



AERMET Overhaul Status

James Thurman

thurman.james@epa.gov

U.S. EPA/OAQPS/Air Quality Modeling Group
2021 Regional/State/Local Modelers Workshop

- What is AERMET?
- Current configuration of AERMET
- Motivation for overhaul
- Nature of overhaul
 - Changes
 - New Configuration
- Example changes
- Current status of overhaul



Current
AERMET

New
AERMET



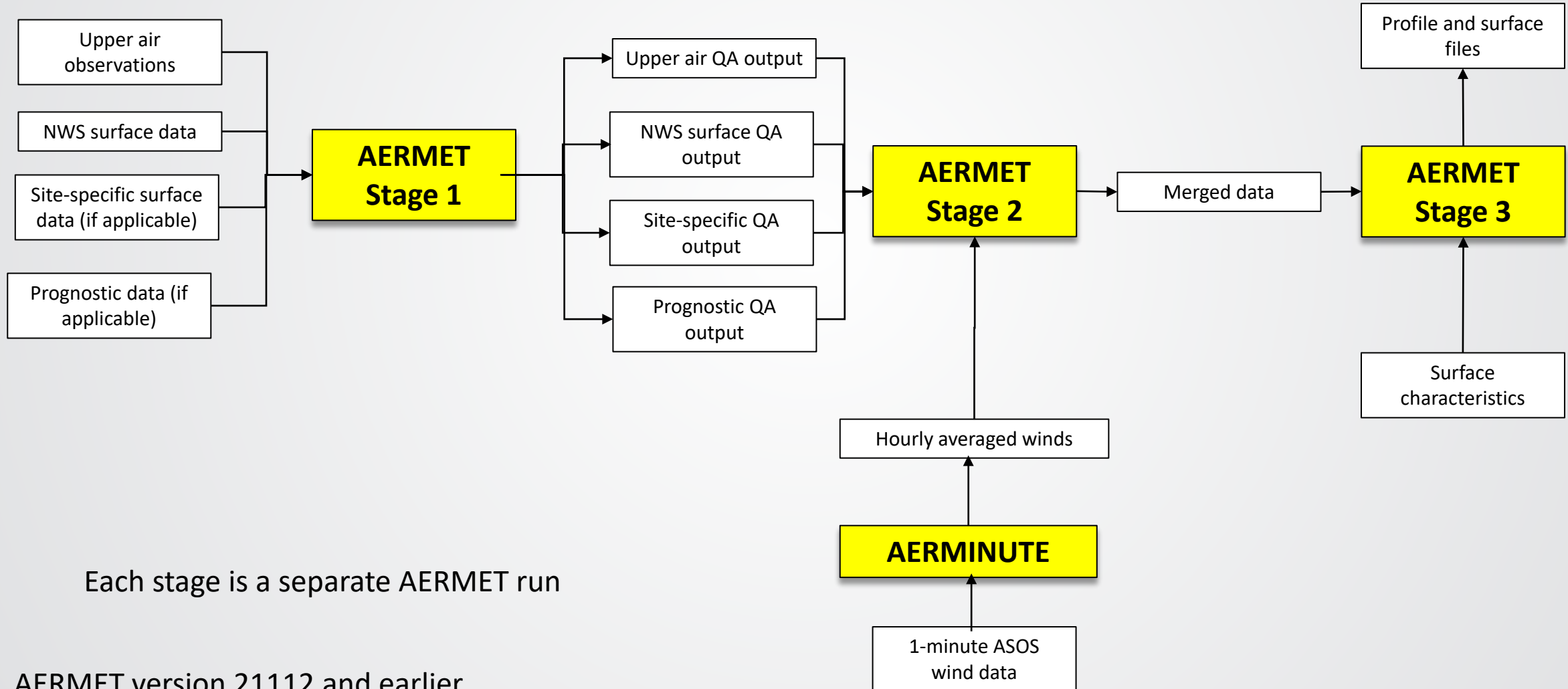


AERMET

- Regulatory meteorological pre-processor for AERMOD
 - Calculates PBL variables needed by AERMOD
- Inputs
 - Upper air sounding data
 - NWS surface data
 - Hourly and hourly averaged 1-minute ASOS winds (AERMINUTE); introduced in 2011
 - Site-specific meteorological data
 - Prognostic meteorological data processed via Mesoscale Model InterFace (MMIF)
 - Surface characteristics (albedo, Bowen ratio, surface roughness)
 - AERSURFACE or similar methodology
- Outputs
 - AERMOD ready surface file
 - AERMOD ready profile file



