



SENTINEL Hub

On-going Monitoring of Surface Water

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Sinergise/Sentinel Hub

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**EUROPEAN EO COMPANY
OF THE YEAR 2018**



DAY Z

Day Zero is based on the previous
Implements the

THE CITY

The City's progress on securing all
water sources.



50%

Cape Town Harbour (Desalination)

Strandfontein (Desalination)

Monwabisi (Desalination)

V&A Waterfront (Desalination)

Cape Flats (Ground Water)

Atlantis (Ground Water)

Zandvliet (Recycled)

2 km

2015-12-18

F

ess, and the City

S

loss

9%

✓

Copernicus

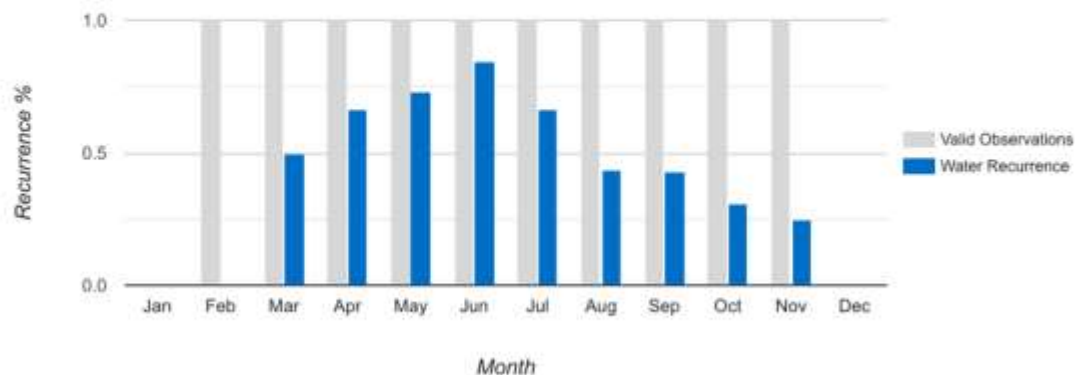


SENTINEL HUB



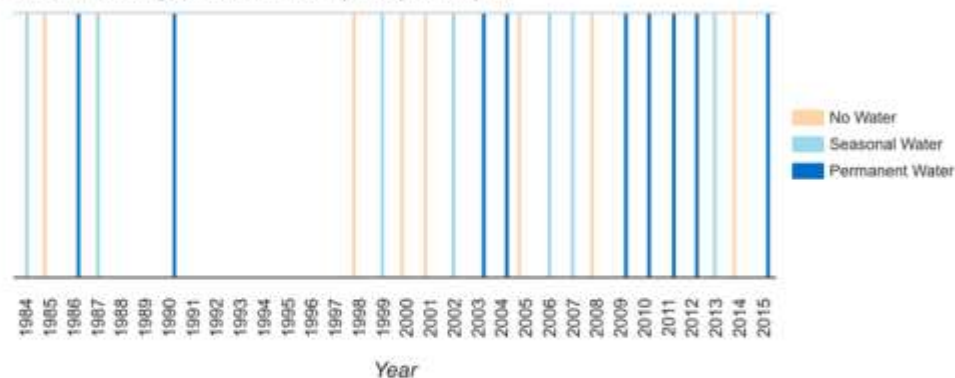
Pixel Coordinates: Lat: 37.895357, Long: 32.285677

Monthly Water Recurrence



Water History

Click a bar on the graph to see full monthly history for that year



reference



Global Surface Water Explorer

Powered by Google Earth Engine

FAQ | Contact: jrc-surfacewater@ec.europa.eu

Water Occurrence (1984-2015)

☒ ON



Water Occurrence Change Intensity (1984-1999 to 2000-2015)

☐ OFF



Water Seasonality (2014-2015)

☐ OFF



Annual Water Recurrence (1984-2015)

☐ OFF

Google Earth Engine



Palm Islands

Aral Sea

Manicouagan Crater

Tahoua

Okavango Delta

Ramanathapuram

Pearl River Delta

Miss River Delta

Atchafalaya River

Lake Gairdner

Am

BLUEDOT

WATER OBSERVATORY

Search water bodies

Type name or country

Altinapa (Turkey)

water body

2018-09-19

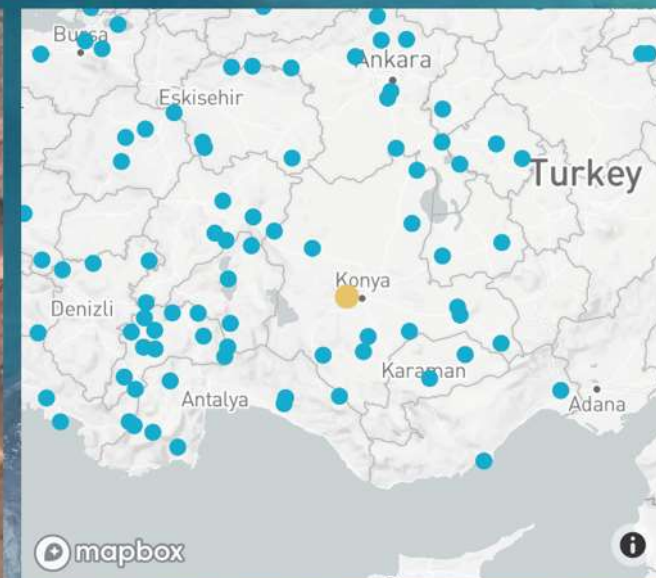
observation date

38%

surface area

82

total observations



water body

observation date

surface area

total observations



BLUEDOT

WATER OBSERVATORY

Search water bodies

Type name or country

Karaoun (Lebanon)

