Co-funded by the
Erasmus+ Programme
of the European Union

Co-funded by the
Erasmus+ Programme
of the European Union

DEVELOPMENT OF A TRAINING PROGRAM FOR ENHANCING THE USE OF ICT TOOLS IN THE IMPLEMENTATION OF PRECISION AGRICULTURE

2018-1-ES01-KA202-050709

T.P.3 – Proximal Data Mapping Exercise in QGIS

Authors: Vasilis Psiroukis, Spyros Fountas

Date: 31-10-2019

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Contents

1 Proximal Mapping Exercise in QGIS

You are given a set of two proximal datasets, a tabular file that contains point measurements of soil electrical conductivity data at two depths and another one with proximal reflectance data points. Additionally, you are given a grid layout (vector file) that you will use in the last step of the exercise to generate a grid-map of the parameters. Generate 2 map projects for electrical conductivity and 1 for the NDVI values.

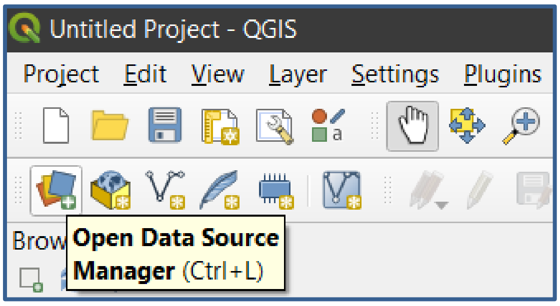
2 Tasks

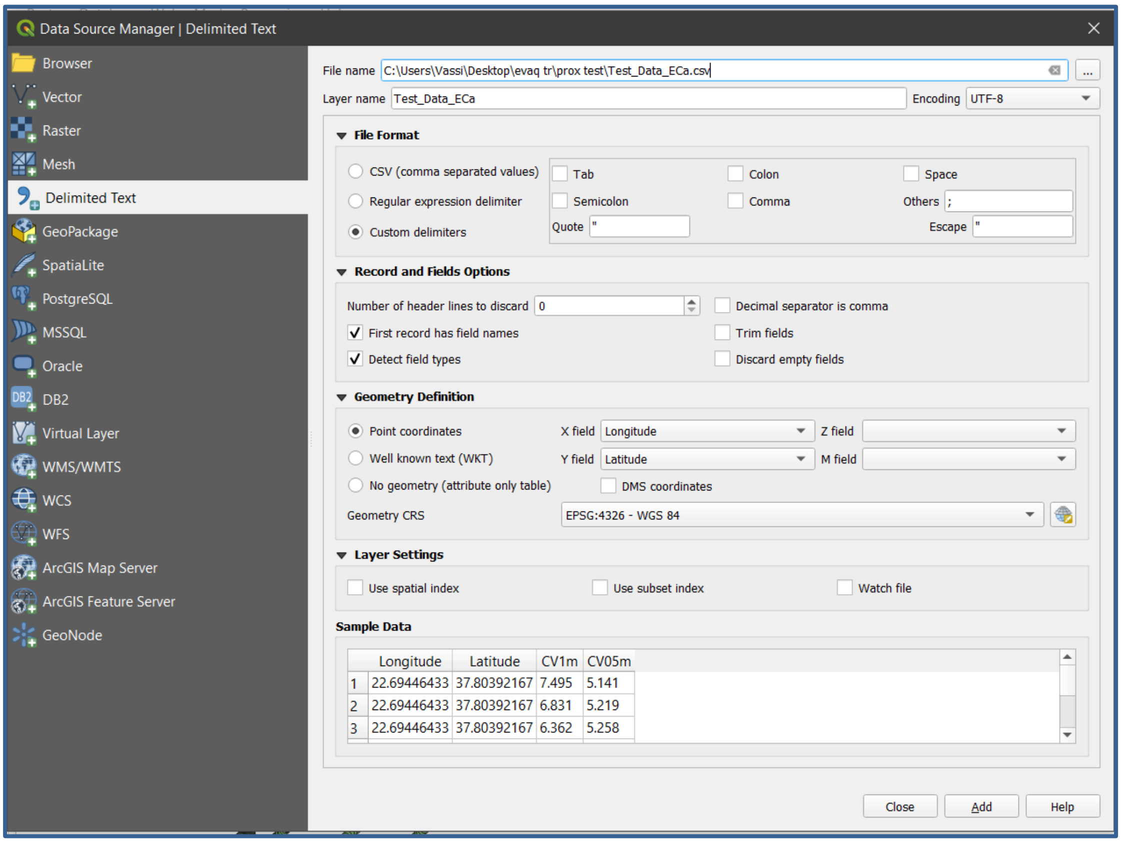
1) Import your data to QGIS.
2) Use you data (tabular files) to create a vector file with the data of each measurement.
3) Generate the boundaries for the field of the measurements, by creating a new polygon vector file.
4) Filter your data for potential outliers.
5) Perform data interpolation using the vector file you created, to generate a constant surface of data values (raster file), using the boundaries' file of step 3.
6) Use the raster file that you created to generate a grid-map based on the grid file.
7) Customize your map by applying different classification and visualization methods.

