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## COMPARE image( ) & imshow( ) for 1-PAGE, 2D ARRAYS

```
% BOTH FUNCTIONS CAN BE USED TO DISPLAY 3-PAGE, RGB IMAGES

% HERE WE DISPLAY 1-PAGE, 2D ARRAYS

% image() is often used to image 2D arrays of
% experimental data or data computed from a math model
% e.g., temperature distribution over a 2D object

% imshow() is often used to display photographic images
% photos with 1-page, 2D arrays might be X-ray images
% or black and white photographs

% both functions have many options not shown here
% search Matlab documentation for help and examples
```

## load and image raw 2D array of data

```
clear all, close all, clc

% load 2D array of data
sc = load('social.txt');

mn = min(min(sc))
mx = max(max(sc))

fprintf('note row,column axis labels with image( ) \n')

figure(1)
image(sc)
title('image( ) raw data')

figure(2)
imshow(sc)
title('imshow( ) raw data')
```

---

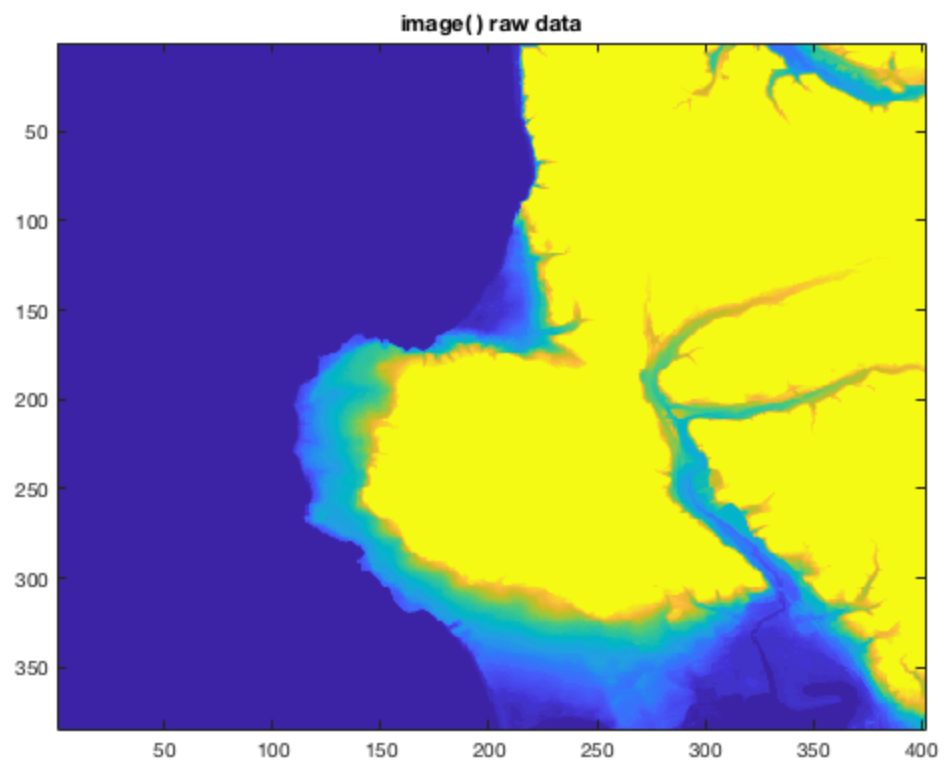
`mn =`

