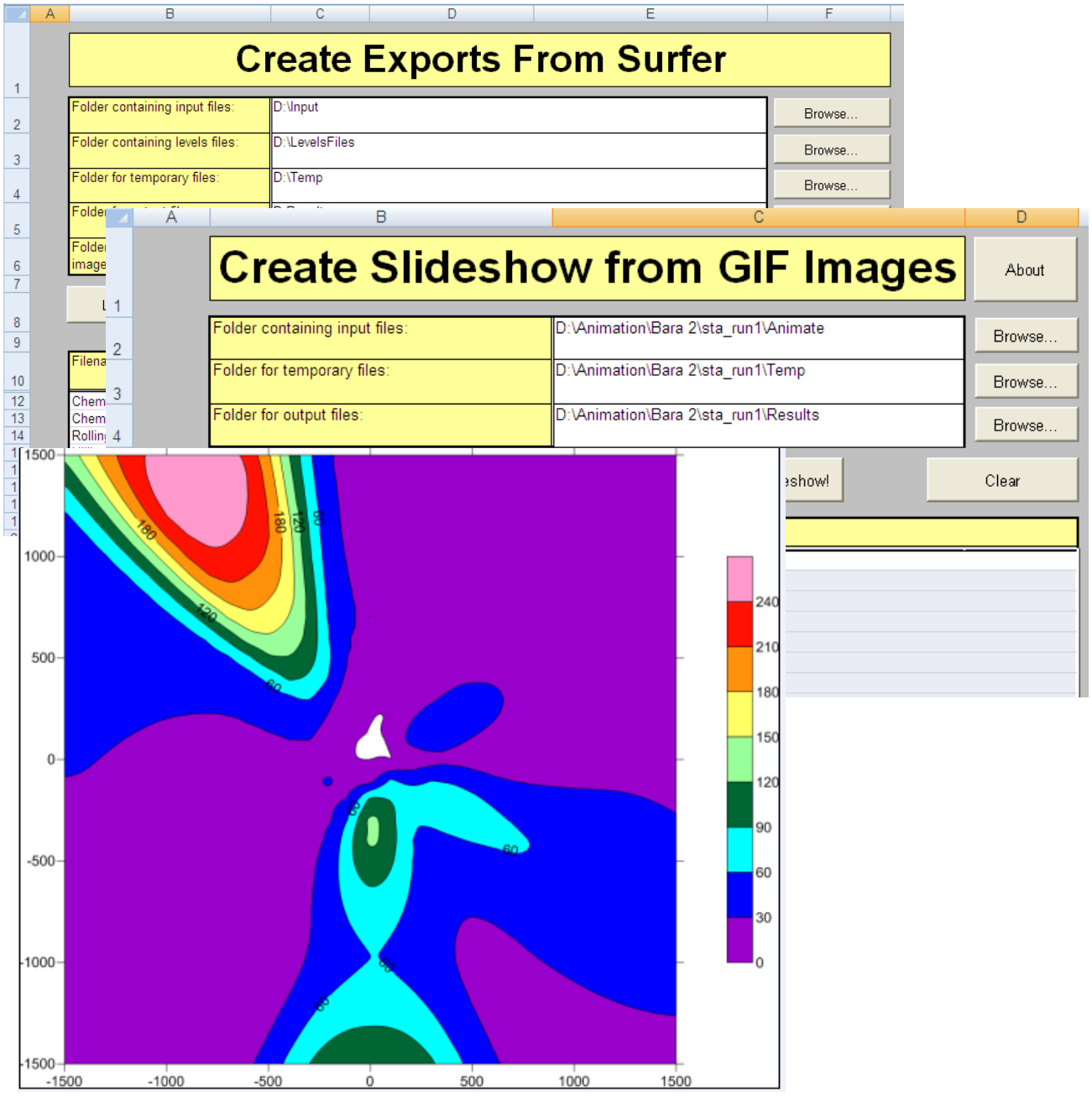
Surfer Automation and Slideshow Creator



USER GUIDE **CERC**

Surfer Automation *and* Slideshow Creator

User Guide

February 2023

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SECTION 1 Introduction

This document describes two spreadsheet programs supplied with your ADMS model, *SurferAutomation.xlt* and *SlideshowCreator.xlt,* that help you visualise your ADMS model output.

1.1 Surfer Automation

The Surfer Automation tool can help speed up the process of creating or recreating plots in Surfer. It can automatically create a number of contour plots in Surfer in one operation saving them in a format chosen by the user. You can create plots from the following ADMS output files: *.gst* files, *.glt* files and *.gtd*. The contour plots can be saved as bitmap *.bmp* files, Surfer *.srf* files, *.gif* files, and ESRI *.shp* shapefiles.

- Bitmap ***.bmp*** format and Surfer ***.srf*** file format are useful for reports and presentations.
- ***.gif*** file format is useful for creating slideshows – see Section 1.2 below.
- ESRI ***.shp*** shapefile format can be useful for importing contour plots into other applications, for example Google Earth and ArcGIS.

To use the *SurferAutomation.xlt* spreadsheet program you will need:

- Microsoft Excel 2016 or later (desktop app only)
- Golden Software Surfer

1.2 Slideshow Creator

The Slideshow Creator program can convert a set of static *.gif* images into a slideshow in the form of an animated *.gif* file. The animated *.gif* format is supported in a number of programs, for example PowerPoint and Internet Explorer. Slideshows can show how a time-varying release evolves over time, or the development of an episode in an urban area.

The Surfer Automation program and Slideshow Creator can be used in combination, the Surfer Automation program (Section 1.2) creating a series of static *.gif* images from contour plots of ADMS model output and the Slideshow Creator converting these frames into an animated *.gif*.

The Slideshow Creator program selects all the *.gif* images within a selected folder and resizes them to be the same size. It then adds a user-defined caption to each of the images and animates the resultant images into a slideshow (an animated *.gif* file).