water body

2018-11-02

observation date

31%

surface area

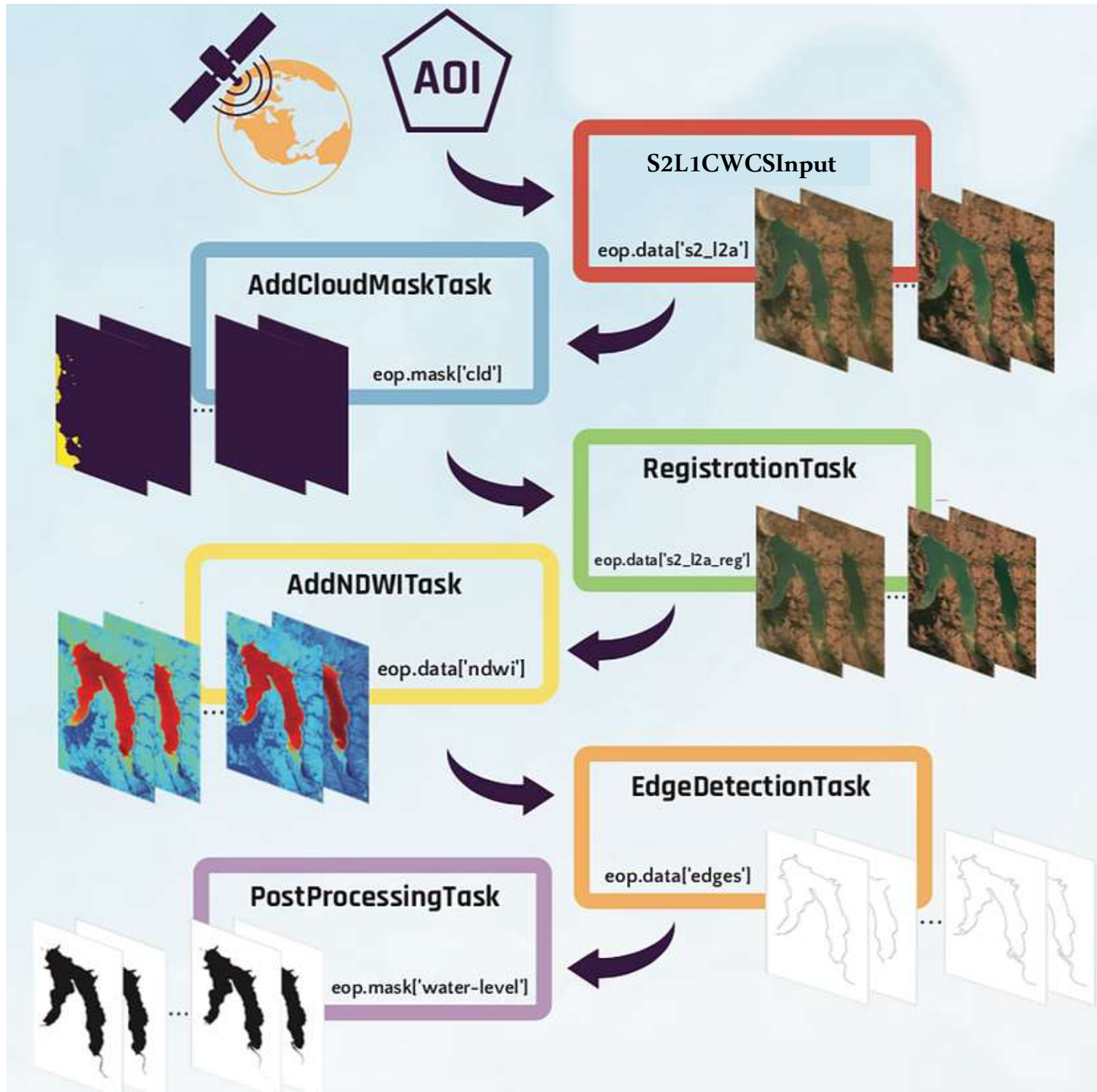
97

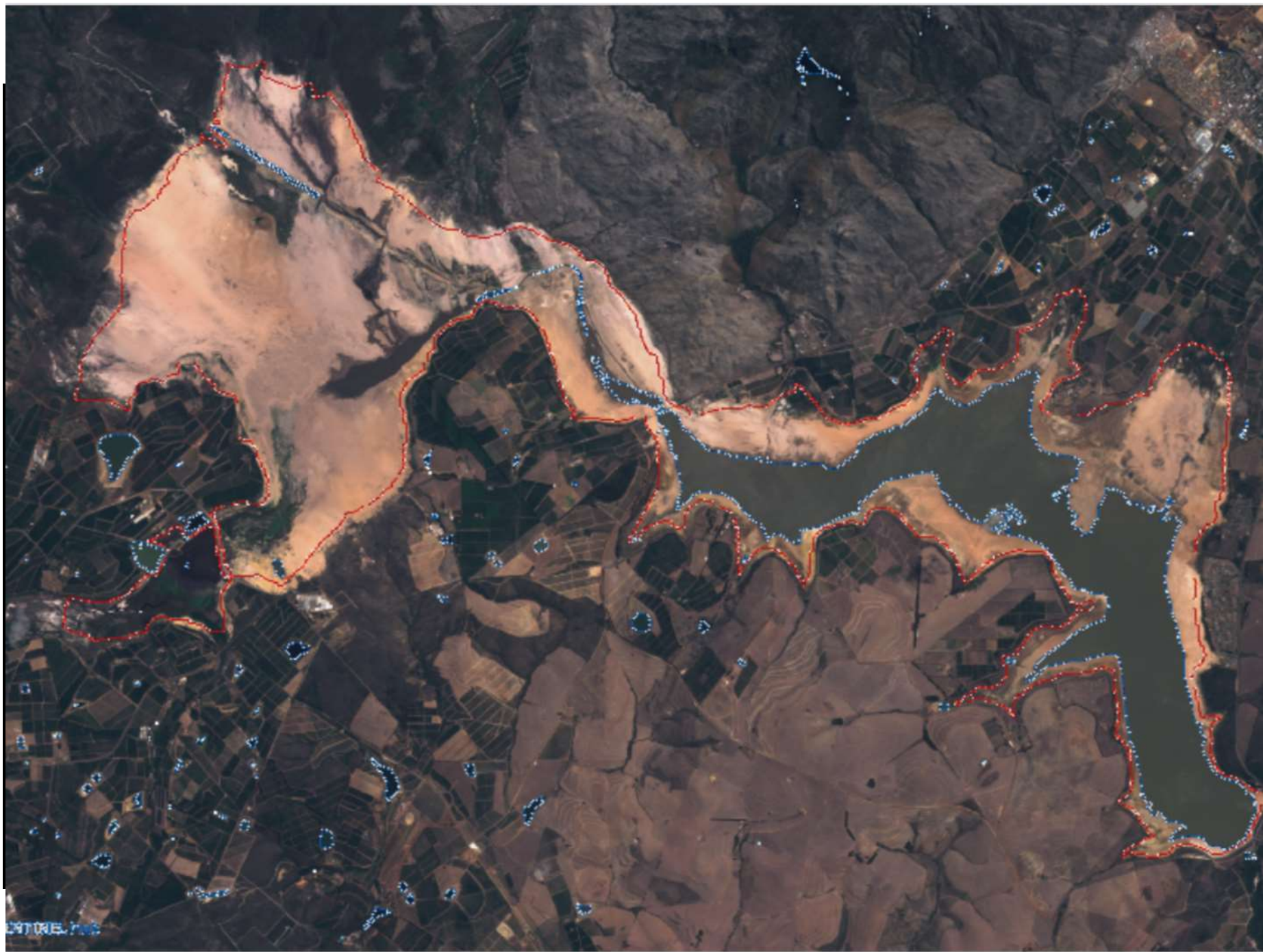
total observations



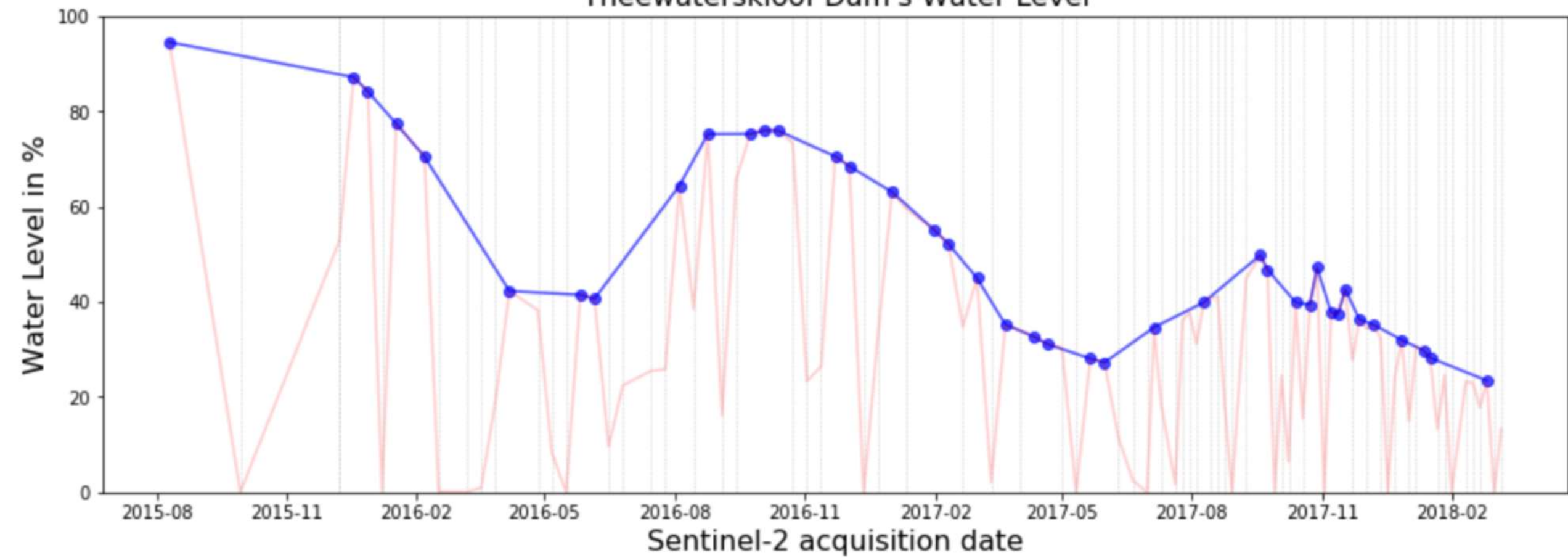
BLUEDOT Water Observatory

