WATSAM

**Support to Arba Minch Town water utility and Municipality in the water & sanitation sector through capacity building
and partnership development with Italian water organizations**

UDIG TUTORIAL

UNIVERSITÀ DEGLI STUDI
DI TRENTO

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This tutorial is written by UniTN, please refer to the authors for any question.

Table of Contents

1   Introduction

Welcome to the User-friendly Internet Desktop GIS (uDig) application!

This is a walkthough of the installation and use of the uDig application, it covers the general introduction to the GIS and the use of shapefile.

uDig is collaborative effort brought together by a diverse project management committee from organizations across the world:

- Andrea Antonello (Italy)
- Frank Gasdorf (Germany)
- Jesse Eichar (Switzerland)
- Jody Garnett (Australia)
- Mauricio Pazos (Spain)

uDig was originated at Refractions Research in Canada with funding from GeoConnections Canada.

uDig is intended to be used in conjunction with your existing investment in spatial information. Data are the most important part of the work, uDig supports a wide range of formats, it is compatible with a range of spatial databases and can access of information services such as WMS and WFS.

Other features are support for printing and excellent desktop integration.

The use of an open source license (EPL and BSD) allows the uDig project to be used by your organization with **no per seat license**.

For more information and a selection of case studies:

This tutorial is written by UniTN, please refer to the authors for any question.
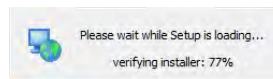
- http://udig.refractions.net/files/tutorials/uDigCaseStudies.pdf
- http://udig.refractions.net/

2 Installing and Running The uDig Application

In this section, you will install and run the application, which will be used for viewing map information.

Windows install:

- Double-click the installer.

Note!

For this workshop you can find the uDig installer on the Desktop. In all the other occasions you first have to download the installer from uDig website.

- The installer will allow you to install uDig into the directory of your choice.

- We have a number of license agreements to click through.

This tutorial is written by UniTN, please refer to the authors for any question.
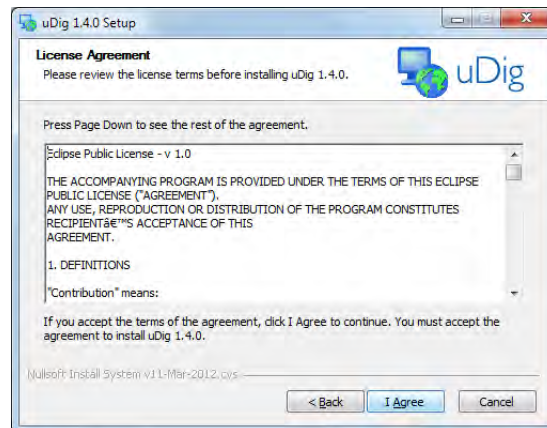
Note!
uDig is an open source project released with a business friendly Eclipse Public License (EPL) and Refractions BSD 3 Clause License (http://udig.refractions.net/files/bsd3-v10.html).

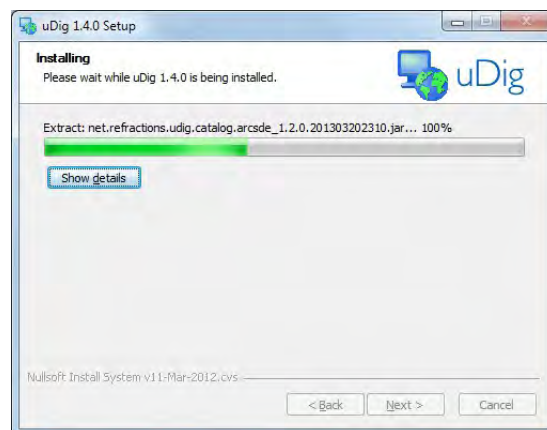*ECW/JP2 support is freely licensed for desktop application use.*

● By default uDig will be installed into your Program Files directory.
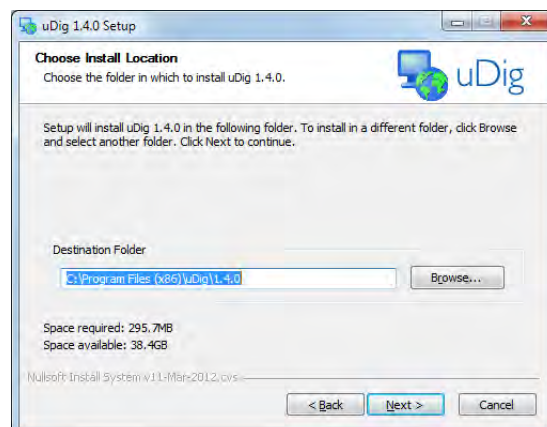
● Shortcuts will be created in your start menu.
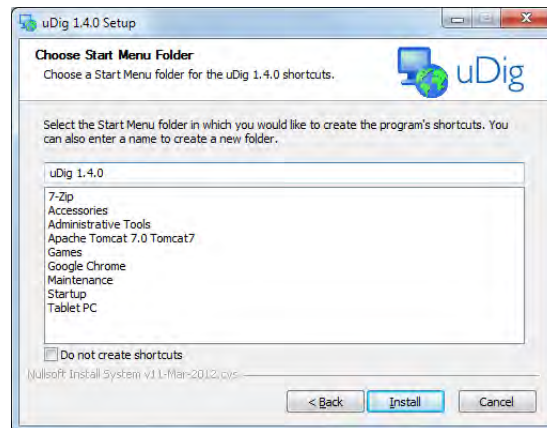
- Please wait while uDig is installed.

- Congratulations you have installed uDig!

- If you are working in a corporate environment with a firewall please review the instructions on uDig webpage for details on proxy configuration.

This tutorial is written by UniTN, please refer to the authors for any question.
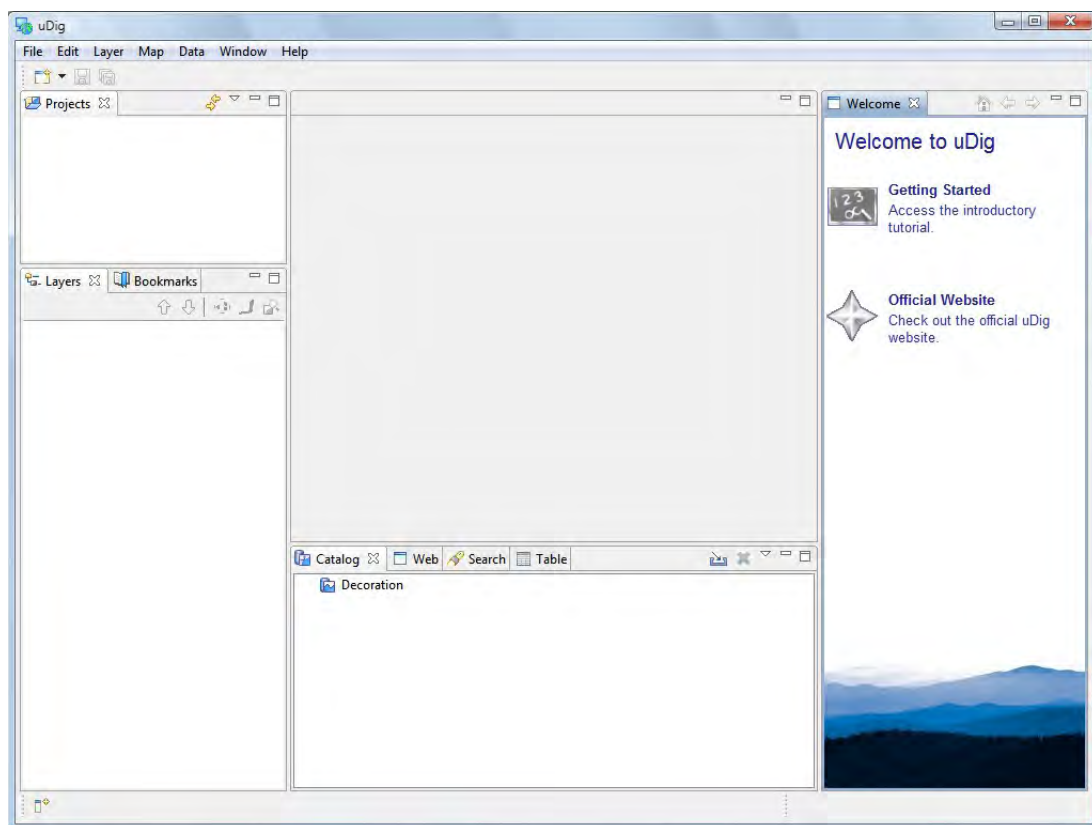
3 Welcome

Now that everything is installed we can start up the application for the first time.

- After completing the installation, run the uDig application from the Windows *Start* --> *Programs* menu.

- Initially you are presented with the uDig workbench. The uDig workbench consists of a number of panels called **views**.

- The *Welcome* view runs along the right hand side of the screen. This view contains:
  - a link to the *Getting Started* tutorial from the online documentation.
  - a link to the uDig *Website*
- To **close** the *Welcome* view click the **x** next to the word welcome.

  This tutorial is written by UniTN, please refer to the authors for any question.

● You can return to the welcome view at any time using the *Help --> Welcome* menu item.
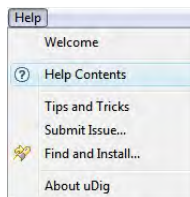
3.1 Online Documentation and Tutorials

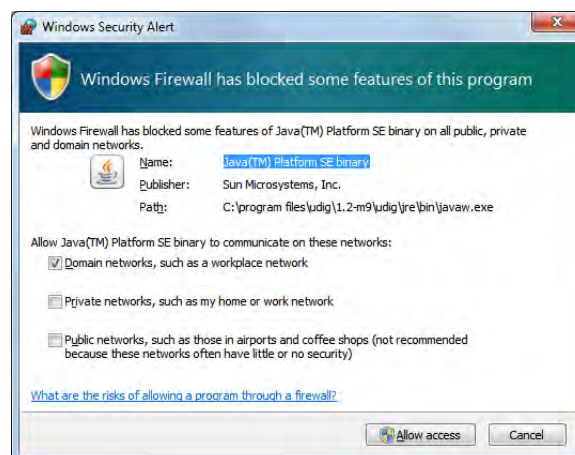In this section you will open up the online help and access reference information.

> **Hint!**
>
> *You can access the online help directly by pressing Getting Started on the welcome screen.*
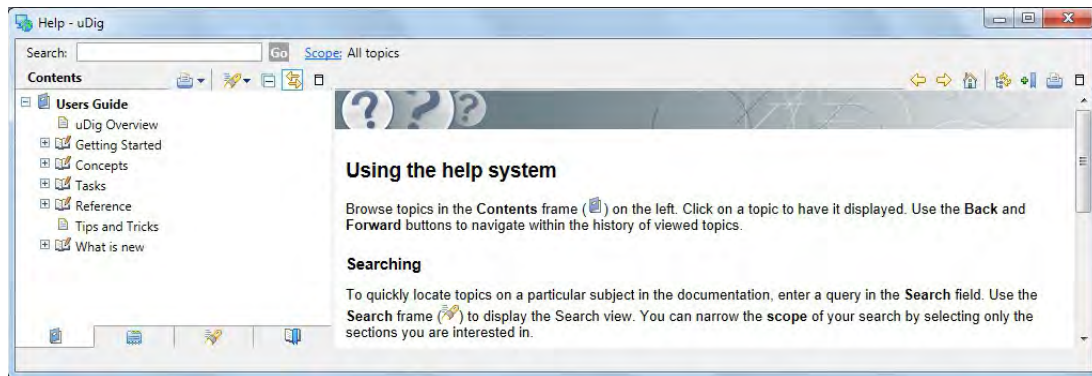
1. Open up the *Help* menu and select *Help Contents*

2. The windows firewall will need to allow the help application to startup.

3. This will bring up the online help system; the help system is a web application that makes use of a *Contents* tree to allow you to navigate between *Pages*.
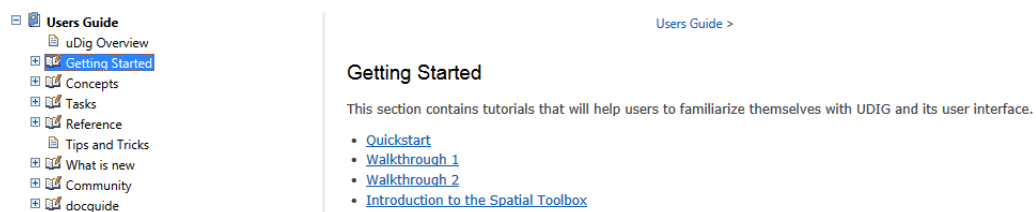
4. The *Contents* tree organizes *Pages* into *Books*. Additional books are included as you install additional features.
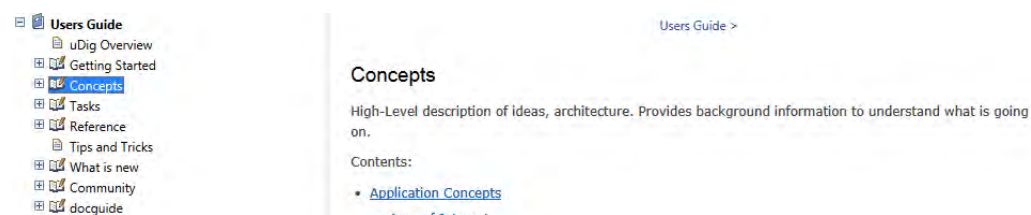
3.2 Help Categories

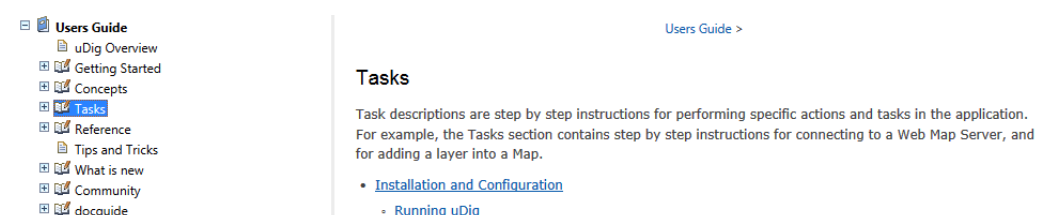You can access additional reference information in the following categories:

*   Getting Started: tutorials that will help familiarize yourself using uDig.

*   Concepts: High-Level description of ideas, architecture abd background knowledge.
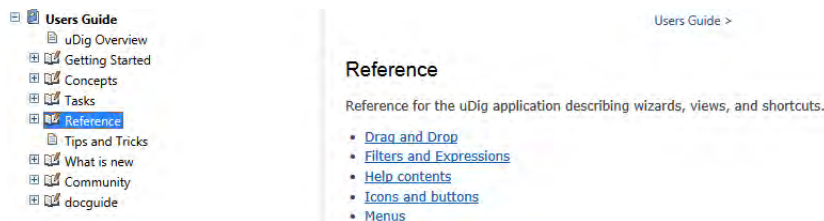

*   Tasks: step by step instructions for performing specific actions and tasks in the application.

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● Reference: reference for the uDig application describing wizards, views, and shortcuts.

4 The Workbench

Before we start playing with maps, let's take a look at the default layout of the uDig workbench and what some of the key components are.

Shown below is a typical session of uDig with an open *Map* editor surrounded by *Projects*, *Layers*, and *Catalog* views. These views will be described further as we demonstrate their uses.

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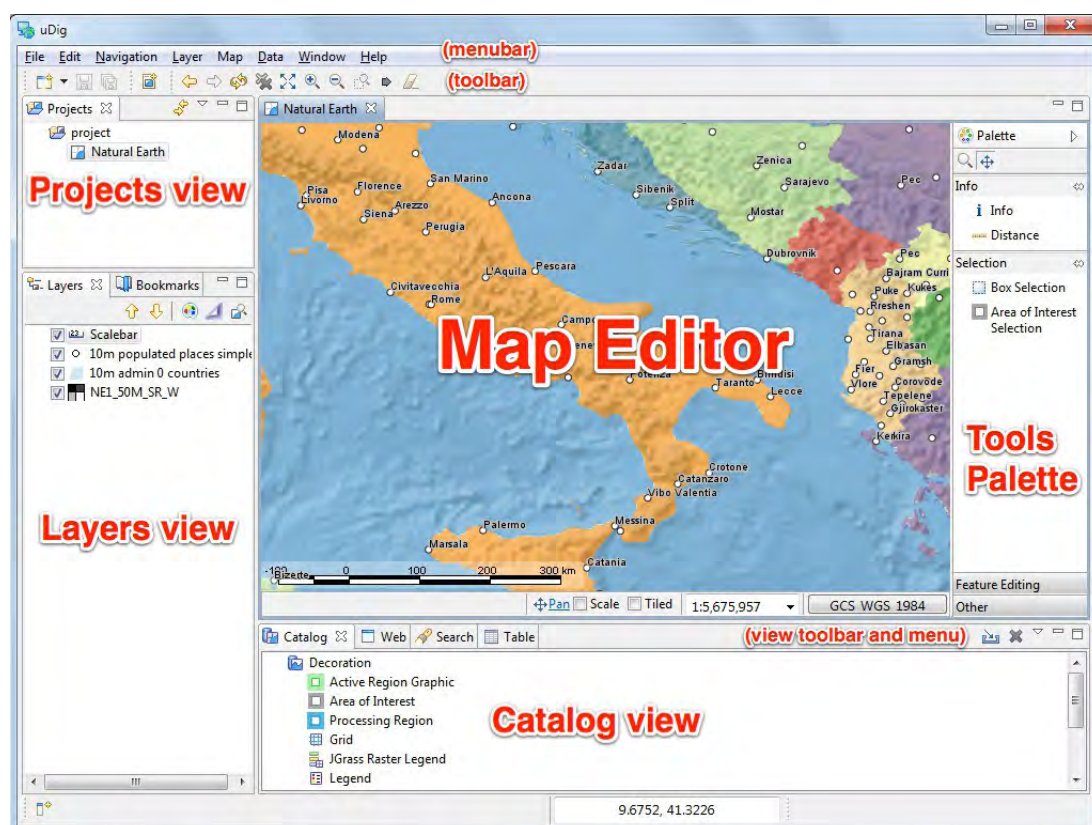
5 Working with Files

You can work directly with files from the file system.

- This section makes use of sample data provided by the *Natural Earth* project.

- Click on the following link (http://udig.refractions.net/files/data/data_1_3.zip) and save the zip file to your local computer.

  o data_1_3.zip

  > **Hint!**
  >
  > *Please find the data folder ready to be used on your Desktop: data_1_3.zip.*

- Unzip the download to create your *data* directory.

  o You may wish to create a data directory on your desktop or in your documents folder.

