ESA Online Training Activities in EO

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Massive Open Online Courses (MOOCs)

Free online courses covering theory and practical tutorials you can follow at home!

- **Land in Focus** – all available (see next slide)

  - Online course series with a focus on **EO for land applications.** Good for people new to EO.

  - 8 parts covering RS basics, agriculture, forests, hazard mapping, cities, dry and wet ecosystems and sustainability.

Links!

- **Echoes in Space** - all available (see next slide)

  - **Complete intro to SAR** RS including principles of SAR, agriculture, ship detection, flooding.

- **Towards Zero Hunger** – **ongoing**

  - Made collaboratively by ESA, DLR, EUMESAT, and more!

  - Theory and practicals on EO for **food security**, agriculture, land management, etc.

- **EO Data Access MOOC** – **Coming Soon**
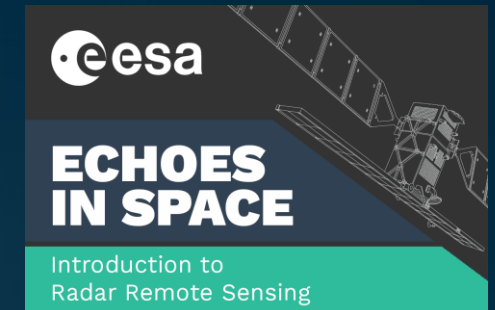
All ESA and DLR MOOCs can be found on https://eo-college.org/
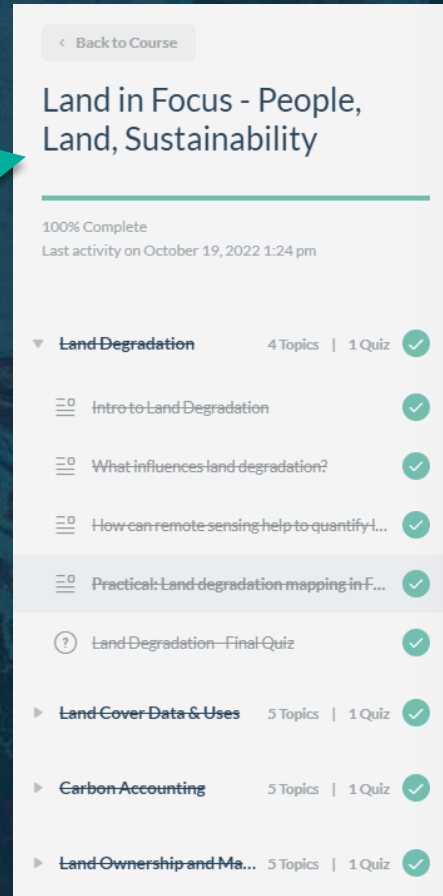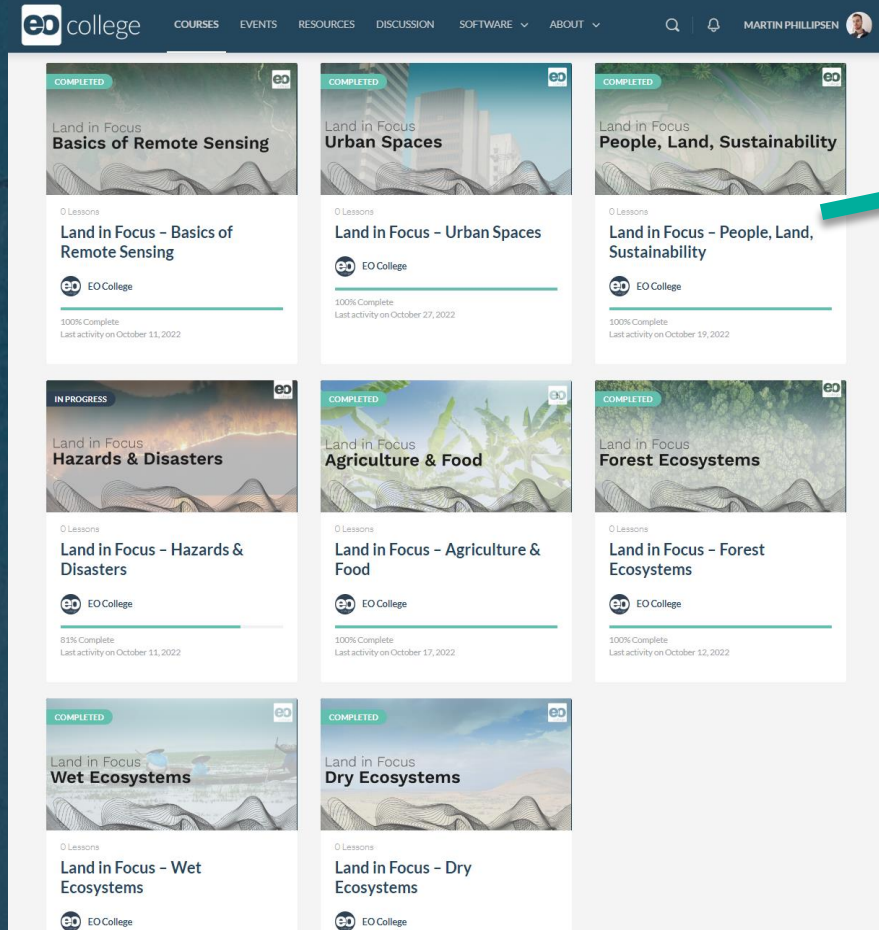
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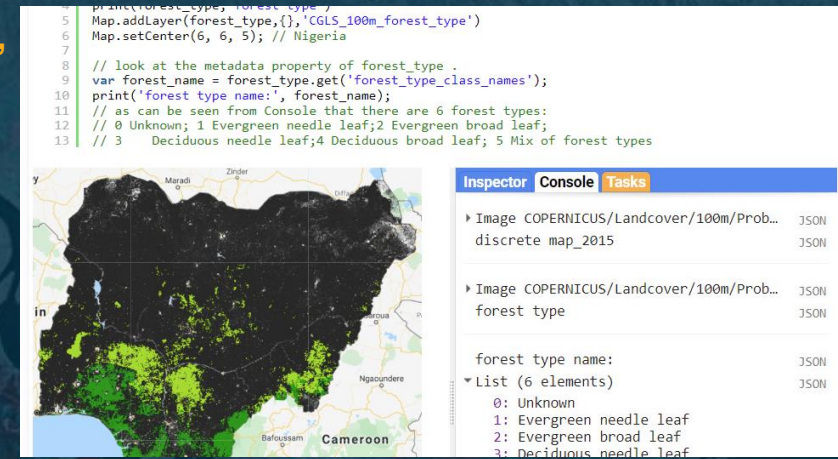
Land MOOC: Land in Focus

