

The ESA Atmospheric Validation Data Centre (EVDC): Applications for EarthCARE

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EVDC PLATFORM ARCHITECTURE

01 Cal/Val Search

287k correlative EarthCARE files ·
1300 GEOMS-formatted files ·
simplified discovery

02 File Viewer

Preview Cal/Val files · plot variables ·
NetCDF, HDF5, Legacy HDF

03 Collocation DB

EarthCARE ↔ Cal/Val · pre-collocated
pairs database

04 Workflows

Visual processing workflow builder ·
Jupyter support · run & scale up on
HPC

05 Underflights

Campaign tracks & overpass
coordination

06 OPOT

Orbit prediction & overpasses

EARTHCARE CAL/VAL & SCIENCE USE CASES

1 Cal/Val Search (simplified)

Quick Search Cal/Val Data

Search across filenames, variables, campaigns, locations, disciplines and investigators. Need more filters? Use the advanced search.

e.g. O3, lauder, NDACC, lidar, sonde ...

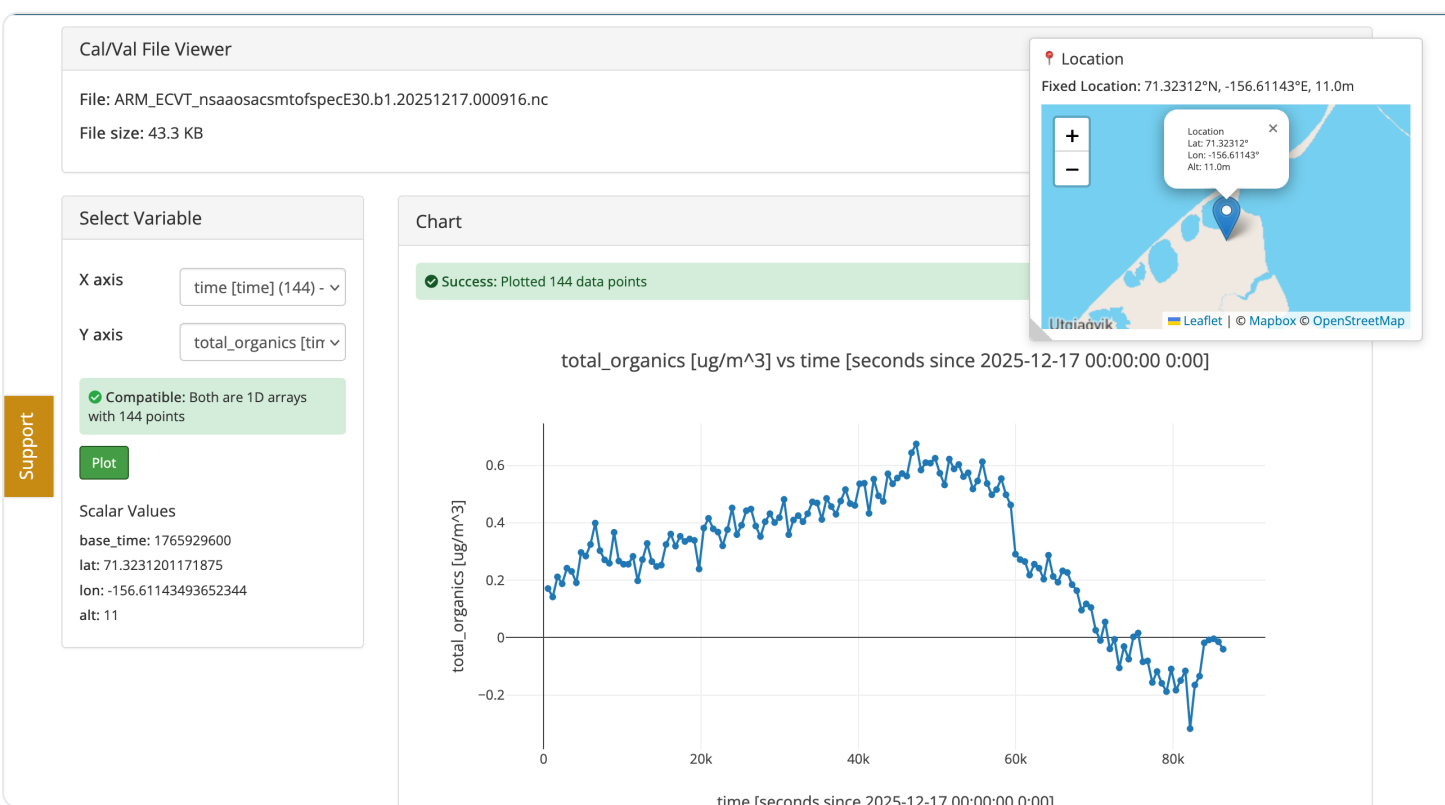
Search

Filters

Text-based discovery

