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EODC Service Offering

Christoph Reimer & the EODC team
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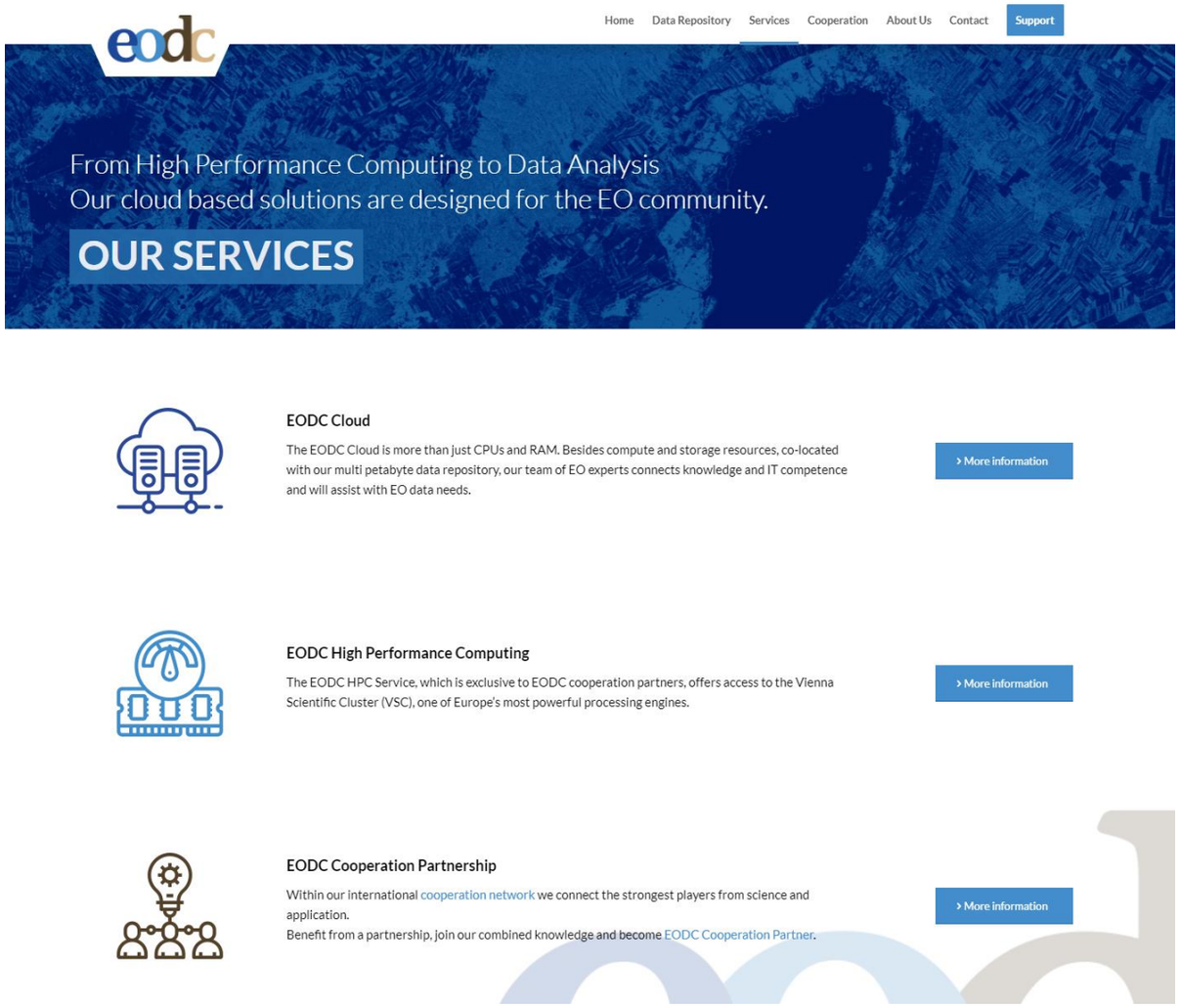
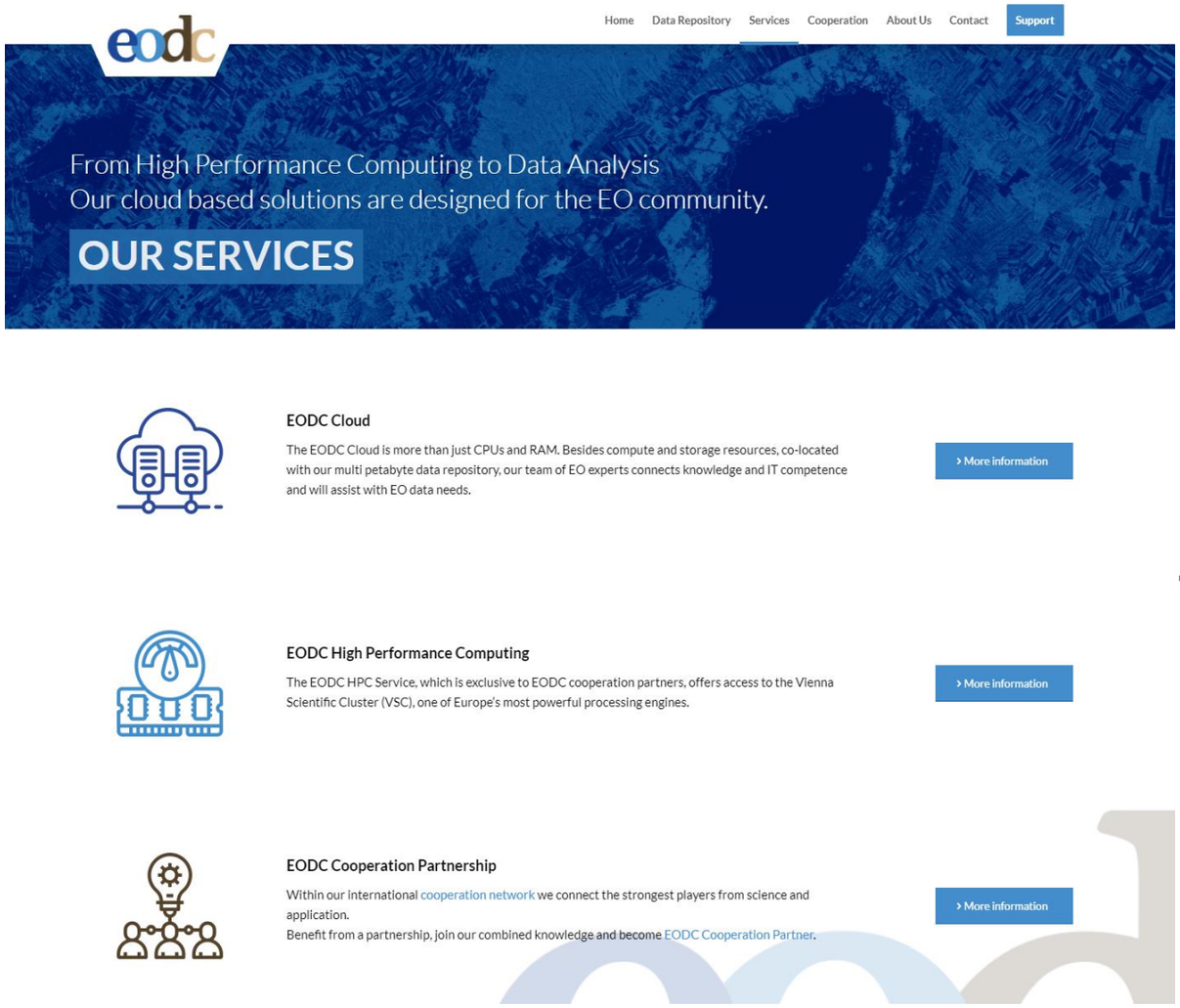
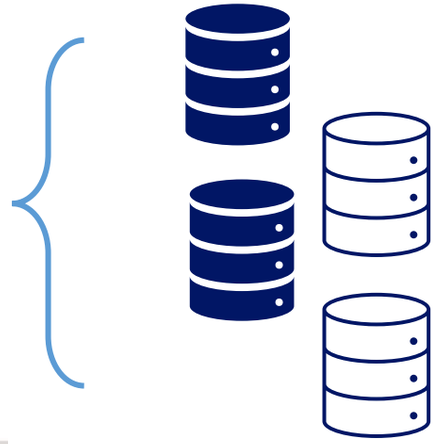
https://eodc.eu/services/