3 Example on how to make a map of one dataset (ECa 1m depth)

The following section will provide analytical guidelines for the creation of a map project, similar to the ones asked in the introduction

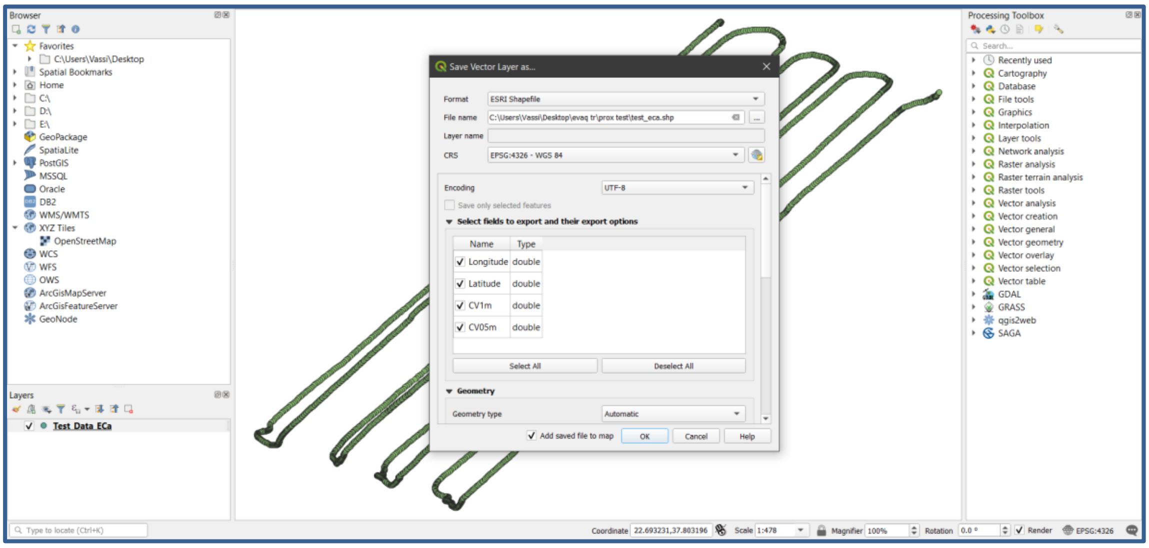
1) Import your data into QGIS by using the **Open Data Source Manager** and select to import a **delimited text file**. Then, browse to your file.



