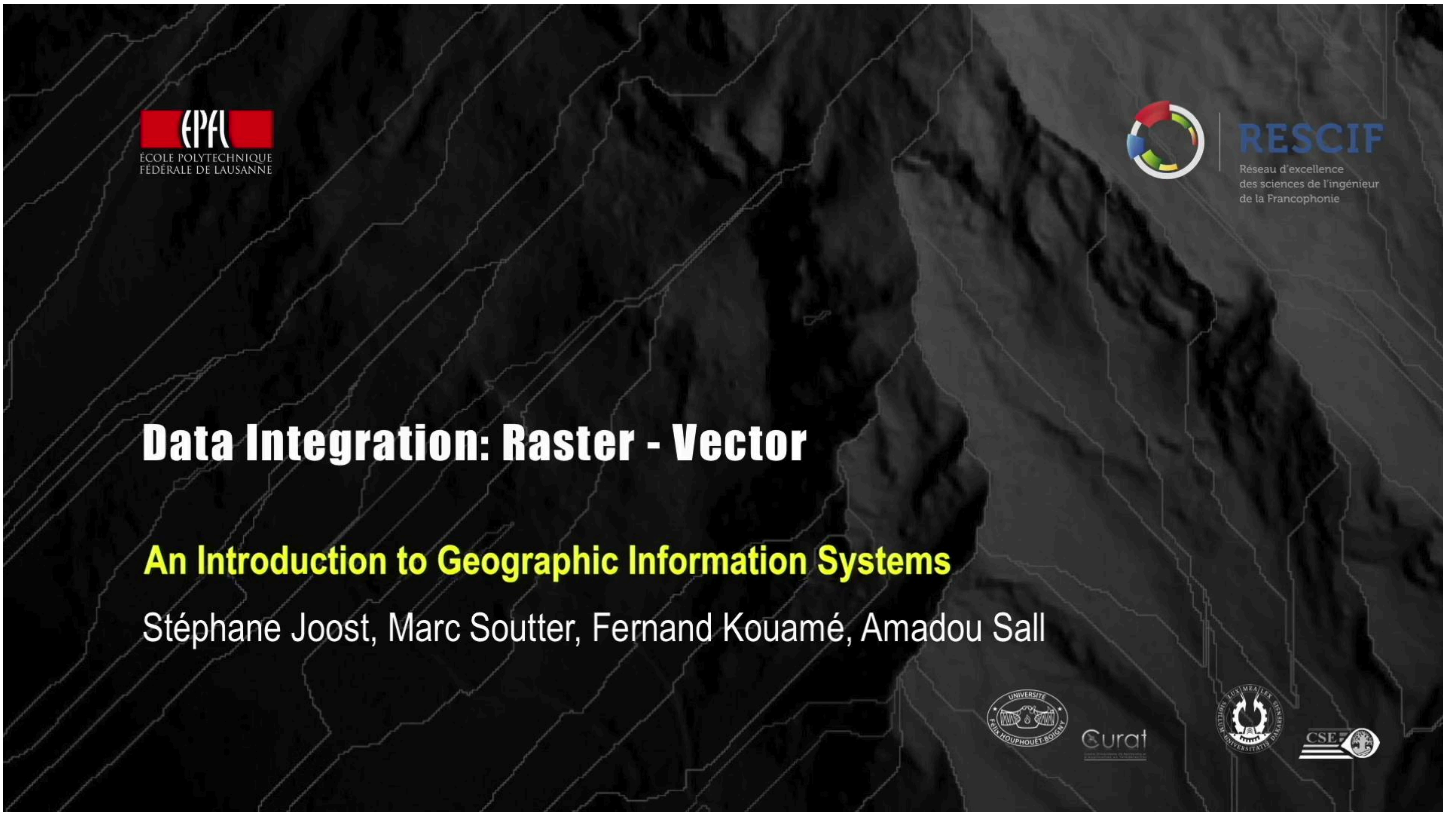
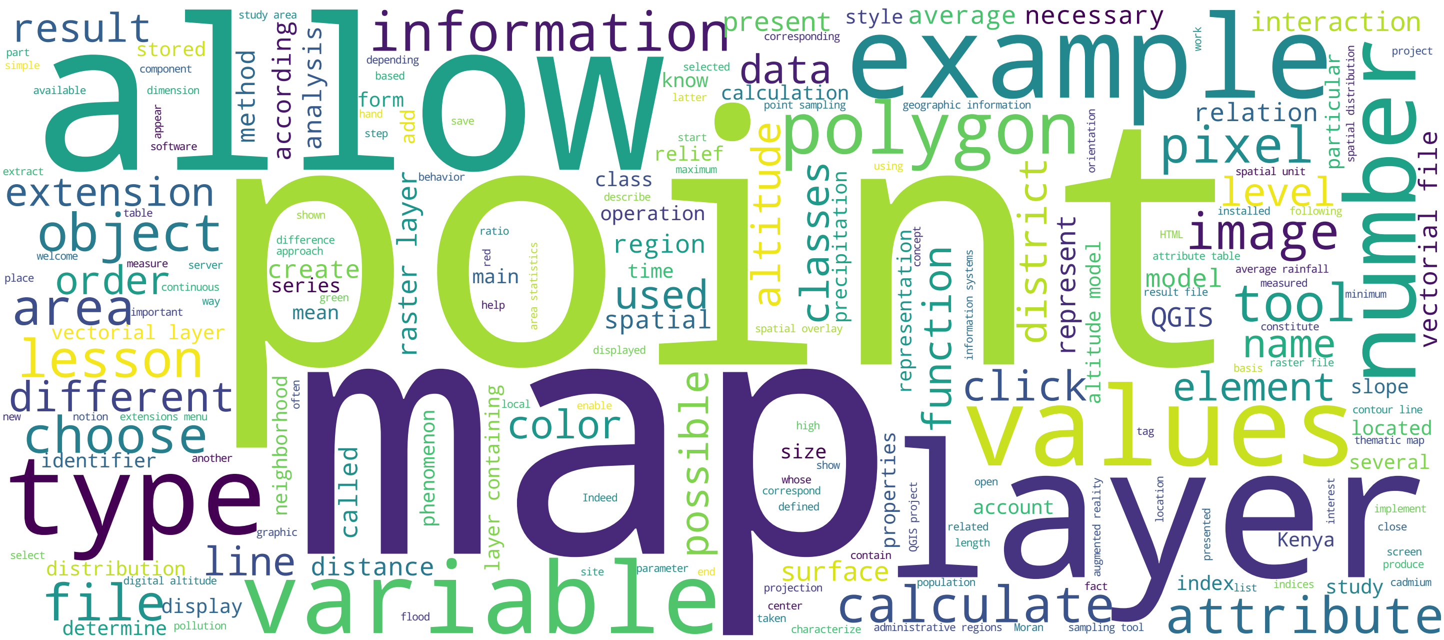
