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Introduction to data processing using OpenEO and Terrascope

EO4GEO EO Tools

Hande Erdem
VITO

EO4GEO

We are supporting EO4GEO vision by providing a **fully prepared environment** through Terrascope platform and **hiding** software processing **complexity** through OpenEO, allowing users to focus on gaining the skills relevant to their domain.

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What is Terrascope?

- Belgian Collaborative Ground Segment for Sentinel missions
- **Easy access** to
  - satellite data
  - products derived from satellite data
  - services (OGC web services, time series service)
  - cloud processing capacity (Jupyter Notebooks, Virtual Machines, openEO)
- **Enabling platform**
- Open for everyone (scientists, public authority, industry, citizens)
- **Free to use for everyone**
- Funded by BELSPO

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What makes Terrascope stand out?

- **Analysis Ready Data**
  - preprocessed (atmospheric correction, georeferencing, …)
  - in Cloud Optimized GeoTIFF format
  - not just satellite imagery or data, but also value added products
  - ✓ a unique long term global vegetation data set (from 1998 onwards)
- **Analysis tools**
  - catalogue – where do I find data of interest
  - comparison – see change or different perspectives
  - trend analysis – evolution over time
- **Cloud processing**
  - bring your analysis to the data
  - save on storage and processing power
  - free tier, funding opportunity for higher requirements (Network of Resources)

EO4GEO EO Tools

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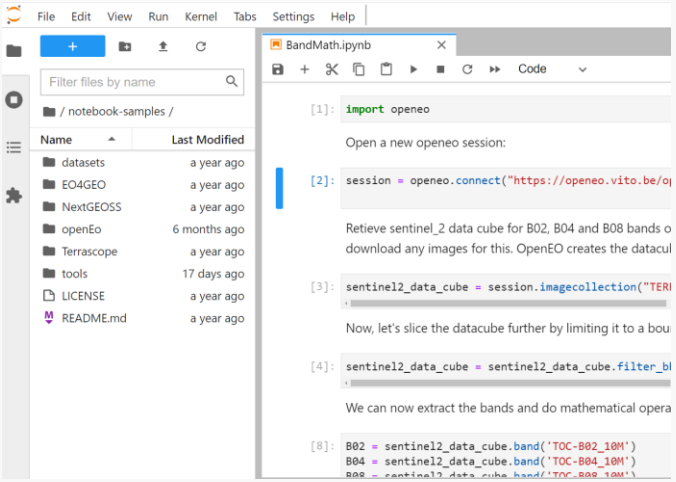
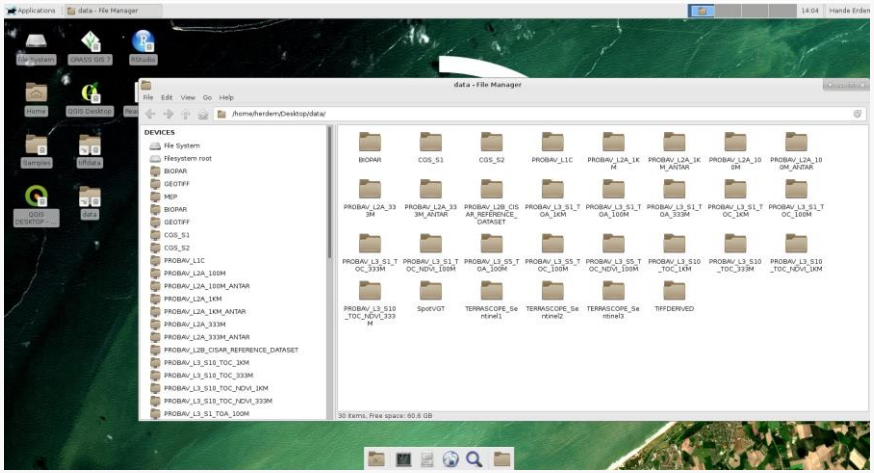
Terrascope Viewer

