The Rio de Janeiro State University - UERJ
Laboratory of Photogrammetry and Remote Sensing
The E-Foto project

Integration with GIS Software Platforms

Authors: Lia de Souza e Simões Figueiredo
Revision: Jorge Luís Nunes e Silva Brito

Introduction

Over the years the e-foto project has been developed and the need for integration with other Geographic Information Systems software became more evident. From this need several improvements have been made to the software so that now it is possible to save features in shape file and to save the ortho-images in Geotiff format. These file formats are commonly used for GIS processing and they are present in most of the software used for this purposes.

In this tutorial we will explain some of the possible uses of the e-foto products in the generation of some other products in specific GIS software. For this demonstration we chose the Quantum GIS software platform, the QGIS, which is also free software.

There are three modules in the e-foto free software whose products integrate with other GIS platforms; they are the Stereoplotter module, the digital surface model module and the ortho-images generation module. In this tutorial we will see how to integrate those products with the QGIS and to generate other products, such as level curves and the rendering of cartographic features.

Contour Lines Generation

To generate contour lines using the e-foto products, first of all you should generate a DSM model, and interpolate it to a grid. To know how to generate and to interpolate a DSM model, please see its specific tutorial.

To use your grid in the QGIS in a simply way you should save your DSM grid as **ASCII 3D points (no index)** as in Figure 1 below.

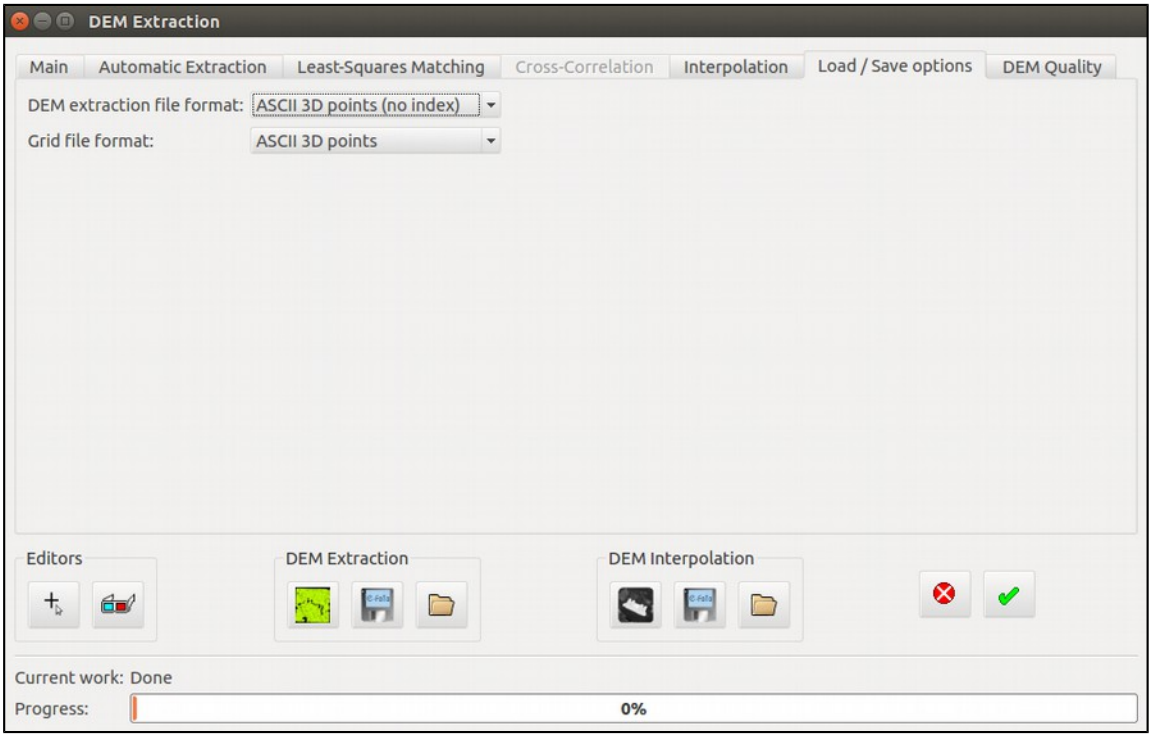

Figure 1 – File format for the DSM extraction

After you generate your model you should go to the QGIS software to proceed to the contour line extraction. In this tutorial we are using the version 2.14 - Essen of the QGIS.

When you open the QGIS you must click on the **Add delimited text layer** tab in the lateral menu (Figure 2).

