Oriana

Version 3

Version 3 addendum to the Users' Manual

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Table of Contents

1 Introduction

Welcome to the manual addendum for Oriana version 3, the circular statistics program for Windows. This addendum will describe the new features in version 3 of the program. It is meant to help existing users of version 2 to explore the new features of the new version.

2 New features in version 3

General features

- New user interface
  - o Multiple toolbars 7 that can be placed at any position around the main window, or can be set to float outside of the main window. Buttons shown on each toolbar can be customized.
  - o Multipage dialog boxes (e.g. for graphs and statistics) now have tabs down the left side for easier access, particularly for graph dialogs with numerous pages.
  - o Graph window 8 now has improved tabs scheme to allow user to more easily find specific graphs when a large number have been created. The tabs now run down the left hand side, and the tab for each graph is now labeled with the variable(s) used. Multiple graphs created at the same time are grouped together under a tab labeled with the graph type and the time created.
  - o User can select from a number of different color schemes 55, many with attractive gradient effects.
- Full Vista compatibility.
- Now uses standard Windows XP/Vista file open and save dialog boxes.

Data handling

- Implemented filtering 11, restricting analyses and graphs to just cases that meet a certain criterion (e.g. Angle > 90 or Month = June).
- Circular data can now be entered as x/y coordinates 31 defining the beginning and ending point of a vector. The new **Data|Convert XY to Vector** command can then be used to convert those points into vectors (angle and length).
- Added a **Data|Define Vector Pair** 34 option to flag pairs of Angle/Linear variables that define a vector. These pairs can then be used to automatically pick the correct pair of variables in the two-variable graph dialogs, to calculate weighted mean angle in basic statistics, and to draw a weighted mean vector in the graphs.
- Modified data editor to work more like Excel - typing into a cell in edit mode replaces contents, not appends as it previously did, and tab key now moves cell focus to the right.
- Added export of results to an Excel file.
- Added option to export all result pages at once, rather than

having to do each page separately.

New graph types

- Circular scatterplots - The Two-Variable Vector plot type has been expanded and generalized into a Circular-Linear plot type 28. This has the option to create a circular scatterplot, where the position of a point on the circular grid indicates the value of the linear variable, and the position around the circular graph its circular variable. An option to have the linear variable represented by a wedge has also been added to the existing vector and bar options.
- Raw Data Plots - A number of new forms of raw data plots 27 have been added. Besides the type in Oriana 2, where the points extend from the outer margin inwards, the points can now extend from the margin outwards, or from the center outwards. The raw data plots have been moved to a separate menu item from the histogram types.

New graph options

- The segments in two-variable histograms 46 can now be extensively customized:
  - Specify number of segments
  - Use a logarithmic scale when dividing data into segments
  - Have a separate segment for each unique value
  - Set exact boundaries of each segments
- A large number of new options are available for the circular axes 43.
  - Option to have a more finely divided circular scale (e.g. rather than having cross lines at just 0°, 90°,180°, 270° the user can have lines every 45°, 10° etc.). User can also specify whether the minor divisions should be labeled.
  - Option to specify the number of gridlines on XY graphs (distribution graphs and two-sample scatterplots).
  - User-defined orientation of circular graphs (e.g. user can specify that the 0°/N is placed at the top, right, left or bottom, top-left, etc.). User can also specify clockwise or counterclockwise direction.
  - Add manual scaling of axes for scatterplots with linear/angle/axial data.
  - Option to use N, E, S, W (& NE, etc.) labels on histograms when plotting regular angle variables.
  - Allow user-defined abbreviations for compass directions. Through the Preferences dialog the user can specify the abbreviations for their local language (e.g. O for Ouest in French rather than W for West). These abbreviations are

also used in the data editor as well as other output.
  - User definable decimal places for axis labels.
  - Ability to rotate axis labels for XY graphs and linear histograms.
  - Option for log scaling of the circular grid in circular histograms as well as both axes in XY scatterplots.
  - Option for having the circular scale of histograms labeled with percentage of total frequency rather than the actual frequencies.
  - Option to adjust the diameter of the circle at center of circular histograms
- A number of new options related to symbols 38 are available.
  - The shape of symbols for raw data and scatterplots/distributions plots can be set by the user.
  - Option on two-variable vector plots, scatterplots, Q-Q plots and distribution plots to plot different symbols or colors 38 for different subgroups on a single graph. With version 2 subgrouped data produced a separate graph for each group.
  - When subgrouped data are being plotted on raw data and scatterplots/distributions plots, each subgroup can be indicated by different symbols, different color, or both.
  - Allow user to specify whether circular scatterplots and raw data plots have symbols rotated around the centre of the graph, or all with same orientation (e.g. triangles pointing out from centre or all pointing up).
- Allow user to set the color 36 of confidence intervals on circular plots that correspond to unreliable standard errors (previously always red).
- Allow user to set thickness of mean/r lines 37
- Added an option to display a table of frequencies and percentages used to create histograms.
- Option to have mean vector weighted 34 by a linear variable (such as wind speed).
- Added option to export and print all graphs at once, rather than having to do each individually.

Statistical analyses

- Add calculation of the weighted mean angle, with weighting by length of the vector.
- Add calculation of the basic stats of weighting variable.
- Previously F-tests only printed estimated overall mean if $p > 0.05$ (no significant different between the pairs). Now all estimated overall means are calculated and printed, but

those for tests with significant differences are flagged as possibly inaccurate.

Other changes:

- Saving desktop to file has been made more bullet-proof.
- Dialog box settings for common graph options (lines, colors, etc.) are now saved individually for each graph type, whereas before all graphs had the same default settings.
- Edit Graph dialog now goes straight to previous page displayed, rather than the first (main) page. This makes it easier experiment with settings.
- Bug fix: histograms of Day of Week variables were being drawn with the correct 7 classes, but if Edit Graph called then graph was redrawn with 6 classes.
- Fixed X-axis labeling of linear histogram graphs for Day of Week and Week of Year variables (they were both being scaled 0-400).
- Linear histograms of compass directions had N at the origin of the graph, rather than centered on first bar, as in other discrete types. Fixed.
- The ReverseXY Axes option wasn't reflecting current state when graph edited – checkbox was always unticked. Fixed.
- Fixed Undo/Redo descriptions for the Change Layout option.
- Fixed bug in Chi-square pairwise test where some class width values (like 14) would give range check error. A similar error could sometimes occur with Axial data.
- Previously the Data|Fill dialog was restricted to entering an angle for the mean when doing a von Mises random fill, even if variable was another circular type. Fixed so you can enter means in the appropriate form for the variable type (e.g.12:00 or June).
- The Data|Fill dialog now has an option to do incremental date filling by weeks.
- Improved sorting of the subgrouping variable. Previously it would sort data by numeric index (e.g. the order subgroups appear in the dropdown box). Now it will sort subgroup data alphabetically or numerically.
- Speeded up adding new graphs when there are a large number of previous graphs.

3 User Interface

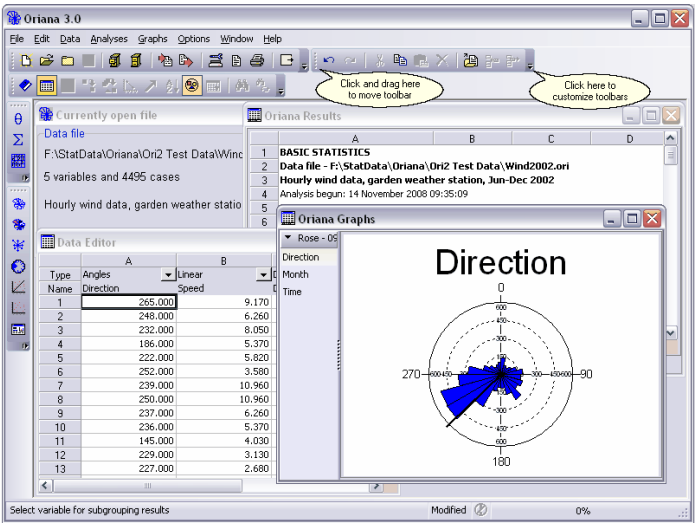
The user interface of Oriana has been updated. In particular, the main program window and the Graphs window now work in a different way. The following sections describe the major new features.

3.1 Main window

The Oriana program interface consists of a single main window (a so-called multiple document window). A number of windows can be displayed within this main window, as shown below.

All these windows relate to a single data file; if you wish to have data and results from a second data file on your screen you can run Oriana again to create a second main window.

The image below shows a typical layout of the main window during an analysis session.



Note that most of the commands from the menus are also represented as buttons on the toolbars at the top and left hand side in the image above. These toolbars can be customized to show just the buttons you want, and can be positioned anywhere you would like.

There are eight different toolbars that you can display, one for each top level item in the main menu. You can choose which toolbars to display by right clicking the mouse in an empty area next to one of the toolbars and clicking on the name of the desired toolbar. The buttons displayed on each toolbar can be customized by clicking on the downward pointing triangle on the right hand side of the toolbar, hovering the mouse over the "Add or Remove Buttons" item, then over the toolbar name. A list of all possible buttons for that toolbar will appear, with a checkmark next to those that are visible. You can then click on the items to check or uncheck the desired buttons.

The toolbars themselves can be moved around by by clicking and holding the mouse on the bar at the left end of the toolbar (indicated above). The toolbars can be moved around to different positions at the top or left hand side of the main window, as shown above. They can also be placed on the right hand side or bottom of the window by dragging them to those positions. Finally you can drag the toolbar to float over the center of the window, or float outside of the window.

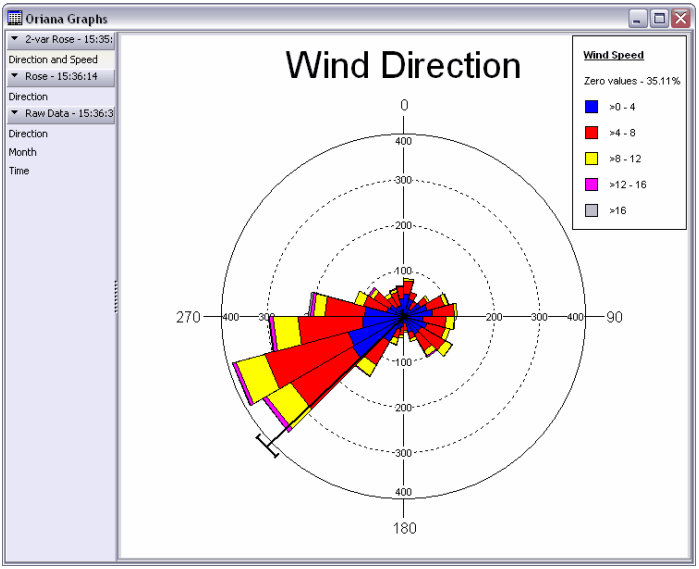
At the bottom of the window is the status bar that provides information about the program. The large section to the left displays hints, giving a fuller description of the menu item or toolbar button currently under the mouse pointer. It also describes the current status of the program when it is doing calculations or other long operations. The next section displays the word "Modified" if the contents of the window that is currently on top (the graph window above) have been modified. Next to this is a button that lights up when the program is doing long operations, such as loading large files or doing long calculations. You can stop the current activity by clicking on this button. Finally there is a progress bar that indicates how much of the current operation has been completed.

