OPEN SOURCE Python TOOLS to VISUALIZE and ANALYSE GEOSPATIAL DATA

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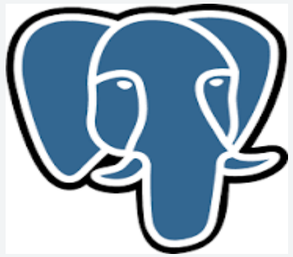
Topics

- Geospatial data ecosystem
- Python open source tools
- Examples
- Integration with Django

Ecosystem

- Storage and Management
- Access and Analysis
- Visualization

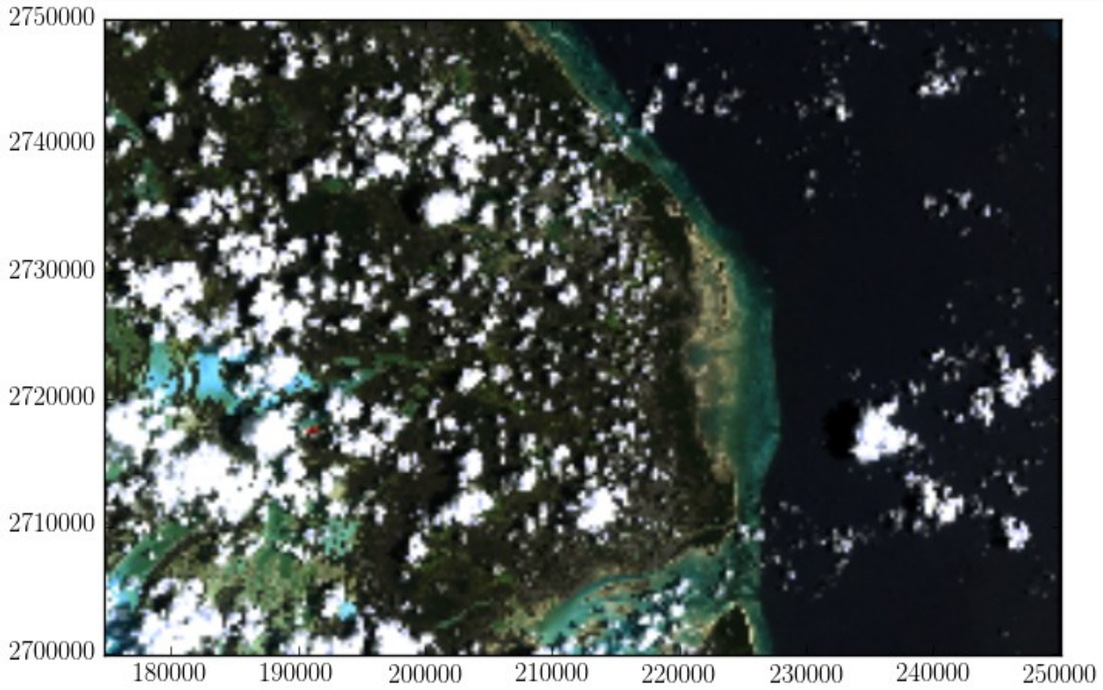


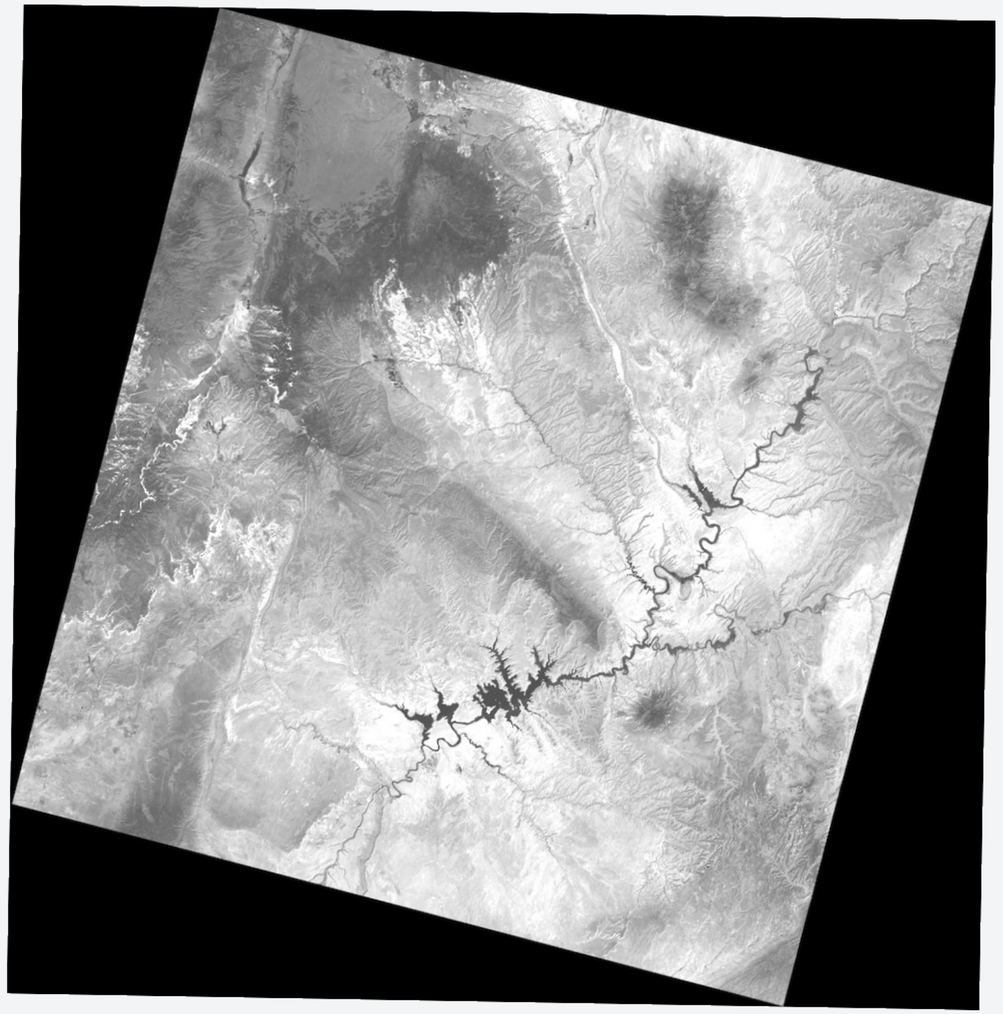
Open source tools

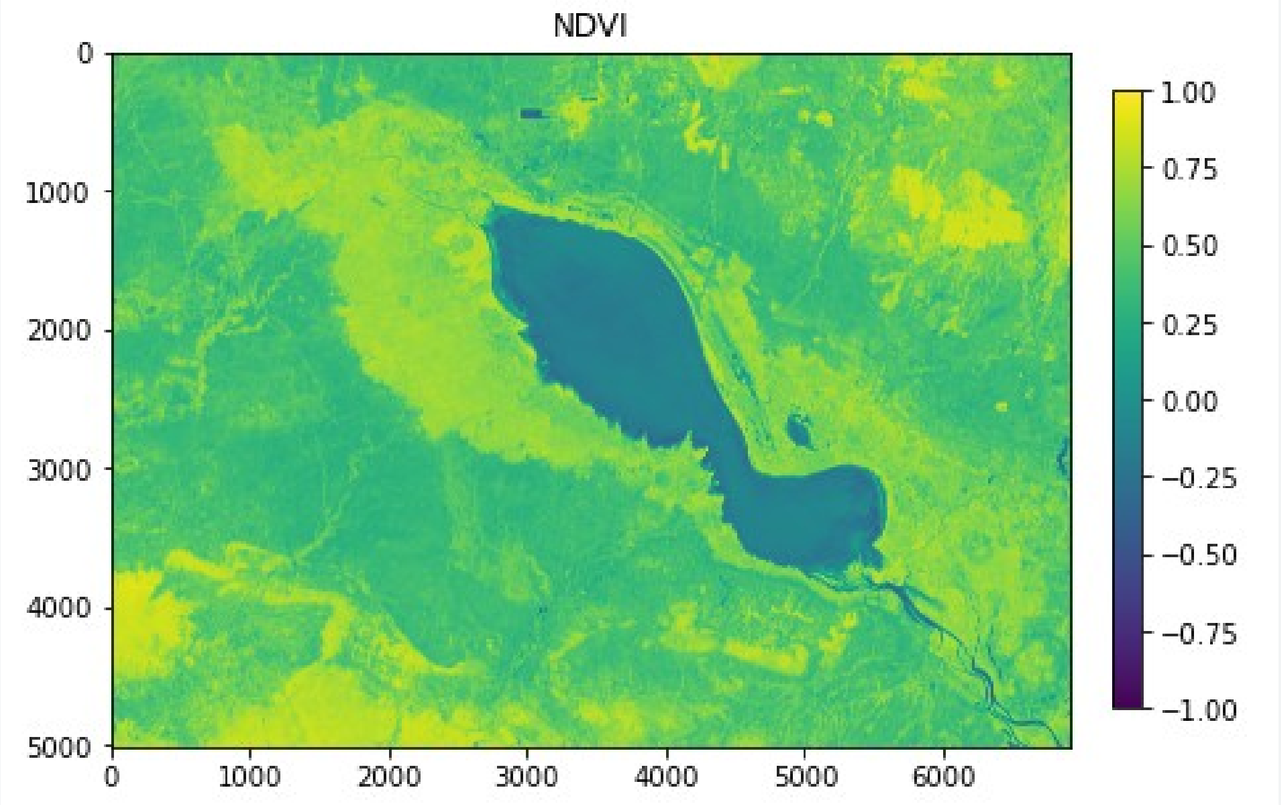
Rasterio

```
>>> import rasterio
```

```
>>> dataset = rasterio.open('example.tif')
```

