Hands-On

Geospatial data Generation and Visualization

OTGA-INCOIS Course
Coastal Vulnerability Mapping and analysis using QGIS

Vedula Chandra Sekhar
cs.vedula-p@incois.gov.in

International Training Centre for operational Oceanography(ITCO),

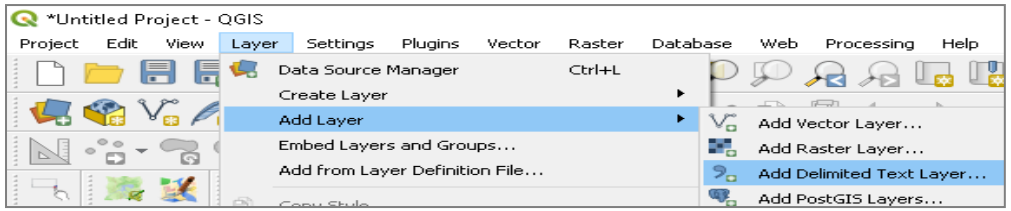
INCOIS, Hyderabad, India

Overview

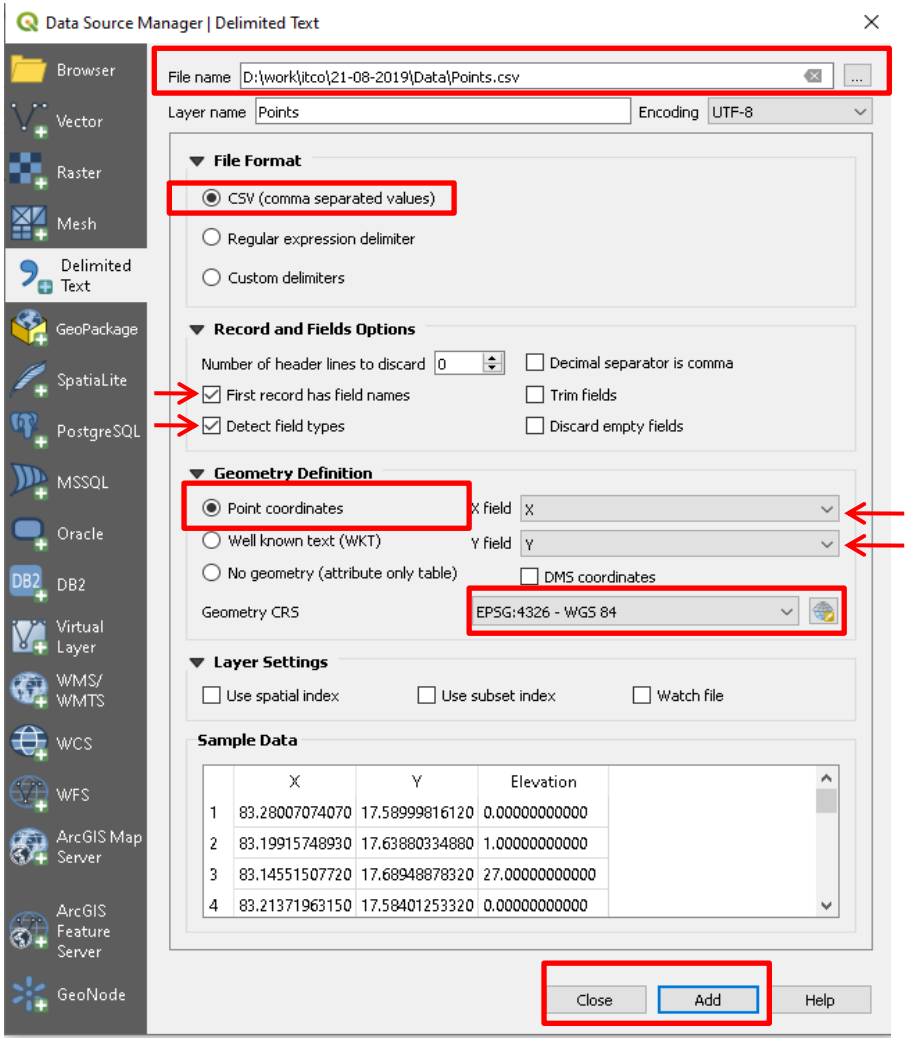
- Importing tabular (point) data
- Converting tabular data to vector data
- Raster surface generation using point data
- Clipping raster data
- Clipping raster data (Iterate over features)
- Sampling raster values
- Visualising Point data
- Visualising Raster data