https://eodc.eu/services/





EO Data

Copernicus Sentinel Data

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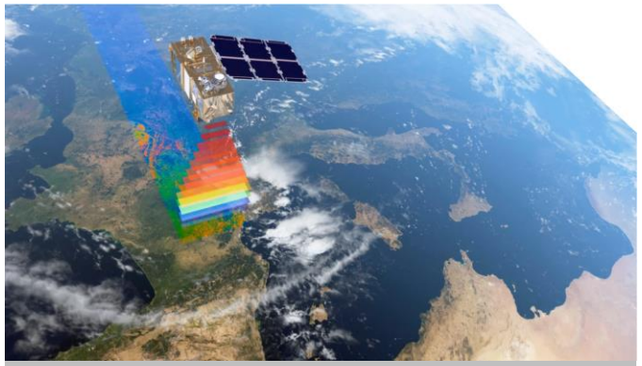
Sentinel-1 A/B GRDH IW/EW
Sentinel-1 A/B SLC IW [on demand]



Sentinel-2 A/B MSI L1C

Sentinel-3 A/B OLCI EFR/ERR

71.1 %

28.5 %

0.4 %

Copernicus Data KPIs

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14.1 K
products per day

7.53 TB
per day

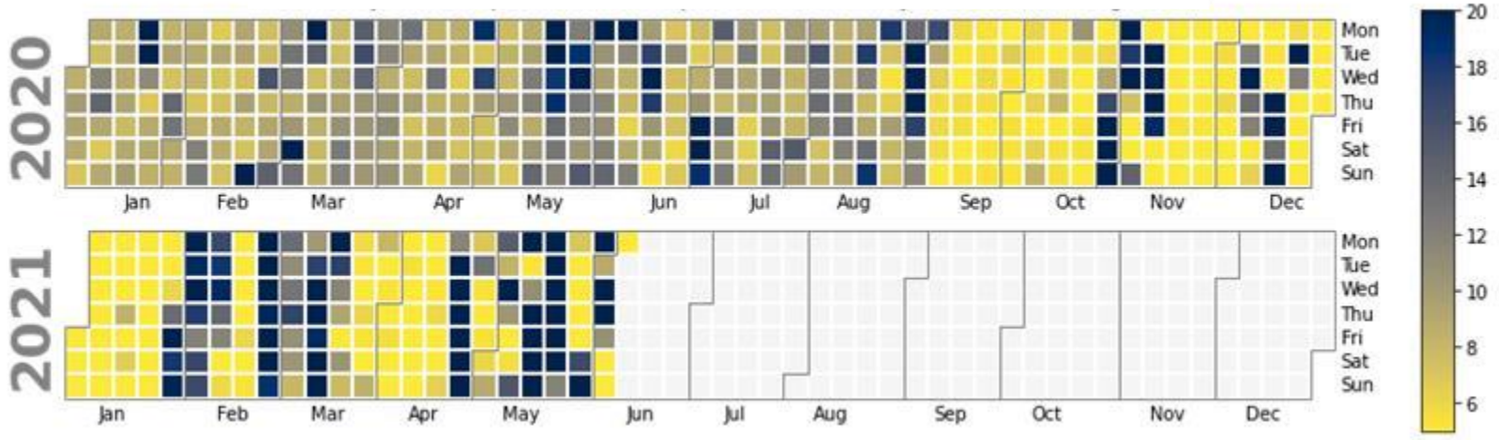
99.9 %
completeness last year

16.2 Mil
products total

9.23 PB
total size

94.3 %
completeness overall

Product Timeliness



13 h on average

- Main events affecting the timeliness (2021)
  - 2021-02-07 [Hubs]: Reduced Copernicus Sentinel-1 production rate
  - 2021-03-19 [Hubs]: Temporary unavailability of Copernicus Sentinel-2 production due to a ground segment anomaly
  - 2021-04-18 [Hub]: Temporary unavailability of Copernicus Sentinel-2 production due to multiple contingencies that occurred at ground segment level
  - 2021-02-23 [EODC]: Change of Sentinel-1 NRT-3h and Fast-24h products
  - 2021-04-20 [EODC]: Issues with Sentinel-2 Data Provision due to unexpected changes to the Sentinel-2 ZIP package format
  - 2021-05-05 [EODC]: EODC Cloud and Storage Maintenance and resulting unavailability of EO Data Storage

