Sinergise
Anže Zupanc
SINERGISE

Sinergise

- Small company changing the world one step at a time

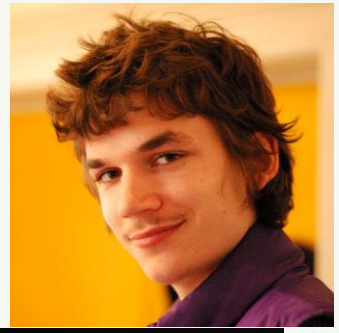
sentinelhub

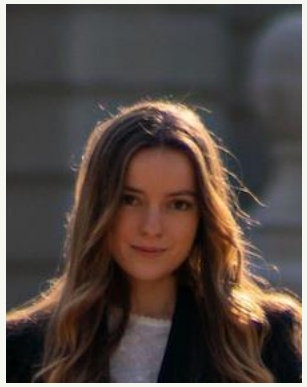
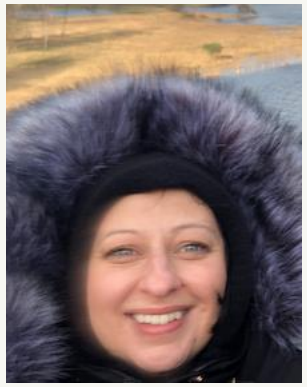
Service providing you fast and simple access to satellite data

- Around 85 employees
  - 4 physics, 1 mathematics, 1 medical imaging PhDs
  - 4+ physics masters

Earth Observation Research teams

- Research and development within EU Horizon, ESA, … projects
- Developing novel ways to extract value in satellite imagery
  - Organized like research group
    - Journal clubs
    - Research Meetings
- Putting research into production

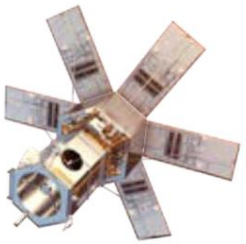


Enormous volumes of Earth Observation data

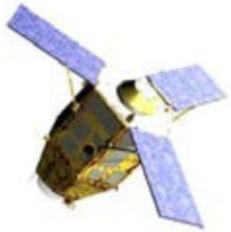
Commercial

DigitalGlobe



WorldView-4
Launch Mass 2,485kg

AIRBUS



Pleiades
Launch Mass 970kg

planet.