3.2 Graph windows

The graph window displays all the graphs so far produced, one on each page. When you first create a graph 12 you can change various settings that determine how the graph is drawn. You can then modify the appearance of the graph by choosing the **Graph|Edit graph** 55 menu item, or by right-clicking on the graph and choosing **Edit Graph**.

The size of the graph can be changed by resizing the window.

Some of the graphs have a fixed length/width ratio, but the shape of others can be adjusted by changing the shape of the window.



The navigation bar at the left side allows you to select which graph you would like to view. Each time you create a graph (or series of graphs) a bar is created giving the graph type and the time of creation. Below this is one or more tabs labeled with the variable(s) used in the graph. If more than one graph is created (because you either have multiple variables selected or you are using subgroups) then these all occur grouped together under the same graph type bar. You can show or hide the individual tabs under each bar by clicking on the downward pointing black triangle on the left hand side of the bar.

If you click the right mouse button over this navigation bar you will see a menu with the options **Open all** (to open up all the bars to show all the tabs) and **Close all** (to close all the bars so all tabs are hidden). There are also options to delete the graph page corresponding the the tab clicked, and to delete the whole group of pages clicked. Right clicking on the graph itself will give a menu with the option to delete that graph.

4 Tutorial

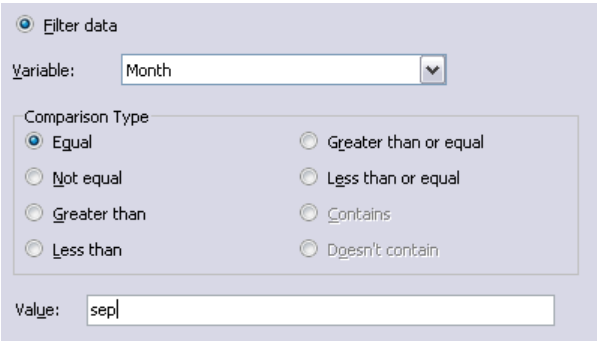
Some new tutorials have been added, and others updated, to describe how to use some of the new features.

4.1 Filtering data

There are often times when you want to analyze just a subset of your data, rather than all of it. You may want to analyze data from just a single month, rather than the whole year, or only those data for which an associated linear variable exceeds a certain value. You can do this through the **Filter Data** 32 dialog box. You can access this in two ways: either choose the **Data|Filter Data** menu item after a data file has been opened, or click on the **Filtering** button on the **Select** page of any analysis or graph dialog box.

To define the subset of data you wish to use you must select a variable that contains the data you want to use to define the subgroup, then declare the criterion to filter on. Lets say we want to calculate statistics of the wind data in the Wind2002.ori example data file in September alone. To do this:

1. Open the Wind2002.ori data file.
2. Choose the **Data|Filter Data** 32 menu item.
3. Click on the **Filter Data** button.
4. Select the variable "Month" in the **Variable** drop-down box.
5. In the **Comparison Type** section click the "Equal" button.
6. In the **Value** box enter "sep" for September.



7. Click **OK**.

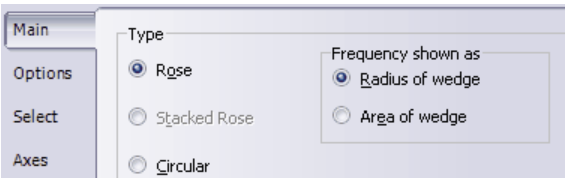
The Status window will now be updated to show you are filtering on the selected criterion. Now when you calculate basic statistics, as in the Calculating Statistics tutorial, only those data recorded in September will be used. The number of observations in the analysis will be just 700, rather than the 4495 in the full data set.

4.2 Plotting graphs

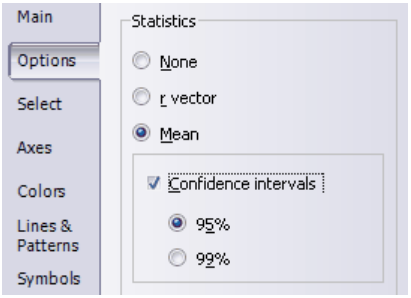
Oriana version 3 has a large number of new options on the graphs dialog boxes, plus some old options have been moved. The following few tutorials take you through these new options.

Diagrams are produced through the **Graphs** menu. We will produce some rose diagrams and a distribution plot of the Wind2002.ori data.

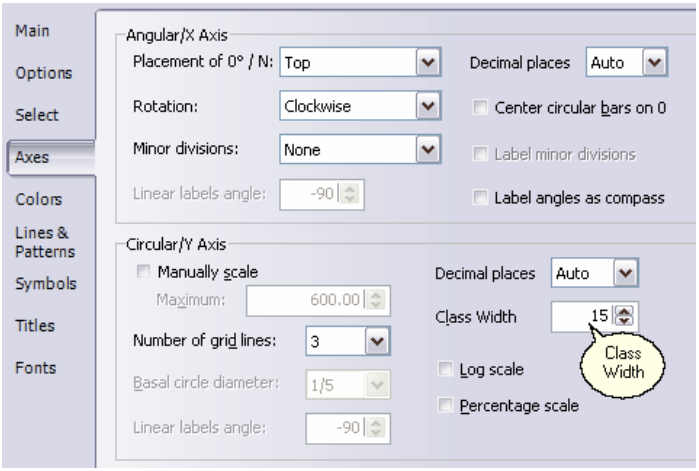
1. Open the Wind2002.ori data file.
2. Choose the **Graphs|Histogram** menu item. A dialog box will appear.
3. On the first page make sure that **Rose** is ticked as the graph **Type**.



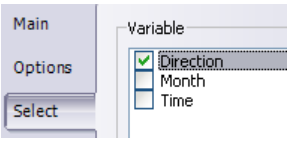
4. Click on the **Options** tab to go to that page. In **Statistics** tick the **Mean** option, along with **Confidence Intervals**.



5. Set the **Class Width** to 15 to set the width of the individual segments of the graph to 15°.



6. Click on the **Select** tab, then untick the Month and Time variables, so that only Direction is ticked.

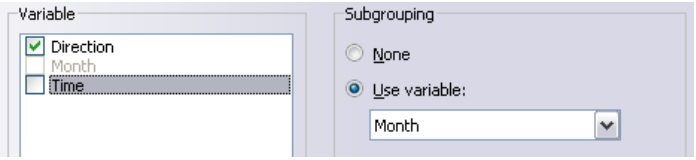


7. Press **OK**. The Graphs 8 window will open, if it isn't already visible. A new page will be added, to which the plot will be drawn.

This diagram shows the wind direction distribution of all the data in the file. Now let's try creating a rose diagram for each

month.

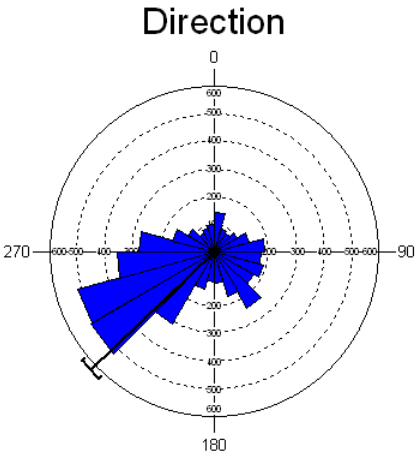
1. Again choose the **Graphs|Histogram** menu item. All the options will be at the same settings used previously, so you don't need to follow steps 3-5 above, unless you wish to change them.
2. On the **Select** page, in the **Subgrouping** box, tick the **Use variable:** button then select Month from the drop-down box below it.



3. Press **OK**. Seven new graphs will be added to the Graphs window, one for each month from June-December. These demonstrate the variation in the wind direction through the seasons, with it being primarily southwesterly in the summer, but more varied in the autumn and winter.

4.3 Adjusting graph axes

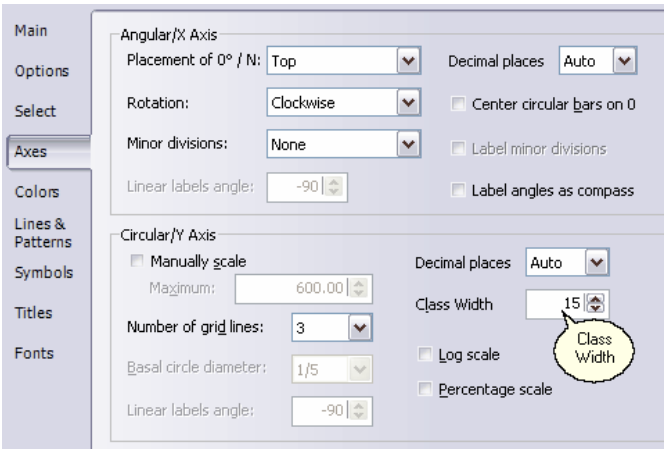
Oriana has a wide variety of options that allow you to customize the appearance of the graph. Let's first try out some of the options for changing the axes of the circular graph. Here is what our graph looks like so far:



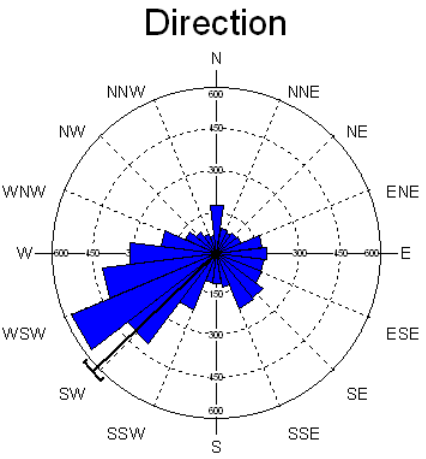
1. With the graph window topmost, showing the graph you want to change, choose the **Graphs|Edit Graph** menu

item. The **Histogram** dialog box will appear again.

2. Now go to the **Axes** page. This has two sections, the first for adjusting various aspects of the Angular or X Axis. This is the one around the circumference of the circle, which represents the angles, time of day, or other circular data. In the graph above it is labeled 0, 90, 180, 270. The second section is for changing the Circular or Y Axis. This is the set of concentric rings that provide the grid representing the frequencies in the histogram.

