Raster Analysis

SuperMap Software Co., Ltd.

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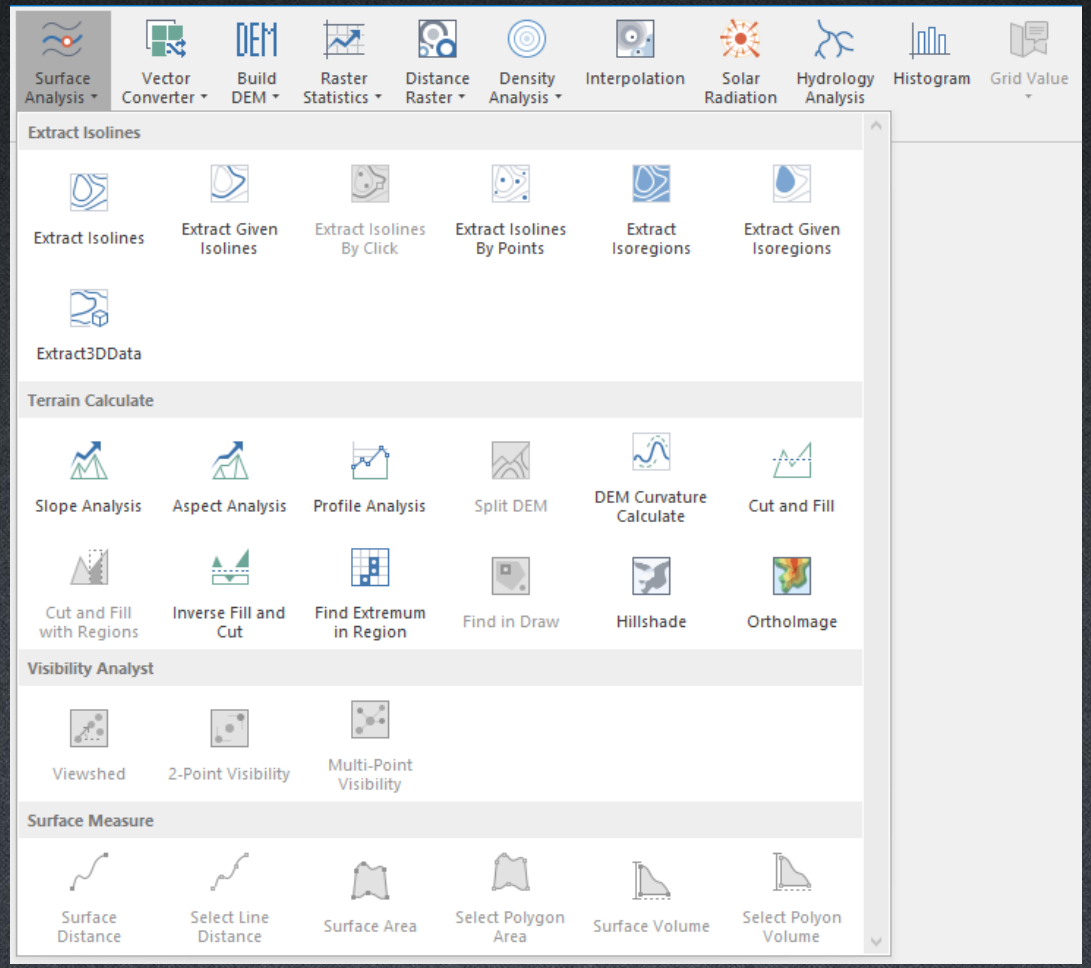
TO BE THE GLOBAL LEADING GIS

Raster Analysis

- Analysis based on raster dataset.



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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

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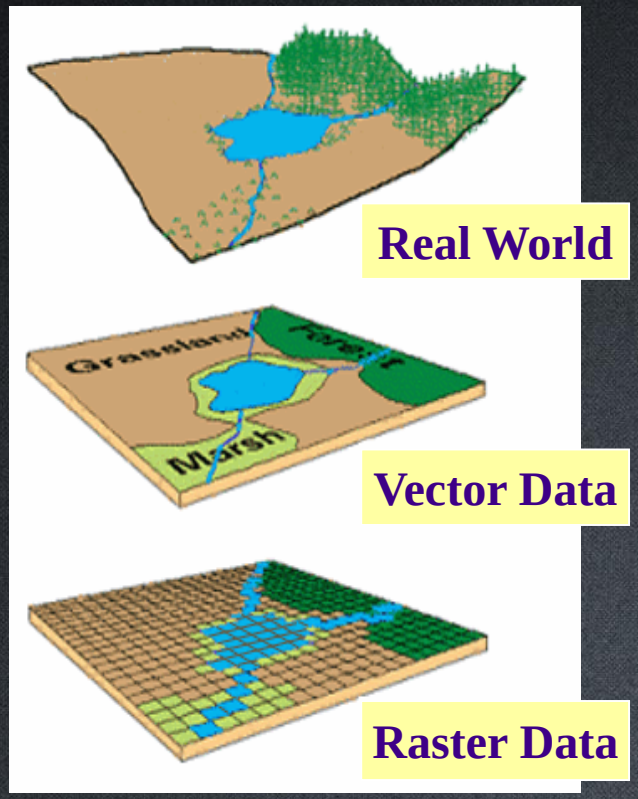
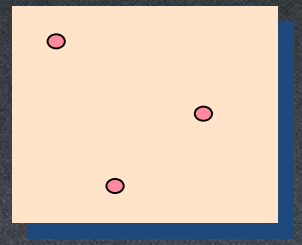
Raster Data Structure

