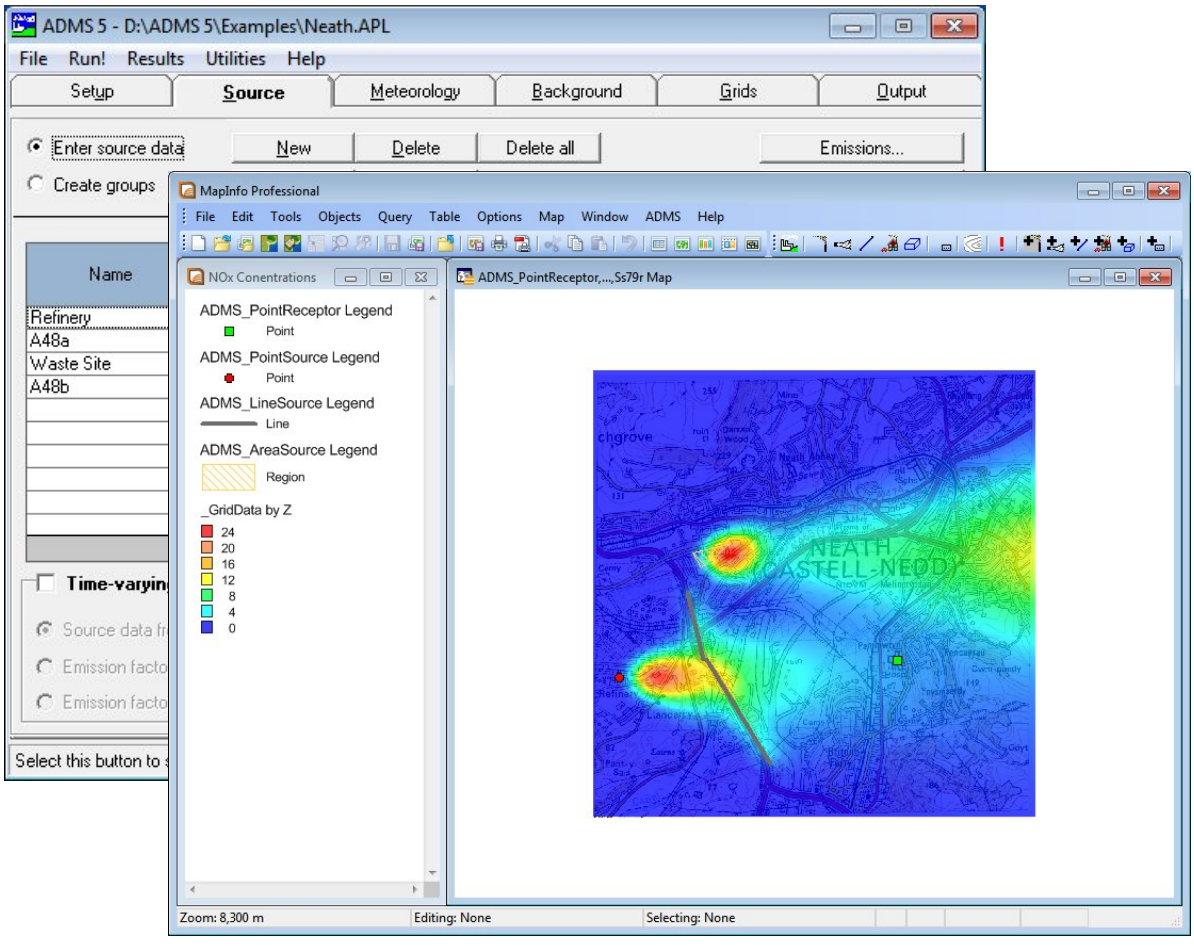
ADMS 5

MapInfo Link



User Guide

CERC

ADMS 5
MapInfo Link

User Guide

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Section One: Getting Started

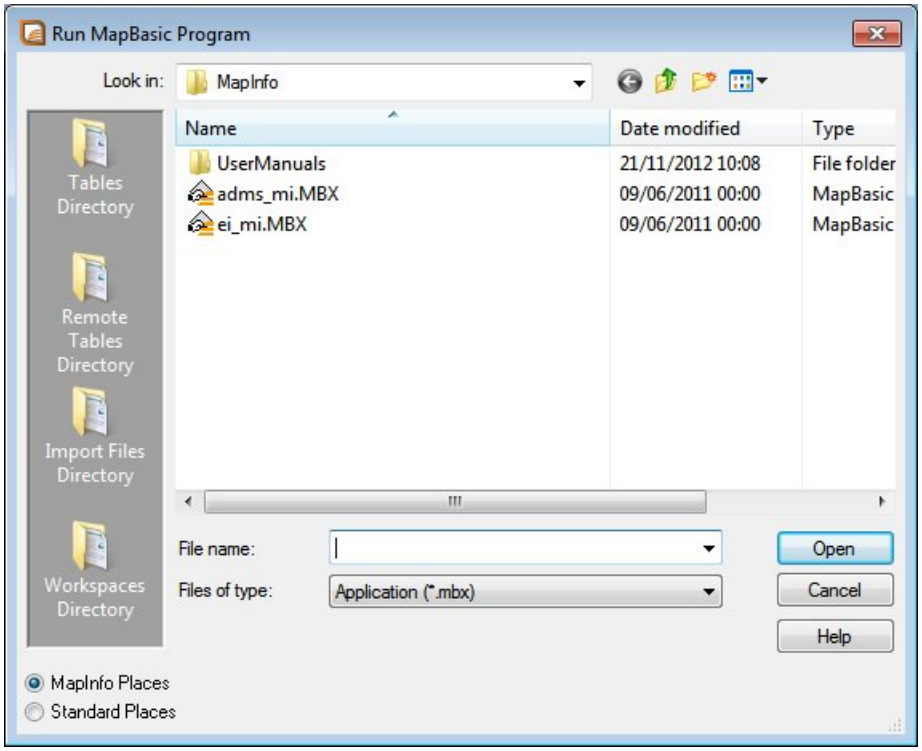
You will need the ADMS 5 MapInfo Link, ADMS 5 and MapInfo Professional[1]. If you have not already done so, you should install them following the instructions provided with each product.

To use the ADMS 5 MapInfo link:

i) Launch MapInfo Professional from the Start menu.

ii) From the MapInfo **Tools** menu choose **Run MapBasic Program.**

iii) The dialogue box shown below will appear. Browse for the ADMS MapInfo extension file ADMS_MI.MBX, which will have been created when you installed the link. By default it will be in the directory *<install_path>\Support\MapInfo*



You are now ready to use ADMS 5 with MapInfo.

[1] Check cerc.co.uk for the full list of supported MapInfo Professional versions.

Section Two: An introduction to MapInfo

If you are new to MapInfo, we recommend that you complete the MapInfo tutorial and read the introductory chapters in the MapInfo manual. Some useful MapInfo concepts are summarised below to get you started. Note that the screenshots and command names given are based on MapInfo Professional version 11.0, earlier or later versions may provide different options.

