Hands On

Generation of DEM using ASCII data

Training Course on
'Geospatial Techniques for coastal mapping and monitoring'

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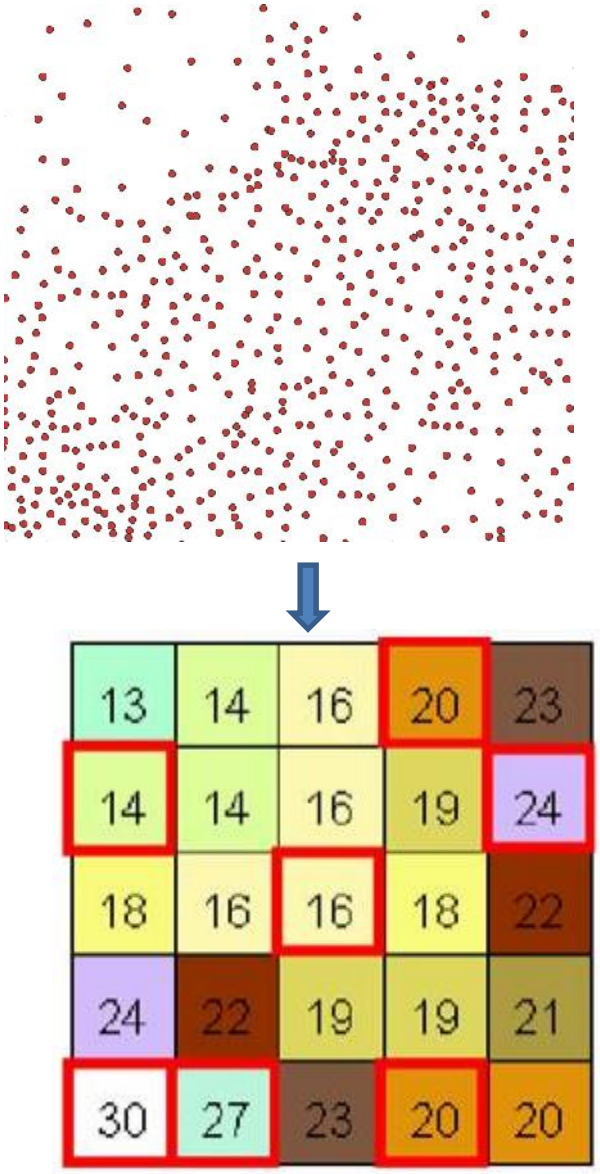
Overview