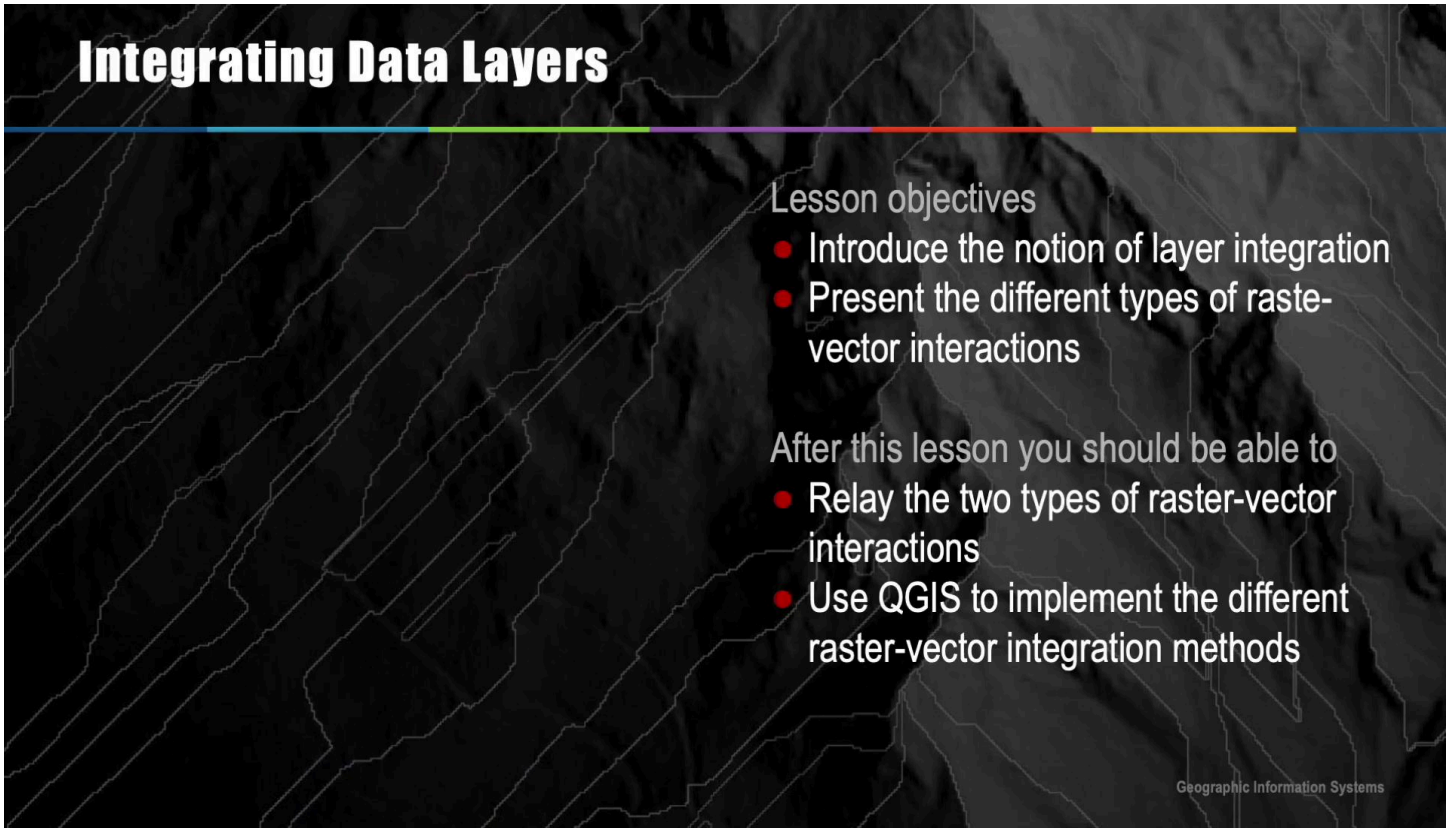