Copernicus Data Migration Policy

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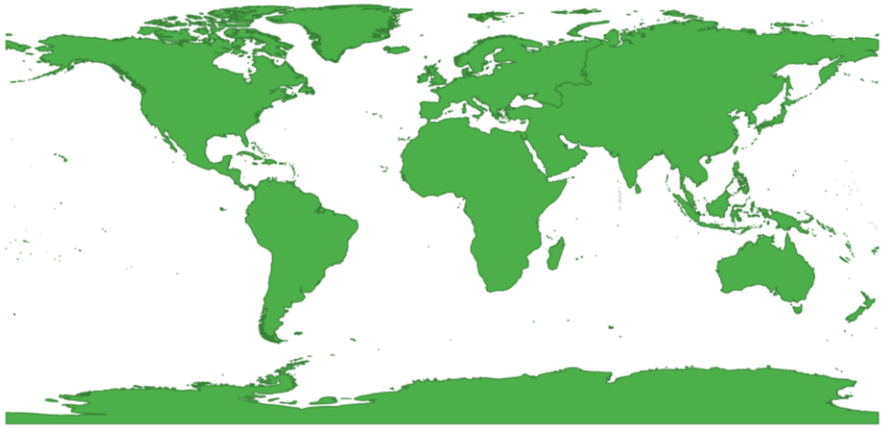
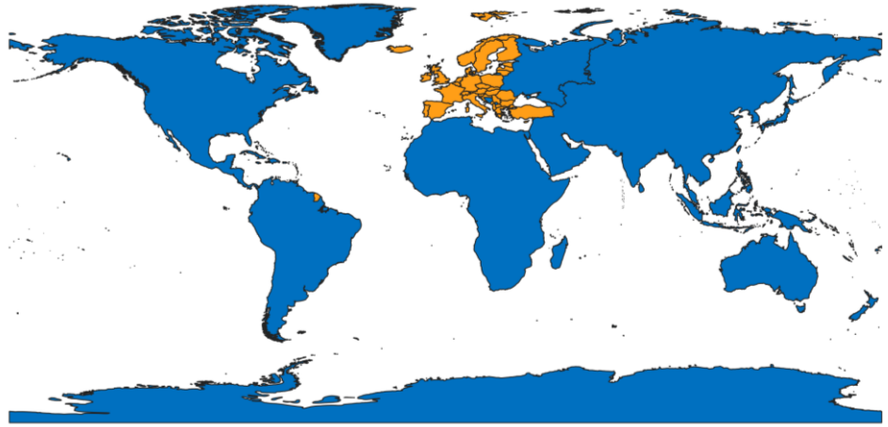
Sentinel-1 Last 12 month



