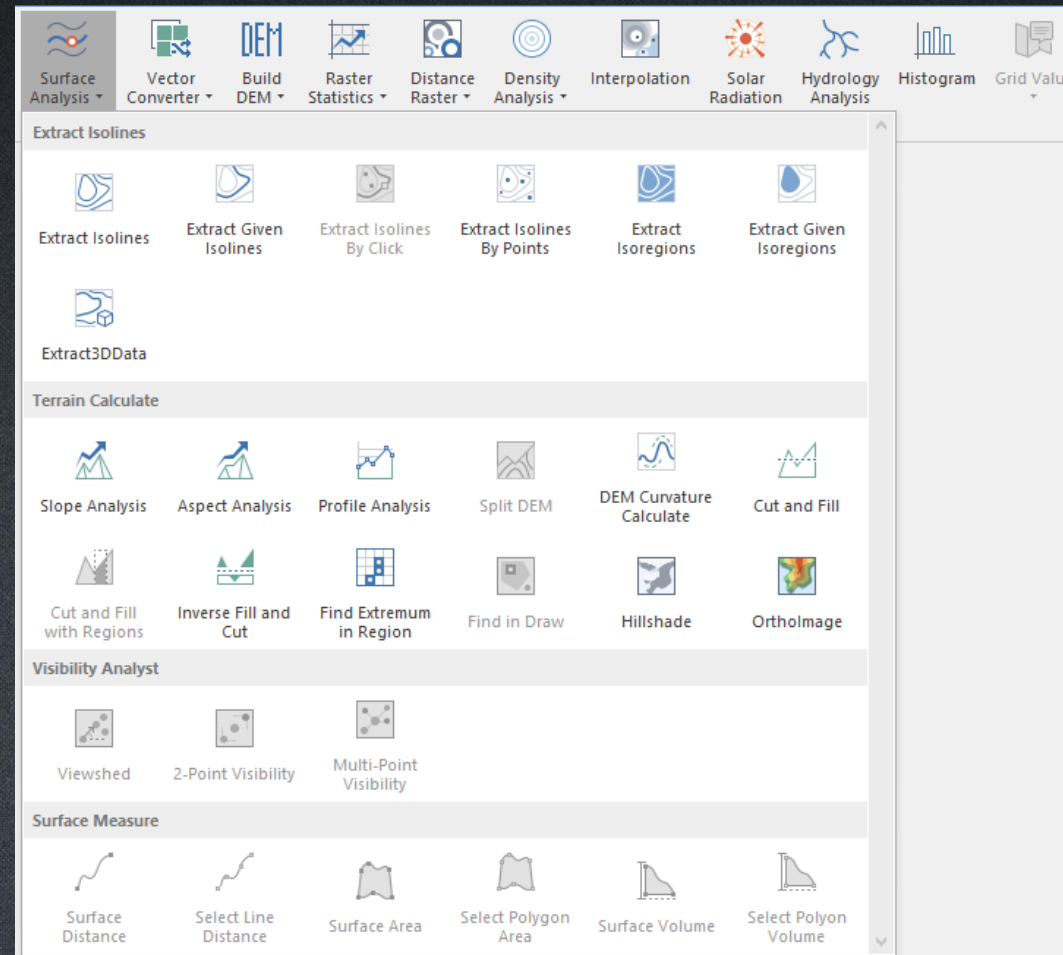


Raster Analysis

SuperMap Software Co., Ltd.

Raster Analysis

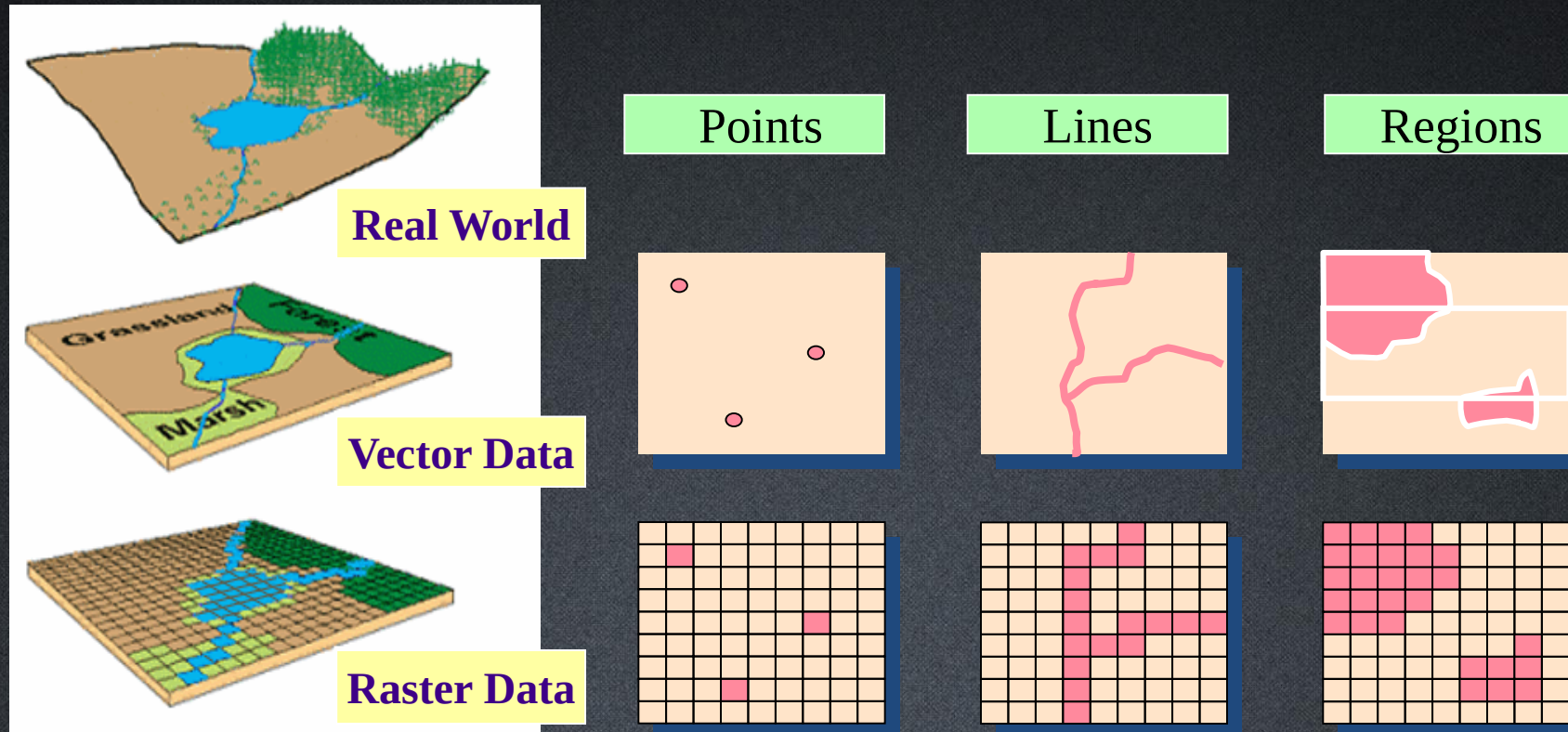
- Analysis based on raster dataset.