2.1 MapInfo concepts

- All data in MapInfo, whether textual or graphic, is organized in **tables**. Each table is a collection of files that constitute either a map file or a database file.
- MapInfo presents table data on screen in three different formats
    - **Map windows** present information arranged as maps, allowing you to visualize the geographic patterns of your data. Tables are viewed in individual **layers** in a Map window.
    - **Browser windows** present information as tabular lists, just as conventional databases do.
    - **Graph windows** present information arranged as graphs, allowing you to visualize and make comparisons of the purely numerical patterns.

2.2 Useful MapInfo controls

You may like to experiment with a few MapInfo controls.

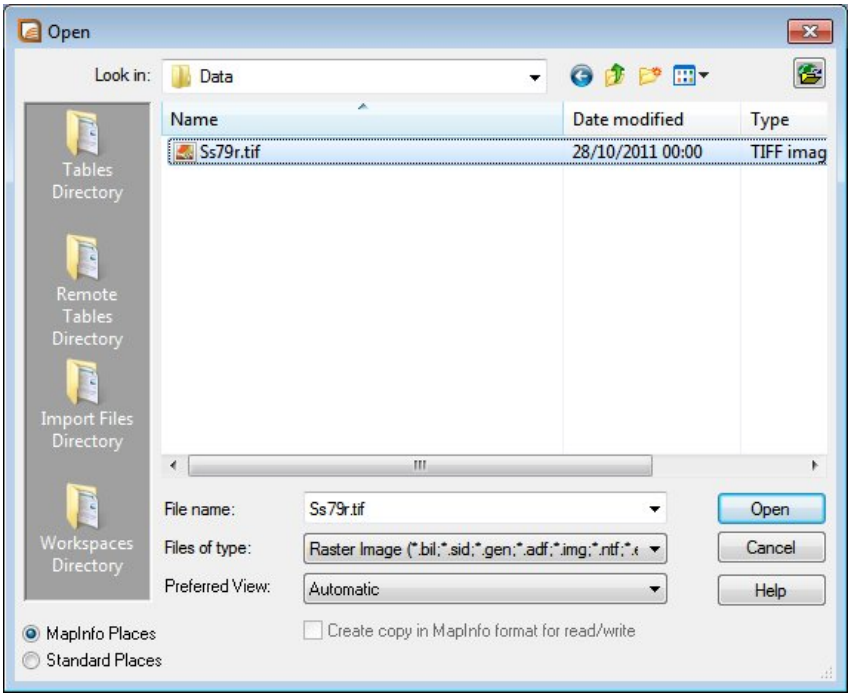
- To zoom to a particular area of a map, click the **Zoom In** tool  and either click on a particular point, or click and drag a rectangle.
- To return to see the whole map, select **View Entire Layer** from the **Map** menu, and then choose All Layers.
- To pan a Map window, click on the **Grabber** tool  and then click and drag to show a different portion of the map.
- To zoom out, click on the **Zoom Out** button  and click on the map.

2.3 Displaying a map image in MapInfo

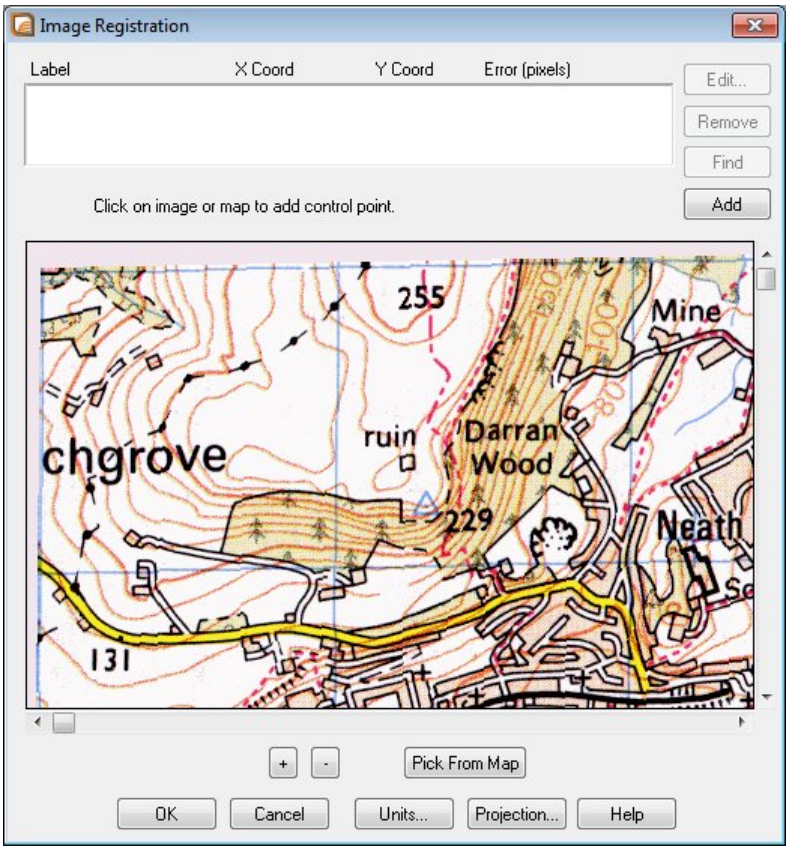
It is often useful to check the positions of your ADMS sources against a map image, such as an Ordnance Survey map tile. Before you can do this, you must **register** the image so that it can be shown in a Map window. The advice below has been adapted from the MapInfo manual. Please refer to your MapInfo manual for more details.

1. Select **Open...** from the **File** menu.

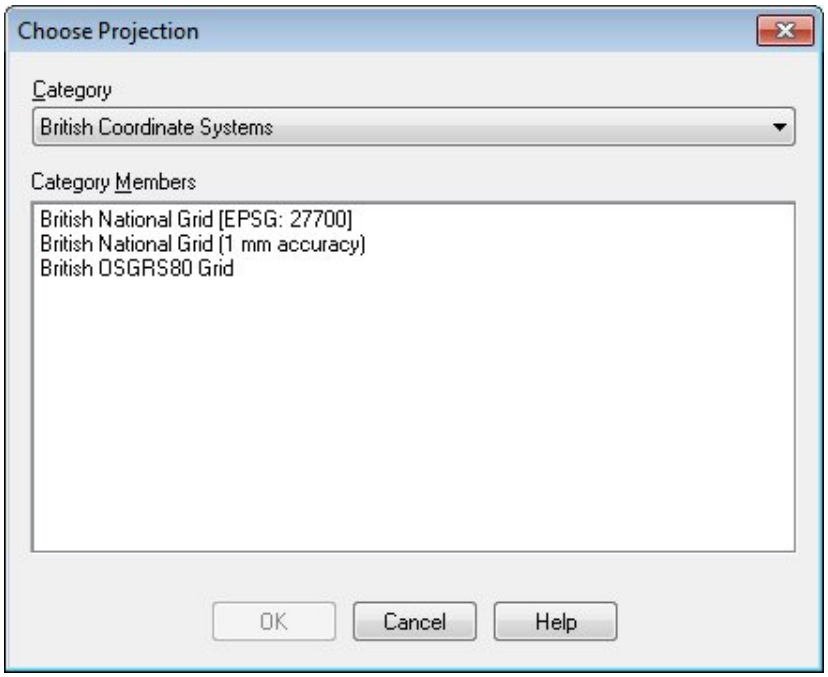
2. Change the file type to Raster Image. Select your map file and press **Open**.



