Interpolation using QGIS

The objective of this exercise is to interpolate Bathymetry and topography

Data inputs:

1. Bathymetry gridded raster or points data
2. Topography (Digital Elevation Model- DEM)

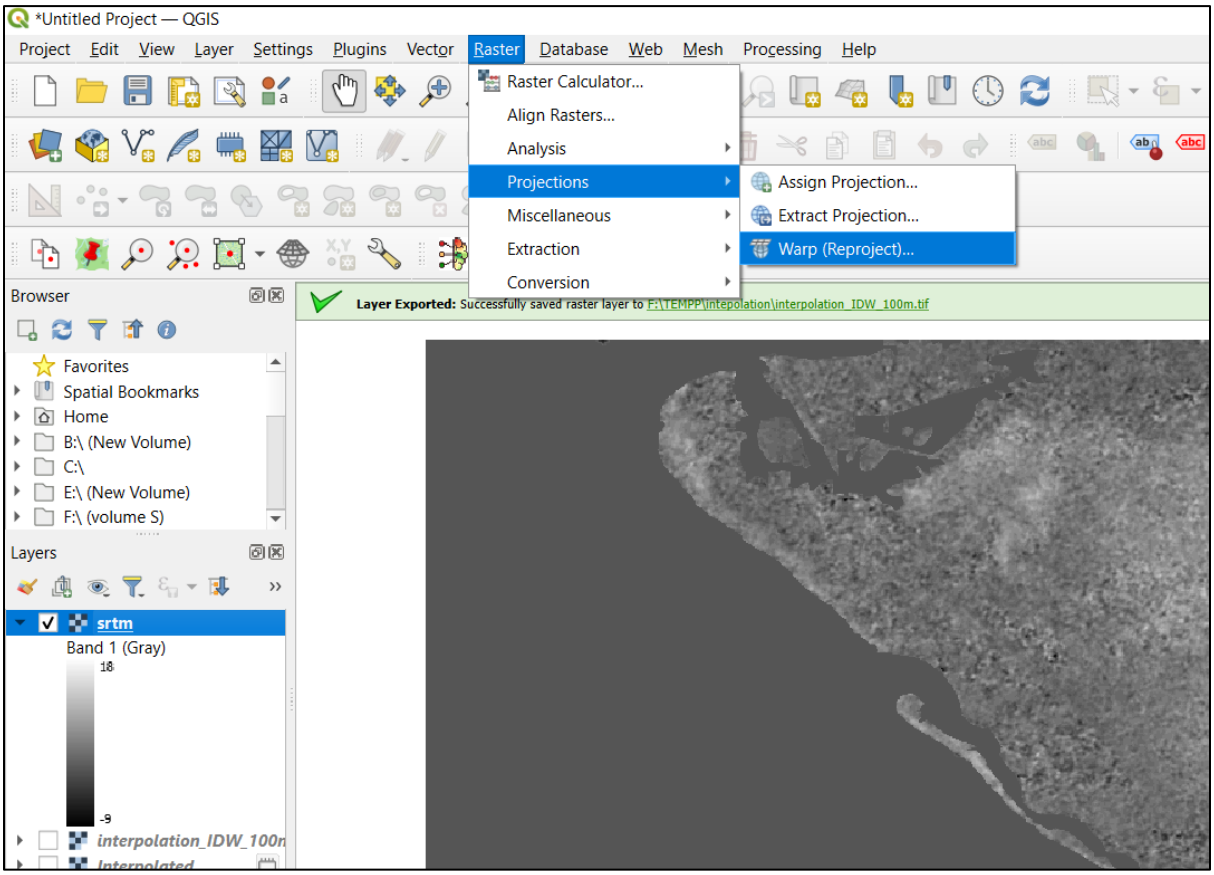
Here we are using GEBCO bathymetry and SRTM topography data

Important Note: Both data should be in same coordinate system → WGS 84: EPSG:4326

If data is not in WGS84: EPSG:4326 → then reprojection is required

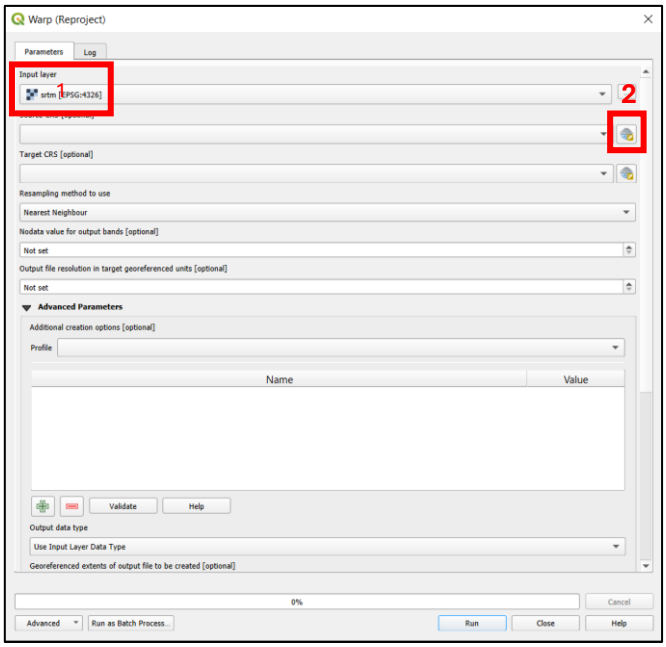
Reprojection:

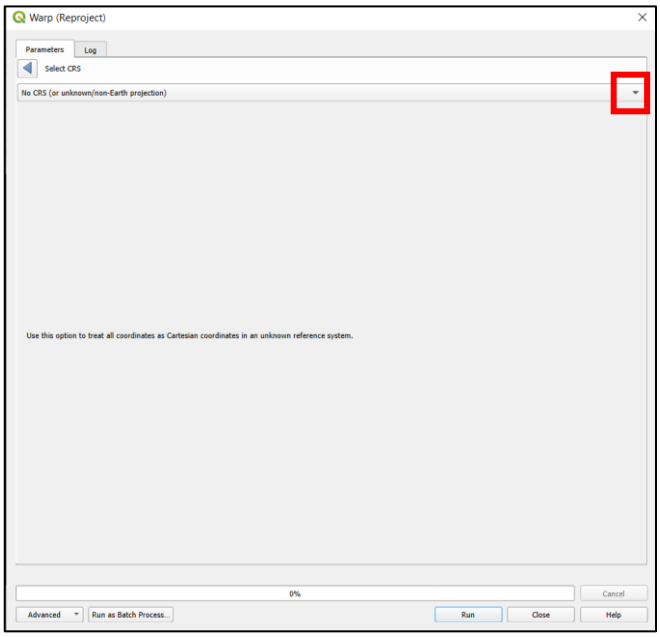
Go to 'Raster' tab → Projections → Warp (reprojection)

