

# Net Carbon

*Space data to value  
farmer's carbon*



A satellite-style aerial photograph of a coastal area, likely a bay or estuary, showing green land, blue water, and some urban development. Four white circles with numbers are overlaid on the image. The background is a dark blue gradient.

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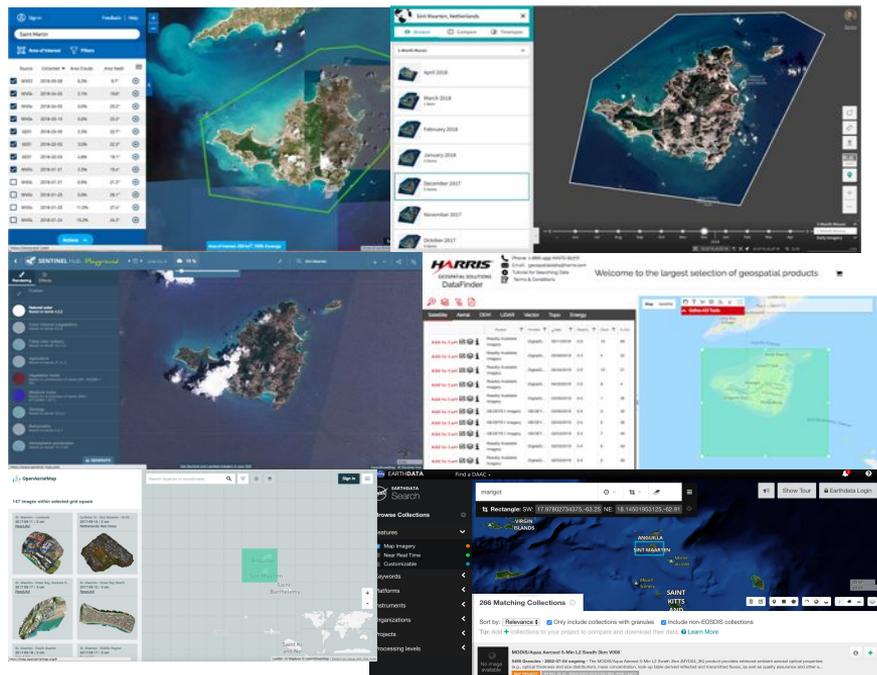
**Contributors**

# Why STAC

Each provider has its **catalog and interface ...**

Just searching the relevant data for your project could be a tough work ...

- **Lot of data providers ...**
- **Each interface in unique ...**



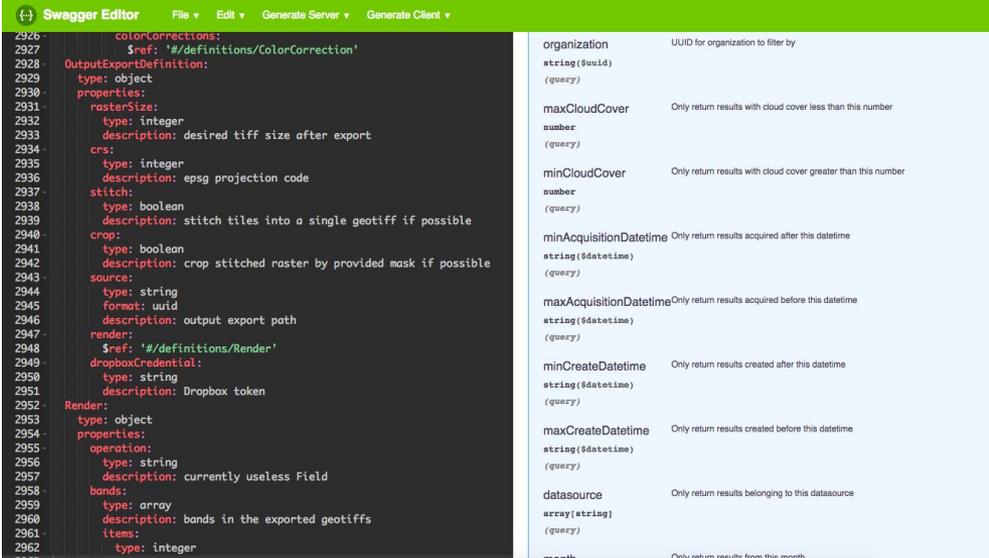
# Why STAC

Each provider has its own **API...**

If you are a programmer  
that's exactly the same ...

You should design a new  
data connector each time...