Geospatial data Generation : Importing tabular (point) data

- Go to Layer → Add Layer
  → Add Delimited Text layer

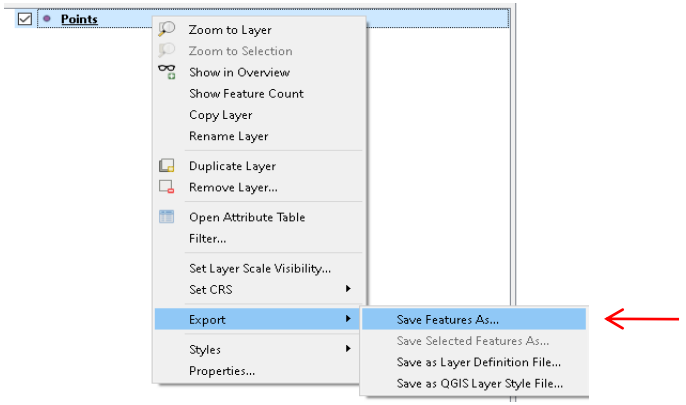


- Go to Data folder and select ***Points.csv***
- Select ***CSV(Comma Separated Values)*** under File format
- Tick ***First Coolum has Field Names***
- Tick ***Detect Field Types*** under Record and Fields Options
- Select ***Point Coordinates*** under Geometry Definition and Select **X** & **Y** fields from dropdown list
- Select ***EPSG:4326-WGS 84*** as Geometry CRS
- Click on **Add** and **Close** the window after adding.

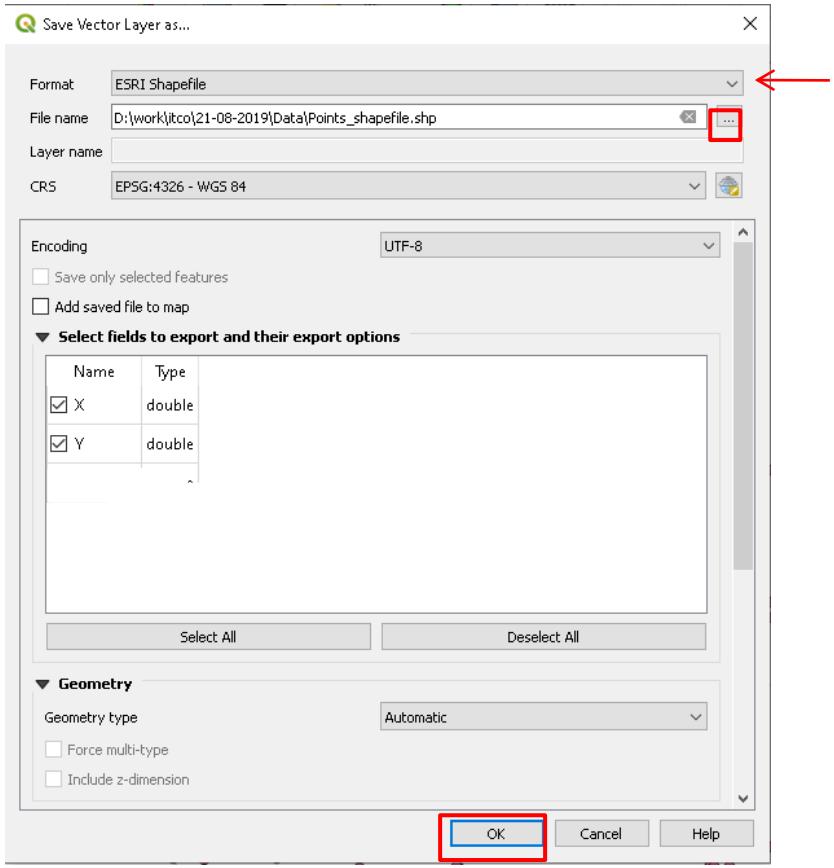


Geospatial data Generation : Converting tabular data to vector data

- Right click **points** layer
- Go to exports -> Save Feature As
  Points_Shapefile.shp

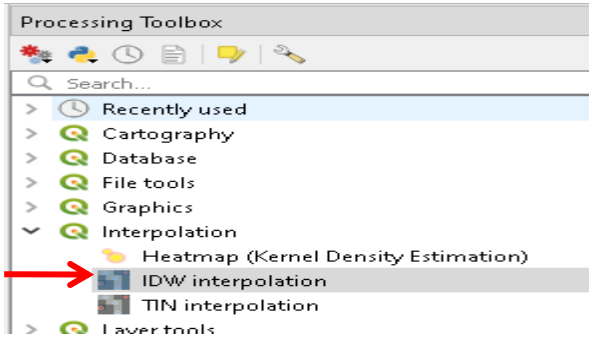


- Select **ESRI Shapefile** format
- Enter Filename **Points_Shapefile.shp**
- Click **OK**

