

2 Re-do of SLR/Synergetics
3 Using SLR/Synergetics Setup
4 Using 2023 TAPM + PerthAP Surface

5 ----- Run title (3 lines) -----

6
7 CALMET MODEL CONTROL FILE
8 -----
9

10 -----

11
12 INPUT GROUP: 0 -- Input and Output File Names

13
14
15 Subgroup (a)

16 -----

17	Default Name	Type	File Name
18	-----	----	-----
19	GEO.DAT	input	! GEODAT = 24015_geo\GEO.DAT !
20	SURF.DAT	input	! SRFDAT = surf.dat !
21	CLOUD.DAT	input	! CLDDAT = CLOUD.DAT !
22	PRECIP.DAT	input	* PRCDAT = *
23	WT.DAT	input	* WTDAT = *
24			
25	CALMET.LST	output	! METLST = CALMET(T010).LST !
26	CALMET.DAT	output	! METDAT = CALMET(T010).DAT !
27	PACOUT.DAT	output	* PACDAT = *
28			

29 All file names will be converted to lower case if LCFILES = T
30 Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
31 T = lower case ! LCFILES = F !
32 F = UPPER CASE
33

34 NUMBER OF UPPER AIR & OVERWATER STATIONS:

35
36 Number of upper air stations (NUSTA) No default ! NUSTA = 0 !
37 Number of overwater met stations
38 (NOWSTA) No default ! NOWSTA = 0 !
39

40 NUMBER OF PROGNOSTIC and IGF-CALMET FILES:

41
42 Number of MM4/MM5/3D.DAT files
43 (NM3D) No default ! NM3D = 1 !
44
45 Number of IGF-CALMET.DAT files
46 (NIGF) No default ! NIGF = 0 !
47

48 !END!
49

50 -----

51 Subgroup (b)

52 -----

53 Upper air files (one per station)

54 -----

54	Default Name	Type	File Name
55	-----	----	-----
56			

56 -----

57
58 Subgroup (c)

59 -----

60 Overwater station files (one per station)

61 -----

62	Default Name	Type	File Name
63	-----	----	-----
64	* OVERWATERFILES = *		

63 -----

64
65
66 Subgroup (d)

67 -----

68 MM4/MM5/3D.DAT files (consecutive or overlapping)

69 -----

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70  Default Name  Type          File Name
71  -----
72  MM41.DAT      input        1  ! M3DDAT=..\..\..\..\MyTAPM\24015\2023(t010).M3D!  ! END !
73
74  -----
75  Subgroup (e)
76  -----
77  IGF-CALMET.DAT files (consecutive or overlapping)
78  -----
79  Default Name  Type          File Name
80  -----
81  * IGFDATFILES = *
82  -----
83  Subgroup (f)
84  -----
85  Other file names
86  -----
87
88  Default Name  Type          File Name
89  -----
90  DIAG.DAT      input         * DIADAT = *
91  PROG.DAT      input         * PRGDAT = *
92
93  TEST.PRT      output        * TSTPRT = *
94  TEST.OUT      output        * TSTOUT = *
95  TEST.KIN      output        * TSTKIN = *
96  TEST.FRD      output        * TSTFRD = *
97  TEST.SLP      output        * TSTSLP = *
98  DCST.GRD      output        * DCSTGD = *
99
100 -----
101 NOTES: (1) File/path names can be up to 70 characters in length
102        (2) Subgroups (a) and (f) must have ONE 'END' (surrounded by
103            delimiters) at the end of the group
104        (3) Subgroups (b) through (e) are included ONLY if the corresponding
105            number of files (NUSTA, NOWSTA, NM3D, NIGF) is not 0, and each must have
106            an 'END' (surround by delimiters) at the end of EACH LINE
107
108                !END!
109
110 -----
111
112
113 INPUT GROUP: 1 -- General run control parameters
114 -----
115
116     Starting date:      Year   (IBYR)  --   No default   ! IBYR = 2023 !
117                       Month  (IBMO)  --   No default   ! IBMO = 1 !
118                       Day    (IBDY)  --   No default   ! IBDY = 1 !
119     Starting time:     Hour   (IBHR)  --   No default   ! IBHR = 0 !
120                       Second (IBSEC) --   No default   ! IBSEC = 0 !
121
122     Ending date:       Year   (IEYR)  --   No default   ! IEYR = 2023 !
123                       Month  (IEMO)  --   No default   ! IEMO = 12 !
124                       Day    (IEDY)  --   No default   ! IEDY = 31 !
125     Ending time:       Hour   (IEHR)  --   No default   ! IEHR = 23 !
126                       Second (IESEC) --   No default   ! IESEC = 0 !
127
128     UTC time zone      (ABTZ)  -- No default   ! ABTZ = UTC+0800 !
129     (character*8)
130     PST = UTC-0800, MST = UTC-0700 , GMT = UTC-0000
131     CST = UTC-0600, EST = UTC-0500
132
133     Length of modeling time-step (seconds)
134     Must divide evenly into 3600 (1 hour)
135     (NSECDT)                      Default:3600      ! NSECDT = 3600 !
136                                   Units: seconds
137
138     Run type           (IRTYPE) -- Default: 1      ! IRTYPE = 1 !

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139
140     0 = Computes wind fields only
141     1 = Computes wind fields and micrometeorological variables
142         (u*, w*, L, zi, etc.)
143     (IRTYPE must be 1 to run CALPUFF or CALGRID)
144
145 Compute special data fields required
146 by CALGRID (i.e., 3-D fields of W wind
147 components and temperature)
148 in additional to regular           Default: T      ! LCALGRD = T !
149 fields ? (LCALGRD)
150 (LCALGRD must be T to run CALGRID)
151
152 Flag to stop run after
153 SETUP phase (ITEST)               Default: 2      ! ITEST = 2 !
154 (Used to allow checking
155 of the model inputs, files, etc.)
156 ITEST = 1 - STOPS program after SETUP phase
157 ITEST = 2 - Continues with execution of
158     COMPUTATIONAL phase after SETUP
159
160
161 Test options specified to see if
162 they conform to regulatory
163 values? (MREG)                     No Default      ! MREG = 0 !
164
165     0 = NO checks are made
166     1 = Technical options must conform to USEPA guidance
167         IMIXH   -1      Maul-Carson convective mixing height
168                        over land; OCD mixing height overwater
169         ICOARE   0      OCD deltaT method for overwater fluxes
170         THRESHL 0.0    Threshold buoyancy flux over land needed
171                        to sustain convective mixing height growth
172         ISURFT  > 0    in OBS mode (pick one representative station)
173                        -2    in NOOBS mode (itprog=2) (average all
174                        surface prognostic temperatures to get
175                        a single representative sf. temp)
176         IUPT    > 0    in OBS mode (pick one representative station)
177                        -2    in NOOBS mode (ITPROG>0) (average all surface
178                        prognostic temperatures to get a single
179                        representative sf. temp)
180         IZICRLX 0      Do NOT use convective mixing height relaxation
181                        to equilibrium value
182
183 !END!
184
185 -----
186
187 INPUT GROUP: 2 -- Map Projection and Grid control parameters
188 -----
189
190 Projection for all (X,Y):
191 -----
192
193 Map projection
194 (PMAP)                               Default: UTM      ! PMAP = UTM !
195
196     UTM : Universal Transverse Mercator
197     TTM : Tangential Transverse Mercator
198     LCC : Lambert Conformal Conic
199     PS  : Polar Stereographic
200     EM  : Equatorial Mercator
201     LAZA : Lambert Azimuthal Equal Area
202
203 False Easting and Northing (km) at the projection origin
204 (Used only if PMAP= TTM, LCC, or LAZA)
205 (FEAST)                               Default=0.0      ! FEAST = 0.0 !
206 (FNORTH)                              Default=0.0      ! FNORTH = 0.0 !
207

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208 UTM zone (1 to 60)
209 (Used only if PMAP=UTM)
210 (IUTMZN) No Default ! IUTMZN = 50 !
211
212 Hemisphere for UTM projection?
213 (Used only if PMAP=UTM)
214 (UTMHEM) Default: N ! UTMHEM = S !
215 N : Northern hemisphere projection
216 S : Southern hemisphere projection
217
218 Latitude and Longitude (decimal degrees) of projection origin
219 (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
220 (RLAT0) No Default ! RLAT0 = 0.00N !
221 (RLON0) No Default ! RLON0 = 0.00E !
222
223 TTM : RLON0 identifies central (true N/S) meridian of projection
224 RLAT0 selected for convenience
225 LCC : RLON0 identifies central (true N/S) meridian of projection
226 RLAT0 selected for convenience
227 PS : RLON0 identifies central (grid N/S) meridian of projection
228 RLAT0 selected for convenience
229 EM : RLON0 identifies central meridian of projection
230 RLAT0 is REPLACED by 0.0N (Equator)
231 LAZA: RLON0 identifies longitude of tangent-point of mapping plane
232 RLAT0 identifies latitude of tangent-point of mapping plane
233
234 Matching parallel(s) of latitude (decimal degrees) for projection
235 (Used only if PMAP= LCC or PS)
236 (XLAT1) No Default ! XLAT1 = 30S !
237 (XLAT2) No Default ! XLAT2 = 60S !
238
239 LCC : Projection cone slices through Earth's surface at XLAT1 and XLAT2
240 PS : Projection plane slices through Earth at XLAT1
241 (XLAT2 is not used)
242
243 -----
244 Note: Latitudes and longitudes should be positive, and include a
245 letter N,S,E, or W indicating north or south latitude, and
246 east or west longitude. For example,
247 35.9 N Latitude = 35.9N
248 118.7 E Longitude = 118.7E
249
250
251 Datum-region
252 -----
253
254 The Datum-Region for the coordinates is identified by a character
255 string. Many mapping products currently available use the model of the
256 Earth known as the World Geodetic System 1984 (WGS-84). Other local
257 models may be in use, and their selection in CALMET will make its output
258 consistent with local mapping products. The list of Datum-Regions with
259 official transformation parameters is provided by the National Imagery and
260 Mapping Agency (NIMA).
261
262 NIMA Datum - Regions(Examples)
263 -----
264 WGS-84 WGS-84 Reference Ellipsoid and Geoid, Global coverage (WGS84)
265 NAS-C NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
266 NAR-C NORTH AMERICAN 1983 GRS 80 Spheroid, MEAN FOR CONUS (NAD83)
267 NWS-84 NWS 6370KM Radius, Sphere
268 ESR-S ESRI REFERENCE 6371KM Radius, Sphere
269
270 Datum-region for output coordinates
271 (DATUM) Default: WGS-84 ! DATUM = WGS-84 !
272
273
274 Horizontal grid definition:
275 -----
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277 Rectangular grid defined for projection PMAP,
278 with X the Easting and Y the Northing coordinate
279
280 No. X grid cells (NX) No default ! NX = 150 !
281 No. Y grid cells (NY) No default ! NY = 150 !
282
283 Grid spacing (DGRIDKM) No default ! DGRIDKM = 0.1 !
284 Units: km
285
286 Reference grid coordinate of
287 SOUTHWEST corner of grid cell (1,1)
288
289 X coordinate (XORIGKM) No default ! XORIGKM = 408.2559 !
290 Y coordinate (YORIGKM) No default ! YORIGKM = 6470.4315 !
291 Units: km
292
293
294 Vertical grid definition:
295 -----
296
297 No. of vertical layers (NZ) No default ! NZ = 10 !
298
299 Cell face heights in arbitrary
300 vertical grid (ZFACE(NZ+1)) No defaults
301 Units: m
302
303 ! ZFACE =
304 0.00,20.00,40.00,80.00,160.00,320.00,640.00,1000.00,1500.00,2200.00,3000.00 !
305
306 !END!
307 -----
308
309 INPUT GROUP: 3 -- Output Options
310 -----
311
312
313 DISK OUTPUT OPTION
314
315 Save met. fields in an unformatted
316 output file ? (LSAVE) Default: T ! LSAVE = T !
317 (F = Do not save, T = Save)
318
319 Type of unformatted output file:
320 (IFORMO) Default: 1 ! IFORMO = 1 !
321
322 1 = CALPUFF/CALGRID type file (CALMET.DAT)
323 2 = MESOPUFF-II type file (PACOUT.DAT)
324
325
326 LINE PRINTER OUTPUT OPTIONS:
327
328 Print met. fields ? (LPRINT) Default: F ! LPRINT = F !
329 (F = Do not print, T = Print)
330 (NOTE: parameters below control which
331 met. variables are printed)
332
333 Print interval
334 (IPRINF) in hours Default: 1 ! IPRINF = 1 !
335 (Meteorological fields are printed
336 every 6 hours)
337
338
339 Specify which layers of U, V wind component
340 to print (IUVOUT(NZ)) -- NOTE: NZ values must be entered
341 (0=Do not print, 1=Print)
342 (used only if LPRINT=T) Defaults: NZ*0
343 * IUVOUT = *
344 -----

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Specify which levels of the W wind component to print
(NOTE: W defined at TOP cell face -- 6 values)
(IWOUT(NZ)) -- NOTE: NZ values must be entered
(0=Do not print, 1=Print)
(used only if LPRINT=T & LCALGRD=T)

Defaults: NZ*0
* IWOUT = *

Specify which levels of the 3-D temperature field to print
(ITOUT(NZ)) -- NOTE: NZ values must be entered
(0=Do not print, 1=Print)
(used only if LPRINT=T & LCALGRD=T)

Defaults: NZ*0
* ITOUT = *

Specify which meteorological fields
to print
(used only if LPRINT=T) Defaults: 0 (all variables)

Variable Print ?
 (0 = do not print,
 1 = print)

- ! STABILITY = 0 ! - PGT stability class
- ! USTAR = 0 ! - Friction velocity
- ! MONIN = 0 ! - Monin-Obukhov length
- ! MIXHT = 0 ! - Mixing height
- ! WSTAR = 0 ! - Convective velocity scale
- ! PRECIP = 0 ! - Precipitation rate
- ! SENSHEAT = 0 ! - Sensible heat flux
- ! CONVZI = 0 ! - Convective mixing ht.

Testing and debug print options for micrometeorological module

Print input meteorological data and
internal variables (LDB) Default: F ! LDB = F !
(F = Do not print, T = print)
(NOTE: this option produces large amounts of output)

First time step for which debug data
are printed (NN1) Default: 1 ! NN1 = 1 !

Last time step for which debug data
are printed (NN2) Default: 1 ! NN2 = 1 !

Print distance to land
internal variables (LDBCST) Default: F ! LDBCST = F !
(F = Do not print, T = print)
(Output in .GRD file DCST.GRD, defined in input group 0)

Testing and debug print options for wind field module
(all of the following print options control output to
wind field module's output files: TEST.PRT, TEST.OUT,
TEST.KIN, TEST.FRD, and TEST.SLP)

Control variable for writing the test/debug
wind fields to disk files (IOUTD)
(0=Do not write, 1=write) Default: 0 ! IOUTD = 0 !

Number of levels, starting at the surface,

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414         to print (NZPRN2)                Default: 1          ! NZPRN2 = 1 !
415
416         Print the INTERPOLATED wind components ?
417         (IPR0) (0=no, 1=yes)             Default: 0          ! IPR0 = 0 !
418
419         Print the TERRAIN ADJUSTED surface wind
420         components ?
421         (IPR1) (0=no, 1=yes)             Default: 0          ! IPR1 = 0 !
422
423         Print the SMOOTHED wind components and
424         the INITIAL DIVERGENCE fields ?
425         (IPR2) (0=no, 1=yes)             Default: 0          ! IPR2 = 0 !
426
427         Print the FINAL wind speed and direction
428         fields ?
429         (IPR3) (0=no, 1=yes)             Default: 0          ! IPR3 = 0 !
430
431         Print the FINAL DIVERGENCE fields ?
432         (IPR4) (0=no, 1=yes)             Default: 0          ! IPR4 = 0 !
433
434         Print the winds after KINEMATIC effects
435         are added ?
436         (IPR5) (0=no, 1=yes)             Default: 0          ! IPR5 = 0 !
437
438         Print the winds after the FROUDE NUMBER
439         adjustment is made ?
440         (IPR6) (0=no, 1=yes)             Default: 0          ! IPR6 = 0 !
441
442         Print the winds after SLOPE FLOWS
443         are added ?
444         (IPR7) (0=no, 1=yes)             Default: 0          ! IPR7 = 0 !
445
446         Print the FINAL wind field components ?
447         (IPR8) (0=no, 1=yes)             Default: 0          ! IPR8 = 0 !
448
449 !END!

