

AERMOD System Bugs, Errata, and Related Guidance

This document identifies recent significant bugs reported and verified in the regulatory version of the EPA AERMOD Modeling System that is available on the EPA's Support Center for Regulatory Atmospheric Modeling (SCRAM) website (<https://www.epa.gov/scram>). System bugs and related guidance will be provided for each AERMOD system component (*i.e.*, AERMOD, AERMET, AERMAP), when applicable.

AERMOD v.23132

No significant issues that require additional guidance on model setup have been reported.

AERMET v.23132

No significant issues that require additional guidance on model setup have been reported.

All issues described below for AERMET 22112 have been addressed in version 23132.

AERMOD v.22112

No significant issues that require additional guidance on model setup have been reported.

The two bugs related to AERMOD v.21112, described below, have been corrected in version 22112. The NO₂ background concentration is no longer incorrectly doubled when using the PVMRM option NO₂ conversion. The actual amount of measured NO₂ background should be entered when using the PVMRM option in AERMOD v.22112.

When modeling BUOYLINE source types and defining groups of BUOYLINE sources using the BLPGROUP keyword, checks on the AERMOD control file have been added to ensure the required keywords are included and should inform the user with appropriate error messages when keyword requirements as described in the AERMOD user's guide are not strictly met.

AERMET v.22112

1. Abnormal AERMET termination due to UPPERAIR data file with data out of temporal sequence (6/28/2022)

A bug was discovered in AERMET version 22112 when reading upper air sounding data. The bug occurs when AERMET is checking to see if the soundings are out of temporal sequence, i.e., a 12Z sounding is listed in the data file before the 00Z sounding for a particular day. The check is new to AERMET 22112 and was not done in prior versions of AERMET. The bug occurs due to an incorrect FORTRAN format statement causing AERMET to abnormally abort. If the user sees this error, the user should either download the upper air sounding file again or if the user manipulated the sounding file, such as substituting for a missing sounding, the user should check for the sequence of dates and times. The user can use the last reported day of upper air processing that is written to the screen to narrow where to search in the sounding file.

2. Incorrect wind direction for missing winds with ONSITE data (7/7/2022)

A bug was discovered in AERMET 22112 when reading in ONSITE or PROG wind speed and direction. The bug causes wind direction to be set to 0 degrees when the wind speed is missing. The bug occurs when the user uses a negative value for missing wind speed, i.e., -99.0. Users should change the missing values for wind speed in their input data files and missing value for wind speed in the AERMET control file to a positive number such as the default missing wind speed value in AERMET, 99. This will allow AERMET to correctly process wind direction when wind speed is missing for an observation.

3. Compilation errors using gfortran on Linux Systems (7/19/2022)

Users who use gfortran to compile AERMET on Linux should contact James Thurman at thurman.james@epa.gov for solutions to compilation errors.

4. Sub-hourly ONSITE data (8/2/2022)

When processing sub-hourly data, the user should verify the following:

- The number of observations per hour should match the number of observations per hour defined by the OBS/HOUR parameter in the AERMET control file. If the number of observations

per hour do not match the OBS/HOUR parameter, the user should insert missing observations in the data file such that the actual number of observations hour match OBS/HOUR

- AERMET 22112 assumes that the observations for sub-hourly data fit a standard interval depending on the value input for OBS/HOUR. For example, if the user enters a value of 12 for OBS/HOUR, then AERMET version 22112 assumes the observations are every five minutes at minutes 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50 and 55. A value of 4 for OBS/HOUR would assume observations every 15 minutes at minutes 0, 15, 30 and 45. If the data does not fit this structure, the user should change the minute observations to match the structure.

AERMET is being modified to be more flexible with sub-hourly data in the next release.

AERMOD v.21112

1. NO₂ Background Concentrations with PVMRM (7/26/2021)

A coding bug was discovered in AERMOD version 21112 when providing background concentrations of NO₂ when using the Tier 3 Plume Volume Molar Ratio Method (PVMRM) for NO₂ conversion. In this case, the background concentrations of NO₂ provided via the AERMOD input control file are added to the internal modeled concentrations twice, resulting in final modeled concentrations that are too high. When using the PVMRM option to model NO₂ concentrations, users should input background concentrations of NO₂ that are one-half of the amount of the actual background concentration. This bug does not affect any of the other NO₂ conversion options (i.e., ARM2, OLM, GRSM, or TTRM). Actual NO₂ background concentrations should be entered when using any of these other NO₂ conversion options.

2. BUOYLINE Source Types and BLPGROUP (7/26/2021)

A coding bug was discovered in AERMOD version 21112 related to error handling which in some circumstances AERMOD will complete processing without an error but concentrations for BUOYLINE source types will not be generated. This can occur when one or more BUOYLINE sources are defined and the required BLPINPUT keyword is omitted, as well as the BLPGROUP keyword. When all BUOYLINE source types defined in the input control file are considered part of a single BLPGROUP, the BLPGROUP keyword is not required, and the BLPGrpID is an optional parameter for the BLPINPUT keyword. However, the BLPINPUT keyword is required. If the BLPINPUT keyword is also omitted, AERMOD will appear to complete successfully, but concentrations will not be generated for the BUOYLINE source types since the BUOYLINE source characteristics have not been specified via the BLPINPUT keyword and parameters.

When modeling BUOYLINE source types, EPA recommends that the user include the BLPGrpID with the BLPINPUT keyword even when all BUOYLINE source types are modeled as a single BLPGROUP and assign each BUOYLINE source type to a BLPGROUP via the BLPGrpID parameter with the BLPGROUP keyword.