

Matlab and ArcMap

Process and map your data in Matlab

In this lab, you will:

- 1st Output your data from ArcMap
 - 2nd Import your data into Matlab
 - 3rd Process your data in Matlab
 - 4th Plot / Export your data in Matlab
-

If you need more information about using Mapping tool box, you can visit

<http://www.mathworks.com/products/mapping/>

Other website that might help your work:

M_Map <http://www.eos.ubc.ca/~rich/map.html>

Matlab file exchange <http://www.mathworks.com/matlabcentral/fileexchange/>

To turn in:

One map (PDF) including

- 1. Your project area
- 2. Your profile line, and projected cross section

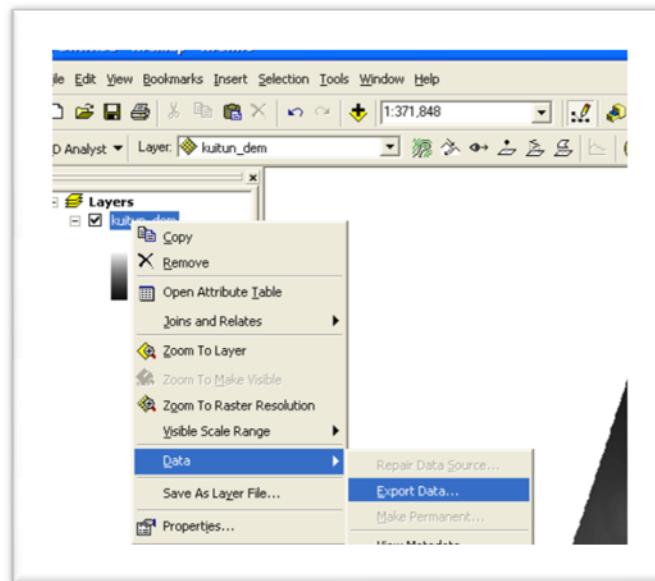
1. Output your data from ArcGIS

(a) For the Raster dataset

1. Matlab can directly read several different DEM formats. Including DTED , DEM, ETOPO, GTOPO, SDTS DEM and so on.

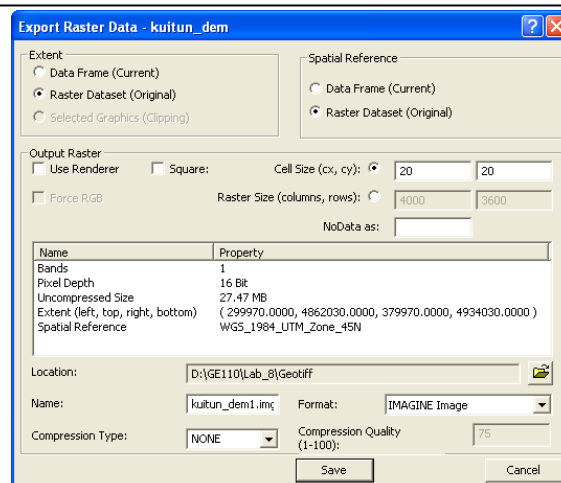
However, we can still use the **GeoTiff** to load our DEM and Image into Matlab.

2. To export your Image / DEM to Geotiff format, *right click* on your data and select “Export Data”.



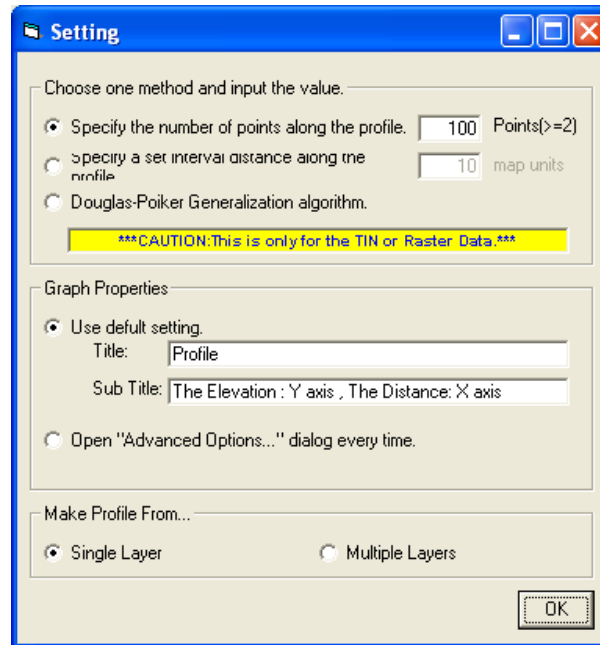
3. Input Location and file name. CHANGE format to **TIFF** and save.