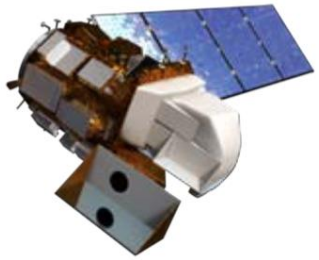
Planetscope (Dove)
Launch Mass 4kg

Open Data

esa

Sentinel-2
Launch Mass 1,130kg

NASA USGS



Landsat-8
Launch Mass 2,780kg

NASA

Aqua (MODIS)
Launch Mass 2,934kg

Taken from: https://www.radiant.earth/infographic/the-view-from-above/

Characteristics I: Spatial Resolution

Aqua (MODIS)
250m Resolution

Landsat-8
30m Resolution

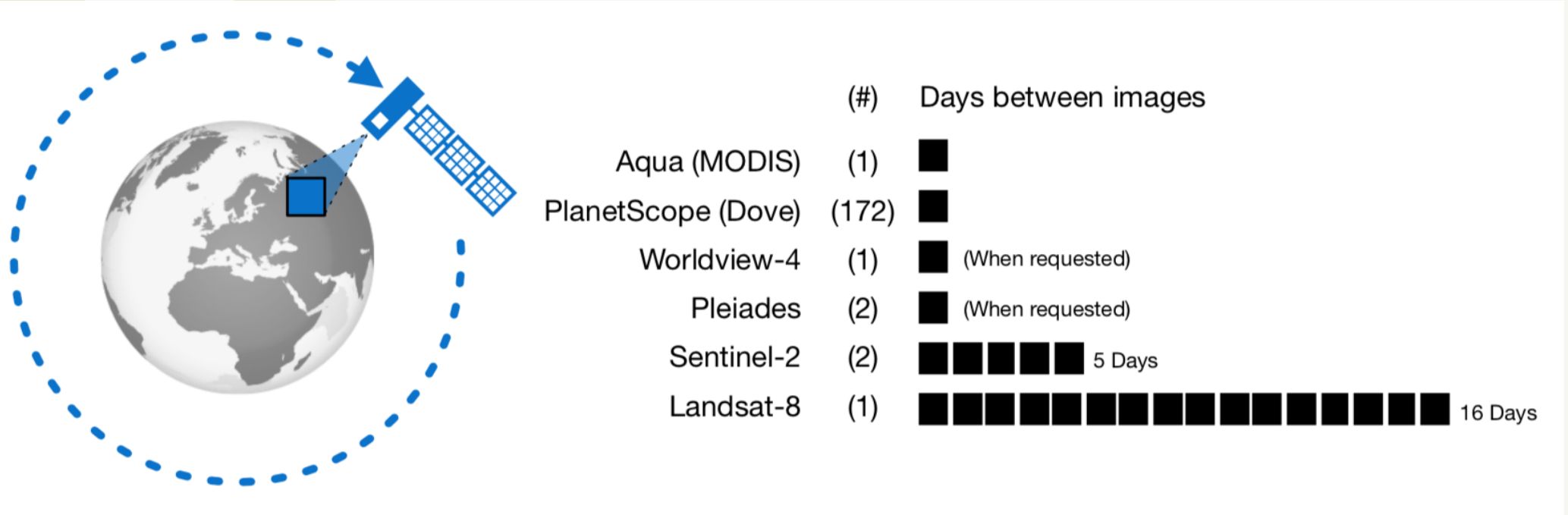
Sentinel-2
10m Resolution

PlanetScope (Dove)
3m Resolution

Pleiades
0.5m Resolution

Worldview-4
0.3m Resolution

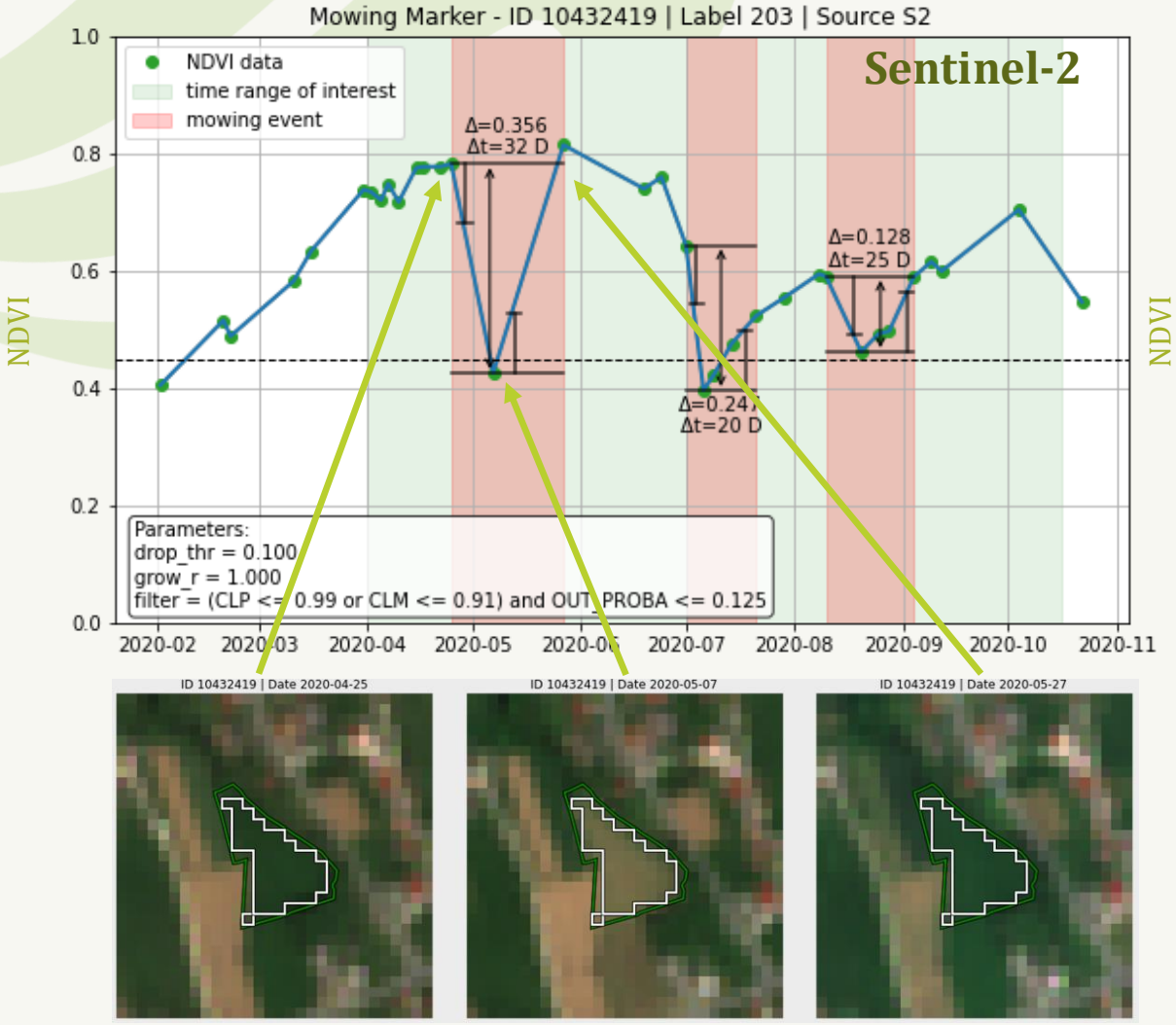
Characteristics II: Temporal Resolution

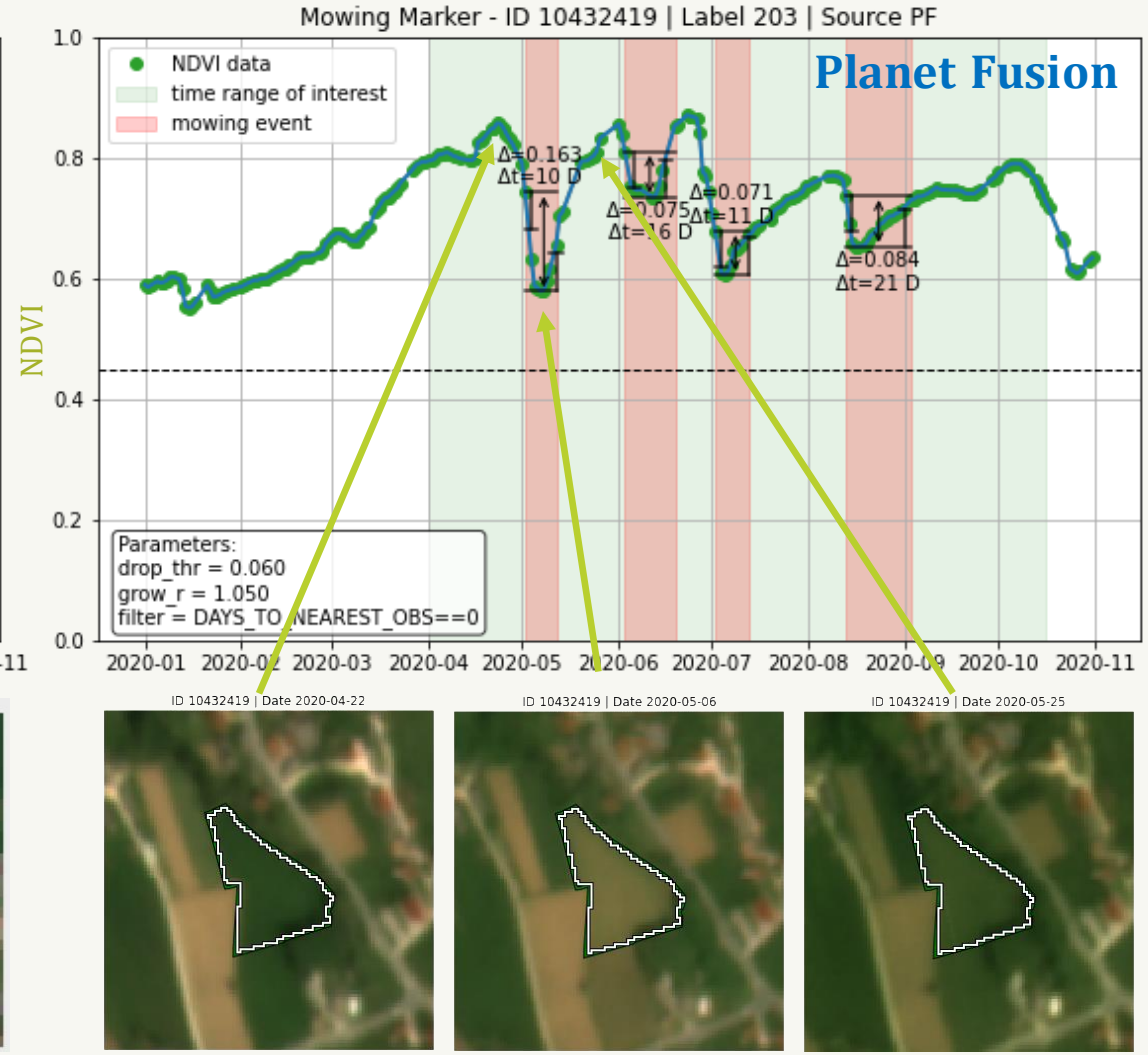


Planet images the entire Earth's landmass every day!