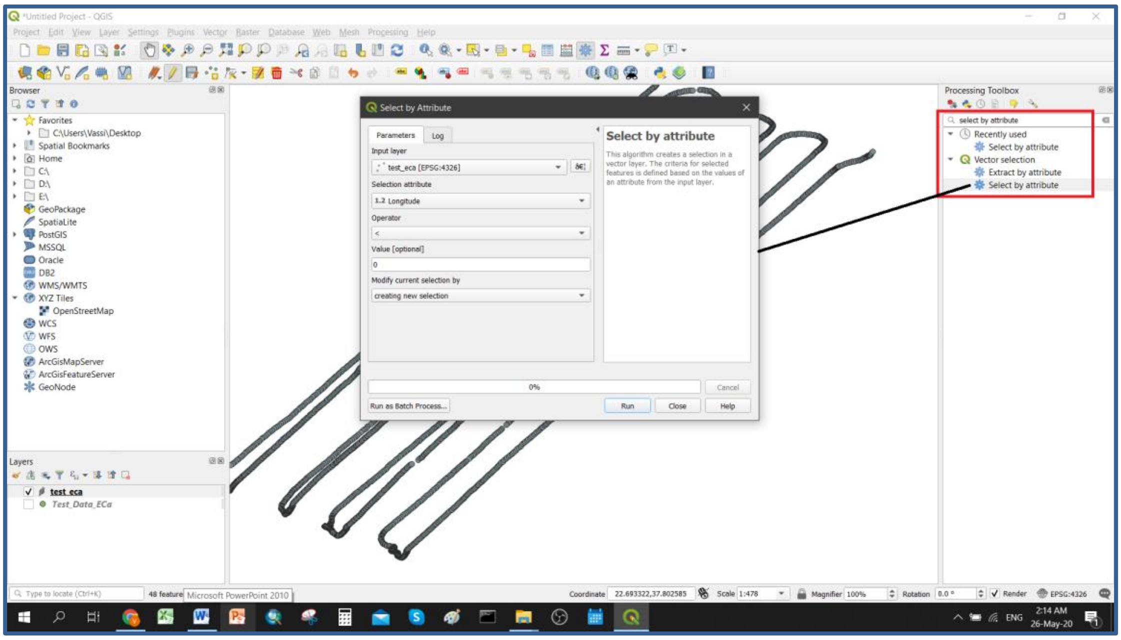


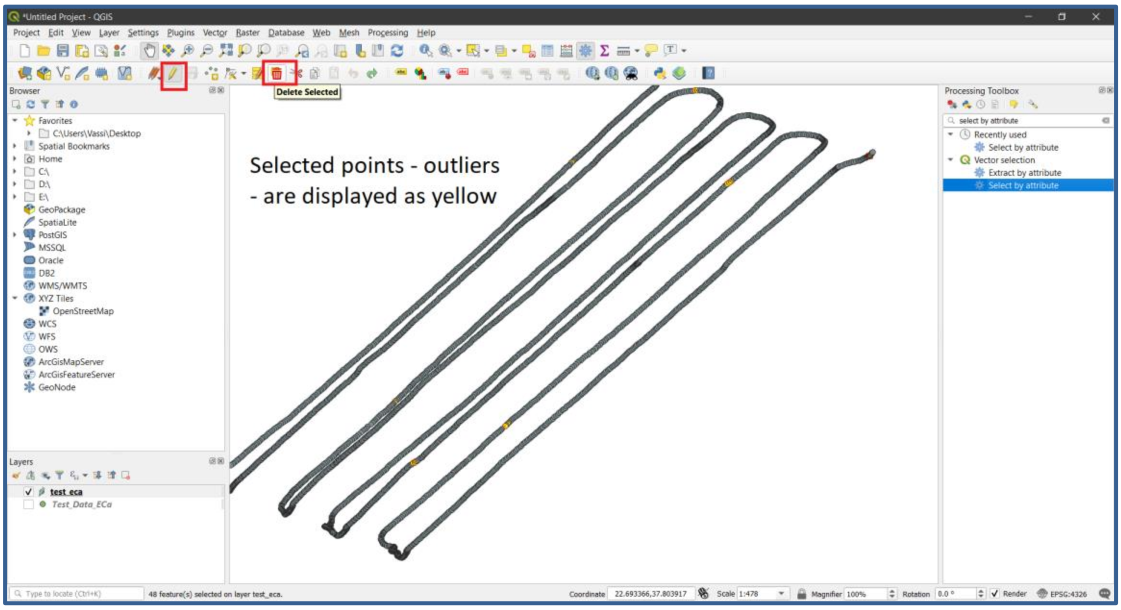
2) Now your file should have been added to your layers. The next step is to convert your tabular data into a shapefile (point vector file), by right

clicking on your file in the layers view (bottom left of your screen) and choosing **Export** -> **Save as features**. The following tab appears.



