

GAUSSIAN DISPERSION MODELS

AERMOD: [HANDS ON!!!]

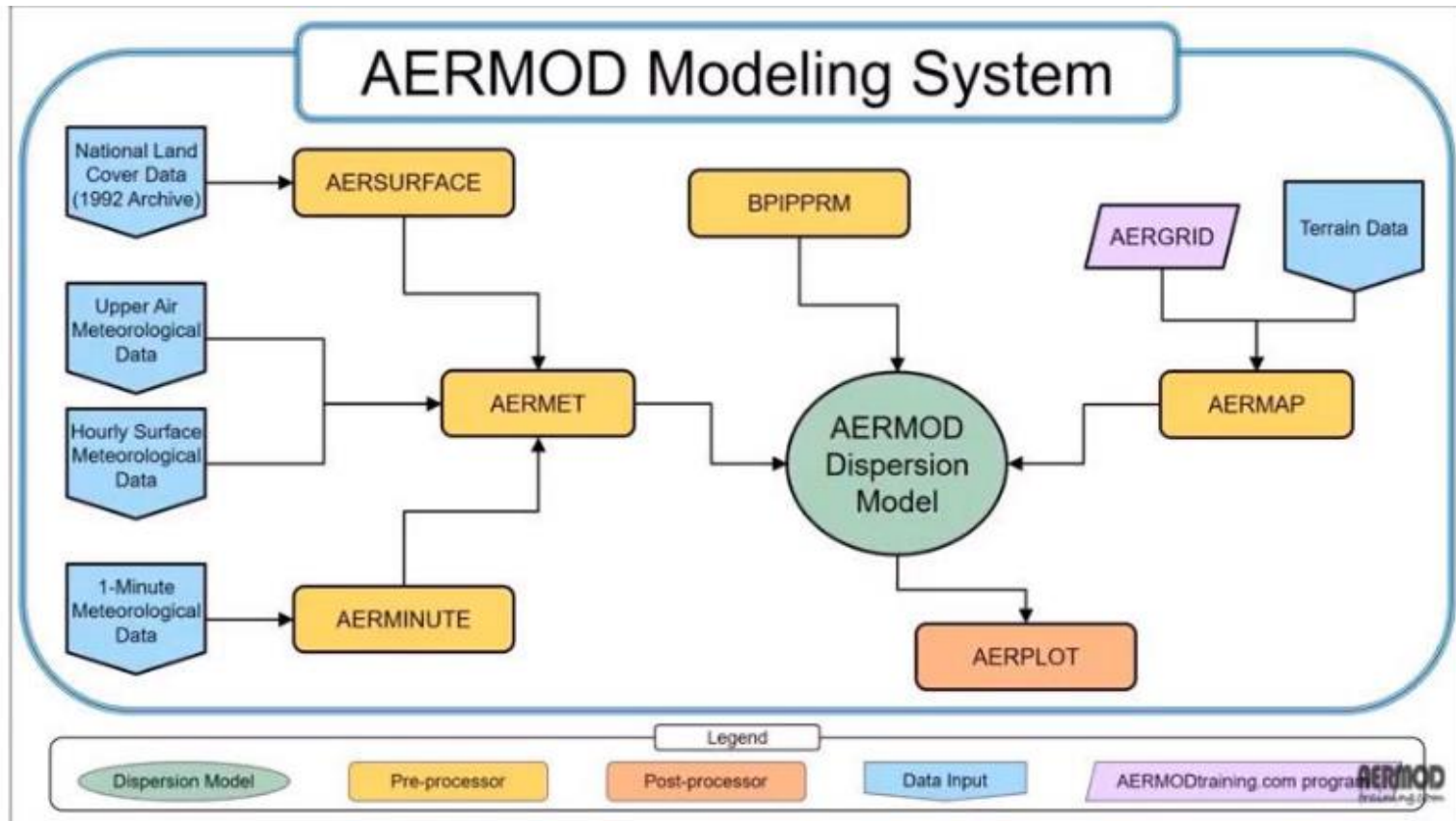


UFES

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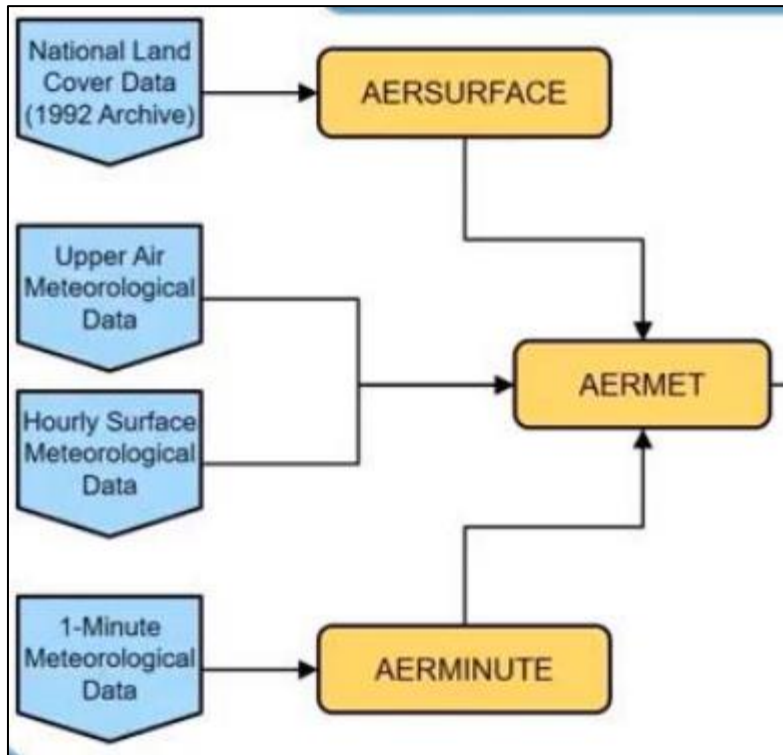
Professor: Dra. Jane Meri Santos

AERMOD CONFIGURATION

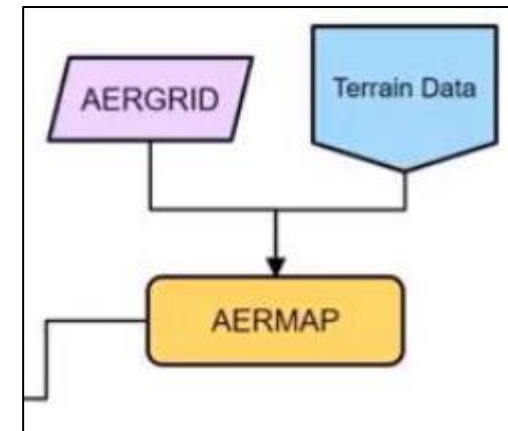


Source: from AERMODtraining.com

PRE-PROCESSORS

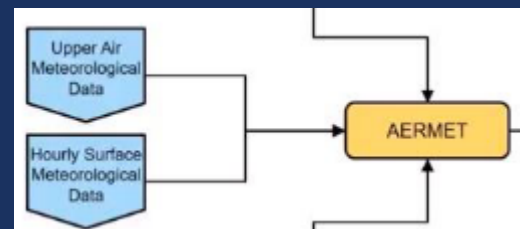


METEOROLOGY



TERRAIN

AERMET: INPUT DATA



AERMOD

Processor	Modeled File	Format	Situation	Observations	Link (Reference)
AERMAP	Digital Elevation Model	.DEM ou GeoTiff	Ready to model	Could be Created in QGIS / ArcGIS	(http://www.webgis.com/)
AERMET	Surface dataset	NCDC	Ready to model	Need to know the station number	National Climatic Data Center (https://www1.ncdc.noaa.gov/pub/data/noaa/)
	Upper air dataset	.FSL	Ready to model	Need to know the station number	NOAA/ESRL Radiosonde Database (https://ruc.noaa.gov/raobs/)
	ONISTE data	(ONSITE)	Created by the author	No obs.	-



