

Copernicus Sentinel-5/UVNS

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Thanks to
S5 Teams at ESA, EUMETSAT, S&T + science
consortium, Consortium led by Airbus, EC, CAMS

AC-VC#22, 1-4 May 2026, SRON, Leiden,
Netherlands





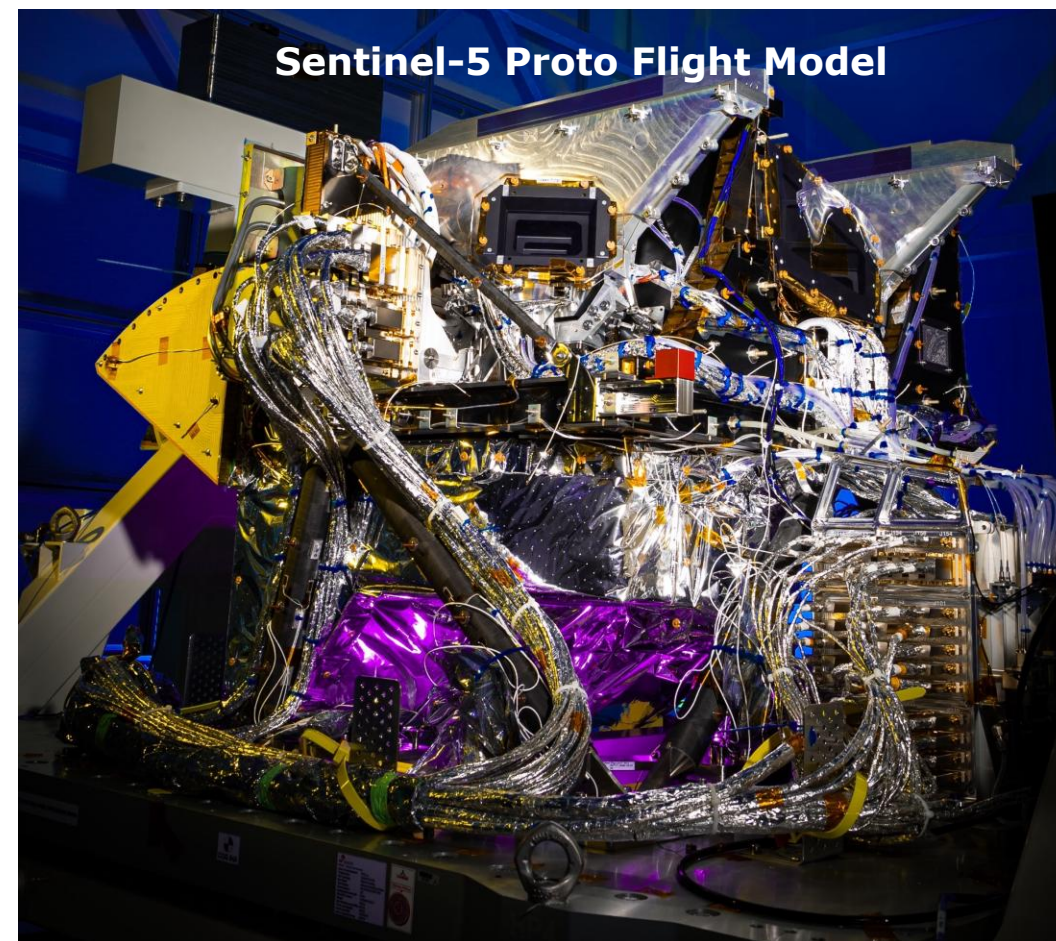
Sentinel-5/UVNS on EPS-SG A1 (LEO orbit)

Developed by industrial consortium
under ESA contract, operated by
EUMETSAT – on behalf of the EC.

Launched on 13 August 2025

Grating imaging UVNS (UV-VIS-NIR-SWIR) spectrometer in
push broom configuration with a nominal swath of 2670 km
width, and spatial sampling of 7.5 x 7.5 km² and daily global
coverage.