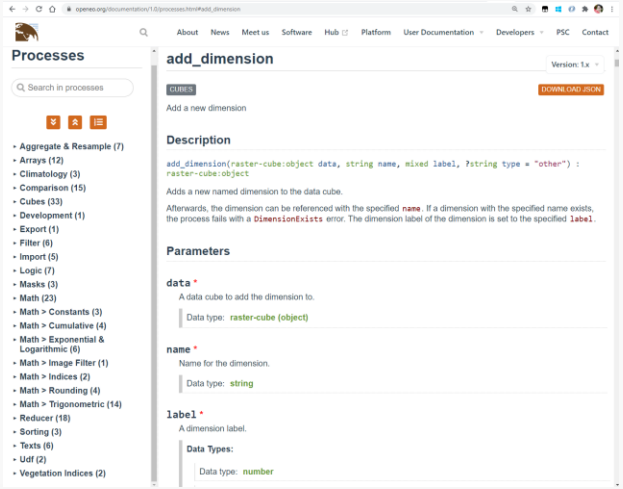
Jupyter Notebooks



Virtual Machines



OpenEO



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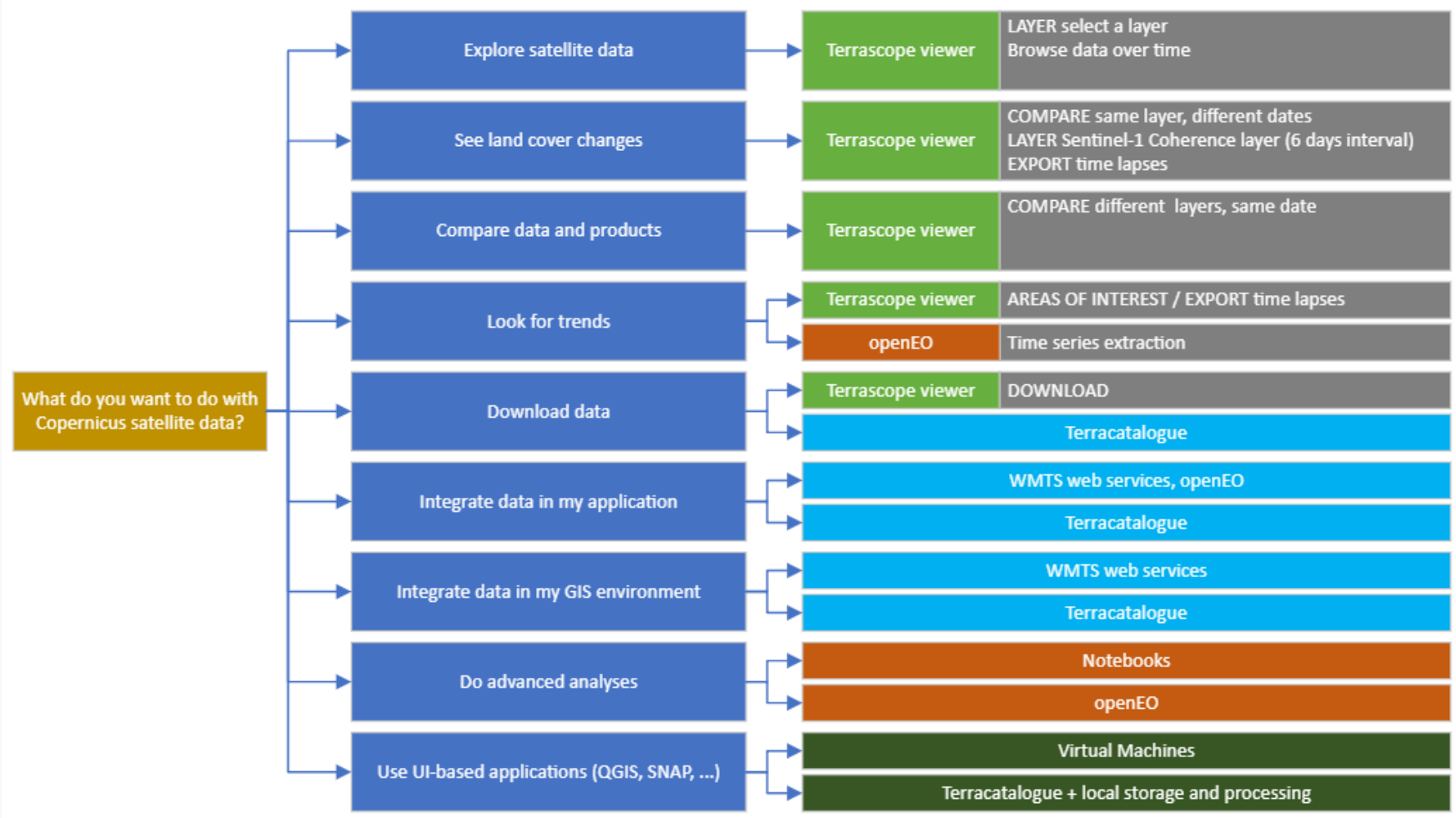
Service Overview



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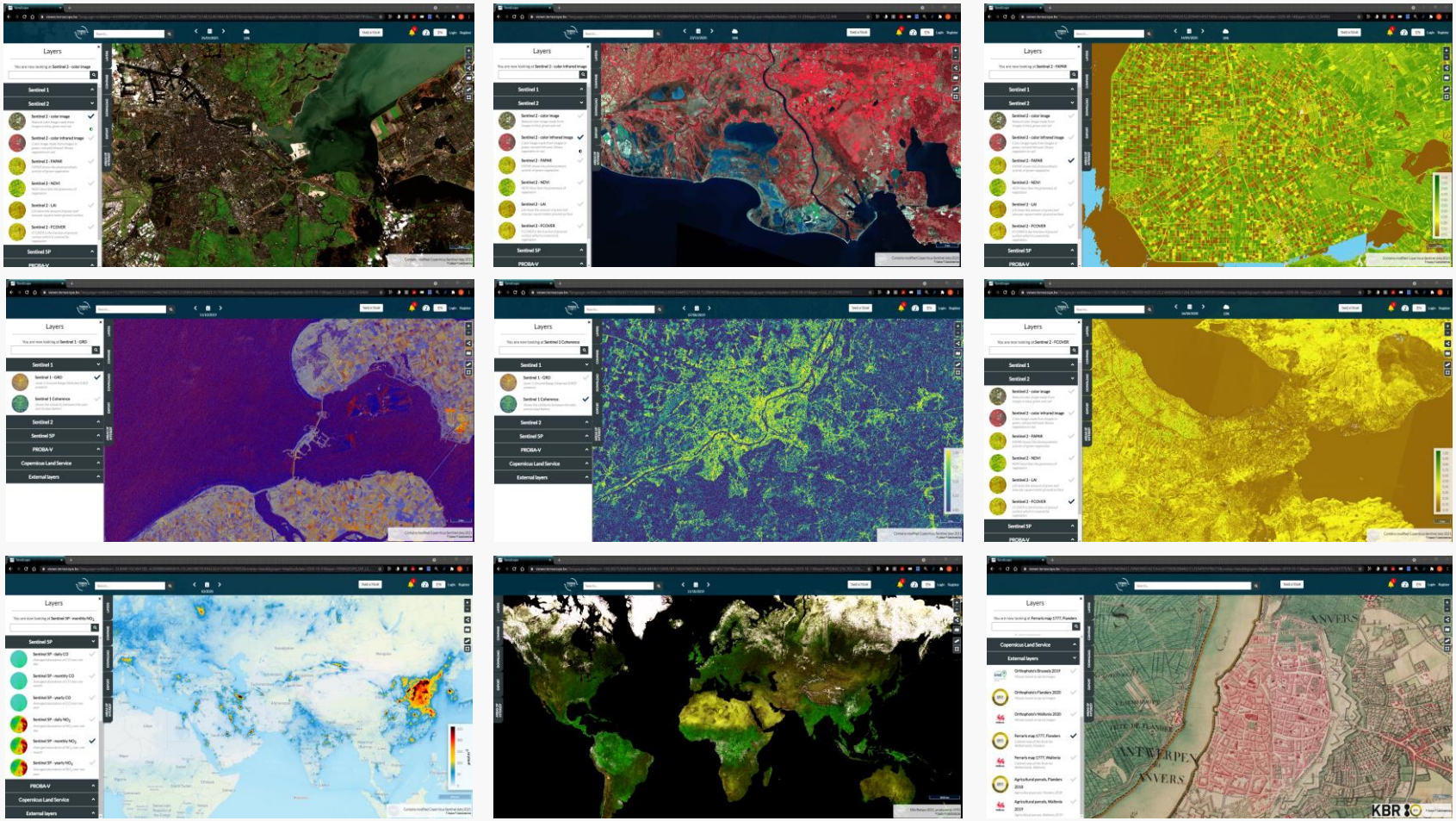
Terrascope Viewer

