Graph

Introduction

Use the **Graph** tab to change graph appearance and perform operations on graphs.

Graph tab in IGB 7
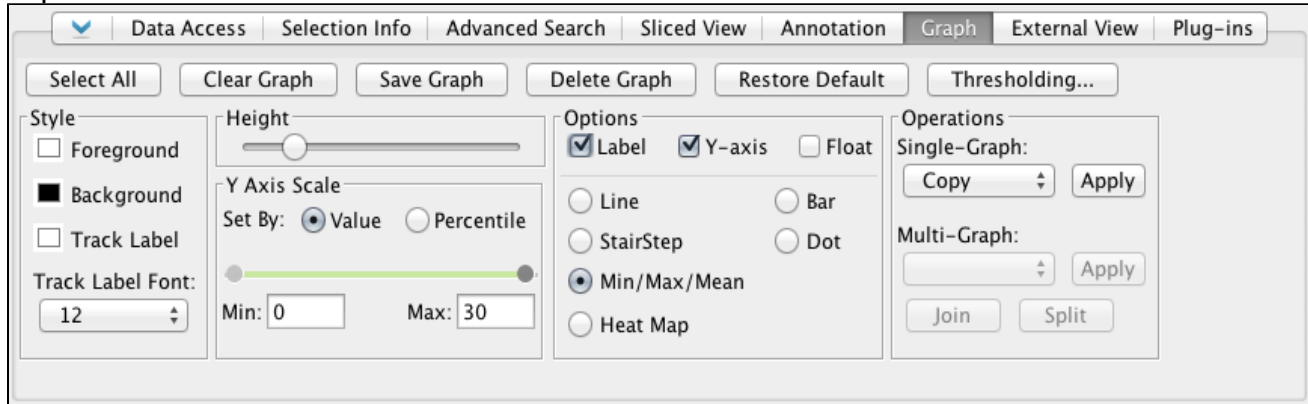
Changing the appearance of graphs

Most graphs are similar to the annotation tracks; you can modify many properties of graph tracks in the same way you modify properties of annotation tracks.

To change Right-click on the track handle and choose from the menu. See Customize track appearance. Floating graphs do not appear in such a track. Settings and adjustments that are specific for graphs can be made using the **Graph** tab; to enable most of these options, a graph track must first be selected.

To change the settings for one or more graphs that are displayed in IGB:

1. Click the Graph Adjuster tab.
2. Select the graph(s) to change by doing one of the following:
    a. Click the track label to select a graph.
    b. Shift-click to select additional graphs.
    c. To change the settings for all graphs that are currently displayed, click the **Select All** button in the **Graph Adjuster** panel.
3. Make changes to the graph settings by typing in new values or by operating sliders in the **Graph Adjuster** panel.

Any changes you make to the values in the Graph Adjuster panel will apply to all currently selected graphs.

Graph Labels

You can show the track name, and y-axis min, max on graphs by checking the **Label** option in the **Manipulations** panel.

Y Axis and Scaling

You can set the **Y axis** to be displayed by checking the **Y Axis** box. The axis markings will appear at the left side of the track.

The **Y-axis scale** can be altered using the **Y-Axis Scale** sliders. Scaling is an important issue to consider when viewing expression values because the distribution of these values across the range defined by their minimum and maximum may be highly asymmetrical. For example, the majority of values could range between 100 and 1,000, with just one or two percent exceeding 100,000. These extremely high values (relative to the rest) would tend to dwarf the others if displayed to scale because the vertical axis would be forced to show a range of 1 to 100,000. Although technically accurate, such a graph would not be very informative because most of the information – the relative differences in value between different base pair positions – would be impossible to discern visually.

Setting minimum and maximum bounds **By Value** allow the user to set the cut-off values based on the actual **Y-axis** number. This does not take into consideration where most of the actual data lies. **By Percentile** offers thresholds defined by the actual percentage of data. For instance, using our theoretical 1 to 100,00, if you set **By Percentile** with **Max:** 90, and 90% of your data is below 1000, the **Y-axis** range would run from 0 to 1000. Any extreme values that are above or below the chosen thresholds are truncated from the display, and the values in between are displayed across a range that allows their differences to be noted.