Current¹ AERMET Stages



Each stage is a separate AERMET run

1. AERMET version 21112 and earlier



Motivation for overhaul

- Runtime or performance is not an issue
- Code update/maintenance primary motivation for overhaul
- AERMET based on older meteorological pre-processor, MPRM
 - Easy to use existing software rather than create new software
- Current AERMET code is convoluted, very “clunky”
 - Each subroutine is its own FORTRAN file, over 180 subroutines
 - Outdated coding practices
 - Intermediate files instead of internal arrays
 - Based on computer technology of 1980’s (small RAM/memory)
 - Difficult/tedious to make substantive changes
 - New data sources
 - New user options
- Not easily portable across operating systems (Windows, Linux)
 - Case sensitivity of filenames on Linux systems



Nature of overhaul

- Recode AERMET to be in line with current best programming practices
 - Modular programming
 - e.g. all subroutines used to process upper air data in one module
 - Arrays instead of writing to intermediate files
 - Take advantage of modern computing power
 - More in-code documentation, variable definitions
 - Easier for others to see what code does
 - Easier to update in future
- Portability across operating systems
 - Case sensitivity of Linux for filenames
- No formulation changes
 - No regulatory action necessary



New features

- Retain original case of input/output filenames in control file(s)
 - AERMET currently converts lines to uppercase for internal processing
 - Filenames become uppercase
 - Problem for Linux OS due to case sensitivity
- Create PROG pathway
 - Analogous to ONSITE pathway
 - Allows AERMOD to recognize data is prognostic in nature
 - Add overwater capability
- New source of upper air data (IGRA format)
- Reformat of information, report, and intermediate QA outputs
 - Easier review of data (import to spreadsheet)
- More QA of input data files
- For sub-hourly data, a new vector averaging for winds (if vector winds)
- SURFACE dates now checked against XDATES after conversion from GMT to LST
 - Consistent with UPPERAIR



New features (cont)

- Debug option to see some stage 1 operations and PBL calculations
- Switch from real to double precision
 - Consistent with AERMAP, AERSURFACE, and AERMOD
 - Will see some differences
- Elimination of hour 23 and 24 persistence substitution
 - Artifact of using intermediate files
 - Hours 23 and 24 now substituted like other hours
- Elimination of hour 23 swapping for hour 24 for missing NWS data
 - Artifact of intermediate files
- Ability to use multiple sets of surface characteristics for a location for multi-year processing
 - Surface characteristics may vary year to year (year 1 is wet, year 2 is dry, etc.)

