



EarthCARE Validation and Workshops

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ESA

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JAXA

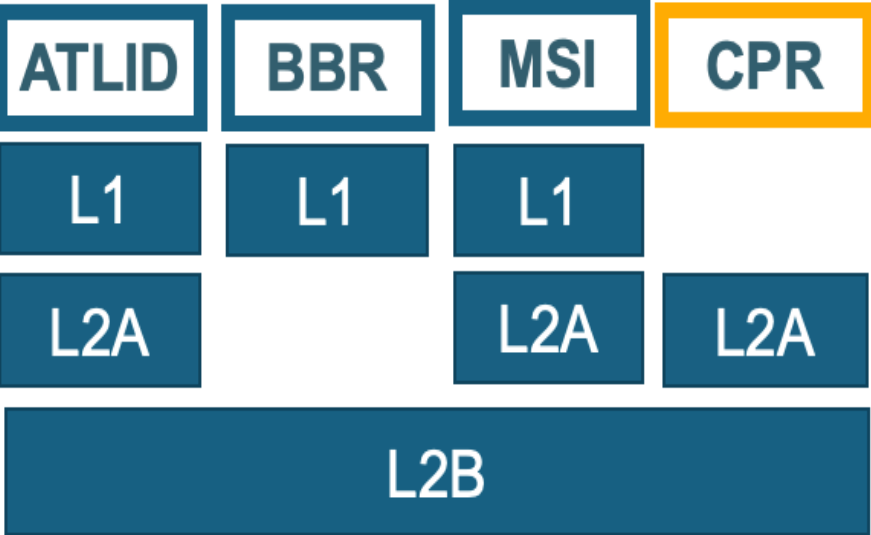
Validation of ESA and JAXA products



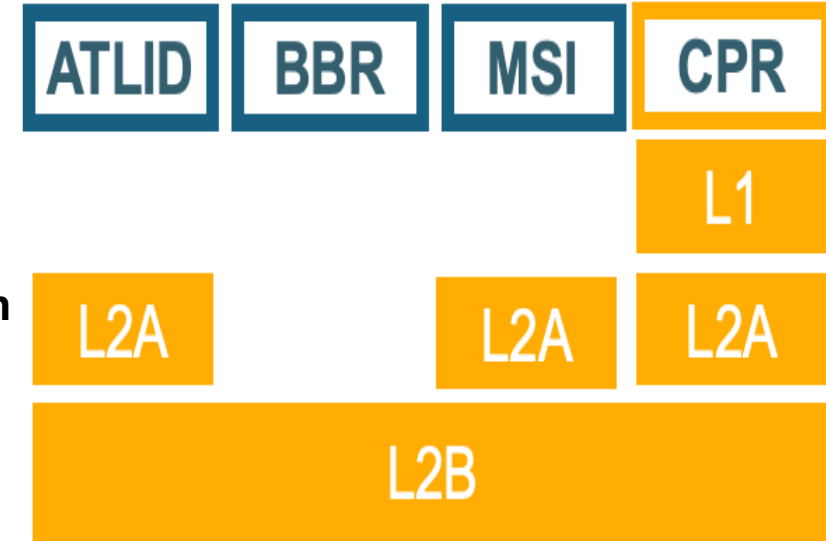
MOU: Validation Responsibilities

ESA products

JAXA products



- **ESA-JAXA Joint Scientific Validation Implementation Plan (2.0)**
- **ESA-JAXA validation coordination**
- **ESA-JAXA Joint Validation Workshops**
- **Interaction between ESA & JAXA algorithm and validation team members**





1st In Orbit Validation

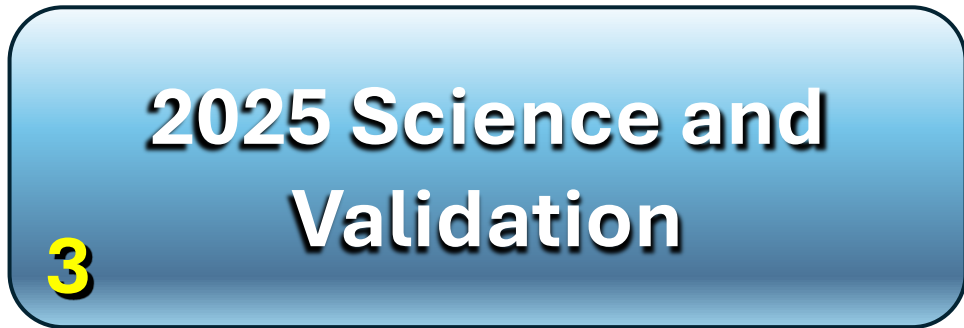
- <https://www.earthcare-validation-2025-1.org/>
- Level 1 and early level 2 validation results
- Public release



2nd In-Orbit Validation

- <https://www.earthcare-validation-2025-2.org/>
- **17-20 March 2025, Frascati, Italy**
- Level 2a and Two-Sensor L2b validation results
- Consolidated level 1 validation results
- Public release of Level 2a and Two Sensor L2b
- **Abstract deadline ~~17 January 2025~~**
- **Registration**

**Delayed to
26 January**



2025 Science and Validation

3

- **1-5 December 2025, Tokyo, Japan**
- Science and Applications
- Validation of all products
- Public Release of three- and four-sensor products