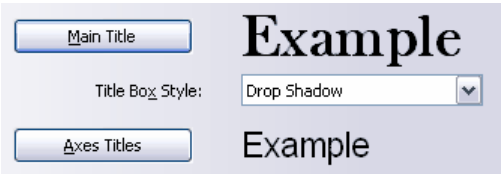


3. First lets change the Angular axis. Notice the the first wedge in the histogram starts at 0° and goes to 15°. With directional data, particular those based on the compass (like our wind direction data) some people prefer to have this first bar centered on 0°, rather than starting there. We can do this with the **Center circular bars on 0** option. We can also tell Oriana to label the axis with compass directions (e.g. N, S, etc.) rather than the actual angles. The **Label angles as compass** option will do this.
4. By default Oriana will divide the graph into four sectors, for N, E, S and W. We might want more gridlines than this. We can use the **Minor divisions** option to specify that we want a medium number of divisions. With compass labels this will give us 16 divisions. We can also tick the **Label minor divisions** option so that the compass directions such as NNE and SW are used.
5. Finally we can reduce the number of circular gridlines in the **Circular/Y Axis** section with the **Number of grid lines** option. Let's set this to 3. Now press **OK**. Our graph now looks like this:



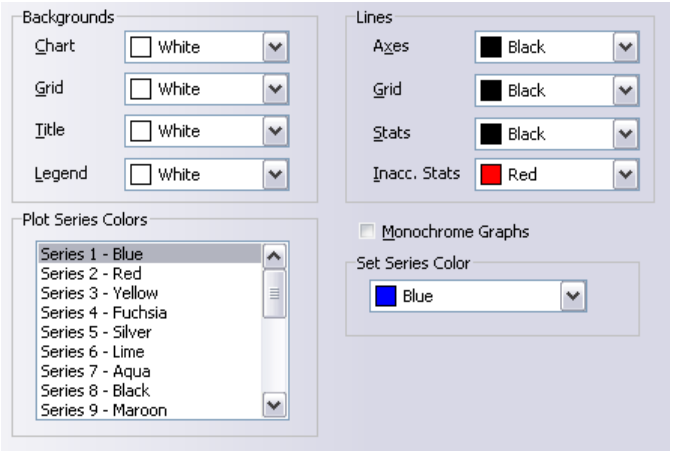
4.4 Customizing graphs

1. Let's customize other aspects of the appearance of the graph. Choose the **Graphs|Edit Graph** menu item. The Histogram dialog box will appear again.
2. If you wish to change any of the options or even the graph type you can do it here. We can change the current graph into a circular histogram type by choosing the Circular type on the **Main** page. Also, on the **Options** page we can change the mean direction indicator into a vector, the length of which reflects the r value for this set of data, by selecting the R Vector option.
3. Go to the Fonts page by clicking on the tab at the side labeled **Fonts**. Click on the button labeled **Main Title**. A standard font dialog will appear. Use this to change the font to be used for the graph title, then press OK. Just below this is a drop-down box labeled **Title Box Style**. Use this to change the box style to **Drop Shadow**.

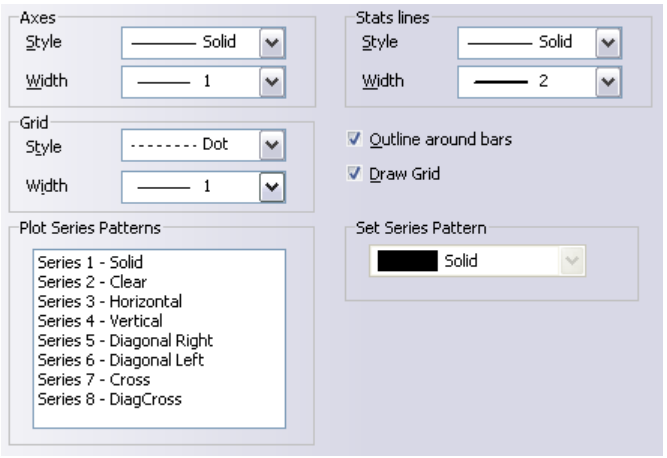


4. Press **OK**. The graph will now be changed to a circular histogram with an r vector, the font of the main title will be changed to the chosen one, and a box will have appeared around the title. These new settings will have been saved, so all future graphs will be of this appearance, until you change them again.
5. Many other options can be changed to alter the appearance. For example, we can change the text of the title that appears at the top of the graph. By default this is the name of the variable. Choose the **Graphs|Edit Graph** menu item again, go to the **Titles** page and change the **Main Title** to "Wind Direction". You could also remove the title completely by clearing the checkbox next to the title.

6. Now go to the **Colors** page. The bars/segments of the histograms are currently plotted in blue. You can change this by going to the list box titled **Plot Series Colors**, selecting **Series 1**, then changing the color with the drop-down box labeled **Set Series Colors**. If this plot were a stacked or two-variable graph then you could use the other series to change the colors of other segments of the bars.



7. You can also use this page to change the background color of various parts of the graph, and also of the lines. Click **OK** to see the results.
8. You may wish to produce a monochrome graph, with shaded areas rather than colored ones, for reproduction in a print journal. You can do this by going to the **Colors** page and ticking the **Monochrome Graphs** option. This will disable the color selection options.
9. Now go to the **Lines and Patterns** page, where you can use the **Plot Series Patterns** and **Set Series Pattern** option to configure the various shading patterns, in a similar way that you did with the colors.

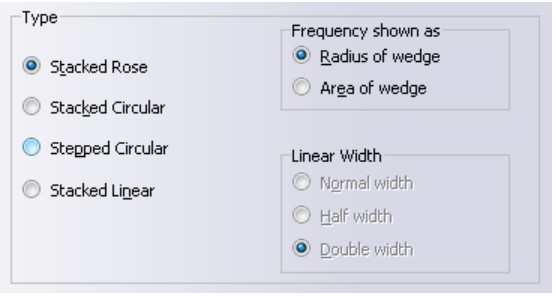


10. This page also lets you customize the lines used in the graph axes and grid. Use the drop-down box labeled **Axes Style** to change between solid and dashed or dotted lines for the axes, and **Axes Width** for the width of the solid lines. Note that the standard Windows line drawing routines do not allow a width to be specified for the dashed and dotted lines, so if you specify a width greater than 1 it will always be drawn as solid.
11. Also on this page you can specify if outlines should be drawn around the bars and symbols of the graph.

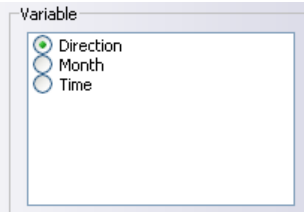
4.5 Two-variable histograms

Let's now try plotting a two-variable rose diagram. This is a rose diagram with each bar divided up into segments that represent a frequency table of a second variable. We can use this to show both the wind direction and wind speed from our Wind2002.ori file.

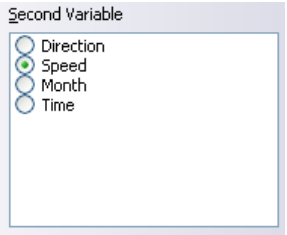
1. Open the Wind2002.ori file, if it isn't already loaded.
2. Choose the **Graphs|Two-Var Histograms** menu item.
3. On the **Main** page of the dialog choose the **Stacked Rose** option (see the section on stacked and stepped diagrams for the difference between these).



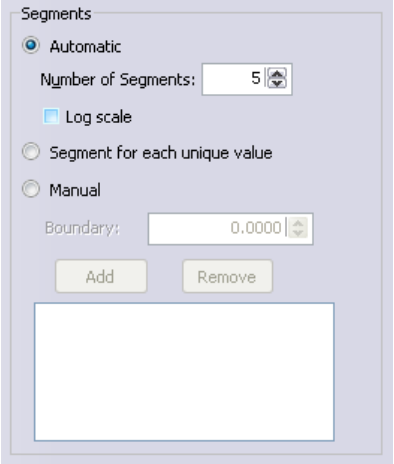
4. Now go to the **Select** page, where we can specify the variable to be used as the second one. This time the **Variable** box only allows a single variable to be selected. We will select the Direction variable.



5. Below this is a new listbox labeled **Second variable**. Use this to specify the second variable that will make up the segments of each bar in the diagram. We will choose the Speed variable, which represents wind speed.



6. Let's now look at the **Options** page. There is a new option here called **Exclude 0.0 values**. With diagrams depicting wind speed it is customary to not include data when the wind speed is zero; the associated direction could be unreliable as the wind vane could be pointing in any direction in becalmed situations. When this option is ticked any zero values are not included in the rose diagram. Instead the legend box will give the percentage of the zero values in the data set.
7. You can choose to have Oriana automatically divide each wedge of the rose diagram into a certain number of segments, using the **Automatic** option and the **Number of Segments** setting. Each segment will represent that proportion of the total range of the second variable. For example, if the second variable ranges from 0 to 100, choosing 5 segments means that the first one will represent the number of observations between 0 and 20, the second from 20-40, and so on.



8. If you prefer you can set the boundaries between each segment manually, using the **Manual** option above. This lets you enter the exact boundaries for each segment. So, in the above example of a variable ranging from 0-100, if you enter a 15 in this option as the first boundary and a 30 as the second then all values from 0-15 will be in the first segment, all values greater than 15 and up to 30 are in the second segments, and so on.

   To build up your list of boundaries tick the **Manual** option, then enter the first boundary into the **Boundary** box and click the **Add** button. This will add the boundary to the box below. Continue doing this for all boundaries. If you need to remove a boundary you can select it in the list and click the **Remove** button.

   If your second variable consists of discrete values (e.g. just the numbers 1, 2, 3 and 4) and you want a separate segment for each you can use the **Segment for each unique value** option.

4.6 Circular-linear plots (formerly Two-variable vector plots)

The process of producing circular-linear plots 28 is similar to that described in the previous section for two-variable histograms. However, in this case the value of the second variable is represented by the length of the arrows or bars, or by the placement of the points on the graph, each of which

represents a single case (or row of the data matrix). We can demonstrate this graph type by again using the Wind2002.ori file.

1. Open the Wind2002.ori file, if it isn't already loaded.
2. Choose the **Graphs|Circular-linear Plot** menu item
3. On the **Select** page ensure that subgrouping is by Month, as done in step 3 of the Stacked Histogram tutorial.
4. Also ensure that the primary and second variables are set to Direction and Speed respectively, as in steps 3-4 of the Two-variable Histogram 19 tutorial.
5. On the **Main** page of the dialog you can choose to have the data represented as a scatterplot, or with arrows, bars or wedges.
6. You can use the **Symbol size** option on the **Symbols** page to determine the size of the scatterplot symbols, and the **Arrowhead size** option on the same page to adjust the arrowheads. If the **Variable arrowhead size** option is ticked then arrowheads closer to the center of the graph will be made smaller. Since shorter arrows have their heads packed more closely together this helps make the individual arrowheads more easily visible.
7. If instead you are using bars the width of the bar is controlled by the **Bar width** option on the **Axes** page. By default this is set to 1 degree wide, but you may wish to make them a bit wider.
8. By default, using Month as the subgrouping variable means that a separate graph is created for each month. If you instead wish to have all data on the same graph, with different colors or symbols representing the different subgroups, you can tick the **Subgroups on single plot** option on the **Main** page. For scatterplots you can choose to use different colors, symbols, or both with the **Represent subgroups with** option on the **Symbols** page.

4.7 Printing graphs and results

The contents of most window types can be printed using the **File|Print** command. You must first make sure that the window you want to print is the currently active window. A new feature in Oriana version 3 is that in the **Print Range** section you can select to have just the current graph printed or all graphs.

You can specify which printer to use and change other options with the **File|Printer setup** command. The size of the margins on the printed page can be changed with the **File|Page setup** command.

4.8 Saving graphs and results to file

The contents of the graph and results windows can be saved to a file using the **File|Export** command. You must first make sure that the window you want to save is the currently active window and that the page with the graph or results you want to save is visible. A new feature in Oriana version 3 is that if you tick the **Export all pages** option on the dialog all graphs or result pages will be exported. For graphs each files is exported to a separate file. The file names will have sequential numbers appended to your chosen file name to distinguish them. All result pages will be exported to a single file.

Different types of windows have their contents saved in different formats; some may have a choice of formats for saving. See the descriptions of the window types 7 for more details.

