

# eLTER Science Conference - 2025 - Tampere,FI



## Analyzing Remote Sensing Data with R

### Getting Started

This [Github repository](#) lists the preparatory steps in advance of the workshop, and contains the practice exercises that will be covered.

### Required Software

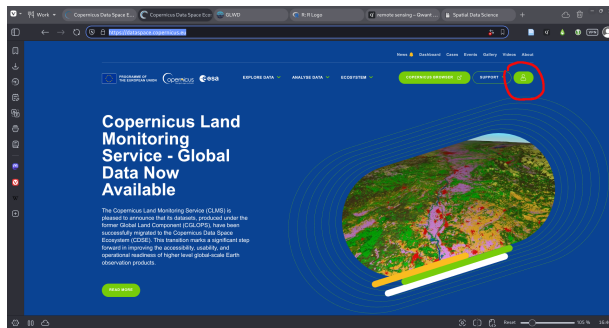
Each workshop participant should do the following on her laptop:

- Install a recent version of R, for your operating system from [CRAN](#)
- Windows users should add the Rtools toolchain;
  - from: [RTools](#)
  - matching the version of R that was installed
- Install RStudio™ from [Posit](#)
- Once R is installed, the following packages should also be added:
  - `terra`, `sf`, `remotes`, `CDSE`, `rOPTRAM`, `leaflet`, `'ggplot2'`
  - At the R command line, run:
  - `install.packages(c("terra", "sf", "remotes", "ggplot2", "leaflet"), dependencies = TRUE)`
  - `remotes::install_github("zivankaraman/CDSE")`
  - `remotes::install_github("ropensci/rOPTRAM")`

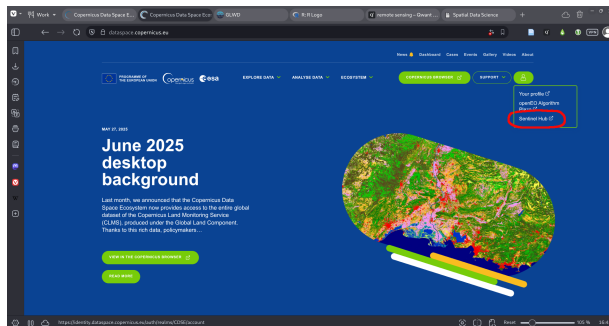
### Authentication on Copernicus DataSpace (CDSE)

- Browse to CDSE [portal](#)
- Follow steps below to register on CDSE and prepare clientid and secret.
- Save both the clientid and secret to a `csv` text file.

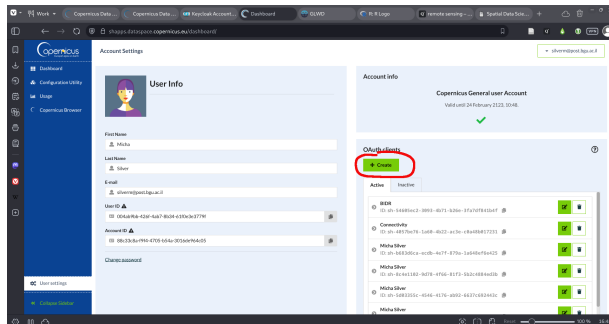
## CDSE Authentication



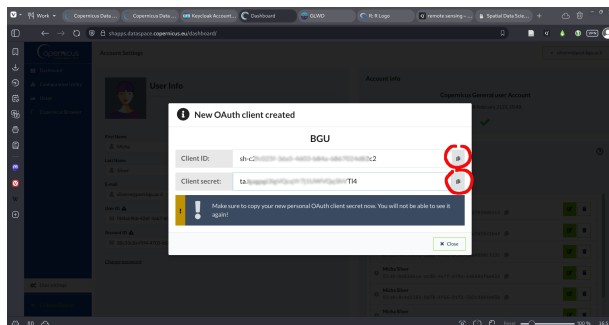
Browse to portal



Go to Sentinel Hub

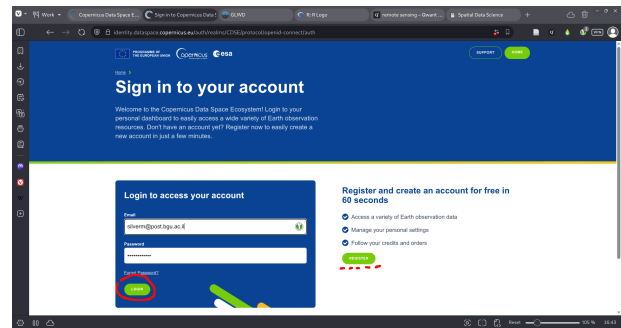


Create a new OAuth client

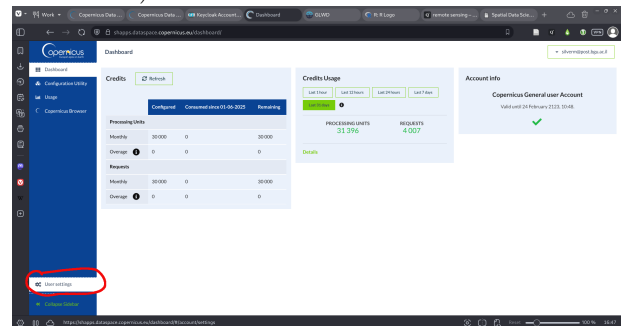


Copy both the clientid and the secret...

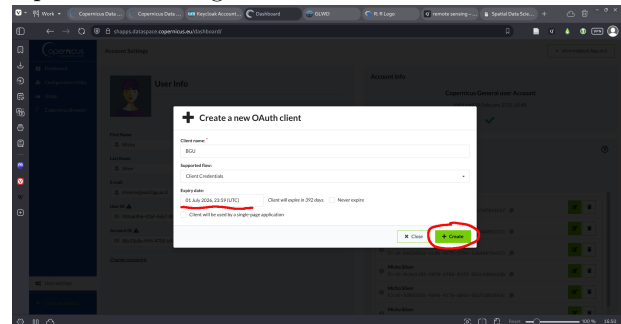
## Steps



Register for an account (of Login if you already have an account)



Open User settings



Set expiration date and click Create



... and save to credentials.csv file

## Workshop Exercise

### Code and data

Each participant can download the exercises and data in advance in one of three ways:

- Participants who are familiar with `git` can clone the repository:

```
git clone https://github.com/micha-silver/elter-2025-R-workshop.git
```

- The same result can be achieved within RStudio™ by starting a new Version Control based project, pointing to the same repository;
- Otherwise, the workshop material can be downloaded as a zip archive from [here](#) .

Put your `credentials.csv` file into the same directory as the exercise.

Start RStudio™ and load the project “elter-2025-R-workshop”.

## Exercises

- Load packages, set parameters;
- Query CDSE catalog for available images;
- Filter for low cloud cover, and only a single Copernicus tileId;
- Loop over list of available image dates;
- Derive MNDWI index for each image;
- Threshold MNDWI to obtain open water surfaces;
- Plot time series of MNDWI values;
- Prepare OPTRAM model from list of available dates;
- Derive soil moisture for one date using model coefficients.

## License

eLTER Workshop-Analyzing Remote Sensing Data in R

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