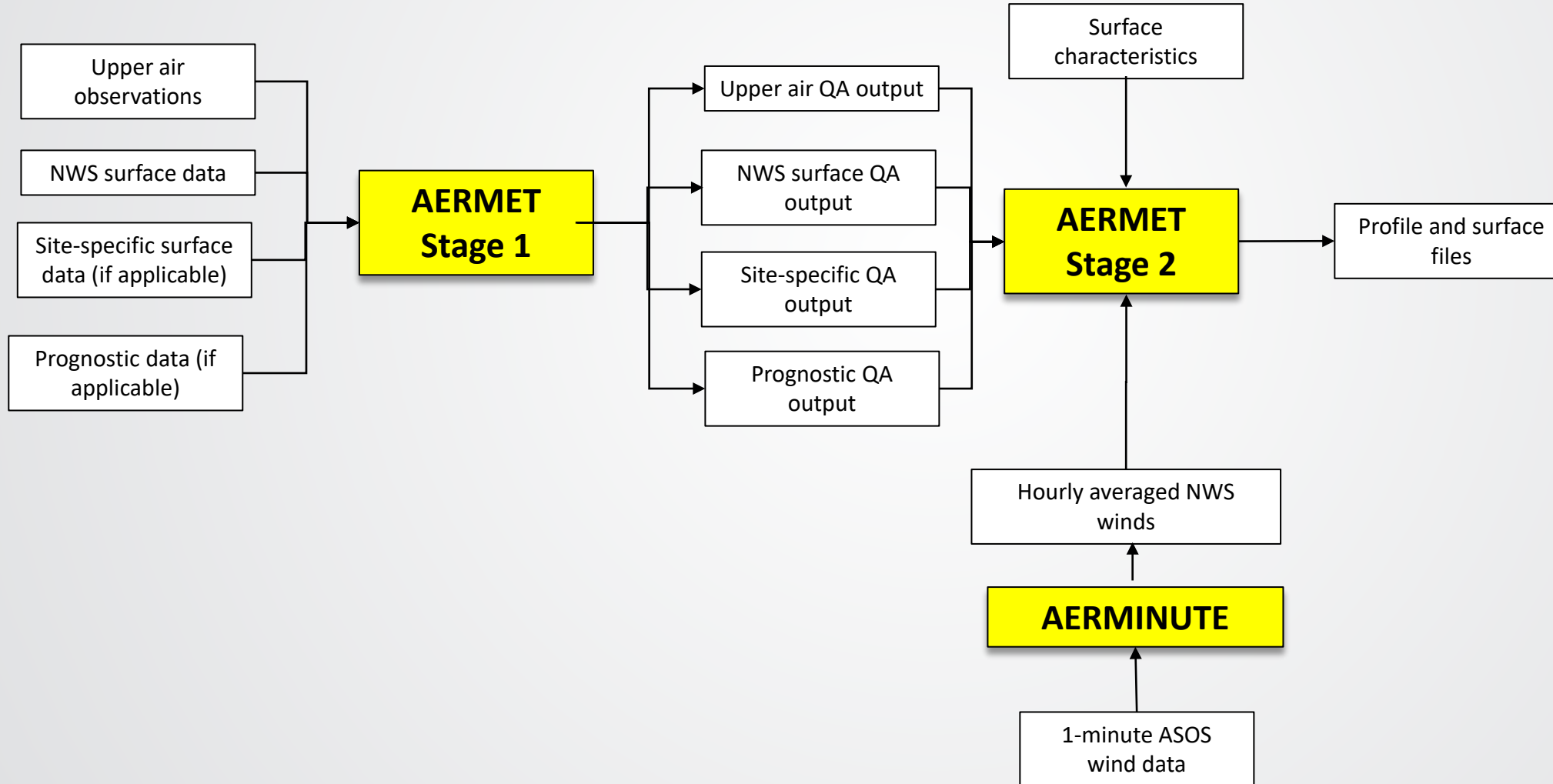


New features (cont)

- Eliminate Stage 2 (merge stage)
 1. Stage 1: raw inputs → QA'd data (current stage 1)
 2. Stage 2: QA'd data → AERMOD ready outputs (modified current stage 3)
- Two options available for running AERMET
 - AERMET modified to allow user to specify either option
 - 1. Single run: raw inputs → AERMOD ready outputs
 - Stage 1 and 2 in one AERMET run
 - Optional QA outputs
 - 2. 2 stage run (2 AERMET runs)
 1. Stage 1: raw inputs → QA outputs (current stage 1)
 2. Stage 2: QA outputs → AERMOD ready outputs



Proposed AERMET Stages





Example UPPERAIR EXTRACT/QAOUT

```
* AERMET Version 19191
*% UPPERAIR
* DATA ..\..\AERMET\DAVENPORT_UA.TXT FSL
* EXTRACT UPPER.IQA
* @ LOCATION 94982 41.60N 90.57W 6
* XDATES 2013/01/01 2017/12/31
* QAOUT UPPER.OQA
* *** UPPER AIR EXTRACTION
*** EOH: END OF UPPERAIR EXTRACT HEADERS
13010106 33
9960 0 -145 -168 345 25
9930 23 -137 -163 999 9990
9710 193 -127 -165 999 9990
9590 288 -113 -151 999 9990
9360 474 -115 -150 999 9990
9330 499 -111 -151 999 9990
9250 565 -107 -207 340 66
9230 582 -105 -215 999 9990
9120 674 -101 -221 999 9990
8500 1216 -101 -241 330 102
8270 1427 -103 -253 999 9990
8140 1577 -103 -267 999 9990
```

Current

```
AERMET 19DRF
LOCATION 94982 41.600N 90.570W 6
FILE TYPE: EXTRACT
DATES 2014 01 01 2014 01 01
DATE SND HR LEV UAPR UAHT UATT UATD UAWD UAWS
20140101 1 06 1 996.0 0.0 -12.5 -15.3 65.0 6.2
20140101 1 06 2 985.0 84.0 -13.3 -15.8 999.0 9990.0
20140101 1 06 3 967.0 224.0 -14.7 -16.3 999.0 9990.0
20140101 1 06 4 953.0 334.0 -14.7 -15.5 999.0 9990.0
20140101 1 06 5 925.0 561.0 -10.1 -10.3 110.0 12.3
20140101 1 06 6 924.0 569.0 -9.9 -10.1 999.0 9990.0
20140101 1 06 7 896.0 807.0 -7.5 -8.0 999.0 9990.0
20140101 1 06 8 850.0 1219.0 -6.9 -6.9 265.0 5.7
20140101 1 06 9 843.0 1283.0 -6.9 -6.9 999.0 9990.0
20140101 1 06 10 835.0 1357.0 -4.3 -4.8 999.0 9990.0
20140101 1 06 11 809.0 1605.0 -4.9 -6.3 999.0 9990.0
20140101 1 06 12 799.0 1702.0 -4.7 -8.2 999.0 9990.0
20140101 1 06 13 793.0 1761.0 -4.3 -5.9 999.0 9990.0
20140101 1 06 14 776.0 1931.0 -3.5 -6.4 999.0 9990.0
20140101 1 06 15 742.0 2283.0 -5.1 -9.0 999.0 9990.0
20140101 1 06 16 729.0 2421.0 -6.1 -9.2 999.0 9990.0
```