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450
451 -----
452
453
454 INPUT GROUP: 4 -- Meteorological data options
455 -----
456
457 NO OBSERVATION MODE                (NOOBS) Default: 0          ! NOOBS = 1 !
458     0 = Use surface, overwater, and upper air stations
459     1 = Use surface and overwater stations (no upper air observations)
460         Use MM4/MM5/3D for upper air data
461     2 = No surface, overwater, or upper air observations
462         Use MM4/MM5/3D for surface, overwater, and upper air data
463
464 NUMBER OF SURFACE & PRECIP. METEOROLOGICAL STATIONS
465
466     Number of surface stations      (NSSTA) No default      ! NSSTA = 1 !
467
468     Number of precipitation stations
469     (NPSTA=-1: flag for use of MM5/3D precip data)
470                                     (NPSTA) No default      ! NPSTA = 0 !
471
472 CLOUD DATA OPTIONS
473     Output option - output a CLOUD.DAT file (yes or no)
474     0=no, 1=yes
475                                     (ICLDOUT) Default:999      ! ICLDOUT = 1 !
476
477     Method to compute cloud fields:
478                                     (MCLLOUD) Default: 999      ! MCLLOUD = 4 !
479     MCLLOUD = 1 - Clouds data generated from surface observations
480     MCLLOUD = 2 - Gridded CLOUD.DAT read from CLOUD.DAT file (no output
481                   is possible since already exist)
482     MCLLOUD = 3 - Gridded cloud cover from Prognostic Rel. Humidity

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483 at 850mb (Teixera)
484 M CLOUD = 4 - Gridded cloud cover from Prognostic Rel. Humidity
485 at all levels (MM5toGrads algorithm)
486

487 FILE FORMATS

488
489 Surface meteorological data file format
490 (IFORMS) Default: 2 ! IFORMS = 2 !
491 (1 = unformatted (e.g., SMERGE output))
492 (2 = formatted (free-formatted user input))
493

494 Precipitation data file format
495 (IFORMP) Default: 2 ! IFORMP = 2 !
496 (1 = unformatted (e.g., PMERGE output))
497 (2 = formatted (free-formatted user input))
498

499 Cloud data file format
500 (IFORMC) Default: 2 ! IFORMC = 1 !
501 (1 = unformatted - CALMET unformatted output)
502 (2 = formatted - free-formatted CALMET output or user input)
503

504 !END!

505
506
507 -----
508
509 INPUT GROUP: 5 -- Wind Field Options and Parameters
510 -----
511

512
513 WIND FIELD MODEL OPTIONS

514 Model selection variable (IWFCOD) Default: 1 ! IWFCOD = 1 !
515 0 = Objective analysis only
516 1 = Diagnostic wind module
517

518 Compute Froude number adjustment
519 effects ? (IFRADJ) Default: 1 ! IFRADJ = 1 !
520 (0 = NO, 1 = YES)
521

522 Compute kinematic effects ? (IKINE) Default: 0 ! IKINE = 0 !
523 (0 = NO, 1 = YES)
524

525 Use O'Brien procedure for adjustment
526 of the vertical velocity ? (IOBR) Default: 0 ! IOBR = 0 !
527 (0 = NO, 1 = YES)
528

529 Compute slope flow effects ? (ISLOPE) Default: 1 ! ISLOPE = 1 !
530 (0 = NO, 1 = YES)
531

532 Extrapolate surface wind observations
533 to upper layers ? (IEXTRP) Default: -4 ! IEXTRP = 1 !
534 (1 = no extrapolation is done,
535 2 = power law extrapolation used,
536 3 = user input multiplicative factors
537 for layers 2 - NZ used (see FEXTRP array)
538 4 = similarity theory used
539 -1, -2, -3, -4 = same as above except layer 1 data
540 at upper air stations are ignored
541

542 Extrapolate surface winds even
543 if calm? (ICALM) Default: 0 ! ICALM = 0 !
544 (0 = NO, 1 = YES)
545

546 Layer-dependent biases modifying the weights of
547 surface and upper air stations (BIAS(NZ))
548 -1<=BIAS<=1
549 Negative BIAS reduces the weight of upper air stations
550 (e.g. BIAS=-0.1 reduces the weight of upper air stations
551 by 10%; BIAS= -1, reduces their weight by 100 %)

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552 Positive BIAS reduces the weight of surface stations
553 (e.g. BIAS= 0.2 reduces the weight of surface stations
554 by 20%; BIAS=1 reduces their weight by 100%)
555 Zero BIAS leaves weights unchanged (1/R**2 interpolation)
556 Default: NZ*0
557 ! BIAS = 0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0 !
558
559 Minimum distance from nearest upper air station
560 to surface station for which extrapolation
561 of surface winds at surface station will be allowed
562 (RMIN2: Set to -1 for IEXTRP = 4 or other situations
563 where all surface stations should be extrapolated)
564 Default: 4. ! RMIN2 = 4 !
565
566 Use gridded prognostic wind field model
567 output fields as input to the diagnostic
568 wind field model (IPROG) Default: 0 ! IPROG = 14 !
569 (0 = No, [IWFCOD = 0 or 1]
570 1 = Yes, use CSUMM prog. winds as Step 1 field, [IWFCOD = 0]
571 2 = Yes, use CSUMM prog. winds as initial guess field [IWFCOD = 1]
572 3 = Yes, use winds from MM4.DAT file as Step 1 field [IWFCOD = 0]
573 4 = Yes, use winds from MM4.DAT file as initial guess field [IWFCOD = 1]
574 5 = Yes, use winds from MM4.DAT file as observations [IWFCOD = 1]
575 13 = Yes, use winds from MM5/3D.DAT file as Step 1 field [IWFCOD = 0]
576 14 = Yes, use winds from MM5/3D.DAT file as initial guess field [IWFCOD = 1]
577 15 = Yes, use winds from MM5/3D.DAT file as observations [IWFCOD = 1]
578
579 Timestep (seconds) of the prognostic
580 model input data (ISTEPPGS) Default: 3600 ! ISTEPPGS = 3600 !
581
582
583 Use coarse CALMET fields as initial guess fields (IGFMET)
584 (overwrites IGF based on prognostic wind fields if any)
585 Default: 0 ! IGFMET = 0 !
586
587 RADIUS OF INFLUENCE PARAMETERS
588
589 Use varying radius of influence Default: F ! LVARY = F !
590 (if no stations are found within RMAX1,RMAX2,
591 or RMAX3, then the closest station will be used)
592
593 Maximum radius of influence over land
594 in the surface layer (RMAX1) No default ! RMAX1 = 6 !
595 Units: km
596 Maximum radius of influence over land
597 aloft (RMAX2) No default ! RMAX2 = 0 !
598 Units: km
599 Maximum radius of influence over water
600 (RMAX3) No default ! RMAX3 = 0 !
601 Units: km
602
603
604 OTHER WIND FIELD INPUT PARAMETERS
605
606 Minimum radius of influence used in
607 the wind field interpolation (RMIN) Default: 0.1 ! RMIN = 0.1 !
608 Units: km
609 Radius of influence of terrain
610 features (TERRAD) No default ! TERRAD = 5 !
611
612 Units: km
613
614 Relative weighting of the first
615 guess field and observations in the
616 SURFACE layer (R1) No default ! R1 = 5 !
617 (R1 is the distance from an Units: km
618 observational station at which the
619 observation and first guess field are
620 equally weighted)

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621 Relative weighting of the first
622 guess field and observations in the
623 layers ALOFT (R2) No default ! R2 = 5 !
624 (R2 is applied in the upper layers Units: km
625 in the same manner as R1 is used in
626 the surface layer).
627
628 Relative weighting parameter of the
629 prognostic wind field data (RPROG) No default ! RPROG = 0 !
630 (Used only if IPROG = 1) Units: km
631 -----
632
633 Maximum acceptable divergence in the
634 divergence minimization procedure
635 (DIVLIM) Default: 5.E-6 ! DIVLIM = 5E-006 !
636
637 Maximum number of iterations in the
638 divergence min. procedure (NITER) Default: 50 ! NITER = 50 !
639
640 Number of passes in the smoothing
641 procedure (NSMTH(NZ))
642 NOTE: NZ values must be entered
643 Default: 2,(mxnz-1)*4 ! NSMTH = 2,9*4 !
644
645 Maximum number of stations used in
646 each layer for the interpolation of
647 data to a grid point (NINTR2(NZ))
648 NOTE: NZ values must be entered Default: 99. ! NINTR2 = 10*99 !
649
650 Critical Froude number (CRITFN) Default: 1.0 ! CRITFN = 1 !
651
652 Empirical factor controlling the
653 influence of kinematic effects
654 (ALPHA) Default: 0.1 ! ALPHA = 0.1 !
655
656 Multiplicative scaling factor for
657 extrapolation of surface observations
658 to upper layers (FEXTR2(NZ)) Default: NZ*0.0
659 * FEXTR2 = *
660 (Used only if IEXTRP = 3 or -3)
661
662
663 BARRIER INFORMATION
664
665 Number of barriers to interpolation
666 of the wind fields (NBAR) Default: 0 ! NBAR = 0 !
667
668 Level (1 to NZ) up to which barriers
669 apply (KBAR) Default: NZ ! KBAR = 10 !
670
671 THE FOLLOWING 4 VARIABLES ARE INCLUDED
672 ONLY IF NBAR > 0
673 NOTE: NBAR values must be entered No defaults
674 for each variable Units: km
675
676 X coordinate of BEGINNING
677 of each barrier (XBBAR(NBAR)) * XBBAR = *
678 Y coordinate of BEGINNING
679 of each barrier (YBBAR(NBAR)) * YBBAR = *
680
681 X coordinate of ENDING
682 of each barrier (XEBAR(NBAR)) * XEBAR = *
683 Y coordinate of ENDING
684 of each barrier (YEBAR(NBAR)) * YEBAR = *
685
686
687 DIAGNOSTIC MODULE DATA INPUT OPTIONS
688
689 Surface temperature (IDIOPT1) Default: 0 ! IDIOPT1 = 0 !

```

```

690      0 = Compute internally from
691          hourly surface observations or prognostic fields
692      1 = Read preprocessed values from
693          a data file (DIAG.DAT)
694
695      Surface met. station to use for
696      the surface temperature (ISURFT)   Default: -1      ! ISURFT = -1 !
697      (Must be a value from 1 to NSSTA
698      or -1 to use 2-D spatially varying
699      surface temperatures).
700      or -2 to use a domain-average prognostic
701      lapse rate (only with ITPROG=2)
702      (Used only if IDIOPT1 = 0)
703      -----
704
705      Temperature lapse rate used in the   Default: 0      ! IDIOPT2 = 0 !
706      computation of terrain-induced
707      circulations (IDIOPT2)
708      0 = Compute internally from (at least) twice-daily
709      upper air observations or prognostic fields
710      1 = Read hourly preprocessed values
711      from a data file (DIAG.DAT)
712
713      Upper air station to use for
714      the domain-scale lapse rate (IUPT) Default: -1      ! IUPT = -2 !
715      (Must be a value from 1 to NUSTA
716      or -1 to use 2-D spatially varying lapse rate)
717      or -2 to use a domain-average prognostic
718      lapse rate (only with ITPROG>0)
719      (Used only if IDIOPT2 = 0)
720      -----
721
722      Depth through which the domain-scale
723      lapse rate is computed (ZUPT)       Default: 200.   ! ZUPT = 200 !
724      (Used only if IDIOPT2 = 0)         Units: meters
725      -----
726
727      Initial Guess Field Winds
728      (IDIOPT3)                           Default: 0      ! IDIOPT3 = 0 !
729      0 = Compute internally from
730          observations or prognostic wind fields
731      1 = Read hourly preprocessed domain-average wind values
732          from a data file (DIAG.DAT)
733
734      Upper air station to use for
735      the initial guess winds (IUPWND)   Default: -1      ! IUPWND = -1 !
736      (Must be a value from -1 to NUSTA, with
737      -1 indicating 3-D initial guess fields,
738      and IUPWND>1 domain-scaled (i.e. constant) IGF
739      (Used only if IDIOPT3 = 0 and noobs=0)
740      -----
741
742      Bottom and top of layer through
743      which the domain-scale winds
744      are computed
745      (ZUPWND(1), ZUPWND(2))             Defaults: 1., 1000. ! ZUPWND= 1.0, 1.00 !
746      (Used only if IDIOPT3 = 0, NOOBS>0 and IUPWND>0)   Units: meters
747      -----
748
749      Observed surface wind components
750      for wind field module (IDIOPT4)   Default: 0      ! IDIOPT4 = 0 !
751      0 = Read WS, WD from a surface
752          data file (SURF.DAT)
753      1 = Read hourly preprocessed U, V from
754          a data file (DIAG.DAT)
755
756      Observed upper air wind components
757      for wind field module (IDIOPT5)   Default: 0      ! IDIOPT5 = 0 !
758      0 = Read WS, WD from an upper

```



```

828 Units: Grid
829 cells
830 Half-angle of upwind looking cone
831 for averaging (HAFANG) Default: 30. ! HAFANG = 30 !
832 Units: deg.
833 Layer of winds used in upwind
834 averaging (ILEVZI) Default: 1 ! ILEVZI = 1 !
835 (must be between 1 and NZ)
836
837
838 CONVECTIVE MIXING HEIGHT OPTIONS:
839 Method to compute the convective
840 mixing height (IMIHXH) Default: 1 ! IMIXH = 1 !
841 1: Maul-Carson for land and water cells
842 -1: Maul-Carson for land cells only -
843 OCD mixing height overwater
844 2: Batchvarova and Gryning for land and water cells
845 -2: Batchvarova and Gryning for land cells only
846 OCD mixing height overwater
847
848 Threshold buoyancy flux required to
849 sustain convective mixing height growth
850 overland (THRESHL) Default: 0.0 ! THRESHL = 0 !
851 (expressed as a heat flux units: W/m3
852 per meter of boundary layer)
853
854
855 Threshold buoyancy flux required to
856 sustain convective mixing height growth
857 overwater (THRESHW) Default: 0.05 ! THRESHW = 0.05 !
858 (expressed as a heat flux units: W/m3
859 per meter of boundary layer)
860
861
862 Option for overwater lapse rates used
863 in convective mixing height growth
864 (ITWPROG) Default: 0 ! ITWPROG = 0 !
865 0 : use SEA.DAT lapse rates and deltaT (or assume neutral
866 conditions if missing)
867 1 : use prognostic lapse rates (only if IPROG>2)
868 and SEA.DAT deltaT (or neutral if missing)
869 2 : use prognostic lapse rates and prognostic delta T
870 (only if iprog>12 and 3D.DAT version# 2.0 or higher)
871
872 Land Use category ocean in 3D.DAT datasets
873 (ILUOC3D) Default: 16 ! ILUOC3D = 16 !
874 Note: if 3D.DAT from MM5 version 3.0, iluoc3d = 16
875 if MM4.DAT, typically iluoc3d = 7
876
877
878 OTHER MIXING HEIGHT VARIABLES
879
880 Minimum potential temperature lapse
881 rate in the stable layer above the
882 current convective mixing ht. Default: 0.001 ! DPTMIN = 0.001 !
883 (DPTMIN) Units: deg. K/m
884 Depth of layer above current conv.
885 mixing height through which lapse
886 rate is computed (DZZI) Default: 200. ! DZZI = 200 !
887 Units: meters
888
888 Minimum overland mixing height Default: 50. ! ZIMIN = 50 !
889 (ZIMIN) Units: meters
890 Maximum overland mixing height Default: 3000. ! ZIMAX = 3000 !
891 (ZIMAX) Units: meters
892 Minimum overwater mixing height Default: 50. ! ZIMINW = 50 !
893 (ZIMINW) -- (Not used if observed Units: meters
894 overwater mixing hts. are used)
895 Maximum overwater mixing height Default: 3000. ! ZIMAXW = 3000 !
896 (ZIMAXW) -- (Not used if observed Units: meters

```