Note : Display large dataset in Matlab may crash the program, so resampling your data if it is very large (and if you don't need to do any further calculation in Matlab).

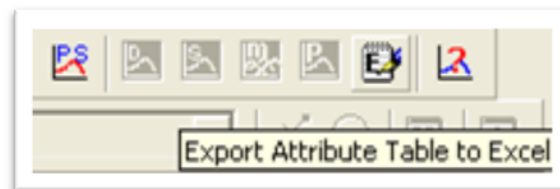


(b) For your data (Profile and Points)

1. To export your profile, use the EZ profiler to extract your data.
2. Change EZ profiler's setting before drawing your profile if necessary.



3. Export your profile to excel

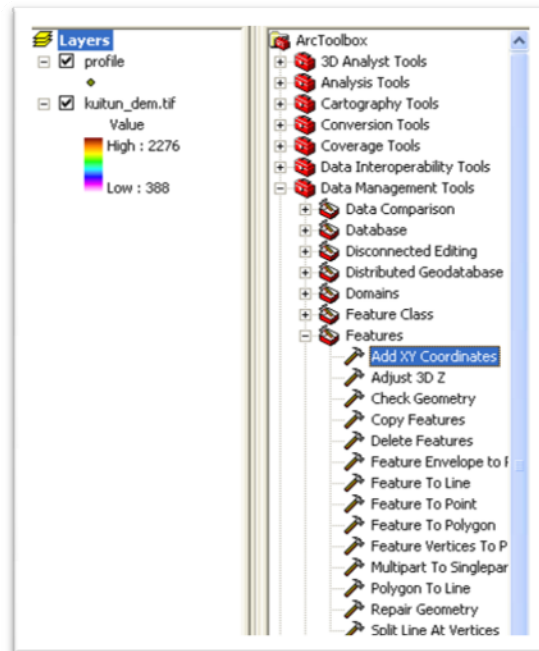


4. Save your file as a .XLS file or TEXT (Tab-lim) file (DO NOT USE .XLSX)

Note:

- i. Matlab can read the excel file (use `xlsread(filename)`). BUT you might have version issue if you use the different version of Matlab on different computer
- ii. You don't need to delete the column header if you decide to use excel format. You DO need to DELETE the column header if you decide to use ASCII format to save your file.

- For the point file, ADD xy coordinate before export your dataset from table.
Save your point data as txt or dBase format and remove the header in Excel.
(SAME with the way to process Profile dataset)