- Create an empty Map by selecting *File --> New --> New Map* from the *menubar*. As you can see a new project is created in the *Projects* view and a new map is added into it called *Map*
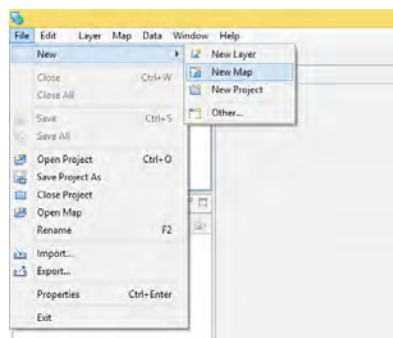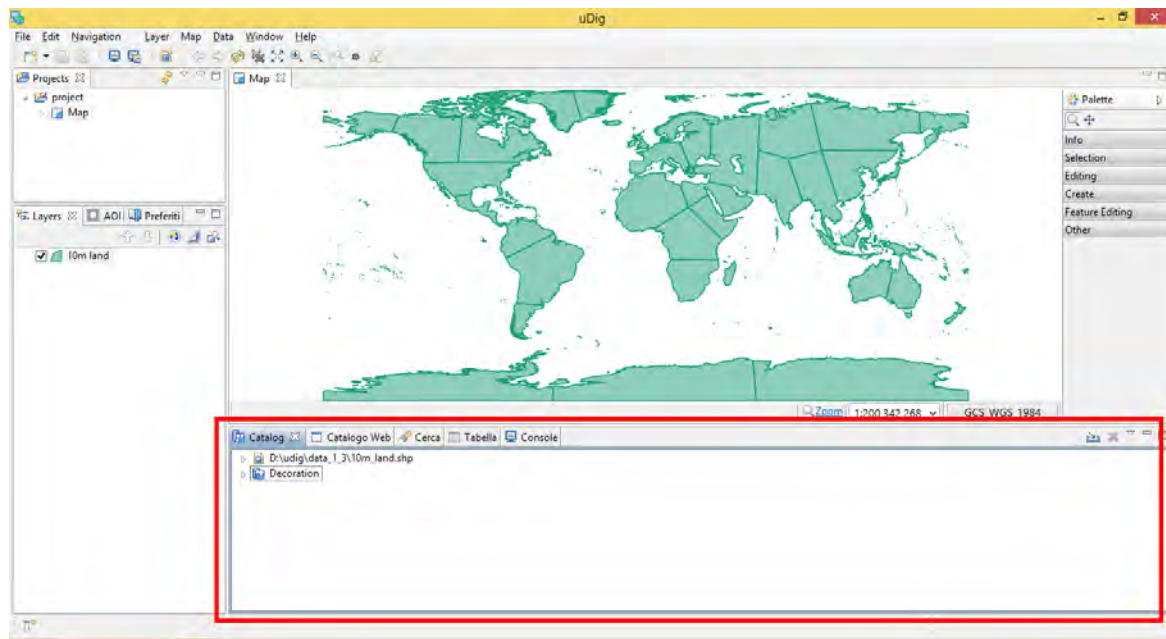

- Drag and Drop the file *10m_land.shp* onto your open *Map*.
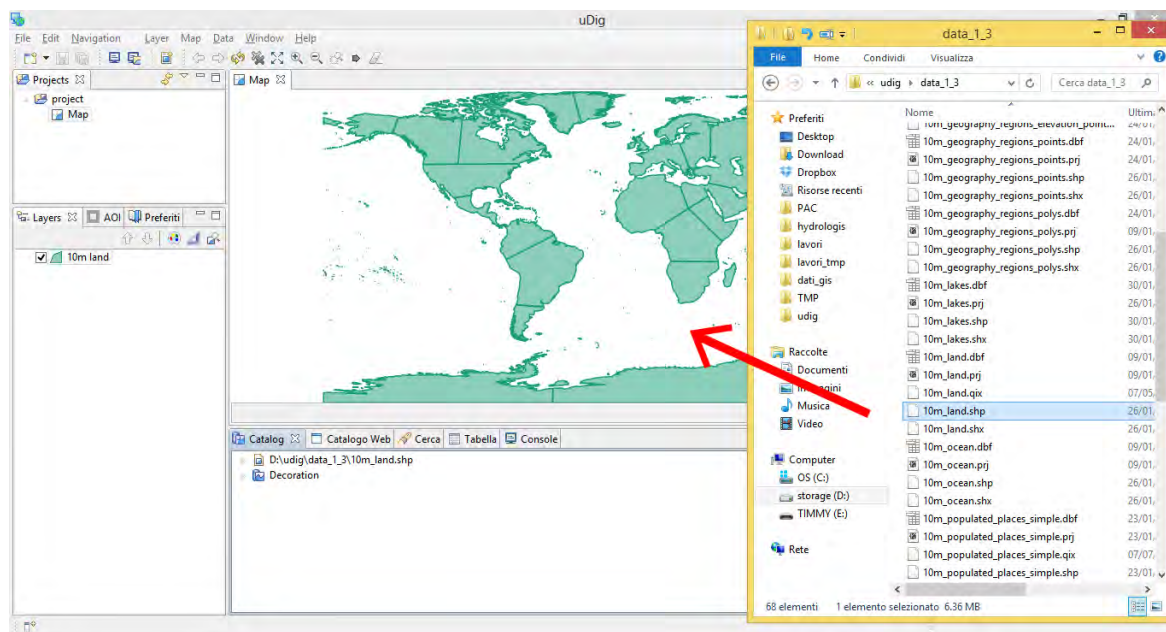
The map will take the size and projection of the first layer added to it.

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You can also see the file listed in the *Catalog* view in case you wish to use it on another map.

- When working with uDig you will often find yourself combining information from several different sources.

  Add the *10m_ocean.shp* shapefile to your map.
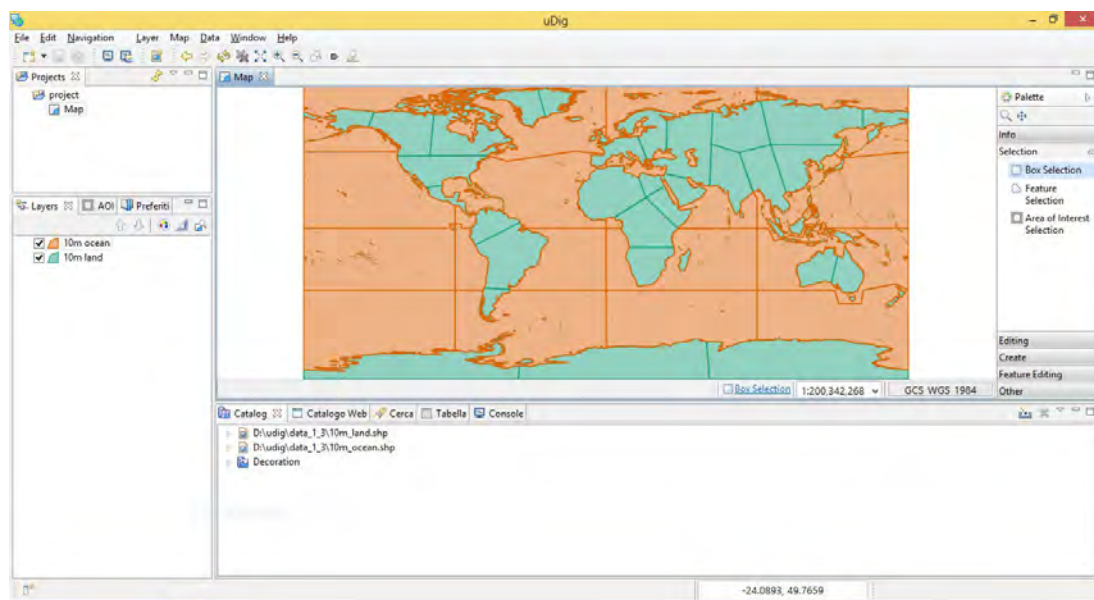
The application will automatically:

  o   Make use of any included style layer descriptor file, or generate a default style.

  o   Perform any reprojection required on the fly allowing you to view layers side by side

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5.1 Map Editor

The *Map* editor is used to display a map on screen. You can open several Maps and the *Layers* view will list the contents of the currently selected editor.

- The *Map* editor is used to display the visible layers.
- *Map* interaction is controlled by the selected *Tool* in the *Palette* on the right hand side of the screen.

    Try the navigation tools along the top of the tool *Palette*.

    - 🔍 Zoom (keyboard short cut *z*) Click or drag the left button (as a window) to

        zoom in, or right button to zoom out.

    - ✛ Pan (keyboard short cut *p*) Click and drag to move the display.

    - Several shortcuts are always available:
        - **Mouse Wheel**: used to zoom in and out quickly
        - **Middle Button**: Used to quickly pan the display

- The *Palette* organises tools into drawers according to function.
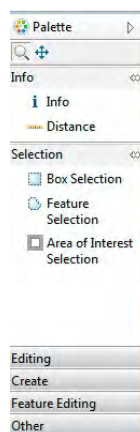
- You can open and close the drawers by clicking on their title.
- Drawers will close automatically as you switch between drawers. Although you can also pin a drawer open for easy access.
- Available tools change depending on the currently selected layer

- Right click on a drawer to customise the size of the icons used; and how much information is displayed in the *Palette*.

This tutorial is written by UniTN, please refer to the authors for any question.
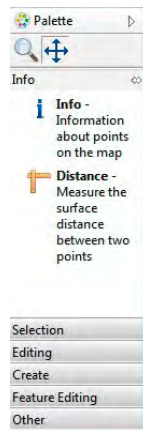
- The *Map* editor lists common commands in the *toolbar* along the top of the screen.

    - Extent: zoom out to show all enabled layers

    - Zoom In

    - Zoom Out

    - Stop Rendering

    - Refresh Map

- Press the *Refresh* button, and watch the *processing* information displayed in the bottom

  right corner of the workbench.
    - Description and progress bar indicate rendering status.
    - Button to open the *Progress* view providing more detail when several layers are rendering at once and the ability to cancel any long running activities.
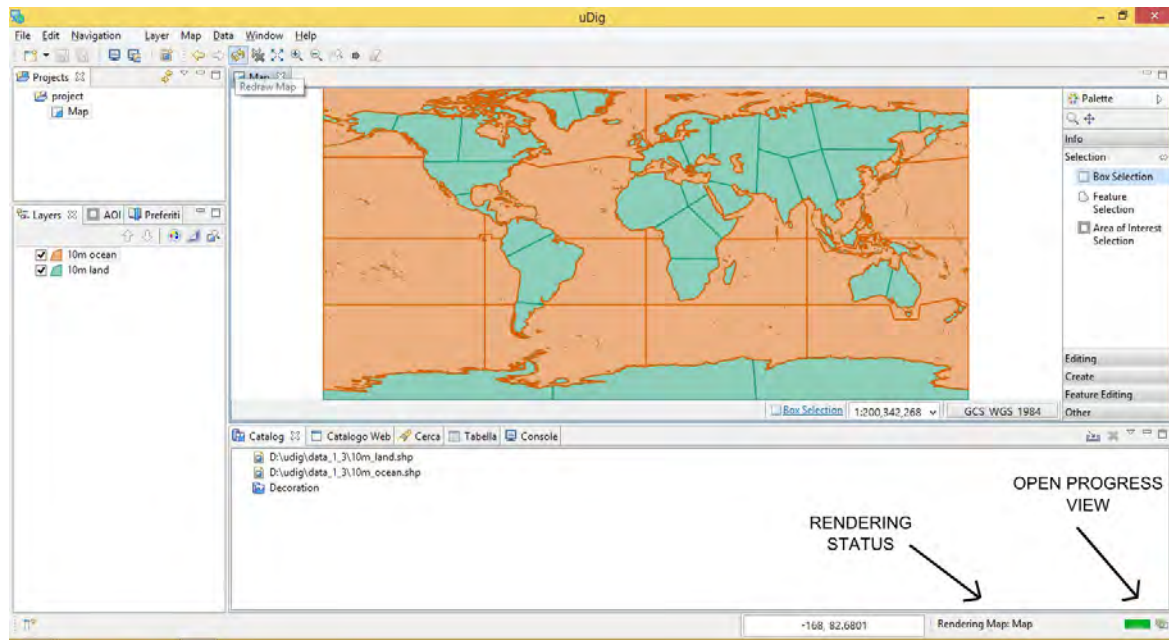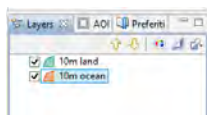
- The *Layers* view shows the order in which layers are drawn. Please select the *10m_land* layer and use the *Move down* button from the *Layer* view toolbar to move selected layer to the bottom of the list.
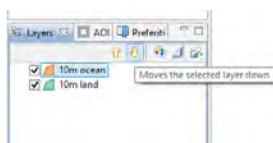
> **Hint!**
>
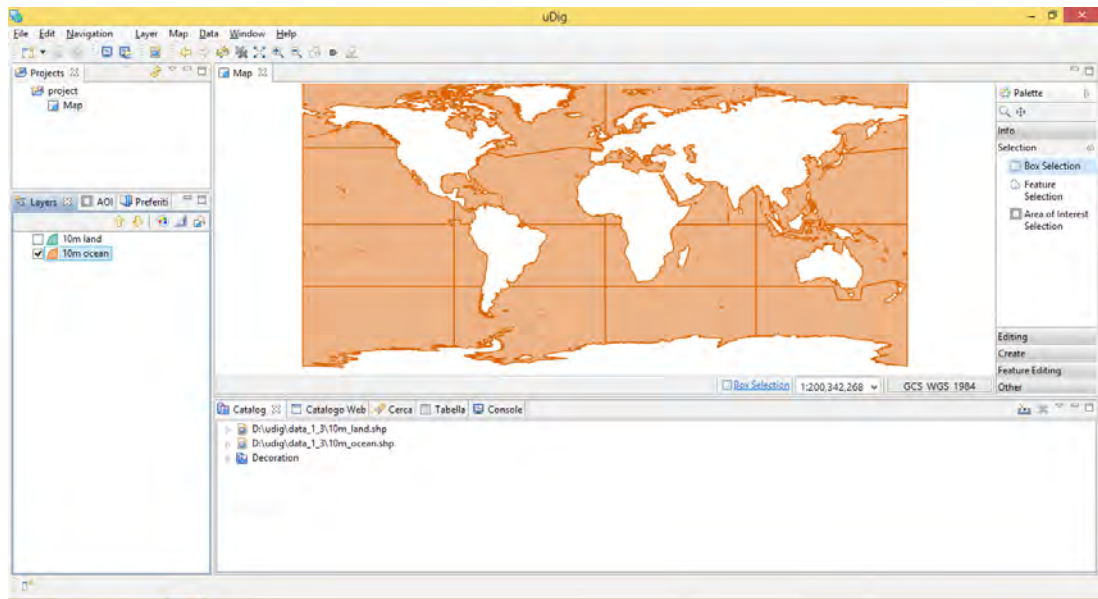> ***Drag and Drop*** *You can also drag layers up and down in the layer view to change the order.*

- The order is now changed.

- You can also use the checkboxes next to each Layer to turn them on and off: try to check the box near the name of *10m land* layer in the Layer view and see what happens.

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Note!

*Selection an checking the layer are different operations and means different behavior of the tools in the GIS. **Checking** has only influence on visualization of the layer in the Map while **selection** is active when you can see the layer with a the blue background in the Layer view and this is the operation that activates all the tools in uDig: selection, edit, ...*

6 Import Directly to The Catalog

As you can see all the layers visualized in the *Map* and in the *Layer* views and added to the application using *drag and drop* are also added to the *Catalog* view, in this section we will import content directly into the catalog.

● On the *Catalog* view please press the *Import* button on the top right of the view:
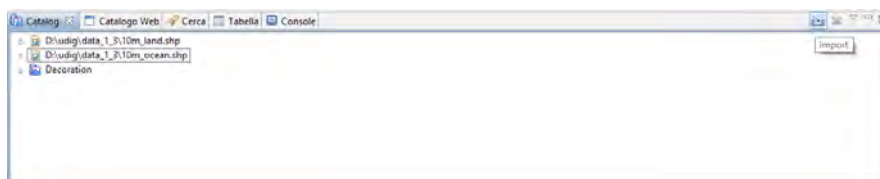
● In the wizard select *Other --> Data* and press *Next*.

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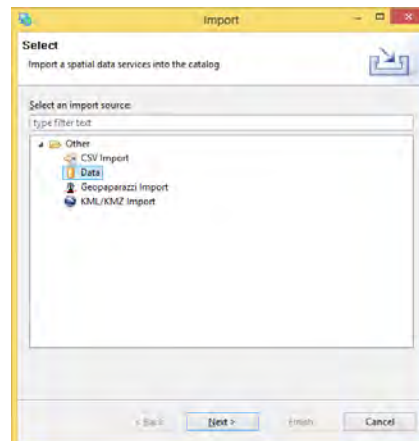
● Choose *File* from the list and press *Next*.
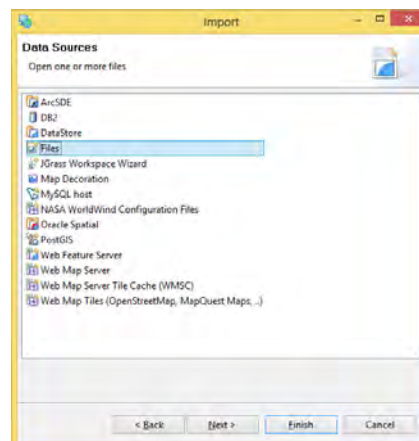

● This time we are going to import layer *10m_admin_0_countries.shp* contained in the data folder: please select this file in the wizard.
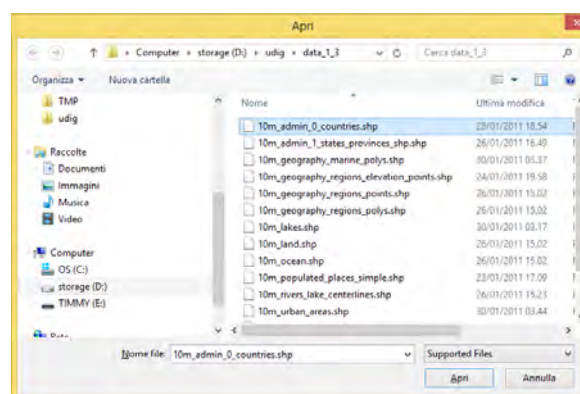

● Press *Finish* to import the selected layer into the *Catalog*.

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Note!
*From the Catalog view you can add only one layer at the time.*

Try to use an other way to import a layer directly into the Catalog:

- Inside the *Catalog* view please press the right click of the mouse and select the *Import* option from the menu
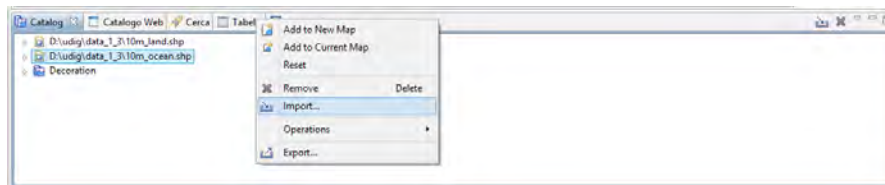
- Proceed as explained before and select *10m_lakes* file from the data folder in the wizard.
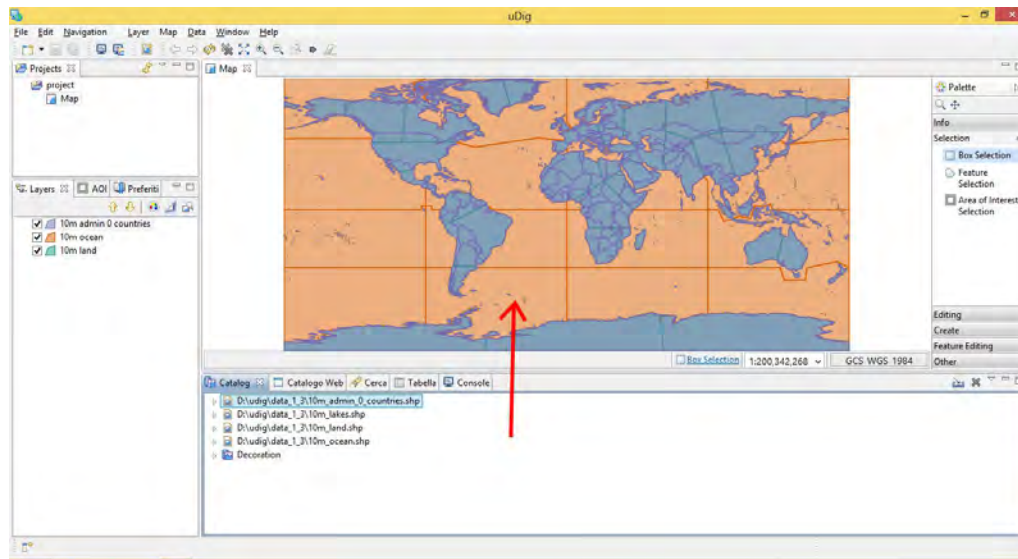
Now that we have imported the shapefiles into the catalog we can add them to our Map.
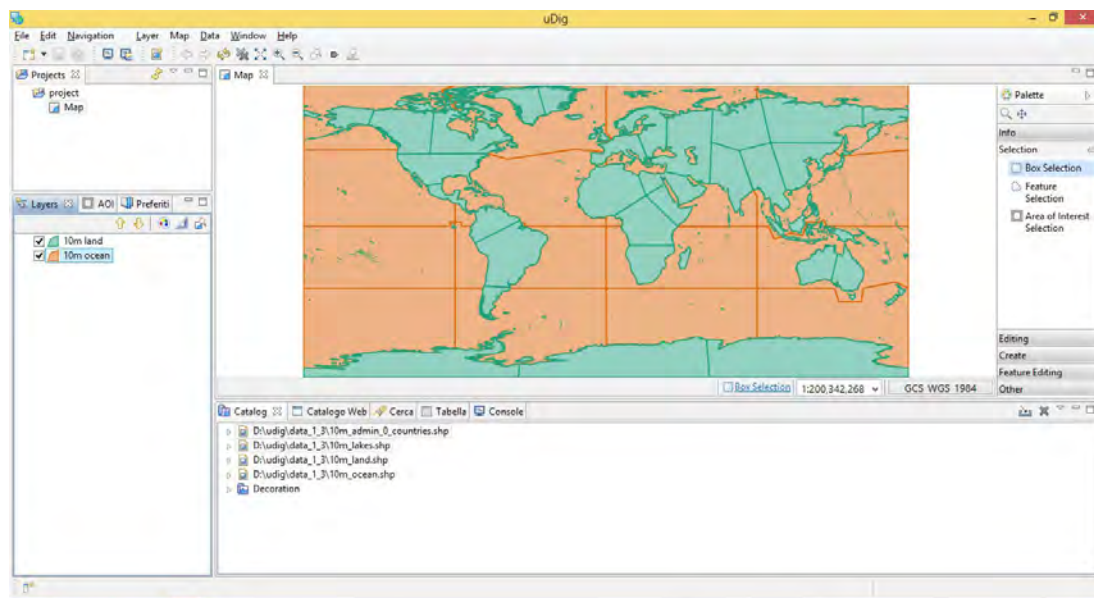
6.1 Adding Layers from the Catalog View

Adding a Layer from a previously connected data source:

- Drag and Drop the *10m_admin_0_countries* layer directly onto *Map* editor.