- **Lot of data providers ..**
- **Each API in unique ...**



The screenshot shows the Swagger Editor interface. The left pane displays the OpenAPI definition for the 'Render' operation, which includes a reference to a 'ColorCorrection' definition. The right pane shows a list of query parameters for the 'Render' operation.

```
2926 colorCorrections:
2927   $ref: '#/definitions/ColorCorrection'
2928 OutputExportDefinition:
2929   type: object
2930   properties:
2931     rasterSize:
2932       type: integer
2933       description: desired tiff size after export
2934     crs:
2935       type: integer
2936       description: epsg projection code
2937     stitch:
2938       type: boolean
2939       description: stitch tiles into a single geotiff if possible
2940     crop:
2941       type: boolean
2942       description: crop stitched raster by provided mask if possible
2943     source:
2944       type: string
2945       format: uuid
2946       description: output export path
2947     render:
2948       $ref: '#/definitions/Render'
2949     dropboxCredential:
2950       type: string
2951       description: Dropbox token
2952 Render:
2953   type: object
2954   properties:
2955     operation:
2956       type: string
2957       description: currently useless Field
2958     bands:
2959       type: array
2960       description: bands in the exported geotiffs
2961     items:
2962       type: integer
```

organization	UUID for organization to filter by
string(\$uuid)	
(query)	
maxCloudCover	Only return results with cloud cover less than this number
number	
(query)	
minCloudCover	Only return results with cloud cover greater than this number
number	
(query)	
minAcquisitionDatetime	Only return results acquired after this datetime
string(\$datetime)	
(query)	
maxAcquisitionDatetime	Only return results acquired before this datetime
string(\$datetime)	
(query)	
minCreateDatetime	Only return results created after this datetime
string(\$datetime)	
(query)	
maxCreateDatetime	Only return results created before this datetime
string(\$datetime)	
(query)	
datasource	Only return results belonging to this datasource
array[string]	
(query)	
month	Only return results from this month

# Why STAC

Let's work *together!*

The main purpose of STAC is :

- **Build an common language to catalog geospatial data**



# STAC

SpatioTemporal  
Asset Catalog

# Why STAC

Let's work **together!**

It's extremely simple, STAC catalogs is composed of three layers :

- **Catalogs**
  - **Collections**
    - **Items**



## It's already used for Sentinel 2 in AWS

### Sentinel 2 L2A COGs (sentinel-s2-l2a-cogs)

<https://earth-search.aws.element84.com/v0/collections/sentinel-s2-l2a-cogs>

Sentinel-2a and Sentinel-2b imagery, processed to Level 2A (Surface Reflectance) and converted to Cloud-Optimized GeoTIFFs

Title	Date Acquired
<a href="#">S2A_37VFG_20220121_0_L2A</a>	Fri, 21 Jan 2022 08:43:15 GMT
<a href="#">S2A_38VLM_20220121_0_L2A</a>	Fri, 21 Jan 2022 08:43:15 GMT
<a href="#">S2A_38VMM_20220121_0_L2A</a>	Fri, 21 Jan 2022 08:43:12 GMT
<a href="#">S2A_37VEH_20220121_0_L2A</a>	Fri, 21 Jan 2022 08:43:11 GMT
<a href="#">S2A_37VFH_20220121_0_L2A</a>	Fri, 21 Jan 2022 08:43:09 GMT
<a href="#">S2A_38VLN_20220121_0_L2A</a>	Fri, 21 Jan 2022 08:43:08 GMT
<a href="#">S2A_38VMN_20220121_0_L2A</a>	Fri, 21 Jan 2022 08:43:03 GMT



METADATA

**STAC Version** 1.0.0-beta.2

**Keywords** sentinel, earth observation, esa

**License** [proprietary](#)

**Temporal Extent** 27/06/2015, 12:25:31 - now

## It's already used for Landsat 8 in MICROSOFT

### Landsat 8 Collection 2 Level-2 (landsat-8-c2-l2)

<https://planetarycomputer.microsoft.com/api/stac/v1/collections/landsat-8-c2-l2>

The [Landsat](#) program has been imaging the Earth since 1972; it provides a comprehensive, continuous archive of the Earth's surface. [Landsat 8](#) is the most recent satellite in the Landsat series. Launched in 2013, Landsat 8 captures data in eleven spectral bands: ten optical/IR bands from the [Operational Land Imager](#) (OLI) instrument, and two thermal bands from the [Thermal Infrared Sensor](#) (TIRS) instrument.\n\nThis dataset represents the global archive of Level-2 Landsat 8 data from [Landsat Collection 2](#). Images are stored in [cloud-optimized GeoTIFF](#) format.\n