Search MOOC

Video

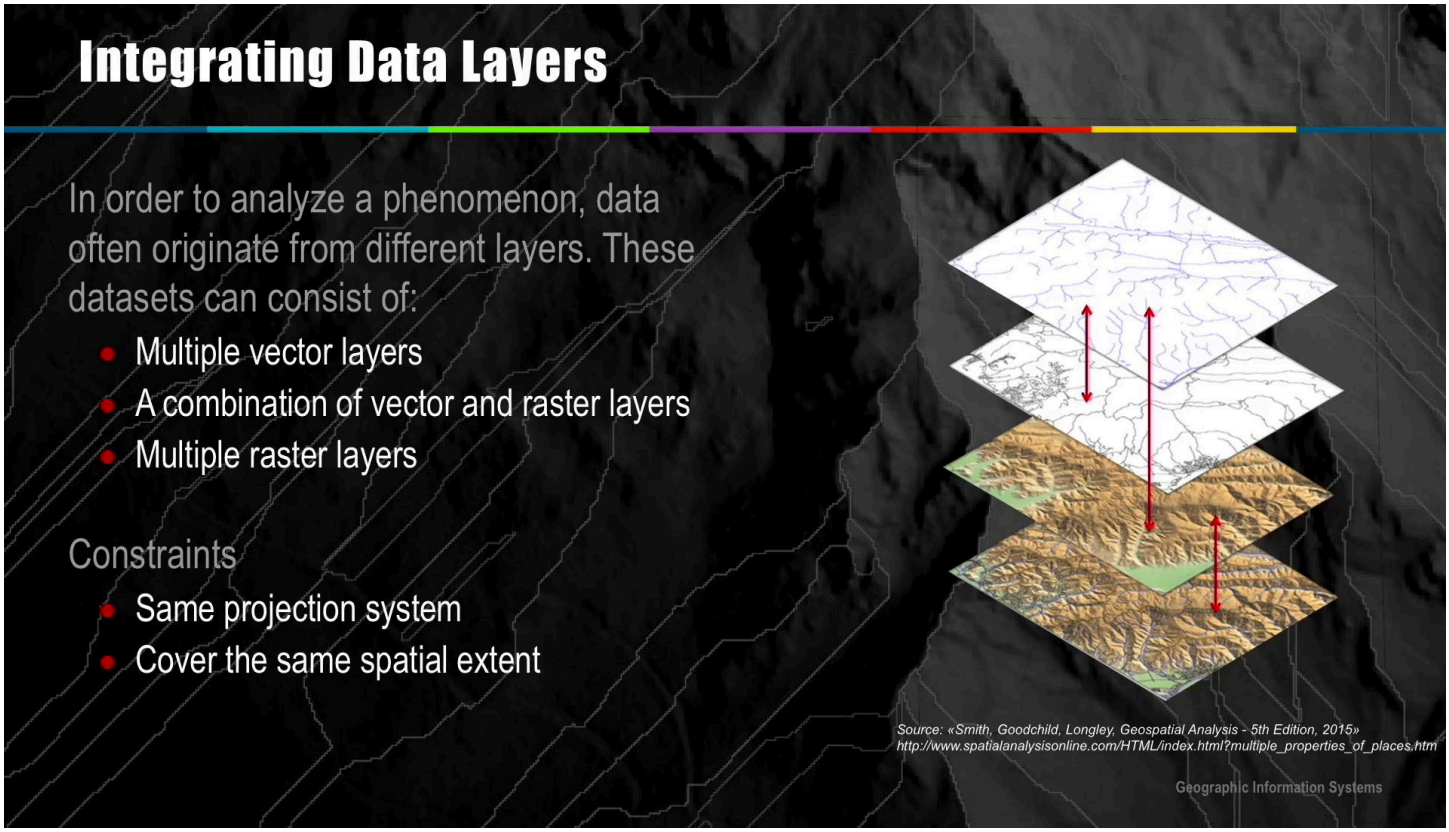


Hello and welcome to this lesson devoted to the interaction between georeferenced data layers. This interaction between layers uses the concept of spatial overlay, to which a set of methods is related that allow data transfer between objects of different types and stored in different layers this according to their spatial relations with each other. We will start with the interaction, between raster data and vectorial data. The goals of this lesson are to introduce briefly the notion of interaction and differentiate the types of interactions between a layer which stores vectorial information to a layer which stores the image information. After this lesson, you should be able to distinguish the two types of raster-vector interactions which we will describe and to implement them in the QGIS software following the instructions that will follow.