This tutorial is written by UniTN, please refer to the authors for any question.

- Earlier we used the the layer view to reorder using the up and down buttons, this time we will drag the layers into the right order.

  Select the *10m_lakes* layer in the layer view and drag it to the bottom of the list.
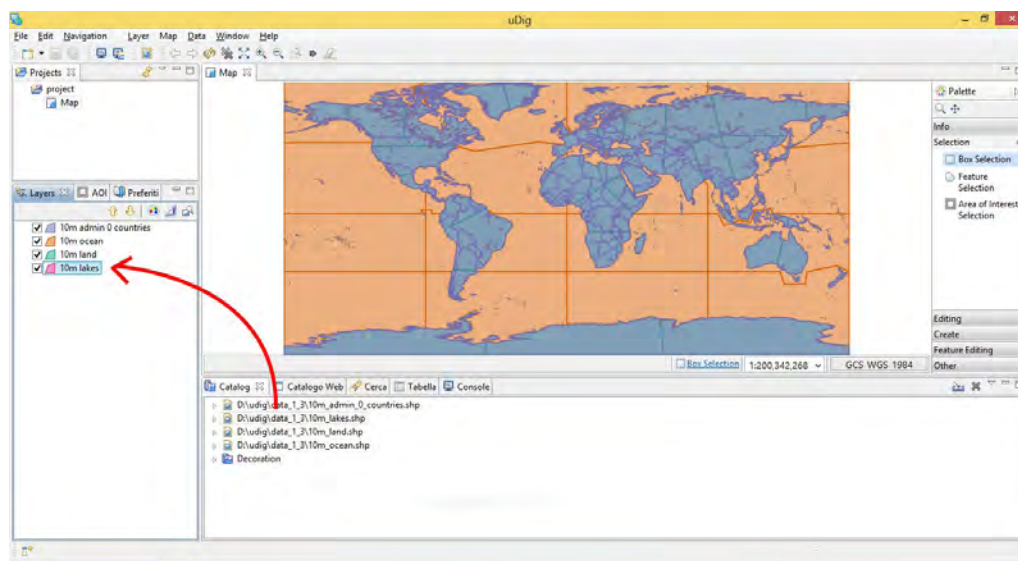
Note!
The layers of lakes is not well visible in the Map, move this layer to the top of the list in the Layer view.

- In the *Layers* view select the layer *10m_admin_0_countries*, rigth click of the mouse and select the *Delete* option to remove the layer from the list and delete it from the visualization.
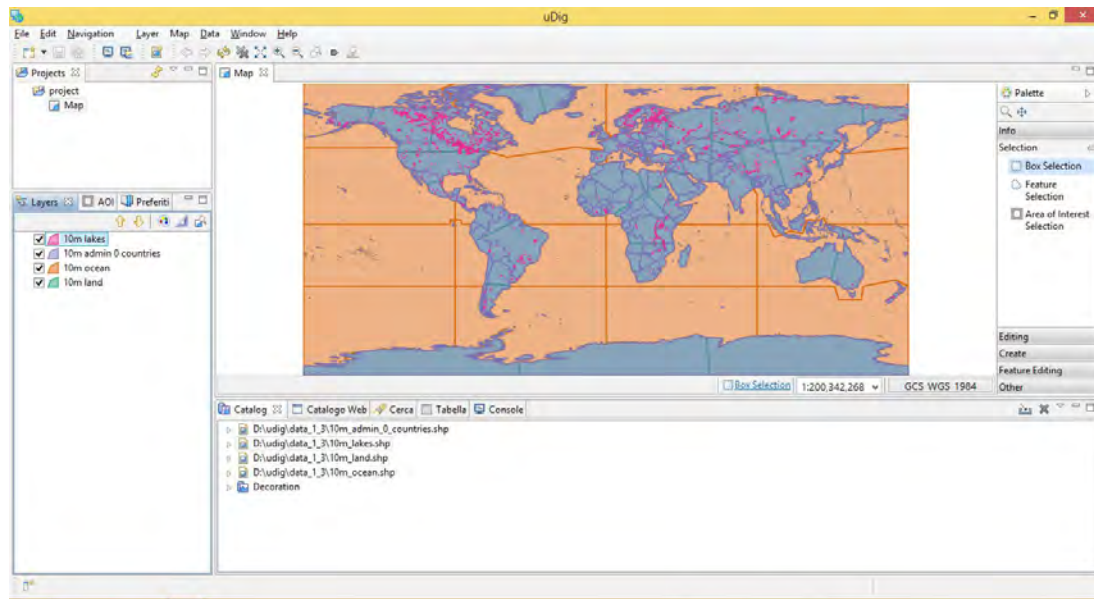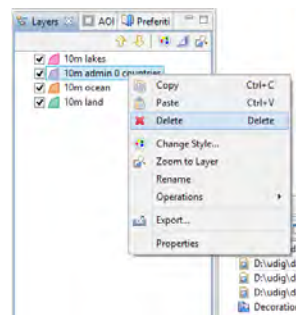

- Do the same for *10m_lakes*: in the *Layers* view select the layer *10m_lakes*, rigth click of the mouse and select the *Delete* option.

> **Hint!**
>
> *Deleting an entire layer withing uDig without editing it will not delete the original file, just the connection in the program.*

Now that we deleted the layers we will try to add them to the same Map using a different procedure:

- in the *Catalog* view select the layer you want to show in the Map *10m_admin_0_countries*
- right-click on *10m_admin_0_countries* and select *Add to Current Map*.
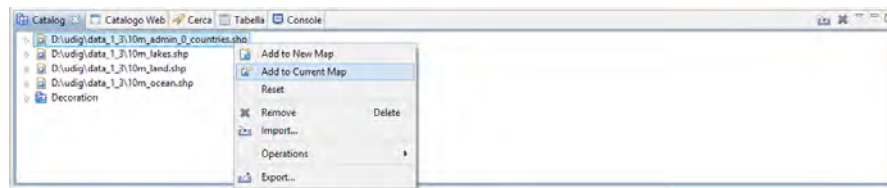
● The new layer will appear in the *Layers* view and automatically start to render. When it finishes rendering, you should see a new *10m_admin_0_countries* layer drawn on screen.
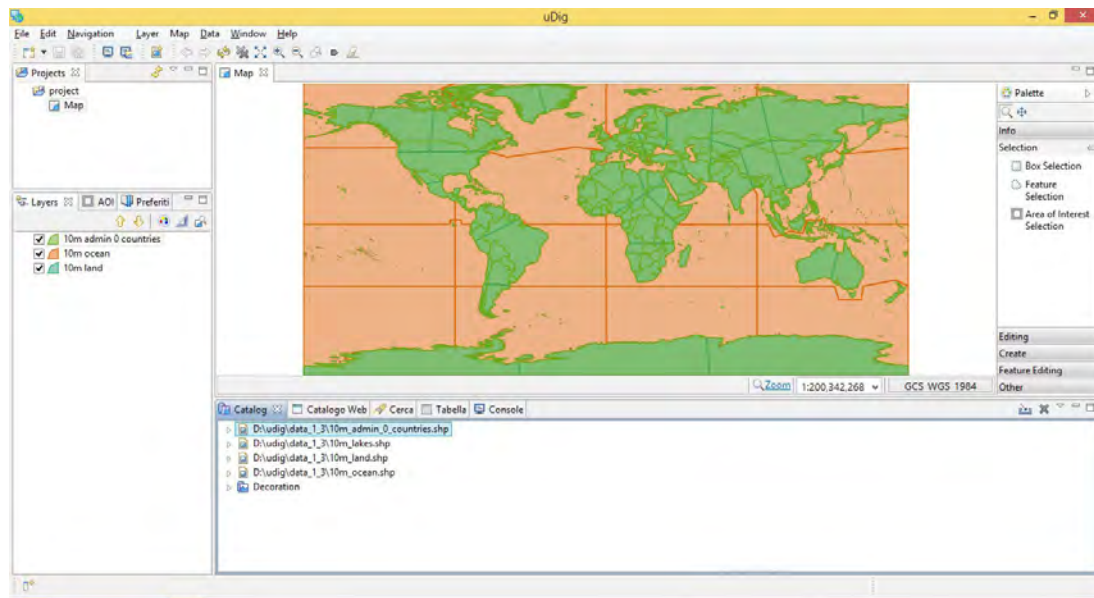

● The catalog also comes equipped with a built in service called *Decoration*. Select *Decoration --> Scalebar* in the *Catalog* view and drag this layer onto the Map

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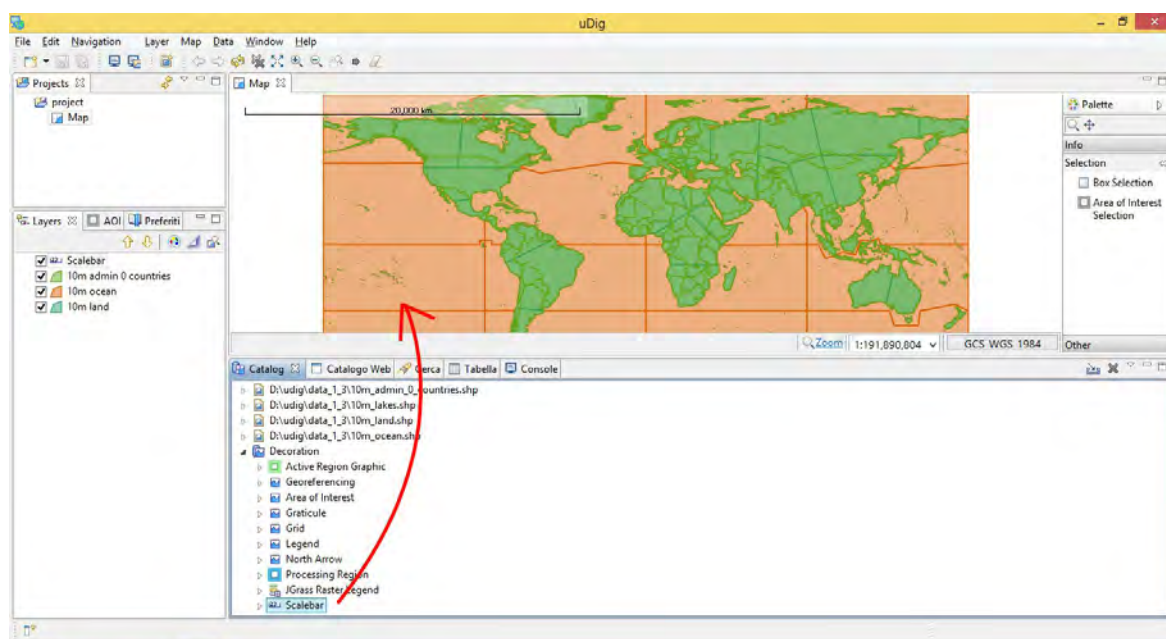
- You can add multiple layers directly to the Map selecting from the main menu *Layer --> Add*
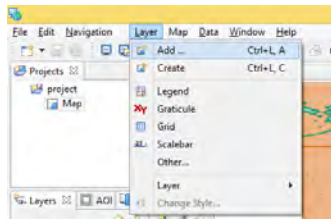
- Select the desired layers. In this case it is possible to add multiple layers together.

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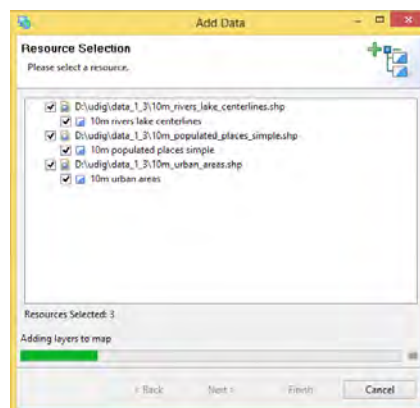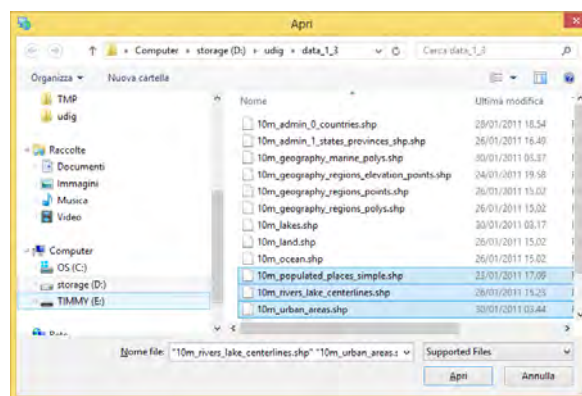
7 Style Editor

The *Style Editor* allows fine grain control of the layer rendering. In **addition to shapes, layers contain attribute values** which we can use to control the rendering process.

In this section we will create a *Styled Layer Descriptor* (SLD) with the uDig *Style Editor* in order to generate labels and theme by attribute values.

> **Note!**
> *if you create the SLD file for the shapefile you will maintain the same style for the layer for ever, so if you exchange the data, others will see the data 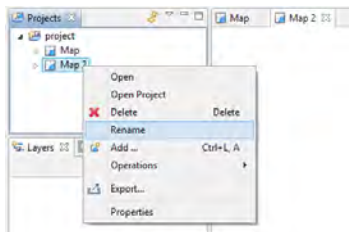same as you and if you load the data in an other Map you will see them always the same style. To export the current style click on the **Export** icon **One click style export for file based layers***.

● Create a new map using *File --> New --> New Map*

● Select your new map in the *Projects* view, and right click to choose *Rename*.

● Enter the name **Natural Earth** and press *OK*.

● Close the map previously used **Map** clicking on the **X** near the name in the *Map* view.
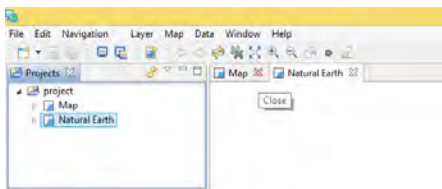
> **Note!**
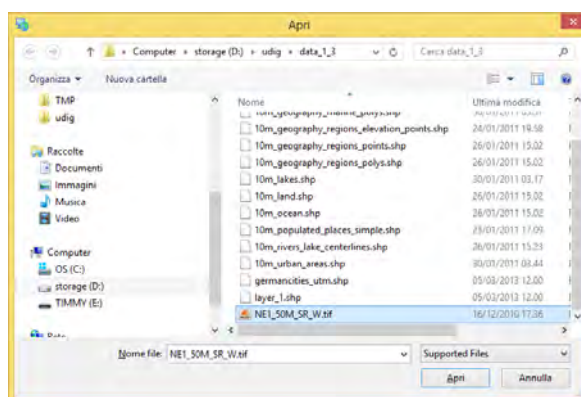> *You can open and close the maps whenever you want, the information will be automatically saved by udig. To open an existing map double clik on the name of the map in the Project view.*

● In the *Layer* menu, select *Add*

● Choose *Files* from the provided list and press *Next*.
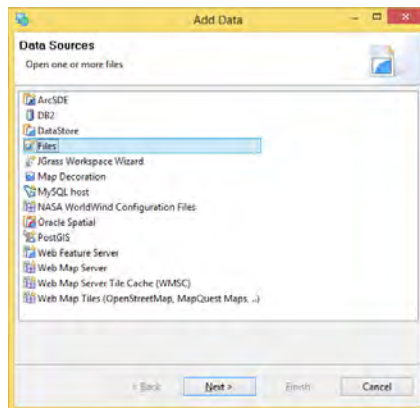
- Select the files *NE1_50M_SR_W.tif* from your data directory:

- Press *Open* and the raster layer will be added to your map
- Search the layer *10m admin 0 countries* in the *Catalog* and add it to the new active map as explained in the previous paragraphs, the layers will the added over the raster image and rendered with a default style.
  - The default style for the *10m admin 0 countries* layer is slightly transparent so can see the base raster layer.
  - You may wish to zoom in and out using the toolbar *Zoom Extent*, *Zoom In* and *Zoom Out* commands.