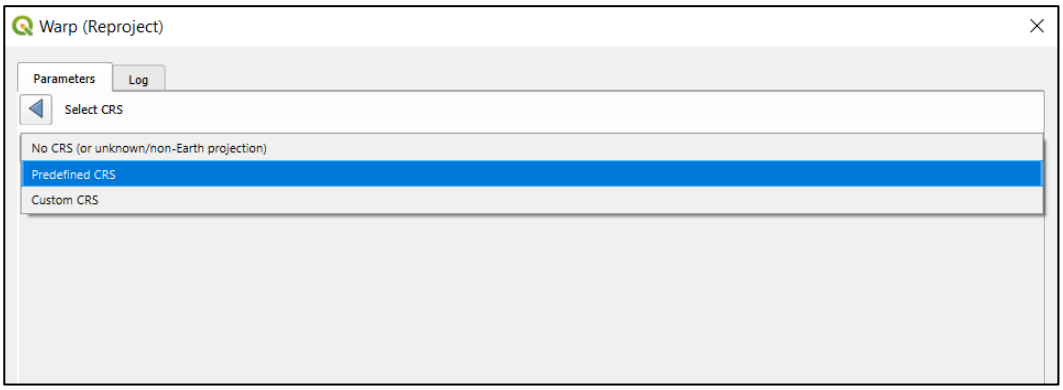


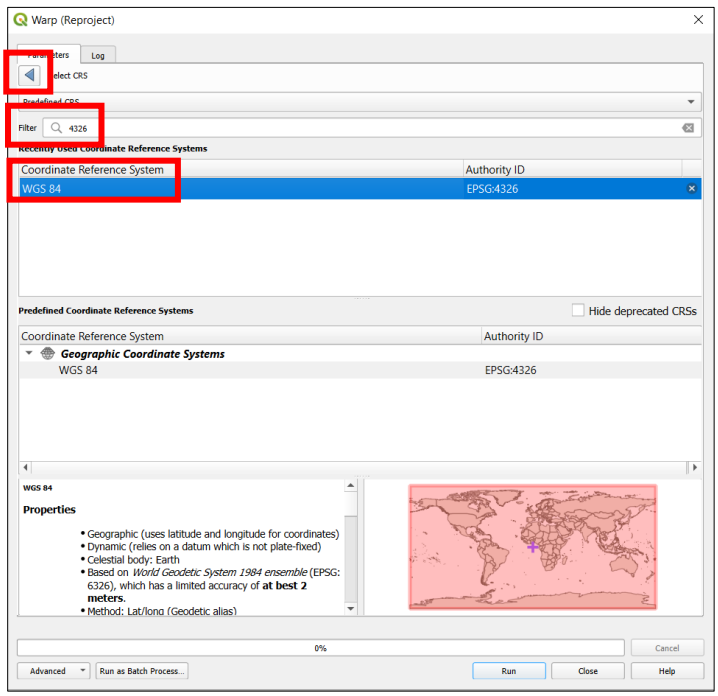
Input layer → Select your raster layer

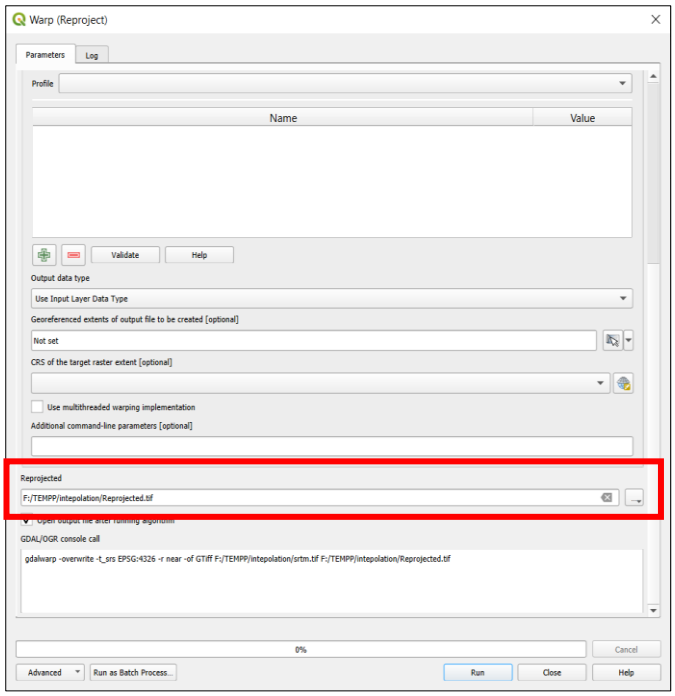
Taeget CRS → click on glob icon  → drop down 'No CRS (or unknown/ non-Earth projection) → select 'Predefined CRS' → in filter search '4326' → Go to "Coordinate Reference System" tab and select 'WGS84' → click back by clicking  this icon → scoll down and save the reprojected file by clicking 'save to file tab'. → Click "Run"


Warp (Reproject)
Parameters
Log
Input layer
srtm [EPSG:4326]
1
2
Target CRS [optional]
Resampling method to use
Nearest Neighbour
Nodata value for output bands [optional]
Not set
Output file resolution in target georeferenced units [optional]
Not set
Advanced Parameters
Additional creation options [optional]
Profile
Name
Value
Validate
Help
Output data type
Use Input Layer Data Type
Georeferenced extents of output file to be created [optional]
0%
Cancel
Advanced
Run as Batch Process...
Run
Close
Help


Warp (Reproject)
Parameters
Log
Select CRS
No CRS (or unknown/non-Earth projection)
Use this option to treat all coordinates as Cartesian coordinates in an unknown reference system.
0%
Cancel
Advanced
Run as Batch Process...
Run
Close
Help

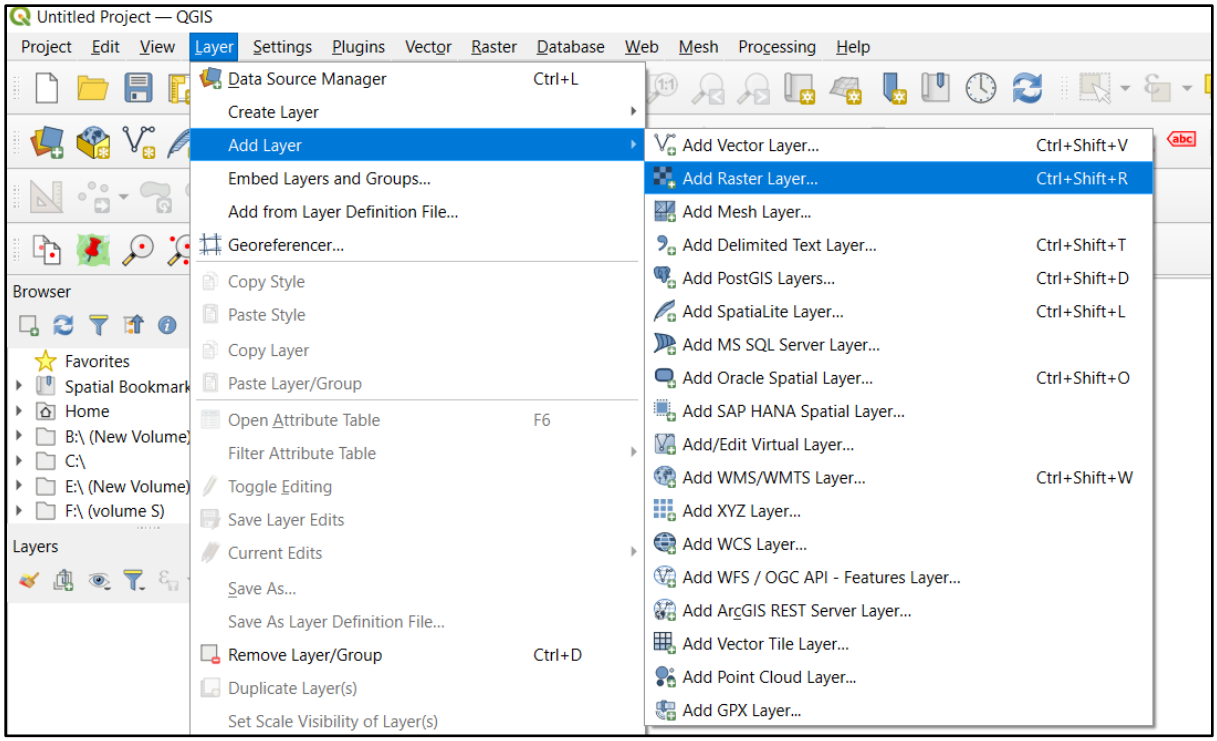

Warp (Reproject)
Parameters
Log
Select CRS
No CRS (or unknown/non-Earth projection)
Predefined CRS
Custom CRS

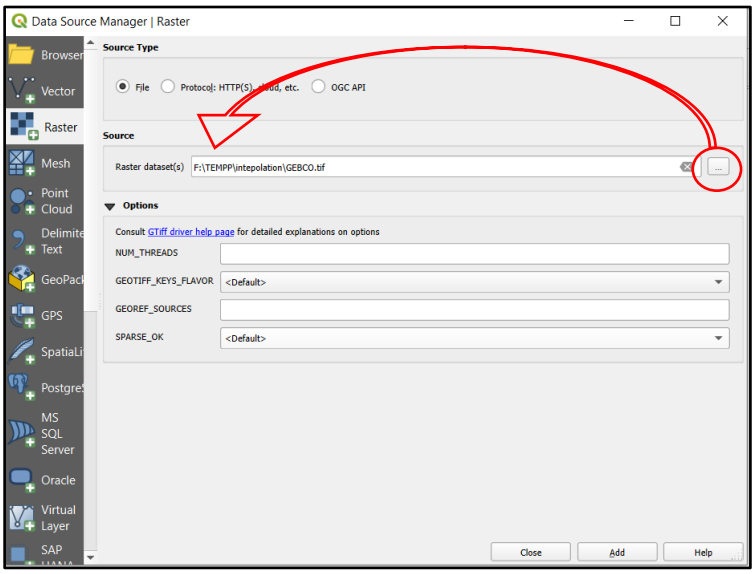

Warp (Reproject)
3
1
2
Filter
4326
Recently Used Coordinate Reference Systems
Coordinate Reference System
Authority ID
WGS 84
EPSG:4326
Predefined Coordinate Reference Systems
Hide deprecated CRSs
Coordinate Reference System
Authority ID
Geographic Coordinate Systems
WGS 84
EPSG:4326
WGS 84
Properties
• Geographic (uses latitude and longitude for coordinates)
• Dynamic (relies on a datum which is not plate-fixed)
• Celestial body: Earth
• Based on World Geodetic System 1984 ensemble (EPSG: 6326), which has a limited accuracy of at best 2 meters.
• Method: Lat/long (Geodetic alias)
0%
Cancel
Advanced
Run as Batch Process...
Run
Close
Help


