Works 2013

Screen model

Version 7.0.0

USER GUIDE

TECHNO logismiki
Advanced Technical Software

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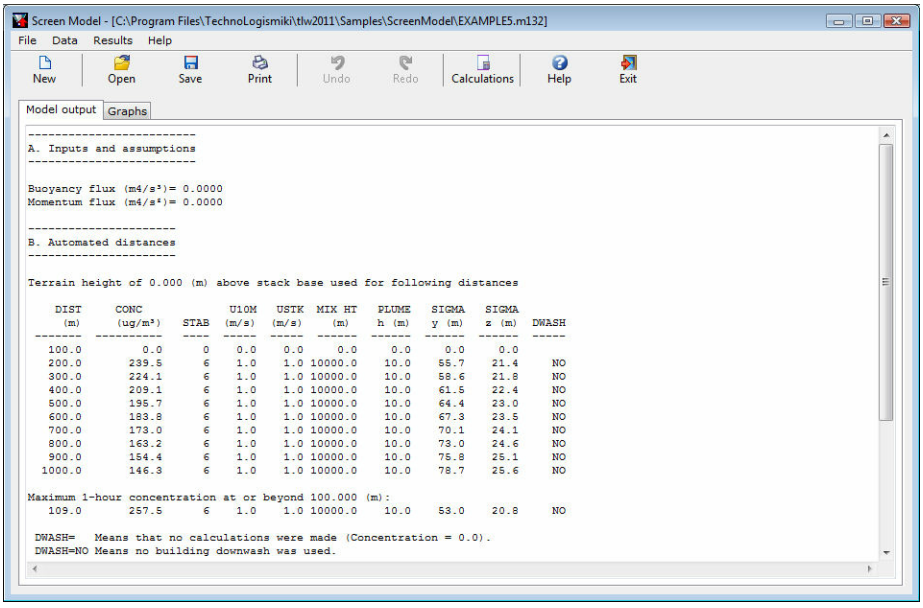
1 About the program

1.1 What does the program do?

This program is based on the well-known EPA Screen3 model. The SCREEN3 model was developed to provide an easy-to-use method of obtaining pollutant concentration estimates based on the screening procedures document. The program can perform all of the single source, short-term calculations in the screening procedures document, including estimating maximum ground-level concentrations and the distance to the maximum (Step 4 of Section 4.2, SPD), incorporating the effects of building downwash on the maximum concentrations for both the near wake and far wake regions (Section 4.5.1), estimating concentrations in the cavity recirculation zone (Section 4.5.1), estimating concentrations due to inversion break-up and shoreline fumigation (Section 4.5.3), and determining plume rise for flare releases (Step 1 of Section 4.2).

The model can incorporate the effects of simple elevated terrain on maximum concentrations (Section 4.2), and can also estimate 24-hour average concentrations due to plume impaction in complex terrain using the VALLEY model 24-hour screening procedure (Section 4.5.2). Simple area sources can be modeled with the program using a numerical integration approach. The model can also be used to model the effects of simple volume sources using a virtual point source procedure. The area and volume source algorithms are described in Volume II of the ISC model user's guide (EPA, 1995b). The model can also calculate the maximum concentration at any number of user-specified distances in flat or elevated simple terrain (Section 4.3), including distances out to 100km for long-range transport (Section 4.5.6).



1.2 Minimum requirements

The minimum requirements for the usage of the programs are the following:

- Windows 2000/ XP/ 2003/ Vista/ 7 (for each case, the latest service packs, updates & patches must be installed)

- Pentium III 800 MHz
- 800x600 with 256 color palette
- 700 MB free disk space
- CD-Rom

If your system does not meet one or more of the above requirements, it is highly recommended that you upgrade it before installing the programs. The recommended system configuration is the following:

- Windows 2000/ XP/ 2003/ Vista/ 7 (for each case, the latest service packs, updates & patches must be installed)
- Pentium IV 2.0 GHz
- 1280x768 with 16-bit color palette
- 1.2 GB free disk space
- CD-Rom
- Internet connection

1.3 Technical support

Support through the Internet

TechnoLogismiki offers technical support 24 hours per day, 365 days per year, through the web site where you can get information on the latest programs and services.

Support by e-mail

Please use the dedicated e-mail addresses for better customer service:

- for questions regarding sales: sales@technologismiki.com
- for questions regarding the usage of programs: support@technologismiki.com
- for any other question or comment: info@technologismiki.com

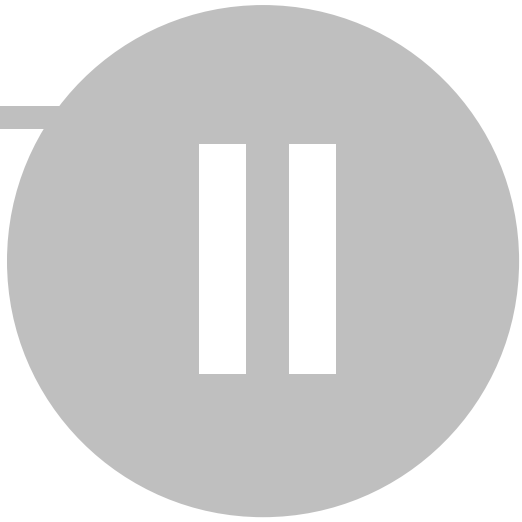
The normal response time is within two business days. If your inquiry cannot be answered by e-mail, a customer service representative will contact you by telephone.

Interactive Support

Business days, 09:00 - 17:00 Eastern European Time:

- Telephone [3 lines]: ++30-210-656-4147
- Fax: ++30-210-654-8461
- Address: 5, Imittou street, Cholargos, 15561, Athens, Greece.

Chapter



2 File

2.1 File menu

With this menu, you can perform file operations and print reports. In the **File** menu you can select one of the following options:

- New project
- Open project
- Save project
- Save project as
- Import Screen3 Source File
- Print setup
- Print
- Print to
  - Print to file
  - Print to Word
  - Print to Word (Formatted)
  - Print to Excel
- Exit

2.2 New project

With this option, a new project is started. All data, results, graphs, titles etc. of the previous project are erased.

To create a new project:

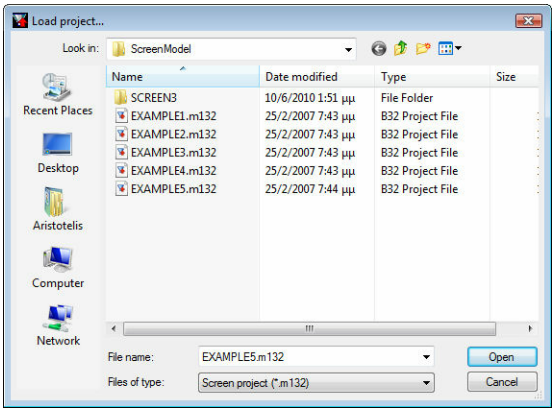
1. Select **New project** from the **File** menu.
2. If a project is already loaded and changes have been made, a warning message will appear that asks the user whether to save the changes or not.
3. The current project is erased and a new project is started.

2.3 Open project

With this option, an existing project is loaded. The project may be located locally, in a network or in an external media device such as a CD-Rom. If a project is already loaded and changes have been made, a warning message will appear that asks whether to save the changes or not. When a project is loaded, all data of the previous project are lost.

To open an existing project:

1. Select **Open project** from the **File** menu.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Screen project" with the extension .m32.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



NOTE: You can find sample projects in the installation folder of the program:
C:\Program Files\TechnoLogismiki\TLW2013\Samples\ScreenModel

Supported file types

- **M32** (Screen project): Files created by Screen Model version 2012 and 2013.
- **M132** (Screen project): Files created by Screen Model version 2011, 2010, 2009, 2008 or 2007.
- **BCK** (Backup files): If you have selected from program options the creation of backup copy when a file is loaded, then the file can be loaded by selecting Backup files (*.bck) from the Files of type drop-down list.
- ***.*** (All files): Displays all files in the current folder.

NOTE: If a message "Could not load project. File may be corrupt or saved by an unknown or incompatible version of the program" then either you are trying to load a project that does not belong to this program or the file is used (and locked) by another process in your computer.

2.4 Save project

With this option, you can save all data of a project into a file. The file may be saved locally, in a network location or in an external media device such as a disk.

The filename and path will be asked only the first time you are saving a project. When the filename and path are set, all subsequent saves will be made to the same file.

When you want to rename a file or save it in a new location, use Save project as... from the **File** menu.

To save the current project:

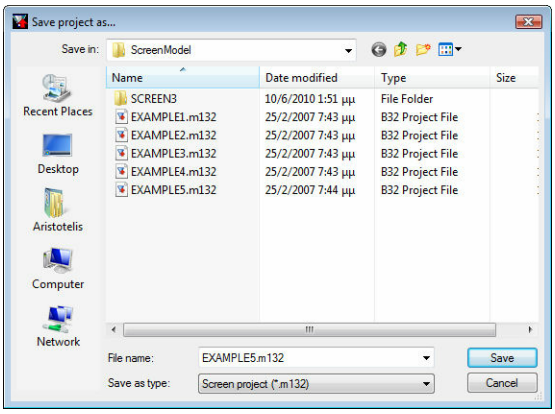
1. Select **Save project** from the **File** menu.
2. If the location of the file is already set, the project is saved to this file without any messages. If the filename is not set, a dialog box will appear that allows the selection of the filename and path.

2.5 Save project as

With this option, the current project is saved just as in the case of Save project, but with the difference that the name and/or location of the file can be changed. In this way, you can create backup files or move a project to another media device.