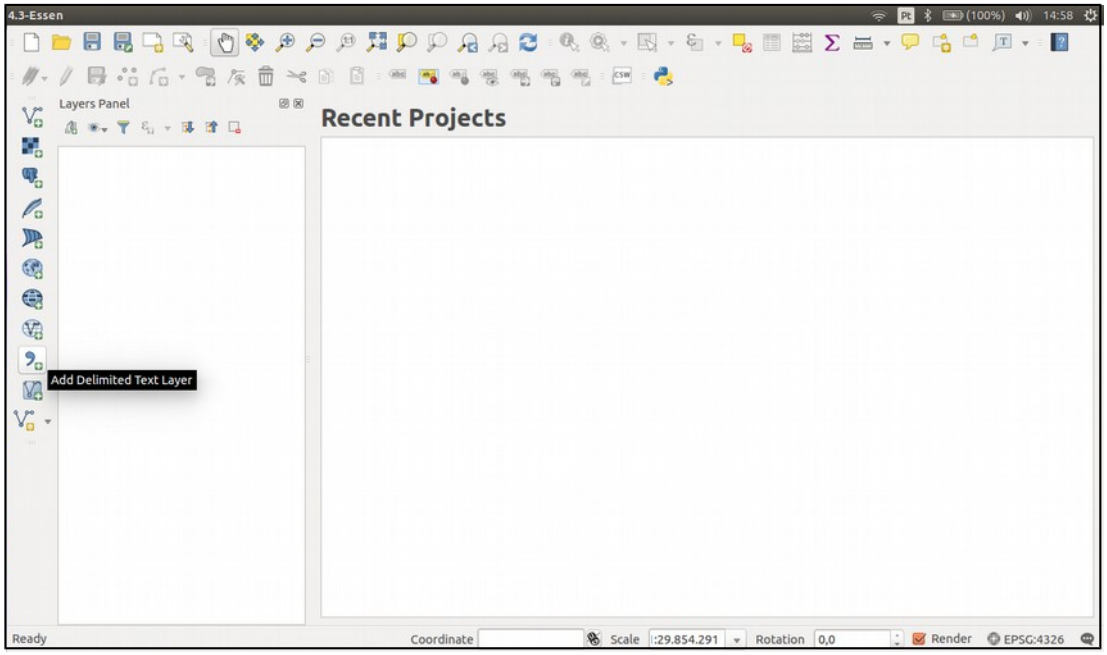

Figure 2 – Main screen of the QGIS

When you click on this button it will open a new window for you to load your points file (Figure 3).

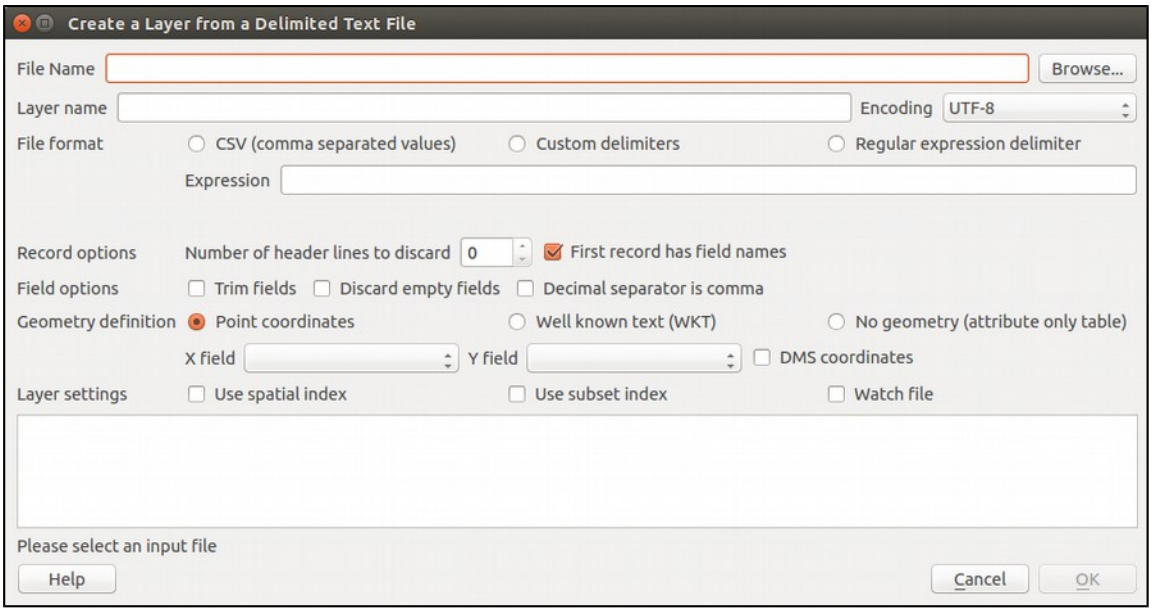

Figure 3 – Creating a layer from a delimited text file

In the list below you will see a quick explanation for all the fields in this window and how to change them to use the e-foto grid coordinates. The result of all the changes can be seen in Figure 4.

- **File Name:** in this box you will browse and open your e-foto file in the .xyz format;
- **Layer Name:** you can choose the name you want for your layer. By default the QGIS will name the layer with your file name;
- **File Format:** In this option you have to choose **Custom Delimiters** and then you choose the **Tab delimiter**.
- **Record options:** You have to disable the option **First record has field names**;
- **Field options:** all options have to be disabled;

- **Geometry definition:** you will mark **Point Coordinates** and the software you able you to choose the **X and Y field**, they are, respectively, fields 1 and 2.