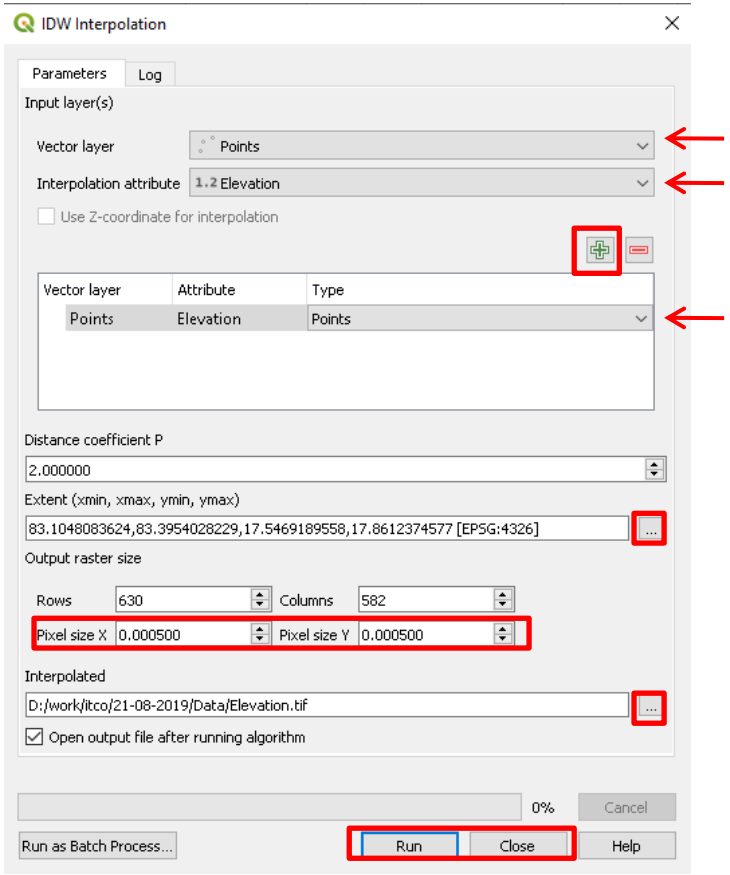


Geospatial data Generation : Raster surface generation using point data

- Go to processing toolbox
- Click the **Interpolation** dropdown
- Double click **IDW interpolation**



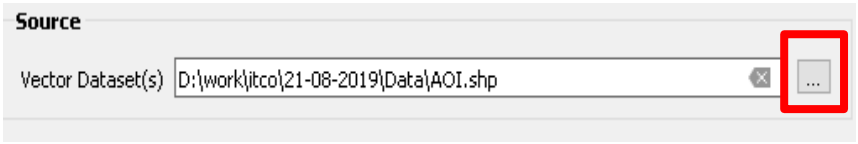
- Select **Points** as Vector Layer
- Select **Elevation** as interpolation attribute
- Click  button
- Select **Points** under Type dropdown
- Give the Extent of **Points** as Layer Extent
- Enter **0.0005** in Pixel Size under output raster size
- Save to file as Interpolated.tif under Interpolated option
- Tick **Open output file after running algorithm**
- Click **Run** and close the window after execution reaches 100%



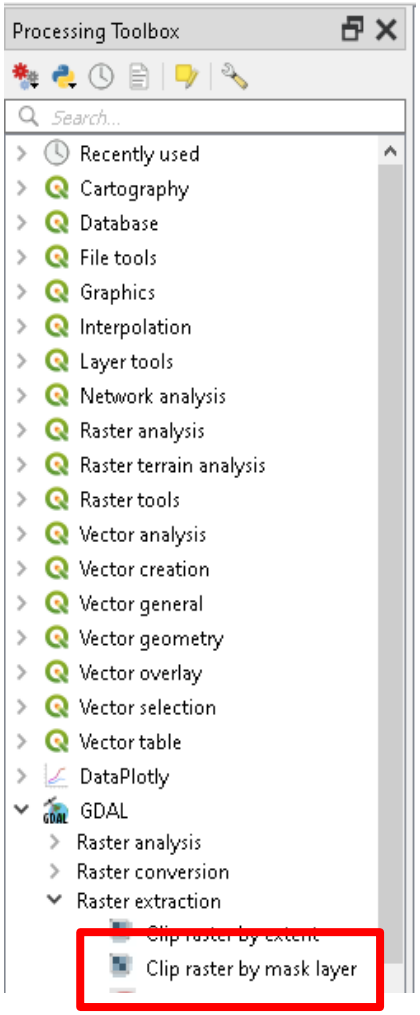
Geospatial data Generation : Clipping raster data