ASCII DEM data

- .XYZ, .ASC, .grd, .txt, etc
- Regular and Irregular spaced data

Generation of Raster surface from points

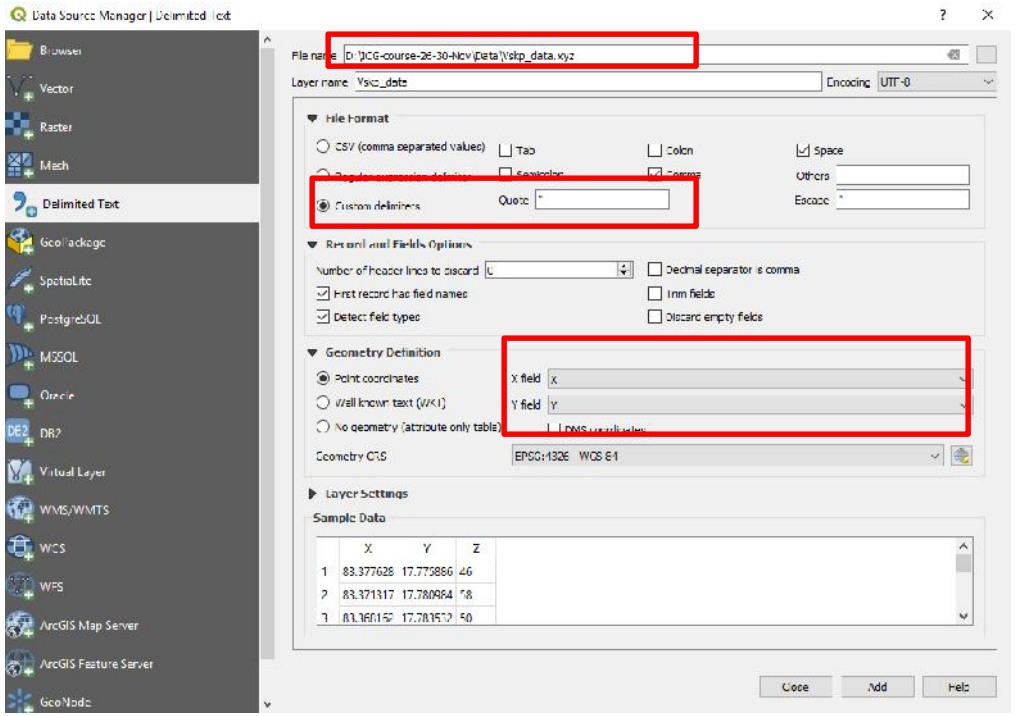
- Interpolation
  - IDW

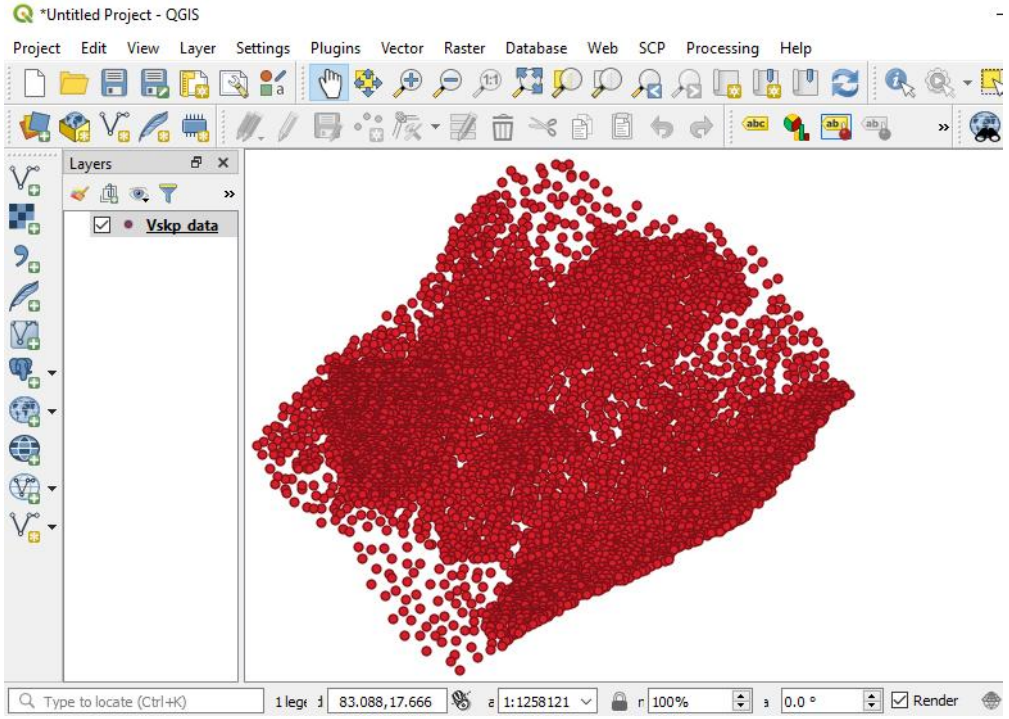


Source: http://planet.botany.uwc.ac.za/nisl/GIS/spatial/chap_1_11.htm

Loading ASCII data in to QGIS

1. Click on add delimited text button in the manage layers toolbar
2. Select the layer VSKP_data.xyz and select "***Comma***" in "***Custom delimiter"*** in file format.
3. In Geometry definition section select ***Point coordinates*** and set ***X field*** as x and ***Y field*** as y and click ok.
4. Now the point data consisting of Longitude (x), Latitude (y) and elevation (z) are loaded and displayed in the QGIS window
5. Verify the attribute table to check it contains all the information of ascii text file
6. In the next step we will convert the point data to continues raster data



