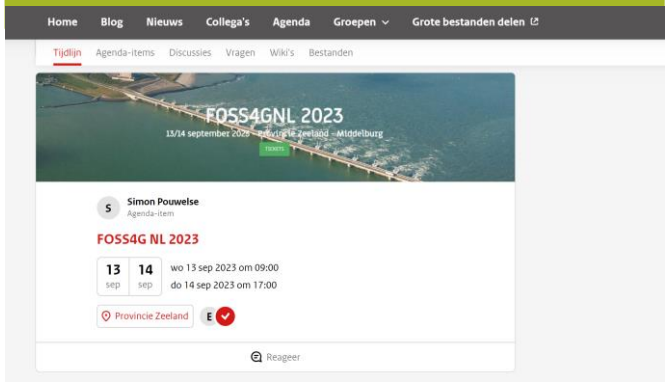
SATELLIETBEELDEN IN JE (DIGITALE) BROEKZAK

Eveline Helder & Simon Pouwelse

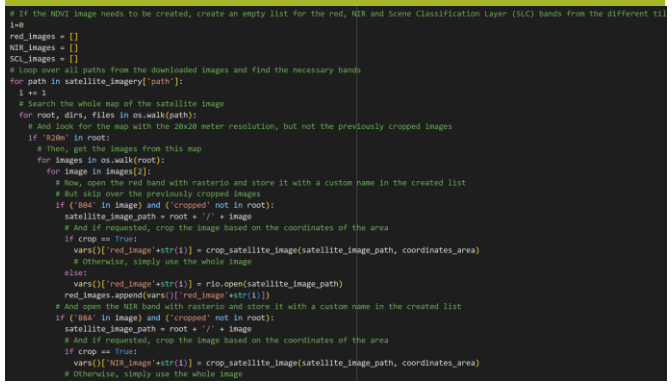
De tijdlijn van dit project

Een vraag over maaidata bij de Provincie Noord-Holland

Interesse vanuit het Provinciaal Overleg Data Science (PODS)



Opschaling door de Provincie Zeeland



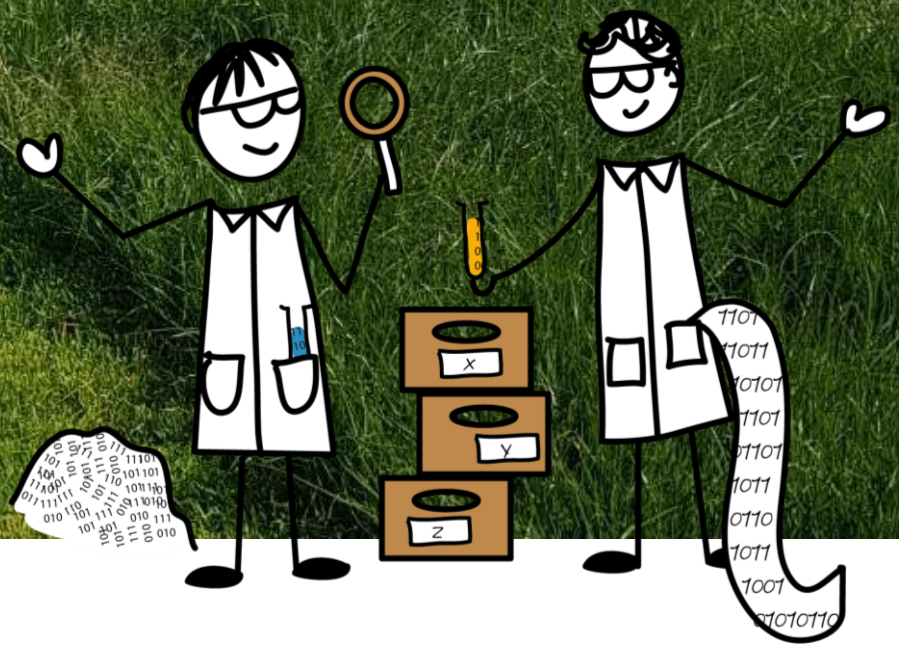
Waar het allemaal mee begon..: Maaidata

Maaien agrariërs/beheerders hun graslanden tijdens het broedseizoen van weidevogels?

