MAPPING GUIDE

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ecosystem
restoration
communities

CREATING A FILE OF THE OUTLINE OF A RESTORATION COMMUNITY USING GOOGLE EARTH PRO Google Earth Pro

The objective of the instructions is to show you how to digitize the outline of the Ecosystem Restoration Community area using Google Earth Pro and to save the result as a KML file, which can also be displayed in Google Maps.

Google Earth Pro has also the capability to display historical aerospace images of the restoration site and surroundings. By going in this way 'back-in-time' it is possible to analyse the temporal changes of man-made structures (buildings, terracing), vegetation / land cover, but also terrain surface features.

Step 1: Download and installation of Google Earth Pro
Time: 5 – 10 minutes max.

Select the below link to download and install Google Earth Pro for free:
www.google.com/intl/en_uk/earth/download/gep/agree.html

Please note that the Google Earth Pro program can only be installed on a desktop or laptop computer (MAC, Windows or Linux). The created KLM file can also be displayed in Google Earth at your Smartphone or Tablet.

Step 2: Sightseeing tour & types of aerospace data used
Time: As long as you wish

After having opened Google Earth Pro you can start in the Places menu (Left pane) with one or more sightseeing tours, for instance the Eiffel tower in Paris. For the Grand Canyon tour you also select Terrain in the Layers menu.
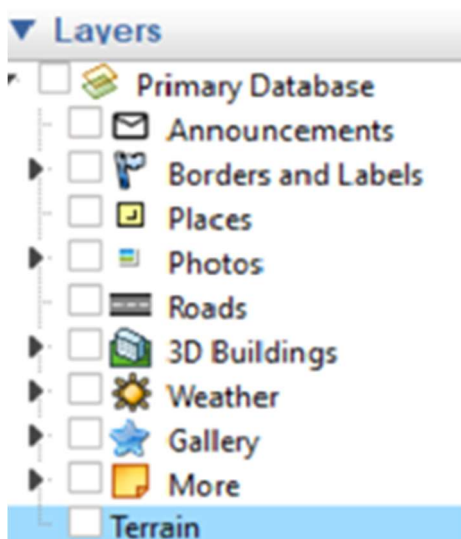
Additional information can be displayed in the Primary database in the Layers menu (Left pane), such as Borders and Labels, Places, Photos, Roads and from some places 3D buildings, Weather, Gallery and More. The advice is to select only those items which are really needed for your spatial analysis.

Details on the source of the aerospace images and the imagery date are displayed at the lower part of your computer screen, together with the geographical coordinates of the cursor location (in Lat. Long.) and the elevation above sea level

of the terrain. Also, the elevation of the view itself is given.
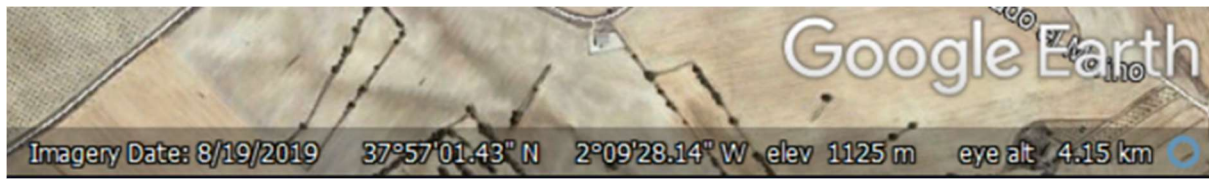
For general overviews Google Earth applies in most cases **Landsat** satellite images processed in natural colors. The detailed imagery is mostly based on **aerial photographs** or **high resolution** (commercial) satellite imagery. In case of combined images with multiple collection dates no acquisition information is being given.

The Three Dimensional (3D) data of the buildings in the urban area, such as the Eiffel tower is derived from laser-altimetry scanning (**Lidar**). The 3D terrain data comes from a Space Shuttle radar survey of the year2000 (**SRTM**).

More information on the types of aerospace images used by Google Earth Pro can be found **here.**

Step 3: Create a polygon of the outline of the Ecosystem Restoration Community and save it in KML format
Time: 30 minutes +

The Google Earth Pro menu offers various options for searching places, adding a place mark and polygon of your area of interest, add image overlay, measure distances with the ruler, show sunlight across a landscape and many more. Very useful is the time slider to show historical images of your area. In this way you can analyze past changes of the landscape.

Make sure the Toolbar and Sidebar are selected in the View menu.