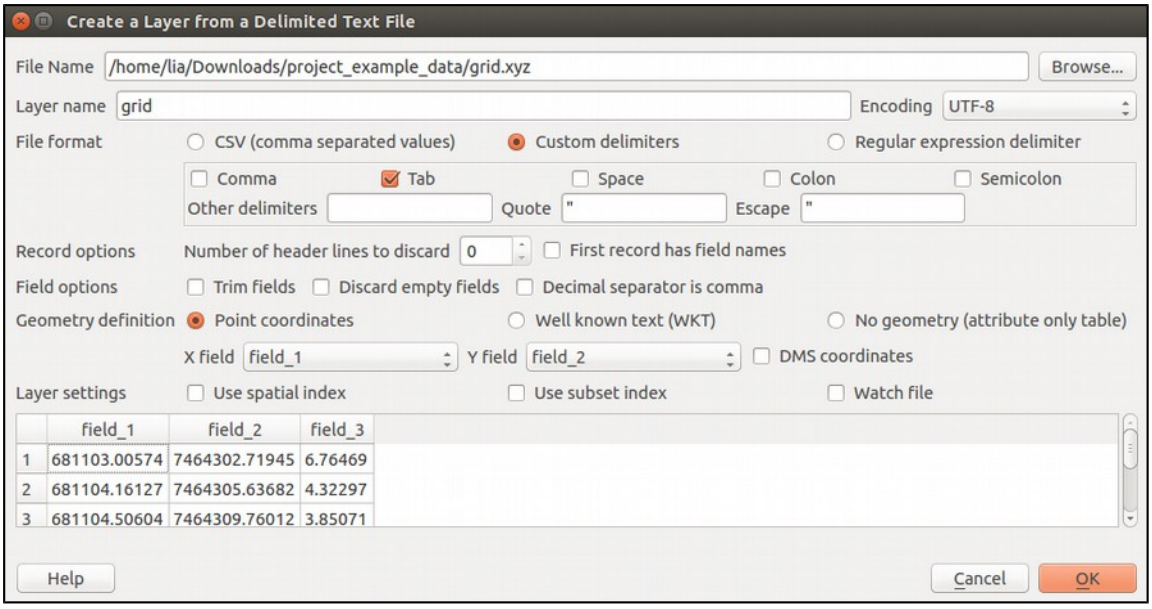

Figure 4 – Result of all the changes in creation of a layer window

After you confirm the layer creation the software will ask you the Coordinate System for the layer. By default the e-foto saves the points in the WGS84 coordinate system. The result of the points importation can be seen in Figure 5.

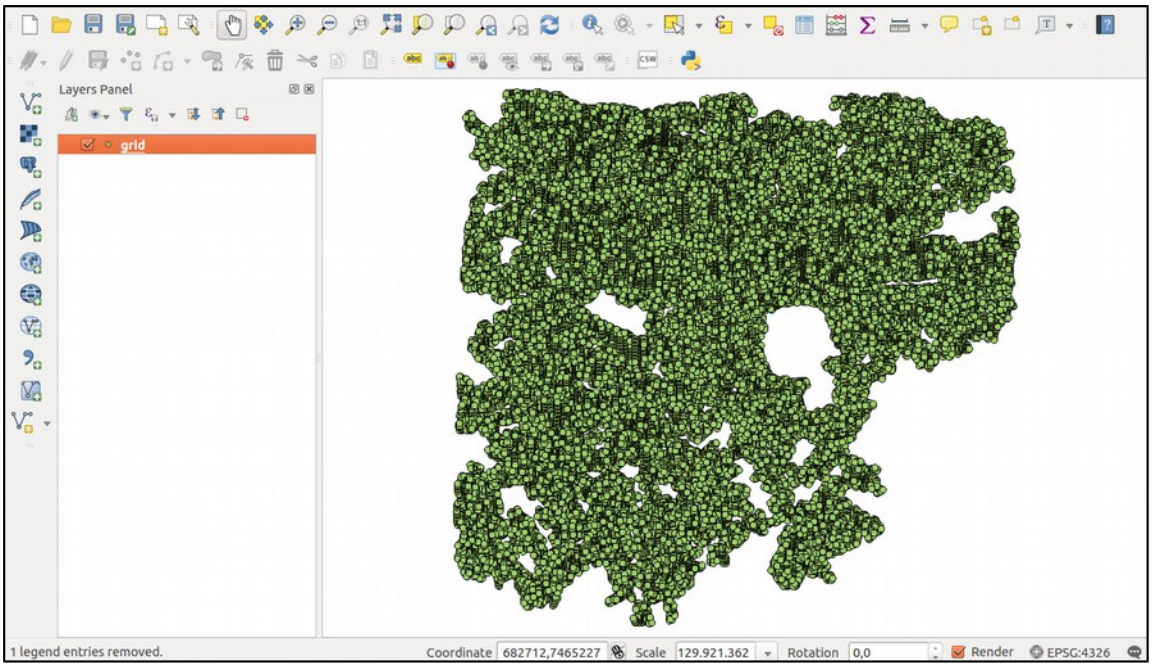

Figure 5 – Points of the DSM file in the QGIS

After loading your DSM points in the QGIS software you have to save those points in shapefile format (*.shp). To do that click on the name of the feature with the right button of your mouse and choose **Save As** (Figure 6). The software will open another window for you to choose the format of your file and its name (Figure 7).

Integration with GIS Software Platforms

Authors: Lia de Souza e Simões Figueiredo
Revision: Jorge Luís Nunes e Silva Brito