Eveline Helder

Dorien Ottenhof

Gerda Edelman



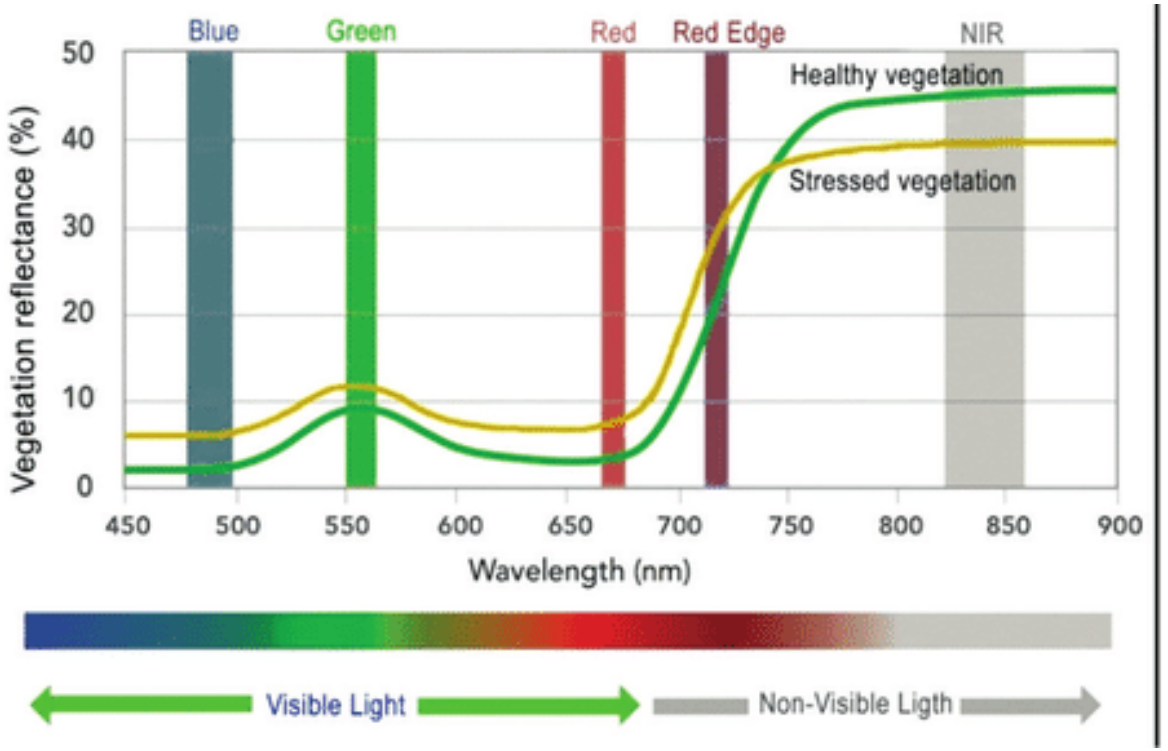
Provincie Noord-Holland

Weidevogels

- Bescherming van soorten, biodiversiteit
- Subsidie voor uitgestelde maaidatum

Monitoring

NDVI



Normalized Difference Vegetation Index:

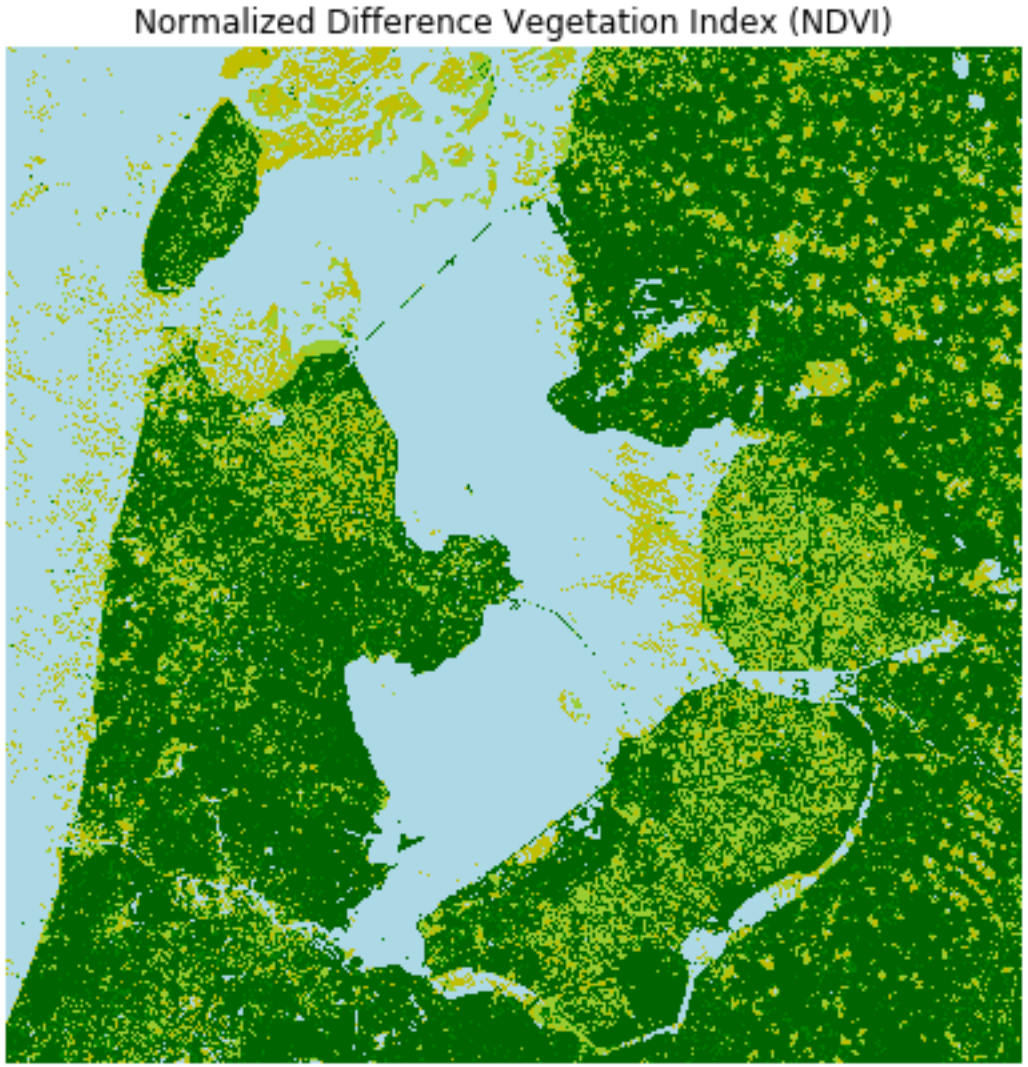
- (NIR – R)/(NIR +R)