- Cal/Val file discovery has been simplified — **find data in 2–3 clicks**
- Filter by measured variable, station, date range, network, geolocation, or PI
- 286k+ files** across EARLINET, NDACC, ARM, BSRN, CloudNet, TOLNet, MPLNet, AERONET
- 1,300+** EarthCARE-dedicated GEOMS files with 15 new templates (lidar, radar, radiometer, OAP)
- Programmatic access via REST API
- Advanced search still available

2 File Viewer: explore & plot measurements



Select file → plot variables → inspect metadata

- Plot any variable directly in the browser** — no download or local software required
- Quick-look profiles, time series, curtains
- Shows station location on a map, plus scalar metadata
- Visual QC before bulk data retrieval
- Supports GEOMS HDF4 / HDF5 / netCDF formats
- Direct download of the plotted file
- Standalone mode for previewing files from a local machine

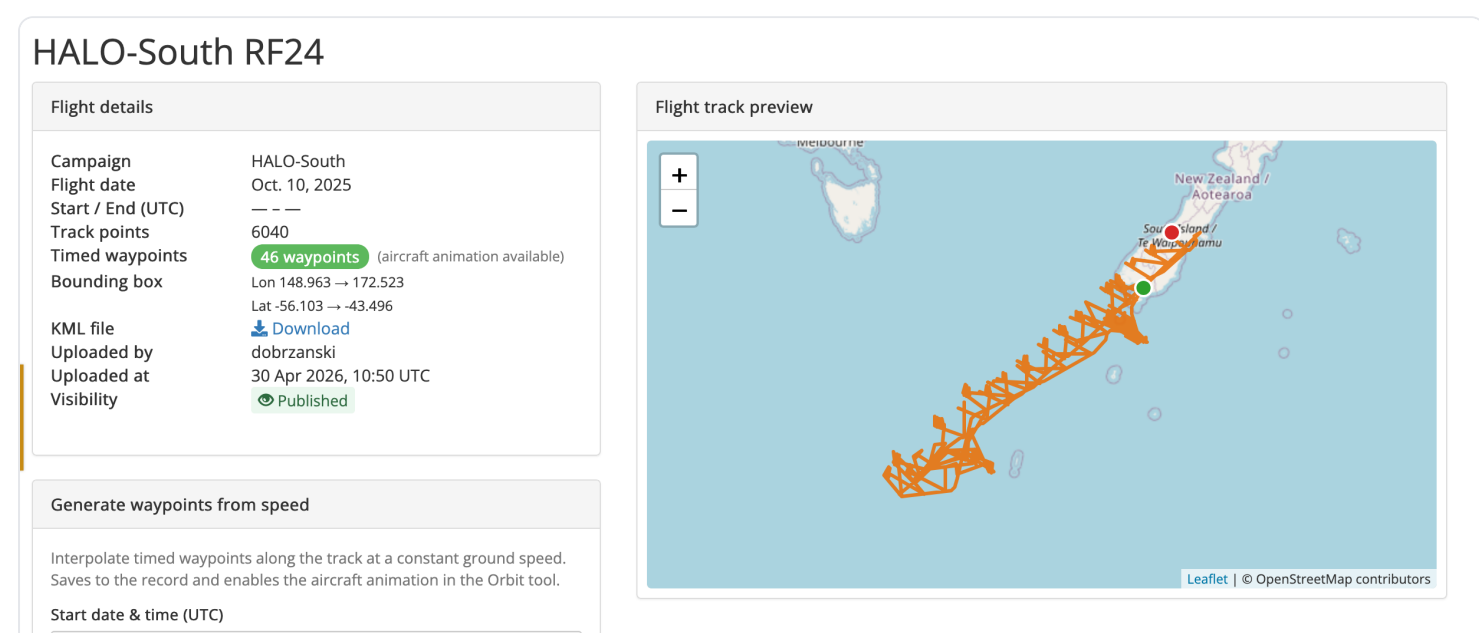
3 Collocations: match EarthCARE to ground data