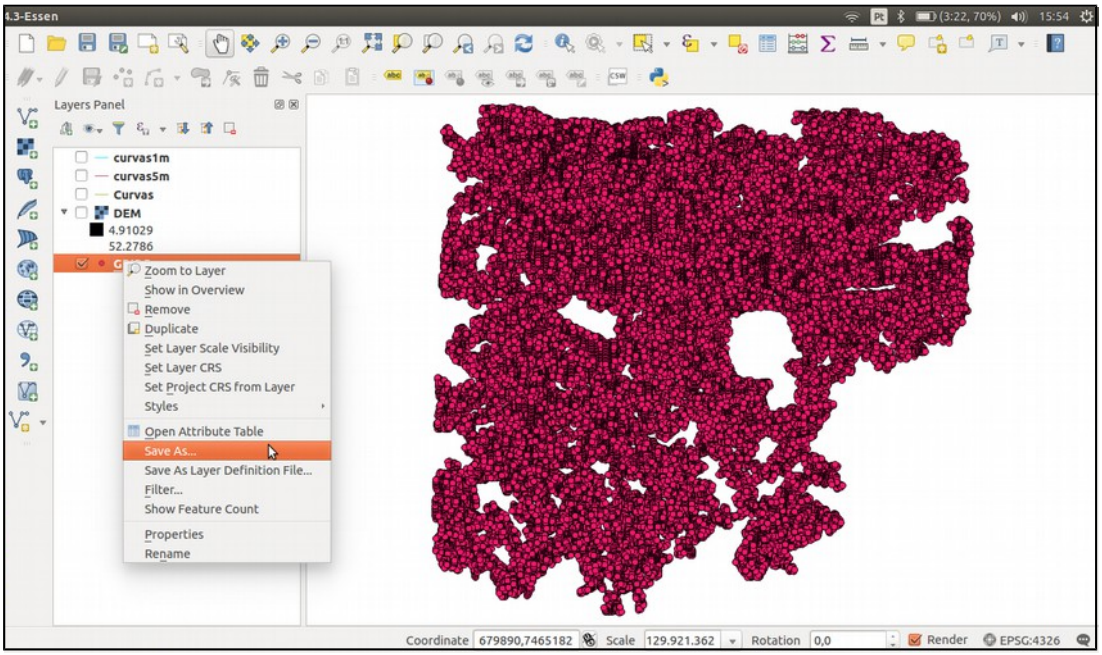

Figure 6 – Saving points as shapefile

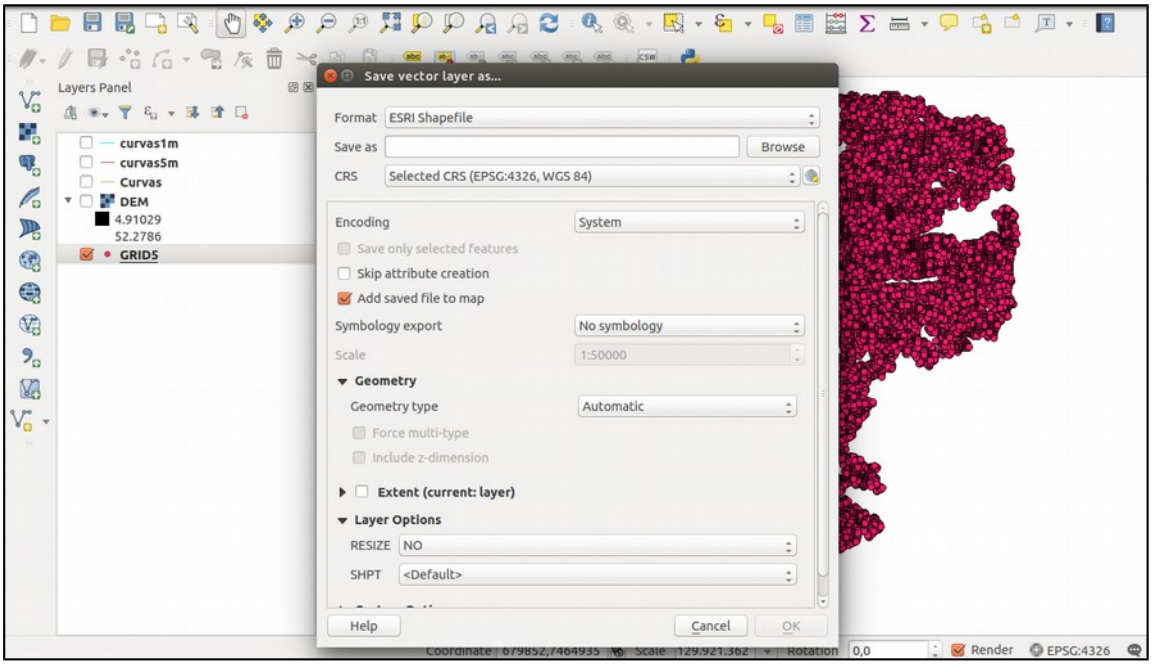

Figure 7 – Saving points as shapefile

After that you must generate a DEM file with those points. In the **Raster Menu**, go to **Analysis** and click in **Grid (Interpolation)**, as in Figure 8.