NDVI

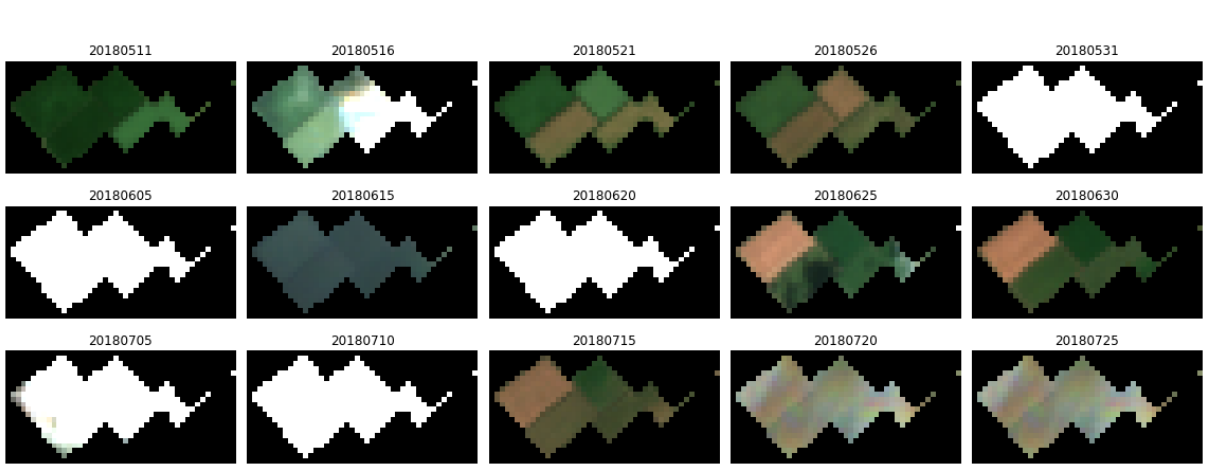
- Normalized Difference Vegetation Index:
  - (NIR – R)/(NIR +R)

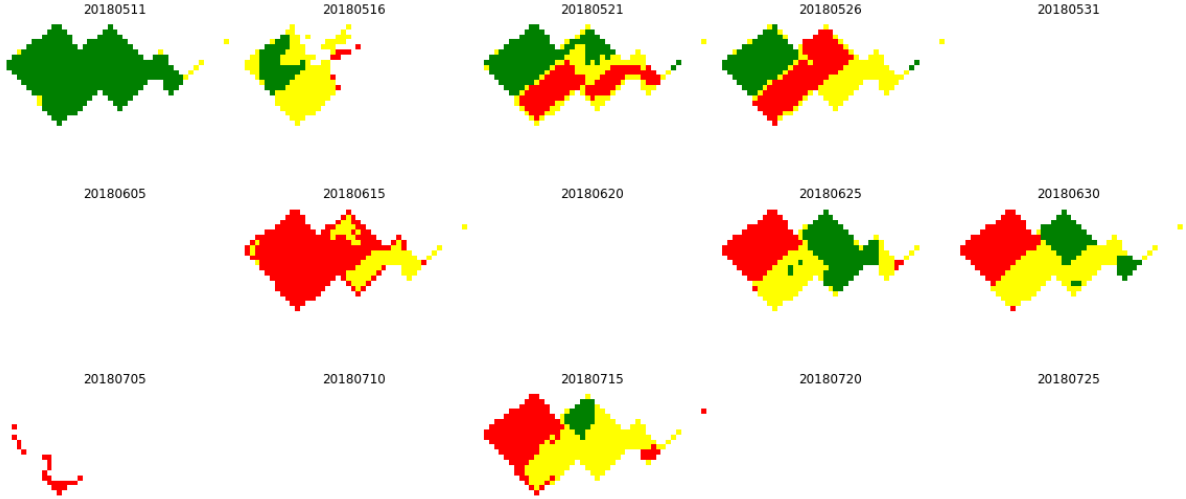
NDVI

- Normalized Difference Vegetation Index:
  - (NIR – R)/(NIR +R)