5 Analyses

5.1 Statistics

5.1.1 Basic Statistics

Most of the basic statistics in Oriana 3 are the same as in version 2. There is one new feature.

If your data consists of vectors (where both the angle and the length have been recorded) and you have defined vector pairs using the **Data|Define vector pair** 34 command, then a weighted mean will also be displayed. This is the angular mean, but weighted by the lengths of the vectors. Basic statistics about the weighting variable will also be displayed.

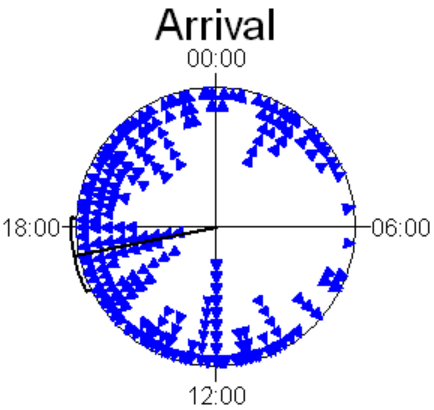
6 Graphs

There have been two new additions to the major new graphs types. First, two new forms of raw data plots have been added. Second, the old Two-variable vector plots have been renamed to Circular-linear plots. This is because of the addition of some new forms, such as circular-linear scatterplots and a wedge-based form of the old vector plots. The next two sections describe these.

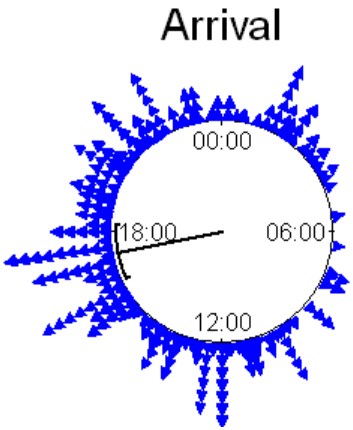
6.1 Raw Data Plots

These circular diagrams plot individual symbols for each datum in the sample. This allows you to assess the sample size at a glance as well as seeing the distribution of the data. For samples with very large numbers of observations, each symbol may represent multiple observations; a note will be placed on the graph if this occurs.

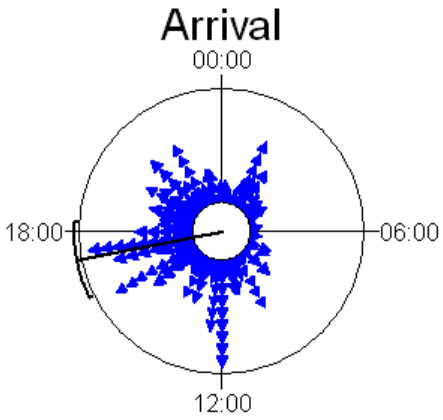
Here is an example of one traditional way of presenting the raw data, with the points stacked from the outer rim of the circle towards the middle:



You can also have the points stacked on the outer rim, pointing outwards:



Finally you can have the points stacked from the middle pointing outwards:

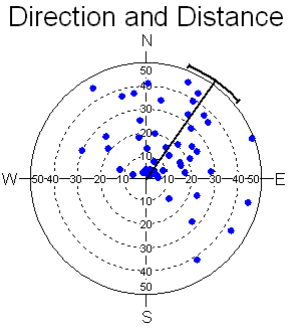


6.2 Circular-linear Plot

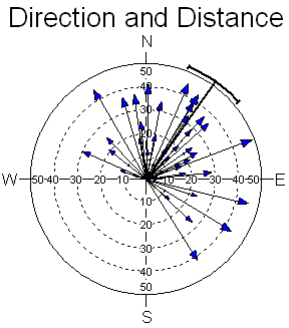
This graph type, like the two-variable histogram, also plots two variables, one circular and one linear. However in this case the second variable is depicted not as frequencies in segments of the histogram, but as individual points. Each observation, or row in the data matrix, is depicted as a point, arrow, bar or wedge.

The first type, the scatterplot, has each observation represented by a point. The position around the circular axis

represents the circular variable, while the position on the concentric grid represents the linear value. Here is an example:



The vector type of circular-linear plot is superficially like the Arrow Histogram, but in this case each arrow corresponds to a single observation. The direction the arrow is pointing is taken from the selected circular variable, while the length of the arrow is determined by the chosen second variable. So you could, for example, use this graph to plot the direction and distance traveled for each animal observed, or the orientation and length of individual toolmarks in sedimentary rocks.



Instead of arrows, you can also choose to have the linear variable represented by bars or wedges.

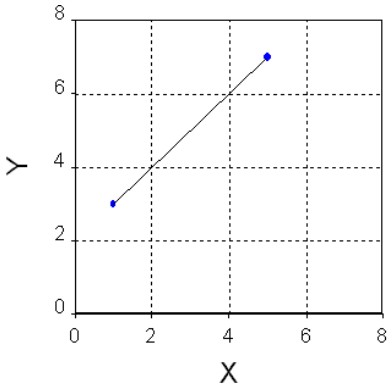
7 Menus

7.1 Data

Three new menu items have been added to the Data menu.

7.1.1 Data|Convert XY to Circular

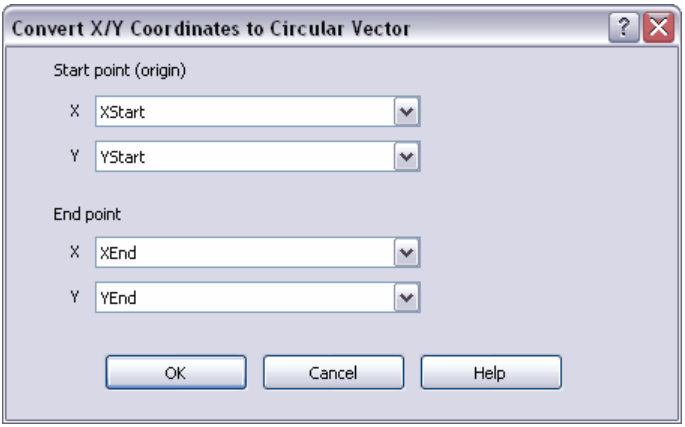
Usually circular vector data are entered directly as measured angles and the length of the vector. However, sometimes it may be more convenient to measure and record the X/Y coordinates of the beginning and ending of the vector. For instance, in the following example you may record the X and Y coordinates of the dots at either end of the vector, rather than the angle and length of the vector itself:



If your data are in this format then you can enter them into Oriana in the following way:

1. Choose **File|New** to create a new file. If the File Creation Wizard comes up switch to Expert mode using the button in the lower left.
2. Set the number of variables to 4 and press **OK**.
3. In the data editor change the variable type of all four variables to Linear.
4. You can now use these variables to enter your data. Put the X and Y coordinates of the start point of the vector in the first two columns, and the X and Y coordinates of the end point in the other two columns.
5. Once the data have been entered select the **Data|Convert X/Y to Circular** menu item. Ensure that the four drop-

down boxes contain the names of the appropriate variables for the X/Y coordinates.



6. Press **OK**. Two new variables will be created, named Angle and Length, that will contain the angle and length of each vector.

Please note that in the conversion process the starting point is translated to the origin of the circular graph, so the angle will be the direction towards which the end point is pointing.

7.1.2 Data|Filter Data

This command lets you restrict the analyses or graphs to a certain subset of data.

When you tick the **Filter data** button you can choose a variable to use for selecting the data to analyse. You can then choose a comparison type (e.g. "Equal" or "Greater than") and enter a value to use for comparisons in the **Value** box. For example, if you wish to only analyse data from September you would set up the dialog box as shown above, with the variable "Month" and the comparison type "Equal" selected, and the word "September" in the **Value** box. You could also use the abbreviated value "Sep". If you instead wanted to restrict the analysis to measurements where the wind speed was greater than 20 miles per hour you would select the variable "Wind Speed", the "Greater than" comparison type, and enter "20" in the **Value** box.

If the variable you are using is a Label or Subgrouping variable then you can use the "Contains" and "Doesn't contain" options to base the selection on a part of the data in that variable. For example, if you had observations labels like "Sample1-1, Sample1-2, Sample 1-3, Sample2-1, Sample 2-2, Sample 2-3" and you wanted to restrict the analysis to just the first three, you would select "Contains" and enter "Sample1" in the **Value** box.

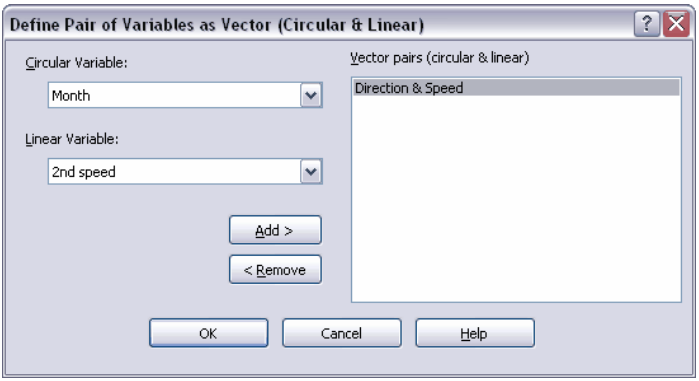
When you press the **OK** button Oriana will check that the value entered in the **Value** box is appropriate given the variable type chosen. If not a message will be displayed and

you will be given the opportunity to fix it.

7.1.3 Data|Define Vector Pair

Circular data are often accompanied by a second variable, describing length, speed or other data measured on a linear scale. The two variables together describe a vector. If you have data in this format you can declare which pairs of variables are supposed to be treated together as a vector. These vector pairs can then be used to produce Two-variable histograms and Circular/Linear plots. 28 They can also be used to calculate weighted means, where the mean is weighted by the linear variable.

To define vector pairs use the **Data|Define Vector Pair** menu item. The dialog box has two drop-down boxes that list the circular and linear variables. Simply choose the appropriate variables and press the Add button to add the variables to the list of vector pairs. When you press the **OK** button the Status window will be updated to show the defined vector pairs.

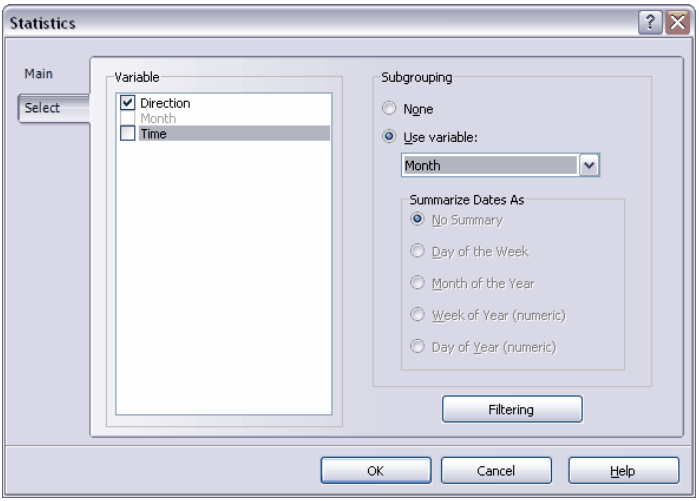


7.2 Analyses

The appearance of the Analyses and Graphs dialog boxes have changed, with the tabs now along the left side and with some new pages. The following sections describe the common sections of these dialog boxes, followed by descriptions of the graphs dialogs.