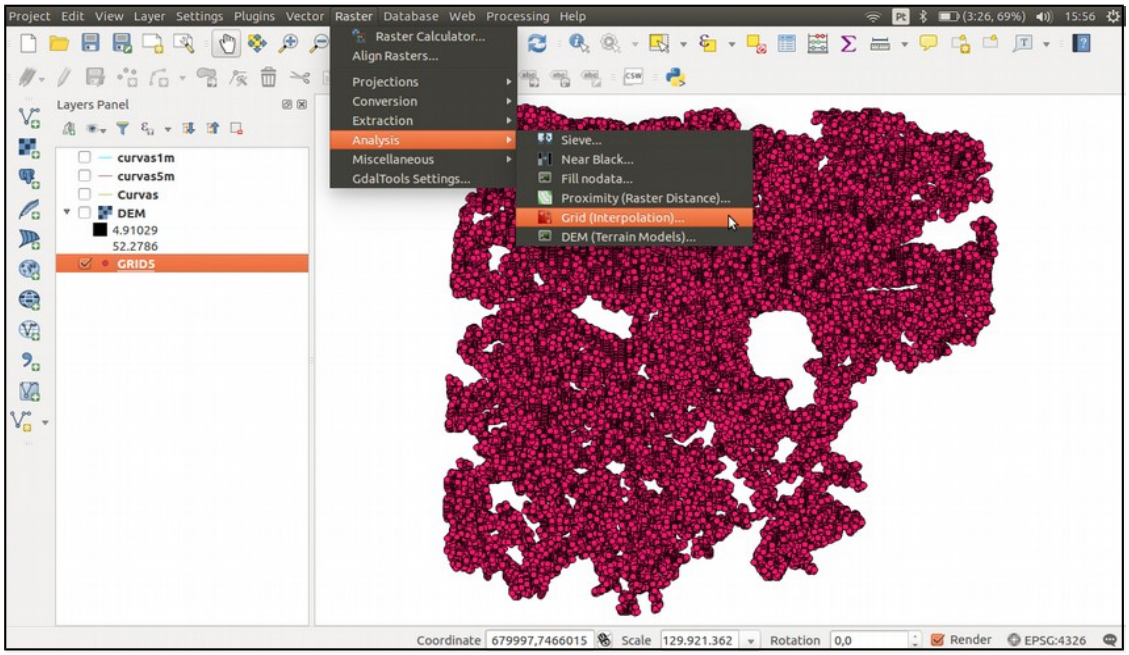

Figure 8 – Generating a Grid

The software will open another window for choosing the **Input File**, the **Z field** and the **Output name**. The Input File is your points shapefile and the Z field is the **field_3**. (Figure 9)

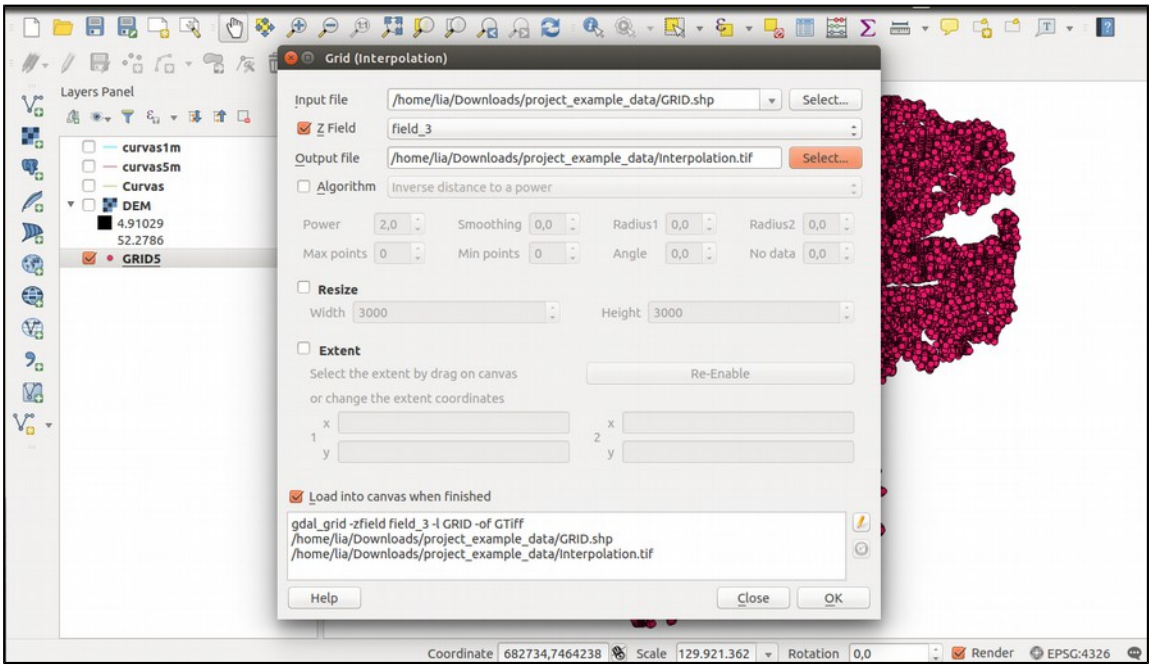

Figure 9 – Generating a Grid

The QGIS will generate a *.tif file with your interpolation and will show it in the screen (Figure 10). You will also see the min and max altitude of your model.

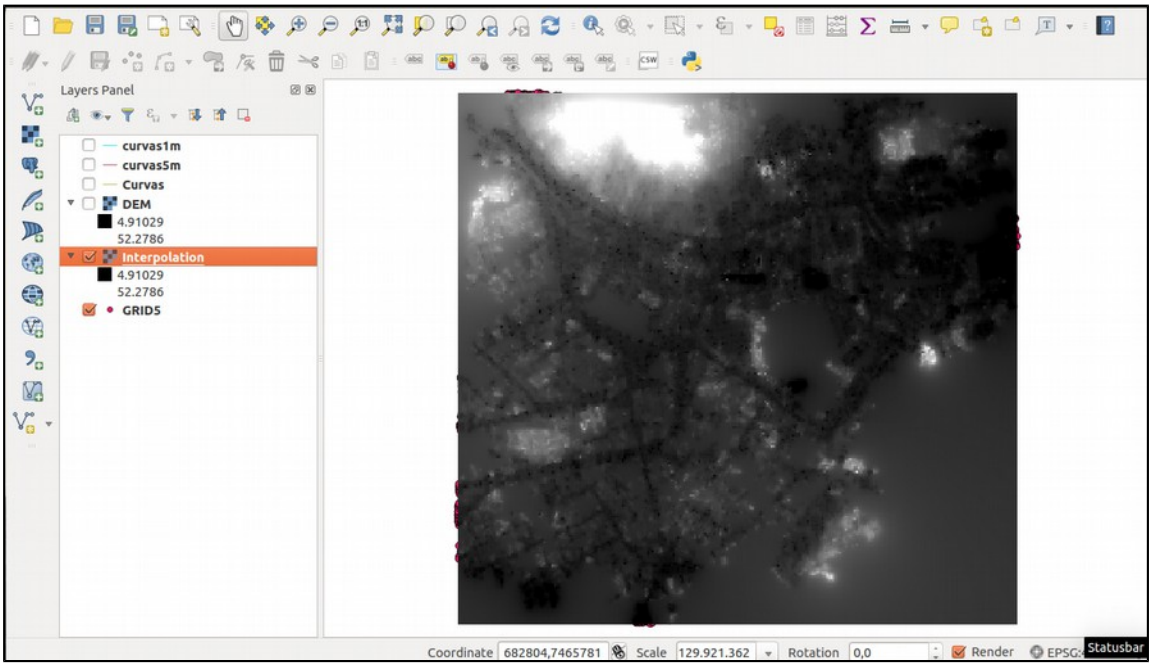

Figure 10 – Grid interpolated

After that we can proceed to the level curves extraction. In the menu **Raster** you have to choose **Extraction** and then **Contour** (Figure 11). The software will open another window to choose your **Input File**, the name of the **Output File**, the **interval between contour lines** and the **Attribute Name** (Figure 12). For this example we will extract the with 1m of interval between lines