Sentinel-2 Last 12 month Last 3 month



Sentinel-3

Last 3 month

ESA EO Missions DHR

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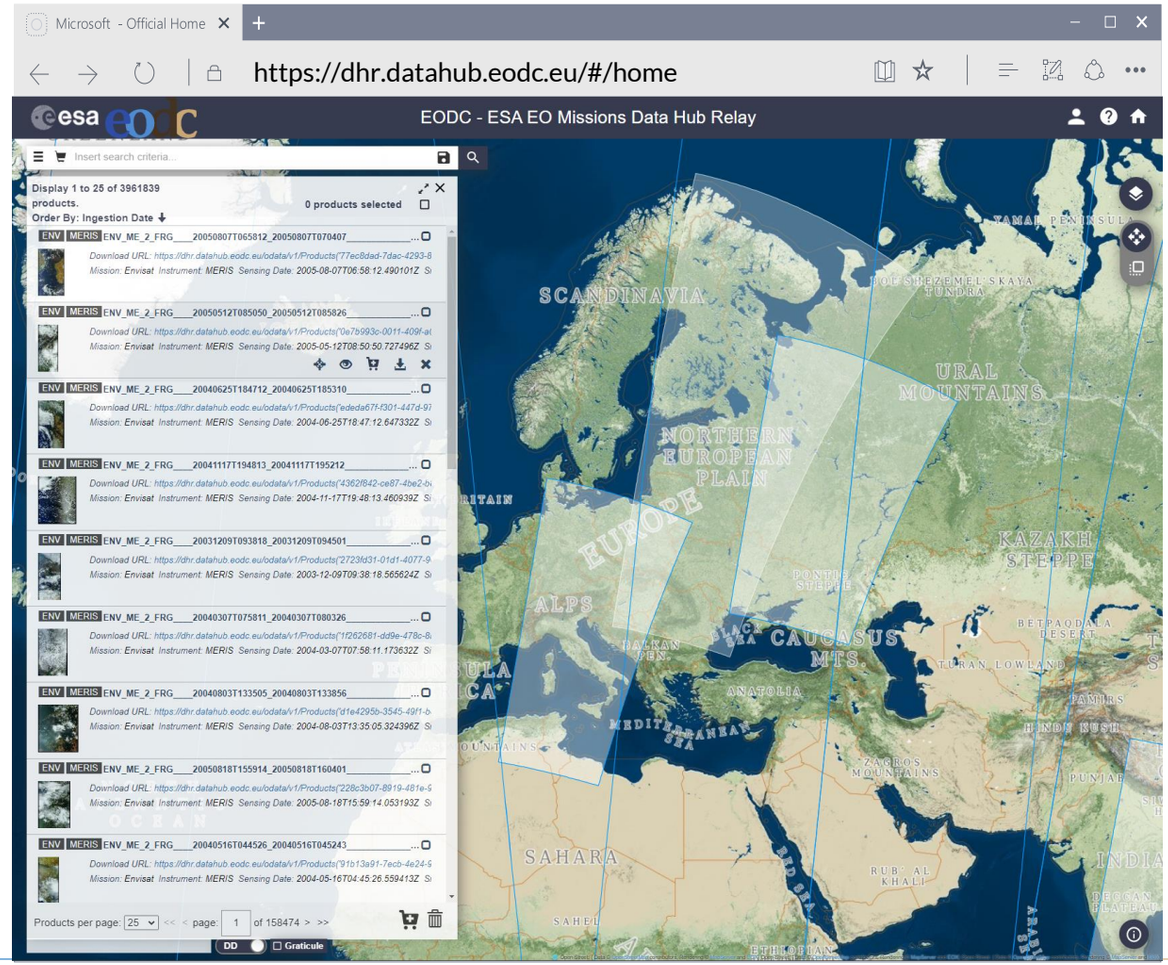
- Data Hub Relay operated by EODC
- Focus on ESA Earth Explorer and other ESA Mission
- Based on Data Hub System (DHuS)
- Same data access interfaces as for Copernicus data
  - ODATA (RESTful API)
  - OpenSearch



DHR data repository

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ADM-Aeolus

Dedicated to measure wind profiles

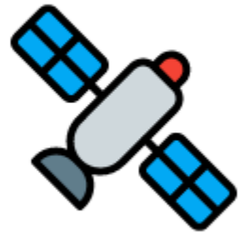
CryoSat

Observing sea-ice and ice sheets from space

Envisat

Continuous observation of the Earth

ERS



Continuous observation of the Earth

LIVE Missions

- Level-1B HLOS
- Level-2B Rayleigh/Mie wind product

- Level-2 Ice Products [4]
- Level-2 Ocean Products [4]
- Level-2 Ice Fast Delivery NRT [production ended 02/2021]

- Level-2 AATSR LST
- Level-1 ASAR in 3 modes
- Level-2 MERIS in 2 res.
- Level-2 RA products

- Level-2 ASPS20 in 2 res.
- Level-2 RA products
- Level-2 ATSR LST in 2 modes
- Level-1 ATSR

https://datahub.eodc.eu/

Data Hosting – GNSS RO

Wegener Center Data Record

GNSS Radio Occultation Record OPS 5.6 2001–2018

Description

The Wegener Center (WEGC) Global Navigation Satellite System (GNSS) radio occultation (RO) record version OPS 5.6 provides globally distributed upper-air satellite data of high quality from multiple RO satellite missions, usable for climate and other high-accuracy applications.

GNSS RO, where we provide data obtained with the Global Positioning System (GPS), is an active limb sounding satellite technique observing thermodynamic atmospheric variables since 2001. Its properties include high vertical resolution and accuracy, global coverage, long-term stability, and particularly high quality within the upper troposphere and lower stratosphere.

This record comprises individual retrieved profiles for the variables listed below.