To save a project with another name and/or to another location:

1. Select **Save project as** from the **File** menu.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the project with the selected filename and path. Select **Cancel** to cancel the operation.



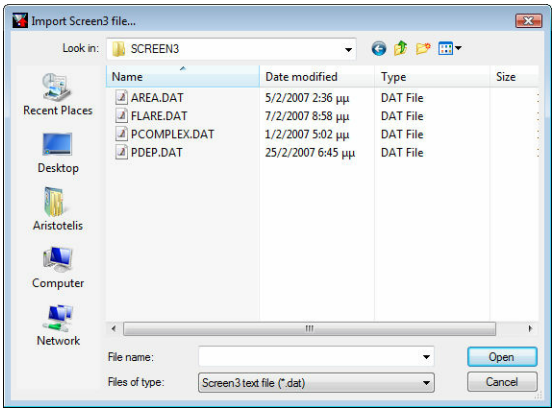
NOTE: If a file with the same name and in the same path already exists, a warning message will appear that asks whether to overwrite the file or not. If you answer Yes, then the existing file is erased and the new file takes its place. If you answer No, the existing file remains intact but NO changes of the current project are saved.

2.6 Import Screen3 source file

With this option, an existing EPA Screen3 source file is loaded and converted to Screen Model Project. The file may be located locally, in a network or in an external media device such as a CD-Rom. If a project is already loaded and changes have been made, a warning message will appear that asks whether to save the changes or not. When a project is loaded, all data of the previous project are lost.

To import an existing Screen3 file:

1. Select **Import Screen3 Source File** from the **File** menu.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Screen3 text file" with the extension .dat.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



NOTE: You can find sample Screen3 files in the installation folder of the program: C:\Program Files\TechnoLogismiki\TLW2007\Samples\ScreenModel\SCREEN3

Supported file types

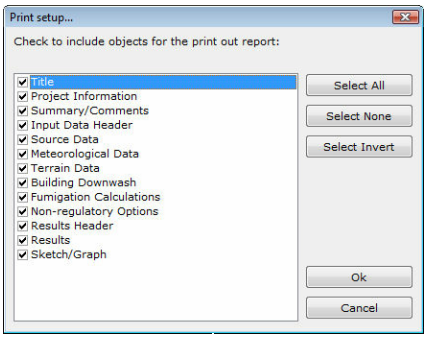
- **dat** (Screen3 text file): Files created for the EPA Screen3 Model.
- ***.*** (All files): Displays all files in the current folder.

2.7 Print setup

With this option, you can select which parts of the project will be included in the printouts. When a new project is created, a full report is selected by default.

To modify the print setup:

1. Select **Print setup** from the **File** menu.
2. Select the **sections** (Title, Project information etc) that will be printed for each solution, from the list on the left.
3. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



The quick keys (**Select all, Select None, Select Invert**) can be used to quickly select all objects, deselect all objects and invert the current selection of a list.

NOTE: The changes are saved with the project. The above preferences are used to all printouts, either to the printer or to other formats such as Word file, Excel file etc.

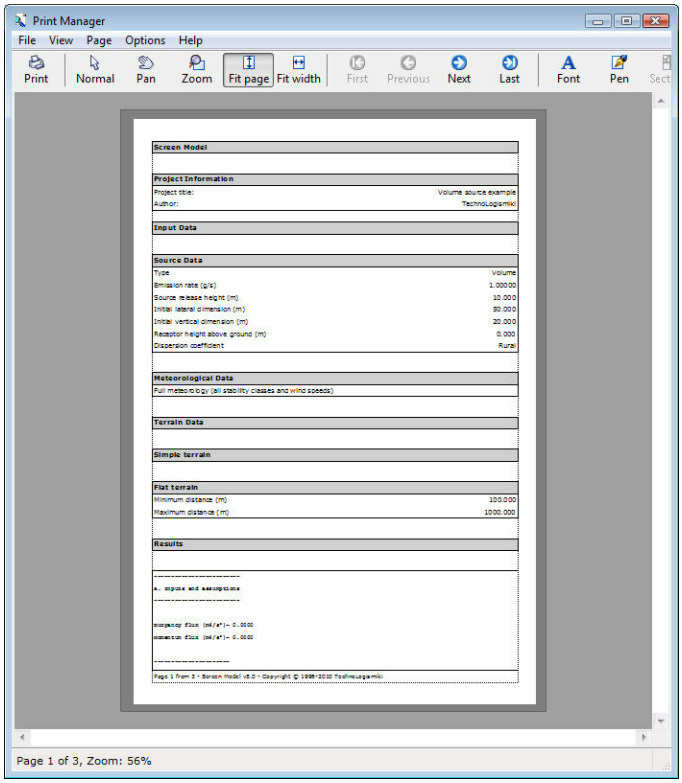
2.8 Print

With this option, you can prepare a report to be printed to a local, network or virtual printer such as Adobe PDF Writer. The parts of the project that will be included in the report are determined from print setup.

By selecting **Print**, the report is not printed directly; instead, a document is prepared and a preview of the printout is created by the **Print manager.** You can print the report by clicking the **Print** button of the toolbar of **Print manager.**

To create a report:

1. Select **Print** from the **File** menu.
2. A report is prepared and sent to **Print manager.** A preview of the document appears.
3. You can print the report by clicking the **Print** button of the toolbar.



NOTE: A complete user manual on the capabilities of **Print manager** can be found in the corresponding help file.

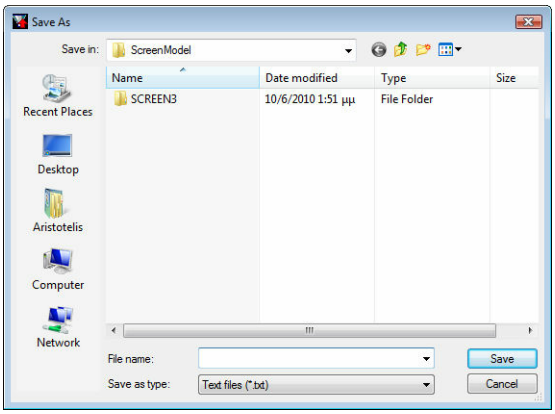
2.9 Print to

2.9.1 Print to File

With this option, you can create a simple text file containing a report of the project. This file is recognized and can be further modified by word processors such as Microsoft Word, OpenOffice Writer etc.

To print to a text file:

1. Select **Print to** from the **File** menu.
2. Select **Print to file** from the **Print to** menu.
3. Select the path of the file.
4. Type the filename in the **File name** text box.
5. Select **Save** to create the file.



The parts of the project that will be included in the report are determined from print setup.

NOTE: If a file with the same name and in the same path already exists, a warning message will appear that asks whether to overwrite the file or not. If you answer Yes, then the existing file is erased and the new file takes its place. If you answer No, the existing file remains intact but the report is NOT printed.

2.9.2 Print to Word

If Microsoft Word (version 97, 2000, XP, 2003 or later) has been installed in the system, then a Microsoft Word file containing the report can be created. Note that Microsoft Word is a separate program and it is not included in TechnoLogismiki's products. Moreover, no technical support is offered regarding the usage of Microsoft Word.

To print the report to a Microsoft Word file:

1. Select **Print to** from the **File** menu.
2. Select **Print to Word** from the **Print to** menu.

The parts of the project that will be included in the report are determined from print setup.

2.9.3 Print to Word (Formatted)

If Microsoft Word (version 97, 2000, XP, 2003 or later) has been installed in the system, then a Microsoft Word file containing the report can be created. Note that Microsoft Word is a separate program and it is not included in TechnoLogismiki's products. Moreover, no technical support is offered regarding the usage of Microsoft Word.

To print the report to a formatted Microsoft Word file:

1. Select **Print to** from the **File** menu.
2. Select **Print to Word (Formatted)** from the **Print to** menu.

The parts of the project that will be included in the report are determined from print setup. This operation is much slower than the regular print to word function. However, the final output requires minimal user intervention as it comes fully formatted with tables, alignment, font styles, etc.

NOTE: Do not use Copy (CTRL+C) on any of the programs running during this operation. If you do so, it will most likely affect the communication between Microsoft Word and the clipboard and as a result the final document will be corrupt.

2.9.4 Print to Excel

If Microsoft Excel (version 97, 2000, XP, 2003 or later) has been installed in the system, then a Microsoft Excel file containing the report can be created. Note that Microsoft Excel is a separate program and it is not included in TechnoLogismiki's products. Moreover, no technical support is offered regarding the usage of Microsoft Excel.

To print the report to a Microsoft Excel file:

1. Select **Print to** from the **File** menu.
2. Select **Print to Excel** from the **Print to** menu.

The parts of the project that will be included in the report are determined from print setup.

2.10 Exit

With this option, you can exit the program. If there are changes in the current project that have not been saved then the program will:

- either ask the user to save the changes
- or save the changes
- or ignore the changes

depending on what you have selected in General preferences.

To exit the program:

1. Select **Exit** from **File** menu.
2. If you are asked whether to save the changes or not, you can save changes or ignore them.
3. The program is terminated.

