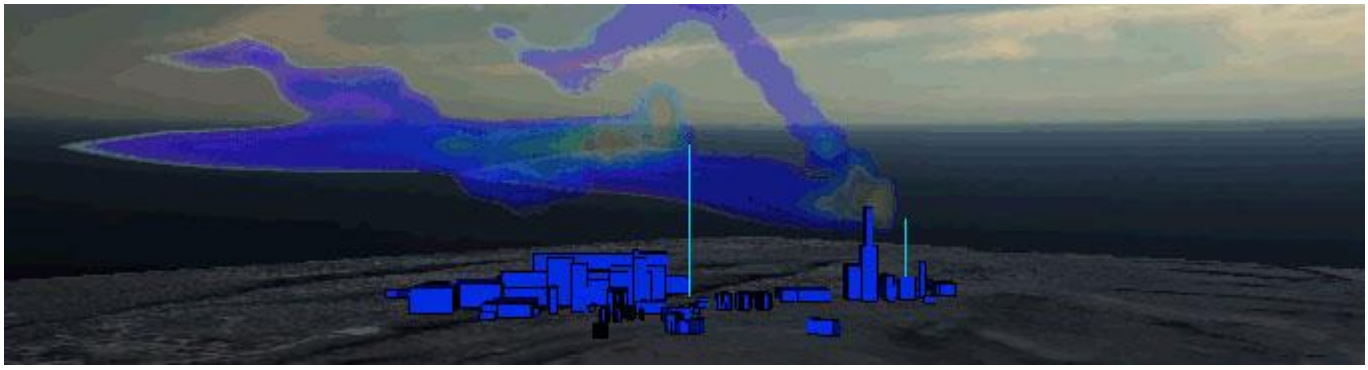
BREEZE CALPRO



CALPUFF is a multi-layer, multi-species non-steady-state puff dispersion model which simulates the effects of time- and space-varying meteorological conditions on pollution transport, transformation, and removal. It includes algorithms for subgrid scale effects and longer range effects. The U.S. EPA recommends its use for regulatory applications on scales of tens to hundreds of kilometers.

BREEZE CALPUFF offers a complete user graphical interface for the U.S. EPA-approved Version 5 and the advanced Version 6 of the CALPUFF modeling system, which includes:

- CALMET - a diagnostic 3-dimensional meteorological model
- CALPUFF - an air quality dispersion model
- CALPOST - a post-processing package
- Pre- and post-processors

BREEZE CALPUFF provides modelers with the tools and functionality required to perform air quality analyses that help to address both permitting, regulatory, and nuisance issues as well as perform academic research.

- Supports the U.S. EPA recently approved CALPOST 6.221
- Streamlines visibility post-processing
- Supports the U.S. EPA-approved Version 5.8 and the advanced Version 6 models
- Integrates with the BREEZE 3DAnalyst
- Models an unlimited number of sources and receptors
- Models numerous source types including point, area, volume, buoyant line, and non-buoyant line
- Models numerous receptor types including discrete Cartesian grid, polar grid, and variable density grid

Features

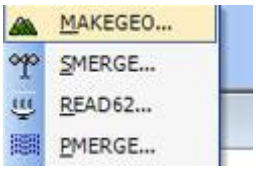
BREEZE CALPUFF improves productivity by offering users many advantages. The careful design of this air dispersion model enables modelers to streamline all aspects from setup to model execution to results analysis. BREEZE CALPUFF saves you time and money by minimizing duplicate data entry and data entry mistakes. BREEZE's professional staff of modelers, meteorologists, scientific software specialists, and PhDs are available to assist you with the science behind the software.

- Supports the U.S. EPA recently approved CALPOST 6.221
- Streamlines visibility post-processing
- Integrates model executables with BREEZE CALPUFF installer
- Streamlines graphical user interface for more intuitive and easier dispersion modeling
- Simplifies the setup of pre-modeling objects with a variety of utilities
- Analyze post-modeling results with multiple tools including BREEZE 3DAnalyst and the processing of sensitive receptors
- Organizes model scenarios using a skeleton and neat file structure for better file management