Validation of ESA products



Product validation organisation

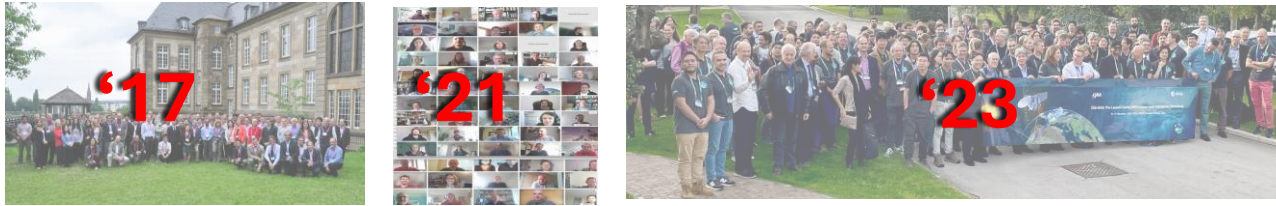
Announcement of Opportunity ->
43(+4) PIs -> Validation Team (ECVT)
>> 300 Co-Investigators

1: Clerbaux, N.	Belgium	RMIB	21: Chandrasekar, V.	USA	Finnish Meteorological Institute
3: Wandinger, U.	Germany	Leibniz Institute for Tropospheric Research TROPOS	22: Nishizawa, T.	Japan	National Institute for Environmental Studies
4: Genthon, C.	France	LMD, Univ. Sorbonne	23: Marinou, E.	Greece	National Observatory of Athens
5: Apituley, A.	Netherlands	KNMI	24: Chepfer, H.	France	UPMC
6: Loeb, N.	USA	NASA Langley Research Center	25: Donovan, D.	Netherlands	KNMI
7: Landulfo, E.	Brazil	IPEN (LALINET)	26: Tanelli, S.	USA	JPL
8: Moisseev, D.	Finland	University of Helsinki	27: Perez-Ramirez D.	Spain	Univ. Granada
9: Renard, J-B.	France	LPC2E-CNRS	28: Markonis, Y.	Czech Republic	Czech Univ. of Life Sciences
10: Delanoe, J.	France	LATMOS	29: Scott, N.	France	LMD, IPSL
11: Liberti, G.L.	Italy	ISAC-CNR	30: Winker, D.	USA	NASA Langley Research Center
12: Müller, D.	UK	Univ. Hertfordshire	31: Qu, Z.	Canada	ECCC
14: Apituley, A.	Netherlands	KNMI	32: Hostetler, C.	USA	NASA Langley Research Center
15: Goloub, P.	France	LOA-CNRS	33: Völger, P.	Sweden	Swedish Institute of Space Physics
16: Devasthale, A.	Sweden	SMHI	34: Kirchengast, G.	Austria	Univ. Graz - Wegener Center
17: Welton, E.	USA	NASA Goddard Space Flight Center	35: Phillips, V.	Sweden	INES, Lund Univ.
18: David, R.O.	Norway	Univ Oslo	36: Sogacheva, L.	Finland	Finnish Meteorological Institute
19: Josset, D.	USA	NRL	37: Mroz, K.	UK	National Centre for Earth Observation
20: Hu, X.	China	National Satellite Meteorological Centre	38: Stebel, K.	Norway	Norwegian Institute for Air Research
			39: Mamouri, R.	Cyprus	Erasthones Centre of Excellence
			40: Mather, J.	USA	Pacific Northwest National Laboratory
			41: Navas, F.	Spain	Universtity of Granada
			42: Cecil, D.	USA	NASA Marshall Space Flight Center
			44: Kazadzis, S.	Switzerland	PMOD World Radiation Data Centre
			46: Protat, A.	Australia	Bureau of Meteorology
			47: Stachlewska, I.	Poland	Univ. Warsaw
			48: Knobelspiesse, K.	USA	NASA Goddard Space Flight Center

ESA validation preparations



Pre-Launch Validation Workshops



Studies, FRMs
Community convergence

Supporting
Pis, Networks

Securing
datasets and
analyses

Pre-Launch
Aircraft
Campaigns

Supporting tools
and facilities

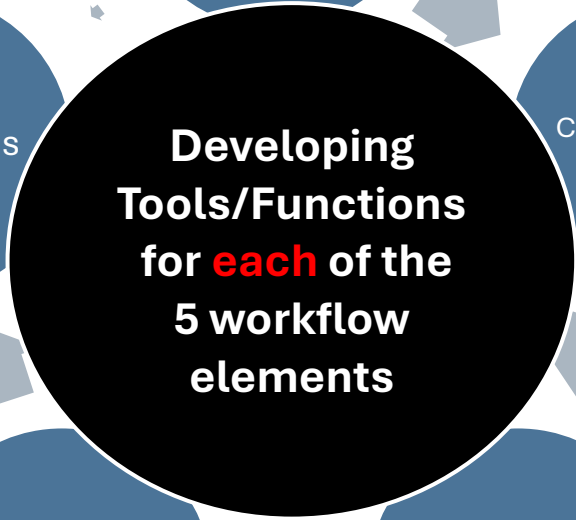
Subgroups,
Portal

Overpass,
ESOV

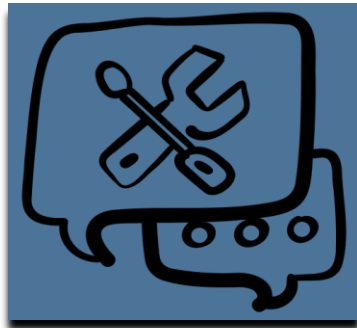
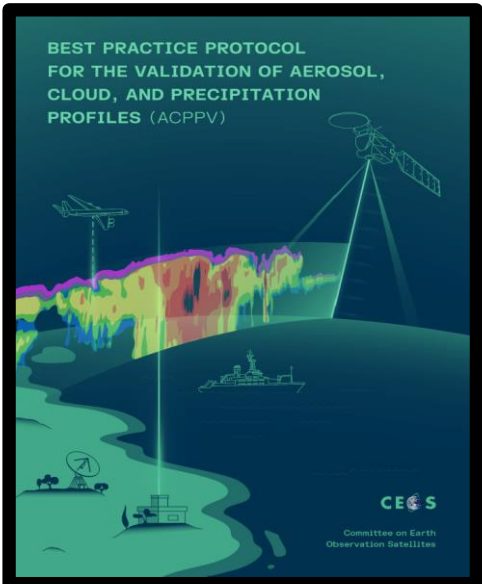
EVDC