To use the *SlideshowCreator.xlt* spreadsheet program you will need:

- Microsoft Excel 2016 or later (desktop app only)
- ImageMagick. ImageMagick is free, open source software created by ImageMagick Studio LLC. The ImageMagick installation can be found in the ***Support\ImageMagick*** subdirectory of your ADMS model installation directory. To install ImageMagick run the executable in the above directory and follow the instructions that appear. If Image Magick is not installed when you attempt to create a slideshow a warning will appear as shown in Figure 1.1.

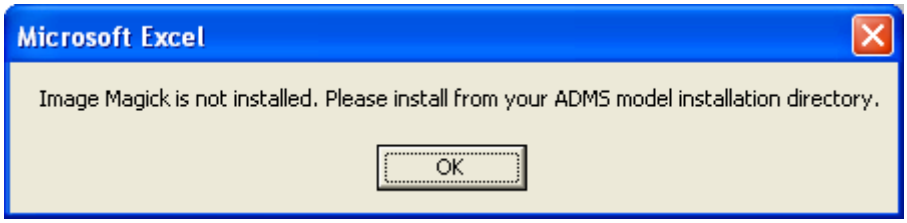

Figure 1.1 – Image Magick not installed warning

SECTION 2 Automate Surfer Exports

The spreadsheet program ***SurferAutomation.xlt*** takes as input ***.gst***, ***.gtd*** or ***.glt*** files and a Surfer level (***.lvl***) files, uses them to create contour plots in Surfer, and then exports the contour plots as ***.gif***, bitmap ***.bmp***, Surfer ***.srf*** file or ESRI ***.shp*** shapefiles.

2.1 Requirements

To use the ***SurferAutomation.xlt*** spreadsheet program you will need:

- Microsoft Excel 2016 or later (desktop app only)
- Golden Software Surfer

Please check with your IT personnel for your organisation's procedures for installing software.

2.2 Step-by-step instructions

Step 1 Create one or more Surfer level files to be used for the contour plots. A level file (*.lvl*) controls the appearance of a contour plot in Surfer. Experienced Surfer users will probably already be familiar with the use of level files. APPENDIX A gives a more detailed explanation of their use and how to create them.

Step 2 Open *SurferAutomation.xlt* in Excel and enable macros. You will find the file in a sub-directory *Templates* of your ADMS installation directory.

Step 3 The Surfer Automation menu will appear as shown in Figure 2.1. Click the **Create exports from Surfer** button.

Step 4 You will see the **Create Exports from Surfer** worksheet as shown in Figure 2.2.

