Standardized Access and Processing of Earth Observation Data within a Regional Data Middleware

- Welcome to my presentation -

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Regional middleware for satellite time-series data

A brokering software developed in Python harmonizes the discovery and access to different data providers.

Data discovery handling

Satellite time-series data discovery & access broker

Data access handling

WMS / WFS / WCS

Sinergise
Sentinel Hub

- Landsat 5-8 (ESA)
- Sentinel 1-3

API

USGS Earth Explorer

- Landsat 1-8 (USGS)
- Sentinel-2

OpenSearch

ESA Open Data Hub

- Sentinel 1-3
Regional middleware for satellite time-series data

- Data discovery service
- Local data storage
- Data extraction service
- Data analysis tools

Regional data middleware

Data discovery handling

Data access handling

Satellite time-series data discovery & access broker

- WMS / WFS / WCS
- API
- OpenSearch

Sinergise Sentinel Hub
- Landsat 5-8 (ESA)
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USGS Earth Explorer
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ESA Open Data Hub
- Sentinel 1-3
Satellite data discovery & visualization

Using the satellite data discovery broker we can provide different applications for our users, such as…
Interactive overview charts to display what kind of data is available when.
Interactive data visualizations supported by quick looks and WMS services from Sentinel-Hub. Satellite scenes can be directly added to the map showing different kinds of derived products (true color, false color, NDVI). Satellite data discovery & visualization.
Satellite time-series data access

Users always need to access different data providers…

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<th>Amazon Web Services</th>
<th>Sinergise Sentinel Hub</th>
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…but even when data have been downloaded, expert knowledge is often needed to prepare data for analysis.
Satellite time-series data access

- There are several issues to be considered
  - Different data formats (GeoTIFF, JPEG2000, HDF, …)
  - Different file naming conventions
  - Different access services (on order, scene download, WCS)

- If we want to bring the algorithms to data, we need to define standardized data input formats for (spatial) time-series data!

- Solution: Data access broker need to harmonize structure of files
Web-based satellite data analysis tools

Web-based analysis tools allow for direct access to algorithms and data. Therefore both need to be coordinated.

Example usage of phenological modeling based on Timesat software and MODIS time-series data.

Results can be directly visualized in the web application.

Users do not need to process any data, but access all files processed.
Standardized web services

Using OGC Web Processing Services for individual data discovery, access, and analysis.

Example: Sentinel-1 ESA Data Hub – Overlapping areas

WPS Execute request:

```
http://artemis.geogr.uni-jena.de/cgi-bin/testbox.cgi?service=WPS&version=1.0.0&request=Execute&identifier=s1_datahub_test&datainputs=[wkt=POLYGON((13.59 55.79, 14.72 55.84, 14.10 58.48, 13.00 58.43, 13.59 55.79));product=GRD; minoverlap=70]&status=true&storeExecuteResponse=true
```

User-friendly data discovery output format:

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<th>Title,</th>
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