Warp (Reproject)
Parameters
Log
Profile
Name
Value
Validate
Help
Output data type
Use Input Layer Data Type
Georeferenced extents of output file to be created [optional]
Not set
CRS of the target raster extent [optional]
Use multithreaded warping implementation
Additional command-line parameters [optional]
Reprojected
F:/TEMPP/intepolation/Reprojected.tif
GDAL/OGR console call
gdalwarp -overwrite -t_srs EPSG:4326 -r near -of GTiff F:/TEMPP/intepolation/srtm.tif F:/TEMPP/intepolation/Reprojected.tif
0%
Cancel
Advanced
Run as Batch Process...
Run
Close
Help

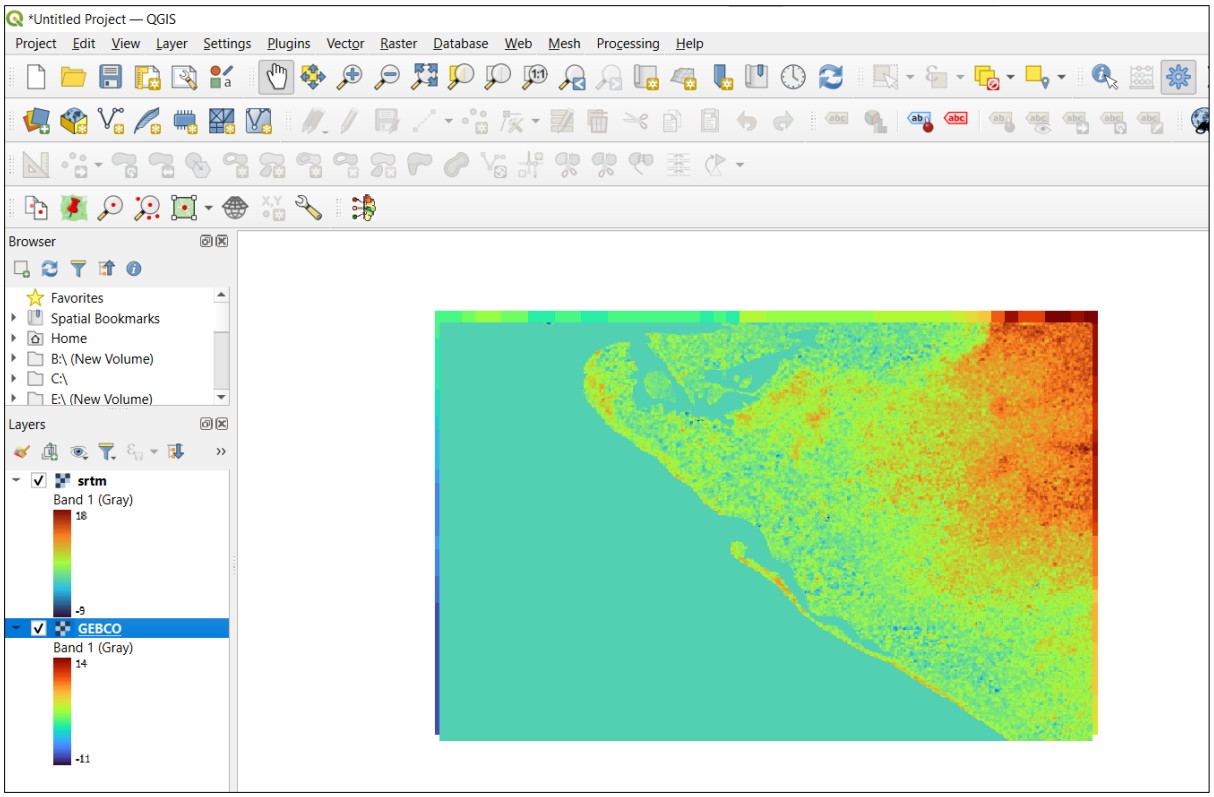
If you have your own Bathymetry and Topography DEM data in point shapefile format then skip step 1 and 2

Step 1: Add Both raster layers in QGIS:





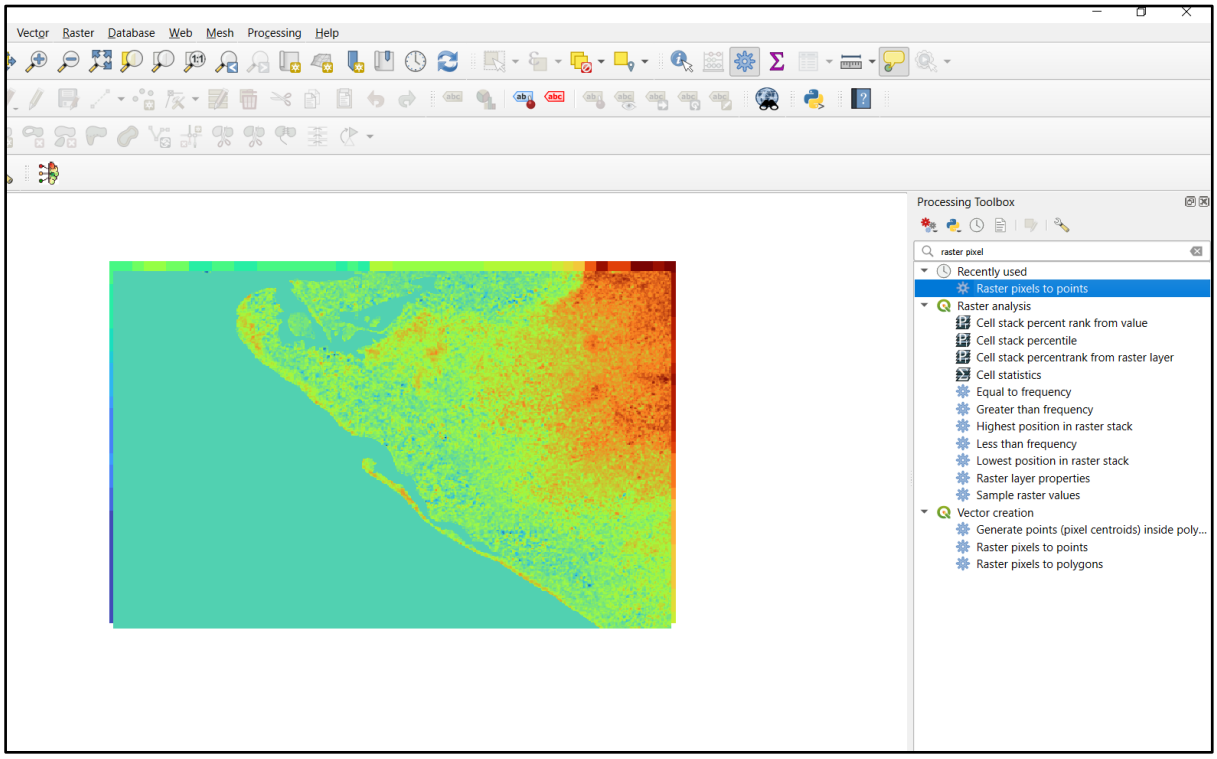
Similarly add SRTM data into QGIS

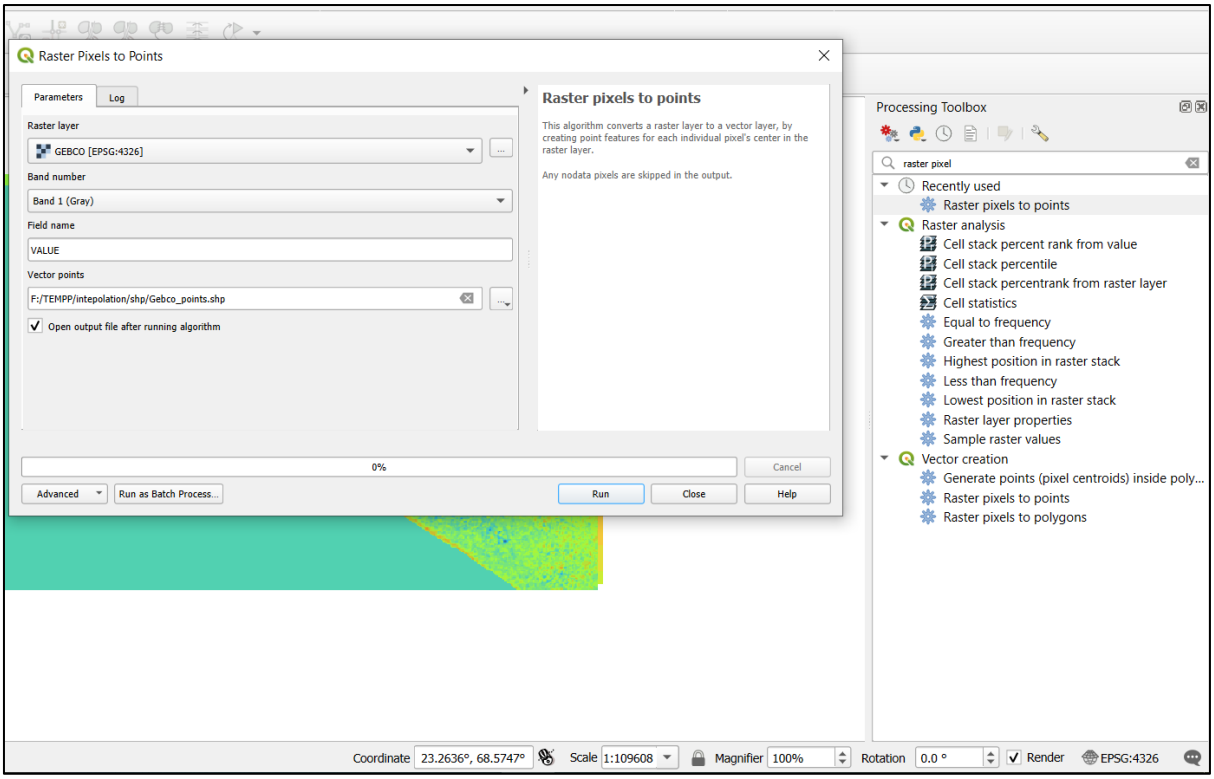


Step 2 : Raster to Vector conversion

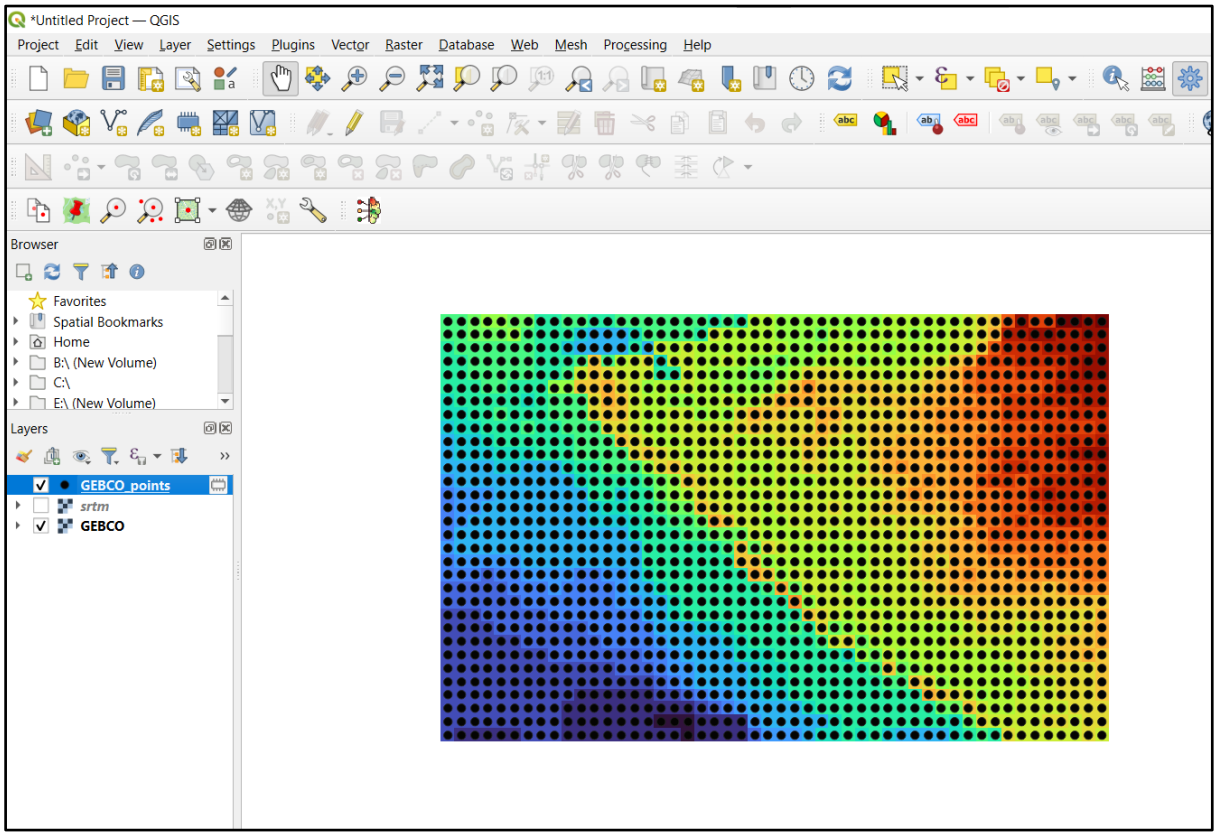
Convert raster pixels to points using “Raster pixels to points”

Search “Raster Pixels to Points” in Processing Toolbox





Save vector points in ".shp" format.

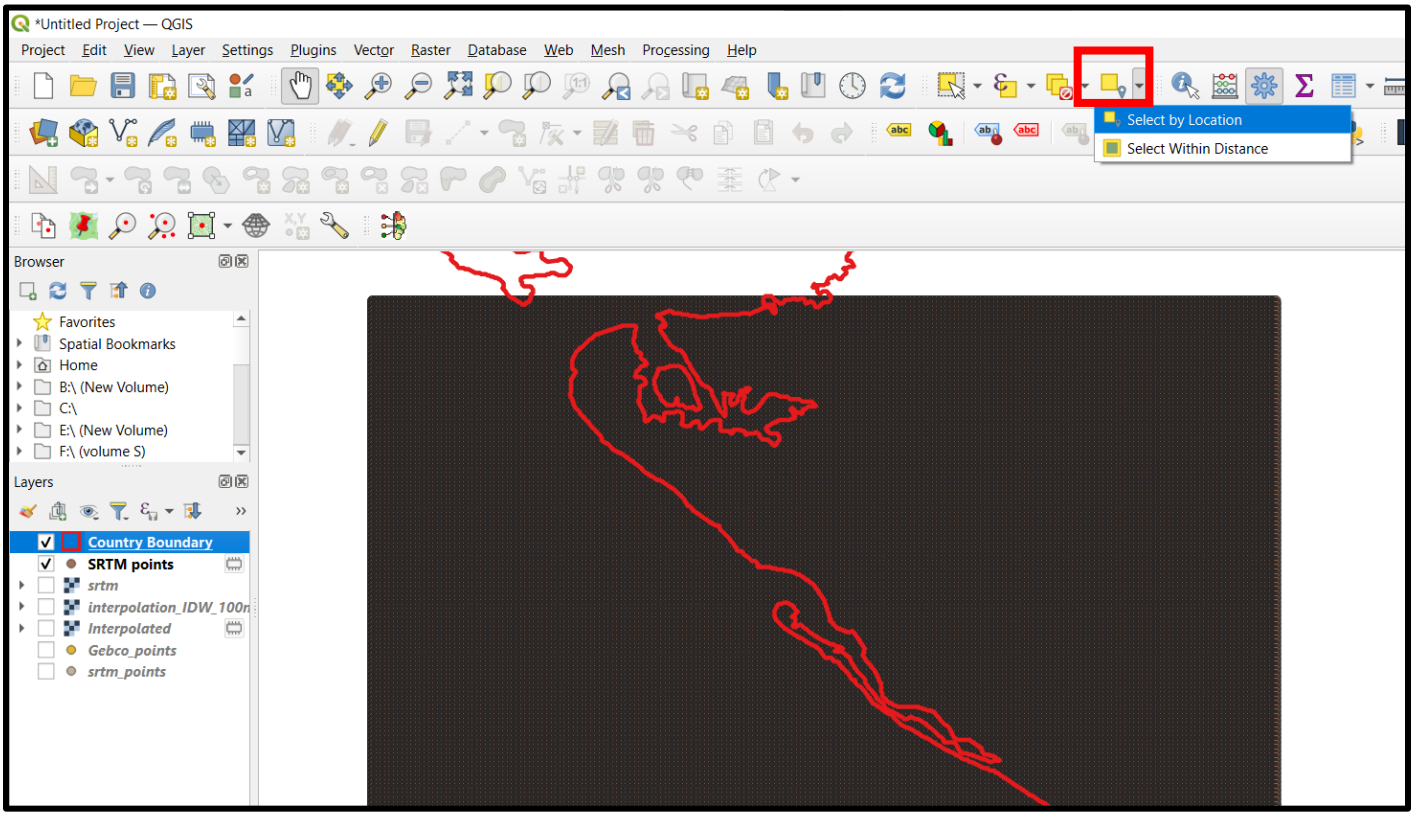


Similarly convert raster pixels to points for SRTM data also

Step 3: To remove land points from GEBCO points →

Import county admin boundary shapefile in QGIS → Layer → add Layer → add Vector Layer

