL 950 |
| | | AXL 955 |
| | | AXL 960 |
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| | | AXL 980 |
| | | AXL 985 |
| | | AXL 990 |
| | | AXL 995 |

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| | IF(SIZMAX .LT. SIZNUM) SIZMAX = SIZNUM | AXL 690 |
| 20 | CONTINUE | AXL 695 |
| C | | AXL 700 |
| C | | AXL 705 |
| C | DRAW TIC MARKS | AXL 710 |
| C | | AXL 715 |
| | CALL PLOT(XTIC , YTIC , 3) | AXL 720 |
| | CALL PLOT(XTIC+DXMAJ, YTIC+DYMAJ, 2) | AXL 725 |
| | IF(NDIV .EQ. NUMDIV) GO TO 50 | AXL 730 |
| | IF(NUMSUB .LE. 1) GO TO 40 | AXL 735 |
| | DO 30 J=2,NUMSUB | AXL 740 |
| | SUBLEN = SURDIV*FLOAT(J-1) | AXL 745 |
| | XSTIC = XTIC + SUBLEN * COSANG | AXL 750 |
| | YSTIC = YTIC + SUBLEN * SINANG | AXL 755 |
| | CALL PLOT(XSTIC+DXMIN, YSTIC+DYMIN, 3) | AXL 760 |
| | CALL PLOT(XSTIC, YSTIC, 2) | AXL 765 |
| 30 | CONTINUE | AXL 770 |
| 40 | NDIV = NDIV + 1 | AXL 775 |
| | GO TO 10 | AXL 780 |
| C | | AXL 785 |
| C | | AXL 790 |
| C | DRAW AXIS | AXL 795 |
| C | | AXL 800 |
| C | | AXL 805 |
| 50 | CALL PLOT(XTIC, YTIC, 3) | AXL 810 |
| | CALL PLOT(X, Y, 3) | AXL 815 |
| C | | AXL 820 |
| C | | AXL 825 |
| C | DRAW LABEL | AXL 830 |
| C | | AXL 835 |
| C | | AXL 840 |
| | IF(LESUPR .EQ. 1 .OR. NABS .EQ. 0) RETURN | AXL 845 |
| | XBIAS=0 | AXL 850 |
| | YBIAS=-SIZNUM-OFFST | AXL 855 |
| | IF(N.LT.0)YBIAS=-YBIAS | AXL 860 |
| | IF(NIURN.EQ.0) YBIAS=0 | AXL 865 |
| | XBIAS = 0.5*(S - BCDLPH) | AXL 870 |
| | YBIAS = (-0.50 + SIGN(0.25, SIGNAX)) * BCOSIZ | AXL 875 |
| | XPOS = X - YBIAS*SINANG + XBIAS*COSANG | AXL 880 |
| | C +YBIAS*SINANG-XBIAS*COSANG | AXL 885 |
| | YPOS = Y + YBIAS*COSANG + XBIAS*SINANG | AXL 890 |
| | C -XBIAS*SINANG-YBIAS*COSANG | AXL 895 |
| | IF(IEMCT.NE.3 .OR. (IYPT.GT.1) GO TO 55 | AXL 900 |
| | IF(THETA.EQ.0.0) GO TO 55 | AXL 905 |
| | YPOS=YPOS-0.375 | AXL 910 |
| | CALL SYMBOL(XPOS,YPOS,BCOSIZ,CHIR,THETA,2) | AXL 915 |
| | YPOS=YPOS+0.375 | AXL 920 |
| 55 | CONTINUE | AXL 925 |
| | CALL SYMBOL(XPOS, YPOS, BCOSIZ, BCD, THETA, NABS) | AXL 930 |
| | IF(THETA.NE.90.) GO TO 60 | AXL 935 |
| | IF(IYPT.GT.1 .OR. IYAXIS.NE.0) GO TO 60 | AXL 940 |
| | AMAR=IYPT | AXL 945 |
| | YPOS=YPOS+0.662 | AXL 950 |
| | XPOS=XPOS-0.10 | AXL 955 |
| | CALL NUMBER(XPOS,YPOS,0.135,AMAR,THETA,-1) | AXL 960 |
| 60 | CONTINUE | AXL 965 |
| | RETURN | AXL 970 |
| | END | AXL 975 |

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| | SUBROUTINE AXLOG(X, Y, BCD, N, NUMCYC, CYCLEN, BEGEXP, | LAX 100 |
| | 1 THETA, HEIGHT, NRPT, NTURN, NOEND, LSUPR, LTURN) | LAX 105 |
| C | | LAX 110 |
| C | | LAX 115 |
| C | WRITTEN BY RICHARD L. TAYLOR RADC/ET EEC NOVEMBER 1980 | LAX 120 |
| C | | LAX 125 |
| C | | LAX 130 |
| C | | LAX 135 |
| C | ROUTINE TO PLOT A LABELLED LOGARITHMIC AXIS | LAX 140 |
| C | | LAX 145 |
| C | | LAX 150 |
| C | | LAX 155 |
| C | | LAX 160 |
| C | X AND Y ARE THE STARTING COORDINATES OF THE AXIS RELATIVE TO THE | LAX 165 |
| C | CURRENT ORIGIN | LAX 170 |
| C | | LAX 175 |
| C | | LAX 180 |
| C | BCD IS THE LABEL OF THE AXIS EXPRESSED AS A HOLLERITH CONSTANT | LAX 185 |
| C | | LAX 190 |
| C | N IS THE NUMBER OF CHARACTERS IN THE LABEL | LAX 195 |
| C | | LAX 200 |
| C | NEGATIVE N PLACES THE LABEL ON THE CLOCKWISE SIDE OF THE AXIS | LAX 205 |
| C | | LAX 210 |
| C | POSITIVE N PLACES THE LABEL ON THE COUNTERCLOCKWISE SIDE | LAX 215 |
| C | | LAX 220 |
| C | NUMCYC IS THE NUMBER OF CYCLES DESIRED | LAX 225 |
| C | | LAX 230 |
| C | CYCLEN IS THE LENGTH OF ONE CYCLE IN INCHES | LAX 235 |
| C | | LAX 240 |
| C | BEGEXP IS THE EXPONENT FOR THE BEGINNING OF THE AXIS | LAX 245 |
| C | | LAX 250 |
| C | THETA IS THE ANGLE OF THE AXIS IN DEGREES (0.0 FOR X, 90.0 FOR Y) | LAX 255 |
| C | | LAX 260 |
| C | HEIGHT IS THE HEIGHT IN INCHES OF THE TENS | LAX 265 |
| C | | LAX 270 |
| C | NRPT IS THE REPEAT FACTOR FOR THE SCALE NUMBERS (USUALLY INTEGER 1) | LAX 275 |
| C | | LAX 280 |
| C | WHEN NRPT IS ZERO THE SCALE NUMBERS WILL BE SUPPRESSED; | LAX 285 |
| C | | LAX 290 |
| C | WHEN NRPT = 2, EVERY 2ND SCALE NUMBER WILL BE PRODUCED; | LAX 295 |
| C | | LAX 300 |
| C | WHEN NRPT = 3, EVERY 3RD SCALE NUMBER WILL BE PRODUCED; ETC. | LAX 305 |
| C | | LAX 310 |
| C | NTURN EQUAL TO 1 TURNS THE AXIS NUMBERS BY 90 DEGREES CLOCKWISE, | LAX 315 |
| C | -1 TURNS NUMBERS BY 90 DEGREES COUNTERCLOCKWISE, 0 FOR NO TURN | LAX 320 |
| C | | LAX 325 |
| C | NOEND EQUAL TO 1 SUPPRESSES THE NUMBERS AT EITHER END OF THE AXIS, | LAX 330 |
| C | | LAX 335 |
| C | NOEND EQUAL TO 2 SUPPRESSES ONLY THE STARTING NUMBER, AND NOEND | LAX 340 |
| C | EQUAL TO 3 SUPPRESSES ONLY THE ENDING NUMBER | LAX 345 |
| C | | LAX 350 |
| C | LSUPR EQUAL TO 1 SUPPRESSES THE LABEL | LAX 355 |
| C | | LAX 360 |
| C | | LAX 365 |
| C | LTURN EQUAL TO 1 TURNS THE LABEL BY 90 DEGREES CLOCKWISE, | LAX 370 |
| C | -1 TURNS LABEL BY 90 DEGREES COUNTERCLOCKWISE, 0 FOR NO TURN | LAX 375 |
| C | | LAX 380 |
| C | | LAX 385 |
| C | COMMON/TITLOC/XPOS, YPOS | LAX 390 |