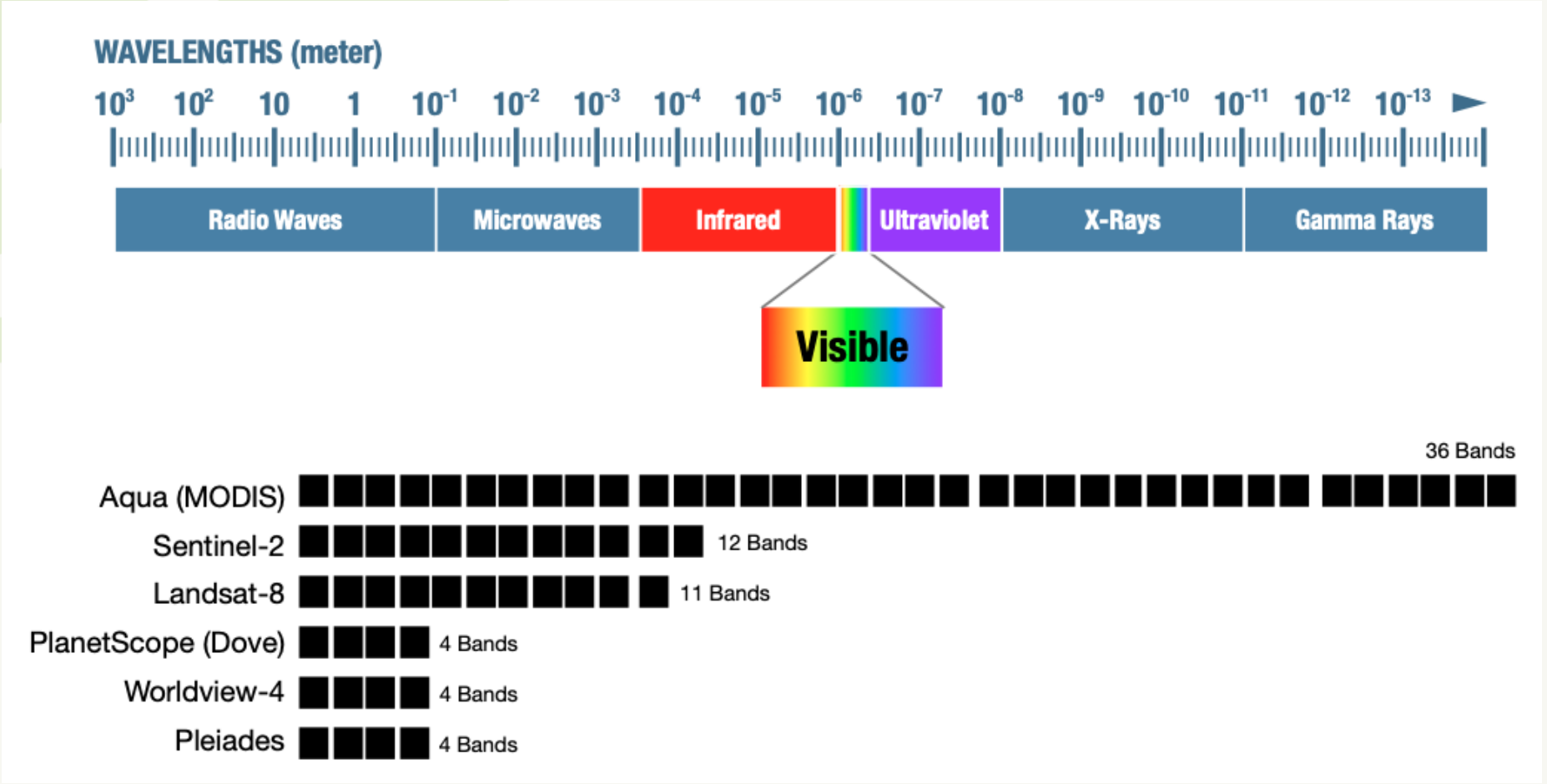
Characteristics II: Temporal Resolution

Monitoring farming activity (mowing of grass) across EU



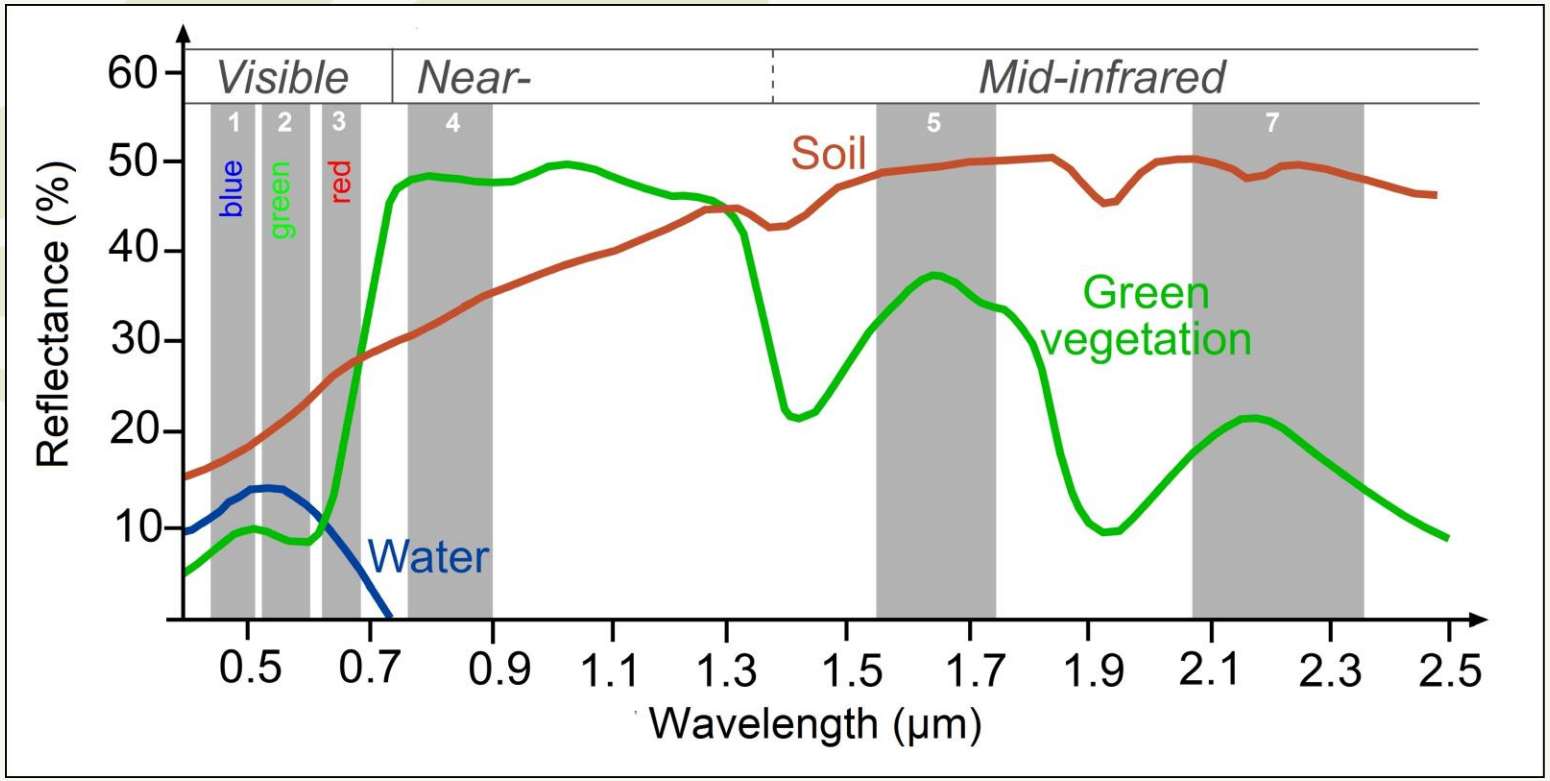


Characteristics III: Spectral Resolution

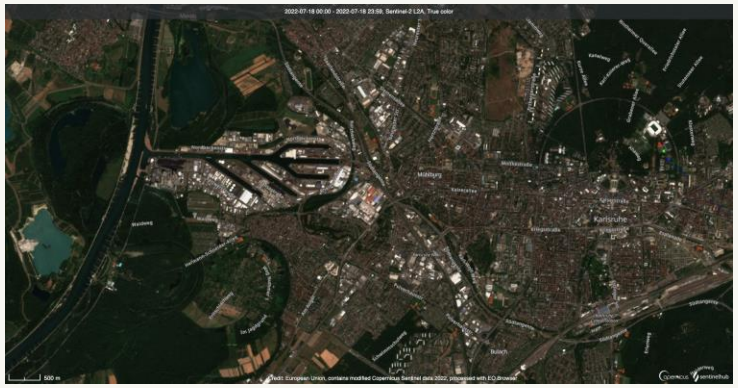


Characteristics III: Spectral Resolution

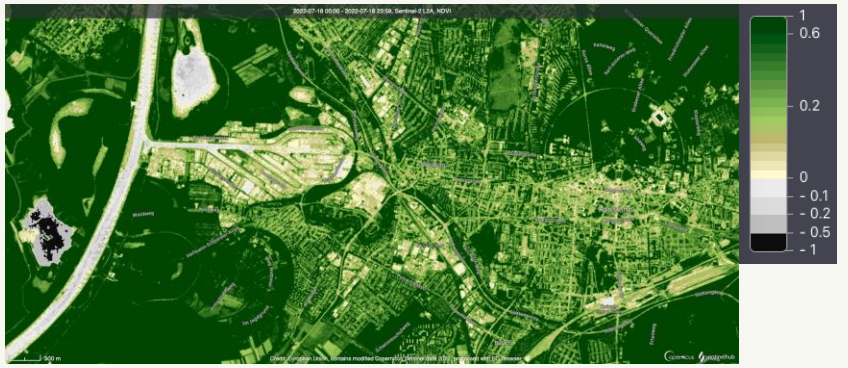
Reflectance of water, soil and vegetation in different wavelengths:



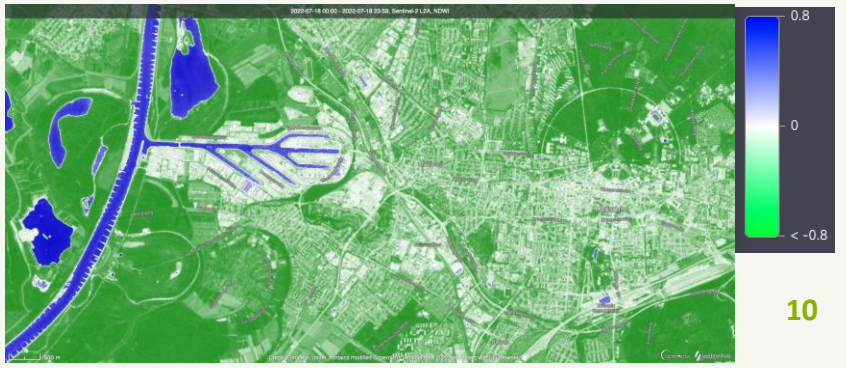
True color



NDVI



NDWI

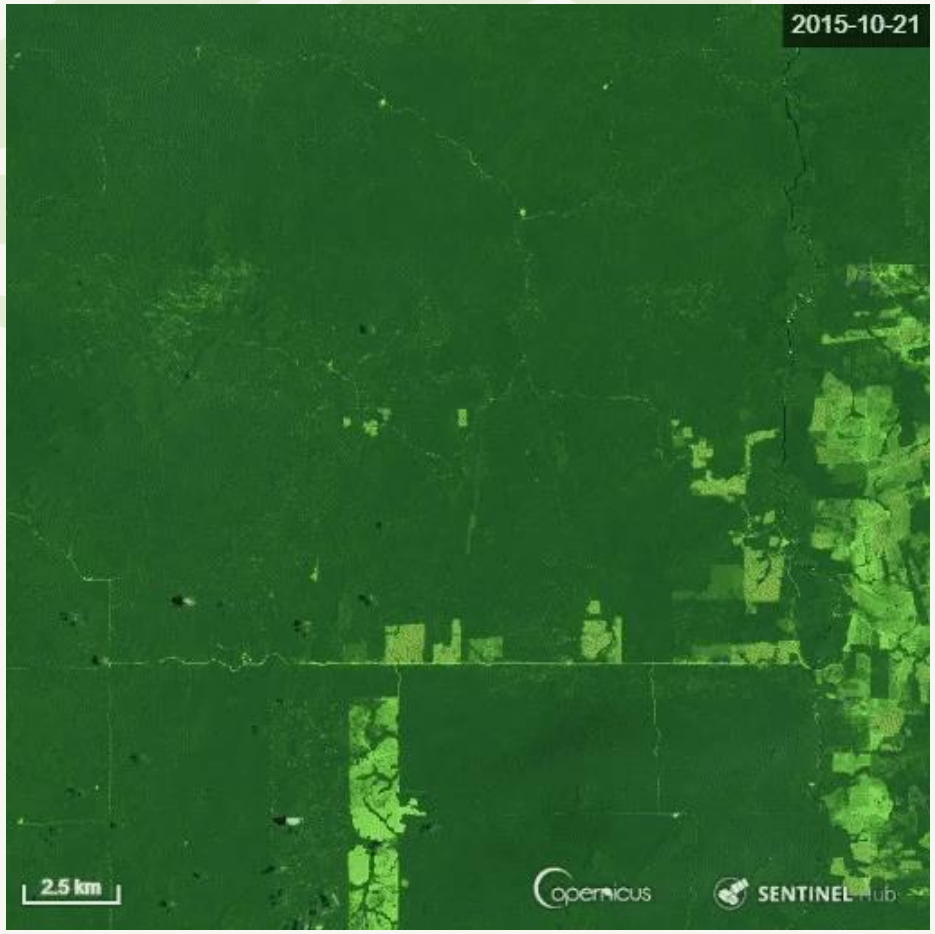


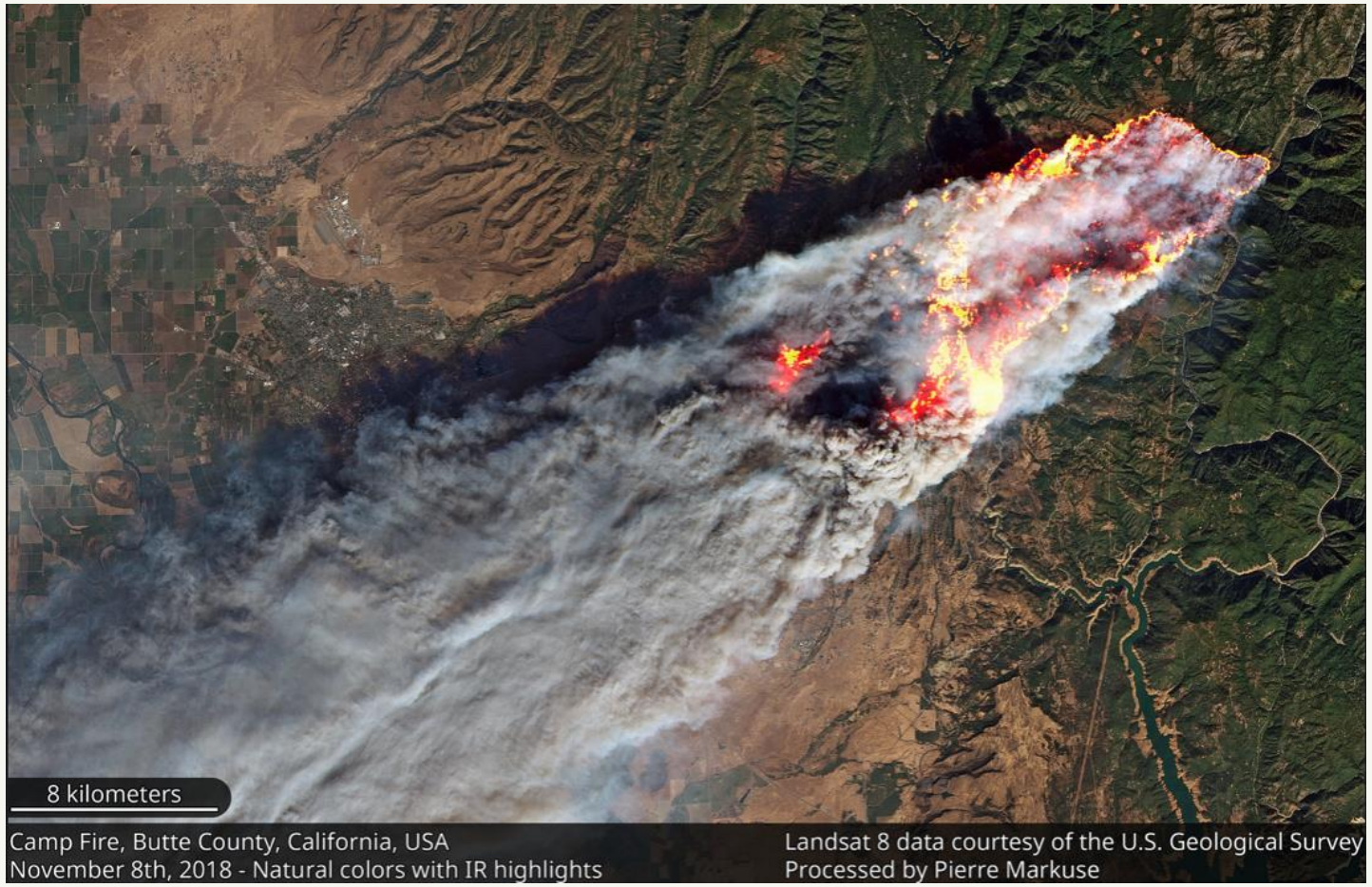
Classical Remote Sensing Features:

$$\text{Normalized Difference Vegetation Index} = \frac{\text{NIR - RED}}{\text{NIR + RED}}$$

$$\text{Normalized Difference Water Index} = \frac{\text{GREEN - NIR}}{\text{GREEN + NIR}}$$

Open data is empowering individuals



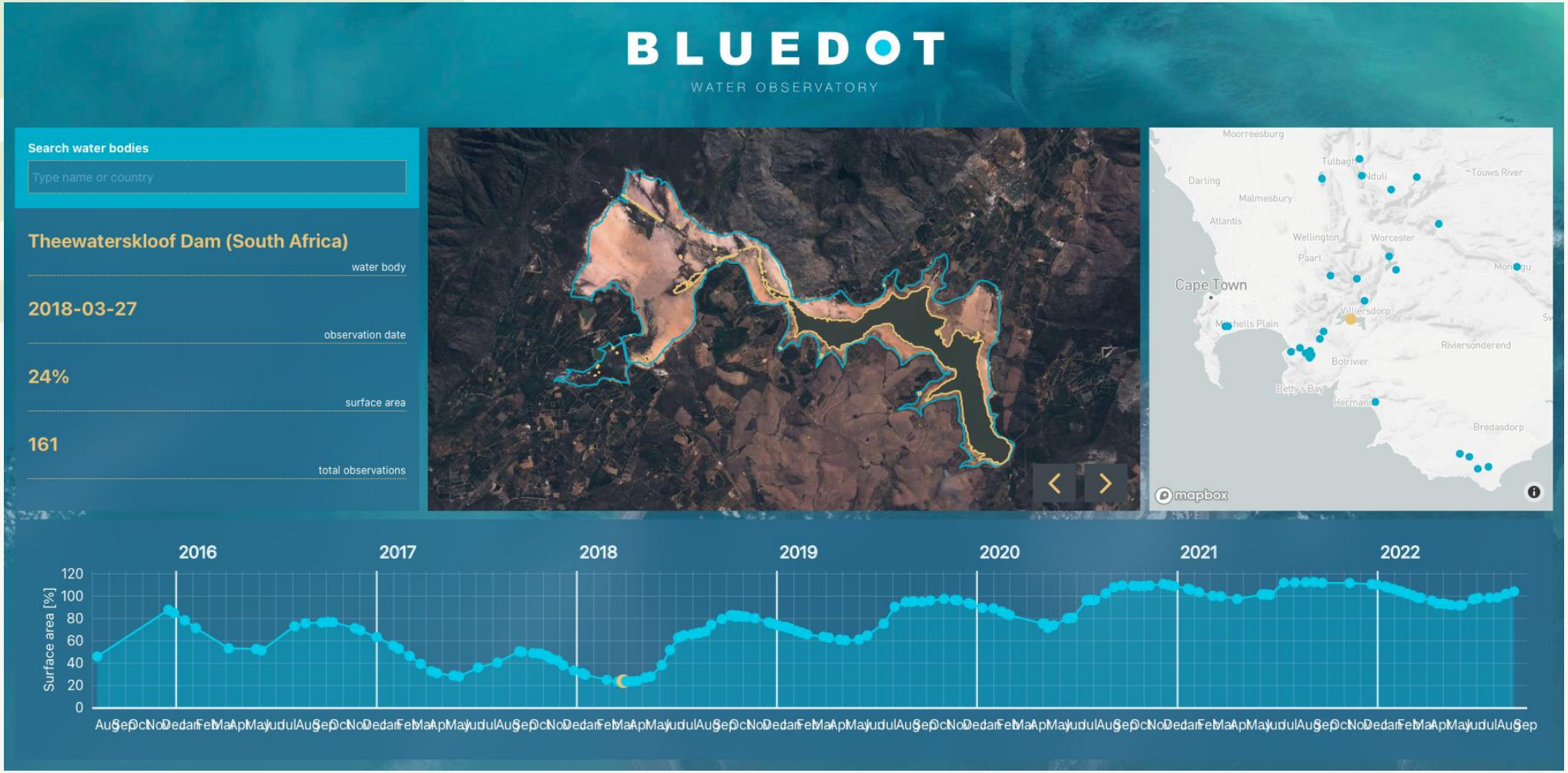


DEMO: EO Browser

EO Browser makes it possible to browse and compare full resolution images from all the data collections.

https://www.sentinel-hub.com/explore/eobrowser/
https://apps.sentinel-hub.com/eo-browser
https://custom-scripts.sentinel-hub.com

Blue Dot Water Observatory



https://www.blue-dot-observatory.com

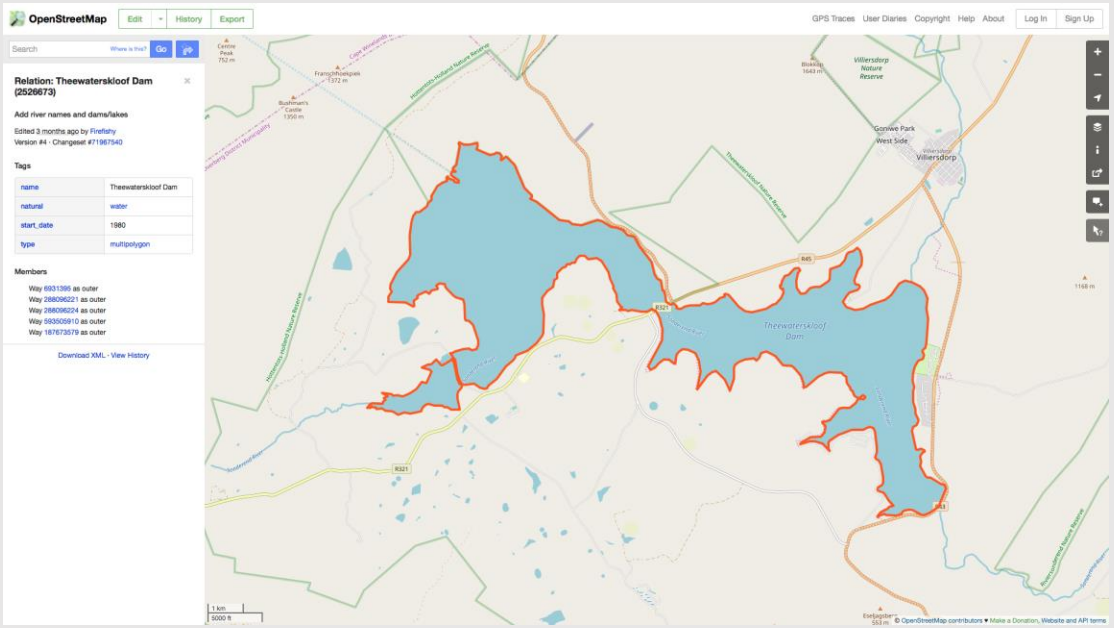
Cape Town water crisis in 2018

Thewaterskloof dam

Monitoring surface water levels from space

1. Take water body's outline
2. Get satellite acquisition
3. Detect surface water
4. Extract surface water area/boundaries
5. Calculate surface water level
6. Store measured water outline