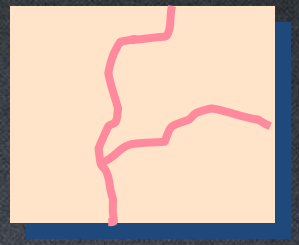


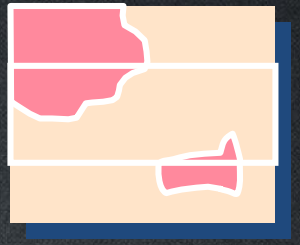
Points

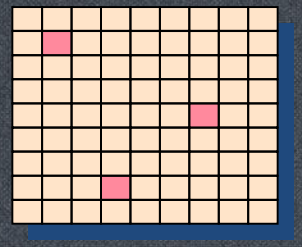
Lines

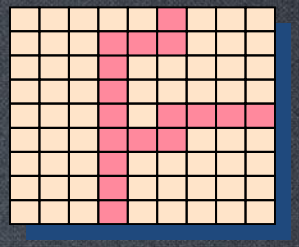
Regions

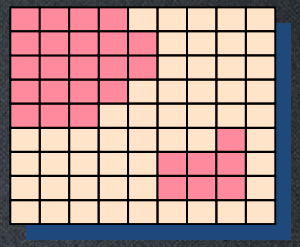












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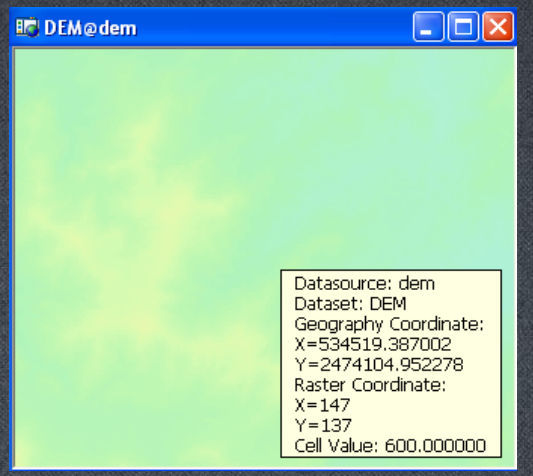
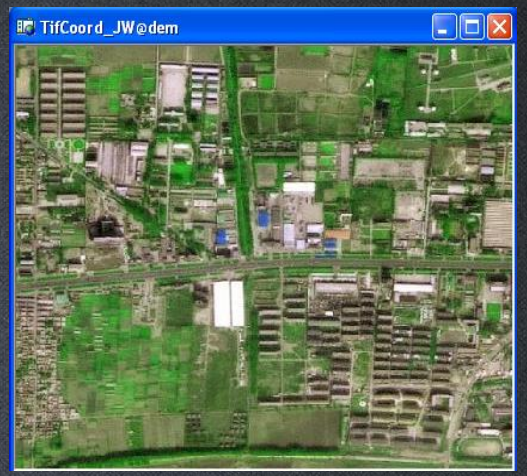
Raster Dataset Types

- 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.





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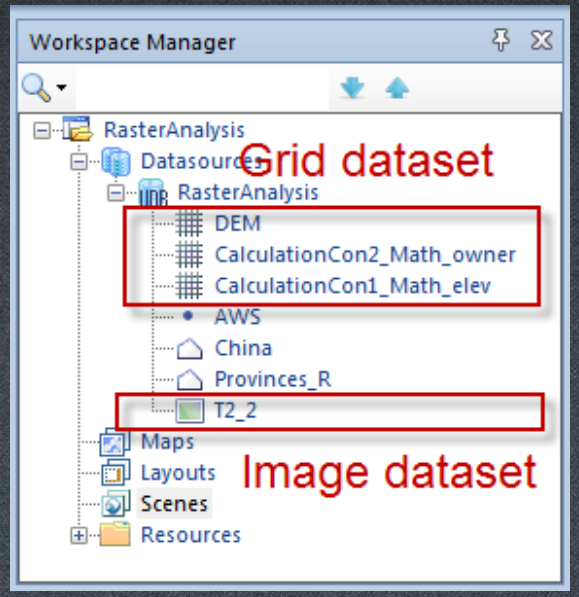
Raster Dataset Types

- 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.



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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.

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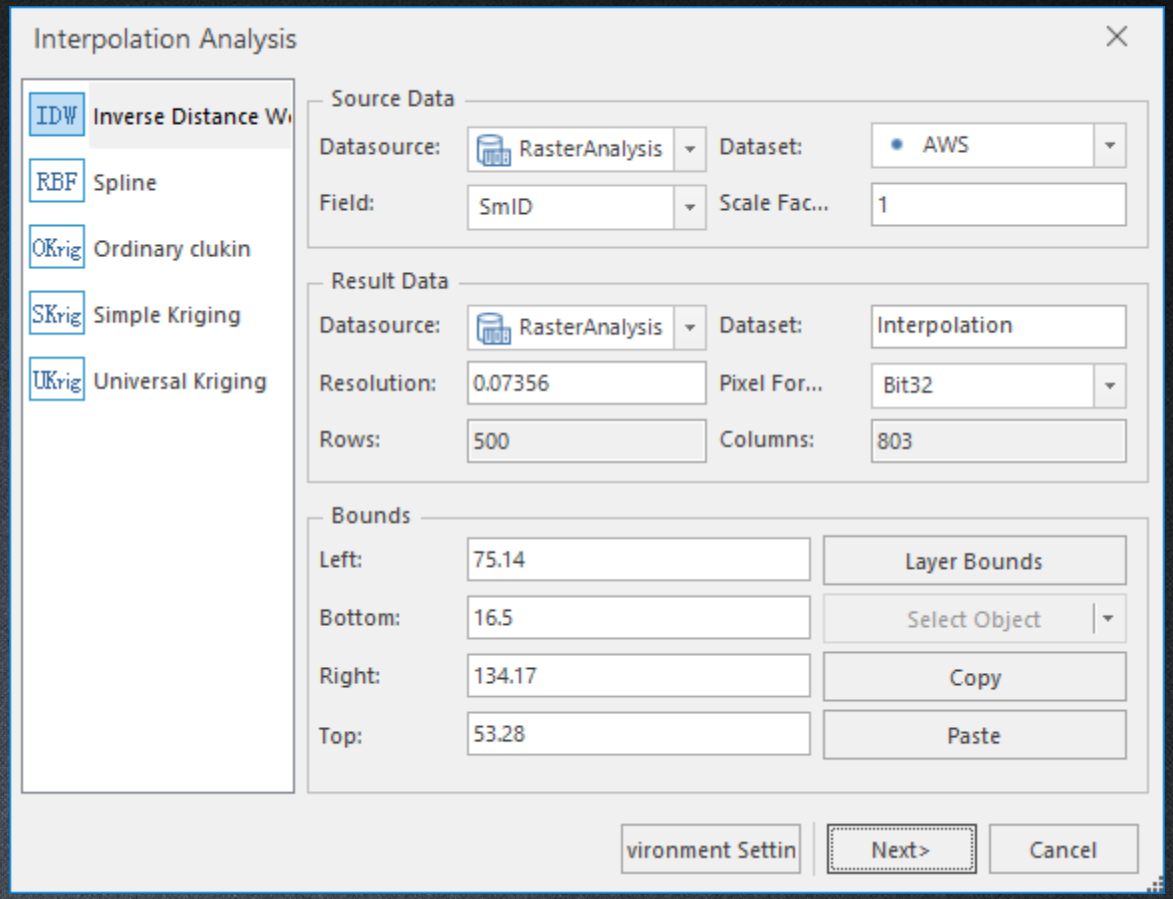
Interpolation to Raster

