

Practical Exercise 3: Topographical Analysis

1.1 Introduction

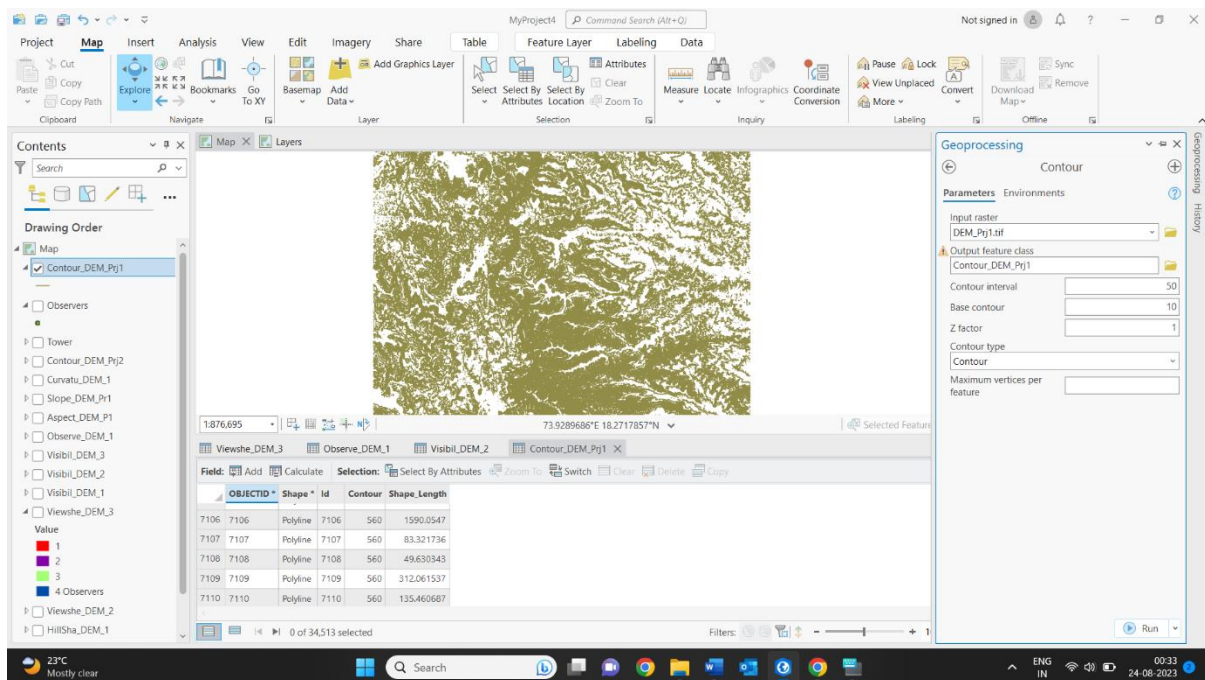
In this exercise, you will perform topographical analysis and visibility analysis of surface terrain.