```

897         overwater mixing hts. are used)
898
899
900 OVERWATER SURFACE FLUXES METHOD and PARAMETERS
901     (ICOARE)                               Default: 10       ! ICOARE = 0 !
902     0: original deltaT method (OCD)
903     10: COARE with no wave parameterization (jwave=0, Charnock)
904     11: COARE with wave option jwave=1 (Oost et al.)
905         and default wave properties
906     -11: COARE with wave option jwave=1 (Oost et al.)
907         and observed wave properties (must be in SEA.DAT files)
908     12: COARE with wave option 2 (Taylor and Yelland)
909         and default wave properties
910     -12: COARE with wave option 2 (Taylor and Yelland)
911         and observed wave properties (must be in SEA.DAT files)
912
913     Note:  When ICOARE=0, similarity wind profile stability PSI functions
914            based on Van Ulden and Holtslag (1985) are substituted for
915            later formulations used with the COARE module, and temperatures
916            used for surface layer parameters are obtained from either the
917            nearest surface station temperature or prognostic model 2D
918            temperatures (if ITPROG=2).
919
920
921     Coastal/Shallow water length scale (DSHELF)
922     (for modified z0 in shallow water)
923     ( COARE fluxes only)
924
925                                     Default : 0.           ! DSHELF = 0 !
926                                     units: km
927
928     COARE warm layer computation (IWARM)           ! IWARM = 0 !
929     1: on - 0: off (must be off if SST measured with
930     IR radiometer)                               Default: 0
931
932     COARE cool skin layer computation (ICOOOL)     ! ICOOL = 0 !
933     1: on - 0: off (must be off if SST measured with
934     IR radiometer)                               Default: 0
935
936 RELATIVE HUMIDITY PARAMETERS
937
938     3D relative humidity from observations or
939     from prognostic data? (IRHPRG)           Default:0           ! IRHPRG = 0 !
940
941     0 = Use RH from SURF.DAT file
942         (only if NOOBS = 0,1)
943     1 = Use prognostic RH
944         (only if NOOBS = 0,1,2)
945
946 TEMPERATURE PARAMETERS
947
948     3D temperature from observations or
949     from prognostic data? (ITPROG)           Default:0           ! ITPROG = 1 !
950
951     0 = Use Surface and upper air stations
952         (only if NOOBS = 0)
953     1 = Use Surface stations (no upper air observations)
954         Use MM5/3D for upper air data
955         (only if NOOBS = 0,1)
956     2 = No surface or upper air observations
957         Use MM5/3D for surface and upper air data
958         (only if NOOBS = 0,1,2)
959
960     Interpolation type
961     (1 = 1/R ; 2 = 1/R**2)                   Default:1           ! IRAD = 1 !
962
963     Radius of influence for temperature
964     interpolation (TRADKM)                   Default: 500.       ! TRADKM = 500 !
965     Units: km

```

```

966      Maximum Number of stations to include
967      in temperature interpolation (NUMTS)   Default: 5           ! NUMTS = 5 !
968
969      Conduct spatial averaging of temp-
970      eratures (IAVET) (0=no, 1=yes)       Default: 1           ! IAVET = 1 !
971      (will use mixing ht MNMDAV,HAFANG
972      so make sure they are correct)
973
974      Default temperature gradient
975      below the mixing height over
976      water (TGDEFB)                        Default: -.0098 ! TGDEFB = -0.0098 !
977      Units: K/m
978
979      Default temperature gradient
980      above the mixing height over
981      water (TGDEFA)                        Default: -.0045 ! TGDEFA = -0.0045 !
982      Units: K/m
983
984      Beginning (JWAT1) and ending (JWAT2)
985      land use categories for temperature
986      interpolation over water -- Make
987      bigger than largest land use to disable
988      ! JWAT1 = 999 !
989      ! JWAT2 = 999 !

```

PRECIP INTERPOLATION PARAMETERS

```

988
989      Method of interpolation (NFLAGP)       Default: 2           ! NFLAGP = 2 !
990      (1=1/R,2=1/R**2,3=EXP/R**2)
991      Radius of Influence (SIGMAP)         Default: 100.0 ! SIGMAP = 100. !
992      (0.0 => use half dist. btwn
993      nearest stns w & w/out
994      precip when NFLAGP = 3)
995      Units: km
996
997      Minimum Precip. Rate Cutoff (CUTP)   Default: 0.01 ! CUTP = 0.01 !
998      (values <CUTP = 0.0 mm/hr)
999      Units: mm/hr
1000 !END!

```

INPUT GROUP: 7 -- Surface meteorological station parameters

SURFACE STATION VARIABLES

(One record per station -- 12 records in all)

	1	2				
	Name	ID	X coord. (km)	Y coord. (km)	Time zone	Anem. Ht. (m)
1013	! SS1 = 'PER'	9021	403.240	6467.140	8	10.000 !

1
Four character string for station name
(MUST START IN COLUMN 9)

2
Six digit integer for station ID

!END!

INPUT GROUP: 8 -- Upper air meteorological station parameters

UPPER AIR STATION VARIABLES

(One record per station -- 3 records in all)

1 2

```

1035      Name      ID      X coord.  Y coord.  Time zone
1036                (km)      (km)
1037      -----
1038
1039      -----
1040      1
1041      Four character string for station name
1042      (MUST START IN COLUMN 9)
1043
1044      2
1045      Five digit integer for station ID
1046
1047      !END!
1048
1049
1050      -----
1051
1052      INPUT GROUP: 9 -- Precipitation station parameters
1053      -----
1054
1055      PRECIPITATION STATION VARIABLES
1056      (One record per station -- 2 records in all)
1057      (NOT INCLUDED IF NPSTA = 0)
1058
1059      1          2
1060      Name      Station  X coord.  Y coord.
1061                Code      (km)      (km)
1062      -----
1063
1064
1065
1066      -----
1067      1
1068      Four character string for station name
1069      (MUST START IN COLUMN 9)
1070
1071      2
1072      Six digit station code composed of state
1073      code (first 2 digits) and station ID (last
1074      4 digits)
1075
1076      !END!
1077
1078

```

1 CALPUFF.INP 7.0
2 Re-do of SLR/Synergetics
3 Using SLR/Synergetics Setup
4 Using 2023 TAPM + PerthAP Surface

5 ----- Run title (3 lines) -----

7 CALPUFF MODEL CONTROL FILE
8 -----

10 -----

11
12 INPUT GROUP: 0 -- Input and Output File Names

13 -----

Default Name	Type	File Name
CALMET.DAT	input	! METDAT = CALMET(T010).DAT !
or		
ISCMET.DAT	input	* ISCDAT = *
or		
PLMMET.DAT	input	* PLMDAT = *
or		
PROFILE.DAT	input	* PRFDAT = *
SURFACE.DAT	input	* SFCDAT = *
RESTARTB.DAT	input	* RSTARTB = *

CALPUFF.LST	output	! PUFLST = CALPUFF.LST !
CONC.DAT	output	! CONDAT = CONC.DAT !
DFLX.DAT	output	! DFDAT = DFLX.DAT !
WFLX.DAT	output	! WFDAT = WFLX.DAT !
VISB.DAT	output	* VISDAT = *
TK2D.DAT	output	* T2DDAT = *
RHO2D.DAT	output	* RHODAT = *
RESTARTE.DAT	output	* RSTARTE = *

37 Other Files

OZONE.DAT	input	* OZDAT = *
VD.DAT	input	* VDDAT = *
CHEM.DAT	input	* CHEMDAT = *
AUX	input	* AUXEXT = *
(Extension added to METDAT filename(s) for files with auxiliary 2D and 3D data)		
H2O2.DAT	input	* H2O2DAT = *
NH3Z.DAT	input	* NH3ZDAT = *
HILL.DAT	input	* HILDAT = *
HILLRCT.DAT	input	* RCTDAT = *
COASTLN.DAT	input	* CSTDAT = *
FLUXBDY.DAT	input	* BDYDAT = *
BCON.DAT	input	* BCNDAT = *
DEBUG.DAT	output	* DEBUG = *
MASSFLX.DAT	output	* FLXDAT = *
MASSBAL.DAT	output	* BALDAT = *
FOG.DAT	output	* FOGDAT = *
RISE.DAT	output	* RISDAT = *
PFTRAK.DAT	output	* TRKDAT = *

59 All file names will be converted to lower case if LCFILES = T
60 Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
61 T = lower case ! LCFILES = F !
62 F = UPPER CASE

63 NOTE: (1) file/path names can be up to 132 characters in length

66 Provision for multiple input files

67 -----
68 Number of CALMET.DAT Domains (NMETDOM)
69 Default: 1 ! NMETDOM = 1 !

```

70
71     Number of CALMET.DAT files (NMETDAT)
72     (Total for ALL Domains)
73                               Default: 1           ! NMETDAT = 1 !
74
75     Number of PTEMARB.DAT files for run (NPTDAT)
76                               Default: 0           ! NPTDAT = 0 !
77
78     Number of BAEMARB.DAT files for run (NARDAT)
79                               Default: 0           ! NARDAT = 0 !
80
81     Number of VOLEMARB.DAT files for run (NVOLDAT)
82                               Default: 0           ! NVOLDAT = 0 !
83
84     Number of FLARE source files (FLEMARB.DAT)
85     with time-varying data (NFLDAT)
86                               Default: 0           ! NFLDAT = 0 !
87
88     Number of ROAD source files (RDEMARB.DAT)
89     with time-varying data (NRDDAT)
90                               Default: 0           ! NRDDAT = 0 !
91
92     Number of BUOYANT LINE source files (LNEMARB.DAT)
93     with time-varying data (NLNDAT)
94                               Default: 0           ! NLNDAT = 0 !
95     Note: Only 1 BUOYANT LINE source file is allowed
96     -----
97
98 !END!
99
100 -----
101 Subgroup (0a)
102 -----
103     Provide a name for each CALMET domain if NMETDOM > 1
104     Enter NMETDOM lines.
105                               a,b
106 Default Name           Domain Name
107 -----
108 * DOMAINLIST = *
109
110
111     The following CALMET.DAT filenames are processed in sequence
112     if NMETDAT > 1
113
114     Enter NMETDAT lines, 1 line for each file name.
115
116                               a,c,d
117 Default Name   Type           File Name
118 -----
119 none          input   * METDAT=      * *END*
120
121 -----
122     a
123     The name for each CALMET domain and each CALMET.DAT file is treated
124     as a separate input subgroup and therefore must end with an input
125     group terminator.
126     b
127     Use DOMAIN1= to assign the name for the outermost CALMET domain.
128     Use DOMAIN2= to assign the name for the next inner CALMET domain.
129     Use DOMAIN3= to assign the name for the next inner CALMET domain, etc.
130     -----
131     |   When inner domains with equal resolution (grid-cell size)   |
132     |   overlap, the data from the FIRST such domain in the list will |
133     |   be used if all other criteria for choosing the controlling   |
134     |   grid domain are inconclusive.                               |
135     |-----|
136     c
137     Use METDAT1= to assign the file names for the outermost CALMET domain.
138     Use METDAT2= to assign the file names for the next inner CALMET domain.

```

```

139     Use METDAT3= to assign the file names for the next inner CALMET domain, etc.
140     d
141     The filenames for each domain must be provided in sequential order
142
143
144 -----
145 Subgroup (0b) - PTEMARB.DAT files
146 -----
147
148     POINT Source File Names
149     The following PTEMARB.DAT filenames are processed if NPTDAT>0
150     A total of NPTDAT lines is expected with one file name assigned per line
151     Each line is treated as an input group and must terminate with END
152     (surrounded by delimiters)
153     (Each file contains emissions parameters for the entire period modeled
154     for 1 or more sources)
155
156     Default Name   Type           File Name
157     -----
158     * PTDATLIST = *
159
160
161 -----
162 Subgroup (0c) - BAEMARB.DAT files
163 -----
164
165     BUOYANT AREA Source File Names
166     The following BAEMARB.DAT filenames are processed if NARDAT>0
167     A total of NARDAT lines is expected with one file name assigned per line
168     Each line is treated as an input group and must terminate with END
169     (surrounded by delimiters)
170     (Each file contains emissions parameters for the entire period modeled
171     for 1 or more sources)
172
173     Default Name   Type           File Name
174     -----
175     * ARDATLIST = *
176
177
178 -----
179 Subgroup (0d) - VOLEMARB.DAT files
180 -----
181
182     VOLUME Source File Names
183     The following VOLEMARB.DAT filenames are processed if NVOLDAT>0
184     A total of NVOLDAT lines is expected with one file name assigned per line
185     Each line is treated as an input group and must terminate with END
186     (surrounded by delimiters)
187     (Each file contains emissions parameters for the entire period modeled
188     for 1 or more sources)
189
190     Default Name   Type           File Name
191     -----
192     * VOLDATLIST = *
193
194 -----
195 Subgroup (0e) - FLEMARB.DAT files
196 -----
197
198     FLARE Source File Names
199     The following FLEMARB.DAT filenames are processed if NFLDAT>0
200     A total of NFLDAT lines is expected with one file name assigned per line
201     Each line is treated as an input group and must terminate with END
202     (surrounded by delimiters)
203     (Each file contains emissions parameters for the entire period modeled
204     for 1 or more sources)
205
206     Default Name   Type           File Name
207     -----

```

```

208 * FLEMARBLIST = *
209
210
211 -----
212 Subgroup (0f) - RDEMARB.DAT files
213 -----
214
215 ROAD Source File Names
216 The following RDEMARB.DAT filenames are processed if NRDDAT>0
217 A total of NRDDAT lines is expected with one file name assigned per line
218 Each line is treated as an input group and must terminate with END
219 (surrounded by delimiters)
220 (Each file contains emissions parameters for the entire period modeled
221 for 1 or more sources)
222
223 Default Name  Type          File Name
224 -----  ----  -----
225 * RDEMARBLIST = *
226
227
228 -----
229 Subgroup (0g) - LNEMARB.DAT file
230 -----
231
232 BUOYANT LINE Source File Name (not more than 1)
233 The following LNEMARB.DAT filename is processed if NLNDAT>0
234 The assignment is treated as an input group and must terminate with END
235 (surrounded by delimiters)
236
237 Default Name  Type          File Name
238 -----  ----  -----
239 * LNEMARBLIST = *
240
241 -----
242
243 INPUT GROUP: 1 -- General run control parameters
244 -----
245
246 Option to run all periods found
247 in the met. file      (METRUN)  Default: 0      ! METRUN = 1 !
248
249 METRUN = 0 - Run period explicitly defined below
250 METRUN = 1 - Run all periods in met. file
251
252 Starting date:      Year  (IBYR)  --  No default  ! IBYR = 2023 !
253                   Month (IBMO)  --  No default  ! IBMO = 1 !
254                   Day   (IBDY)  --  No default  ! IBDY = 1 !
255 Starting time:     Hour  (IBHR)  --  No default  ! IBHR = 0 !
256                   Minute (IBMIN) --  No default  ! IBMIN = 0 !
257                   Second (IBSEC) --  No default  ! IBSEC = 0 !
258
259 Ending date:       Year  (IEYR)  --  No default  ! IEYR = 2023 !
260                   Month (IEMO)  --  No default  ! IEMO = 12 !
261                   Day   (IEDY)  --  No default  ! IEDY = 31 !
262 Ending time:       Hour  (IEHR)  --  No default  ! IEHR = 22 !
263                   Minute (IEMIN) --  No default  ! IEMIN = 0 !
264                   Second (IESEC) --  No default  ! IESEC = 0 !
265
266 (These are only used if METRUN = 0)
267
268 Base time zone:    (ABTZ)  --  No default  ! ABTZ = UTC+0800 !
269 (character*8)
270 The modeling domain may span multiple time zones.  ABTZ defines the
271 base time zone used for the entire simulation.  This must match the
272 base time zone of the meteorological data.
273 Examples:
274 Greenwich Mean Time (GMT) = UTC+0000
275 EST                    = UTC-0500
276 CST                    = UTC-0600

```