7.2.1 Select page

All the dialog boxes displayed by the commands under the **Analyses** and **Graphs** menus contain a tabbed page entitled **Select**. It allows you to select which variables/sets of observations to analyze, and whether to use a subgrouping variable.



The box marked **Variable** on the left hand side lists all the circular variables in the data file. For most analyses and graphs all of them will initially be ticked, indicating that they will be used in the analysis or graph. You can remove a variable from analysis by clearing the checkbox. Oriana will remember the selection state of the variables during the current analysis session so that you don't need to reset them for every analysis and graph.

By default Oriana will calculate statistics and draw graphs using all the data from each variable. However, you may sometimes want to calculate separate statistics and do separate graphs for subsets of the data. You can do this by using a subgrouping variable. This is a separate variable that contains data specifying to which subgroup each case (or row) in the data matrix belongs. You can select which variable to use for this purpose with the set of controls on the right entitled **Subgrouping**.

Ticking the **Use variable:** box will allow you to use the

drop-down box to select the variable you wish to use as the subgrouping variable. If the selected variable is a date variable then the **Summarize Dates As** section can be used to select the method of subgrouping by date (e.g. by month of year or day of week).

The **Filtering** button opens the **Filter Data** 32 dialog box. This lets you restrict the analysis to a certain subset of data. When filtering is active the caption of this button is changed to **Filtering - Active**. See the description of the dialog box for more details.

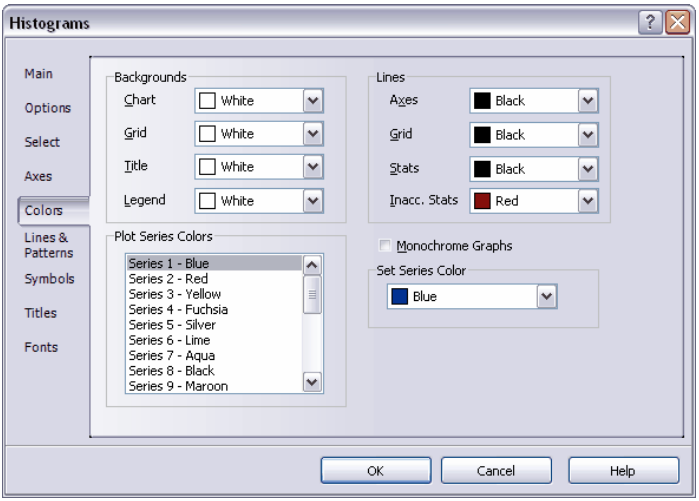
7.3 Graphs

7.3.1 Common elements of graph dialogs

All dialog boxes for creating graphs have five pages that control various aspects of the appearance of the graph. The options on these pages are described in the following sections.

7.3.1.1 Colors

This page lets you customize the colors used for various graph elements.



The **Background** section lets you change the color of the background of the whole chart, the gridded portion within the main axes of the graph, the box behind the graph title and the

box behind the legend. A new color can be chosen from the drop-down boxes.

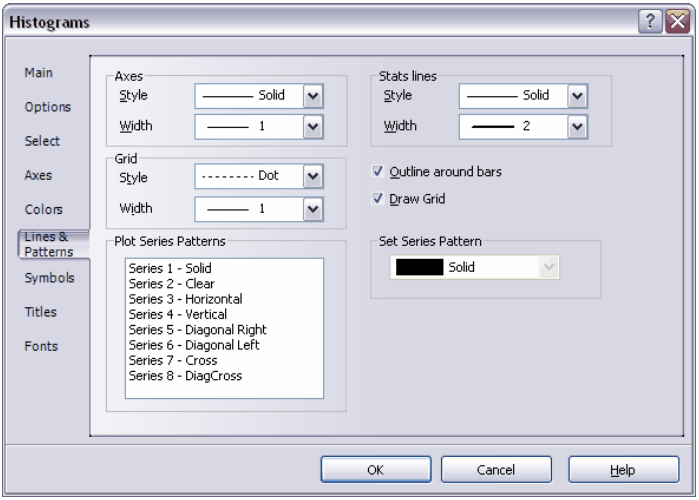
The **Lines** section allows you to change the color of the lines used for the main axes, the grid within the axes, and the line used to indicate the statistics of the data (the mean and confidence limits). The **Inacc. Stats** choice lets you change the color that is used for the confidence limits when there is a small sample size and/or low concentration. By default this is red to warn those viewing the graph that the limits may be unreliable.

The **Monochrome Graphs** option switches the graph to being produced in black and white, for reproduction in monochrome publications. All lines will be black and the graph elements such as histogram bars and symbols will be filled with the patterns selected on the **Lines & Patterns** page.

The **Plot Series Colors** section lists the different fill colors used for filling bars and symbols in color graphs. The first color is used in most graphs, and subsequent colors are used for further data series in stacked/stepped histograms. The colors can be changed by selecting the desired series and using the **Set Series Color** option to the right.

7.3.1.2 Lines & Patterns

This page lets you customize the lines and patterns used for various graph elements.



Axes Style changes the style of the lines forming the main axes of the graph, and **Axes Width** changes the width of these lines. Note that width can only be adjusted for solid lines. The **Grid Style** and **Grid Width** options do the same for the grid lines of the graph, and the **Stats lines** options affect the lines drawn for mean, r vector and confidence limits.

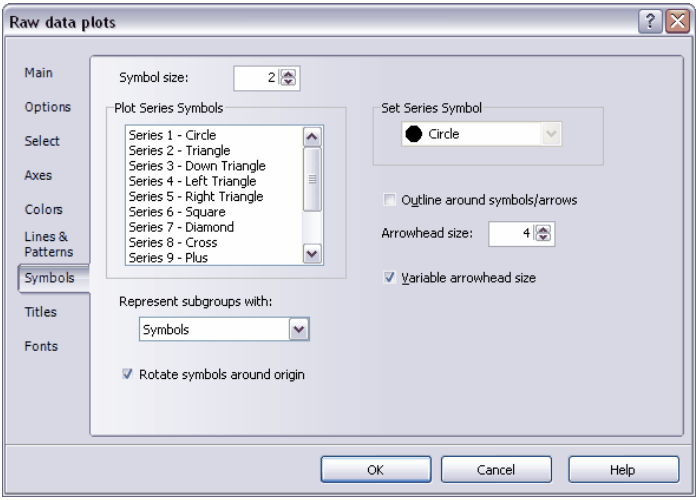
Outline Around Bars and **Outline Around Symbols** set whether there should be black lines drawn around the bars in a histogram and the symbols in a scatterplot or raw diagram

The **Draw Grid** option selects whether to draw gridlines on the graph.

The **Plot Series Patterns** section lists the different fill patterns used for filling bars and symbols in monochrome graphs. The first pattern is used in most graphs, and subsequent patterns are used for further data series in stacked/stepped histograms. The patterns can be changed by selecting the desired series and using the **Set Series Pattern** option to the right.

7.3.1.3 Symbols

This page lets you customize the symbols used on raw data and scatterplots.



The **Symbol Size** option changes the size of the symbols used in the plots.

The **Plot Series Symbols** section lists the different symbols used for different groups of symbols on the graphs. The first symbol is used in most graphs, and subsequent symbols are used for further data series when subgrouped data are being plotted. The symbols can be changed by selecting the desired series and using the **Set Series Symbol** option to the right. The **Outline around symbols/arrows** option lets you set whether to have a black outline drawn around the symbol. When this is not checked the symbol will just be a solid color.

The **Represent subgroups with** option lets you decide whether the different subgroups should be represented by different symbols, or whether the same symbol should be used for all, but with different colors. You can also choose to use both different colors and symbols.

The way the symbols are drawn can be set with the **Rotate symbols around origin** option. With this ticked the symbols will be rotated so that the top of the symbol (e.g. the top tip of the triangle) always points outward on circular graphs. When this is not ticked the symbols will all be oriented the same way.

You can change the size of the arrowheads for the r vectors, arrow and vector plots with the **Arrowhead size** option. The

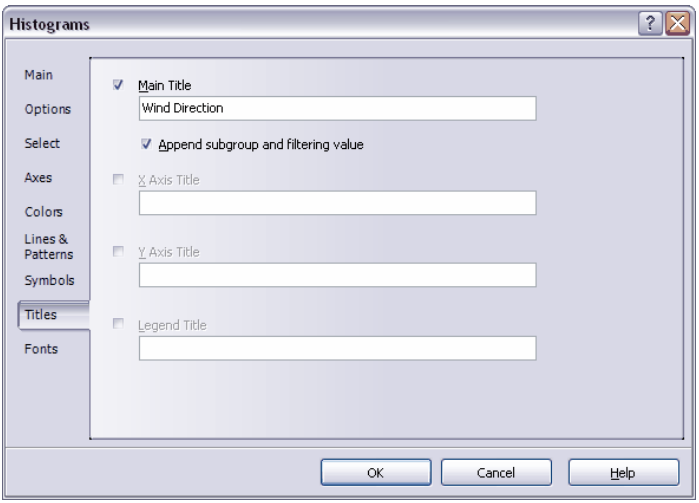
Variable arrowhead size option makes the arrowheads towards the center of an arrow plot progressively smaller, so that it is easier to see the shorter arrows towards the center.

7.3.1.4 Titles

This page allows you to customize the various titles that appear at the top of the graph, near the axes and over the legend. The tick boxes to the left of each title let you suppress the display of the titles. If the text editing box for a particular title is left blank then Oriana will create a default title, if appropriate.

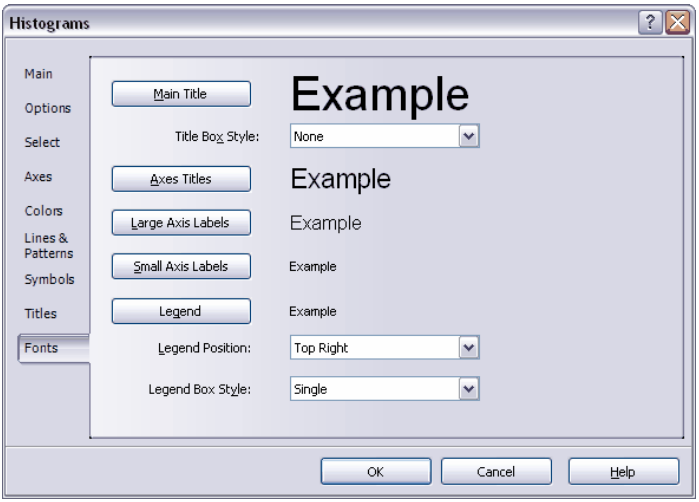
The **Append subgroup and filtering value** checkbox controls whether these values are added to the main title. If subgrouping is in effect the particular subgroup being plotted will be added to the title. If filtering is active the filtering criterion will be added to the title (e.g. "Month = 'June'").

Note that the X and Y axes titles are only displayed on graphs with X and Y axes (e.g. scatterplots, distribution plots, etc.). The have no effect on circular diagrams. The legend title is only displayed on those graphs that have a legend (e.g. stacked plots).



7.3.1.5 Fonts

This page allows you to customize the fonts used for various labels on the graphs. Clicking on any of the buttons will bring up the regular Windows font dialog box, allowing you to select the characteristics of the new font.