Course Overview

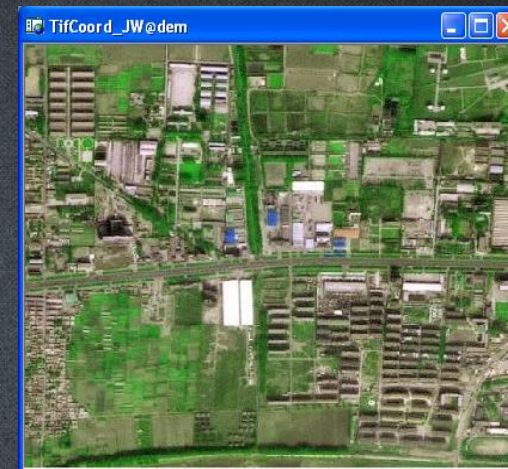
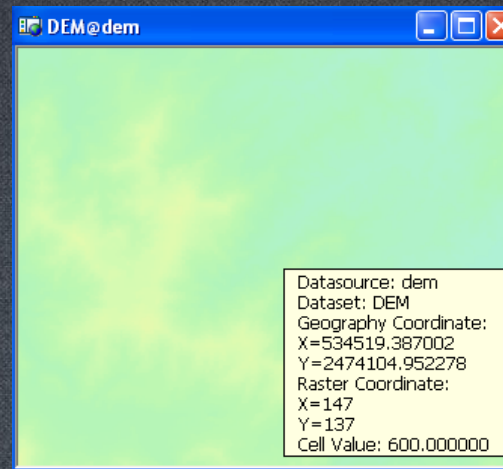
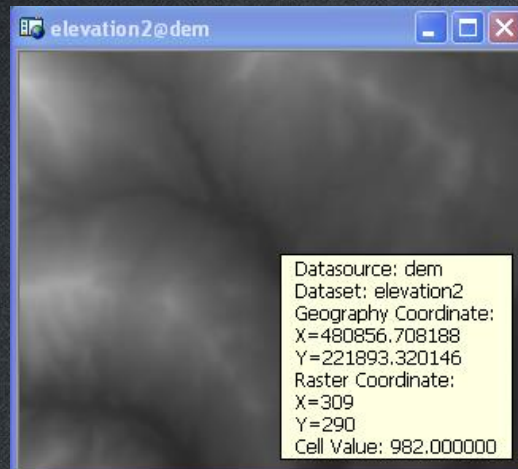
- Raster Dataset Types
- Interpolate to Raster (IDW, Kriging & Spline)
- Surface Analysis
 - Isolines /Isoregions
 - Slope / Aspect
 - Orthographic Image & HillShade
 - Surface Area & Distance
 - Identify Value

Raster Data Structure



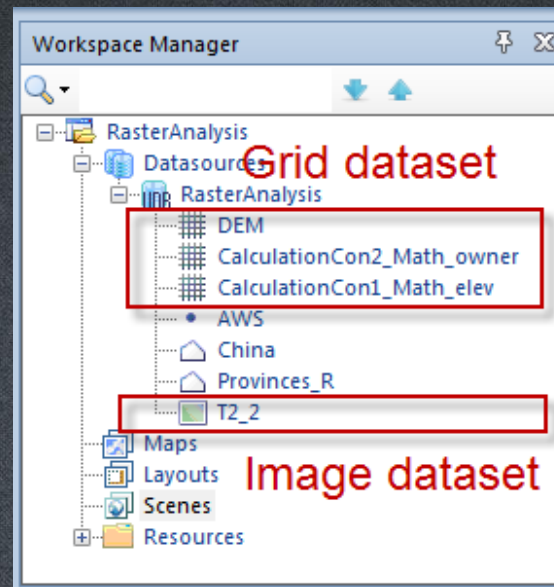
Raster Dataset Types

- DEM Model: Pixel values represent elevation information.
- Grid Data: Pixel values represent business information, such as temperature, rainfall value.
- Image Data: Remote Sensing Image, satellite image, aerial photo, or other photos.



Raster Dataset Types

- DEM dataset and Grid dataset are the main datasets used for Grid Analysis.
- Only several Grid Analysis functions can be used for Image dataset, such as Resample.



Interpolate to Raster

- Purpose: Get a raster dataset based on a point dataset.
- Estimate the cell values using interpolation method and get the correlations between point values.
- Interpolate field type should be numeric.
- Application Example
 - Get rainfall Isolines based on the collected rainfall data in some observation points.