To add a polygon of the outline of your Ecosystem Restoration Community site do the following:

a. Navigate to the approximate location of the site. We use for the instructions Camp Altiplano in Spain. First type the name of the nearest place in Search. For the Altiplano Ecosystem Restoration Community this is El Moralejo.

b. Zoom-out and move to the actual Altiplano Ecosystem Restoration Community site:


c. Zoom-in to the site and select in the Main menu: *Add > Polygon.*
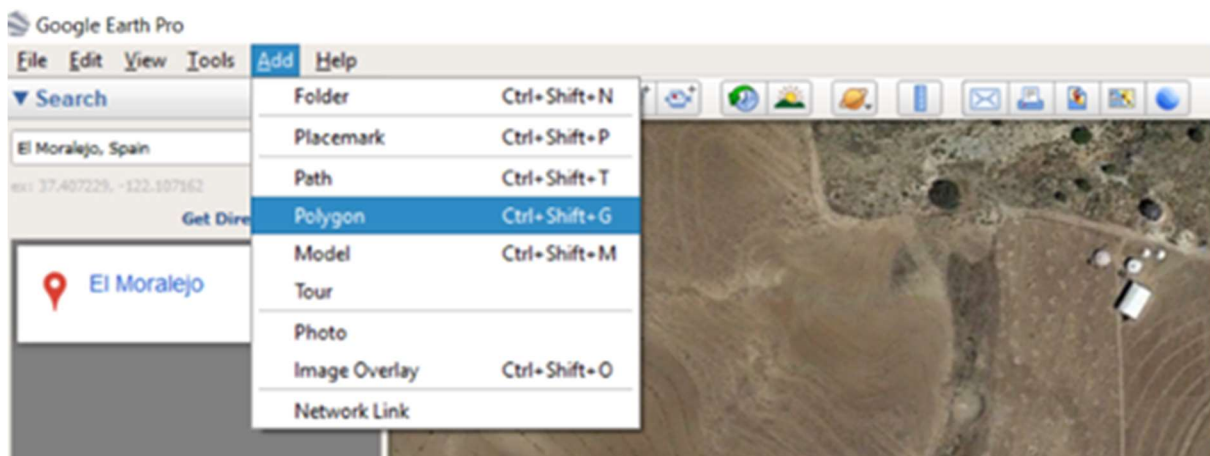
d. In the *New Polygon* menu *select* a line color under the *Style, Color* Tab, for instance *Red*. Type a polygon name, for instance *Altiplano_Boundary*. Keep all the other values default. Click with the mouse careful along the outer boundary of the Ecosystem Restoration Community site. You will see that the form of the cursor has changed to a square symbol and that dots with lines in-between are displayed.

e. After having finished, save the results by selecting *OK*. The file is now shown in the *Places* menu. You can edit the polygon line if needed a second time by selecting in the *Places* menu: Your *filename* (for instance *Altiplano_Boundaries) > Properties*.
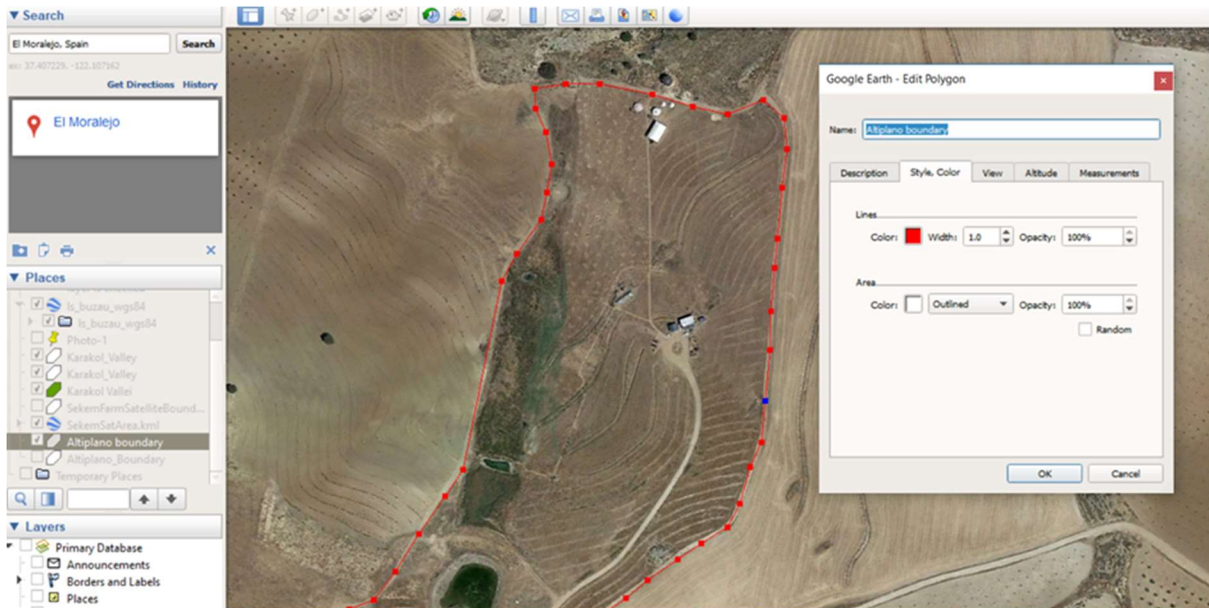
f. Save the polygon file to a folder of your choice by selecting in the *Places* menu: The filename (for instance *Altiplano_Boundaries > Save Place As…*. Select a folder to save the file in KML format. (Remark: KMZ is a compressed version of the KML file).