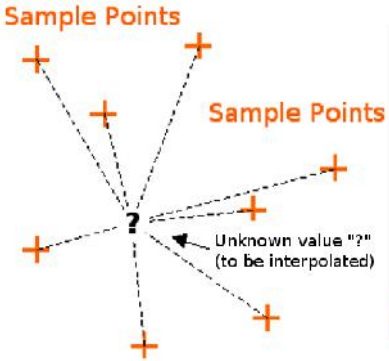


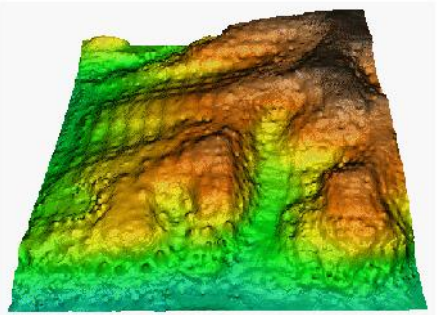
Spatial Interpolation

Spatial interpolation is the process of using points with known values to estimate values at other unknown points. There are different types of interpolation techniques like **Inverse Distance Weighted (IDW)**, Triangulated Irregular Network (TIN) , Krigging, Natural Neighbour, etc

Inverse Distance Weighted

The sample points are weighted during interpolation such that the influence of one point relative to another declines with distance from the unknown point you want to create. Spatial autocorrelation is the underlying assumption. It Assumes that points things near to each other are more alike than the points farther.



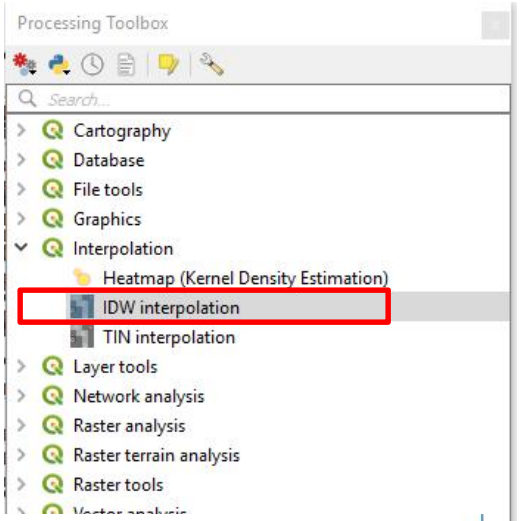


$$Z_p = \frac{\sum_{i=1}^{n} \left(\frac{z_i}{d_i^p} \right)}{\sum_{i=1}^{n} \left(\frac{1}{d_i^p} \right)}$$