To set these visible bounds, use the **Y-axis scale** section of the **Graph** tab:
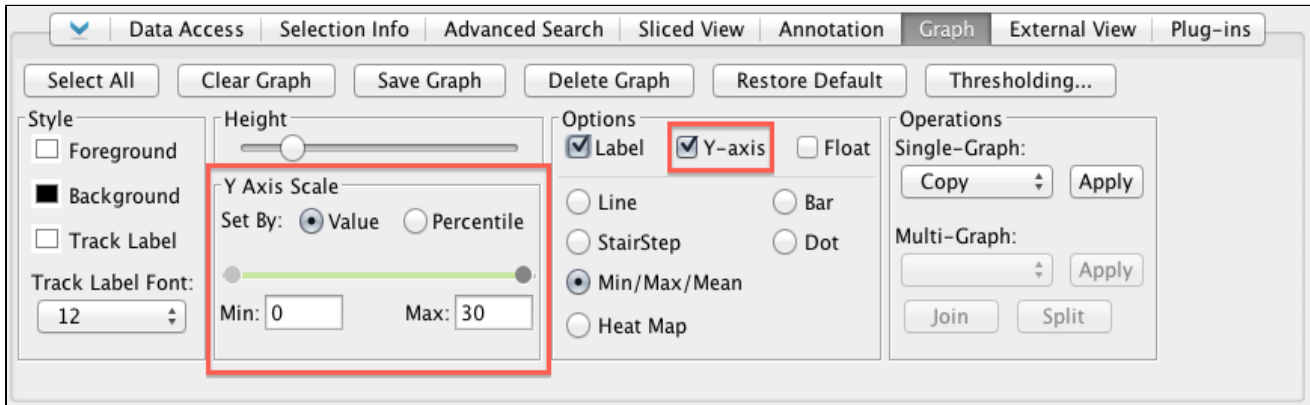

- To set specific values, select **By Value**. The chosen minimum and maximum value will be applied to each selected graph. You are free to set maximum and minimum values that cover a range smaller or larger than the actual range of your data. Either enter the number in the entry box or use the sliders.
- To set values by percentile, select **By Percentile**. Percentile ranges will be computed separately for each graph, which means that the absolute minimum and maximum range values for each selected graph may be different. Either enter the number in the entry box or use the sliders.

To display the full range of the data, choose **By Percentile** and set the **Min** to 0 and **Max** to 100.

Floating Graphs

In the **Options** panel, check the option **Floating**. By selecting this option, the graph track becomes 'disengaged' from the track framework. This allows a graph track to be moved any where (vertically) within the main image, AND overlay whatever it is placed over. By placing this quantitative track (graph) over or nearer to annotation tracks, you might find it easier to understand and analyze the data. If the graph is floating, you can change it's height by holding down the shift key and dragging your mouse up or down on the colored bar at the left end of the graph (this block is the 'graph handle').