Created: 2026-02-09 18:08 Last Updated: 2026-02-09 18:08	Total Collocations: 2 Search Parameters: Refresh Download View Delete					
Back to My Collections Import All Files Delete This Collection						
FileNames	Product Mapping	Spatial Distance	Max Time Difference	Saved	Ingested	Actions
ICA_EBRICATL_BRO_2A_202512171250262_202512171249582_090 508 ICA_EBRICATL_BRO_2A_202512171250262_202512171249582_090 508 ICA_EBRICATL_BRO_2A_202512171250262_202512171249582_090 508 ICA_EBRICATL_BRO_2A_202512171250262_202512171249582_090 508	EarthCARE ATLID - CLOUDNET ARMARLINET Lidars & Ceilometers	118.3 km	1h 55m	2026-02-09 18:08	2026-02-09 18:08	View Download Delete
ICA_EBRICATL_BRO_2A_202512171250262_202512171249582_090 508 ICA_EBRICATL_BRO_2A_202512171250262_202512171249582_090 508 ICA_EBRICATL_BRO_2A_202512171250262_202512171249582_090 508 ICA_EBRICATL_BRO_2A_202512171250262_202512171249582_090 508	EarthCARE ATLID - CLOUDNET ARMARLINET Lidars & Ceilometers	143.3 km	41m	2026-02-09 18:08	2026-02-09 18:08	View Download Delete

Collocation DB → paired files → further filtering

- Pre-computed pairs:** EarthCARE products matched to correlative measurements
- Parameter mappings
- Download both files together, then run a comparison workflow (regrid to a common grid, compute bias)
- Batch execution over full collocation sets