Chapter

3 Data

3.1 Data menu

With this menu, you can add and modify data. In the **Data** menu you can select one of the following options:

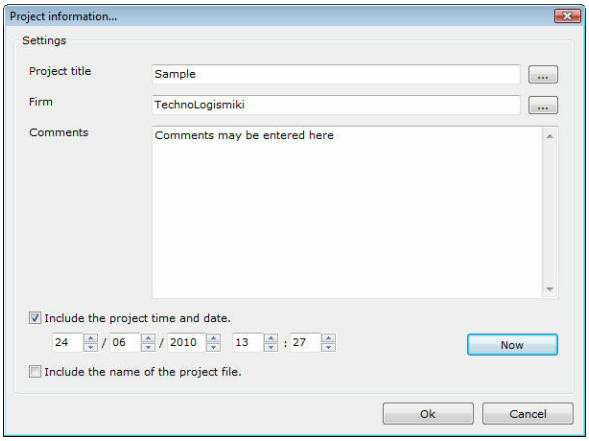
- Project info
- Undo
- Redo
- Source type
- Meteorological data
- Terrain data
  - Terrain data
  - Complex terrain
  - Simple flat or elevated terrain
  - Automated distances
  - Discrete distances
- Building downwash
- Fumigation calculations
- Non-regulatory options
- Options
  - General preferences
  - Grid editing
  - Customize toolbar

3.2 Project info

With this option, you can add project information that include, optionally, title, author and comments. If you want, this information can be included in the reports. The empty fields are ignored.

To add or modify the project information:

1. Select **Project info** from the **Data** menu.
2. Type the project title, author and comments.
3. Check **Include project time and date** if you want to include the time and date in the project.
3.1. Type the day, month, year, hours and minutes in the corresponding text boxes. Alternatively, you may click on the up/down arrows to increase or decrease the respective value in the text box.
3.2. If you click on **Now** then all text boxes are filled with the current values automatically.
4. Check **Include the name of the project file** if you want the full path and filename of the project to be included in the report.
5. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



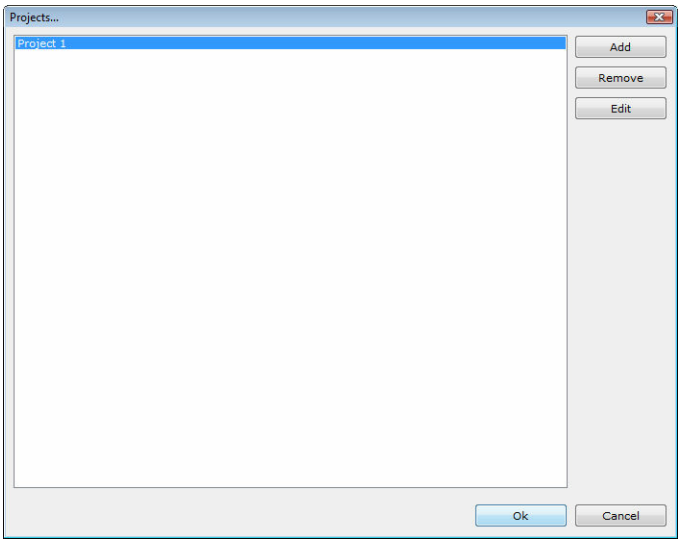
By selecting the buttons with the ellipses (...) next to the project title and author, you can access the corresponding databases.

Project title database

For the completion of a project, more than one programs may be needed. For convenience, you can add the project title to the database and retrieve it from all programs.

To use the project title database:

1. Select the button with the ellipses (...) next to the project title text box. The project title database appears.
2. Select **Add** to add a new title to the database.
3. Select **Remove** to remove the selected entry from the database. You will be asked for confirmation only if you have selected to confirm deletions in the General preferences tab.
4. Select **Edit** to modify the selected entry.
5. Select **Ok** to use the currently selected project title and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.

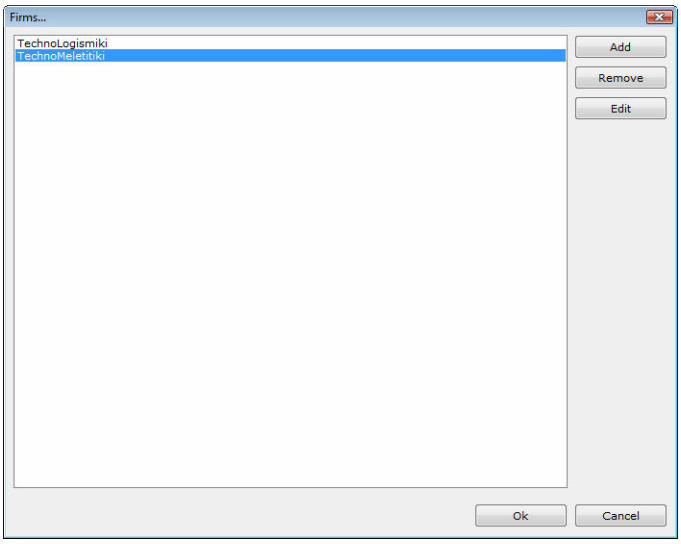


Author database

An engineer may be involved in multiple projects. For convenience, you can add the author name to the database and retrieve it from all programs.

To use the author database:

1. Select the button with the ellipses (...) next to the author text box. The author database appears.
2. Select **Add** to add a new author to the database.
3. Select **Remove** to remove the selected entry from the database. You will be asked for confirmation only if you have selected to confirm deletions in the General preferences tab.
4. Select **Edit** to modify the selected entry.
5. Select **Ok** to use the currently selected author and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



3.3 Undo

Undo cancels the last committed change in the project.

To cancel the last committed change:

1. Select **Undo** from the **Data** menu.
2. The last committed change is canceled.

To cancel an undo command, you may use the redo function which is described below. Redo becomes available once undo is used.

It is possible to undo more than one recent changes and to redo them, by following the step described above. The number of actions that are kept in memory and may be undone or redone is 20 by default. This means that the program is able to keep track of up to 20 successive changes and undo them. This number may change for all programs, using the option in the main menu. For more information, please consult main menu user guide.

NOTE: Some changes cannot be undone like the new project or the save project

functions.

3.4 Redo

Redo cancels the latest undo command.

To redo the latest change that was undone:

1. Select **Redo** from the **Data** menu.
2. The latest undone change is redone.

To undo a redo, you may use the undo command.

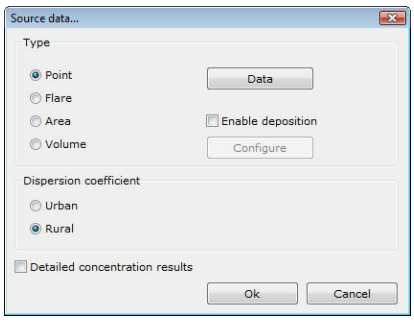
It is possible to redo more than one changes that were previously undone by following the steps described above. The number of actions that are kept in memory and may be undone or redone is 20 by default. This means that the program is able to keep track of up to 20 successive changes that are undone and redo them. This number may change for all programs, using the option in the main menu. For more information, please consult main menu user guide.

3.5 Source type

From the source type menu, the user can control the major characteristics of the pollutant source.

To edit the source type data:

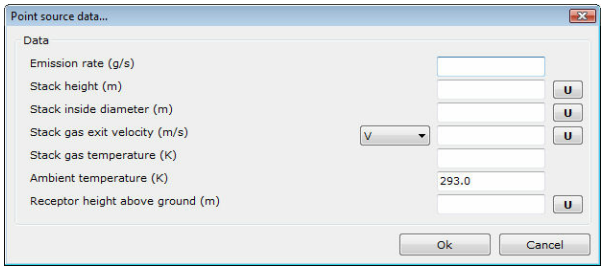
1. From the **Data** menu, select **Source Type**.
2. Select the **type** of the source by clicking on the corresponding option button (point, flare, area or volume).
3. Click **Data** to enter the data necessary for the complete description of the source type. The type and amount of data required depend on the source type selected.
4. If you wish to account for deposition, select the **Enable deposition** option and click on **Configure** to enter deposition data.
5. Select the **dispersion coefficient**, urban or rural.
6. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



Data Required for Point Sources

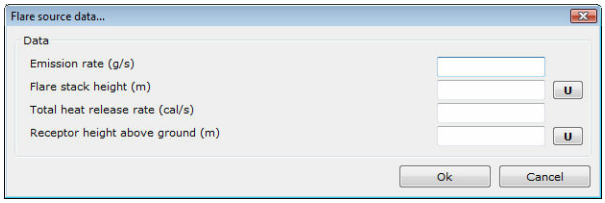
1. Enter the **emission rate** in g/s.
2. Enter the **stack height** in m.