This tutorial is written by UniTN, please refer to the authors for any question.
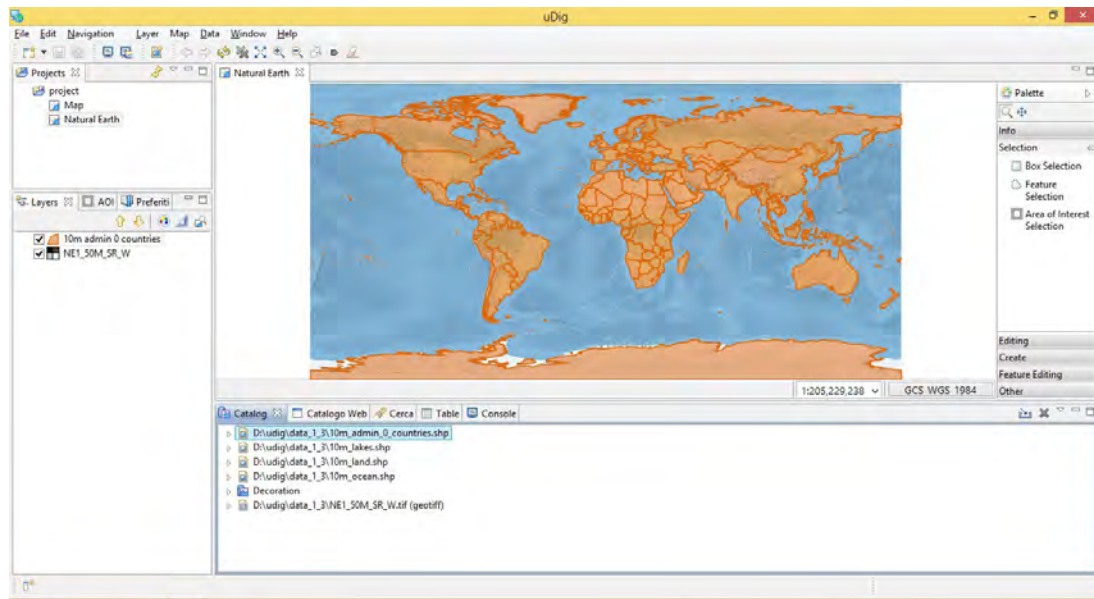
- Select and right click on the countries layer in the *Layers* view and select *Change Style* to open the *Style Editor*.
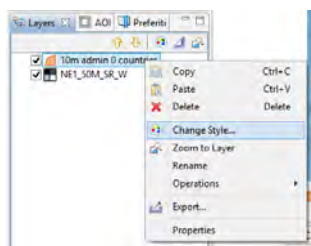
- The *Style Editor* is arranged into a series of pages.
- Select the *Polygons* page from the list on the right: we will use this page to add labels to the countries layer.
- Click the *Labels* tab on the *Polygon* page.
  - Enable labels by checking the *enable/disable labelling* checkbox
  - In the list to the far right of *label* choose the *NAME* attribute
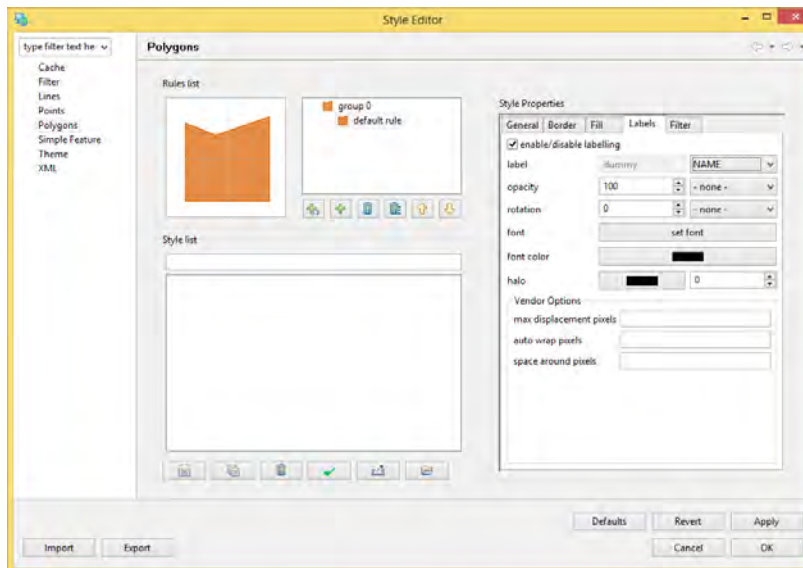
● You can press the *Apply* and/or *OK* button to see what your map will look like with labels.

7.1 Theme

A common use for maps is as a visual display of attribute values. In cartographic terms this is known as creating a *Thematic* map, accomplished by defining a *theme* for a layer.

The *Style Editor* is used to theme data by setting up a thematic style for a layer based on attribute values.

● Please reopen the *Style Editor*, switch to the *Theme* page and select the following:

   ● *Attribute*: Select the *POP_EST* attribute.

   ● Select **7** Classes instead of the proposed **5**.

   ● *Normalize*: Select the *GDP_MD_EST* attribute.
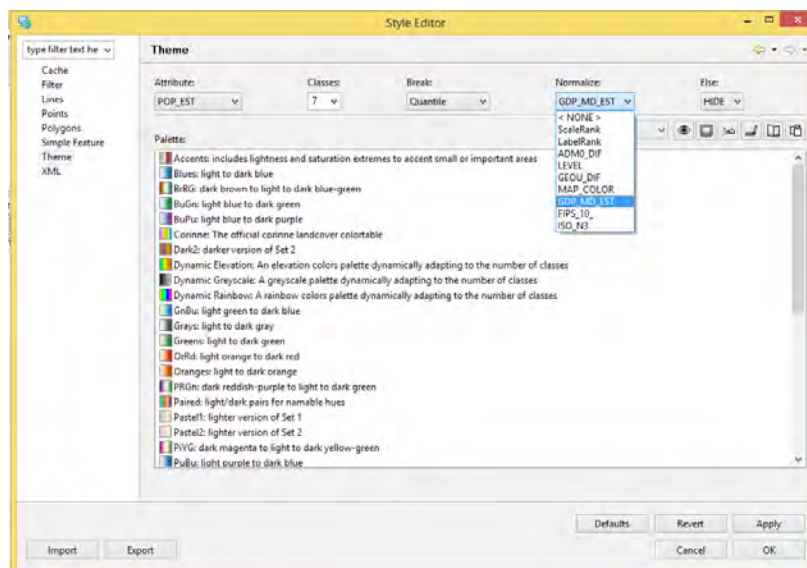
● Filter the available color palettes to show a subset of those available:

This tutorial is written by UniTN, please refer to the authors for any question.

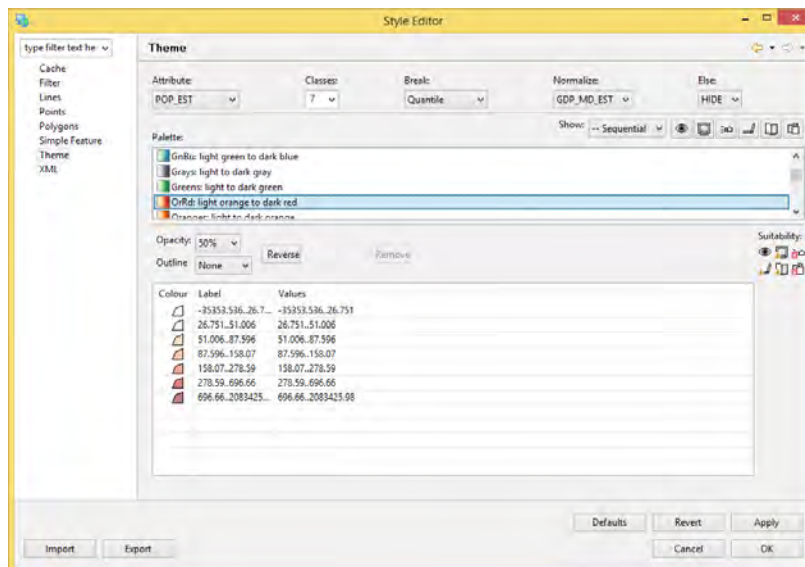- o   *Show*: change from guilabel: *Show All* to *Sequential,* this option shows palettes which are a ramp of color.

- o   Select the *light orange to dark red* color palette

- ●   Press the *OK* button
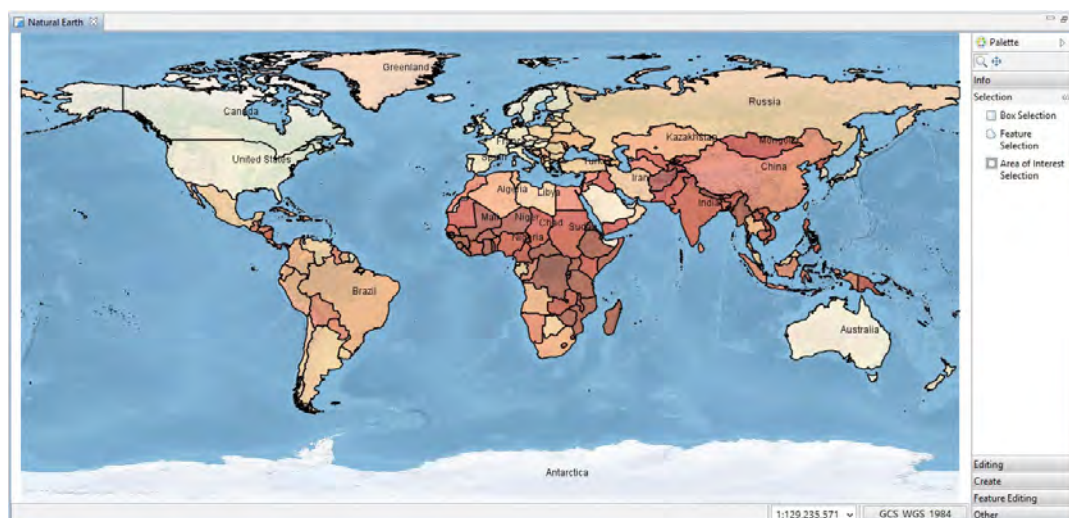
- ●   The countries layer is now displayed as *theme of population data normalized by gross domestic product as a quick measure of population productivity*.

7.2 *Legend*

You can use a legend to review the colors and symbology used to illustrate your thematic map.

- ●   From the menubar select *Layer --> Legend*.

- The *Legend* decorator offers a quick summary of your themed data.

- If you want to visualize the legend better you can uncheck the layer *NE1_50M_SR_W* from the *Layers* view.

- Zoom to the entire extent of the *10m admin 0 countries* selecting the *Zoom to layer* upper rigth of the *Layer* view.
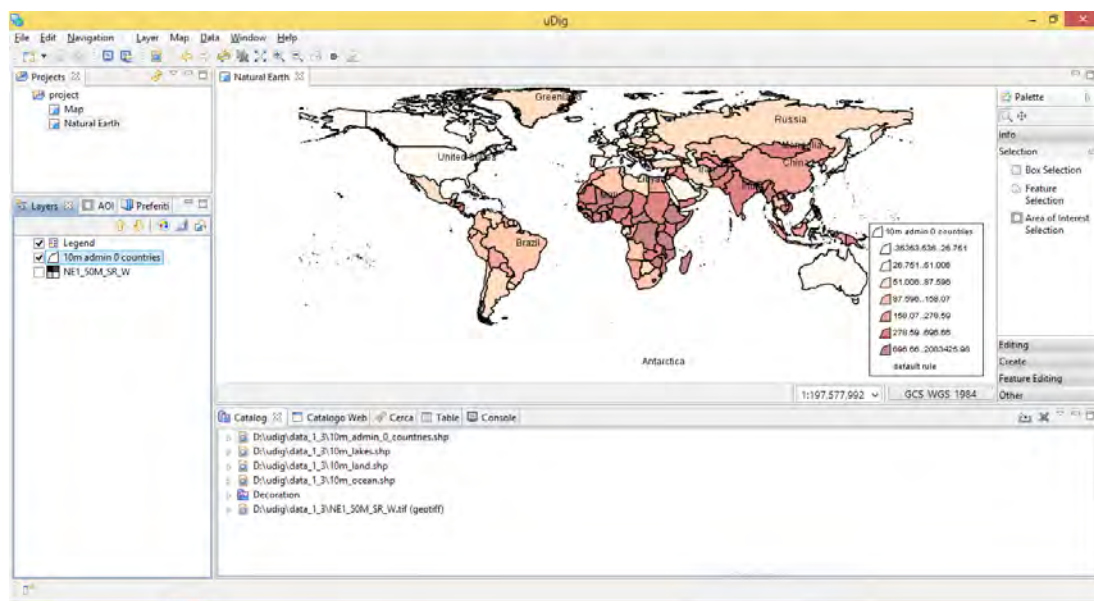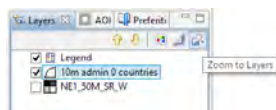
7.3 Layout and Perspectives

- *Map* editors can be resized and expanded
  - Double click on the *Natural Earth* editor tab to maximize the editor display.
  - Use the zoom tool to explore the world while the editor is maximized.

This tutorial is written by UniTN, please refer to the authors for any question.
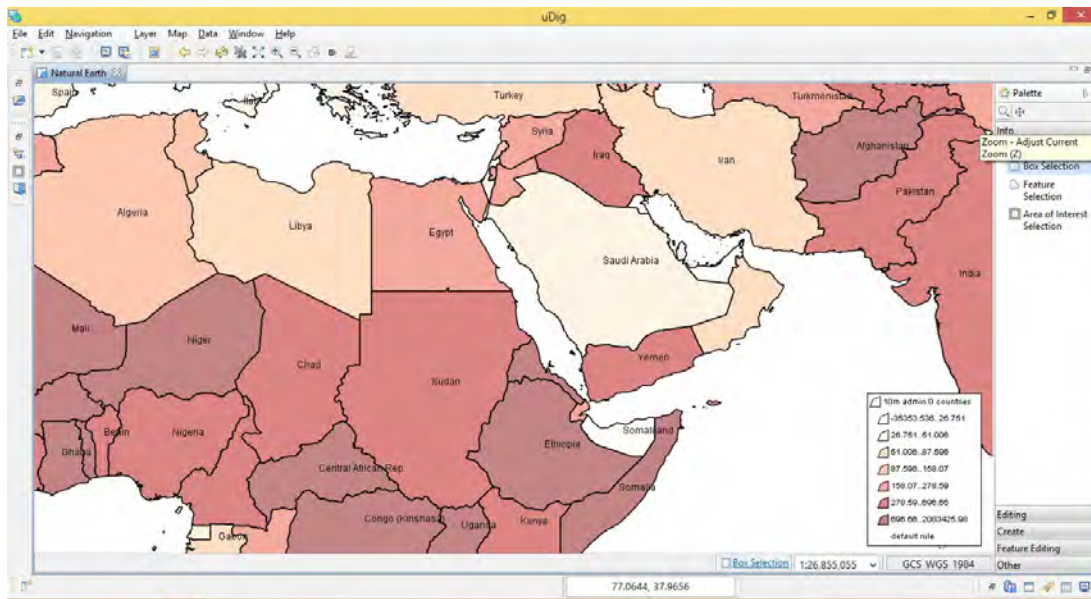
- o Your *Layers* view is still available as a fast view on the left hand side of the screen. Press *Layer* view button to slide the *layer* view on and off the screen as needed.

- o Double click on the *Natural Earth* editor tab again to restore the previous size.

- You can also open two map editors and arrange them side by side by dragging the *Map* editor tab into new position.

- You have a lot of flexibility in arranging views around your *Map* editor.

  - o You can drag views into different locations along the edge of your map by dragging their *View* tab into the desired location.

  - o You can detach a view by dragging it completely out of the window

  - o You can right click on the view for more options including a slide out *Fast* view.

  - o More views are available using the menubar *Window --> Show Views*

- The arrangement of the *Workbench* editors and views is called a *Perspective*.

  - o Switch between perspectives using the menubar *Window --> Open Perspective*

  - o Use the menubar *Window --> Reset Perspective* to restore any views you accidentally closed during experimentation.
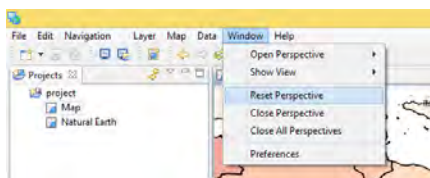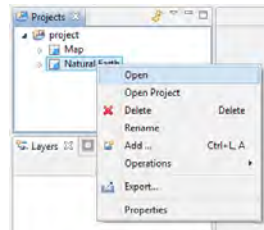

- Close the *Map* view clicking on the **X** near the name of the map on the upper side of the view.

8 Information Request

In this section, you will learn how to use the *Info* tool.

- Open your *Natural Earth* map,

Hint!

You can also double click on the Natural Earth map in the Projects view to open it.

● Uncheck or delete the *Legend* layer in the *Layers* view to have more space for displaying features.

● Use the *Zoom* tool to navigate to an interesting detail.

● Change to the *Info* tool in the *Map* editor *Palette*.

Hint!

*You can use the **i** keyboard shortcut cycle between available information tools. The tool cursor will indicate the current tool so you do not have to look up when working.*

● Use the *Info* tool to click on a country: the *Information* view open to list each layer with information

● The left pane of the *Information* is used to pick the details to display: pick the *10m admin 0 countries* feature.

● The right pane of the *Information* view is used to explore the attributes of the country you clicked on.

   ● You will see the information view flash the country to remind you of the area you clicked. This is useful when sorting through several features on different layers.

   ● The *Information* view is only used to review values, we will cover editing further in this tutorial
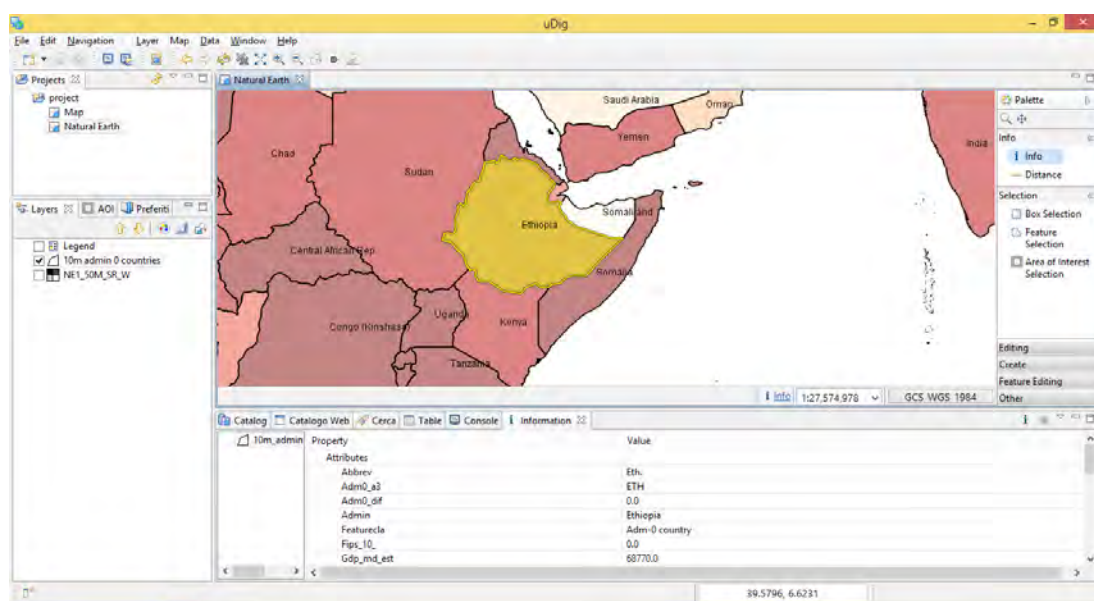
This tutorial is written by UniTN, please refer to the authors for any question.

- The details displayed based on the content picked in the left pane of the *Information* view: Pick the *NE1_50M_SR_W* raster layer to review the RGB values.

- Exit the *Info* tool clicking on an other map navigation tool (zoom, pan or select).

9   Re-projection

The shapes making up a map can come from a range of **coordinate reference systems** - each using **different measurements to record locations on the earth**.

In order to combine these data sets on screen automatic reprojection is used to transform information into the common coordinate reference system you have selected for your map.

- You can ask that the map change its projection to match a layer.

    Check the *NE1_50M_SR_W* layer in the *Layers* view to visualize the raster data, right click on *NE1_50M_SR_W* and use *Operation --> Set Map Projection from Layers* to use this layers projection in the map.
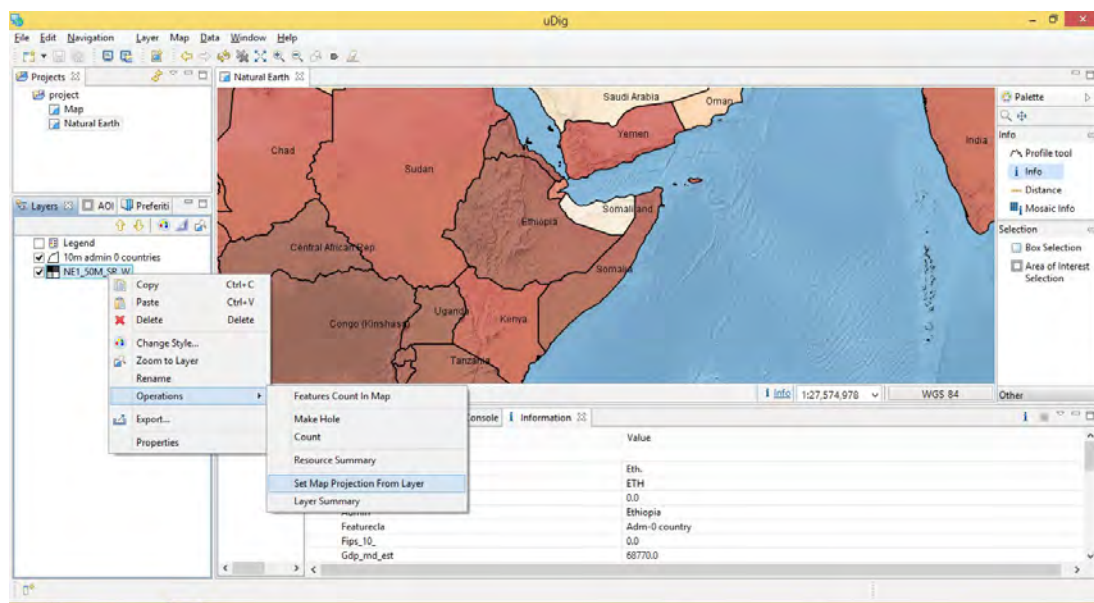
- o Not all coordinate reference systems can display all information. Some are only valid for a specific region.