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 <https://www1.ncdc.noaa.gov/pub/data/>  *to run the model

 <https://www.ncei.noaa.gov/pub/data/noaa/isd-lite/>  *to check data (+ friendly format)

Index of /pub/data/noaa/isd-lite

<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
Parent Directory		-	
1901/	2018-08-26 02:55	-	
1902/	2018-08-26 03:35	-	
1903/	2018-08-26 05:07	-	
1904/	2018-08-26 05:37	-	
1905/	2018-08-26 06:10	-	
1906/	2018-08-31 10:48	-	
1907/	2018-08-26 07:12	-	
1908/	2018-08-26 07:42	-	
1909/	2018-08-26 08:13	-	
1910/	2018-08-26 09:10	-	
1911/	2018-08-26 09:40	-	
1912/	2018-08-26 10:35	-	
1913/	2018-08-26 11:05	-	



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836120-99999-2015.gz	64.1 kB	07/11/2018 22:00:00
836230-99999-2015.gz	1.3 kB	07/11/2018 22:00:00
836300-99999-2015.gz	3.3 kB	07/11/2018 22:00:00
836440-99999-2015.gz	25.1 kB	07/11/2018 22:00:00
836490-99999-2015.gz	63.9 kB	07/11/2018 22:00:00
836500-99999-2015.gz	9.4 kB	07/11/2018 22:00:00
836520-99999-2015.gz	53.3 kB	07/11/2018 22:00:00
836710-99999-2015.gz	36.7 kB	07/11/2018 22:00:00
836724-99999-2015.gz	25.9 kB	07/11/2018 22:00:00
836725-99999-2015.gz	12.2 kB	07/11/2018 22:00:00
836726-99999-2015.gz	37.1 kB	07/11/2018 22:00:00
836727-99999-2015.gz	36.7 kB	07/11/2018 22:00:00
836728-99999-2015.gz	27.1 kB	07/11/2018 22:00:00
836729-99999-2015.gz	7.2 kB	07/11/2018 22:00:00
836760-99999-2015.gz	2.2 kB	07/11/2018 22:00:00
836870-99999-2015.gz	11.1 kB	07/11/2018 22:00:00
836890-99999-2015.gz	32.0 kB	07/11/2018 22:00:00