- Online course series with a focus on **EO for land applications.**
  8 parts including a large basics module for students new to RS.
- **Update this year**: Adding new content and **'gamifying'** the MOOCs
  - more interactive and fun

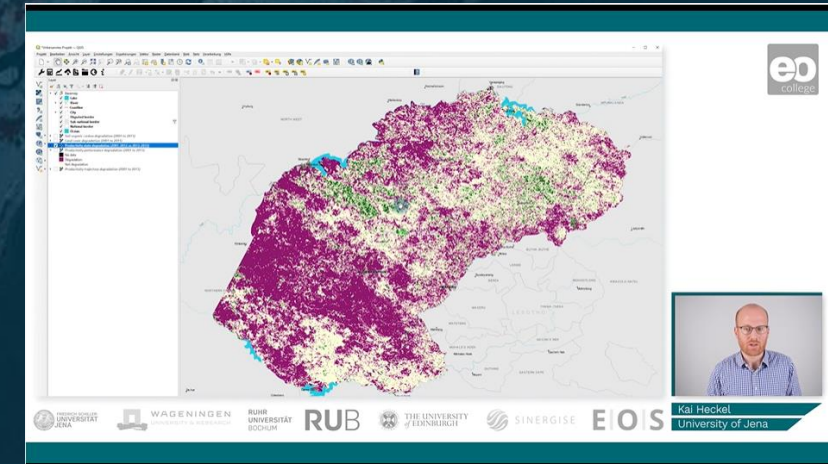**Simple sections with lectures, tutorials, and quizzes:**

Example Tutorials:
Creating land cover maps using Google Earth Engine:

Calculating sub-indicators related to productivity, land cover and soil organic carbon using QGIS:
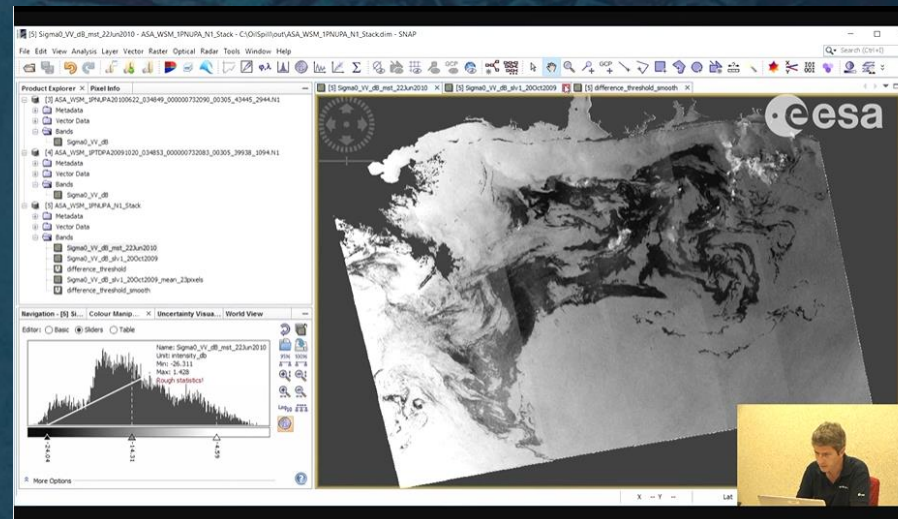
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SAR MOOC: Echoes in Space

Link!

- **Complete intro to SAR** RS including principles of SAR, agriculture, ship detection, flooding, and more.

- **Update this year:** Adding content on X, L, and P-band and Multi-Frequency Synergy
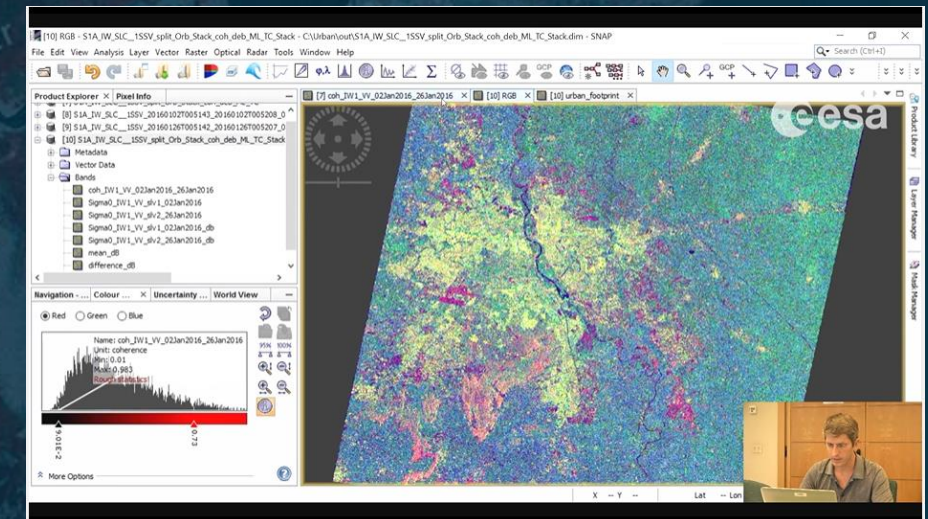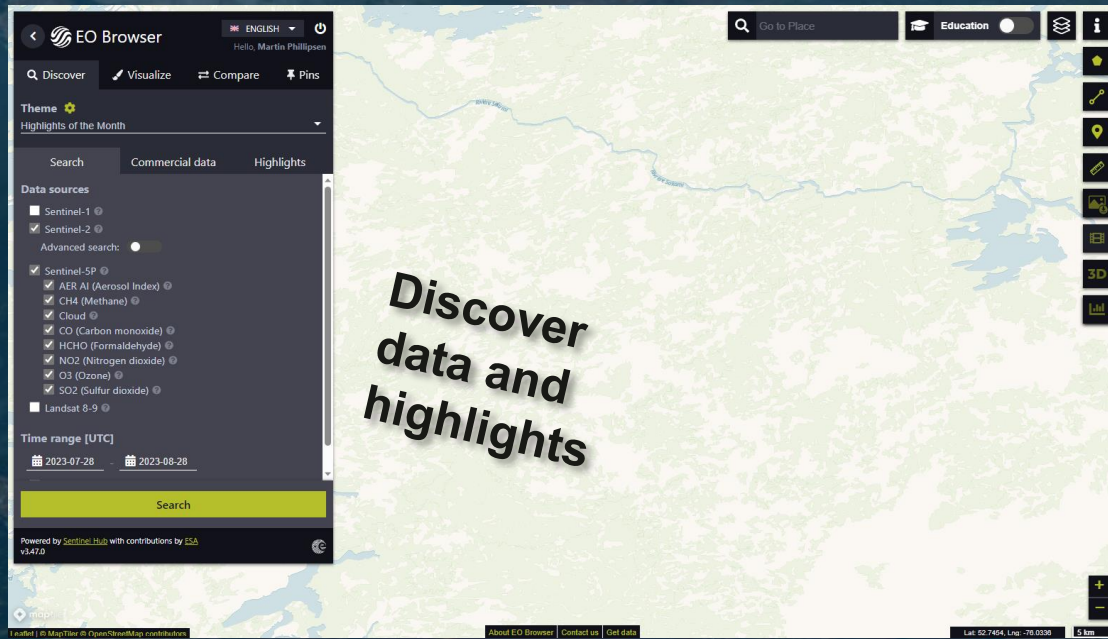
Example Tutorials:

Oil Spill Mapping using SNAP:

Urban Footprint mapping using SNAP:

EO Browser

Our free, in-browser EO data visualisation and analysis tool

Discover data and highlights

- Divide data sources by theme for easy access
- Sentinel, Landsat, MODIS, DEMs, and more
- **Good for any beginners**
- Calculate and export time-series, averages, timelapses, etc.

- **Ready-to-use band ratios** and other relevant visualisations:
  - Explanations and tooltips for all data sources and visualisation ("What is a false composite"):

  - Comparison Tool Example: Wildfires in Canada, June 2023:
    - (NVDI; Moisture Index; SWIR, and False Colour composites)

Visualise and Compare

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EO Browser: Case studies and tutorials
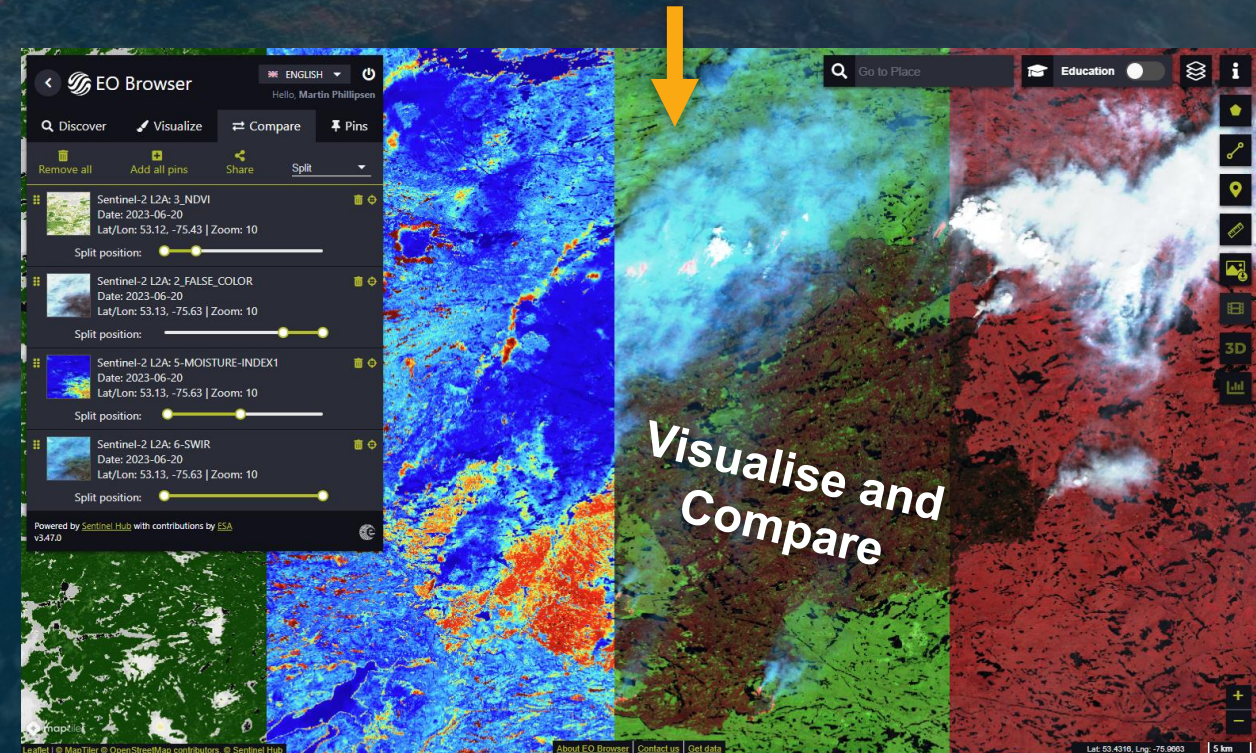
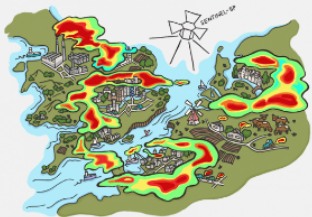## Use cases