ColIDB

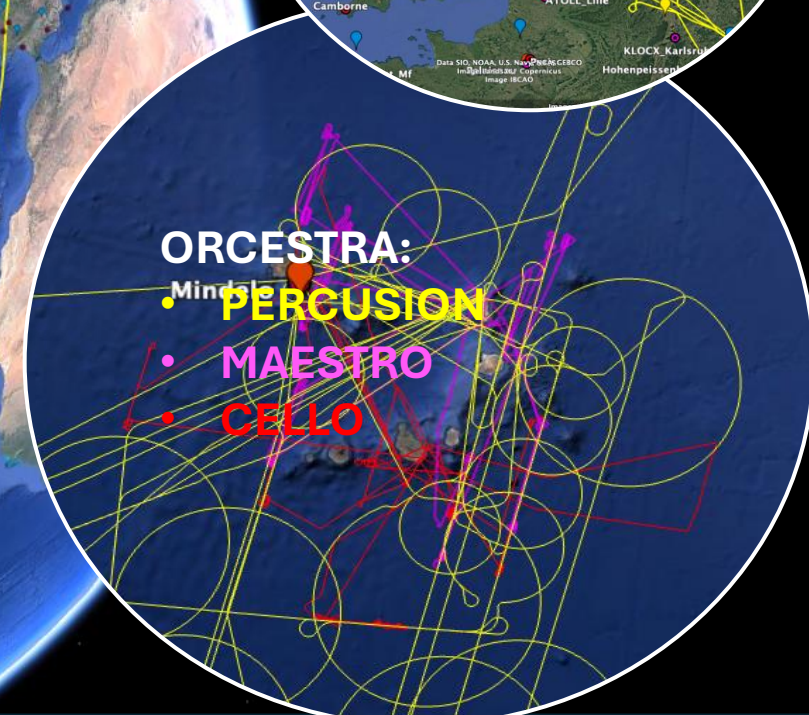
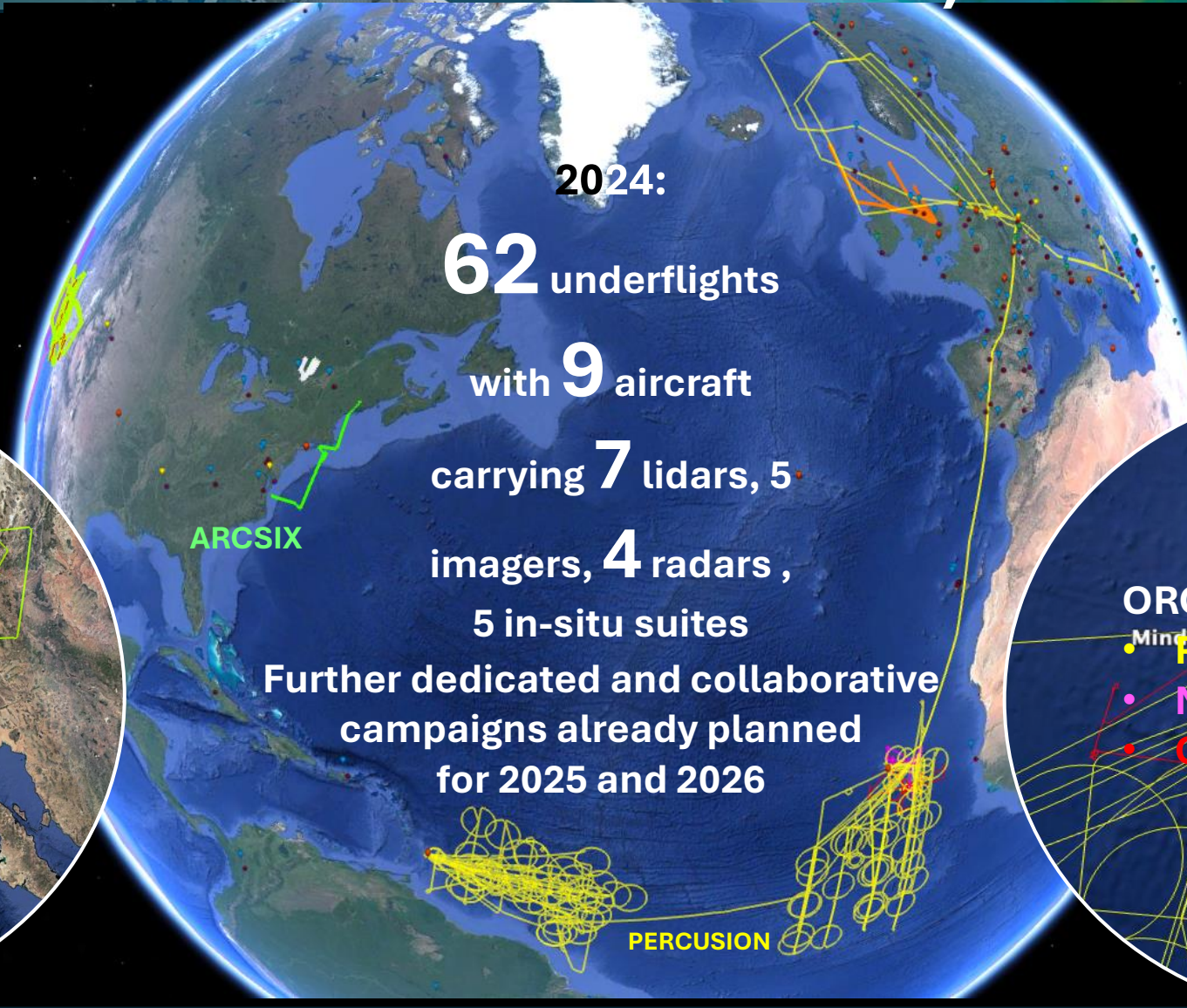
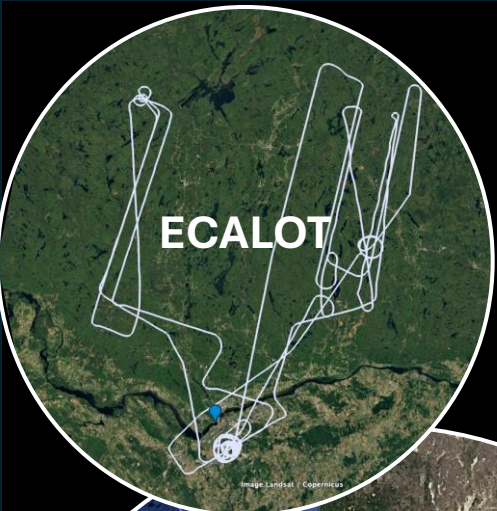
OADS