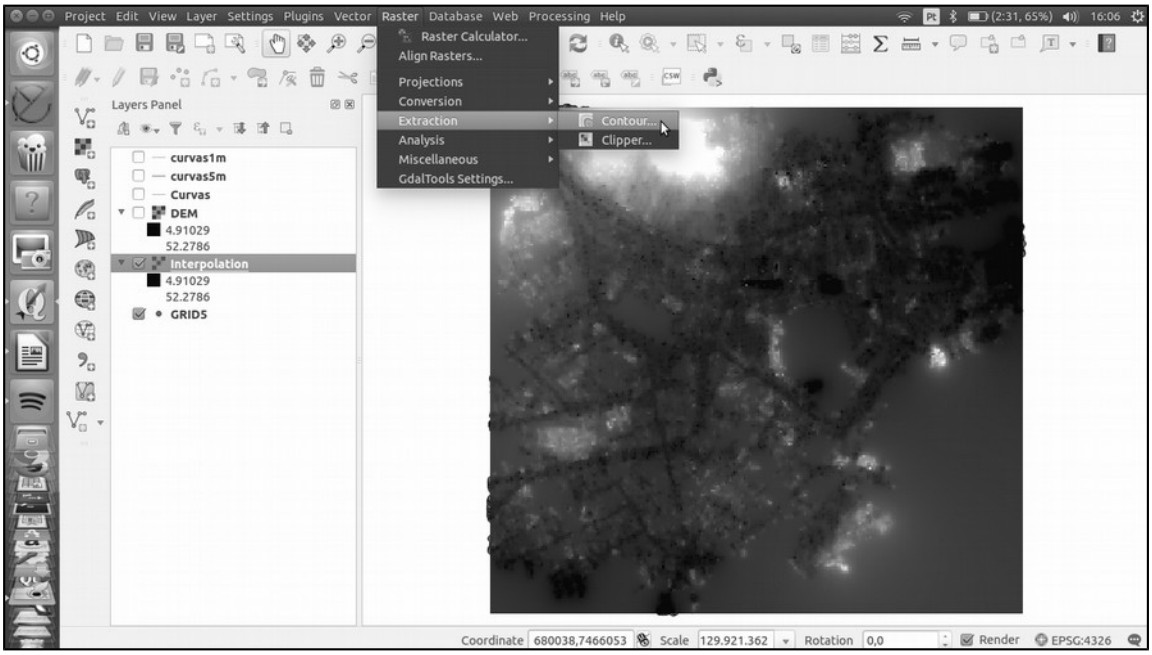

Figure 11 – Contour lines extraction

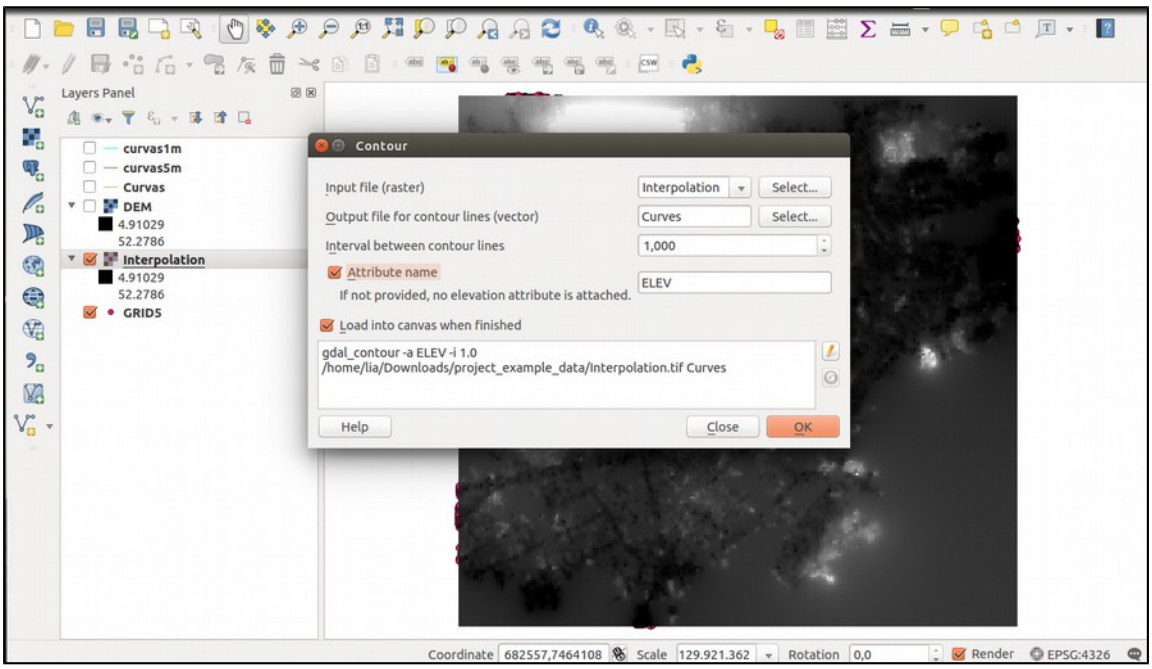

Figure 12 – Contour lines extraction

The software will show the results in the screen (Figure 13). If you want you can load your ortho-image previously saved in *.tif and see the contour lines in the ortho-image (Figure 14). To know how to generate and save the ortho-image in Geotiff format, please see its specific tutorial.

