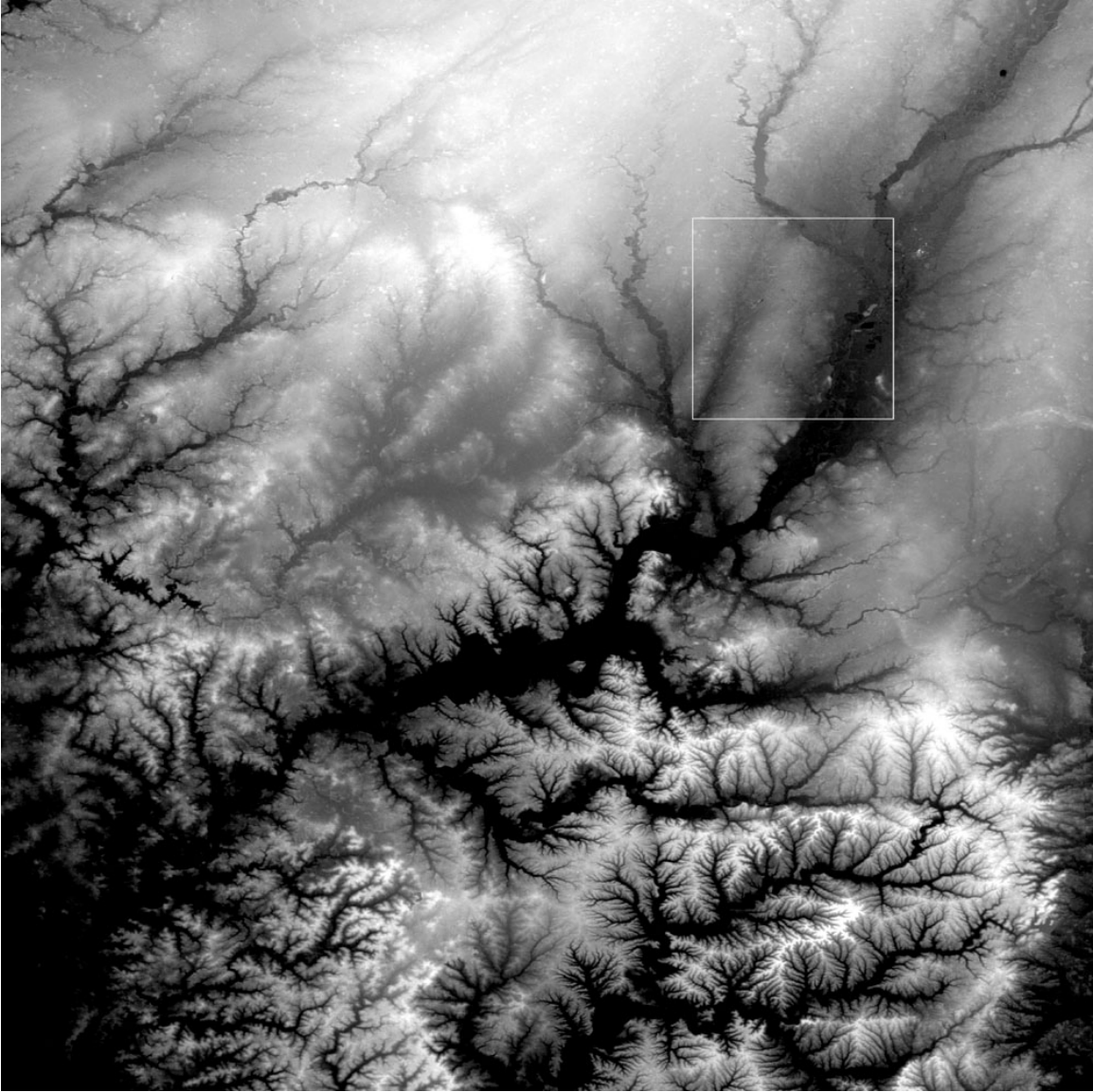


## Orthorectification Homework

- Find the file rpc\_80.txt on geomatics drive, offsets, scales, and RPC coefficients for Indianapolis Quickbird scene – see QB product guide / NITF spec for order of data, lat, lon decimal degrees, h meters, line, sample pixels
- Find the SRTM data file n39w087.bil. It is 1 degree by 1 degree cell, at 1 arc second spacing, 3601 x 3601 elements (16 bit – short integer), H meters (note  $h=H+N$ , where  $N= -33.1m$ ). -32727 means “no data”, suggest clip anything below 197m. Note data stored North to South, backwards from many other DEM formats.
- Find minified QB imagery (image pyramid) dg1\_m2.tif (minified 2x = 1.2m pixel), dg1\_m4.tif (minified 4x, 2.4m pixel), etc. Also raw binary files if you prefer.
- Select an extent in UTM coordinates (min/max X&Y) and a GSD for the ortho image.
- Based on above choice for GSD select an appropriate pyramid level from which to interpolate intensities, to avoid aliasing
- Program loop should:
  - Go to next point in the XY grid
  - Convert to phi, lambda
  - Interpolate an elevation from SRTM data
  - Evaluate RPC and obtain line, sample
  - divide by appropriate power of 2 for pyramid level
  - interpolate a gray value / intensity / DN
  - put into the “blank” file that you are creating
  - repeat
- when done get image into a .tif format (anyone knows geotif ??) and make an ESRI world file so we can use the result in GIS tools.
- Due Friday, April 1.



**Figure 1 Gray scale rendering of SRTM data - Approx QB limit shown**

1.5002000000000000e+004  
1.3776000000000000e+004  
3.9707800000000000e+001  
-8.6290300000000000e+001  
2.1690000000000000e+002  
1.5002000000000000e+004  
1.3776000000000000e+004  
8.3000000000000000e-002  
9.9050000000000000e-002  
1.0000000000000000e+002  
-3.716767997739488e-004  
1.227175047519375e-003  
-1.000970414116480e+000  
2.249643198260163e-004  
-4.361082240702233e-001  
9.114243279253021e-005  
3.352580878983082e-003  
8.833857326773284e-005  
2.390922307571166e+000  
1.455684334092681e-006  
1.398711435488339e-005  
-2.432023359665938e-004  
-4.767388974625451e-002  
-5.822109203756660e-006  
1.267731999617561e-002  
-3.101599728449034e+000  
4.131069539610399e-003  
-6.229584352704330e-007  
6.923501681539018e-004  
-9.207053737466200e-007  
1.0000000000000000e+000  
4.337381981726375e-001  
-2.386789942015370e+000  
-3.723256189381186e-003  
4.827921620204982e-002  
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-1.062807762042489e-002  
3.094746632844561e+000  
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5.169393660951977e-003  
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-1.490591403499122e-003  
1.458689000256785e-003  
-2.477672308306435e-006  
-2.107744608187851e-006  
4.848134091186939e-004  
-6.442311760749761e-007  
-1.723424854463340e-002  
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-3.158098532245273e-001  
-1.073720928639738e-001  
-2.813390067055079e-005  
3.236352650269215e-004  
-1.052348161917316e-002  
2.253928882640652e-004  
4.062865449341591e-004

1.0000000000000000e+000  
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-4.103620493278067e-004  
7.416817406755843e-005