Air Pollution Meteorology: AERMOD Installation for Mac & Linux- Quick Guide v1.2

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M. Fung

Two options to install AERMOD UNIX like OS, (tested on OSX, Ubuntu).
AERMOD version 15181, credits to Enviroware for their blog post, which this guide is based on.
PREQUESITES: FORTRAN compiler (OSX/Linux) look at gfortran
**this guide serves only as a supplement of docs, do read the docs, it will save you time &tears.

http://www.enviroware.com/compiling-aermod-under-linux-and-os-x/
https://gcc.gnu.org/wiki/GFortranBinaries#MacOS
http://packages.ubuntu.com/search?keywords=gfortran

Content:

Option 1. Downloading files through Git.

The OSX & Linux version of AERMOD is provided in source fortran files, meaning compilation is required to produce an executable. In order to compile the program, one needs a makefile, an executable that runs the compilation specifying the source files used and the settings desired. Included in the git repository mentioned below are all the source files and a makefile. Depending on your machine, however, you may need to change the options of the makefile, which could be done by opening the makefile with a text editor of your choice.

i. Before pulling the files in git, let's first determine which FORTRAN compiler is running in your machine because we need to tell the makefile which compiler to use. The default WFRT Macs use 'G95', another common compiler is 'gfortran'. Other machines use commercial ones such as Portland Group Fortran Compiler 'PGF', etc.

   To check if you have a FORTRAN compiler, open terminal and type:
   "g95 --version"
   If it says "command not found", g95 is likely not installed.
   Conversely, try to see if gfortran is installed, type:
   "gfortran –version"
   Now that you know which compiler is installed, proceed to the next step.

ii. I have put the source files + makefile in git, there are, however two versions, one for the g95 compiler, and the other for gfortran. If you have both, there isn't really a difference between the two, choose one and go with it. If you have another version that is not mentioned, download either g95 version, and make the changes specified in the next step.

Please open terminal, navigate to the directory where you want the AERMOD files to be by typing:

"cd /PATH/TO/DIRECTORY"

ex. "cd /Users/mfung/Documents" would bring you to documents.

If g95 compiler is installed, type the following:

"git clone https://github.com.mattfung/AERMOD.git"

If gfortran compiler is installed, type the following:

"git clone –b AERMOD-gfortran https://github.com.mattfung/AERMOD.git"

```
mfunga23-175:~/Documents/AIR_POLL/AERMOD/bin$ git clone https://github.com/mattfung/AERMOD.git
Cloning into 'AERMOD'...
remote: Counting objects: 401, done.
remote: Compressing objects: 100% (178/178), done.
remote: Total 401 (delta 159), reused 401 (delta 159), pack-reused 0
Receiving objects: 100% (401/401), 12.79 MiB | 3.36 MiB/s, done.
Resolving deltas: 100% (159/159), done.
Checking connectivity... done.
Checking out files: 100% (401/401), done.
mfunga23-175:~/Documents/AIR_POLL/AERMOD/bin$
```

iii. After git cloning, you should have a folder named 'AERMOD' in the directory you pulled. Open the folder AERMOD, inside AERMOD/src/ there should be multiple files ending with ".f", the fortran source files. The next step would be to compile the source code using the executable makefile.

First, open makefile with a text editor,

```
FC=g95
FCFLAGS=-c -fcheck-bounds -O2 -mtune=native
LDFLAGS=
OBJECTS=modules.o aermod.o setup.o coset.o soset.o reset.o meset.o ouset.o inpsu
m.o metext.o iblval.o siggrid.o tempgrid.o windgrid.o calc1.o calc2.o prise.o pr
ime.o sigmas.o pitarea.o output.o evset.o evcalc.o evoutput.o

all: $(OBJECTS)
	$(FC) $(LDFLAGS) $(OBJECTS) -o aermod
%.o: $.f
	$(FC) $(FCFLAGS) $< -o $@
clean:
	rm -f *.o *.mod *.exe aermod
```

Check the first line of code, FC should equal a fortran compiler installed.
If you have another version, type in the name of the compiler as if you would invoke it in terminal.

In order to compile it, open terminal and navigate to the folder containing the source files by typing:

"cd /PATH/TO/AERMOD/src"

eg. "cd /Users/mfung/Documents/AERMOD/src"

Then type "make"

```
$ cd AERMOD/src
/AERMOD/src$ make
```

If no error message pops up, you can proceed to the next step. If you encounter errors, check the end of this doc, there are helps for common issues

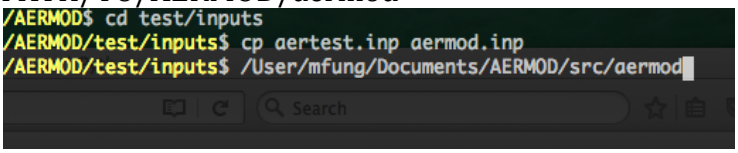
iv. Running AERMOD.

After a successful compilation, there should be an executable named 'aermod' in the source folder. The way to run aermod is to navigate to an input folder, then call the aermod executable. A sample input folder is provided in the test cases. Please note that aermod only ingests input files named 'aermod.inp', so each time you want to run a different test, just rename the desired .inp file into 'aermod.inp', then run aermod.

1. Navigate to input folder (test cases are located in /AERMOD/test)
   "cd /PATH/TO/AERMOD/test/inputs"
   ex. cd /Users/mfung/Documents/AERMOD/test/inputs

2. Make a copy of desired (.inp) file as name "aermod.inp"
   If I want to use aermet.inp would be:
   "cp aermet.inp aermod.inp"

3. Run aermod executable from the directory that contains "aermod.inp" by typing:
   /PATH/TO/AERMOD/aermod



4. If there is an error in the output, open aermod.out in the input folder with a text editor. There should be an error log at the bottom of the file.