Overhaul



Example SURFACE EXTRACT/QAOUT

```
* AERMET Version 19191
** SURFACE
*@ DATA ...\\AERMET\\MDW.TXT ISHD
* EXTRACT MDW.IQA
* XDATES 2013/01/01 2017/12/31
*@ LOCATION 14819 41.784N 87.756W 6 188.
* QAOUT MDW.OQA
* SURFACE OBSERVATION EXTRACTION
*** EOH: END OF SURFACE EXTRACT HEADERS
12123119 0 10197 9961 6 01099 09999 00300 00300 00300 00300 31 31 A
00300 09999 00000 00099 00999 160 -33 999 -78 71
12123120 0 10200 9965 6 01099 09999 00300 00300 00300 00300
00300 09999 00000 00099 00999 140 -33 999 -78 71 29 26 A
12123121 0 10197 9961 999 01099 09999 00300 00300 00300 00300
00300 09999 00000 00099 00999 110 -28 999 -83 65 36 41 A
12123122 0 10207 9971 6 01099 09999 00300 00300 00300 00300
00300 09999 00000 00099 00999 160 -44 999 -100 65 33 57 A
12123123 0 10212 9975 6 01099 09999 00300 00300 00300 00300
00300 09999 00000 00099 00999 160 -56 999 -122 59 34 57 A
12123124 0 10214 9975 30 01099 09999 00300 00300 00300 00300
00300 09999 00000 00099 00999 160 -56 999 -122 59 33 57 A
```

```
AERMET 19DRF
LOCATION 14819 41.784N 87.756W 6 188.000
FILE TYPE: QAOUT
DATES 2014 01 01 2014 01 01
DATE HR ASOS PRCP SLVP PRES TSKC PWITH ASKY TMPD DPTP RHUM WDIR
20140101 01 Y 0.00 1027.2 1002.5 9999.0 0.0 10.0 -8.9 -11.1 84.0 10.0
20140101 02 Y 0.00 1026.9 1002.1 9999.0 0.0 10.0 -8.3 -10.6 83.0 340.0
20140101 03 Y 0.00 1026.4 1001.8 1099.0 0.0 99.0 -7.8 -10.0 84.0 340.0
20140101 04 Y 0.00 1025.8 1001.1 9999.0 0.0 10.0 -7.2 -9.4 84.0 340.0
20140101 05 Y 0.00 1025.7 1001.5 9999.0 0.0 10.0 -5.0 -7.2 84.0 50.0
20140101 06 Y 0.00 1025.8 1001.5 9999.0 0.0 10.0 -5.6 -7.2 88.0 100.0
20140101 07 Y 0.00 1025.9 1001.5 9999.0 0.0 10.0 -5.6 -7.8 84.0 80.0
20140101 08 Y 0.00 1025.9 1001.5 9999.0 0.0 10.0 -5.6 -8.9 77.0 80.0
20140101 09 Y 0.00 1026.4 1002.1 1099.0 0.0 99.0 -5.6 -8.9 77.0 70.0
20140101 10 Y 0.00 1026.9 1002.5 9999.0 0.0 10.0 -5.6 -8.3 81.0 70.0
20140101 11 Y 0.00 1026.3 1001.8 9999.0 0.0 10.0 -5.6 -7.8 84.0 60.0
20140101 12 Y 0.00 1025.5 1001.1 9999.0 0.0 10.0 -5.6 -7.8 84.0 70.0
20140101 13 Y 0.30 1024.9 1000.5 9999.0 0.0 10.0 -5.6 -7.8 84.0 60.0
20140101 14 Y 0.00 1024.4 1000.1 9999.0 0.0 10.0 -5.6 -7.8 84.0 60.0
20140101 15 Y 0.00 1024.0 999.8 1099.0 0.0 99.0 -5.6 -7.2 88.0 60.0
20140101 16 Y 0.30 1024.3 1000.1 9999.0 0.0 10.0 -5.0 -7.2 84.0 70.0
20140101 17 Y 0.00 1024.0 999.8 9999.0 0.0 10.0 -5.6 -7.2 88.0 70.0
20140101 18 Y 0.00 1023.9 999.8 9999.0 0.0 10.0 -5.6 -7.8 84.0 60.0
20140101 19 Y 0.00 1024.1 999.8 9999.0 0.0 10.0 -5.6 -8.3 81.0 70.0
20140101 20 Y 0.00 1024.0 999.8 9999.0 0.0 10.0 -6.1 -8.3 84.0 60.0
20140101 21 Y 0.00 1023.9 999.8 1099.0 0.0 99.0 -6.1 -8.3 84.0 70.0
20140101 22 Y 0.00 1023.4 999.1 9999.0 0.0 10.0 -6.1 -8.3 84.0 60.0
20140101 23 Y 0.00 1023.2 999.1 9999.0 0.0 10.0 -6.1 -8.3 84.0 50.0
20140101 24 Y 0.00 1022.5 998.5 9999.0 0.0 10.0 -6.1 -8.9 80.0 50.0
```