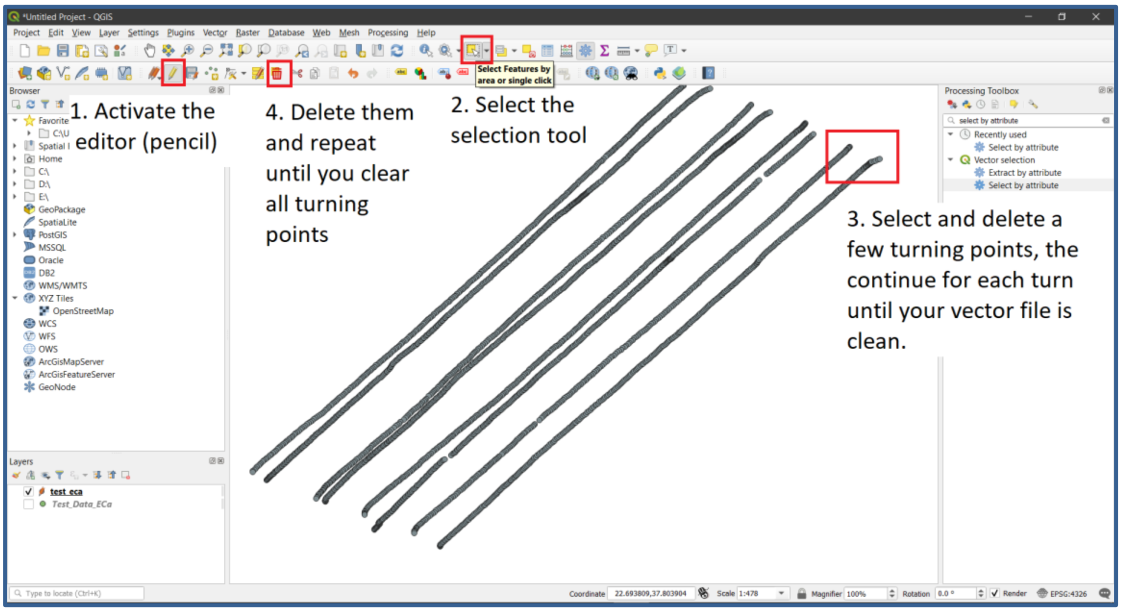
3) The next step is to delete the points that are essentially outliers. In ECa, it is usual that the sensor scans the surface over a metallic object, resulting in false measurements. To filter this kind of obvious outliers, we can simple search for the tool **select by attribute**, select all points with negative values of ECa, and the activate the toggle editor to reveal the **delete selected** option and delete our outliers.



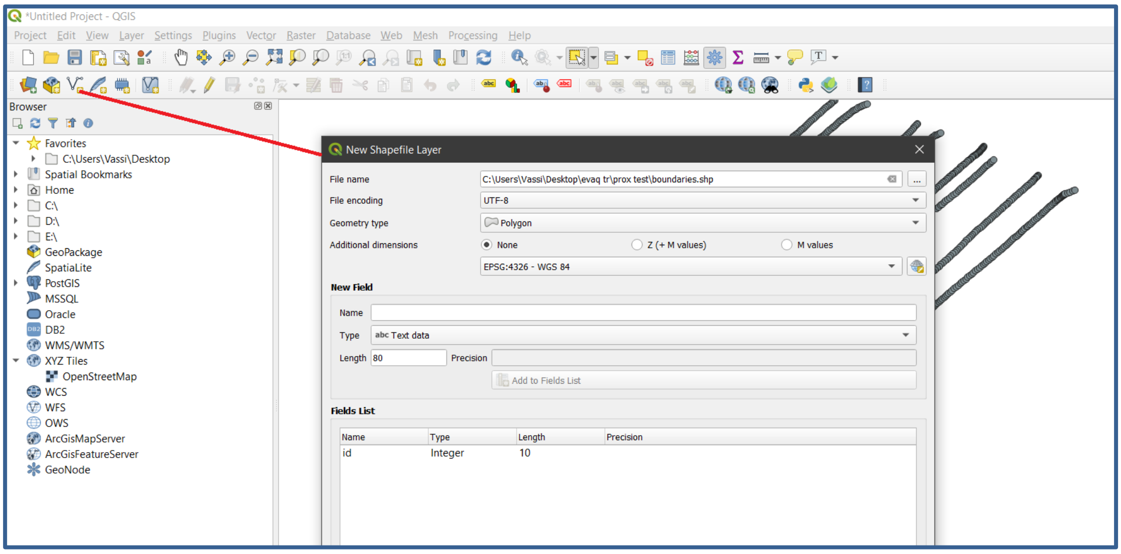


Important: In this example, we selected to clear the values for ECa at 1m column. If we were working with ECa at 0.5m, we would repeat this process for that column as well. Finally, for NDVI Values, you have to delete all values that are **below 0.2 and over 1**, since this is the NDVI range of vegetation.