- Go to **Layer** -> **Add Layer** -> **Add Vector Layer**

- Add **AOI.shp** from data folder

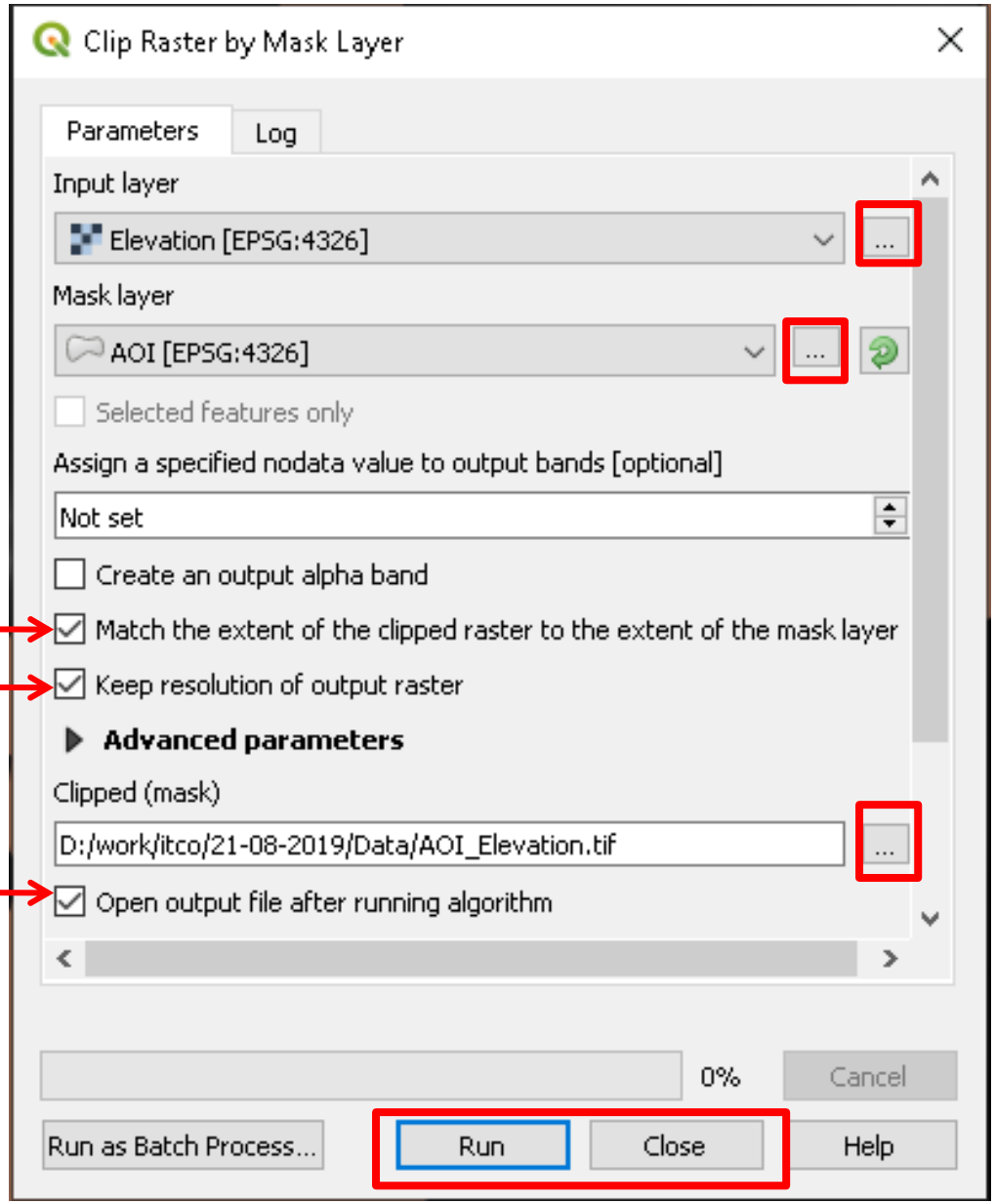


- In the processing toolbox click on
  GDAL -> **Raster Extraction** ->
  Clip raster by mask layer