https://viewer.terrascope.be



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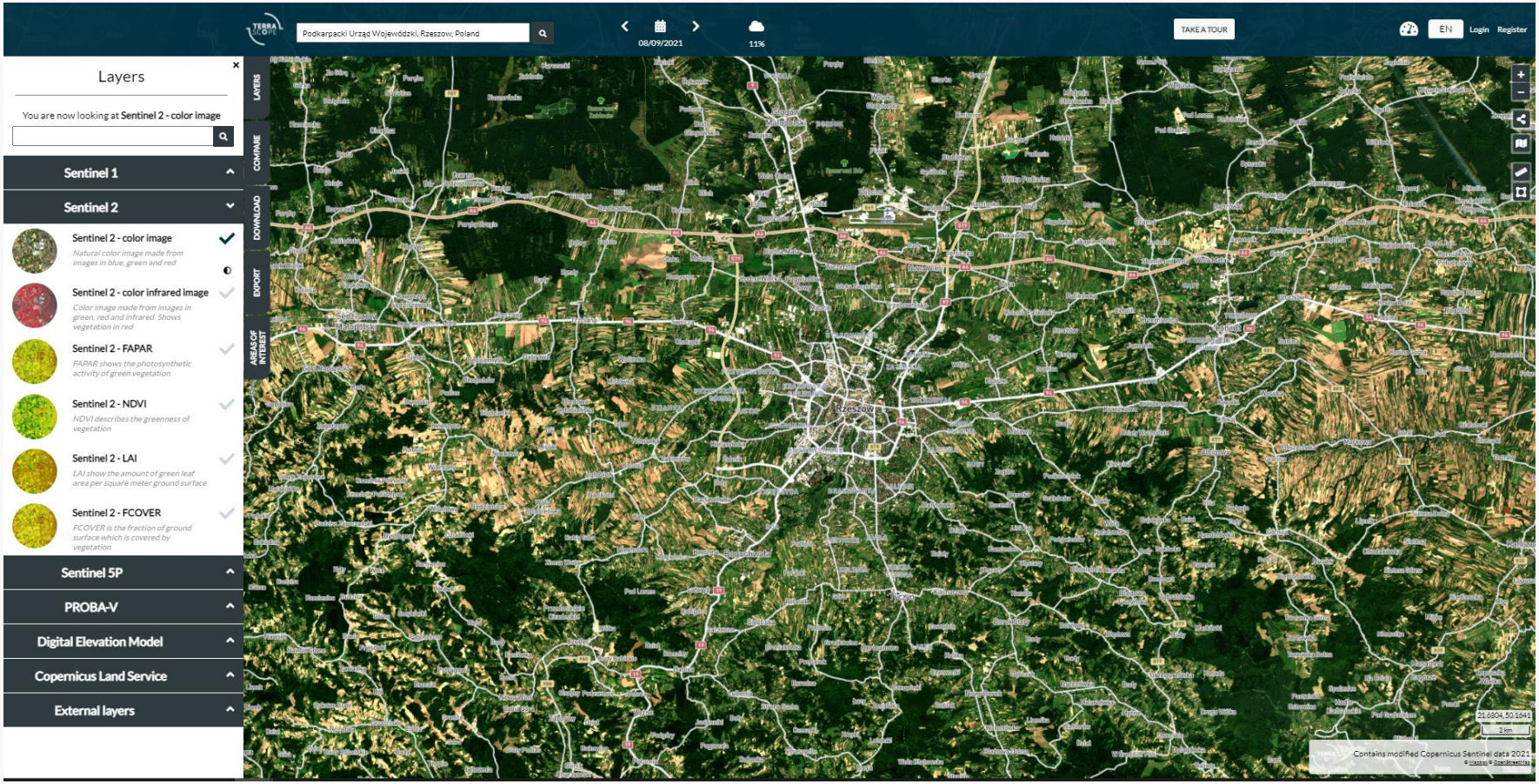
Layers



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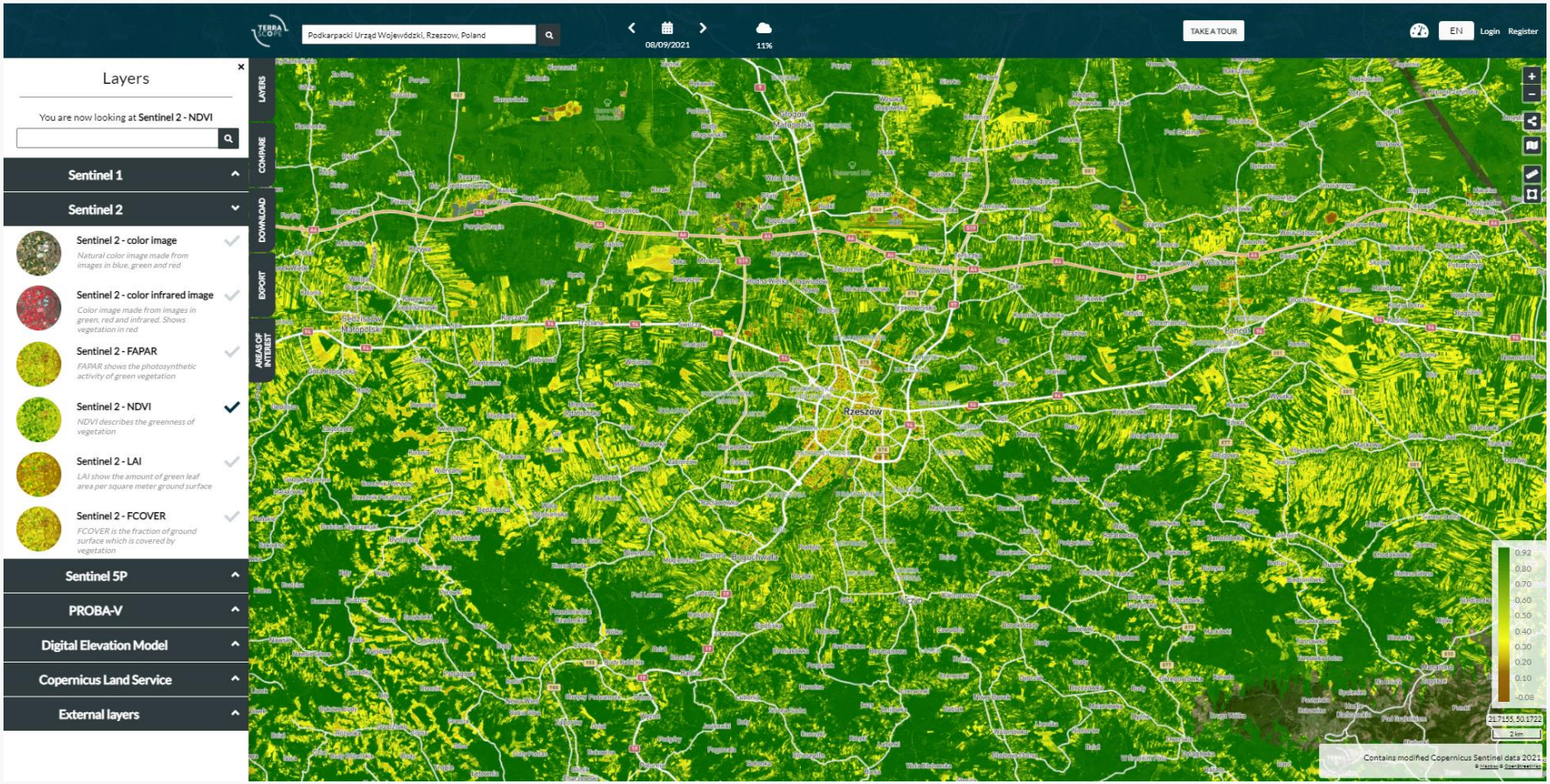
Layers