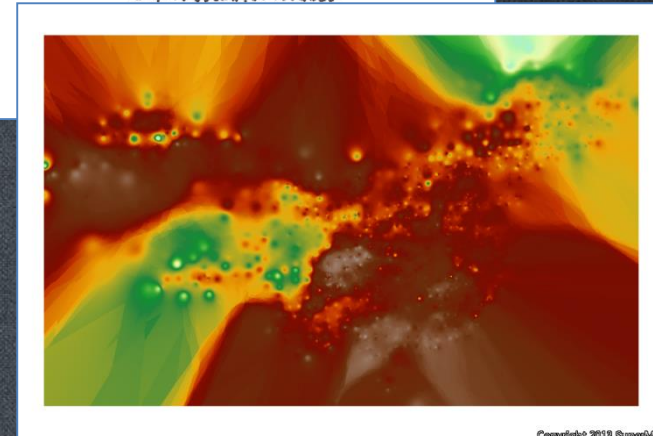
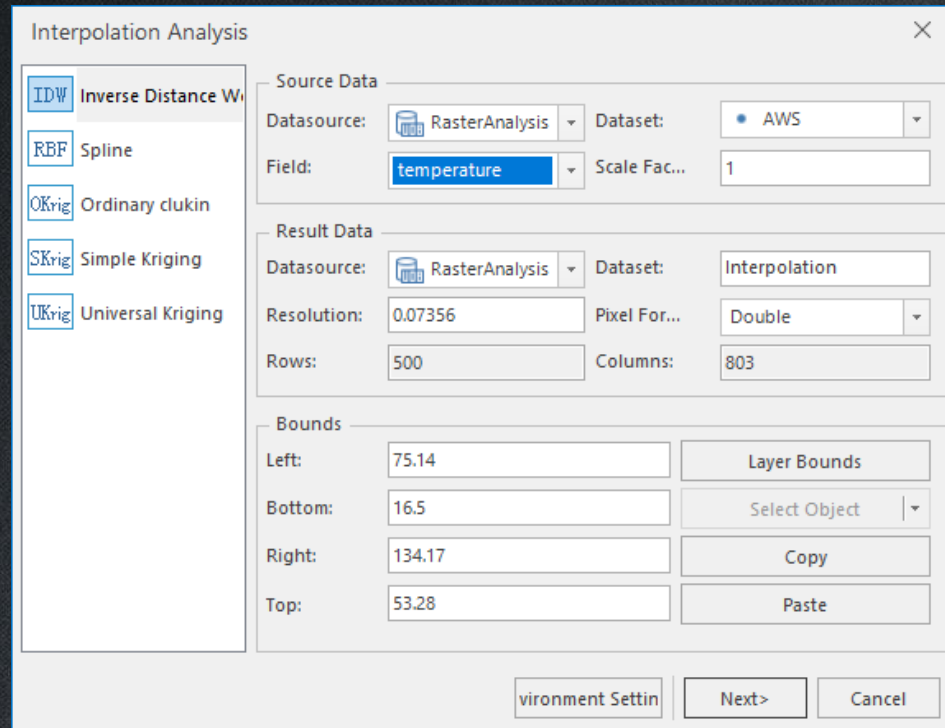
Interpolation to Raster

- Interpolation method
 - Inverse Distance Weighted (IDW)
 - Spline Interpolation
 - Kriging
 - Ordinary Kriging
 - Simple Kriging
 - Universal Kriging

The screenshot shows the 'Interpolation Analysis' dialog box. On the left, a list of methods is shown: IDW (Inverse Distance Weighted), RBF (Spline), OKrig (Ordinary Kriging), SKrig (Simple Kriging), and UKrig (Universal Kriging). The 'Source Data' section on the right includes 'Datasource: RasterAnalysis', 'Dataset: AWS', 'Field: SmID', and 'Scale Fac...: 1'. The 'Result Data' section includes 'Datasource: RasterAnalysis', 'Dataset: Interpolation', 'Resolution: 0.07356', 'Pixel For...: Bit32', 'Rows: 500', and 'Columns: 803'. The 'Bounds' section includes input fields for 'Left: 75.14', 'Bottom: 16.5', 'Right: 134.17', and 'Top: 53.28', along with buttons for 'Layer Bounds', 'Select Object', 'Copy', and 'Paste'. At the bottom, there are buttons for 'Environment Settings', 'Next>', and 'Cancel'.

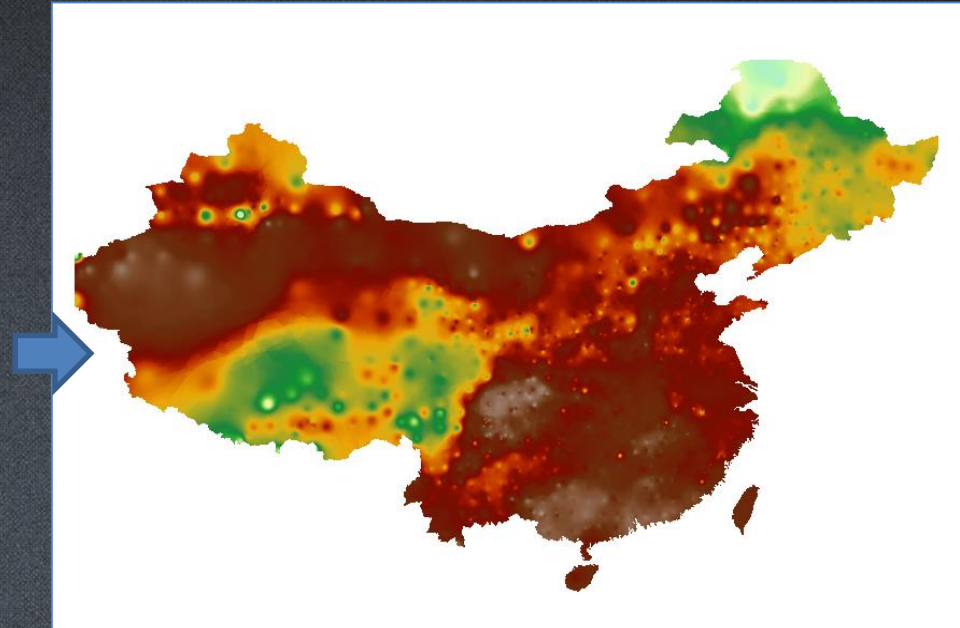
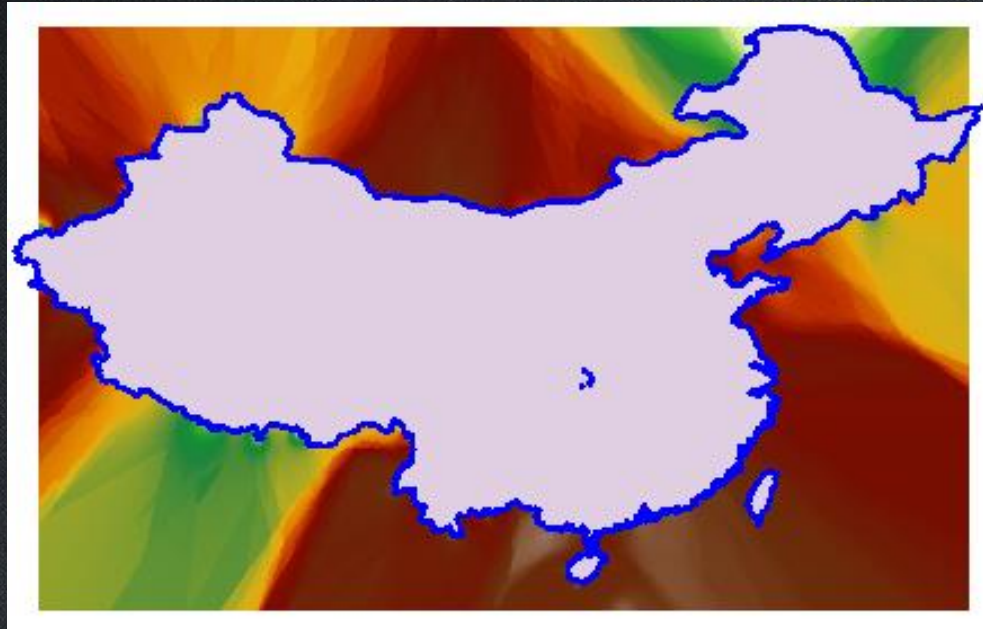
Exercise:

- Get a raster dataset based on the point dataset “AWS”, use the field “temperature” for interpolation.
- Data for Exercise: \Data\RasterAnalysis.udb.



Exercise:

- Clip the interpolation result dataset using region dataset “China”.
- Data for Exercise: \Data\RasterAnalysis.udb.



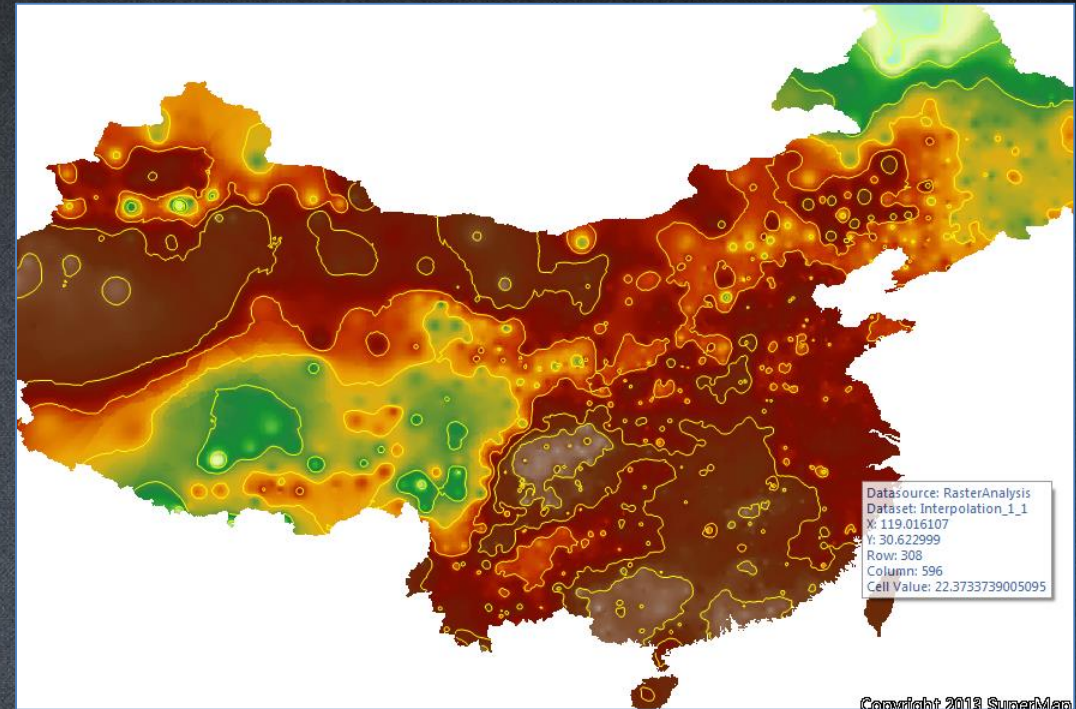
Use Grid Value to query raster values.

Extract Isolines

- Extract isolines that meet the conditions on the raster surface.
- Data for Exercise: \Data\RasterAnalysis.udb.

Extract All Isolines

Source Data		Target Data	
Datasource:	RasterAnalysis	Datasource:	RasterAnalysis
Dataset:	Interpolation	Dataset:	IsoLine
Result Settings		Parameter Settings	
Max Cell Value:	31.548735	Datum Value:	0
Min Cell Value:	0.274053	Interval:	4
Max Isoline:	28	Resampling:	0
Min Isoline:	4	Smooth Met...	None
Count:	7	Smoothness:	2
		OK Cancel	



Extract Isoregions

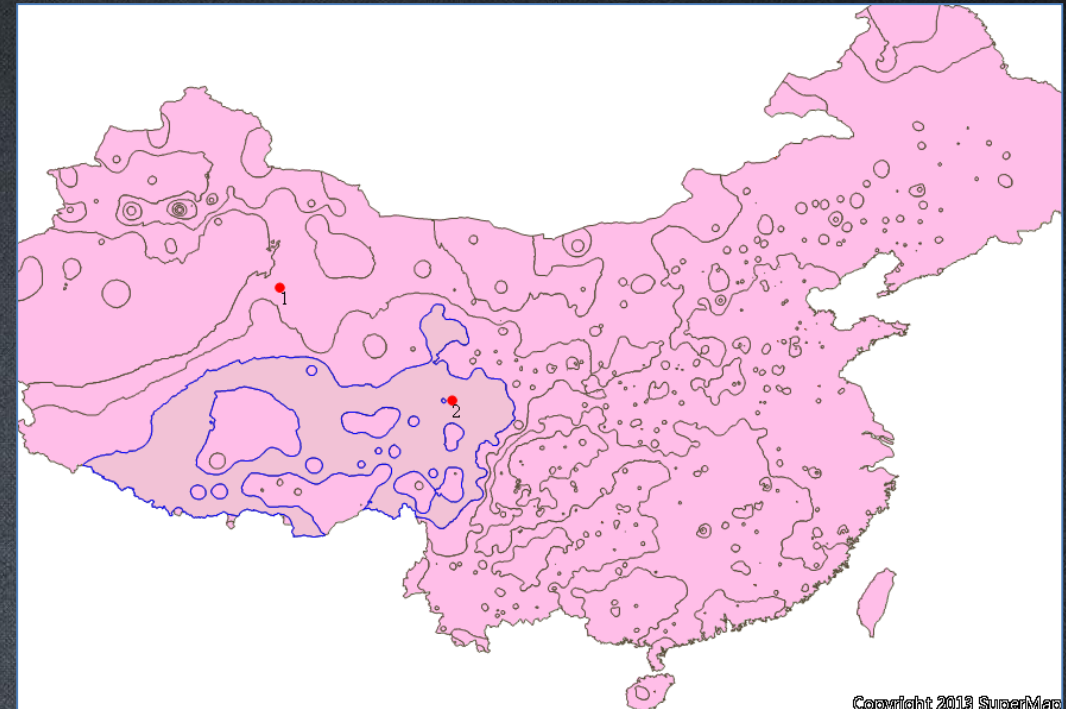
- Extract isoregions that meet the conditions on the raster surface.
- Data for Exercise: \Data\RasterAnalysis.udb.