The various graph elements are:

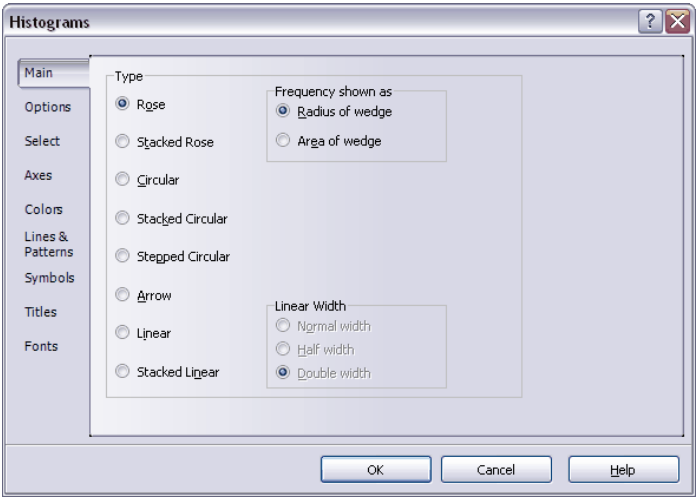
- **Main Title**: The title that appears at the top center of the graph.
- **Axes Titles**: These are the titles that appear alongside the X and Y axes of graphs like linear histograms, scatterplots, etc. They do not appear on the circular graph types.
- **Large Axis Labels**: These are the larger axis tick mark labels. These are used for labeling the tick marks along X and Y axes of scatterplots, etc. This font is also used for labeling the four point on circular diagrams (e.g. the 0°, 90°, 180° and 270° points) and the minor divisions.
- **Small Axis Labels**: These are used for labeling the steps of the circular grid in circular diagrams.
- **Legend**: This is used for labeling the entries in the legend. The title of the legend will use the same font, but in boldface and underlined.

The **Title Box Style** and **Legend Box Style** drop-down boxes allow you to customize (or remove) the box that is drawn around these two graph elements. The **Legend**

Position adjusts where the legend is drawn.

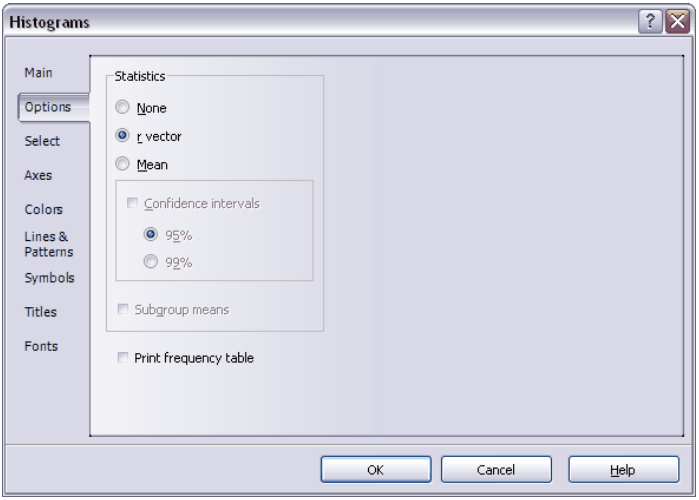
7.3.2 Graphs|Histograms

This option allows you to plot a variety of histograms 27. Choosing this option will cause the following dialog box to be displayed:



The first page lets you choose which type of histogram to produce. They are described in the section about graph types 27. For rose diagrams the **Frequency Shown As** box lets you choose between the two methods for producing the rose diagram sections (see the section about rose diagrams for more details). If one of the linear histogram types is chosen then you can use the **Linear Width** option to set the extent of the X axis.

The **Options** page lets you change a variety of settings that affect how the data are displayed.

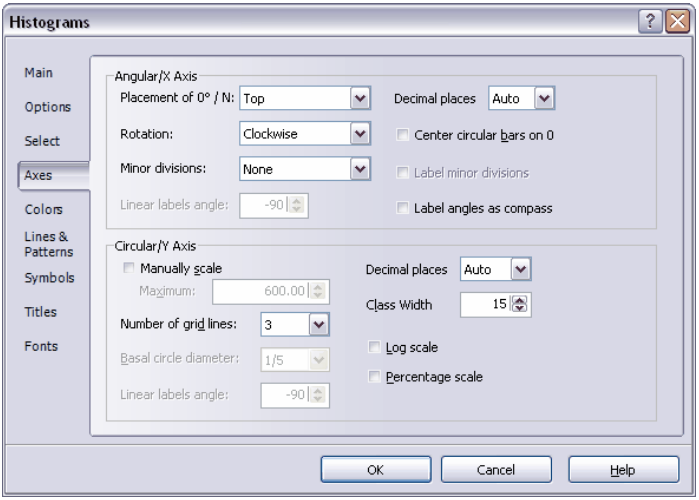


You can choose to have the mean and confidence intervals displayed on the graphs. The mean can be depicted either as a line to the edge of the circle, or as a vector, the length of which reflects the r value.

If the **Subgroup means** option is ticked then separate statistics lines are drawn for each subgroup when a subgrouping variable is in use. Otherwise just a single overall mean is drawn.

When the **Print frequency table** option is ticked a frequency table will be created in the Results window, showing the frequencies for each class that are used to draw the histogram, as well as the percentages.

The **Axes** page allows you to make extensive customizations of the axes in the circular and linear graphs. There are two sections. The first, labeled **Angular/X Axis**, is for adjusting various aspects of the axis around the circumference of the circle, which represents the angles, time of day, or other circular data. The second section, labeled **Circular/Y Axis**, is for changing the set of concentric rings that provide the grid representing the frequencies in the histogram.



Both sections have options called **Decimal places**. This adjusts the number of decimal places used for numeric labels on either axis. When set to "Auto" the shortest number possible will be used (e.g. there will be no decimal portion if the number is a whole number). If set to a specific number of decimal places then all numbers will have that many places.

The second option occurring in both sections is **Linear labels angle**. This only affects linear histograms. By default the labels are oriented parallel to the bottom of the graph. You can use this option to rotate the labels to any angle, up to 90° either way.

Angular/X Axis

By default the Angular grid is oriented so that the 0° or North point is at the top of the graph. In some disciplines it is more usual to have the graph oriented differently, so you can use the **Placement of 0°/N** option to set the position on the circle where the 0° should occur (e.g. to the right or at the bottom). The next option, **Rotation** sets whether the scale should increase clockwise or counterclockwise. With clockwise, and the 0° point at the top, the 90° point will be on the right, whereas with counterclockwise it will be on the left.

By default Oriana will divide the graph into four sectors, with boundaries at 0°, 90°, 180° and 270°. We might want more gridlines than this. We can use the **Minor divisions** option to customize the minor division. You can set the minor divisions

to be every 45°, 22.5° or 10° (or their equivalents in Compass or Time variables). Note that for Time variables the finest division occurs every 1:00 hour, rather than the time equivalent of 10°. This option has no effect on the date-based variable types (such as Day of Week) as they always have their own angular divisions. If you want the minor divisions labeled you can tick the **Label minor divisions** option.

The **Center circular bars on 0** option specifies that the bars or wedges should be arranged so that the first one is centered on zero (e.g. first bar would range from 350°-10° instead of 0°-20°).

Usually Angle and Axial data are plotted with the actual degrees (e.g. 90°) used as labels. However, if these data represent geographical directions then you may wish to have the graph labeled with the compass directions (such as E for East) instead. You can do this by ticking the **Label angles as compass** option.

Circular/Y Axis
Normally Oriana will scale the Circular or Y Axis to the best value to accommodate all frequencies in the histogram. However you may want to produce multiple graphs with the same scaling, for comparison. Ticking the **Manually scale** option will allow you to specify (in the **Maximum** box) the maximum extent of the circular/Y axis.

The **Number of grid lines** option will allow you to specify how many concentric circles grid lines are on the graph. When set to "Auto" it will use the optimum number of gridlines, with the aim of producing a neatly scaled grid with values such as 10 or 25, if possible, rather than 33.33, 24.25, etc. You can set a specific number of gridlines if you desire using this option.

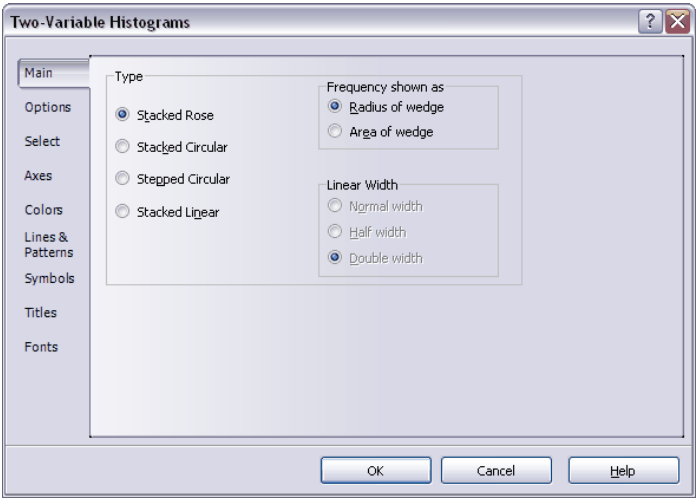
With circular histograms, which use bars with parallel sides rather than wedges, the bars actually extend outwards from a small circle around the middle of the graph rather than from the very center, so that the bases of the bars do not overlap. You can use the **Basal circle diameter** option to adjust the size of this circle. The value is expressed as a fraction of the diameter of the graph, so a setting of 1/5 means that the diameter of the circle will be 1/5 the total diameter. The width of the bars will be adjusted so that they do not overlap.

The **Class Width** option lets you set width of the bars in the diagrams, in degrees.

The **Log scale** option lets you choose to have the circular concentric grid (or Y axis on linear graphs) scaled logarithmically rather than linearly. The **Percentage scale** option will label the scale with the percentages of the total frequencies rather than the frequencies themselves.

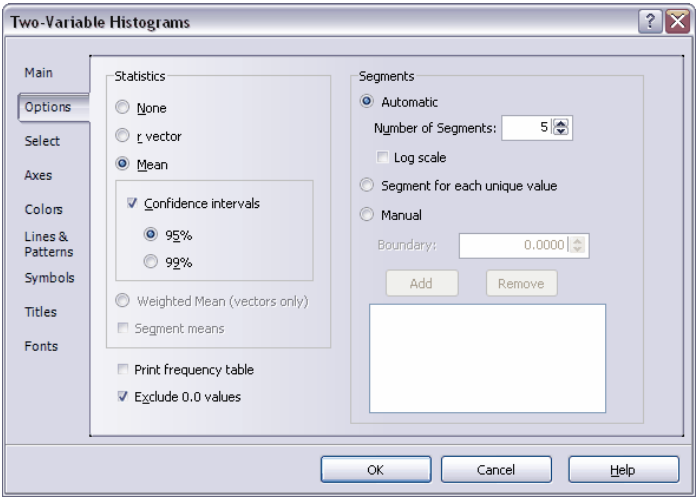
7.3.3 Graphs|Two-var Histograms

This dialog box allows you to create two-variable histograms, which allow two variables to be plotted together on a single graph, with the second variable being represented as stacked segments of each bar or wedge.



