

eurac
research



R4openEO – NoR Sponsoring

2023-04-03



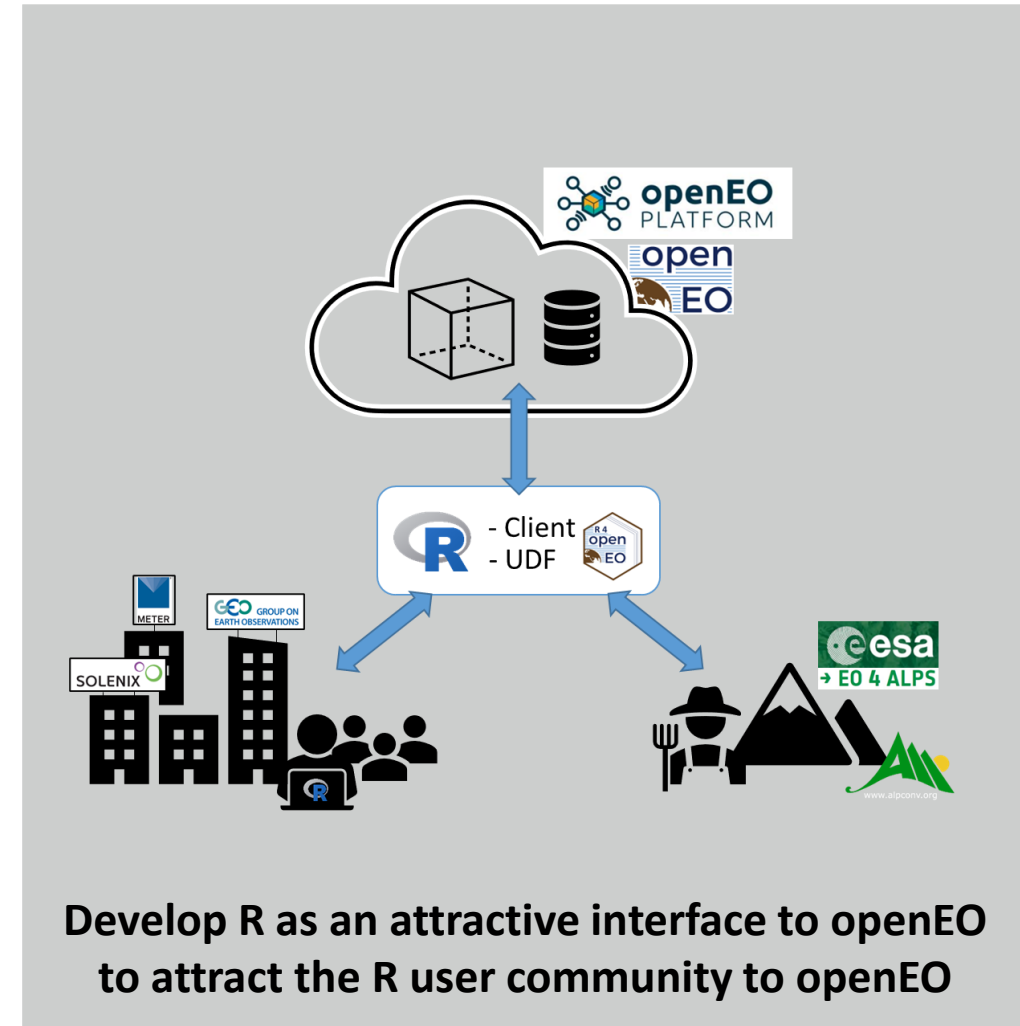
Project Objectives

The objectives of the project R4openEO were to

- install and maintain R, alongside Python, as a first-class data science language for analyzing Earth observation datacubes using the openEO software ecosystem,
- and to develop it further in order to encourage cross language inspiration and competition,
- as well as to open openEO to the R user community.

This has been achieved by developing R software components on both

- client (R-Client) and
- back-end side (R-UDFs),
- by testing this software in openEO back-ends like Terrascope and
- by demonstrating it in relevant use cases directly related to initiatives like ECO4Alps for regional exploitation