Missions

CHAMP, C/NOFS, FORMOSAT-3 COSMIC, GRACE, MetOp, SAC-C

Variables

Bending angle, Refractivity, Temperature, Pressure, Density, Specific humidity, Geopotential height

https://doi.org/10.25364/WEGC/OPS5.6:2019.1

- Data produced by cooperation partner Wegener Center at Uni Graz
- EODC acting as data host
  - Data management
  - Backup and Archiving
  - Data Access

sftp://public:nopassword@wegc.eodchosting.eu/DOIs/WEGC_OPS5.6-2019.1

Data Hosting – ECMWF ERA-5

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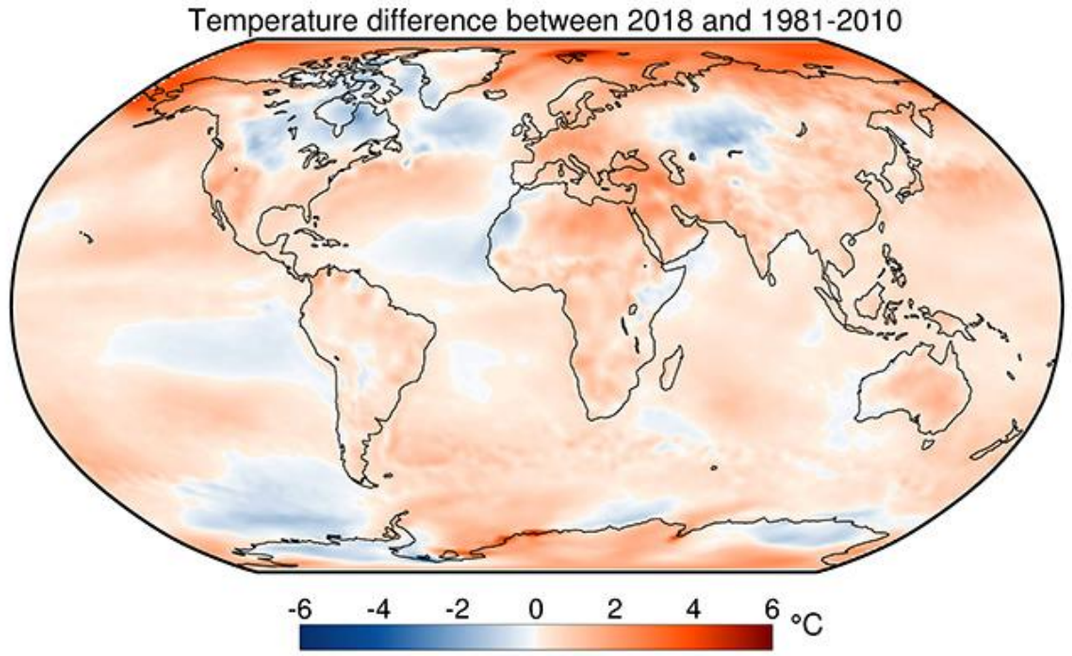
- Hosting of ERA5 re-analysis datasets to support research activities in respect to Climate Change
- Data acquisition and management on behalf of the GEOCLIM project consortium
- Access via EODC Cloud / HPC service



EODC as data producer

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- Together with EODC cooperation partners through funded projects
- Partners bring expertise in product retrieval via algorithms
- EODC enables access to compute and storage infrastructure (EODC service offering)
- EODC implements the data production chain based on inputs of the partners
- EODC operates, maintains data production chain (data management, monitoring, backups) and provides data dissemination channels
- 3 operational data production services for Copernicus
  - Global Land Service
  - Climate Change Service
  - Global Flood Monitoring