Open Street Map



Monitoring surface water levels from space

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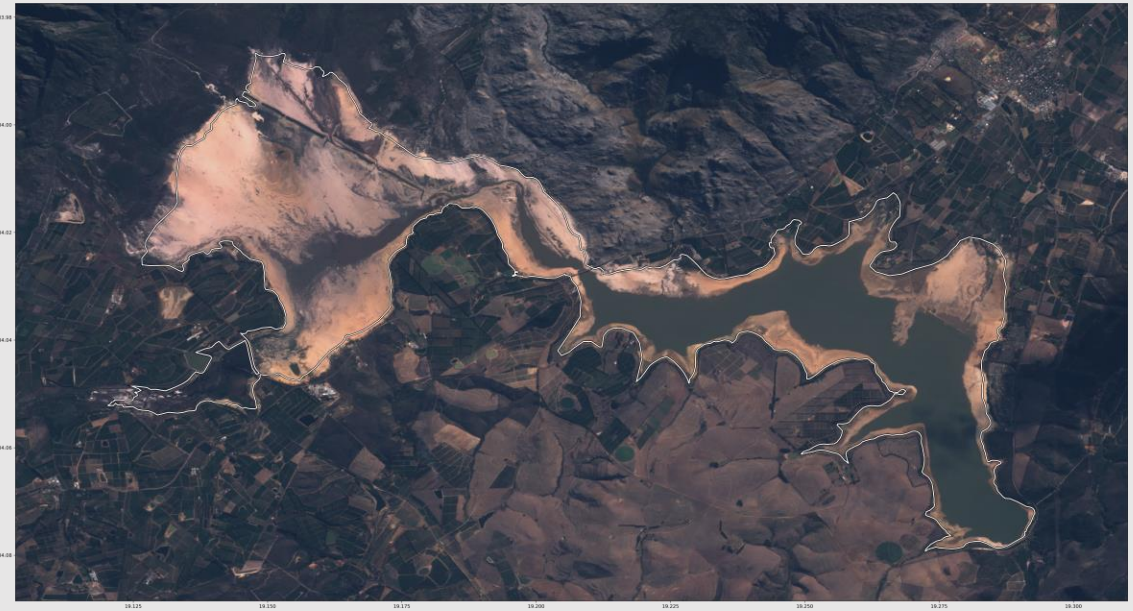
SentinelHub



True color 2017/5/31

Monitoring surface water levels from space

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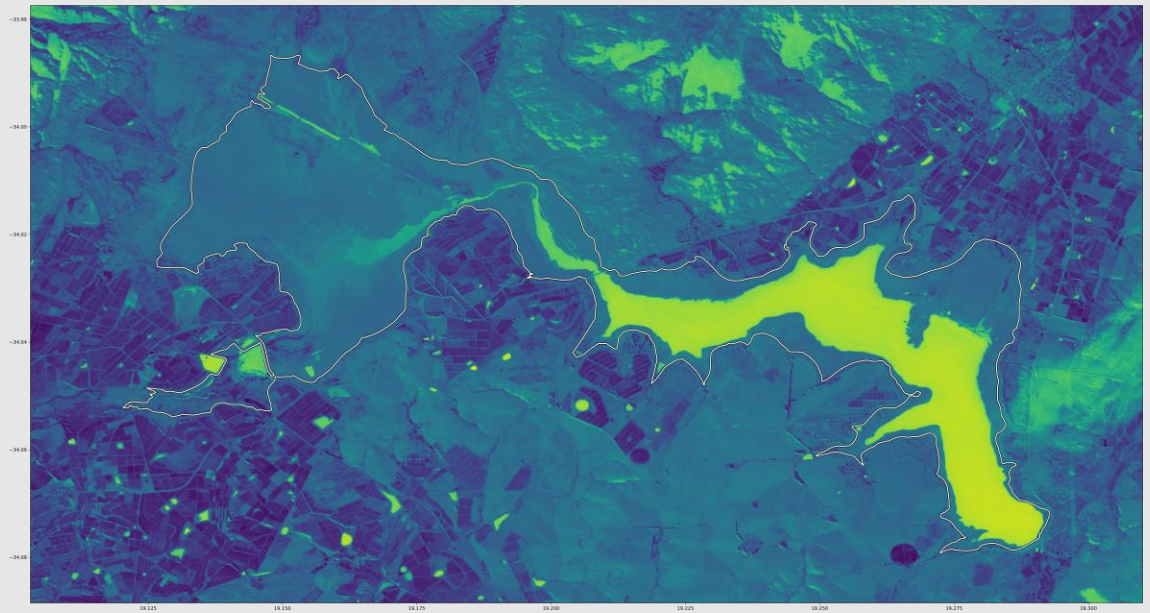
SentinelHub



Normalized Difference Water Index 2017/5/31

Monitoring surface water levels from space

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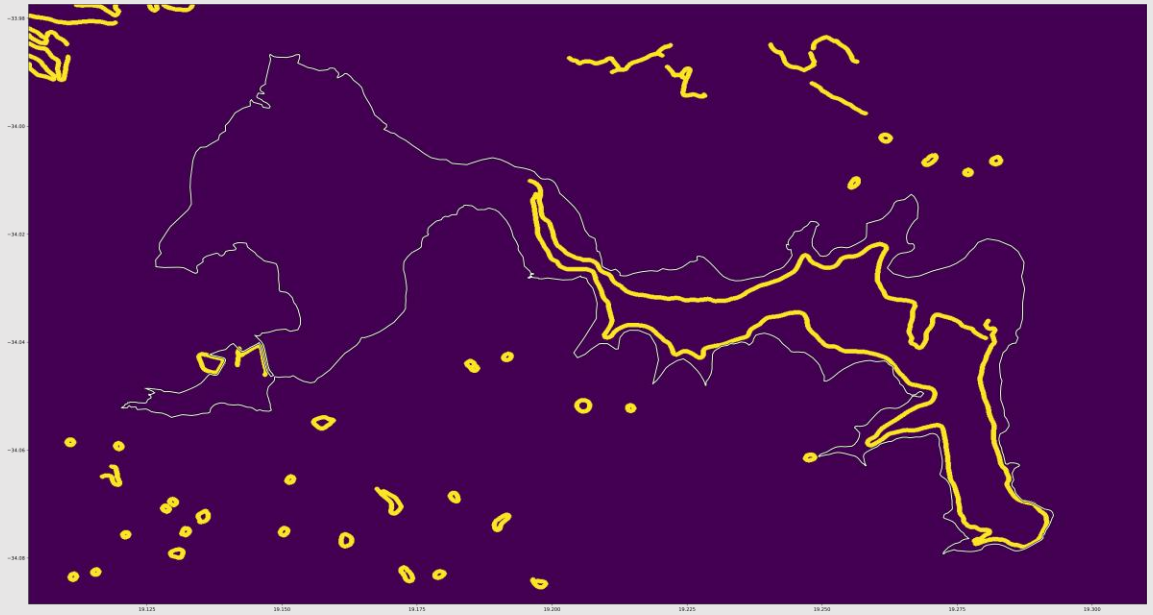
Canny edge detector