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



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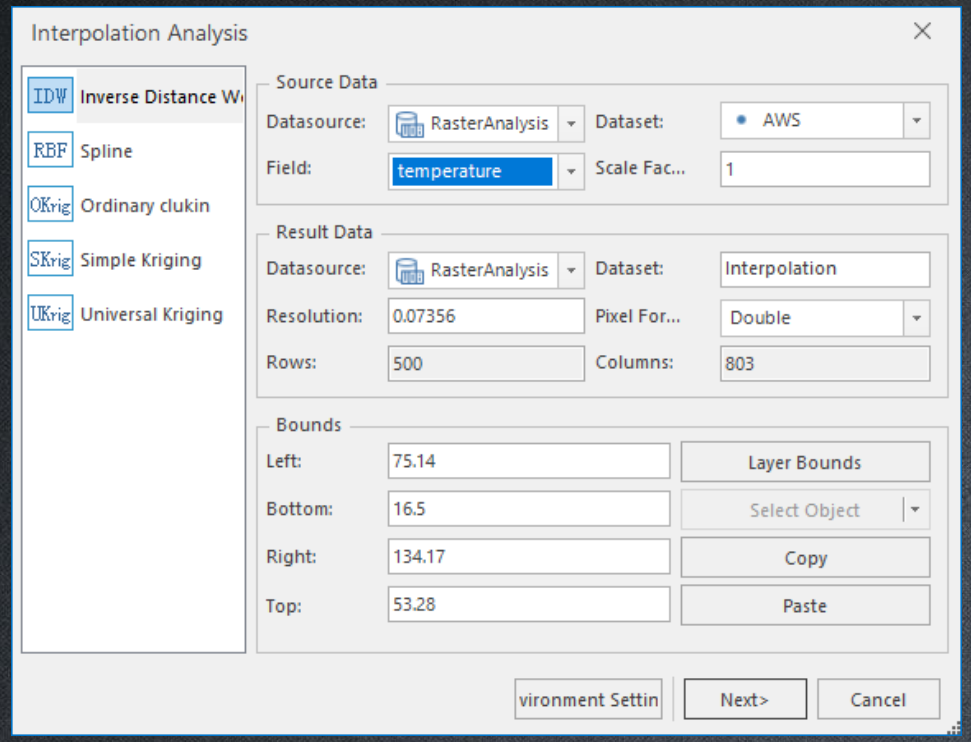
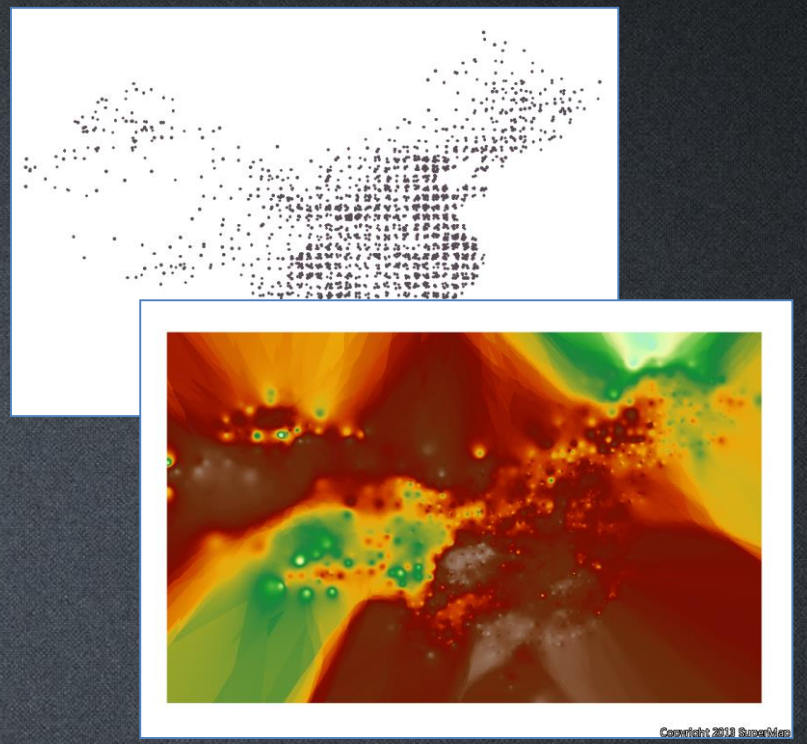
Exercise:

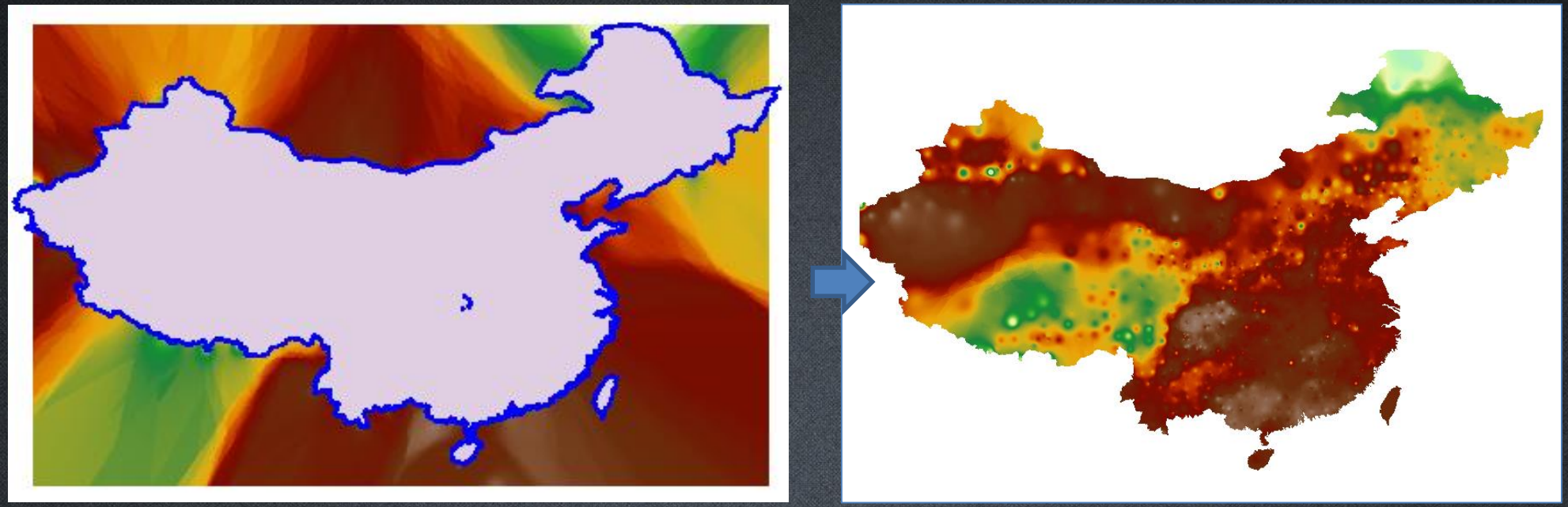
- Get a raster dataset based on the point dataset “AWS”, use the field “temperature” for interpolation.
- Data for Exercise: \Data\RasterAnalysis.udb.





Exercise:

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



Use Grid Value to query raster values.