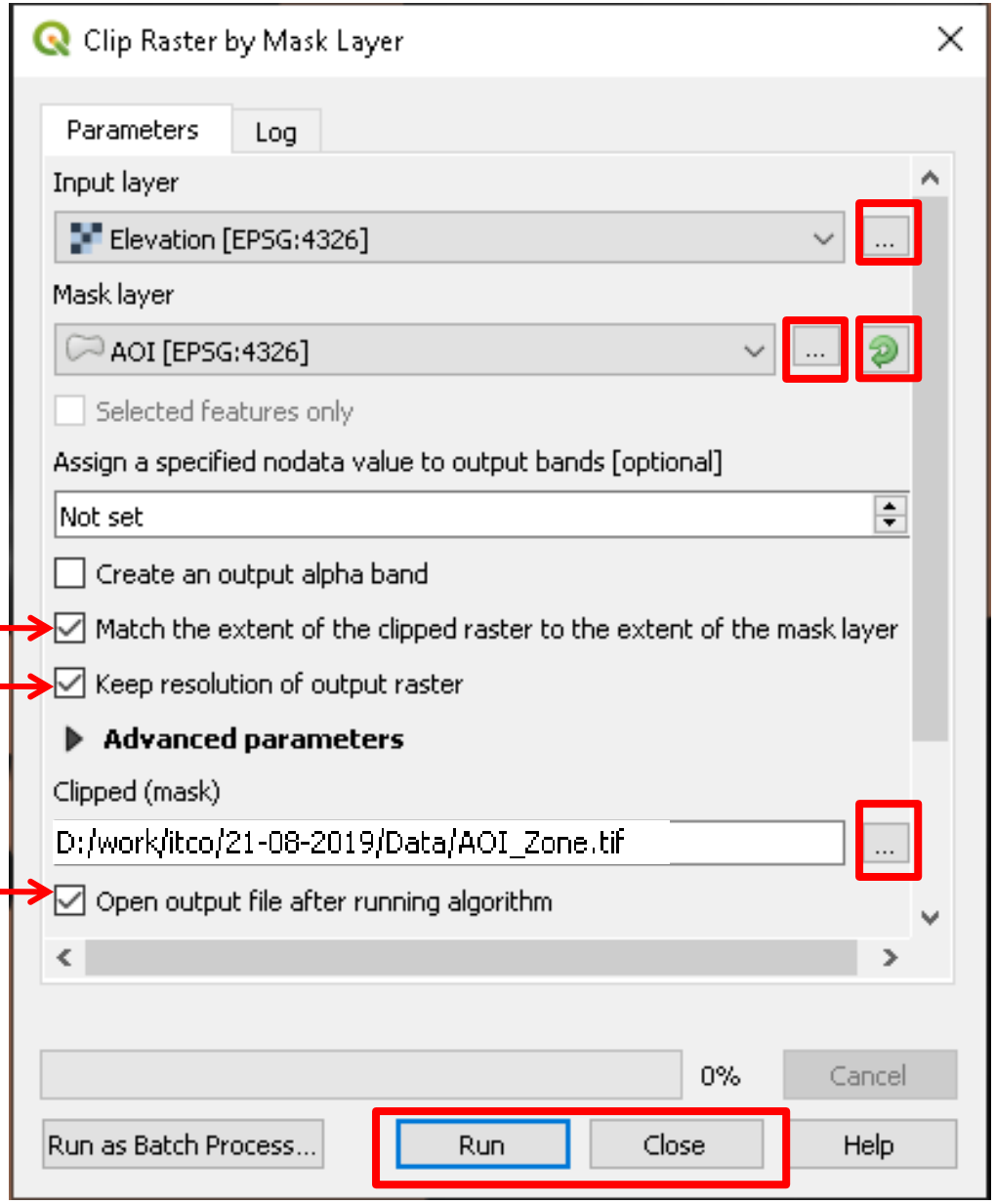
Geospatial data Generation : Clipping raster data

- Select **Elevation** as Input layer and **AOI** as Mask layer
- Tick Match the extent of the clipped raster to the extent of the mask layer
- Tick Keep resolution of output raster
- Save to file as **AOI_Elevation .tif** under clipped(mask)
- Tick Open output file after running algorithm
- Click **Run** and **close** after execution reaches 100%



Geospatial data Generation : Clipping raster data (Iterate over features)

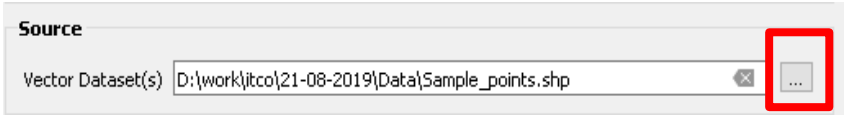
- Select **Elevation** as Input layer and **AOI** as Mask layer
- Click on  symbol to iterate over features of AOI layer
- Tick Match the extent of the clipped raster to the extent of the mask layer
- Tick Keep resolution of output raster
- Save to file as **AOI_ZONE .tif** under clipped(mask)
- Tick Open output file after running algorithm
- Click **Run** and **close** after execution reaches 100%



