Last Revised: May 2025

AERMOD System Bugs, Errata, and Related Guidance

This document identifies recent significant bugs reported in the EPA AERMOD Modeling System and related programs and utilities 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 of the AERMOD system components for the current versions posted on SCRAM and related programs (*e.g.*, AERMOD, AERMET, AERMAP, AERSURFACE, AERMINUTE, BPIPPRM).

AERMOD v.24142

1. BOUYLINE modeled with FLAT terrain (11/2024)

When sources are modeled in FLAT terrain, AERMOD sets the source and receptor elevation equal to the elevation entered for PROFBASE in the AERMOD control file in the ME pathway. PROFBASE is the base elevation above mean sea level of the main meteorological tower and is used to build the potential temperature profile used in the plume rise calculations. Setting the source and receptor elevations equal to PROFBASE defines a FLAT horizontal plane from which all vertical profile calculations are based. When modeling a BUOYLINE source using MODELOPT FLAT terrain option, AERMOD is not properly setting the BUOYLINE source elevation equal to the PROFBASE elevation resulting in an offset (i.e., discrepancy) between the BUOYLINE source and receptor elevations which is not representative of FLAT terrain. Thus, BUOYLINE sources elevations set to above the PROFBASE with the FLAT terrain option would cause the plume to be modeled above the PROFBASE elevation applied to receptors and producing lower concentrations in most cases; conversely, modeling BUOYLINE sources with elevations below the PROFBASE with the FLAT terrain option would cause the plume to be modeled below the PROFBASE producing higher concentrations in some cases.

To avoid this issue and force AERMOD to treat the environment as FLAT with no differences in the elevation of the BUOYLINE sources, receptors, and meteorological tower PROFBASE, the BUOYLINE source and groups of all BUOYLINE sources can be modeled using either the same elevation as the PROFBASE or by specifying the FLAT keyword for each BUOYLINE source location elevation input. NOTE, this work-around is **only** applicable if all source types modeled are modeled with FLAT terrain. This work around **IS NOT** applicable if modeling a mix of source types and some are modeled with elevated (ELEV) terrain and others are modeled with FLAT terrain. This is not an issue if all sources are modeled with elevated terrain with non-missing elevation inputs to the source location pathway.

2. EMISUNIT keyword not working with BUOYLINE source type (11/2024)

When modeling a BUOYLINE source type and providing emission rates in units other than the default units of g/s specified with the EMISUNIT keyword, AERMOD is not applying the conversion for the BUOYLINE source type. When modeling a BUOYLINE source type by itself or included with other source types, avoid using the EMISUNIT keyword and provide emission rates in default units for all source types modeled.

Source Type	**Default Emission Rate Units**
POINT POINTHOR POINTCAP VOLUME BUOYLINE SWPOINT	g/s

AREA AREACIRC AREAPOLY LINE OPENPIT RLINE	g/(s-m^2)
RLINEXT	g/(s-m)

3. DEBUG Options Limit (11/2024)

The DEBUGOPT list on CO pathway could exceed the number of allowed characters. The DEBUGOPT keyword is non-repeatable with a limit on total number of characters that is read from the control file that the list of specified debug options is contained. With the growing number of debug options available, there is the potential for the list of debug options specified to exceed the total character limit.

To avoid this issue, limit the number of debug options specified with the DEBUGOPT keyword to no more than 4-6 for a single model run. Note that using the debug options can generate very large files if the period that is modeled spans multiple hours.

4. Dynamically Assigned and User-defined File Units (11/2024)

With the growing number of model options added across recent version, whether output file units are assigned dynamically by AERMOD or if assigned by the user, assignments could interfere with the internal hardcoded assignments used for data input files.

To avoid potential file unit conflicts when listing a large number of output files on the OU pathway, provide user-defined file units for each output file, and start with a large integer value such as 10,000 and increment by one consecutively.

5. Fatal Error – Gap in Meteorological File (11/2024)

A fatal error may be encountered stating a meteorological record is out of sequence when that is not the case. To avoid this error, ensure SFC and PFL files are synchronized (same data period and hours are consecutive) and SURFDATA and UAIRDATA keywords on the ME pathway specify the earliest year of data represented in both files. Use the STARTEND keyword on the ME pathway to model a subset of the meteorological data provided.

AERMET v.24142

1. Upper air stations at elevations 1,000 m or higher (11/2024)

If an upper air station has an elevation of 1,000 m or higher, the UPPERAIR EXTRACT and QAOUT files will have a string of asterisks in the LOCATION line where the elevation is supposed to be reported. If these files are used in AERMET stage 2, AERMET will issue an error and abort processing. To avoid this error, AERMET can be run in a combined stage 1 and 2 run and AERMET will run to completion. AERMET correctly reads the elevation on the LOCATION keyword in the AERMET control file and uses the correct elevation internally. Alternatively, if the user wishes to use the EXTRACT or QAOUT file in a separate stage 2 run, the user should manually correct the elevation on the LOCATION line in the EXTRACT or QAOUT file prior to running stage 2.

AERMAP v.24142

1. Data gaps in 3DEP files (11/2024)

There are cases where there appear to be data gaps in the 3DEP data downloaded from the USGS National Map. This can occur when a receptor falls on the boundary of an elevation file. A move as much as 5-10m may be required. If this occurs, modify the location of the receptor either east-west or north-south depending on the orientation of the elevation files to one another. Using 1-arcsecond data, this will usually keep the receptor within the same 30 m x 30 m grid cell. In the AERMOD run, assign the elevation from AERMAP to the original receptor location.

AERSURFACE v.24142

1. Missing projection parameters in Tree Canopy TIFF files (01/2025)

Tree Canopy TIFF files downloaded from the Multi-Resolution Land Characteristics Consortium (MRLC) using the MRLC Data Viewer are currently missing the Albers Equal Area projection parameters. Users attempting to use canopy data downloaded from the MRLC will be prompted by AERSURFACE to manually input these projection parameters; however, a bug in AERSURFACE prevents the run from completing successfully with the manually entered parameters.

There are two immediate workarounds that users may pursue to process canopy data with AERSURFACE. The first being to use the 2021 edition of the NLCD files available on the EPA FTP site: https://gaftp.epa.gov/Air/aqmg/nlcd/2011-2021_2021ed/. The 2021 edition is available for the 2011, 2013, 2016, 2019, and 2021 NLCD years. The files on the FTP site are separated by region and include either the entire region, part of the region, or part of a single state in a few cases (CA, TX), depending on the geographic size of the region/states.

The second workaround is to use a software such as GDAL to rewrite the canopy TIFF file downloaded from the MRLC to add the necessary projection parameters to the file. The EPA has put together a zip file, “GDAL_MRLC_canopy_preprocessor.zip”, containing the GDAL Warp utility (gdalwarp.exe) and associated library and data files required to add the Albers projection parameters to the canopy TIFF files within the CONUS. The zip file can be found on the SCRAM webpage at: https://gaftp.epa.gov/Air/aqmg/SCRAM/models/related/aersurface/GDAL_MRLC_canopy_preprocessor.zip.