3. Enter the **stack inside diameter** in m.
4. Select from the drop down list whether you want to enter the **stack gas exit velocity** in m/s or the **flow rate** (ft^3/min or m^3/s). You need to enter only one of three options.
5. Enter the **stack gas temperature** in Kelvin.
6. Enter the **ambient temperature** in Kelvin.
7. Enter the **receptor height above ground** in m.
8. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



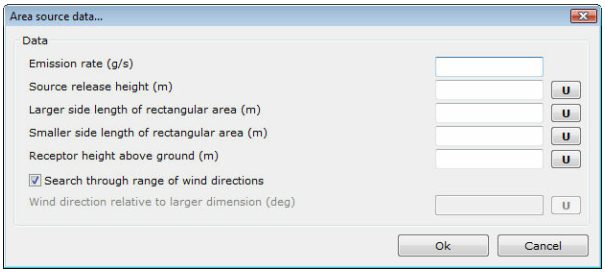
Data Required for Flare Sources

1. Enter the **emission rate** in g/s.
2. Enter the **flare stack height** in m.
3. Enter the **total heat release rate** in cal/s.
4. Enter the **receptor height above ground** in m.
5. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



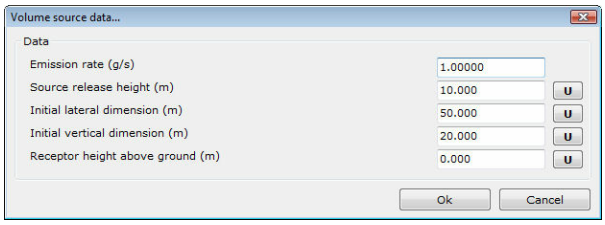
Data Required for Area Sources

1. Enter the **emission rate** in g/s.
2. Enter the **source release height** in m.
3. Enter the **larger side length of rectangular area** in m.
4. Enter the **smaller side length of rectangular area** in m.
5. Enter the **receptor height above ground** in m.
6. If you wish to search **through a range of wind directions** instead of entering a specific directions, check the option.
7. If you did not select the range in step 6, enter the specific **wind direction** in degrees.
8. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



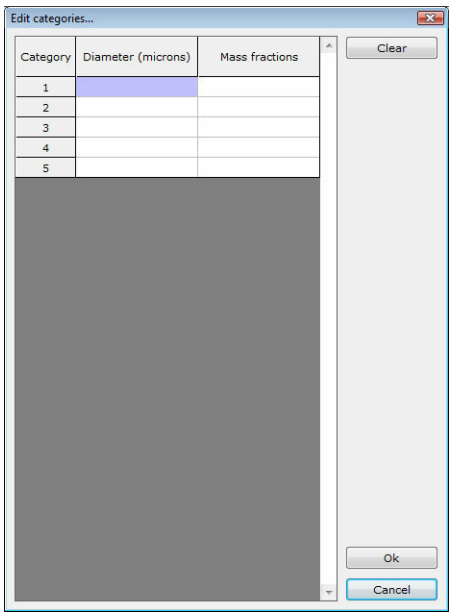
Data Required for Volume Sources

1. Enter the **emission rate** in g/s.
2. Enter the **source release height** in m.
3. Enter the **initial lateral dimension** in m.
4. Enter the **initial vertical dimension** in m.
5. Enter the **receptor height above ground** in m.
6. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.

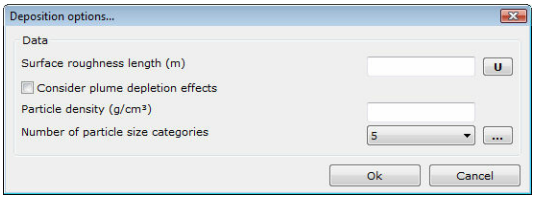


Data Required for Deposition

1. Enter the **surface roughness length** in m.
2. Check the **Consider plume depletion effects** if you wish to account for plume depletion.
3. Enter the **particle density** in g/cm^3.
4. Select the **number of particle size categories** from the drop down list. Particle size categories may vary from 1 to 20.
5. Click the button with the ellipses (...) to enter mass fractions and diameters in microns for each category.
5.1. Enter the diameter in microns for each one of the categories.
5.2. Enter the mass fractions (0 to 1) for each one of the categories. The sum of all mass fractions must add up to 1.0.
5.3. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



6. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



3.6 Meteorological data

For simple elevated or flat terrain screening, the user is given the option of selecting from three choices of meteorology:

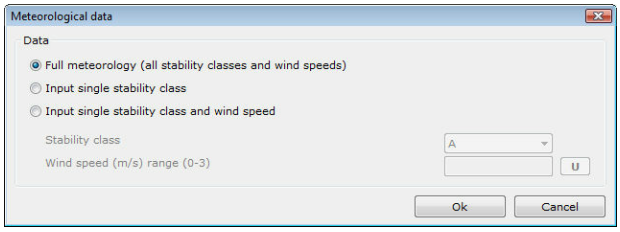
- full meteorology (all stability classes and wind speeds)
- specifying a single stability class; or
- specifying a single stability class and wind speed.

Generally, the full meteorology option should be selected. The other two options may only be useful when particular meteorological conditions are of concern. Refer to Section 3 for more details on the determination of worst case meteorological conditions by the model.

To edit the meteorological data:

1. From the **Data** menu, select **Meteorological Data.**
2. Select **full meteorology** if you need the program to examine all stability classes (A to F) for all wind directions. This is the most common option. Select **Input single stability class** if you need to examine only a particular stability class for all wind directions. In this case you have to select a stability class from the drop-down list.

Select **Input single stability class and wind speed** if you need to enter a specific stability class and a wind speed. The wind speed varies depending on the selected stability class.
3. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



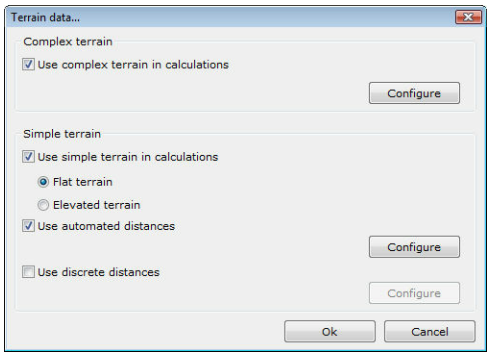
3.7 Terrain data

3.7.1 Terrain data

With this option, the user can enter terrain data for the project.

To manage the terrain data:

1. Select **Terrain Data** from the **Data** menu.
2. Check the appropriate options and click on configure to edit the relevant data.
3. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



3.7.2 Complex terrain

The complex terrain option of the program allows the user to estimate impacts for cases where terrain elevations exceed stack height. If the user elects this option, then model will calculate and print out a final stable plume height and distance to final rise for the VALLEY model 24-hour screening technique. This technique assumes stability class F (E for urban) and a stack height wind speed of 2.5 m/s. For complex terrain, maximum impacts are expected to occur for plume impaction on the elevated terrain under stable conditions.

The user is therefore instructed to enter minimum distances and terrain heights for which impaction is likely, given the plume height calculated, and taking into account complex terrain closer than the distance to final rise. If the plume is at or below the

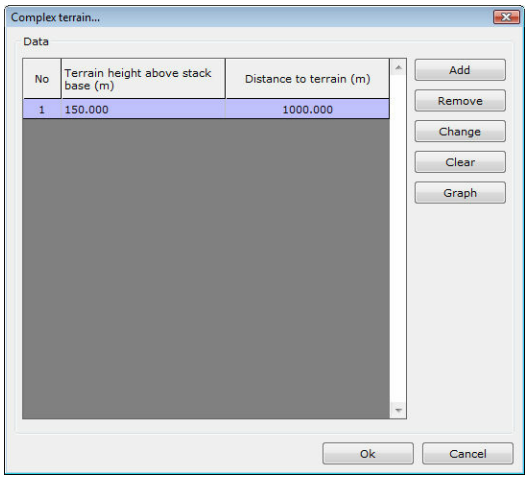
terrain height for the distance entered, then the program will make a 24-hour concentration estimate using the VALLEY screening technique. If the terrain is above stack height but below plume centerline height for the distance entered, then the program will make a VALLEY 24-hour estimate (assuming E or F and 2.5 m/s), and also estimate the maximum concentration across a full range of meteorological conditions using simple terrain procedures with terrain "chopped off" at physical stack height.

The higher of the two estimates is selected as controlling for that distance and terrain height (both estimates are printed out for comparison). The simple terrain estimate is adjusted to represent a 24-hour average by multiplying by a factor of 0.4, while the VALLEY 24-hour estimate incorporates the 0.25 factor used in the VALLEY model. Calculations continue for each terrain height/distance combination entered until a terrain height of zero is entered. The user will then have the option to continue with simple terrain calculations or to exit the program.

It should be noted that the program will not consider building downwash effects in either the VALLEY or the simple terrain component of the complex terrain screening procedure, even if the building downwash option is selected. The program also uses a receptor height above ground of 0.0m (i.e. no flagpole receptors) in the complex terrain option even if a non-zero value is entered. The original receptor height is saved for later calculations.

To use complex terrain:

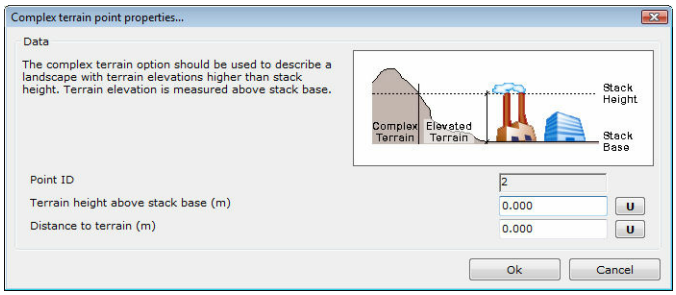
1. Check the **use complex terrain** in calculations option.
2. Click on **configure** to open the complex terrain editor.
3. Click **Add**, **Remove** or **Change** to manage the data in the editor.
4. Click **Clear** to remove all data instantaneously. The program will ask for confirmation only if the confirmation option in general preferences is active.
5. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



To add a point in the complex terrain editor:

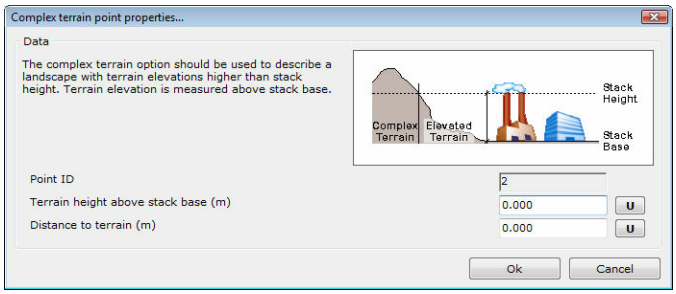
1. Click on **Add**.

