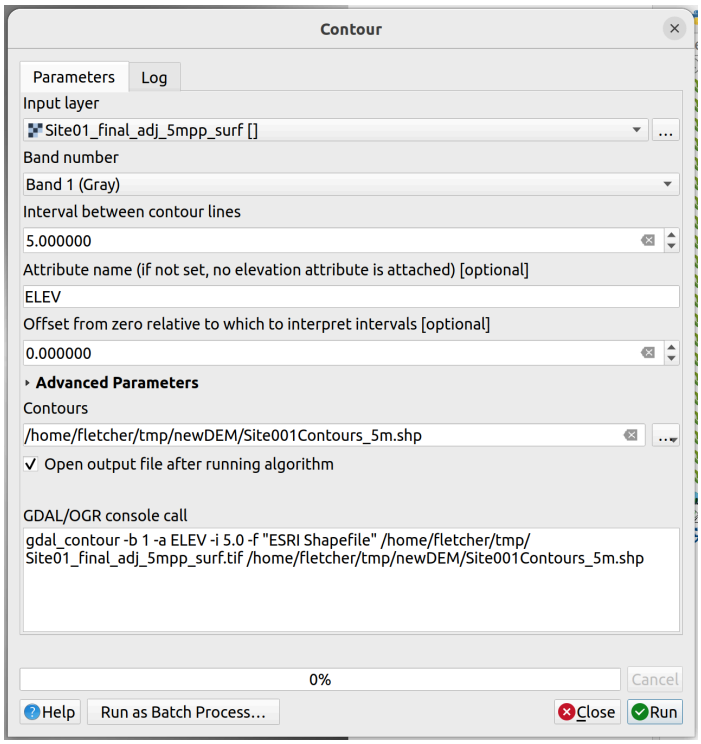
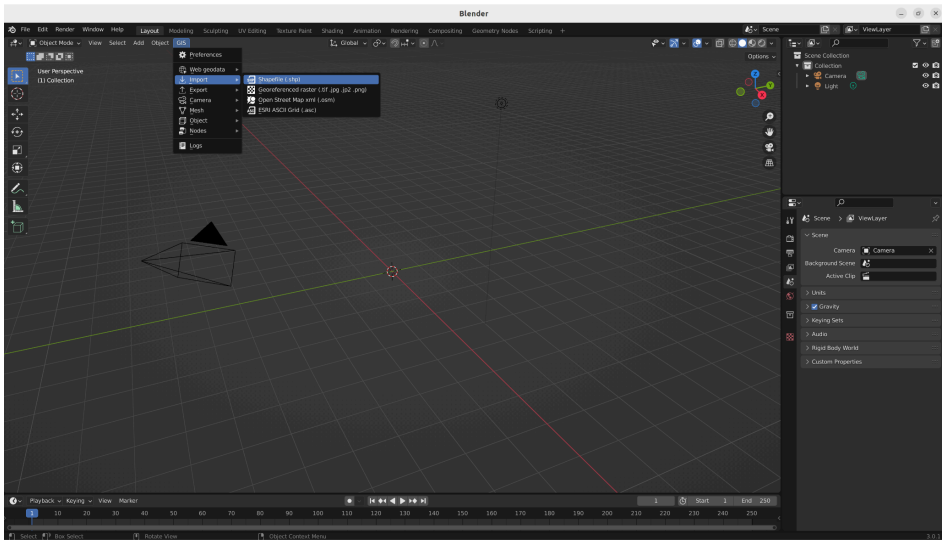
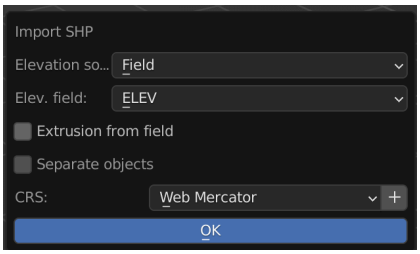
1. Download Site001_final_adj_5mpp_surf.tif from https://pgda.gsfc.nasa.gov/products/78
2. Open file in QGIS - https://qgis.org/en/site/
3. To clip from terrain map: Raster→Extraction→Clip Raster by Extent
    a. In “Clipping Extent” select “Draw on Canvas”
4. Create contours: Raster→Extraction→Contours
    a. Pick the interval at which the contours are placed (doesn’t have to be 5 mpp try out lower values)
    b. Save to a file with a unique name and in a location you know
    c. Save as a .shp file