- o This operation can be useful if you are having any trouble displaying a layer and want to directly view the data.

Note!
You can see the CRS (Coordiate Reference System) of the Map in the box in the lower right of the view ***map editor status area***.

- You can also choose the map coordinate reference system yourself.

    In the *Map* editor status area press the *WGS_1984* button to bring up the *Coordinate Systems* property page for your map.
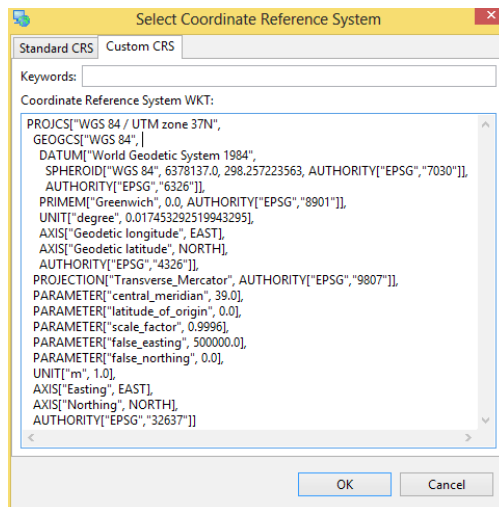
This tutorial is written by UniTN, please refer to the authors for any question.

● The *Coordinate Systems* property page allows you to change the Coordinate Reference System of your map. The *Standard CRS* tab allows you to search the predefined coordinate reference systems.

Please type in **wgs 84 / utm**, then select **zone 37N** and press *ENTER*.
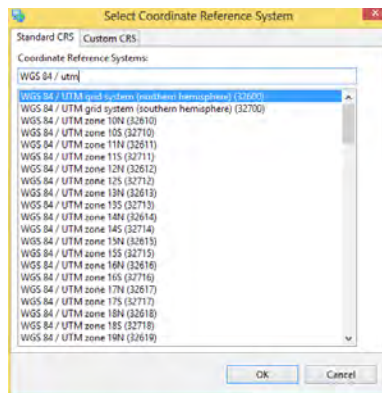
● This selects the *UTM coordinate reference system based on 1984 datum* which is commonly used to represent metric information, in the *37 zone northern hemisphere*.

   ○ You can also search by name, try typing in **32637** (EPSG code) to list matching projection

● You can have a look at the formal definition of *WGS 84 / UTM zone 37N* by switching to the *Custom CRS* tab.

   ○ The definition is provided in *Well Known Text* - you can use this format for your own custom CRS.

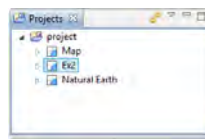● Press the *OK* button to change the coordinate reference system of your map.

10 Creating Feature Type

In this section we are going to create a new feature type to experiment with some of the more interesting edit tools.

● Close the Map *Natural Earth*

This tutorial is written by UniTN, please refer to the authors for any question.
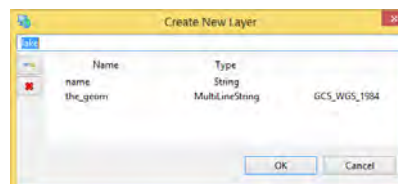
● Create a New Map

● Rename the map to **Ex2**

● Add the **10m_rivers_lake_centerlines.shp** contained in your data folder. You can drag and drop the file onto the map, or use *Layer --> Add* from the menu bar (see previous chapters).

● Use the navigation tools to go and zoom to an interesting place in the world.

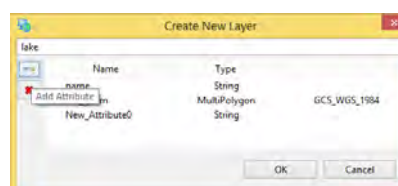● Select the *Layer --> Create* command from the menu bar.
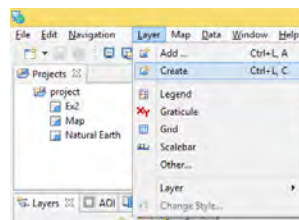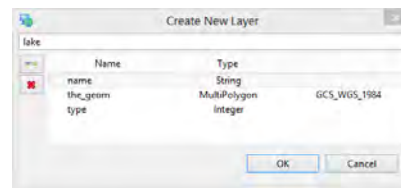

● Replace **New_Feature_Type** with **Lake**.

● Change the type of the *the_geom* attribute to **MultiPolygon**.
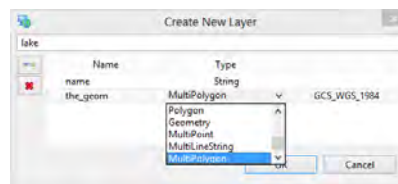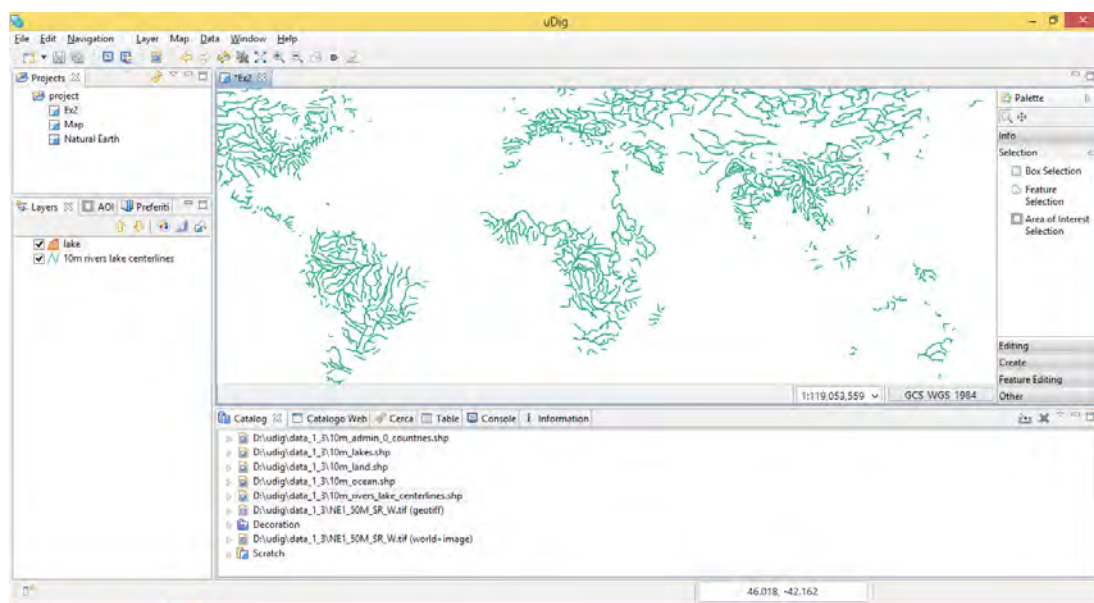

● Click *Add Attribute* button.

● Select your new attribute and change the Type to **Integer** and the Name to **type**.


● Press *OK* button.

● Your layer has been added to the current map.

● Your data has been added to the Scratch area of the catalog.

11 Copying Content

Now that we have created a new feature type, we can use cut and paste to grab geometry content from other layers.

● Add the layer *10m_lakes* to the map, it should be already loaded in the *Catalog* view.

● Select the layer *10m_lakes* in the *Layers* view and *Navigation --> Zoom to All* in the menu bar, then zoom with *Zoom* window tool to Africa.

● In the Layers view make sure that **10m_lakes** is selected as shown below.

This tutorial is written by UniTN, please refer to the authors for any question.
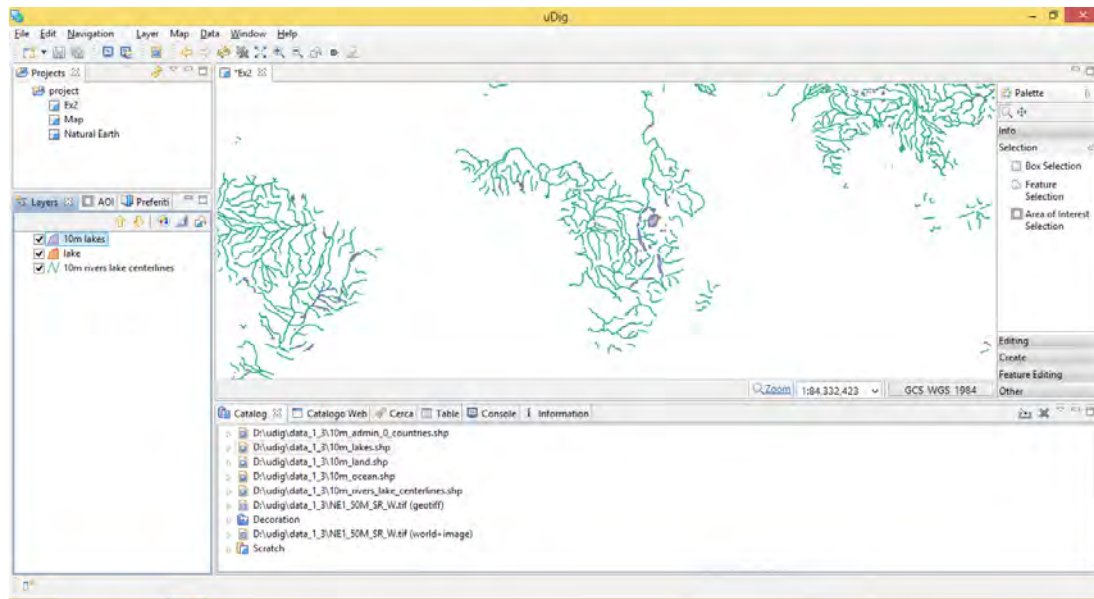
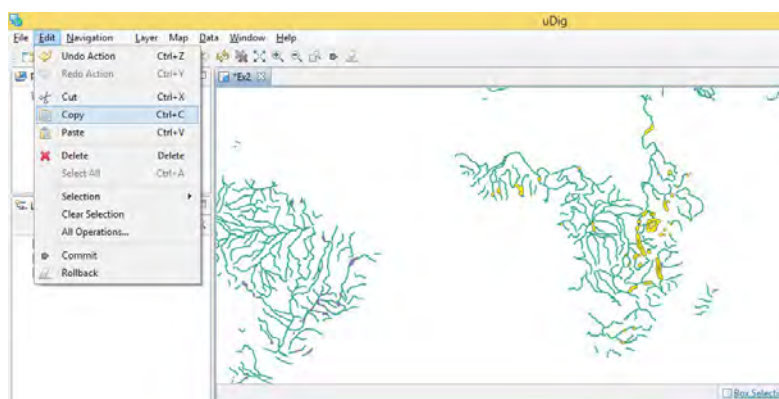- Select Box Selection from the tool palette.

- Use the Box Selection tool to draw a box around the lakes of Africa. The lakes will change color when selected.
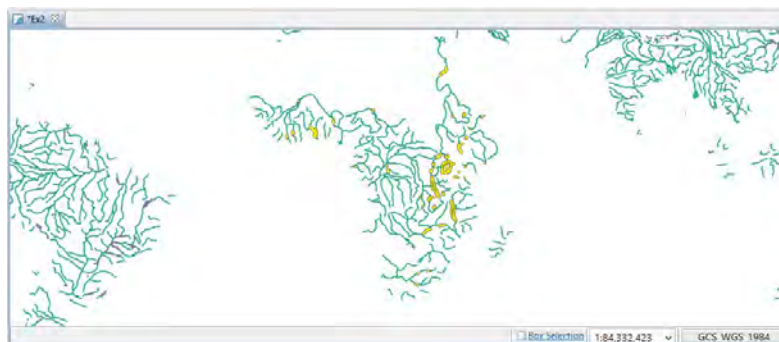
- Select *Edit --> Copy* from Edit menu. These lakes will be placed onto the clipboard.

*This tutorial is written by UniTN, please refer to the authors for any question.*

● Select **Lake** layer in the layer view, and select *Edit --> Paste* from Edit menu. You can do the same operation with right-click mouse button in the map view and select *Paste*.
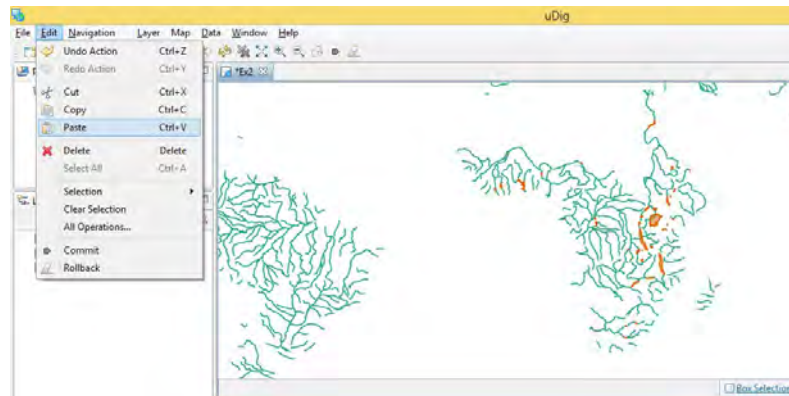
● Press *Save* button to save the new layer and write these new features into it.

● Select the folder where to save the new shapefile called **Lake** and then press *Finish*.

  While saving it is possible to change both the name and the CRS of the shapefile you are saving.
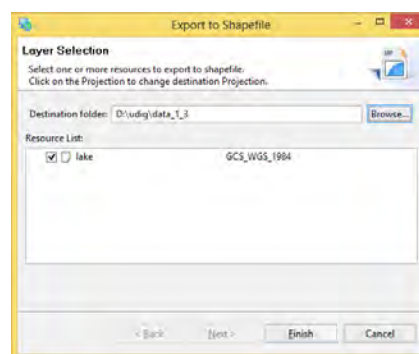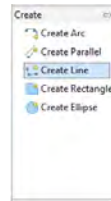

12 Create Geometry

The second category of tools involves *creating geometry*, we will cover line and polygon creation and *vertex snapping*.

● Select *10m_rivers_lake_centerlines* in the layer view and zoom to Ethiopia.
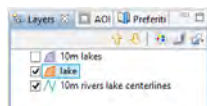

● Choose the Create Line Tool from the Create drawer of the Palette.

This tutorial is written by UniTN, please refer to the authors for any question.

- Draw a river on your map, and press *Enter* on the keyboard to indicate that you are finished your line.

- You have just created a new river, remember to press *Save* or *Commit* in the tool bar to write your change to the shape file.
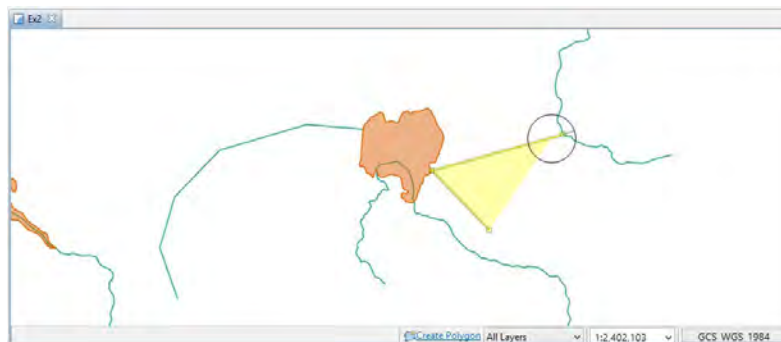- Change to the Lake layer in the *Layers* view.

- Choose the *Create Polygon Tool* from the *Create* drawer of the *Palette*.

- Enable snapping by pressing *CTRL + SHIFT + S* until Snap to features in current layer is displayed in a dialog.

- Draw a polygon, close to a feature, as you draw close to another polygon or a line you can watch how snapping effects the drawing process.

- You can complete your polygon by ending it on the vertex that started the polygon or pressing *Enter* on the keyboard when you want to connect the last inserted vertex with the first one.
- Please press *Save* or *Commit* button in the toolbar to save the new feature in the shapefile.


This tutorial is written by UniTN, please refer to the authors for any question.
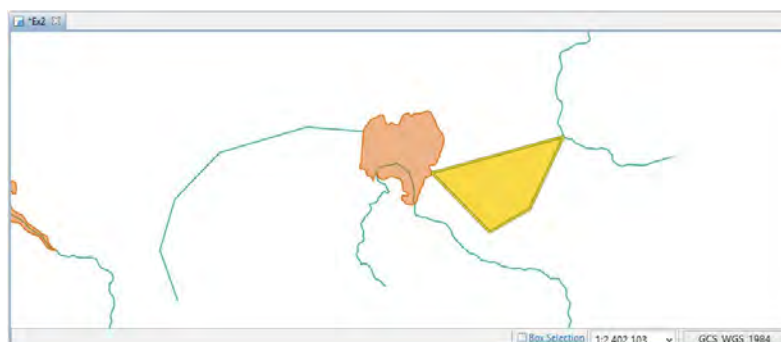
13 Changing Snapping Behavior

The snapping choices included with uDig are as follows:

No Snapping	Snapping is turned off by default.
Selected Features	Snap to a vertex in a selected feature.
Current Layer	Snap to a vertex in the current layer
All Layers	Snap to a vertex in any layer
Grid	Snap to the nearest grid intersection

There are three different ways to change the snap behavior:

● In the which can be found in the *Window --> Preferences* menu.
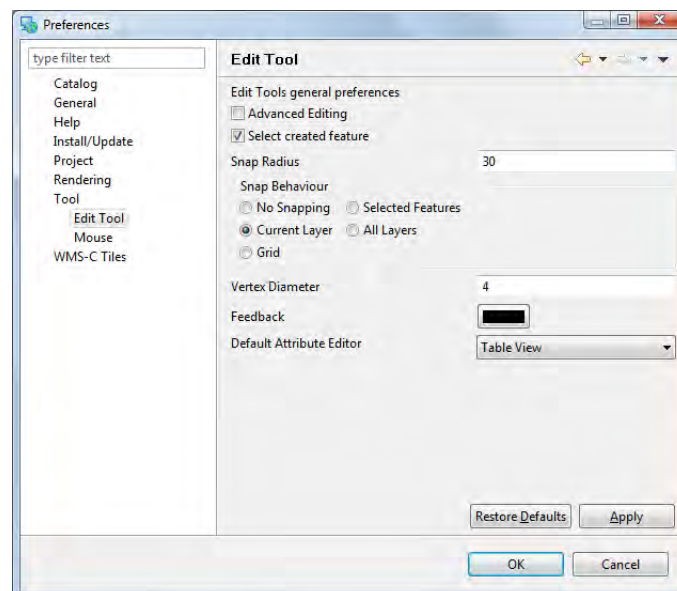
● While an edit tool is **active** press *CTRL + SHIFT + S*. This will cycle through the available snap behaviors. A small pop-up will display the new behavior.

● You can see a short cut of the tool snapping options in the tool options along the bottom of the Map view.

14 Delete Feature Tool

● To delete the feature just created select the *Delete Feature Tool* in the Feature Editing tool of palette.

This tutorial is written by UniTN, please refer to the authors for any question.
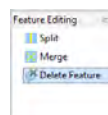
● Click on the newly created feature and it will be deleted.

15 Working with Attributes

In this section you will learn how to edit an Attribute, along the way we will explore the use of search and selection tools.