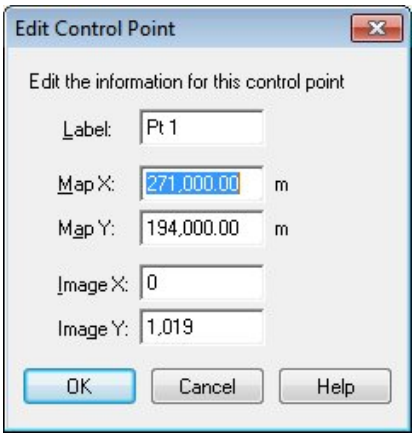
3. Press the **Register** button in the resulting dialogue. The **Image Registration** screen will appear:



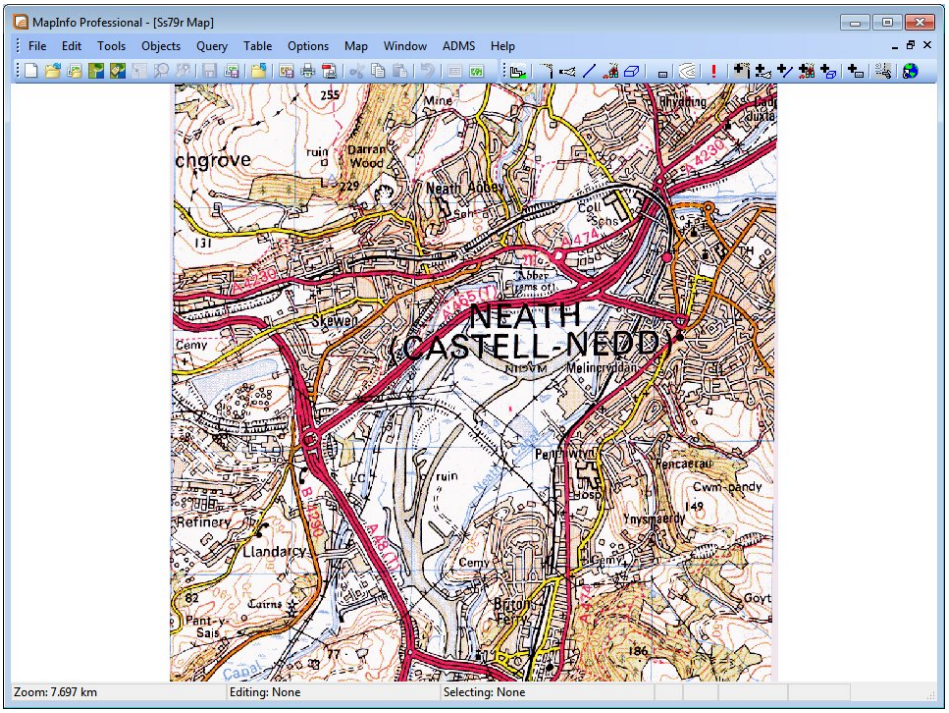
4. Press the **Projection...** button, and choose an appropriate projection. For instance, in the UK you will probably select 'British National Grid' from the 'British Coordinate Systems' as shown below. Press **OK** when you have made a selection.



5. Now you must provide coordinates for at least four **control points** on the map so that MapInfo can determine the position, scale and rotation of the image. A control point is added as follows. Find a point on the image whose coordinates you know, such as a prominent landmark or perhaps a corner of the image. Click on the point and the dialogue box shown below will appear. Enter the coordinates of the point in the *Map X* and *Map Y* boxes then click **OK**.



The control point coordinates are listed in the Image Registration dialogue and can be edited if they are incorrect. Click **OK** when you have finished. The map is then displayed in a map window:



6. Save the registered map image by selecting **Save Workspace...** from the **File** menu, and selecting the map layer. This will save your map with the extension *.wor*.

You only have to register a raster image once. Each subsequent time you open the file, it can be opened like any other MapInfo workspace. Choose **Open...** from the **File** menu and select the *.wor* file created in step 6 above.

Section Three: Setting up an ADMS run using MapInfo

3.1 Overview

Once your map image is registered, you are ready to position sources on the map and set up an ADMS run.

You use the ADMS MapInfo extension by choosing options from the **ADMS** menu or by clicking buttons on the toolbar. The toolbar is shown in **Figure 1**, and the buttons are described in **Table 1**.



Figure 1 - The ADMS 5 toolbar

Table 1 - Brief description of toolbar buttons in the MapInfo extension for ADMS 5.

Button	Button Name	Action
	Show ADMS	Makes the ADMS model interface active
	Show Point Sources	Toggles the display of point sources in the current ADMS *.apl* file in a Map window
	Show Jet Sources	Toggles the display of jet sources in the current ADMS *.apl* file in a Map window
	Show Line Sources	Toggles the display of line sources in the current ADMS *.apl* file in a Map window
	Shoe Area Sources	Toggles the display of area sources in the current ADMS *.apl* file in a Map window
	Show Volume Sources	Toggles the display of volume sources in the current ADMS *.apl* file in a Map window
	Show Receptor Points	Toggles the display of receptors in the current ADMS *.apl* file in a Map window
	Plot Pollution Contours	Creates a contour plot of concentrations based on ADMS output in the Map window
	Refresh	Updates the display
	Add Point Source	Adds a new ADMS point source where you click
	Add Jet Source	Adds a new ADMS jet source where you click
	Add Line Source	Adds a new ADMS line source where you click (click at the start of the source, hold the mouse button down and then release at the end of the source)
	Add Area Source	Adds a new ADMS area source where you click (double-click to end the area source)

Button	Button Name	Action
	**Add Volume Source**	Adds a new ADMS volume source where you click (double-click to end the source)
	**Add Receptor Point**	Locates a new receptor point for generating output concentrations
	**Define Grid Area**	Defines an output grid over the rectangle drawn
	**Import ADMS File**	Imports an ADMS output file into MapInfo
	**Clip Points by Boundary**	Clips a point layer according to the boundaries in a polygon layer
	**Display Max Values**	Displays the maximum concentration values in a layer

3.2 Creating point sources

Follow the steps below to create a point source from within MapInfo.

1. Click on the **Show Point Sources** button  to display point sources, if you have not already done so.

2. Click the **Add Point Source** tool. 

3. Click on the map window at the position you want to put your point source.

4. A new point source is created and displayed in the ADMS **Source** screen. The source coordinates will have been filled in automatically, but you will need to enter the other parameters for the source. To add another point source, return to MapInfo by clicking on the MapInfo window title bar, and click on a second position on the map.