`-444`

`mx =`

`250`

*note row,column axis labels with image( )*





## scale 2D data array 0-1

```
close all, clc

sc01 = (sc - mn)/(mx - mn);

figure(1)
image(sc01)
title('image( ) data scaled 0-1')

figure(2)
imshow(sc01)
title('imshow( ) data scaled 0-1')

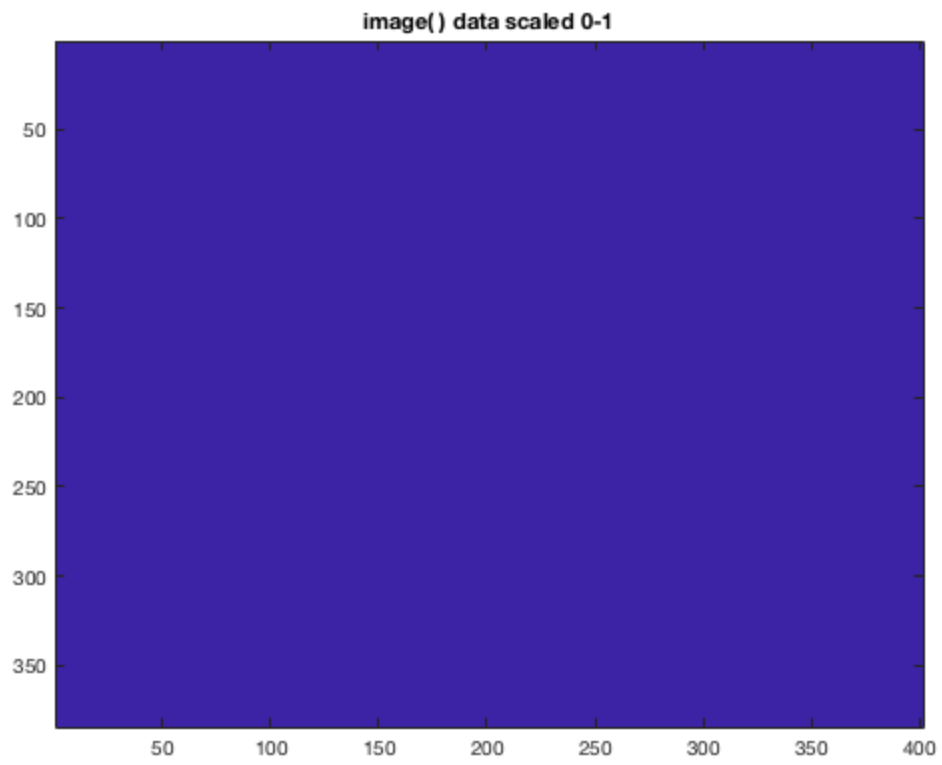
fprintf('imshow( ) default colormap is gray \n')
fprintf('imshow( ) colormap can be changed \n')

figure(3)
imshow(sc01,'Colormap',jet)
title('imshow( ) data scaled 0-1 with ''Colormap'', ''jet'' ')

fprintf('imshow( ) image size can be changed \n')

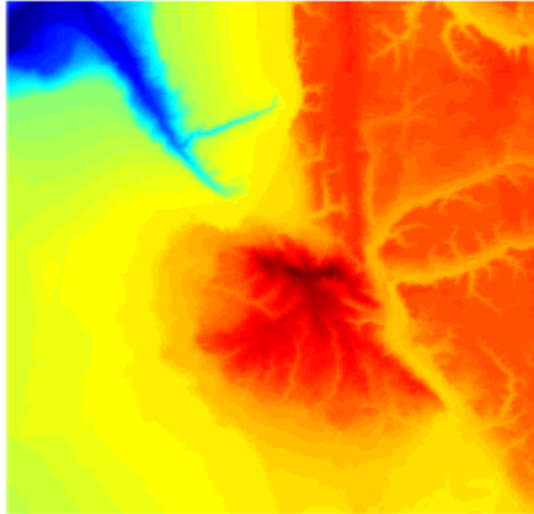
figure(4)
imshow(sc01,'InitialMagnification','fit')
title('imshow( ) data scaled 0-1 with ''InitialMagnification'', ''fit''
')

imshow( ) default colormap is gray
imshow( ) colormap can be changed
imshow( ) image size can be changed
```

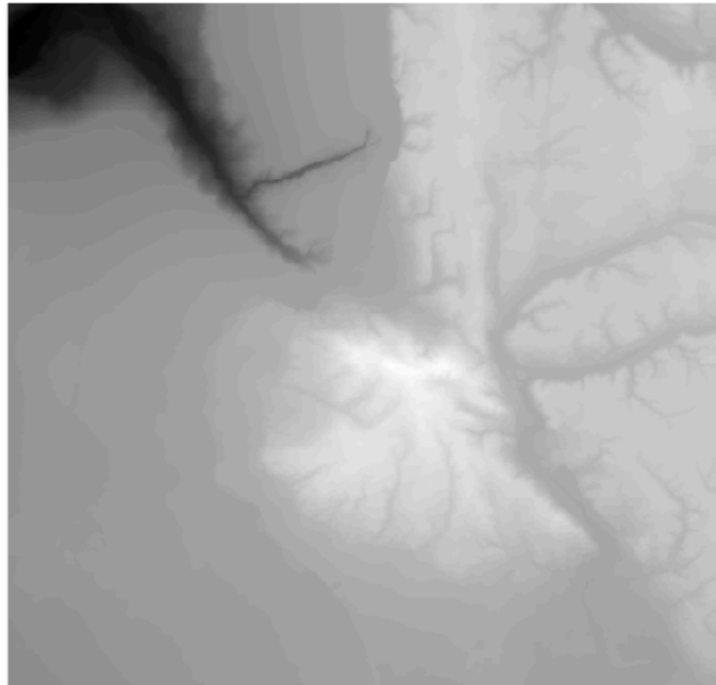


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`imshow()` data scaled 0-1 with 'Colormap','jet'