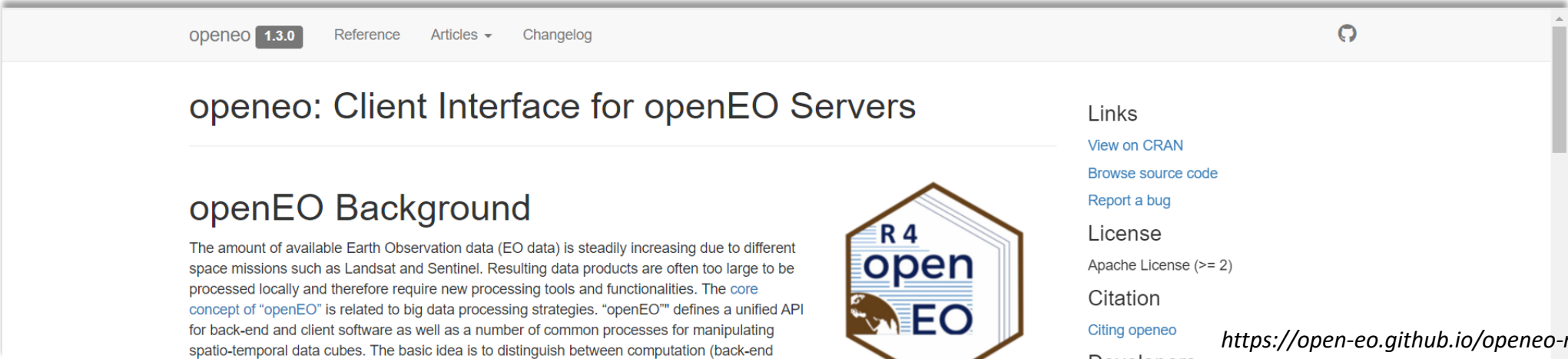


Project Achievements

The R-Client

R-Client to let R users interact with openEO in their preferred and user friendly environment

- The R-Client is an official software package on CRAN meeting all quality standards.
- Automatic adaption to API changes by design (minimal maintenance effort).
- Integration with R-Studio (R-Studio Panes and HTML widgets from Vue components).
- Integration with JupyterHub on openEO platform.
- Integration with R ecosystem: R-Spatial, tidyverse.
- Large Documentation Repository for users and developers.



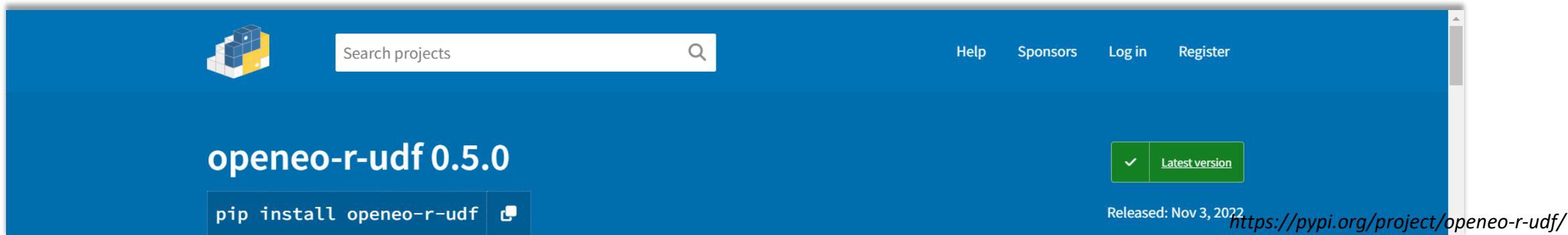
The screenshot shows the documentation page for the 'openeo' R package. The page title is 'openeo: Client Interface for openEO Servers'. The version '1.3.0' is displayed in a dark box. Navigation links include 'Reference', 'Articles', and 'Changelog'. The main content area features a section titled 'openEO Background' with a paragraph of text and a logo for 'R4 open EO'. The logo consists of a hexagon with 'R4' at the top, 'open' in the middle, and 'EO' at the bottom, with a globe icon. To the right of the main content is a sidebar with sections for 'Links' (containing 'View on CRAN', 'Browse source code', and 'Report a bug'), 'License' (containing 'Apache License (>= 2)'), and 'Citation' (containing 'Citing openeo'). A URL 'https://open-eo.github.io/openeo-r-client/index.html' is visible at the bottom right of the page.

Project Achievements

The R-UDF Service

Allows to use arbitrary R Code together in one workflow with openEO capabilities

- Service is designed to cater the needs of backend providers in order to augment the chances of deployment: Using an R to python bridge instead of a generally applicable microservice.
- Official Software Package available on pip.
- Documentation and Set-Up Guide as well as Docker Containers and Environments provided for easy uptake.
- All Use Cases carried out with R-UDFs.
- R-UDF Service running on Eurac and VITO (experimental).