g. You can *Email* the resulting file as a *Screenshot, Current view or as a Placemark/Folder.*
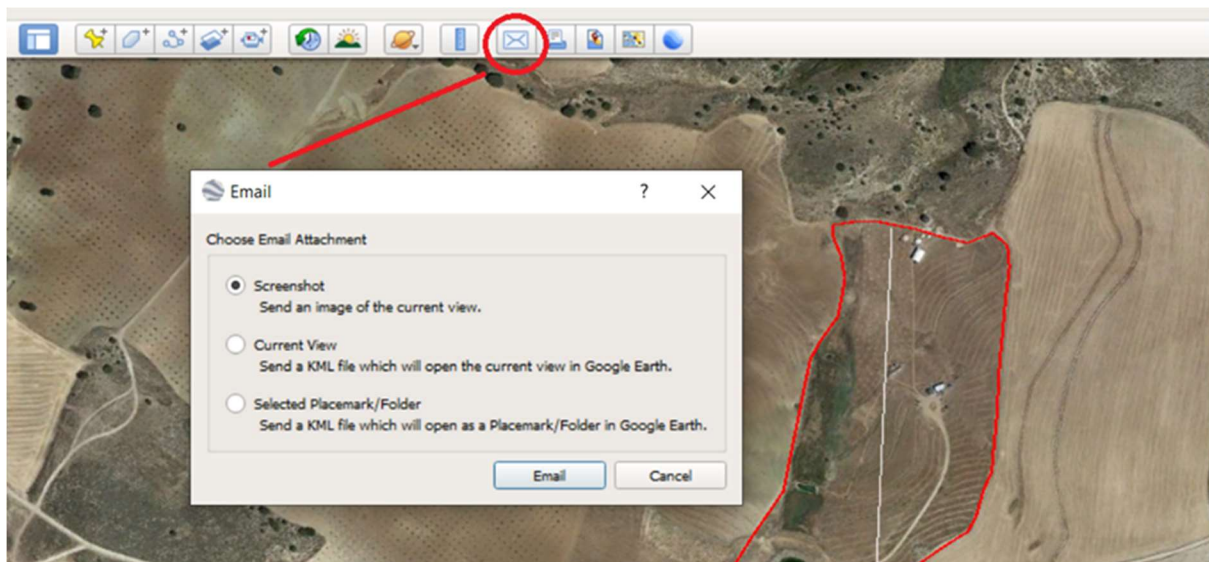
TERRAIN ANALYSIS WITH GOOGLE EARTH PRO