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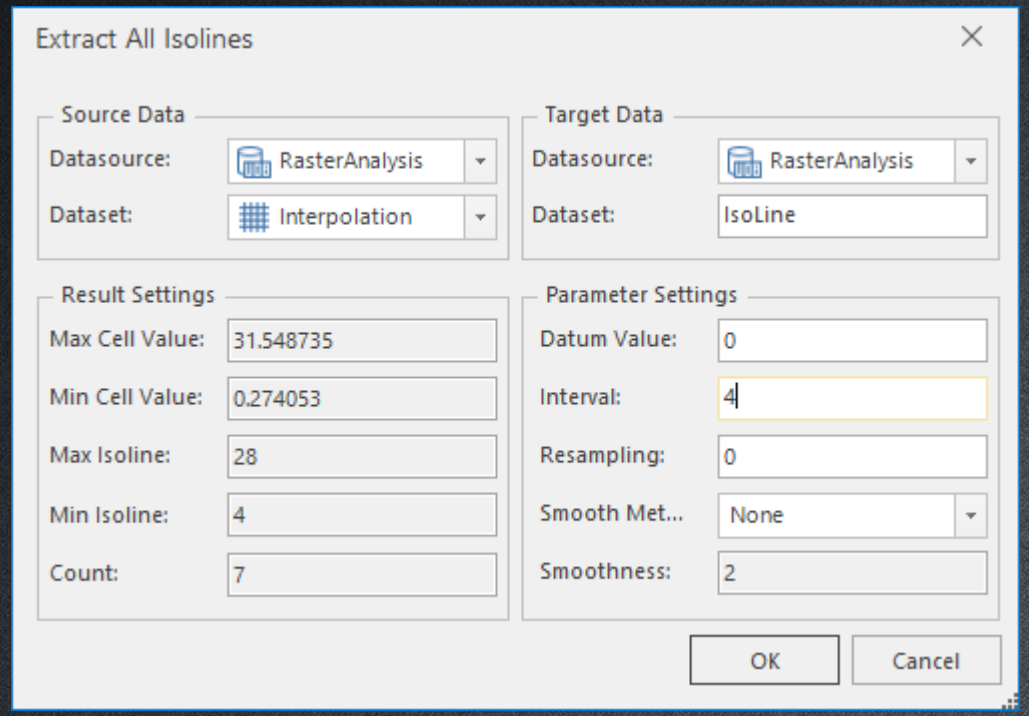
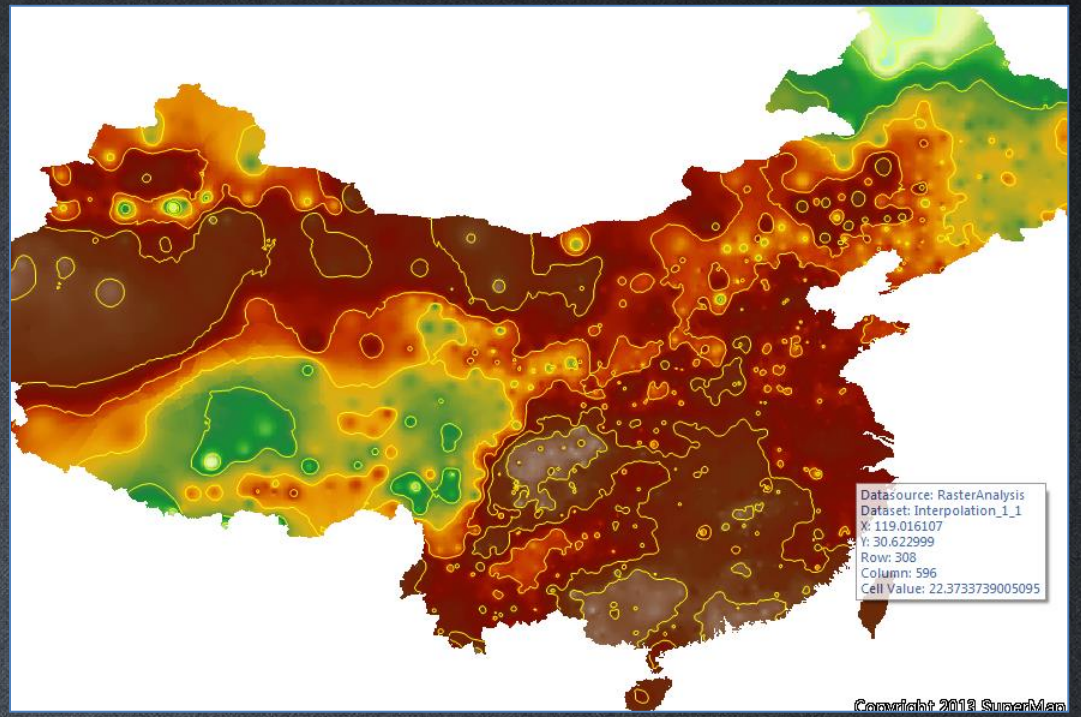
Extract Isolines