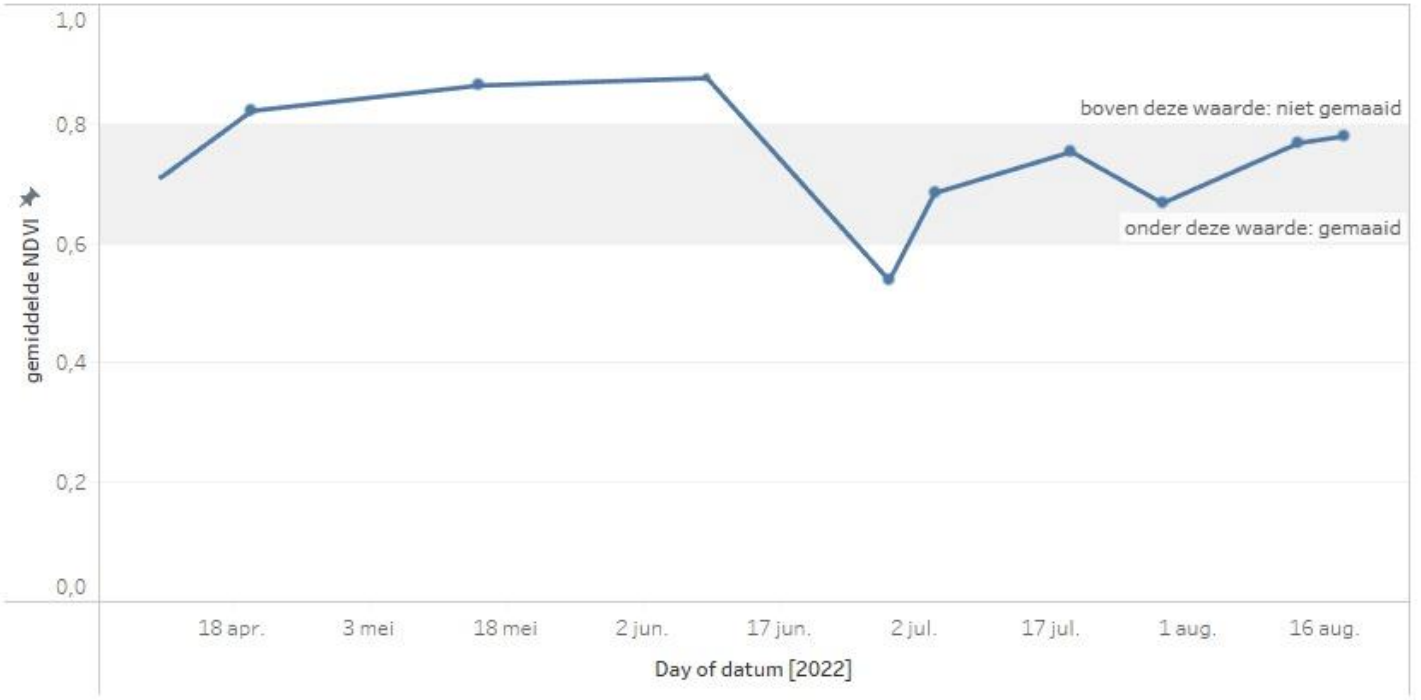
Perceel


20180511
20180516
20180521
20180526
20180531
20180605
20180615
20180620
20180625
20180630
20180705
20180710
20180715
20180720
20180725


20180511
20180516
20180521
20180526
20180531
20180605
20180615
20180620
20180625
20180630
20180705
20180710
20180715
20180720
20180725

Maaimomenten

- > 50 % van de pixels?
- Gemiddelde NDVI
- Sprong van >0.8 naar <0.6



Tal

Provincie Noord-Holland

< Introductie | Beheer eigenaar | Beheer perceel >

Beheer eigenaar

Jaar
- (•) 2020
- ( ) 2019
- ( ) 2018

Eigenaar
(All)

NNN gebied
(All)

Aantal maaibeurten
(All)

Gemaaid
(1 april - 15 juni)
(All)

Oppervlakte perceel ha.
0,50 — 66,37

Aantal maaibeurten per perceel 2020

Gemaaid periode 1 april - 15 juni 2020

Oppervlakte (ha.)
2020
Totaal: **23.318**
NNN: **3.921** *(17%)*
ANLb: **6.667** *(29%)*

Eigenaar/ perceel
2020
Percelen: **8.753**
Eigenaren: **2.224**

Maaibeurten
2020
Totaal: **10.723**
Broedseizoen: **3.474**

% Percelen minimaal 1 x gemaaid
periode 1 april - 15 juni

Aantal maaibeurten totaal per perceel
1 2 3 4

Gemaaid periode 1 april - 15 juni
Ja Nee

Eigenaarschap

Eigenaar	Jaar	Unieke percelen	Percelen min. 1 ..	1 april - 15 juni	Totaal maaibeur..	NNN perceel	ANLb gebied
[redacted]	2020	157	62	39%	193	42	57
	2019	165	24	15%	181	48	61
	2018	212	53	25%	243	77	67

Provinciaal Overleg Data Science (PODS)