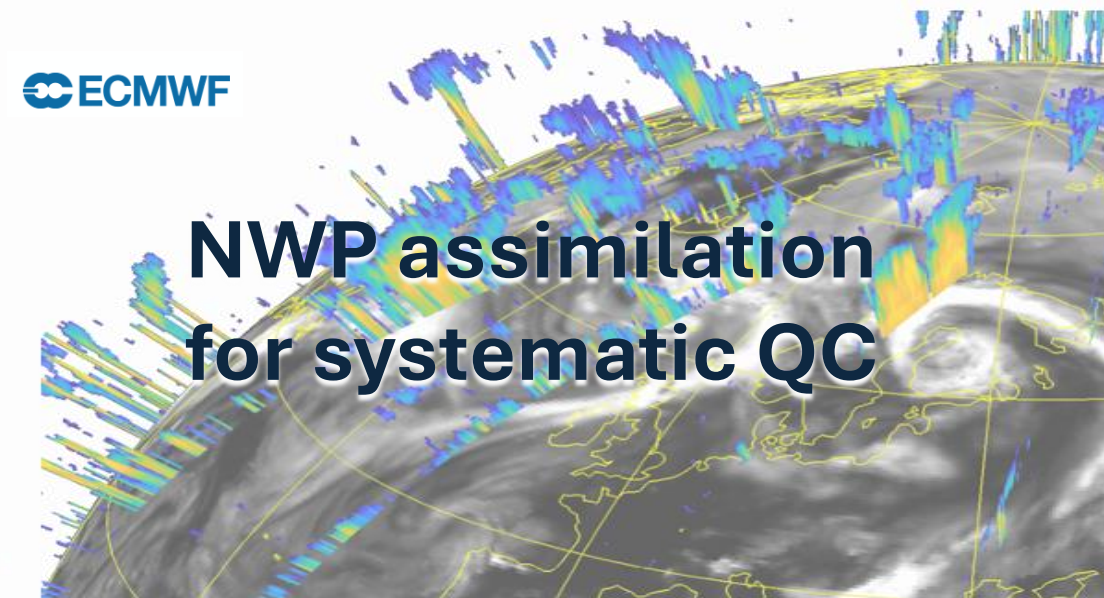
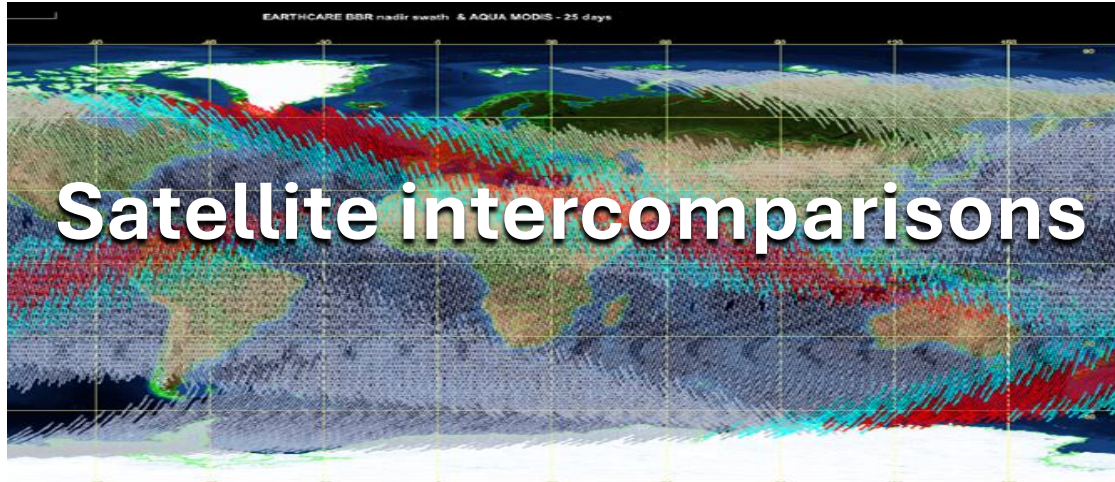


...
AVL
CIS
Sub2Orb: Lid. Rad. Img.