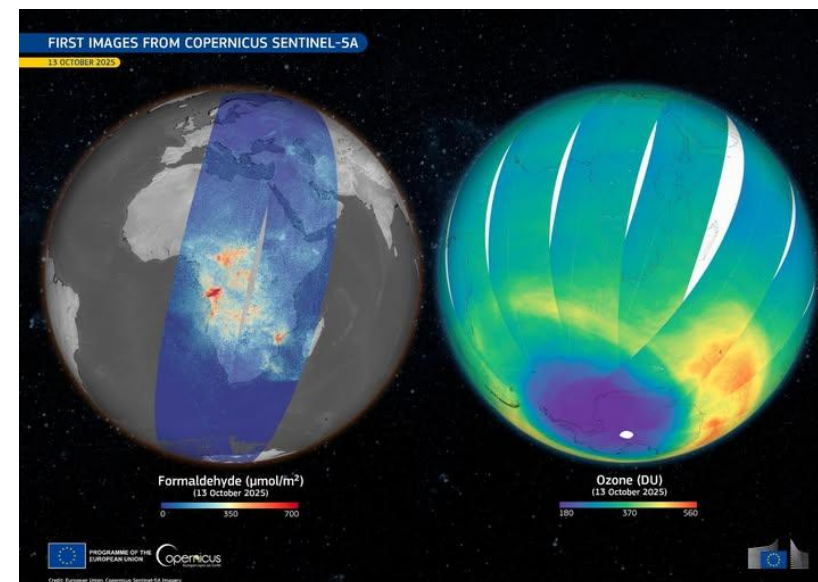
Spectral Range [nm]	270 – 310	300 – 500	685 – 710	755 – 773	1595 – 1675	2305 – 2385
Spectral Resolution [nm]	1	0.5	0.4	0.4	0.25	0.25
Spectral Oversampling	3	3	3	3	2.5	2.5
Signal to Noise of radiance (SZA=75/70°, alb=0.02/0.05 in UVN/SWIR)	100 @ 270 nm	1500 @ 420 nm	500 @ 710 nm	500 @ 755 nm	~220 (cont.)	~100 (cont.)
Radiometric Accuracy	3%	3%	3%	3%	6%	3.5%
Polarisation Sensitivity	0.5%	0.5%	0.5%	0.5 / 0.7%	20%	20%
Spectral Features	0.25% and L2 impact <50% of total uncertainty					
Revisit Time	Daily (more often at higher latitudes)					
Coverage	global					
Spatial Sampling	7.5 km @ nadir					





Sentinel-5/UVNS on EPS-SG A1 (LEO orbit)

13/08/2025	MetOP-SG A1 launch
15/08/2025	LEOP hand-over
09/09/2025	Decontamination completed
October 2025	First Earth radiance acquisitions
26/11/2025	First images released
04/12/2025	Satellite In-Orbit-Verification Review
12/02/2026	Instrument configuration updated Correction of spectral band settings and removal of inhomogeneous swath coaddition
Q3 2026	Start of Cal/Val (EUM in-house + S4S5VT + EUM/COPER services) Staggered per product group, depending on progress regarding L1 data quality and ESA'S L2 product commissioning activities
from August 2026	ESA-EUMETSAT handover EUM takes over mission responsibility.



Compare S5 and METImage L1B Radiances

Matching bands for S5 / METImage:

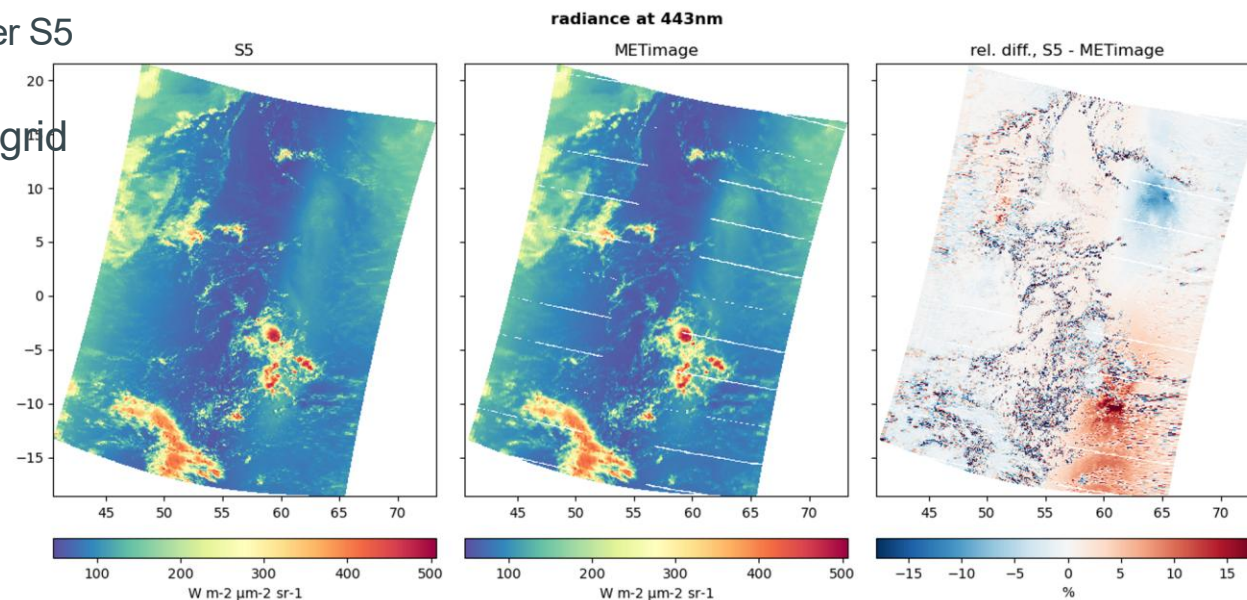
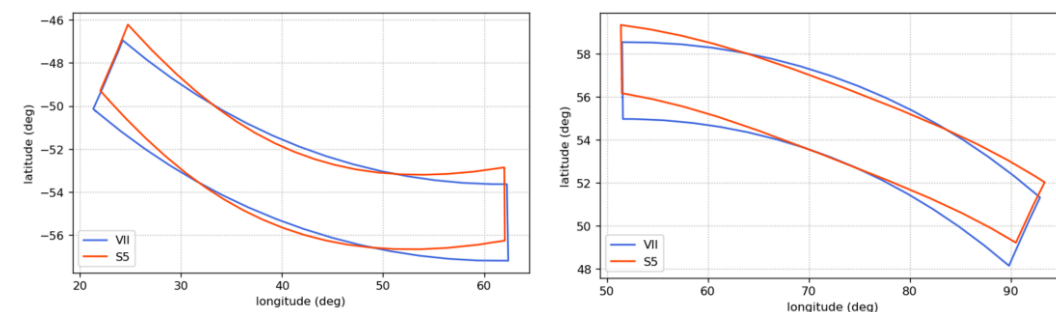
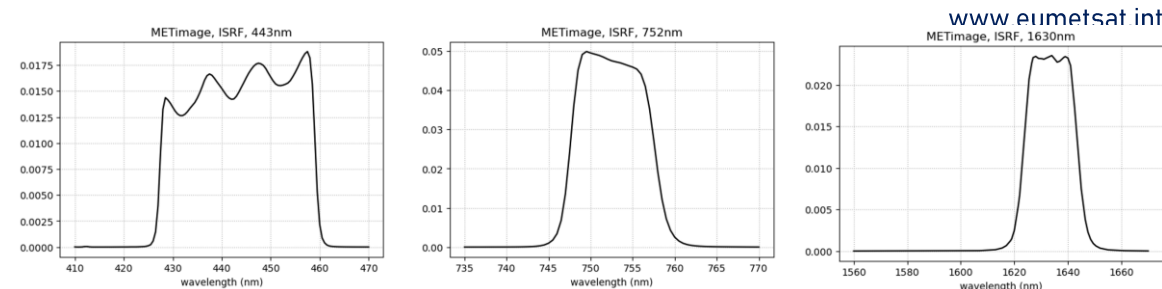
- S5 band 2 vs. METImage 443nm
- S5 band 3b/c vs. METImage 752 nm
- S5 band 4 vs. METImage 1630 nm

