3D landscapes in Blender and TinkerCAD

In this manual you will find:

How to make a 3D landscape from data that you've found online and edited in Blender and TinkerCAD.

For this manual we'll specifically use Terrain.party, Blender and TinkerCAD

1. Find your data.

If you find for topographical data online, you'll find a lot of sites that offer you this. Some data is restricted a a certain country (for example the USA) other sites offer you a full global library of data.

Global
- http://viewfinderpanoramas.org/Coverage%20map%20viewfinderpanoramas_org3.html View finder panorama's
- https://terrain.party/ Terrain party (open data)
- Google maps: switch to topographical view
- https://www.openstreetmap.org/#map=8/50.510/4.475 Open street map
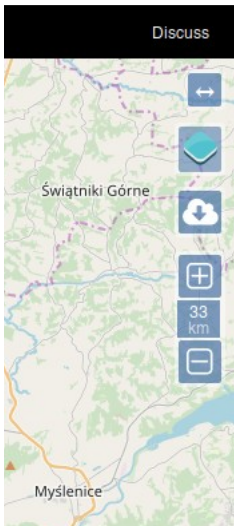
USA
- https://viewer.nationalmap.gov/basic/ National map

2. Download the data to your device.

Once you found a piece of land that you want to 3D print, you can export or download it to your device.
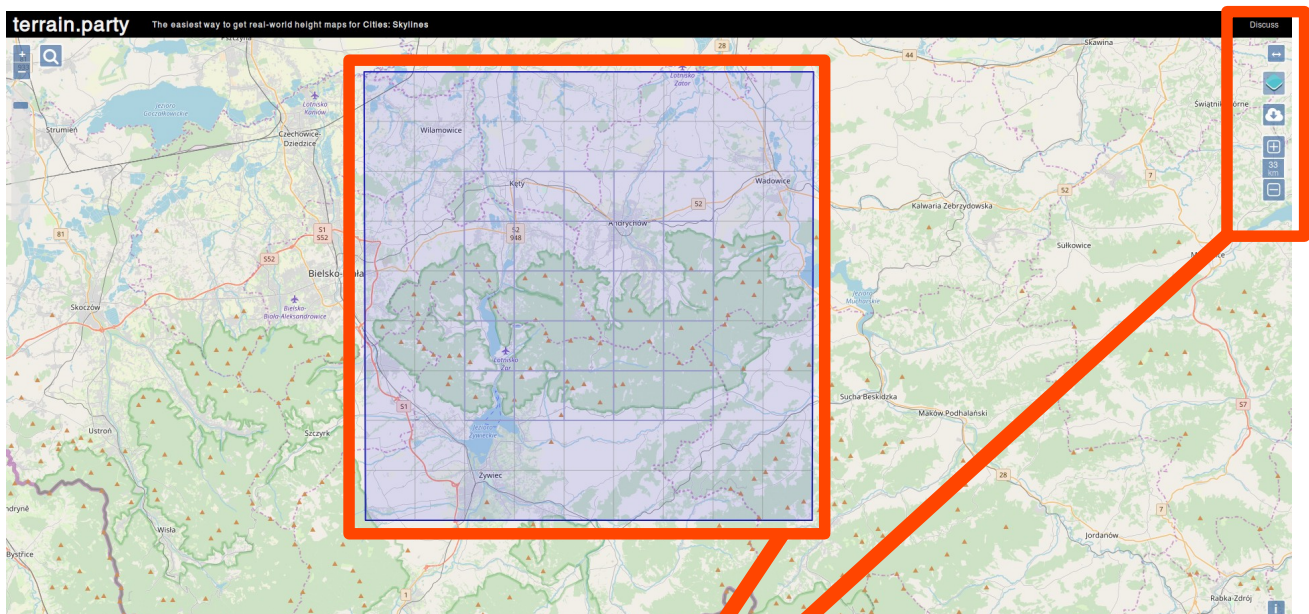
1. The part of land you want to print
2. Make the square bigger or smaller.

In my case, I wish to 3D print the Karkonoski National Park in Poland.

Once you've played around with the blue square and mapped out the exact piece of land that you want to export you can do so.

Above the settings of the blue square, you find the download/export button. Click this and download the data.

Give the download a fitting name and save the file.

If you want you can already unzipp all the files into a better located folder than downloads.
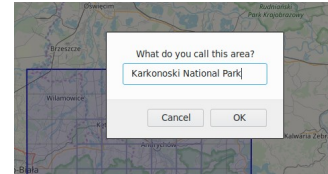
3. Getting started with Blender

Blender is a free 3D program that can be downloaded here: https://www.blender.org/ It's a completely free program and used both professionally as available for hobbyists. A good thing for ut: it runs on Linux.

Once you want to start with learning Blender, don't give up. It has a very steep learning curve, but once you're there it's fun. Hang in there!