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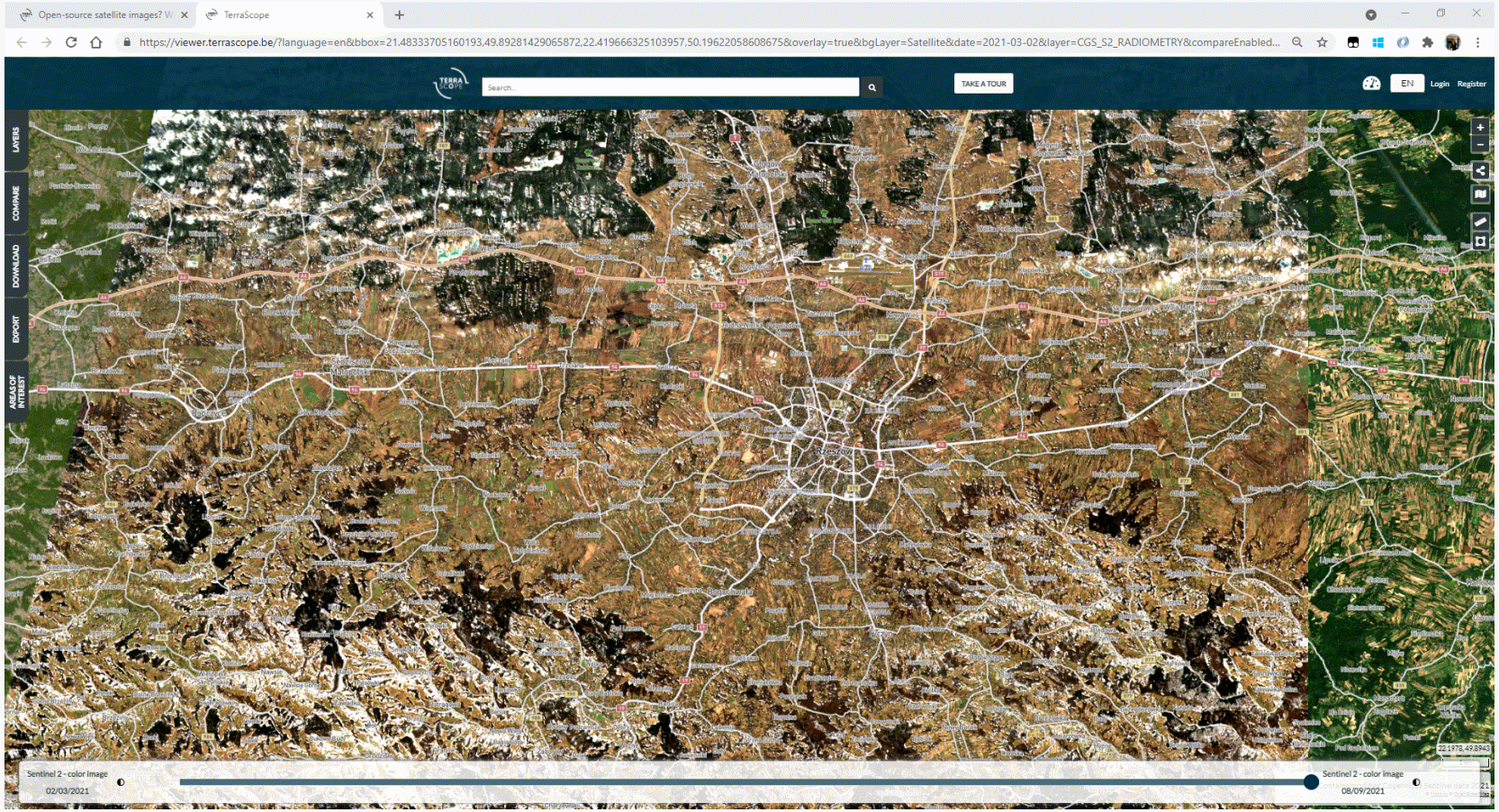
Compare Images



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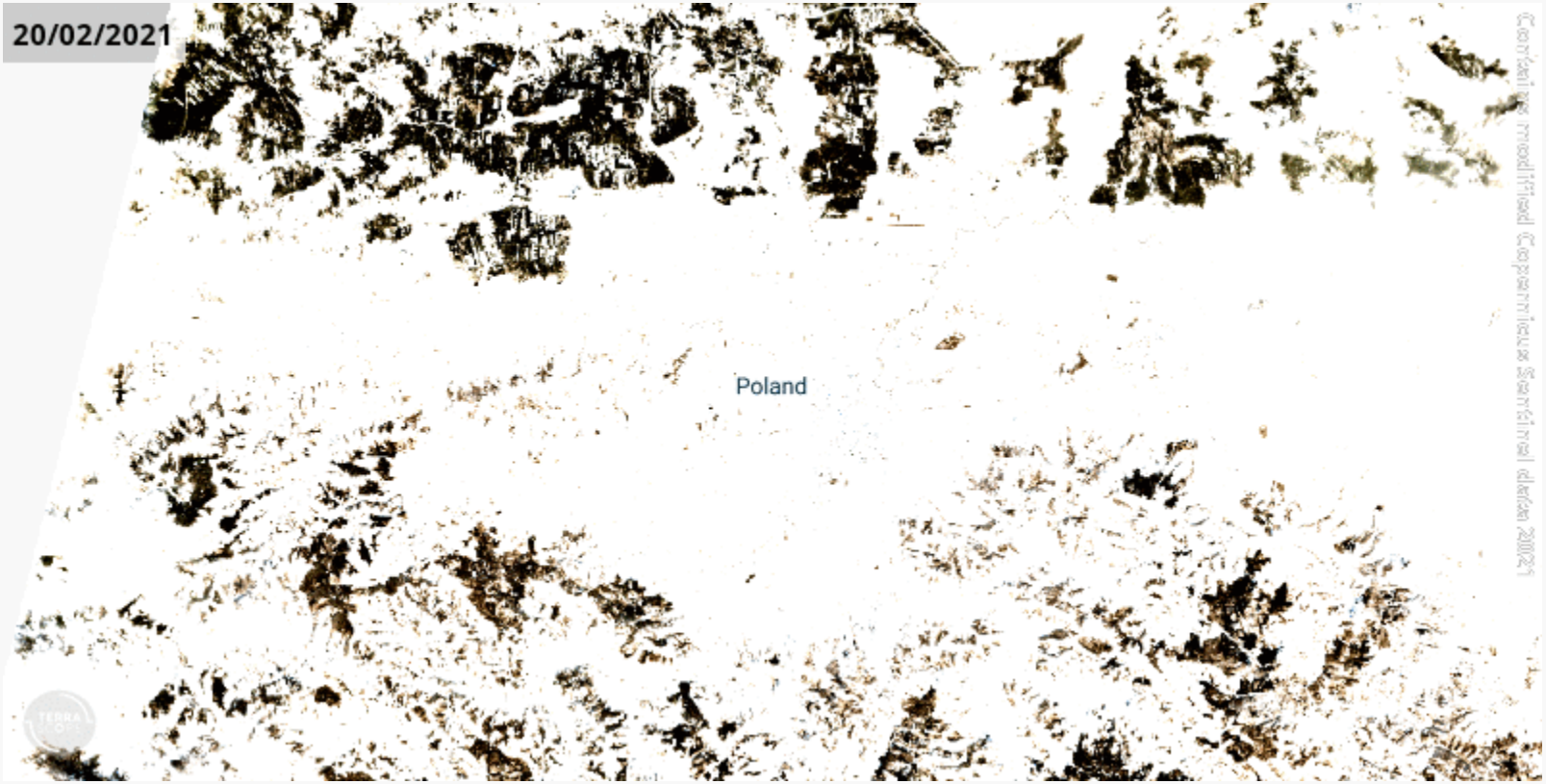
Timelapse