To move or select a floating graph, click the graph-handle. In the pictures below you can see how the floating graph can be moved to overlay two different gene models, showing the alignment of exons and introns with the depth graph (.wig) from a next-generation sequencing experiment.
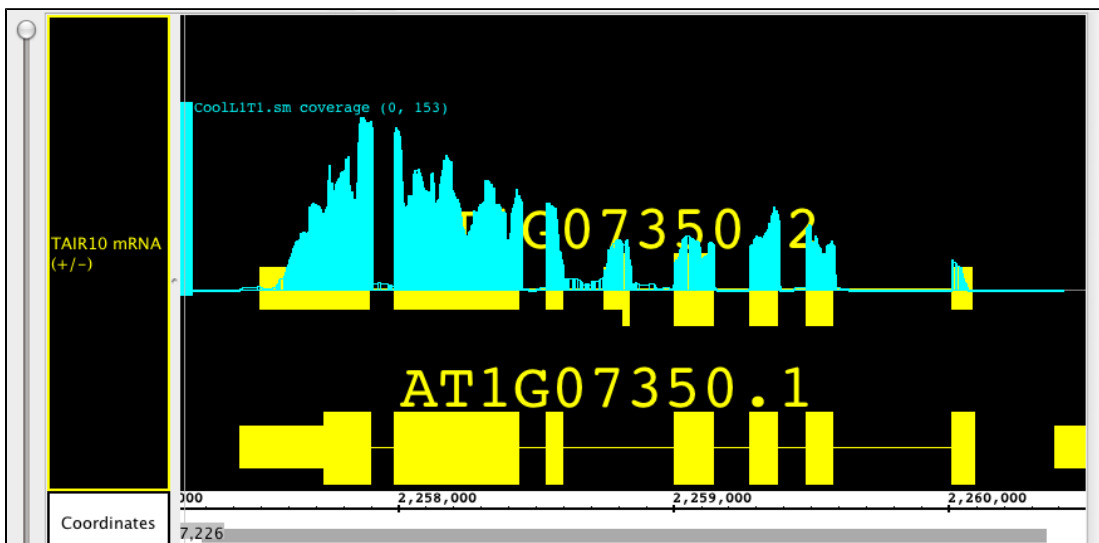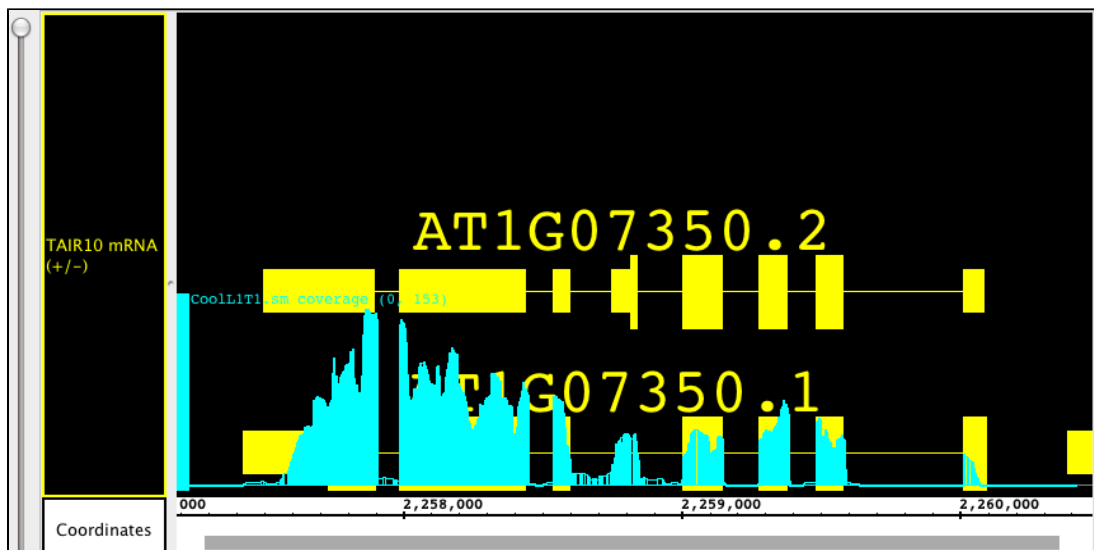
Change the height of a graph

There are several ways to change the vertical height of a graph. Select the graphs you want to change by clicking on their track label, then drag the **Height** slide bar in the **Graph** tab. Alternatively, move your cursor to the boundary between track labels, and shift the edge of the track label up or down.

Change graph styles

Graphs can be shown in various representational styles; the type of graph that is most appropriate depends on the type of question being asked about the data. For example, when comparing trends and patterns, it is very useful to use the line graph display method. The number of expression intervals being shown also can affect the graph display choice. The user is encouraged to experiment with the different display types to find out which method works best for specific purposes.

To change the graph style, select the graph track, then select the type of graph in the **Style** panel.
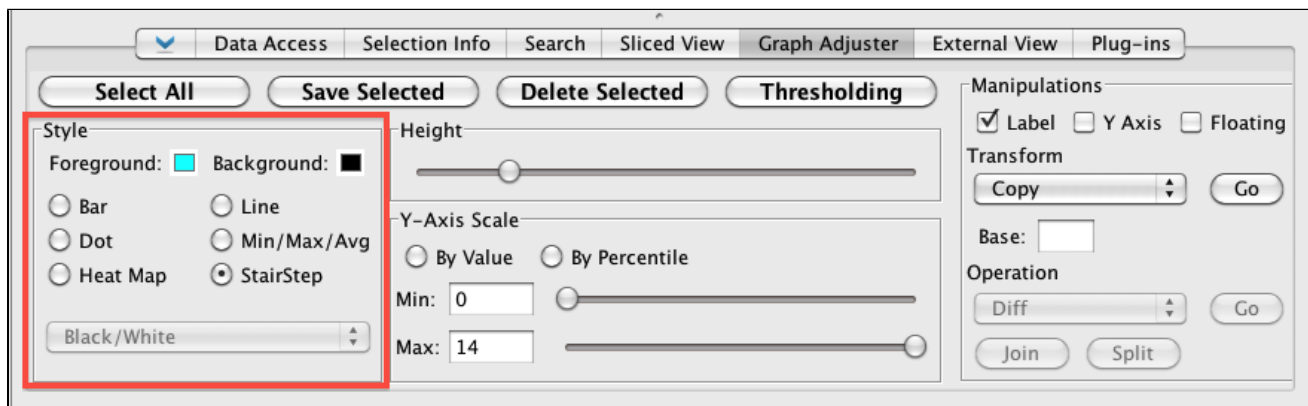