presentations on Day 2 - Block 1

Analysis Ready Data and Data Cubes

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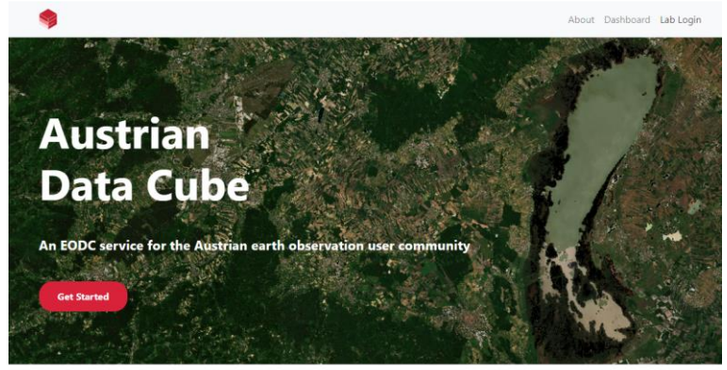
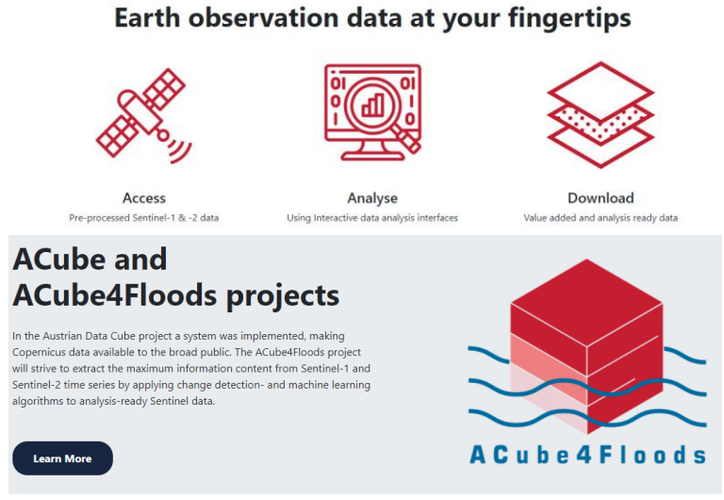
- What is Analysis Ready Data?
- Common steps to produce ARD
  - Search, download and manage data
  - Resampling of data to a common grid
  - Apply corrections/conversions and data masking
  - Radiometric calibration ('co-registration')
  - Metadata creation [common and per pixel]
- Why do we think ARD is important?
  - Enable non-EO experts to work with the data
  - Foster data interoperability to increase information density (more applications)
- Data Cube concept to represent ARD

EODC Data Cube Activities

- Initial FFG funded project “ACube”
  - ARD data over Austria provided by partners BOKU and TUW GEO
  - 2 Sentinel-1 and 12 Sentinel-2 collections over Austria [Equi7Grid]
  - Based on OPEN DATA CUBE https://www.opendatacube.org/
  - Data access via ODC Python API in hosted JupyterLabs
- Support follow-up project “ACube4Floods”
  - Change detection and machine learning on ARD
  - Combine ARD with weather and mobile movement data





openEO API

Details and Demos on Day 3

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- Standardised REST API to enable data access and processing across multiple EO data infrastructure providers
- Started as Horizon 2020 research project, now in development to an ESA funded operational service “openEO Platform”
  - API implementation based on Data Cube concept “multidimensional arrays”
  - Serverless computing paradigm, remote execution without the need to provision resources
  - Run your workflow on multiple backends (infrastructure providers)
- EODC openEO Backend [*https://openeo.eodc.eu/*]
  - Transition to incorporate ARD via bindings to Open Data Cube Python API
  - Enable HPC processing via openEO API

OPEN DATA CUBE
DASK xarray

ARD strategy at EODC

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- Move away from file-based data access to cube based data access (spatial and temporal dimensions)
- How we are doing that?
  - Build on Open Data Cube ecosystem
  - Integration of further data cubes to the already existing ones
  - Increase compute cluster resources available for data cube operations
  - Enhance interoperability with openEO API and the openEO Platform
- Make ARD more visible and accessible by utilising STAC and the STAC API
- Support multiple interfaces to interact with the data
  - openEO API, Python API [JupyterLab], pre-defined dashboards, WMTS/XYZ, etc.

Sentinel-1 ARD Collections

- Joint initiative with partner TUW GEO
  - Generation of Sentinel-1 ARD data with regular collections updates (< 24h)
- Global ARD Collections for
  - Sentinel-1 Monthly Aggregated Composites at 10m
  - Sentinel-1 orbit-averaged Projected Local Incidence Angle (PLIA) at 10m and 20m
  - Sentinel-1 SIG0 at 20m
- Enable access via openEO API and ODC Python API

presentation Day 1 - Block 2

Roadmap

- Improve timeliness and QC of Copernicus Sentinel data stream
- Enhance or maintain operations of the Copernicus data production services
- Further evolve the provisioning of additional ARD as data cubes
  - Collections from EODC partners, Copernicus Climate Data Store, EUMETSAT HDA, Sentinel-2, etc.
- Contribute to the development of the openEO Platform

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Question / Comments

info@eodc.eu

Break-out session in the evening (Comments and Discussion)
[16:40 – 17:00]