1) Find the station by its WMO number

2) Download and extract the file

3) You can rename it at will



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ISD-LITE

1	2015.01.01.00	253	200	10151	30	67	1	-9999	-9999	03
2	2015.01.01.01	250	200	-9999	10	62	-9999	-9999	-9999	03
3	2015.01.01.02	250	200	-9999	10	51	-9999	-9999	-9999	03
4	2015.01.01.03	250	200	-9999	10	51	-9999	-9999	-9999	03
5	2015.01.01.04	250	200	-9999	340	31	-9999	-9999	-9999	03
6	2015.01.01.05	240	200	-9999	360	26	-9999	-9999	-9999	03
7	2015.01.01.06	243	195	10138	20	31	0	-9999	-9999	03
8	2015.01.01.07	240	190	-9999	350	21	-9999	-9999	-9999	03
9	2015.01.01.08	240	180	-9999	360	51	-9999	-9999	-9999	03
10	2015.01.01.09	240	180	-9999	360	31	-9999	-9999	-9999	03
11	2015.01.01.10	260	190	-9999	10	51	-9999	-9999	-9999	03
12	2015.01.01.11	270	190	-9999	10	72	-9999	-9999	-9999	03
13	2015.01.01.12	287	190	10145	10	67	7	-9999	-9999	03
14	2015.01.01.13	310	190	-9999	10	67	-9999	-9999	-9999	03
15	2015.01.01.14	310	190	-9999	10	67	-9999	-9999	-9999	03
16	2015.01.01.15	320	200	-9999	60	93	-9999	-9999	-9999	03
17	2015.01.01.16	310	200	-9999	50	98	-9999	-9999	-9999	03
18	2015.01.01.17	310	200	-9999	50	93	-9999	-9999	-9999	03
19	2015.01.01.18	298	192	10107	50	93	0	-9999	-9999	03
20	2015.01.01.19	290	190	-9999	50	88	-9999	-9999	-9999	03
21	2015.01.01.20	290	190	-9999	50	93	-9999	-9999	-9999	03
22	2015.01.01.21	270	190	-9999	50	98	-9999	-9999	-9999	03
23	2015.01.01.22	260	190	-9999	40	72	-9999	-9999	-9999	03
24	2015.01.01.23	260	190	-9999	40	51	-9999	-9999	-9999	03
25	2015.01.02.00	257	188	10134	30	51	2	-9999	-9999	03
26	2015.01.02.01	260	190	-9999	20	62	-9999	-9999	-9999	03
27	2015.01.02.02	250	190	-9999	20	57	-9999	-9999	-9999	03

*Should be read using Excel, R, Python and compared to the nearest meteorological station data

Format:

Year / Month / Day /Hour (...)

(...) Temp. (Dry bulb - K) / (...)

(...) Temp. (Wet bulb - K) / (...)

(...) Atm. pressure (every 6h) / (...)

(...) Wind direction / (...)

(...) Wind speed (x10) / (...)

(...) Cloud clover (tenths) (1-10) (...)



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Basically same data in worse format to read..

FTP

```

1 0182836490999992015010100004-20267-040283FM-12+000499999V0200301N006719999999N020000199
2 0142836490999992015010100004-20258-040286FM-15+000399999V0200301N006719999999N009999199
3 0142836490999992015010101004-20258-040286FM-15+000399999V0200101N006219999999N009999199
4 0142836490999992015010102004-20258-040286FM-15+000399999V0200101N005119999999N009999199
5 0142836490999992015010103004-20258-040286FM-15+000399999V0200101N005119999999N009999199
6 0072836490999992015010104004-20258-040286FM-15+000399999V0203401N003119999999Y999999999
7 0072836490999992015010105004-20258-040286FM-15+000399999V0203601N002619999999Y999999999
8 0115836490999992015010106004-20267-040283FM-12+000499999V0200201N003119999999N020000199
9 0072836490999992015010106004-20258-040286FM-15+000399999V0200201N003119999999Y999999999
10 0142836490999992015010107004-20258-040286FM-15+000399999V0203501N002119999999N009999199
11 0072836490999992015010108004-20258-040286FM-15+000399999V0203601N005119999999Y999999999
12 0072836490999992015010109004-20258-040286FM-15+000399999V0203601N003119999999Y999999999
13 0072836490999992015010110004-20258-040286FM-15+000399999V0200101N005119999999Y999999999
14 0072836490999992015010111004-20258-040286FM-15+000399999V0200101N007219999999Y999999999
15 0201836490999992015010112004-20267-040283FM-12+000499999V0200101N006719999999N020000199
16 0072836490999992015010112004-20258-040286FM-15+000399999V0200101N006719999999Y999999999
17 0072836490999992015010113004-20258-040286FM-15+000399999V0200101N006719999999Y999999999
18 0072836490999992015010114004-20258-040286FM-15+000399999V0200101N006719999999Y999999999
19 0072836490999992015010115004-20258-040286FM-15+000399999V0200601N009319999999Y999999999
20 0072836490999992015010116004-20258-040286FM-15+000399999V0200501N009819999999Y999999999
21 0072836490999992015010117004-20258-040286FM-15+000399999V0200501N009319999999Y999999999
22 0115836490999992015010118004-20267-040283FM-12+000499999V0200501N009319999999N020000199
23 0072836490999992015010118004-20258-040286FM-15+000399999V0200501N009319999999Y999999999
24 0072836490999992015010119004-20258-040286FM-15+000399999V0200501N008819999999Y999999999
25 0072836490999992015010120004-20258-040286FM-15+000399999V0200501N009319999999Y999999999
26 0072836490999992015010121004-20258-040286FM-15+000399999V0200501N009819999999Y999999999