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| COMMON /DXDY/ DX,ADY,PFRBEG,YRMIN,IXAXIS,IYAXIS,PFREND,YRMAX, | LAX | 391 |
| C ITYP,IYPWR,IEMSC | LAX | 392 |
| DIMENSION BCD(1), SUBDIV(10), DIVLOG(8) | LAX | 395 |
| DATA DIVLOG / 0.301029995664, 0.477121254720, 0.602059991328, | LAX | 400 |
| 1 0.698970004336, 0.778151250384, 0.845098040014, | LAX | 405 |
| 2 0.903089986992, 0.954242509439/ | LAX | 410 |
| THETA1=THETA-90.*NTURN | LAX | 415 |
| PI = 2. * ASIN(1.) | LAX | 420 |
| ANGLE = (PI/180.) * THETA | LAX | 425 |
| SINANG = SIN(ANGLE) | LAX | 430 |
| COSANG = COS(ANGLE) | LAX | 435 |
| SIGNAX = FLOAT(ISIGN(1, N)) | LAX | 440 |
| SIZMAJ = 0.25 * HEIGHT + 0.05 | LAX | 445 |
| OFFST=HEIGHT*1.5 | LAX | 450 |
| DXMAJ = -SIZMAJ * SINANG * SIGNAX | LAX | 455 |
| DYMAJ = SIZMAJ * COSANG * SIGNAX | LAX | 460 |
| DXMIN = 0.5 * DXMAJ | LAX | 465 |
| DYMIN = 0.5 * DYMAJ | LAX | 470 |
| BCDSIZ = 1.25 * HEIGHT | LAX | 475 |
| ENLARG=1.5 | LAX | 480 |
| EXOSIZ = 0.60 * HEIGHT *ENLARG | LAX | 485 |
| NABS = IABS(N) | LAX | 490 |
| BCDLEN = (FLOAT(NABS) - 0.4) * BCDSIZ | LAX | 495 |
| S = CYCLEN * FLOAT(NUMCYC) | LAX | 500 |
| NUMTIC = 2 - MINI(1.0, C/CLEN) | LAX | 505 |
| NUMLOG = 8 / NUMTIC | LAX | 510 |
| XBIAS = 1.85*HEIGHT *ENLARG | LAX | 515 |
| YBIAS = 0.70*HEIGHT *ENLARG | LAX | 520 |
| EXPBX = -YBIAS*SINANG + XBIAS*COSANG | LAX | 525 |
| EXPBY = YBIAS*COSANG + XBIAS*SINANG | LAX | 530 |
| IF (NTURN .EQ. 0) GO TO 5 | LAX | 535 |
| EXPBX = XBIAS * SINANG + YBIAS * COSANG | LAX | 540 |
| EXPBY = YBIAS * SINANG - XBIAS * COSANG | LAX | 545 |
| 5 DO 10 I=2,8 | LAX | 550 |
| SUBDIV(I) = DIVLOG(I-1)*CYCLEN | LAX | 555 |
| 10 CONTINUE | LAX | 560 |
| NNUB = NUMCYC + 1 | LAX | 565 |
| SIZMAX = EXPSIZ | LAX | 570 |
| EXP = BEGEXP | LAX | 575 |
| DO 20 I=1,NNUB | LAX | 580 |
| DIGITS = 0.0 | LAX | 585 |
| IF(ABS(EXP) .GE. 10.0) DIGITS = ALOG10(ABS(EXP)) | LAX | 590 |
| DIGITS = AINT(DIGITS + 1.0E-12) + 0.7 | LAX | 595 |
| IF(EXP .LT. 0.0) DIGITS = DIGITS + 1.0 | LAX | 600 |
| SIZNUM = DIGITS * EXPSIZ | LAX | 605 |
| IF(SIZMAX .LT. SIZNUM) SIZMAX = SIZNUM | LAX | 610 |
| 20 EXP = EXP + 1.0 | LAX | 615 |
| SIZNUM = SIZMAX + 2.0*HEIGHT | LAX | 620 |
| C | LAX | 625 |
| C | LAX | 630 |
| C | LAX | 635 |
| C | LAX | 640 |
| C | LAX | 645 |
| NCYCLE = 0 | LAX | 650 |
| EXP = BEGEXP | LAX | 655 |
| XBIAS = -0.7*HEIGHT | LAX | 660 |
| YBIAS = (-0.50 + SIGN(1.25, SIGNAX)) * HEIGHT | LAX | 665 |
| XBIAS1=0. | LAX | 670 |
| YBIAS1=0. | LAX | 675 |

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| | IF(NTURN.EQ.0) GO TO 25 | LAX 680 |
| | XBIAS1=XBIAS+HEIGHT*0.5 | LAX 685 |
| | YBIAS1=YBIAS1-OFFST-SIZNUM | LAX 690 |
| | IF(N.LT.0) YBIAS1 = YBIAS+OFFST | LAX 695 |
| 25 | TENBX = -YBIAS*SINANG + XBIAS*COSANG | LAX 700 |
| | C +YBIAS1*SINANG - XBIAS1*COSANG | LAX 705 |
| | TENBY = YBIAS*COSANG + XBIAS*SINANG | LAX 710 |
| | C -YBIAS1*COSANG -XBIAS1*SINANG | LAX 715 |
| 30 | XTIC = X + FLOAT(NCYCLE)*CYCLEN+COSANG | LAX 720 |
| | YTIC = Y + FLOAT(NCYCLE)*CYCLEN+SINANG | LAX 725 |
| | IF(NRPT .EQ. 0) GO TO 40 | LAX 730 |
| | NSUPR = NCYCLE - (NCYCLE/NRPT)*NRPT | LAX 735 |
| | IF(NSUPR .NE. 0) GO TO 40 | LAX 740 |
| | IF((NOEND .EQ. 1 .OR. NOEND .EQ. 2) .AND. NCYCLE .EQ. 0) | LAX 745 |
| | 1 GO TO 40 | LAX 750 |
| | IF((NOEND .EQ. 1 .OR. NOEND .EQ. 3) .AND. NCYCLE .EQ. NUMCYC) | LAX 755 |
| | 1 GO TO 40 | LAX 760 |
| | XPOS = XTIC + TENBX | LAX 765 |
| | YPOS = YTIC + TENBY | LAX 770 |
| | CALL SYMBOL(XPOS, YPOS, HEIGHT, 2H10, THETA1, 2) | LAX 775 |
| | CALL NUMBER((XPOS+EXPBX), (YPOS+EXPBY), EXP, THETA1, -1) | LAX 780 |
| 40 | CONTINUE | LAX 785 |
| C | | LAX 790 |
| C | | LAX 795 |
| C | DRAW TIC MARKS | LAX 800 |
| C | | LAX 805 |
| C | | LAX 810 |
| | CALL PLOT(XTIC , YTIC , 3) | LAX 815 |
| | CALL PLOT(XTIC+DXMAJ, YTIC+DYMAJ, 2) | LAX 820 |
| | IF(NCYCLE .EQ. NUMCYC) GO TO 70 | LAX 825 |
| | IF(NRPT .LT. 0) GO TO 60 | LAX 830 |
| | DO 50 ILOG=1,NUMLOG | LAX 835 |
| | I = ILOG+NUMTIC + 1/NUMTIC | LAX 840 |
| | XLOG = XTIC + SUBDIV(I)*COSANG | LAX 845 |
| | YLOG = YTIC + SUBDIV(I)*SINANG | LAX 850 |
| | CALL PLOT(XLOG+DXMIN, YLOG+DYMIN, 3) | LAX 855 |
| | CALL PLOT(XLOG, YLOG, 2) | LAX 860 |
| 50 | CONTINUE | LAX 865 |
| 60 | NCYCLE = NCYCLE + 1 | LAX 870 |
| | EXP = EXP + 1.0 | LAX 875 |
| | GO TO 30 | LAX 880 |
| C | | LAX 885 |
| C | | LAX 890 |
| C | DRAW AXIS | LAX 895 |
| C | | LAX 900 |
| | 70 CALL PLOT(XTIC, YTIC, 3) | LAX 905 |
| | CALL PLOT(X, Y, 2) | LAX 910 |
| | | LAX 915 |
| C | | LAX 920 |
| C | | LAX 925 |
| C | DRAW LABEL | LAX 930 |
| C | | LAX 935 |
| | IF(LSUPR .EQ. 1 .OR. NABS .EQ. 0) RETURN | LAX 940 |
| | XBIAS = 0.5*(S - BCDLEN) | LAX 945 |
| | YBIAS = (-0.50 + SIGN(3.25, SIGNAX)) * BCD5IZ | LAX 950 |
| | THETA2 = THETA - 90. * LTURN | LAX 955 |
| | XBIAS2=0. | LAX 960 |
| | OFFST=HEIGHT*2.5 | LAX 965 |
| | YBIAS2= -SIZNUM-OFFST | LAX 970 |
| | IF (N .LT. 0) YBIAS2=OFFST | LAX 975 |
| | IF (LTURN .EQ. 0) GO TO 80 | LAX 980 |
| | XBIAS2 = XBIAS -0.5*(S-HEIGHT) | LAX 985 |
| 80 | XPOS = X - YBIAS*SINANG + XBIAS*COSANG | LAX 990 |
| | C +YBIAS2*SINANG - XBIAS2*COSANG | LAX 995 |
| | YPOS = Y + YBIAS*COSANG + XBIAS*SINANG | LAX 1000 |
| | C -YBIAS2*COSANG -XBIAS2*SINANG | LAX 1005 |
| | IF(LEMSCT.NE.3 .OR. ITYP.GT.1) GO TO 85 | LAX 1010 |
| | IF(THETA.EQ.0.0) GO TO 85 | LAX 1015 |
| | YPOS=YPOS-0.375 | LAX 1018 |
| | IF(N.LT.0) CALL SYMBOL((XPOS+0.5),YPOS,BCD5IZ,2HIR,THETA2,2) | LAX 1019 |
| | IF(N.GT.0) CALL SYMBOL(XPOS,YPOS,BCD5IZ,2HIR,THETA2,2) | LAX 1020 |
| | YPOS=YPOS+0.375 | LAX 1021 |
| 85 | CONTINUE | LAX 1022 |
| | IF(N.LT.0) CALL SYMBOL((XPOS+0.5),YPOS,BCD5IZ,BCD,THETA2,NABS) | LAX 1023 |
| | IF(N.GT.0) CALL SYMBOL(XPOS,YPOS,BCD5IZ,BCD,THETA2,NABS) | LAX 1024 |
| | RETURN | LAX 1025 |
| | END | LAX 1030 |

```

SUBROUTINE DRAW(X,Y,NPT,ICURVE)
C          DRAWS DIFFERENT KINDS OF CURVES FOR Y VS X
C
C X = XARRAY TO BE PLOTTED
C Y = YARRAY TO BE PLOTTED
C NPT = NUMBER OF POINTS TO BE PLOTTED
C ICURVE INDICATES THE TYPE OF CURVE DRAWN
C   ICURVE = 1 SOLID LINE WITHOUT SYMBOLS
C   ICURVE = 2 DASHED LINE WITHOUT SYMBOLS
C   ICURVE = 3 DOTTED LINE WITHOUT SYMBOLS
C   ICURVE = 4 ALTERNATING DASHES & DOTS WITHOUT SYMBOLS
C   ICURVE = 5 ALTERNATING DASHES & 2 DOTS WITHOUT SYMBOLS
C   ICURVE = 6 TO 10 SAME AS 1 TO 5 WITH SYMBOLS AT EVERY POINT
C   THE SYMBOL CHOSEN IN THIS PROGRAM IS NO. 2 OF
C   THE LIST OF SYMBOLS AVAILABLE IN THE CALCOMP SYSTEM
C   ICURVE .GT. 10 ALTERNATING DASHES OF DIFFERENT LENGTHS
C   (THE ONES' DIGIT)*0.1 INCHES WITH (THE TENS' DIGIT)*0.1 INCH
C   ICURVE .LT. 0 DATA POINTS ONLY, WITH ABS(ICURVE) = SYMBOL NUMBER
C
COMMON /DXDY/ DX,DY, XMIN,YMIN, LOGLN,LOGLN, XMAXV, YMAXV
DIMENSION X(NPT), Y(NPT), XT(100), YT(100)
DATA KSYM, J, SIZ/2, 1, 0.05/
KT = KSYM
IF(ICURVE .LE. -1) KT = -ICURVE
CCC
CCC IF ICURVE IS INPUT AS 0 RESET TO 1 TO PLOT LINE
CCC
C IF(ICURVE.EQ.0) ICURVE=1
C   PLOT THE X, Y PAIRS IN GROUPS OF 100 POINTS
C   NEXT = 1
C   5 LAST = NEXT + 99
C     IF(LAST .LE. NPT) N = 100
C     IF(LAST .GT. NPT) N = NPT - NEXT + 1
C     IF(LAST .GT. NPT) LAST = NPT
C
C   DO 10 M = NEXT, LAST
C     I = M + 1 - NEXT
C     IF DOING LOG OR SEMI-LOG PLOT - CONVERT X AND/OR Y TO LOG(X)
C     IF( LOGLN .EQ. 0 ) XT(I) = X(M)
C     IF( LOGLN .EQ. 1 .AND. X(M) .GT. 0. ) XT(I) = ALOG10(X(M))
C     IF( LOGLN .EQ. 1 .AND. X(M) .LE. 0. ) XT(I) = XMIN
C     IF( LOGLN .EQ. 0 ) YT(I) = Y(M)
C     IF( LOGLN .EQ. 1 .AND. Y(M) .GT. 0. ) YT(I) = ALOG10(Y(M))
C     IF( LOGLN .EQ. 1 .AND. Y(M) .LE. 0. ) YT(I) = YMIN
C     5 IF X OR Y OUTSIDE OF PLOT FORCE TO NEAREST EDGE OF PLOT
C     IF(XT(I) .LT. XMIN) XT(I) = XMIN
C     IF(XT(I) .GT. XMAXV) XT(I) = XMAXV
C     IF(YT(I) .GT. YMAXV) YT(I) = YMAXV
C     IF(YT(I) .LT. YMIN) YT(I) = YMIN
C   10 CONTINUE
C   CHOOSE TYPE OF CURVE PLOTTED DEPENDING ON ICURVE
C   IF(ICURVE .LE. -1) CALL LINE(XT,YT,N,1,-1,KT,XMIN,DX,YMIN,DY,SIZ)
C   IF(ICURVE .EQ. 1) CALL LINE(XT,YT,N,1,0,KT,XMIN,DX,YMIN,DY,.08)
C   IF(ICURVE .EQ. 2) CALL DASH2(XT,YT,N,1,0,KT,XMIN,DX,YMIN,DY,.1,1,1)
C   IF(ICURVE .EQ. 3) CALL DOT(XT,YT,N,1,0,KT,XMIN,DX,YMIN,DY,.08)
C   IF(ICURVE .EQ. 4) CALL DSHOT(XT,YT,N,1,0,KT,XMIN,DX,YMIN,DY,.08)
C   IF(ICURVE .EQ. 5) CALL DSHOT2(XT,YT,N,1,0,KT,XMIN,DX,YMIN,DY,.08)
C   IF(ICURVE .EQ. 6) CALL LINE(XT,YT,N,1,J,KT,XMIN,DX,YMIN,DY, SIZ)
C   IF(ICURVE .EQ. 7) CALL DASH2(XT,YT,N,1,J,KT,XMIN,DX,YMIN,DY, SIZ,1,1)
C   IF(ICURVE .EQ. 8) CALL DOT(XT,YT,N,1,J,KT,XMIN,DX,YMIN,DY, SIZ)
C   IF(ICURVE .EQ. 9) CALL DSHOT(XT,YT,N,1,J,KT,XMIN,DX,YMIN,DY, SIZ)
C   IF(ICURVE .EQ. 10) CALL DSHOT2(XT,YT,N,1,J,KT,XMIN,DX,YMIN,DY, SIZ)
C   IF(ICURVE .LE. 10) GO TO 20
C   FOR ICURVE .GT. 10, DETERMINE LENGTH OF DASHES
C   LDASH1 = ICURVE/10
C   LDASH2 = ICURVE-10*LDASH1
C   CALL DASH2(XT,YT,N,1,0,0,XMIN,DX,YMIN,DY,.08,LDASH1,LDASH2)
C 20 CONTINUE
C   NEXT = LAST
C   IF(LAST .LT. NPT) GO TO 5
C
C RETURN
C END