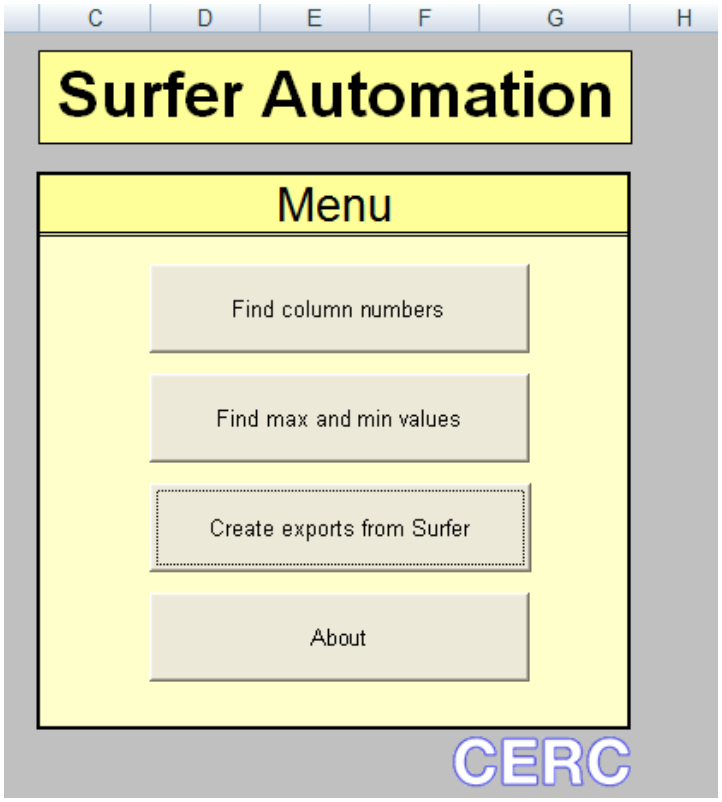

Figure 2.1 – Surfer Automation menu

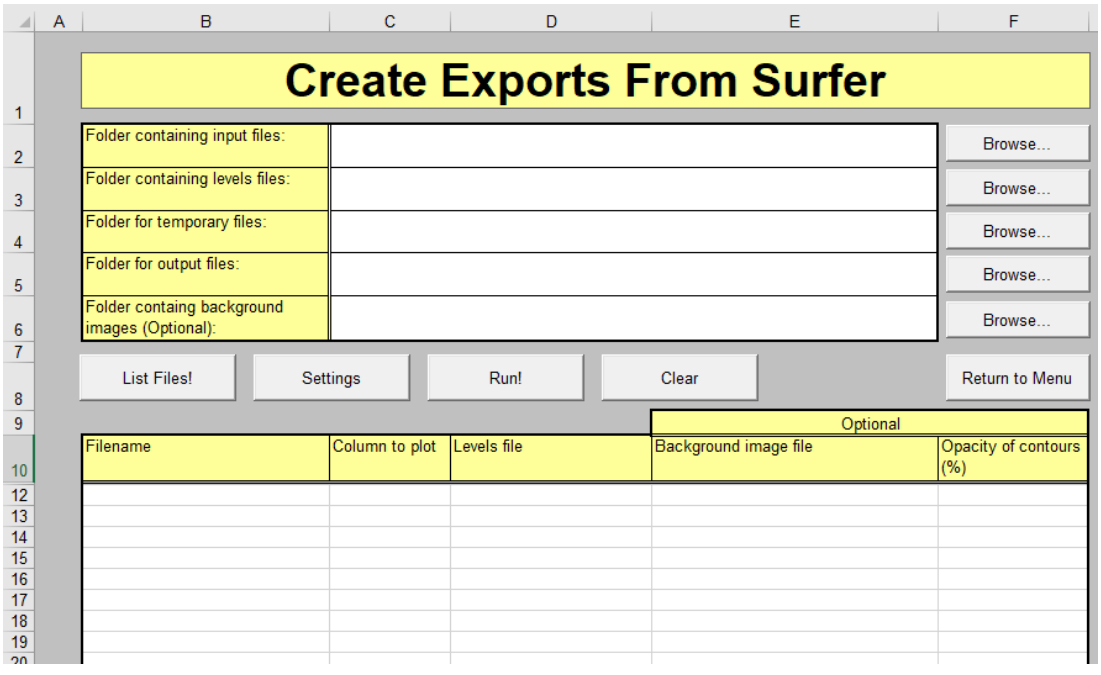

Figure 2.2 – Create Exports From Surfer worksheet

Table 2.1 and Table 2.2 describe the values that you need to enter in the **Create Exports From Surfer** worksheet shown in Figure 2.2:

Inputs relating to all files	
Input	**Description**
Folder containing input files	Location of the folder containing your input files (*.gst* files, *.glt* files and/or *.gtd* files)
Folder containing levels files	Location of the folder where the level files are stored
Folder for temporary files	Location of the folder where temporary files will be created. This folder must already exist. Surfer Grid files (*.grd*) are created here. When plotting *.gst* files, text files for each time period are also created here.
Folder for output files	Location of the folder where the output files will be created. This folder must already exist.
Folder containing background images (optional)	If you wish to include a background image, this is the location of the folder containing the background files.

Table 2.1 - **Create Exports from Surfer**: input relating to all files

Inputs relating to each file	
Input	**Description**
Filename	In this column list the filenames of the *.gst, .glt* and *.gtd* files to be plotted. Remember to include the file extension.
Column to plot	Column number in the file of the pollutant-averaging time output you want to plot. If you want to plot more than one output from the same file, create another row with the same filename and a different column number. The **Find column numbers** worksheet described in APPENDIX A can help identify the correct columns.
Levels file	Name of the level file (remember to include the file extension *.lvl*)
Background image file	If you would like to include a background image, enter the file name of the background image. The background image file must have the co-ordinates embedded within it e.g. a TIFF file with an accompanying world file (*.tfw*) or an image in GeoTIFF format. See the Surfer help for details.
Opacity of contours (%)	If you are using a background image, enter the opacity of your contours. The opacity must be a percentage between 0 and 100. An opacity of 100% would not allow the background image to be visible; an opacity of 0% would mean the contours would not be visible.

Table 2.2 – **Create Exports from Surfer**: input relating to individual files

Step 5 Click on the **Settings** button of the **Create Exports from Surfer** worksheet and the **Settings** worksheet shown in Figure 2.3 will appear.

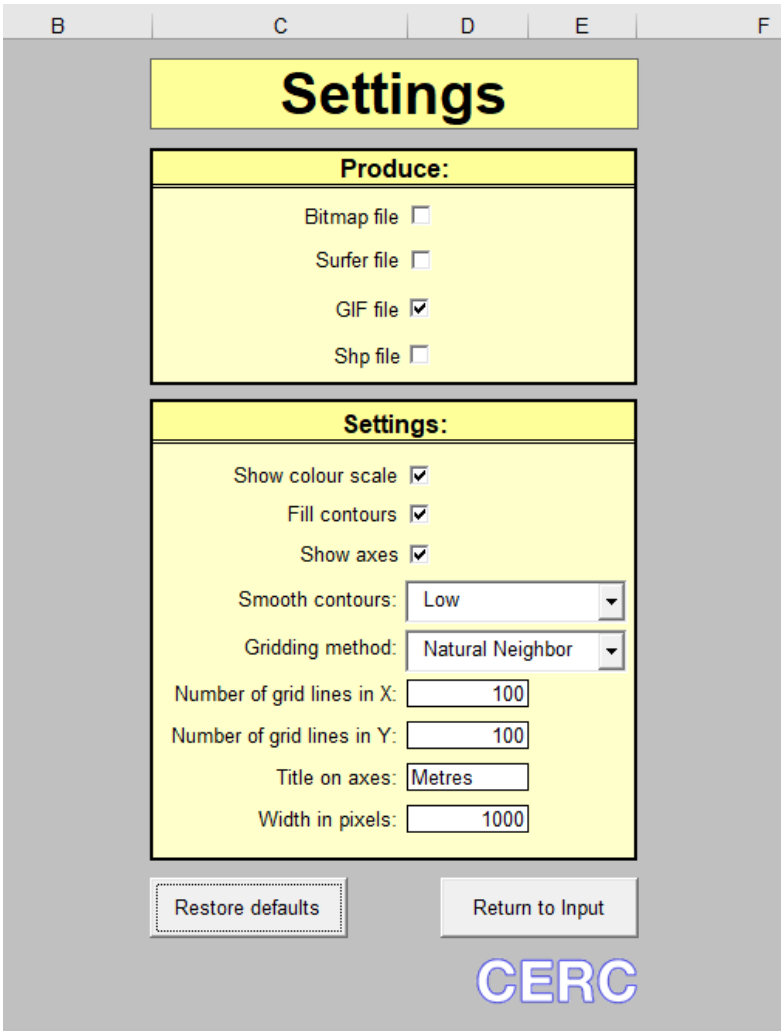

Figure 2.3 –Shows the **Settings** worksheet with default settings.

Step 6 Fill in the **Settings** sheet shown in Figure 2.3 to control the contour plot production. Table 2.3 and Table 2.4 describe the different parameters.

Output to be produced	
Input	**Description**
Bitmap file	Produce a bitmap image.
Surfer file	Produce a Surfer *.srf* file. Surfer *.srf* files can be opened in Surfer and the contour plot copied and pasted into another application, for instance for a report or presentation.
GIF file	Produce a *.gif* file. *.gif* files are used by the Slideshow Creator program.
Shp file	Produce an ESRI shapefile. Shapefile format can be useful for exporting contour plots into other applications e.g. Google Earth.