Extract All Isoregions

Source Data	Target Data
Datasource: RasterAnalysis	Datasource: RasterAnalysis
Dataset: Interpolation	Dataset: IsoRegion

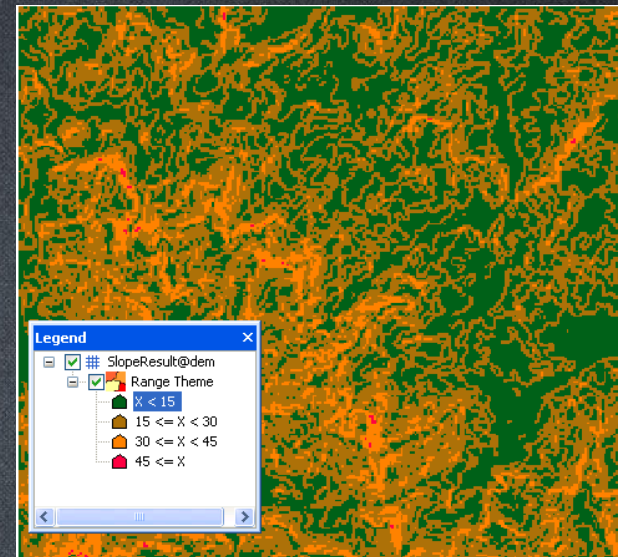
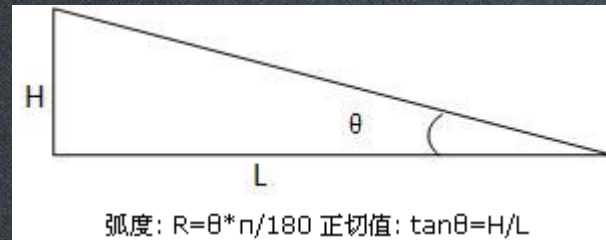
Result Settings	Parameter Settings
Max Cell Value: 31.548735	Datum Value: 0
Min Cell Value: 0.274053	Interval: 4
Max Isoregion: 28	Resampling: 0
Min Isoregion: 4	Smooth Met...: None
Count: 7	Smoothness: 2

OK Cancel



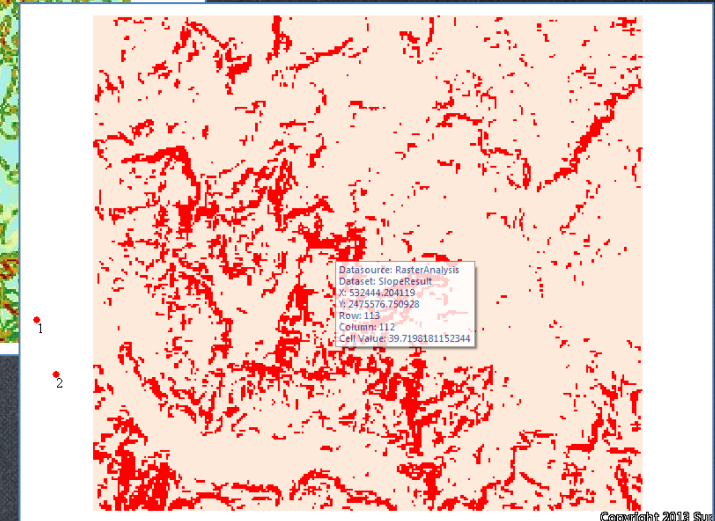
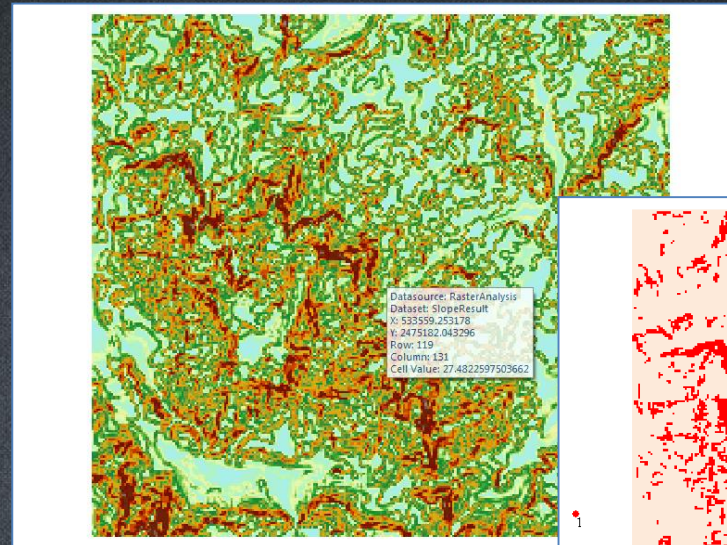
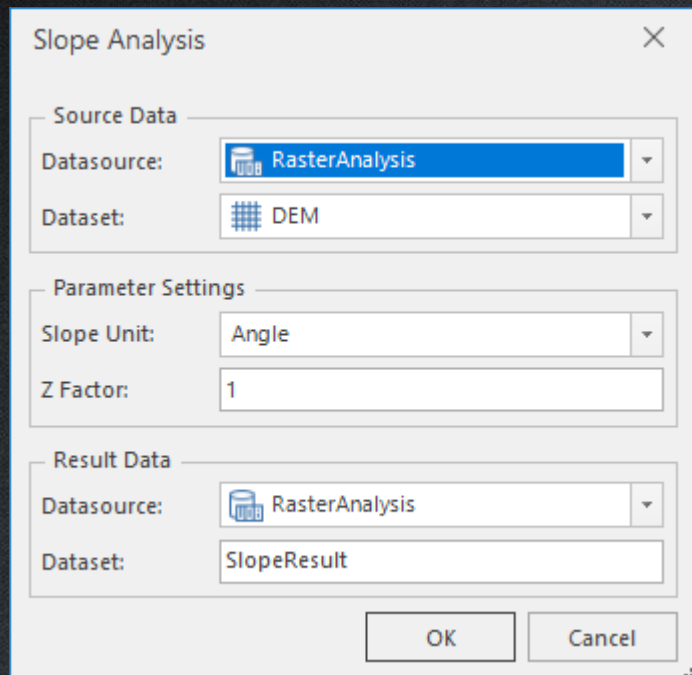
Slope

