

## ADAS Subroutine d2data

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SUBROUTINE D2DATA( DSFULL , TITLF , IFAIL , LRESO , IPRT , IGRND
&                , IZ0    , IZ1    , ICLASS , ITMAX , IEVCUT
&                , ITDIMD , ITMAXD , IDMAXD , IZMAXD
&                , DTEV   , DDENS
&                , DTEVD  , DDENSD , DRCOFD , ZDATA
&                , DRCOFI , YEAR
&                )
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C PURPOSE : TO EXTRACT adf11 COLLISIONAL DIELECTRONIC DATA
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C NOTE    : THE SOURCE DATA IS CONTAINED IN CENTRAL (OR USER) ADAS
C           DATASETS AS:
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```
C           /home/adas/adas/adf11/<typ><yr>/<typ><yr>_<el>.<fl>.dat
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```
C           where, <yr> = nominal year of data
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```
C                   <el> = element name
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```
C                   <typ> = type of data
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C                   <fl> = optional filter for power data
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C           The classes are
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C           iclass = 1 : acd
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```
C           iclass = 2 : scd
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```
C           iclass = 3 : ccd
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```
C           iclass = 4 : prb
```

```
C           iclass = 5 : prc
```

```
C           iclass = 6 : plt
```

```
C           iclass = 7 : pls
```

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C           This routine was originally used to extract data for the SANCO
C           impurity transport code where filenames were constructed from
C           a userid, the year and a cutoff energy. The routine was
C           rewritten so that the full adf11 filename was passed. Hence some
C           of the inputs are unnecessary but are retained for backwards
C           compatibility in calling codes.
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```
C INPUT   : (C*2)  YEAR      = YEAR OF DATA (not used)
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C           (C*2)  YEARDF   = DEFAULT YEAR OF DATA IF REQUESTED YEAR
C                       DOES NOT EXIST
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```
C           (I*4)  IZ0      = NUCLEAR CHARGE
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C           (I*4)  IZ1      = MINIMUM ION CHARGE + 1 (not used)
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```
C           (I*4)  ICLASS   = CLASS OF DATA (1 - 6)
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C           (I*4)  ITMAX    = NUMBER OF ( DTEV() , DDENS() ) PAIRS
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C           (I*4)  IEVCUT   = ENERGY CUT-OFF (EV) (not used)
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```
C           (R*8)  DTEV()   = DLOG10(ELECTRON TEMPERATURES (EV))
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```
C           (R*8)  DDENS()  = DLOG10(ELECTRON DENSITIES (CM-3))
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```
C           (I*4)  IPRT     = INDEX OF PARENT STATE
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C           (I*4)  IGRND    = INDEX OF GROUND STATE
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```
C           (L*4)  LRESO    = FLAG WHETHER RESOLVED DATA
```