- Supports the U.S. EPA-approved Version 5.8 and the advanced Version 6 models
- Integrates with the BREEZE 3DAnalyst
- Models an unlimited number of sources and receptors
- Models numerous source types including point, area, volume, buoyant line, and non-buoyant line
- Models numerous receptor types including discrete Cartesian grid, polar grid, and variable density grid
- Models multiple emission scenarios simultaneously
- Models an unlimited number of buildings with integrated BPIP analysis and downwash
- Imports buildings, sources, and receptors from ISC/AERMOD input files
- Draw sources with CAD drawing tools
- Supports 7.5 DEM and 1 minute USGS DEM
- Supports three-dimensional meteorological fields as well as single station meteorology

Product Tour

CALPUFF is an advanced non-steady-state meteorological and air quality modeling system developed by ASG scientists. It is maintained by the model developers and distributed by TRC. The model has been adopted by the U.S. EPA in its *Guideline on Air Quality Models* as the preferred model for assessing long range transport of pollutants and their impacts on Federal Class I areas and on a case-by-case basis for certain near-field applications involving complex meteorological conditions.



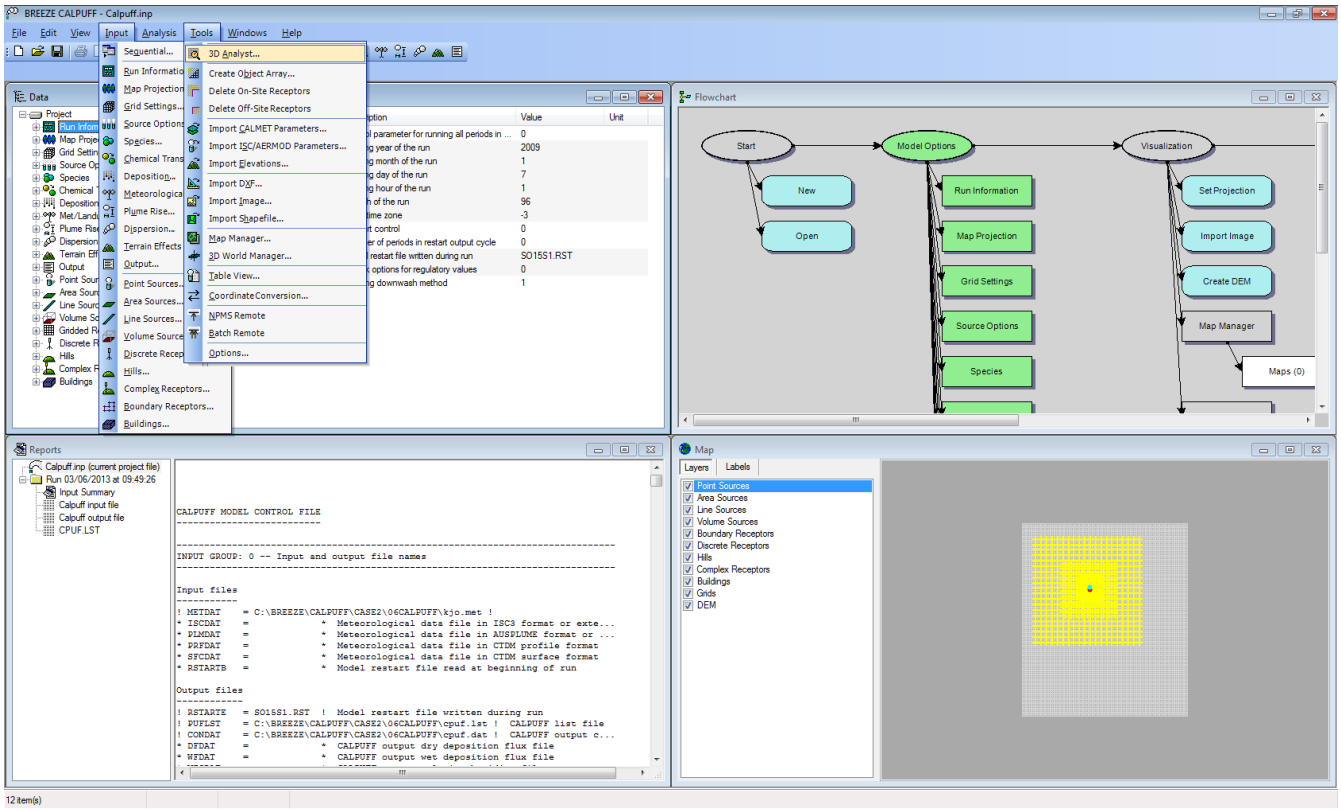
Programs and processors

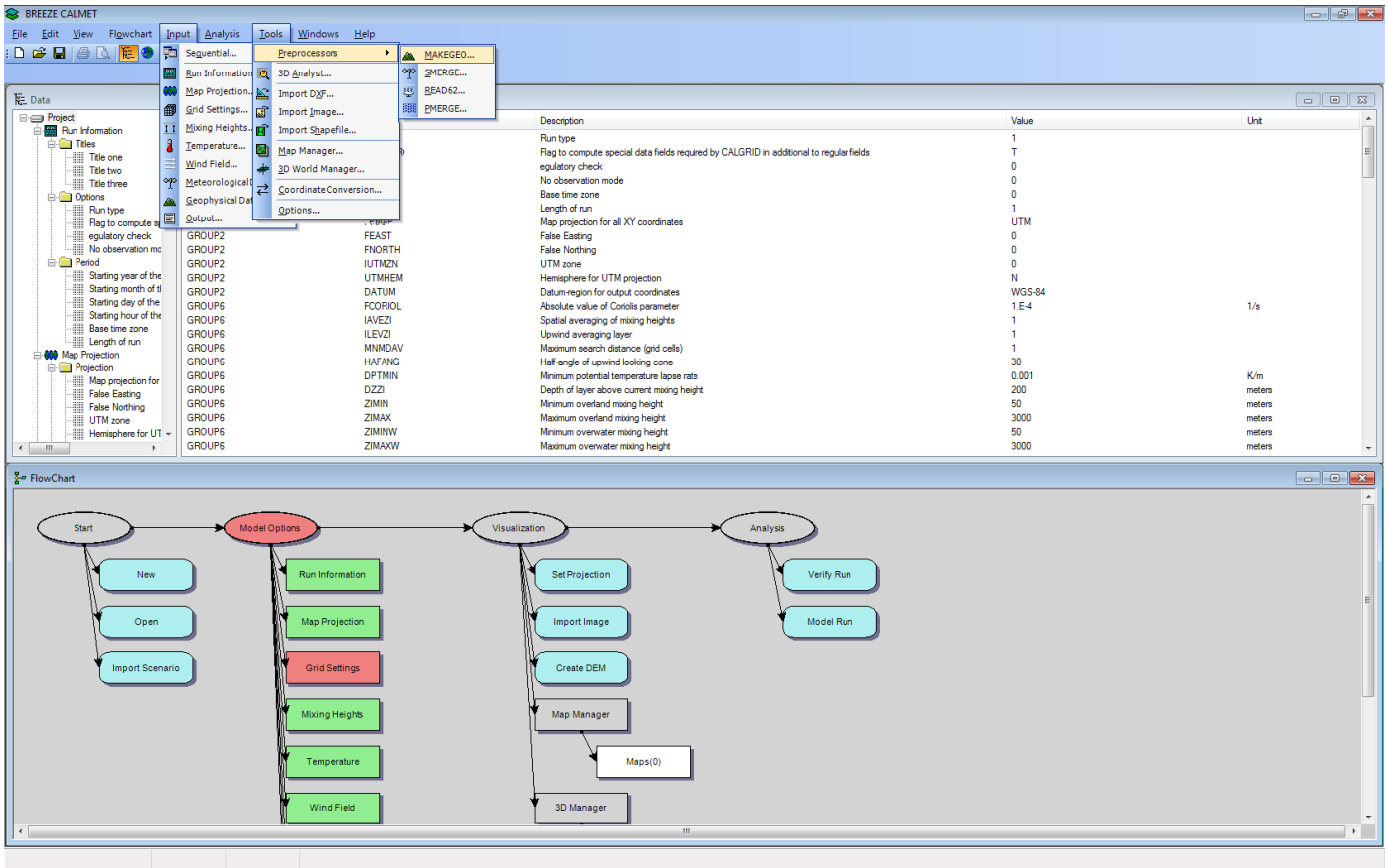
BREEZE CALPUFF enhances the basic EPA-approved programs providing modelers with more functionality and tools for analyzing results. The main components of the BREEZE CALPUFF modeling system are:

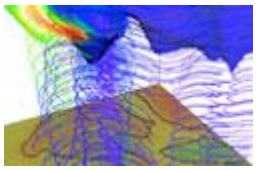
- CALMET – includes a diagnostic 3-dimensional meteorological model (considering slop flows, kinematic terrain effects, terrain blocking effects, and a divergence minimization procedure) and a micro-meteorological model for overland and overwater boundary layers
- CALPUFF – a non-steady-state Lagrangian Gaussian puff model (considering complex terrain effects, overwater transport, coastal interaction effects, building downwash, wet and dry removal, and simple chemical transformation)
- CALPOST – a post-processing package (Computation of time-averaged concentrations, deposition fluxes, and visibility impacts)

Pre- and post-processors of BREEZE CALPUFF include:

- READ62 – a meteorological preprocessor for extracting and processing upper air wind and temperature data
- SMERGE – a meteorological preprocessor for processing hourly surface observations
- PMERGE – a meteorological preprocessor for reformatting the precipitation data
- MAKEGEO – a preprocessor reading land use, terrain data, user inputs and surface parameters and producing a file ready for CALMET
- CALSUM – a postprocessor summing and scaling concentrations or wet/dry fluxes
- APPEND – a postprocessor appending two or more sequential CALPUFF concentration, wet/dry flux, or relative humidity (visibility) files in time
- POSTUTIL – a postprocessor merging species, summing and scaling results from different runs, adding background, and repartitioning nitric acid/nitrate


BREEZE CALPUFF - Calpuff.inp
File Edit View Input Analysis Tools Windows Help
3D Analyst...
Create Object Array...
Delete On-Site Receptors
Delete Off-Site Receptors
Import CALMET Parameters...
Import ISC/AERMOD Parameters...
Import Elevations...
Import DXF...
Import Image...
Import Shapefile...
Map Manager...
3D World Manager...
Table View...
Coordinate Conversion...
NPMS Remote
Batch Remote
Options...
Flowchart
Start
New
Open
Model Options
Run Information
Map Projection
Grid Settings
Source Options
Species
Visualization
Set Projection
Import Image
Create DEM
Map Manager
Maps (0)
Reports
Calpuff.inp (current project file)
Run 03/06/2013 at 09:49:26
Input Summary
Calpuff input file
Calpuff output file
CPUF.LST
CALPUFF MODEL CONTROL FILE
INPUT GROUP: 0 -- Input and output file names
Input files
Output files
Map
Layers
Labels
Point Sources
Area Sources
Line Sources
Volume Sources
Boundary Receptors
Discrete Receptors
Hills
Complex Receptors
Buildings
Grids
DEM
12 item(s)


BREEZE CALMET
File Edit View Flowchart Input Analysis Tools Windows Help
Preprocessors
MAKEGEO...
SMERGE...
READ62...
PMERGE...
3D Analyst...
Import DXF...
Import Image...
Import Shapefile...
Map Manager...
3D World Manager...
Coordinate Conversion...
Options...
Description
Value
Unit
FlowChart
Start
New
Open
Import Scenario
Model Options
Run Information
Map Projection
Grid Settings
Mixing Heights
Temperature
Wind Field
Visualization
Set Projection
Import Image
Create DEM
Map Manager
Maps(0)
3D Manager
Analysis
Verify Run
Model Run