- Sinds een jaar
- Meeting in februari in Haarlem
- Live coding door Gerda
- Code gedeeld met aanwezigen

```
# Loop over all paths from the downloaded images and find the necessary bands
for path in satellite_imagery['path']:
  i += 1
  # Search the whole map of the satellite image
  for root, dirs, files in os.walk(path):
    # And look for the map with the 20x20 meter resolution, but not the previously cropped images
    if 'R20m' in root:
      # Then, get the images from this map
      for images in os.walk(root):
        for image in images[2]:
          # Now, open the red band with rasterio and store it with a custom name in the created list
          # But skip over the previously cropped images
          if ('B04' in image) and ('cropped' not in root):
            satellite_image_path = root + '/' + image
            # And if requested, crop the image based on the coordinates of the area
            if crop == True:
              vars()['red_image'+str(i)] = crop_satellite_image(satellite_image_path, coordinates_area)
              # Otherwise, simply use the whole image
            else:
              vars()['red_image'+str(i)] = rio.open(satellite_image_path)
```

OPSCHALING

1-2-3

01

Kies een regio

02

Kies een periode

May

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

June

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

03

Kies een map

Naam	Datum	Type
NDVI_2023-06-0...	31-8-2023 1...	PNG-bestand
NDVI_2023-06-0...	31-8-2023 1...	TIFF-bestand
NDVI_2023-06-0...	31-8-2023 1...	PNG-bestand
NDVI_2023-06-0...	31-8-2023 1...	TIFF-bestand
NDVI_2023-06-0...	31-8-2023 1...	PNG-bestand
NDVI_2023-06-0...	31-8-2023 1...	TIFF-bestand

Simpele code

```
satellite_imagery = Sentinel2_images(
    coordinates_area = (3.6, 51.5),
    start_date = 20210601,
    end_date = 20210631,
    download_path = 'C:/.../folder',
    username_copernicus = 'username123',
    password_copernicus = 'password456'
    )
```

Gebied selecteren

1. **Coordinaat**:
   (3.6, 51.5)
2. **Lijst aan coordinaten**:
   [(3.6, 51.5), (3.7, 51.5), (3.7, 51.4), (3.6,51.4)]
3. **Polygoon**:
   Shapely of Folium
4. **Keene**:
   https://www.keene.edu/campus/maps/tool/


```
{
  "coordinates": [
    [
      [
        3.6318969,
        51.7526198
      ],
      [
        3.6387634,
        51.6437328
      ],
      [
        3.7994384,
        51.6428811
      ],
      [
        3.792572,
        51.749221
      ],
      [
        3.6318969,
        51.7526198
      ]
    ]
  ],
  "type": "Polygon"
}
```