Notes

Summary

0m 31s

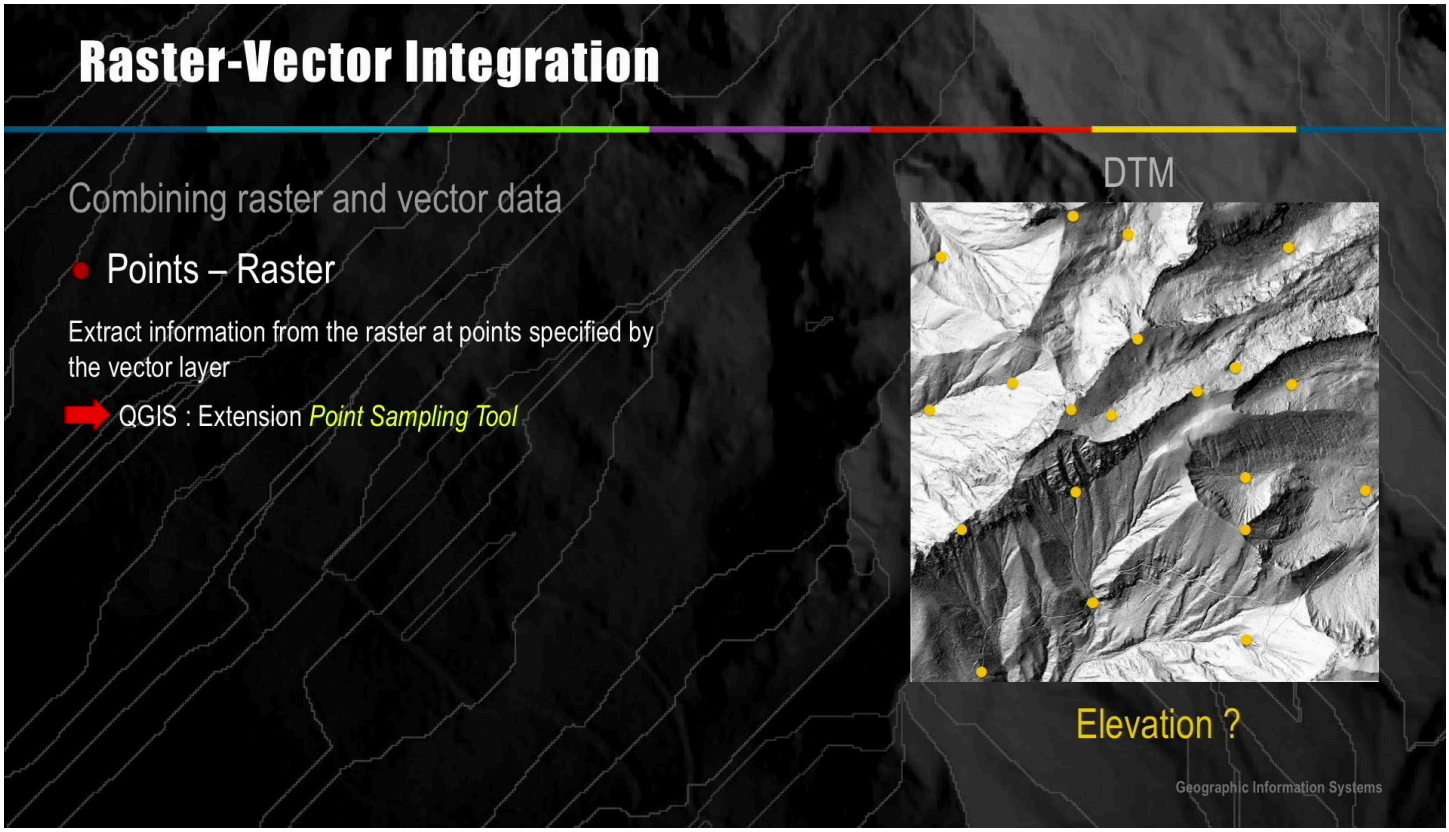


The spatial overlay is the emblematic function of geographic information systems. It alone symbolizes the originality of these information systems in relation to others and above all that gives them all their power. Indeed, the analysis of phenomena distributed in the geographic space often requires that we simultaneously resort to information from distinct layers. This can be the case, for example, if we want to calculate the sum of the number of inhabitants per department, the latter being polygons, whereas the population data is stored in a distinct layer containing their capital, so a series of centroids. The interaction made possible by the spatial overlay can allow the transfer of data from a source layer to a target layer by implementing a specific method partially induced by the types of layers considered, as we will see a little later. The spatial interaction can take place, between several vector layers, between raster layers and vectorial layers or between several raster layers. The constraints to the implementation of spatial interaction are the use of an identical coordinate projection system and a common spatial coverage.