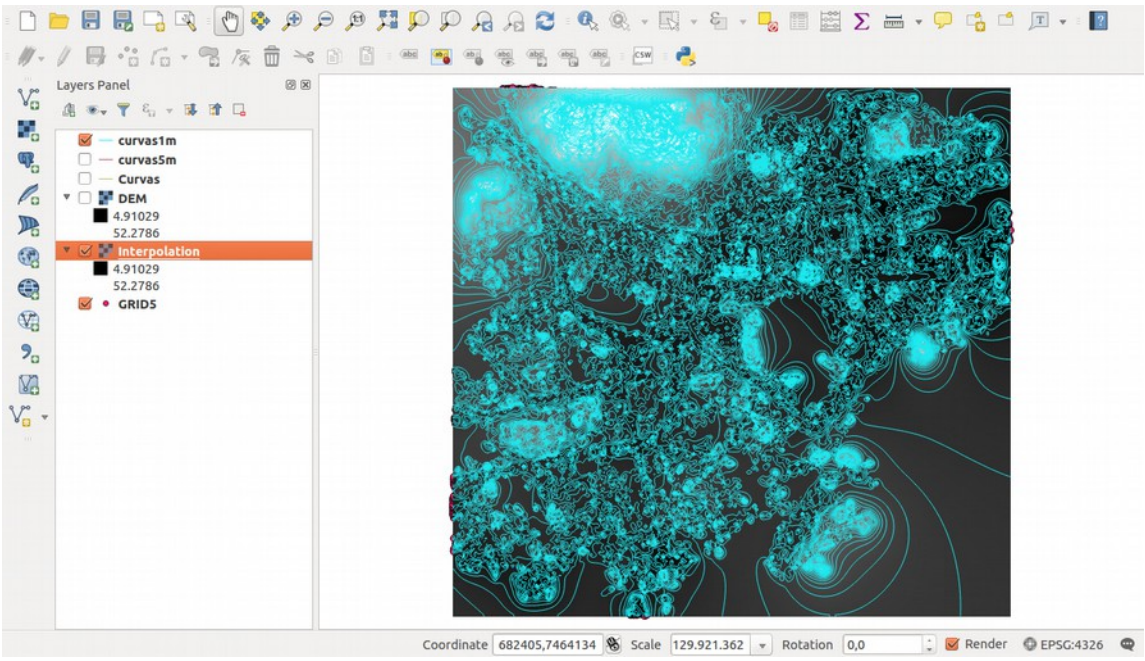

Figure 13 – Contour lines

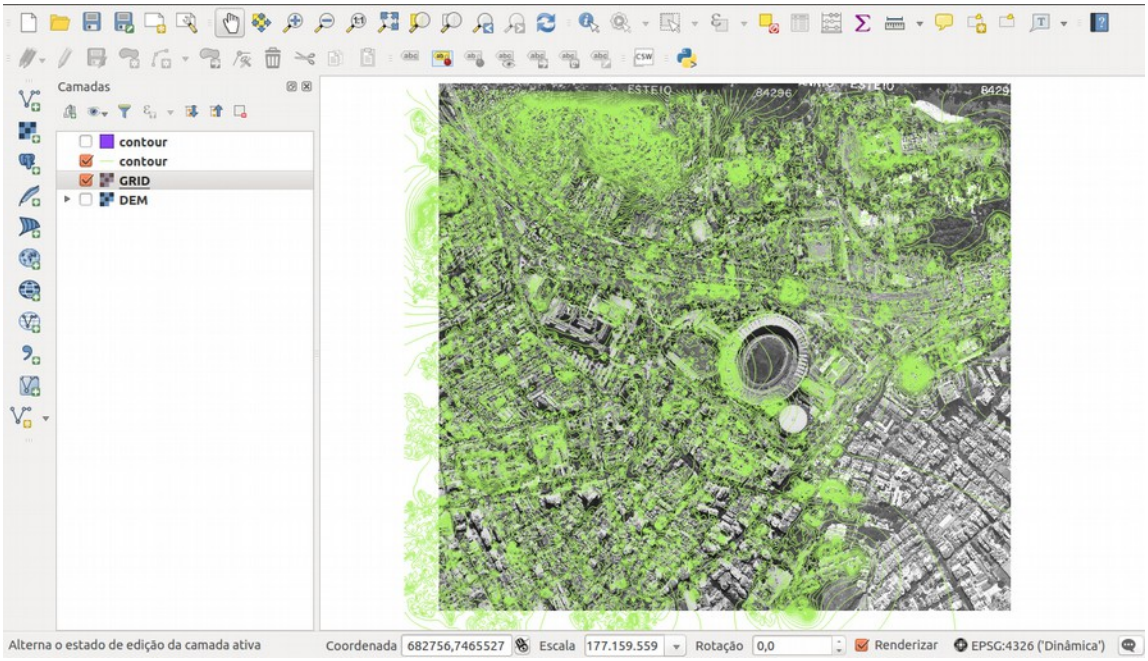

Figure 14 – Contour lines in the ortho-image

Using the stereo features

To use the features generated by the e-foto you should generate them in the stereoplotter module. To know how to generate features using the stereo-pair, please see its specific tutorial. To use your features in other GIS softwares you must export your measurements in the *.shp format, as explained in the stereoplotter tutorial.