To start out with, lets import in the *Catalog* and visualize in the *Map* the layer *10m_populated_place_simple*, then:

● select *Navigation --> Zoom to All* from the menu bar

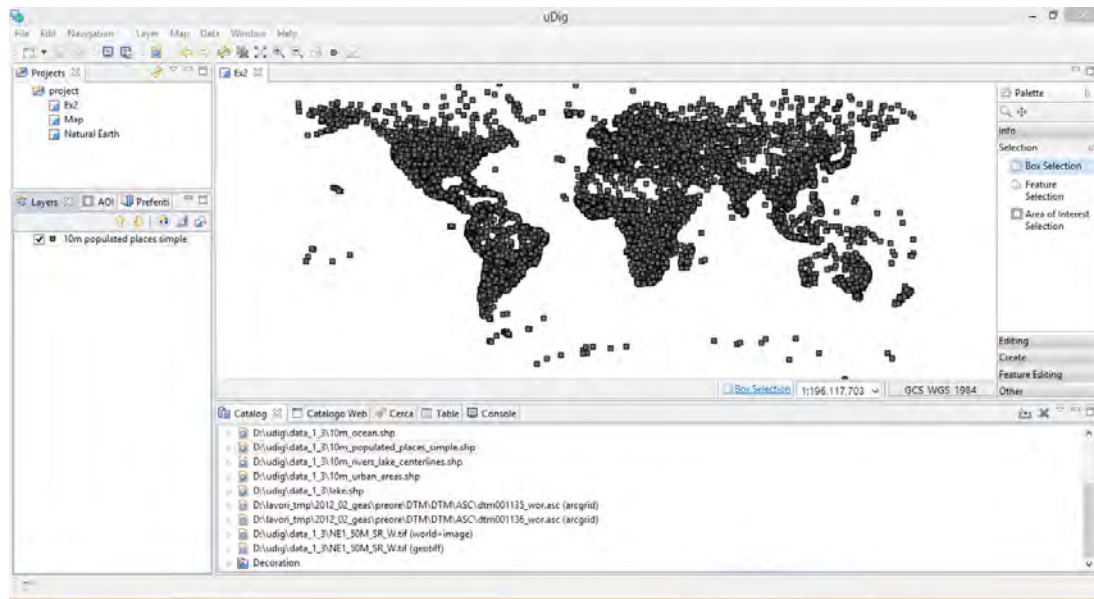● select the layers *10m_lake*, *lake* and *10m_rivers_lake_centerlines* in the *Layers* view

<div style="background-color:yellow;">
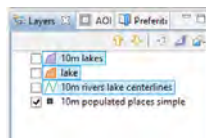
Note!
On windows hold down the control key or shift key for selecting multiple files.

</div>

● select the *Edit --> Delete* command from the menu bar to delete them from visualization so you will have only the layer *10m_populated_place_simple* in the *Layers* view
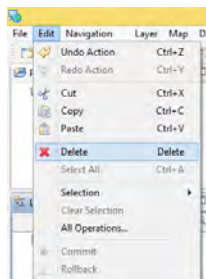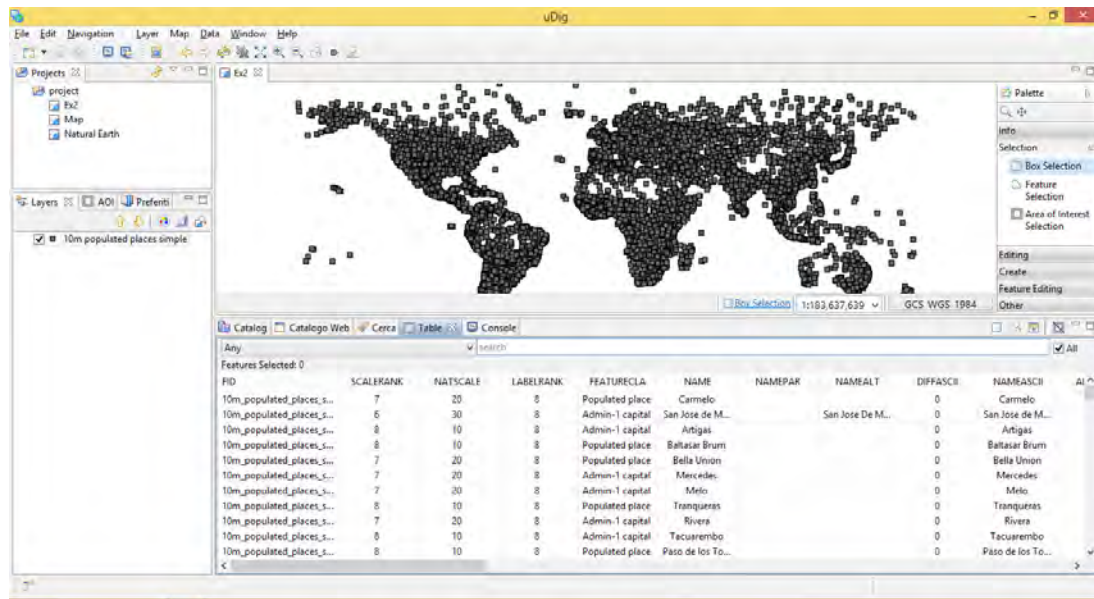
- ensure that **10m_populated_place_simple** is still selected in the layers view, and select the *Table* view

- the first time you use *Table* view you will need to accept a warning that all the features will be loaded into memory, check the flag on *Do not show the warning in the future*
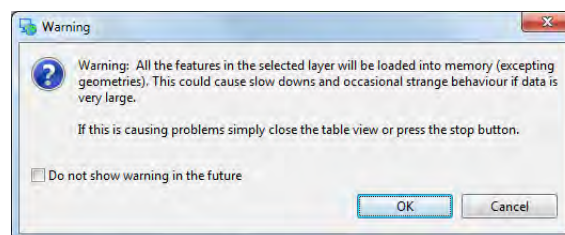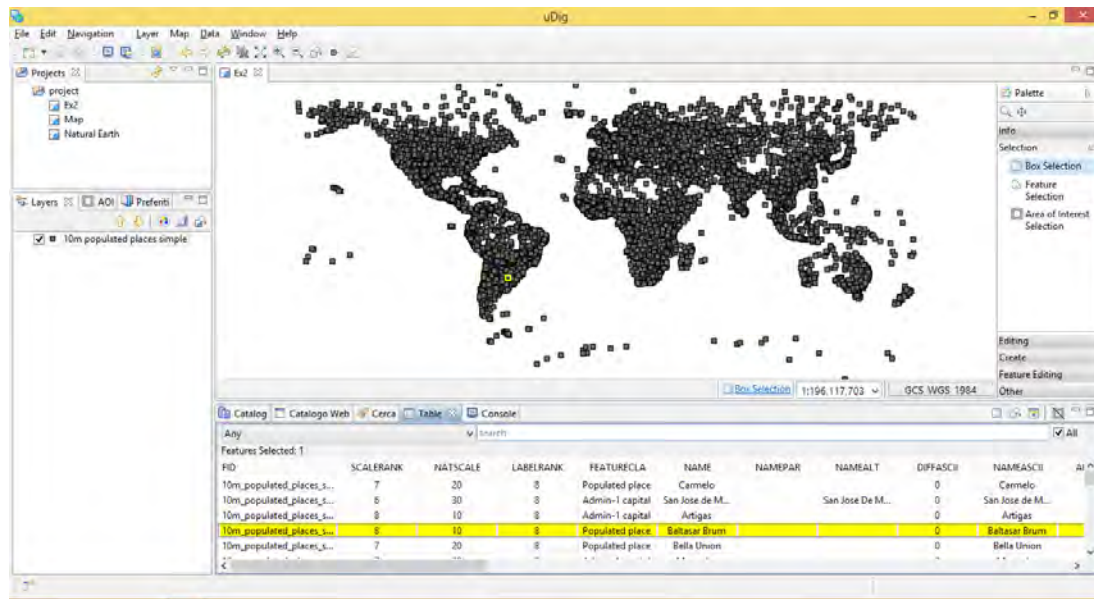

- the *Table* view shows all the features for the current layer
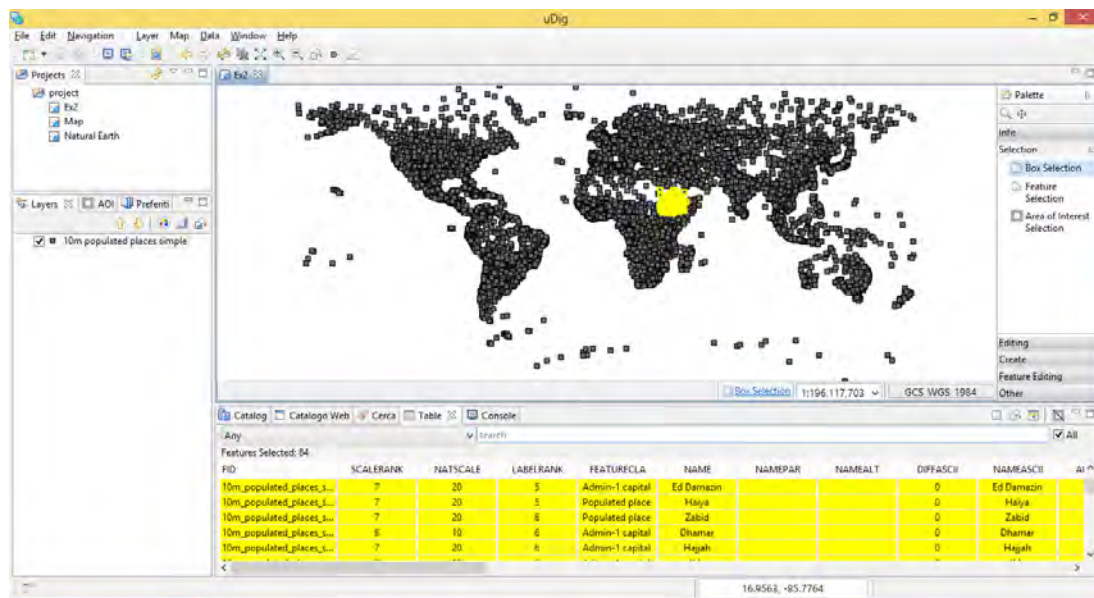
● choose the *Box Selection* tool in the *Palette --> Selection*
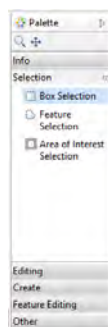
● if you select one feature in the *Table* view you will see that the corresponding line will be highlighted in yellow in the table and also in the *Map* view

- if you select one or more feature in the *Map* view you will see that/those features highlighted in yellow in the map and also the relative rows in the *Table* view

- it is possible that you will not see all the highlighted features in the *Table* view, as you can see in the following image, three features are selected from the *Map* view and you can see only 2 features highlighted in the *Table*, even if in the header there is written that the selected features are 3
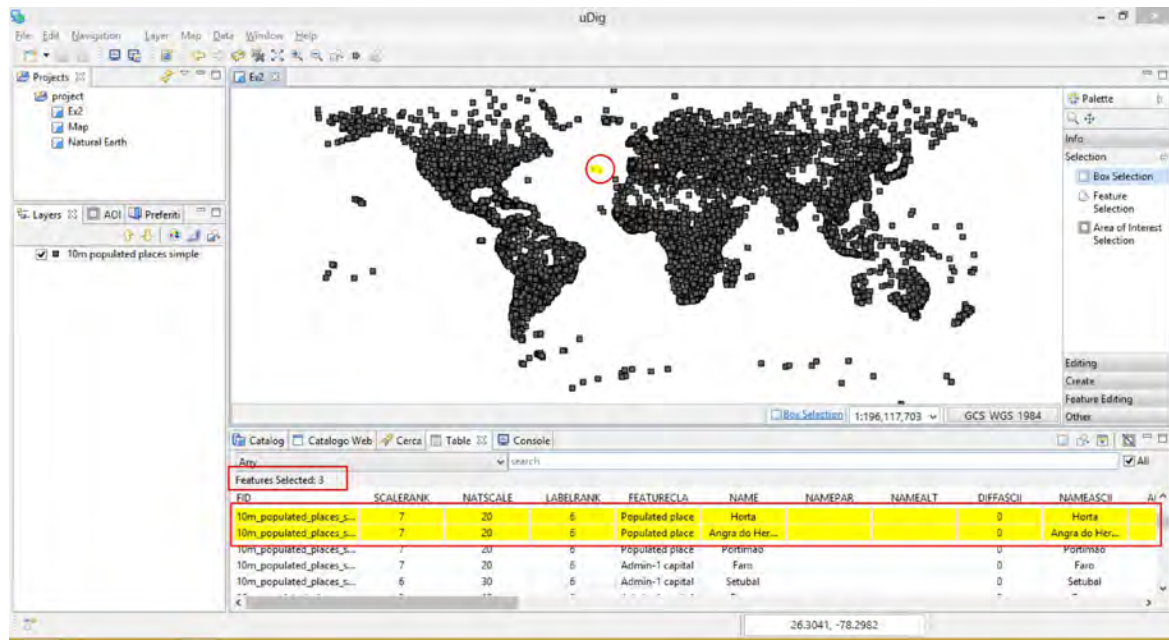
● select the **Promote selection to top of the table** from the *Table* view
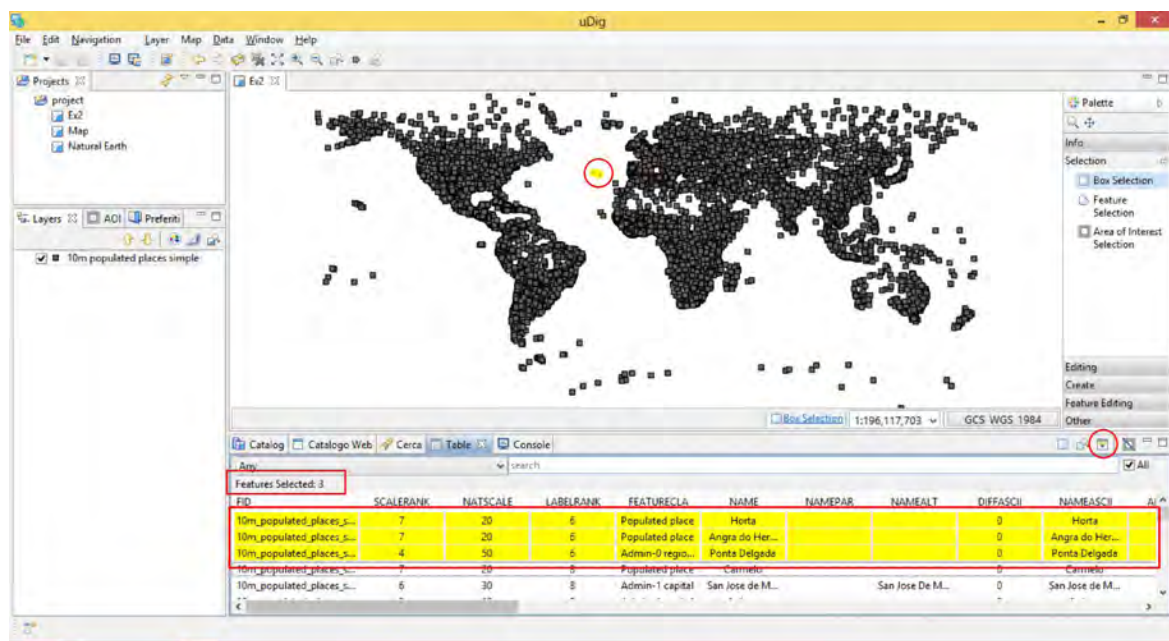
● visualize the *10m_admin_0_countries* in the map and zoom to Ethiopia: you can navigate the map and then select the country and verify that it is Ethiopia

Note!
The selection tool works only on the layer selected in the Layer view.
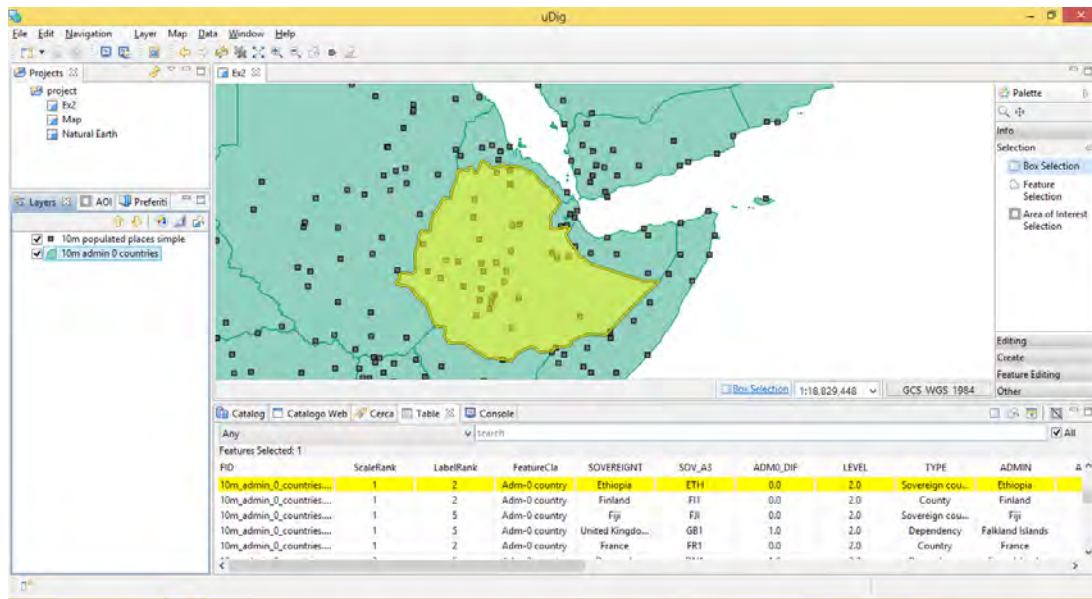
This tutorial is written by UniTN, please refer to the authors for any question.

Note!
To unselect the feature just select something else or nothing in the Map view.