Current

Overhaul



Example ONSITE EXTRACT/QAOUT

```
|* AERMET Version 19191
*% ONSITE
* DATA ARGONNE_15_MIN.DAT
* QAOUT ARGONNE.OQA
* XDATES 2013/01/01 2017/12/31
*@ LOCATION 99999 41.701N 87.995W 0 230.0
*$ READ 1 OSYR OSMO OSDY OSHR OSMN INSO NRAD DT01 PRES
*$ READ 2 HT01 TT01 WS01 WD01 SA01
*$ READ 3 HT02 TT02 WS02 WD02 SA02
*$ FORMAT 1 (5(I2),4(1X,F10.4))
*$ FORMAT 2 (11X,F4.1,4(1X,F10.4))
*$ FORMAT 3 (10X,F5.1,4(1X,F10.4))
*$ DELTA_TEMP 1 10.0 60.0
*$ OSHEIGHTS 10.0 60.0
*$ THRESHOLD 1.0
* OBS/HOUR 4
* OS ON-SITE QUALITY ASSESSMENT
*** EOH: END OF ON-SITE QA HEADERS
13 1 1 1-9 0.0000 -8.8764 -0.4266 9972.5254
40.0 -7.0316 2.8267 338.4550 20.0218
240.0 -7.4581 5.2172 351.8875 9.2291
13 1 1 2-9 0.0000 -13.6030 -0.4114 9973.7754
40.0 -7.3400 2.9517 337.7275 18.4186
240.0 -7.7514 5.3213 351.0075 8.3045
13 1 1 3-9 0.0000 -24.1175 -0.3585 9975.2500
40.0 -7.7251 2.3822 337.4700 17.9410
240.0 -8.0837 4.4032 350.4400 8.6976
13 1 1 4-9 0.0000 -21.3805 -0.3842 9977.7002
40.0 -8.0849 2.4359 330.7300 17.1271
240.0 -8.4691 4.3486 345.2575 9.1784
```

```
AERMET VERSION 19DRF
LOCATION 99999 41.701N 87.995W 0 230.000
FILE TYPE: QAOUT
THRESHOLD 0.000
DELTA_TEMP 1 10.000 60.000
DATES 2014 01 01 2014 01 01
DATE HR LEV HTNN INSO NRAD DT01 PRES SANN TTNN WDNW WSNN
20140101 01 1 10.00000 0.00000 0.49707 -0.39500 1001.05000 14.05437 -11.26800 33.28900 3.03500
20140101 01 2 60.00000 9999.00000 999.00000 9.00000 99999.00000 8.23031 -11.66300 39.60500 4.60217
20140101 02 1 10.00000 0.00000 0.24835 -0.36800 1000.95000 14.24541 -10.98875 24.64050 2.73005
20140101 02 2 60.00000 9999.00000 999.00000 9.00000 99999.00000 7.67013 -11.35675 31.47725 4.32705
20140101 03 1 10.00000 0.00000 -0.21615 -0.28600 1000.85000 13.16328 -10.77375 19.11500 2.31450
20140101 03 2 60.00000 9999.00000 999.00000 9.00000 99999.00000 8.01353 -11.05975 26.37550 3.73682
20140101 04 1 10.00000 0.00000 -1.05878 -0.28025 1000.42500 13.28906 -10.58700 15.71275 2.41682
20140101 04 2 60.00000 9999.00000 999.00000 9.00000 99999.00000 6.27646 -10.86725 24.68675 3.72897
20140101 05 1 10.00000 0.00000 -1.10423 -0.30090 1000.20000 12.68009 -9.88135 17.07475 2.41740
20140101 05 2 60.00000 9999.00000 999.00000 9.00000 99999.00000 6.40961 -10.18225 27.42450 4.13760
20140101 06 1 10.00000 0.00000 -1.70067 -0.26465 1000.12500 16.79956 -8.85697 39.23350 2.61740
20140101 06 2 60.00000 9999.00000 999.00000 9.00000 99999.00000 14.21239 -9.12162 45.92925 4.26520
20140101 07 1 10.00000 0.00000 -2.80525 -0.30968 1000.22500 12.23456 -8.14152 48.68325 2.58803
20140101 07 2 60.00000 9999.00000 999.00000 9.00000 99999.00000 8.23317 -8.45120 66.55050 4.60837
20140101 08 1 10.00000 5.01372 -1.62927 -0.51362 1000.22500 13.05035 -6.88670 65.28800 5.36320
20140101 08 2 60.00000 9999.00000 999.00000 9.00000 99999.00000 8.58509 -7.40032 74.96900 7.71805
20140101 09 1 10.00000 24.51100 8.94332 -0.37235 1000.62500 12.76492 -6.71590 62.16425 5.70950
20140101 09 2 60.00000 9999.00000 999.00000 9.00000 99999.00000 9.48199 -7.08825 71.11625 7.84557
20140101 10 1 10.00000 77.23600 36.43075 -0.32727 1001.15000 13.27201 -6.69533 56.95100 5.55373
20140101 10 2 60.00000 9999.00000 999.00000 9.00000 99999.00000 9.06712 -7.02260 64.68825 7.83988
20140101 11 1 10.00000 181.40250 87.32950 -0.33800 1001.07500 14.02231 -6.44085 57.90775 6.35695
20140101 11 2 60.00000 9999.00000 999.00000 9.00000 99999.00000 9.04043 -6.77885 66.93325 9.06235
20140101 12 1 10.00000 159.70500 75.20525 -0.29383 1000.60000 13.64304 -6.35150 57.98100 6.15785
20140101 12 2 60.00000 9999.00000 999.00000 9.00000 99999.00000 8.18055 -6.64533 65.03875 8.86803
20140101 13 1 10.00000 158.38750 74.10575 -0.27400 1000.17750 15.02612 -6.40345 52.17000 5.92637
20140101 13 2 60.00000 9999.00000 999.00000 9.00000 99999.00000 9.36428 -6.67745 58.72750 8.41387
20140101 14 1 10.00000 140.06750 65.06675 -0.27840 999.62250 14.13351 -6.37058 49.15750 6.09765
20140101 14 2 60.00000 9999.00000 999.00000 9.00000 99999.00000 8.93018 -6.64898 56.53975 9.04335
20140101 15 1 10.00000 68.06625 30.45950 -0.25453 999.42500 14.36972 -6.44093 44.63425 4.33098
```

