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openEO Platform: Enabling analysis of large-scale Earth Observation data repositories with federated computational infrastructure

Benjamin Schumacher¹, Patrick Griffiths², Edzer Pebesma³, Jeroen Dries⁴, Alexander Jacob⁵, Daniel Thiex⁶, Matthias Mohr³, and Christian Briese¹

¹EODC, Wien, Austria (benjamin.schumacher@eodc.eu)

²ESA, Frascati, Italy

³University of Münster, Münster, Germany

⁴VITO, Mol, Belgium

⁵EURAC, Bozano, Italy

⁶Sinergise, Ljubljana, Slovenia

The growing data stream from Earth Observation (EO) satellites has advanced scientific knowledge about the environmental status of planet earth and has enabled detailed environmental monitoring services. The openEO API developed in the Horizon 2020 project openEO (2017–2020, see <https://openeo.org/>) demonstrated that large-scale EO data processing needs can be expressed as a common set of analytic operators which are implemented in many GIS software or image analysis software products. The openEO Platform service implements the API into an operational, federated service currently running at back-ends at EODC and VITO with access to SentinelHub data to meet processing needs of a wide user community.

openEO Platform (<https://openeo.cloud/>) enables users to access a large collection of open EO data and perform scientific computations with intuitive client libraries simplifying underlying complexity. The platform is currently under construction with a strong focus on user co-creation and input from various disciplines incorporating a range of use-cases and a free-of-charge Early Adopter program that allows users to test the platform and to directly communicate with its developers. The use cases include CARD4L compliant ARD data creation with user defined parameterisation, forest dynamics mapping including time series fitting and prediction functionalities, crop type mapping including EO feature engineering supporting machine learning based crop mapping and forest canopy mapping supporting regression based fraction cover mapping.

The interaction with the platform includes multiple programming interfaces (R, Python, JavaScript) and a browser-based management console and model builder which allows a direct, interactive display and modification of processing workflows. The resulting processing graph is then forwarded via the openEO API to the federated back-ends.

In the future users will be able to process continental-scale EO data and create ready-to-use environmental monitoring services with analysis-ready data (ARD) and predefined available

processes. This presentation will provide an overview of the current capabilities and the evolution roadmap of openEO Platform. It will demonstrate the utility of the platform to process large amounts of EO data into meaningful information products, supporting environmental monitoring, scientific research and political decision-makers.