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Areas of Interest

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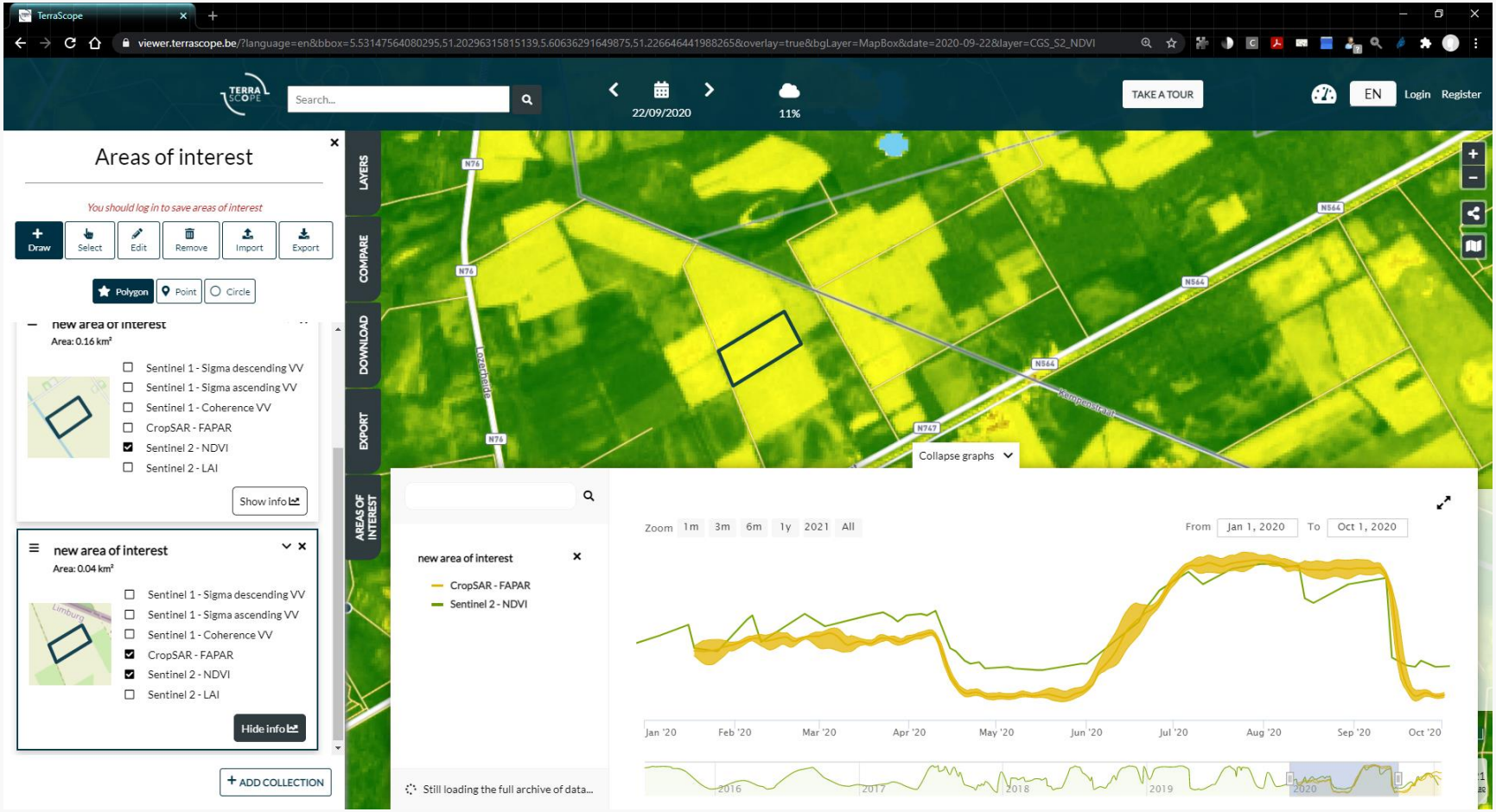