```

| | | | |
|-----|---|----|-----|
| | SUBROUTINE DOT(X,Y,N,K,NUMSYM,JSYM,XMIN,DX,YMIN,DY,SYMSZE) | DT | 100 |
| CCC | DRAW A DOTTED LINE | DT | 105 |
| CCC | | DT | 110 |
| CCC | | DT | 115 |
| | DIMENSION X(N),Y(N),XD(200),YD(200) | DT | 120 |
| | COMMON/XXDYD/XD,YD | DT | 125 |
| | DATA ISYMB,NUMDOT,DOTSIZ,DOTLEN/5, -1, 0.03, 0.09/ | DT | 130 |
| | IF (NUMSYM .LT. 0) GO TO 250 | DT | 135 |
| | XDOT = DX * DOTLEN | DT | 140 |
| | YDOT = DY * DOTLEN | DT | 145 |
| | RESID * DOTLEN | DT | 150 |
| | MB = K+1 | DT | 155 |
| | DO 200 I = MB,N,K | DT | 160 |
| | XLEN = (X(I)-X(I-K))/DX | DT | 165 |
| | YLEN = (Y(I) - Y(I-K))/DY | DT | 170 |
| | SLEN = SQRT(XLEN **2 + YLEN **2) | DT | 175 |
| | IF(SLEN .LE. 0.) GO TO 200 | DT | 180 |
| | TLEN = SLEN + RESID | DT | 185 |
| | NDOT = 0 | DT | 190 |
| | IF (TLEN .LT. DOTLEN) GO TO 150 | DT | 195 |
| | NDOT = INT(TLEN / DOTLEN) | DT | 200 |
| | XSTEP = XDOT * XLEN/SLEN | DT | 205 |
| | YSTEP = YDOT * YLEN/SLEN | DT | 210 |
| | SS = 1. - RESID/DOTLEN | DT | 215 |
| | YD(1) = SS * YSTEP + Y(I-K) | DT | 220 |
| | XD(1) = SS * XSTEP + X(I-K) | DT | 225 |
| | IF (NDOT .LT. 2) GO TO 230 | DT | 230 |
| | DO 10 J = 2,NDOT | DT | 235 |
| | XD(J) = XD(J-1) + XSTEP | DT | 240 |
| | YD(J) = YD(J-1) + YSTEP | DT | 245 |
| 10 | CONTINUE | DT | 250 |
| 20 | CONTINUE | DT | 255 |
| | CALL LINE (XD,YD,NDOT,1,NUMDOT,ISYMB,XMIN,DX,YMIN,DY,DOTSIZ) | DT | 260 |
| 150 | RESID = TLEN - NDOT * DOTLEN | DT | 265 |
| 200 | CONTINUE | DT | 270 |
| 250 | CONTINUE | DT | 275 |
| | IF(NUMSYM .EQ. 0) GO TO 300 | DT | 280 |
| | IF(NUMSYM .LT. 0) NUMSYM = IABS(NUMSYM) | DT | 285 |
| | DO 40 MN = 1,N,NUMSYM | DT | 290 |
| | CALL SYMBOL((X(MN)-XMIN)/DX,(Y(MN)-YMIN)/DY,SYMSZE,JSYM,0.0,-1) | DT | 295 |
| 40 | CONTINUE | DT | 300 |
| 300 | CONTINUE | DT | 305 |
| | RETURN | DT | 310 |
| | END | DT | 315 |

```

SUBROUTINE DSHT2(X,Y,N,K,NUMSYM,JSYM,XMIN,DX,YMIN,DY,SYMSZ)  DD2 100
CCC  DD2 105
CCC  DD2 110
CCC  DD2 115
DIMENSION X(N),Y(N),XD(200),YD(200)  DD2 120
COMMON/XXDYD/XD,YD  DD2 125
DATA DOTLEN/0.09/  DD2 130
KPT = 0  DD2 135
IF (NUMSYM .LT. 0) GO TO 250  DD2 140
XDOT = DX * DOTLEN  DD2 145
YDOT = DY * DOTLEN  DD2 150
RESID = DOTLEN  DD2 155
MB = K+1  DD2 160
DO 200 I = MB,N,K  DD2 165
XLEN = (X(I)-X(I-K))/DX  DD2 170
YLEN = (Y(I) - Y(I-K))/DY  DD2 175
SLEN = SQRT(XLEN **2 + YLEN **2)  DD2 180
IF(SLEN .LE. 0.) GO TO 200  DD2 185
TLEN = SLEN + RESID  DD2 190
NDOT = 0  DD2 195
IF ( TLEN .LT. DOTLEN ) GO TO 150  DD2 200
NDOT = INT(TLEN / DOTLEN)  DD2 205
XSTEP = XDOT * XLEN/SLEN  DD2 210
YSTEP = YDOT * YLEN/SLEN  DD2 215
SS = 1. - RESID/DOTLEN  DD2 220
YD(1) = SS * YSTEP + Y(I-K)  DD2 225
XD(1) = SS * XSTEP + X(I-K)  DD2 230
IF ( NDOT .LT. 2 ) GO TO 20  DD2 235
DO 10 J = 2,NDOT  DD2 240
XD(J) = XD(J-1) + XSTEP  DD2 245
YD(J) = YD(J-1) + YSTEP  DD2 250
10 CONTINUE  DD2 255
20 CONTINUE  DD2 260
DO 30 L = 1,NDOT  DD2 265
KPT = KPT + 1  DD2 270
IF(KPT .EQ. 1) CALL PLOT((XD(L)-XMIN)/DX,(YD(L)-YMIN)/DY,3)  DD2 275
IF(KPT .EQ. 5) CALL PLOT((XD(L)-XMIN)/DX,(YD(L)-YMIN)/DY,2)  DD2 280
IF(KPT .EQ. 6)  DD2 285
+CALL SYMBOL((XD(L)-XMIN)/DX,(YD(L)-YMIN)/DY,.03,5,0.0,-1)  DD2 290
IF(KPT .EQ. 7)  DD2 295
+CALL SYMBOL((XD(L)-XMIN)/DX,(YD(L)-YMIN)/DY,.03,5,0.0,-1)  DD2 300
IF(KPT .EQ. 7) KPT = 0  DD2 305
30 CONTINUE  DD2 310
IF(KPT .GE. 1 .AND. KPT .LE.4)  DD2 315
+CALL PLOT((X(I)-XMIN)/DX,(Y(I)-YMIN)/DY,2)  DD2 320
150 RESID = TLEN - NDOT * DOTLEN  DD2 325
200 CONTINUE  DD2 330
250 CONTINUE  DD2 335
IF(NUMSYM .EQ. 0) GO TO 300  DD2 340
IF(NUMSYM .LT. 0) NUMSYM = IABS(NUMSYM)  DD2 345
DO 40 MN = 1,N,NUMSYM  DD2 350
CALL SYMBOL((X(MN)-XMIN)/DX,(Y(MN)-YMIN)/DY,SYMSZ,JSYM,0.0,-1)  DD2 355
40 CONTINUE  DD2 360
300 CONTINUE  DD2 365
RETURN  DD2 370
END  DD2 375