Table 2.3 – **Settings**: list of output options. Several options can be selected at once.

Output settings	
Input	**Description**
Show colour scale	Tick this box to include a legend in the contour plot. (Shapefiles never include a colour scale.)
Fill contours	Tick this box to create colour-filled contours.
Show axes	Tick this box to include axes in the contour plot. (Shapefiles never include axes.)
Smooth contours	Select the degree of smoothing for the contour lines. See the Surfer help for details.
Gridding method	Select the gridding method for the contour plot interpolation. See the Surfer help for details.
Number of grid lines in X	Choose the number of grid lines in the X direction.
Number of grid lines in Y	Choose the number of grid lines in the Y direction.
Title on axes	Enter the text for the title of the axes.
Width in pixels	Enter the width of the image in pixels. The height will be calculated to maintain the aspect ratio of the area being plotted.

Table 2.4 – **Settings**: detailed settings

Step 7 Once you have adjusted the **Settings**, click **Return to Input** and click the **Run!** button. Surfer will appear and begin to create the contour plots. Wait until the process has finished.

You will find your output files in the folder you chose for output.

- *.glt* files contain a single set of ADMS output values from long-term calculations. The **Surfer Automation** tool produces a single image (output file) for each line in the **Create Export from Surfer** worksheet. The output files are named *InputFilename_Col.** where *InputFilename* is the name of the original *.glt* file and *Col* is the number of the column that was plotted.
- *.gst* files and *.gtd* files contain multiple sets of ADMS output values, one for each line of meteorological data. The **Surfer Automation** tool produces one image (output file) for each met line in a *.gst* file or *.gtd* file for the column specified in the **Create Export from Surfer** worksheet. The output files are named *InputFilename_Col_Num.** where *InputFilename* is the name of the original ADMS model output file, *Col* is the number of the column that was plotted and *Num* is the number of the met line in the *.gst* or *.gtd* file.

SECTION 3 Slideshow Creator

SECTION 2 described how the Surfer Automation program can be used to create a series of static images in ***.gif*** files by contour plotting ADMS model output. The Slideshow Creator program can then be used to convert these images into an animated ***.gif*** file with user-defined captions. The animated *.gif* file format is supported in a number of programs, for example PowerPoint and most web browsers.

3.1 Requirements

To use the *SlideshowCreator.xlt* spreadsheet program you will need:

- Microsoft Excel 2016 or later (desktop app only)
- ImageMagick. ImageMagick is free open source software created by ImageMagick Studio LLC. This program was designed to work with ImageMagick version 6.5.4 which can be installed from your ADMS model installation directory, in the subdirectory *Support\ImageMagick*. To install ImageMagick run the executable in the above directory and follow the instructions that appear. If Image Magick is not installed when you attempt to create a slideshow a warning will appear as shown in

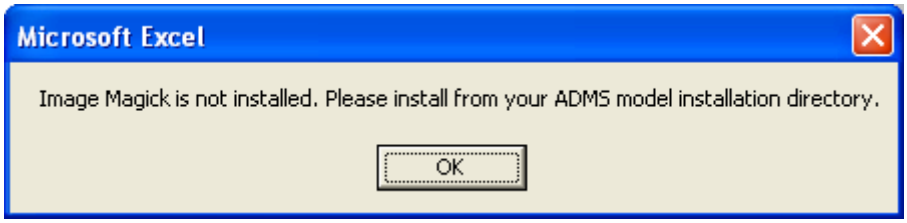

Figure 3.1 - Image Magick not installed warning

Please check with your IT personnel for your organisation's procedures for installing software.

3.2 Step-by-step instructions for creating slideshows

Step 1 Collect the.*gif* image files to be included in the slideshow in a single folder. The slideshow will use the image files in alphabetical order by their file names: you may need to alter the names so that when they are put into alphabetical order, they are in the same order as you want them to appear in the slideshow.

Step 2 Open *SlideshowCreator.xlt* in Excel and enable macros. You will find the file in a sub-directory *Templates* of your ADMS installation directory.

Step 3 You will see the **Create Slideshow from GIF Images** worksheet as shown in Figure 3.2.

- Under **Folder containing input files** enter the location of the folder where you have collected the *.gif* files to be included in the slideshow.
- Under **Folder for temporary files** enter a folder location where the temporary files will be created. This folder must already exist.
- Under **Folder for output files** enter the location where the animated *.gif* file will be created. This folder must already exist.