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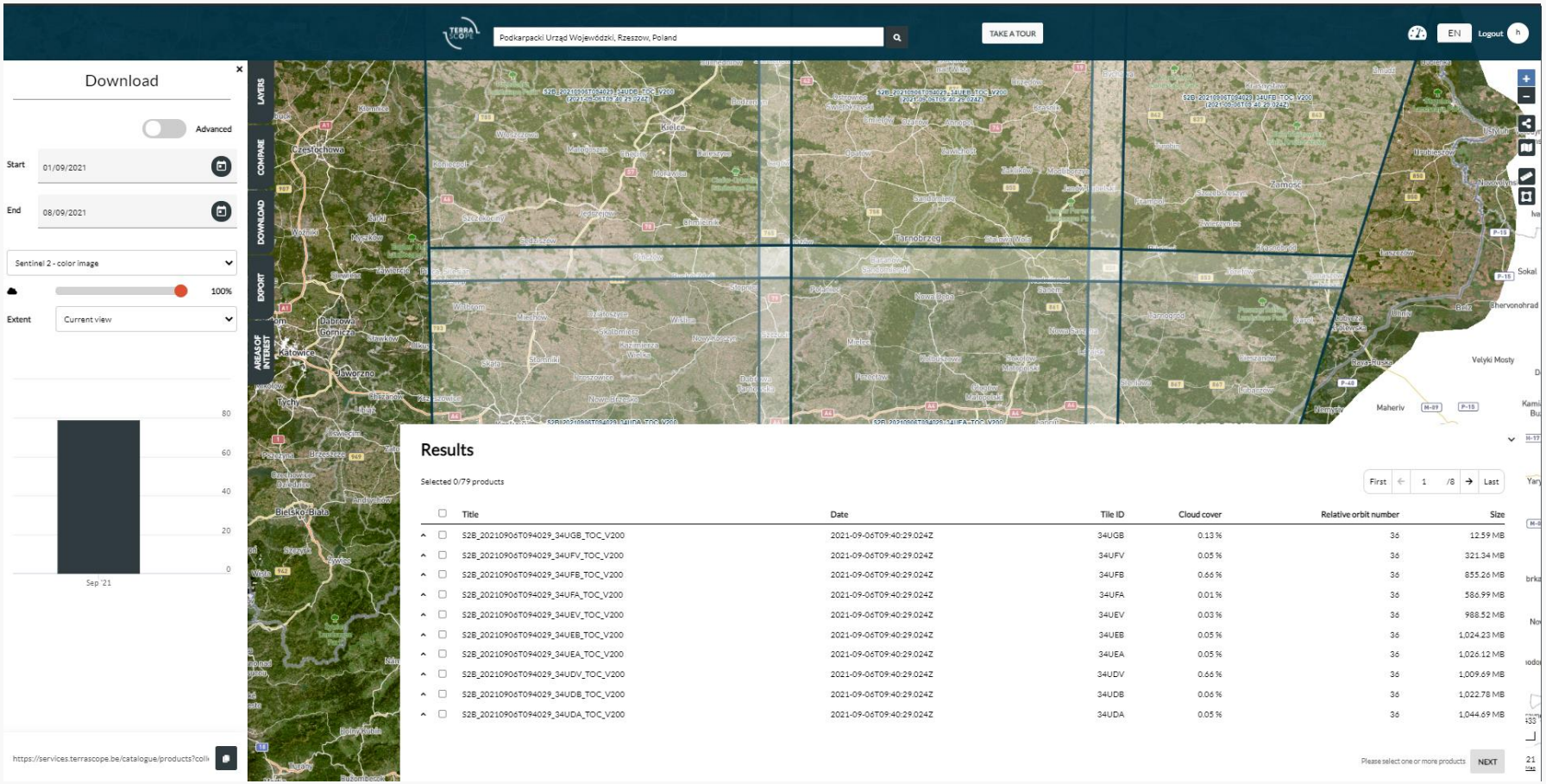
Download



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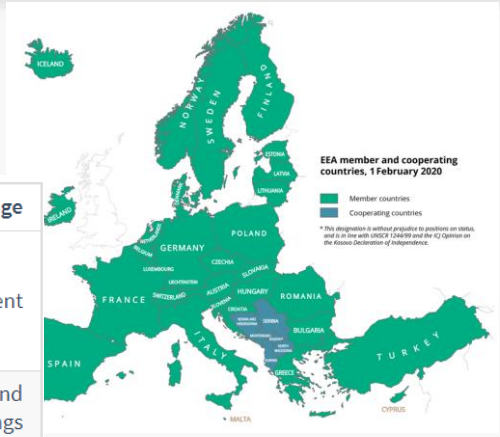
Product Portfolio



Satellite/Provider	Instrument(s)	Data Products	Available Region	Temporal range
Sentinel-1	C-SAR	GRD GRD σ_0 SLC SLC Coherence	Belgium and surroundings	2015 - present
Sentinel-2	MSI	Level-2A TOC Vegetation Indicators	Europe, Africa, Asia	2015 - present for Belgium and surroundings 2-year rolling archive outside this region
Sentinel-5P	TROPOMI	NO_2 CO	Global	2018 - present
PROBA-V	VGT	Level-1C TOA Level-2A TOA Level-3 TOC, NDVI	Global	2013 - 2020
SPOT-VGT	Végétation	Level-2A TOA (VGT-P) Level-3 TOC, NDVI (VGT-S)	Global	1998 - 2014
Copernicus Land Monitoring Service	PROBA-V Sentinel-3 OLCI	S10 LAI S10 FAPAR	Global	2014 - present
Copernicus Digital Elevation Model (DEM)	TanDEM-X	Digital Elevation Model	Global	2011 - 2015

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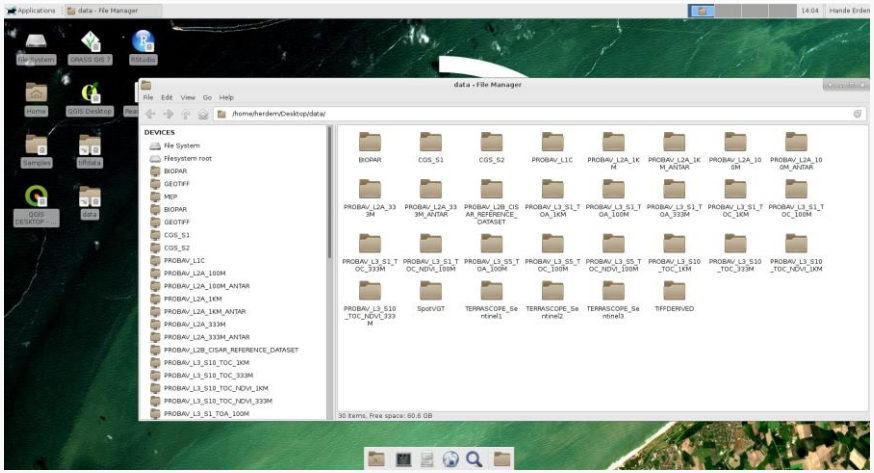
Terrascope Viewer

- Explore satellite images and derived products
- See land cover changes
- Compare different layers or different dates for the same layer
- Look for trends in areas of interest
- Create time lapses
- Download data

https://viewer.terrascope.be

Virtual Machines



- Fully prepared virtual desktop environment offering powerful tool set and libraries for further data exploration and analysis (using e.g. the SNAP toolbox, GRASS GIS, and QGIS)
- Direct access to available data archives
- use develop-debug-test applications (in e.g. R, Python or Java)