```


| | | |
|-----|---|---------|
| CCC | SUBROUTINE DSHOOT(X,Y,N,K,NUMSYM,JSYM,XMIN,DX,YMIN,DY,SYMSZE) | DHD 100 |
| CCC | DRAW A LINE WITH ALTERNATING DASHES AND DOTS | DHD 105 |
| CCC | | DHD 110 |
| | DIMENSION X(N),Y(N),XD(200),YD(200) | DHD 115 |
| | COMMON/XXDYD/XD,YD | DHD 120 |
| | DATA DOTLEN/0.09/ | DHD 125 |
| | KPT = 0 | DHD 130 |
| | IF (NUMSYM .LT. 0) GO TO 250 | DHD 135 |
| | XDOT = DX * DOTLEN | DHD 140 |
| | YDOT = DY * DOTLEN | DHD 145 |
| | RESID = DOTLEN | DHD 150 |
| | MS = K+1 | DHD 155 |
| | DO 200 I = MB,N,K | DHD 160 |
| | XLEN = (X(I)-X(I-K))/DX | DHD 165 |
| | YLEN = (Y(I) - Y(I-K))/DY | DHD 170 |
| | SLEN = SQRT(XLEN **2 + YLEN **2) | DHD 175 |
| | IF(SLEN .LE. 0.) GO TO 200 | DHD 180 |
| | TLEN = SLEN * RESID | DHD 185 |
| | NDOT = 0 | DHD 190 |
| | IF (TLEN .LT. DOTLEN) GO TO 150 | DHD 195 |
| | NDOT = INT(TLEN / DOTLEN) | DHD 200 |
| | XSTEP = XDOT * XLEN/SLEN | DHD 205 |
| | YSTEP = YDOT * YLEN/SLEN | DHD 210 |
| | SS = 1. - RESID/DOTLEN | DHD 215 |
| | YD(1) = SS * YSTEP + Y(I-K) | DHD 220 |
| | XD(1) = SS * XSTEP + X(I-K) | DHD 225 |
| | IF (NDOT .LT. 2) GO TO 20 | DHD 230 |
| | DO 10 J = 2,NDOT | DHD 235 |
| | XD(J) = XD(J-1) + XSTEP | DHD 240 |
| | YD(J) = YD(J-1) + YSTEP | DHD 245 |
| 10 | CONTINUE | DHD 250 |
| 20 | CONTINUE | DHD 255 |
| | DO 30 L = 1,NDOT | DHD 260 |
| | KPT = KPT + 1 | DHD 265 |
| | IF(KPT .EQ. 1) CALL PLOT((XD(L)-XMIN)/DX,(YD(L)-YMIN)/DY,3) | DHD 270 |
| | IF(KPT .EQ. 3) CALL PLOT((XD(L)-XMIN)/DX,(YD(L)-YMIN)/DY,2) | DHD 275 |
| | IF(KPT .EQ. 4) | DHD 280 |
| | +CALL SYMBOL((XD(L)-XMIN)/DX,(YD(L)-YMIN)/DY,.03,5,0.0,-1) | DHD 285 |
| | IF(KPT .EQ. 4) KPT = 0 | DHD 290 |
| 30 | CONTINUE | DHD 295 |
| | IF(KPT .GE. 1 .AND. KPT .LE.2) | DHD 300 |
| | +CALL PLOT((X(I)-XMIN)/DX,(Y(I)-YMIN)/DY,2) | DHD 305 |
| 150 | RESID = TLEN - NDOT * DOTLEN | DHD 310 |
| 200 | CONTINUE | DHD 315 |
| 250 | CONTINUE | DHD 320 |
| | IF(NUMSYM .EQ. 0) GO TO 300 | DHD 325 |
| | IF(NUMSYM .LT. 0) NUMSYM = IABS(NUMSYM) | DHD 330 |
| | DO 40 MN = 1,N,NUMSYM | DHD 335 |
| | CALL SYMBOL((X(MN)-XMIN)/DX,(Y(MN)-YMIN)/DY,SYMSZE,JSYM,0.0,-1) | DHD 340 |
| 40 | CONTINUE | DHD 345 |
| 300 | CONTINUE | DHD 350 |
| | RETURN | DHD 355 |
| | END | DHD 360 |
| | | DHD 365 |

| | | |
|-----|--|---------|
| | SUBROUTINE DASH2(X,Y,N,K,NUMSYM,JSYM,XMIN,DX,YMIN,DY,SYMSZE, LDASH1,LDASH2) | DH2 100 |
| CCC | | DH2 105 |
| CCC | VARIABLE LENGTH DASH ROUTINE | DH2 110 |
| CCC | | DH2 115 |
| | DIMENSION X(N),Y(N),XD(200),YD(200) | DH2 120 |
| | COMMON/XXDYD/XD,YD | DH2 125 |
| | DATA DOTLEN/0.1/ | DH2 130 |
| | KPT = 0 | DH2 135 |
| | IF (NUMSYM .LT. 0) GO TO 250 | DH2 140 |
| | M1 = 1 + LDASH1 | DH2 145 |
| | MS2 = M1 + 1 | DH2 150 |
| | M2 = MS2 + LDASH2 | DH2 155 |
| | XDOT = DX * DOTLEN | DH2 160 |
| | YDOT = DY * DOTLEN | DH2 165 |
| | RESID = DOTLEN | DH2 170 |
| | MB = K+1 | DH2 175 |
| | DO 200 I = MB,N,K | DH2 180 |
| | XLEN = (X(I)-X(I-K))/DX | DH2 185 |
| | YLEN = (Y(I) - Y(I-K))/DY | DH2 190 |
| | SLEN = SQRT(XLEN **2 + YLEN **2) | DH2 195 |
| | IF(SLEN .LE. 0.) GO TO 200 | DH2 200 |
| | TLEN = SLEN + RESID | DH2 205 |
| | NDOT = 0 | DH2 210 |
| | IF (TLEN .LT. DOTLEN) GO TO 150 | DH2 215 |
| | NDOT = INT(TLEN / DOTLEN) | DH2 220 |
| | XSTEP = XDOT * XLEN/SLEN | DH2 225 |
| | YSTEP = YDOT * YLEN/SLEN | DH2 230 |
| | SS = 1. - RESID/DOTLEN | DH2 235 |
| | YD(1) = SS * YSTEP + Y(I-K) | DH2 240 |
| | XD(1) = SS * XSTEP + X(I-K) | DH2 245 |
| | IF (NDOT .LT. 2) GO TO 20 | DH2 250 |
| | DO 10 J = 2,NDOT | DH2 255 |
| | XD(J) = XD(J-1) + XSTEP | DH2 260 |
| | YD(J) = YD(J-1) + YSTEP | DH2 265 |
| 10 | CONTINUE | DH2 270 |
| 20 | CONTINUE | DH2 275 |
| | DO 30 L = 1,NDOT | DH2 280 |
| | KPT = KPT + 1 | DH2 285 |
| | IF(KPT .EQ. 1) CALL PLOT((XD(L)-XMIN)/DX,(YD(L)-YMIN)/DY,3) | DH2 290 |
| | IF(KPT .EQ..M1) CALL PLOT((XD(L)-XMIN)/DX,(YD(L)-YMIN)/DY,2) | DH2 295 |
| | IF(KPT .EQ. MS2) CALL PLOT((XD(L)-XMIN)/DX,(YD(L)-YMIN)/DY,3) | DH2 300 |
| | IF(KPT .EQ. M2) CALL PLOT((XD(L)-XMIN)/DX,(YD(L)-YMIN)/DY,2) | DH2 305 |
| | IF(KPT .EQ. M2) KPT = 0 | DH2 310 |
| 30 | CONTINUE | DH2 315 |
| | IF(KPT .GE. 1 .AND. KPT .LT. M1) | DH2 320 |
| | +CALL PLOT((X(I)-XMIN)/DX,(Y(I)-YMIN)/DY,2) | DH2 325 |
| | IF(KPT .GE. MS2 .AND. KPT .LT. M2) | DH2 330 |
| | +CALL PLOT((X(I)-XMIN)/DX,(Y(I)-YMIN)/DY,2) | DH2 335 |
| 150 | RESID = TLEN - NDOT * DOTLEN | DH2 340 |
| 200 | CONTINUE | DH2 345 |
| 250 | CONTINUE | DH2 350 |
| | IF(NUMSYM .EQ. 0) GO TO 300 | DH2 355 |
| | IF(NUMSYM .LT. 0) NUMSYM = IABS(NUMSYM) | DH2 360 |
| | DO 40 MN = 1,N,NUMSYM | DH2 365 |
| | CALL SYMBOL((X(MN)-XMIN)/DX,(Y(MN)-YMIN)/DY,SYMSZE,JSYM,0.0,-1) | DH2 370 |
| 40 | CONTINUE | DH2 375 |
| 300 | CONTINUE | DH2 380 |
| | RETURN | DH2 385 |
| | END | DH2 390 |
| | | DH2 395 |