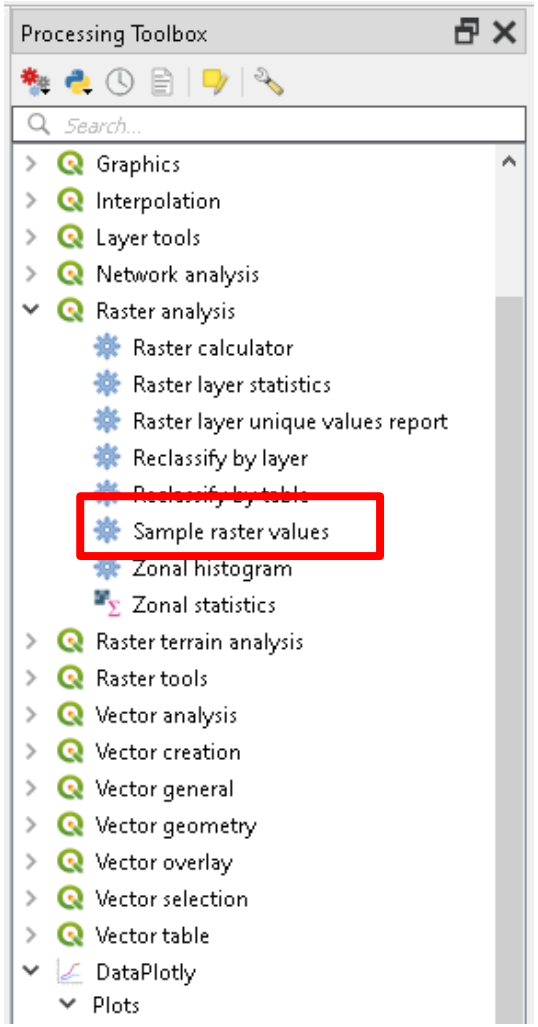
Geospatial data Generation : Sampling raster values

- Go to **Layer** -> **Add Layer** -> **Add Vector Layer**

- Add **Sample_points.shp** from data folder

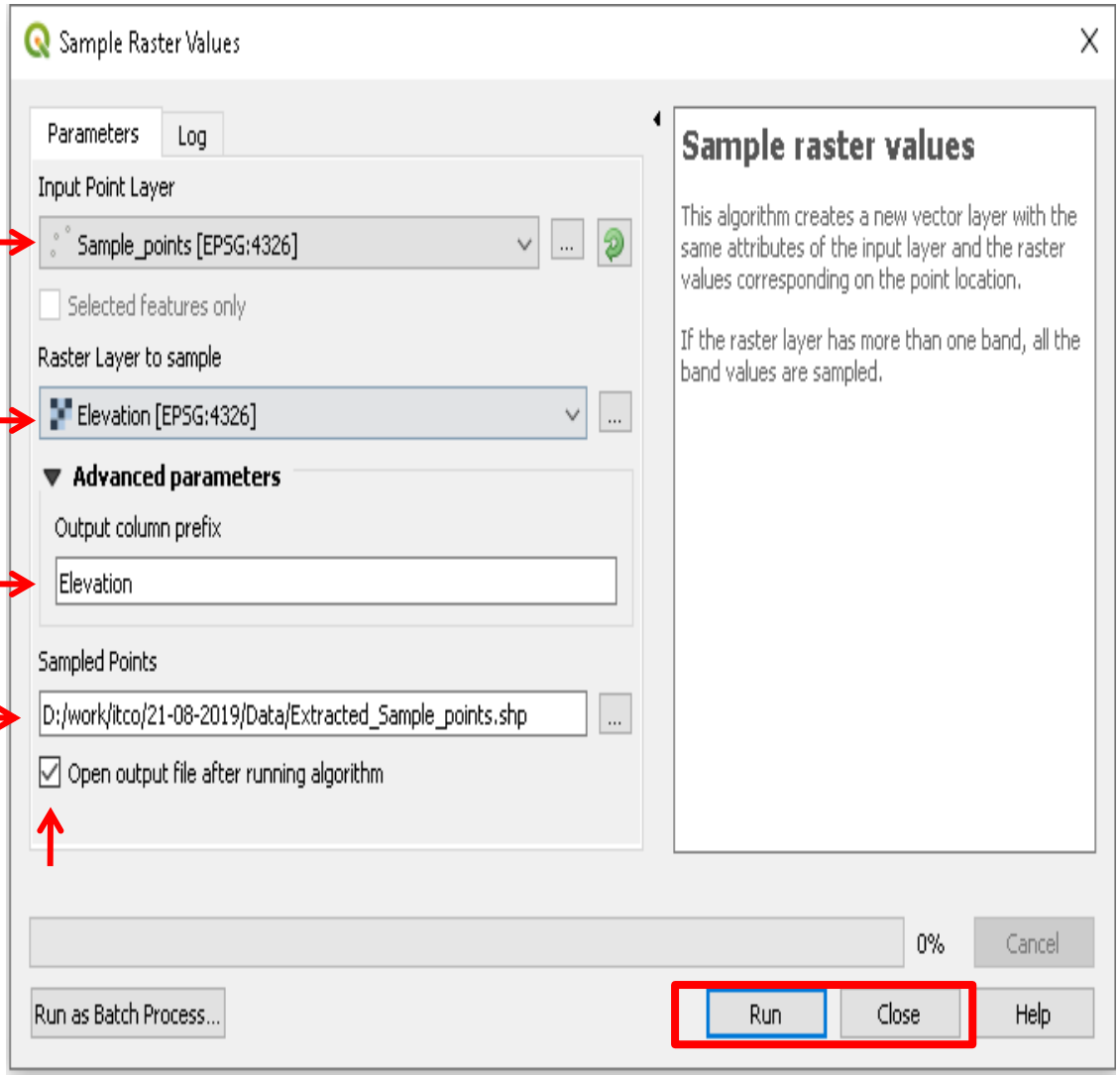


- In the processing toolbox click on
  Raster analysis -> **sample raster values**