When you open Blender for the first time, you get a welcome screen, ignore this and go straight to the working environment. You'll see that there are already some shapes added on the working plane. Delete all of those by right clicking on them and deleting them. **You should delete 3 items: the cube, the lines and the sun.**
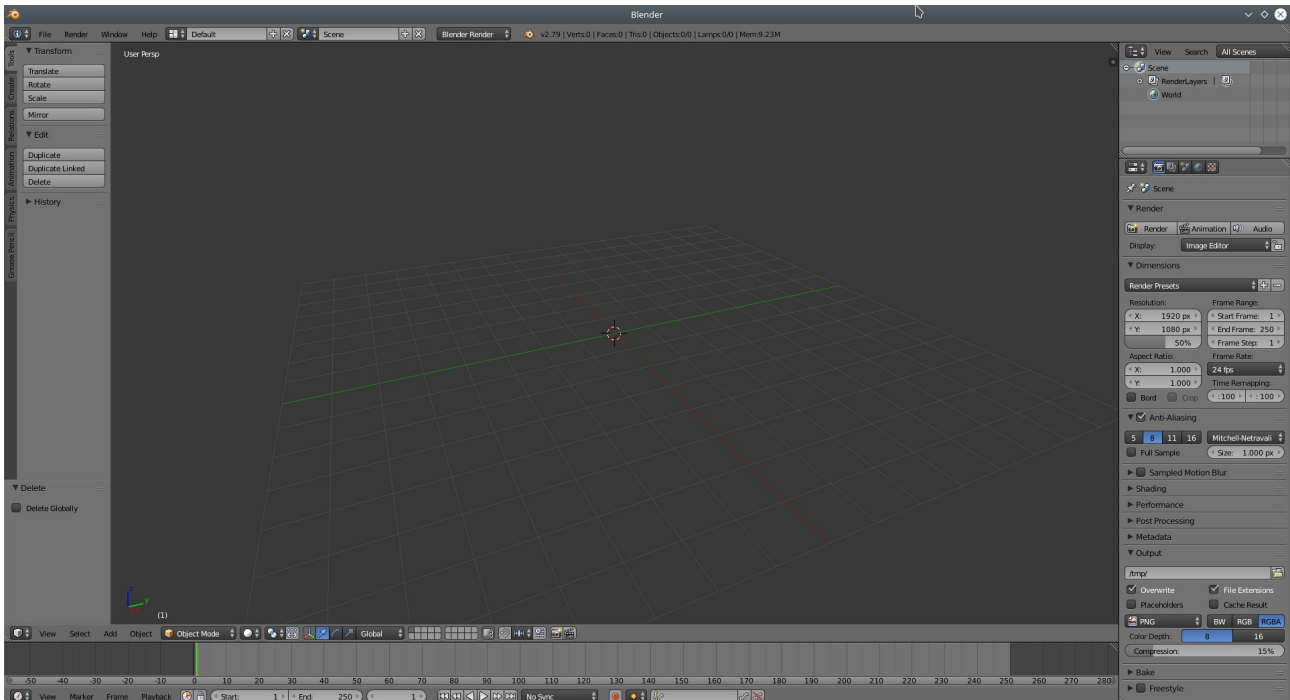
4. Add a plane in Blender