5. To see the new point source in MapInfo, save the APL file and then click on the **Refresh** button .

3.3 Creating jet sources

Jet sources can be created in a very similar way to point sources.

1. Click on the **Show Jet Sources** button  to display jet sources, if you have not already done so.

2. Click the **Add Jet Source** tool. 

3. Click on the map window at the position you want to put your jet source.

4. A new jet source is created and displayed in the ADMS **Source** screen. The source coordinates will have been filled in automatically, but you will need to enter the other parameters for the source. To add another jet source, return to

MapInfo by clicking on the MapInfo window title bar, and click on a second position on the map.

5. To see the new jet source in MapInfo, save the APL file and then click on the **Refresh** button .

3.4 Creating line sources

Line sources can be created in a similar way to point sources.

1. Click on the **Show Line Sources** button  to display line sources, if you have not already done so.

2. Click the **Add Line Source** tool. 

3. Click on the map at the starting point of your line source, and hold the mouse button down. Move to the end point of the source and then release the mouse button.

4. A new line source is created and displayed in the ADMS **Source** screen. The source coordinates will have been filled in automatically, but you will need to enter the other parameters for the source.

5. To see the new source in MapInfo, save the APL file and then click on the **Refresh** button 

3.5 Creating area sources

Area sources can be created in a similar way to point sources.

1. Click on the **Show Area Sources** button  to display area sources, if you have not already done so.

2. Click the **Add Area Source** tool .

3. An area source can have three to fifty vertices. Click on the map at the position of one of the vertices. Then, moving around the source clockwise or anticlockwise, click at the position of the remaining vertices, double-clicking at the final vertex.

4. A new area source is created and displayed in the ADMS **Source** screen. The source coordinates will have been filled in automatically, but you will need to enter the other parameters for the source.

5. To see the new area source in MapInfo, save the APL file and then click on the **Refresh** button 

3.6 Creating volume sources

Volume sources can be created in a very similar way to area sources.

1. Click on the **Show Volume Sources** button  to display volume sources, if you have not already done so.

2. Click the **Add Volume Source** tool .

3. A volume source can have three to fifty vertices. Click on the map at the position of one of the vertices. Then, moving around the source clockwise or anticlockwise, click at the position of the remaining vertices, double-clicking at the final vertex.

4. A new volume source is created and displayed in the ADMS **Source** screen. The source coordinates will have been filled in automatically, but you will need to enter the other parameters for the source.

5. To see the new volume source in MapInfo, save the APL file and then click on the **Refresh** button .

3.7 Defining an output grid

You can use MapInfo to help you define an output grid. Note that the grid will be defined in Cartesian coordinates. Polar output grids must be defined in the ADMS interface as described in the manual.

1. Click on the **Define Grid Area** button .

2. Click on the map at one of the corners of the output grid area and hold down the mouse button. Now drag the mouse to the opposite corner of the area. A rectangle will appear on the map while you drag the mouse. When the rectangle reaches the size you require, release the mouse button.

3. The ADMS **Grids** screen will appear with the new output grid coordinates. You may correct them by hand if you wish.

3.8 Adding specified points

Follow the steps below to define receptors (also known as "specified points") using MapInfo.

1. Click the **Show Receptor Points** button  to view the location of existing receptors, if you have not already done so.

2. Click the **Add Receptor Point** button 

3. Click on the map at the position for the new receptor point.

4. The ADMS **Grids** screen appears, showing your new specified point with the coordinates of the point at which you clicked. You should provide a name for the point.

5. Save the APL file and then click on the **Refresh** button  to view the new receptor in MapInfo.

Section Four: Displaying ADMS results in MapInfo

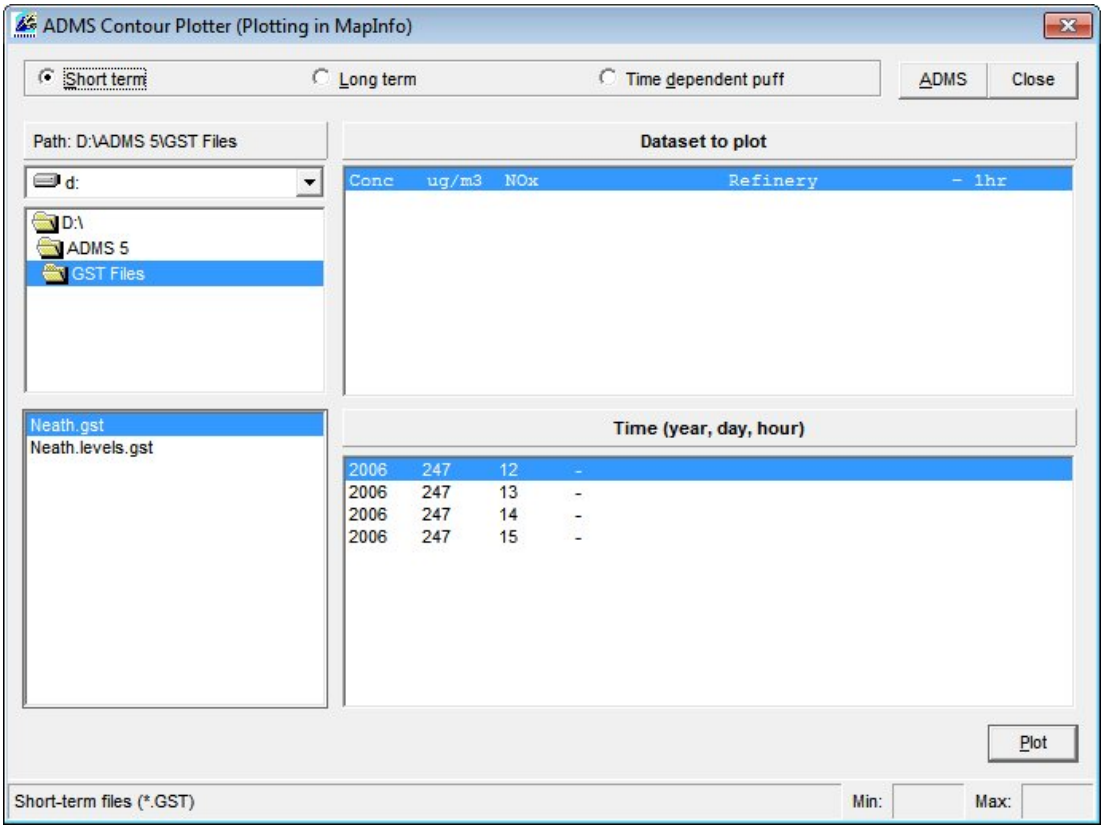
4.1 Producing contour plots from ADMS results

Once you have completed the definition of a problem in an APL file and run the model, you can create contour plots. Please note that you must have used gridded output to create a contour plot. On the **Grids** screen the **Receptor type** option must be either **Gridded** or **Both**.