1.2 Objectives:

1. Contouring
2. Slope
3. Aspect
4. Hillshade
5. Viewshed
6. Visibility Analysis

Task 1: Preparing Contours

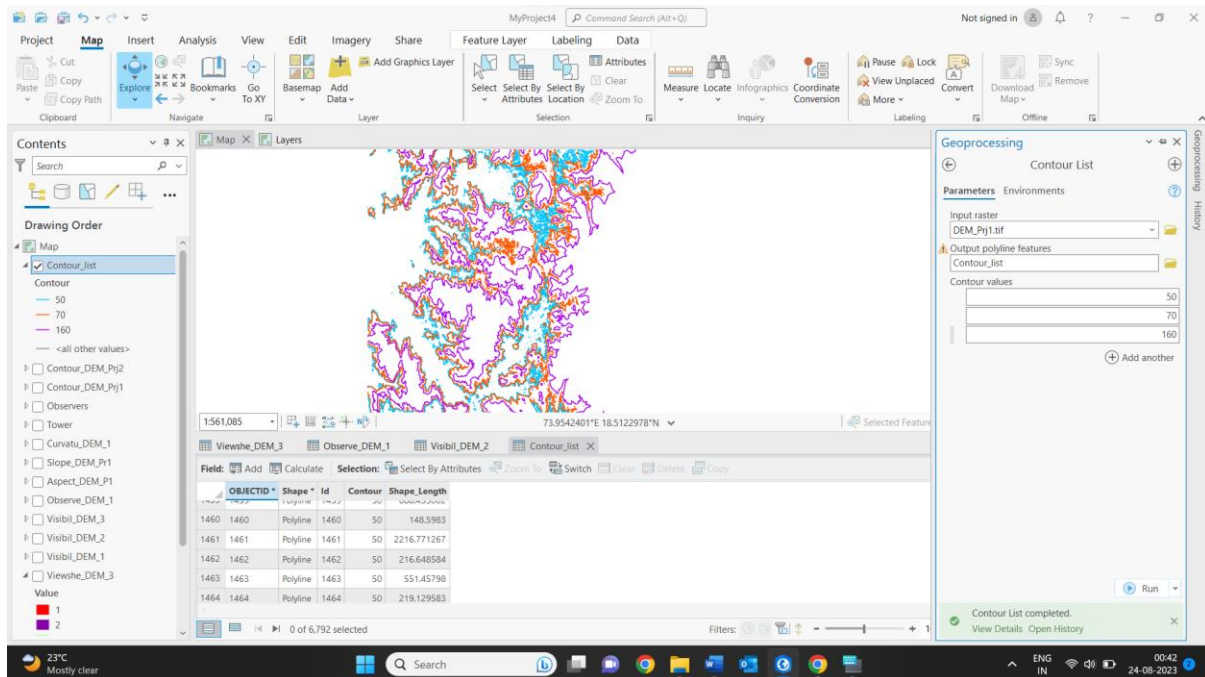
Use of DEM is not always possible, especially if you are developing or using mobile GIS application due to size of the DEM. Hence the best way to replace this is by using contour lines which would help surveyors, managers, ecologist, wildlife specialist or others to identify the approximate elevation above the mean sea level.