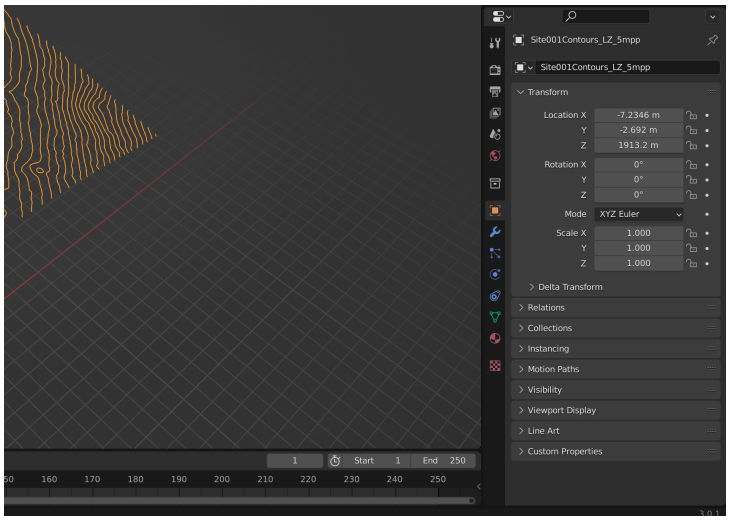
5. Open Blender; make sure you have add-on Blender GIS: https://github.com/domlysz/BlenderGIS
6. Delete object that is automatically generated in Blender (i.e. cube)
7. Import contours through GIS→Import→ShapeFile→Select file



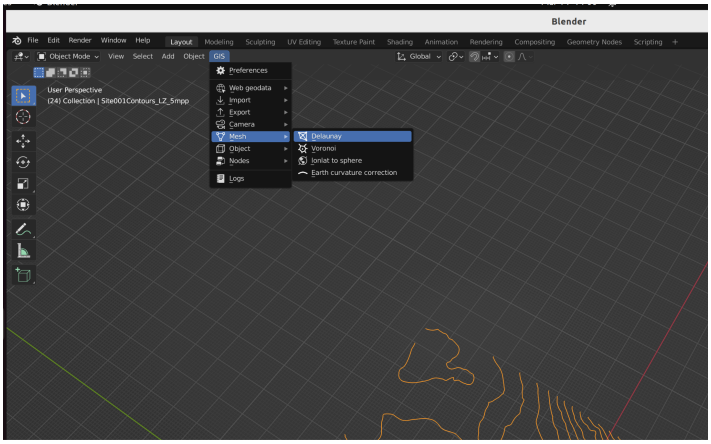
8. Select Field and change ID to ELEV. This is where the elevation is associated with each contour line from QGIS