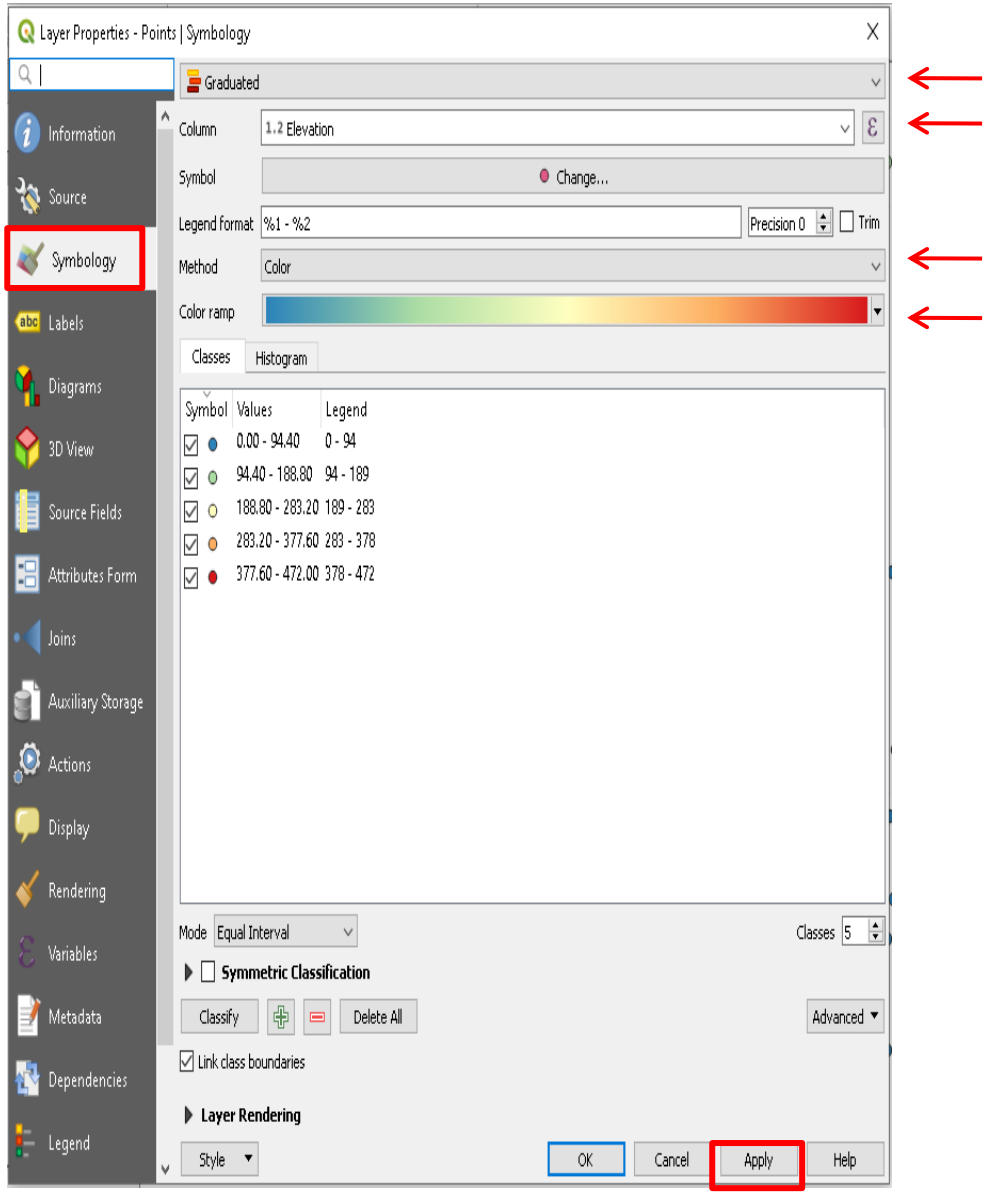
Geospatial data Generation : Sampling raster values

- Select **Sample_points.shp** as Input point layer from Data folder
- Select **Elevation** as Raster Layer to sample
- Type **Elevation** in Output column prefix
- Save to file as **Extracted_Sapmled_points.shp**
- Tick open output file after running algorithm
- Click **Run** and **close** after execution reaches 100%