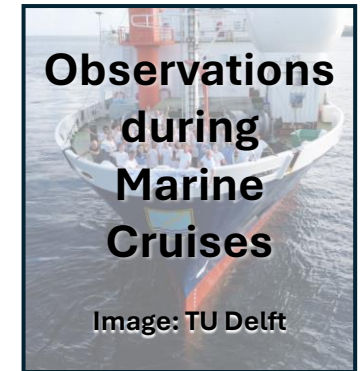
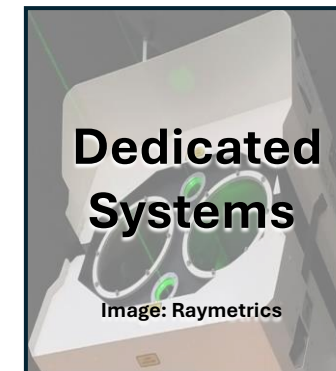
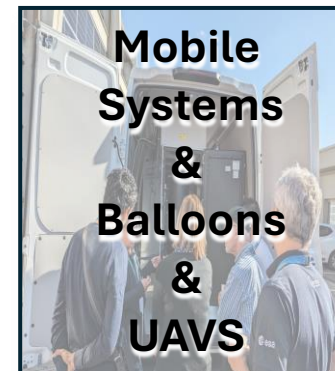


Approach: Intense Airborne campaigns (EarthCARE-dedicated and collaborative)





**ACTRIS /
ATMO- ACCESS
MPLNET
LALINET
E-PROFILE
ADNET
ARM
WegenerNet
Other**





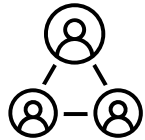
EarthCARE Validation presents unique Challenges



The many teams collaborating on EarthCARE validation have performed an unprecedented validation activity



JAXA Validation Related Activities



JAXA Validation Team

- ✓ Defining validation method and approaches: JAXA validation implementation plan (JAXA VIP)
- ✓ Regular Val. team meetings
- ✓ Maintenance and continuous observation
- ✓ Matchup frequency analysis
- ✓ Conducting actual validation



Collaboration/Coordination



- ✓ ESA-JAXA Validation Implementation Plan
- ✓ Exchange validation-related satellite operation information
- ✓ Validation workshops
- ✓ Mutual use of validation related tools
- International collaborations
 - ✓ Airborne campaign with DLR
 - ✓ Ground-based correlative data exchange with NOAA
 - ✓ Contributing to ACPPV concluding a CEOS document



Web pages/tools development

- ✓ EarthCARE Quick Look (publicly released)
- ✓ EarthCARE Orbit Prediction (publicly released)
- ✓ EarthCARE Orbit Search (publicly released)
- ✓ JAXA EarthCARE Validation portal
- ✓ Validation Data Archive System (VDAS)
- ✓ Validation Matchup Web



Campaigns

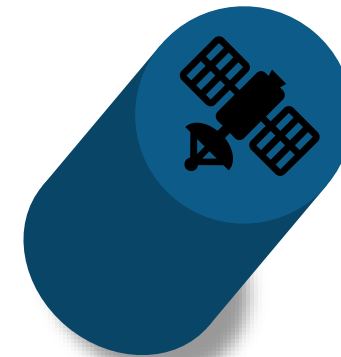
Ground campaign provides multi-sensor detailed evaluations, and airborne campaign provides abundant number of matchup samples in early phase

Networks

Long-term ground observation networks provide detailed validations

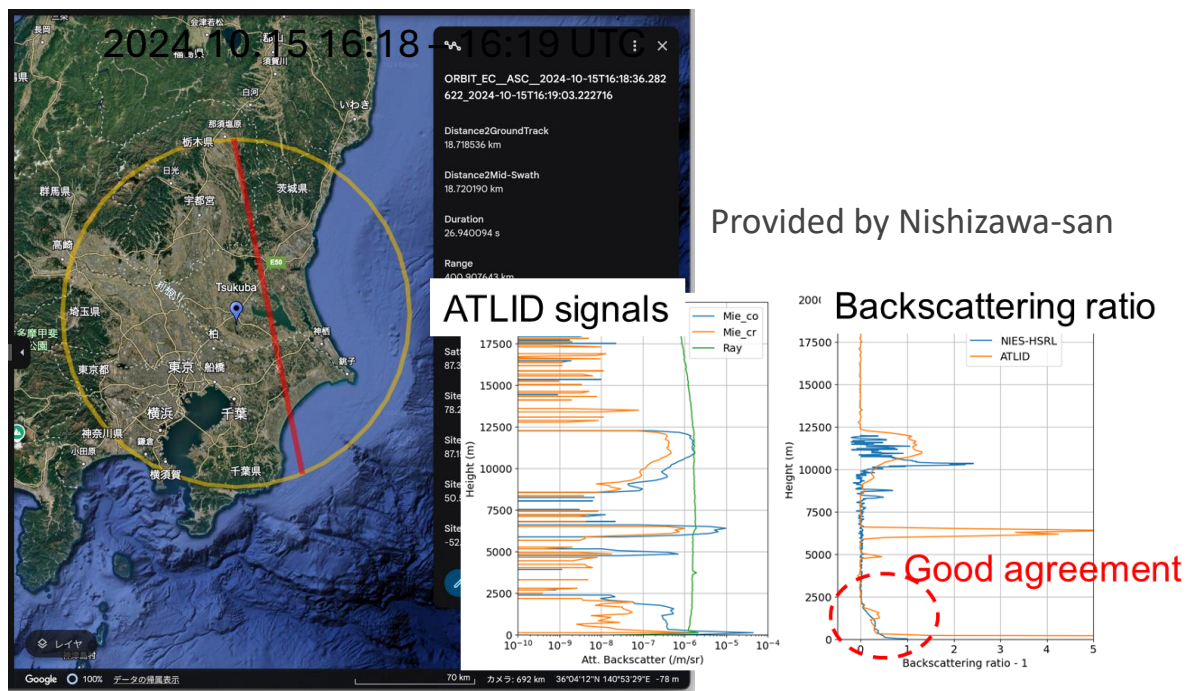
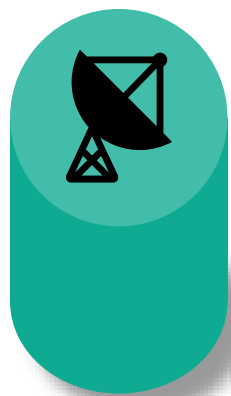
Spaceborne