Our second step in Blender is to add a plane to the work environment. We'll do this by going to the "create" tap and choose "plane"
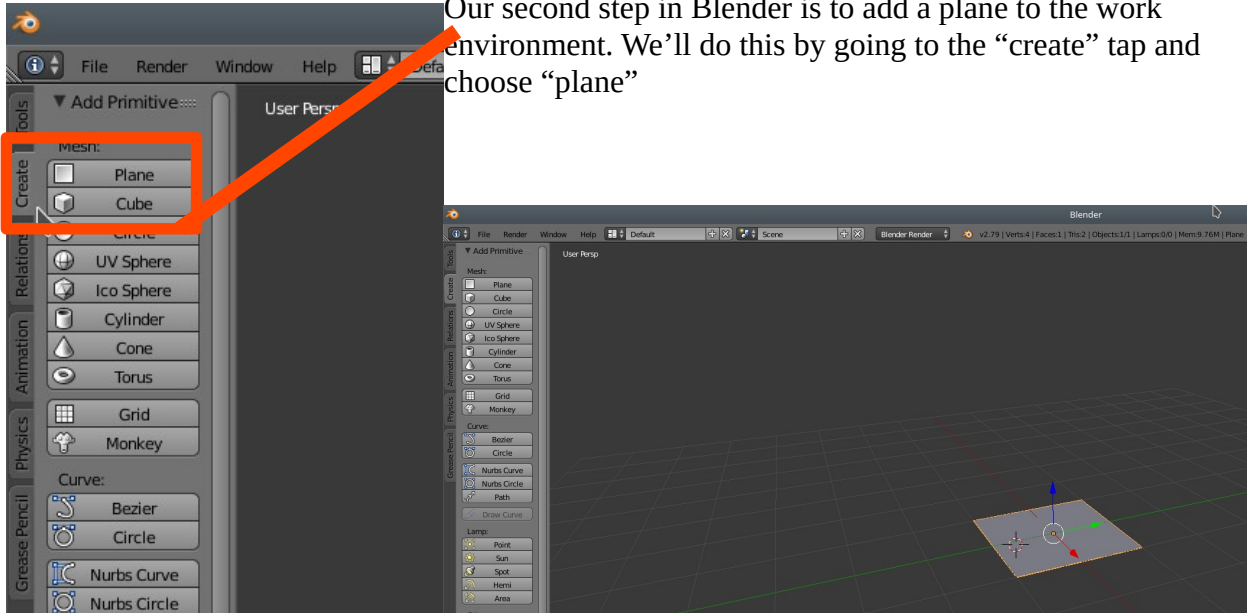
You might find this plane far to small for what you want to do. If you want to change the size of the plane, the tab 'tools' and choose scale. You'll notice that when you want to move the mouse, the plane now moves along in scaling. Of course, you don't want to go smaller, so use the 'shift' button on you keyboard and keep moving the mouse to the left. You'll notice that it re-appears to the right and moves left again, scaling the plane.