Table 9. Description of LOWTRAN Filter Programs Subroutines

| | | Page No. |
|--------|--|-------------|
| LOWFIL | MAIN DRIVER PROGRAM. READS CONTROL CARDS AND TAPE7 OUTPUT FROM LOWTRAN. | 188 |
| WAVEN | CHANGES A SYSTEM RESPONSE FUNCTION VS WAVELENGTH (μm) TO A RESPONSE FUNCTION VS WAVENUMBER (CM^{-1}) | 195 |
| BRACK | FINDS THE LOWTRAN WAVENUMBERS, WHICH BRACKET THE SYSTEM RESPONSE FUNCTION. | 196 |
| INTLOG | INTERPOLATES A PAIR OF VECTORS $F(I) = f(x_i)$, AND $X(I) = x_i$, $i = 1, 2, \dots, N$, TO A NEW SET OF COORDINATES $FNEW(J) = f(x_j)$ & $XNEW(J) = x_j$, $j = 1, 2, \dots, M$. | 195 |
| BIGFIL | ROUTINE TO FIND THE MAXIMUM VALUE OF THE SYSTEM RESPONSE FUNCTIONS. | 194 |
| INTRAD | INTEGRATES THE EMITTED OR SCATTERED RADIANCE FROM LOWTRAN TIMES THE SYSTEM RESPONSE FUNCTION. | 194 |
| BLKBDY | WEIGHTS THE SYSTEM RESPONSE FUNCTION BY A BLACKBODY RADIANCE. | 196 |
| INTGRT | FINDS THE AVERAGE VALUE OF THE TRANSMITTANCE FROM LOWTRAN WEIGHTED BY THE SYSTEM RESPONSE FUNCTION. | 194 |
| COMBT | FINDS THE WEIGHTED AVERAGE TRANSMITTANCE DUE TO WATER VAPOR (BOTH BAND-TYPE AND CONTINUUM COMBINED) AND ALL THE OTHER GASES COMBINED. | 196 |

Table 10. Listing of LOWTRAN 6 Filter Function Code

Pages 187 to 196

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PROGRAM LOWFIL(INPUT,OUTPUT,TAPES=INPUT,TAPES=OUTPUT,TAPE7)      FIL 100
C                                                                    FIL 105
C                                                                    FIL 110
C                                                                    FIL 115
C                                                                    FIL 120
C                                                                    FIL 125
C                                                                    FIL 130
C                                                                    FIL 135
C                                                                    FIL 140
C                                                                    FIL 145
C                                                                    FIL 150
C                                                                    FIL 155
C-----FILTER FUNCTION CONTROL INPUTS-----                      FIL 160
C 1.) CARD 1 NF,NEW,IFT,TEMP,IPRINT,NLOW (315, F10.2, 215)      FIL 165
C   NF = NUMBER OF FILTERS (15)                                  FIL 170
C   IF NF > 0 READ IN NF FILTERS (NF<=15)                       FIL 175
C   IF NF = 0 USE PRECEDING FILTERS AND LOWTRANOUTPUT, WITH     FIL 180
C   OPTION TO CHANGE BLACKBODY TEMPERATURE.                     FIL 185
C   IF (NF < 0) STOP FILTER PROGRAM                             FIL 190
C   NEW = OPTION TO USE SAME LOWTRAN DATA SET FOR NEXT FILTER-- FIL 195
C   0=NO, 1=YES--REWINDS LOWTRAN FILE (15)                       FIL 200
C   IFT = OPTION TO ENTER BLACKBODY TEMPERATURE                 FIL 205
C   0=NO BLACKBODY, 1=FOLD IN BLACKBODY TEMPERATURE (15)      FIL 210
C   TEMP = BLACKBODY TEMPERATURE IN DEGREES KELVIN (F10.2)     FIL 215
C   IPRINT = DATA PRINT CONTROL (15)                           FIL 220
C   IF IPRINT>=10, PRINT LOWTRAN TRANSMITTANCES AND INFO       FIL 225
C   BELOW                                                        FIL 230
C   IF IPRINT>=5, PRINT FILTER FUNCTION WITH BLACKBODY         FIL 235
C   FUNCTION FOLDED IN.                                         FIL 240
C   IF IPRINT<5, ONLY PRINT FINAL TRANSMITTANCES.              FIL 245
C   NLOW = NUMBER OF LOWTRAN FILES TO BE READ (15)             FIL 250
C                                                                    FIL 255
C REPEAT CARDS 2 AND 3 NF TIMES                                   FIL 260
C 2.) CARD 2 IDFIL,MODE,IFWV,NW (2A10, 315)                       FIL 265
C   IDFIL = FILTER IDENTIFICATION (2A10)                        FIL 270
C   MODE = FILTER NUMBER (15)                                   FIL 275
C   IFWV = OPTION TO CONVERT FROM WAVELENGTH TO WAVENUMBER--   FIL 280
C   0=YES, 1=NO (15)                                           FIL 285
C   NW = NUMBER OF WAVELENGTHS FOR THE FILTER (15) (NW<=80)   FIL 290
C                                                                    FIL 295
C 3.) CARD 3 (WAVE(I), FF(I), I=1,NW) (FREE FORMAT--AS MANY CARDS FIL 300
C   AS NEEDED FOR NW WAVELENGTHS)                              FIL 305
C   WAVE = WAVELENGTH OR WAVENUMBER                             FIL 310
C   FF = CORRESPONDING FILTER FUNCTION                         FIL 315
C PROGRAM ASSUMES FILTER FUNCTION INPUTS ARE ON TAPES AND      FIL 320
C LOWTRANOUTPUT FILES ARE ON TAPE7.                             FIL 325
C-----                                                                    FIL 330
C                                                                    FIL 335
C DIMENSION IVP(15), IVL(15), VP(15), NVL(15)                  FIL 340
C DIMENSION BIGF(15),TRRND(9,15)                               FIL 345
C DIMENSION IDFIL(15,15), MODE(15), IFWV(15)                  FIL 350
C DIMENSION NW(15)                                              FIL 355
C DIMENSION FIFT(500), TRRND(9,15)                              FIL 360
C DIMENSION ACRO2A(20),ACRO2B(20),ACRO2C(20),AC03A1(20),AC03A2(20) FIL 365
C COMMON /WAVE(80,15), FF(80,15), RST(500,10),VNU(500),ALAM(500) FIL 370
C COMMON/ATM/VIS,TEMP,DP,RANGE                                  FIL 375
C 1 READ(5,910) NF, NEW, IFT, TEMP, IPRINT, NLOW               FIL 380
C WRITE (6,915) NF, NEW, IFT, TEMP, IPRINT, NLOW              FIL 385
C IF(NF .GT. 0) NFIL = NF                                      FIL 390

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| | | |
|---|--|---------|
| | IF(NF .EQ. 0) GO TO 140 | FIL 395 |
| | IF(NF .LT. 0) GO TO 801 | FIL 400 |
| C | | FIL 405 |
| | DO 120 L=1,NFIL | FIL 410 |
| | READ(5,920) (IDFIL(I,L),I=1,5), KODE(L), IFWV(L), NW(L) | FIL 415 |
| | NT = NW(L) | FIL 420 |
| | READ(5,*) (WAVE(K,L), FF(K,L), K=1,NT) | FIL 425 |
| | IF(IFWV(L).EQ.1) GO TO 50 | FIL 430 |
| | WRITE (6,930) (IDFIL(I,L), I=1,5), KODE(L), IFWV(L), NW(L), | FIL 435 |
| | +(WAVE(K,L), FF(K,L), K=1,NT) | FIL 440 |
| | | FIL 445 |
| C | CONVERT FROM WAVELENGTH TO WAVENUMBER IF NECESSARY. | FIL 450 |
| C | REVERSE ORDER OF FILTER FUNCTIONS AND WAVENUMBERS TO BE | FIL 455 |
| C | COMPATIBLE WITH LOWTRAN. | FIL 460 |
| C | | FIL 465 |
| | CALL WAVEN(WAVE(1,L), FF(1,L),NT) | FIL 470 |
| | 50 CONTINUE | FIL 475 |
| | WRITE (6,940) (IDFIL(I,L), I=1,5), KODE(L), IFWV(L), NW(L), | FIL 480 |
| | +(WAVE(K,L), FF(K,L), K=1,NT) | FIL 485 |
| | 120 CONTINUE | FIL 490 |
| | IF NEW GE 1 USE PRECEDING LOWTRAN DATA READ | FIL 495 |
| C | 140 IF(NEW .GE. 1) REWIND 7 | FIL 500 |
| | | FIL 505 |
| C | ***** READ IN LOWTRAN DATA FILE ***** | FIL 510 |
| C | | FIL 515 |
| C | READ LOWTRAN HEADER CARDS | FIL 520 |
| C | READ IN LOWTRAN DATA FILE FROM TAPE--WAVENUMBER VS | FIL 525 |
| C | TRANSMITTANCE FOR THE NINE MOLECULAR AND AEROSOL COMPONENTS | FIL 530 |
| | DO 400 KK=1,NLOW | FIL 535 |
| C | | FIL 540 |
| | WRITE (6,945) | FIL 545 |
| | READ (7,950) MODEL, ITYPE, IEMSC, M1, M2, M3, IM, NOPRT, TBOUND, SALB | FIL 550 |
| | WRITE (6,950) MODEL, ITYPE, IEMSC, M1, M2, M3, IM, NOPRT, TBOUND, SALB | FIL 555 |
| | READ (7,952) IHAZE, ISEASN, IVULCN, ICSTL, ICIR, IVSA, | FIL 560 |
| | *VIS, WSS, WHH, RAINRT | FIL 565 |
| | WRITE (6,952) IHAZE, ISEASN, IVULCN, ICSTL, ICIR, IVSA, | FIL 570 |
| | *VIS, WSS, WHH, RAINRT | FIL 575 |
| | READ (7,954) AC02A | FIL 580 |
| | WRITE (6,954) AC02A | FIL 585 |
| | READ (7,954) AC02B | FIL 590 |
| | WRITE (6,954) AC02B | FIL 595 |
| | READ (7,954) AC02C | FIL 600 |
| | WRITE (6,954) AC02C | FIL 605 |
| | IF(MODEL.NE.0) READ (7,958) M1, M2, ANGLE, RANGE, BETA, RO, LEN | FIL 610 |
| | IF(MODEL.NE.0) WRITE (6,958) M1, M2, ANGLE, RANGE, BETA, RO, LEN | FIL 615 |
| | IF(MODEL.EQ.0) READ (7,958) M1, P, T, DP, RH, WH, WD, RANGE | FIL 620 |
| | IF(MODEL.EQ.0) WRITE (6,958) M1, P, T, DP, RH, WH, WD, RANGE | FIL 625 |
| | READ (7,954) AC03A1 | FIL 630 |
| | WRITE (6,954) AC03A1 | FIL 635 |
| | READ (7,954) AC03A2 | FIL 640 |
| | WRITE (6,954) AC03A2 | FIL 645 |
| | READ (7,960) V1, V2, DV | FIL 650 |
| | WRITE (6,960) V1, V2, DV | FIL 655 |
| | READ (7,962) IRPT | FIL 660 |
| | WRITE (6,962) IRPT | FIL 665 |
| | READ (7,963) RAIN, CIRRS | FIL 670 |
| | NP = INT((V2 - V1)/DV) + 1 | FIL 675 |
| | IF(IPRINT.LT.10) GO TO 145 | FIL 680 |
| | IF(IEMSC.EQ.0) WRITE (6,968) RAIN, CIRRS | FIL 685 |