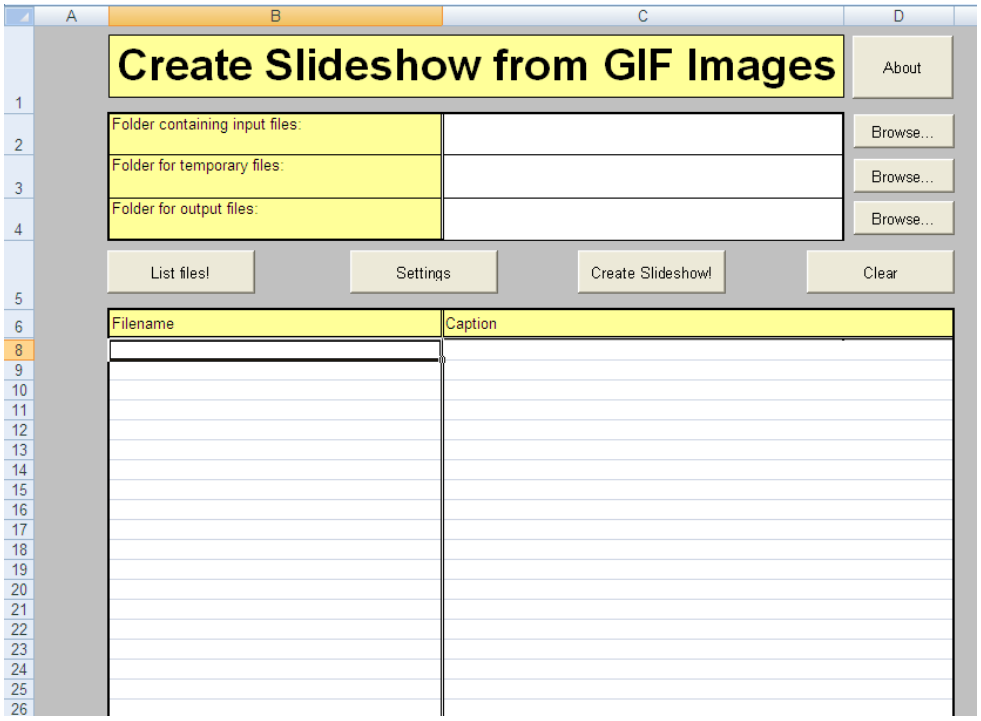

Figure 3.2 – **Create Slideshow from GIF Images** worksheet

Step 4 Click the **List Files!** button. The program will list all the *.gif* files in the **Folder containing input files**, as shown in Figure 3.3.

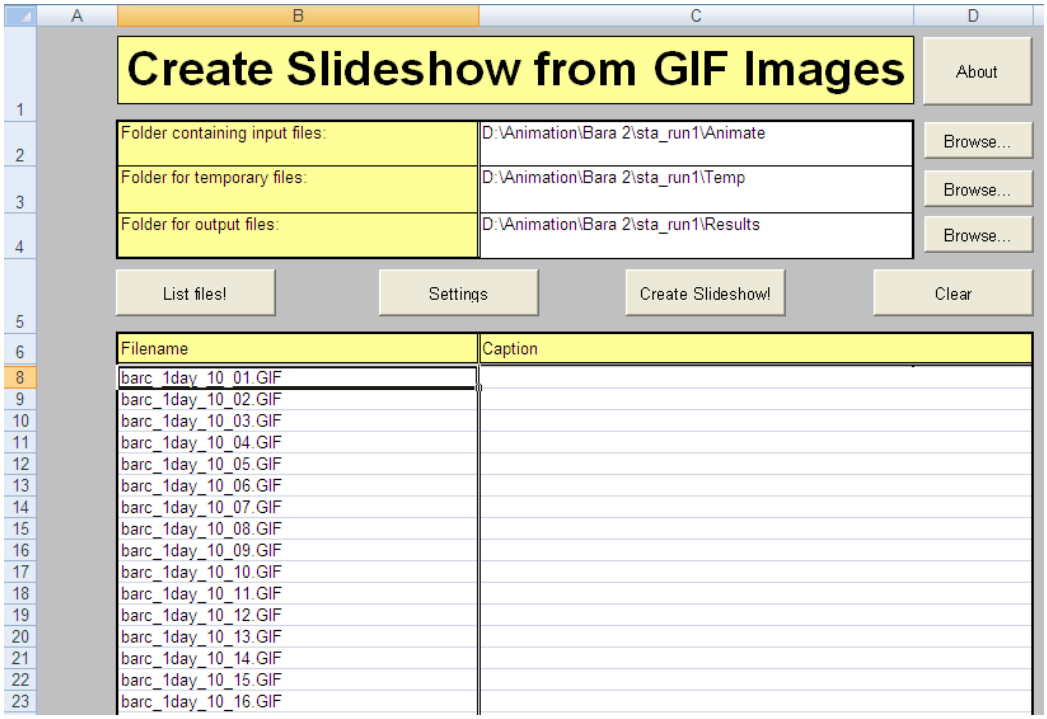

Figure 3.3 - **List Files** results

Step 5 For each file you can add a **Caption** that will appear with the *.gif* in the slideshow.

You can use Excel formulae and tools to create the captions. For example in Figure 3.4 the first caption was typed by hand and then the Excel auto fill tool was used to create the subsequent captions. See the Excel help for details.

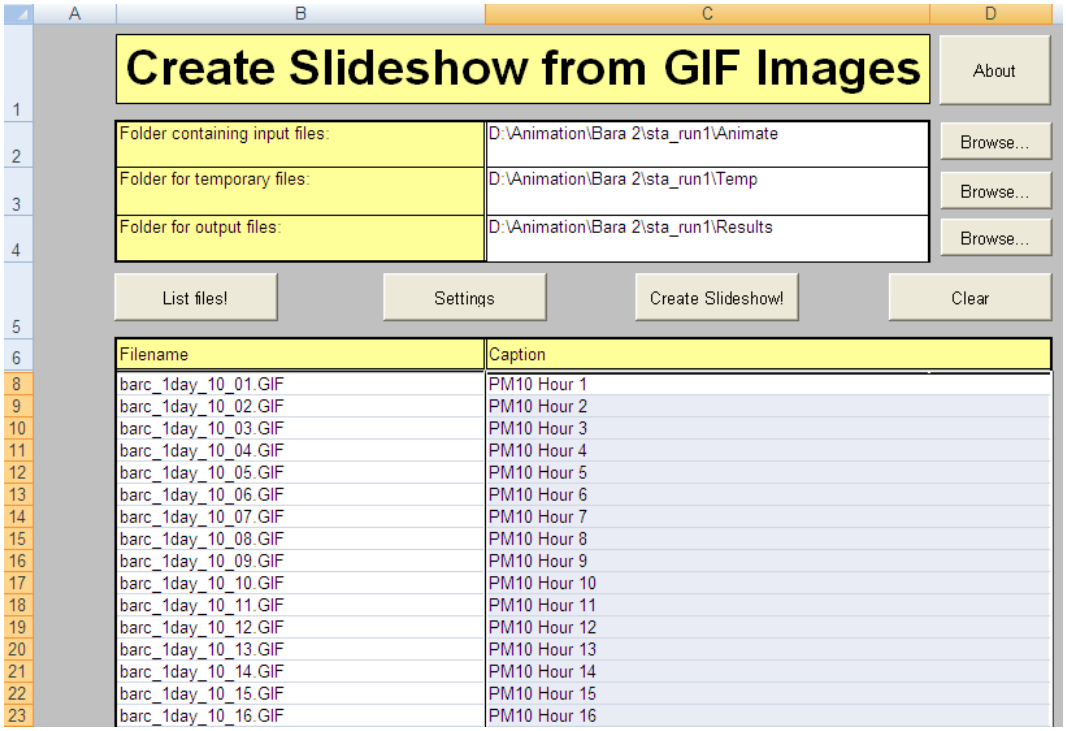

Figure 3.4 – List of files with an accompanying caption for each file

Step 6 Click on the **Settings** button and the **Settings** worksheet shown in Figure 3.5 will appear.