2. Enter the **terrain height above stack base** in m.
3. Enter the **distance to terrain** in m.
4. Select **Ok** to add the point in the complex terrain editor or cancel to **Close** the dialog box without applying any changes.



To edit a point in the complex terrain editor:

1. Select the point that will be changed.
2. Click on **Change**.
3. Enter the **terrain height above stack base** in m.
4. Enter the **distance to terrain** in m.
5. Select **Ok** to change the point in the complex terrain editor or cancel to **Close** the dialog box without applying any changes.



To remove a point from the complex terrain editor:

1. Select the point that will be removed.
2. Click on **Remove**. The program will ask for confirmation only if the confirmation option in general preferences is active.
3. The point is removed.

3.7.3 Simple flat or elevated terrain

The user is given the option of modeling either simple elevated terrain, where terrain heights exceed stack base but are below stack height, or simple flat terrain, where terrain heights are assumed not to exceed stack base elevation. If the user elects not to use the option for simple terrain screening with terrain above stack base, then flat terrain is assumed and the terrain height is assigned a value of zero. If the simple elevated terrain option is used, the model will expect the user to enter a terrain height above stack base. If terrain heights above physical stack height are entered by the

user for this option, they are chopped off at the physical stack height.

The simple elevated terrain screening procedure assumes that the plume elevation above sea level is not affected by the elevated terrain. Concentration estimates are made by reducing the calculated plume height by the user-supplied terrain height above stack base. Neither the plume height nor terrain height are allowed to go below zero. The user can model simple elevated terrain using either or both of the distance options described below, i.e., the automated distance array or the discrete distance option. When the simple elevated terrain calculations for each distance option are completed, the user will have the option of continuing simple terrain calculations for that option with a new terrain height. (For flat terrain the user will not be given the option to continue with a new terrain height). For conservatism and to discourage the user from modeling terrain heights that decrease with distance, the new terrain height for the automated distances cannot be lower than the previous height for that run. The user is still given considerable flexibility to model the effects of elevated terrain below stack height across a wide range of situations.

For relatively uniform elevated terrain, or as a "first cut" conservative estimate of terrain effects, the user should input the maximum terrain elevation (above stack base) within 50 km of the source, and exercise the automated distance array option out to 50 km. For isolated terrain features a separate calculation can be made using the discrete distance option for the distance to the terrain feature, with the terrain height input as the maximum height of the feature above stack base. Where terrain heights vary with distance from the source, then the model can be run on each of several concentric rings using the minimum and maximum distance inputs of the automated distance option to define each ring, and using the maximum terrain elevation above stack base within each ring for terrain height input. As noted above, the terrain heights are not allowed to decrease with distance in the program. If terrain decreasing with distance (in all directions) can be justified for a particular source, then the distance rings would have to be modeled using separate model runs, and the results combined. The overall maximum concentration would then be the controlling value. The optimum ring sizes will depend on how the terrain heights vary with distance, but as a "first cut" it is suggested that ring sizes of about 5 km be used (i.e., 0-5km, 5-10km, etc.). The application of the program to evaluating the effects of elevated terrain should be done in consultation with the permitting agency.

3.7.4 Automated distances

The automated distance array option of the model gives the user the option of using a pre-selected array of 50 distances ranging from 100m out to 50 km. Increments of 100m are used out to 3,000m, with 500m increments from 3,000m to 10 km, 5 km increments from 10 km to 30 km, and 10 km increments out to 50 km. When using the automated distance array, the program prompts the user for a minimum and maximum distance to use. The model then calculates the maximum concentration across a range of meteorological conditions for the minimum distance given (>= 1 meter), and then for each distance in the array larger than the minimum and less than or equal to the maximum. Thus, the user can input the minimum site boundary distance as the minimum distance for calculation and obtain a concentration estimate at the site boundary and beyond, while ignoring distances less than the site boundary.

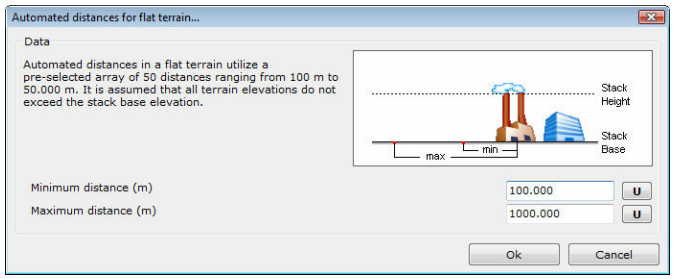
If the automated distance array is used, then the model will use an iteration routine to determine the maximum value and associated distance to the nearest meter. If the minimum and maximum distances entered do not encompass the true maximum concentration, then the maximum value calculated by the model may not be the true

maximum. Therefore, it is recommended that the maximum distance be set sufficiently large initially to ensure that the maximum concentration is found. This distance will depend on the source, and some "trial and error" may be necessary, however, the user can input a distance of 50,000m to examine the entire array. The iteration routine stops after 50 iterations and prints out a message if the maximum is not found.

Also, since there may be several local maxima in the concentration distribution associated with different wind speeds, it is possible that the model will not identify the overall maximum in its iteration. This is not likely to be a frequent occurrence, but will be more likely for stability classes C and D due to the larger number of wind speeds examined.

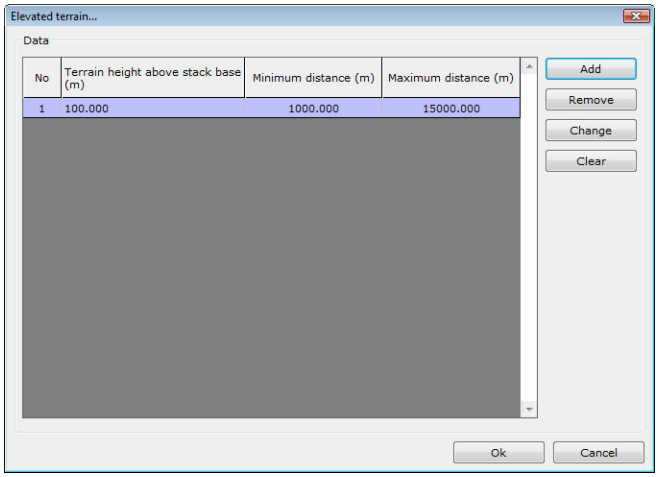
To use flat terrain with automated distances:

1. Check the **use simple terrain** in calculations option.
2. Select the **flat terrain** option.
3. Check the **use automated distances** option.
4. Click on **configure** to open the simple flat terrain editor with automated distances.
5. Enter the **minimum distance** in m.
6. Enter the **maximum distance** in m.
7. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



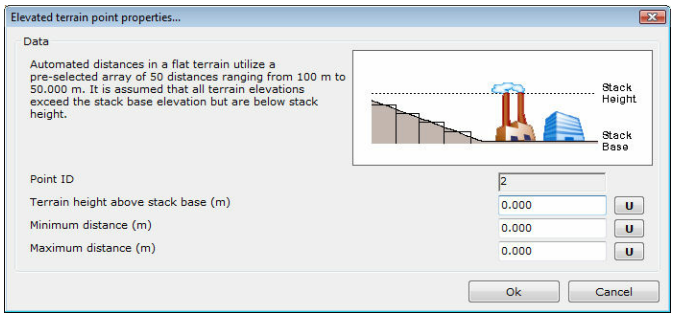
To use elevated terrain with automated distances:

1. Check the **use simple terrain** in calculations option.
2. Select the **elevated terrain** option.
3. Check the **use automated distances** option.
4. Click on **configure** to open the simple elevated terrain editor with automated distances.
5. Click **Add**, **Remove** or **Change** to manage the data in the editor.
6. Click **Clear** to remove all data instantaneously. The program will ask for confirmation only if the confirmation option in general preferences is active.
7. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



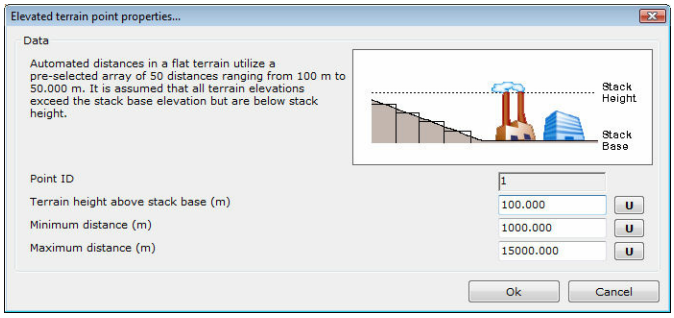
To add a point in the simple terrain editor with automated distances:

1. Click on **Add**.
2. Enter the **terrain height above stack base** in m.
3. Enter the **minimum distance** in m.
4. Enter the **maximum distance** in m.
5. Select **Ok** to add the point in the complex terrain editor or cancel to **Close** the dialog box without applying any changes.



To edit a point in the simple terrain editor with automated distances:

1. Select the point that will be changed.
2. Click on **Change**.
3. Enter the **terrain height above stack base** in m.
4. Enter the **minimum distance** in m.
5. Enter the **maximum distance** in m.
6. Select **Ok** to change the point in the complex terrain editor or cancel to **Close** the dialog box without applying any changes.