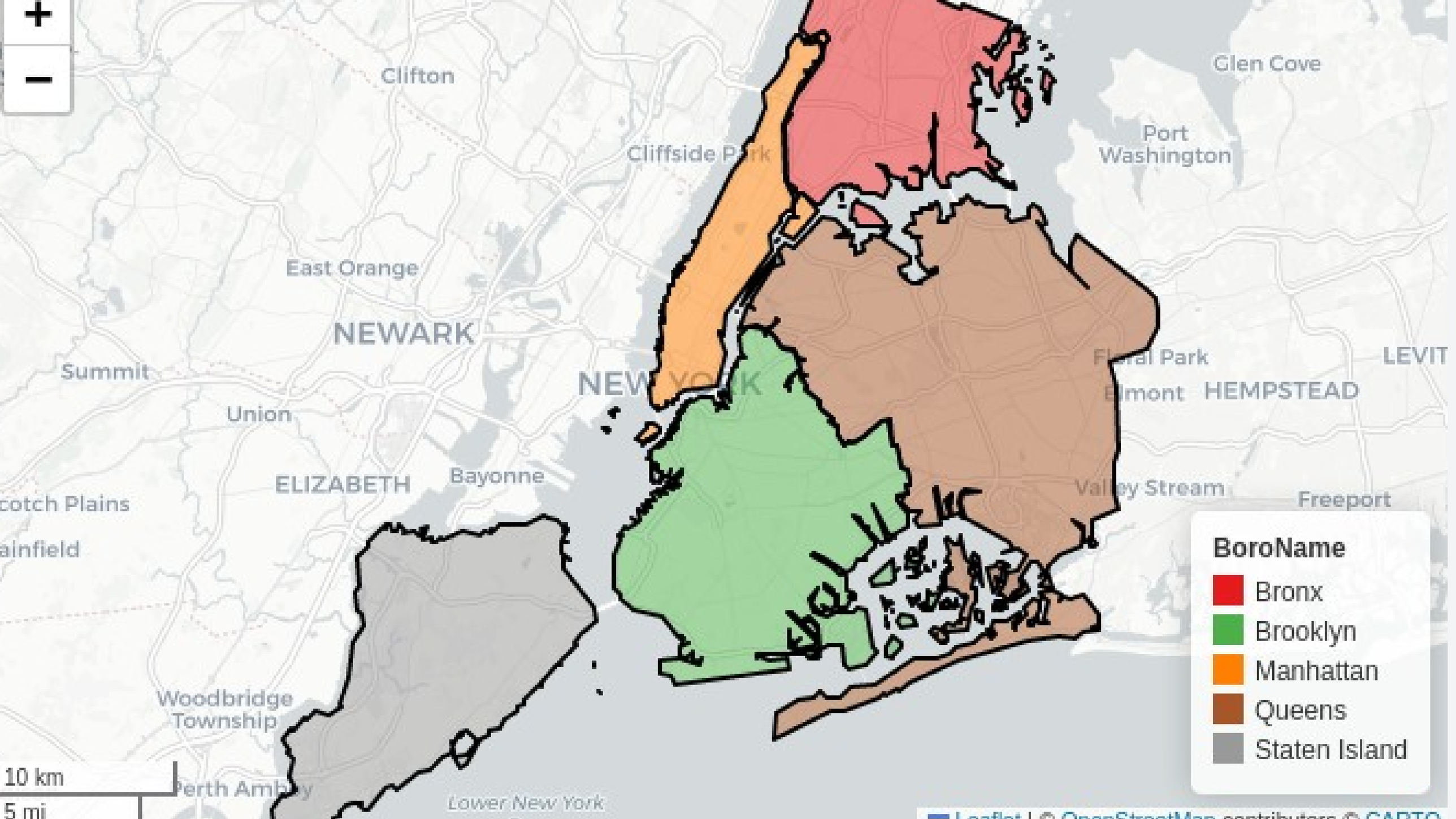





NDVI
0
1000
2000
3000
4000
5000
0
1000
2000
3000
4000
5000
6000
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00

Geopandas

```
>>> import geodatasets
>>> nybb_path = geodatasets.get_path('nybb')
>>> boros = geopandas.read_file(nybb_path)
>>> boros.set_index('BoroCode', inplace=True)
>>> boros.sort_index(inplace=True)
>>> boros
               BoroName     Shape_Leng    Shape_Area  \
BoroCode
1             Manhattan  359299.096471  6.364715e+08
2                 Bronx  464392.991824  1.186925e+09
3              Brooklyn  741080.523166  1.937479e+09
4                Queens  896344.047763  3.045213e+09
5         Staten Island  330470.010332  1.623820e+09

                                                  geometry
BoroCode
1         MULTIPOLYGON (((981219.0557861328 188655.31579...
2         MULTIPOLYGON (((1012821.805786133 229228.26458...
3         MULTIPOLYGON (((1021176.479003906 151374.79699...
4         MULTIPOLYGON (((1029606.076599121 156073.81420...
5         MULTIPOLYGON (((970217.0223999023 145643.33221...
```


Clifton
Glen Cove
Cliffside Park
Port Washington
East Orange
NEWARK
Summit
Union
NEW YORK
Floral Park
Elmont
HEMPSTEAD
LEVIT
ELIZABETH
Bayonne
Valley Stream
Freeport
cotch Plains
ainfield
Woodbridge Township
Perth Amboy
Lower New York
10 km
5 mi
BoroName
Bronx
Brooklyn
Manhattan
Queens
Staten Island