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





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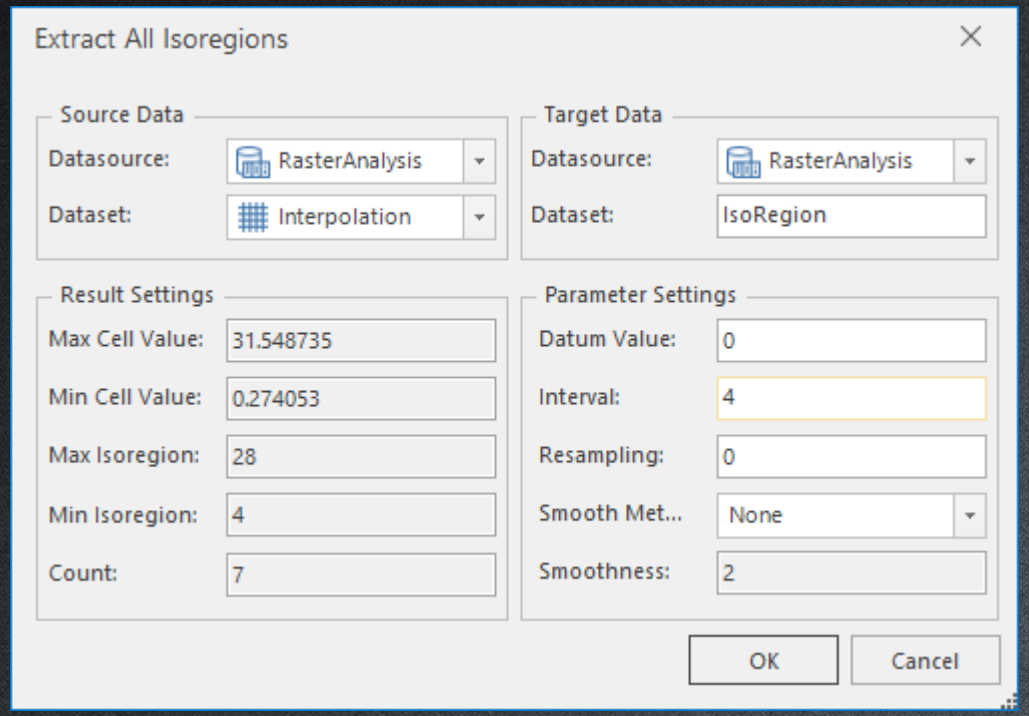
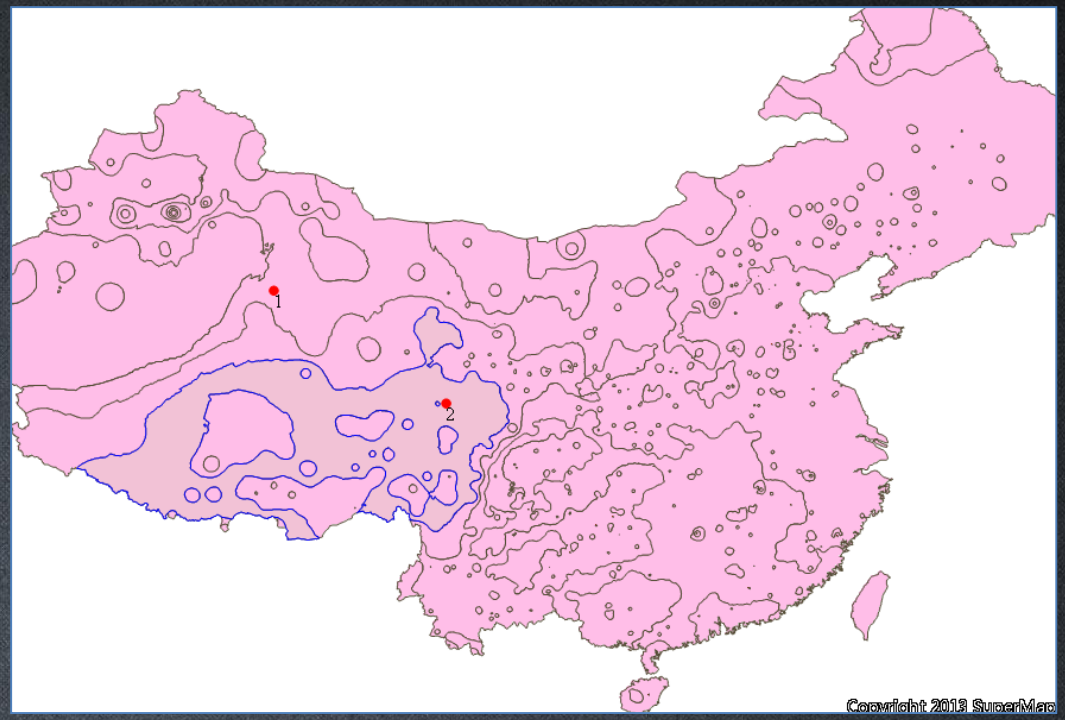
Extract Isoregions

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





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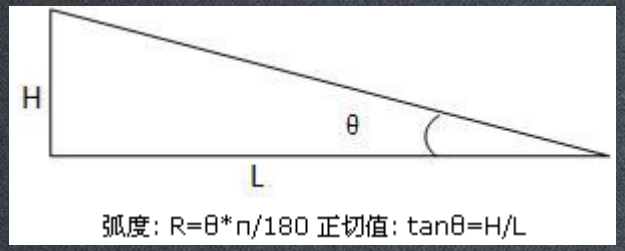
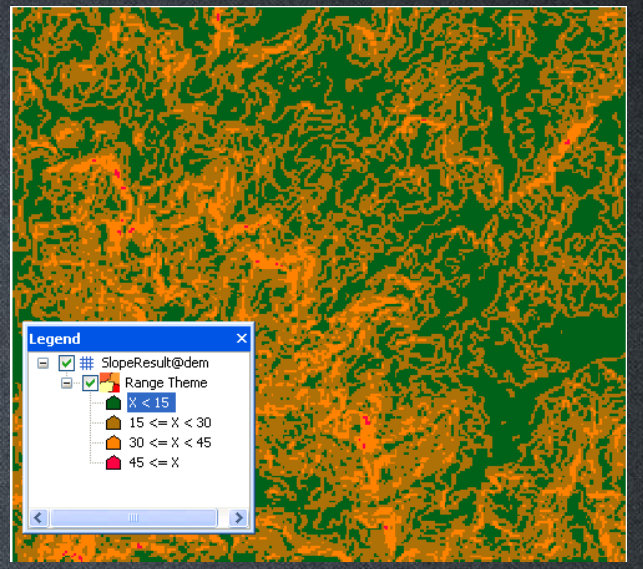
Slope