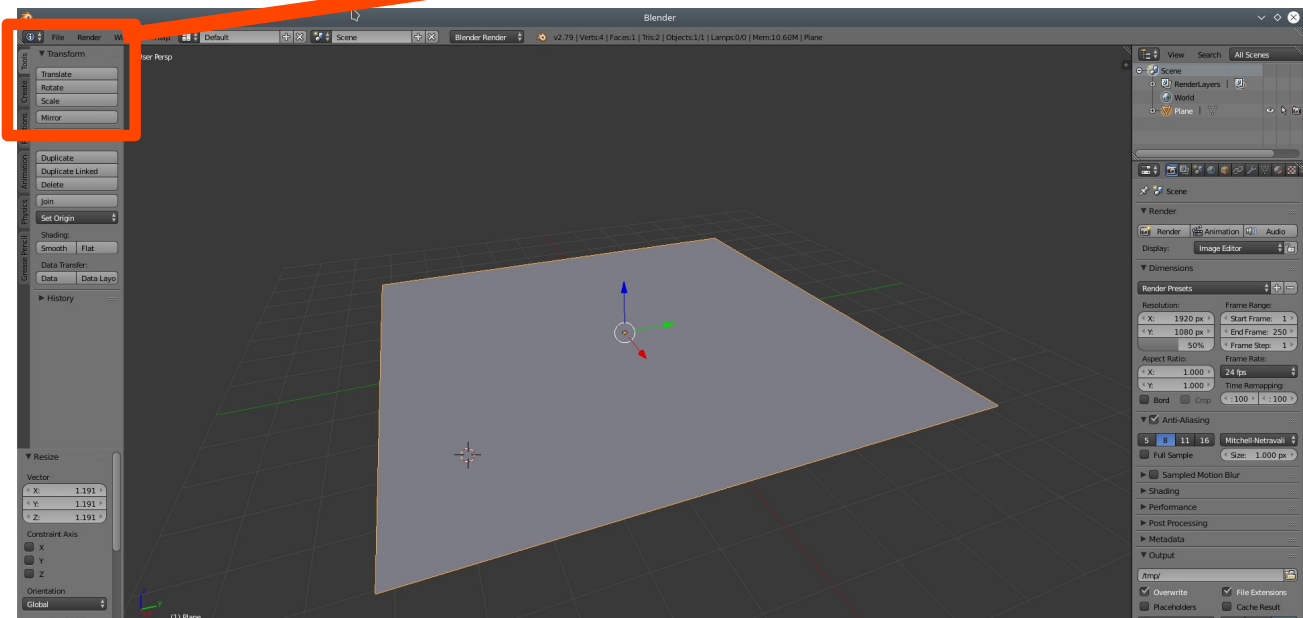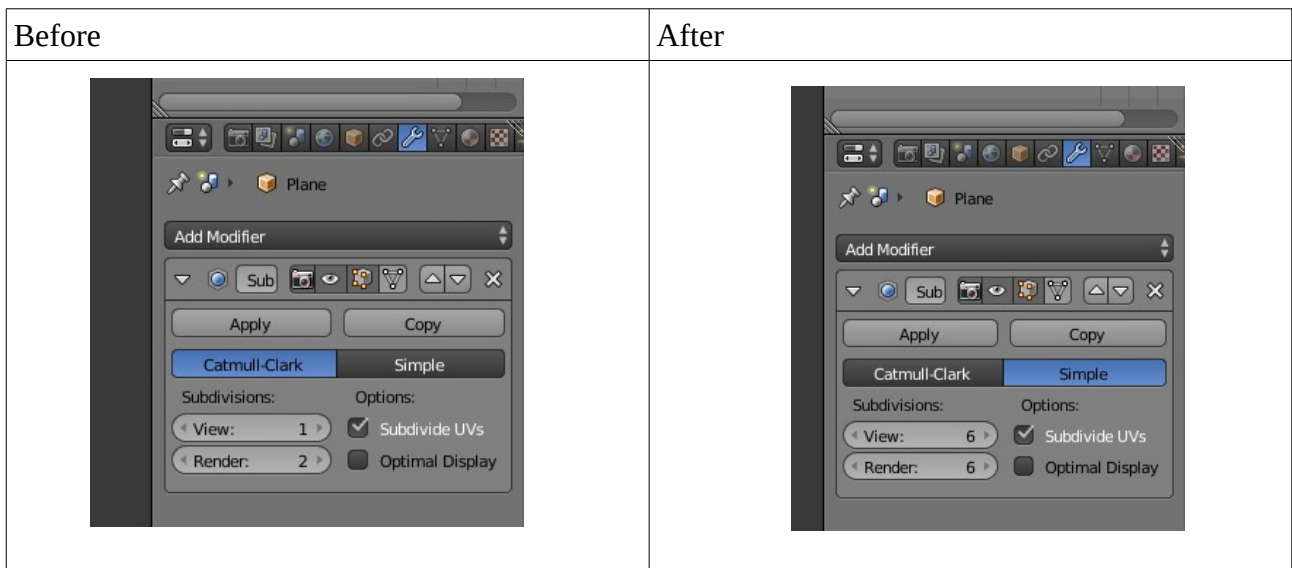
5. Add a modifier → subdivider surface
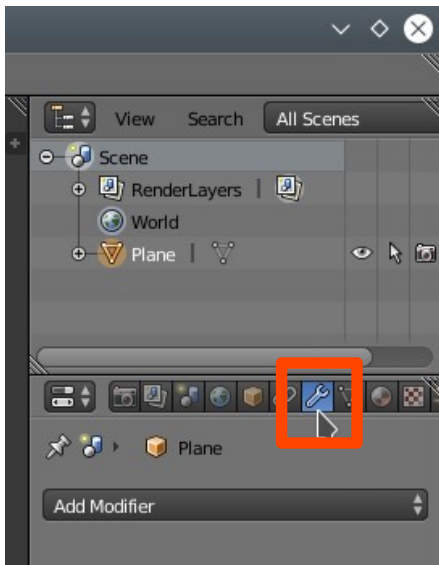
Our next step is to add a modifier. This tab you will find on the right side of Blender, and looks like a wrech. When you click on it, you can go to another menu. Click on it and go to "Generate" and "Subdevision surface"
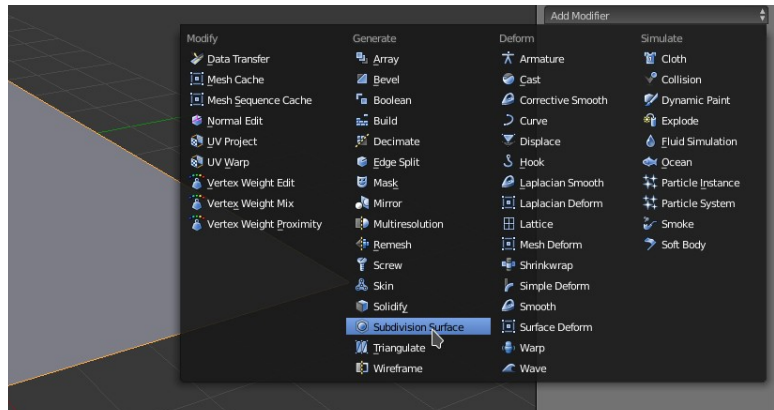
Once you have that, it's time to adjust some settings.