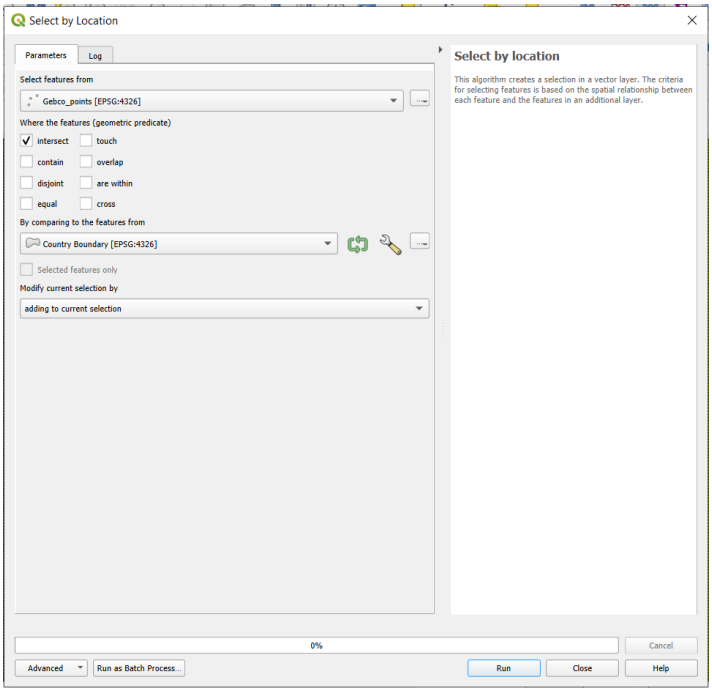
for selecting pixels falling inside country polygon → drop down 'Select by Location' by clicking  symbol



Select feature from → GEBCO points

By comparing features from → Country Boundary

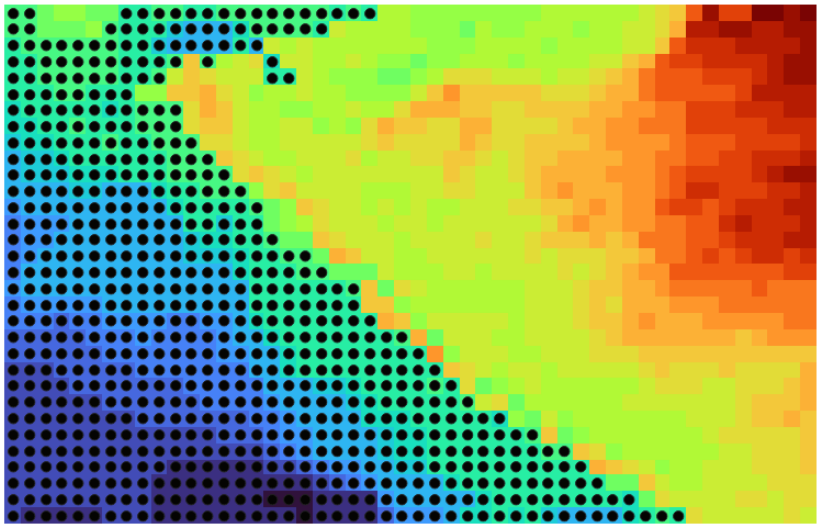
Modify current selection by → adding to current selection → Run → Close



Open Attribute table of GEBCO points → Selected points are Land points which we want to remove.

start editing using ( ) this symboll. Delete selected features by clicking delete symboll ( )

Save the edits and stop editing by clicking symboll
GEBCO points will be look like this:



For SRTM we want to keep land points. Again click selection by location tab →

Select feature from → SRTM points

By comparing features from → Country Boundary

Modify current selection by → adding to current selection → Run → Close

Right click on SRTM points → Open Attribute Table → start editing using ( ) this symbol.

Now to keep land points we will do invert selection by clicking symbol.

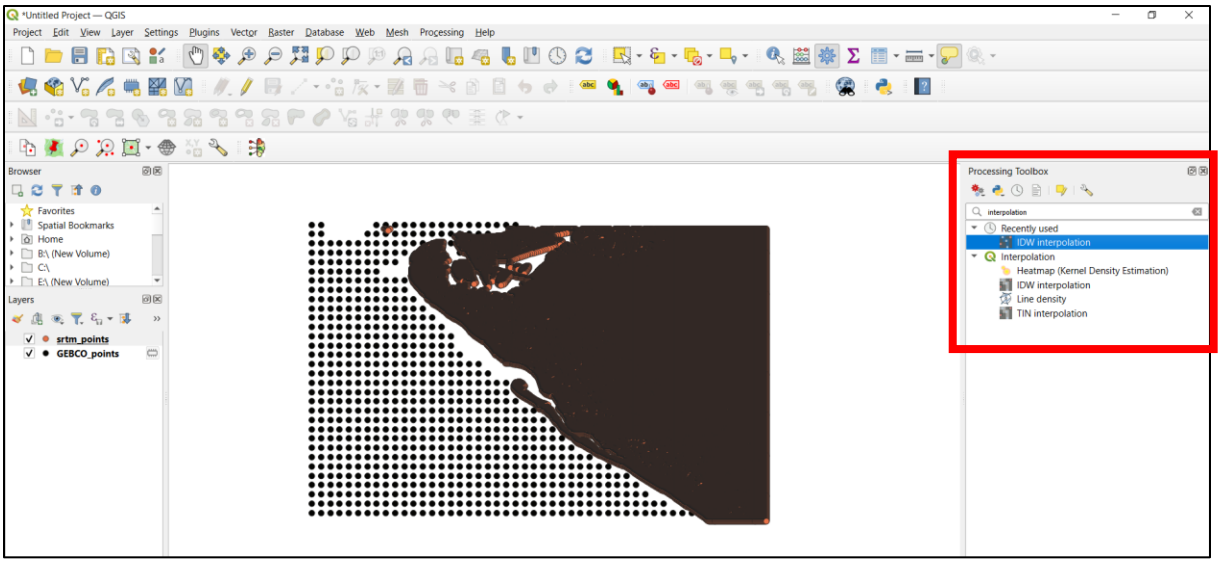
→ Delete selected features by clicking delete symboll ( )

Save the edits and stop editing by clicking symboll

SRTM points will look like this:

Step 4: Interpolation

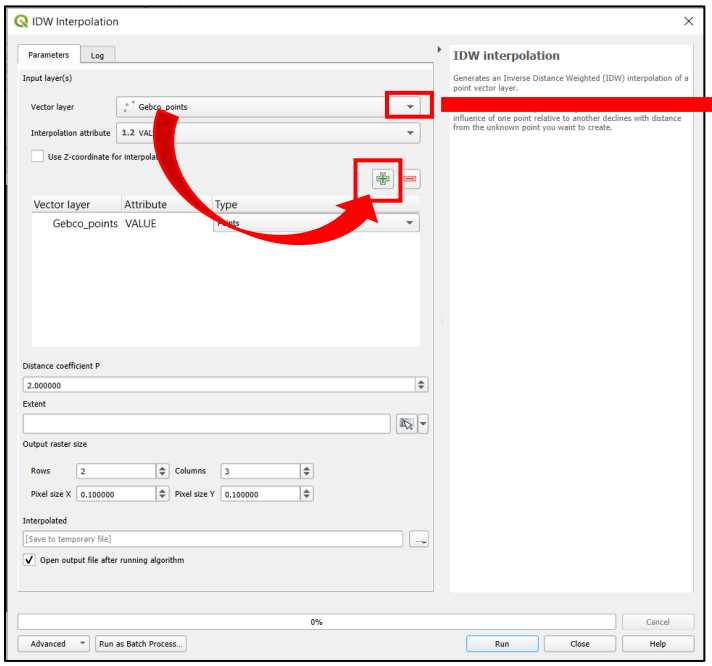
Search ‘interpolation’ in the processing toolbox:

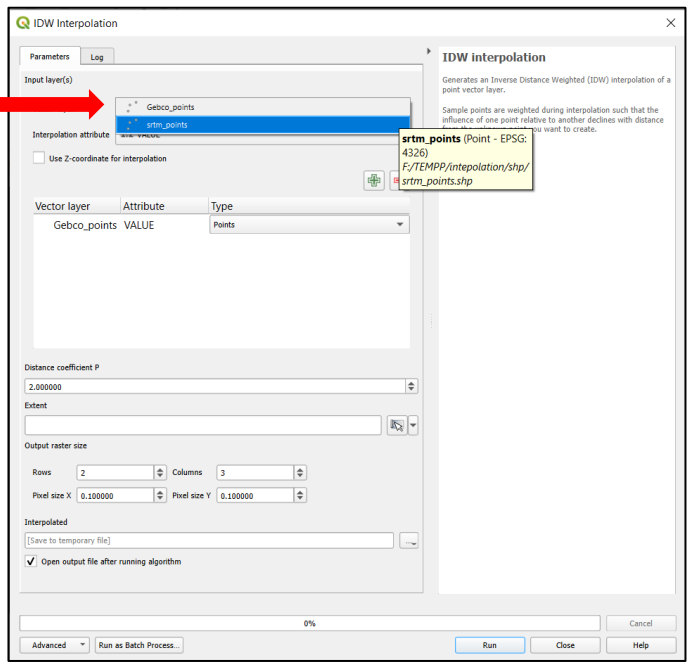


Double Click on “IDW interpolation” →

Select Vector Layer as “GEBCO_points” then click  to add in table →

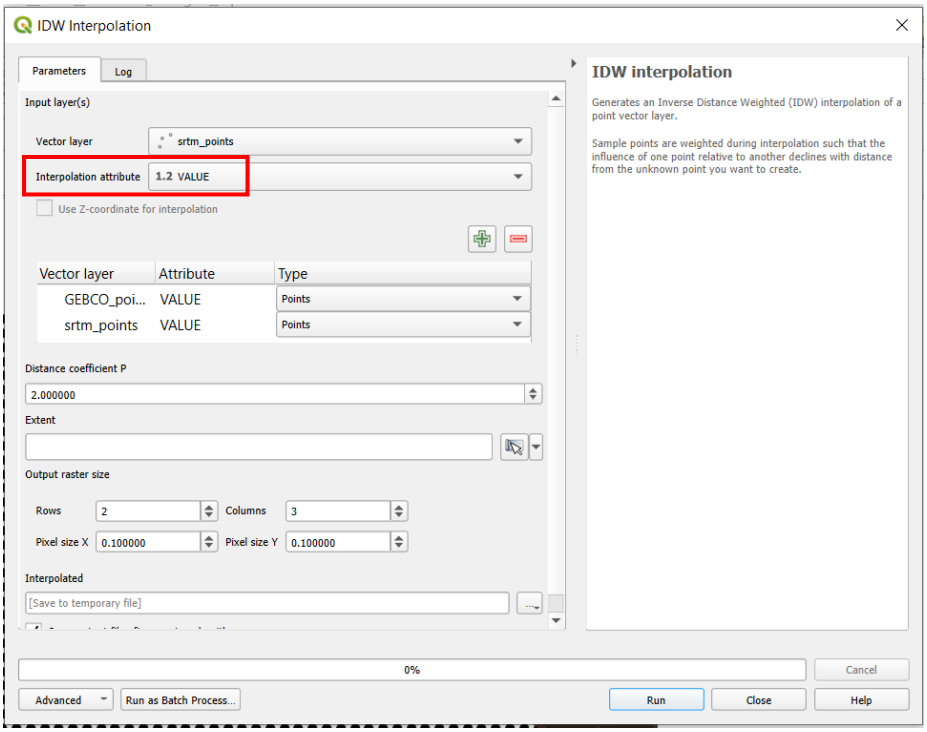
After adding GEBCO point select SRTM_points by drop down in ‘vector layer’ by clicking and then click  to add in table



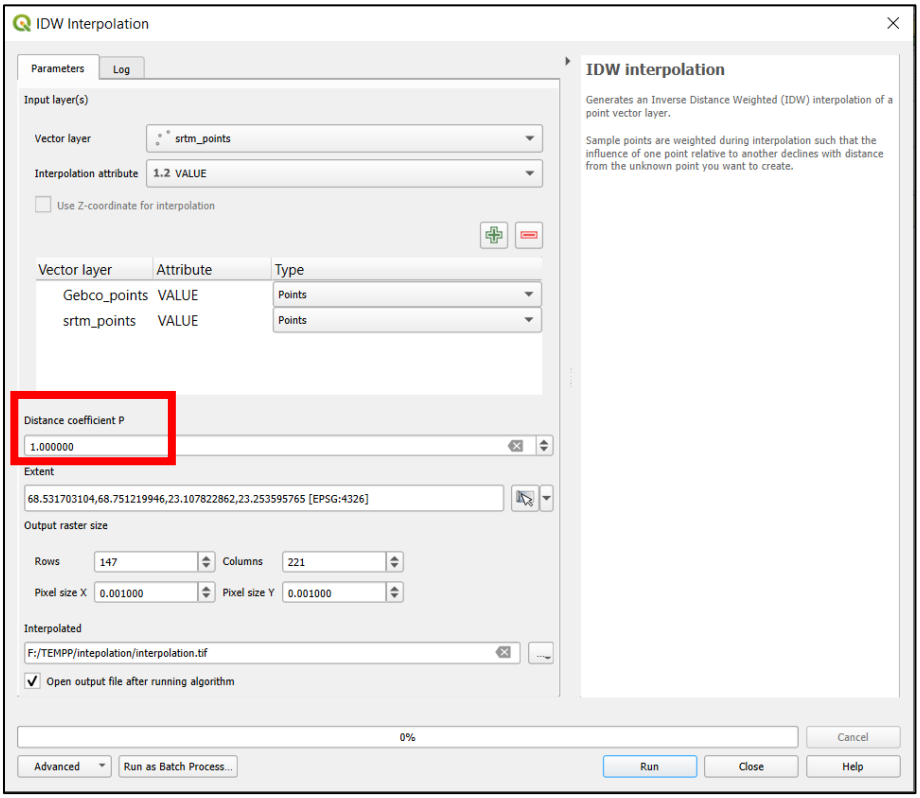


Important Note:

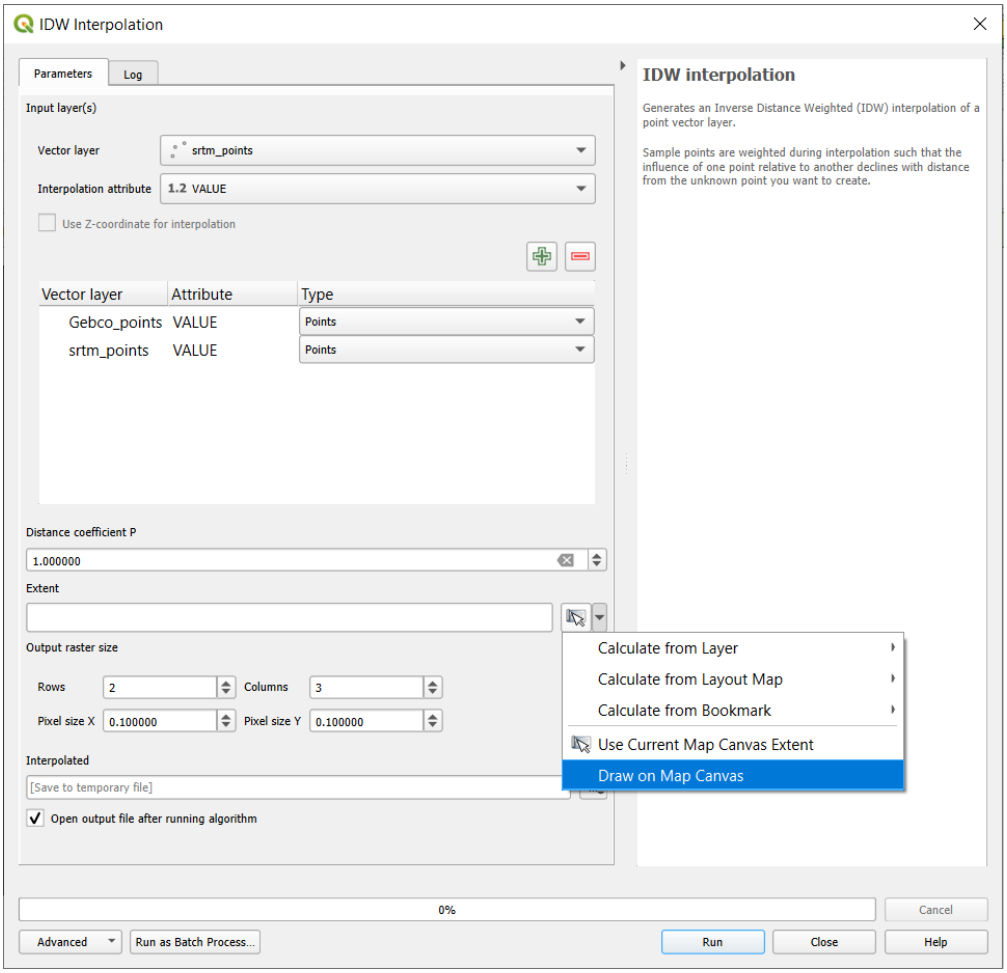
If you have your own DEM or Bathymetry data in shapefile then Check column name where elevation values are present. Here column name for both data is “VALUE”. If your column name is different then change dropdown into “Interpolation attirbute” tab.