Satellite sensors provide global evaluations and large amount of matchup samples



AD-Net

Asian dust and aerosol lidar observation network
Main correlative observation

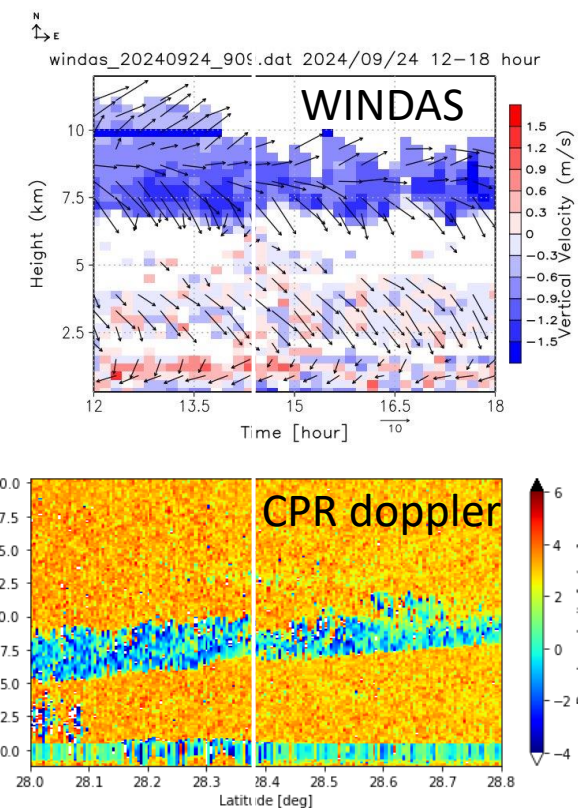


Y. Jin-san/T. Nishizawa-san's talk in ATLID session part 2

Networks: AD-Net, SAVERNET, WINDAS, SKYNET, AERONET,
NIED Ka-band radars, All-sky cameras, BSRN, GEBA

WINDAS

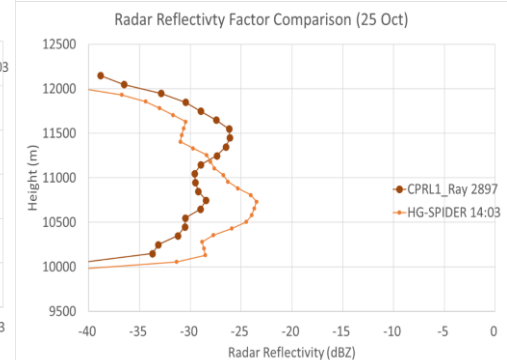
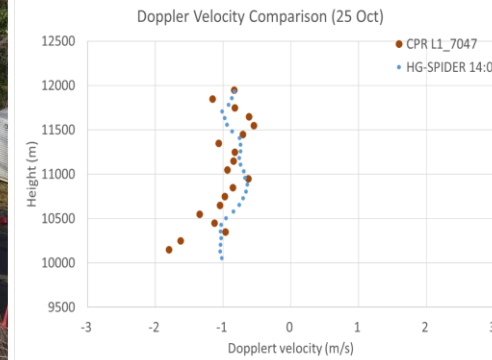
JMA wind profiler network
33 stations around Japan



