

Santa Cruz Island Point Cloud Processing

We are relying on the classified point cloud stored in `Pozo_USGS_UTM11_NAD83_all_color_cl.laz`.

If you have no ground classification...

You can use the SMRF to perform the ground classification the Simple Morphological Filter ([SMRF](#)):

```
pdal translate \  
  Pozo_USGS_UTM11_NAD83_all_color_cl.laz \  
  -o Pozo_USGS_UTM11_NAD83_all_color_cl2.laz \  
  outlier smrf range \  
  --filters.outlier.method="statistical" \  
  --filters.outlier.mean_k=8 \  
  --filters.outlier.multiplier=3.0 \  
  --filters.smrf.ignore="Classification[7:7]" \  
  --filters.range.limits="Classification[2:2]" \  
  --writers.las.compression=true --verbose 4
```

In Windows, you will need to replace `\` by `^` to continue writing on the next line:

```
pdal translate ^  
  Pozo_USGS_UTM11_NAD83_all_color_cl.laz ^  
  -o Pozo_USGS_UTM11_NAD83_all_color_cl2.laz ^  
  outlier smrf range ^  
  --filters.outlier.method="statistical" ^  
  --filters.outlier.mean_k=8 ^  
  --filters.outlier.multiplier=3.0 ^  
  --filters.smrf.ignore="Classification[7:7]" ^  
  --filters.range.limits="Classification[2:2]" ^  
  --writers.las.compression=true --verbose 4
```

Creating a file with only ground-classified points

It generally is a nice idea to have a file that only contains the ground points (it's smaller and easier to work with):

```
pdal translate \  
  Pozo_USGS_UTM11_NAD83_all_color_cl.laz \  
  -o Pozo_USGS_UTM11_NAD83_all_color_cl2.laz \  
  range \  
  --filters.range.limits="Classification[2:2]"
```

Creating a DEM and saving a GeoTIFF

Let's create a `.json` control file for [writers.gdal](#). We will use the IDW interpolation.

Create the file `Pozo_USGS_UTM11_NAD83_all_color_cl2_idw.json`:

```
{
  "pipeline": [
    "Pozo_USGS_UTM11_NAD83_all_color_cl2.laz",
    {
      "filename": "Pozo_USGS_UTM11_NAD83_all_color_cl2_DEM_1m.tif",
      "gdaldriver": "GTiff",
      "output_type": "idw",
      "resolution": "1.0",
      "window_size": "10",
      "type": "writers.gdal"
    }
  ]
}
```

Run the pipeline on the command line with:

```
pdal pipeline Pozo_USGS_UTM11_NAD83_all_color_cl2_idw.json
```

NOTE: The output tif file is an uncompressed Float64 file. Depending on your purposes, this may be using up too much storage space. You can convert to a compressed Float32 with (will reduce file size from 102MB to 27MB):

```
gdal_translate -ot Float32 -co COMPRESS=DEFLATE -co ZLEVEL=9 \
  Pozo_USGS_UTM11_NAD83_all_color_cl2_DEM_1m.tif \
  Pozo_USGS_UTM11_NAD83_cl2_DEM_1m.tif
```

Plot a PNG with gdal:

```
gdal_translate -of PNG -ot Byte -scale -outsize 75% 75% \
  Pozo_USGS_UTM11_NAD83_cl2_DEM_1m.tif \
  Pozo_USGS_UTM11_NAD83_cl2_DEM_1m.png
```

Compiled with:

```
pandoc --listings --variable papersize=a4paper \
  -H auto_linebreak_listings.tex \
  --variable urlcolor=blue \
  -V lang=en-GB \
  -s PC_pdal_for_SCI_from_USGS_Lidar.md \
  -o PC_pdal_for_SCI_from_USGS_Lidar.pdf
```

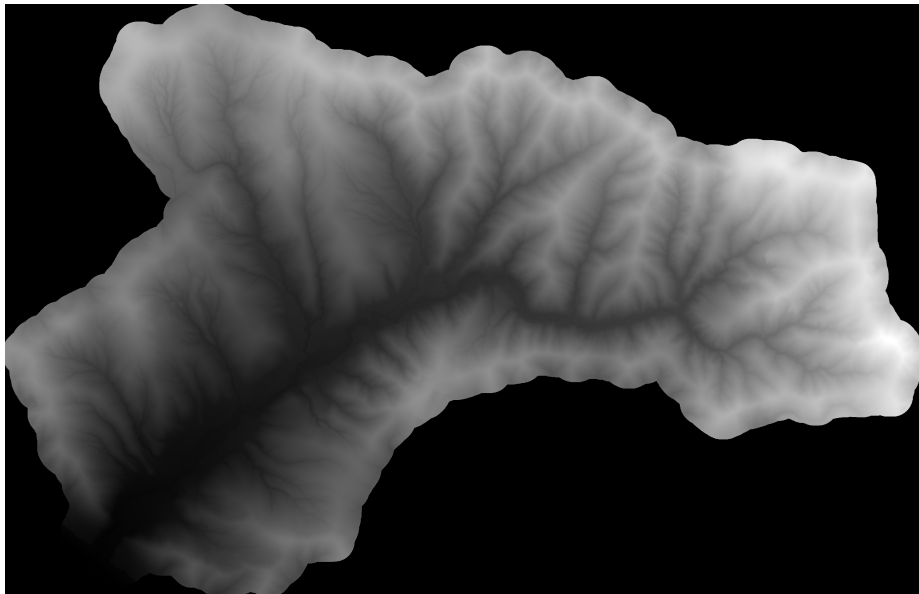


Figure 1: PNG of interpolated DEM