- 7.000 water bodies
 - New data according to water risk ranking map (Aqueduct project, WRI)
 - Goal 20-30.000 water bodies (could be expanded to all if DB is available)
- Sentinel-2 data



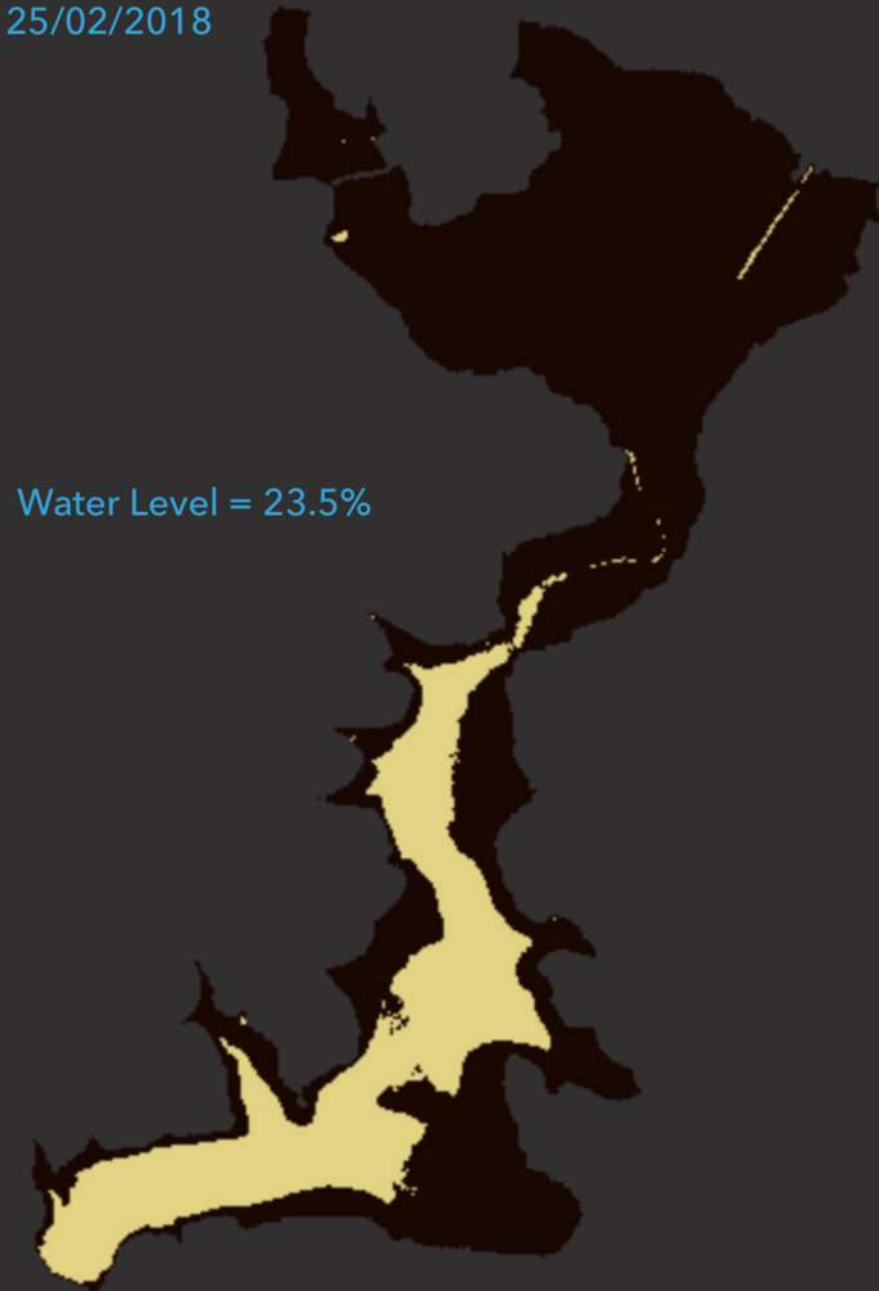


Theewaterskloof Dam's Water Level



Theewaterskloof Dam

25/02/2018



Water Level = 23.5%

**DON'T LET THE
PERFECT BE THE
ENEMY OF THE
GOOD.**

Voltaire

BLUEDOT

WATER OBSERVATORY

Search water bodies

Barrage du Ksob (Algeria)