Visualization using

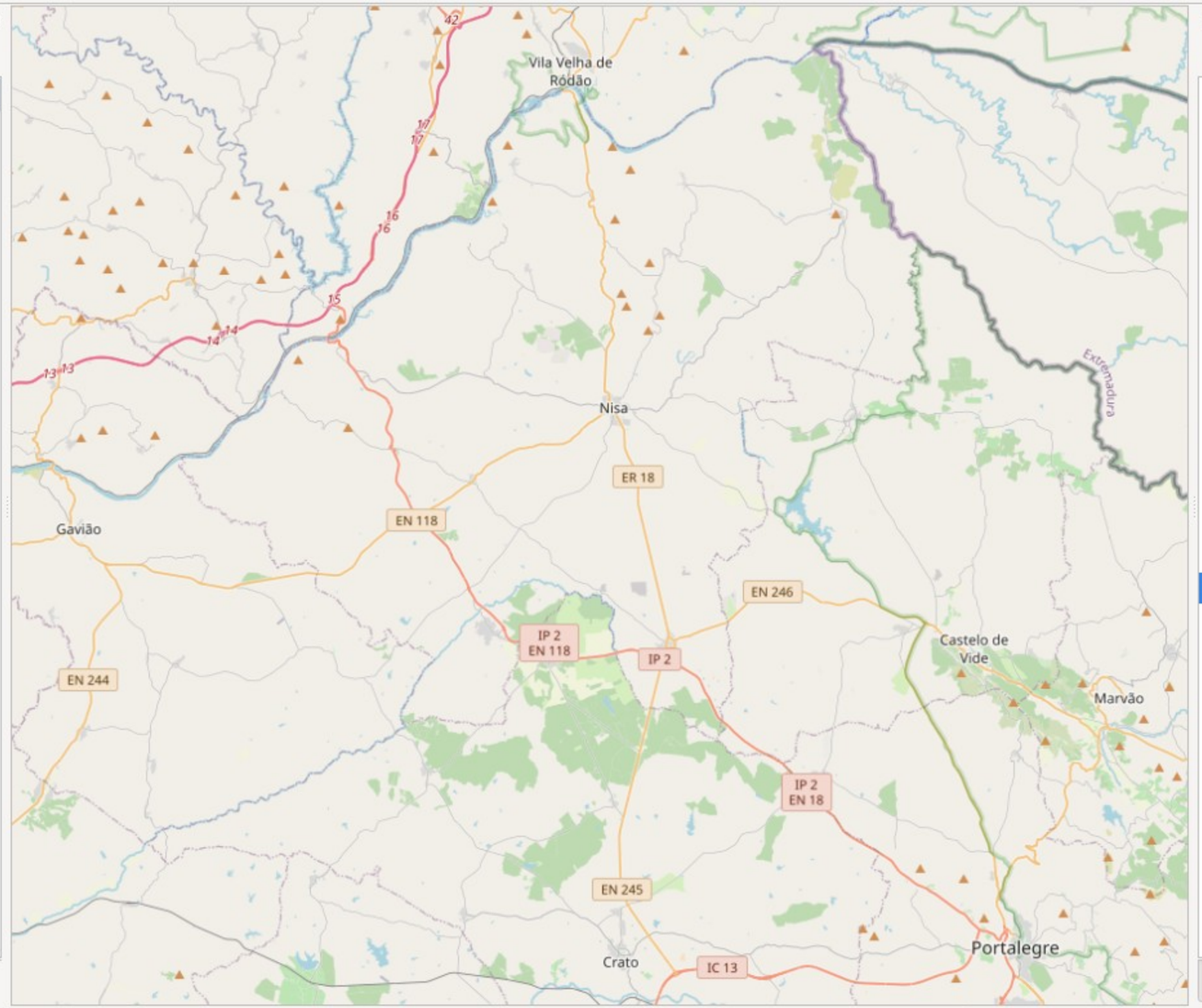
PyQGIS

About QGIS

- Analyse and publish geospatial information
- Create maps, edit and visualize them
- Free to download and use
- Development is a team effort!

*Untitled Project — QGIS [Open GIS Stack]

ject Edit View Layer Settings Plugins Vector Raster Database Web Mesh Processing Help