Air Pollution

Measuring Air Pollution from Space

Air pollution is a serious problem worldwide - especially in large urban areas. According to the WHO (World Health Organization), some 4.2 million premature deaths each year are linked to air pollution. According to data the European Environment Agency published, around 90% of city dwellers in Europe are subjected to air pollutants at levels deemed harmful.

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MORE ABOUT AIR POLLUTION

BLOG ON AIR POLLUTION

Etna Eruption

Volcano from Space

In early spring of 2017, the biggest Sicilian volcano - Etna - awakened and erupted several times. Let's observe the event using satellite imagery. Can we find satellite images of any previous Etna eruptions?

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ETNA ERUPTION PYTHON EXAMPLE

Wildfires

Wildfires from Satellite Images

In recent years, we hear a lot of news about wildfires occurring in areas, where they did not occur often in the past. In spring and summer of 2018, we have witnessed the boreal forests in Siberia burning at extraordinary rates; last summer the wildfires suddenly erupted in Portugal; in September of 2017, California was in flames, with firefighters fighting more than 9000 fires and in the beginning months of 2020, wildfires in Australia have destroyed thousands of homes and more than 5 million hectares of land. We can observe them with satellite imagery.

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WILDFIRES AND SATELLITE IMAGERY

For Case studies and step-by-step guides on how to use EO Browser: https://www.sentinel-hub.com/explore/education/

1- Wildfires Case Study in EO Browser

Note that in the **Wildfires Theme** it is **not possible to display time series** (the feature is not yet available).

So to reproduce the steps taken in the Case Study:

1. Make sure you have an **AOI drawn** over the burned area (it can be a small section of the burned area)
2. In Search, under Theme choose **Default** (not Wildfire)
3. As Data sources, keep **Sentinel-2 L1C**
4. Next we need to display an image. However, it can be **any image**, because this will simply allow us to access the Time Series tool. Once inside the tool, the time range (i.e. how far back in time the time series goes) can be adjusted. You could enter the same time range as the wildfire case study, for example.
5. Click **Search**
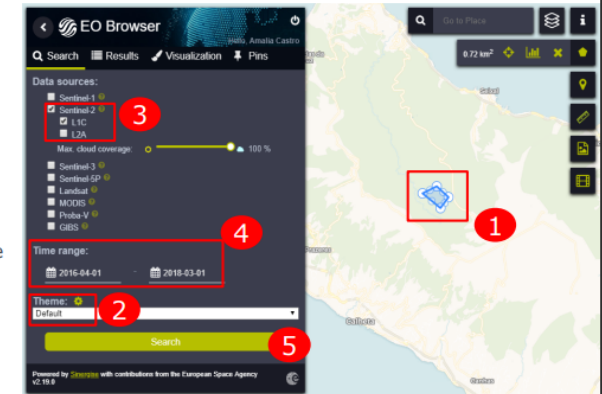
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All ESA EO courses and materials available at
https://eo4society.esa.int/

Free online webinars, courses, and more

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