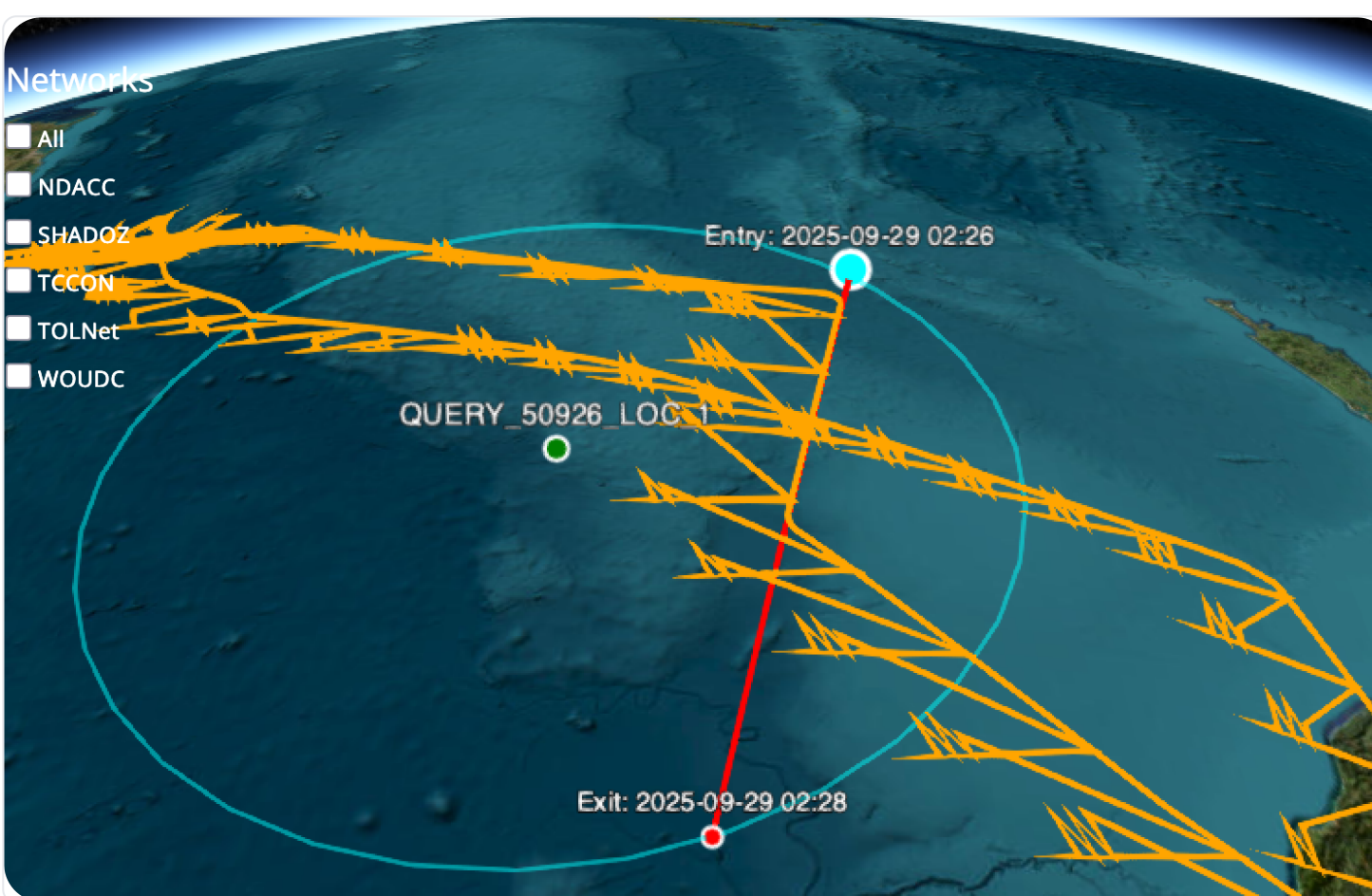
5 Campaign Manager: underflight coordination



Upload flight track → animate → match to overpass

- Upload KML/KMZ aircraft tracks per campaign (HALO-South, PERCUSION, ARCSIX, ASCCI, CELLO-ARCTIC)
- Visualise track geometry alongside predicted EarthCARE overpasses in OPOT
- Animate aircraft position synced to overpass time
- Associate uploaded data files with each flight
- Share published flights with the campaign team
- Track metadata: waypoints, bbox, flight date
- Generate waypoints

6 OPOT: predict EarthCARE overpasses



Orbit prediction

- When will EarthCARE pass over my station?**
- Define a location, max distance from the ground track, and select instruments (ATL, CPR, MSI, BBR swaths)
- 3D visualisation: predicted tracks with station networks (NDACC, TCCON, TOLNet, SHADOZ, WUOUC)
- Export as KML, CZML (3D animation), or CSV
- Overlay aircraft tracks for underflight planning
- Based on ESA-curated orbit prediction files