- Slope reflects the oblique degree (It's the angle between the tangent passing a point on the surface of the earth and the horizontal flat).
- The value of each cell represents the degree of slope, the larger the value is, the more oblique the slope is.
- Application Example
 - Water and soil lose research



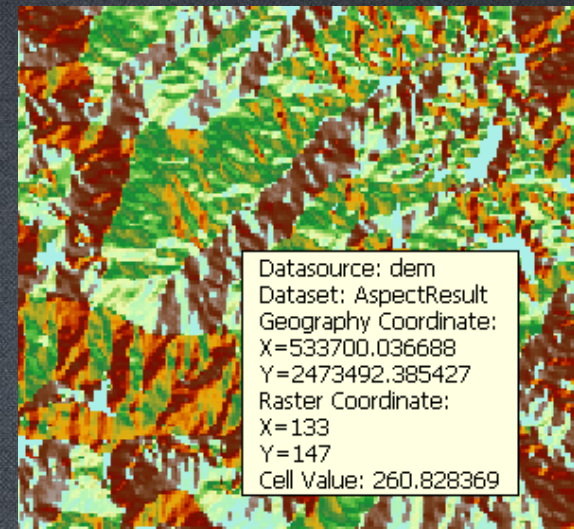
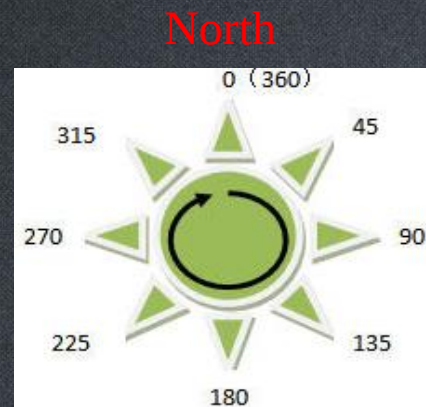
Exercise:

- Calculate the slope value for the dataset “DEM”.
- Make a range map for the slope result.
 - The red pixels' slope value are more than 30 degree.



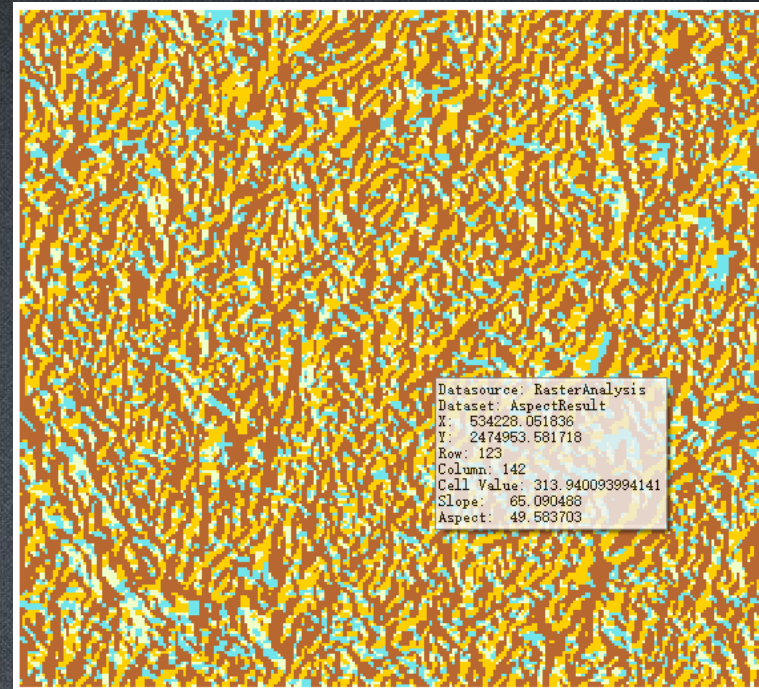
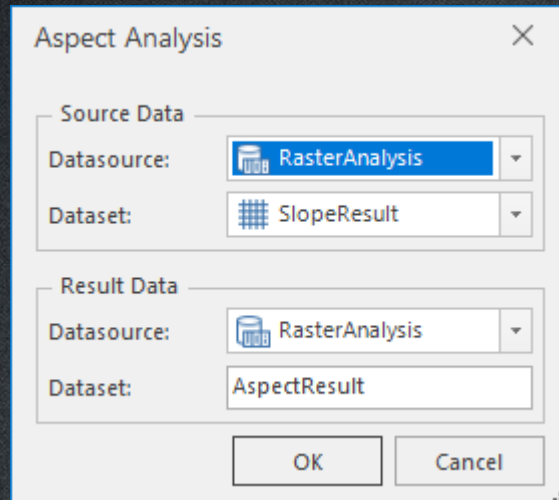
Aspect (Slope Direction)

- Application Example: Pay attention to some area in specified slope direction, such as the area which face south.
- The value of each cell represents the steepest downslope direction from each cell to its neighbors.
- The slope direction value is calculated clockwise from due North, and the slope direction ranges from 0 to 360.



