

Open and Plot Data

This notebook demonstrates how to open the plot data using `rioxarray`, `stackstac` and `pystac_client`.

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```
from datetime import datetime
import matplotlib.pyplot as plt
from pystac_client import Client
import rasterio as rio
import rioxarray
import stackstac
import xarray as xr
```

Accessing the data

The data is in a protected bucket. Please request access by emailing aimee@developmentseed.org providing your affiliation, interest in or expected use of the dataset, and an AWS IAM role or user Amazon Resource Name (ARN). Once you have provided the role you will use to access the data, the team will add that role or user ARN to the permitted list of identities which can assume a role with read access to the data. The code in `create_rio_session.py` can then be used to assume this read-access role, identified in that code by the environment variable `AWS_ROLE`.

```
%run -i 'create_rio_session.py'
```

Declare your collection of interest

You can discover available collections the following ways:

- Use the {STAC_API_URL}/collections API endpoint (JSON response)
- Programmatically using pystac (see example in the `list-collections.ipynb` notebook)
- In the STAC Browser: <http://delta-staging-stac-browser.s3-website-us-east-1.amazonaws.com/>

```
STAC_API_URL = 'https://staging-stac.delta-backend.com/'
collection = 'social-vulnerability-index-overall-nopop'
```

Use satsearch to discover items in the social-vulnerability-index-socioeconomic-nopop collection

```
client = Client.open(STAC_API_URL)
search = client.search(
    collections=[collection],
    datetime=[datetime(2000,1,1), datetime(2019,1,1)],
    limit=10
)
items = list(search.items())

len(items)
```

Create an xarray.DataArray

```
s3_link = items[0].assets['cog_default'].href
da = rioxarray.open_rasterio(s3_link)
da
```

```
<xarray.DataArray (band: 1, y: 6297, x: 13353)>
[84083841 values with dtype=float32]
Coordinates:
  * band      (band) int64 1
  * x         (x) float64 -178.2 -178.2 -178.2 ... -66.98 -66.97 -66.96
  * y         (y) float64 71.38 71.37 71.36 71.35 ... 18.94 18.93 18.92 18.91
    spatial_ref  int64 0
Attributes:
  _FillValue:    -3.3999999521443642e+38
  scale_factor:  1.0
  add_offset:    0.0
```

```
da = da.squeeze('band', drop=True)
da
```

```
<xarray.DataArray (y: 6297, x: 13353)>
[84083841 values with dtype=float32]
Coordinates:
  * x         (x) float64 -178.2 -178.2 -178.2 ... -66.98 -66.97 -66.96
  * y         (y) float64 71.38 71.37 71.36 71.35 ... 18.94 18.93 18.92 18.91
    spatial_ref  int64 0
Attributes:
  _FillValue:    -3.3999999521443642e+38
  scale_factor:  1.0
  add_offset:    0.0
```

```
plt.figure(figsize=[15, 8])
da.plot(x='x', y='y', vmin=0, vmax=1)
```

```
<matplotlib.collections.QuadMesh at 0x12adb95b0>
```

```
/Users/leo/development-seed/veda/veda-documentation/env-veda-documentation/lib/python3.8/site-packages/veda/veda.py:10: SyntaxWarning: 'xa' is not a valid keyword
  xa *= self.N
```