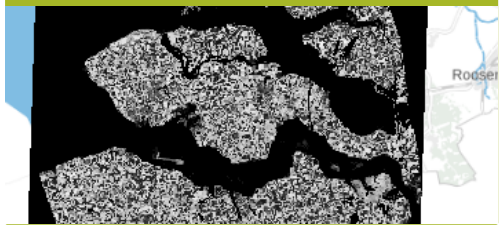
Geavanceerdere opties

01

Wolken filteren & Uitsnijden

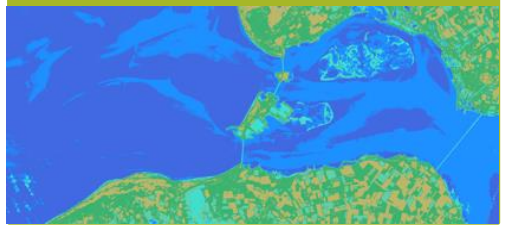
02

GeoTiff



03

Analyses



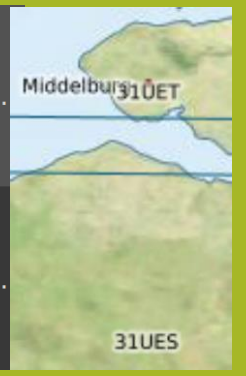
04

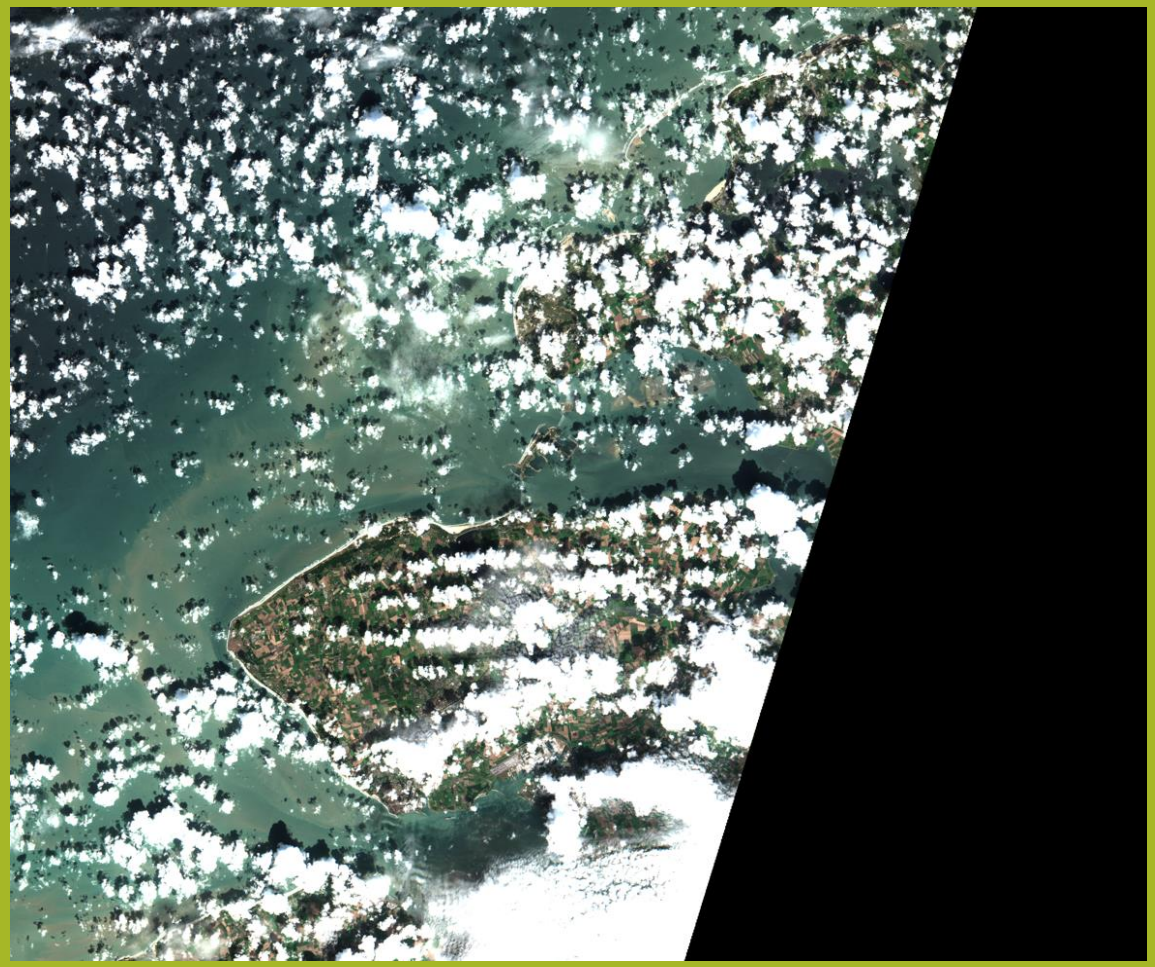
Tijdlijn

1. Wolken & Uitsnijden

```
satellite_imagery = Sentinel2_images(
    coordinates_area = area,
    start_date = 20230801,
    end_date = 20230805,
    cloudcover_percentage = 30,
    sentinel_tiles = ['31UET'],
    crop = False
    username_copernicus = 'username123',
    password_copernicus = 'password456'
    )
```

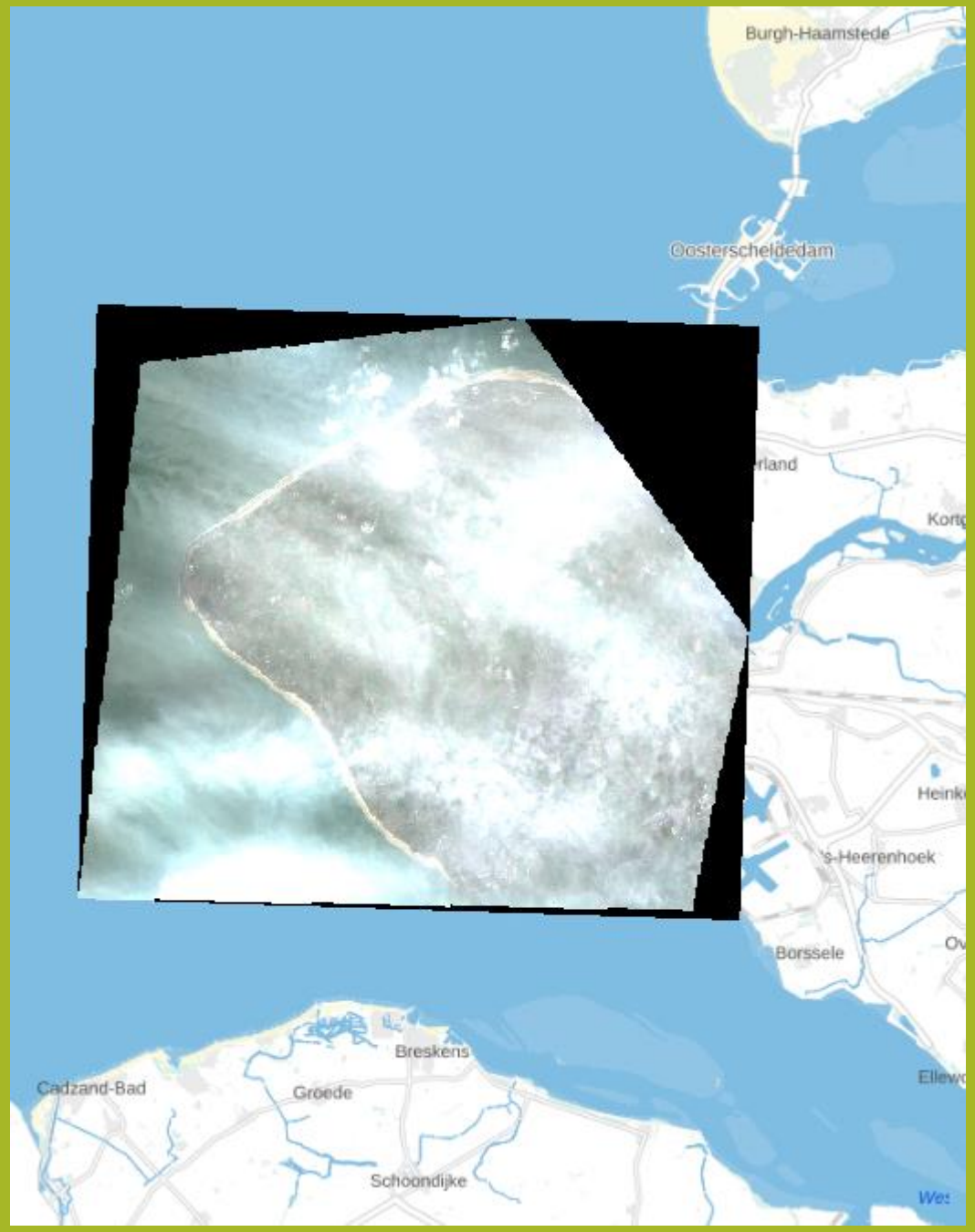
b68e1cbe-cf12-4b3c-b574-0ea8f7aa1673	S2B_MSIL2A_20230801T105629_N0509_R094_T31UES_2...
d47c605f-e083-4050-ac8a-e4853d941be2	S2B_MSIL2A_20230801T105629_N0509_R094_T31UET_2...





