

Changes and Updates to the U.S. EPA Models and BREEZE® Software

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BREEZE[®] Software & Data Services

- BREEZE[®] has been developing dispersion modeling software for over 25 years
- Serves thousands of clients in over 70 countries across the world
- Develop easy to use software based upon the U.S. EPA regulatory and a number of other industry-standard models
- Keep current with regulatory updates and dispersion modeling science
- Adheres to Microsoft development and design standards—Microsoft Certified Solution Provider
- Diverse team of Meteorologists, Environmental Engineers, Consultants, and Developers



What prompted these recent U.S. EPA model changes?

- Updates since the AERMOD Version 09292 included:
 - Eliminate known issues (bugs)
 - Model enhancements
 - Miscellaneous changes
 - Updates in modeling science
- Changes to the U.S. National Ambient Air Quality Standards (NAAQS) for 1-hour NO₂ and SO₂ (along with 24-hr PM_{2.5})



Changes to the NAAQS

- New 1-hr NO₂ NAAQS of 100 ppb, based on the 98th-percentile of annual distribution of daily maximum 1-hr values, effective April 12, 2010
- New 1-hr SO₂ NAAQS of 75 ppb, based on the 99th-percentile of annual distribution of daily maximum 1-hr values, effective August 23, 2010
- 24-hr PM_{2.5} NAAQS of 35 µg/m³, based on the 98th-percentile of annual distribution of 24-hr values, effective December 17, 2006



U.S. EPA Changes - AERMOD

- AERMOD executable
 - ◆ 11103 released April 13, 2011
 - ◆ Includes AERMAP 11103
 - ◆ 11059 released April 7, 2011
(February 28, 2001)
 - ◆ Includes AERMET and AERMINUTE 11059



U.S. EPA Changes - AERMOD

- AERMOD 11103 executable includes:
 - ◆ Bug fixes, enhancements, and modifications
 - ◆ Key changes:
 - Addresses 1-hr NO₂ and SO₂ NAAQS, along with and 24-hr PM_{2.5} standards (US-specific)
 - Processes daily max 1-hr values for each day
 - Specifies background ozone for OLM and PVMRM options for NO₂
 - Calculates downwash using PRIME rather than EPA formula height (GEP)
 - Addresses formulation bug for transition from nighttime urban BL to daytime convective BL



U.S. EPA Changes - AERMOD

- **AERMET 11059: Meteorological preprocessor**
 - ◆ Key changes:
 - Corrected bugs with processing subhourly onsite (met) data
 - Allows use of hourly-averaged winds from 1-minute ASOS data generated by AERMINUTE
- **AERMINUTE 11059:**
 - ◆ Processes 1-minute ASOS wind data to generate hourly average winds for input to AERMET Stage 2
- **AERMAP 11103: Terrain preprocessor**
 - ◆ Minor changes:
 - Corrected formatting issues and increased max source ID length from 8 to 12



U.S. EPA Changes - AERSCREEN

- AERSCREEN is a screening model based on AERMOD that produces “worst-case” 1-hour concentrations for a single source
 - ◆ 11126 released May 6, 2011
 - ◆ 11076 released March 17, 2011
 - ◆ 11060 released March 11, 2011
 - ◆ Based on reported bugs and suggestions from Beta Version release in August 2010
- Ability to use AERMOD Version 09292 or later along with AERMAP and BPIPPRIME
- Includes 09183 MAKEMET



U.S. EPA Changes - AERSCREEN

- AERSCREEN has become the U.S. EPA recommended screening model
- AQMG released a clarification memo on April 11, 2010 recommending AERSCREEN as screening model—this replaced SCREEN3
- Per Appendix W of EPA 40 CFR Part 51, p.68221
- AERSCREEN : AERMOD :: SCREEN3 : ISCST3
- If sources exceed NAAQS using AERSCREEN, consider performing refined modeling

BREEZE AERMOD Version 7.3

The screenshot displays the BREEZE AERMOD software interface. The main window is titled "BREEZE AERMOD - Case3 Terrain Manual.ami". The interface is divided into several sections:

- Home Page:** Contains a welcome message for BREEZE AERMOD 7, announcements for new versions (AERMOD 7.3, AERSCREEN 1.2), and links for current versions and EPA versions. It also features a "Data Input Flow for AERMOD" section with options for entering data.
- Map:** Shows a satellite map with a yellow grid overlay representing the model domain. The "Layers" panel on the left lists various map elements like Point Sources, Area Sources, and Receptors.
- Data Table:** A table with columns for X coordinate, Y coordinate, Elevation, Emission rate, Release height, and Init. lat. It lists 24 sources with their respective coordinates and emission rates.
- Reports:** Displays the "BREEZE AERMOD Model Results" for the "Case3 Terrain Manual.ami" project. It includes a summary of the highest results for the pollutant "OTHER" at 1-HR and 24-HR intervals.