Notes

Summary

1m 34s

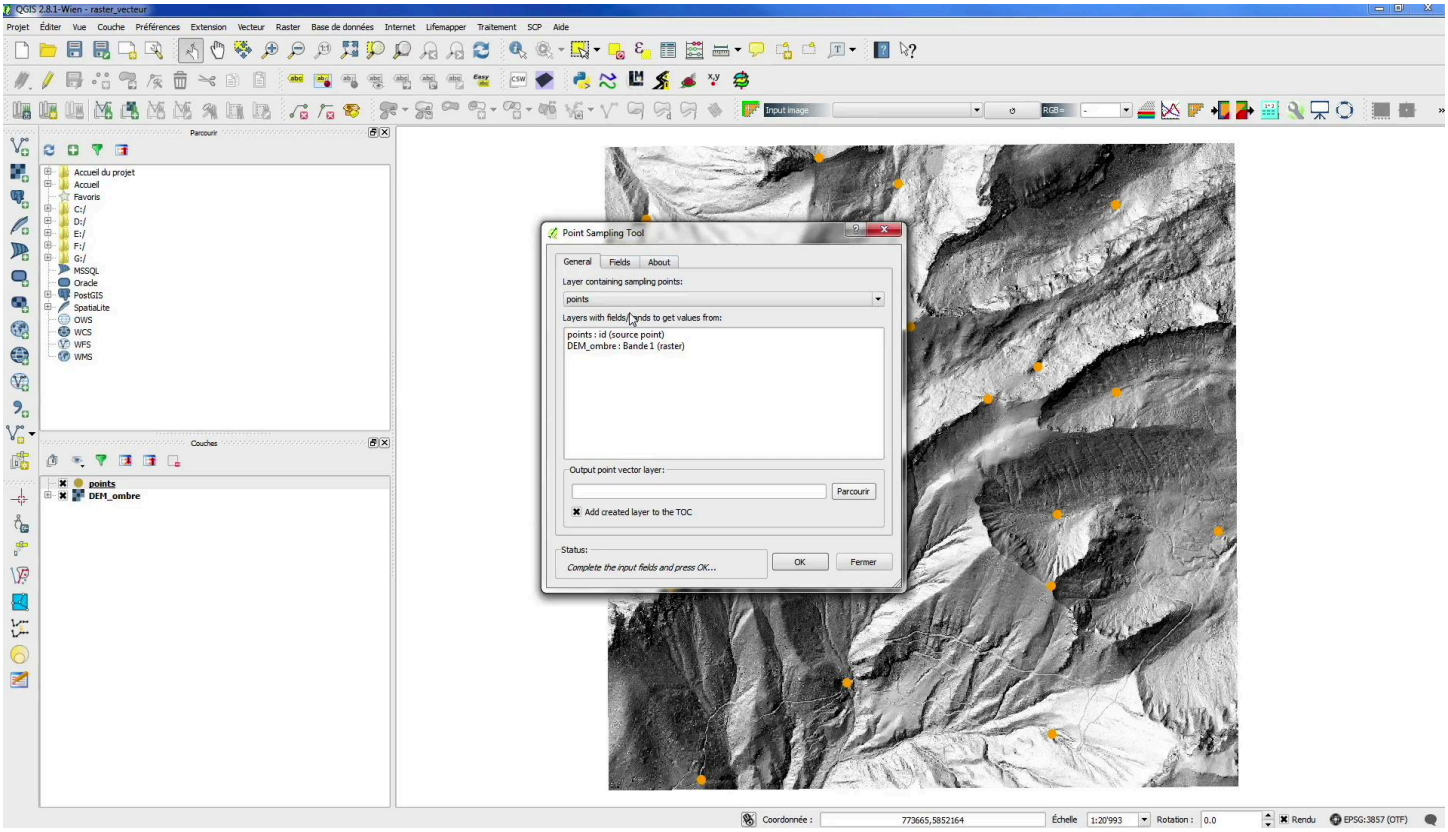


In the case of the vector-raster interaction which we are looking at in this lesson, the first type of information transfer that we distinguish is that of the extraction a variable z stored in the pixels of a raster and its copy in a series of punctual vectorial objects spatially distributed and stored in a superimposed vectorial layer. This typical implementation of the concept of spatial coincidence allows for example to know the altitude of a series of measurement points which are distributed in a mountain massif, as shown here on the screen. In QGIS, it is the extension "point sampling tool" which allows to carry out this type of operation. Let's see how it works.