Current

Overhaul



Example multi-year surface characteristics

XDATES 2013 01 01 2017 12 31

nws_hgt wind 10.0

output test.sfc

profile test.pfl

AERSURF onsite_2014.txt 2013 2014

AERSURF2 airport_2014.txt 2013 2014

AERSURF onsite_2015.txt 2015

AERSURF2 airport_2015.txt 2015

AERSURF onsite_2016.txt 2016

AERSURF2 airport_2016.txt 2016

AERSURF onsite_2017.txt 2017

AERSURF2 airport_2017.txt 2017

Using AERSURF and AERSURF2 keywords

FREQ_SECT MONTHLY 4 2013 2014

SECTOR 1 20.00 120.00

SECTOR 2 120.00 210.00

SECTOR 3 210.00 290.00

SECTOR 4 290.00 20.00

** Month Sect Alb Bo Zo
SITE_CHAR 1 1 0.44 0.47 0.103

FREQ_SECT MONTHLY 4 2015

SECTOR 1 20.00 120.00

SECTOR 2 120.00 210.00

SECTOR 3 210.00 290.00

SECTOR 4 290.00 20.00

** Month Sect Alb Bo Zo
SITE_CHAR 1 1 0.44 0.47 0.103
SITE_CHAR 1 2 0.44 0.47 0.118
SITE_CHAR 1 3 0.44 0.47 0.067
SITE_CHAR 1 4 0.44 0.47 0.340
SITE_CHAR 2 1 0.44 0.47 0.103