water body

2017-07-24

observation date

70%

water coverage

136

total observations



Location: Beja, Tunisia
Latitude: 36.622
Longitude: 9.367
Date: 2017-02-03



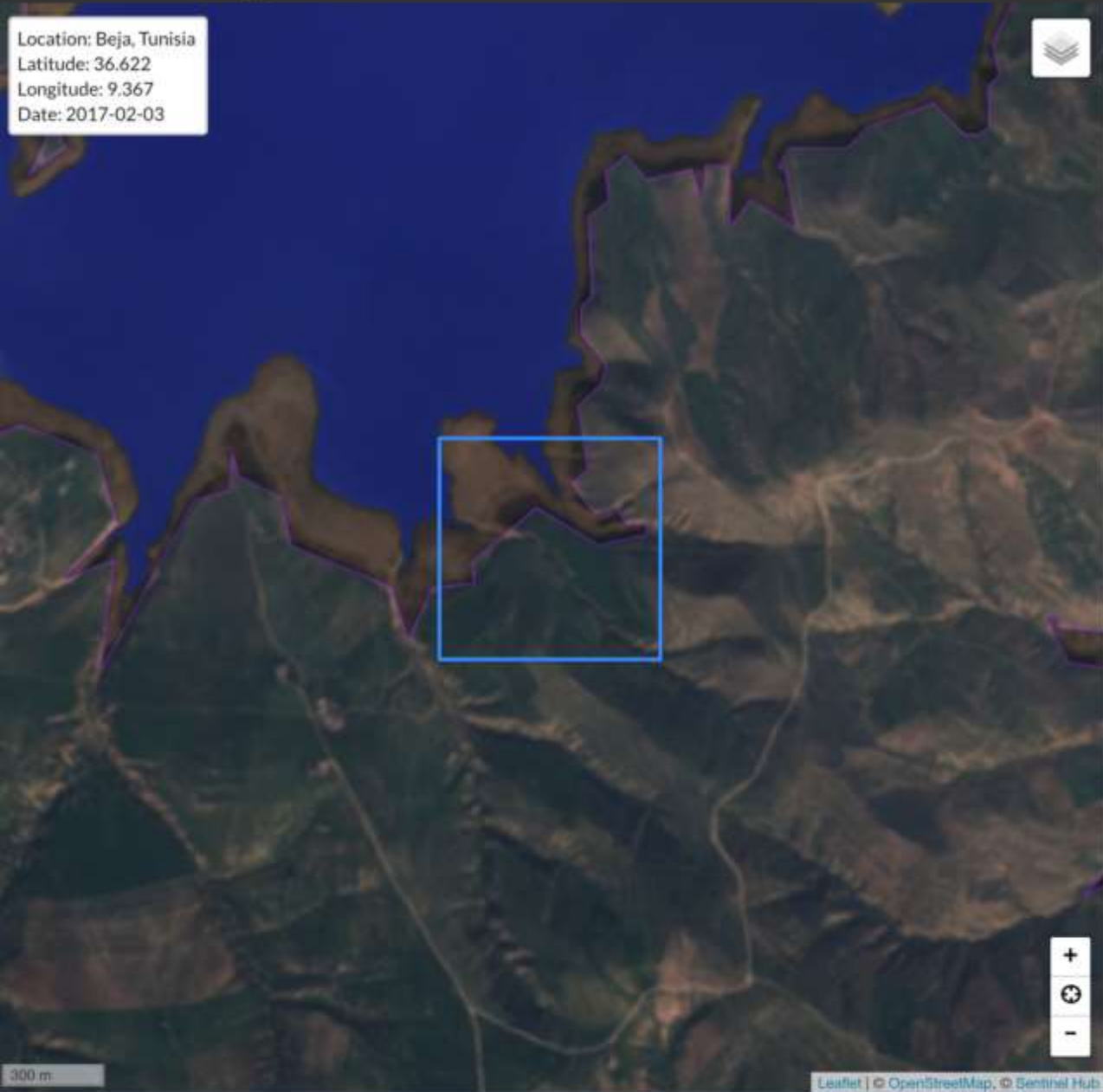
Active classifier: Water-body → Wrong class

Buttons: [Save] [Share]

Tools: [Pencil] [Eraser] [Lasso] [Move] [Previous View] [Next View] [Zoom In] [Zoom Out] [Clear]