`imshow()` data scaled 0-1 with 'InitialMagnification','fit'



## scale 2D data array 0-64

```
close all, clc
```

---

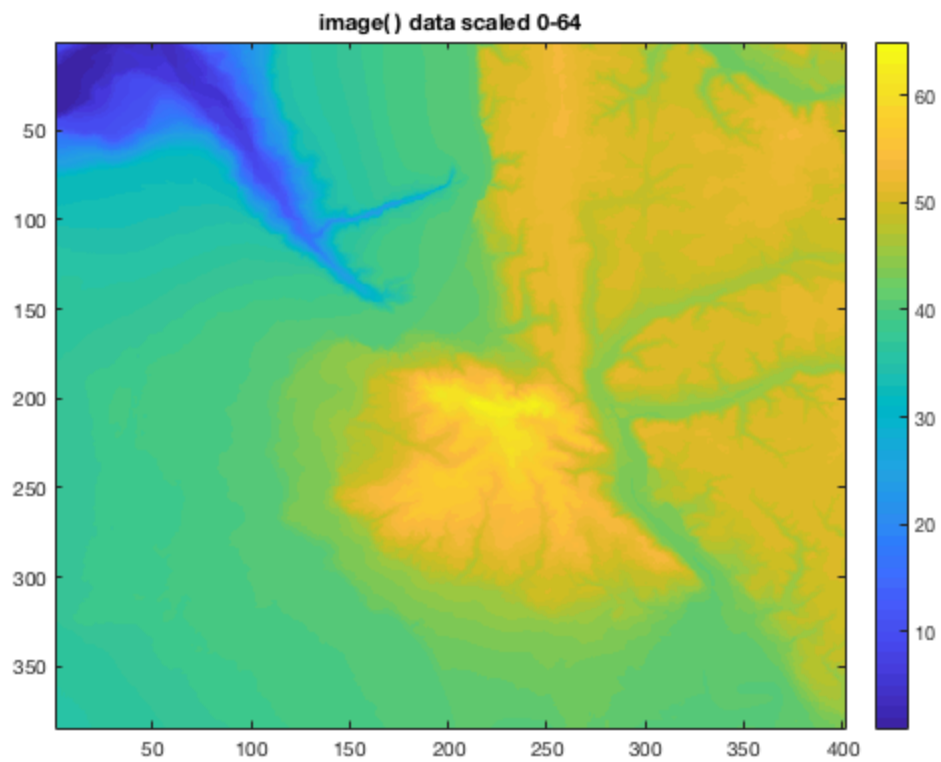
```
sc64 = sc01 * 64;

fprintf('a colorbar can be added with image( ) \n')

figure(1)
image(sc64)
title('image( ) data scaled 0-64')
colorbar

figure(2)
imshow(sc64)
title('imshow( ) data scaled 0-64')

a colorbar can be added with image( )
```



---

`imshow( ) data scaled 0-64`

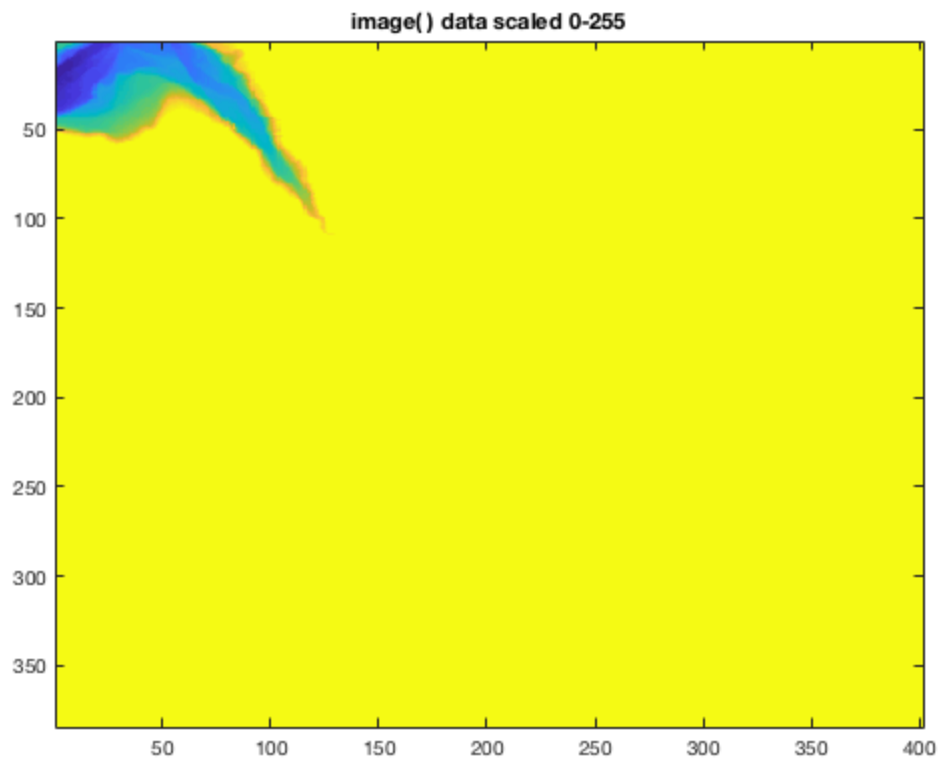
## scale 2D data array 0-255

```
close all, clc

sc255 = sc01 * 255;

figure(1)
image(sc255)
title('image( ) data scaled 0-255')

figure(2)
imshow(sc255)
title('imshow( ) data scaled 0-255')
```