2. GeoTiff

```
satellite_imagery = Sentinel2_images(
    area = area,
    start_date = 20230307,
    end_date = 20230312,
    download_path = 'C:/.../folder',
    cloudcover_percentage = 30,
    sentinel_tiles = ['31UET'],
    crop = True,
    output_sort = 'geotiff',
    username_copernicus = 'username123',
    password_copernicus = 'password456'
    )
```

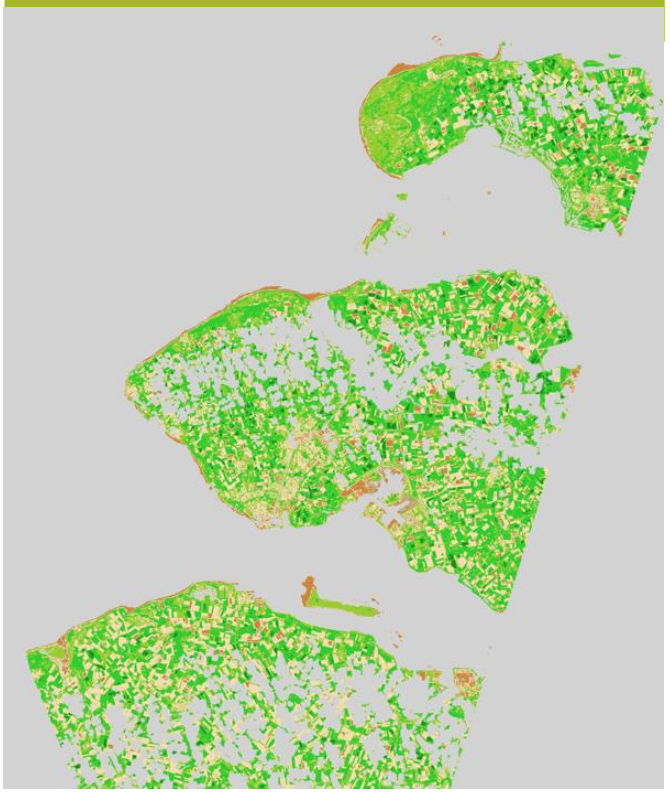


3. Analyses

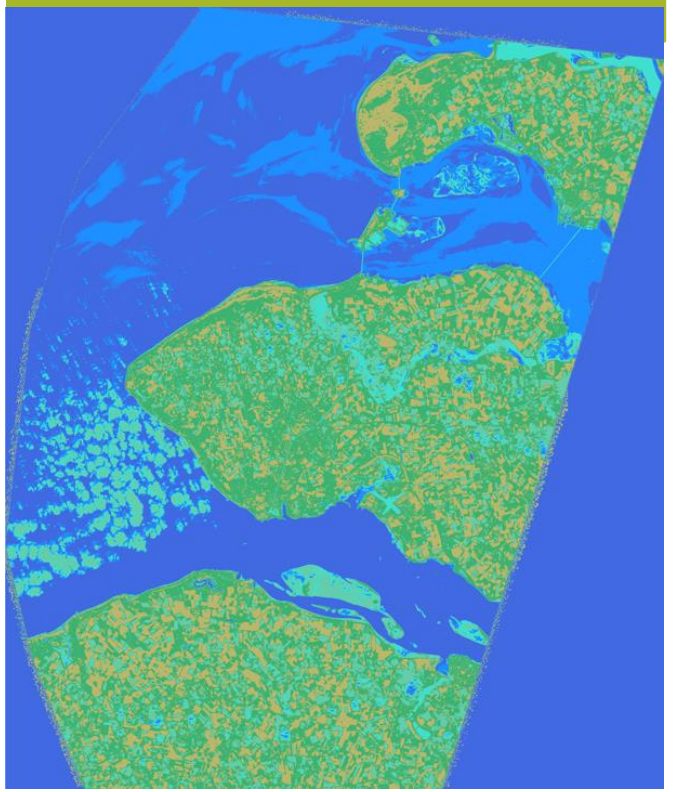
```
output_sort = 'image'
RGB = False,
NDVI = True,
AWEI = True,
username_copernicus = 'username123'
```