```




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For modelling purposes it is useful to download AT LEAST one day before and one day after of the study period. Example:

Period of interest: 2019

Download 30/12/2018 to 02/01/2020 and merge the files using Notepad++ or other software of choice


Same with Upper air data (next)

NOAA/ESRL Radiosonde Database

General information about this database, access to station lists, database access software for our CDrom and DVD archive products, and other details is available on the ESRL [website](#).

Recent Activities:

- February 2018: Updated the archive with the latest IGRA-2 data from NCDC, and GTS data collected from ESRL/GSD
- June 2017
 - reinstated netCDF output. (SkewT output will remain unavailable.)
- May 2017
 - Moved to a new web server.
- January 2016
 - Updated the archive with GTS data collected from NWS (IGRA archive) and ESRL/GSD data for 2015 and 2016 thru March 24th.
 - Updated the [inventory](#) to include all observations from 2000 thru 2015.

 <https://ruc.noaa.gov/raobs/>

I. Input Dates: (UTC units)

From: yr mo dy hr

Thru: yr mo dy hr

} *select period of interest

II. Sounding Specific Information

Hours of access: Data levels:

Wind Units:

→ *change to "Tenths of meter/second"

III. Select Stations / Data

Select Radiosonde Sites by:

[National Oceanic and Atmospheric Administration \(NOAA\)](#)
[Earth System Research Laboratory \(ESRL\)](#)
[Global Systems Division \(GSD\)](#)

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 - Updated the [inventory](#) to include all observations from 2000 thru 2015.

IV. Select Stations

Option 1: View (select from) the list of radiosonde sites?

Option 2: Enter your list of WMO Station identifiers (separated by spaces or carriage controls) below:

*** Select Either Option ***

V. Select Output Options

Sort Order:

**optional (usually more complete)*

Note: We no longer are able to offer the SkewT format.

Format:

Descriptions are available for the: [Both FSL output formats.](#)

VI. Submit Data Request

NOAA/ESRL Radiosonde Database

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 - Updated the [inventory](#) to include all observations from 2000 thru 2015.

IV. Select Stations

Note: Use your left mouse button to select stations

9999	99999	83456	-11.75	-55.25	00005	CAKAYELAS 99 BR
SBUL	99999	83525	-18.87	-48.22	00922	UBERLANDIA 99 BR
9999	99999	83554	-19.00	-57.67	00142	CORUMBA (AEROPORTO) 99 BR
9999	99999	83566	-19.62	-43.57	00827	CONFIS INTNL ARPT 99 BR
SBCG	99999	83612	-20.47	-54.67	00556	CAMPO GRANDE INTL 99 BR
SBVT	99999	83649	-20.26	-40.28	00004	VITORIA AEROPORTO 99 BR
9999	99999	83650	-20.50	-29.32	00005	TRINDADE ISLAND 99 BR
9999	99999	83708	-22.78	-45.20	00537	GUARATINGUETA 99 BR
SBGL	99999	83746	-22.82	-43.25	00006	GALEAO/RIO(CIV/MIL) 99 BR
SBLO	99999	83768	-23.33	-51.12	00570	LONDRINA AIRPORT 99 BR
SBMT	99999	83779	-23.52	-46.63	00722	MARTE (CIV/MIL) 99 BR

*find station with upper air soundings

init wban wmo lat lon elev station name

Station Sort by WMO Station Identifier

V. Select Output Options

Sort Order: Station Series Sort ▼

Format: Original FSL format (ASCII text) ▼

Descriptions are available for: [Both FSL output formats](#).