**Using FREQ_SECT
keywords in control file**



Changes to control files

- For both stage 1 and stage 2, XDATES now REQUIRES a 4-digit year
 - XDATES 2020/01/01 2020/12/31
 - XDATES 2020/01/01 TO 2020/12/31
 - XDATES 2020 01 01 2020 12 31
- With exception of XDATES and new options, current stage 1 control file will work as is
- New stage 2 file is a concatenation of current stage 2 and stage 3 control files
- New combined stage 1 and 2 control file is a concatenation of current stage 1 and 3 control files with ASOS1MIN from stage 2
- Overhaul will ignore the MERGE pathway keywords and DATA keyword in METPREP pathway



Stage 1 input file

job

messages test_st1.msg
report test_st1.rpt

upperair

data ua.txt fsl
extract upper.iqa
location 99999 35.00N 90.00 W 6
xdates 2013/01/01 2017/12/31
qaout upper.oqa

surface

data airport.txt ishd
extract nws.iqa
xdates 2013/01/01 2017/12/31
location location 99999 35.00N 90.00 W 6 123.
qaout nws.oqa

onsite

data onsite_hourly.dat
qaout onsite_hourly.oqa
xdates 2013/01/01 2017/12/31
location dates 99999 35.00N 90.00 W 0 123.

read 1 osyr osmo osdy oshr inso pres
read 2 ht01 tt01 ws01 wd01 sa01
read 3 ht02 tt02 ws02 wd02 sa02

format 1 (4(i2),2(1x,f10.4))
format 2 (11x,f4.1,4(1x,f10.4))
format 3 (11x,f4.1,4(1x,f10.4))

threshold 0.1

range sa 0 < 35 99
range ws 0 <= 50 99
range wd 0 <= 360 999
range tt -30 < 40 99
range rh 0 <= 100 999
range inso 0 <= 1250 9999
range nrad -100 < 800 999
range pres 9000 < 10999 99999
audit tt01 ws01 wd01 sa01 pres



Stage 2 input file

```
job
  messages test_st2.msg
  report test_st2.rpt
  debug debug_1.txt
upperair
  qaout upper.oqa

surface
  qaout nws.oqa
  ASOS1MIN nws.dat

onsite
  qaout onsite_hourly.oqa

MERGE
  OUTPUT test1.dat
```

New feature

Ignored

METPREP

data test.dat

```
METHOD REFLEVEL SUBNWS
METHOD WIND_DIR RANDOM
```

```
XDATES 2013 01 01 2017 12 31
nws_hgt wind 10.0
output test.sfc
profile test.pfl
AERSURF onsite_2014.txt 2013 2014
AERSURF2 nws_2014.txt 2013 2014
```

```
AERSURF onsite_2015.txt 2015
AERSURF2 nws_2015.txt 2015
```

```
AERSURF onsite_2016.txt 2016
AERSURF2 nws_2016.txt 2016
```

```
AERSURF onsite_2017.txt 2017
AERSURF2 nws_2017.txt 2017
```



Combined stage 1 and 2 control file

```
job
  messages test_st1_st2.msg
  report test_st1_st2.rpt
  debug debug_1.txt
upperair
  data ua.txt fsl
  extract upper.iqa
  location 99999 35.00N 90.00 W 6
  xdates 2013/01/01 2017/12/31
  qaout upper.oqa

surface
  data airport.txt ishd
  extract nws.iqa
  xdates 2013/01/01 2017/12/31
  location Ish 99999 35.00N 90.00 W 6 123.
  qaout nws.oqa
  ASOS1MIN nws.dat

onsite
  qaout onsite.oqa
```

```
onsite
  data onsite_hourly.dat
  qaout onsite_hourly.oqa
  xdates 2013/01/01 2017/12/31
  location onsite. OQA 99999 35.00N 90.00 W 0 123.

  read 1 osyr osmo osdy oshr inso pres
  read 2 ht01 tt01 ws01 wd01 sa01
  read 3 ht02 tt02 ws02 wd02 sa02

  format 1 (4(i2),2(1x,f10.4))
  format 2 (11x,f4.1,4(1x,f10.4))
  format 3 (11x,f4.1,4(1x,f10.4))

  threshold 0.1

  range sa 0 < 35 99
  range ws 0 <= 50 99
  range wd 0 <= 360 999
  range tt -30 < 40 99
  range rh 0 <= 100 999
  range inso 0 <= 1250 9999
  range nrad -100 < 800 999
  range pres 9000 < 10999 99999
  audit tt01 ws01 wd01 sa01 pres
```