Notes

Summary

2m 59s

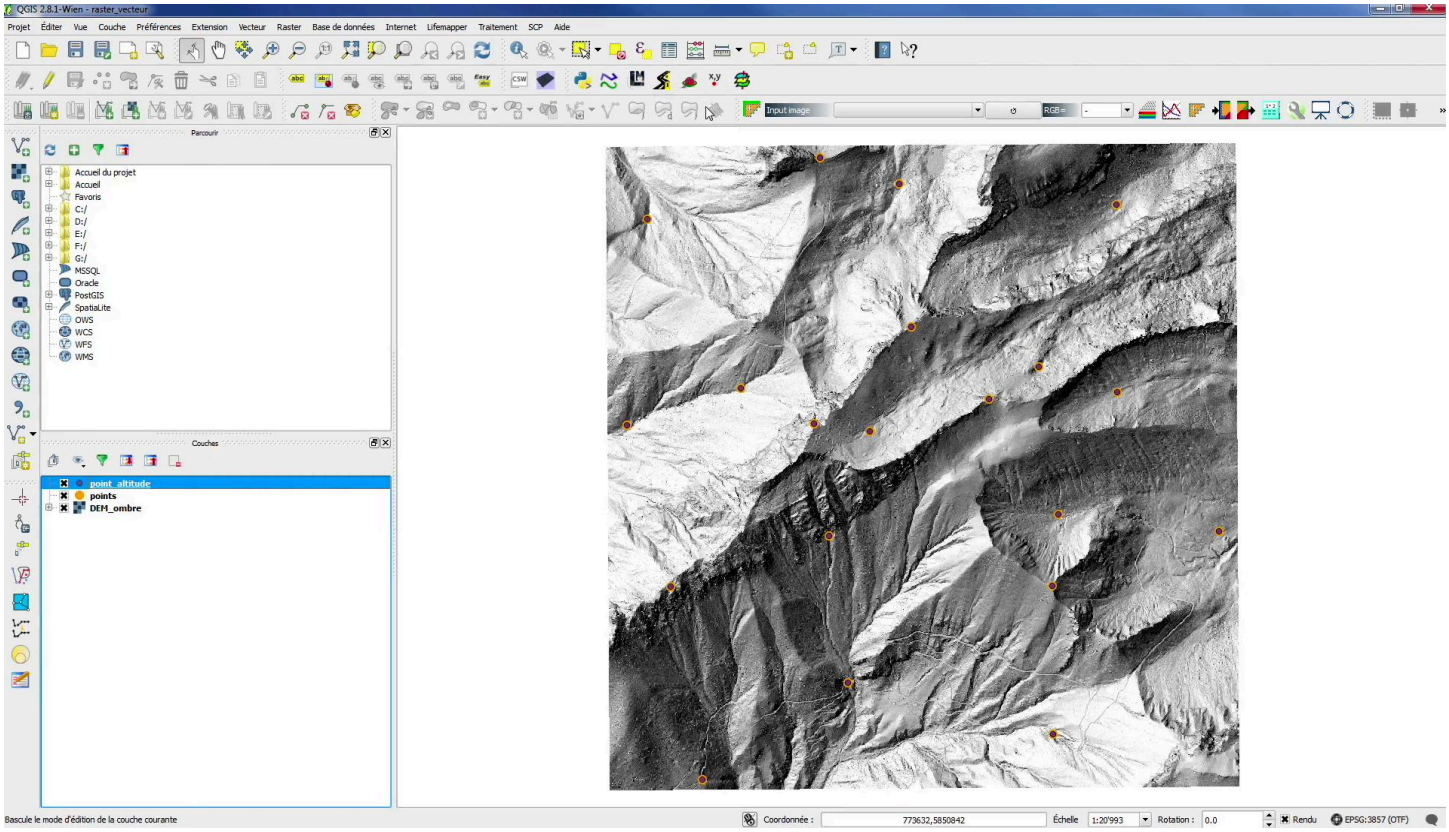


In the QGIS project we have a raster file of the digital ground model and a vectorial file containing the points for which we want to extract the altitude. In order to combine the two layers, we must first ensure that they are in the same projection system. To do this, we can right click on the raster layer, then define the SRC of a layer, we choose the swiss projection system CH1903/LV03 and we do the same for the vectorial file. Now that the two layers are in the same projection system we will be able to extract the altitude for the points that interest us. For now, the "points" layer contains only one attribute: that is its identifier. We will add an altitude column using the "point sampling tool". This tool is an extension of QGIS and so we have to install it first. By going to the "extensions" menu "install", "manage extensions" we can search the "point sampling tool" in the search bar and click on the tool when it appears in the list, then ask to "install the extension". The extension is thus automatically installed and we can click on "close". The tool has been installed under the "extensions" menu, "analysis", "point sampling tool". under the "general" tab, we must first define the layer containing the points.