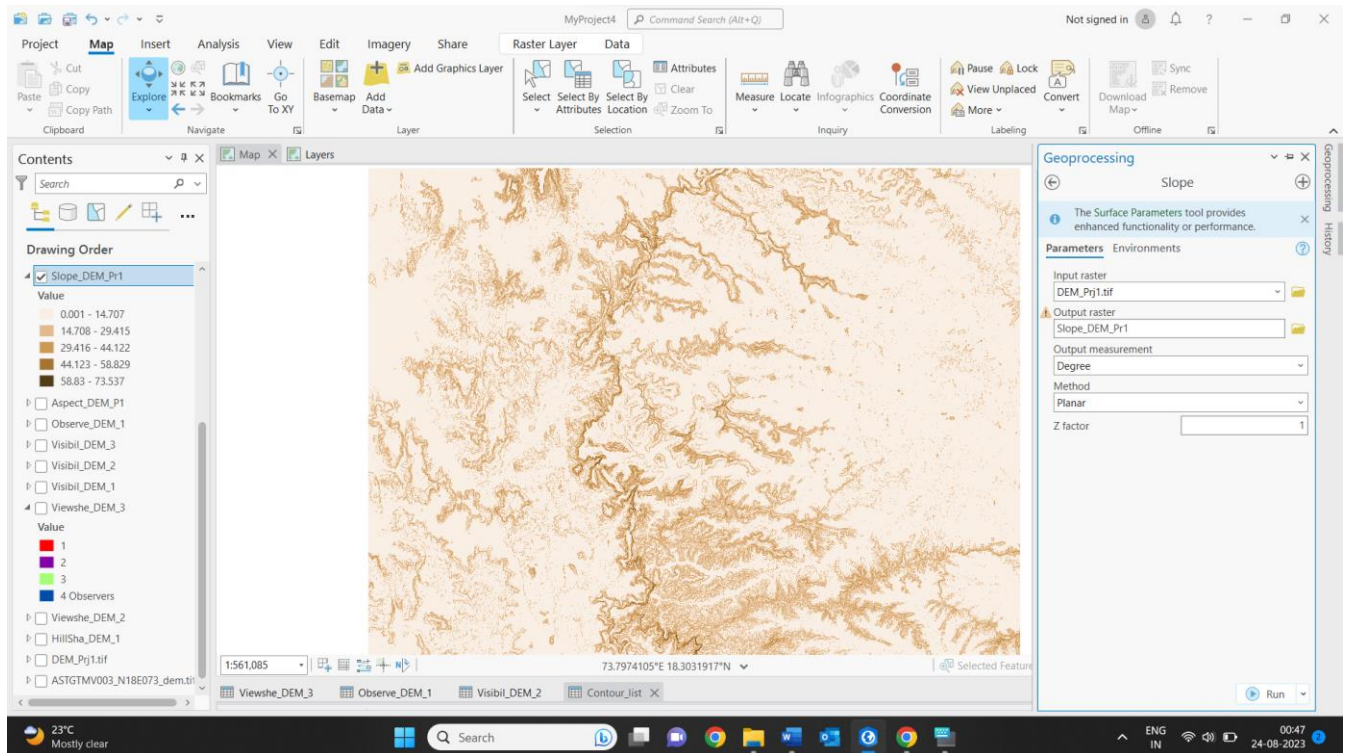
Specify contour interval. (Contour interval is critical it depends on varying heights you have. E.g. if you are working with Western Ghats you will specify lesser contour interval because the elevation level changes frequently. However if you are studying central Maharashtra you will need to give a higher contour interval. For the present practical try to identify the location and give the contour interval accordingly.

