

# **CARTOPY LIBRARY PRESENTATION**

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# ABOUT CARTOPY

CartoPy is a Python library that specializes in creating geospatial visualizations, designed to make drawing maps for data analysis and visualization easy.



It is widely used in scientific and academic settings for tasks such as weather visualization, geographic analysis, and environmental modeling.

# KEY FEATURES

## Projection Support

A variety of map projections are available with CartoPy. These include both global (e.g., Mercator) and regional (e.g. Lambert Conformal) projections.

## Geospatial Analysis

Buffer creation and coordinate transformations are just some of the features provided by CartoPy that make spatial data analysis easier.

## OpenStreetMap Integration

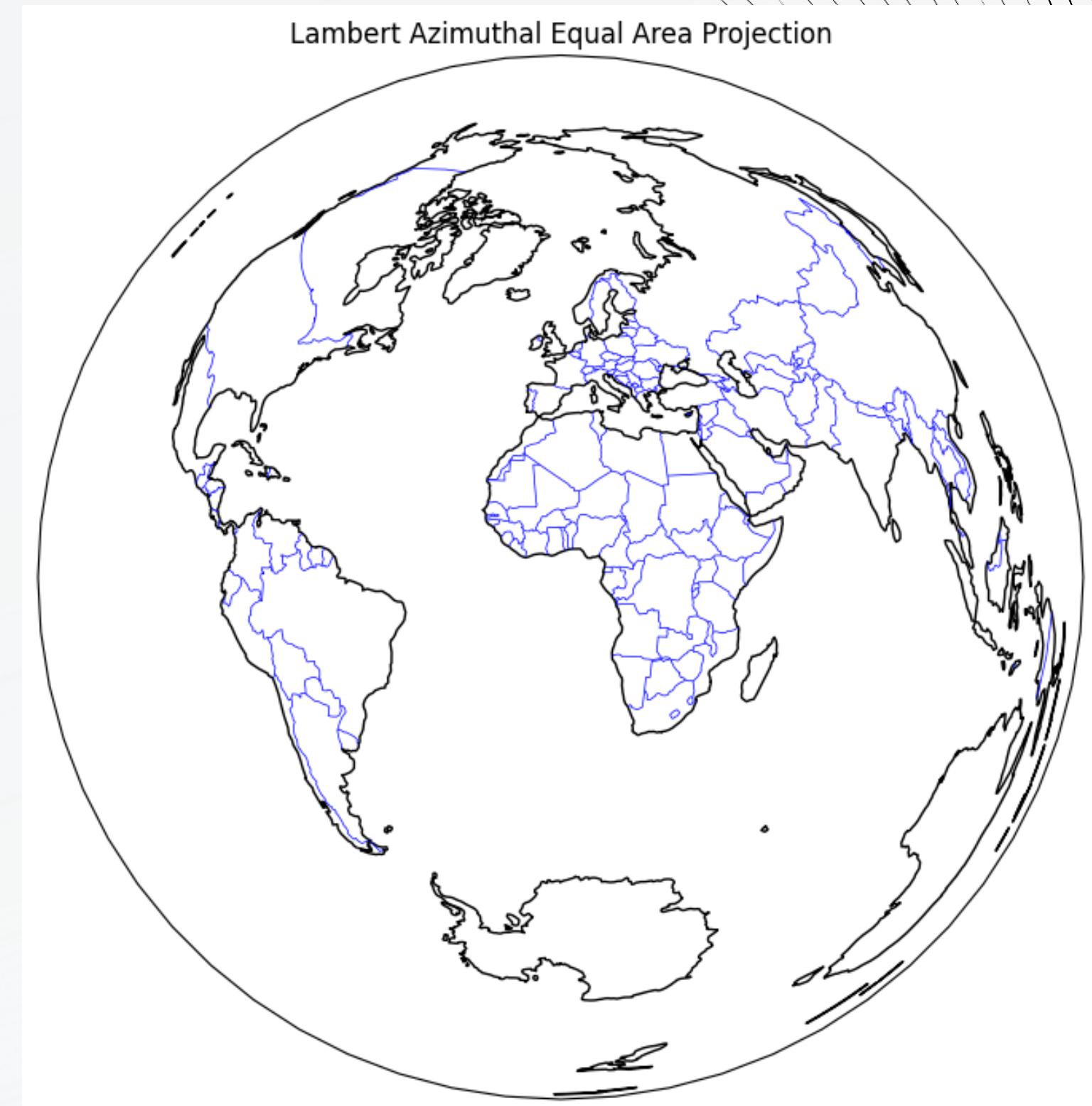
CartoPy can overlay data on top of OpenStreetMap, which allows for detailed contextual mapping, such as the visualization of transportation networks.

# CARTOPY FEATURE INTERFACE

- The `cartopy.feature` module offers predefined models which are ready-to-use geographic features like coastlines or lakes.
- Custom features can also be created, using shapefiles or geoJSON data through the `cartopy.feature.ShapelyFeature` class

# COORDINATE REFERENCE SYSTEM (CRS)

- CRS defines how geographic coordinates (latitude and longitude) map onto a flat surface.
- CartoPy ensures consistency among datasets by making it simple for users to convert data between several CRS.
- This is useful when combining data from various sources with differing CRS definitions.



# GEOAXES

- Importing cartopy.crs allows us to use the library's CRS for geographical projections.
- If we specify such a projection to an Axes object, this is then converted into a GeoAxes object. This will effectively georeference the subplot.

```
fig = plt.figure(figsize=(11, 8.5))
projMoll = ccrs.Mollweide(central_longitude=0)
ax = plt.subplot(1, 1, 1, projection=projMoll)
ax.set_title("Mollweide Projection")

plt.show()
```

## Sources used:

- CartoPy documentation:  
<https://scitools.org.uk/cartopy/docs/latest/index.html>
- ObsPy:  
[https://docs.obspy.org/tutorial/code\\_snippets/cartopy\\_plot\\_with\\_beachballs.html](https://docs.obspy.org/tutorial/code_snippets/cartopy_plot_with_beachballs.html)
- Project Pythia:  
<https://foundations.projectpythia.org/core/cartopy/cartopy.html#basic-concepts-map-projections-and-geoaxes>