Notes

Summary

3m 42s

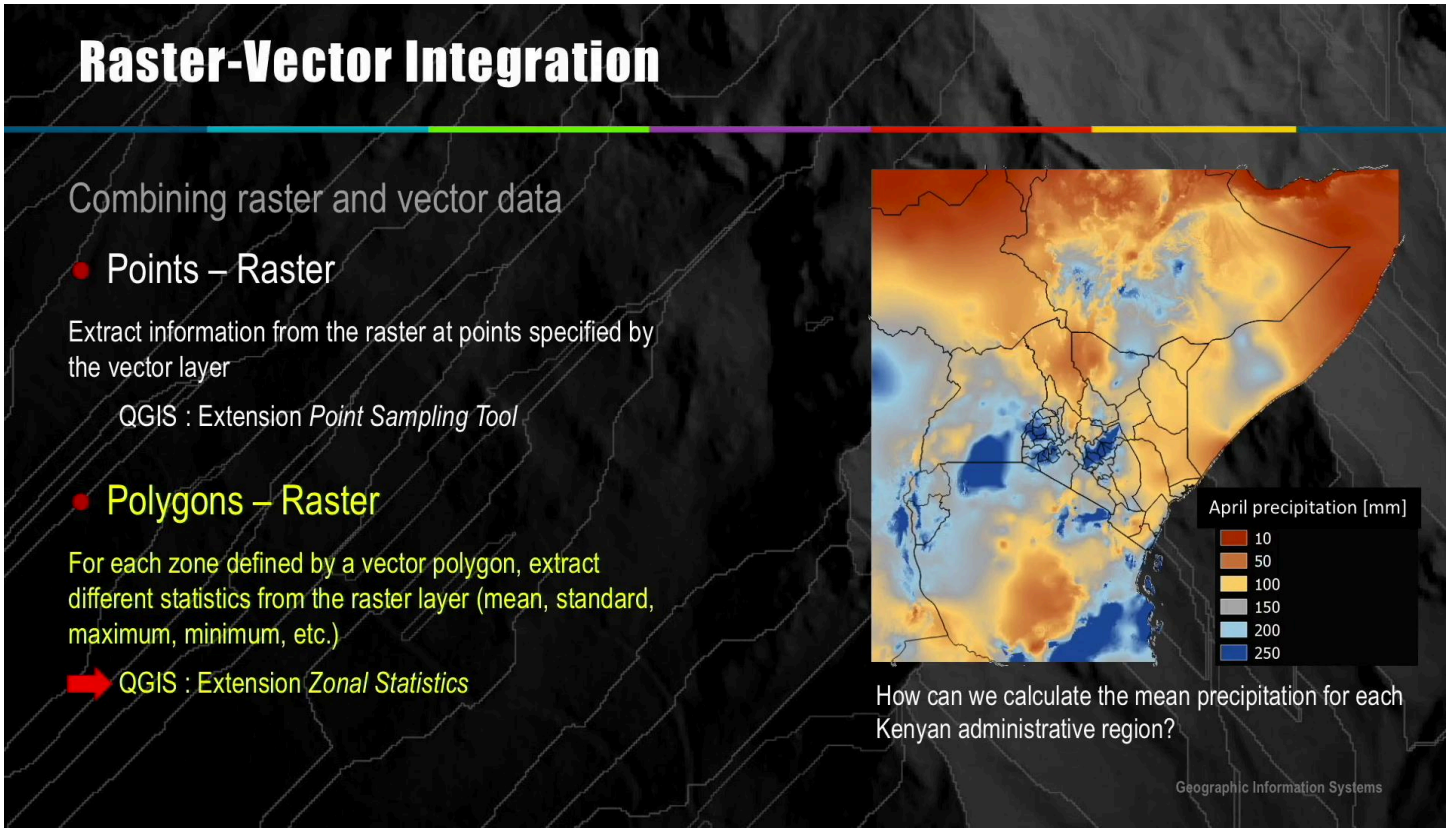


In our case, it is the layer named "points". We must then choose the layers which values we want to retrieve. In our case, we select the raster file of the digital ground model. At this point, we also tick the "points" vectorial file in order to retrieve attributes of this file, in our case the identifier of the point. On the "field" tab, we have a preview of the columns that will be present in the result file. So we will see the identifier of the points and the value extracted from the digital altitude model. We will rename this last column "altitude". We then return in the "general" tab to define the name of the result file and where we want to save it, we can then click on OK. The result layer was loaded into the project. We find all the points for which we wanted to extract the altitude and if we open the attribute table, we now see the presence of an "altitude" column which gives us the required information.

Notes

Summary

5m 15s

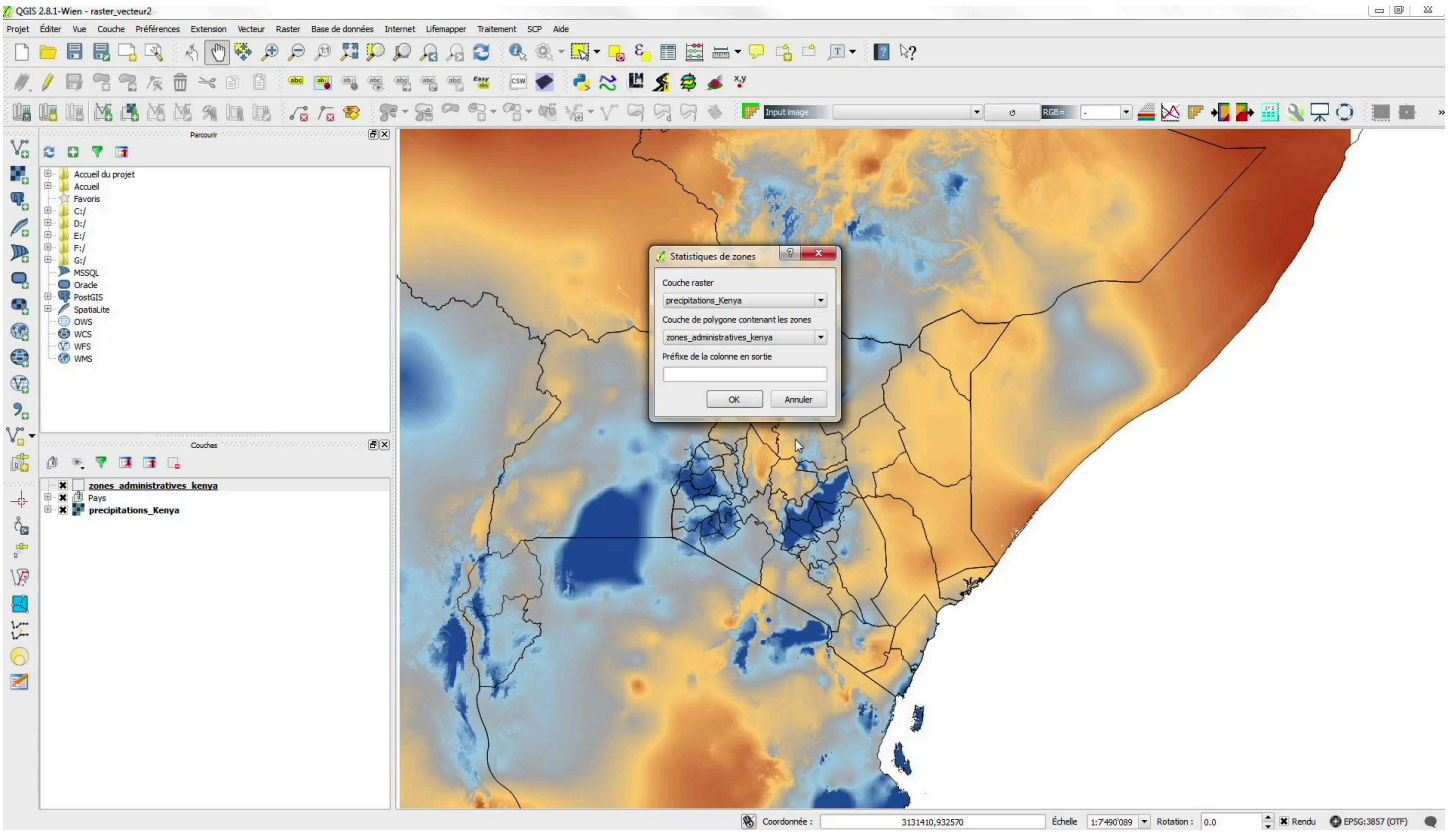


The second type of information transfer between a raster and vectorial layer is that of the extraction of a statistic of the values stored in the pixels of a raster layer and which must be brought back to the superimposed polygons to characterize them. These statistics can be the sum of the variable of interest, its maximum, its minimum, its standard deviation, its median, etc. Here for example, we want to calculate the average rainfall by administrative regions in Kenya. To perform this type of operation, QGIS has a tool called "area statistics".