Cross section of the terrain

Cross sections along a line can be displayed using 3D terrain data from a Space Shuttle radar survey of the year 2000 (**SRTM**). Please note that the regional accuracy of the data is 15 meters or even (much) less. This means that the elevation will in most cases not correspond well with the elevation a.s.l. of your national topographical map. This is caused by the global (worldwide) geographical Datum used by Google (WGS-84). A Datum is a geographical model of the form of the earth. Most national mapping agencies use their own more accurate Datum. However, for local measurements the provided data can be very useful. Digitize the line of the cross-section with *Tools > Add Path*. Give the file a name in the *New Path* menu. After having finished the digitizing of the beginning and the end of the line, safe the results by selecting *OK*. The file is now shown in the Places menu. After having selected the file again in the *Places* menu, select *Show Elevation Profile*. The cross section is being displayed below the image. By moving the mouse along the cross section, values on elevation and slope steepness are being displayed.
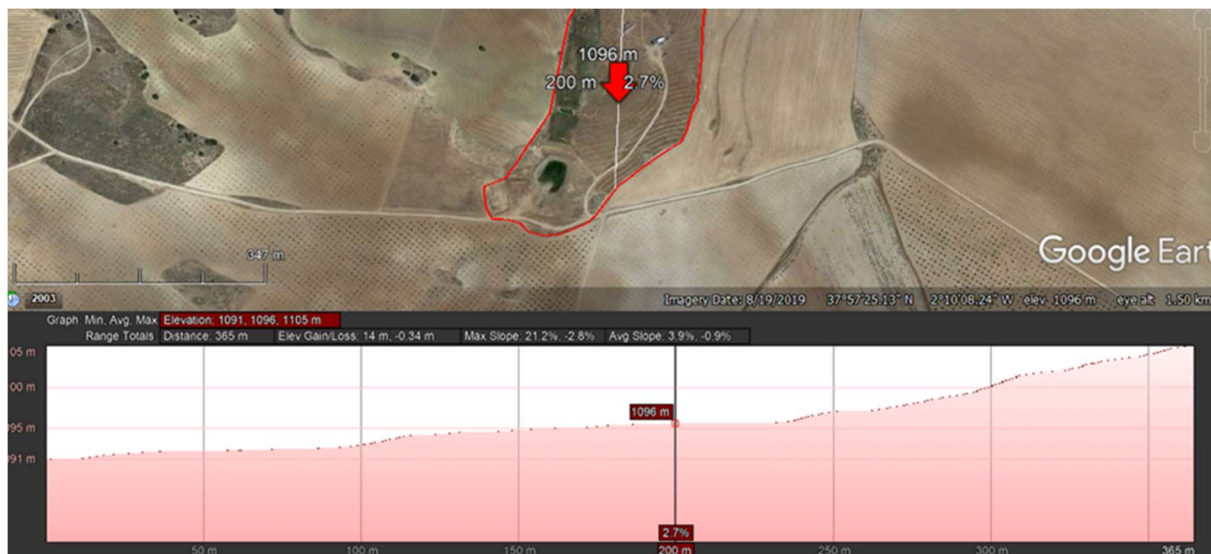
MULTI TEMPORAL IMAGE ANALYSIS BY GOOGLE EARTH PRO

You can use the *Time Slider* to display aerospace images of different dates. This can be aerial photographs or satellite images, depending on their availability.

Select the time slider function and do this yourself. Keep the polygon file of the restoration site displayed for orientation. Analyse the changes of the terrain, soil erosion features, vegetation/land cover and infrastructures. Consider seasonal climatic differences, such as temperature and rainfall.

The white image tone at various places in the September 2003 photograph of the Altiplano site gives an indication of severe soil erosion. The humus layer of the (top) soil has been eroded, exposing the dryer subsurface. This can be caused by overland flow of water in combination with poor agricultural practices.

WHY IS IT IMPORTANT TO DIGITIZE THE OUTLINE OF YOUR RESTORATION COMMUNITY?

With the high-resolution images, provided for free by Google Earth Pro, it is possible to analyse past and present changes in the most important elements of the various ecological functions. Of course, this analysis should be supplemented by detailed observations at ground level on soil properties, vegetation type, crop (rotation), rainfall and temperature. This will help you with the planning of the work to be carried out, such as for instance mitigation measures for soil erosion or mass movement hazards.

There is also a possibility to receive funding through various partners such as Re-Gen Network, who measure ecological function and services via satellites. They need the KML files of your polygons in order to do this.

Digitizing the outline of the Ecosystem Restoration Community site as a KML file can be the first step in sharing information with the "outside world", such as potential earth restorer participants ("where am I going to work?"), and experts of various ecological disciplines. Google Earth Pro makes it possible to overlay your data with existing (digital) thematic maps on soils, vegetation/land use, elevation, geology and geomorphology.

As a next step – and with more local help! – more advanced software can be used, such as for instance the free and open source **QGIS package.**

By combining 3-dimensional digital elevation with aerospace data it will even be possible to create stereo anaglyph views of your Ecosystem Restoration Community and the surrounding land.

My advice to the Ecosystem Restoration Community Leaders is to ask some people with computer skills to help with the digital work and to collect also suitable attribute data from survey organisations. Most of this is nowadays online freely available. But don't forget to integrate all the findings with your own ground data in a holistic approach!

Of course you can ask me for any help if needed.

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