VI. Submit Data Request

Get Radiosonde Data

*Upper air data format (must be checked using R, MATLAB, Python ...) – PLOT charts for variables for each layer and/or following the vertical profile

NOAA/ESRL Radiosonde Database

FSL Rawinsonde data format

The official FSL data format is similar to the format used by the National Severe Storms Forecast Center (NSSFCC) in Kansas City. The first 4 lines of the sounding are identification and information lines. All additional lines are data lines. An entry of 32767 (original format) or 99999 (new format) indicates that the information is either missing, not reported, or not applicable.

---COLUMN NUMBER---

1	2	3	4	5	6	7
LINTYP						
254	hour	day	month	year	(blank)	(blank)
1	WBAN#	WMO#	LAT D	LON D	ELEV	RTIME
2	HYDRO	MXWD	TROPL	LINES	TINDEX	SOURCE
3	(blank)	STAID	(blank)	(blank)	SONDE	WSUNITS
9	PRESSURE	HEIGHT	TEMP	DEWPT	WIND DIR	WIND SPD
4						
5						
6						
7						
8						

LEGEND

LINTYP: type of identification line
 254 = indicates a new sounding in the output file
 1 = station identification line
 2 = sounding checks line
 3 = station identifier and other indicators line
 4 = mandatory level
 5 = significant level
 6 = wind level (PPBB) (GTS or merged data)
 7 = tropopause level (GTS or merged data)
 8 = maximum wind level (GTS or merged data)
 9 = surface level

hour: time of report in UTC
 LAT: latitude in degrees and hundredths
 LON: longitude in degrees and hundredths

D: direction latitude ('N' or 'S') or longitude ('E' or 'W') -note this only appears in the online archive containing international observations.

ELEV: elevation from station history in meters
 RTIME: is the release time of radiosonde balloon
 HYDRO: the pressure of the level to where the sounding passes the hydrostatic check (see section 4.3).**
 MXWD: the pressure of the level having the maximum wind in the sounding. If within the body of the sounding there is no "8" level then MXWN is estimated (see section 3.2).
 TROPL: the pressure of the level containing the tropopause. If within the body of the sounding there is no "7" level, then TROPL is estimated (see section 3.3)**
 LINES: number of levels in the sounding, including the 4 identification lines.
 TINDEX: indicator for estimated tropopause. A "7" indicates that sufficient data was available to attempt the estimation; 11 indicates that data terminated and that tropopause is a "suspected" tropopause.
 SOURCE: 0 = National Climatic Data Center (NCDC)
 1 = Atmospheric Environment Service (AES), Canada
 2 = National Severe Storms Forecast Center (NSSFCC)
 3 = GTS or FSL GTS data only
 4 = merge of NCDC and GTS data (sources 2,3 merged into sources 0,1)
 SONDE: type of radiosonde code from TTBB. Only reported with GTS data
 10 = VIZ "A" type radiosonde
 11 = VIZ "B" type radiosonde
 12 = Space data corp.(SDC) radiosonde.
 WSUNITS: wind speed units (selected upon output)
 ms = tenths of meters per second
 kt = knots

PRESSURE: in whole millibars (original format)
 in tenths of millibars (new format)
 HEIGHT: height in meters (m)
 TEMP: temperature in tenths of degrees Celsius
 DEWPT: dew point temperature in tenths of a degree Celsius
 WIND DIR: wind direction in degrees
 WIND SPD: wind speed in either knots or tenths of a meter per second (selected by user upon output)

THANK YOU!



Next:

Feedback

- Any relevant feedback for my next presentations

Questions

- Was something unclear?

References

- AERMOD Model Formulation and Evaluation (US EPA)
- AERMET User's Guide (US EPA)

In case a question comes up later:

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