Contour List:

Multiple contour intervals as opposed to constant contour intervals can maximize the information of that terrain.



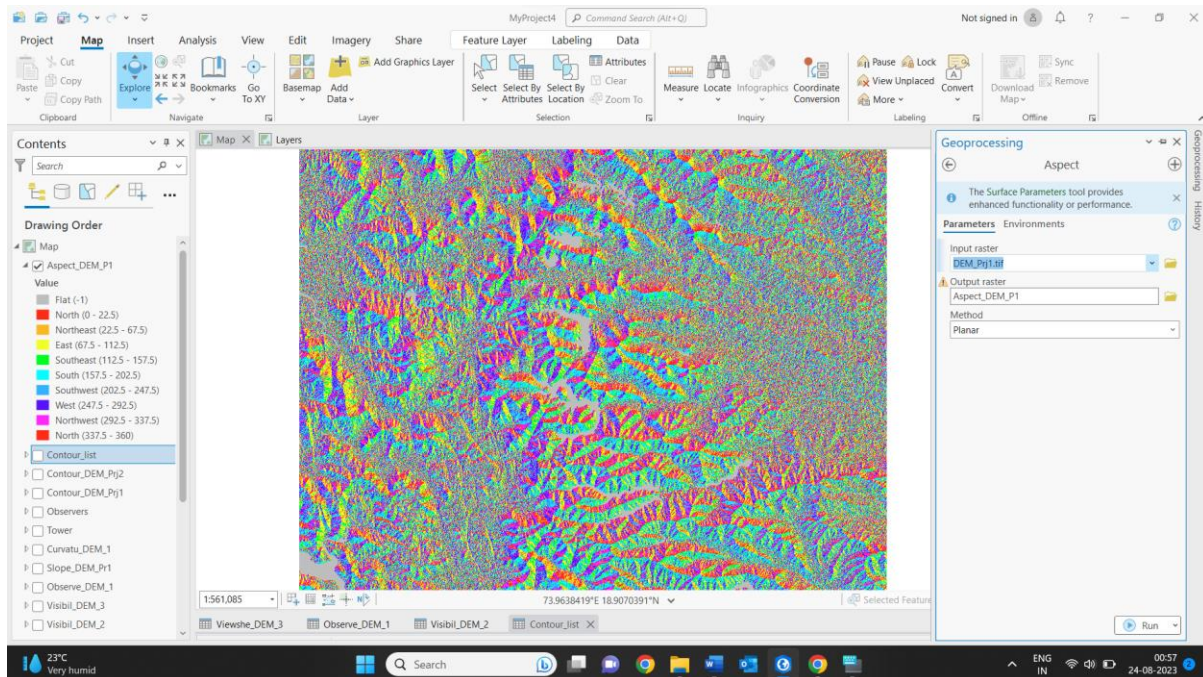
Task 2: Calculating Slope



You can reclassify the slope into 5 classes using appropriate colour ramp to display your image.

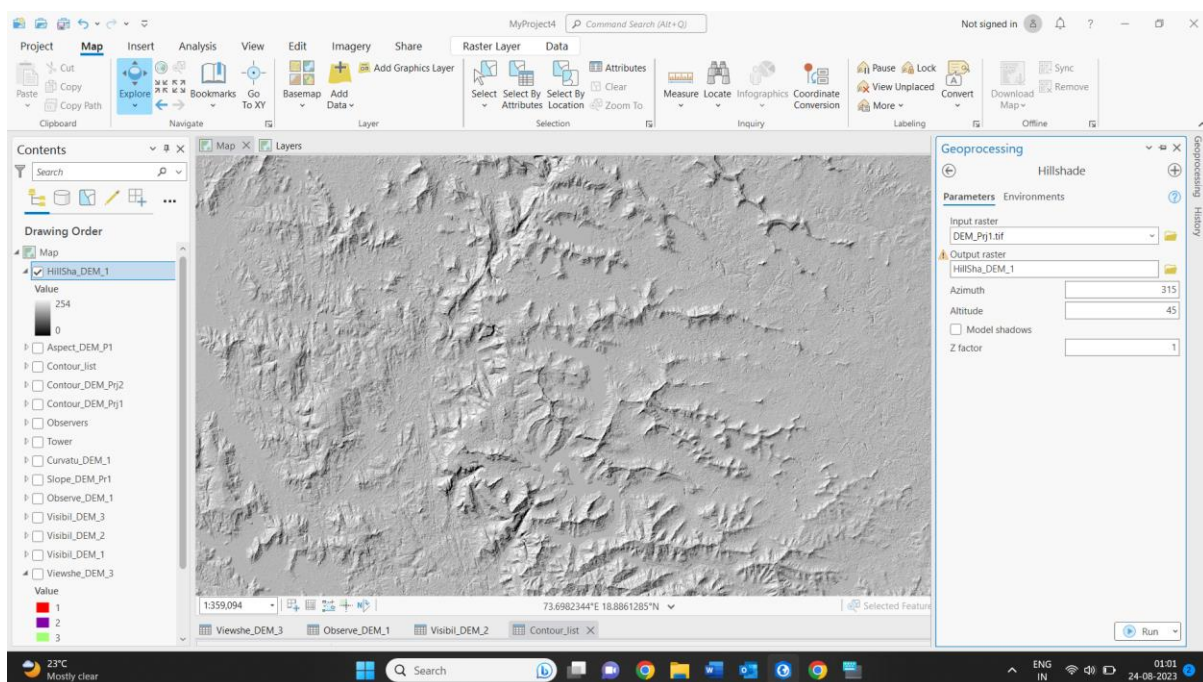
Task 3: Calculating Aspect

Aspect provides the direction of the downhill slope. This can help distinguish terrains of similar slopes. The output is 0 -360 (Starting from North clockwise)



Task 4: Calculating Hillshade

The hillshade analysis tool creates a shaded relief from a surface raster by considering the illumination source angle and shadows. It works using the illumination source as sun or object and angle you specify. The output is the illumination intensity from 0 – 255.