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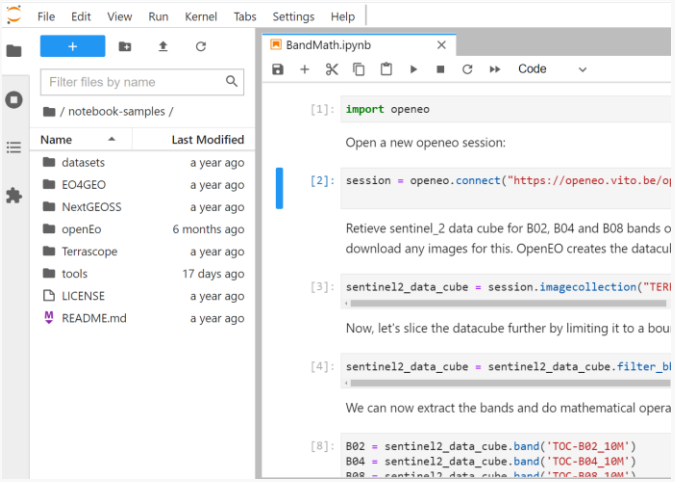
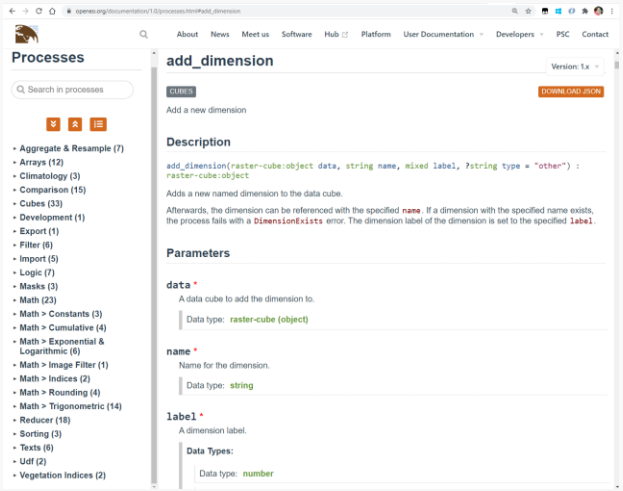
Jupyter Notebooks

- A web environment on the Terrascope server in which you can work directly with satellite data.
- Start with the data in the programming language you are familiar with.
- Easily track and export the data you need in the code.
- Do not just work in the code, but also add information about the code. This is useful for secondary and higher education.



OpenEO

- A standard API to process the EO data in a simple and unified way to reduce complexity
- Work with datacubes: “I want time series of of the median NDVI of these parcels between 2018 and 2021, using Sentinel-2 data”.
- Provides out of the box functions and processes tailored for EO.
- Readily available via Terrascope Jupyter notebooks.



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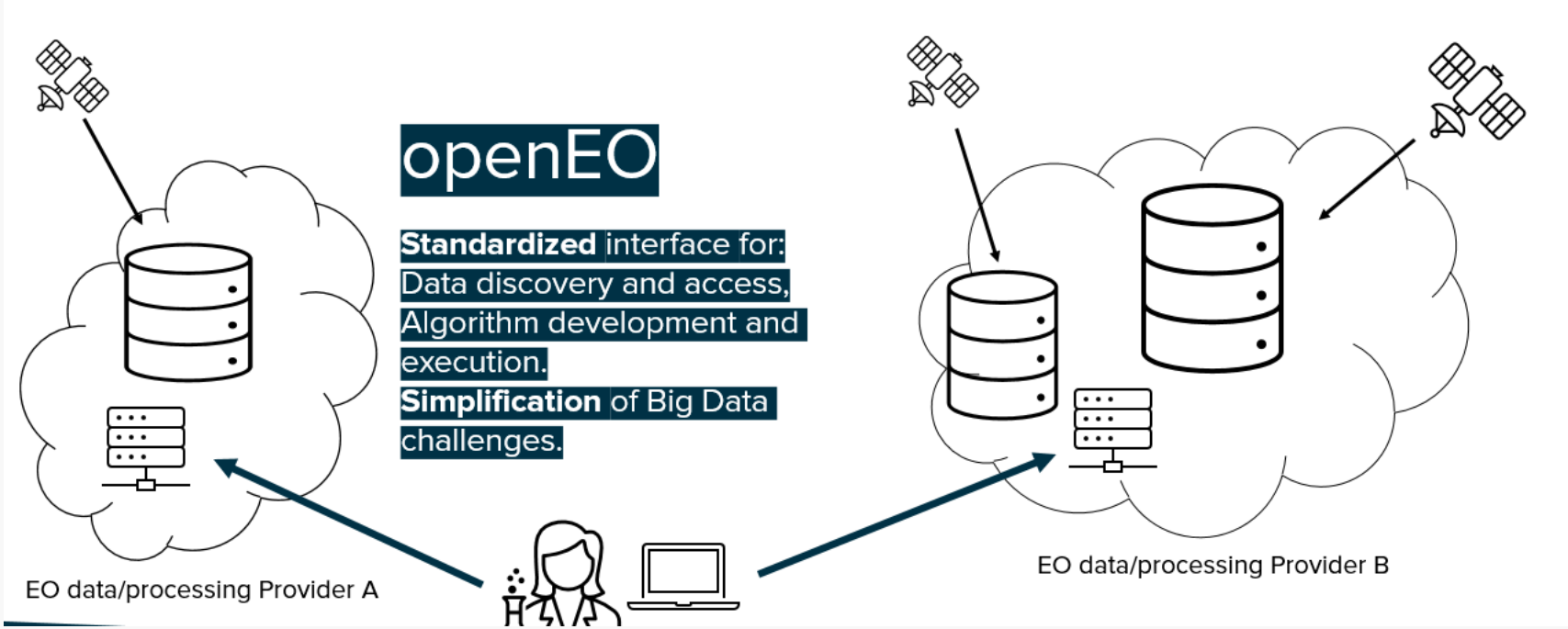
EO Processing with OpenEO