- 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





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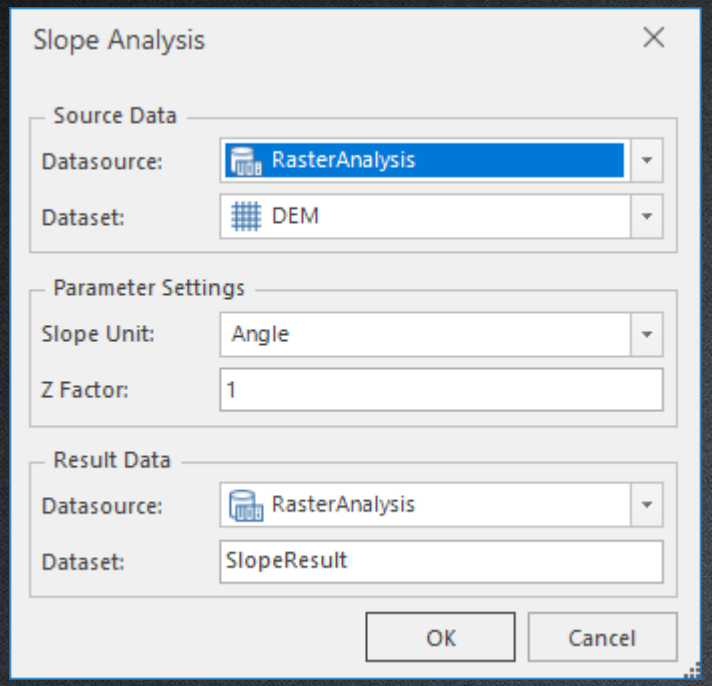
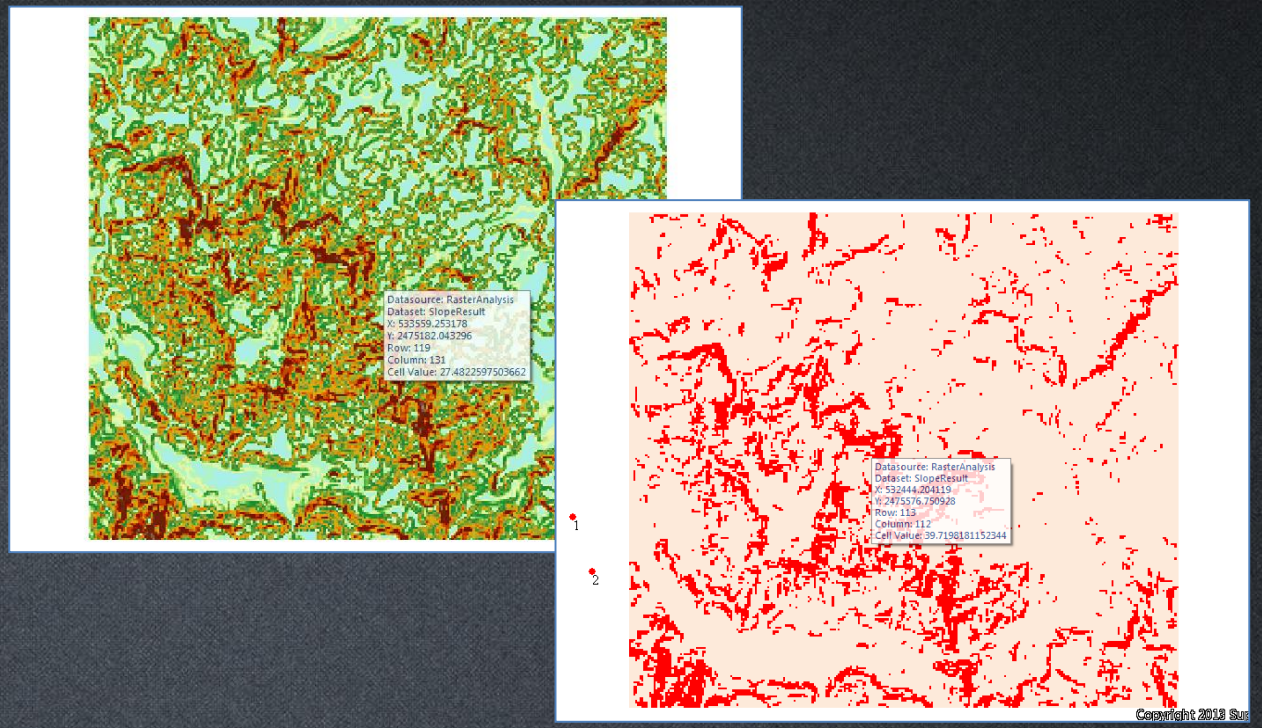
Exercise:

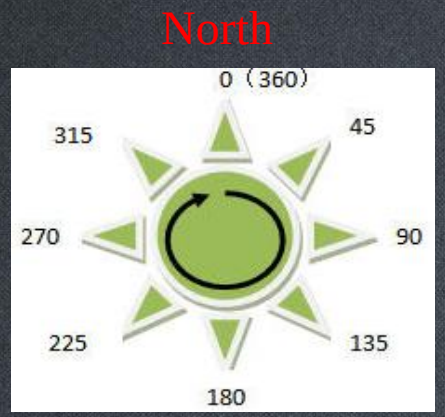
- Calculate the slope value for the dataset “DEM”.
- Make a range map for the slope result.
  - The red pixels’ slope value are more than 30 degree.

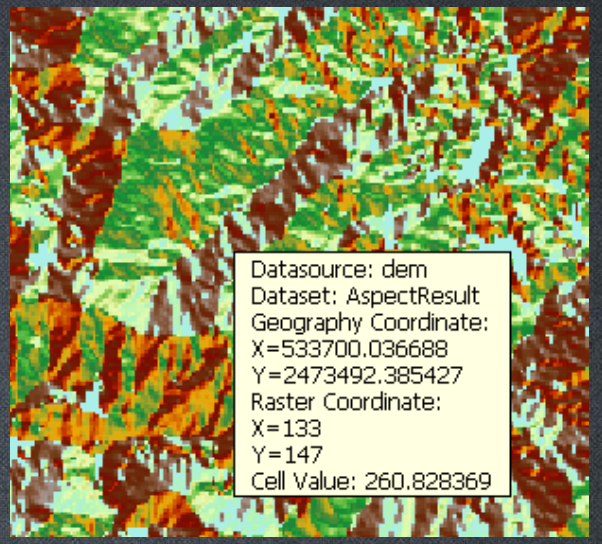




Aspect (Slope Direction)

- 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.





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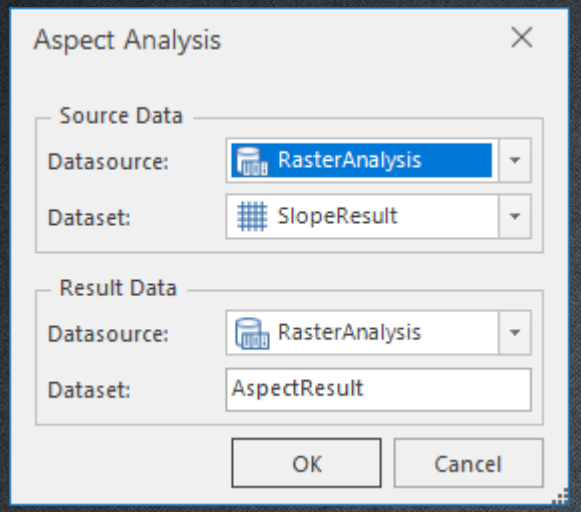
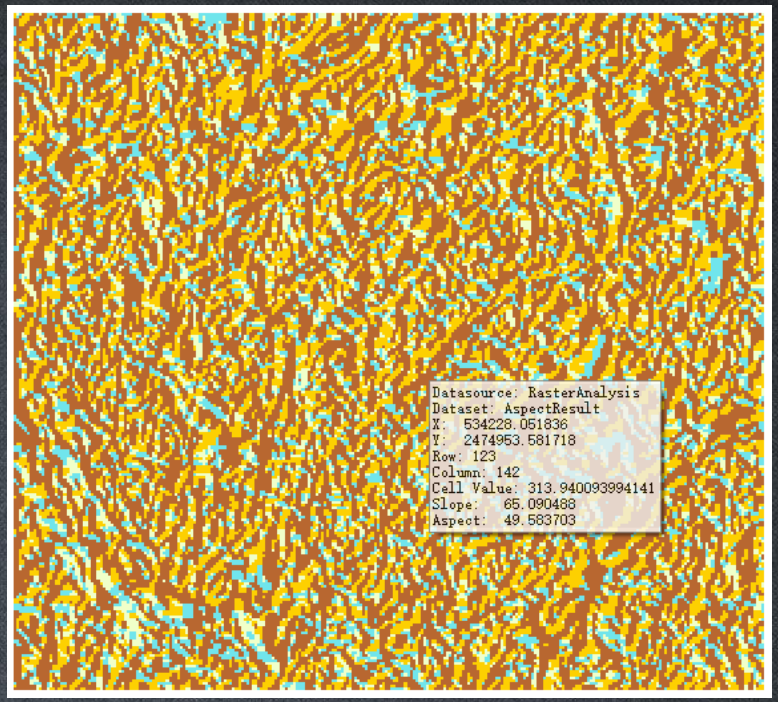
Exercise:

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





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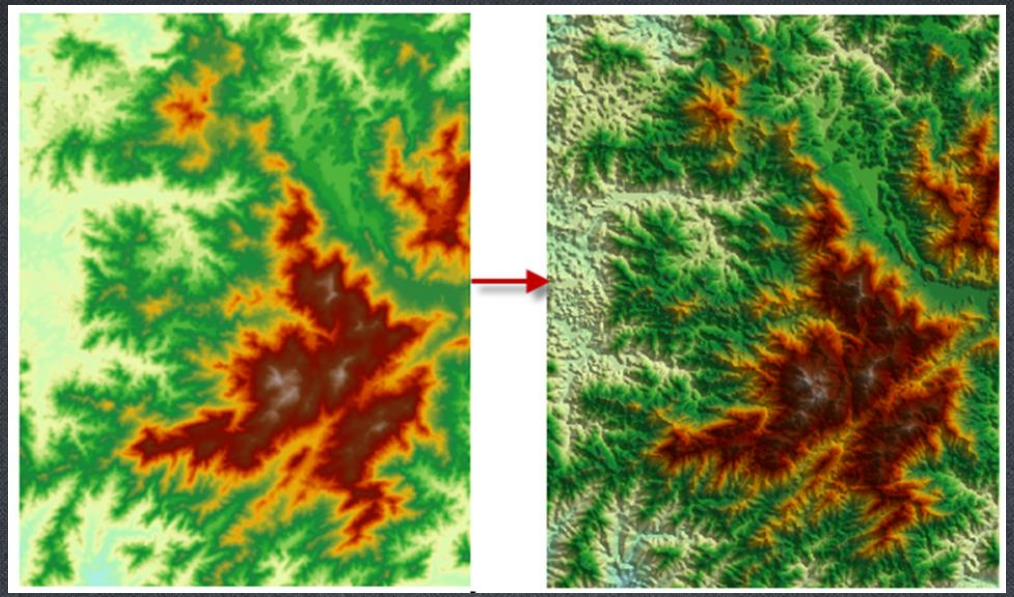
Ortho Image

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



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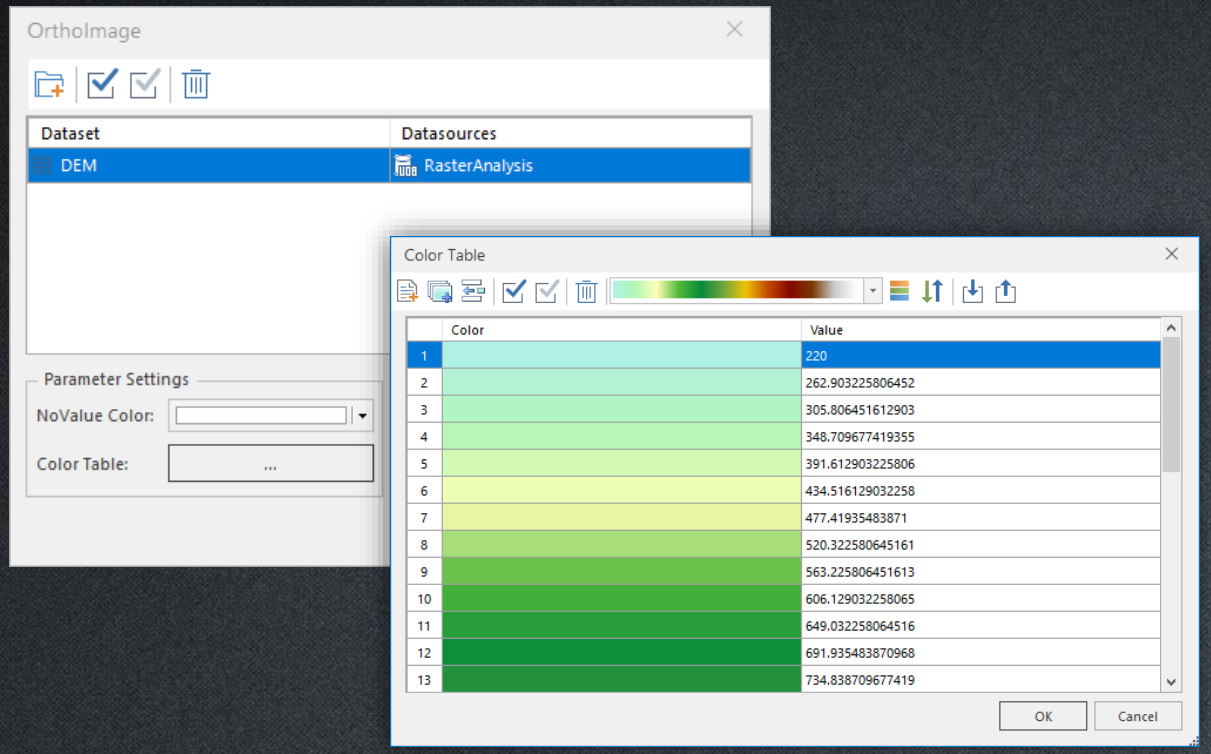
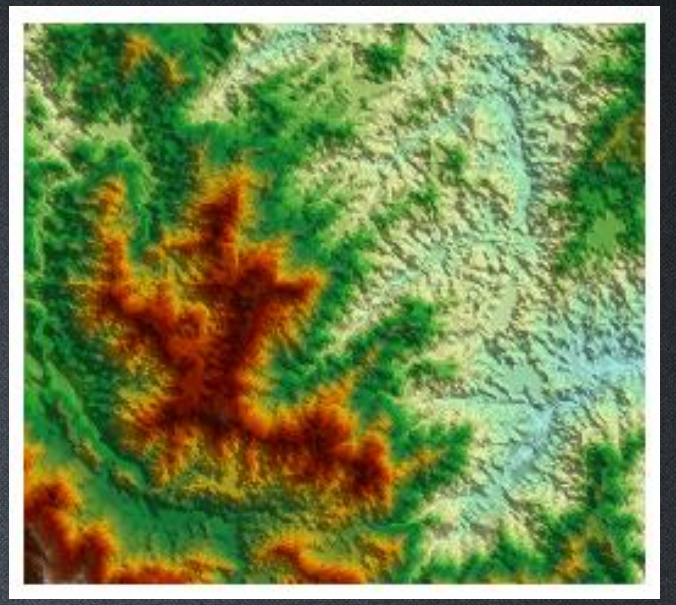
Exercise:

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





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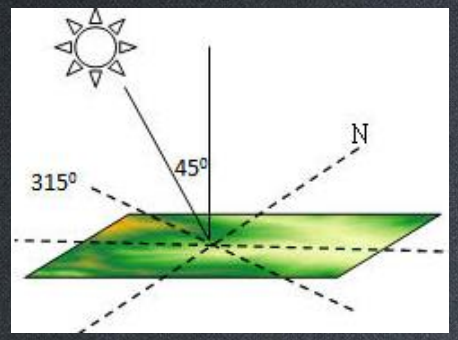
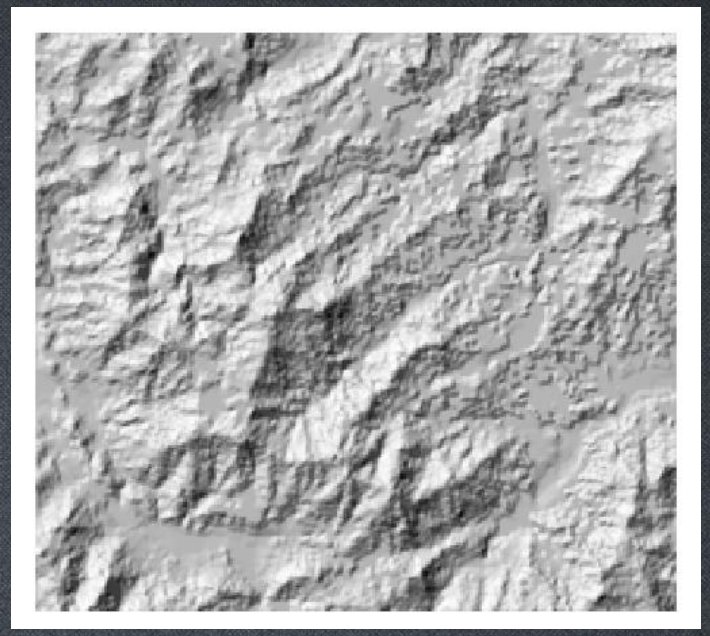
Hillshade

- 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.





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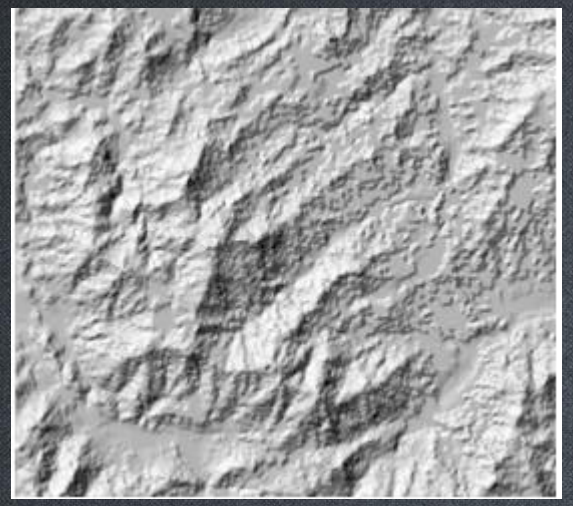
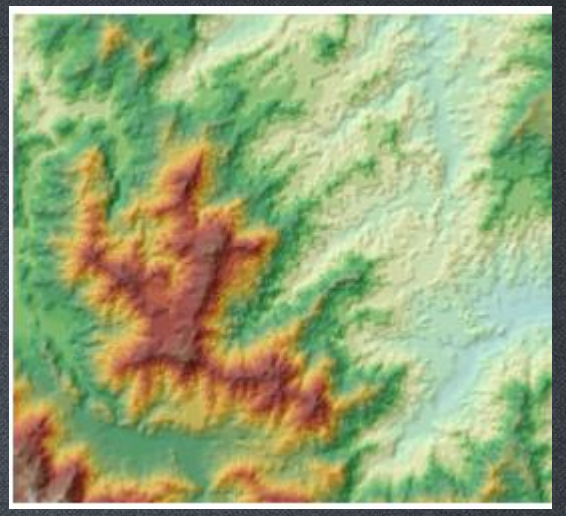
Exercise:

- 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.





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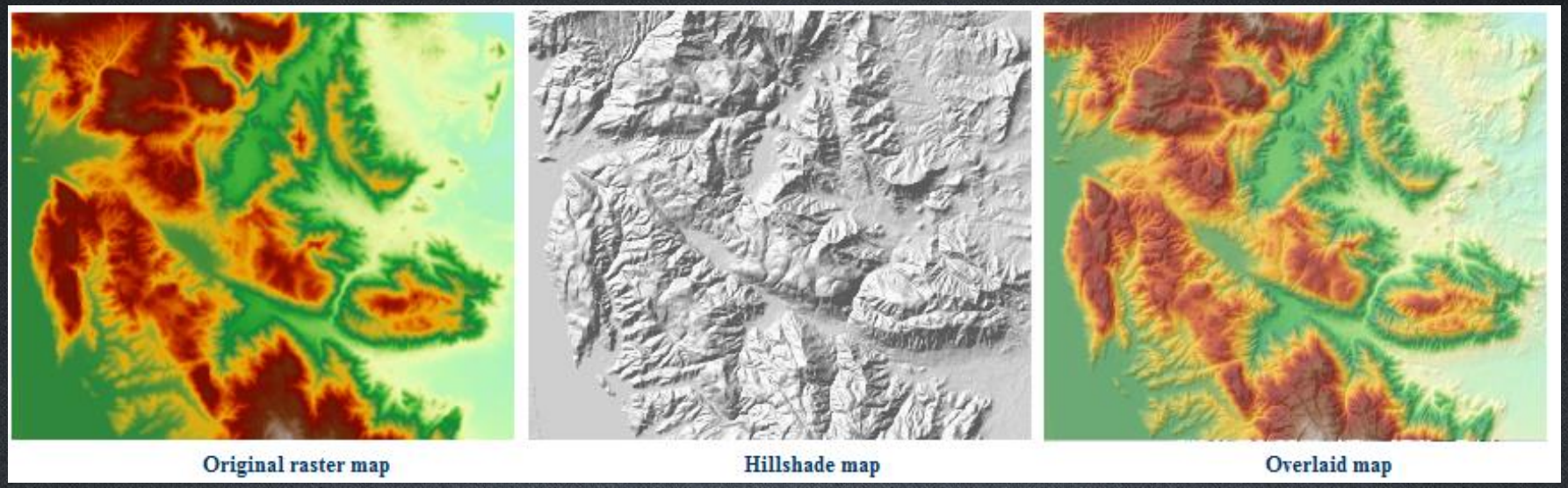
Ortho Image & Hillshade

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



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Thank You!

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