```

277         MST                = UTC-0700
278         PST                = UTC-0800
279         Los Angeles, USA   = UTC-0800
280         New York, USA      = UTC-0500
281         Santiago, Chile    = UTC-0400
282         UK                 = UTC+0000
283         Western Europe     = UTC+0100
284         Rome, Italy         = UTC+0100
285         Cape Town, S.Africa = UTC+0200
286         Sydney, Australia  = UTC+1000
287
288 Length of modeling time-step (seconds)
289 Equal to update period in the primary
290 meteorological data files, or an
291 integer fraction of it (1/2, 1/3 ...)
292 Must be no larger than 1 hour
293 (NSECDT)                Default:3600      ! NSECDT = 3600 !
294                          Units: seconds
295
296 Number of chemical species (NSPEC)
297                          Default: 5        ! NSPEC = 1 !
298
299 Number of chemical species
300 to be emitted (NSE)      Default: 3        ! NSE = 1 !
301
302 Flag to stop run after
303 SETUP phase (ITEST)      Default: 2        ! ITEST = 2 !
304 (Used to allow checking
305 of the model inputs, files, etc.)
306     ITEST = 1 - STOPS program after SETUP phase
307     ITEST = 2 - Continues with execution of program
308                  after SETUP
309
310 Restart Configuration:
311
312     Control flag (MRESTART)    Default: 0        ! MRESTART = 0 !
313
314     0 = Do not read or write a restart file
315     1 = Read a restart file at the beginning of
316         the run
317     2 = Write a restart file during run
318     3 = Read a restart file at beginning of run
319         and write a restart file during run
320
321     Number of periods in Restart
322     output cycle (NRESPD)      Default: 0        ! NRESPD = 0 !
323
324     0 = File written only at last period
325     >0 = File updated every NRESPD periods
326
327 Meteorological Data Format (METFM)
328                          Default: 1        ! METFM = 1 !
329
330     METFM = 1 - CALMET binary file (CALMET.MET)
331     METFM = 2 - ISC ASCII file (ISCMET.MET)
332     METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
333     METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
334                 surface parameters file (SURFACE.DAT)
335     METFM = 5 - AERMET tower file (PROFILE.DAT) and
336                 surface parameters file (SURFACE.DAT)
337
338 Meteorological Profile Data Format (MPRFFM)
339     (used only for METFM = 1, 2, 3)
340                          Default: 1        ! MPRFFM = 1 !
341
342     MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
343     MPRFFM = 2 - AERMET tower file (PROFILE.DAT)
344
345 Sigma-y is adjusted by the factor (AVET/PGTIME)**0.2 to either

```

346 decrease it if the averaging time selected is less than the base
347 averaging time, or increase it if the averaging time is greater.
348 The base averaging time is denoted as PGTIME due to historical
349 reasons as this adjustment was originally applied to the PG sigma
350 option. It is now applied to all dispersion options.
351 The factor is applied to the ambient turbulence sigma-v (m/s) and
352 does not alter buoyancy enhancement or far-field Heffter growth.
353

354 Averaging Time (minutes) (AVET) Default: 60.0 ! AVET = 60 !
355
356 Base Averaging Time (minutes) (PGTIME) Default: 60.0 ! PGTIME = 60 !
357
358

359 Output units for binary concentration and flux files
360 written in Dataset v2.2 or later formats
361 (IOUTU) Default: 1 ! IOUTU = 1 !
362 1 = mass - g/m3 (conc) or g/m2/s (dep)
363 2 = odour - odour_units (conc)
364 3 = radiation - Bq/m3 (conc) or Bq/m2/s (dep)
365

366 !END!
367

368 -----
369

370
371 INPUT GROUP: 2 -- Technical options
372 -----
373

374
375 Vertical distribution used in the
376 near field (MGAUSS) Default: 1 ! MGAUSS = 1 !
377 0 = uniform
378 1 = Gaussian
379

380 Terrain adjustment method
381 (MCTADJ) Default: 3 ! MCTADJ = 0 !
382 0 = no adjustment
383 1 = ISC-type of terrain adjustment
384 2 = simple, CALPUFF-type of terrain
385 adjustment
386 3 = partial plume path adjustment
387

388 Subgrid-scale complex terrain
389 flag (MCTSG) Default: 0 ! MCTSG = 0 !
390 0 = not modeled
391 1 = modeled
392

393 Near-field puffs modeled as
394 elongated slugs? (MSLUG) Default: 0 ! MSLUG = 0 !
395 0 = no
396 1 = yes (slug model used)
397

398 Transitional plume rise modeled?
399 (MTRANS) Default: 1 ! MTRANS = 1 !
400 0 = no (i.e., final rise only)
401 1 = yes (i.e., transitional rise computed)
402

403 Stack tip downwash? (MTIP) Default: 1 ! MTIP = 1 !
404 0 = no (i.e., no stack tip downwash)
405 1 = yes (i.e., use stack tip downwash)
406

407 Method used to compute plume rise for
408 point sources not subject to building
409 downwash? (MRISE) Default: 1 ! MRISE = 1 !
410 1 = Briggs plume rise
411 2 = Numerical plume rise
412

413 Apply stack-tip downwash to FLARE sources?
414 (MTIP_FL) Default: 0 ! MTIP_FL = 0 !

```

415         0 = no (no stack-tip downwash)
416         1 = yes (apply stack-tip downwash)
417
418 Plume rise module for FLARE sources
419 (MRISE_FL)                               Default: 2      ! MRISE_FL = 2 !
420     1 = Briggs module
421     2 = Numerical rise module
422
423 Method used to simulate building
424 downwash? (MBDW)                           Default: 1      ! MBDW = 1 !
425     1 = ISC method
426     2 = PRIME method
427
428 Vertical wind shear modeled above
429 stack top? (MSHEAR)                         Default: 0      ! MSHEAR = 0 !
430     0 = no (i.e., vertical wind shear not modeled)
431     1 = yes (i.e., vertical wind shear modeled)
432
433 Puff splitting allowed? (MSPLIT)            Default: 0      ! MSPLIT = 0 !
434     0 = no (i.e., puffs not split)
435     1 = yes (i.e., puffs are split)
436
437 Chemical mechanism flag (MCHEM)             Default: 1      ! MCHEM = 0 !
438     0 = chemical transformation not
439         modeled
440     1 = transformation rates computed
441         internally (MESOPUFF II scheme)
442     2 = user-specified transformation
443         rates used
444     3 = transformation rates computed
445         internally (RIVAD/ARM3 scheme)
446     4 = secondary organic aerosol formation
447         computed (MESOPUFF II scheme for OH)
448     5 = user-specified half-life with or
449         without transfer to child species
450     6 = transformation rates computed
451         internally (Updated RIVAD scheme with
452         ISORROPIA equilibrium)
453     7 = transformation rates computed
454         internally (Updated RIVAD scheme with
455         ISORROPIA equilibrium and CalTech SOA)
456
457 Aqueous phase transformation flag (MAQCHEM)
458 (Used only if MCHEM = 6, or 7)             Default: 0      ! MAQCHEM = 0 !
459     0 = aqueous phase transformation
460         not modeled
461     1 = transformation rates and wet
462         scavenging coefficients adjusted
463         for in-cloud aqueous phase reactions
464         (adapted from RADM cloud model
465         implementation in CMAQ/SCICHEM)
466
467 Liquid Water Content flag (MLWC)
468 (Used only if MAQCHEM = 1)                 Default: 1      ! MLWC = 1 !
469     0 = water content estimated from cloud cover
470         and presence of precipitation
471     1 = gridded cloud water data read from CALMET
472         water content output files (filenames are
473         the CALMET.DAT names PLUS the extension
474         AUXEXT provided in Input Group 0)
475
476 Wet removal modeled ? (MWET)               Default: 1      ! MWET = 0 !
477     0 = no
478     1 = yes
479
480 Dry deposition modeled ? (MDRY)            Default: 1      ! MDRY = 0 !
481     0 = no
482     1 = yes
483     (dry deposition method specified)

```

```

484         for each species in Input Group 3)
485
486
487 Gravitational settling (plume tilt)
488 modeled ? (MTILT)                Default: 0      ! MTILT = 0 !
489     0 = no
490     1 = yes
491     (puff center falls at the gravitational
492     settling velocity for 1 particle species)
493
494 Restrictions:
495     - MDRY = 1
496     - NSPEC = 1 (must be particle species as well)
497     - sg = 0 GEOMETRIC STANDARD DEVIATION in Group 8 is
498         set to zero for a single particle diameter
499
500 Method used to compute dispersion
501 coefficients (MDISP)                Default: 3      ! MDISP = 3 !
502
503     1 = dispersion coefficients computed from measured values
504         of turbulence, sigma v, sigma w
505     2 = dispersion coefficients from internally calculated
506         sigma v, sigma w using micrometeorological variables
507         (u*, w*, L, etc.)
508     3 = PG dispersion coefficients for RURAL areas (computed using
509         the ISCST multi-segment approximation) and MP coefficients in
510         urban areas
511     4 = same as 3 except PG coefficients computed using
512         the MESOPUFF II eqns.
513     5 = CTDM sigmas used for stable and neutral conditions.
514         For unstable conditions, sigmas are computed as in
515         MDISP = 3, described above. MDISP = 5 assumes that
516         measured values are read
517
518 Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
519 (Used only if MDISP = 1 or 5)      Default: 3      ! MTURBVW = 3 !
520     1 = use sigma-v or sigma-theta measurements
521         from PROFILE.DAT to compute sigma-y
522         (valid for METFM = 1, 2, 3, 4, 5)
523     2 = use sigma-w measurements
524         from PROFILE.DAT to compute sigma-z
525         (valid for METFM = 1, 2, 3, 4, 5)
526     3 = use both sigma-(v/theta) and sigma-w
527         from PROFILE.DAT to compute sigma-y and sigma-z
528         (valid for METFM = 1, 2, 3, 4, 5)
529     4 = use sigma-theta measurements
530         from PLMMET.DAT to compute sigma-y
531         (valid only if METFM = 3)
532
533 Back-up method used to compute dispersion
534 when measured turbulence data are
535 missing (MDISP2)                    Default: 3      ! MDISP2 = 3 !
536 (used only if MDISP = 1 or 5)
537     2 = dispersion coefficients from internally calculated
538         sigma v, sigma w using micrometeorological variables
539         (u*, w*, L, etc.)
540     3 = PG dispersion coefficients for RURAL areas (computed using
541         the ISCST multi-segment approximation) and MP coefficients in
542         urban areas
543     4 = same as 3 except PG coefficients computed using
544         the MESOPUFF II eqns.
545
546 [DIAGNOSTIC FEATURE]
547 Method used for Lagrangian timescale for Sigma-y
548 (used only if MDISP=1,2 or MDISP2=1,2)
549 (MTAULY)                            Default: 0      ! MTAULY = 0 !
550     0 = Draxler default 617.284 (s)
551     1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
552     10 <Direct user input (s)         -- e.g., 306.9

```

```

553
554
555 [DIAGNOSTIC FEATURE]
556 Method used for Advective-Decay timescale for Turbulence
557 (used only if MDISP=2 or MDISP2=2)
558 (MTAUADV) Default: 0 ! MTAUADV = 0 !
559 0 = No turbulence advection
560 1 = Computed (OPTION NOT IMPLEMENTED)
561 10 <Direct user input (s) -- e.g., 800
562
563
564 Method used to compute turbulence sigma-v &
565 sigma-w using micrometeorological variables
566 (Used only if MDISP = 2 or MDISP2 = 2)
567 (MCTURB) Default: 1 ! MCTURB = 1 !
568 1 = Standard CALPUFF subroutines
569 2 = AERMOD subroutines
570
571 PG sigma-y,z adj. for roughness? Default: 0 ! MROUGH = 0 !
572 (MROUGH)
573 0 = no
574 1 = yes
575
576 Partial plume penetration of Default: 1 ! MPARTL = 1 !
577 elevated inversion modeled for
578 point sources?
579 (MPARTL)
580 0 = no
581 1 = yes
582
583 Partial plume penetration of Default: 1 ! MPARTLBA = 0 !
584 elevated inversion modeled for
585 buoyant area sources?
586 (MPARTLBA)
587 0 = no
588 1 = yes
589
590 Strength of temperature inversion Default: 0 ! MTINV = 0 !
591 provided in PROFILE.DAT extended records?
592 (MTINV)
593 0 = no (computed from measured/default gradients)
594 1 = yes
595
596 PDF used for dispersion under convective conditions?
597 Default: 0 ! MPDF = 0 !
598 (MPDF)
599 0 = no
600 1 = yes
601
602 Sub-Grid TIBL module used for shore line?
603 Default: 0 ! MSGTIBL = 0 !
604 (MSGTIBL)
605 0 = no
606 1 = yes
607
608 Boundary conditions (concentration) modeled?
609 Default: 0 ! MBCON = 0 !
610 (MBCON)
611 0 = no
612 1 = yes, using formatted BCON.DAT file
613 2 = yes, using unformatted CONC.DAT file
614
615 Note: MBCON > 0 requires that the last species modeled
616 be 'BCON'. Mass is placed in species BCON when
617 generating boundary condition puffs so that clean
618 air entering the modeling domain can be simulated
619 in the same way as polluted air. Specify zero
620 emission of species BCON for all regular sources.
621

```

622 Individual source contributions saved?
623 Default: 0 ! MSOURCE = 1 !
624 (MSOURCE)
625 0 = no
626 1 = yes
627
628

629 Analyses of fogging and icing impacts due to emissions from
630 arrays of mechanically-forced cooling towers can be performed
631 using CALPUFF in conjunction with a cooling tower emissions
632 processor (CTEMISS) and its associated postprocessors. Hourly
633 emissions of water vapor and temperature from each cooling tower
634 cell are computed for the current cell configuration and ambient
635 conditions by CTEMISS. CALPUFF models the dispersion of these
636 emissions and provides cloud information in a specialized format
637 for further analysis. Output to FOG.DAT is provided in either
638 'plume mode' or 'receptor mode' format.
639

640 Configure for FOG Model output?
641 Default: 0 ! MFOG = 0 !
642 (MFOG)
643 0 = no
644 1 = yes - report results in PLUME Mode format
645 2 = yes - report results in RECEPTOR Mode format
646
647

648 Test options specified to see if
649 they conform to regulatory
650 values? (MREG) Default: 1 ! MREG = 0 !
651

652 0 = NO checks are made
653 1 = Technical options must conform to USEPA
654 Long Range Transport (LRT) guidance
655 METFM 1 or 2
656 AVET 60. (min)
657 PGTIME 60. (min)
658 MGAUSS 1
659 MCTADJ 3
660 MTRANS 1
661 MTIP 1
662 MRISE 1
663 MCHEM 1 or 3 (if modeling SOx, NOx)
664 MWET 1
665 MDRY 1
666 MDISP 2 or 3
667 MPDF 0 if MDISP=3
668 1 if MDISP=2
669 MROUGH 0
670 MPARTL 1
671 MPARTLBA 0
672 SYTDEP 550. (m)
673 MHFTSZ 0
674 SVMIN 0.5 (m/s)
675
676

677 !END!
678
679

680 -----
681
682 INPUT GROUP: 3a, 3b -- Species list
683 -----
684
685 -----
686 Subgroup (3a)
687 -----
688

689 The following species are modeled:
690

```

691 ! CSPEC =          PM10 !          !END!
692
693
694
695 SPECIES              MODELED              EMITTED              Dry              OUTPUT GROUP
696 NAME                (0=NO, 1=YES)         (0=NO, 1=YES)         DEPOSITED          NUMBER
697 (Limit: 12          1=COMPUTED-GAS          1=COMPUTED-GAS      1=1st CGRUP,
698 Characters          2=COMPUTED-PARTICLE      2=COMPUTED-PARTICLE 2=2nd CGRUP,
699 in length)          3=USER-SPECIFIED)        3=USER-SPECIFIED)   3= etc.)
700
701 !          PM10 =          1,          1,          0,          0 !
702
703

```

```
704 !END!
```

```

706 Note: The last species in (3a) must be 'BCON' when using the
707 boundary condition option (MBCON > 0). Species BCON should
708 typically be modeled as inert (no chem transformation or
709 removal).
710

```

```

711 -----
713 Subgroup (3b)
714 -----

```

```

715 The following names are used for Species-Groups in which results
716 for certain species are combined (added) prior to output. The
717 CGRUP name will be used as the species name in output files.
718 Use this feature to model specific particle-size distributions
719 by treating each size-range as a separate species.
720 Order must be consistent with 3(a) above.
721
722
723
724 -----

```

```

726
727 INPUT GROUP: 4 -- Map Projection and Grid control parameters
728 -----

```

```
729 Projection for all (X,Y):
```

```
730 Map projection
```

```
731 (PMAP) Default: UTM ! PMAP = UTM !
```

- 732 UTM : Universal Transverse Mercator
- 733 TTM : Tangential Transverse Mercator
- 734 LCC : Lambert Conformal Conic
- 735 PS : Polar Stereographic
- 736 EM : Equatorial Mercator
- 737 LAZA : Lambert Azimuthal Equal Area

```

738 False Easting and Northing (km) at the projection origin
739 (Used only if PMAP= TTM, LCC, or LAZA)
740 (FEAST) Default=0.0 ! FEAST = 0.0 !
741 (FNORTH) Default=0.0 ! FNORTH = 0.0 !
742

```

```

743 UTM zone (1 to 60)
744 (Used only if PMAP=UTM)
745 (IUTMZN) No Default ! IUTMZN = 50 !
746

```

```

747 Hemisphere for UTM projection?
748 (Used only if PMAP=UTM)
749 (UTMHEM) Default: N ! UTMHEM = S !
750 N : Northern hemisphere projection
751 S : Southern hemisphere projection
752

```