The final step is to delete all points when the sensor was logging measurements while outside the field, in our case when the ATV that was pulling the sensor was turning. This is done by once again clicking on the **toggle editor** to activate it, selecting all the out-of-field points and deleting them. Once you are done, click the **editor** again, select **save for all layers** (your changes are not saved otherwise), and then click one last time to close the editor.

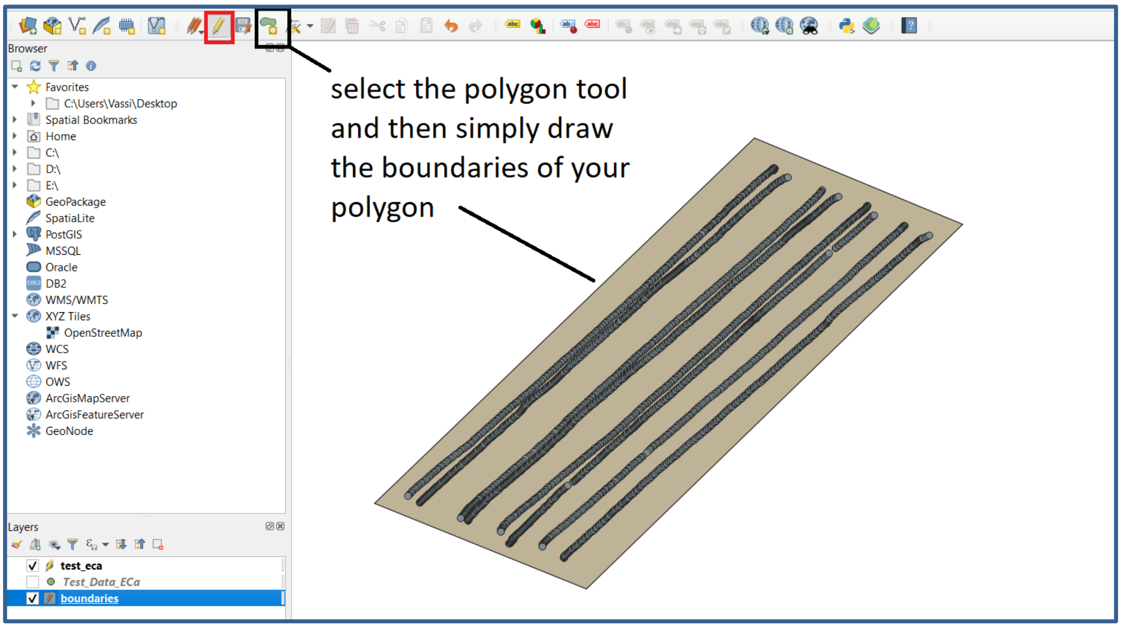


4) Now we have completed the steps to prepare our vector file. The next step is to generate the boundaries of our field. This can be easily done by creating a **new shapefile layer**, and specifying that we need a polygon file.