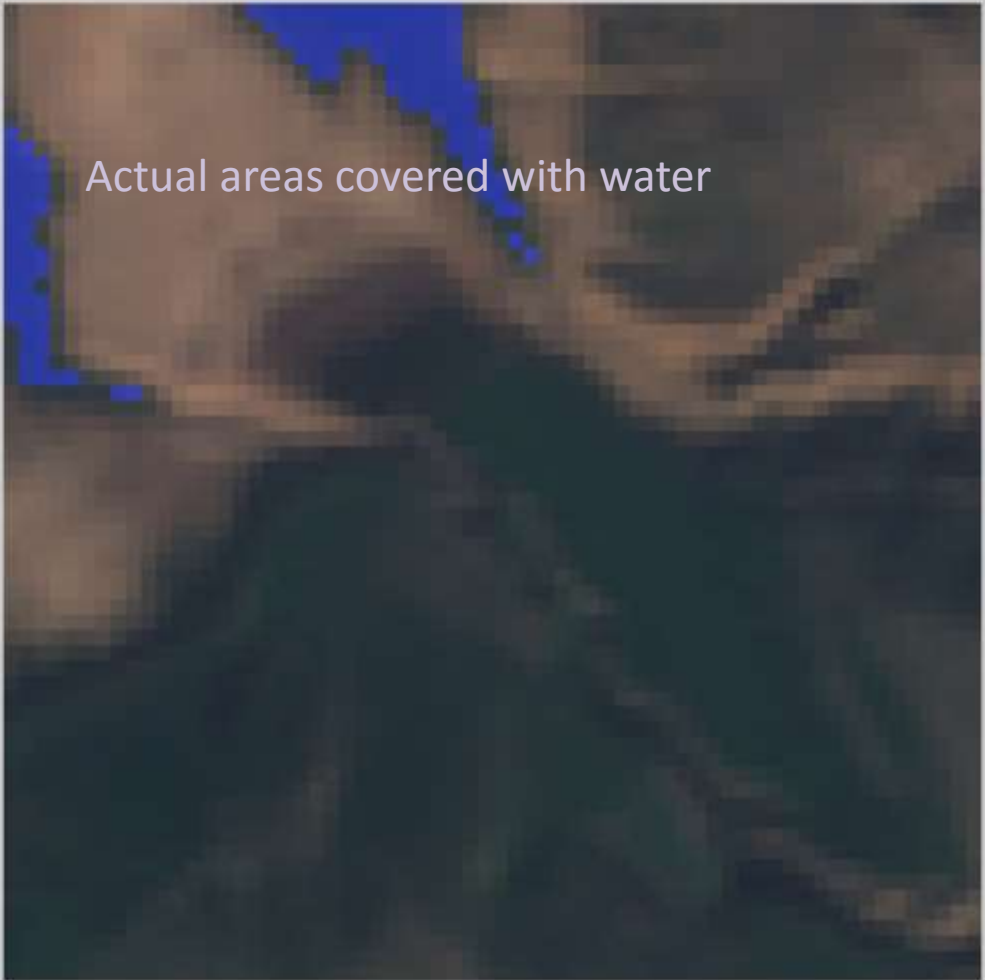
Location: Beja, Tunisia
Latitude: 36.622
Longitude: 9.367
Date: 2017-02-03



Active classifier: Water-body → Wrong class →

Save & →

Clear

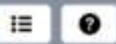
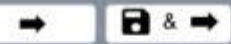


Location: Beja, Tunisia
Latitude: 36.622
Longitude: 9.367
Date: 2017-02-03



Leaflet | OpenStreetMap, Sentinel Hub

Active classifier: Water-body → Wrong class



Clear



Contributors will mark wrongly detected areas



An aerial photograph of a coastline. The top left corner shows a dark, vegetated land area. A thin strip of sandy beach runs diagonally from the top left towards the center. The rest of the image is filled with clear, turquoise water that transitions to a pale blue at the horizon.

It's not a rocket science

Cost of operation

3-5 man-weeks

400 EUR for initial processing

50 EUR/month for cloud infrastructure

100 EUR/month for Sentinel Hub

An aerial photograph of a coastline. The top left corner shows a dark, vegetated land area. A thin strip of sandy beach runs diagonally from the top left towards the center. The rest of the image is filled with clear, turquoise water that transitions to a pale blue at the horizon.

It was never easier to get into EO

It was never easier to get into EO

Large volumes of good quality free data

Cloud infrastructure

Open-source machine learning tools

Research papers

It was never easier to get into EO

Large volumes of good quality free data

Cloud infrastructure

Open-source machine learning tools

(Some) research papers

Data for the year 2018 or [2017](#), [2016](#)

in USA and Europe -

Total size of fields, ha Total number of fields

376.8M **60M**

Countries ranking

| # | Country ↕ | Size ↕ | Number ↕ |
|---|-----------|--------|----------|
| 1 | USA | 173M | 16M |
| 2 | Ukraine | 35.9M | 2M |
| 3 | France | 27.5M | 7M |
| 4 | Germany | 18.2M | 4M |
| 5 | Poland | 14.8M | 4M |
| 6 | Spain | 13.0M | 5M |