RGB

NDVI

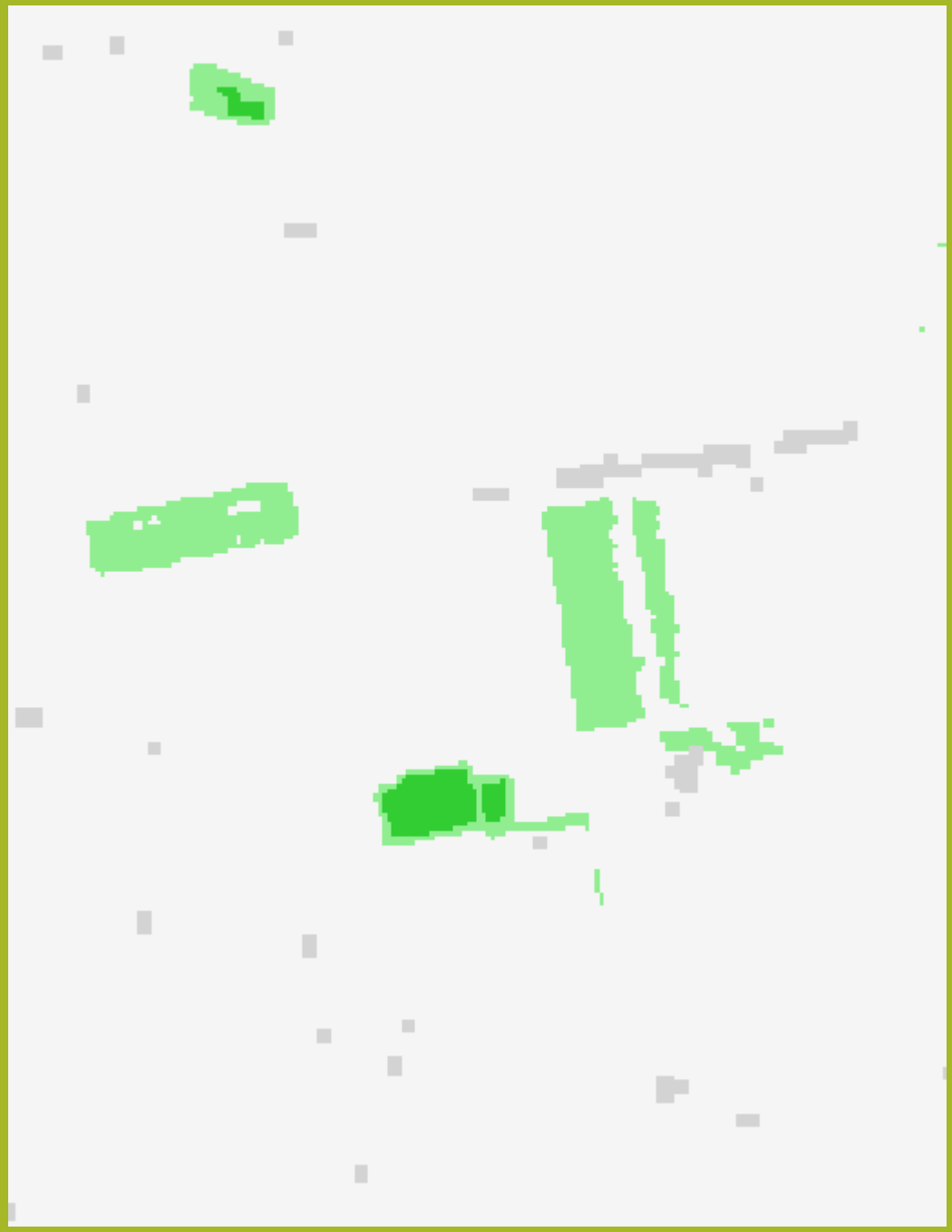


AWEI



4. Tijdlijn

```
cloudcover_percentage = 50,
crop = True,
output_sort = 'image'
RGB = False,
NDVI = True,
difference_overview = True,
username_copernicus = 'username123',
password_copernicus = 'password456'
)
```



Project description

SatImages: the powerful and user-friendly way for satellite imagery

The **Sat Images** Python package is a powerful tool that allows you to easily access **satellite images** for a specific area or region. With this module, you can explore the possibilities that satellite imagery brings you. Whether you want a simple **RGB-image or a vegetation (NDVI) analysis** of your region. We hope to provide the perfect package for every environmental researcher, GEO enthusiast, or anyone who is just curious about satellite imagery. This module makes it **easy and effortless** to work with such data!

WORDT VERVOLGD...

Sentinel-1, Sentinel 5-p, nieuwe analyses, etc.

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