To remove a point from the simple terrain editor with automated distances:

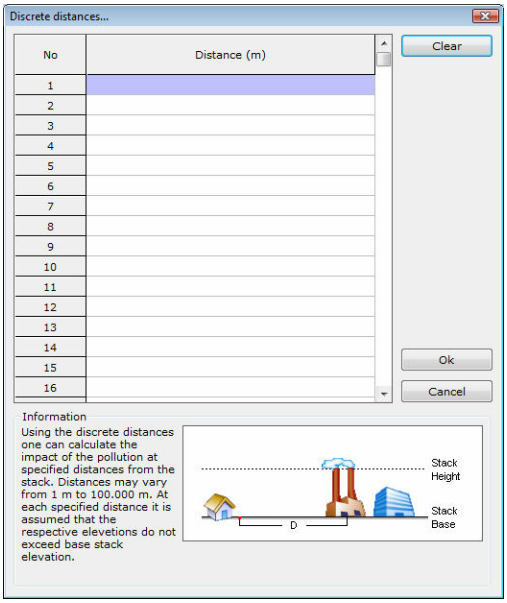
1. Select the point that will be removed.
2. Click on **Remove**. The program will ask for confirmation only if the confirmation option in general preferences is active.
3. The point is removed.

3.7.5 Discrete distances

The discrete distance option of the model allows the user to input specific distances. Any number of distances (>= 1 meter) can be input by the user and the maximum concentration for each distance will be calculated. The user will always be given this option whether or not the automated distance array option is used. The program will accept distances out to 100 km for long-range transport estimates with the discrete distance option. However, for distances greater than 50 km, the program sets the minimum 10 meter wind speed at 2 m/s to avoid unrealistic transport times.

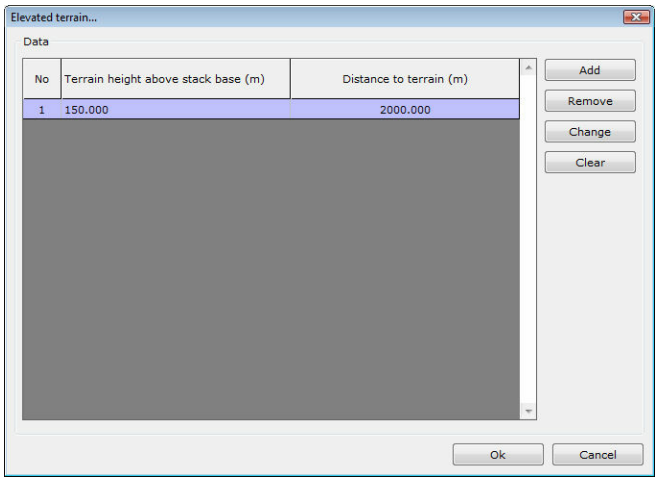
To use flat terrain with discrete distances:

1. Check the **use simple terrain** in calculations option.
2. Select the **flat terrain** option.
3. Check the **use discrete distances** option.
4. Click on **Configure** to open the simple flat terrain editor with discrete distances.
5. Enter directly the distances in m on the table.
6. Click **Clear** to remove all data instantaneously. The program will ask for confirmation only if the confirmation option in general preferences is active.
7. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



To use elevated terrain with discrete distances:

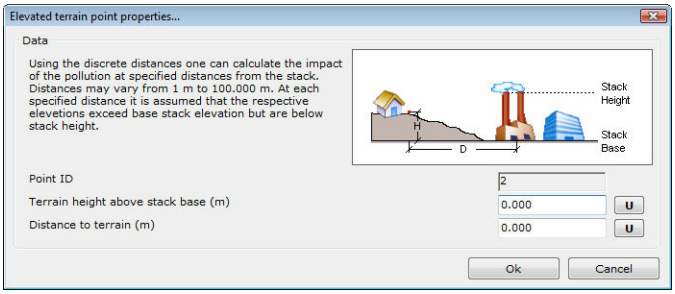
1. Check the **use simple terrain** in calculations option.
2. Select the **elevated terrain** option.
3. Check the **use discrete distances** option.
4. Click on **Configure** to open the simple elevated terrain editor with discrete distances.
5. Click **Add**, **Remove** or **Change** to manage the data in the editor.
6. Click **Clear** to remove all data instantaneously. The program will ask for confirmation only if the confirmation option in general preferences is active.
7. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



To add a point in the simple elevated terrain editor with discrete distances:

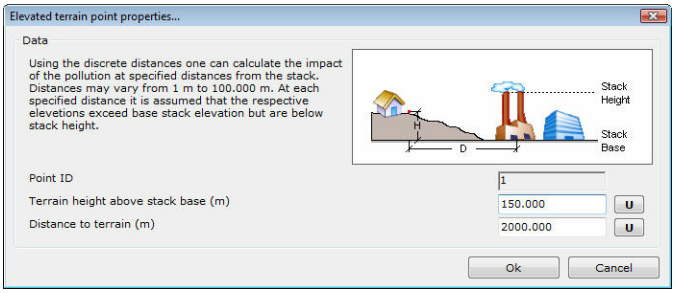
1. Click on **Add**.
2. Enter the **terrain height above stack base** in m.
3. Enter the **distance to terrain** in m.

4. Select **Ok** to add the point in the complex terrain editor or cancel to **Close** the dialog box without applying any changes.



To edit a point in the simple elevated terrain editor with discrete distances:

1. Select the point that will be changed.
2. Click on **Change**.
3. Enter the **terrain height above stack base** in m.
4. Enter the **distance to terrain** in m.
5. Select **Ok** to change the point in the complex terrain editor or cancel to **Close** the dialog box without applying any changes.



To remove a point from the simple elevated terrain editor with discrete distances:

1. Select the point that will be removed.
2. Click on **Remove**. The program will ask for confirmation only if the confirmation option in general preferences is active.
3. The point is removed.

3.8 Building downwash

There are two downwash options available with this model, a regulatory and a non-regulatory option. Both are discussed below.

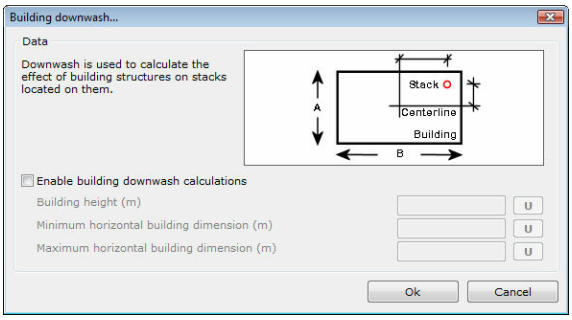
Regulatory Building Downwash Option

Following the basic input of source characteristics, if building downwash is to be considered, the building height, minimum horizontal dimension and maximum horizontal dimension, in meters, are needed. The downwash screening procedure assumes that the building can be approximated by a simple rectangular box. Wake effects are included in any calculations made using the automated distance array or discrete distance options. Cavity calculations are made for two building orientations - first with the minimum horizontal building dimension alongwind, and second with the

maximum horizontal dimension alongwind. The cavity calculations are summarized at the end of the distance-dependent calculations. Refer to Section 3.6 for more details on the building downwash cavity and wake screening procedure.

To enter regulatory building downwash data:

1. From the **Data** menu select **Building Downwash**.
2. Check the **Enable building downwash calculations**.
3. Enter the **building height** in m.
4. Enter the **minimum horizontal building dimension** in m.
5. Enter the **maximum horizontal building dimension** in m.
6. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



Non-Regulatory Building Downwash Option

A Schulman-Scire Building Downwash/Cavity option can be selected along with two other non-regulatory options by selecting the appropriate options. The program will need the building height, minimum horizontal dimension, and maximum horizontal dimension in meters as is done for the regulatory cavity option. However, for this option only, the program will also need the position of the source on the building with respect to the two building orientations mentioned in the regulatory case. The data will need to be in the form of a ratio of the stack distance from a building centerline drawn perpendicular to the wind over the horizontal dimension of the side of the building which is parallel to the wind.

To enter non-regulatory building downwash data:

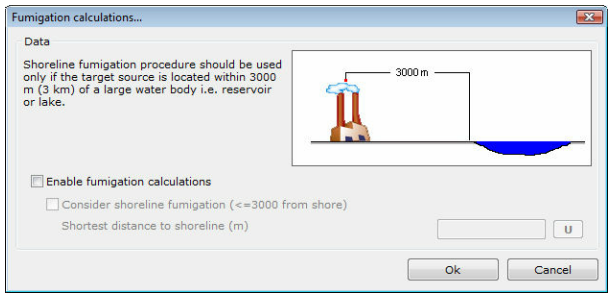
1. Use the non-regulatory options dialog box.

3.9 Fumigation calculations

The user has the option of estimating maximum concentrations and distance to the maximum associated with inversion break-up fumigation, and shoreline fumigation. The option for fumigation calculations is applicable only for rural inland sites with stack heights greater than or equal to 10 meters (within 3,000m onshore from a large body of water.) The fumigation algorithm also ignores any potential effects of elevated terrain.

To configure fumigation calculations:

1. Select **Fumigation Calculations** from the **Data** menu.
2. Check the **Enable fumigation calculations** option to force the model to account for inversion break-up fumigation.
3. Check the **Consider shoreline fumigation** option to force the model to account for shoreline fumigation.
4. If the option in step 3 has been enabled, the user must supply the shortest distance to shoreline in m.
5. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.