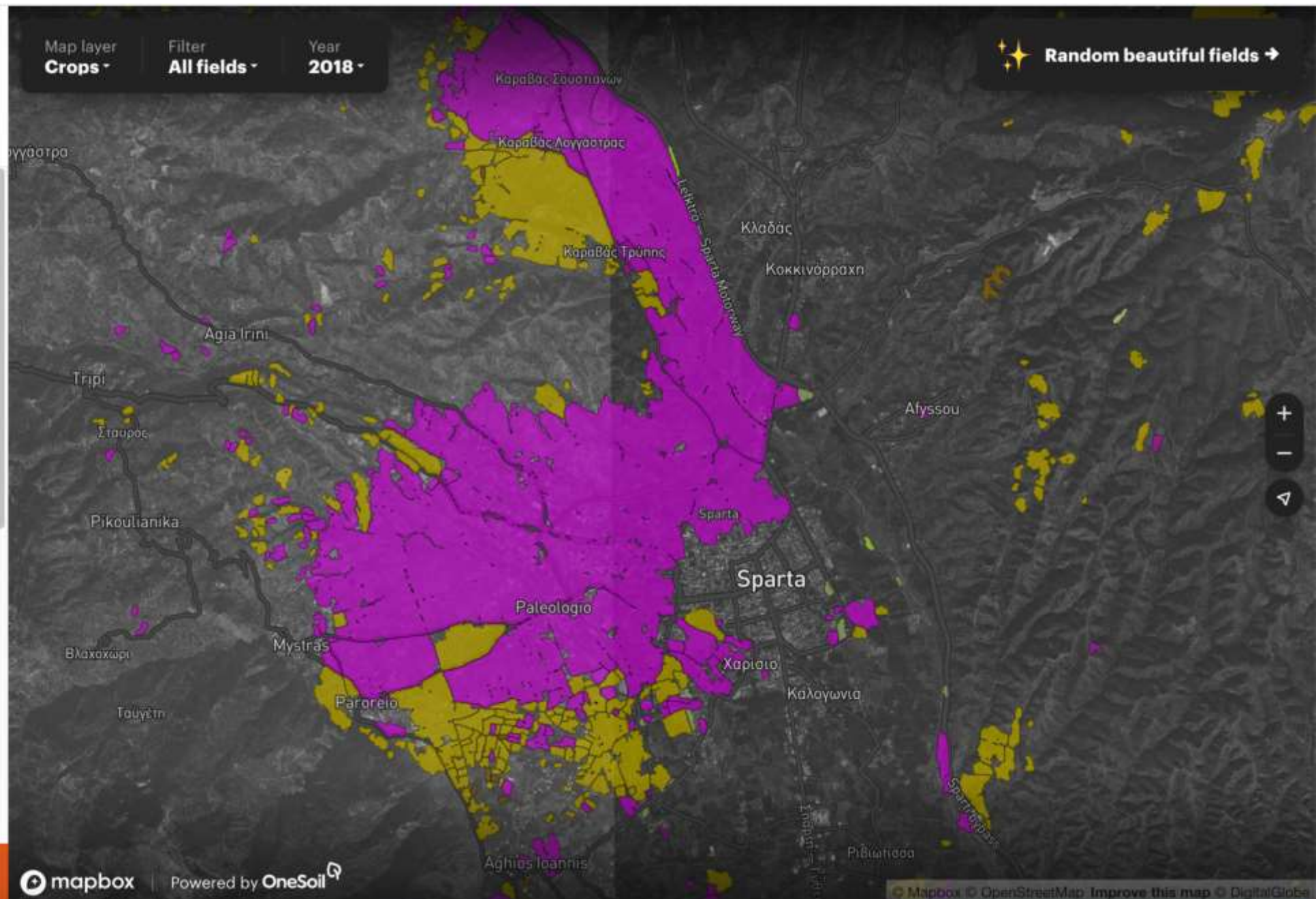
[Show all 44 countries ↕](#)

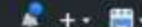
Crops ranking

| # | Crop ↕ | Size ↕ | Leader ↕ |
|---|----------|--------|----------|
| 1 | Maize | 89.8M | USA |
| 2 | Grass | 83.8M | USA |
| 3 | Wheat | 67.1M | USA |
| 4 | Soybeans | 52.6M | USA |
| 5 | Alfalfa | 14.9M | USA |
| 6 | Barley | 12.0M | Germany |

[Show all 27 crops ↕](#)

Popular crops in largest countries



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8dcf648 5 days ago

0 contributors

1.63 MB

[Download](#) [History](#)

```
In [1]: import matplotlib as mpl
        mpl.use('Agg')
        import matplotlib.pyplot as plt

In [2]: %reload_ext autoreload
        %autoreload 2
        %matplotlib inline

In [3]: import numpy as np
        from datetime import datetime
        from shapely.geometry import shape
        from shapely.wkt import loads

        import urllib.request as request
        import json

In [4]: import sys
        sys.path.append('../src')

        from visualisation import plot_water_body
        from geom_utils import get_bbox, get_optimal_resolution
        from sh_requests import get_optical_data, get_S2_request, get_S2_vmsrequest
        from s2_water_extraction import extract_surface_water_area_per_frame, surface_water_area_with_dam_veto
```

Surface water level extraction example

This notebook demonstrates how to run water detection algorithm and extract surface water level for a single reservoir in a given time interval. The necessary input is:

- shapely polygon of reservoir's nominal outline,
- time.