METPREP

data test.dat

METHOD REFLEVEL SUBNWS
METHOD WIND_DIR RANDOM

XDATES 2013 01 01 2017 12 31
nws_hgt wind 10.0

output test.sfc
profile test.pfl

AERSURF onsite_2014.txt 2013 2014
AERSURF2 nws_2014.txt 2013 2014

AERSURF onsite_2015.txt 2015
AERSURF2 nws_2015.txt 2015

AERSURF onsite_2016.txt 2016
AERSURF2 nws_2016.txt 2016

AERSURF onsite_2017.txt 2017
AERSURF2 nws_2017.txt 2017



Debug file

- Outputs some stage 1 processes
 - UPPERAIR calculations (speed shear, direction shear, lapse rate, dewpoint deviation)
 - SURFACE ISHD extraction (enhanced messaging about duplicate observations, special observations in MESSAGE file)
 - ONSITE sub-hourly averaging
- Stage 2 processing and PBL calculations
 - Target time for each day's sounding
 - Initial assignments of winds, temperatures, cloud cover, from ONSITE or SURFACE data
 - Stability assignment for each hour based on critical angle
 - Inputs and calculations for variables (heat flux, w^* , etc.)
 - Iterative processing steps for u^* calculations and Bulk-Richardson calculations
 - Mechanical mixing height calculation
 - Iterative processing for convective mixing height calculations
- Use with care, could be large file



Debug file

STAGE 2 DEBUG PROCESSING START

UPPER AIR SOUNDING WINDOW INFORMATION

UPPER LON	MY_ZONE	MY_SOUNDING	WINDOW BEGIN	TARGET HOUR	WINDOW END
-90.570	-6	12	11 (-1)	12	13 (1)

DATE: 20130316

LOCAL SUNRISE/SUNSET: 06:08:40 17:53:37

UPPERAIR SUNRISE/SUNSET: 06:18:56 18:03:57

SOUNDING WINDOW FOR 20130316

BEGIN WINDOW DATE/HR	TARGET DATE/HR	ENDING WINDOW DATE/HR
20130316 05	20130316 06	20130316 07

READ_SOUND START

SOUNDING DATE: 20130316 HR 06 SOUNDING # 2

SOUNDING NOT EXTENDED

HEIGHT	PRES	TEMP	THETA
0.000	982.000	273.150	274.571
330.000	942.000	270.850	275.513
398.000	934.000	272.250	277.613
480.000	925.000	272.450	278.587
619.000	909.000	272.650	280.184
698.000	900.000	273.550	281.909
1157.000	850.000	270.850	283.723
1213.000	844.000	273.150	286.712
1241.000	841.000	273.550	287.424
1308.000	834.000	273.750	288.321
1356.000	829.000	273.950	289.028
1661.000	798.000	274.150	292.406
1793.000	785.000	274.950	294.638
1886.000	776.000	275.150	295.826
2169.000	749.000	272.850	296.336
2450.000	723.000	272.450	298.904
2713.000	700.000	270.850	299.905
2999.000	675.000	268.650	300.576
3247.000	654.000	268.050	302.625
4295.000	571.000	261.050	306.375
5301.000	500.000	252.250	307.493

HOUR 01

WIND SPEED/DIRECTION/HT/SOURCE/Z0: 3.7 30.9 10.0 1 0.14300

INITIAL ALBEDO/BOWEN RATIO: 0.17 0.45

TEMPERATURE/HT/SOURCE: 274.5 10.0 1

INITIAL CLOUD COVER/SOURCE: 10 2

PRESS: USE ONSITE STATION PRESSURE: 978.3

STABILITY

SOLAR ANGLE HOUR 24 DATE 20130316: -50.407

SOLAR ANGLE HOUR 01 DATE 20130316: -48.257

ANGLE: -49.332

ANGLE < 0, ALBEDO SET TO 1.0

ANGLE CRIT ANGLE STABILITY

-49.332 < 94.000 STABLE



Current status of overhaul

- Overhaul effort discovered several bugs in AERMET that were corrected in AERMET 21112
- New code developed and tested
 - NWS data
 - Site-specific data
 - Prognostic data
 - Linux testing
 - AERMOD evaluation databases
- Updating user's guide
- Draft release fall of 2021 with a comment period (similar to AERSCREEN and AERSURFACE draft releases)
 - Release webinar explaining new features and anticipated differences between overhaul and current version