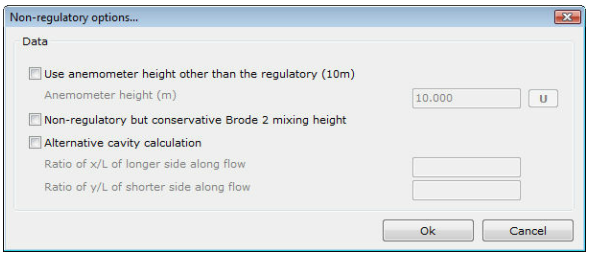


3.10 Non-regulatory options

With this option, you can control the non-regulatory options of the program.

To set the non-regulatory options:

1. Select **Non-regulatory options** from the **Data** menu.
2. If you wish to use an **anemometer height** other than the regulatory (=10m), the select this option and enter the anemometer height below.
3. If you wish to use a non-regulatory but **conservative Brode 2 mixing height** (1991) routine, the select this option.
4. Finally, if you need the **non-regulatory building downwash calculation**, select the option and enter x/L and y/L of longer and shorter side along flow respectively.
5. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



NOTE: The ratios x/L and y/L required in step 4, are calculated as follows:

Suppose that the area of interest is rectangular with larger side Lx and smaller side Ly. Then if you take for origin the center of the building, the values of x can vary from -Lx/2 to +Lx/2 and the values of y may vary from -Ly/2 to +Ly/2. Therefore the absolute value of x/Lx varies from 0 to 0.5 and so does the value of y/Ly. These values are the required data for the alternative cavity calculation.

3.11 Options

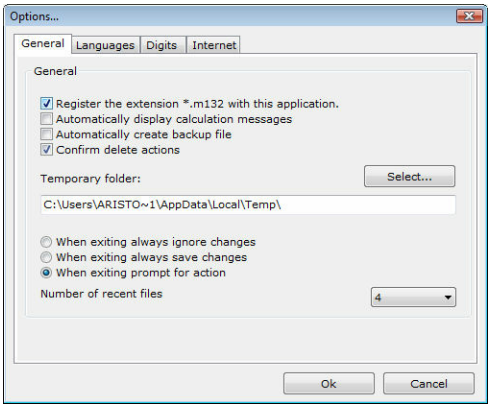
3.11.1 General preferences

With this option, you can modify the general preferences of the program.

To modify the general preferences:

1. Select **Options** from the **Data** menu.
2. Select **General preferences** from the **Options** menu.
3. The general preferences dialog box appears. The preferences are grouped into four tabs. You can select a tab by clicking on its name.

General Tab



This tab contains general preferences regarding the usage of the program.

Check **Register the extension *.m32 with this application** to associate the extension .m32 with this program. This extension is used by the program when saving a project. In this way, you will be able to run the program and load a project by double-clicking on the project filename in Windows Explorer.

Check **Automatically display calculation messages** if you want report details to be automatically displayed when you calculate the results.

Check **Automatically create backup file** if you want a backup file (with the extension .bck) to be created every time a project is loaded. By default, this file is created in the temporary folder of Windows.

Check **Confirm delete actions** if you want to be asked for confirmation each time an object is about to be deleted.

You can also modify the temporary folder that will be used for the creation of backup files. By default, this folder is the temporary folder of Windows.

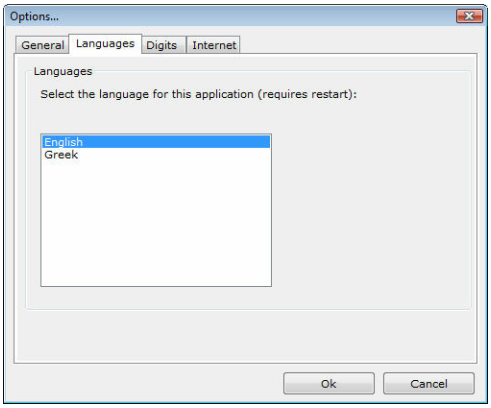
Finally, there are three options regarding the termination of the program:

- **When exiting always ignore changes** - All changes since the last save of the project are ignored.
- **When exiting always save changes** - All changes in the current project are automatically saved. If the filename of the project is not set, a dialog box will appear that allows the selection of the filename, as when selecting Save project

as from the **File** menu.

- **When exiting prompt for action** - If there are changes in the current project, then a dialog box will appear. You can choose to save or ignore the changes. If the filename of the project is not set, a dialog box will appear that allows the selection of the filename, as when selecting Save project as from the **File** menu.

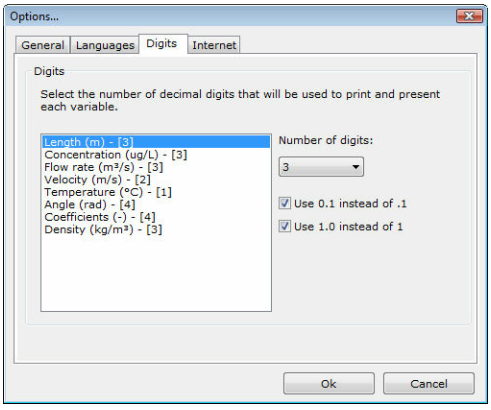
Languages Tab



If more than one language packs have been installed, then you can choose the language of the program. In the above case, there are two language packs; English (that are already selected) and Greek. If you change the language, all forms, menus, messages, help files will reflect the chosen language.

In order for the changes to take effect, you must restart the program.

Digits Tab



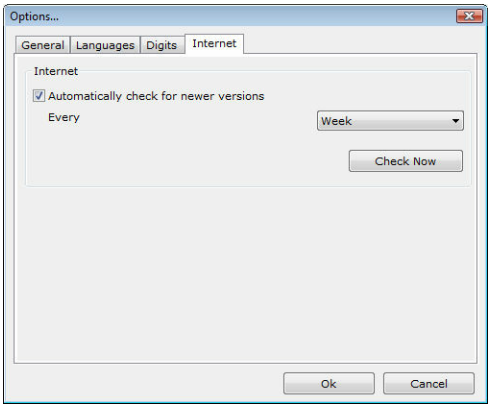
With this tab, you can modify the way the results are presented. All values used in the program are displayed in the list on the left.

For each value, you can select the number of decimal digits using the **Number of digits** drop-down list.

Check **Use 0.1 instead of .1** to use a preceding zero when displaying numbers between -1 and 1, for example -0.08 instead of -.08 and 0.98 instead of .98.

Check **Use 1.0 instead of 1** to use trailing zeros (when necessary) in order to display a number with the decimal digits selected in the **Number of digits** drop-down list, for example 1.1600 instead of 1.16 (when the number of digits is set to 4).

Internet Tab



The program can automatically check for newer versions over the Internet. Check **Automatically check for newer versions** to enable this feature. The check is automatically performed at an interval specified in the **Every** drop-down list. Select **Check now** to manually check for newer versions.

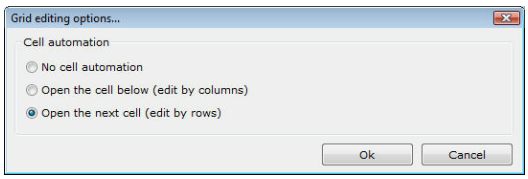
When a newer version is found, you will be prompted to download and install the latest version.

NOTE: TechnoLogismiki protects your privacy. During the check for newer versions, no data is transferred from your computer to the Internet.

Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.

3.11.2 Grid editing

With this option, you can modify the behavior of grids.



The behaviour of all editable grids is controlled by the preferences in this dialog box.

Select **No cell automation** if you want the active cell to remain the same when hitting ENTER.

Select **Open the cell below (edit by columns)** if you want to activate the cell below when hitting ENTER. This is particularly useful when editing tables by columns.

Select **Open the next cell (edit by rows)** if you want to activate the next cell on the right when hitting ENTER. This is particularly useful when editing tables by rows.

In some cases, the program may automatically fill some missing values (for example, when performing linear interpolation). In this case, you can select a distinctive color in order to recognize these values. You can choose the color by clicking on the button in the **Auto-complete settings** frame.

NOTE: These preferences affect all projects, old and new.

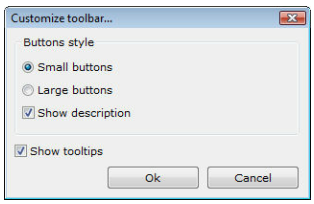
Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.

3.11.3 Customize toolbar

With this option, you can customize the toolbar of the main form.

To customize the toolbar of the main form:

1. Select **Options** from the **Data** menu.
2. Select **Customize toolbar** from the **Options** menu.
3. Make the appropriate changes.
4. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



The toolbar may contain small or large buttons.

Check **Show description** if you want a small description to be displayed under the buttons.

Check **Show tooltips** if you want tooltips to be displayed when the mouse pointer hovers over a button for 2-3 seconds.

NOTE: These preferences affect all projects, old and new.

Chapter IV

4 Results

4.1 Results menu

With this menu, you can perform calculations and view the results. In the **Results** menu you can select one of the following options:

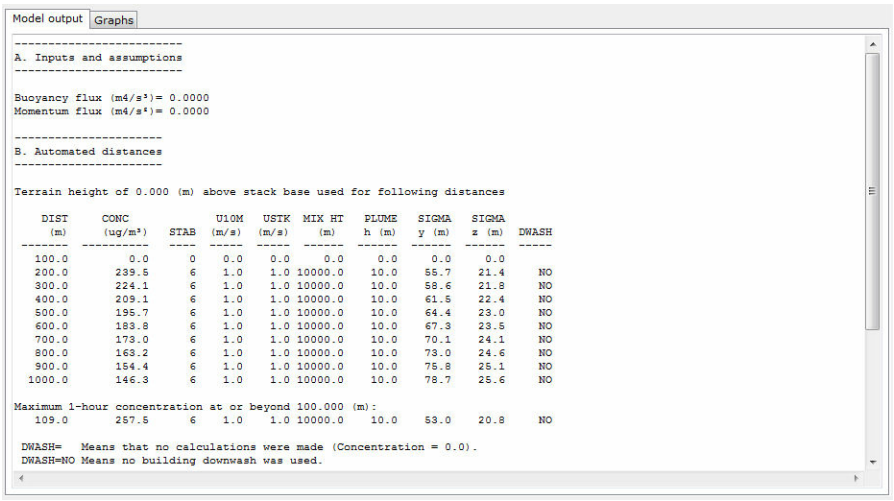
- Perform calculations
- Graphs

4.2 Perform calculations

With this option, you can perform calculations. The results are displayed in the main form.