Attributes of profile												
FID	Shape	Id	Name	XCoord	YCoord	ZCoord	Dist	POINT_X	POINT_Y	POINT_Z	POINT_M	
0	Point ZM	0		324130.487116	4894072.77956	1123	0	324130.487116	4894072.77956	1123	0	
1	Point ZM	1		324135.862932	4894081.21168	1123	10	324135.862932	4894081.21168	1123	10	
2	Point ZM	2		324141.238747	4894089.64379	1123	20	324141.238747	4894089.64379	1123	20	
3	Point ZM	3		324146.614563	4894098.07591	1123	30	324146.614563	4894098.07591	1123	30	
4	Point ZM	4		324151.990379	4894106.50803	1123	40	324151.990379	4894106.50803	1123	40	
5	Point ZM	5		324157.366195	4894114.94014	1122	50	324157.366195	4894114.94014	1122	50	
6	Point ZM	6		324162.742011	4894123.37226	1122	60	324162.742011	4894123.37226	1122	60	
7	Point ZM	7		324168.117827	4894131.80438	1122	70	324168.117827	4894131.80438	1122	70	
8	Point ZM	8		324173.493643	4894140.2365	1121	80	324173.493643	4894140.2365	1121	80	
9	Point ZM	9		324178.869459	4894148.66861	1121	90	324178.869459	4894148.66861	1121	90	
10	Point ZM	10		324184.245275	4894157.10073	1119	100	324184.245275	4894157.10073	1119	100	
11	Point ZM	11		324189.621091	4894165.53285	1119	110	324189.621091	4894165.53285	1119	110	
12	Point ZM	12		324194.996907	4894173.96497	1119	120	324194.996907	4894173.96497	1119	120	
13	Point ZM	13		324200.372723	4894182.39708	1119	130	324200.372723	4894182.39708	1119	130	
14	Point ZM	14		324205.748539	4894190.8292	1119	140	324205.748539	4894190.8292	1119	140	
15	Point ZM	15		324211.124354	4894199.26132	1119	150	324211.124354	4894199.26132	1119	150	
16	Point ZM	16		324216.50017	4894207.69344	1119	160	324216.50017	4894207.69344	1119	160	
17	Point ZM	17		324221.875986	4894216.12555	1119	170	324221.875986	4894216.12555	1119	170	
18	Point ZM	18		324227.251802	4894224.55767	1119	180	324227.251802	4894224.55767	1119	180	
19	Point ZM	19		324232.627616	4894232.98979	1117	190	324232.627616	4894232.98979	1117	190	
20	Point ZM	20		324238.003434	4894241.4219	1117	200	324238.003434	4894241.4219	1117	200	
21	Point ZM	21		324243.37925	4894249.85402	1117	210	324243.37925	4894249.85402	1117	210	
22	Point ZM	22		324248.755066	4894258.28614	1117	220	324248.755066	4894258.28614	1117	220	
23	Point ZM	23		324254.130882	4894266.71826	1119	230	324254.130882	4894266.71826	1119	230	
24	Point ZM	24		324259.506698	4894275.15037	1117	240	324259.506698	4894275.15037	1117	240	
25	Point ZM	25		324264.882514	4894283.58249	1117	250	324264.882514	4894283.58249	1117	250	
26	Point ZM	26		324270.25833	4894292.01461	1117	260	324270.25833	4894292.01461	1117	260	
27	Point ZM	27		324275.634146	4894300.44673	1117	270	324275.634146	4894300.44673	1117	270	
28	Point ZM	28		324281.009961	4894308.87894	1117	280	324281.009961	4894308.87894	1117	280	
29	Point ZM	29		324286.385777	4894317.31096	1115	290	324286.385777	4894317.31096	1115	290	
30	Point ZM	30		324291.761593	4894325.74308	1119	300	324291.761593	4894325.74308	1119	300	
31	Point ZM	31		324297.137409	4894334.1752	1119	310	324297.137409	4894334.1752	1119	310	
32	Point ZM	32		324302.513225	4894342.60731	1119	320	324302.513225	4894342.60731	1119	320	
33	Point ZM	33		324307.889041	4894351.03943	1119	330	324307.889041	4894351.03943	1119	330	
34	Point ZM	34		324313.264857	4894359.47155	1119	340	324313.264857	4894359.47155	1119	340	
35	Point ZM	35		324318.640673	4894367.90367	1119	350	324318.640673	4894367.90367	1119	350	
36	Point ZM	36		324324.016489	4894376.33578	1119	360	324324.016489	4894376.33578	1119	360	
37	Point ZM	37		324329.392305	4894384.7679	1119	370	324329.392305	4894384.7679	1119	370	
38	Point ZM	38		324334.768121	4894393.20002	1122	380	324334.768121	4894393.20002	1122	380	
39	Point ZM	39		324340.143937	4894401.63213	1122	390	324340.143937	4894401.63213	1122	390	
40	Point ZM	40		324345.519753	4894410.06425	1122	400	324345.519753	4894410.06425	1122	400	
41	Point ZM	41		324350.895568	4894418.49637	1122	410	324350.895568	4894418.49637	1122	410	
42	Point ZM	42		324356.271384	4894426.92849	1122	420	324356.271384	4894426.92849	1122	420	
43	Point ZM	43		324361.6472	4894435.3606	1122	430	324361.6472	4894435.3606	1122	430	
44	Point ZM	44		324367.023016	4894443.79272	1122	440	324367.023016	4894443.79272	1122	440	
45	Point ZM	45		324372.398832	4894452.22484	1121	450	324372.398832	4894452.22484	1121	450	
46	Point ZM	46		324377.774648	4894460.65696	1121	460	324377.774648	4894460.65696	1121	460	
47	Point ZM	47		324383.150464	4894469.08907	1121	470	324383.150464	4894469.08907	1121	470	