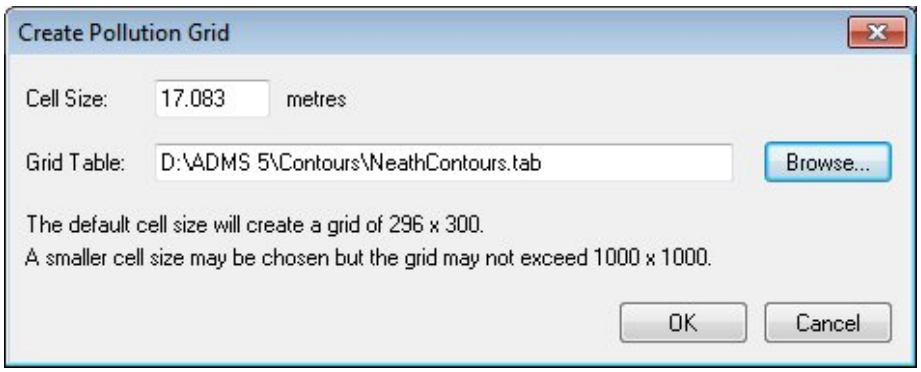
Follow the steps below to produce a contour plot.

1. Press the **Plot Pollution Contours** button .

2. The **ADMS Contour Plotter** screen will appear. Select the data file and dataset you wish to plot, and press **Plot**.



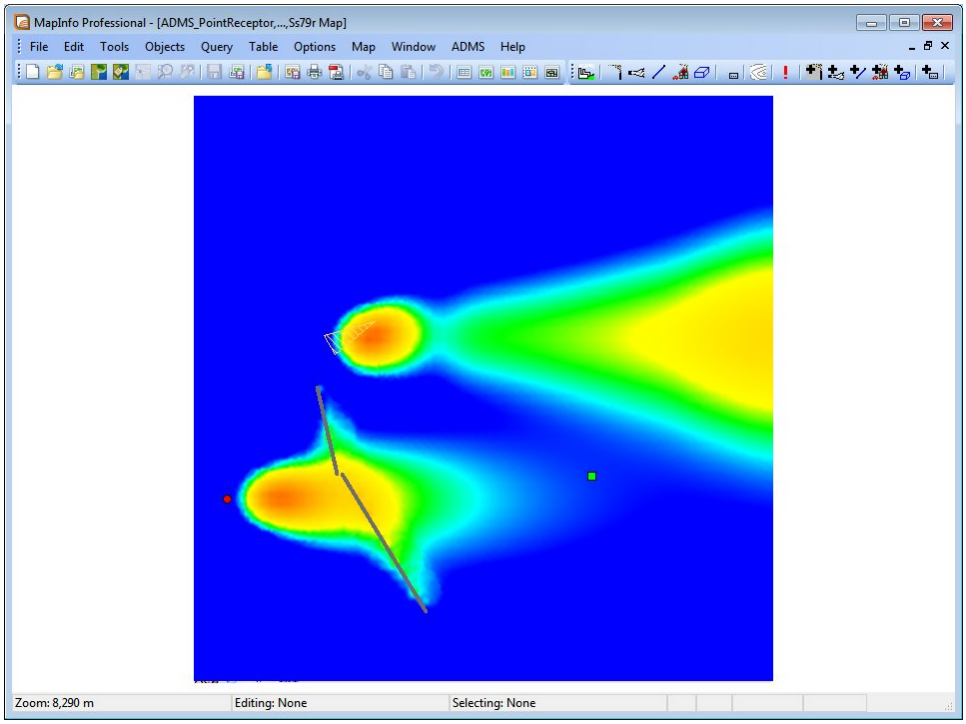
3. The screen below will appear, allowing you to specify a file name and the cell size for the calculation. Click **OK** when you have done this.



- MapInfo stores contour plots in *.tab* files, like all tables. It is good practice to store your *.tab* files in a directory with your input files and other data. Click **Browse...** and choose a suitable location.

- You can use the cell size to control how much detail is shown in your contour plot. MapInfo calculates a value for each cell in the grid and plots the contours accordingly.

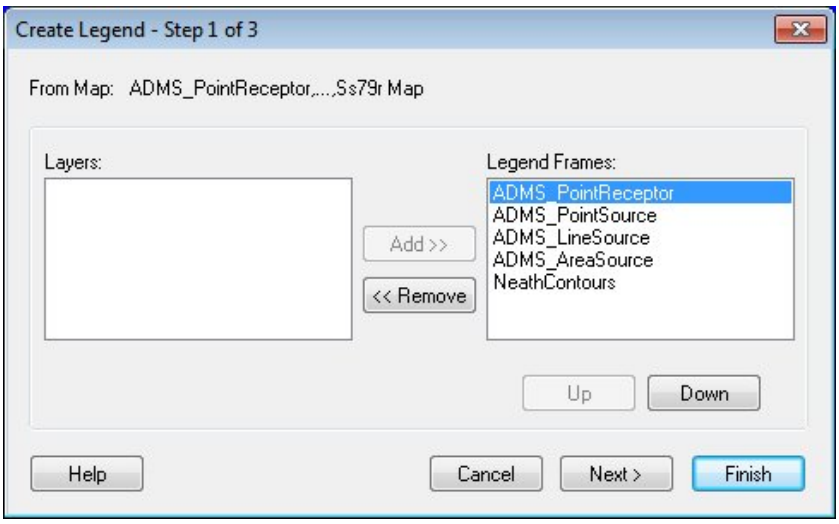
4. After spending a few moments interpolating the data, MapInfo will display a contour plot of your results. An example contour plot is shown below.



4.2 Creating a legend for your contour plot

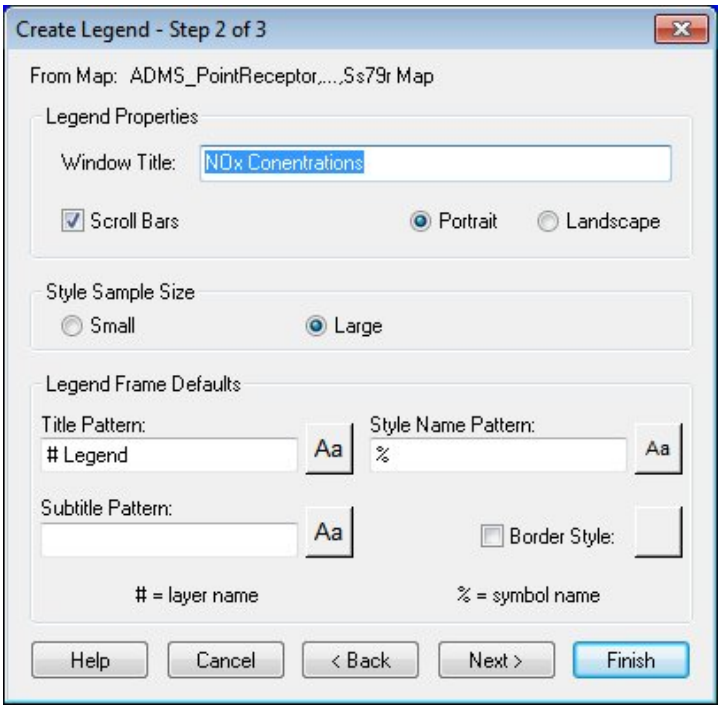
You may want to create legends for your contour plots. The advice below has been adapted from the MapInfo manual. Please consult the online help or your MapInfo manual for further details.