rs

OpenStreetMap

Browser

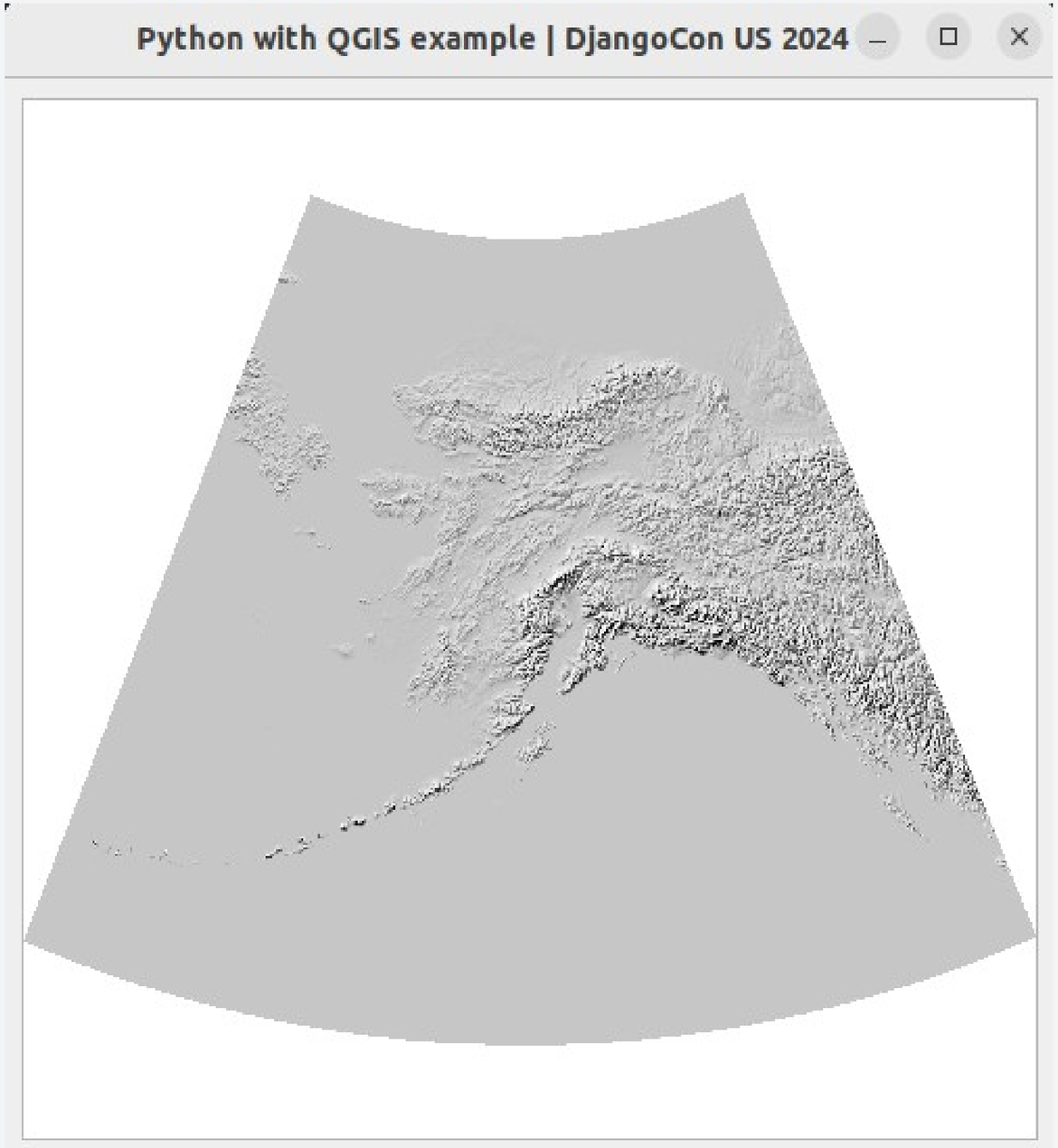
- Esri National Geographic
- Esri Ocean
- Esri Satellite
- Esri Standard
- Esri Terrain
- Esri Topo World
- Esri Transportation
- Google Maps
- Google Satellite
- Google Satellite Hybrid
- Google Terrain
- Google Terrain Hybrid
- Mapzen Global Terrain
- Open Weather Map Clouds
- Open Weather Map Temperature
- Open Weather Map Wind Speed
- OpenStreetMap
- OpenStreetMap H.O.T.
- OpenStreetMap Monochrome
- OpenStreetMap Standard
- OpenTopoMap
- Stamen Terrain
- Stamen Toner
- Stamen Toner Light
- Stamen Watercolor
- Strava All
- Strava Run
- Wikimedia Hike Bike Map

rers Undo/Redo Browser (2)

Proj… Debugging/Develop… B… La… Processin

Type to locate (Ctrl+K) 1 legend entries removed. Coordinate -857714,4805367 Scale 1:364782 Magnifier 100% Rotation 0.0 ° Render EPSG:3857

```python
from qgis.core import *
from qgis.gui import QgsMapCanvas
from qgis.PyQt.QtWidgets import QFrame, QGridLayout, QMainWindow

application = QgsApplication([], False)


QgsApplication.setPrefixPath('/usr', True)
QgsApplication.initQgis()

main_window = QMainWindow()
main_window.setWindowTitle(
    "Python with QGIS example | "
    "DjangoCon US 2024"
)
frame = QFrame()
main_window.setCentralWidget(frame)
layout = QGridLayout(frame)

map_canvas = QgsMapCanvas()
layout.addWidget(map_canvas)

raster_file_uri = 'https://github.com/qgis/QGIS-Sample-Data/' \
                  'blob/master/qgis_sample_data/raster/' \
                  'SR_50M_alaska_nad.tif?raw=true'

raster_layer = QgsRasterLayer(raster_file_uri, 'test_layer')

QgsProject.instance().addMapLayer(raster_layer)
map_canvas.setLayers([raster_layer])
map_canvas.setExtent(raster_layer.extent())

main_window.show()
application.exec_()
```



Visualiazation example

Resources link: https://github.com/Samweli/djangocon_us_2024

Django Integration

Thank you!

SPECIAL THANKS