Before	After

Put the 'view' and 'render' on maximum after you selected 'simple' instead of 'Catmull-clark".

6. Add a modifier → displace
The second modifier that we'll add is a "displace". This can be found under "deform".
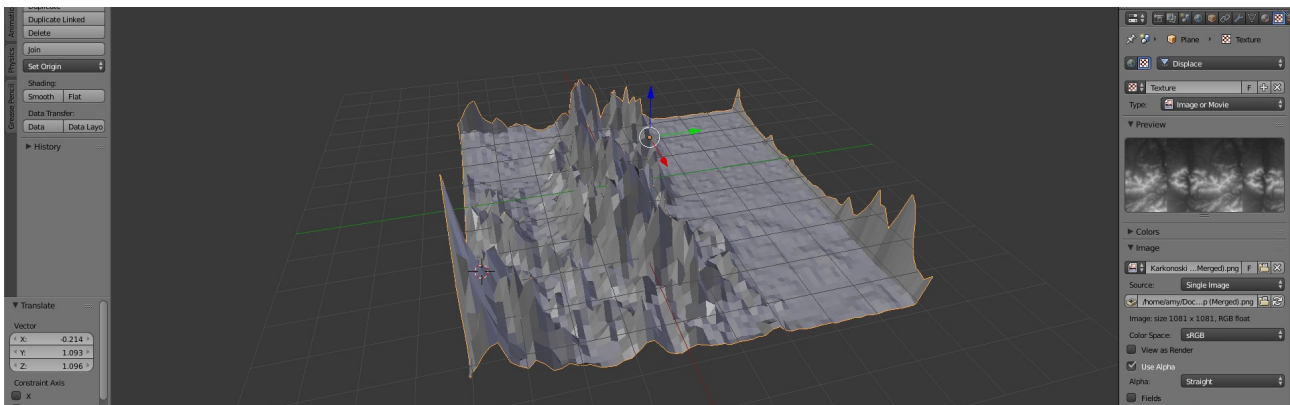
Here we select 'new' and you will see that it changes to texture.
Leave it like this. But select the "show texture in texture lab" button.
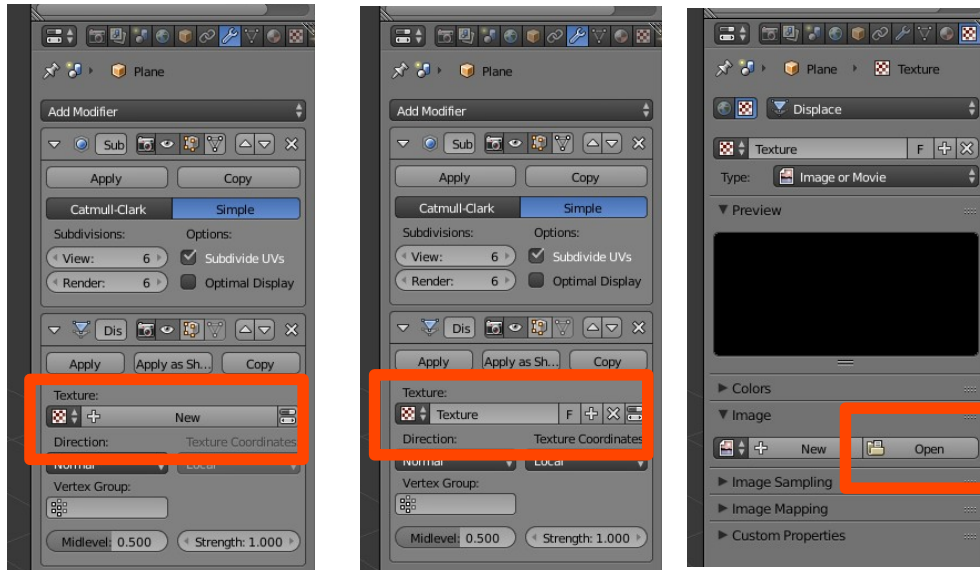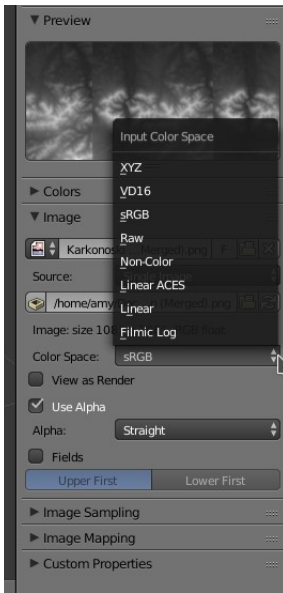
Now it is time to add our gray scale landscape. In the folder that you downloaded and unzipped, there is a file **"merged.png"**. Load this one in into Blender.
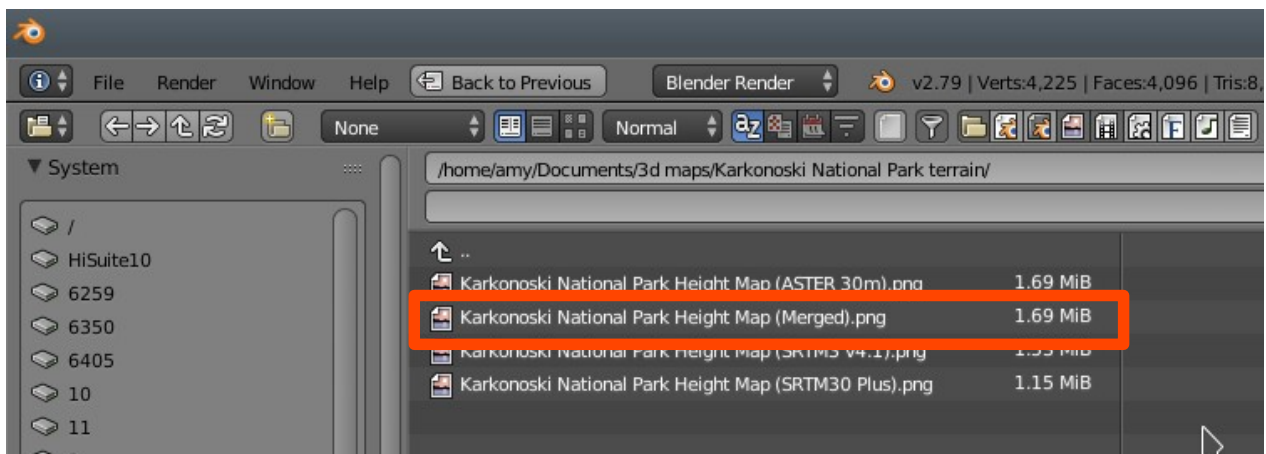
You'll now see your landscape emerge from the plane. But it's not in the right proportions.

7. Tweek your file.

As the mountains do not have the right proportions, it's time to play around a bit with it.

First: put the color space from RGB to Linear. This makes the mountains change immediately.


When we go back to our first mods (click on the little wrench) we ca adjust more settings.
Go to the setting 'strength'. Standard it is put to a 1.000. Just like the person who thought me this, we prefer settings around the 0.300 / 0.350.