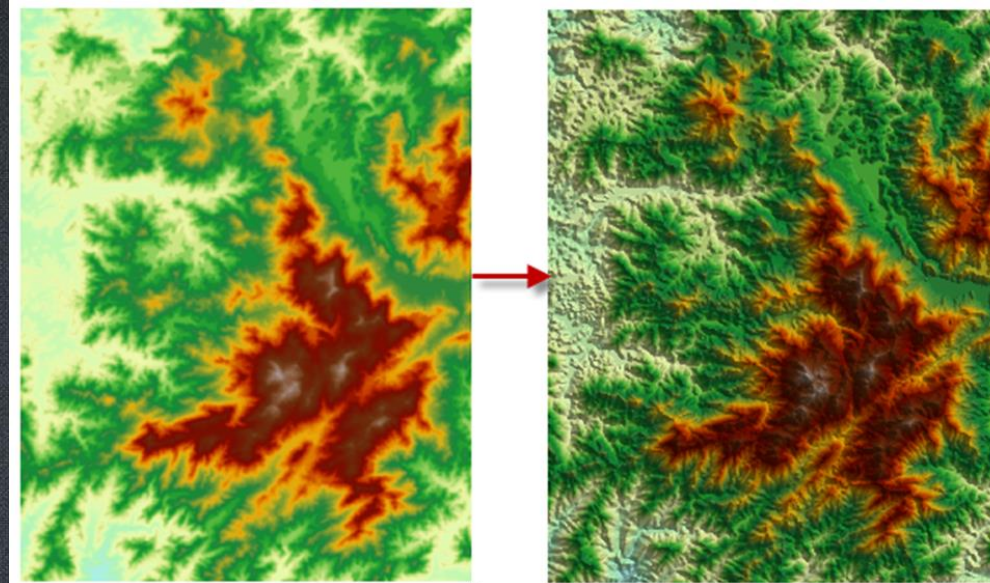
Exercise:

- Calculate the slope direction for the “DEM” dataset.
- Make a range map for the aspect result.
- Data for Exercise: \Data\RasterAnalysis.udb.



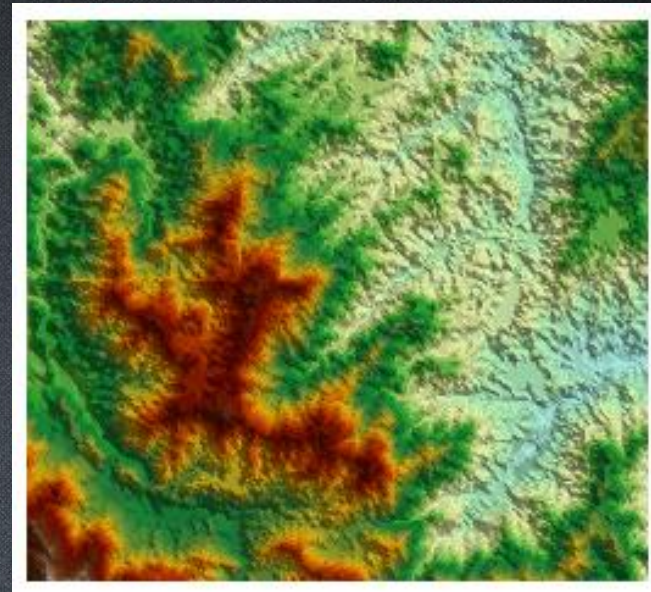
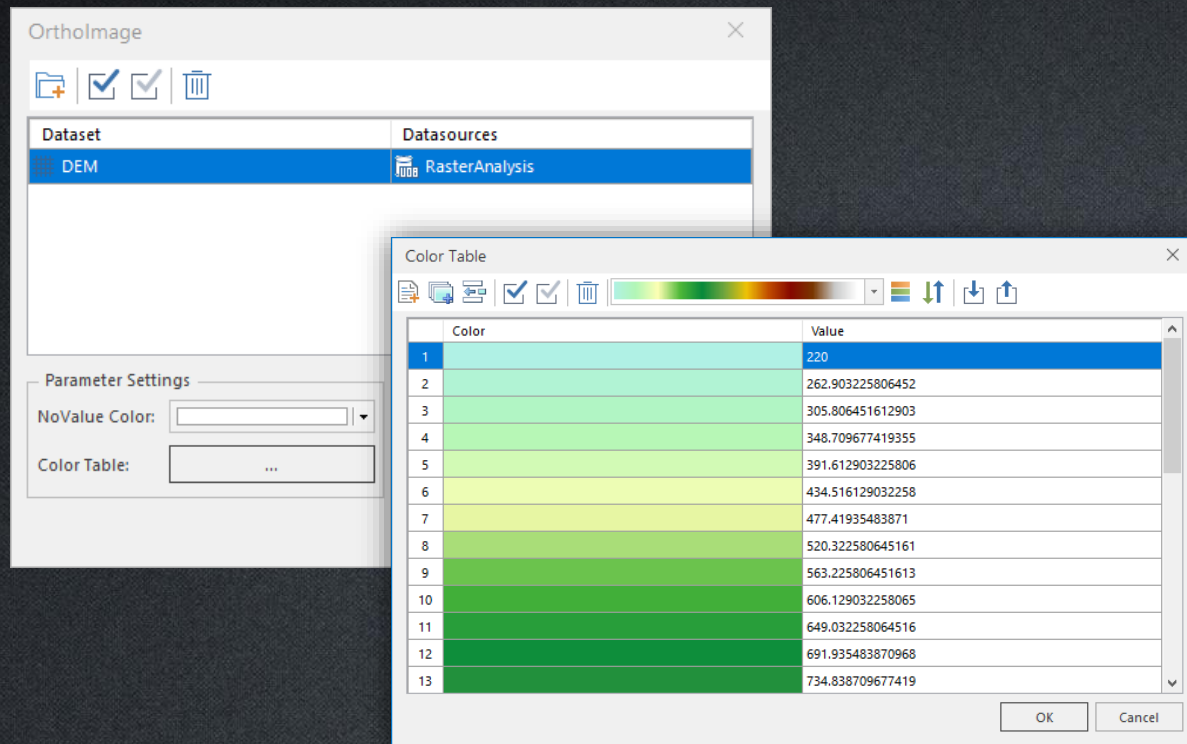
Ortho Image

- Orthographic Image
 - Show the variation of grid values by variation of colors, such as elevation.
- The result looks like 3D data.