DATA STANDARDS, SERVICES & API

GEOMS & Campaign Dataset Support

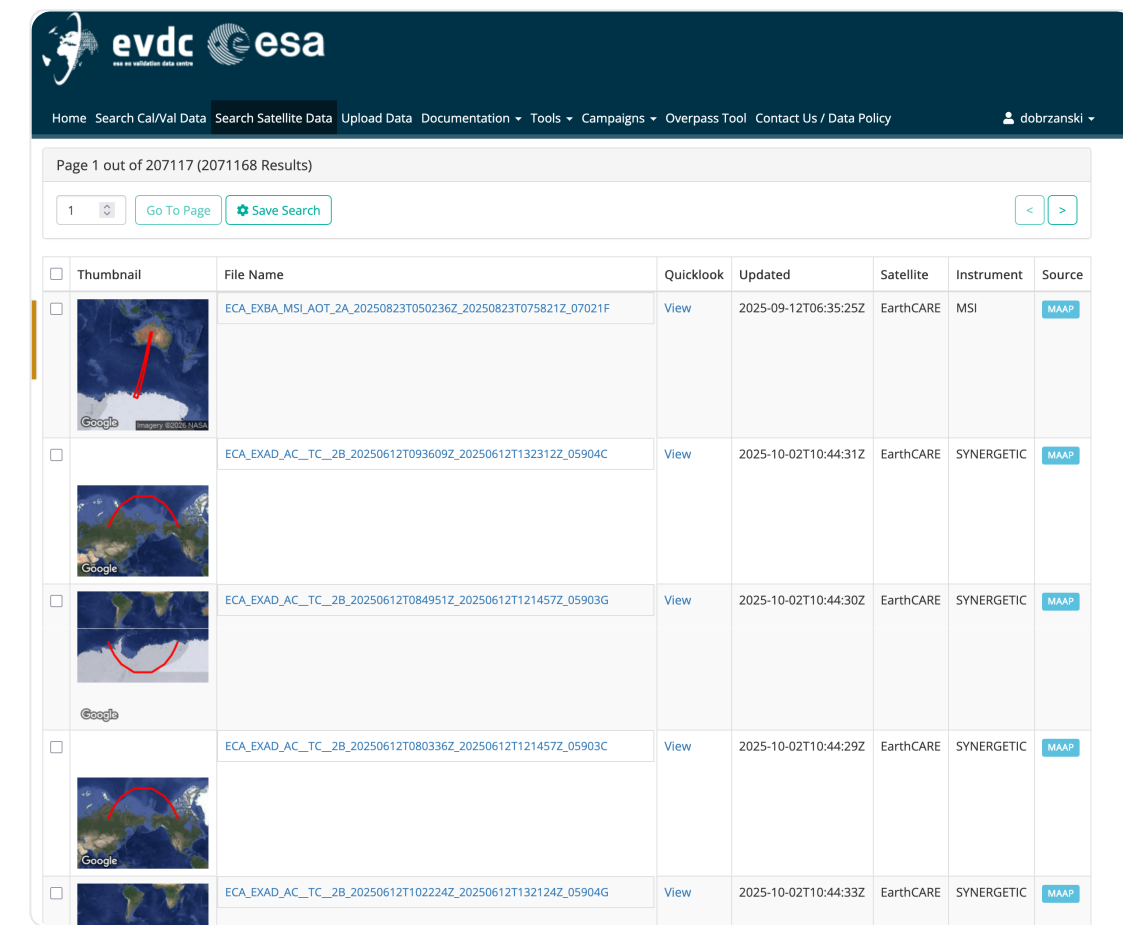
NILU maintains the GEOMS standard for all Cal/Val data:

- 15 new GEOMS templates** for EarthCARE (lidar, radar, radiometer)
- 1,300+ EarthCARE-dedicated GEOMS datasets
- 286,000+ total correlative files across 12 networks
- EARLINET routine GEOMS conversion (in approval)
- Campaign teams: ARCSIX, ECALOT, CELLO, PERCUSION, VERIFY

Access to EVDC data is open to all researchers (signing the EVDC data protocol required).