Y. Ohno-san's talk in CPR session

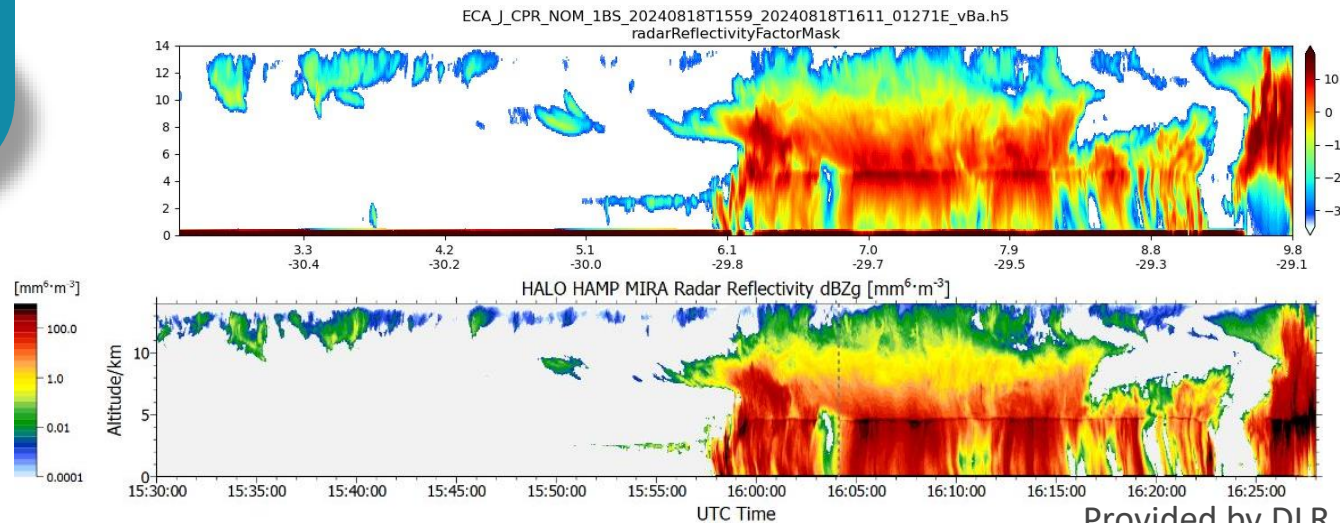
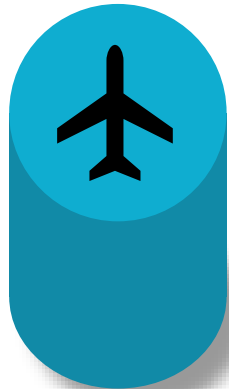
Koganei Validation Super Site

High sensitivity doppler cloud radar and scanning doppler cloud radar, wind profiler, doppler lidars, HSRL, MFMSPL, microwave radiometer, all-sky camera, etc.



Provided by NICT

H. Horie-san's talk in CPR session



Provided by DLR

HALO PERCUSION campaign

Collaboration with DLR. EarthCARE-like airborne campaign PERCUSION was conducted with HALO aircraft (High Altitude and Long Range Research Aircraft)

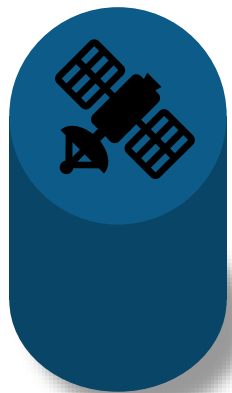
F. Ewald-san's talk in CPR session

S. Gross-san's talk in ATLID session part 1

JAXA Validation Approach



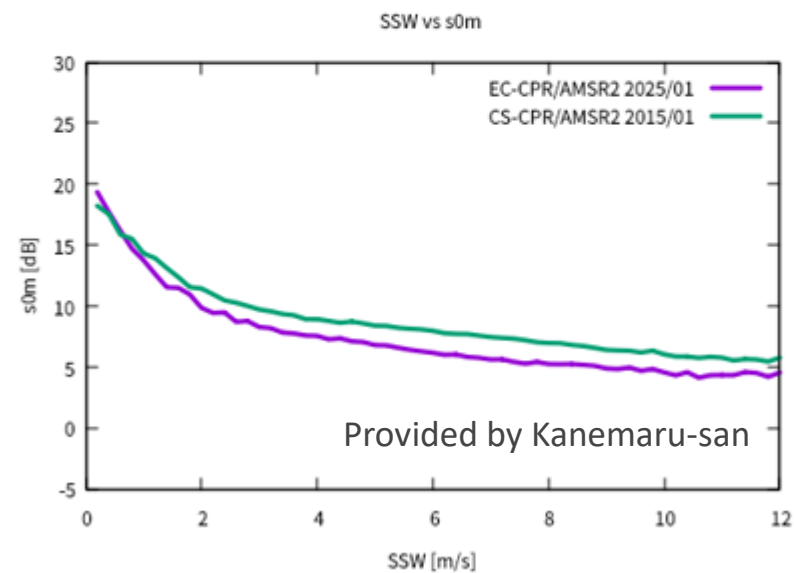
Spaceborne



Statistical comparison
using CloudSat

EarthCARE(EC)-CPR: 2025/01/01-2025/01/10 (vCa)
CloudSat(CS)-CPR: 2015/01/01-2015/01/31 (R05)