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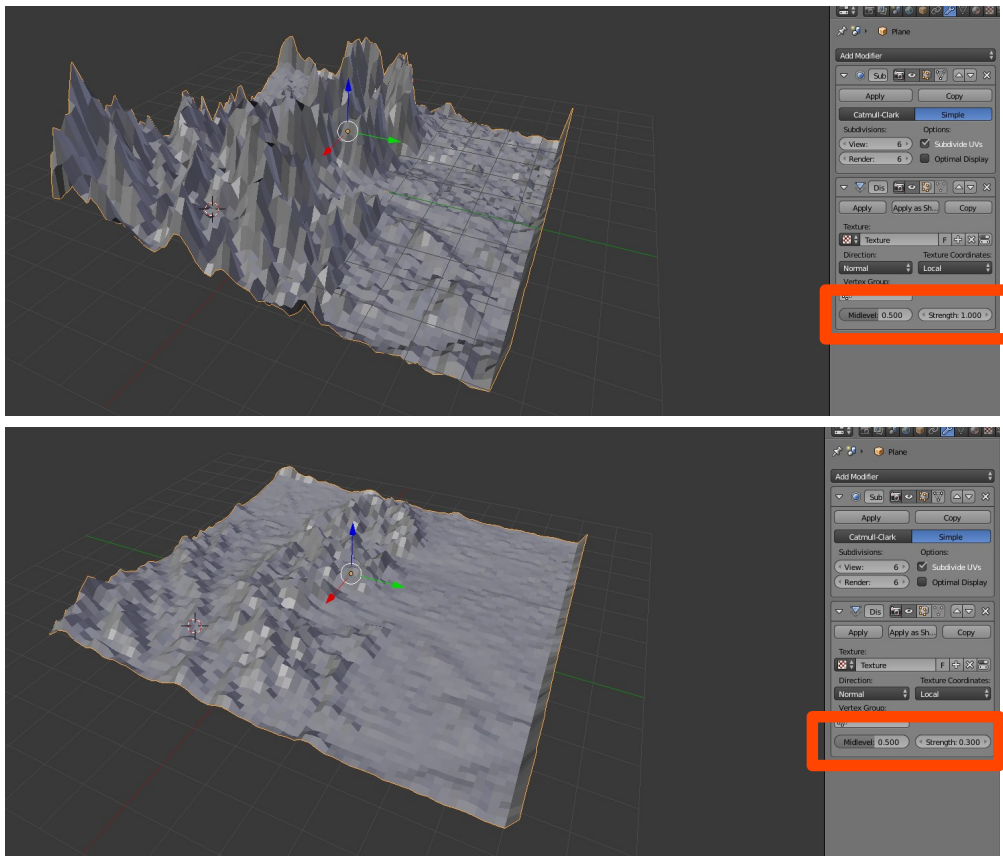
Another setting that we can change is the "view" setting that we maximised before. If you double click on it now, you can add another number. The higher the number, the better the quality, but also the heavier your file.