Title	Date Acquired
<a href="#">LC08_L2SR_182122_20211209_02_T2</a>	Thu, 09 Dec 2021 09:34:25 GMT
<a href="#">LC08_L2SR_182121_20211209_02_T2</a>	Thu, 09 Dec 2021 09:34:01 GMT
<a href="#">LC08_L2SR_182120_20211209_02_T2</a>	Thu, 09 Dec 2021 09:33:37 GMT



METADATA

**STAC Version** 1.0.0

**Keywords** Landsat, USGS, NASA, Satellite, Global, Imagery, Reflectance

**License** [proprietary](#)

A satellite-style map of a river delta, likely the Amazon, showing a complex network of orange-brown channels and floodplains. The background is a mix of brown, green, and blue, representing land, vegetation, and water. Four white circles with numbers inside are overlaid on the map, each pointing to a specific section of the delta. The numbers are 01, 02, 03, and 04, arranged in a 2x2 grid.

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# How to use STAC

Depending on *your needs*



## Storing your data

You can build your own STAC catalog easily with python (pystac)



## Searching data

You can search data from any STAC provider with the same code thanks to STAC API (pystac-client or sat-search)

# How to use STAC

## Searching *data*

Let's search data  
in my area of  
interest between  
2019-01-01 &  
2019-06-04

```
$ sat-search search --intersects maine.geojson --found  
1674 items found  
$ clear
```

# How to use STAC

## Searching *data*



# How to use STAC

## Searching *data*

This is an example of our own tool to search and download easily satellite data

The screenshot shows a web browser at `netcarbon-sentinel2.herokuapp.com`. The interface includes a navigation bar with links for Applications, Gmail, NetCarbon, Google Agenda, Workspace, Clouds, Plateform, Data, and Chat. A sidebar on the left features the Net Carbon logo, a 'Periode de temps' input field set to '2017/01/01 - 2022/01/21', and a 'Couverture nuageuse' slider set to 10. The main content area has two search options: 'Recherche par geojson' with a file upload area (limit 200MB) and a 'Rechercher' button, and 'Recherche par ville:' with 'Bordeaux' selected. Below the search options is a satellite image of a coastal area and a 'Download' button with an 'Ouvrir avec QGIS' option.

```
56
57 url = 'https://earth-search.aws.element84.com/v0' #STAC API provider|
58 collection = 'sentinel-s2-l2a-cogs' #L2A
59 results = satsearch.Search.search(url=url,
60                                   collections=[collection],
61                                   datetime=dates,
62                                   bbox=bbox,
63                                   sortby=['-properties.datetime'],
64                                   query={'eo:cloud_cover': {'lt': cloud_cover},
65                                         'sentinel:data_coverage' : {'gt': data_coverage}
66                                   })
67
68 items = results.items()
69 df = catalog_to_gpd(items)
70 print(f'Found {len(items)} Items')
71
```

An aerial photograph of a coastal area, likely a river delta or estuary. The water is dark blue on the left, transitioning to a lighter, greenish-blue as it flows into a network of channels and marshes. The land is a mosaic of green, brown, and grey, indicating different types of vegetation, agriculture, and urban development. A winding road or path is visible on the right side. The overall scene is a complex landscape of natural and human-made elements.

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# STAC Ecosystem

*A lot of project are now build around **STAC***

All the STAC Catalog available are here (and it's just the beginning ...):

<https://stacindex.org/catalogs>

Lot of tutorial can be found here:

<https://stacindex.org/learn>

All packages that rely or work extremely well with STAC are here:

<https://stacindex.org/ecosystem>



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# Contacts

*All lot of contributors !*



Radiant Earth  
Foundation

EARTH IMAGERY FOR IMPACT

Element 84



<https://github.com/radiantearth/stac-spec>



Google Earth Engine

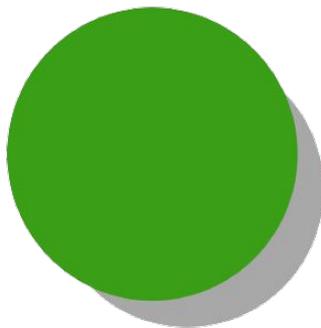


HEXAGON  
GEOSPATIAL



Boundless





# Net Carbon



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