● select the *10m_populated_places_simple* in the *Layers* view and select in the *Map* view the
  cities until you find **Arba Minch**
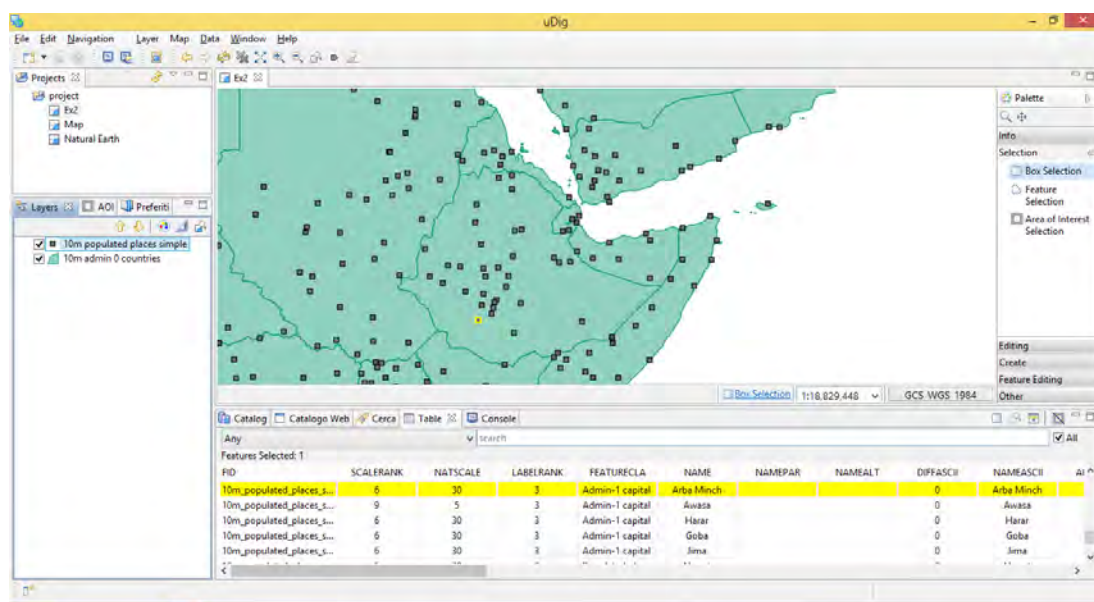
● you can also look for a specific attribute with the *search* too in the *Table* view, type Addis in
  the box and press *Enter* on the keyboard: as you can see there are different features having
  the word *Addis* in one of the attributes field, in this case most in the *ADM1NAME*
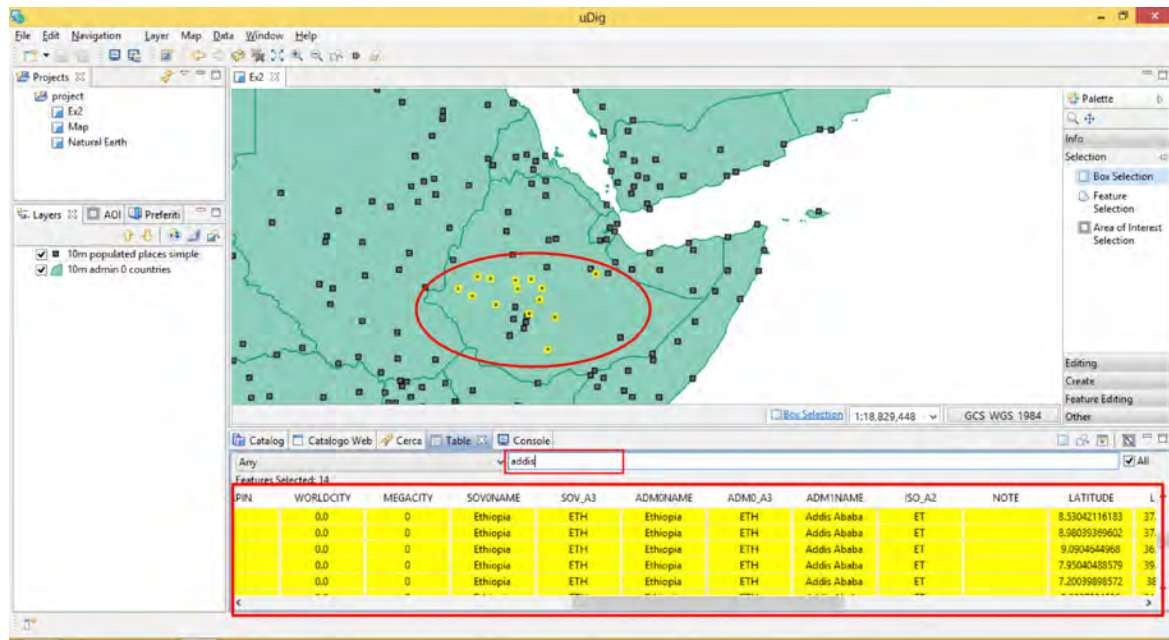
- if you want to select only the city of *Addis Ababa* you have to select the name of the attribute in which searching for that word: select **NAME** from the drop down menu and press *Enter*, you will see the city highlighted both in the *Table* and in the *Map* view.
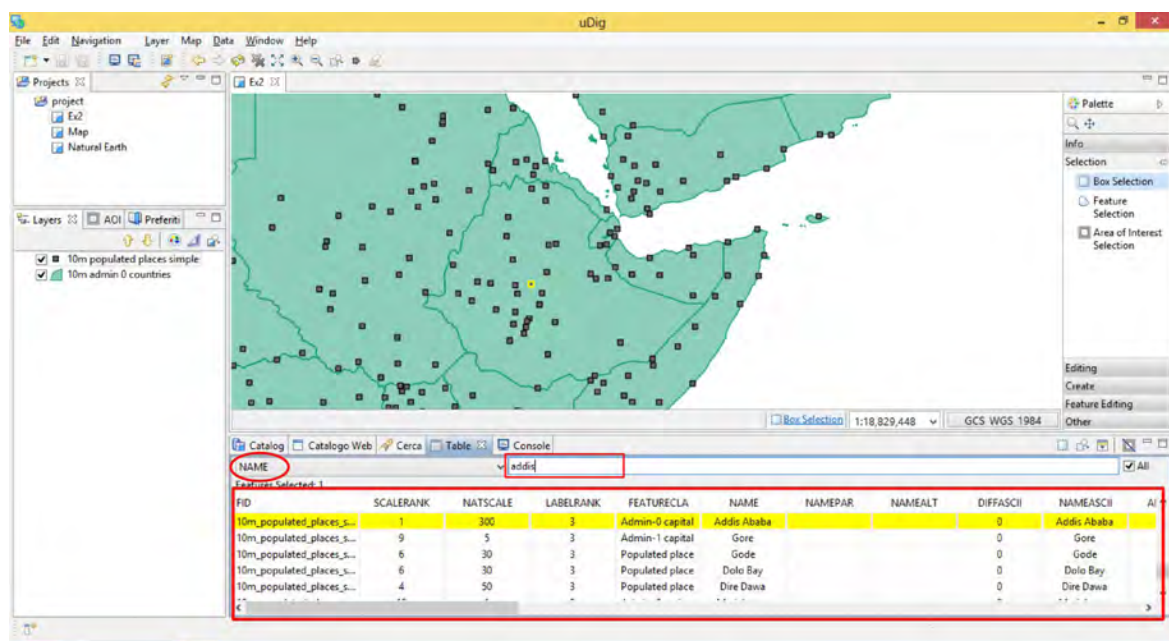

- go ahead, search **Arba Minch** and rename the city yourself, change the **NAME** attribute by clicking in the *Table* view inside the cell you want to edit
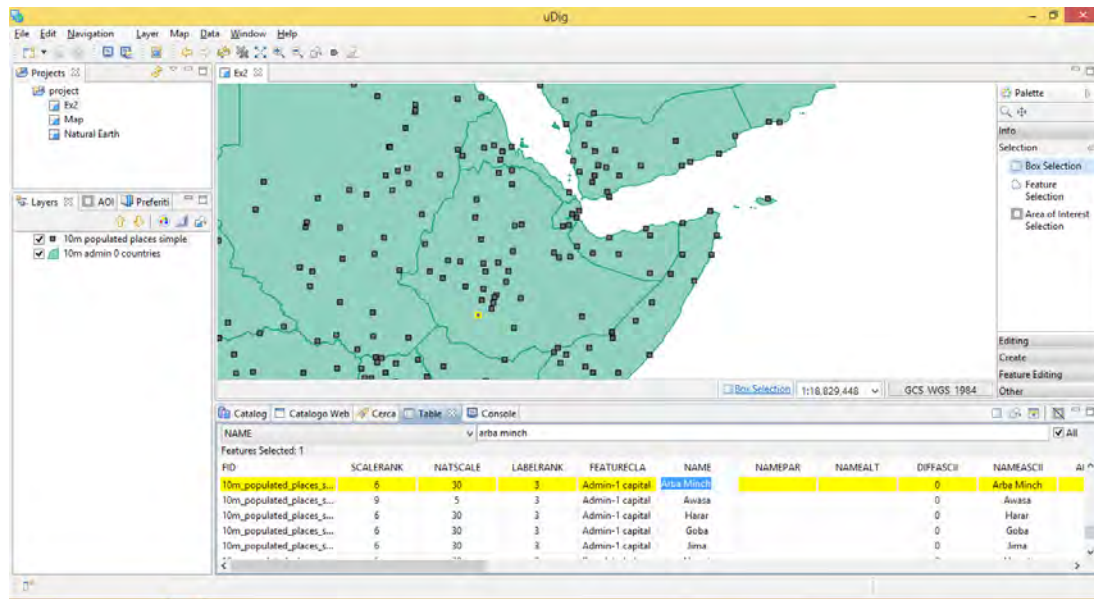
- once selected the cell to edit type the new *NAME* as **My City** and then press *Enter* on the keyboard
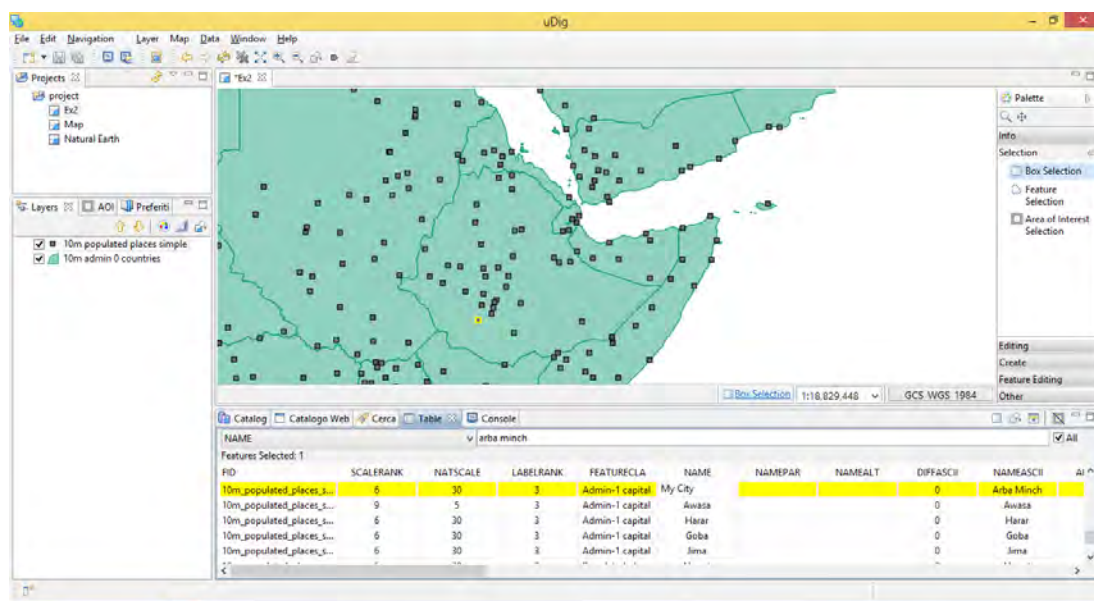
- press the *Commit Changes* or *Save* button, in the tool bar, to save the modified layer

This tutorial is written by UniTN, please refer to the authors for any question.

16   Editing Geometry in a shapefile

We will use the Edit Geometry tool to move river *Genale* in Ethiopia.

●   Add the layer *10m_rivers_lake_centerlines* to your Map from the Catalog.
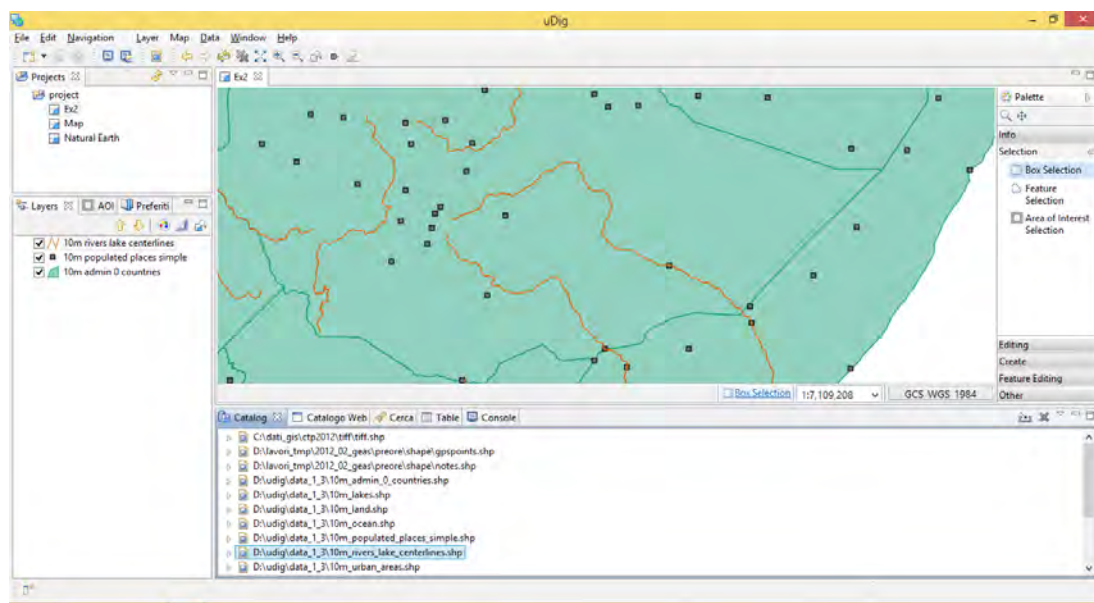
●   Select **10m_rivers_lake_centerlines** in the *Layers* view.
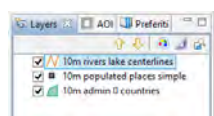
●   Zoom to Ethiopia and look for River *Genale* in the southern part of the country. Zoom to a scale of 1:1000000 and pan until the map contains the starting point of that river.

This tutorial is written by UniTN, please refer to the authors for any question.
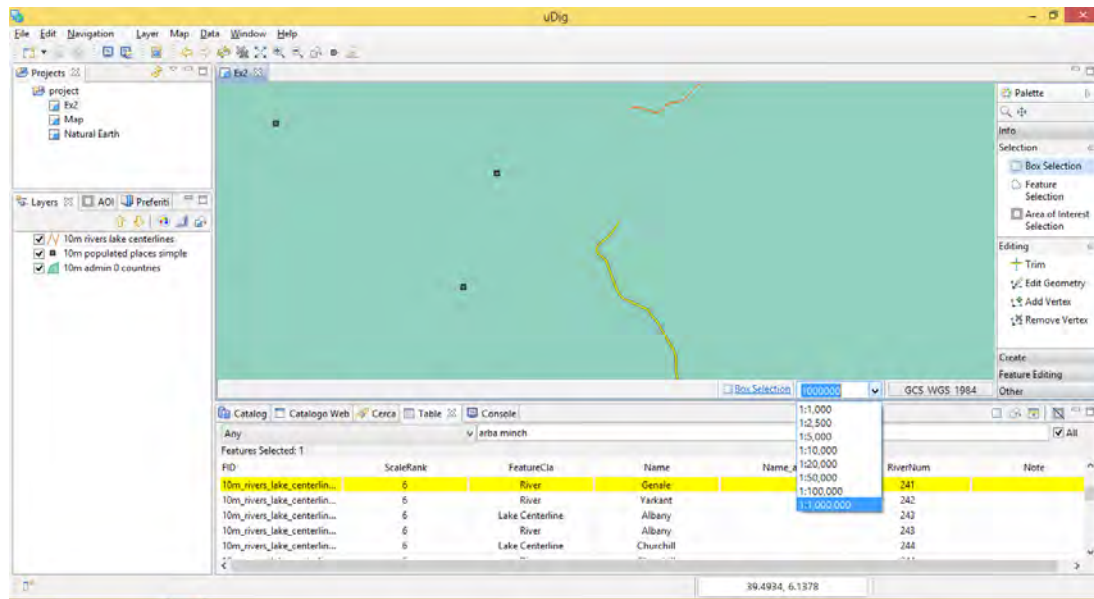
- Change to the Edit Geometry tool from the tool palette (click the Editing drawer to see the available editing tools).

- Use the Edit Geometry tool to select river *Genale*.
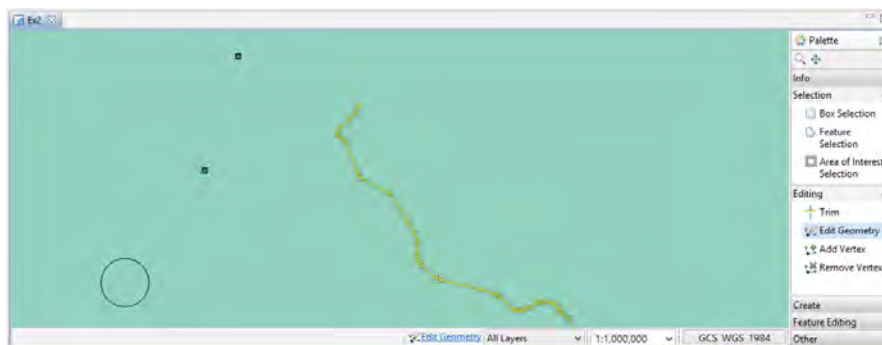
- The river will change color and develop "vertex handles".

- Move the vertex handles as you prefer one by one or selecting multiple vertex and moving all together.

This tutorial is written by UniTN, please refer to the authors for any question.

● Add new vertex by switching to the *Add Vertex* tool in the Editing drawer of the Palette.

● You can click any where on the road to add a new vertex.

● While editing a feature you can use Undo and Redo in the Edit menu as required.
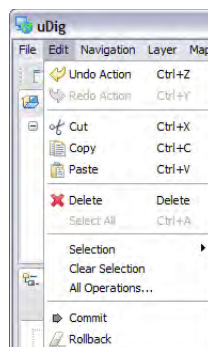
● Press the Commit Changes button in the tool bar to send your changes off to the shapefile.

● Your line has now been moved.

● You can edit many Features at once, from different layers, or from different sources of data. Pressing Commit Changes will send off all the changes made in the current map.

This tutorial is written by UniTN, please refer to the authors for any question.

17   Exporting to Shape file

In addition to editing content from many sources, you can also export content to a shapefile.

- Select in the layer **10m_populated_places_simple** only the cities of Ethiopia, use the *Search* tool in the *Table* view.
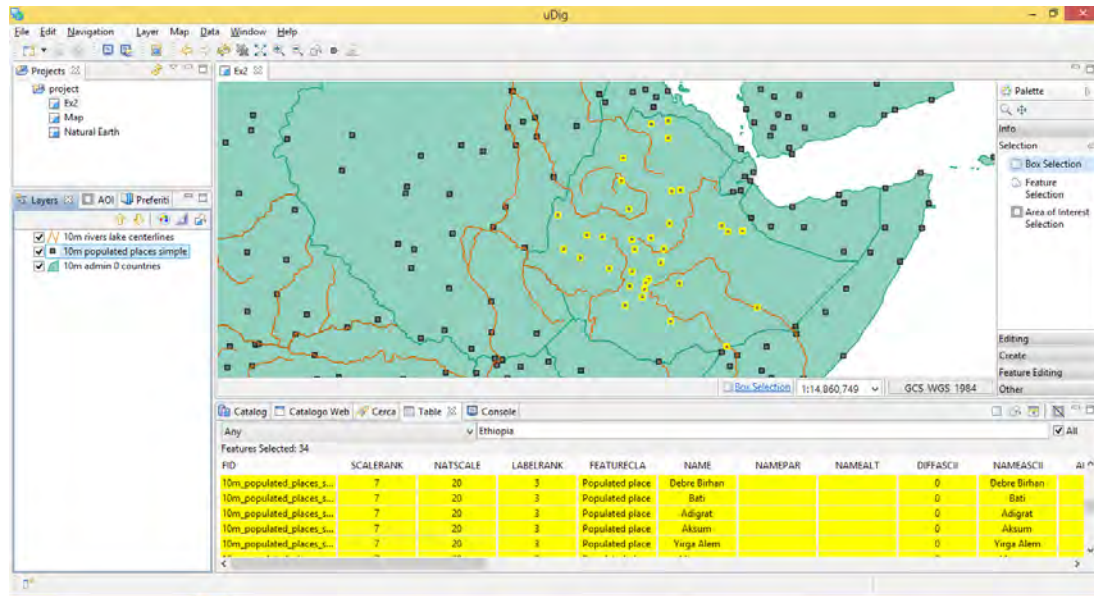
- With **10m_populated_places_simple** selected, choose *File --> Export* from the menu bar or right click on the name of the layer in the *Layers* view and select *Export*.
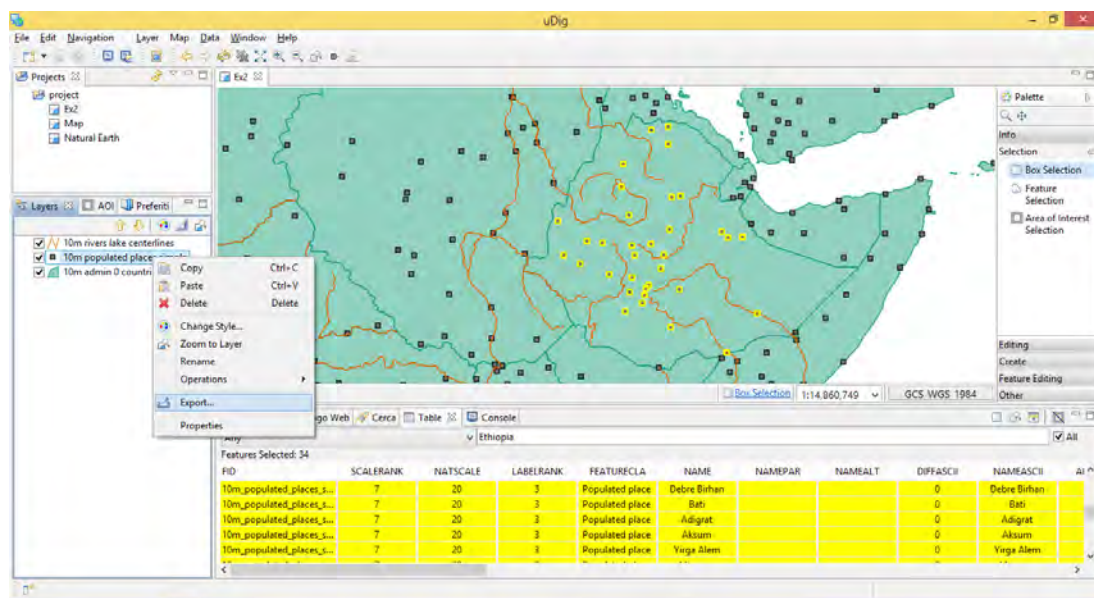
- Open the **Other** option, select the **Layer to Shapefile** option and press *Next*

This tutorial is written by UniTN, please refer to the authors for any question.
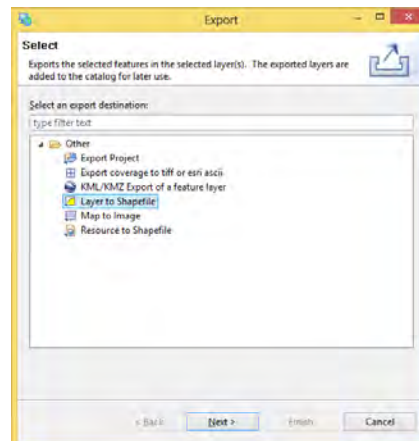
- Your Ethiopian cities layer will be available for export, you can see that it is in the *CGS_WGS_1984* projection. uDig propose to save the new shapefile in the same directory of the source data and with the same name, click on the name and write *10m_ethiopian_populated_places*
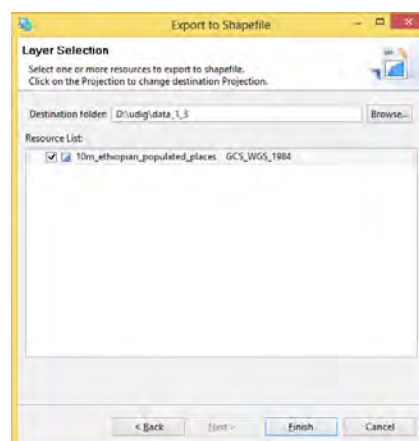
- Press *Finish* to save the file to disk.
- Exported files are added to the catalog.