Monitoring surface water levels from space

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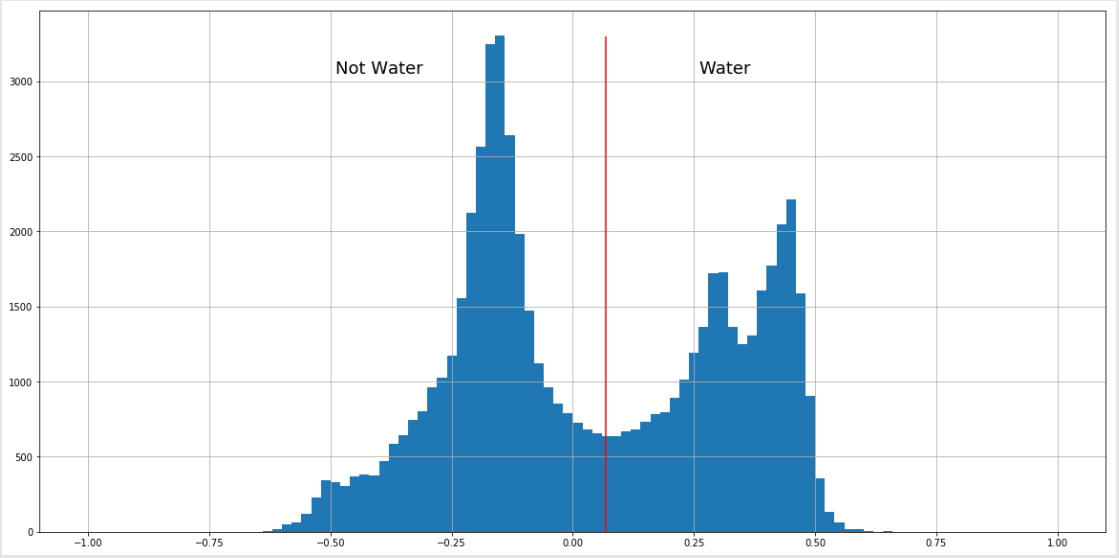
Otsu thresholding



NDWI

Monitoring surface water levels from space

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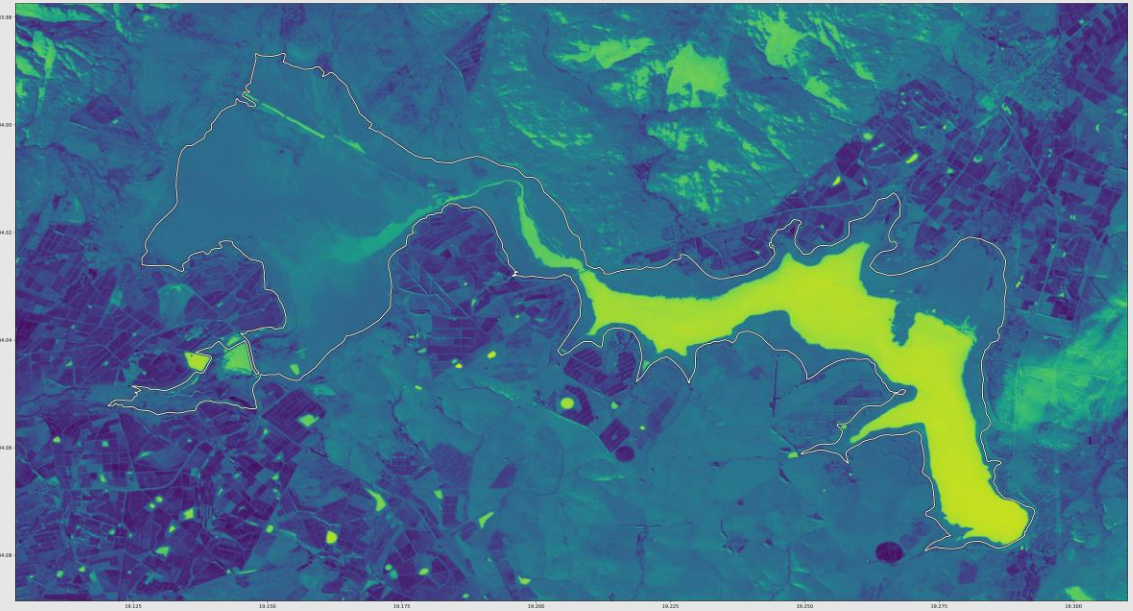
Water mask



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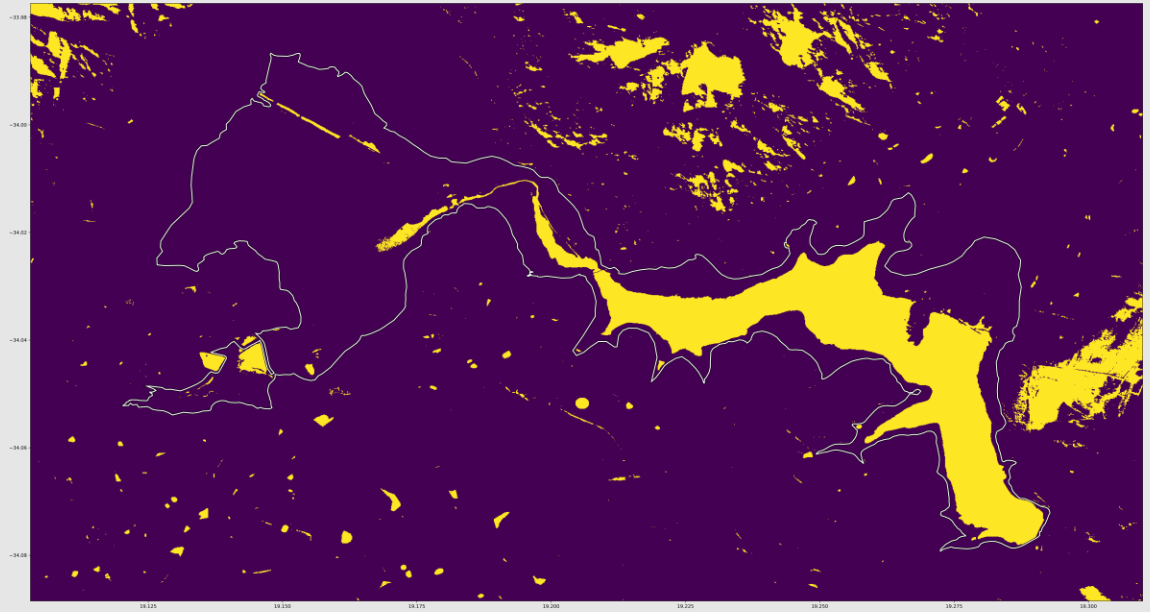