In the QGIS you should click in Add Vector Layer in the main Menu, and then select your shape files (Figure 15). The features will be shown in the screen (Figure 16).

With the features loaded you can edit them, change the Datum, create other features, etc.

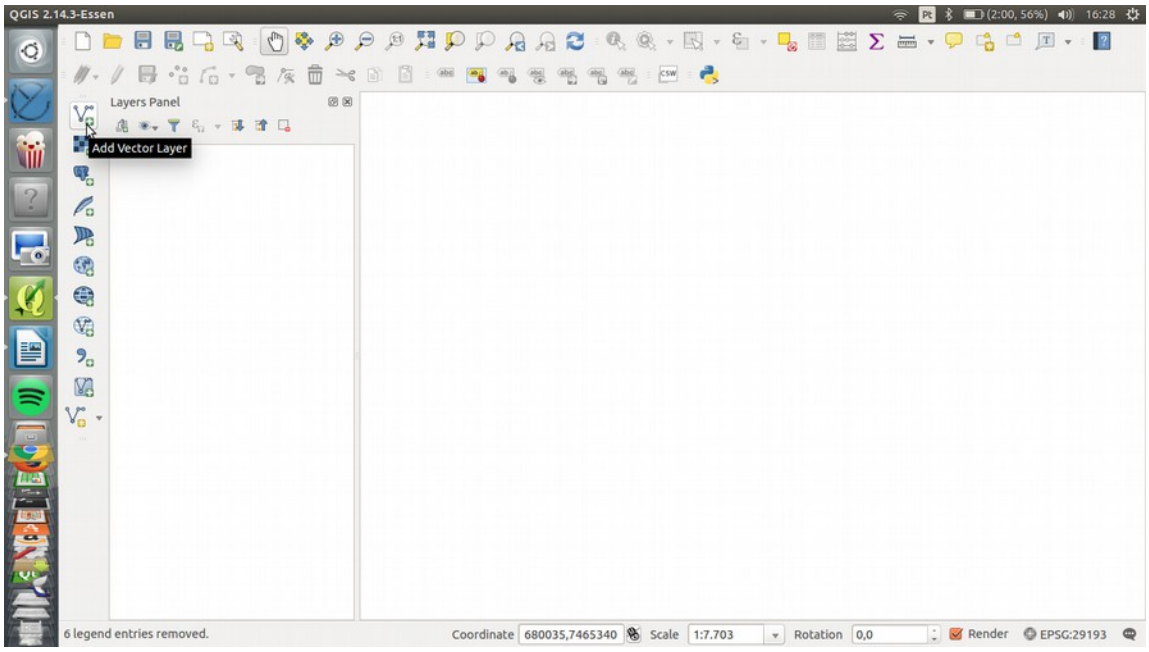

*Figure 15 – Opening the *.shp features*

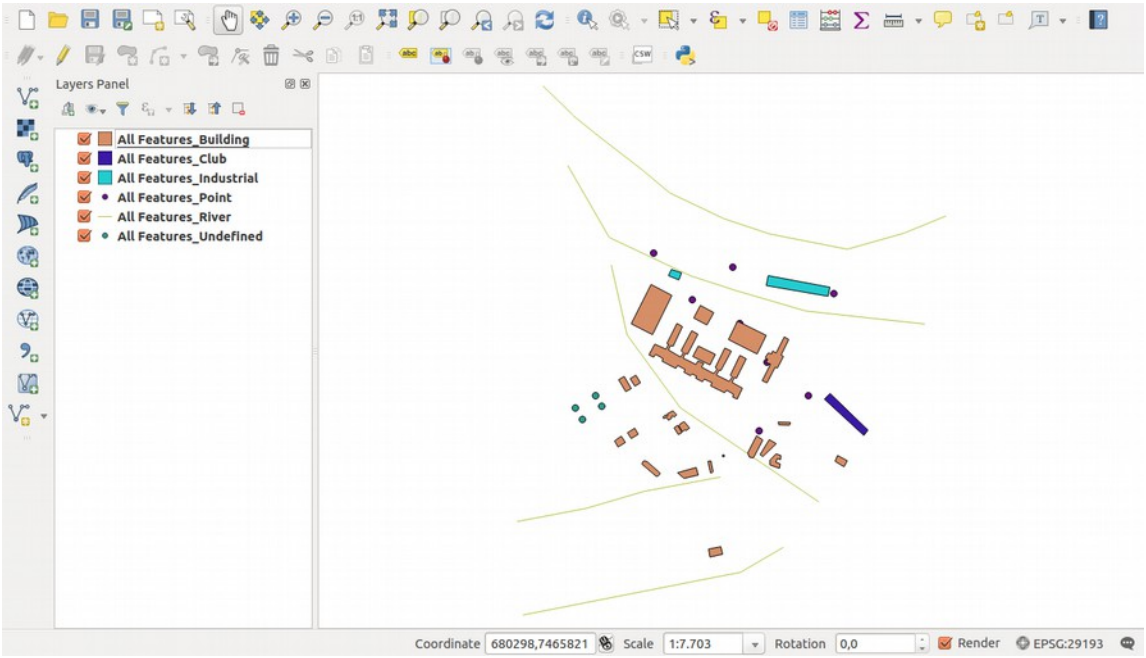

Figure 16 – Shapefile features

Any contribution for correcting and improving this tutorial is very welcome. Please send your comments and/or suggestions to the e-foto team at http://www.efoto.eng.uerj.br/forum

<END OF TUTORIAL>