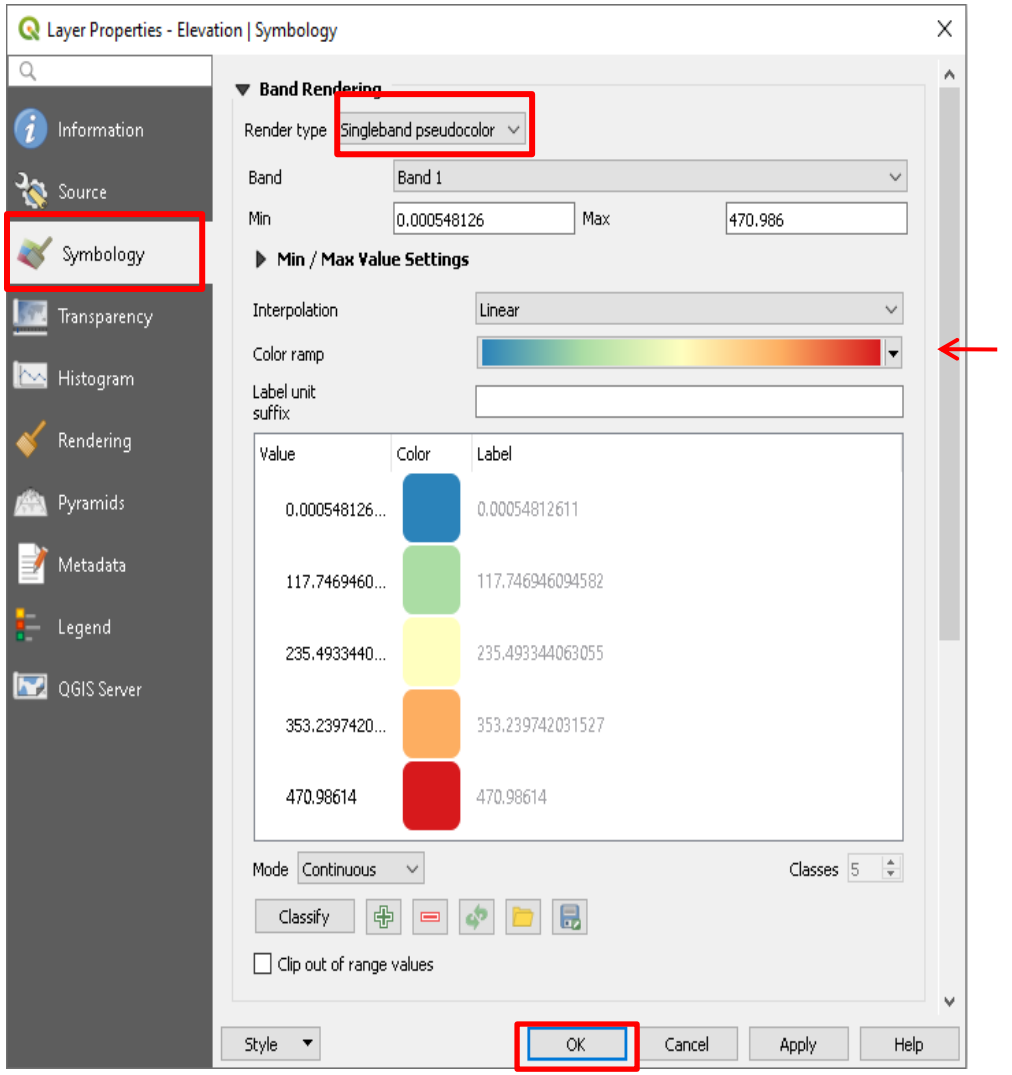
Geospatial data visualization : Visualising Point data

- Right click **points** layer -> Go to **Properties** -> **Symbology**
- Select **Graduated** as symbology type and **Elevation** as column
- Select **Colour** as Method and **Spectral** Colour ramp
- **Invert Colour Ramp** to give red colour to higher values and blue colour to lower values
- Click **Classify**
- **Click Apply** and close the window



Geospatial data visualization : Visualising Raster data

- Right click **Elevation** layer -> Go to **Properties** -> **Symbology**
- Select **Singleband Pseudocolor** as Render type
- Select **Spectral** Colour ramp
- **Invert Colour Ramp** to give red colour to higher values and blue colour to lower values
- **Click Apply** and close the window



References

- **QGIS :** https://qgis.org/en/site/
- **Raster vs Vector :** https://gisgeography.com/spatial-data-types-vector-raster/
- **Interpolation :** https://gisgeography.com/tag/interpolation/
- **IDW Interpolation :** https://gisgeography.com/inverse-distance-weighting-idw-interpolation/
- **TIN vs IDW :** https://docs.qgis.org/2.8/en/docs/gentle_gis_introduction/spatial_analysis_interpolation.html


Thank You