```

753 Latitude and Longitude (decimal degrees) of projection origin
754 (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
755

```

760 (RLAT0) No Default ! RLAT0 = 0.00N !
 761 (RLON0) No Default ! RLON0 = 0.00E !
 762
 763 TTM : RLON0 identifies central (true N/S) meridian of projection
 764 RLAT0 selected for convenience
 765 LCC : RLON0 identifies central (true N/S) meridian of projection
 766 RLAT0 selected for convenience
 767 PS : RLON0 identifies central (grid N/S) meridian of projection
 768 RLAT0 selected for convenience
 769 EM : RLON0 identifies central meridian of projection
 770 RLAT0 is REPLACED by 0.0N (Equator)
 771 LAZA: RLON0 identifies longitude of tangent-point of mapping plane
 772 RLAT0 identifies latitude of tangent-point of mapping plane
 773

774 Matching parallel(s) of latitude (decimal degrees) for projection
 775 (Used only if PMAP= LCC or PS)

776 (XLAT1) No Default ! XLAT1 = 30S !
 777 (XLAT2) No Default ! XLAT2 = 60S !
 778

779 LCC : Projection cone slices through Earth's surface at XLAT1 and XLAT2
 780 PS : Projection plane slices through Earth at XLAT1
 781 (XLAT2 is not used)
 782

783 -----
 784 Note: Latitudes and longitudes should be positive, and include a
 785 letter N,S,E, or W indicating north or south latitude, and
 786 east or west longitude. For example,
 787 35.9 N Latitude = 35.9N
 788 118.7 E Longitude = 118.7E
 789

790 Datum-region
 791 -----
 792

793
 794 The Datum-Region for the coordinates is identified by a character
 795 string. Many mapping products currently available use the model of the
 796 Earth known as the World Geodetic System 1984 (WGS-84). Other local
 797 models may be in use, and their selection in CALMET will make its output
 798 consistent with local mapping products. The list of Datum-Regions with
 799 official transformation parameters is provided by the National Imagery and
 800 Mapping Agency (NIMA).
 801

802 NIMA Datum - Regions(Examples)
 803 -----

804 WGS-84 WGS-84 Reference Ellipsoid and Geoid, Global coverage (WGS84)
 805 NAS-C NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
 806 NAR-C NORTH AMERICAN 1983 GRS 80 Spheroid, MEAN FOR CONUS (NAD83)
 807 NWS-84 NWS 6370KM Radius, Sphere
 808 ESR-S ESRI REFERENCE 6371KM Radius, Sphere
 809

810 Datum-region for output coordinates

811 (DATUM) Default: WGS-84 ! DATUM = WGS-84 !
 812
 813

814 METEOROLOGICAL Grid (outermost if nested CALMET grids are used):
 815

816 Rectangular grid defined for projection PMAP,
 817 with X the Easting and Y the Northing coordinate
 818

819 No. X grid cells (NX) No default ! NX = 150 !
 820 No. Y grid cells (NY) No default ! NY = 150 !
 821 No. vertical layers (NZ) No default ! NZ = 10 !
 822

823 Grid spacing (DGRIDKM) No default ! DGRIDKM = 0.1 !
 824 Units: km
 825

826 Cell face heights
 827 (ZFACE(nz+1)) No defaults
 828 Units: m

829 ! ZFACE = 0.0, 20.0, 40.0, 80.0, 160.0, 320.0, 640.0, 1000.0, 1500.0, 2200.0, 3000.0
!

830
831 Reference Coordinates
832 of SOUTHWEST corner of
833 grid cell(1, 1):

834
835 X coordinate (XORIGKM) No default ! XORIGKM = 408.2559 !
836 Y coordinate (YORIGKM) No default ! YORIGKM = 6470.4320 !
837 Units: km

838
839
840 COMPUTATIONAL Grid:

841
842 The computational grid is identical to or a subset of the MET. grid.
843 The lower left (LL) corner of the computational grid is at grid point
844 (IBCOMP, JBCOMP) of the MET. grid. The upper right (UR) corner of the
845 computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
846 The grid spacing of the computational grid is the same as the MET. grid.

847
848 X index of LL corner (IBCOMP) No default ! IBCOMP = 1 !
849 (1 <= IBCOMP <= NX)

850
851 Y index of LL corner (JBCOMP) No default ! JBCOMP = 1 !
852 (1 <= JBCOMP <= NY)

853
854
855 X index of UR corner (IECOMP) No default ! IECOMP = 150 !
856 (1 <= IECOMP <= NX)

857
858 Y index of UR corner (JECOMP) No default ! JECOMP = 150 !
859 (1 <= JECOMP <= NY)

860
861
862
863 SAMPLING Grid (GRIDDED RECEPTORS):

864
865 The lower left (LL) corner of the sampling grid is at grid point
866 (IBSAMP, JBSAMP) of the MET. grid. The upper right (UR) corner of the
867 sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
868 The sampling grid must be identical to or a subset of the computational
869 grid. It may be a nested grid inside the computational grid.
870 The grid spacing of the sampling grid is DGRIDKM/MESH DN.

871
872 Logical flag indicating if gridded
873 receptors are used (LSAMP) Default: T ! LSAMP = T !
874 (T=yes, F=no)

875
876 X index of LL corner (IBSAMP) No default ! IBSAMP = 30 !
877 (IBCOMP <= IBSAMP <= IECOMP)

878
879 Y index of LL corner (JBSAMP) No default ! JBSAMP = 30 !
880 (JBCOMP <= JBSAMP <= JECOMP)

881
882
883 X index of UR corner (IESAMP) No default ! IESAMP = 120 !
884 (IBCOMP <= IESAMP <= IECOMP)

885
886 Y index of UR corner (JESAMP) No default ! JESAMP = 120 !
887 (JBCOMP <= JESAMP <= JECOMP)

888
889
890 Nesting factor of the sampling
891 grid (MESH DN) Default: 1 ! MESH DN = 1 !
892 (MESH DN is an integer >= 1)

893
894 !END!
895
896

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INPUT GROUP: 5 -- Output Options

```
-----
*
*
FILE                                DEFAULT VALUE                                VALUE THIS RUN
-----                                -----                                -----
Concentrations (ICON)                1                                ! ICON = 1 !
Dry Fluxes (IDRY)                     1                                ! IDRY = 0 !
Wet Fluxes (IWET)                     1                                ! IWET = 0 !
2D Temperature (IT2D)                 0                                ! IT2D = 0 !
2D Density (IRHO)                     0                                ! IRHO = 0 !
Relative Humidity (IVIS)               1                                ! IVIS = 0 !
(relative humidity file is
required for visibility
analysis)
Use data compression option in output file?
(LCOMPRS)                               Default: T                        ! LCOMPRS = F !
*
0 = Do not create file, 1 = create file

QA PLOT FILE OUTPUT OPTION:

Create a standard series of output files (e.g.
locations of sources, receptors, grids ...)
suitable for plotting?
(IQAPLOT)                               Default: 1                        ! IQAPLOT = 1 !
0 = no
1 = yes

DIAGNOSTIC PUFF-TRACKING OUTPUT OPTION:

Puff locations and properties reported to
PFTRAK.DAT file for postprocessing?
(IPFTRAK)                               Default: 0                        ! IPFTRAK = 0 !
0 = no
1 = yes, update puff output at end of each timestep
2 = yes, update puff output at end of each sampling step

DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

Mass flux across specified boundaries
for selected species reported?
(IMFLX)                               Default: 0                        ! IMFLX = 0 !
0 = no
1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
are specified in Input Group 0)

Mass balance for each species
reported?
(IMBAL)                               Default: 0                        ! IMBAL = 0 !
0 = no
1 = yes (MASSBAL.DAT filename is
specified in Input Group 0)

NUMERICAL RISE OUTPUT OPTION:

Create a file with plume properties for each rise
increment, for each model timestep?
This applies to sources modeled with numerical rise
and is limited to ONE source in the run.
(INRISE)                               Default: 0                        ! INRISE = 0 !
0 = no
1 = yes (RISE.DAT filename is
```

specified in Input Group 0)

LINE PRINTER OUTPUT OPTIONS:

Print concentrations (ICPRT) Default: 0 ! ICPRT = 0 !
 Print dry fluxes (IDPRT) Default: 0 ! IDPRT = 0 !
 Print wet fluxes (IWPRT) Default: 0 ! IWPRT = 0 !
 (0 = Do not print, 1 = Print)

Concentration print interval (ICFRQ) in timesteps Default: 1 ! ICFRQ = 8760 !
 Dry flux print interval (IDFRQ) in timesteps Default: 1 ! IDFRQ = 1 !
 Wet flux print interval (IWFRQ) in timesteps Default: 1 ! IWFRQ = 1 !

Units for Line Printer Output (IPRTU) Default: 1 ! IPRTU = 1 !

	for	for	
	Concentration	Deposition	
1 =	g/m**3	g/m**2/s	
2 =	mg/m**3	mg/m**2/s	
3 =	ug/m**3	ug/m**2/s	
4 =	ng/m**3	ng/m**2/s	
5 =	Odour Units		
6 =	TBq/m**3	TBq/m**2/s	TBq=terabecquerel
7 =	GBq/m**3	GBq/m**2/s	GBq=gigabecquerel
8 =	Bq/m**3	Bq/m**2/s	Bq=becquerel (disintegrations/s)

Messages tracking progress of run written to the screen ? (IMESG) Default: 2 ! IMESG = 2 !
 0 = no
 1 = yes (advection step, puff ID)
 2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)

SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

----- CONCENTRATIONS ----- DRY FLUXES ----- WET FLUXES
 ----- -- MASS FLUX --

SPECIES						
/GROUP	PRINTED?	SAVED ON DISK?	PRINTED?	SAVED ON DISK?	PRINTED?	SAVED
ON DISK?	SAVED ON DISK?					
-----	-----	-----	-----	-----	-----	-----

! PM10 = 0, 1, 0, 0, 0,
 0, 0 !

Note: Species BCON (for MBCON > 0) does not need to be saved on disk.

OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

Logical for debug output (LDEBUG) Default: F ! LDEBUG = F !
 First puff to track (IPFDEB) Default: 1 ! IPFDEB = 1 !
 Number of puffs to track (NPFDEB) Default: 1 ! NPFDEB = 100 !
 Met. period to start output (NN1) Default: 1 ! NN1 = 1 !
 Met. period to end output

1031 (NN2) Default: 10 ! NN2 = 10 !

1032

1033 !END!

1034

1035

1036 -----

1037

1038

1039 INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs

1040 -----

1041

1042 -----

1043 Subgroup (6a)

1044 -----

1045

1046

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1071

1072 ! END !

1073

1074 -----

1075 Subgroup (6b)

1076 -----

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1095

1096

INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs

Subgroup (6a)

Number of terrain features (NHILL) Default: 0 ! NHILL = 0 !

Number of special complex terrain receptors (NCTREC) Default: 0 ! NCTREC = 0 !

Terrain and CTSG Receptor data for CTSG hills input in CTDM format ? (MHILL) No Default ! MHILL = 2 !

1 = Hill and Receptor data created by CTDM processors & read from HILL.DAT and HILLRCT.DAT files
2 = Hill data created by OPTHILL & input below in Subgroup (6b); Receptor data in Subgroup (6c)

Factor to convert horizontal dimensions to meters (MHILL=1) Default: 1.0 ! XHILL2M = 1.0 !

Factor to convert vertical dimensions to meters (MHILL=1) Default: 1.0 ! ZHILL2M = 1.0 !

X-origin of CTDM system relative to CALPUFF coordinate system, in Kilometers (MHILL=1) No Default ! XCTDMKM = 0.0 !

Y-origin of CTDM system relative to CALPUFF coordinate system, in Kilometers (MHILL=1) No Default ! YCTDMKM = 0.0 !

! END !

Subgroup (6b)

1 **
HILL information

HILL SCALE 2 XC AMAX1 (km) YC AMAX2 (km) THETAH (deg.) ZGRID (m) RELIEF (m) EXPO 1 (m) EXPO 2 (m) SCALE 1

Subgroup (6c)

COMPLEX TERRAIN RECEPTOR INFORMATION

XRCT (km) YRCT (km) ZRCT (m) XHH

```

1097
1098 -----
1099 1
1100     Description of Complex Terrain Variables:
1101     XC, YC = Coordinates of center of hill
1102     THETAH = Orientation of major axis of hill (clockwise from
1103             North)
1104     ZGRID  = Height of the 0 of the grid above mean sea
1105             level
1106     RELIEF = Height of the crest of the hill above the grid elevation
1107     EXPO 1 = Hill-shape exponent for the major axis
1108     EXPO 2 = Hill-shape exponent for the major axis
1109     SCALE 1 = Horizontal length scale along the major axis
1110     SCALE 2 = Horizontal length scale along the minor axis
1111     AMAX   = Maximum allowed axis length for the major axis
1112     BMAX   = Maximum allowed axis length for the major axis
1113
1114     XRCT, YRCT = Coordinates of the complex terrain receptors
1115     ZRCT      = Height of the ground (MSL) at the complex terrain
1116             Receptor
1117     XHH      = Hill number associated with each complex terrain receptor
1118             (NOTE: MUST BE ENTERED AS A REAL NUMBER)
1119
1120     **
1121     NOTE: DATA for each hill and CTSG receptor are treated as a separate
1122           input subgroup and therefore must end with an input group terminator.
1123
1124 -----
1125
1126 INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
1127 -----
1128
1129     SPECIES      DIFFUSIVITY      ALPHA STAR      REACTIVITY      MESOPHYLL
1130     RESISTANCE   HENRY'S LAW COEFFICIENT
1131     NAME         (cm**2/s)
1132     (s/cm)      (dimensionless)
1133     -----
1134
1135 * DRYGAS = *
1136
1137 !END!
1138 -----
1139
1140 INPUT GROUP: 8 -- Size parameters for dry deposition of particles
1141 -----
1142
1143     For SINGLE SPECIES, the mean and standard deviation are used to
1144     compute a deposition velocity for NINT (see group 9) size-ranges,
1145     and these are then averaged to obtain a mean deposition velocity.
1146
1147     For GROUPED SPECIES, the size distribution should be explicitly
1148     specified (by the 'species' in the group), and the standard deviation
1149     for each should be entered as 0. The model will then use the
1150     deposition velocity for the stated mean diameter.
1151
1152     SPECIES      GEOMETRIC MASS MEAN      GEOMETRIC STANDARD
1153     NAME         DIAMETER              DEVIATION
1154     (microns)   (microns)
1155     -----
1156
1157 * DRYPART = *
1158 !END!
1159
1160 -----
1161
1162

```



