

# PlotOffsetRoughness.m function

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PlotOffsetRoughness will display the number of tracks found within a data set and plot the tracks along with qualitative plots of roughness values perpendicular to the satellite tracks.

PlotOffsetRoughness has up to eleven inputs: filename, tracks, linearization, symmetry, title, scaling, boundaries, offset color, jump color, track color, and background color. If an argument is not entered or a 0 is entered, the default value is used.

If no arguments are inputted, the above text is displayed along with the prompt “For more help, type PlotOffsetRoughness('help <argument>')”. For each argument the following text is displayed:

## Filename

filename is simply the name of the pond roughness file being plotted (or the path to it if the file is not in the same folder as PlotOffsetRoughness.m). The filename must be surrounded by '.

## Tracks

The tracks values determine which and how many satellite tracks to plot. By default, the function plots all the tracks, but otherwise will plot all tracks given in the tracks argument. For instance, a tracks entry of [2:6 10 15:16] will plot tracks two through six, ten, fifteen, and sixteen.

## Linearization

The three options for roughness linearization are 'values', 'sqrt', and 'log'. 'values' plots the raw roughness data, 'sqrt' plots the square-rooted values, and 'log' performs a log base two transform on the data. By default linearization is set to 'values'. For more control over plotted data, see scaling.

## Symmetry

If this argument is a 1, the offset plot will only plot on one side of the track. If this argument is a 2, the offset plot will plot symmetrically around the track. Values higher than 2 will plot on the current plot (rather than making a new one). A value of 3 will plot one side, a value of 4 will plot on the opposite side, and a value of 5 will plot symmetrically. Note: This will not save the old data into the text files while using TOR or FPOR.

## Title

title sets the title of the plot. The title must be surrounded by '. By default, the title displays Jakobshavn Isbrae <year> GLAS Data pond. To keep the default while entering additional arguments, enter 'default'. To create a PostScript image and a text file including boundary data and linearization type, enter 'image'. To label each of the tracks with a track number, enter 'label'.

## Scaling

scaling sets the average x displacement of the plotted roughness data from the satellite tracks in terms of the x axis. So a scaling of 1/100 will result in an average distance of 1/100 of the x axis away from the satellite tracks. By default, the average displacement is 1/100 for 'values', 1/50 for 'sqrt', and 1/40 for 'log'. If the scaling value is above 1, the scaling coefficient is set to that value.

## Boundaries

Allows the user to manually set the minimum and maximum x and y values of the plot. The boundaries must be inputted in brackets: [xmin xmax ymin ymax]. If not enough boundary arguments are given, any user inputted boundary arguments are ignored and a message is displayed warning the user default boundaries are used. An entry of 0 will not trigger this warning message. Default boundaries use MatLAB plot boundaries.

## Offset color or jump color or track color or background color

All four color arguments require RGB values inputted within brackets: [red green blue]. 1 is the max value and 0 is the minimum value. E.G. [0 0 1] is blue and [0 0 0] is black. The offset color affects the offset plotted roughness data, the jump color affects the empty space between observations, the

track color affects the color of the satellite tracks, and the background color affects the color of the plot. If anything but a bracketed RGB value is inputted, a warning message will be sent and values reset to their defaults. An entry of 0 will not trigger this warning message. Default values for offset color, jump color, track color, and background color are, respectively, [.8 0 0], [0 .8 .4], [.2 .6 1], and [1 1 1].

## TOR.m and FPOR.m

TOR.m works exactly the same way as PlotOffsetRoughness.m except for two key differences. It writes the coordinates of all the points plotted into multiple text files. The text files are named filename<track number>.txt and contain all the data points corresponding to that track. For instance, the data for the first track of GLA06\_05052016\_r4203\_428\_L3C.dat.pond would be titled GLA06\_05052016\_r4203\_428\_L3C.dat.pond1.txt. These files include the track coordinates under the heading “%Satellite Track (x, y) in UTM” and offset coordinates under the heading %Offset Track. Discontinuities within the offset coordinates are notated by lines of “%jump point”.

The second important difference is that TOR.m outputs an argument file which contains all the arguments inputted into TOR.m. This file is named filename.args.txt. This argument file can be read by FPOR.m which is otherwise functionally identical to TOR.m.