2 Import your data into Matlab

(a) For the Raster dataset

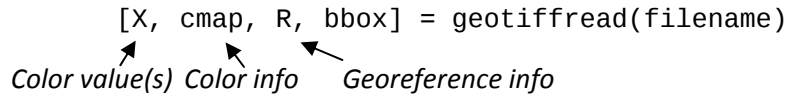
Use *Geotiffread(Filename)* function.

(For more information, please use *doc geotiffread* in Matlab)

Example for image

```
[X, cmap, R, bbox] = geotiffread(filename)
```

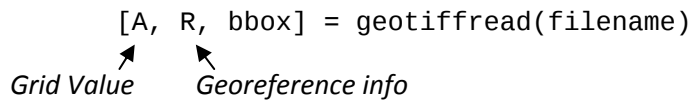
Color value(s) Color info Georeference info



Example for DEM

```
[A, R, bbox] = geotiffread(filename)
```

Grid Value Georeference info



(b) For the Point dataset

USE `A = load(filename, '-ascii')` to load your data

or

USE `A = xlsread(filename)` to load your data

(For more information, please use Matlab's help)

Note: use *xlsread* may have version compatible issue. But it is easier to organize you data by using excel data format **IF** it is not a large dataset.

(c) For the SHP file

Matlab can directly read the shape file format, too. Use *shaperead(filename)* to load the shp file if you need.

```
cities = shaperead('worldcities.shp')  
cities = shaperead('worldcities.shp', 'UseGeoCoords', true)
```

Note: shp file will be read as **cell** format in Matlab. It is **NOT** easy to directly use your data if you load it as shp file.

3 Plot your data in Matlab

There are various methods to plot your data in matlab. Here are several commands you can use.

- (a) `geoshow(Lat, Long)` [with projection]
- (b) `mapshow(X, Y)` [without projection]
- (c) `plotm(X,Y)` [Line and Point data with projection]
- (d) `plot(X,Y) / image(X,Y,C)....` Etc.

Note: Keep your data in the **same** coordinate system before you plot the data. The command coordinate system we can use is UTM(E,N,H) and Lat/Long

- (a) For the map projection...

Please try the following steps:

```
load coast;  
figure;  
axesm eckert4;  
framem; gridm;  
patchm(lat, long);  
setm(gca, 'Origin', [ 0 45 0])  
setm(gca, 'Origin', [ 0 90 0])  
setm(gca, 'Origin', [ 45 90 0])  
setm(gca, 'Origin', [45 45 30])
```

Use Matlab help to find the different projection method if you need

Please note the center point and orientation changes ..

Note: Define the projection method BEFORE you plot your map. It might not automatically update the map after you change the projection.

- (b) Plot the data in Lat/Long format

Use *geoshow* / *plotm* / *contourm* ... etc

- (c) Plot the data in X/Y format (E,N,H)

Use *mapshow* / *plotm* / *contourm* ... etc

Example:

```

load korea; load geoid;
figure;
worldmap(map, refvec)

% Display the Korean data grid as a texture map.
    geoshow(map,refvec,'DisplayType', 'texturemap');
    colormap(demcmap(map))

% Contour the geoid values from -100 to 100 in increments of 5.
    [c,h] = contourm(geoid, geoidrefvec, -100:5:100, 'k');

% Add red labels to the contours.
    ht=clabel(c,h);
    set(ht,'Color','r');

```

Example:

```

cd d:\Ge110\lab_8\Geotiff\
[Z R bbox] = geotiffread('kuitun_dem.tif');
H = double(Z);

% Display the DEM grid as a texture map.
    mapshow(H,R,'DisplayType', 'texturemap');

% Contour the DEM values from 0 to 2000 in increments of 100 in block
    [c,h] = contourm(H, R, [0:100:2000], 'k');

```

For more example, please look at Today's demo scripts or go to Matlab's help