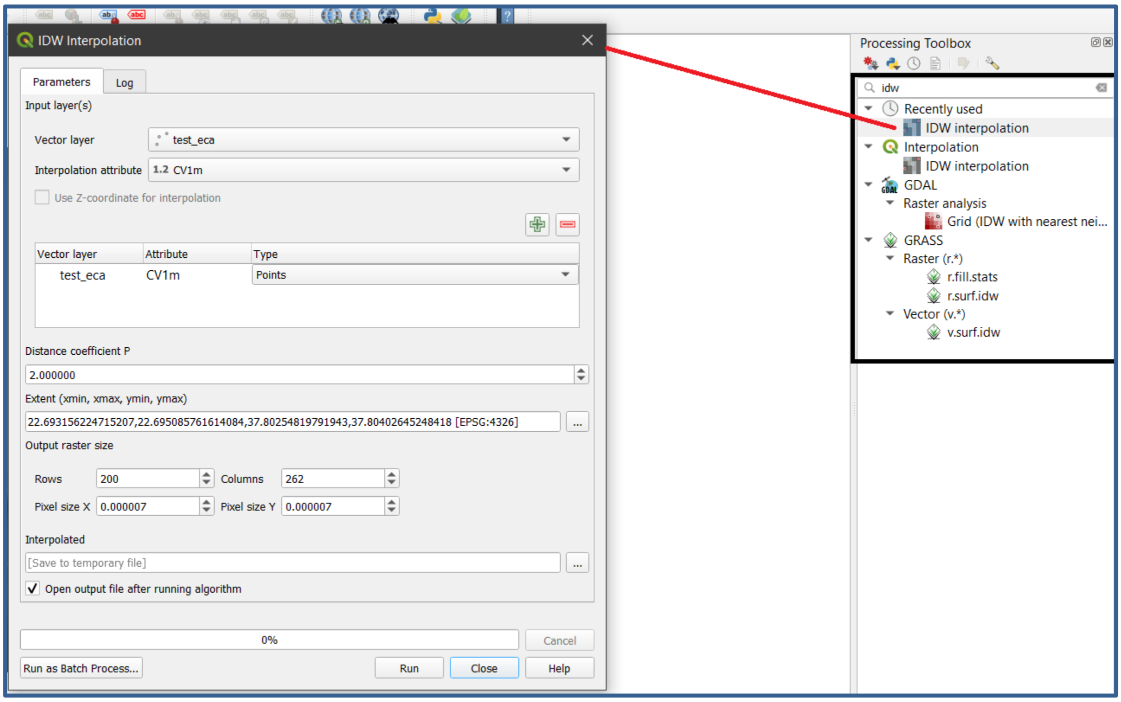


Note: You can add a basemap to check where your points are (i.e. the QuickMapServices plugin for QGIS), however, keep in mind that these basemaps often have slight offsets, and it is generally preferred to generate boundaries that include your data.

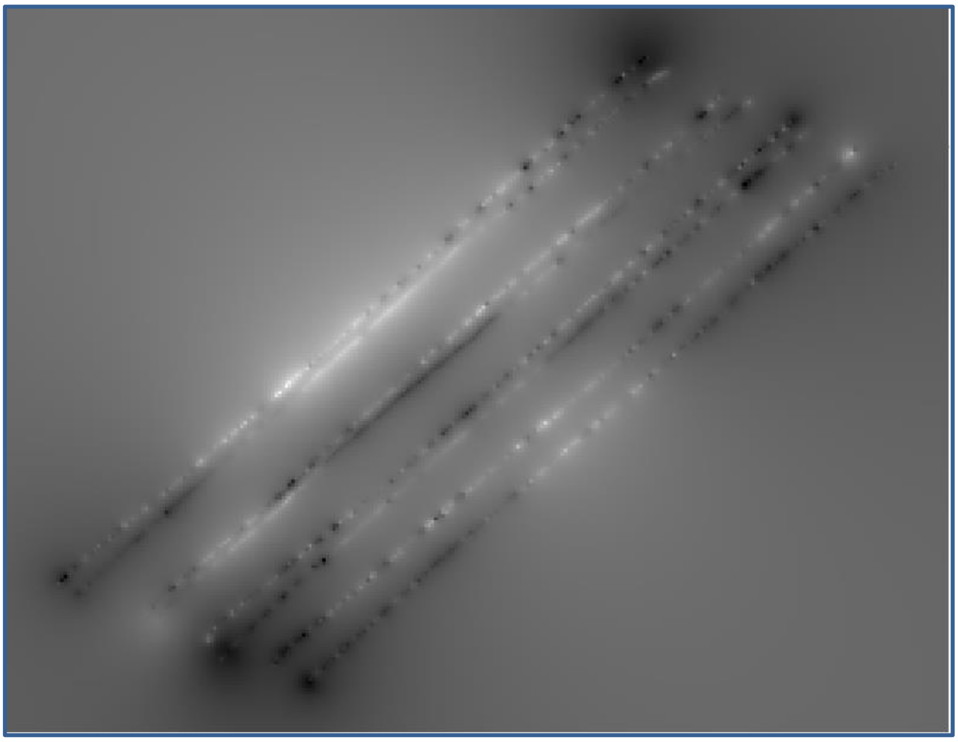
Then, activate the editor once again, select the **add polygon feature** and draw your polygon. Then, double click to finish, save your edits and close the editor.