1. Select **Create Legend** from the MapInfo **Map** menu. The **Create Legend** wizard will appear as shown below.

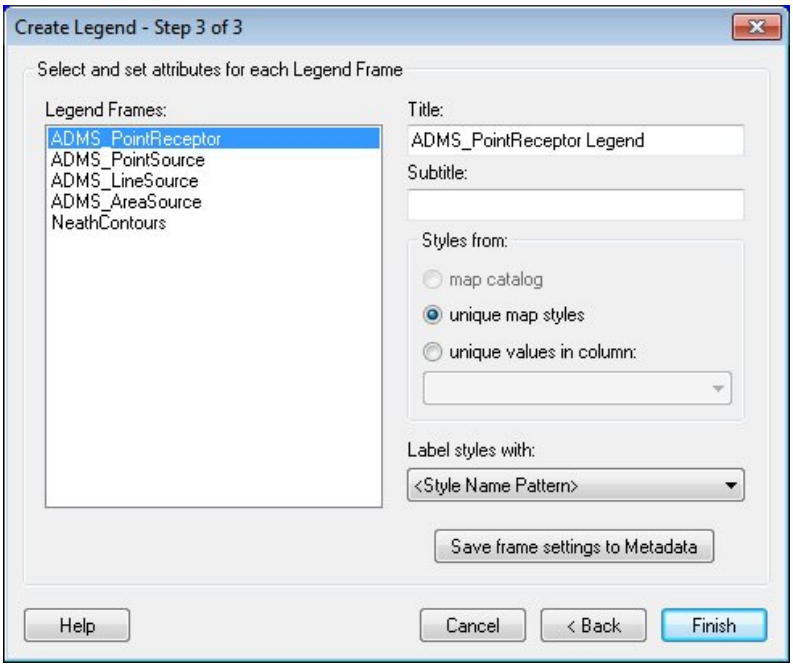


2. If necessary, use the *Add* and *Remove* buttons to make sure that the **Legend Frames** group contains only the layers for which you want to create a legend.

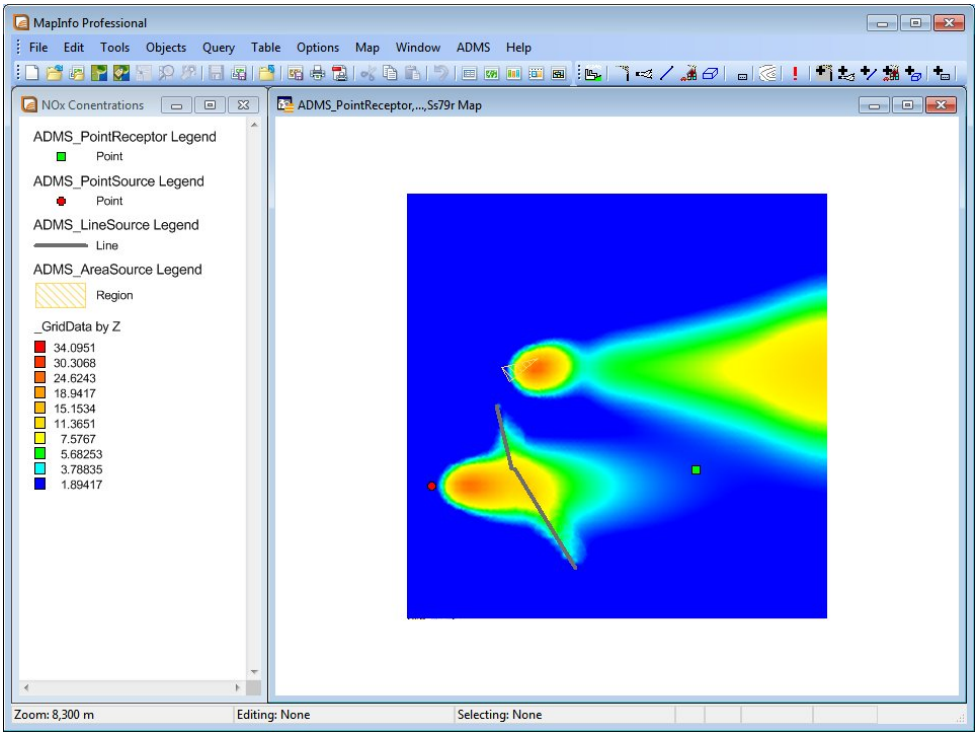
3. Click **Next**. Step 2 of the wizard appears as shown below.



4. Provide a title for the legend and click **Next**. Step 3 of the wizard appears as shown below.



5. Click **Finish**. The legend will be displayed in MapInfo. You may wish to choose **Tile Windows** from the **Window** menu to view the legend and the contour plot together, as shown below



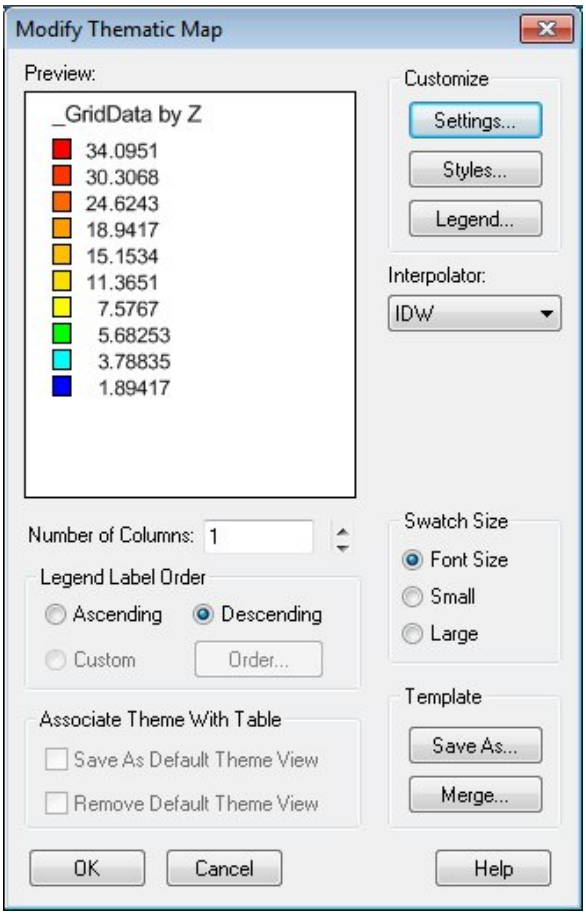
4.3 Further hints on contour plots

As you become more experienced with MapInfo contour plots you may find the following hints useful. You may also like to consult the MapInfo user manuals and online documentation for more information on the commands involved.