```

1232
1233 Ozone data input option (MOZ)      Default: 1          ! MOZ = 1 !
1234 (Used only if MCHEM = 1,3,4,6 or 7)
1235     0 = use a monthly background ozone value
1236     1 = read hourly ozone concentrations from
1237         the OZONE.DAT data file
1238
1239 Monthly ozone concentrations in ppb (BCKO3)
1240 (Used only if MCHEM = 1,3,4,6, or 7 and either
1241     MOZ = 0, or
1242     MOZ = 1 and all hourly O3 data missing)
1243                                     Default: 12*80.
1244 ! BCKO3 = 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00,
1245     80.00, 80.00 !
1246
1247 Ammonia data option (MNH3)          Default: 0          ! MNH3 = 0 !
1248 (Used only if MCHEM = 6 or 7)
1249     0 = use monthly background ammonia values (BCKNH3) - no vertical variation
1250     1 = read monthly background ammonia values for each layer from
1251         the NH3Z.DAT data file
1252
1253 Ammonia vertical averaging option (MAVGNH3)
1254 (Used only if MCHEM = 6 or 7, and MNH3 = 1)
1255     0 = use NH3 at puff center height (no averaging is done)
1256     1 = average NH3 values over vertical extent of puff
1257                                     Default: 1          ! MAVGNH3 = 1 !
1258
1259 Monthly ammonia concentrations in ppb (BCKNH3)
1260 (Used only if MCHEM = 1 or 3, or
1261     if MCHEM = 6 or 7, and MNH3 = 0)
1262                                     Default: 12*10.
1263 ! BCKNH3 = 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00,
1264     10.00, 10.00 !
1265
1266 Nighttime SO2 loss rate in %/hour (RNITE1)
1267 (Used only if MCHEM = 1, 6 or 7)
1268 This rate is used only at night for MCHEM=1
1269 and is added to the computed rate both day
1270 and night for MCHEM=6,7 (heterogeneous reactions)
1271                                     Default: 0.2          ! RNITE1 = 0.2 !
1272
1273 Nighttime NOx loss rate in %/hour (RNITE2)
1274 (Used only if MCHEM = 1)
1275                                     Default: 2.0          ! RNITE2 = 2 !
1276
1277 Nighttime HNO3 formation rate in %/hour (RNITE3)
1278 (Used only if MCHEM = 1)
1279                                     Default: 2.0          ! RNITE3 = 2 !
1280
1281 H2O2 data input option (MH2O2)      Default: 1          ! MH2O2 = 1 !
1282 (Used only if MCHEM = 6 or 7, and MAQCHEM = 1)
1283     0 = use a monthly background H2O2 value
1284     1 = read hourly H2O2 concentrations from
1285         the H2O2.DAT data file
1286
1287 Monthly H2O2 concentrations in ppb (BCKH2O2)
1288 (Used only if MQACHEM = 1 and either
1289     MH2O2 = 0 or
1290     MH2O2 = 1 and all hourly H2O2 data missing)
1291                                     Default: 12*1.
1292 ! BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
1293
1294 --- Data for ISORROPIA Option
1295 (used only if MCHEM = 6 or 7)
1296
1297 Minimum relative humidity used in ISORROPIA computations (RH_ISRP)
1298                                     Default: 50.          ! RH_ISRP = 50.0 !
1299                                     Units: %
1300

```

1299 Minimum SO4 used in ISORROPIA computations (SO4_ISRP)
 1300 Default: 0.4 ! SO4_ISRP = 0.4 !
 1301 Units: ug/m3
 1302

1303 --- Data for SECONDARY ORGANIC AEROSOL (SOA) Options
 1304 (used only if MCHEM = 4 or 7)
 1305

1306 The MCHEM = 4 SOA module uses monthly values of:
 1307 Fine particulate concentration in ug/m^3 (BCKPMF)
 1308 Organic fraction of fine particulate (OFRAC)
 1309 VOC / NOX ratio (after reaction) (VCNX)
 1310

1311 The MCHEM = 7 SOA module uses monthly values of:
 1312 Fine particulate concentration in ug/m^3 (BCKPMF)
 1313 Organic fraction of fine particulate (OFRAC)
 1314

1315 These characterize the air mass when computing
 1316 the formation of SOA from VOC emissions.
 1317 Typical values for several distinct air mass types are:
 1318

Month	1	2	3	4	5	6	7	8	9	10	11	12
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

1322 Clean Continental

BCKPMF	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
OFRAC	.15	.15	.20	.20	.20	.20	.20	.20	.20	.20	.20	.15
VCNX	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.

1327 Clean Marine (surface)

BCKPMF	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5
OFRAC	.25	.25	.30	.30	.30	.30	.30	.30	.30	.30	.30	.25
VCNX	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.

1332 Urban - low biogenic (controls present)

BCKPMF	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.
OFRAC	.20	.20	.25	.25	.25	.25	.25	.25	.20	.20	.20	.20
VCNX	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.

1337 Urban - high biogenic (controls present)

BCKPMF	60.	60.	60.	60.	60.	60.	60.	60.	60.	60.	60.	60.
OFRAC	.25	.25	.30	.30	.30	.55	.55	.55	.35	.35	.35	.25
VCNX	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.

1342 Regional Plume

BCKPMF	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
OFRAC	.20	.20	.25	.35	.25	.40	.40	.40	.30	.30	.30	.20
VCNX	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.

1347 Urban - no controls present

BCKPMF	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
OFRAC	.30	.30	.35	.35	.35	.55	.55	.55	.35	.35	.35	.30
VCNX	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.

1352 Default: Clean Continental

1353 ! BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
 1354 ! OFRAC = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
 1355 ! VCNX = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !
 1356

1357 --- End Data for SECONDARY ORGANIC AEROSOL (SOA) Options
 1358

1359 Number of half-life decay specification blocks provided in Subgroup 11b
 1360 (Used only if MCHEM = 5)
 1361 (NDECAY) Default: 0 ! NDECAY = 0 !
 1362

1363 !END!
 1364
 1365
 1366


```

1436 Site characterization parameters for single-point Met data files -----
1437 (needed for METFM = 2,3,4,5)
1438
1439 Land use category for modeling domain
1440 (ILANDUIN) Default: 20 ! ILANDUIN = 20 !
1441
1442 Roughness length (m) for modeling domain
1443 (Z0IN) Default: 0.25 ! Z0IN = .25 !
1444
1445 Leaf area index for modeling domain
1446 (XLAIIN) Default: 3.0 ! XLAIIN = 3.0 !
1447
1448 Elevation above sea level (m)
1449 (ELEVIN) Default: 0.0 ! ELEVIN = .0 !
1450
1451 Latitude (degrees) for met location
1452 (XLATIN) Default: -999. ! XLATIN = -999.0 !
1453
1454 Longitude (degrees) for met location
1455 (XLONIN) Default: -999. ! XLONIN = -999.0 !
1456
1457 Specialized information for interpreting single-point Met data files -----
1458
1459 Anemometer height (m) (Used only if METFM = 2,3)
1460 (ANEMHT) Default: 10. ! ANEMHT = 10.0 !
1461
1462 Form of lateral turbulence data in PROFILE.DAT file
1463 (Used only if METFM = 4,5 or MTURBVW = 1 or 3)
1464 (ISIGMAV) Default: 1 ! ISIGMAV = 1 !
1465 0 = read sigma-theta
1466 1 = read sigma-v
1467
1468 Choice of mixing heights (Used only if METFM = 4)
1469 (IMIXCTDM) Default: 0 ! IMIXCTDM = 0 !
1470 0 = read PREDICTED mixing heights
1471 1 = read OBSERVED mixing heights
1472
1473 Maximum length of a slug (met. grid units)
1474 (XMXLEN) Default: 1.0 ! XMXLEN = 1 !
1475
1476 Maximum travel distance of a puff/slug (in
1477 grid units) during one sampling step
1478 (XSAMLEN) Default: 1.0 ! XSAMLEN = 1 !
1479
1480 Maximum Number of slugs/puffs release from
1481 one source during one time step
1482 (MXNEW) Default: 99 ! MXNEW = 99 !
1483
1484 Maximum Number of sampling steps for
1485 one puff/slug during one time step
1486 (MXSAM) Default: 99 ! MXSAM = 99 !
1487
1488 Number of iterations used when computing
1489 the transport wind for a sampling step
1490 that includes gradual rise (for CALMET
1491 and PROFILE winds)
1492 (NCOUNT) Default: 2 ! NCOUNT = 2 !
1493
1494 Minimum sigma y for a new puff/slug (m)
1495 (SYMIN) Default: 1.0 ! SYMIN = 1 !
1496
1497 Minimum sigma z for a new puff/slug (m)
1498 (SZMIN) Default: 1.0 ! SZMIN = 1 !
1499
1500 Maximum sigma z (m) allowed to avoid
1501 numerical problem in calculating virtual
1502 time or distance. Cap should be large
1503 enough to have no influence on normal events.
1504 Enter a negative cap to disable.

```

```

1505 (SZCAP_M) Default: 5.0e06 ! SZCAP_M = 5000000 !
1506
1507 Default minimum turbulence velocities sigma-v and sigma-w
1508 for each stability class over land and over water (m/s)
1509 (SVMIN(12) and SWMIN(12))
1510
1511 ----- LAND ----- WATER -----
1512 Stab Class : A B C D E F A B C D E F
1513 -----
1514 Default SVMIN : .50, .50, .50, .50, .50, .50, .37, .37, .37, .37, .37, .37
1515 Default SWMIN : .20, .12, .08, .06, .03, .016, .20, .12, .08, .06, .03, .016
1516
1517 ! SVMIN = 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.37, 0.37, 0.37, 0.37, 0.37, 0.37 !
1518 ! SWMIN = 0.2, 0.12, 0.08, 0.06, 0.03, 0.016, 0.2, 0.12, 0.08, 0.06, 0.03,
0.016 !
1519
1520 Divergence criterion for dw/dz across puff
1521 used to initiate adjustment for horizontal
1522 convergence (1/s)
1523 Partial adjustment starts at CDIV(1), and
1524 full adjustment is reached at CDIV(2)
1525 (CDIV(2)) Default: 0.0,0.0 ! CDIV = 0, 0 !
1526
1527 Search radius (number of cells) for nearest
1528 land and water cells used in the subgrid
1529 TIBL module
1530 (NLUTIBL) Default: 4 ! NLUTIBL = 4 !
1531
1532 Minimum wind speed (m/s) allowed for
1533 non-calm conditions. Also used as minimum
1534 speed returned when using power-law
1535 extrapolation toward surface
1536 (WSCALM) Default: 0.5 ! WSCALM = 0.5 !
1537
1538 Maximum mixing height (m)
1539 (XMAXZI) Default: 3000. ! XMAXZI = 3000 !
1540
1541 Minimum mixing height (m)
1542 (XMINZI) Default: 50. ! XMINZI = 50 !
1543
1544
1545 Temperatures (K) used for defining upper bound of
1546 categories for emissions scale-factors
1547 11 upper bounds (K) are entered; the 12th class has no upper limit
1548 (TKCAT(11))
1549 Default : 265., 270., 275., 280., 285., 290., 295., 300., 305., 310.,
315. (315.+)
1550 << << << << << <Temperature Class :
1551 1 2 3 4 5 6 7 8 9
1552 10 11 (12)
1553 -----
1554 ! TKCAT = 265., 270., 275., 280., 285., 290., 295., 300.,
305., 310., 315. !
1555
1556 Default wind speed profile power-law
1557 exponents for stabilities 1-6
1558 (PLX0(6)) Default : ISC RURAL values
1559 ISC RURAL : .07, .07, .10, .15, .35, .55
1560 ISC URBAN : .15, .15, .20, .25, .30, .30
1561
1562 Stability Class : A B C D E F
1563 -----
1564 ! PLX0 = 0.07, 0.07, 0.1, 0.15, 0.35, 0.55 !
1565
1566 Default potential temperature gradient
1567 for stable classes E, F (degK/m)
1568 (PTG0(2)) Default: 0.020, 0.035
1569 ! PTG0 = 0.02, 0.035 !

```

```

1568
1569 Default plume path coefficients for
1570 each stability class (used when option
1571 for partial plume height terrain adjustment
1572 is selected -- MCTADJ=3)
1573 (PPC(6))
1574 Stability Class : A B C D E F
1575 Default PPC : .50, .50, .50, .50, .35, .35
1576 --- --- --- --- --- ---
1577 ! PPC = 0.5, 0.5, 0.5, 0.5, 0.35, 0.35 !

1578 Slug-to-puff transition criterion factor
1579 equal to sigma-y/length of slug
1580 (SL2PF) Default: 10. ! SL2PF = 10 !

1581
1582 Receptor-specific puff/slug properties (e.g., sigmas and height above
1583 ground at the time when the trajectory is nearest the receptor) may be
1584 extrapolated forward or backward in time along the current step using
1585 the current dispersion, for receptors that lie upwind of the puff/slug
1586 position at the start of a step, or downwind at the end of a step.
1587 Specify the upwind/downwind extrapolation zone in sigma-y units.
1588 Using FCLIP=1.0 clips the the upwind zone at one sigma-y at the start
1589 of the step and the downwind zone at one sigma-y at the end of the step.
1590 This is consistent with the sampling done in CALPUFF versions through
1591 v6.42 prior to the introduction of the FCLIP option.
1592 The default is No Extrapolation, FCLIP=0.0.
1593 (FCLIP) Default: 0.0 ! FCLIP = 0 !

1594
1595 Puff-splitting control variables -----
1596
1597 VERTICAL SPLIT
1598 -----
1599
1600 Number of puffs that result every time a puff
1601 is split - nsplit=2 means that 1 puff splits
1602 into 2
1603 (NSPLIT) Default: 3 ! NSPLIT = 3 !

1604
1605 Time(s) of a day when split puffs are eligible to
1606 be split once again; this is typically set once
1607 per day, around sunset before nocturnal shear develops.
1608 24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
1609 0=do not re-split 1=eligible for re-split
1610 (IRESPLIT(24)) Default: Hour 17 = 1
1611 ! IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0 !

1612
1613 Split is allowed only if last hour's mixing
1614 height (m) exceeds a minimum value
1615 (ZISPLIT) Default: 100. ! ZISPLIT = 100 !

1616
1617 Split is allowed only if ratio of last hour's
1618 mixing ht to the maximum mixing ht experienced
1619 by the puff is less than a maximum value (this
1620 postpones a split until a nocturnal layer develops)
1621 (ROLDMAX) Default: 0.25 ! ROLDMAX = 0.25 !

1622
1623
1624 HORIZONTAL SPLIT
1625 -----
1626
1627 Number of puffs that result every time a puff
1628 is split - nsplith=5 means that 1 puff splits
1629 into 5
1630 (NSPLITH) Default: 5 ! NSPLITH = 5 !

1631
1632 Minimum sigma-y (Grid Cells Units) of puff
1633 before it may be split
1634 (SYSPLITH) Default: 1.0 ! SYSPLITH = 1 !