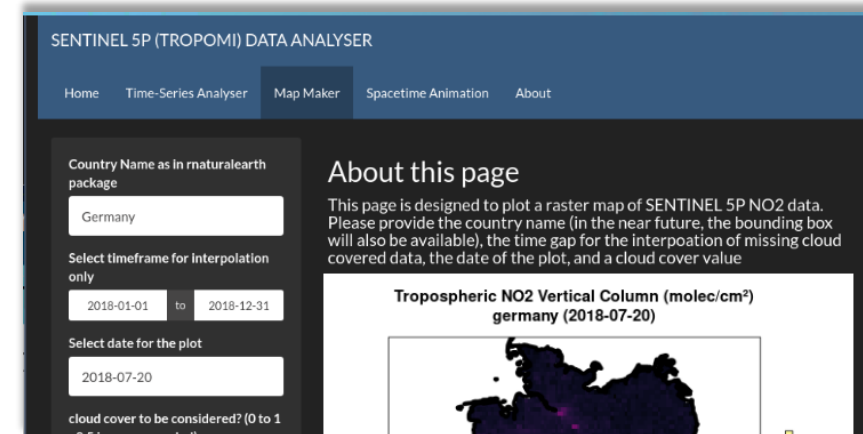
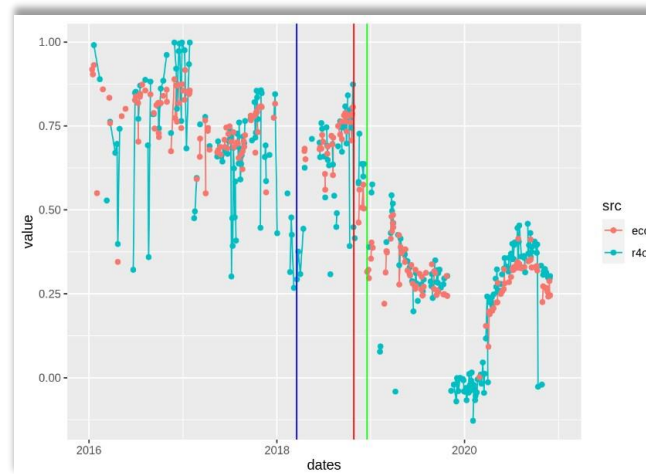
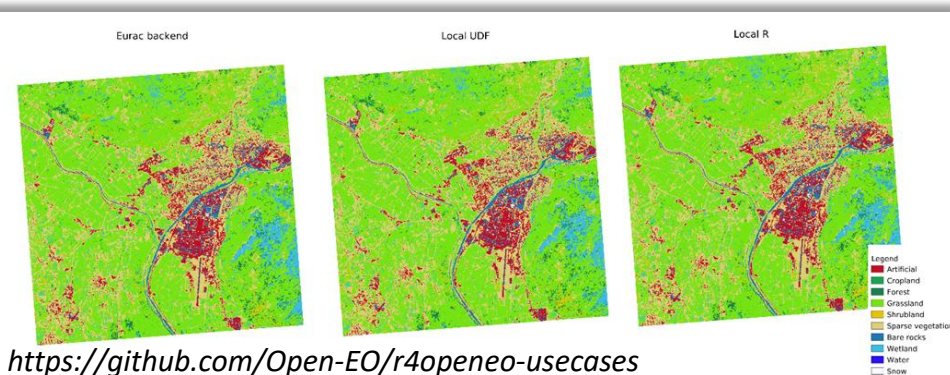
The screenshot shows the PyPI page for the `openeo-r-udf` package. The page has a blue header with the package logo on the left, a search bar, and navigation links for Help, Sponsors, Log in, and Register. The main content area displays the package name `openeo-r-udf` in large white text, followed by the version `0.5.0`. Below this is a dark blue button with the command `pip install openeo-r-udf` and a copy icon. To the right, there is a green checkmark icon and a link for the `Latest version`. At the bottom right, it says "Released: Nov 3, 2022" and provides the URL <https://pypi.org/project/openeo-r-udf/>.

Project Achievements

Use Cases

Applications and Blueprints on what can be achieved with the R-Client and R-UDFs

- Machine Learning through R-UDFs is being adapted to a real-life Ecosystem Mapping Service from ECO4Alps.
- Advanced Time Series Modelling through R-UDFs adapted to the Forest Disturbance Detection Service from ECO4Alps.
- Sentinel5P Air Quality Monitoring Dashboard serves as a blueprint for creating RShiny Dashboards with openEO in the background.



Project Achievements

Outreach Activities

Reaching the R-Community, Earth Observers and Cloud Platform Users

- The R-Client has its own homepage, hosting many tutorial vignettes.
- The R-Client has been presented at Scientific Conferences such as the Living Planet Symposium and the Phi-Week.
- The R-Client Documentation and News are integrated into openEO platform and openEO.org channels.
- The preparation of an R-Spatial Blog post and R-Journal Manuscript is in progress.

https://github.com/openEOPlatform/LPS-presentations/blob/main/demos/WWU_Web_Editor_Rclient/LPS_RClient_Demo_2022.Rmd

Project Benefits

- The R-Client is fully functional and ready to use and there is extensive documentation – also for developers.
- The R-UDFs have proven to work in real life scenarios, some more work is needed to make them available operationally.
- The Use Cases show how to approach projects on the border between research and service with openEO.
- R Users are ready to explore openEO/openEO platform with the achievements from this project.

The screenshot shows the openEO Platform Documentation website. The header includes the openEO Platform logo, a search bar, and navigation links for Datasets, Get Started, Clients, Use Cases, Processes, File Formats, Advanced, and Contact. The main content area features a sidebar with 'Get started with the openEO R Client' and a list of useful links: Useful links, Installation, Connect to openEO Platform and explore, Collections, and Processes. The main content area has a heading 'Get started with the openEO R Client' and a 'NOTE' box stating: 'To access the processing infrastructure you need an openEO Platform account. Read all about the service offering including our free trial offer [here](#) .'