Monitoring surface water levels from space

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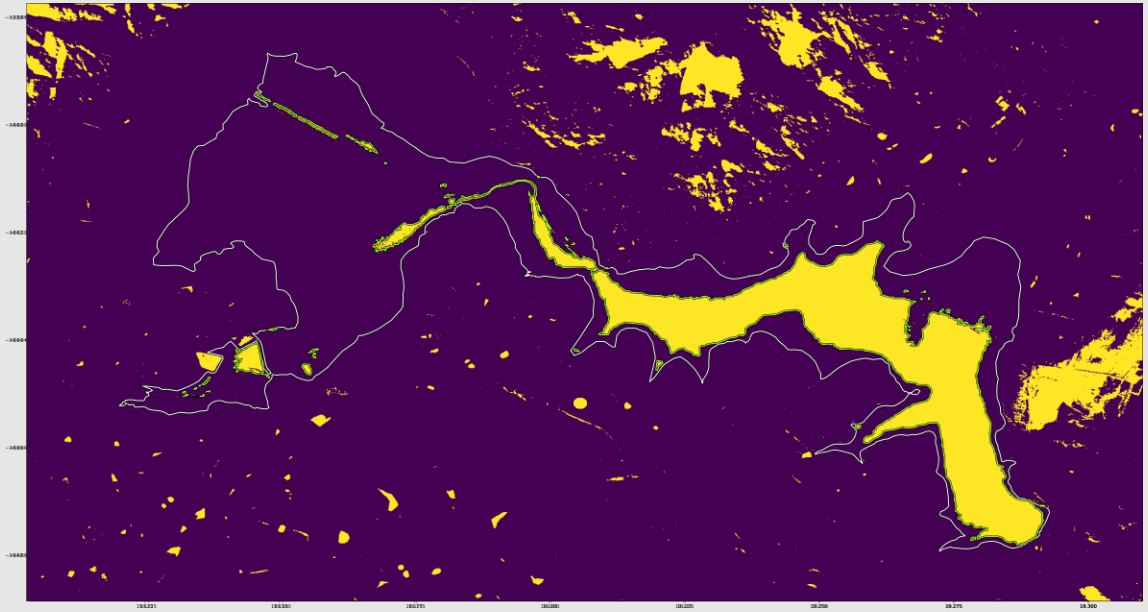
Vectorize



Monitoring surface water levels from space

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$$\text{Surface water level} = \frac{\text{Detected water area}}{\text{Water body area}}$$

Monitoring surface water levels from space

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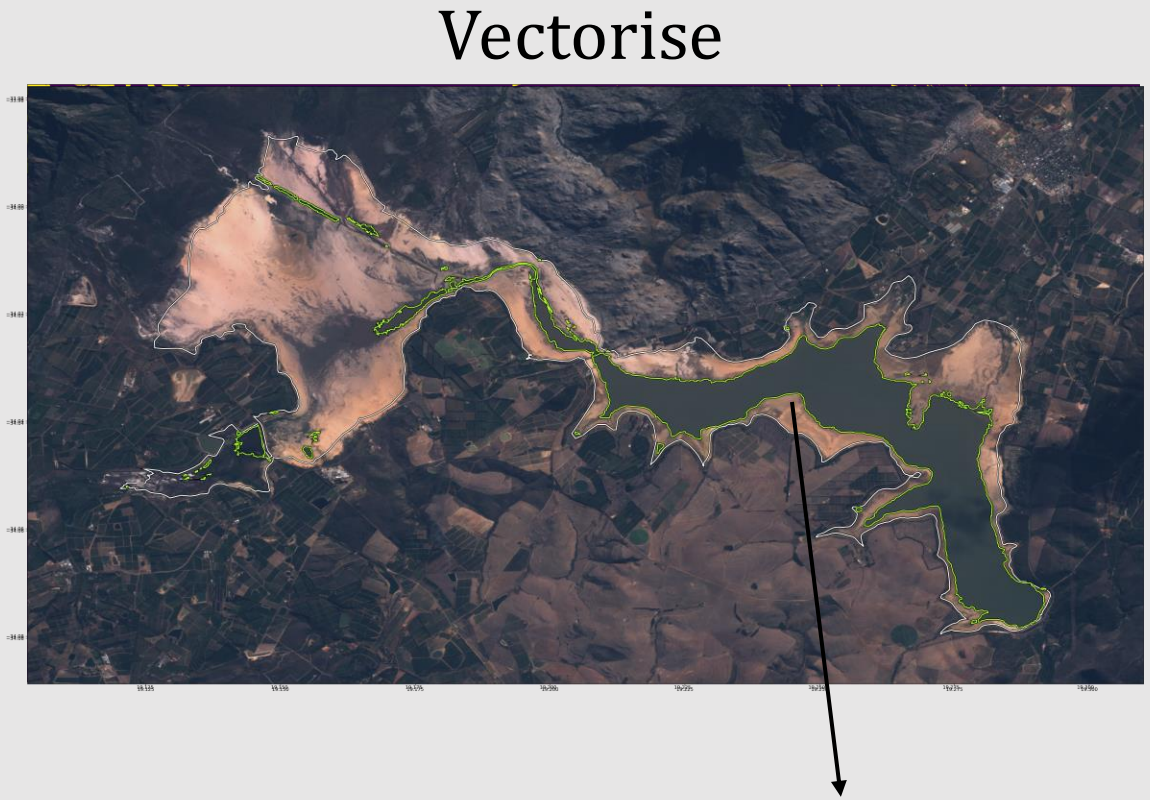


BLUEDOT

WATER OBSERVATORY

Search water bodies

Type name or country

Theewaterskloof Dam (South Africa)

water body

2019-10-08

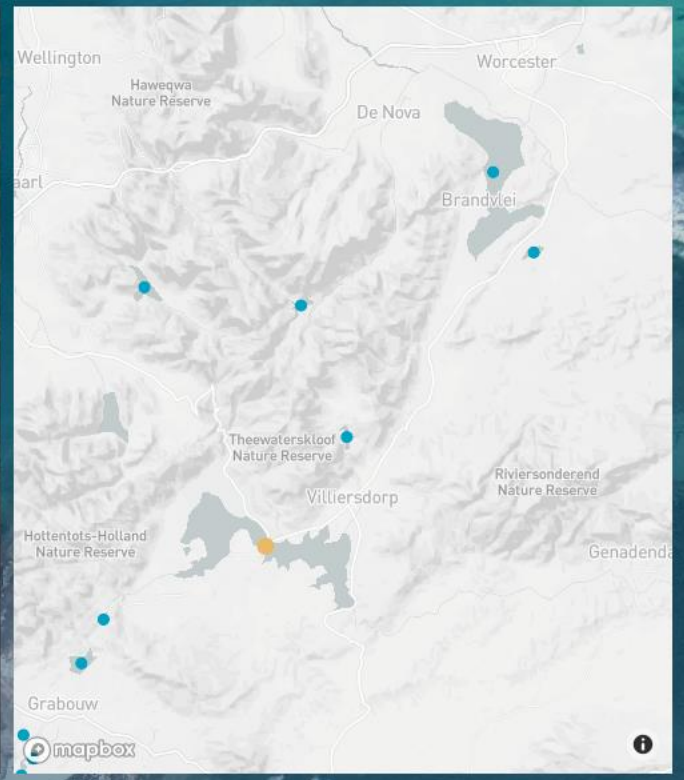
observation date

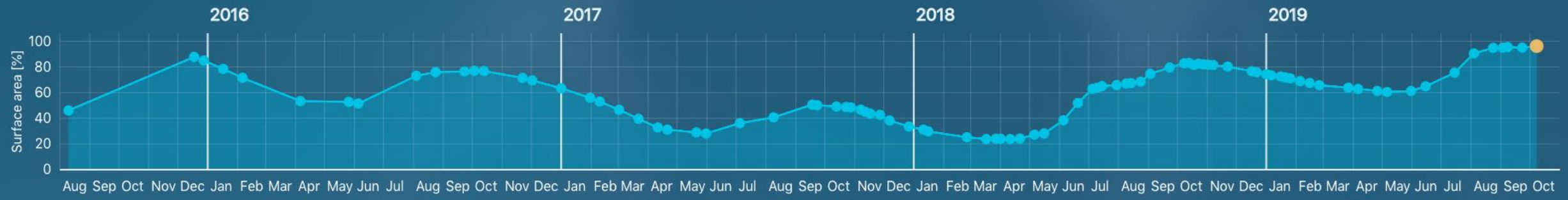
96%

surface area

89

total observations





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https://www.sinergise.com/en/careers/summer-school

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In zaposlujemo!