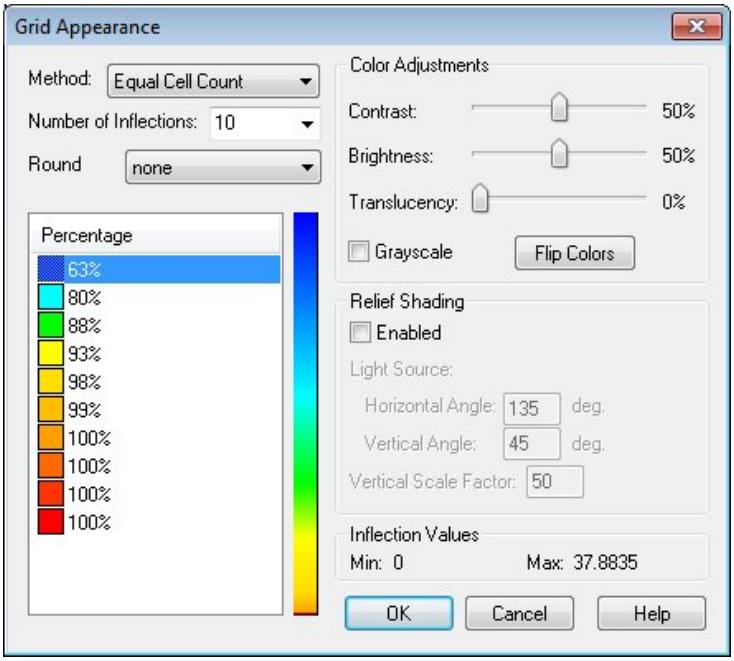
- To **temporarily hide a contour plot layer**
    1. Click on the MapInfo **Layer Control** button
    2. Find the layer you wish to hide in the resulting dialogue. Uncheck the tick box next to the layer to remove it from view.
- To **remove a contour plot from a map window**
    1. Click on the MapInfo **Layer Control** button
    2. Find the layer you wish to remove in the resulting dialogue and select it. Click **Remove** at the top of the dialogue box.
- To **generate a translucent plot or change the colours used**

    MapInfo gives you control over many aspects of the display of your contour plots. The steps below are provided simply as an example. Consult the MapInfo documentation for more ideas about the display of your plots.

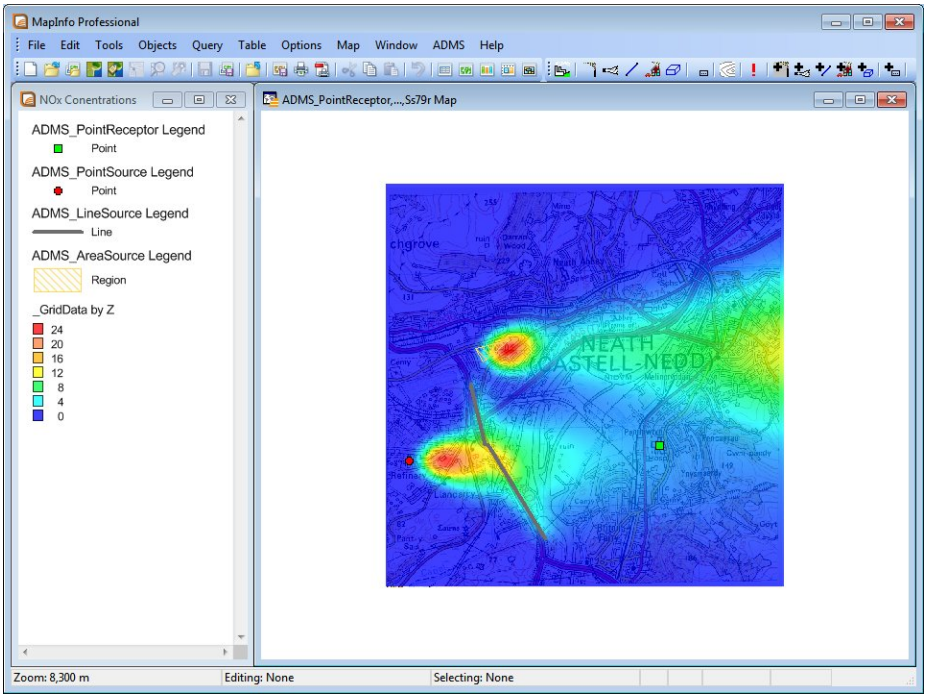
    1. Select **Modify Thematic Map** from the **Map** menu. The **Modify Thematic Map** dialogue will appear.



2. Click the **Styles** button.



- You may like to use the **Translucency** slider so that your background map shows through the contours.



- The colours used in the plot are controlled by the **inflection method** and the number of **inflection points**. You can change the number of colours by changing the **Number of inflections** in the dialogue. You can change the colour for a particular value by double-clicking the colour sample in the list under the **Percentage** caption, and selecting a new colour in the resulting dialogue. The example below uses translucency and custom colours.

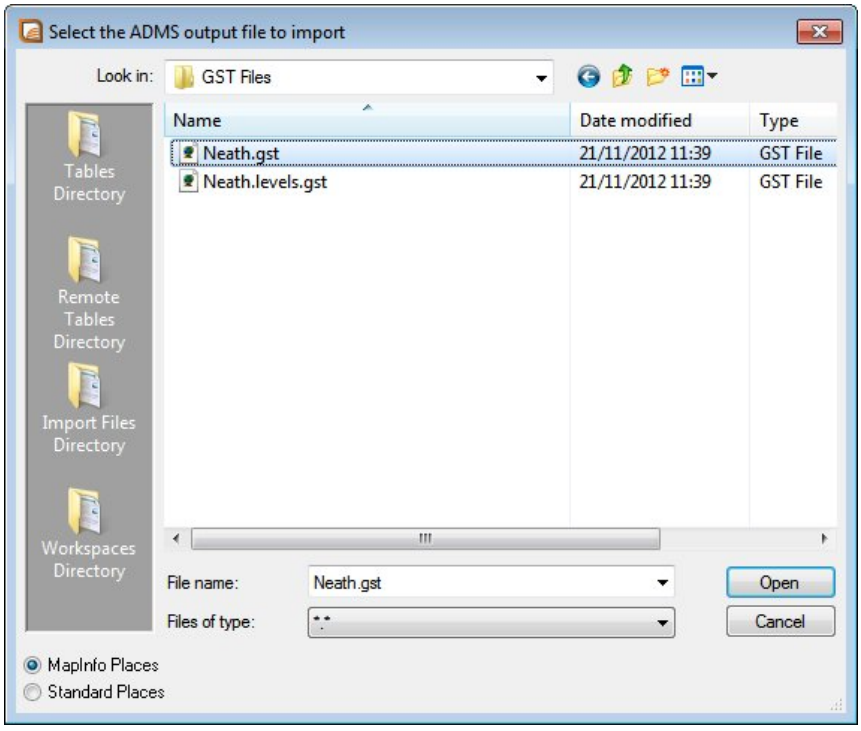
Section Five: Displaying Maximum Concentration Values

The ADMS Link provides the facility to calculate the maximum concentration values in an ADMS output file outside, or inside, a site boundary. Typically you would run the following options in order: import an ADMS output file, following instructions in section 5.1; delete points from the output of 5.1, following the instructions in section 5.2; and finally display the maximum concentration values of the remaining points, following the instructions in section 5.3.