AMSR-2 SSW vs. s0m in clear-sky



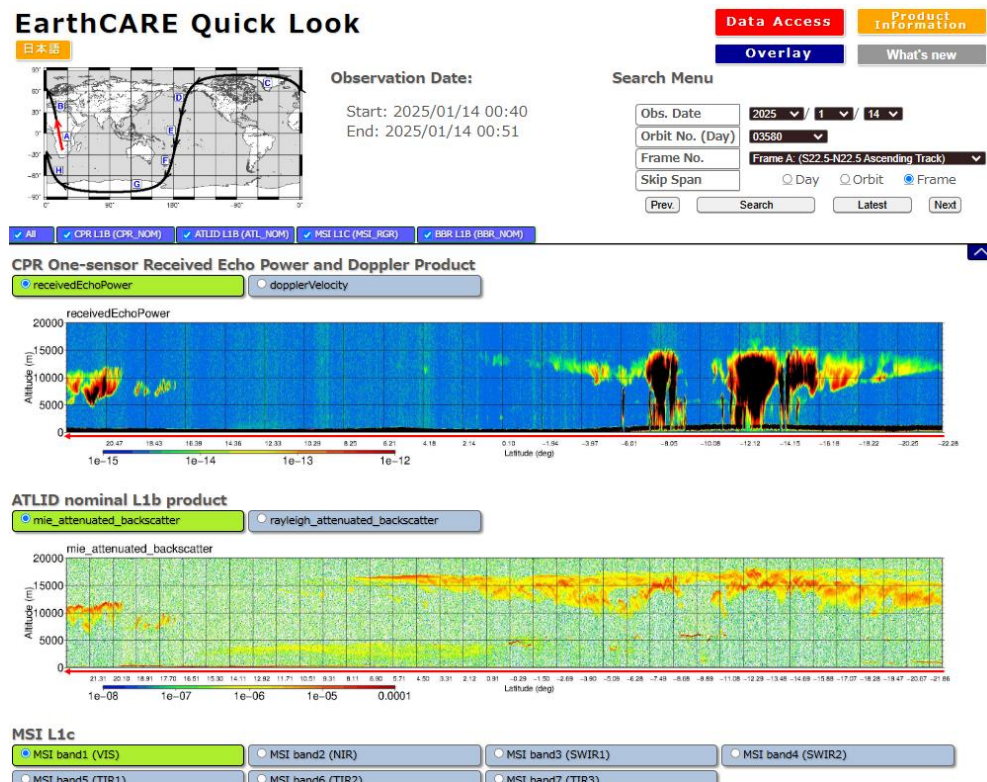
K. Kanemaru-san's talk in CPR session

Others: A-Train, Himawari, GPM, GCOM-C, Aeolus

- We released several web pages/tools

- ✓ EarthCARE Quick Look

<https://www.eorc.jaxa.jp/EARTHCARE/Quicklook/index.html>

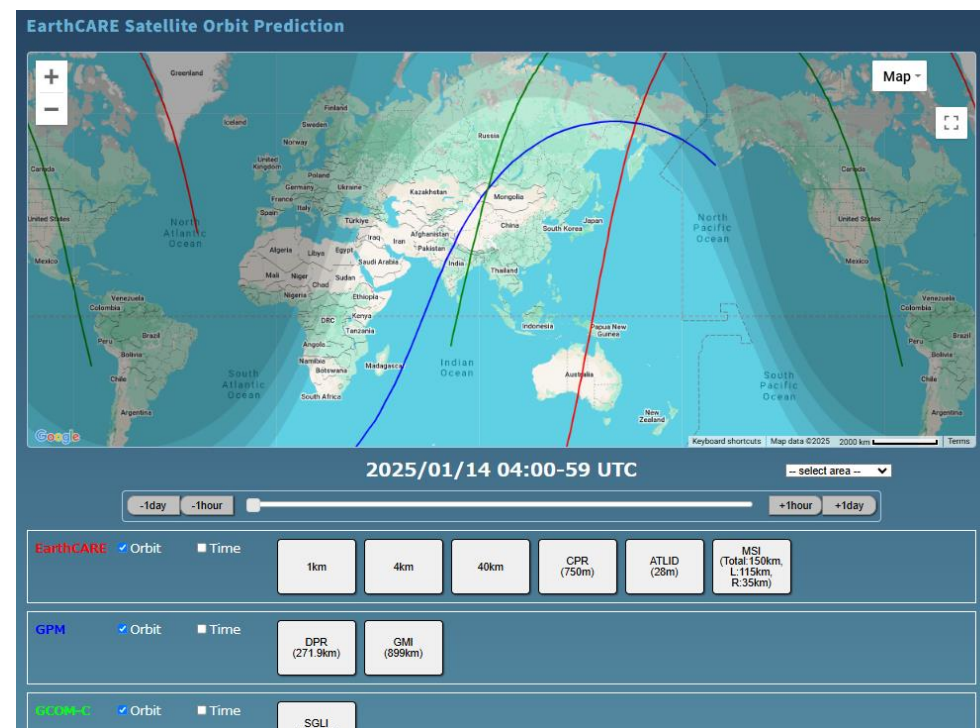


- ✓ EarthCARE Orbit Prediction

https://www.eorc.jaxa.jp/EARTHCARE/auth/orbit/rs/EC_orbit_view.html

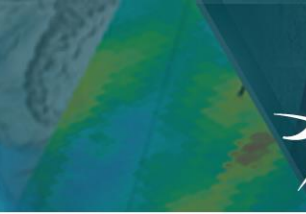
- ✓ EarthCARE Orbit Search

<https://www.eorc.jaxa.jp/EARTHCARE/auth/orbit/rs/EC>



Planned to release in public

- ✓ JAXA EarthCARE Validation portal
- ✓ Validation Data Archive System (VDAS)
- ✓ Validation Matchup



- The JAXA validation team including international collaboration with DLR and NOAA is advancing the validation of JAXA EarthCARE products.
- A multifaceted evaluation is being conducted by comparing with ground-based and airborne campaigns, network observations, and satellite observations which have complementary aspects in terms of sample numbers/density, spatial coverage, multi-instrumentality, etc.
- In this workshop, the validation results of Level 1 products and preliminary validation results of Level 2 products will be reported in each session.
- Validation-related Web tools are released.
 - ✓ EarthCARE Quick Look
<https://www.eorc.jaxa.jp/EARTHCARE/Quicklook/index.html>
 - ✓ EarthCARE Orbit Prediction
https://www.eorc.jaxa.jp/EARTHCARE/auth/orbit/rs/EC_orbit_view.html
 - ✓ EarthCARE Orbit Search
https://www.eorc.jaxa.jp/EARTHCARE/auth/orbit/rs/EC_orbit_search.html

Networks



Campaigns



Spaceborne