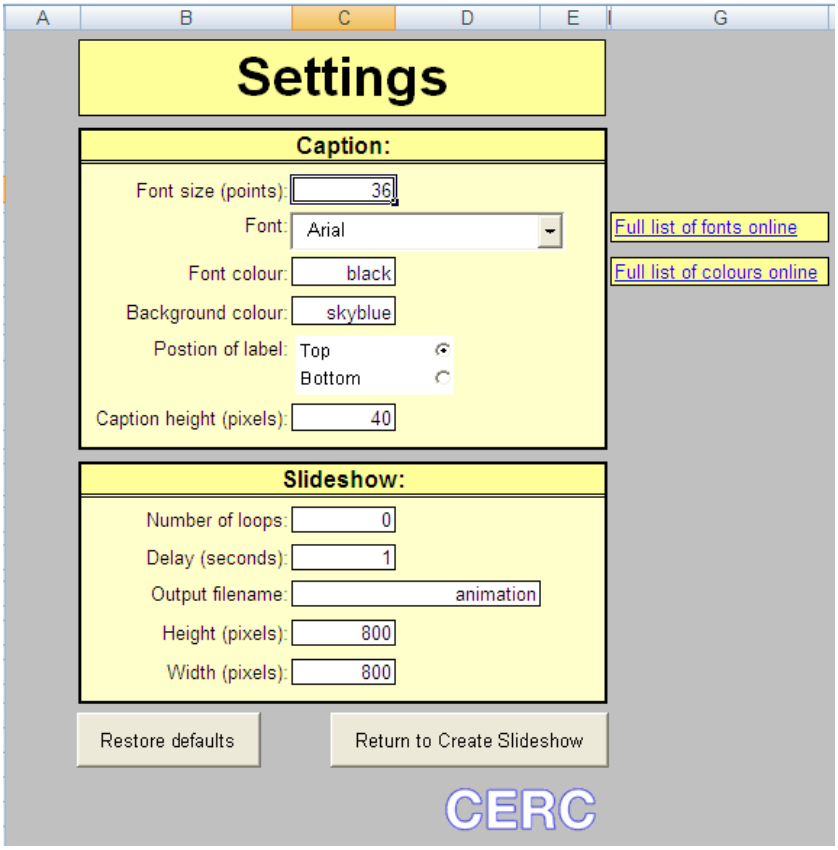

Figure 3.5 – **Settings** worksheet showing the default settings.

Step 7 In the **Settings** worksheet you can change how the captions are displayed and set the properties of your slideshow. Table 3.1 and Table 3.2 describe the **Settings** parameters.

Caption settings	
Input	**Description**
Font size (points)	Size of the caption for each frame in points. The **Caption height (pixels)** controls the size of the area available for the caption, and may need to be adjusted if the font size is changed.
Font	The font to use for the caption. A full list of all the fonts available can be found by clicking **Full list on fonts online**[1] on the right.
Font colour	The colour for the caption text. A list of all the text and background colours that can be used can be found by clicking **Full list of colours online**[2] on the right. This link also explains how to use the RGB colour scheme to use user-defined colours.
Background colour	The background colour for the caption. See the remarks under **Font colour** above.
Position of label	Whether the caption is above the image or below.
Caption height (pixels)	The size of the area available for the caption, in pixels. See the remarks above under **Font size (points).**

Table 3.1 – **Caption** settings.

Slideshow settings	
Input	**Description**
Number of loops	The number of times the slideshow will be repeated. Entering zero will cause the slideshow to repeat indefinitely
Delay (seconds)	The time for which each slide (image with caption) is displayed.
Output filename	The filename for the output animated *.gif* file.
Height (pixels)	The height of each image in the slideshow in pixels, excluding the caption.
Width (pixels)	The width of each image in the slideshow in pixels.

Table 3.2 – **Slideshow** settings.

The default settings are shown in Figure 3.5. Figure 3.6 shows a slideshow created using the default settings.

[1] https://www.imagemagick.org/discourse-server/viewtopic.php?f=1&t=6233
[2] https://imagemagick.org/script/color.php