| | | |
|-----|--|---------|
| | IF(IEMSCY.GT.0) WRITE (6,969) RAIN,CIRRUS | FIL 690 |
| | CONTINUE | FIL 695 |
| 145 | DO 150 J=1,NP | FIL 700 |
| | IF(IEMSCY.EQ.0) READ (7,964) VNU(J), ALAM(J), (RST(J,I),I=1,10) | FIL 705 |
| | IF(IEMSCY.GT.0) READ (7,966) VNU(J), ALAM(J), (RST(J,I),I=1,10) | FIL 710 |
| | IF(IPRINT.LT.10) GO TO 150 | FIL 715 |
| | IF(IEMSCY.EQ.0) WRITE (6,965) VNU(J), ALAM(J), (RST(J,I),I=1,10) | FIL 720 |
| | IF(IEMSCY.GT.0) WRITE (6,967) VNU(J), ALAM(J), (RST(J,I),I=1,10) | FIL 725 |
| 150 | CONTINUE | FIL 730 |
| C | | FIL 735 |
| C | +++++ CALCULATE WEIGHTED TRANSMITTANCES +++++ | FIL 740 |
| C | | FIL 745 |
| C | THIS PART OF THE PROGRAM NOW LOOPS OVER EACH OF THE LOWTRAN | FIL 750 |
| C | TRANSMITTANCES, CALCULATING WEIGHTED TRANSMITTANCES FOR EACH | FIL 755 |
| C | MOLECULAR OR AEROSOL COMPONENT | FIL 760 |
| | DO 300 L=1,NP | FIL 765 |
| | NT = NW(L) | FIL 770 |
| C | | FIL 775 |
| C | FIND ARRAY IN LOWTRAN WAVENUMBERS WHICH BRACKETS THE FILTER | FIL 780 |
| C | FUNCTION WAVENUMBERS. | FIL 785 |
| | | FIL 790 |
| | CALL BRACK(V1, WAVE(1,L), NT, DV, IVP(L), IVL(L), NVL(L)) | FIL 795 |
| | IA = IVP(L) | FIL 800 |
| | IB = IVL(L) | FIL 805 |
| | VF(L) = VNU(IA) | FIL 810 |
| | WRITE (6,970) KODE(L), (IDFIL(J,L), J=1,5) | FIL 815 |
| | IF(IPRINT.GE.5) | FIL 820 |
| | *WRITE (6,972) IA, IB, NVL(L), VNU(IA), VNU(IB) | FIL 825 |
| | | FIL 830 |
| C | | FIL 835 |
| C | INTERPOLATE IN INPUT FILTER FUNCTION RESPONSES TO GET FILTER | FIL 840 |
| C | FUNCTIONS FOR LOWTRAN WAVENUMBERS. | FIL 845 |
| | | FIL 850 |
| | CALL INTLOG(FP(1,L), WAVE(1,L), NT, FILT, VNU(IA), NVL(L)) | FIL 855 |
| C | | FIL 860 |
| C | CHECK INTERPOLATED FILTER VALUES | FIL 865 |
| C | IF ANY ARE NEGATIVE RESET TO ZERO | FIL 870 |
| | | FIL 875 |
| | N=NVL(L) | FIL 880 |
| | DO 210 I=1,N | FIL 885 |
| | IF(FILT(I).LT.0) FILT(I)=0. | FIL 890 |
| 210 | CONTINUE | FIL 895 |
| | CALL BIGFIL(FILT,NVL(L),BIGF(L)) | FIL 900 |
| | IF(IPRINT.LT.5) GO TO 260 | FIL 905 |
| | IF(IEMSCY.EQ.0) IE=1 | FIL 910 |
| | IF(IEMSCY.GT.0) IE=10 | FIL 915 |
| | WRITE (6,976) (VNU(M), FILT(M-IA+1), RST(M,IE), M=IA,IB) | FIL 920 |
| 250 | CONTINUE | FIL 925 |
| | IF(IEMSCY.LT.1) GO TO 270 | FIL 930 |
| | IF(IEMSCY.EQ.2) GO TO 260 | FIL 935 |
| C | | FIL 940 |
| C | IEMSCY=1 STANDARD EMISSION RUN | FIL 945 |
| C | INTEGRATE THE PATH RADIANCE AND TOTAL TRANS. | FIL 950 |
| | | FIL 955 |
| C | OR IEMSCY=3 DIRECT SOLAR | FIL 960 |
| C | INTEGRATE THE TRANSMITTED IRRADIANCE AND TOTAL TRANSMITTANCE | FIL 965 |
| | | FIL 970 |
| | CALL INTRAD(FILT,RST(IA,1),NVL(L),DV,TRND(1,L)) | FIL 975 |
| | TRND(1,L)=TRND(1,L)/BIGF(L) | FIL 980 |
| | IF(IPT.EQ.1) CALL SUNBOY(TEMP,FILT,NVL(L),VNU(IA)) | FIL 985 |

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IF(IPRINT.GE.5 .AND. IFT.EQ.1) WRITE (6,975)          FIL 970
IF(IPRINT.GE.5 .AND. IFT.EQ.1)                      FIL 975
WRITE (6,976) (VNU(M),FILT(M-IA+1),RST(M,IE),M=IA,18) FIL 980
CALL INTGRT(FILT,RST(IA,10),NVL(L),TRNRD(9,L))      FIL 985
GO TO 280                                           FIL 990
260 CONTINUE                                         FIL 995
C                                                     FIL 1000
C IEMSCY=2 EMISSION WITH SCATTERING                 FIL 1005
C INTEGRATE THE PATH RADIANCE, SCATTERED RADIANCE, REFLECTED RADIANCE FIL 1010
C TOTAL RADIANCE AND TOTAL TRANS.                  FIL 1015
C                                                    FIL 1020
DO 265 I=1,7,2                                       FIL 1025
CALL INTRAD(FILT,RST(IA,I),NVL(L),DV,TRNRD(I,L))   FIL 1030
TRNRD(I,L)=TRNRD(I,L)/SIGF(L)                       FIL 1035
265 CONTINUE                                         FIL 1040
IF(IFT.EQ.1) CALL BLKBDY(TEMP,FILT,NVL(L),VNU(IA))  FIL 1045
IF(IPRINT.GE.5 .AND. IFT.EQ.1) WRITE (6,975)       FIL 1050
IF(IPRINT.GE.5 .AND. IFT.EQ.1)                     FIL 1055
WRITE (6,976) (VNU(M),FILT(M-IA+1),RST(M,IE),M=IA,18) FIL 1060
CALL INTGRT(FILT,RST(IA,10),NVL(L),TRNRD(9,L))    FIL 1065
GO TO 290                                           FIL 1070
270 CONTINUE                                         FIL 1075
C                                                     FIL 1080
C IEMSCY=0 STANDARD TRANSMISSION RUN                FIL 1085
C INTEGRATE ALL MOLECULES                           FIL 1090
C                                                    FIL 1095
C MERGE WATER CONTINUUM WITH WATER BAND TO GET AVERAGE WATER          FIL 1100
C TRANSMITTANCE (WATAV). MERGE GASES TO GET UNIFORMLY MIXED          FIL 1105
C GASES TRANSMITTANCE (GASAV).                                       FIL 1110
C                                                                    FIL 1115
IF(IFT.EQ.1) CALL BLKBDY(TEMP,FILT,NVL(L),VNU(IA))  FIL 1120
IF(IPRINT.GE.5 .AND. IFT.EQ.1) WRITE (6,975)       FIL 1125
IF(IPRINT.GE.5 .AND. IFT.EQ.1)                     FIL 1130
WRITE (6,976) (VNU(M),FILT(M-IA+1),RST(M,IE),M=IA,18) FIL 1135
CALL INTGRT(FILT,RST(IA,10),NVL(L),WATAV,GASAV)    FIL 1140
DO 275 I=1,9                                       FIL 1145
CALL INTGRT(FILT,RST(IA,I),NVL(L),TRNRD(I,L))     FIL 1150
275 CONTINUE                                         FIL 1155
WRITE (6,977)                                       FIL 1160
WRITE (6,978) (I,TRNRD(I,L),I=1,9)                 FIL 1165
WATAV=WATAV+GASAV+TRNRD(9,L)*RAIN+CIRNUS           FIL 1170
TRNRD(1,L)=TRNRD(1,L)+TRNRD(1,L)+TRNRD(4,L)+TRNRD(5,L)+TRNRD(6,L)+ FIL 1175
+TRNRD(7,L)+TRNRD(8,L)+TRNRD(9,L)*RAIN+CIRNUS     FIL 1180
WRITE (6,980) T100, WATAV, RAIN, CIRNUS           FIL 1185
IF(MODEL.EQ.0) WRITE (6,982) VIS, T, OP, P, RANGE, TEMP. FIL 1190
+TRNRD(1,L),WATAV,GASAV, TRNRD(6,L), MODE(L), (IDFIL(I,L),I=1,5) FIL 1195
IF(MODEL.NE.0) WRITE (6,983) VIS,TEMP,TRNRD(1,L),WATAV,GASAV, FIL 1200
+TRNRD(6,L),MODE(L),(IDFIL(I,L),I=1,5)            FIL 1205
GO TO 300                                           FIL 1210
280 CONTINUE                                         FIL 1215
WRITE (6,988)                                       FIL 1220
IF(MODEL.EQ.0) WRITE (6,984) VIS,T,OP,P,RANGE,TEMP, FIL 1225
+TRNRD(1,L),TRNRD(9,L),MODE(L),(IDFIL(I,L),I=1,5)  FIL 1230
IF(MODEL.NE.0) WRITE (6,985) VIS,TEMP,TRNRD(1,L),TRNRD(9,L), FIL 1235
+MODE(L),(IDFIL(I,L),I=1,5)                       FIL 1240
WRITE (6,989)                                       FIL 1245
IF(MODEL.EQ.0) WRITE (6,994) TRNRD(1,L)           FIL 1250
IF(MODEL.NE.0) WRITE (6,995) TRNRD(1,L)           FIL 1255
GO TO 300                                           FIL 1260