	X coordinate	Y coordinate	Elevation	Emission rate	Release height	Init. lat.
	meters	meters	meters	g/s	meters	meters
1	361055.3	4749828.3	1344.02	0.475	16	
2	361048.8	4749762.5	1345.25	0.475	16	
3	361044.5	4749697.2	1345.28	0.475	16	
4	361555.4	4749567.8	1327.18	0.006545454	2	1
5	361532.2	4749573.9	1328.59	0.006545454	2	1
6	361508.7	4749578.5	1330.51	0.006545454	2	1
7	361485.0	4749582.4	1333.54	0.006545454	2	1
8	361461.3	4749586.3	1337.20	0.006545454	2	1
9	361437.6	4749590.2	1340.67	0.006545454	2	1
10	361413.9	4749594.1	1342.90	0.006545454	2	1
11	361390.3	4749598.0	1341.64	0.006545454	2	1
12	361366.6	4749601.9	1339.40	0.006545454	2	1
13	361342.9	4749605.9	1338.47	0.006545454	2	1
14	361319.2	4749609.8	1338.59	0.006545454	2	1
15	361295.6	4749613.7	1340.72	0.006545454	2	1
16	361271.9	4749617.7	1343.42	0.006545454	2	1
17	361248.3	4749622.3	1345.20	0.006545454	2	1
18	361224.8	4749626.9	1344.81	0.006545454	2	1
19	361201.2	4749631.5	1345.66	0.006545454	2	1
20	361177.6	4749635.9	1345.70	0.006545454	2	1
21	361154.0	4749639.9	1345.20	0.006545454	2	1
22	361130.3	4749644.0	1344.61	0.006545454	2	1
23	361106.7	4749648.0	1344.68	0.006545454	2	1
24	361083.0	4749652.1	1345.25	0.006545454	2	1

