

Color Resolution in Matlab Images

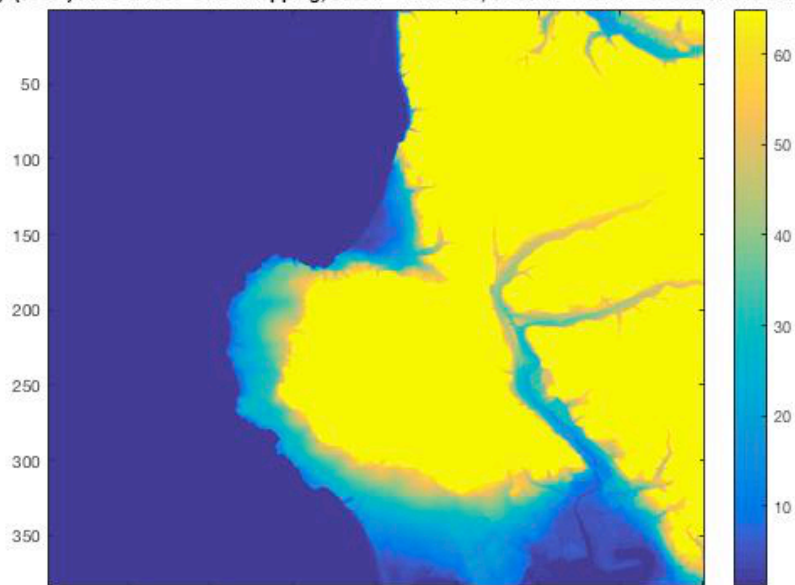
Reactorlab.net

The built-in functions `image` and `imagesc` map the input data to a colormap array. The default colormap is "parula" in which a 64x3 array contains RGB values in the 3 columns. Function `image` with no options does direct mapping of the input data to the colormap row number, e.g., data value 3 will show as the color specified by the RGB values in row 3 of the colormap. For the NOAA data, elevations of 1 and less than 1 display with the color in row 1 of the colormap. Values of 64 and above display with the color in row 64. That is, the image colors are "saturated" for data below and above these limits of 1-64.

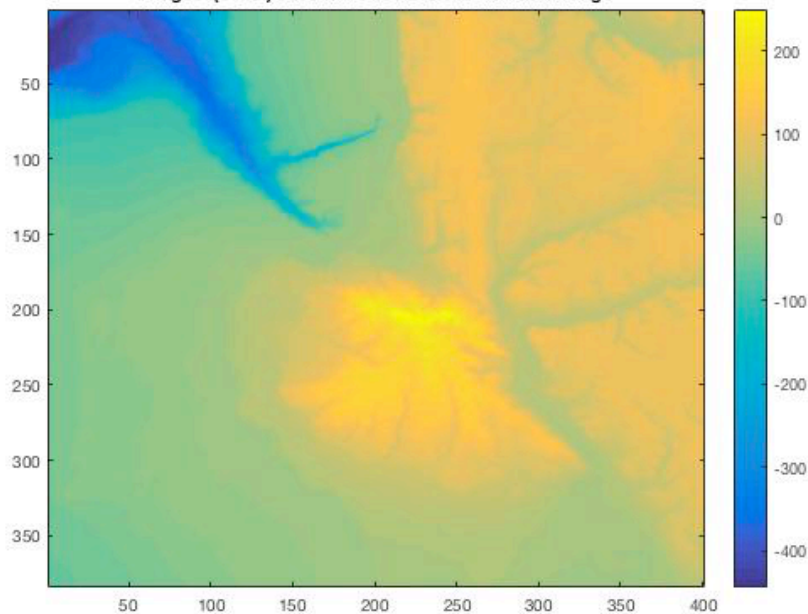
In contrast, function `imagesc` scales the data such that it ranges between 1 and 64 so that the full range of values in the data is represented in the figure. That is, elevation -444 will show as color in row 1 of the colormap and elevation 250 will show as color in row 64, for a data range of -444 to 250. The color resolution is still 64 with `imagesc` but it represents the full range of data values, not just data values from 1 to 64.

The default colormap is "parula." Matlab has several predefined colormaps, which you can see by searching the docs for colormap (enter in Command window `>> doc colormap`). You can define your own colormap, as I did in one research project to get the desired resolution for a space-time map of a reaction-diffusion simulation. Three figures below: `image`, `imagesc`, and `imagesc` with colormap `jet`. Use the command `colorbar` after the `image` or `imagesc` command to get the colorbar to display.

image(socal) uses "direct" color mapping, socal -444 to 250, so data < 1 and > 64 are saturated



imagesc(socal) uses full 64 colors over full data range



```
>> colormap('jet')
>> imagesc(socal)
>> p = colorbar; % get handle so can add label
>> p.Label.String = 'elevation in meters' % add label to colorbar
```