1635
1636 Minimum puff elongation rate (SYSPLITH/hr) due to

```

```

1637     wind shear, before it may be split
1638     (SHSPLITH)                               Default:  2.           ! SHSPLITH = 2 !
1639
1640     Minimum concentration (g/m^3) of each
1641     species in puff before it may be split
1642     Enter array of NSPEC values; if a single value is
1643     entered, it will be used for ALL species
1644     (CNSPLITH)                               Default:  1.0E-07      ! CNSPLITH = 0 !
1645
1646     Integration control variables -----
1647
1648     Fractional convergence criterion for numerical SLUG
1649     sampling integration
1650     (EPSSLUG)                               Default:  1.0e-04      ! EPSSLUG = 0.0001 !
1651
1652     Fractional convergence criterion for numerical AREA
1653     source integration
1654     (EPSAREA)                               Default:  1.0e-06      ! EPSAREA = 1E-006 !
1655
1656     Trajectory step-length (m) used for numerical rise
1657     integration
1658     (DSRISE)                               Default:  1.0          ! DSRISE = 1.0 !
1659
1660     Boundary Condition (BC) Puff control variables -----
1661
1662     Minimum height (m) to which BC puffs are mixed as they are emitted
1663     (MBCON=2 ONLY). Actual height is reset to the current mixing height
1664     at the release point if greater than this minimum.
1665     (HTMINBC)                               Default:  500.         ! HTMINBC = 500 !
1666
1667     Search radius (km) about a receptor for sampling nearest BC puff.
1668     BC puffs are typically emitted with a spacing of one grid cell
1669     length, so the search radius should be greater than DGRIDKM.
1670     (RSAMPBC)                               Default:  10.         ! RSAMPBC = 10 !
1671
1672     Near-Surface depletion adjustment to concentration profile used when
1673     sampling BC puffs?
1674     (MDEPBC)                               Default:  1           ! MDEPBC = 1 !
1675     0 = Concentration is NOT adjusted for depletion
1676     1 = Adjust Concentration for depletion
1677
1678     !END!
1679
1680
1681     -----
1682
1683
1684     INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
1685     -----
1686
1687     -----
1688     Subgroup (13a)
1689     -----
1690
1691     Number of point sources with
1692     parameters provided below          (NPT1)  No default  ! NPT1 = 5 !
1693
1694     Units used for point source
1695     emissions below                  (IPTU)  Default: 1  ! IPTU = 1 !
1696     1 =          g/s
1697     2 =          kg/hr
1698     3 =          lb/hr
1699     4 =          tons/yr
1700     5 =          Odour Unit * m**3/s (vol. flux of odour compound)
1701     6 =          Odour Unit * m**3/min
1702     7 =          metric tons/yr
1703     8 =          Bq/s (Bq = becquerel = disintegrations/s)
1704     9 =          GBq/yr
1705

```

1706 Number of source-species
 1707 combinations with variable
 1708 emissions scaling factors
 1709 provided below in (13d) (NSPT1) Default: 0 ! NSPT1 = 0 !
 1710
 1711 Number of point sources with
 1712 variable emission parameters
 1713 provided in external file (NPT2) No default ! NPT2 = 0 !
 1714
 1715 (If NPT2 > 0, these point
 1716 source emissions are read from
 1717 the file: PTEMARB.DAT)
 1718

1719 !END!

1720 -----
 1721 Subgroup (13b)
 1722 -----
 1723

1724 a
 1725 POINT SOURCE: CONSTANT DATA
 1726 -----
 1727

b

c

Source No.	X Coordinate (km)	Y Coordinate (km)	Stack Height (m)	Base Elevation (m)	Stack Diameter (m)	Exit Vel. (m/s)	Exit Temp. (deg. K)	Bldg. Dwash	Emission Rates
1 ! SRCNAM = SILO1 !									
1 ! X = 414.658,	6477.299,		16.4,	265.37,	0.15,	28.294,	303.15,	1.0,	0.005
! ZPLTFM = 0.0 !									
! FMFAC = 0.0 !									!END!
2 ! SRCNAM = SILO2 !									
2 ! X = 414.661,	6477.302,		16.4,	265.45,	0.15,	28.294,	303.15,	1.0,	0.005
! ZPLTFM = 0.0 !									
! FMFAC = 0.0 !									!END!
3 ! SRCNAM = SILO3 !									
3 ! X = 414.665,	6477.302,		16.4,	265.45,	0.15,	28.294,	303.15,	1.0,	0.005
! ZPLTFM = 0.0 !									
! FMFAC = 0.0 !									!END!
4 ! SRCNAM = SILO4 !									
4 ! X = 414.668,	6477.299,		16.4,	265.38,	0.15,	28.294,	303.15,	1.0,	0.005
! ZPLTFM = 0.0 !									
! FMFAC = 0.0 !									!END!
5 ! SRCNAM = SILO5 !									
5 ! X = 414.670,	6477.296,		11.4,	265.29,	0.15,	28.294,	303.15,	1.0,	0.005
! ZPLTFM = 0.0 !									
! FMFAC = 0.0 !									!END!

1758 -----

1760 a
 1761 Data for each source are treated as a separate input subgroup
 1762 and therefore must end with an input group terminator.
 1763
 1764 SRCNAM is a 12-character name for a source
 1765 (No default)
 1766 X is an array holding the source data listed by the column headings
 1767 (No default)
 1768 SIGYZI is an array holding the initial sigma-y and sigma-z (m)

1769 (Default: 0.,0.)
 1770 FMFAC is a vertical momentum flux factor (0. or 1.0) used to represent
 1771 the effect of rain-caps or other physical configurations that
 1772 reduce momentum rise associated with the actual exit velocity.
 1773 (Default: 1.0 -- full momentum used)
 1774 ZPLTFM is the platform height (m) for sources influenced by an isolated
 1775 structure that has a significant open area between the surface
 1776 and the bulk of the structure, such as an offshore oil platform.
 1777 The Base Elevation is that of the surface (ground or ocean),
 1778 and the Stack Height is the release height above the Base (not
 1779 above the platform). Building heights entered in Subgroup 13c
 1780 must be those of the buildings on the platform, measured from
 1781 the platform deck. ZPLTFM is used only with MBDW=1 (ISC
 1782 downwash method) for sources with building downwash.
 1783 (Default: 0.0)

- 1784
 1785 b
 1786 0. = No building downwash modeled
 1787 1. = Downwash modeled for buildings resting on the surface
 1788 2. = Downwash modeled for buildings raised above the surface (ZPLTFM > 0.)
 1789 NOTE: must be entered as a REAL number (i.e., with decimal point)

1790
 1791 c
 1792 An emission rate must be entered for every pollutant modeled.
 1793 Enter emission rate of zero for secondary pollutants that are
 1794 modeled, but not emitted. Units are specified by IPTU
 1795 (e.g. 1 for g/s).

1796
 1797 -----
 1798 Subgroup (13c)
 1799 -----

1800
 1801 BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
 1802 -----

1803 Source a
 1804 No. Effective building height, width, length and X/Y offset (in meters)
 1805 every 10 degrees. LENGTH, XBADJ, and YBADJ are only needed for
 1806 MBDW=2 (PRIME downwash option)
 1807 -----

1808
 1809 1 ! SRCNAM = SILO1 !
 1810 1 ! HEIGHT = 16.40, 16.40, 16.40, 16.40, 16.40, 16.40,
 1811 16.40, 11.40, 11.40, 16.40, 16.40, 16.40,
 1812 16.40, 16.40, 16.40, 16.40, 16.40, 16.40,
 1813 16.40, 16.40, 16.40, 16.40, 16.40, 16.40,
 1814 16.40, 11.40, 11.40, 16.40, 16.40, 16.40,
 1815 16.40, 16.40, 16.40, 16.40, 16.40, 16.40 !
 1816 1 ! WIDTH = 10.10, 10.07, 10.03, 9.80, 9.27, 8.45,
 1817 7.48, 10.00, 9.22, 6.82, 7.67, 8.61,
 1818 9.39, 9.88, 10.08, 10.06, 10.07, 9.85,
 1819 10.10, 10.07, 10.03, 9.80, 9.27, 8.45,
 1820 7.48, 10.00, 9.22, 6.82, 7.67, 8.61,
 1821 9.39, 9.88, 10.08, 10.06, 10.07, 9.85 !

1822 !END!

1823 2 ! SRCNAM = SILO2 !
 1824 2 ! HEIGHT = 16.40, 16.40, 16.40, 16.40, 16.40, 16.40,
 1825 16.40, 11.40, 11.40, 16.40, 16.40, 16.40,
 1826 16.40, 16.40, 16.40, 16.40, 16.40, 16.40,
 1827 16.40, 16.40, 16.40, 16.40, 16.40, 16.40,
 1828 16.40, 11.40, 11.40, 16.40, 16.40, 16.40,
 1829 16.40, 16.40, 16.40, 16.40, 16.40, 16.40 !
 1830 2 ! WIDTH = 10.11, 10.07, 10.03, 9.80, 9.27, 8.45,
 1831 7.48, 10.00, 9.22, 6.82, 7.67, 8.61,
 1832 9.39, 9.88, 10.08, 10.06, 10.07, 9.85,
 1833 10.11, 10.07, 10.03, 9.80, 9.27, 8.45,
 1834 7.48, 10.00, 9.22, 6.82, 7.67, 8.61,
 1835 9.39, 9.88, 10.08, 10.06, 10.07, 9.85 !

1836 !END!

1837 3 ! SRCNAM = SILO3 !

```

1838      3 ! HEIGHT = 16.40, 16.40, 16.40, 16.40, 16.40, 16.40,
1839          16.40, 11.40, 11.40, 16.40, 16.40, 16.40,
1840          16.40, 16.40, 16.40, 16.40, 16.40, 16.40,
1841          16.40, 16.40, 16.40, 16.40, 16.40, 16.40,
1842          16.40, 11.40, 11.40, 16.40, 16.40, 16.40,
1843          16.40, 16.40, 16.40, 16.40, 16.40, 16.40 !
1844      3 ! WIDTH = 10.11, 10.07, 10.03, 9.80, 9.27, 8.45,
1845          7.48, 10.00, 9.22, 6.82, 7.67, 8.61,
1846          9.39, 9.88, 10.08, 10.06, 10.07, 9.85,
1847          10.11, 10.07, 10.03, 9.80, 9.27, 8.45,
1848          7.48, 10.00, 9.22, 6.82, 7.67, 8.61,
1849          9.39, 9.88, 10.08, 10.06, 10.07, 9.85 !

```

1850 !END!

```

1851      4 ! SRCNAM = SILO4 !
1852      4 ! HEIGHT = 16.40, 16.40, 16.40, 16.40, 16.40, 16.40,
1853          16.40, 11.40, 11.40, 16.40, 16.40, 16.40,
1854          16.40, 16.40, 16.40, 16.40, 16.40, 16.40,
1855          16.40, 16.40, 16.40, 16.40, 16.40, 16.40,
1856          16.40, 11.40, 11.40, 16.40, 16.40, 16.40,
1857          16.40, 16.40, 16.40, 16.40, 16.40, 16.40 !
1858      4 ! WIDTH = 10.11, 10.07, 10.03, 9.80, 9.27, 8.45,
1859          7.48, 10.00, 9.22, 6.82, 7.67, 8.61,
1860          9.39, 9.88, 10.08, 10.06, 10.07, 9.85,
1861          10.11, 10.07, 10.03, 9.80, 9.27, 8.45,
1862          7.48, 10.00, 9.22, 6.82, 7.67, 8.61,
1863          9.39, 9.88, 10.08, 10.06, 10.07, 9.85 !

```

1864 !END!

```

1865      5 ! SRCNAM = SILO5 !
1866      5 ! HEIGHT = 16.40, 16.40, 16.40, 16.40, 16.40, 16.40,
1867          16.40, 11.40, 11.40, 16.40, 16.40, 16.40,
1868          16.40, 16.40, 16.40, 16.40, 16.40, 16.40,
1869          16.40, 16.40, 16.40, 16.40, 16.40, 16.40,
1870          16.40, 11.40, 11.40, 16.40, 16.40, 16.40,
1871          16.40, 16.40, 16.40, 16.40, 16.40, 16.40 !
1872      5 ! WIDTH = 10.08, 10.07, 10.03, 9.80, 9.27, 8.45,
1873          7.48, 10.00, 9.22, 6.82, 7.67, 8.61,
1874          9.39, 9.88, 10.08, 10.06, 10.07, 9.85,
1875          10.08, 10.07, 10.03, 9.80, 9.27, 8.45,
1876          7.48, 10.00, 9.22, 6.82, 7.67, 8.61,
1877          9.39, 9.88, 10.08, 10.06, 10.07, 9.85 !

```

1878 !END!

1879

1880

1881 -----

1882

1883 a

1884 Building height, width, length, and X/Y offset from the source are treated
1885 as a separate input subgroup for each source and therefore must end with
1886 an input group terminator. The X/Y offset is the position, relative to the
1887 stack, of the center of the upwind face of the projected building, with the
1888 x-axis pointing along the flow direction.

1889

1890 -----

1891 Subgroup (13d)

1892 -----

1893

1894 POINT SOURCE: EMISSION-RATE SCALING FACTORS

1895 -----

1896

1897 Use this subgroup to identify temporal variations in the emission
1898 rates given in 13b. Factors assigned multiply the rates in 13b.
1899 Skip sources here that have constant emissions. For more elaborate
1900 variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

1901

1902 Sets of emission-rate scale factors are defined in Input Group 19, and
1903 are referenced by the FACTORNAME. Provide NSPT1 lines that identify the
1904 emission-rate scale factor table for each source-species combination that
1905 uses the scaling option. Note that a scale-factor table can be used with
1906 more than one source-species combination so a FACTORNAME can be repeated.

```

1907
1908
1909 Source-           Source      Species      Scale-factor table
1910 Species          Name      b      Name      c      Name      d
1911 No.             (SRCNAM)  (CSPEC)  (FACTORNAME)
1912 -----
1913
1914
1915 -----
1916 a
1917 Assignment for each source-specie is treated as a separate input subgroup
1918 and therefore must end with an input group terminator.
1919 b
1920 Source name must match one of the SRCNAM names defined in Input Group 13b
1921 c
1922 Species name must match one of the CSPEC names of emitted species defined in Input
1923 Group 3
1924 d
1925 Scale-factor name must match one of the FACTORNAME names defined in Input Group 19
1926
1927 -----
1928
1929 INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters
1930 -----
1931
1932 -----
1933
1934 Subgroup (14a)
1935 -----
1936
1937 Number of polygon area sources with
1938 parameters specified below (NAR1)          No default ! NAR1 = 0 !
1939
1940 Units used for area source
1941 emissions below (IARU)          Default: 1 ! IARU = 1 !
1942 1 =          g/m**2/s
1943 2 =          kg/m**2/hr
1944 3 =          lb/m**2/hr
1945 4 =          tons/m**2/yr
1946 5 =          Odour Unit * m/s (vol. flux/m**2 of odour compound)
1947 6 =          Odour Unit * m/min
1948 7 =          metric tons/m**2/yr
1949 8 =          Bq/m**2/s (Bq = becquerel = disintegrations/s)
1950 9 =          GBq/m**2/yr
1951
1952 Number of source-species
1953 combinations with variable
1954 emissions scaling factors
1955 provided below in (14d)          (NSAR1) Default: 0 ! NSAR1 = 0 !
1956
1957 Number of buoyant polygon area sources
1958 with variable location and emission
1959 parameters (NAR2)          No default ! NAR2 = 0 !
1960 (If NAR2 > 0, ALL parameter data for
1961 these sources are read from the file: BAEMARB.DAT)
1962
1963 !END!
1964
1965 -----
1966 Subgroup (14b)
1967 -----
1968
1969 AREA SOURCE: CONSTANT DATA
1970 -----
1971
1972 Source          Effect.      Base      Initial      Emission
1973 No.            Height      Elevation  Sigma z      Rates
1974              (m)        (m)        (m)

```

1975
1976
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2042

a
Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.
b
An emission rate must be entered for every pollutant modeled.
Enter emission rate of zero for secondary pollutants that are
modeled, but not emitted. Units are specified by IARU
(e.g. 1 for g/m**2/s).

Subgroup (14c)

COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON

Source a
No. Ordered list of X followed by list of Y, grouped by source

a
Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.

Subgroup (14d)

a
AREA SOURCE: EMISSION-RATE SCALING FACTORS

Use this subgroup to identify temporal variations in the emission
rates given in 14b. Factors assigned multiply the rates in 14b.
Skip sources here that have constant emissions. For more elaborate
variation in source parameters, use BAEMARB.DAT and NAR2 > 0.
Sets of emission-rate scale factors are defined in Input Group 19, and
are referenced by the FACTORNAME. Provide NSAR1 lines that identify the
emission-rate scale factor table for each source-species combination that
uses the scaling option. Note that a scale-factor table can be used with
more than one source-species combination so a FACTORNAME can be repeated.
Source- Source Species Scale-factor table
Species Name b Name c Name d
No. (SRCNAM) (CSPEC) (FACTORNAME)

a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.
b
Source name must match one of the SRCNAM names defined in Input Group 14b
c
Species name must match one of the CSPEC names of emitted species defined in Input
Group 3
d
Scale-factor name must match one of the FACTORNAME names defined in Input Group 19