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C OUTPUT : (C*120)TITLF      = INFORMATION STRING
C      (I*4) ITDIMD        = MAXIMUM NUMBER OF DATA TEMP & DENS
C      (I*4) ITMAXD        = NUMBER OF DATA DTEVD()
C      (I*4) IDMAXD        = NUMBER OF DATA DDENS()
C      (I*4) IZMAXD        = NUMBER OF DATA ZDATA()
C      (I*4) ITDIMD        = MAXIMUM NUMBER OF DATA TEMP & DENS
C      (I*4) ZDATA()       = Z1 CHARGES IN DATASET
C      (I*4) IFAIL         = -1   IF ROUTINE SUCCESSFUL BUT THE DEFAULT
C                          YEAR FOR THE DATA WAS USED.
C                          = 0   IF ROUTINE SUCCESSFUL - DATA FOR THE
C                          REQUESTED YEAR USED.
C                          = 1   IF ROUTINE OPEN STATEMENT FAILED
C      (R*8) DTEVD()       = DLOG10(DATA ELECTRON TEMPERATURES (EV))
C      (R*8) DDENSD()      = DLOG10(DATA ELECTRON DENSITIES (CM-3))
C      (R*8) DRCOFD()      = DLOG10(DATA RATE COEFFICIENTS (CM-3/S))
C      (R*8) DRCOFI()      = INTERPOLATION OF DRCOFD(,,) FOR
C                          DTEV() & DDENS()
C
C PROGRAM: (C*80) STRING    = GENERAL VARIABLE
C      (C*80) BLANK        = BLANK STRING
C      (C*2) YEARSV        = LAST YEAR USED IN THIS ROUTINE
C      (I*4) IREAD         = INPUT STREAM FOR OPEN STATEMENT
C      (I*4) IZ0SV         = LAST IZ0 USED IN THIS ROUTINE
C      (I*4) ICLSV         = LAST ICLASS USED IN THIS ROUTINE
C      (I*4) INDXZ1        = LOCATION OF IZ1 IN ZDATA()
C      (I*4) LCK           = MUST BE GREATER THAN 'ITMAXD' & 'IDMAXD'
C                          & 'ITMAX' - ARRAY SIZE FOR SPLINE CALCS.
C      (R*8) A()           = GENERAL ARRAY
C      (R*8) DRCOF0(,,)    = INTERPOLATION OF DRCOFD(,,) W.R.T DTEV()
C      (L*8) LEXIST        = TRUE --- FILE TO OPEN EXISTS ELSE NOT
C
C PE BRIDEN = ADDED VARIABLES (14/01/91)
C
C      (I*4) L1            = PARAMETER = 1
C      (I*4) IOPT         = DEFINES THE BOUNDARY DERIVATIVES FOR THE
C                          SPLINE ROUTINE 'XXSPLE', SEE 'XXSPLE'.
C
C      (L*4) LSETX        = .TRUE. => SET UP SPLINE PARAMETERS RELATING
C                          TO X-AXIS.
C                          .FALSE. => DO NOT SET UP SPLINE PARAMETERS
C                          RELATING TO X-AXIS.
C                          (I.E. THEY WERE SET IN A PREVIOUS
C                          CALL )
C                          (VALUE SET TO .FALSE. BY 'XXSPLE')
C
C      (R*8) DY()         = SPLINE INTERPOLATED DERIVATIVES
C
C      (R*8 ADAS FUNCTION - 'R8FUN1' ( X -> X ) )
C
C PE BRIDEN = ADDED VARIABLES (23/04/93)
C
C      (I*4 ADAS FUNCTION - 'I4UNIT' (OUTPUT STREAM))

```

C  
C AUTHOR : JAMES SPENCE (TESSELLA SUPPORT SERVICES PLC)  
C K1/0/80  
C JET EXT. 4866  
C  
C DATE : 22/02/90  
C  
C DATE : 21/08/90 PE BRIDEN - REVISION: SEQUA(43) CHANGED ('TE'->'TC')  
C  
C DATE : 08/10/90 PE BRIDEN - REVISION: RENAMED SUBROUTINE  
C  
C DATE : 12/11/90 PE BRIDEN - CORRECTION: MOVE THE SETTING OF 'INDXZ1'  
C TO AFTER THE '20 CONTINUE'  
C STATEMENT. ALSO SAVE THE  
C VALUE OF 'IZ1MIN'.  
C  
C DATE : 14/01/91 PE BRIDEN - ADAS91: CALLS TO NAG SPLINE ROUTINES  
C 'E01BAF' & 'E02BBF' REPLACED  
C BY CALLS TO ADAS SPLINE  
C ROUTINE 'XXSPLE'.  
C  
C DATE : 25/06/91 PE BRIDEN - CORRECTION: CHANGED FOLLOWING DIMENSION:  
C 'DIMENSION DRCOFI(ITDIMD)'  
C TO  
C 'DIMENSION DRCOFI(ITMAX)'  
C  
C DATE : 07/08/91 PE BRIDEN - ADDED ERROR HANDLING IF THE OPEN STATE-  
C MENT FAILS. (IFAIL=1 RETURNED)  
C  
C DATE : 27/04/92 PE BRIDEN - ADDED DEFAULT YEAR FOR DATA IF REQUESTED  
C YEAR DOES NOT EXIST. (ADDED 'YEARDF')  
C INTRODUCED IFAIL = -1 IF DEFAULT YEAR  
C WAS USED AND NOT THE REQUESTED YEAR.  
C  
C DATE : 10/03/93 PE BRIDEN - ALLOWED INPUT DATA SETS TO BE ACCESSED  
C FROM ANY USERID (DEFAULT = JETSHP)  
C - INTRODUCED USERID VARIABLE AND CALL  
C TO XXUID.  
C  
C DATE : 23/04/93 PE BRIDEN - ADDED I4UNIT FUNCTION TO WRITE  
C STATEMENTS FOR SCREEN MESSAGES  
C  
C UPDATE: 24/05/93 - PE BRIDEN - ADAS91: CHANGED I4UNIT(0)-> I4UNIT(-1)  
C  
C UPDATE: 14/09/94 - PE BRIDEN - ADAS91: ADDED CHECK TO MAKE SURE THAT  
C ITMAX, ITMAXD AND IDMAXD ARE  
C IN RANGE (I.E. <= LCK).  
C  
C UPDATE: 16/08/96 - PE BRIDEN - ADAS91: MINOR MOD - IF DEFAULT DATA  
C IS NOT FOUND THEN ASSIGN TITLE  
C BEFORE EXITING WITH AN ERROR.  
C  
C-----

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C
C UNIX-IDL PORT:
C
C VERSION: 1.1 DATE: 28-10-96
C MODIFIED: WILLIAM OSBORN (TESSELLA SUPPORT SERVICES PLC)
C - FIRST CONVERTED
C
C VERSION: 1.2 DATE: 14-02-97
C MODIFIED: RICHARD MARTIN
C - CHANGED DEFINITION OF 'BLANKS' TO 80 CHARACTERS ONLY
C
C VERSION: 1.3 DATE: 26-10-97
C MODIFIED: LORNE HORTON (JET)
C - CHANGED EXTRAPOLATION ALGORITHM
C
C VERSION: 1.4 DATE: 23-07-99
C MODIFIED: Martin O'Mullane (JET)
C - Changed the test for checking whether the file was opened.
C           - Removed commented out code for constructing filenames
C           - Modified the comments at the top of the file
C           - Converted code to implicit none
C           - Increased LCK to 200

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CHARACTER*80      DSFULL
CHARACTER*120     TITLE
CHARACTER*2       YEAR
INTEGER           ICLASS,      IDMAXD,      IEVCUT,      IFAIL
INTEGER           IGRND,       IPRT,       ITDIMD,      ITMAX
INTEGER           ITMAXD,      IZ0,       IZ1,        IZMAXD
LOGICAL           LRESO
REAL*8            DDENS (ITMAX),      DDENS (ITDIMD)
REAL*8            DRCOFD (ITDIMD, ITDIMD, ITDIMD)
REAL*8            DRCOFI (ITMAX),      DTEV (ITMAX)
REAL*8            DTEVD (ITDIMD),      ZDATA (ITDIMD)

```