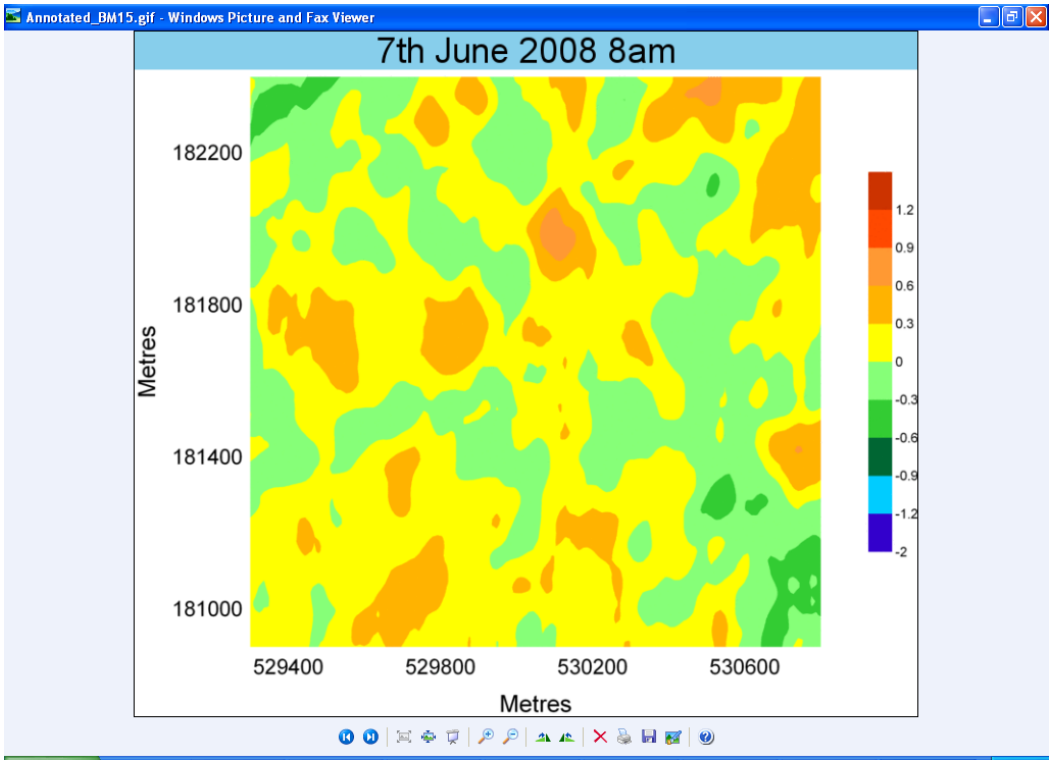

Figure 3.6 – Slideshow created with the default settings

Step 8 Create the slideshow by clicking the **Create Slideshow!** button on the **Create Slideshow from GIF Images** worksheet. Once complete a message will appear telling you your animation has been created successfully.

Step 9 To view the slideshow, double click the animated *.gif* file in Windows Explorer to open it in the default application.

Two folders are created in your temporary directory when the program runs, called Resized *and* Annotated. Resized *contains the files resized to the pixel size entered on your* ***Settings*** *worksheet.* Annotated *contains the images with their captions. The files created in these directories are deleted each time the program starts to run.*

APPENDIX A Creating Level Files

A level file (*.lvl*) controls the appearance of a contour plot in Surfer. Section A.3 gives step-by-step instructions explaining how to create level files for use with the Surfer Automation tool. First, Sections A.1 and A.2 describe some features of the Surfer Automation tool that help in creating level files. These are, the **Find Column Numbers** worksheet to help select the column containing the correct pollutant-averaging time to be plotted, and the **Find Maximum and Minimum** worksheet that determines the values that need covered by the level file.

A.1 Finding column numbers

The **Find Column Numbers** worksheet can help you identify the column number of interest (Figure A.1). Select the file of interest, click **Find column numbers** and the parameters for each column are displayed in the table below.

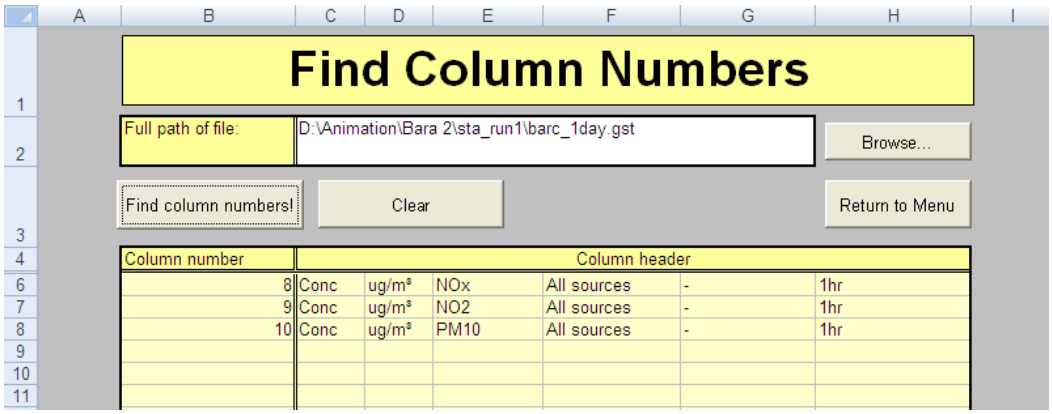

Figure A.1 - Find Column Numbers

A.2 Finding max and min values in ADMS output files

The default levels created by the ADMS contour plotter are optimized for the values found in the specific ADMS output file being plotted. You may wish to create a single level file that can be used for several different ADMS output files, especially if you are creating an animation, as for comparison purposes the plots should have the same scale.

There is a tool in the program tells you the maximum and minimum values for each set of output without the need to plot all the files. Knowing the maximum and minimum values then allows a suitable level file to be created. If you click on **Find max and min values** on the Surfer Automation menu, it will open the tool – shown in Figure A.2 below.

If you want to find the max and min values across more than one column in the same file, create another row with the same filename, but a different column number.

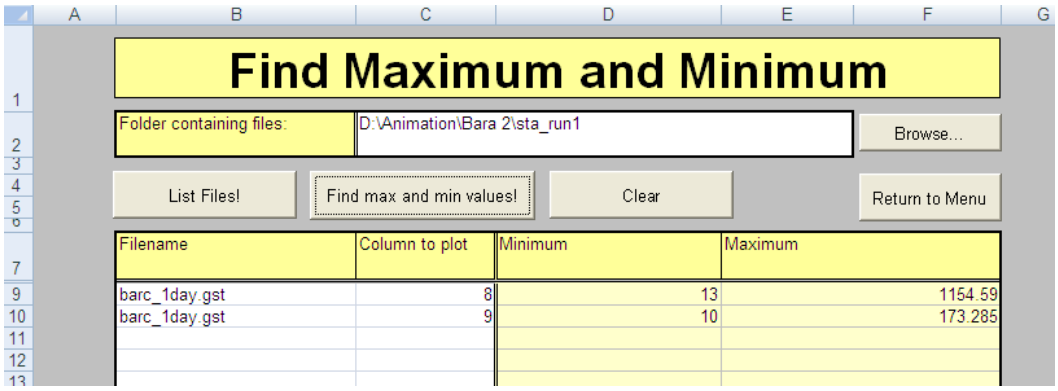

Figure A.2 - Find max and min values for level file SurferAutomation.xlt

To use the **Find max and min values** tool, enter the:

Input	Description
Folder containing files	Either enter or browse to the location of the folder containing the ADMS model output files
Filename	Input each file's name (remember to enter the file extension on the end)
Column to plot	This is the column number within your file of the pollutant you want to plot.