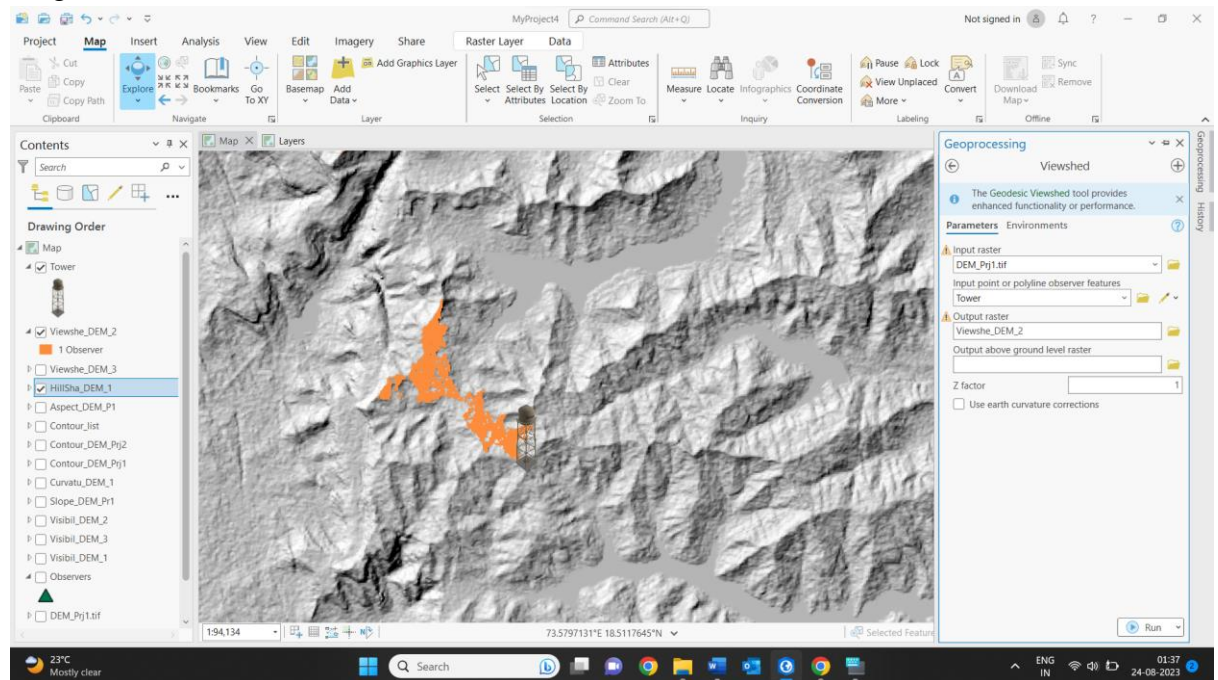
The azimuth angle and altitude angle value will change in real world considering the position along the earth's surface, elevation and the time at which you are illuminating the earth's surface. Default values are 315 – Azimuth Angle and 45 degrees – Altitude Angle

