Section 12: Examining Elevation Data

Section Objective

This section is intended introduce users to the basics of Elevation Data

Class Notes

Examining Topography

Objective:

Students will use the ERDAS IMAGINE Profile Tools to further understand and visualize the topography of a clear area. We will examine the topography of the Yosemite Valley using a DEM derived from a filtered LIDAR dataset. This dataset has been resampled to improve processing time so it does not represent the quality of the original. The original dataset can be sourced from https://irma.nps.gov/.

Task 1: Viewing Elevation Data as Relief

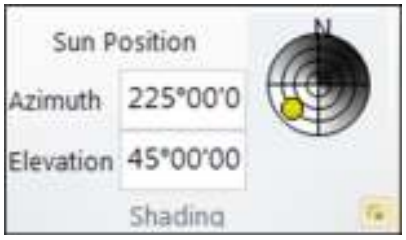
1. In a 2D Viewer open **Yosemite_DEM.img**.

   This dataset is being displayed as a DEM. Bright values symobize high points and dark values represent low. Whilst this is still somewhat useful, a more suitable display method is to display as Relief.

2. **Clear** the 2D View.
3. Open the Yosemite_DEM.img dataset as **shaded relief** by using the Display as Relief option.

   The image display as a Relief.

4. **Pan around the image** and assess the results of the Relief. You may notice features such as track, roads or bridges that were not visible with the standard DEM.
5. Click the **Relief tab** and locate the **Shading group**

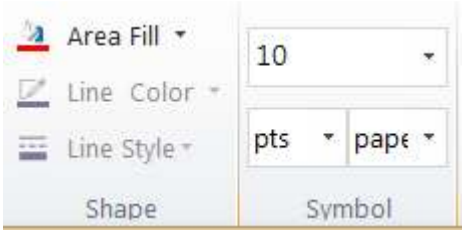


6. **Click and drag** the Yellow Sun Icon icon on the Relief tab to **adjust the sun angle**.
7. Leave the Yosemite_DEM.tif data open in the 2D view for the next exercise.

Task 2: Examining Elevation

1. **Open** the vector layer **pointlocations.shp** on top of the Yosemite_DEM.tif relief.

   You may want to change the symbology to something else by using the Shape and Symbol groups from within the Style tab



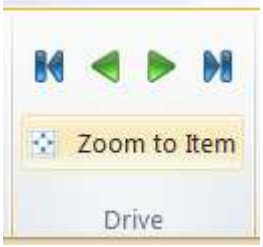
2. From the Table tab click **Show Attributes**.

   These points represent some of the geographic features of Yosemite Valley.

3. Select the **ElCapitan** entry from the table

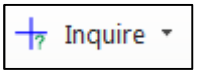
Record	ID	Name
1	1	ElCapitan
2	3	ClacierPoint
3	5	YosemitePoint

4. Click the **Zoom to Item** button from the Table tab, Drive group



   This point represents El Capitan, we will now use the Inquire tool to identify the height (in metres) at this location.

5. From the Home tab, Information group, select the **Inquire tool**



6. Place the Inquire cursor of the the ElCapitan point.

The FILE PIXEL column represents elevation in metres. However, you may notice that the Z value is currently 0.00 metres.

When working with elevation data we need to tell IMAGINE when the raster represents elevation rather than a single-band greyscale image.

7. On the bottom right of the image interface is a grey box which usually displays elevation.

8. **Left click** the grey box and select **Choose Elevation Source**.
9. By default the current **Yosemite_DEM.tif** dataset should appear. Leave the units as **metres** and click **OK**.

   The previously empty box should now display the elevation in metres, likewise the Z value in the Inquire will display elevation.

   What is the elevation of the El Capitan point?

   What is the elevation of the other two points?

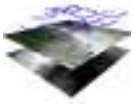
10. Leave all datasets open in the 2D View for the next exercise.

Task 3: Using a Vector Layer to Create a Spatial Profile

Students will use the ERDAS IMAGINE Profile Tools to further understand and visualize the topography of a clear area.

1. In the 2D Viewer open **Merced_River.shp** on top of the other datasets.
2. The Merced_River polyline shapefile is separated into different sections. Click on the section to the East (Right) of the image to select it.

   The polyline will turn yellow to indicate the arc has been selected
3. Click on **Yosemite_DEM.tif** in the contents panel.
4. From the Relief tab select Spatial Profile > **Spatial Profile**.