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290 CONTINUE
WRITE (6,988)
IF(MODEL.EQ.0) WRITE (6,986) VIS,T,DP,P,RANGE,TEMP,
+TRNRD(1,L),TRNRD(3,L),TRNRD(5,L),TRNRD(7,L),TRNRD(9,L),
+MODE(L),(IDFIL(I,L),I=1,5)
IF(MODEL.NE.0) WRITE (6,987) VIS,TEMP,TRNRD(1,L),TRNRD(3,L),
+TRNRD(5,L),TRNRD(7,L),TRNRD(9,L),KODE(L),(IDFIL(I,L),I=1,5)
WRITE (6,989)
IF(MODEL.EQ.0) WRITE (6,998) TRRDNO(1,L),TRRDNO(3,L),TRRDNO(5,L),
+TRRDNO(7,L)
IF(MODEL.NE.0) WRITE (6,997) TRRDNO(1,L),TRRDNO(3,L),TRRDNO(5,L),
+TRRDNO(7,L)
300 CONTINUE

C
C TEST FOR END-OF-FILE.
C LOWTRAN 8 SEPARATES FILES WITH A -9999. CODE IN THE
C FIRST WORD (F7.0) FOLLOWING THE LAST RECORD OF DATA OUTPUT.
C
READ (7,999) DUM
IF (DUM.EQ.-9999.) GO TO 400
310 WRITE (6,998)
STOP
400 CONTINUE
GO TO 1
801 CONTINUE
STOP

C
C ***** FORMATS *****
C
910 FORMAT(3I5, F10.2, 2I5)
915 FORMAT(2IH1 NUMBER OF FILTERS= , I5, 2X, 4HNEW=, I5, 2X, 4HIFT=,
+I5, 2X, 12HTEMPERATURE=, F10.2, 2X, 7HPRINT=, I5, 2X, 5HLOW=, I5)
920 FORMAT(5A4, 3I5)
930 FORMAT(/1H0, 2X, 12H FILTER NAME, 10X, 5HFILT#, 2X, 5HFIFW NW,
+/2X, 5A4, 2X, 3I5/1X, 9(14H WAVEL FF )/9(F8.3, F6.2))
940 FORMAT(2X, 12H FILTER NAME, 10X, 5HFILT#, 2X, 5HFIFW NW,
+/2X, 5A4, 2X, 3I5/1X, 9(14H WAVEN FF )/9(F8.1, F6.2))
945 FORMAT(/1H0, 2X, 10(2H****), 22H LOWTRAN CONTROL DATA ,
+ 10(4H****))
950 FORMAT(6I5, 2F10.3)
952 FORMAT(6I5, 3F10.3)
954 FORMAT(20A4)
956 FORMAT(8F10.3, I5)
958 FORMAT(3F10.3, 2F8.1, 2E10.3, F10.3)
960 FORMAT(3F10.3)
962 FORMAT(I5)
963 FORMAT(2F9.4)
964 FORMAT(F7.0, F6.3, 10F8.4, F10.4)
965 FORMAT(2X, F7.0, F6.3, 9F8.4)
966 FORMAT(F7.0, F6.3, 9E9.2, F6.4)
967 FORMAT(2X, F7.0, F6.3, 10E10.2, 0FF10.4)
968 FORMAT(/5X, 42H LOWTRAN TAPE 7 OUTPUT TRANSMISSION CASE,
+/2X, 5HRAIN=, F9.4, 2X, 7HCIRBUS=, F9.4,
+/2X, 5HWAVEN WAVEL TOT TRN M20 COS* O3 ,
+/43H N2 CONT M20 CONT MOL SCI AEROSOL MND3 /)
969 FORMAT(/5X, 42H LOWTRAN TAPE 7 OUTPUT EMISSION CASE ,
+/2X, 5HRAIN=, F9.4, 2X, 7HCIRBUS=, F9.4,
+/2X, 5HWAVEN WAVEL EMITTED RADIANCE SCATTER RADIANCE ,
+/51H 3ND REFL RADIANCE TOTAL RADIANCE INTEGRAL,

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FIL 1265
FIL 1270
FIL 1275
FIL 1280
FIL 1285
FIL 1290
FIL 1295
FIL 1300
FIL 1305
FIL 1310
FIL 1315
FIL 1320
FIL 1325
FIL 1330
FIL 1335
FIL 1340
FIL 1345
FIL 1350
FIL 1355
FIL 1360
FIL 1365
FIL 1370
FIL 1375
FIL 1380
FIL 1385
FIL 1390
FIL 1395
FIL 1400
FIL 1405
FIL 1410
FIL 1415
FIL 1420
FIL 1425
FIL 1430
FIL 1435
FIL 1440
FIL 1445
FIL 1450
FIL 1455
FIL 1460
FIL 1465
FIL 1470
FIL 1475
FIL 1480
FIL 1485
FIL 1490
FIL 1495
FIL 1500
FIL 1505
FIL 1510
FIL 1515
FIL 1520
FIL 1525
FIL 1530
FIL 1535
FIL 1540
FIL 1545
FIL 1550
FIL 1555

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|---|----------|
| +10H TOT TRANS/) | FIL 1556 |
| 970 FORMAT(/18X,30MSUMMARY OF CALCULATIONS WITH .7HFILTER#, I3, | FIL 1560 |
| + 2X, 12HFILTER NAME , 5A4/) | FIL 1565 |
| 972 FORMAT(2X, 15H IVF, IVL, NVL=, 3I5, 2X, | FIL 1570 |
| +24HLOWTRAN WAVENUMBERS FROM, F10.2, 2X, 2HTO, F10.2, | FIL 1575 |
| + /30X,41HFILTER RESPONSES AND TOTAL TRANSMITTANCES/) | FIL 1580 |
| 975 FORMAT(/30X,42HFILTER RESPONSES WITH BLACKBODY EMISSIVITY/) | FIL 1585 |
| 976 FORMAT(1X, 5(25HWAVE RESP T ,1X), / | FIL 1590 |
| + 5(F7.0, 1PE9.2, OPF7.3,3X)) | FIL 1595 |
| 977 FORMAT(/36X,39H SENSOR WEIGHTED AVERAGE TRANSMITTANCES, | FIL 1600 |
| +21X,9HTOT TRANS,12H M20 BAND ,9H CO2 ,9H OZONE , | FIL 1605 |
| +2X,9H N2 CONT ,2X,9HM20 CONT ,9H MOL SCT ,2X,9HAER TRANS, | FIL 1610 |
| +9H HNO3) | FIL 1615 |
| 978 FORMAT(21H CONSTITUENT TRANS.=, 9(I3, 1X, F5.3,1H,)) | FIL 1620 |
| 980 FORMAT(2X, 7H T2T09=, F6.3, 4X, 8HTWGA= , F6.3,4X,7HTRAIN= ,F6.3, | FIL 1625 |
| + 4X,9HTCIRRUS= ,F6.3) | FIL 1630 |
| 982 FORMAT(/41H VIS T DP P RANGE 8BTEMP , | FIL 1635 |
| +32HTTOT TH20 TGAS TAER FILT# NAME, /, | FIL 1640 |
| +F5.1, 2F6.1, F6.0, F10.3, F6.0, 2F5.3,1X,2F5.3, I5, 5A4) | FIL 1645 |
| 983 FORMAT(/49H VIS 8BTEMP TTOT TH20 TGAS TAER FILT# NAME,/, | FIL 1650 |
| +3X,F5.1,1X,F6.0,4F5.3,1X,I5,5A4) | FIL 1655 |
| 984 FORMAT(/41H VIS T DP P RANGE 8BTEMP, | FIL 1660 |
| +32H EMIT RAD TOT TRNS FILT# NAME, | FIL 1665 |
| +/,F5.1,2F6.1,F6.0,F10.3,F6.0,1PE10.3,OPF10.3,I5,5A4) | FIL 1670 |
| 985 FORMAT(/45H VIS 8BTEMP EMIT RAD TOT TRNS FILT# NAME, | FIL 1675 |
| +/,F5.1,1X,F6.0,1PE10.3,OPF10.3,I5,5A4) | FIL 1680 |
| 986 FORMAT(/41H VIS T DP P RANGE 8BTEMP, | FIL 1685 |
| +62H EMIT RAD SCAT RAD REFL RAD TOT RAD TOT TRNS FILT# NAME, | FIL 1690 |
| +/,F5.1,2F6.1,F6.0,F10.3,F6.0,1P4E10.3,OPF10.3,I5,5A4) | FIL 1695 |
| 987 FORMAT(/13H VIS 8BTEMP, | FIL 1700 |
| +62H EMIT RAD SCAT RAD REFL RAD TOT RAD TOT TRNS FILT# NAME, | FIL 1705 |
| +/,F5.1,1X,F6.0,1P4E10.3,OPF10.3,I5,5A4) | FIL 1710 |
| 988 FORMAT(/8X,38H SENSOR WEIGHTED INTEGRATED RADIANCES) | FIL 1715 |
| 989 FORMAT(/15X,29H FILTER NORMALIZED RADIANCES) | FIL 1720 |
| 994 FORMAT(/41X,9H EMIT RAD,/,41X,1PE10.3) | FIL 1725 |
| 995 FORMAT(/18X,9H EMIT RAD,/, 13X,1PE10.3) | FIL 1730 |
| 996 FORMAT(/41X,39H EMIT RAD SCAT RAD REFL RAD TOT RAD, | FIL 1735 |
| +/,41X,1P4E10.3) | FIL 1740 |
| 997 FORMAT(/.12X,39H EMIT RAD SCAT RAD REFL RAD TOT RAD, | FIL 1745 |
| +/,12X,1P4E10.3) | FIL 1750 |
| 998 FORMAT(36H ERROR--END OF FILE NOT ENCOUNTERED) | FIL 1755 |
| 999 FORMAT(F7.0) | FIL 1760 |
| END | FIL 1765 |