EarthCARE L1 / L2 Product Access (via MAAP)

- EarthCARE products directly from the **MAAP catalogue**
- Filter by instrument (ATL, CPR, MSI, BBR, SYNERGETIC), product type, processor version
- Timeliness: NRTI / OFFL / RPRO, bbox, date range
- Orbit quicklook thumbnails on an interactive map



Integrated into EVDC — a single platform for both satellite and ground-based data discovery.

DOI Minting Service

DOI minting for datasets related to ESA Cal/Val:

- Self-service DOI tool:** data providers create landing pages and mint DOIs themselves
- EVDC provides long-term hosting for DOI landing pages
- Landing pages integrate with the Cal/Val database to link directly to the data files behind a DOI
- Used by several networks: COCCON, PGN, EarthCARE (e.g. CELLO-ARCTIC underflights dataset)

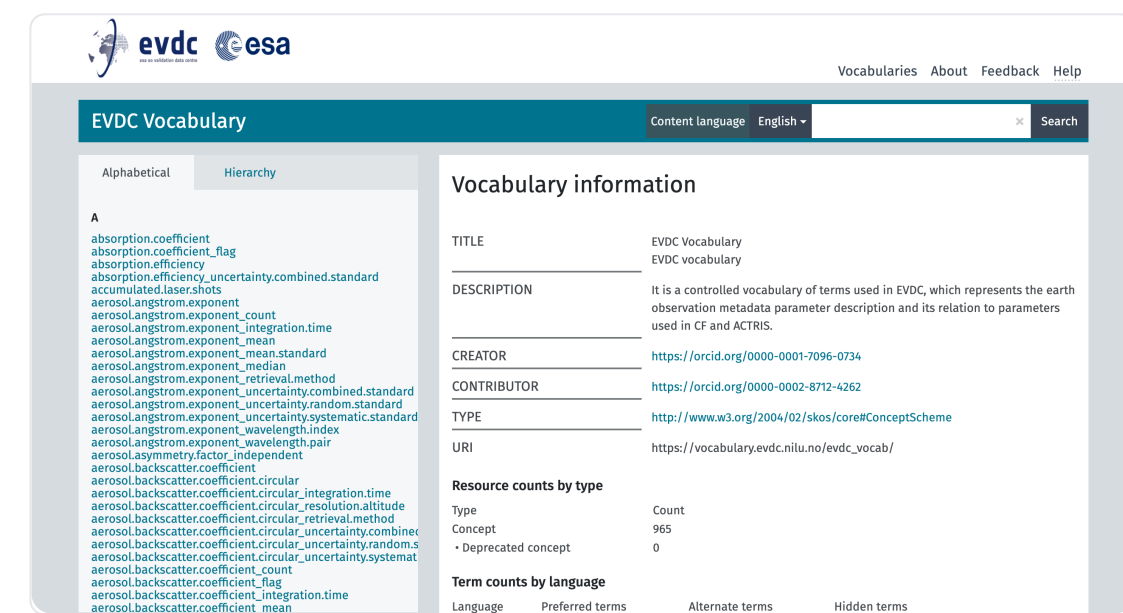
Note: initial contact with the EVDC team is required to use self-service

Enables proper citation in publications and long-term traceability of validation datasets.

Skosmos Vocabulary Server

vocabulary.evdc.nilu.no

- Central vocabulary reflecting all EVDC template variables and concepts
- Standardized terminology for consistent naming of EVDC GEOMS variables
- Machine-readable SKOS format for automated cross-network intercomparison



EVDC REST API — evdc.esa.int/api/v1/docs/

Programmatic access to all services: search, collocations, file download, orbit queries · Open API 3.0 schema · Token authentication

1.5M+
correlative products

1,000+
ground stations

20+
data networks

1300
GEOMS-compliant EarthCARE
correlative products

A COLLABORATION OF
skytek SKYTEK
ICHEC
nilu