imshow() data scaled 0-255

r

## automatic scaling of raw data with imagesc( )

```
close all, clc
```



---

```
% use "close all" to close all figures
% otherwise, figure(2) will inherit small size of
% figure(2) last used with imshow() function

fprintf('imagesc( ) scales data to 0-64 \n')
fprintf('but colorbar shows raw number range \n')

figure(1)
imagesc(sc)
title('use imagesc( ) to automatically scale raw data to 0-64',...
      'FontSize',14)
p = colorbar; % get "handle" to colorbar object so can add label
p.Label.String = 'raw data range'; % add label to colorbar
p.Label.FontSize = 18;

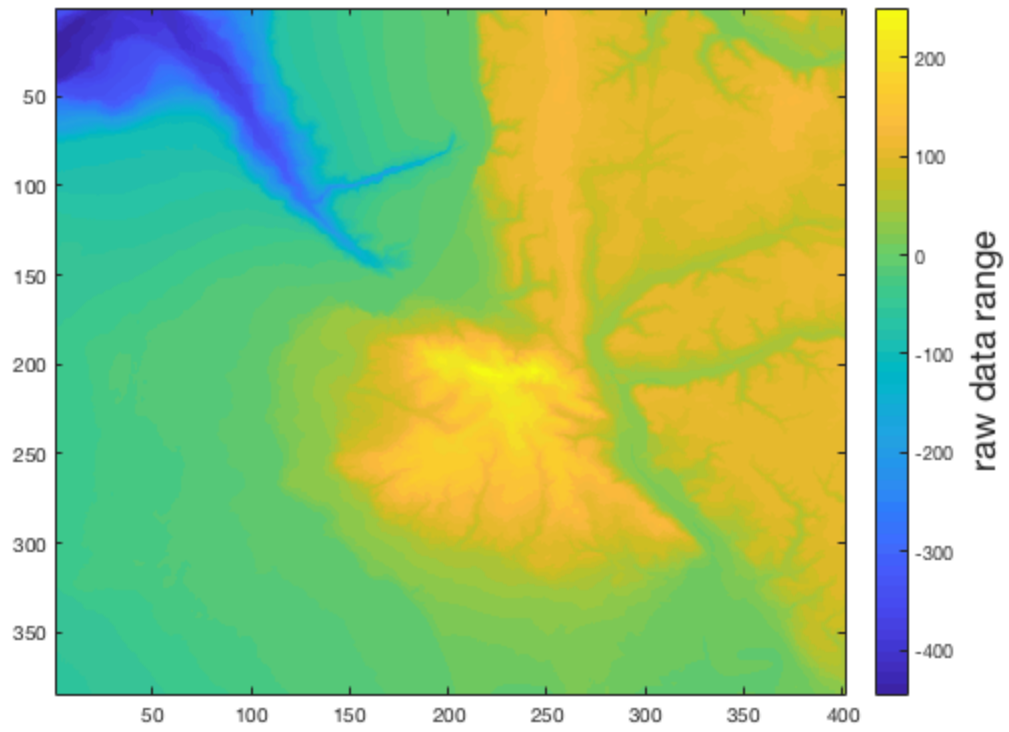
fprintf('image( ) default colormap is parula \n')
fprintf('change image( ) colormap to, e.g., jet \n')

figure(2)
colormap('jet');
imagesc(sc)
title('change colormap from default ''parula'' to ''jet'' ',...
      'FontSize',14)
p = colorbar; % get "handle" to colorbar object so can add label
p.Label.String = 'raw data range'; % add label to colorbar
p.Label.FontSize = 18;

imagesc( ) scales data to 0-64
but colorbar shows raw number range
image( ) default colormap is parula
change image( ) colormap to, e.g., jet
```

---

**use imagesc() to automatically scale raw data to 0-64**



**change colormap from default 'parula' to 'jet'**