Task 5: Performing visibility /viewshed Analysis

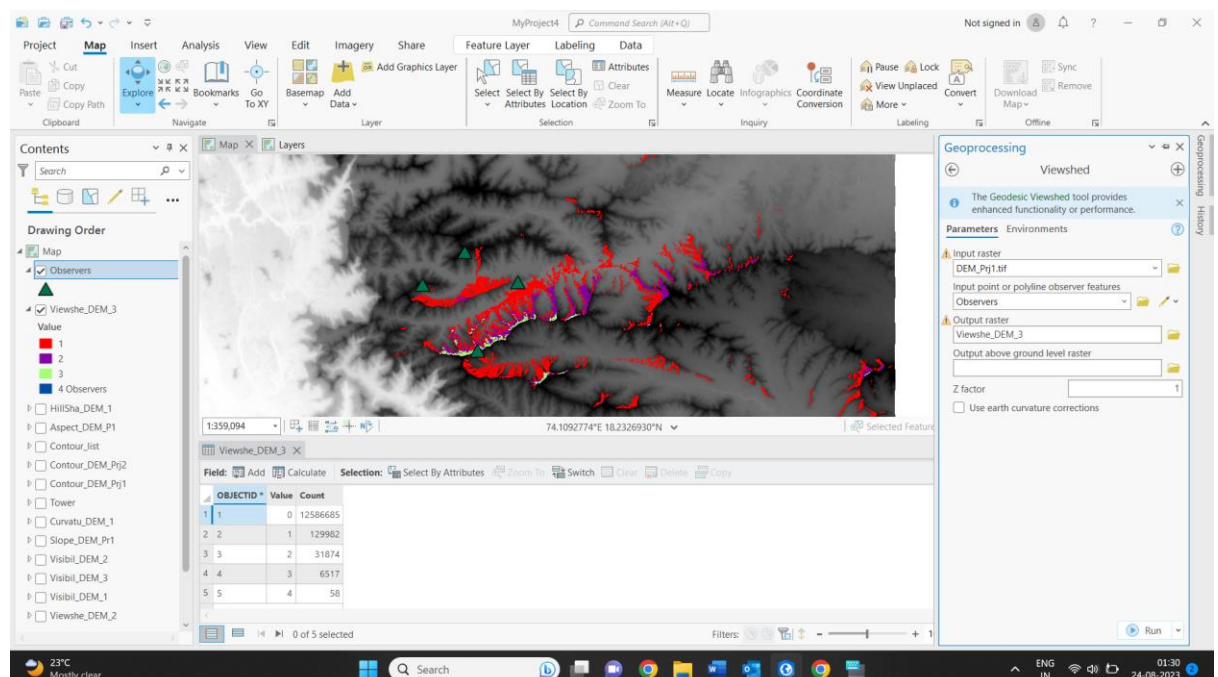
a. Viewshed:

Viewshed determines the raster surface locations visible to a set of observer features.

Single Observer Point:

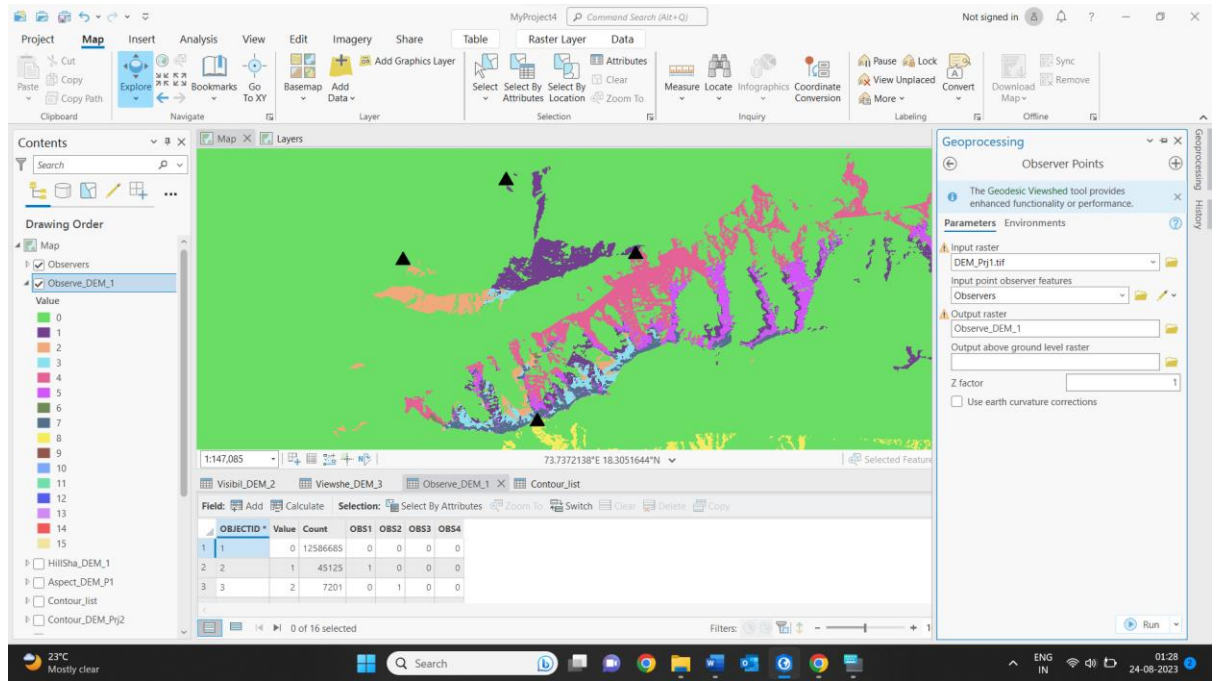


Multiple Observer Points



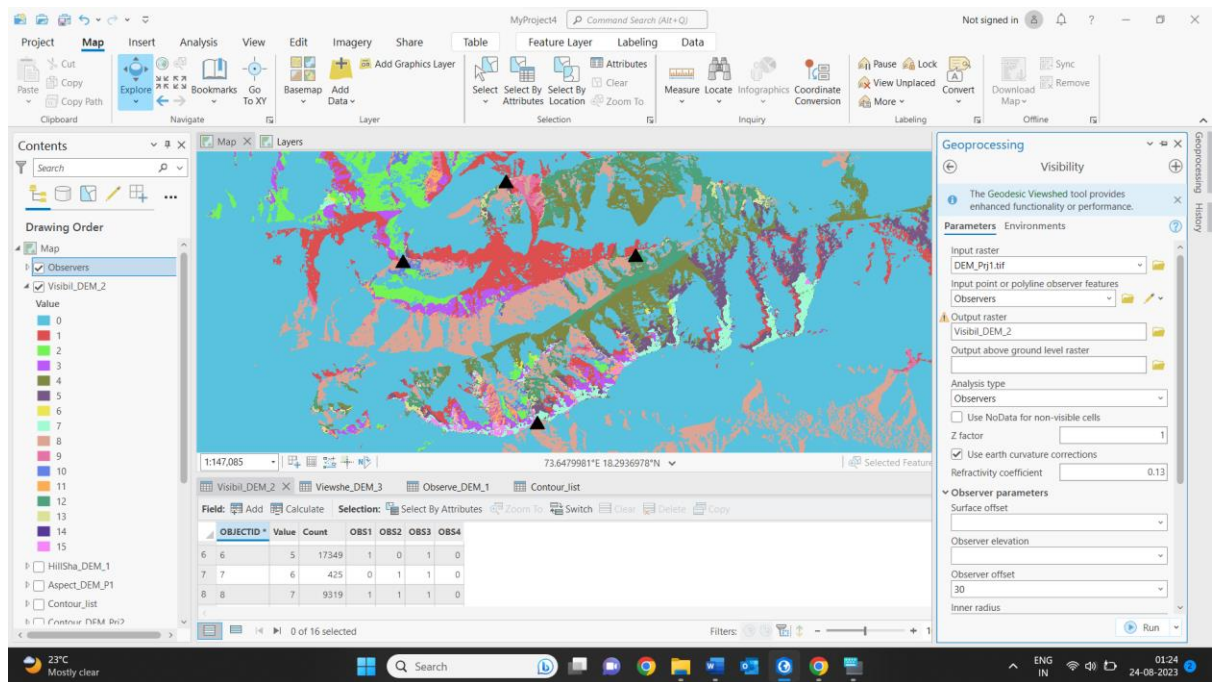
b. Observer Points:

For visibility analysis with multiple observation points, this tool helps us identify which areas are visible from specific points out of the multiple observation input points. The attribute table gives an additional Boolean table with value 1 for visible point/points and 0 value for the non-observable points.



c. Visibility:

This tool helps set additional observer parameters for visibility analysis along with analysis type option. Users can provide observer offset height data (example, height of a tower), observer elevation (example, elevation at which the tower is placed at) and surface offset height data. If the analysis option is 'frequency' then the Boolean table is not specified.



User can also determine visibility angle radius, start and end angle for horizontal and vertical angles.