To perform calculations:

1. Select **Perform calculations** from the **Results** menu.
2. The calculations are performed and if successful, the results table appear on the main form.


Model output Graphs

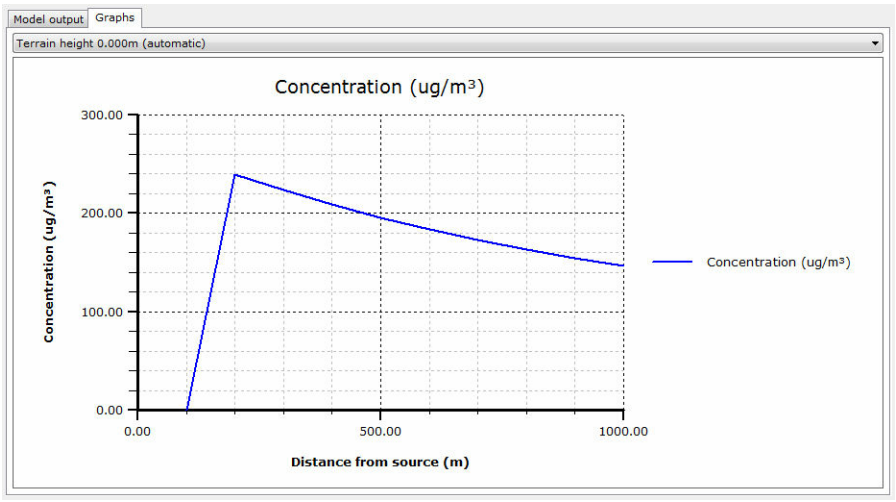
```
--------------------------
A. Inputs and assumptions
--------------------------

Buoyancy flux (m4/s³)= 0.0000
Momentum flux (m4/s⁴)= 0.0000

----------------------
B. Automated distances
----------------------

Terrain height of 0.000 (m) above stack base used for following distances

     DIST      CONC            U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
      (m)     (ug/m³)   STAB  (m/s)  (m/s)    (m)    h (m)   y (m)   z (m)  DWASH
 -------  ----------   ----  -----  -----  ------  ------  ------  ------  -----
    100.0        0.0      0    0.0    0.0     0.0     0.0     0.0     0.0
    200.0      239.5      6    1.0    1.0 10000.0    10.0    55.7    21.4     NO
    300.0      224.1      6    1.0    1.0 10000.0    10.0    58.6    21.8     NO
    400.0      209.1      6    1.0    1.0 10000.0    10.0    61.5    22.4     NO
    500.0      195.7      6    1.0    1.0 10000.0    10.0    64.4    23.0     NO
    600.0      183.8      6    1.0    1.0 10000.0    10.0    67.3    23.5     NO
    700.0      173.0      6    1.0    1.0 10000.0    10.0    70.1    24.1     NO
    800.0      163.2      6    1.0    1.0 10000.0    10.0    73.0    24.6     NO
    900.0      154.4      6    1.0    1.0 10000.0    10.0    75.8    25.1     NO
   1000.0      146.3      6    1.0    1.0 10000.0    10.0    78.7    25.6     NO

Maximum 1-hour concentration at or beyond 100.000 (m):
    109.0      257.5      6    1.0    1.0 10000.0    10.0    53.0    20.8     NO

 DWASH=   Means that no calculations were made (Concentration = 0.0).
 DWASH=NO Means no building downwash was used.
```

4.3 Graphs

With this option, the user can switch to the graphs tab, provided that the results have been calculated successfully.

To view all available graphs:

1. Select **Graphs** from the **Results** menu.
2. Select a graph from the drop-down list. If the list is disabled then there are no graphs available at the moment.
3. The selected graph appears automatically on the main form.



Chapter

5 Help

5.1 Help menu

In the **Help** menu you can select one of the following options:

- Contents
- User guide
- Tutorials
- Tip of the day
- Unit conversion
- TechnoLogismiki website
- Buy products
- TechnoLogismiki NOMOS
- TechnoLogismiki Live!
- About the program

5.2 Contents

With this option, you can access the online help which contains detailed information regarding the usage of the program.

To view the online help:

1. Click **Contents** from the **Help** menu.
2. The online help appears.

NOTE: If an error message appears then the online help has not been installed. You can install the online help from the installation CD or the Internet.

5.3 User guide

With this option, you can access the user guide which contains detailed information regarding the usage of the program.

To view the user guide:

1. Click **User Guide** from the **Help** menu.
2. The user guide appears.

NOTE: If an error message appears then the online help has not been installed. You can install the online help from the installation CD or the Internet.

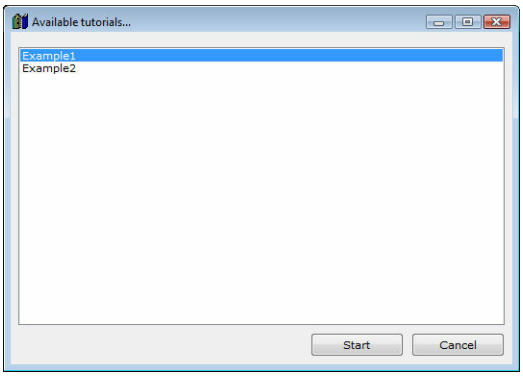
NOTE: Adobe Acrobat Reader or a similar program that can display pdf files is required in order to view or print the user guide.

5.4 Tutorials

With this option, you can access the tutorials of the program. The tutorials are step-by-step examples that allow you to decrease the learning cycle of the programs dramatically.

To access the tutorials:

1. Click **Tutorials** from the **Help** menu.
2. The tutorial selection dialog box appears.
2. Select the appropriate tutorial and click **Start** to proceed. Click **Cancel** to close the dialog box.



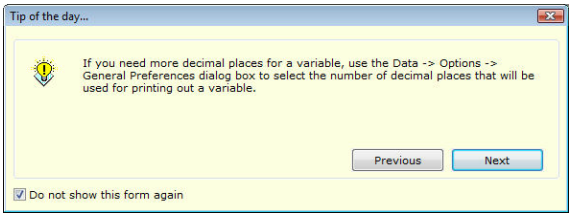
NOTE: The number and content of the tutorials is changed frequently. Use the live update system of TechnoLogismiki's products to download the latest tutorials.

5.5 Tip of the day

With this option, you can access the tip database of the program. The tips are short guidelines regarding the usage of the programs which may be of great help to the user.

To access the tips:

1. Click **Tip of the day** from the **Help** menu.
2. The tip of the day form appears.
3. Check **Do not show this form again** to prevent the program from showing the tip of the day when starting. Press the **Previous/Next** buttons to browse all available tips.
4. Press **Esc** to close the form.



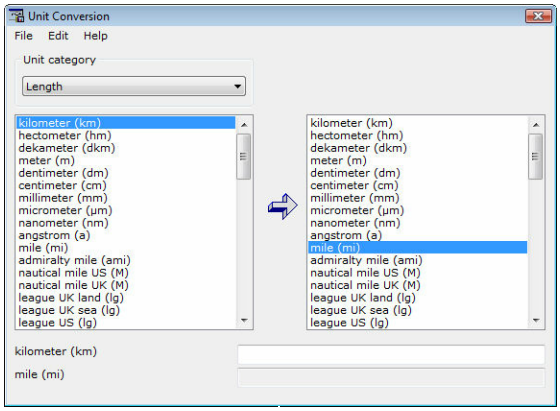
NOTE: The number and content of the tips is changed frequently. Use the live update system of TechnoLogismiki's products to download the latest tips.

5.6 Unit conversion

With this option, you can access the unit conversion tool. You can find more information about its usage in its help system.

To launch the unit conversion tool:

1. Click **Unit conversion** from the **Help** menu.
2. The unit conversion tool is launched.



NOTE: If an error message appears then the unit conversion tool has not been installed. You can install the unit conversion tool from the installation CD or the Internet.

5.7 TechnoLogismiki website

With this option, you can load on your Internet browser the website of TechnoLogismiki's.

5.8 Buy products

With this option, you can load on your Internet browser the main product page of TechnoLogismiki's website.

5.9 TechnoLogismiki NOMOS

With this option, you can load on your Internet browser the **NOMOS** service of Technologismiki.

5.10 TechnoLogismiki Live!

With this option, you can load on your Internet browser the **Live!** service of Technologismiki.

5.11 About the program

With this option, a form containing the name, version and licence information of the program appears.

To show this form:

1. From the **Help** menu, select **About the program**.
2. The form appears.
3. Click anywhere on the form or hit ESC to close the form.

Keyword index

- A -

- B -

- C -

- D -

- E -

- F -

- G -

- H -

- I -

- L -

- M -

- N -

- O -

- P -

- R -

- S -

- T -

- U -

- V -

- W -

- Z -

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