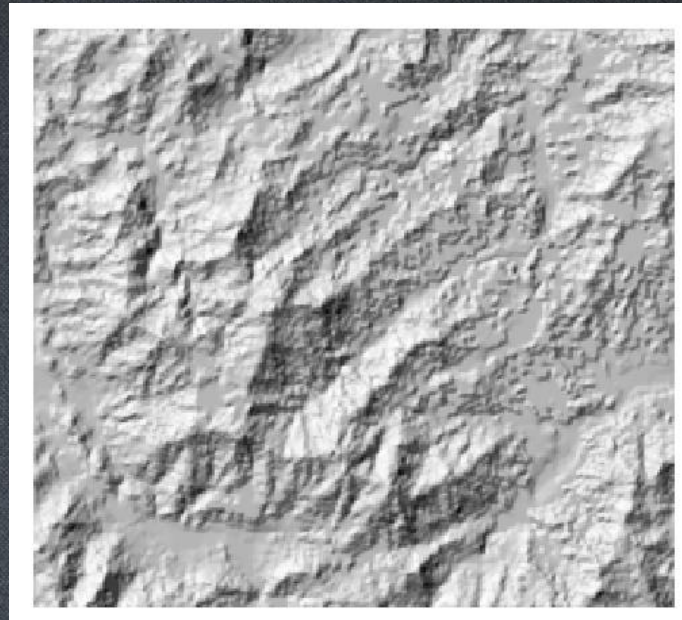
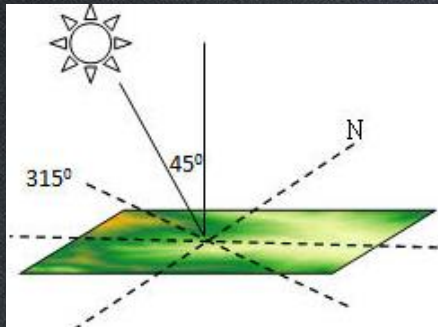
Exercise:

- Make an orthographic image for dataset “DEM”.
- Data for Exercise: \Data\RasterAnalysis.udb.



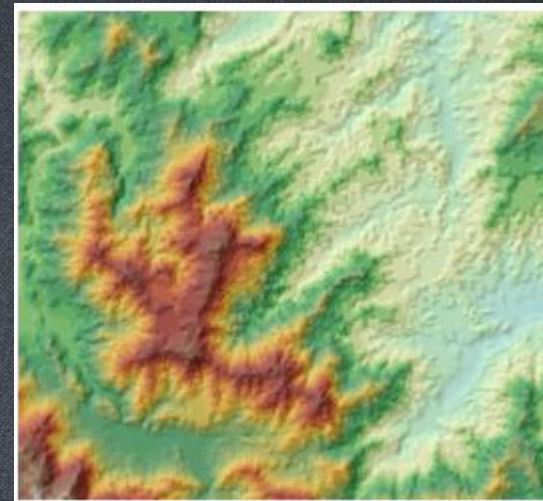
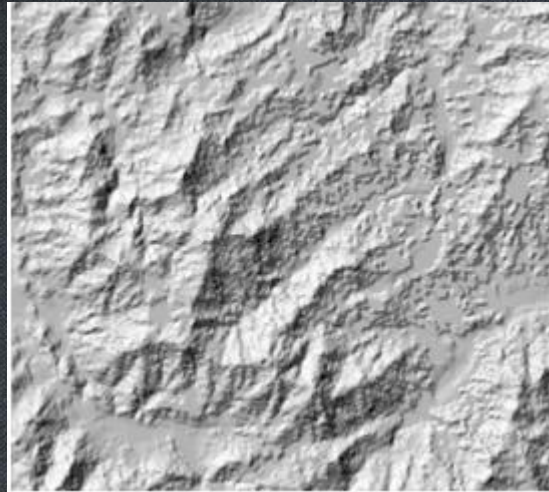
Hillshade

- Determine the illumination of each cell to enhance 3D effects.
- Creates a shaded relief view from a DEM dataset or a grid dataset by considering the illumination angle of the light source.



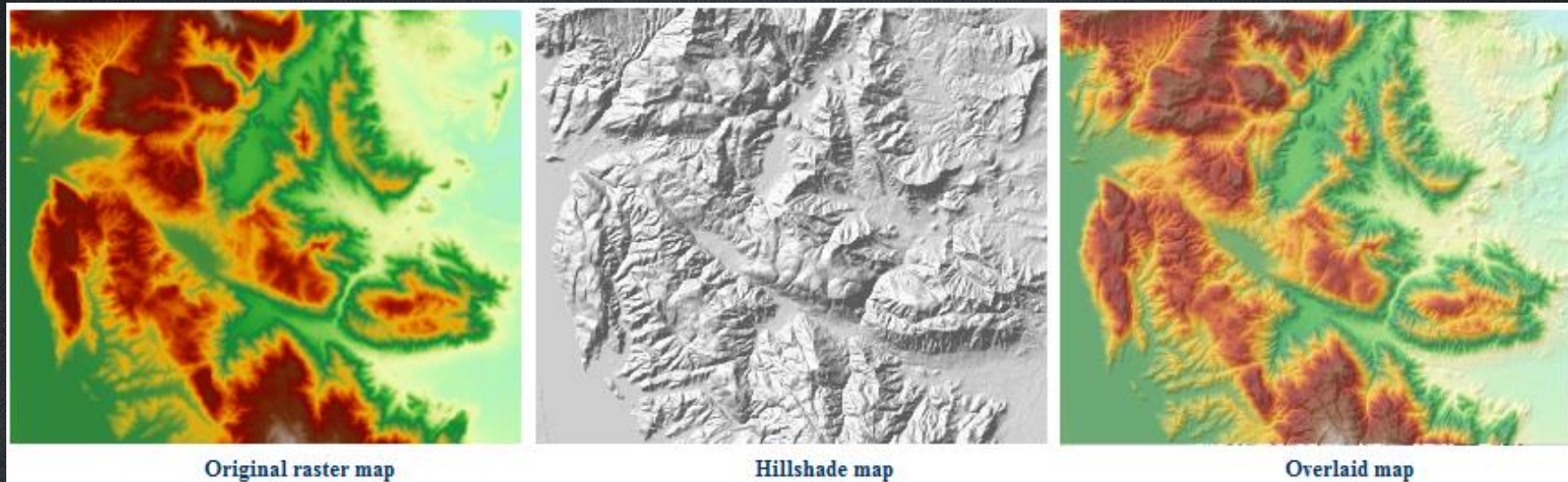
Exercise:

- Make a 3D hillshade map for dataset “DEM”.
- Overlay hillshade result map with the original DEM dataset, set the DEM layer transparency as 35.
- Data for Exercise: \Data\RasterAnalysis.udb.



Ortho Image & Hillshade

- Ortho Image: Get illumination intensity through the elevation of surrounding cells, then perform orthorectification to get 3D effects.



Thank You!

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