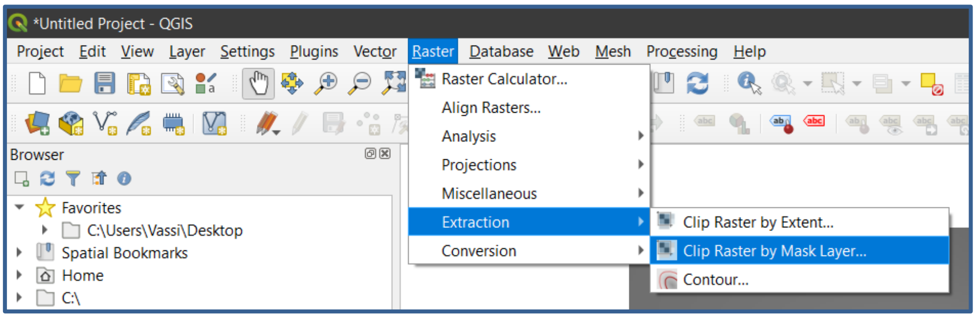
5) The first map will be generated from the IDW interpolation of our vector file, inside the boundaries of our boundaries polygon. Search for IDW in the toolbox. In our example, we generate a grid 200 rows (colums are specified automatically from the geometry of our boundary).



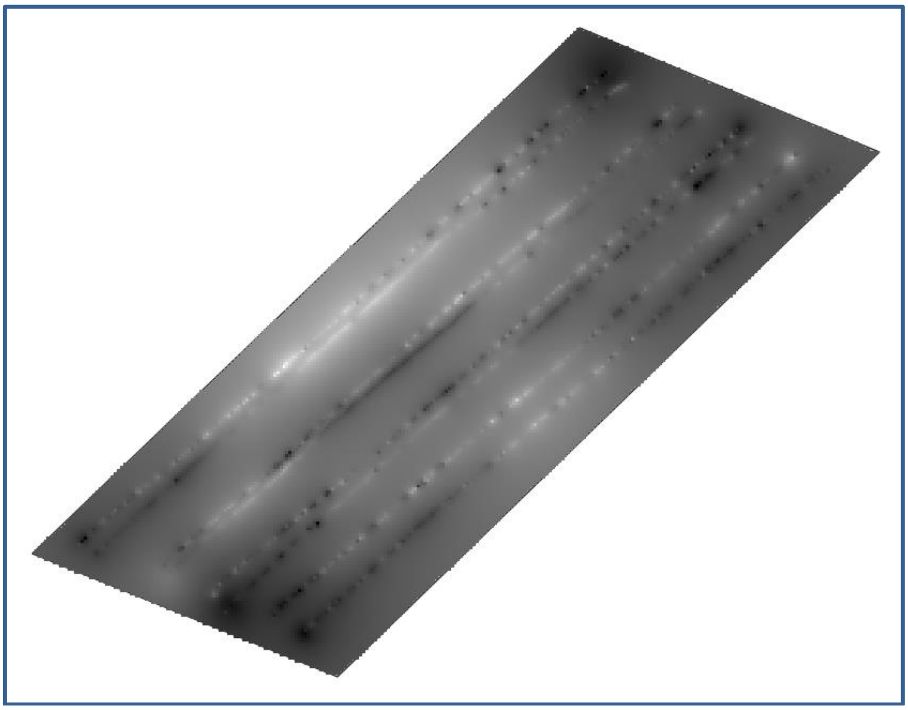
The final raster looks like this:



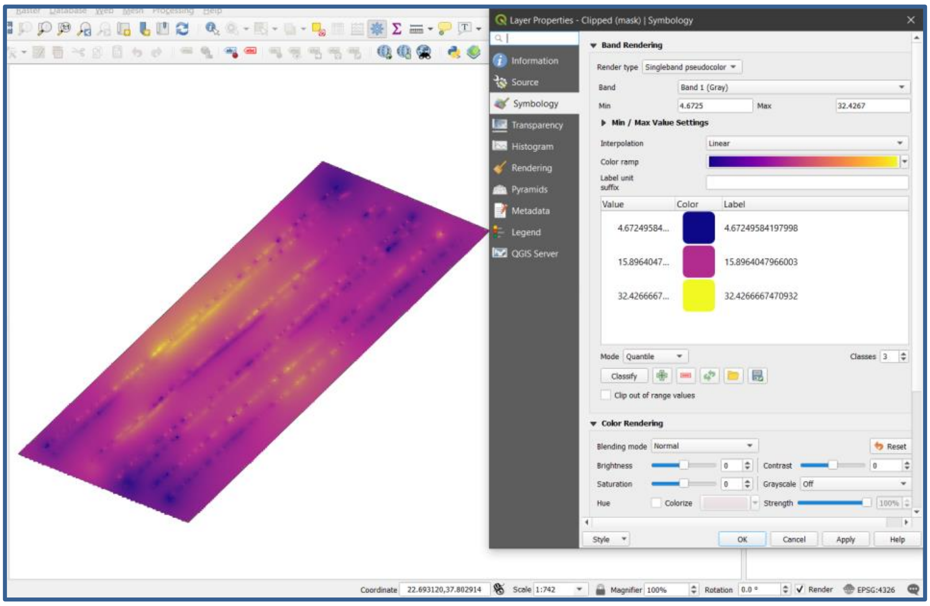
The geometry is rectangular, and contains the complete boundaries file. We can simply clip it, by using **Raster** -> **Extraction** -> **Clip Raster by Mask Layer**.



The final raster should now look like this:

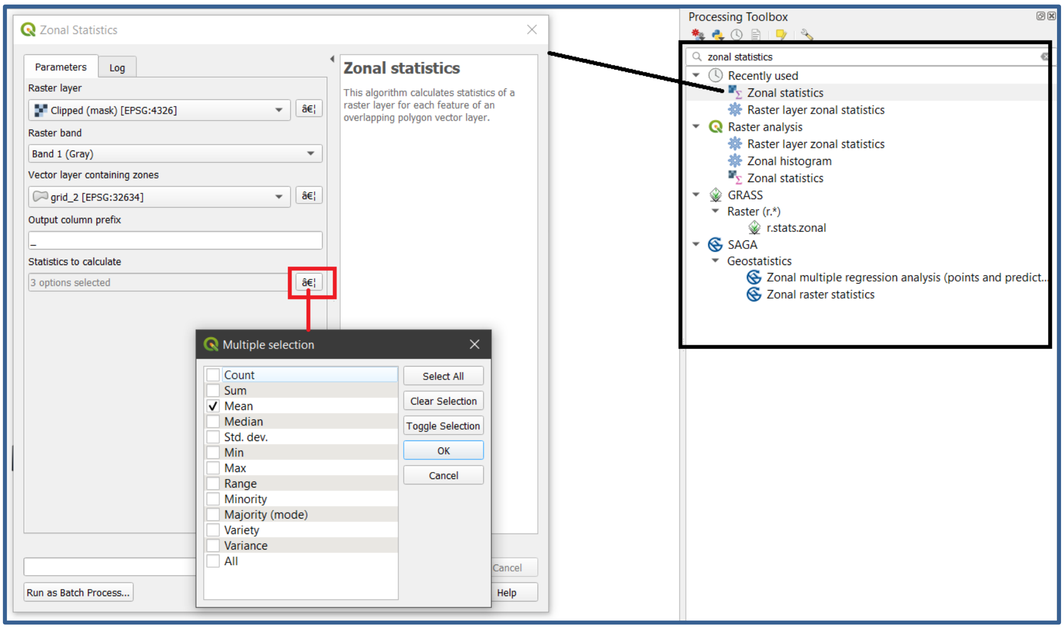


6) The next step is to visualize our data better. We can choose from several options by right clicking on our final raster, and selecting **Properties** -> **Symbology**. Experiment with different number of classes and visualization elements, like the next example.



7) The final task is to generate a grid-map. First, you will need to import your grid file (only the one with the ".shp" format).Then, simply look for

the tool **zonal statistics**, and generate the grid-map using the mean value of our raster values.



This command creates a new column in your grid file, and in order to visualize the mean value of the column that we added, we have to go to our grid's **Properties** -> **Symbology** and select **categorized** as your label styling. Your final output should look like this.