TinkerCAD ha dno problems managing files up to 10.
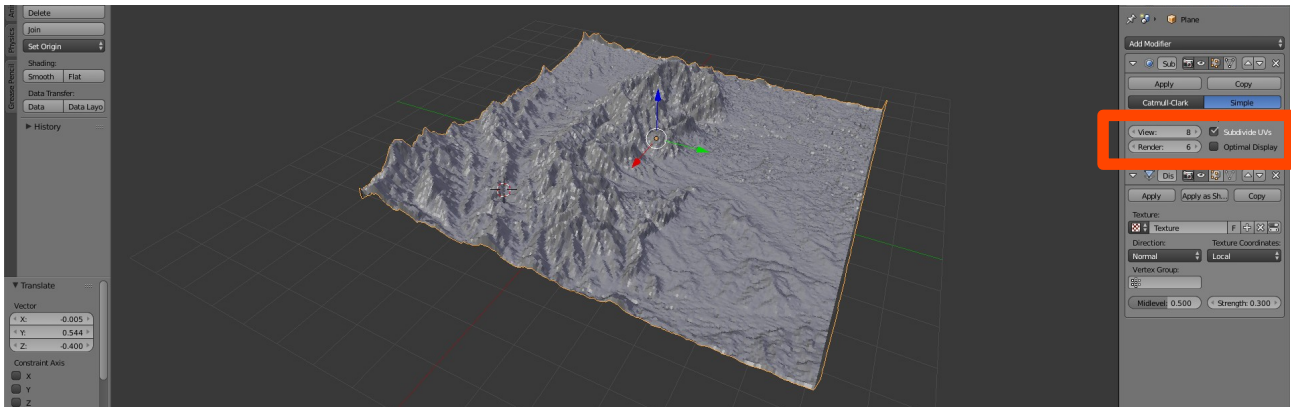
8. Save your project as .stl file (export)
You can't just save your project as .stl, and therefore you need to use the export function. Place the file somewhere logical on your device.
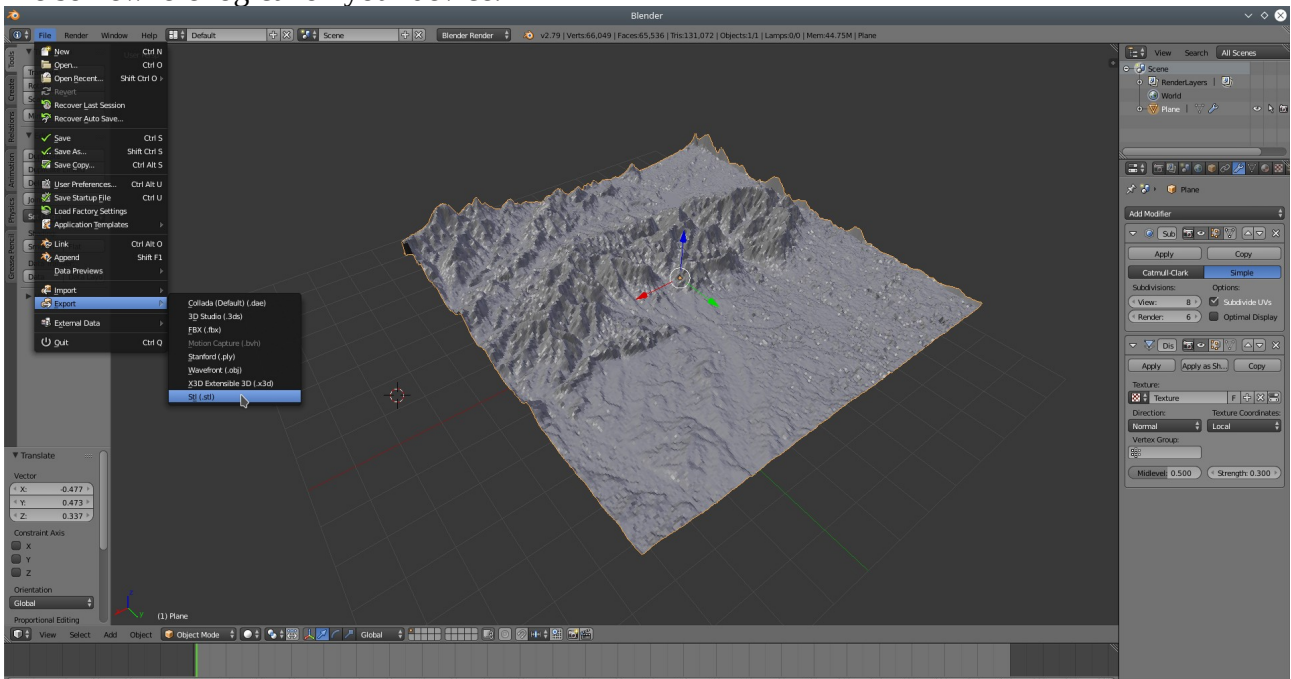
9. Import your file in TinkerCAD
Create a new file in TinkerCAD and import the .stl that you made in Blender. Depending on the detail (and views) you used, it can take a while.

Also be carefull that you don't go over 25 MB files for TinkerCAD. It cannot load in files bigger than that.

Once your .stl file has been loaded into TinkerCad, it already helps you by giving a thickness to some of the places on your file. Now you can choose. Or you leave it to 3D printed support or you start filling up some of the holes…
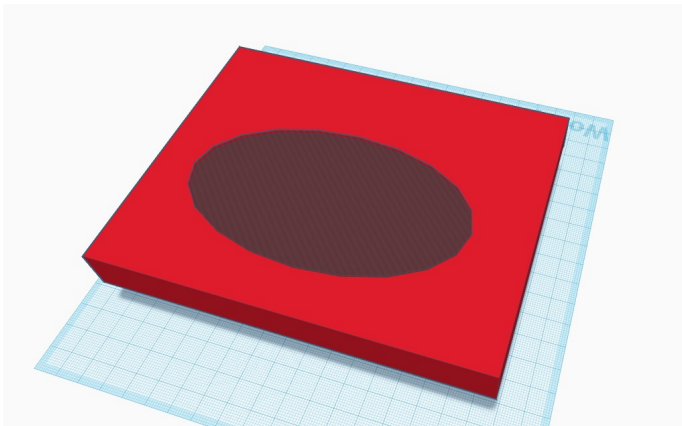
10. Option: change the shape of your landscape

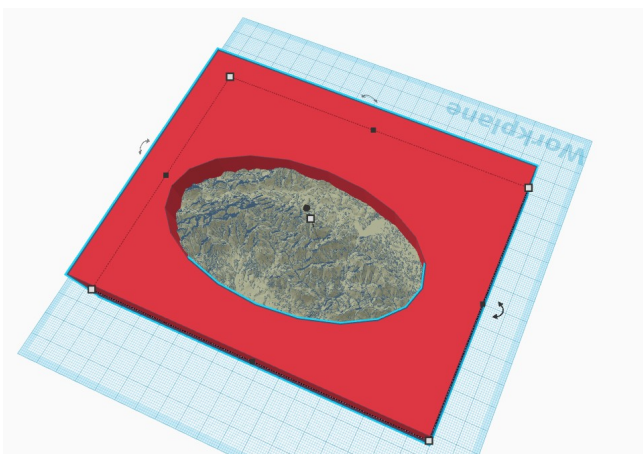Rectangles and squares are fun, but might get boring after a while. What about a oval?