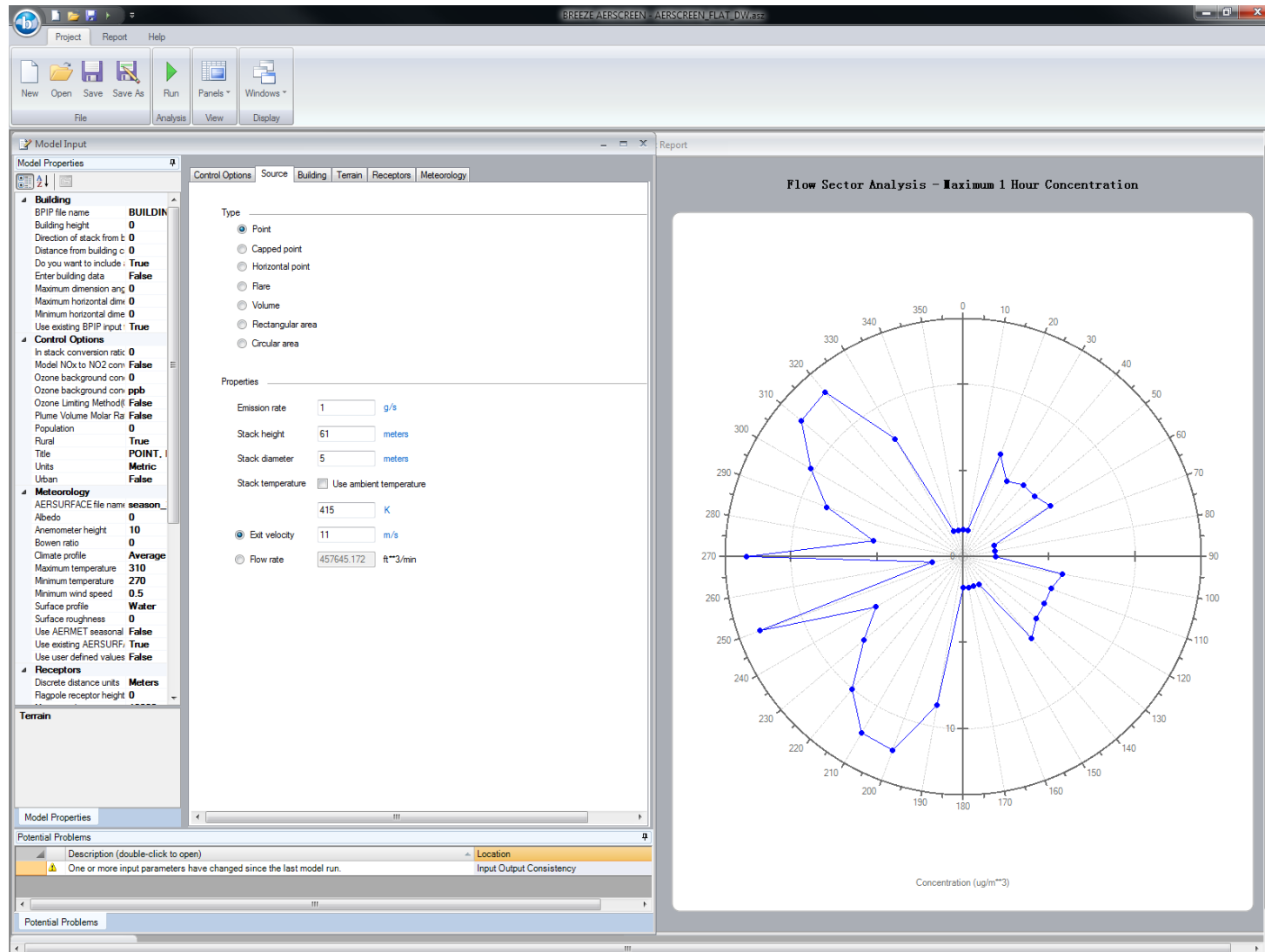
Highest Results of Pollutant: OTHER											
Avg. Per.	Grp ID	High	Type	Val	Units	Date	UTM		Elev. (m)	Hill Ht. (m)	Flag
						YYMMDDHH	East (m)	North (m)			
1-HR	ALL	1ST	Avg. Conc.	1054.45307	ug m**3	95010219	360914.80	4749566.10	1345.16	1345.16	0.00
	PT_TALL	1ST		425.95744		95010219	357744.80	4741276.30	1382.13	1407.00	0.00
	PT_SHORT	1ST		1005.99911		95010219	360914.80	4749566.10	1345.16	1345.16	0.00
	COALPILE	1ST		640.99162		95010209	361688.10	4749472.40	1330.04	1344.78	0.00
	BUILDNG	1ST		151.09493		95010219	360944.80	4749476.30	1349.50	1349.50	0.00
	ROAD	1ST		106.51019		95010305	360885.10	4749620.90	1343.80	1343.80	0.00
24-HR	ALL	1ST	Avg. Conc.	169.818136	ug m**3	95010224	360885.10	4749620.90	1343.80	1343.80	0.00
	PT_TALL	1ST		23.796346		95010224	357744.80	4741276.30	1382.13	1407.00	0.00
	PT_SHORT	1ST		185.954899		95010224	360885.10	4749620.90	1343.80	1343.80	0.00
	COALPILE	1ST		122.27481		95010124	361744.80	4749576.30	1327.80	1344.80	0.00
	BUILDNG	1ST		19.411276		95010224	360744.80	4749576.30	1351.70	1351.70	0.00
	ROAD	1ST		23.84146		95010224	360891.00	4749610.10	1343.97	1343.97	0.00

BREEZE 3DAnalyst 2.2

The screenshot displays the BREEZE 3DAnalyst 2.2 software interface. The top menu bar includes Home, Data, 3D, Map, Cross Section, Contribution, Distribution, Table, and Report. The interface is divided into several panels:

- Home Panel:** Contains a welcome message for BREEZE 3D Analyst 2.2.1, a list of related training courses, and links to get the latest updates and learn more about upcoming training courses.
- Map Panel:** Shows a 2D map view of a terrain model with a purple plume overlay. The map includes a legend for 'Appearance' and a list of data layers such as 'Case3 Terrain Manual', 'Other, all, 1-hr, 1st high, conc', etc.
- Contribution Panel:** Displays a pie chart titled 'Contribution' showing the distribution of different model components. The total contribution is 355745.4744277.1350 at coordinates 355744.8, 47442. The pie chart is color-coded to match the legend in the 3D view.
- 3D Panel:** Shows a 3D perspective view of the terrain model with the purple plume overlay. The 3D view includes a legend, a coordinate system (Easting in meters, Northing in meters), and a color scale for the plume concentration.

BREEZE AERSCREEN Version 1.1





BREEZE[®] Resources

- Diverse suite of BREEZE Software Products
 - AERSCREEN, AERMOD, CALPUFF Pro, Incident Analyst, ROADS, explosion, and more!
- High performance computing
 - BREEZE Remote Modeling Service (BRMS)
- Dedicated team of technical support staff
- Model-ready meteorological and terrain data
- Professional training—fundamental and hands-on
- Custom software development



Thank You

- Additional information can be obtained by:
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