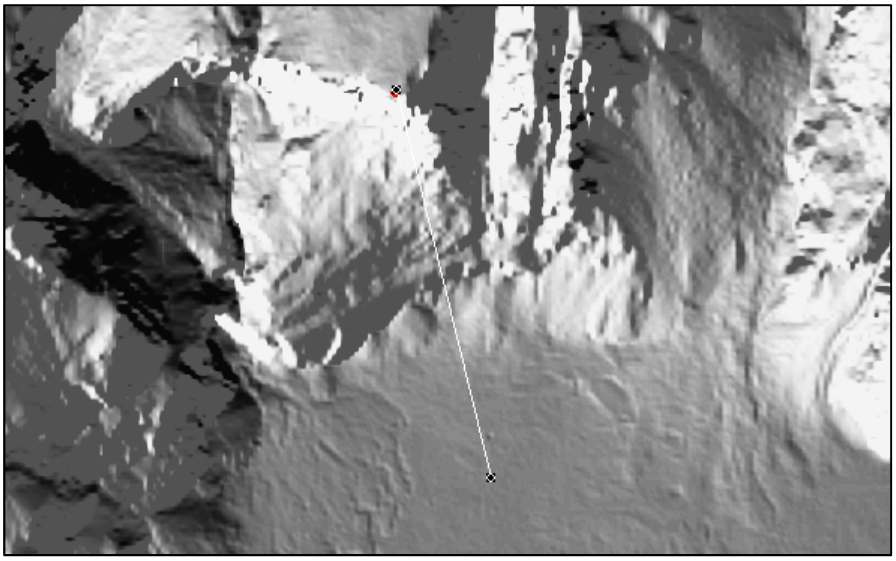
*The **Spectral** Profile Viewer allows you to visualize the reflectance spectrum of a single pixel through many bands.*

*The **Spatial** Profile Viewer allows you to visualize the reflectance spectrum of a polyline of data file values in a single band of data (one-dimensional mode) or in many bands (perspective three-dimensional mode).*

*The **Surface** Profile Viewer allows you to visualize the reflectance spectrum of a rectangular area of data file values in a single band of data. You can overlay the wire frame surface with a gray scale, thematic, or true color image.*

5. In the Spatial Profile dialog, click the **Show Profile for selected vectors** icon.

6. View the profile.
7. In the Spatial Profile dialog, select **Edit > Chart Options**.
8. Click the pop-up list button for **Plot Background**, select **White**, and for the **Solid Colour** option, select **Dark Green**.
9. Click the **Y-Axis** tab, set the **Max** value to **2000**
10. Click **Apply** and **Close**.
11. Select **Reverse the direction of the line** icon 
12. Select some or all of the remaining segments of the line to gain an understanding of the topography of the river.
13. Using the **pointlocation.shp** dataset, Open the attribute table and zoom to the GlacierPoint feature .
14. From within the Spatial Profile dialog, click the **Create a New Profile Line** icon.
15. Click once on the GlacierPoint point feataure and draw a line into the valley



16. Assess the gradient of the graph.
17. Adjust the **X-Axis** and **Y-Axis** settings in the preferences.
18. With the profile line selected in the 2D Viewer, press the **spacebar** on your keyboard.

    The Poly Edit window appears displaying the X and Y coordinates of the nodes at each end of the arc. You can also create profile lines using multiple clicks (nodes) and display the X and Y values using the spacebar.
19. **Close** the Poly Edit window.
20. Complete the same process for **Yosemite Point** and **El Capitan**.

Which point has the highest elevation?

Which point has the steepest gradient or drop?

Task 4: Creating a Surface Profile

1. Select the **Relief** (or Panchromatic) tab and then **Surface Profile** from the **Profile Tools** menu.
2. Click the Create Box icon.
3. In the Viewer, click and drag around a portion of the DEM image.
4. In the Surface Profile dialog, select **Edit > Overlay TrueColor**.
5. **Select DATASET** as the Overlay File and click **OK**.
6. In the Surface Profile dialog, select **Edit > Chart Options**.
7. Disable the **Wire Frame** checkbox. Click **Apply** and **Close**.
8. Change the size and position of the Surface box to view other areas of the terrain surface.
9. Click on the green handle and rotate the Surface box.
10. Select the Surface box, press the **Spacebar**.
11. Set the Angel to **0** and click **OK**.
12. **Clear all Viewers** and close all dialogs.

    Do not save changes to the AOI file.

Class Notes

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