The options are similar to those on the **Graphs|Histogram** 42 dialog box, but with only the relevant graph types listed.

The **Options** page is similar to that for regular histograms, except for the addition of a few new options.



The **Exclude 0.0 values** option excludes any cases where the second variable is 0. This is useful in meteorological graphs. With diagrams depicting wind speed it is customary to not include data when the wind speed is zero; the associated direction could be unreliable as the wind vane could be pointing in any direction in becalmed situations. Instead the legend box will give the percentage of the zero values in the data set.

The **Segments** section allows you to specify the number of frequency classes (and thus segments on each bar) to be used for the second variable. When **Automatic** is selected you can choose to have Oriana automatically divide each wedge of the rose diagram into a certain number of segments, specified by the **Number of Segments** setting. Each segment will represent that proportion of the total range of the second variable. For example, if the second variable ranges from 0 to 100, choosing 5 segments means that the first one will represent the number of observations between 0 and 20, the second from 20-40, and so on. If your second variable is better expressed on a logarithmic scale, with many very large values as well as small ones, you can tick the **Log scale** scale option to base the divisions on a log scale (e.g. 0-10, 10-100 and 100-1000).

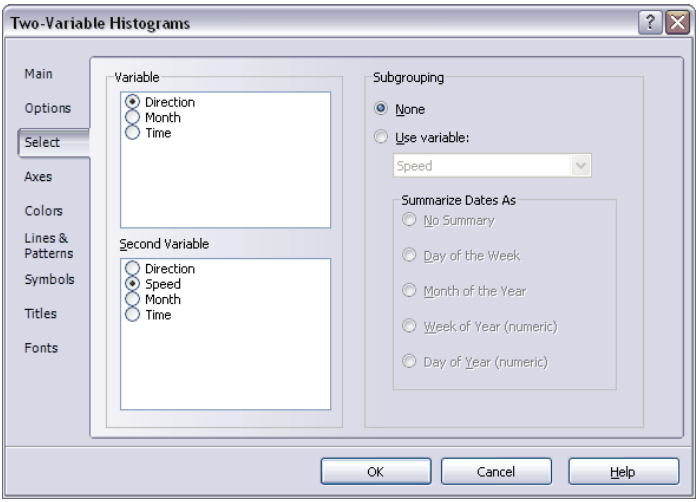
If you prefer you can set the boundaries between each segment manually, using the **Manual** option above. This lets you enter the exact boundaries for each segment. So if you

enter a 15 in this option as the first boundary and a 30 as the second then all values from 0-15 will be in the first segment, all values greater than 15 and up to 30 are in the second segments.

To build up your list of boundaries tick the **Manual** option, then enter the first boundary into the **Boundary** box and click the **Add** button. This will add the value to the box below. Continue doing this for all boundaries. If you need to remove a boundary you can select it in the list and click the **Remove** button.

If your second variable consists of discrete values (e.g. just the numbers 1, 2, 3 and 4) and you want a separate segment for each you can use the **Segment for each unique value** option.

The **Select** page is also slightly different from the **Graphs|Histogram** 42 dialog box.

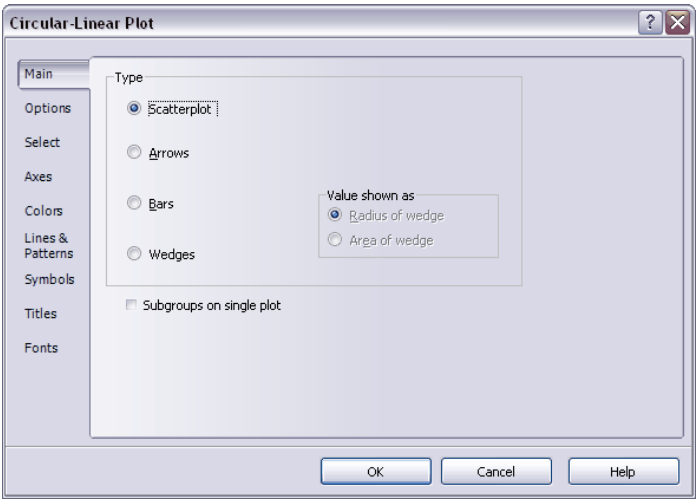


The **Variable** box now only allows one variable to be selected. There is also a second box, labeled **Second Variable**, which allows for selection of the second variable.

7.3.4 Graphs|Circular-linear

This dialog box allows you to create circular-linear plots 28, which allow two variables to be plotted together on a single

graph, with the second variable determining the length or placement of each of the graph elements.



The section titled **Type** allows you to specify the graph type. The **Scatterplot** will plot points on the graph so that the positioning around the graph represents the angle, and the distance from the center of the graph represents the second linear variable. You can also have the value of the second variable represented by an arrow, bar or wedge. When bars are used they, by default, are one degree wide. You may use the **Bar Width** option on the **Axes** page to make them wider. For wedges the **Value shown as** option lets you determine how the wedges as scaled, just like in the rose diagrams in the **Graphs|Histogram** 42 dialog box.

If you have a subgrouping variable in use then by default a separate graph is created for each subgroup. You can tick the **Subgroups on single plot** to have them all plotted on a single plot, with different colors or symbols for each subgroup, as specified on the **Colors** and **Symbols** pages.

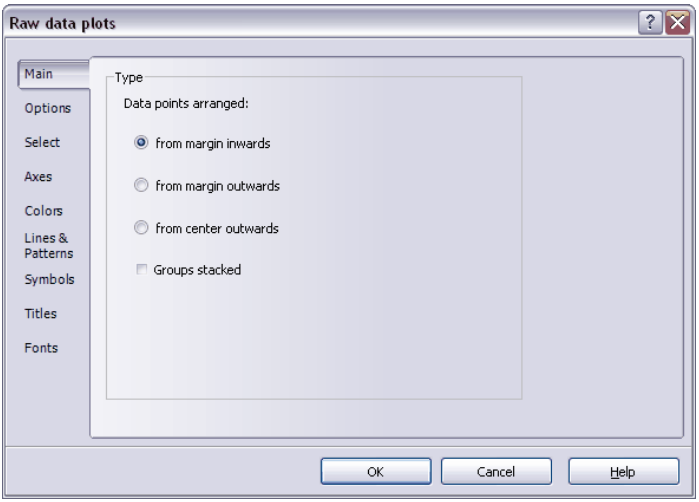
The **Options** page is similar to that in the **Graphs|Histogram** 42 dialog box, with the addition of one new mean type. If you have vector data that consist of both an angle and a length or distance, and you have defined the two variables as a vector pair in **Data|Define Vector Pair** 34 then you can choose to have a weighted mean plotted on the

graph. This is the angular mean that is weighted with the second variable. For instance, in wind data you may want to have the mean weighted by the wind speed, so that if higher winds occur predominantly from a certain direction the mean will be weighted more towards that direction. The mean is depicted by an arrow that extends beyond the edge of the graph to distinguish it from an unweighted r vector.

The **Select** page is similar to that for two-variable histograms 46.

7.3.5 Graphs|Raw Data Plots

This graph type allows you to plot raw data plots 27, where each data point (i.e. row in the data matrix) is plotted on the graph with a symbol, stacked up in a histogram-like format. There are three methods of placing the points.



When **Data points arranged** is set to **from margin inwards** then the points start at the outer rim of the circular graph and are stacked inwards. The **from margin outwards** also starts at the outer rim but stacks the points outwards instead. The circle of the graph is much smaller, with the labels in the inside, to give plenty of room for the points.

The third option, **from center outwards**, starts from the middle of the graph and stacks the points outwards. The points actually start from a circle plotted a small distance

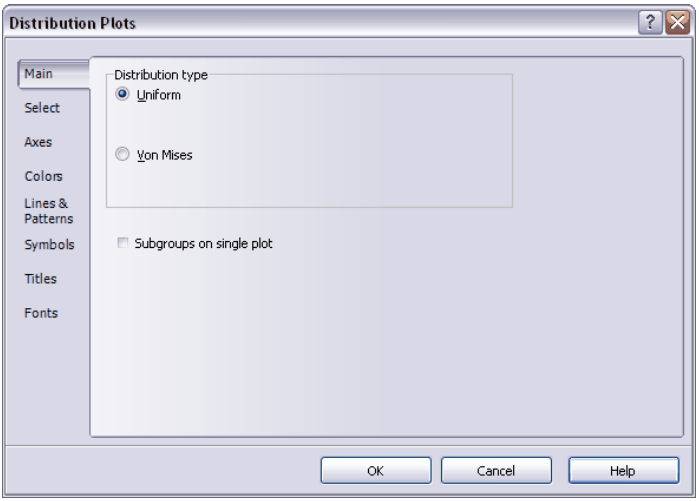
outside the center of the plots, because if all points started at the very center they would overlap too much. You can adjust the size of this circle with the **Basal circle diameter** option on the **Axes** page.

If you have a subgrouping variable in use then by default a separate graph is created for each subgroup. You can tick the **Groups stacked** option to have them all plotted on a single plot, with different colors or symbols for each subgroup, as specified on the **Colors** and **Symbols** pages.

The **Options** and **Select** pages are identical to those in the **Graphs|Histogram** 42 dialog box.

7.3.6 Graphs|Distribution

This option allows you to plot two different types of distribution graphs. These are helpful for assessing whether your data fit a theoretical distribution. The data can be compared to either the Uniform or von Mises distribution.



If you have a subgrouping variable in use then by default a separate graph is created for each subgroup. You can tick the **Subgroups on single plot** to have them all plotted on a single plot, with different colors or symbols for each subgroup, as specified on the **Colors** and **Symbols** pages.

The **Select** page is identical to that in the **Graphs|Histogram** 42 dialog box.

The **Axes** page lets you customize the axes of the plot.

The **Extent of Axes** option allows you, for uniform distributions, to have the axes of the graph extended so that any patterns that overlap the wrap-around can be seen more easily (see the section on distribution graphs for an example).

The **Number of grid lines** option will allow you to specify how many grid lines to draw on the graph. When set to "Auto" it will use the optimum number of gridlines, with the aim of producing a neatly scaled grid with values such as 10 or 25, if possible, rather than 33.33, 24.25, etc. You can set a specific number of gridlines if you desire using this option. Since the main purpose of this graph is to compare the distributions on the two axes the same number of gridlines is used for both axes.

The **X Axis** and **Y Axis** sections both have options called **Decimal places**. This adjusts the number of decimal places used for numeric labels on either axis. When set to "Auto" the shortest number possible will be used (e.g. there will be no decimal portion if the number is a whole number). If set to a specific number of decimal places then all numbers will have that many places.