The following graph styles are available in IGB:

- **Bar** -- Individual values are shown as vertical bars that are one base wide for position graphs and of variable width for interval graphs.
- **Line** -- Subsequent values are linked with a line. Even if the input file was not sorted, the values will be connected in order along the genomic coordinate axis.
- **Dot** -- Shows a single dot for each data value. For interval graphs, horizontal lines will be connect the start and end points.
- **Min/Max/Avg** -- This is the default style for most graph data types and is usually fine for most purposes. It is especially useful for showing very densely populated graphs with data points for large numbers of positions. When IGB is zoomed all the way in, the display is equivalent to the Bar style. When zooming out, IGB starts to summarize values. When the scale of the display reaches the point where individual x-values are associated with multiple score values, IGB picks the maximum and minimum values and draws a vertical bar between them. In addition, IGB draws lines through the average of all the data points represented at each x value.
- **Stairstep** -- Similar to the bar graph style, except that bar widths along the horizontal axis are stair-stepped. For example, if position 100 has a value of 50 and position 200 has a value of 75 and there are no values in between, then IGB will draw a bar of height 50 that starts at position 100 and stops at position 200. Then, at position 200, IGB will draw a new bar of height 75 that terminates at the next location with a value. This style is particularly useful for viewing .egr and .sgr files, ESTs, or other high-density data.

- **Heat map** -- Instead of showing relative intensity via the height of the line at each pixel or coordinate as in most other graph styles, a heat map shows expression levels via color or brightness of the line at each pixel or coordinate. This graph style is useful if you want areas of greater expression to jump out at you. If a graph does not render or is hard to see, adjust the visible bounds of the graph until features are readily visible. Several heat map color maps are available to choose from. Transparent color maps are available and may be useful for floating graphs.

The following image illustrates how a single data set would look in each of the graph styles. The graph used for this image is a simple position graph. An example of an interval graph was given in the introduction to this chapter.
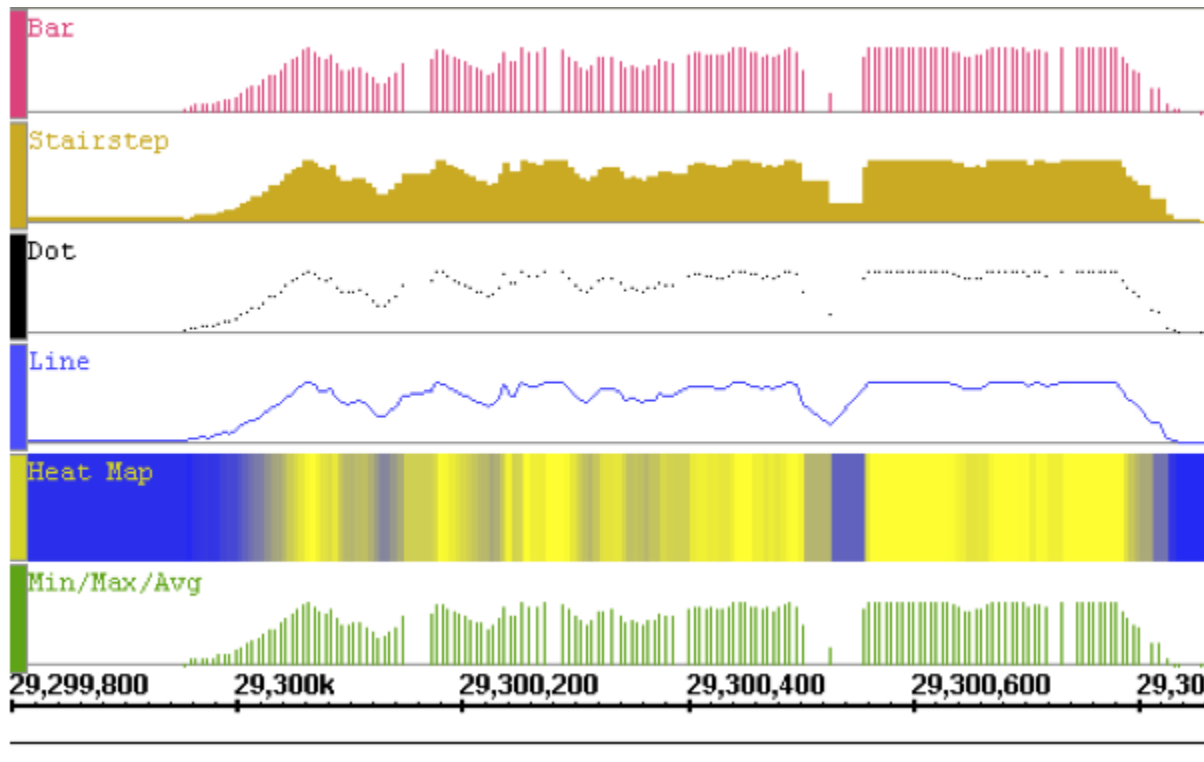
Note that with the heat map style for position graphs, the background (here in white) does not show through in regions where there are no data points. This is because the heat map first applies the stair-step function on the data before choosing colors to display. Compare the widths of the color bands in the heat map graph to those in the stair-step graph. For interval graphs displayed in the heat map style, the background will show through in regions with no data.

