Hands On

# **Generation of DEM using ASCII data**

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

November 26 - 30, 2018

P Sai Bharadwaj saibhardwaj.p@incois.gov.in

International Training Centre for operational Oceanography(ITCOocean),

INCOIS, Hyderabad, India







## Overview

#### ASCII DEM data

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

Generation of Raster surface from points

• Interpolation

o 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
- Select the layer VSKP\_data.xyz and select "*Comma*" in "*Custom delimiter*" in file format.
- In Geometry definition section select
  *Point coordinates* and set *X field* as x and *Y field* as y and click ok.
- 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.





Source : <u>https://docs.qgis.org/testing/en/docs/gentle\_gis\_introduction/spatial\_analysis\_interpolation.html</u> <u>https://gisgeography.com/inverse-distance-weighting-idw-interpolation/</u>

#### Generation of DEM raster from poir

- In the processing toolbox click on interpola 1. interpolation
- In the IDW interpolation toolbox select the 2. dropdown menu

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

		Processing Toolbox
•		🍬 💠 🕓 🖹 🔍 🌂
ints		Q Search
		Cartography
		G Eileteele
		Graphics
ation and select	t IDW	
		Hestman (Vernel Deprity Estimation)
		IDW internolation
havor Vskn data in the		TIN interpolation
e layer vskp_uu		
		A Network analysis
		Rector analysis
		Racter terrain analysis
		Vector analysis
Q IDW Interpolation		? ×
Parameters Log		
Input layer(s)		
Vector laver	ta	
vector layer	ta	
Interpolation attribute 123 z		~
Use Z-coordinate for interpolation	1	
Vector laver Attribute	Туре	
Vskp data z	Points	~
tut-and	1.500	
Distance coefficient P		
2.000000		
Number of columns		
951		
Number of rows		Amod
988		
		لينتبا
Extent (xmin, xmax, ymin, ymax)		
Extent (xmin, xmax, ymin, ymax) 82.943977,83.419115,17.47504,17.90	68387 [EPSG:4326]	
Extent (xmin, xmax, ymin, ymax) 82.943977,83.419115,17.47504,17.90 Interpolated	68387 [EPSG:4326]	
Extent (xmin, xmax, ymin, ymax) [82.943977,83.419115,17.47504,17.9 Interpolated [Save to temporary file]	68387 [EPSG:4326]	
Extent (xmin, xmax, ymin, ymax) [82.943977,83.419115,17.47504,17.9] Interpolated [Save to temporary file] ① Open output file after running algor	68387 [EPSG:4326]	
Extent (xmin, xmax, ymin, ymax) [82.943977,83.419115,17.47504,17.90 Interpolated [Save to temporary file] ① Open output file after running algor	68387 [EPSG:4326] ithm	
Extent (xmin, xmax, ymin, ymax) [82.943977,83.419115,17.47504,17.9] Interpolated [[Save to temporary file] ] Open output file after running algor	68387 [EPSG:4326] ithm	0% Cancel

## **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*

Clip Raster by Mask Layer ? ×
Parameters Log
input layer
Therpolated [EPSG:4326]
Mask layer
🖓 Vskp_Boundary [EPSG:4326] 🗸 🗸 💭
Selected features only
Assign a specified nodata value to output bands [optional]
Not set
Create an output alpha band
${box{ }}$ Match the extent of the dipped raster to the extent of the mask layer
☑ Keep resolution of output raster
Advanced parameters
Clipped (mask)
[Save to temporary file]
☑ Open output file after running algorithm 3DAL/OGR console call
gdalwarp -of GTiff -tr 0.000499619349999986 -0.000499339070000001 -tap -cutline D:\ICG-course-26-30-Nov\Data\Vskp_Boundary.shp - crop_to_cutline C:\Users/PSB/AppData/Local/Temp/processing_9155f6d70a8e40fb93cdc28497ec59d1/d958ba5c718b49c882cfefe1320f7e23/ OUTPUT.ttf OUTPUT.ttf
0% Cancel
un as Batch Process Close Help

Q	Se	arch	
>	Q	File tools	
>	Q	Graphics	
>	Q	Interpolation	
>	Q	Layer tools	
>	Q	Network analysis	
>	Q	Raster analysis	
>	Q	Raster terrain analysis	
>	Q	Raster tools	
>	Q	Vector analysis	
>	Q	Vector creation	
>	Q	Vector general	
>	Q	Vector geometry	
>	Q	Vector overlay	
>	Q	Vector selection	
>	Q	Vector table	
~	GDAL	GDAL	
	>	Raster analysis	
	>	Raster conversion	
	*	Raster extraction	
		Clip raster by extent	
		Clip raster by mask layer	
		Contour Parter minerally and a	
	>	Raster miscellaneous	
	5	Vector conversion	

## **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