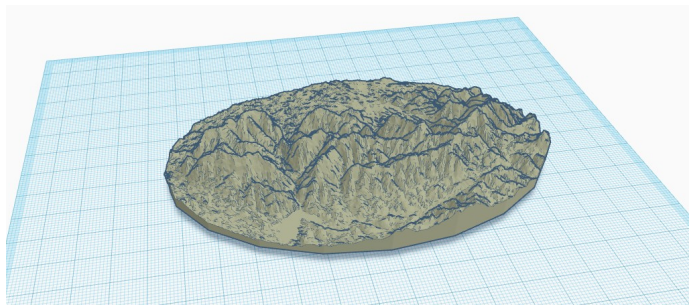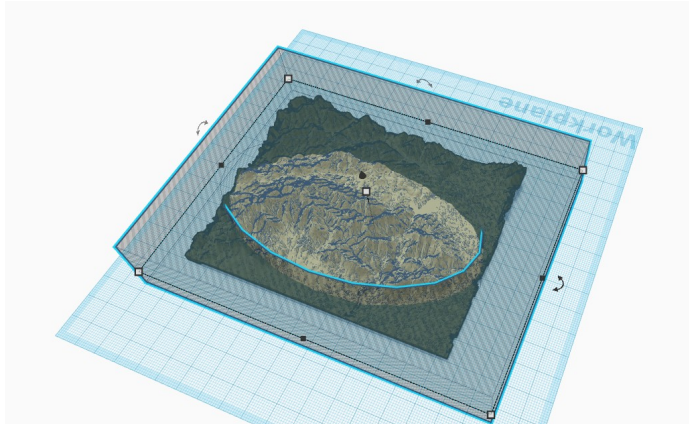10.1: look for the shape that you want to print.
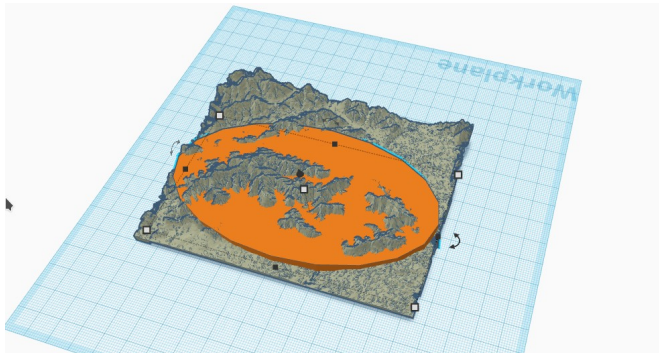
10.2: Put a huge block around, covering everything.

10.3: Do a difference Boolean on the new block (red) and oval (orange / seethrough. This will show the landscape afterwards.

10.4: Do a difference boolean on you landscape with the new block you just made.

11. Optional: level the groundplate.

As you noticed in the beginning, not every part of the landscape already has a solid under it. You can fill those up by adding blocks, whats the surface! Or as you changed the shape, you might have exxes material. Use the boolean functions to addor remove material.
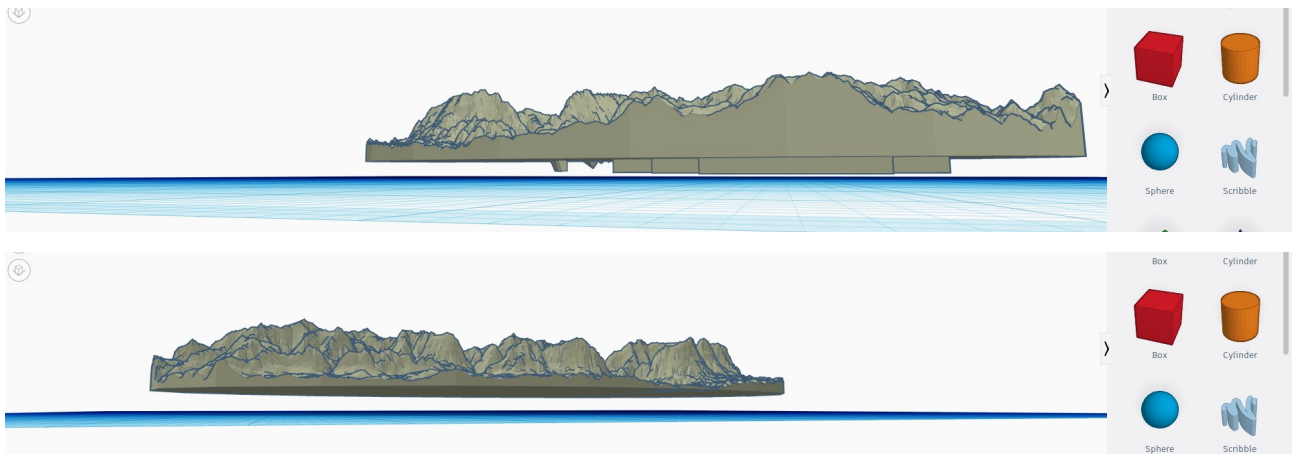
12. Export the file as .stl and start priting!

Import the .stl in your favourite slicing program and print out the file.