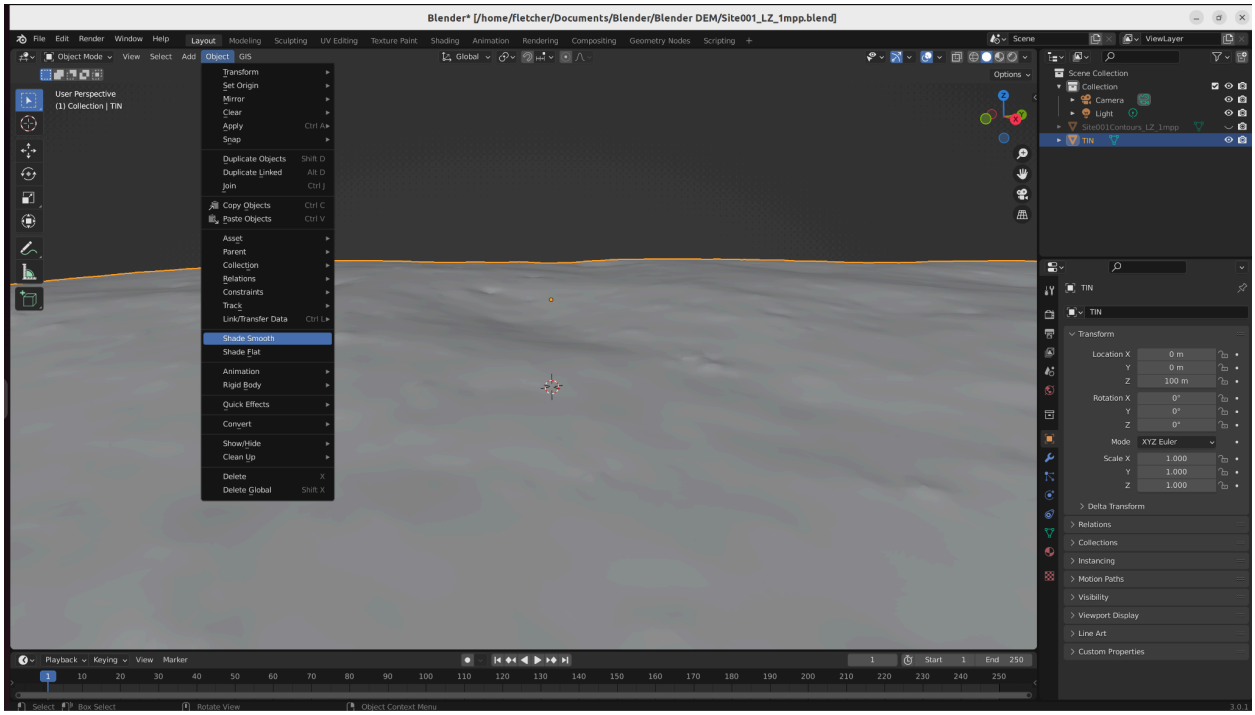
9. Zero the coordinates of the contours using the panel on the right



10. Create a mesh using GIS→Mesh→Delaunay



11. Can smooth the mesh by going to Object→Shade Smooth



Blender to Gazebo

1. In .gazebo/models/ add Flare_Lunar_Terrain_Maps folder
2. Create a folder to hold a mode, in this case “Site001_05mpp” for 0.5 meter per pixel
3. In the folder create a “media” folder and “model.config” and “model.sdf”
4. In media create folders “DAE”, “scripts”, “Textures”
5. In DAE put the .dae file from Blender
6. In textures add the texture to be applied to the mesh
7. In scripts add “repeated.materials”

```
material RepeatedDust/Diffuse
{
 receive_shadows off
 technique
 {
        pass
        {
        texture_unit
        {
        // Relative to the location of the material script
        texture AS16-110-18026HR-512x512.jpg
        // Repeat the texture over the surface (4 per face)
        }
        }
 }
}
```

8. In model.config adjust appropriately

```
<?xml version="1.0"?>

<model>
 <name>FLARE_lunar_cropped</name>
 <version>1.0</version>
 <sdf version="1.4">model.sdf</sdf>

 <author>
        <name>Fletcher</name>
        <email>fsmith14@terpmail.umd.edu</email>
 </author>

 <description>
        Site 001 mission site cropped 2000m for NASA mission
 </description>

</model>
```

9. In model.sdf adjust the directory path to make sure it goes to the correct dae file

```
<?xml version="1.0" ?>
<sdf version="1.5">
  <model name="FLARE lunar terrain cropped">
        <pose>0 0 0 0 0 0</pose>
        <static>true</static>
        <link name="body">
        <visual name="visual">
        <geometry>

<mesh><uri>model://Site001_05mpp/media/DAE/Site001_LZ_05mpp.dae</uri></mesh>
        </geometry>
    <material>
        <script>
        <uri>model://FLARE_Lunar_Terrain/media/scripts</uri>
        <uri>model://FLARE_Lunar_Terrain/media/Textures</uri>
        <name>RepeatedDust/Diffuse</name>
        </script>
        </material>
        </visual>
        <collision name="collision">
        <geometry>

<mesh><uri>model://Site001_05mpp/media/DAE/Site001_LZ_05mpp.dae</uri></mesh>
        </geometry>
        </collision>
        </link>
  </model>
</sdf>
```

Blender Scattering Rockers

Create the rock by using the rock generator

Method 1.
Select the rock(s) that you want to scatter →F3 to search for the scatter tool → Draw on the surface the rocks you want to scatter

Method 2.
Add particle emission, model as hair and interpolate the children