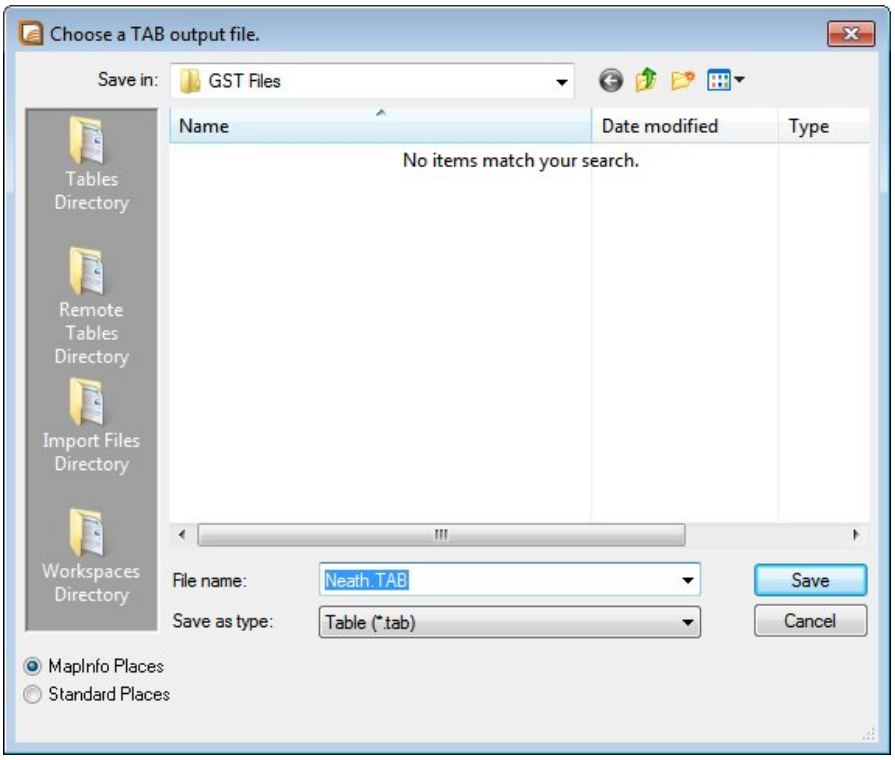
5.1 Importing ADMS Output Files

This step converts an ADMS output file (*.glt, .gst, .gtd, .plt, .pst, .ptd*) into a point table, which can be viewed in MapInfo. The field values of the points are provided by the ADMS output values for that point, and the coordinates.

1. Click on the **Import ADMS File** button and locate the file to import from the **Select the ADMS output file to import** dialogue.



2. Select the name and location of the resulting *.tab* file in the **Choose a TAB output file** dialogue.

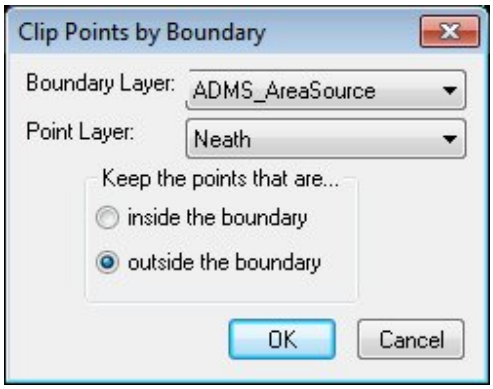


3. Click **Save**

5.2 Clip Points by Boundary

This step deletes points from a point table, by comparing against a set of polygons in a boundary table, e.g. only the points outside a site boundary.

1. Ensure the point and boundary tables are open in MapInfo.
2. Click on the **Clip Points by Boundary** button to display the **Clip Points by Boundary** dialogue.



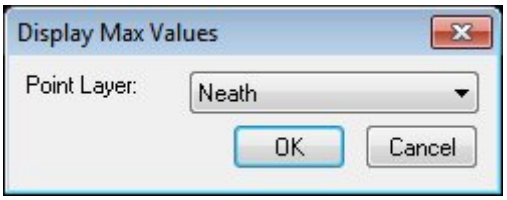
3. Select the layer containing the constraining polygons from the **Boundary Layer** drop-down.
4. Select the layer containing the ADMS point data from the **Point Layer** drop-down.
5. Choose whether to keep only the points within the boundaries, or only the points outside the boundaries.

4. Click **OK**

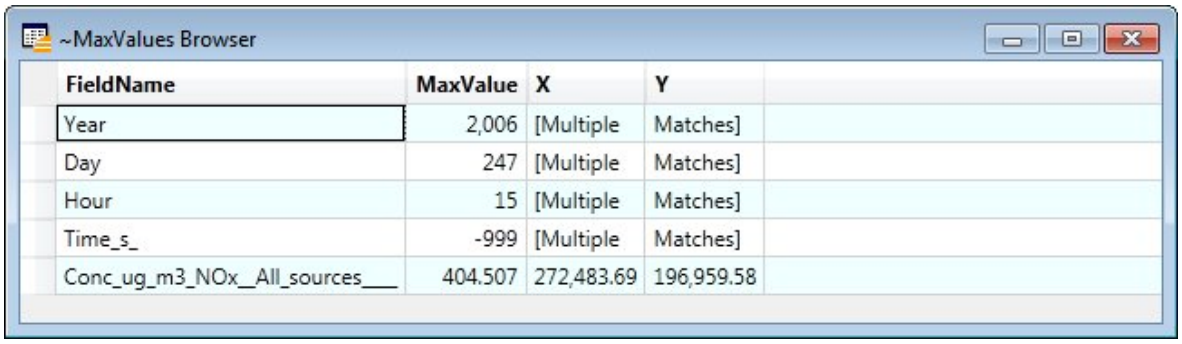
5.3 Display Maximum Concentration Values

This step reports on the maximum value for each field in a point table.

1. Click on the **Display Max Values** button to display the **Display Max Values** dialogue.



2. Select the point layer in the drop-down and click **OK** to open a new browser window containing the maximum values of each concentration recorded in the file. The information in the browser is also automatically copied, ready to paste into another program, e.g. Microsoft Word.



FieldName	MaxValue	X	Y
Year	2,006	[Multiple	Matches]
Day	247	[Multiple	Matches]
Hour	15	[Multiple	Matches]
Time_s_	-999	[Multiple	Matches]
Conc_ug_m3_NOx__All_sources___	404.507	272,483.69	196,959.58

3. Click a row's selection checkbox to highlight that row's maximum value point on the map.