```

2043
2044 INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
2045 -----
2046
2047 -----
2048 Subgroup (15a)
2049 -----
2050
2051 Number of buoyant line sources
2052 with variable location and emission
2053 parameters (NLN2) No default ! NLN2 = 0 !
2054
2055 (If NLN2 > 0, ALL parameter data for
2056 these sources are read from the file: LNEARB.DAT)
2057
2058 Number of buoyant line sources (NLINES) No default ! NLINES = 0 !
2059
2060 Units used for line source
2061 emissions below (ILNU) Default: 1 ! ILNU = 1 !
2062 1 = g/s
2063 2 = kg/hr
2064 3 = lb/hr
2065 4 = tons/yr
2066 5 = Odour Unit * m**3/s (vol. flux of odour compound)
2067 6 = Odour Unit * m**3/min
2068 7 = metric tons/yr
2069 8 = Bq/s (Bq = becquerel = disintegrations/s)
2070 9 = GBq/yr
2071
2072 Number of source-species
2073 combinations with variable
2074 emissions scaling factors
2075 provided below in (15c) (NSLN1) Default: 0 ! NSLN1 = 0 !
2076
2077 Maximum number of segments used to model
2078 each line (MXNSEG) Default: 7 ! MXNSEG = 7 !
2079
2080 The following variables are required only if NLINES > 0. They are
2081 used in the buoyant line source plume rise calculations.
2082
2083 Number of distances at which Default: 6 ! NLRISE = 6 !
2084 transitional rise is computed
2085
2086 Average building length (XL) No default ! XL = 0.0 !
2087 (in meters)
2088
2089 Average building height (HBL) No default ! HBL = 0.0 !
2090 (in meters)
2091
2092 Average building width (WBL) No default ! WBL = 0.0 !
2093 (in meters)
2094
2095 Average line source width (WML) No default ! WML = 0.0 !
2096 (in meters)
2097
2098 Average separation between buildings (DXL) No default ! DXL = 0.0 !
2099 (in meters)
2100
2101 Average buoyancy parameter (FPRIMEL) No default ! FPRIMEL = 0 !
2102 (in m**4/s**3)
2103
2104 !END!
2105
2106 -----
2107 Subgroup (15b)
2108 -----
2109
2110 BUOYANT LINE SOURCE: CONSTANT DATA
2111 -----

```

2112

a

Source No.	Beg. X Coordinate (km)	Beg. Y Coordinate (km)	End. X Coordinate (km)	End. Y Coordinate (km)	Release Height (m)	Base Elevation (m)	Emission Rates
-----	-----	-----	-----	-----	-----	-----	-----

2120 a

2121 Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

2124 b

2125 An emission rate must be entered for every pollutant modeled. 2126 Enter emission rate of zero for secondary pollutants that are 2127 modeled, but not emitted. Units are specified by ILNTU 2128 (e.g. 1 for g/s).

2130 -----
2131 Subgroup (15c)
2132 -----

2133 a
2134 BUOYANT LINE SOURCE: EMISSION-RATE SCALING FACTORS
2135 -----

2136
2137 Use this subgroup to identify temporal variations in the emission 2138 rates given in 15b. Factors assigned multiply the rates in 15b. 2139 Skip sources here that have constant emissions. For more elaborate 2140 variation in source parameters, use LNEMARB.DAT and NLN2 > 0.

2141
2142 Sets of emission-rate scale factors are defined in Input Group 19, and 2143 are referenced by the FACTORNAME. Provide NSLN1 lines that identify the 2144 emission-rate scale factor table for each source-species combination that 2145 uses the scaling option. Note that a scale-factor table can be used with 2146 more than one source-species combination so a FACTORNAME can be repeated.

Source-Species No.	Source Name (SRCNAM)	Species Name (CSPEC)	Scale-factor table Name (FACTORNAME)
-----	-----	-----	-----

2156 a

2157 Data for each species are treated as a separate input subgroup 2158 and therefore must end with an input group terminator.

2159 b

2160 Source name must match one of the SRCNAM names defined in Input Group 15b

2162 c

2163 Species name must match one of the CSPEC names of emitted species defined in Input 2164 Group 3

2166 d

2167 Scale-factor name must match one of the FACTORNAME names defined in Input Group 19
2168 -----

2169
2170 INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
2171 -----

2172
2173 -----
2174 Subgroup (16a)
2175 -----

2176
2177 Number of volume sources with
2178 parameters provided in 16b,c (NVL1) No default ! NVL1 = 0 !

2179
 2180 Units used for volume source
 2181 emissions below in 16b (IVLU) Default: 1 ! IVLU = 5 !
 2182 1 = g/s
 2183 2 = kg/hr
 2184 3 = lb/hr
 2185 4 = tons/yr
 2186 5 = Odour Unit * m**3/s (vol. flux of odour compound)
 2187 6 = Odour Unit * m**3/min
 2188 7 = metric tons/yr
 2189 8 = Bq/s (Bq = becquerel = disintegrations/s)
 2190 9 = GBq/yr

2191
 2192 Number of source-species
 2193 combinations with variable
 2194 emissions scaling factors
 2195 provided below in (16c) (NSVL1) Default: 0 ! NSVL1 = 0 !

2196
 2197 Number of volume sources with
 2198 variable location and emission
 2199 parameters (NVL2) No default ! NVL2 = 0 !

2200
 2201 (If NVL2 > 0, ALL parameter data for
 2202 these sources are read from the VOLEMARB.DAT file(s))

2203
 2204 !END!

2205
 2206 -----
 2207 Subgroup (16b)
 2208 -----

2209
 2210 a
 2211 VOLUME SOURCE: CONSTANT DATA
 2212 -----
 2213 Source X Y Effect. Base Initial Initial b
 2214 No. Coordinate Coordinate Height Elevation Sigma y Sigma z Emission
 2215 (km) (km) (m) (m) (m) (m) Rates
 2216 -----
 2217
 2218

2219
 2220 a
 2221 Data for each source are treated as a separate input subgroup
 2222 and therefore must end with an input group terminator.

2223
 2224 b
 2225 An emission rate must be entered for every pollutant modeled.
 2226 Enter emission rate of zero for secondary pollutants that are
 2227 modeled, but not emitted. Units are specified by IVLU
 2228 (e.g. 1 for g/s).

2229
 2230 -----
 2231 Subgroup (16c)
 2232 -----

2233
 2234 a
 2235 VOLUME SOURCE: EMISSION-RATE SCALING FACTORS
 2236 -----

2237 Use this subgroup to identify temporal variations in the emission
 2238 rates given in 16b. Factors assigned multiply the rates in 16b.
 2239 Skip sources here that have constant emissions. For more elaborate
 2240 variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

2241
 2242 Sets of emission-rate scale factors are defined in Input Group 19, and
 2243 are referenced by the FACTORNAME. Provide NSVL1 lines that identify the
 2244 emission-rate scale factor table for each source-species combination that
 2245 uses the scaling option. Note that a scale-factor table can be used with
 2246 more than one source-species combination so a FACTORNAME can be repeated.
 2247

```

2248
2249 Source-          Source      Species      Scale-factor table
2250 Species          Name      b      Name      c      Name      d
2251 No.             (SRCNAM)   (CSPEC)   (FACTORNAME)
2252 -----
2253
2254
2255
2256 -----
2257 a
2258 Data for each species are treated as a separate input subgroup
2259 and therefore must end with an input group terminator.
2260 b
2261 Source name must match one of the SRCNAM names defined in Input Group 16b
2262 c
2263 Species name must match one of the CSPEC names of emitted species defined in Input
2264 Group 3
2265 d
2266 Scale-factor name must match one of the FACTORNAME names defined in Input Group 19
2267
2268 -----
2269
2270 INPUT GROUP: 17  -- FLARE source control parameters (variable emissions file)
2271 -----
2272
2273 Number of flare sources defined in FLEMARB.DAT file(s)
2274 (NFL2)                               Default: 0      ! NFL2 = 0 !
2275
2276 (At least 1 FLEMARB.DAT file is needed if NFL2 > 0)
2277
2278 !END!
2279
2280 -----
2281
2282
2283
2284 INPUT GROUPS: 18a, 18b, 18c -- Road Emissions parameters
2285 -----
2286
2287 -----
2288 Subgroup (18a)
2289 -----
2290
2291 Emissions from roads are generated from individual line segments defined
2292 by a sequence of coordinates provided for each road-link. Each link
2293 is entered as a discrete source and is defined as a section of the road
2294 for which emissions are uniform.
2295
2296 A long, winding isolated road might be characterized by a single link made
2297 up of many coordinate triples (x,y,z) that describe its pathway. These
2298 points should be sufficient to resolve curves, but need not have uniform
2299 spacing. For example, a straight flat segment can be defined by 2 points,
2300 regardless of the distance covered. Long line segments are automatically
2301 divided further within the model into segments that are limited by the
2302 grid-cell boundaries (no segment may extend across multiple cells).
2303 One emission rate (g/m/s) for each species is used for the entire road.
2304
2305 Near a congested intersection, many short links may be required to resolve
2306 the spatial and temporal distribution of emissions. Each is entered and
2307 modeled as a discrete source.
2308
2309 Number of road-links with emission parameters
2310 provided in Subgroup 18b (NRD1)      No default      ! NRD1 = 0 !
2311
2312 Number of road-links with arbitrarily time-varying
2313 emission parameters (NRD2)          No default      ! NRD2 = 0 !
2314 (If NRD2 > 0, ALL variable road data
2315 are read from the file: RDEMARB.DAT)

```

2316
 2317
 2318 Emissions from one or more of the roads presented in Subgroup 18b
 2319 may vary over time-based cycles or by meteorology. This variability
 2320 is modeled by applying an emission-rate scale factor specified for
 2321 particular road links and species in Subgroup 18c.
 2322
 2323 Number of road links and species combinations
 2324 with variable emission-rate scale-factors
 2325 (NSFRDS) Default: 0 ! NSFRDS = 0 !
 2326

2327 !END!

2328
 2329 -----
 2330 Subgroup (18b)
 2331 -----

2332 a
 2333 DATA FOR ROADS WITH CONSTANT OR SCALED EMISSION PARAMETERS
 2334 -----

2335 b
 2336 Road Effect. Initial Initial Emission
 2337 No. Height Sigma z Sigma y Rates
 2338 (mAGL) (m) (m) (g/s/m)
 2339 -----

2340 c

2341
 2342

2343 -----

2344 a
 2345 Data for each of the NRD1 roads are treated as a separate input subgroup
 2346 and therefore must end with an input group terminator.
 2347 b
 2348 NSPEC Emission rates must be entered (one for every pollutant modeled).
 2349 Enter emission rate of zero for secondary pollutants.
 2350 c
 2351 Road-source names are entered without spaces, and may be 16 characters long.
 2352

2353
 2354 -----
 2355 Subgroup (18c)
 2356 -----

2357 a
 2358 EMISSION-RATE SCALING FACTORS
 2359 -----

2360
 2361 Use this subgroup to identify temporal variations in the emission
 2362 rates given in 18b. Factors assigned multiply the rates in 18b.
 2363 Skip sources here that have constant emissions. For more elaborate
 2364 variation in source parameters, use RDEMARB.DAT and NRD2 > 0.
 2365

2366 Sets of emission-rate scale factors are defined in Input Group 19, and
 2367 are referenced by the FACTORNAME. Provide NSFRDS lines that identify the
 2368 emission-rate scale factor table for each source-species combination that
 2369 uses the scaling option. Note that a scale-factor table can be used with
 2370 more than one source-species combination so a FACTORNAME can be repeated.
 2371

2372
 2373 Source- Source Species Scale-factor table
 2374 Species Name b Name c Name d
 2375 No. (SRCNAM) (CSPEC) (FACTORNAME)
 2376 -----

2377
 2378
 2379
 2380 -----

2381 a
 2382 Assignment for each source-specie is treated as a separate input subgroup
 2383 and therefore must end with an input group terminator.
 2384 b

2385 Source name must match one of the SRCNAM names defined in Input Group 18b
 2386 c
 2387 Species name must match one of the CSPEC names of emitted species defined in Input
 Group 3
 2388 d
 2389 Scale-factor name must match one of the FACTORNAME names defined in Input Group 19

2390 -----
 2391 Subgroup (18d)
 2392 -----
 2393

2394 a
 2395 COORDINATES FOR EACH NAMED ROAD
 2396 -----
 2397
 2398 X Y Ground
 2399 Coordinate Coordinate Coordinate Elevation
 2400 No. (km) (km) (m)
 2401 -----
 2402
 2403 -----

2404 a
 2405 Each line of coordinates is treated as a separate input subgroup
 2406 and therefore must end with an input group terminator.
 2407
 2408
 2409 -----

2410
 2411
 2412 INPUT GROUPS: 19a, 19b -- Emission rate scale-factor tables
 2413 -----
 2414

2415 Use this group to enter variation factors applied to emission rates for any
 2416 source-specie combinations that use this feature. The tables of emission-rate
 2417 scale factors are referenced by the name assigned to FACTORNAME. These names
 2418 do not need to include specific source or species names used in the simulation,
 2419 particularly if one factor table is used for many types of sources and species,
 2420 but should be descriptive. But if a factor table applies to just one source,
 2421 the reference name for it should generally contain that source-name.
 2422 FACTORNAME must NOT include spaces.
 2423

2424 The FACTORTYPE for each table must be one of the following:
 2425

- 2426 CONSTANT1 1 scaling factor
- 2427 MONTH12 12 scaling factors: months 1-12
- 2428 DAY7 7 scaling factors: days 1-7
- 2429 [SUNDAY, MONDAY, ... FRIDAY, SATURDAY]
- 2430 HOUR24 24 scaling factors: hours 1-24
- 2431 HOUR24_DAY7 168 scaling factors: hours 1-24,
- 2432 repeated 7 times: SUNDAY, MONDAY, ... SATURDAY
- 2433 HOUR24_MONTH12 288 scaling factors: hours 1-24,
- 2434 repeated 12 times: months 1-12
- 2435 WSP6 6 scaling factors: wind speed classes 1-6
- 2436 [speed classes (WSCAT) defined in Group 12]
- 2437 WSP6_PGCLASS6 36 scaling factors: wind speed classes 1-6
- 2438 repeated 6 times: PG classes A,B,C,D,E,F
- 2439 [speed classes (WSCAT) defined in Group 12]
- 2440 TEMPERATURE12 12 scaling factors: temperature classes 1-12
- 2441 [temperature classes (TKCAT) defined in Group 12]
- 2442

2443 The number of tables defined may exceed the number of tables referenced in the
 2444 input groups for each source type above (for convenience), but tables for all
 2445 FACTORNAME names referenced must be present here.
 2446

2447 -----
 2448 Subgroup (19a)
 2449 -----
 2450

2451 Number of Emission Scale-Factor
 2452 tables (NSFTAB) Default: 0 ! NSFTAB = 0 !

```

2453
2454     !END!
2455
2456
2457 -----
2458 Subgroup (19b)
2459 -----
2460                                     a,b,c
2461     Enter factors for NSFTAB Emission Scale-Factor tables
2462
2463
2464
2465
2466
2467 -----
2468     a
2469     Assignments for each table are treated as a separate input subgroup
2470     and therefore must end with an input group terminator.
2471     b
2472     FACTORNAME must be no longer than 40 characters
2473     c
2474     Spaces are NOT allowed in any FACTORNAME or FACTORTYPE assignment,
2475     and the names are NOT case-sensitive
2476
2477
2478
2479 -----
2480
2481 INPUT GROUPS: 20a, 20b, 20c -- Non-gridded (discrete) receptor information
2482 -----
2483
2484 -----
2485 Subgroup (20a)
2486 -----
2487
2488     Number of non-gridded receptors (NREC)  No default  ! NREC = 27 !
2489
2490     Group names can be used to assign receptor locations in
2491     Subgroup 17c and thereby provide an identification that
2492     can be referenced when postprocessing receptors.  The
2493     default assignment name X is used when NRGRP = 0.
2494
2495     Number of receptor group names (NRGRP)  Default: 0  ! NRGRP = 0 !
2496
2497 !END!
2498
2499 -----
2500 Subgroup (20b)
2501 -----
2502
2503     Provide a name for each receptor group if NRGRP>0.
2504     Enter NRGRP lines.
2505                                     a,b
2506     Group Name
2507     -----
2508 * RGRPNAMLIST = *
2509
2510
2511 -----
2512     a
2513     Each group name provided is treated as a separate input subgroup
2514     and therefore must end with an input group terminator.
2515     b
2516     Receptor group names must not include blanks.
2517
2518
2519 -----
2520 Subgroup (20c)
2521 -----

```

a

NON-GRIDDED (DISCRETE) RECEPTOR DATA

2522
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c		X		Y	Ground	Height	b
Receptor	Group	Coordinate	Coordinate	Coordinate	Elevation	Above Ground	
No.	Name	(km)	(km)	(km)	(m)	(m)	
-----		-----		-----	-----	-----	-----
1	! X =	415.42500,	6478.51500,		275.3,	0.0	!END!
2	! X =	415.88700,	6478.70000,		278.3,	0.0	!END!
3	! X =	416.00300,	6478.76300,		270.0,	0.0	!END!
4	! X =	416.43500,	6478.83300,		264.7,	0.0	!END!
5	! X =	416.60700,	6478.87900,		251.3,	0.0	!END!
6	! X =	416.95500,	6478.70000,		258.4,	0.0	!END!
7	! X =	416.82000,	6478.41100,		266.6,	0.0	!END!
8	! X =	416.78600,	6478.29300,		268.4,	0.0	!END!
9	! X =	416.86600,	6478.19600,		274.1,	0.0	!END!
10	! X =	416.75500,	6478.00700,		277.8,	0.0	!END!
11	! X =	416.91900,	6477.79200,		289.7,	0.0	!END!
12	! X =	416.78600,	6477.39500,		290.3,	0.0	!END!
13	! X =	416.91100,	6477.06300,		284.4,	0.0	!END!
14	! X =	416.88700,	6476.93100,		271.2,	0.0	!END!
15	! X =	416.52600,	6476.63800,		269.0,	0.0	!END!
16	! X =	416.40400,	6476.65900,		269.3,	0.0	!END!
17	! X =	416.32500,	6476.64300,		269.5,	0.0	!END!
18	! X =	416.21800,	6476.66000,		268.4,	0.0	!END!
19	! X =	416.11800,	6476.68100,		268.7,	0.0	!END!
20	! X =	416.03400,	6476.65300,		266.7,	0.0	!END!
21	! X =	415.95400,	6476.64200,		263.4,	0.0	!END!
22	! X =	415.86400,	6476.63200,		263.3,	0.0	!END!
23	! X =	415.76600,	6476.62700,		258.4,	0.0	!END!
24	! X =	415.62400,	6476.61700,		251.8,	0.0	!END!
25	! X =	415.51400,	6476.61100,		251.2,	0.0	!END!
26	! X =	415.41600,	6476.59200,		244.5,	0.0	!END!
27	! X =	415.27400,	6476.57000,		246.6,	0.0	!END!

a

Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b

Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.

c

Receptors can be assigned using group names provided in 17b. If no group names are used (NRGRP=0) then the default assignment name X must be used.