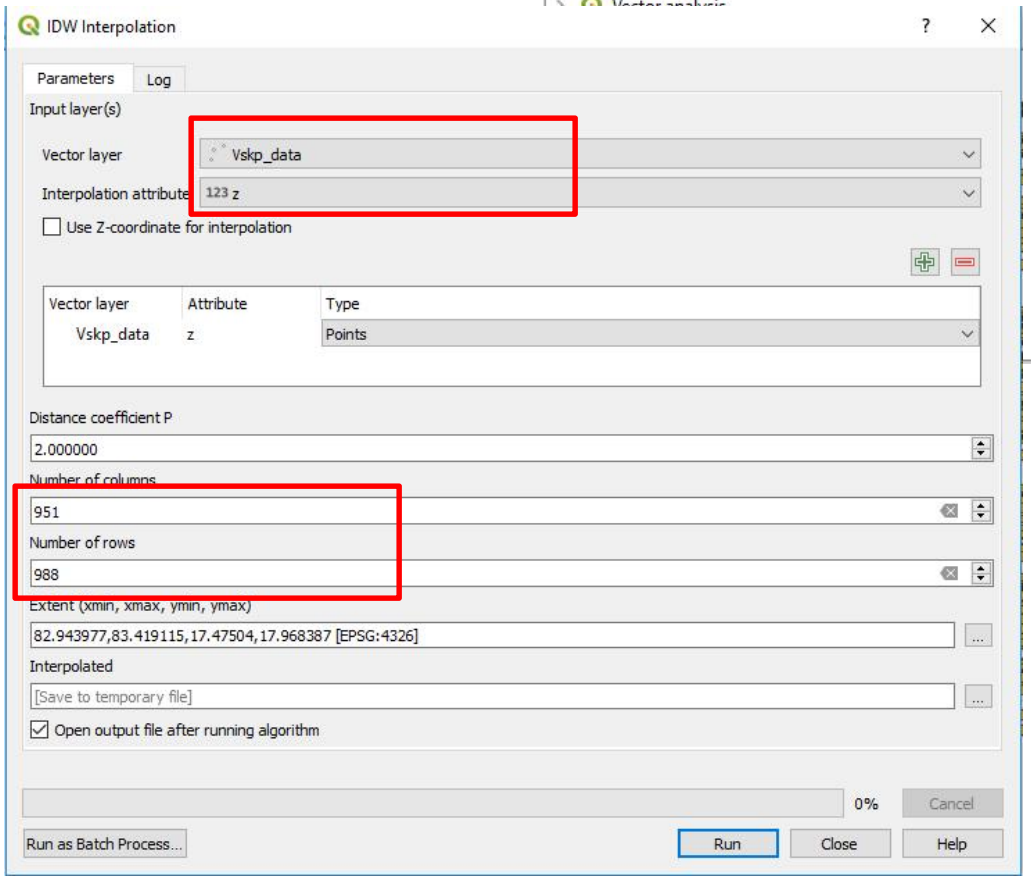
Source : https://docs.qgis.org/testing/en/docs/gentle_gis_introduction/spatial_analysis_interpolation.html
https://gisgeography.com/inverse-distance-weighting-idw-interpolation/

Generation of DEM raster from points

1. In the processing toolbox click on interpolation and select IDW interpolation
2. In the IDW interpolation toolbox select the layer ***Vskp_data*** in the dropdown menu