Distance to coeffcient P = 1



Extent → Click on dropdown icon in extent → select Draw on Map Canvas



Draw the extent you want of output interpolated file→ start from Upper left and end at Bottom Right.

It will appear as:

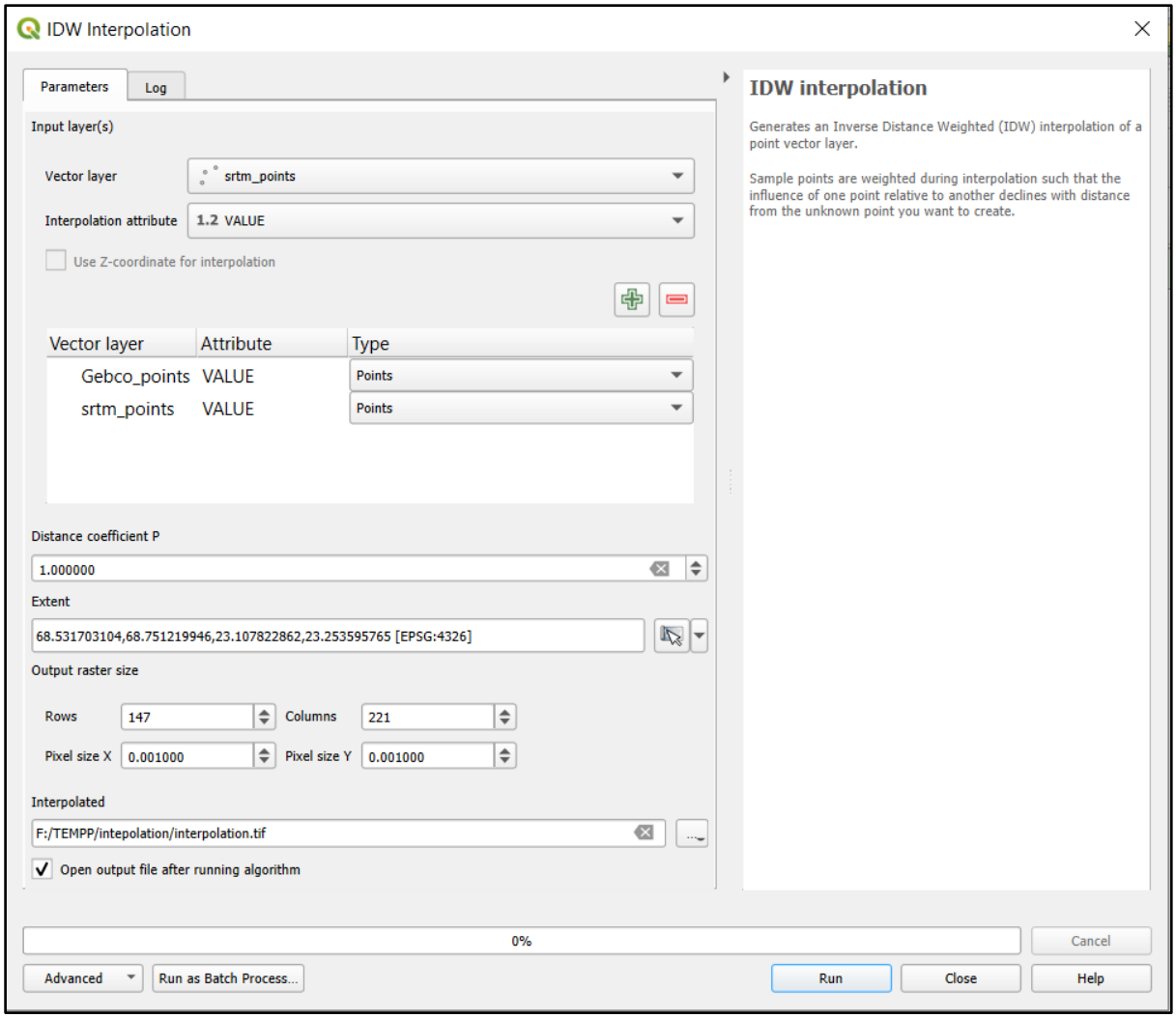
Top Left Longitude, Bottom Right Longitude, Bottom Right Latitude, Top Left Latitude [EPSG:4326]

Give Pixel size in decimal degrees: for 10m spatial resolution, give pixel size for X and Y as

[10/(108*1000) = 0.000093]

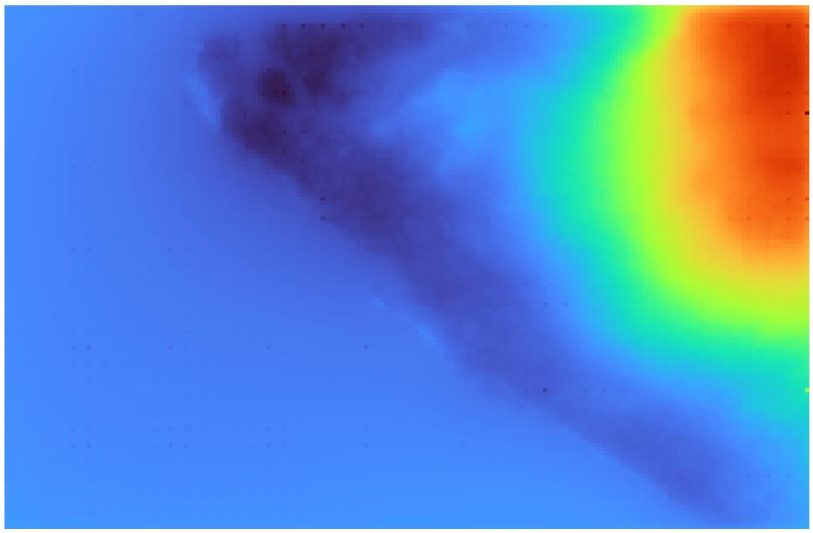
Spatial Resolution (meters)	Decimal Degree
10m	0.000093
30m	0.000278
90m	0.000833
120m	0.00111

Save file to your directory:



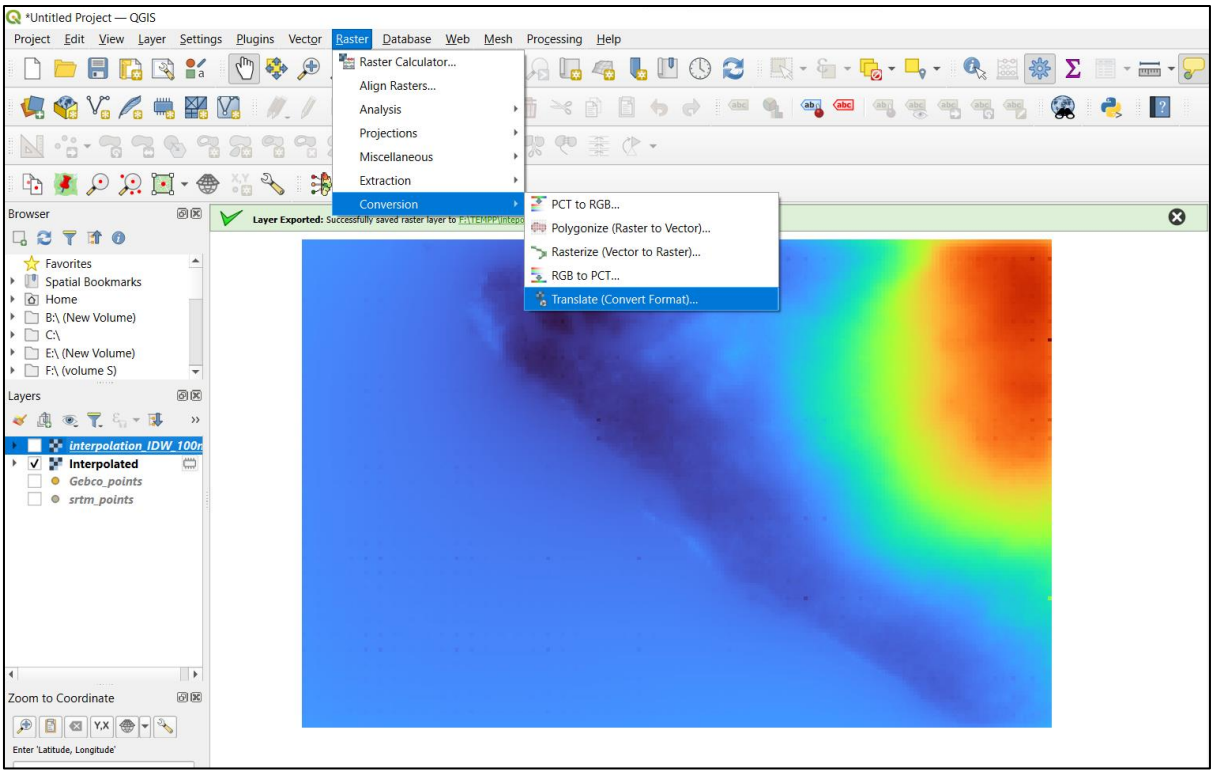
Run the IDW interpolation.

Result:

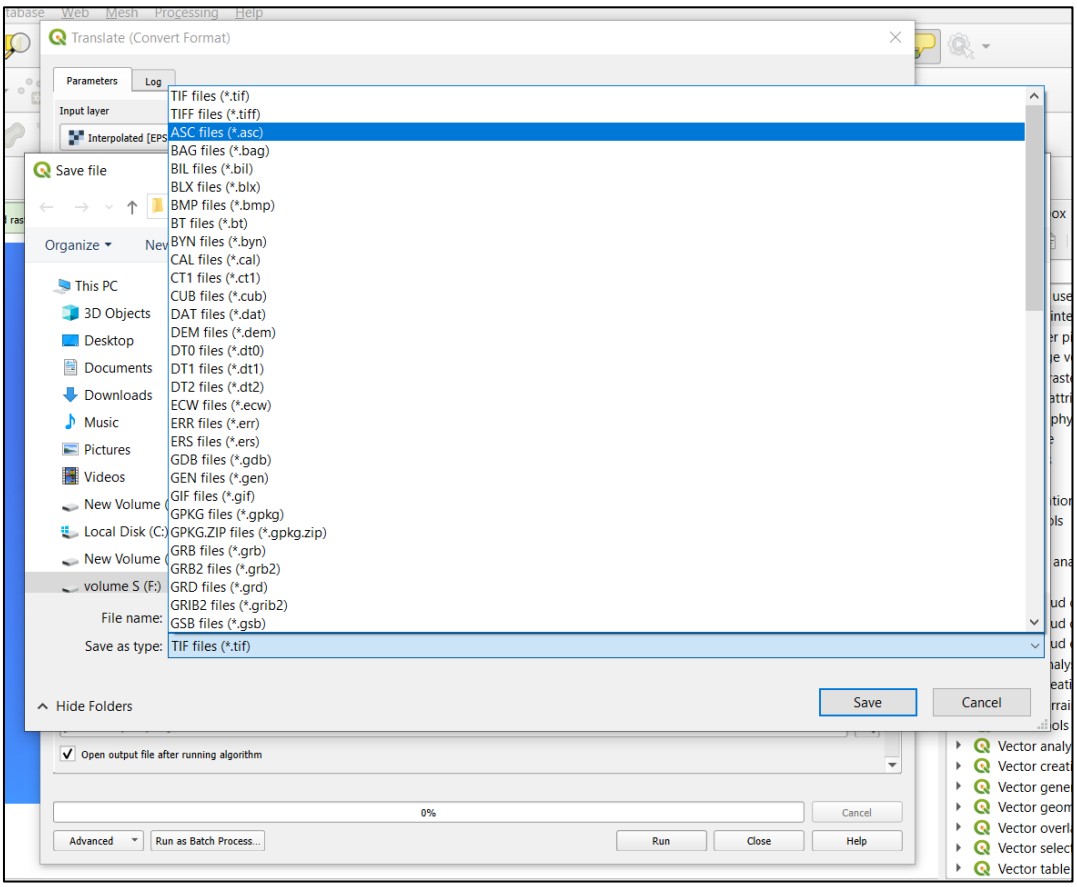


Step 5: Raster to ASCII conversion:

Make sure output raster projection is in WGS84- EPSG:4326

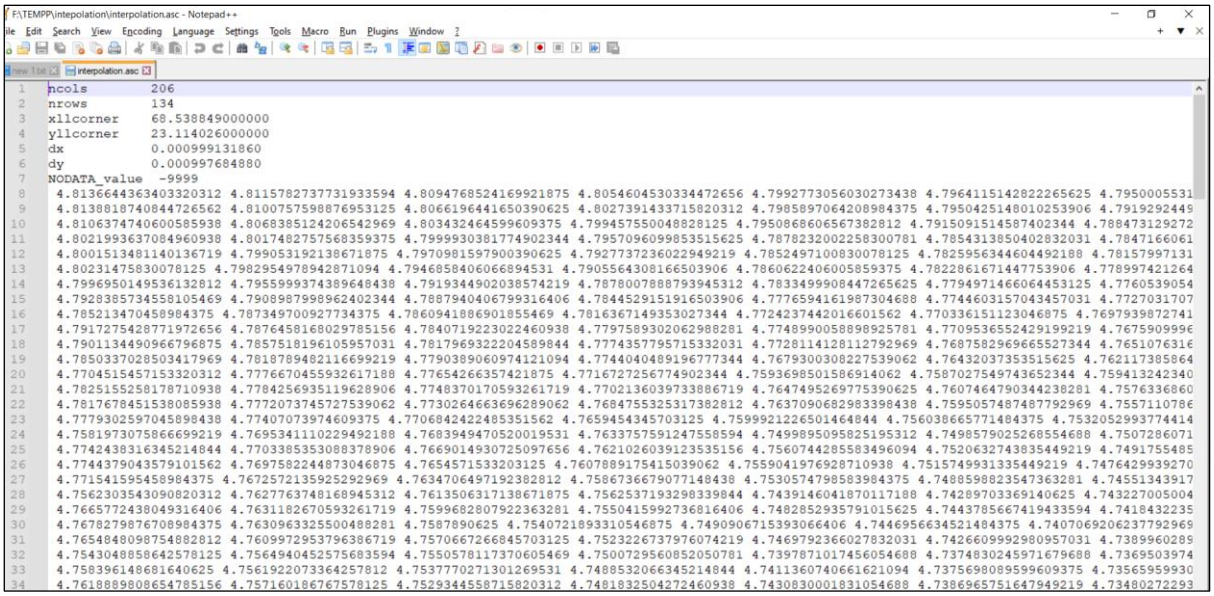


Give input layer as Interpolated file. Save file into drive in ".asc" format. And click run.

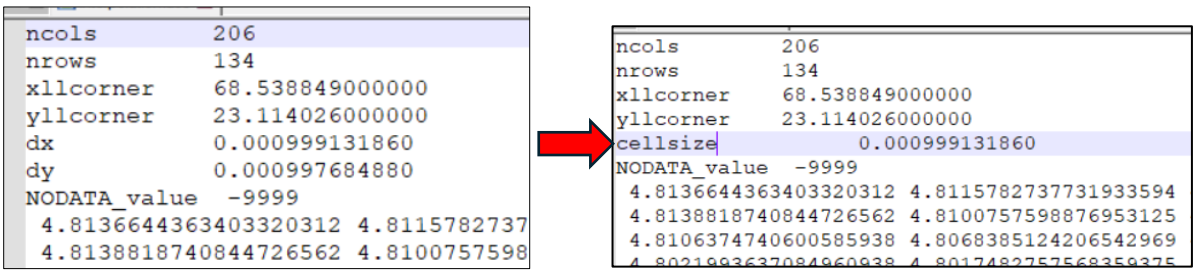


Step6: Edit ASCII data

Open that ascii file in notepad.



Delete “dy” row, and replace dx as “cellsize” dx→ cellsize



Save this ascii file and this will be use as C Grid in ComMIT model