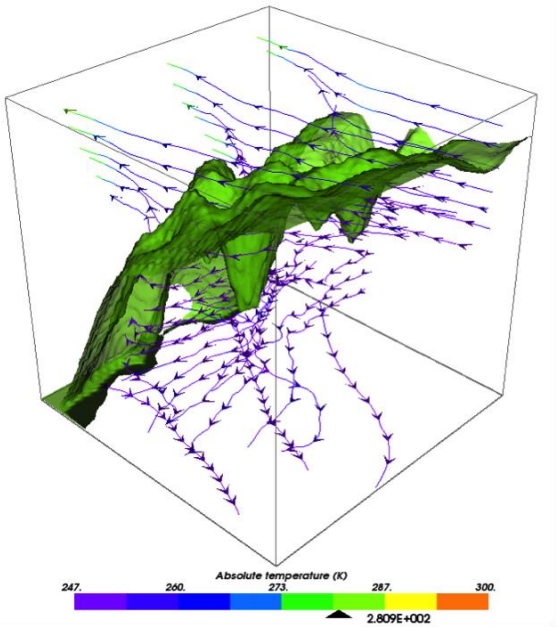


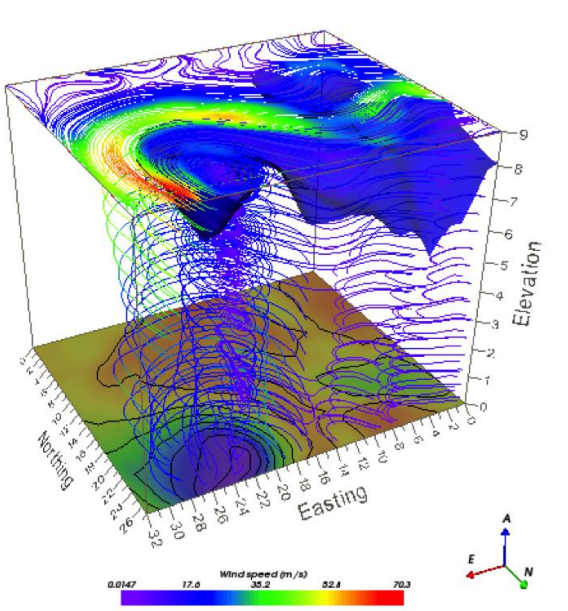
Integration with Breeze 3D Analyst

BREEZE 3D Analyst is a powerful post-processor that enables you to analyze and visualize data in time series, contour plots, and 3D isosurface and plane views; and to visualize the intersection / union of multiple data sets. It is useful for analyzing meteorological, terrain, and concentration data. Animated movies can be created for display in presentations and it is compatible with Golden Software's Surfer application and Google Earth.

The plotting and graphing features in 3D Analyst allow you to create great-looking plots of modeling results and raw datasets so that you can quickly analyze the data in both two and three dimensions. With BREEZE 3D Analyst, you can:

- Create custom contour levels for an entire project or individual datasets
- Customize all object properties to display only the results and objects you want to see
- View data from every angle with 2D plane views, 3D surfaces, and slices of 3D data in the XY, XZ, and YZ planes
- Plot data as a function of time and animate the time steps
- Use your mouse to view real-time data interpolation between receptors
- Plot data to Golden Software's Surfer application and Google Earth
- Create 3D templates that can be loaded with future projects to quickly recreate three dimensional display views





Not only can you display data, BREEZE 3D Analyst allows users to perform data manipulation simultaneously. Temporarily transform data with easy-to-use scaling and transformation tools to analyze how your results could change. You can also use the numerous tools to extract averages, percentiles, highs, and more all from a single dataset.

Buildings

CALPUFF takes into account the obstruction of wind flow from structures, such as buildings and point s ources (i.e., stacks). Like any other model object in BREEZE CALPUFF, buildings can be copied and pasted or drawn into the 2 D display. Building information can be processed by the embedded U.S. EPA BPIP EPA BPIP program.

BREEZE CALPUFF offers you the ability to create rectangular, circular, and polygon buildings. A simple building mode is an exclusive feature of BREEZE that eliminates the error prone requirement of assigning "tier levels" to each and every structure.