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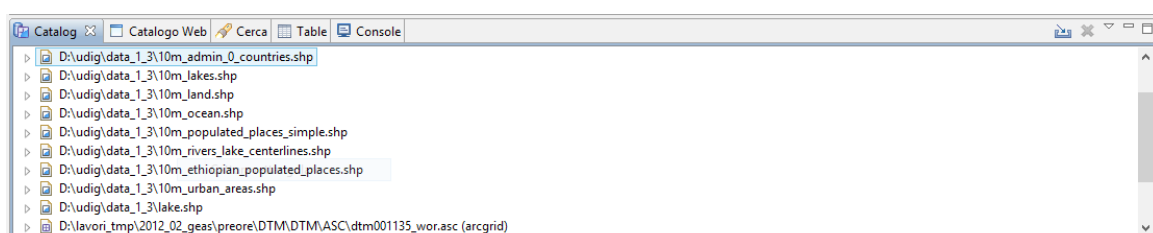
18 Print

To print the current map you must first create a Page that allows you to lay it out and print it from there.

1. Open the map you wish to print: in this case we want to print the current opened map **Ex2**

2. Press the print button 📝 on the toolbar to create the printing page (or select *File --> Print*)

3. It will ask you what template you wish to create the page from.
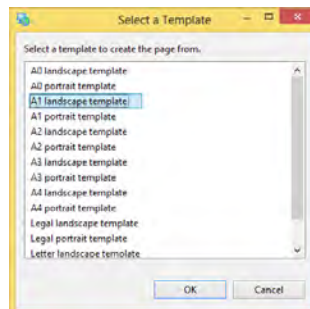
4. Page Editor will be opened showing the arrangement of the Page

5. You can modify some of the component of the print by selecting them and modifying the dimension and position, or choosing new elements to add from the *Palette*
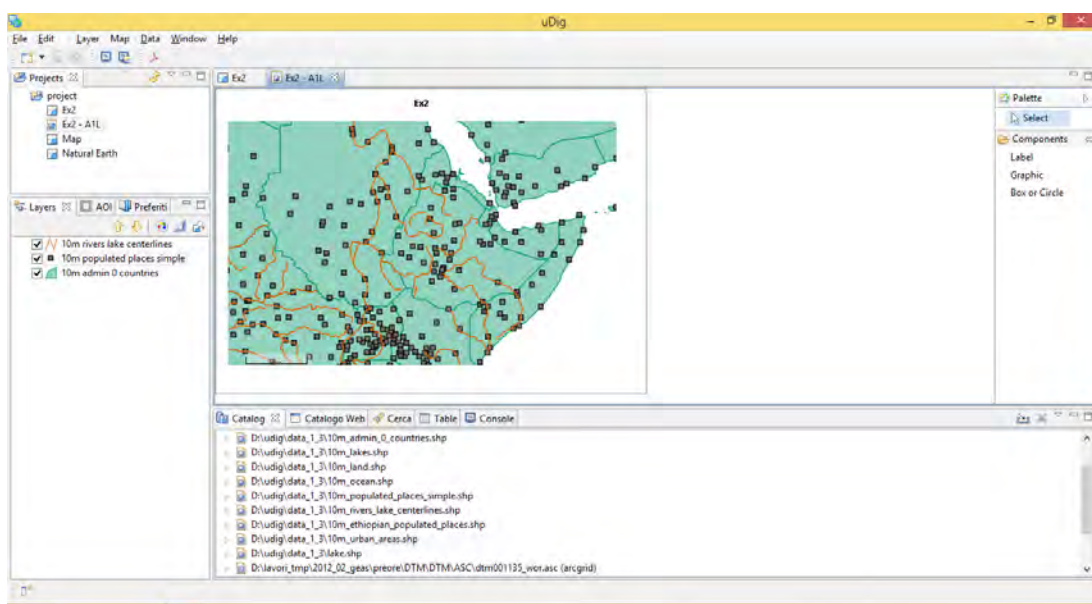
6. You can now press the pdf button 📄 to generate a PDF in the desired path.

19 Import GPS data

Point information can be easily written in an ASCII file with the format of Comma Separated Values (CSV), this means an ascii editable file with information separated by a special symbol, typically a *comma*.

GPS collected point information in the field are saved in this native format on the GPS and it can be directly imported in uDig. In particular *Leica* GPS saves the registered points with some attributes as a

CSV file containing the following columns:

Attribute	Description	Type
long	**longitude** of the point in degree	X
lat	**latitude** of the point in degree	Y
elev	**elevation** of the point	double
IDpoint	unique identifier of the registered point	string
PDOP	precision of the GPS signal for the current point	double
desc	a short description of the point if available	string
user	an identifier of the person that collected the point in the field	string
yymmdd	date of the relief as year (YY), month (MM) and day (DD)	string
hhmm	timestep of the measure in hours (hh) and minutes (mm)	string

The file looks like a TXT file with columns separated by a comma:

```
11.0821017295,46.0400073771,347.2291851472,1000   ,99999.00,--------  ,--------    ,130507,08:04
11.0821030625,46.0400109571,347.1763205901,A1      ,1.53,DAVIDE       ,--------    ,130507,10:13
11.0821024061,46.0400106934,347.1608341783,A2      ,1.53,--------     ,TTTT        ,130507,10:15
11.0821026554,46.0400109042,347.1898908559,A3      ,1.53,--------     ,TTTT        ,130507,10:16
11.0821171495,46.0400810839,346.3771764832,A4      ,1.53,--------     ,TTTT        ,130507,10:18
11.0821472916,46.0401252580,346.3474883046,A5      ,1.61,GAS          ,TTTT        ,130507,10:19
11.0822311922,46.0401265729,346.3621049151,A6      ,1.84,SCALA        ,TTTT        ,130507,10:20
11.0821362121,46.0401605455,347.4523371086,A7      ,1.53,ANGOLO INGRESSO,TTTT      ,130507,10:21
11.0822263398,46.0401522553,348.9949271008,A8      ,1.44,A 1 MURO STRADA,TTTT      ,130507,10:22
11.0822705024,46.0401478462,349.6590203531,A9      ,1.44,NO STRADA PER O,TTTT      ,130507,10:23
11.0821828401,46.0400912126,346.0772523573,2000    ,99999.00,--------  ,TTTT        ,130507,10:32
11.0821820753,46.0400871401,346.1033849567,A10     ,1.44,--------     ,RRRRR       ,130507,10:33
11.0821046863,46.0400095985,347.2055021804,A11     ,1.50,BASE VECCHIA ,RRRRR       ,130507,10:34
11.0822310974,46.0401265972,346.3619315242,A12     ,2.46,SCALE NUOVE  ,RRRRR       ,130507,10:35
11.0822703234,46.0401484356,349.6503213635,A13     ,1.50,ANTA BASE NUOVA,RRRRR     ,130507,10:35
11.0821360284,46.0401608683,347.3673373917,A14     ,1.50,SPIGOLO      ,RRRRR       ,130507,10:36
```

and the meaning of these information is what is contained in the previous table in the form of:

long,lat,elev,IDpoint,PDOP,description,user,yymmdd,hh:mm

Note!
*The GPS collected data are in lat/long WGS84 CRS (Coordinate Reference System) this is the standard CRS identified by EPSG code **4326**.*

You can import this file directly in uDig and create a point layer, to do this follow the following points:

- open the *Map* in which you want to import the data or close all the maps to create a new one
- switch to the *Catalog* view and press the *Import* button on the upper right side of the window then select the **CSV Import** to import a file in CSV (or TXT) format from the local file system into the workspace, then press *Next*

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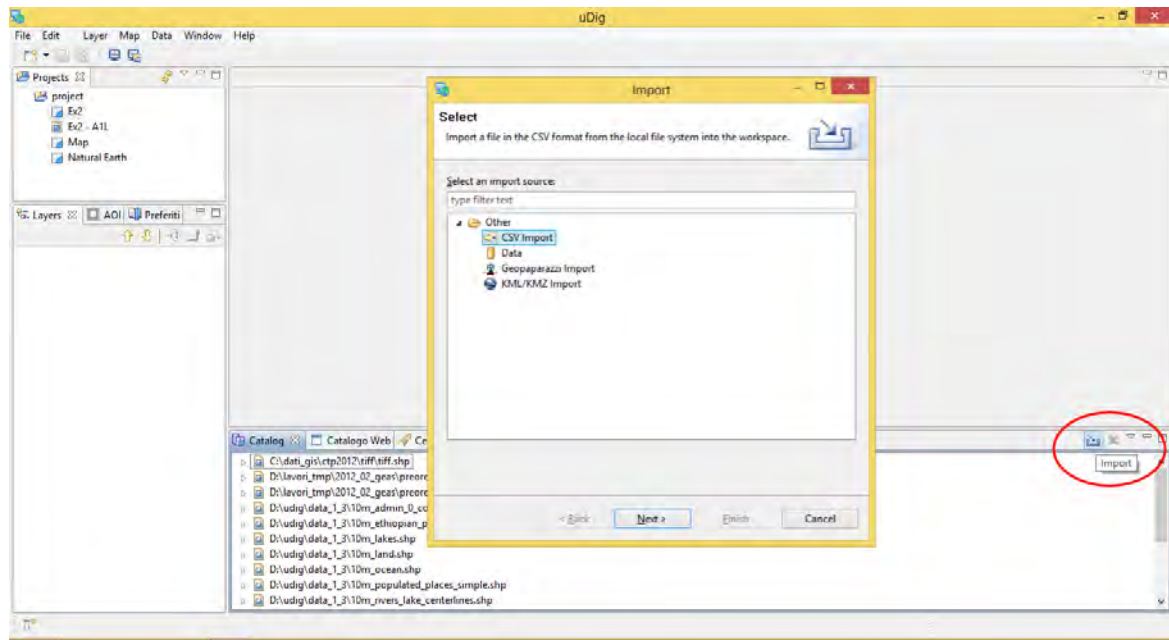
Note!
You must open the original file exported by the GPS and check for the first line. If there is an header as first line, please remove it from the file, save and select this new version of the file for the import.

- in the next window select the file on the file system and enter the required information:
  - CRS (Coordinate Reference System) of the original point data: please select to insert the CRS and type **4326** in the text box
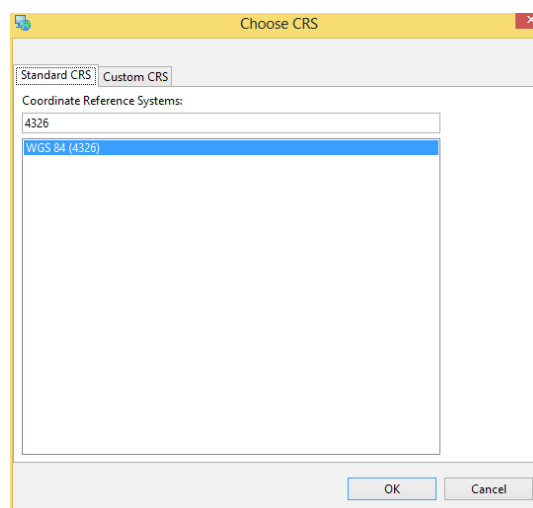
  - separator character: leave the proposed default value **comma**
  - complete the table by selecting the name of the *attributes* and their type: the values contained in the table are those of the first row of the original file. Select che attribute name to change as **Fieldname** and open the drop down menu in the **Type** column to change the proposed ones

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● the complete selection of attributes and types are proposed in the following picture, press *Next* to go on and create the new point layer

---

Note!

*Latitude and Longitude attributes are taken to create the geometry of the points: do not change the proposed attribute types, they have to be **X** (longitude) and **Y** (latitude).*

● if you had an opened map, a temporary layer is added to your active map, otherwise a new map is created with the name of the temporary layer and only this layer is preset

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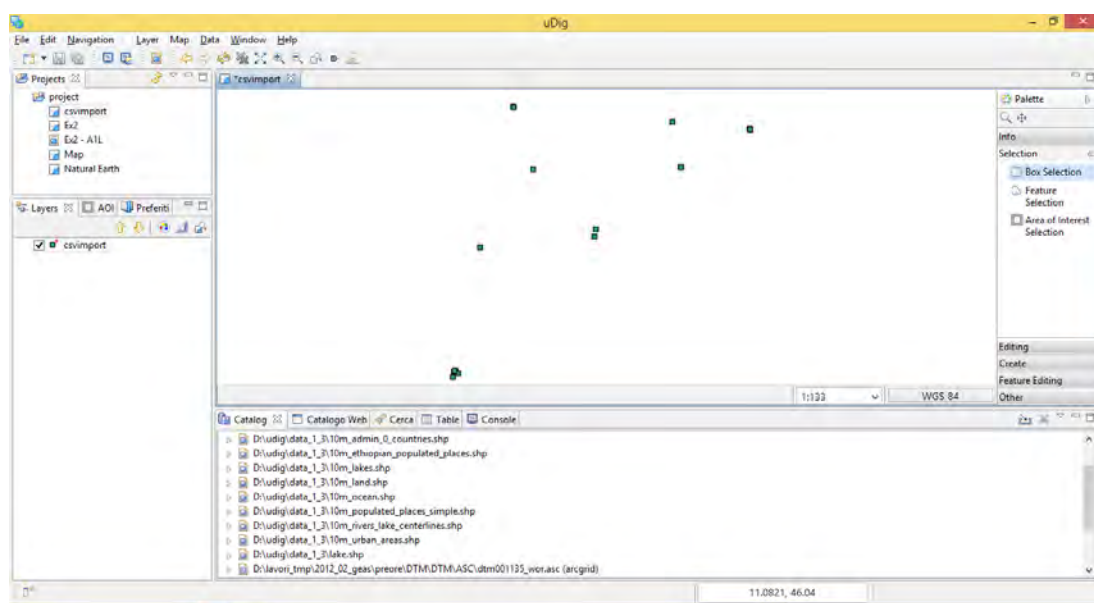
- as you can see the new layer has a red asterisk before the name in the *Layers* view, this means that it is a **temporary** layer

- if you want to save the new layer as shapefile you have to press *Save* button in the toolbar or *File --> Save* from the menu and select the path, the name and the projection of the new shapefile. Press *Finish* to save the file
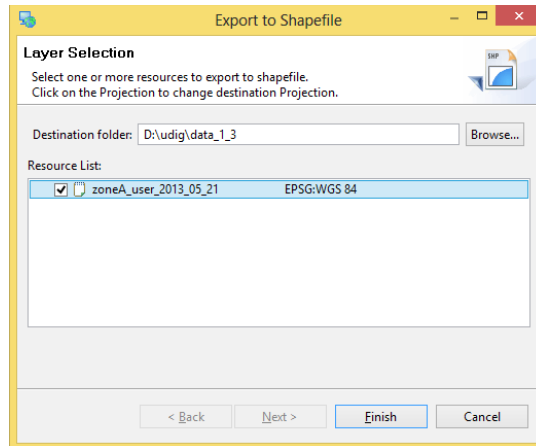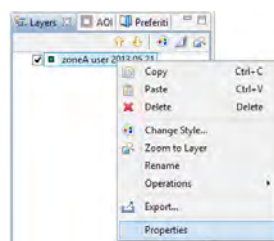

Note!
Since the field relief operations will be a lot of data, we suggest you to choose a good identifier for the relief as name of the new shapefile, for example something containing the Zone, the user and the date of the relief, all separated by an underscore. An example could be **zoneA_user_2013_05_21***.*

- as you can see the layer's name is changed in the *Layers* view and the red asterisk is disappeared, this means that the layer is saved on your hard disk.

- Your map has been updated to use your new layer, you can verify this by right clicking on your layer in the *Layers* view and checking its *Properties*

- select **Summary** from the left window and read the information contained about the **path** of the shapefile and the **Feature Type** for the list of attributes and types.

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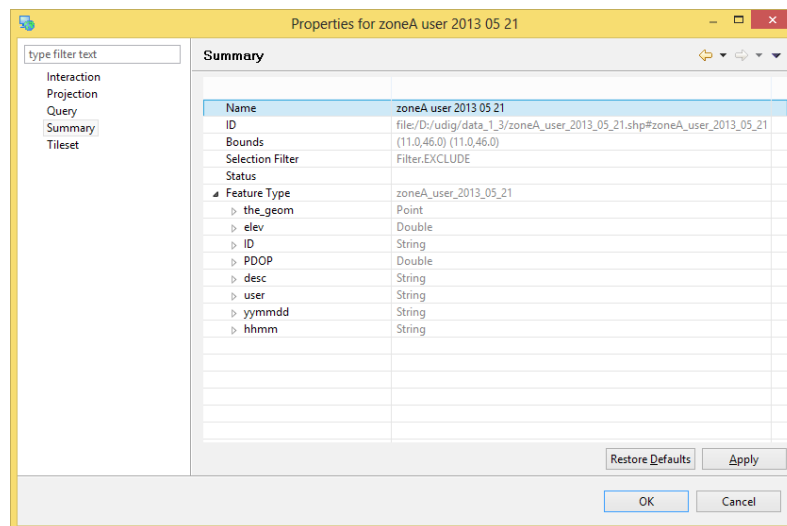
Note!
Your GPS always saves the data in this format, you have to repeat this procedure every time you will receive data from field relief. Please save in different folders the original data (CSV or TXT) and the derived shapefiles.

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