Option 2. Clean Compile & Quick Test

i. [Download source code](http://www3.epa.gov/scram001/dispersion_prefrec.htm) from US EPA
http://www3.epa.gov/scram001/dispersion_prefrec.htm

AERMOD Implementation Guide
AERMOD Implementation Guide (PDF, 133KB) - Provides informatic
(Updated August 3, 2015.)

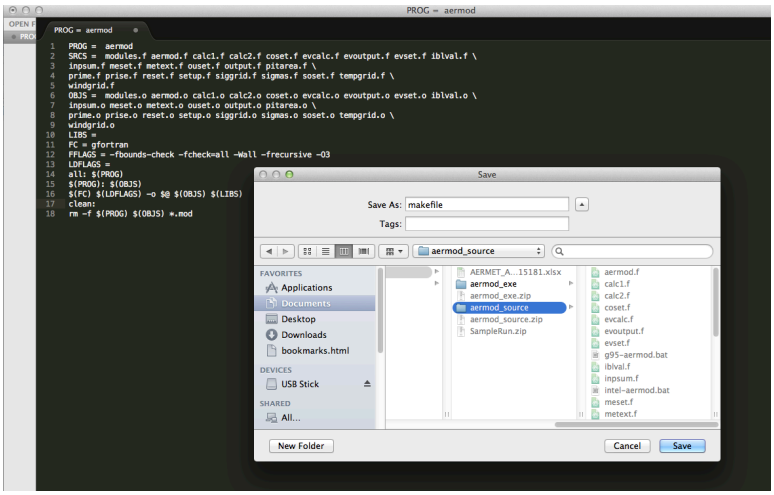
Model Code
README (v15181) (TXT, 1KB)
Executable (v15181) (ZIP, 1.2MB)
Source Code (v15181) (ZIP, 506KB)

Model Documentation

ii. Unzip file. Navigate inside, and with the text editor of your choice, create a file called 'makefile' [according to this website.](http://www.enviroware.com/compiling-aermod-under-linux-and-os-x/)

http://www.enviroware.com/compiling-aermod-under-linux-and-os-x/

Check the first line of code, FC should equal a fortran compiler installed.
If you have another version, type in the name of the compiler as if you would invoke it in terminal.
Eg. If I am using Portand Group Fortran Compiler PGFortran, I'll have..
"FC=PGFortran"
The WFRT iMacs have g95, or gfortran.
Check by typing in terminal:
"g95 --version"
"gfortran --version"



iii. Make changes to 'setup.f' as detailed in the blog post mentioned above. (line 1636-1639).

iv. In Terminal app of your choice, navigate to source file, make.

$USERNAME: cd /path/to/file

$USERNAME: make

v. Testing (Optional)- Download Test Case – AERME_Def_14134_AERMOD_15181.zip from USA EPA44

Addendum to the AERMOD Model Formulation Document (PDF, 44KB

Test Cases
Test Cases README (TXT, 5KB)
AERMET-AERMOD Test Comparisons (XLSX, 516KB)
Test Case - AERMET_Def_14134_AERMOD_15181 (ZIP, 13.2MB)
Test Case - AERMET_Def_15181_AERMOD_14134 (ZIP, 14.3MB)
Test Case - AERMET_Def_15181_AERMOD_15181 (ZIP, 13.2MB)
Test Case - AERMET_UStar_14134_AERMOD_15181 (ZIP, 13.3MB)

vi. Unzip, open folder and navigate to /inputs/. In the text editor of your choice, make the following changes to "aertest.inp"
Line 63-64

From:

STARTING
SURFFILE aermet2.sfc
PROFFILE aermet2.pfl

To:

STARTING
SURFFILE AERMET2.SFC
PROFFILE AERMET2.SFC

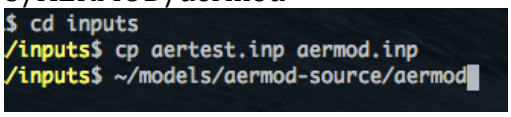
v. Running AERMOD.

- Open terminal, navigate to desired input file (ex. Aermet_test/inputs)

4. Make a copy of desired (.inp) file as name "aermod.inp"

Ex. aermet.inp would be:
"cp aermet.inp aermod.inp"

5. Run aermod executable from the directory that contains "aermod.inp"
/PATH/TO/AERMOD/aermod



TROUBLESHOOTING

Compilation.

*Make: *** multiple target patterns. Stop.*

Hint: Make file 'tabs' need to be tabs, not spaces. Check your editor and see if tab options are spaces, if so, replace them.

Make: gfortran: No such file or directory.

Hint: Is gfortran installed in your computer? Type "gfotran --version" in your terminal. If you have another FORTRAN compiler running, change the FC: handle in the makefile to the installed compiler.

Running.

Program received signal SIGSEGV: Segmentation fault – invalid memory reference.

Did you make the necessary changes in setup.f?

If no, type "make clean" in source dir, change setup.f, rerun "make".
If yes, then procede to embark on a rowdy segfault stacktrace adventure.

FATAL ERROR OCCURRED DURING SETUP PHASE (or any Error msg without segfault)

Take a look at the bottom of /inputs/aermod.out for error log, very useful.

"69 MEOPEN: Fatal Error Occus Opening the Data File SURFFILE"

hint: go to line 69, what is SURFFILE named as? Go to inputs dir, is it the same name as specified in aermod.inp?