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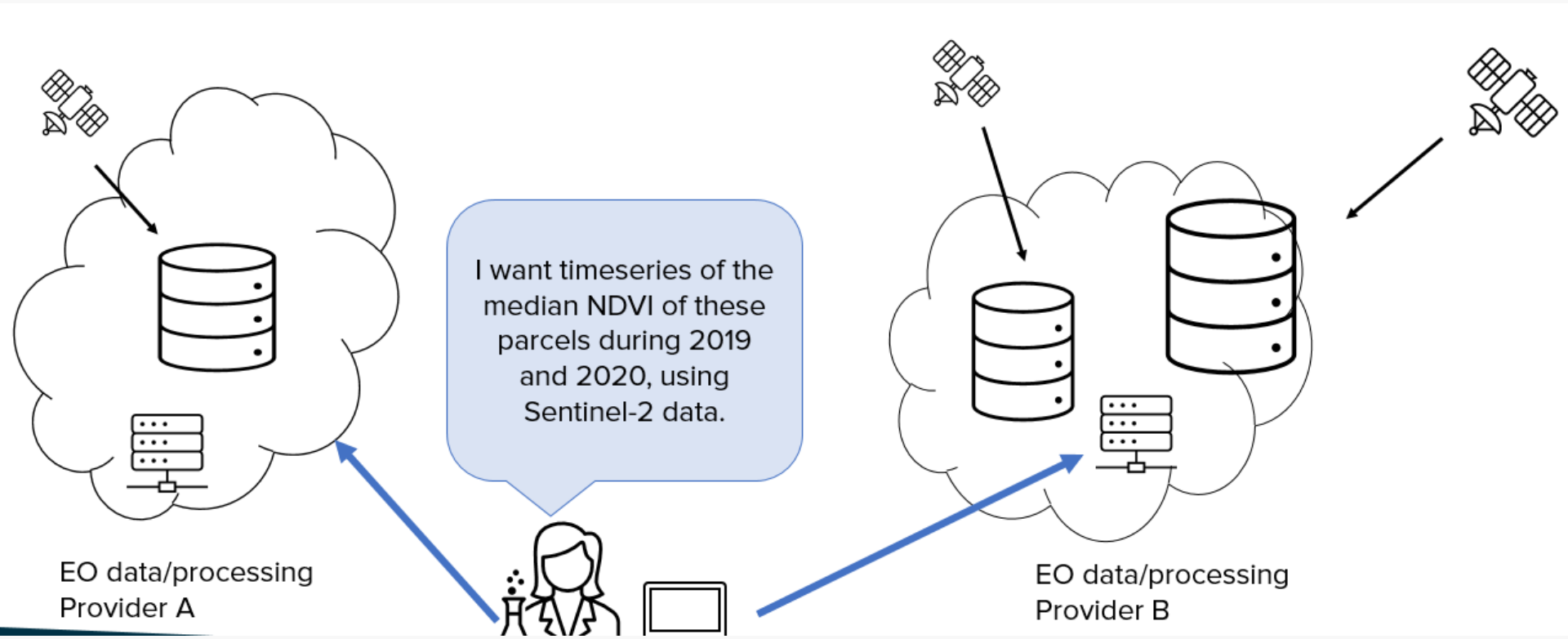

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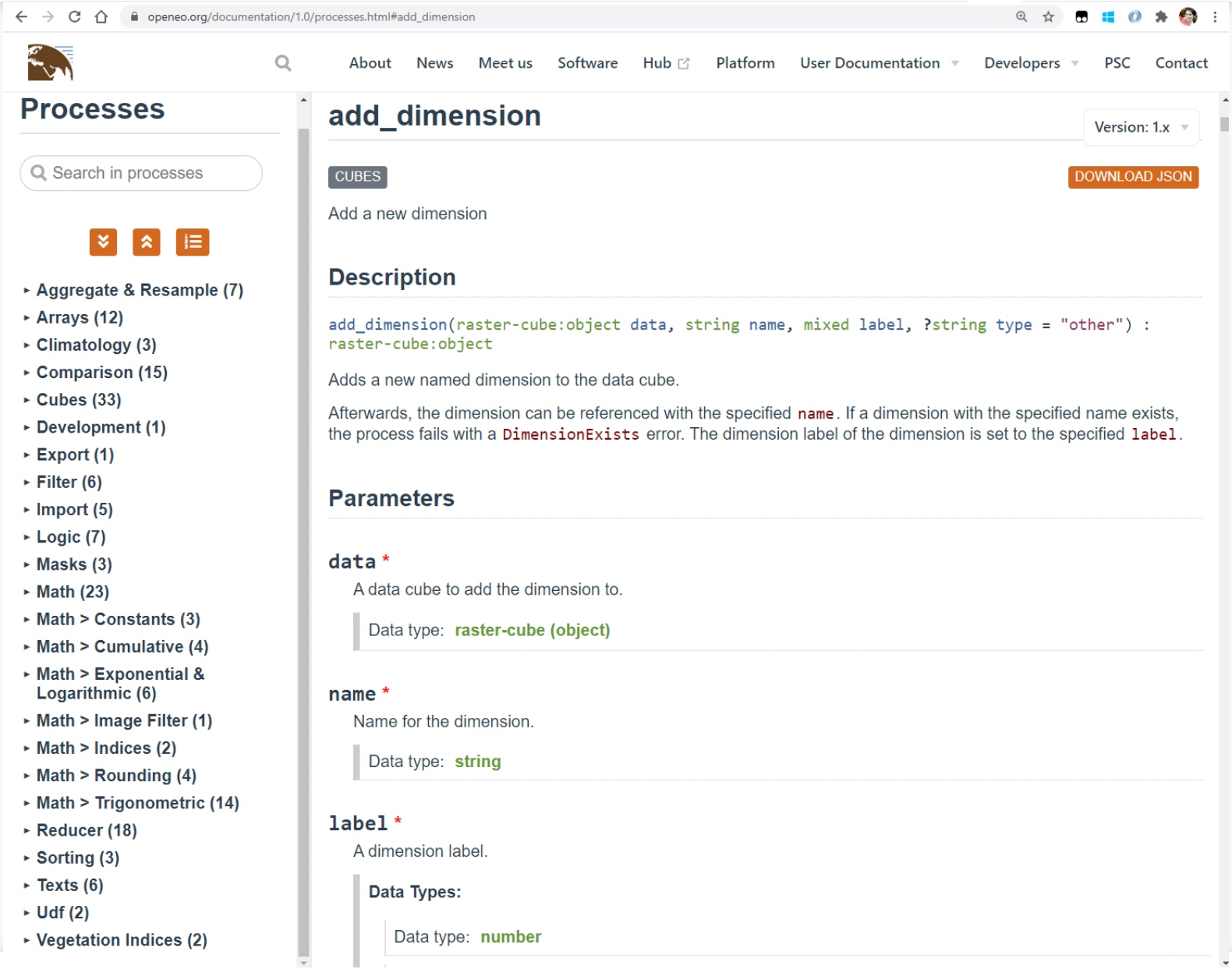

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Thank you!

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