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SUBROUTINE INTGR(F, T, N, TRANS)                                INT 100
C                                                                INT 105
C THIS SUBROUTINE COMPUTES A TRAPEZOIDAL INTEGRATION, WITH    INT 110
C FUNCTION *F* BEING INTEGRATED ALONG THE *T* AXIS.           INT 115
C                                                                INT 120
DIMENSION F(N), T(N)                                          INT 125
TSUM = ((F(1)*T(1)) + (F(N)*T(N)))/2.0                       INT 130
SUM = (F(1) + F(N))/2.0                                       INT 135
NUM=N-1                                                        INT 140
DO 200 I=2,NUM                                                INT 145
TSUM = TSUM + F(I)*T(I)                                       INT 150
SUM = SUM + F(I)                                              INT 155
200 CONTINUE                                                  INT 160
TRANS = TSUM/SUM                                             INT 165
RETURN                                                         INT 170
END                                                            INT 175

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SUBROUTINE INTRAD(F,T,N,DV,TRANS)                               IRD 100
C                                                                IRD 105
C THIS SUBROUTINE PERFORMS AN INTEGRATION FOR F(FILTER FUNCTION) IRD 110
C AND T(RADIANCE) ALONG THE T AXIS                             IRD 115
C                                                                IRD 120
DIMENSION F(N),T(N)                                          IRD 125
RSUM=((F(1)*T(1))+F(N)*T(N))/2.0                             IRD 130
NUM=N-1                                                        IRD 135
DO 200 I=2,NUM                                                IRD 140
RSUM=RSUM+F(I)*T(I)                                         IRD 145
200 CONTINUE                                                  IRD 150
TRANS=RSUM*DV                                                IRD 155
RETURN                                                         IRD 160
END                                                            IRD 165

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SUBROUTINE BIGFIL(F,N,BIG)                                     BIG 100
CCC                                                            BIG 105
CCC ROUTINE TO CHOOSE LARGEST FILTER VALUE                    BIG 110
CCC TO APPLY TO NORMALIZATION OF RADIANCE RESULT             BIG 115
CCC OBTAINED FROM SUBROUTINE INTRAD                          BIG 120
CCC                                                            BIG 125
DIMENSION F(N)                                               BIG 130
BIG=1.0E-14                                                  BIG 135
DO 10 I=1,N                                                  BIG 140
IF(F(I) .GT. BIG) BIG=F(I)                                   BIG 145
10 CONTINUE                                                  BIG 150
RETURN                                                         BIG 155
END                                                            BIG 160

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SUBROUTINE INTLOG(XA, YA, NA, XB, YB, NB)
C
C THIS TAKES A SET OF DATA POINTS XA(I) VS YA(I) (I=1,...,NA)
C AND GIVEN ANOTHER SET OF Y VALUES: YB(I), J=1,...,NB
C FINDS THE CORRESPONDING X VALUES: XB(J).
C
C INTERPOLATES UNDER THE ASSUMPTION:  $X = X_0 \cdot \exp(-Y/H)$ 
C
C NOTE: MUST HAVE YA(1) .LE. YB(1) & YA(NA) .GE. YB(NB)
C WHERE THE Y'S ARE IN ASCENDING ORDER
C
C DIMENSION XA(NA), YA(NA), XB(NB), YB(NB)
C
C I = 1
C DO 50 J = 1, NB
C 5 IF(YB(J)-YA(I) ) 20, 40, 10
C 10 IF(I .EQ. NA) GO TO 25
C I = I + 1
C IF(YB(J) .GT. YA(I) ) GO TO 5
C GO TO 25
C 20 IF(I .EQ. 1) I = 2
C 25 II = I - 1
C IF(XA(I)*XA(II) .LE. 0. ) GO TO 30
C Z = YA(I)/XA(II)
C IF( ABS(Z-1.) .LT. 0.1 ) GO TO 30
C H = (YA(I) -YA(II) )/ALOG(Z)
C XB(J) = XA(II)*EXP( (YB(J)-YA(II) )/H)
C GO TO 50
C 30 XB(J) = XA(II) + (XA(I)-XA(II) )*(YB(J)-YA(II) )/(YA(I)-YA(II) )
C GO TO 50
C 40 XB(J) = XA(I)
C I = I + 1
C 50 CONTINUE
C RETURN
C END

```

```

SUBROUTINE WAVEN(WAVE, FF, NW)
C
C DIMENSION WAVE(NW), FF(NW)
C
C THIS SUBROUTINE CONVERTS AN ARRAY OF WAVELENGTHS TO
C AN ARRAY OF WAVENUMBERS, REVERSING THE ORDER OF THE WAVENUMBERS
C IN THE PROCESS.
C
C M = NW/2
C DO 200 I=1, M
C K = NW-I+1
C FREQ = 1.E4/WAVE(I)
C WAVE(I) = 1.E4/WAVE(K)
C WAVE(K) = FREQ
C FS = FF(I)
C FF(I) = FF(K)
C FF(K) = FS
C 200 CONTINUE
C L = 2*M
C IF(L .LT. NW) GO TO 300
C GO TO 400
C 300 WAVE(I) = 1.E4/WAVE(I)
C 400 RETURN
C END

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SUBROUTINE BRACK(WVN1, VIN, NW, DV, IFRST, LAST, NUMBER)      BCK 100
DIMENSION VIN(NW)                                           BCK 105
C
C     PICKS OUT THE APPROPRIATE INDEXES OF A LARGER ARRAY   BCK 110
C     CORRESPONDING TO THE POSITIONING OF A SMALLER ARRAY.   BCK 115
C
IFRST = INT((VIN(1) - WVN1)/DV) + 1                          BCK 120
LAST  = INT((VIN(NW) - WVN1)/DV) + 2                          BCK 125
NUMBER = LAST - IFRST + 1                                    BCK 130
RETURN                                                       BCK 135
END                                                           BCK 140
                                                             BCK 145
                                                             BCK 150

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```

SUBROUTINE BLKBDY(TEMP, FF, NW, WAVE)                        BLK 100
C
C     THIS SUBROUTINE MODIFIES THE FUNCTION *FF* BY INCORPORATING THE   BLK 105
C     ASSOCIATED WAVENUMBER ARRAY AND A FIXED BLACKBODY TEMPERATURE   BLK 110
C     INTO THE BLACKBODY EQUATION.                                     BLK 115
C
DIMENSION FF(NW), WAVE(NW)                                  BLK 120
IF(TEMP.LE.0.0) GO TO 301                                    BLK 125
DO 200 I=1,NW                                               BLK 130
FF(I) = (1.190056E-12*WAVE(I)**3)/(EXP(1.43879*WAVE(I)/TEMP) - 1.) BLK 135
+ *FF(I)                                                    BLK 140
200 CONTINUE                                                BLK 145
RETURN                                                       BLK 150
301 WRITE (6,901)                                           BLK 155
901 FORMAT(/5X,46HNO BLACKBODY CALCULATION AS TEMP IS ZERO OR LESS./ BLK 160
+5X,32HTEMP SHOULD BE IN DEGREES KELVIN/)                   BLK 165
RETURN                                                       BLK 170
END                                                           BLK 175
                                                             BLK 180
                                                             BLK 185

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SUBROUTINE COMBT(F, T, N, IA, WAT, GAS)                      COM 100
C
C     THIS SUBROUTINE COMBINES THE WATER BAND AND WATER CONTINUUM TO COM 105
C     GET THE WATER TRANSMITTANCE, COMBINES THE GAS TRANSMITTANCES TO COM 110
C     GET THE UNIFORMLY MIXED GASES TRANSMITTANCE, THEN INTEGRATES COM 115
C     BOTH TRANSMITTANCES WITH THE FILTER RESPONSES TO GET THE COM 120
C     WEIGHTED GAS AND WATER TRANSMITTANCE                       COM 125
C
DIMENSION F(500), T(500,10), WTRN(500), GTRN(500)         COM 130
IB = IA * N                                                 COM 135
DO 300 L=1A, IB                                           COM 140
LL=L-1A+1                                                  COM 145
WTRN(LL) = T(L,8)*T(L,2)                                    COM 150
GTRN(LL) = T(L,3)*T(L,4)*T(L,5)*T(L,7)*T(L,9)             COM 155
300 CONTINUE                                                COM 160
CALL INTGRT(F, WTRN, W, WAT)                                COM 165
CALL INTGRT(F, GTRN, W, GAS)                                COM 170
RETURN                                                       COM 175
END                                                           COM 180
                                                             COM 185

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