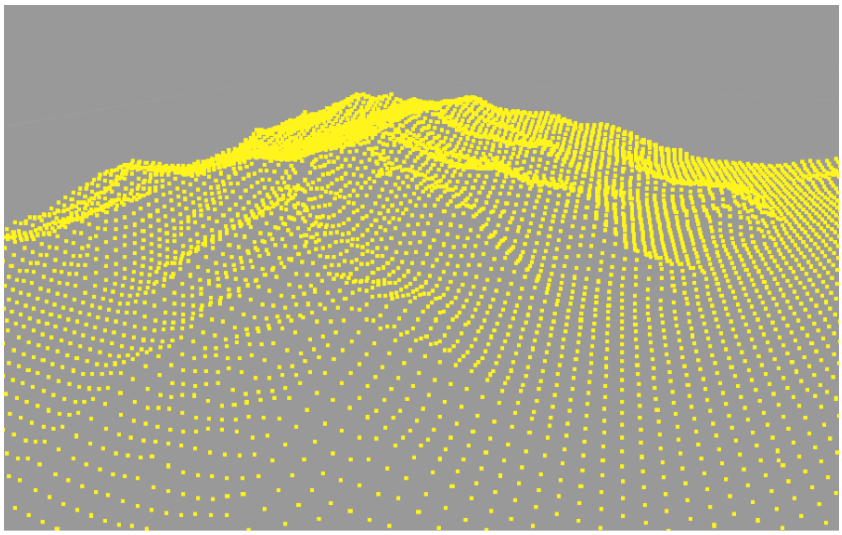
Sources

BREEZE CALPUFF allows you to model point, area, volume, and line sources. At least one source must be defined. BREEZE offers object array generators that create user defined arrays (e.g., polylines, polygons, and Cartesian grids) of the model object type.

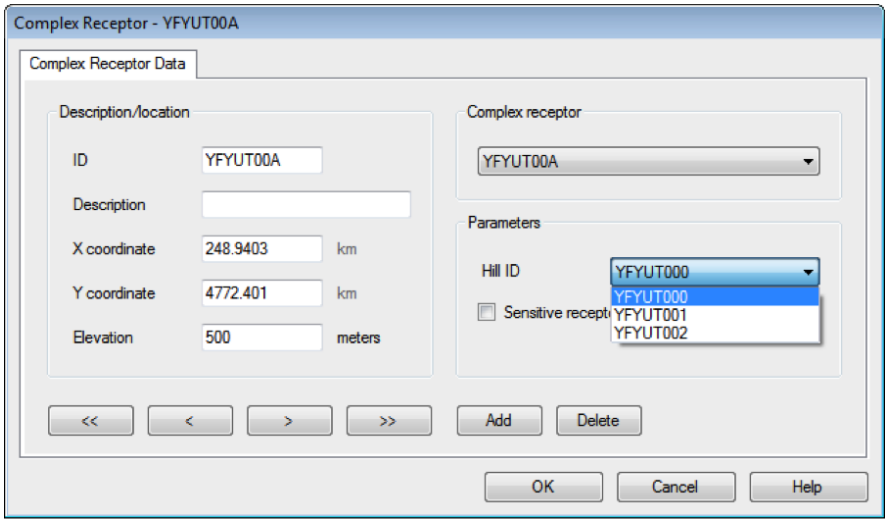
BREEZE CALPUFF source option allows you to specify entry units for point, line, area, and volume sources, line source parameters (e.g. buoyancy parameter), external emissions and boundary source files.

Receptors

Receptors are locations where BREEZE CALPUFF will compute a concentration or deposition value. At least one receptor must be defined. BREEZE CALPUFF offers you the ability to create discrete, gridded, and polygon arrays. BREEZE also has the exclusive ability to generate variable density and 3D gridded networks.



BREEZE CALPUFF allows you to set the physical characteristics of hills including the location, size, and height, as well as further associate complex receptors with hills.



Scenario Development Tools

BREEZE CALPUFF provides a variety of utilities to facilitate model setup or the analysis of results.

- Embedded Surfer (need to be pre-installed) link in BREEZE MAKEGEO
- Coordinate Converter to convert one coordinate to another
- A tool to blank on-site or off-site receptors
- Data Explorer to provide means of viewing project data in a Windows Explorer-like fashion. It is also referred to as Spreadsheet or Table view because model object data can be viewed, added, removed, and edited from within this view much like today's standard spreadsheet applications
- Map window to import DXF file, shape file, or base map image and to visualize model objects
- 3D window to view buildings and terrain
- Access to BREEZE support and get help from AERMOD experts

Requirements

Hardware

- Intel or AMD processor, 32 or 64 bit. 500-megahertz (Mhz) or higher
- 256 megabytes (MB) RAM, 512 MB RAM recommended
- 2 gigabyte (GB) available disk space
- 1024 x 768 minimum display resolution
- Mouse or other pointing device

Software

- Windows XP, Windows Vista, Windows 7, Windows 8, Windows Server 2003, Windows Server 2008 or Windows Server 2012
- Microsoft .NET Framework 2.0 or later

Additional requirements

- CALPUFF-ready model data

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