Table A.1 – Input values for find maximum and minimum sheet

A.3 Creating level files

Step 1 Use the ADMS **2-D Output Plotter** (as shown in Figure A.3) to plot contours in Surfer from your model output. See the main ADMS manual for details. Remember that the default levels created by the ADMS contour plotter are optimised for the values found in the specific ADMS output file being plotted.

Step 2 Once the contour plot has been plotted in Surfer, click on the **ContourPlot** layer in the **Contents** window to bring up this layer's properties in the **Properties** window (if you cannot see either of these windows, ensure that **Contents** and **Properties** are both ticked in the **Show/Hide** section of the **View** tab). Go to the **Levels** tab of the **Properties** window and click the **Edit Levels**... button to bring up the **Levels for ContourMapFram: ContourPlot** window (as shown in Figure A.4).

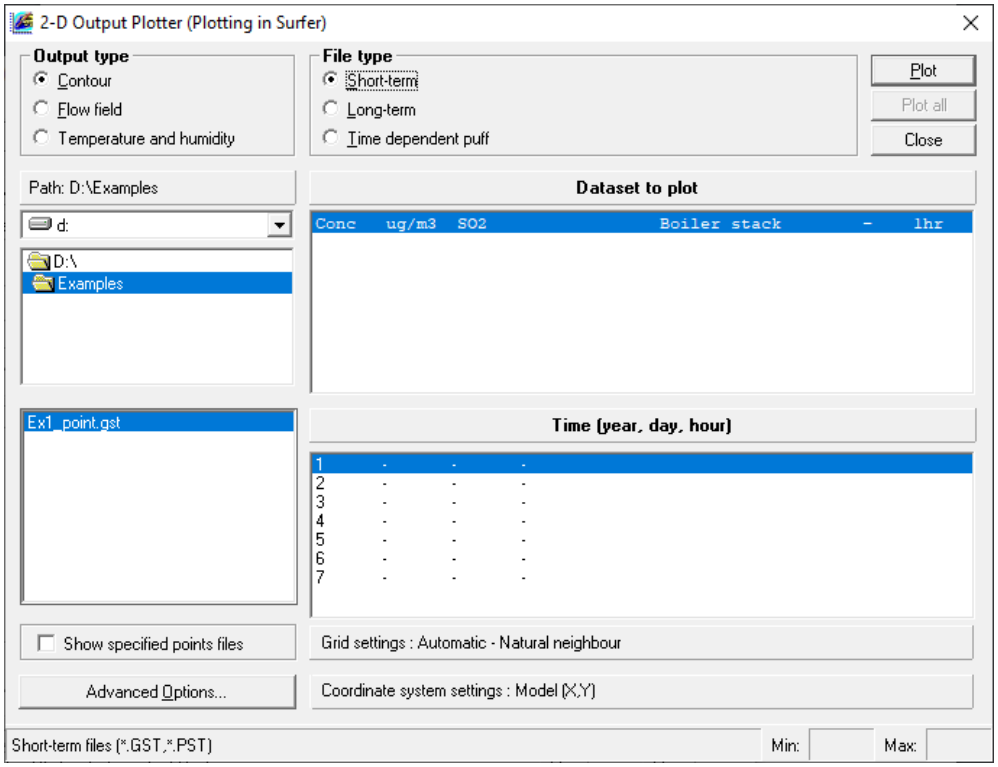

Figure A.3 - ADMS 2-D Output Plotter (Plotting in Surfer)

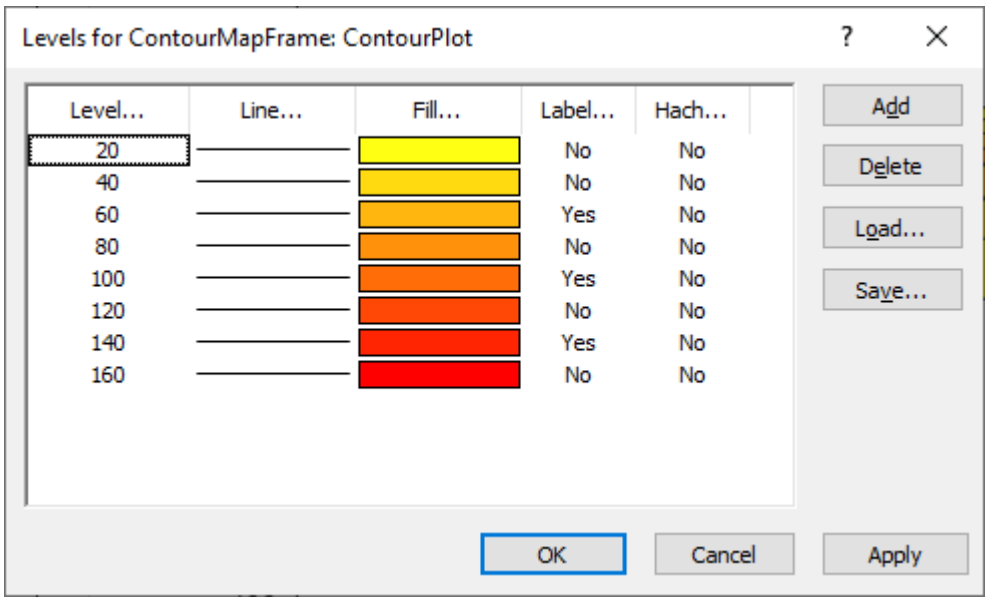

Figure A.4 - Level Properties

Step 3 The contour levels can be customized here to control the contour plot appearance. Here you can change the maximum and minimum values so that the level file can be used for multiple plots. See the Surfer help for details. The **Save**... button allows you to save a level file that will reproduce the same appearance in another plot.