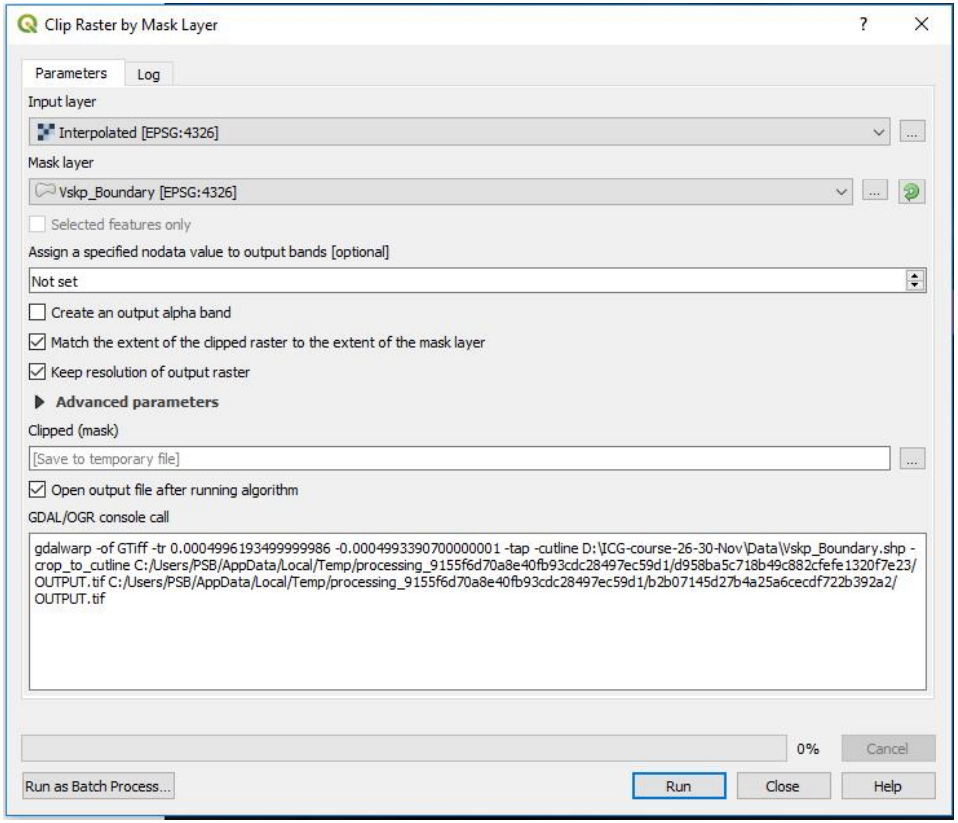


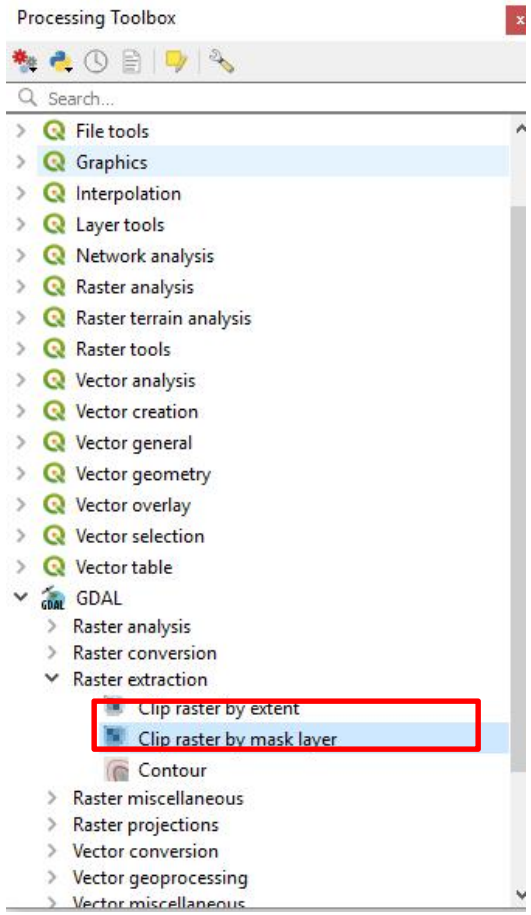
3. In the Interpolation attribute section select the ***z*** as the field
4. Now, click on add button and select the Points the ***Type*** drop down menu
5. Provide 951, 988 in the Number of columns and Number of rows field respectively.
6. This gives a resolution of 0.0005 degrees (~ 55 meters)
7. In ***Extent*** field select the ***Use Layer Extent***
8. Provide the out file destination in the ***Interpolated*** field and click run



Clipping DEM to boundary

1. Now, using Vskp_boundary.shp clip the DEM using ***Clip raster by mask tool*** in ***Raster extraction*** toolbox in **GDAL** tools
2. In the ***Input layer*** select the generated DEM and in the ***Mask layer*** select the Vskp_Bounday.shp file
3. Check the Keep resolution of the output raster
4. Save the file to a desired location and click ***Run***





Applying Symbology

1. Add the clipped layer to the QGIS window and select the layer Properties by left clicking on the layer
2. In the ***Symbology*** section select the ***Render type*** as ***singleband psuedocolor***.
3. Select the required color ramp and click on classify to get the colors assigned to the DEM values
4. Now click ***Apply*** and next click ***Ok*** to apply the symbology