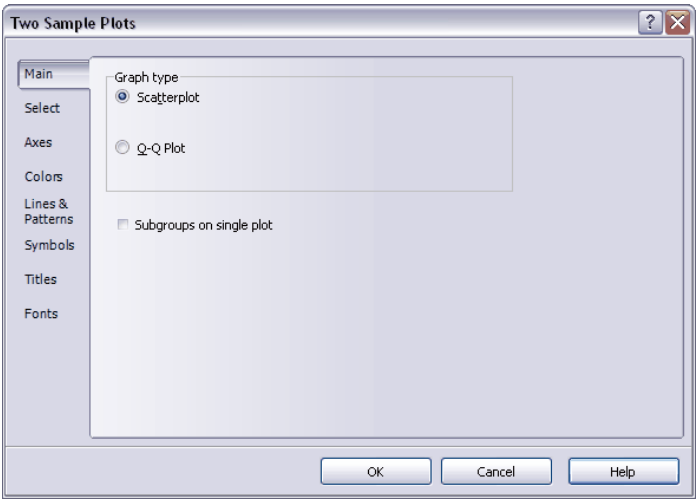
The second option occurring in both sections is **Labels angle**. By default the labels are oriented parallel to the bottom of the

graph. You can use this option to rotate the labels to any angle, up to 90° either way.

You can use the **Symbol Size** option on the **Symbols** page to adjust the size of the points on the graph.

7.3.7 Graphs|Two-sample

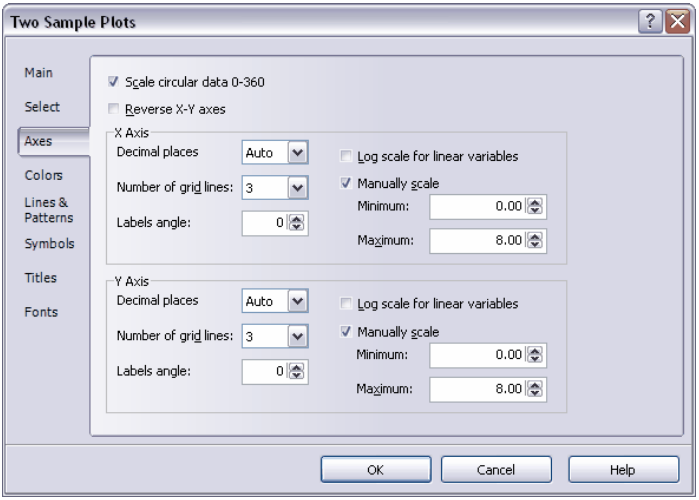
This dialog box lets you create two-sample plots, either a standard scatterplot (using either circular or linear data types) or a Q-Q plot that compares the distributions of two circular variables.



If you have a subgrouping variable in use then by default a separate graph is created for each subgroup. You can tick the **Subgroups on single plot** to have them all plotted on a single plot, with different colors or symbols for each subgroup, as specified on the **Colors** and **Symbols** pages.

The **Select** page is identical to that in the **Graphs|Histogram** 42 dialog box.

The **Axes** page lets you customize the axes of the plot.



When the **Scale circular data 0-360** option is ticked all axes for circular data depict the whole range, even if the data are restricted to a certain section of the graph. Otherwise the axes are scaled to fit the data range. The **Reverse X-Y axes** lets you change the samples that occur on the two axes.

The **X Axis** and **Y Axis** sections both have a number of options that let you change aspects of either of the axes. The **Decimal places** option adjusts the number of decimal places used for numeric labels on either axis. When set to "Auto" the shortest number possible will be used (e.g. there will be no decimal portion if the number is a whole number). If set to a specific number of decimal places then all numbers will have that many places.

The second option occurring in both sections is **Number of grid lines**. This option will allow you to specify how many grid lines are plotted on the graph. When set to "Auto" it will use the optimum number of gridlines, with the aim of producing a neatly scaled grid with values such as 10 or 25, if possible, rather than 33.33, 24.25, etc. You can set a specific number of gridlines if you desire using this option.

By default the labels are oriented parallel to the bottom of the graph. You can use the **Labels angle** option to rotate the labels to any angle, up to 90° either way.

If you are plotting linear data that are better expressed on a

logarithmic scale, with many very large values as well as small ones, you can tick the **Log scale for linear variables** scale option to base the scale on a log scale (e.g. 0, 10, 100, 1000).

Normally Oriana will scale the axes to the best value to accommodate all data. However you may want to produce multiple graphs with the same scaling, for comparison. Ticking the **Manually scale** option will allow you to specify (in the **Minimum** and **Maximum** boxes) the extents of the axis.

The **Symbol Size** option on the **Axes** page lets you adjust the size of the points on the graph.

7.3.8 Graphs|Edit graph

Choosing this option allows you to modify the graph settings for the diagram in the currently active window. A dialog box similar to that used when first creating the graph will be displayed. You can change most of the options; the graph will then be redrawn with the new settings when you press **OK**.

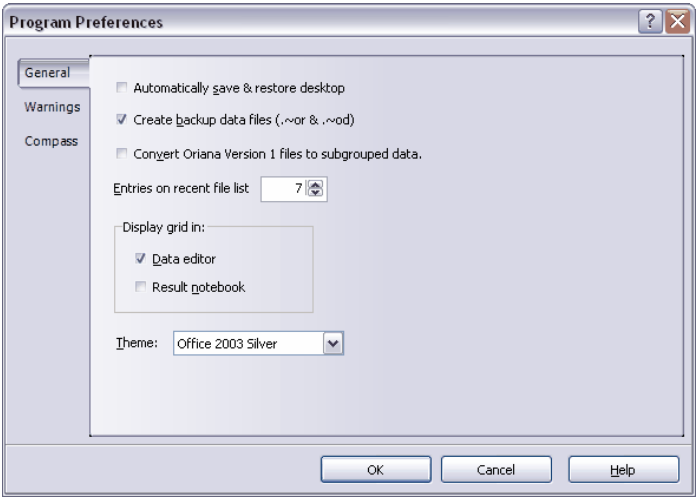
These dialog boxes will not display the **Select** page that allows you to select the samples for plotting. If you wish to plot a different sample then you will need to create a new graph. Also, scatterplot and Q-Q plots cannot be changed from one plot type to the other; new graphs will also need to be created in this case.

7.4 Options

Some new features have been added to the Preferences dialog box. The following section describes this dialog.

7.4.1 Options|Preferences

This option lets you change a variety of settings that affect the whole of the program. These settings are automatically saved for future use. When you choose it, the following dialog box is displayed.



Automatically save & restore desktop
If you choose this option your desktop will be saved when you exit Oriana. It will automatically be restored to the same state next time you run the program.

Create backup data files (.~or)
By default, Oriana makes backup copies of your data files (with the extension .~OR instead of .ORI) whenever you save your data. Desktop files are also backed up to the extension .~OD instead of .ODK. You can turn this off using this option.

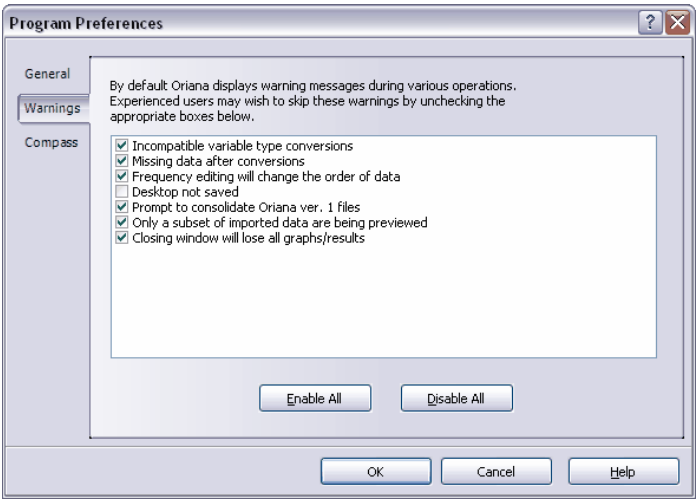
Convert Oriana version 1 files to subgrouped data
When selected, any Oriana ver. 1 files that contain multiple columns (samples) will be converted into one column of data and another subgrouping variable, containing the labels of the original samples.

Entries on recent file list
This allows you to set the number of entries on the Reopen menu.

Display grid in:
This lets you choose whether to have grids displayed in the data editor and results spreadsheets.

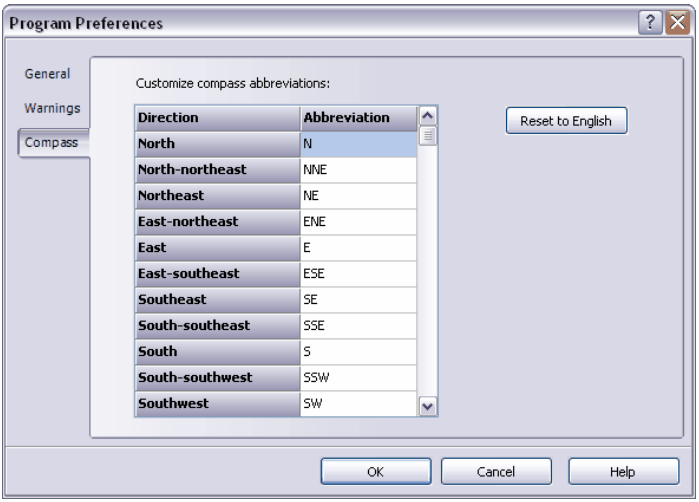
Theme:
This lets you change the visual appearance of the Oriana window, including different colors and visual effects. By default a scheme is chosen that will match your current Windows theme as well as possible. The drop down box for this option lets you change it to a different one. The new theme will be applied immediately after you select a new one, so that you can easily see the effects of the different themes, but the change is only made permanent when you press **OK**. If you press **Cancel** the theme will revert to the original one.

The second page of the dialog box, labeled **Warnings**, lets you set whether certain warning messages are shown. When these warnings are displayed they have a check box labeled **Don't show this again** that suppresses future display of the warning. This dialog box lets you turn them back on again.



The **Compass** page lets you customize the abbreviation used on graphs, results and in the data editor for the compass directions. By default the standard English abbreviations are used (e.g. N for North, SE for southeast). You can change these to the equivalents in your own language by just typing the new abbreviations into the table. You can reset the

abbreviations to their defaults with the **Reset to English** button.



7.5 Help

Oriana 3 now has a new option on the Help menu to check for updates to the program.

7.5.1 Help|Check for updates

This will allow you to check on the Kovach Computing Services web site to see if a new version of Oriana is available. When you chose this menu item a wizard will appear that will take you through the process of checking over the Internet to see if there is a new version. If there is the new version number and information about the update will be displayed and you can continue on with the wizard to download and install the new version.

By default Oriana will check every month to see if there is a new version. It performs this check when you start up the program. You can change the frequency of the check, or disable it completely, by clicking on the **Options** button on the update wizard.

Please note that Oriana will always ask you first before checking for updates, and that no information about your computer or software setup is transmitted to our web site. This update check simply downloads a small file from our web

site containing the version number of the latest version and information about the update.

8 Appendices

8.1 Data file structure

The data files in Oriana version 3 are very similar to those of version 2 and are compatible with each other, so version 3 can open version 2 files and vice versa. The only new feature is related to the new vector pairs option.

If any vector pairs 34 have been declared then the last line of the file will identify these. The line begins with the word "VectorPairs", followed by one or more pairs of numbers (separated by a colon) that identify the numbers of the two variables in the vector pair. The line is terminated with a "-1" to indicate that the last pair has been written. So, if the first and second variable in the data file have been declared as a vector pair the last line will look like this:

VectorPairs 1:2 -1

Please note that the numerous additions of features to the graphs in Oriana version 3 means that any desktop files that have graphs saved in them under version 3 will not be readable in version 2. However, version 3 can open old version 2 desktop files.