Notes

Summary

6m 30s

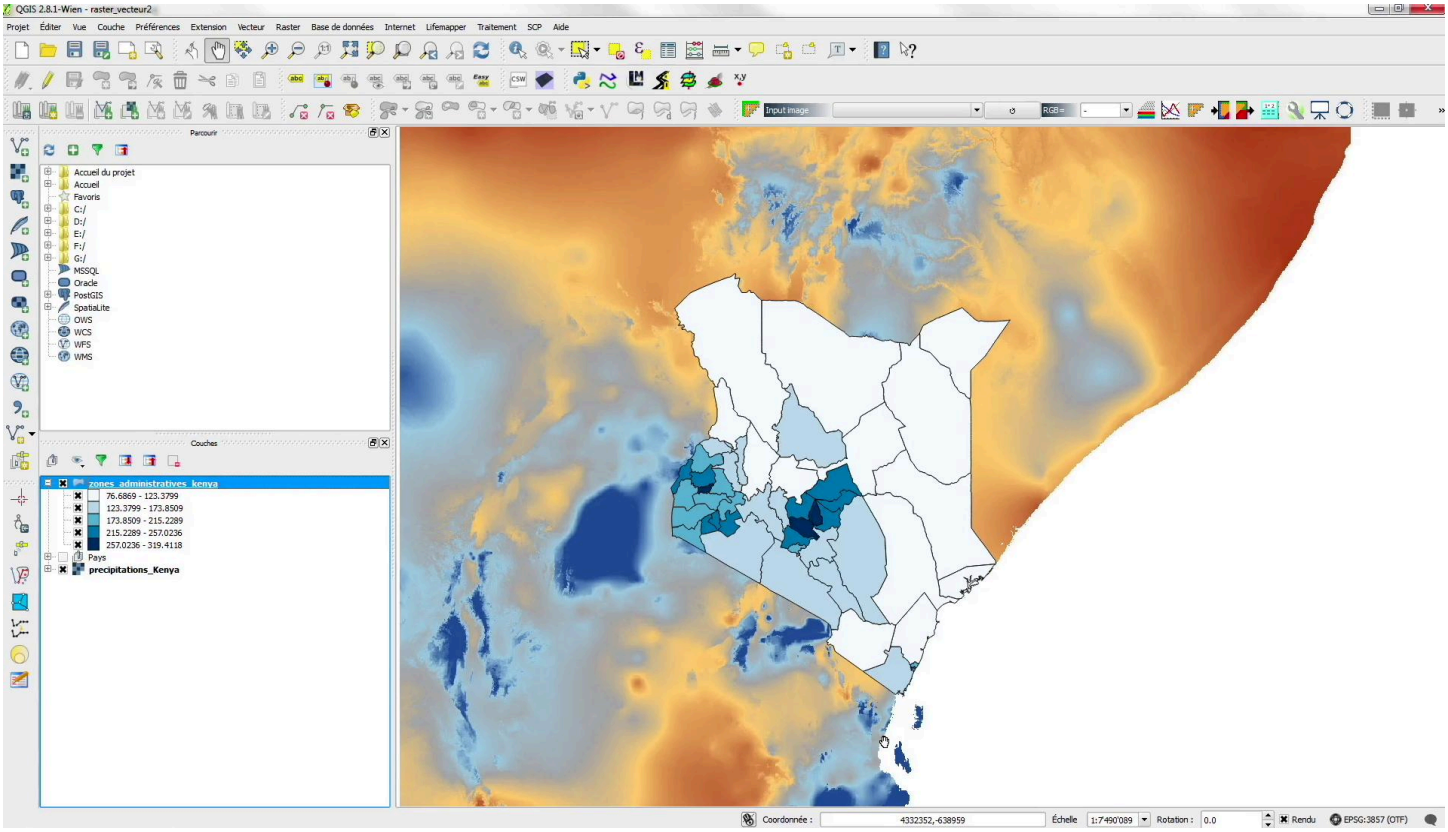


In the QGIS project we have a raster file with the rainfall and a vectorial file of polygons with the delimitation of African countries. We will also display the polygons of the contours of administrative regions of Kenya for which we would like to know the average rainfall. This file contains currently only two attributes: the identifier and the name of each region. To calculate the average rainfall, we are going to use the "area statistics" tool. This tool is an extension so we have to install it first. In the "extensions" menu, "install", "manage extensions" we can search "area statistics" and tick the small box. The extension is installed and we can click on "close". This extension has been installed in the "area statistics" raster menu. It will allow to calculate the average and the sum of precipitations for each polygon of the administrative regions of Kenya. Under "raster layer", we define the raster layer containing the values on which we want to calculate the statistics. In our case, this is the rainfall file. Under "polygon layer" containing the areas, we choose the administrative regions of Kenya. The results will be added directly as a new attribute of the layer containing polygons.

Notes

Summary

7m 08s



We can, if we wish, define a possible prefix which will be placed before the name of each column. Here we will put the prefix "prec" for precipitations. You can then click on OK. Once the calculation is complete, we can return to our vectorial file of the administrative divisions and open the attribute table. We see that three new columns have been added, all beginning with the prefix "prec". The first contains the number of values that were present in each polygon so the number of pixels. The second column shows the sum of precipitations and the last column contains the average that we wanted to know. Now we can represent each region of Kenya with a color depending on the average rainfall. To do this, it necessary go to the properties of the vectorial layer, in the "style" tab. We choose a graduated style on the "precmean" column. We can choose a suitable color palette and a class or discretization based on natural soils. We click on OK and we obtain the desired map.

Notes

Summary

8m 32s