Due to the high zoom level in the above image, the Min/Max/Avg graph style is displayed exactly the same as the Bar style. When zoomed out, it reverts to showing the minimum, maximum and average values of all the data in the whole range of coordinates under each horizontal pixel width.
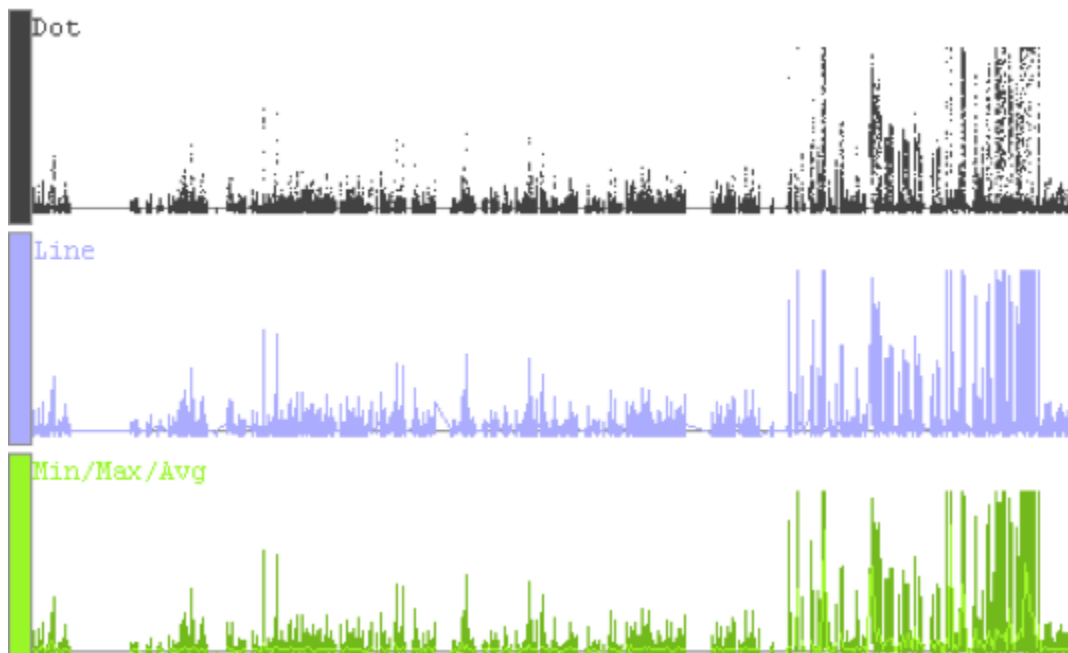
Change graph color

To change graph color, like changing graph style, select graph, then use the color boxes in the **Style** panel.

For graphs in the heat map style, the chosen color will only be used on graph labels and handles. The heatmap colors come from the chosen heat map.