Requirements: Sentinel Hub account (trial available and sufficient) with configuration based on Python scripts template. See [README](#) for more detailed instructions.

Inputs

In this example we'll extract surface water level of [Wemmershoek Dam](#) in South Africa on May 31. 2017. We can obtain the dam's

It's funny but it looks like the roles of Sinergise and the research institutes are swapped. We are presenting an open-source tool with an example that can empower individuals, entrepreneurs, etc. to enter the field of EO and make a difference in their wallets, while the research institutes are simply presenting results of their know-how and sending a message that private companies usually do (“we're the best, buy our services”).

Anonymus guy, Sinergise

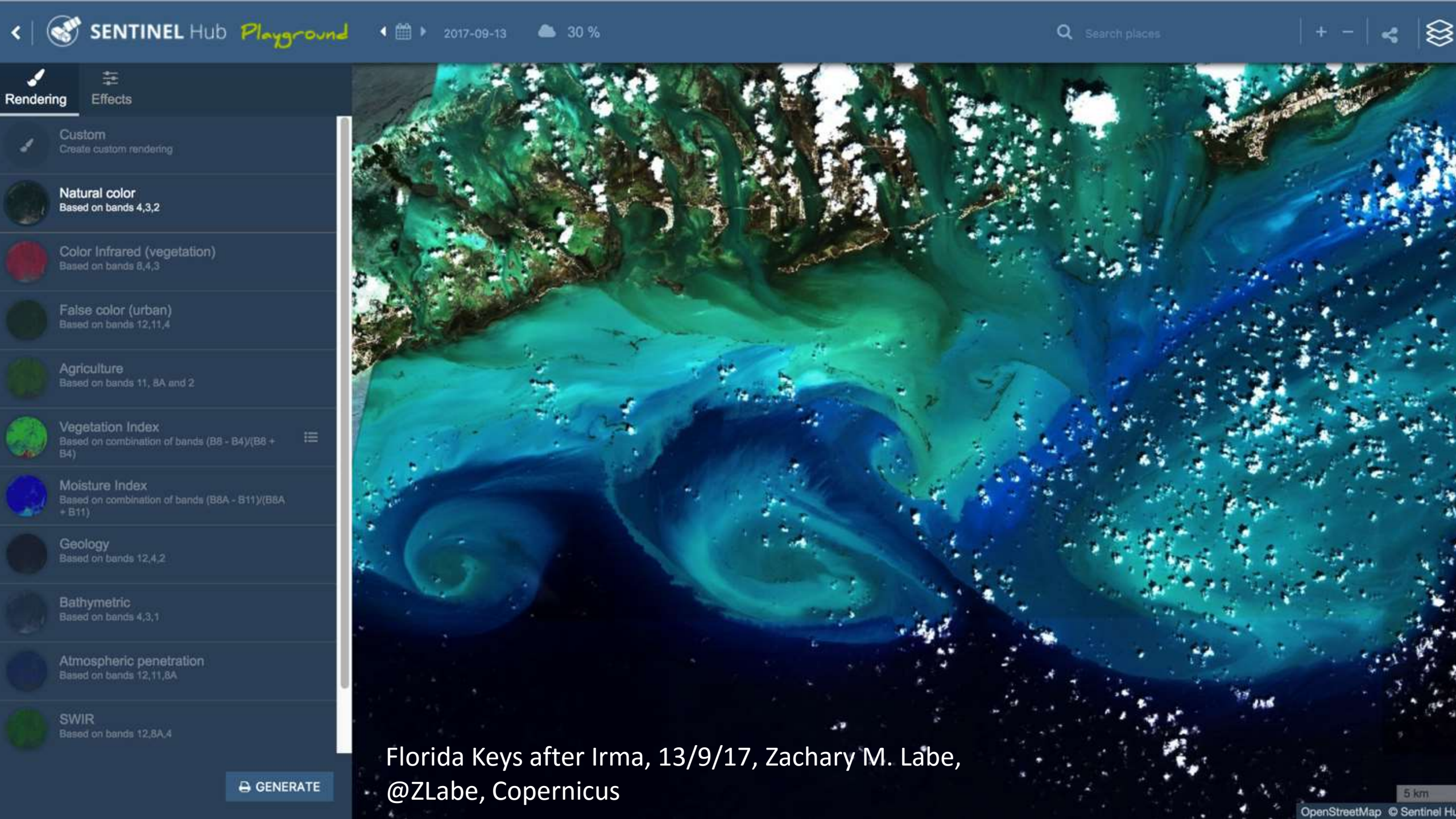
Conclusion

It's possible to do operational services – do it.
Share your research.

More info

- <https://water.blue-dot-observatory.com>
- <https://github.com/sentinel-hub/water-observatory-backend>
- <https://github.com/sentinel-hub/eo-learn>





Florida Keys after Irma, 13/9/17, Zachary M. Labe,
@ZLabe, Copernicus