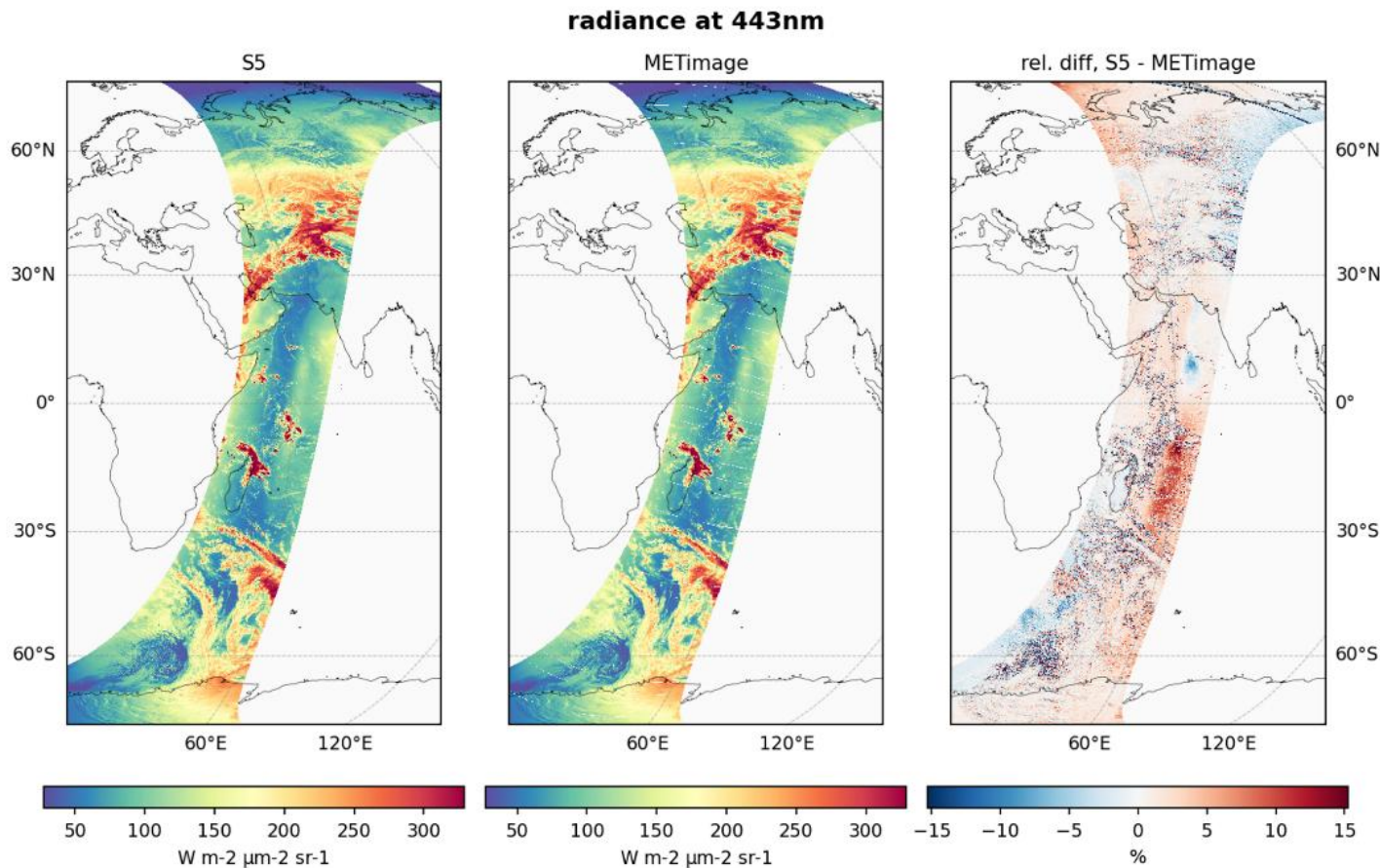
Approach:

- input:
 - S5 L1B radiance
 - S5 L2 HET, PSF-weighted mean METImage radiance per S5 pixel
- interpolate S5 radiance to METImage ISRF wavelength grid and convolve with METImage ISRF

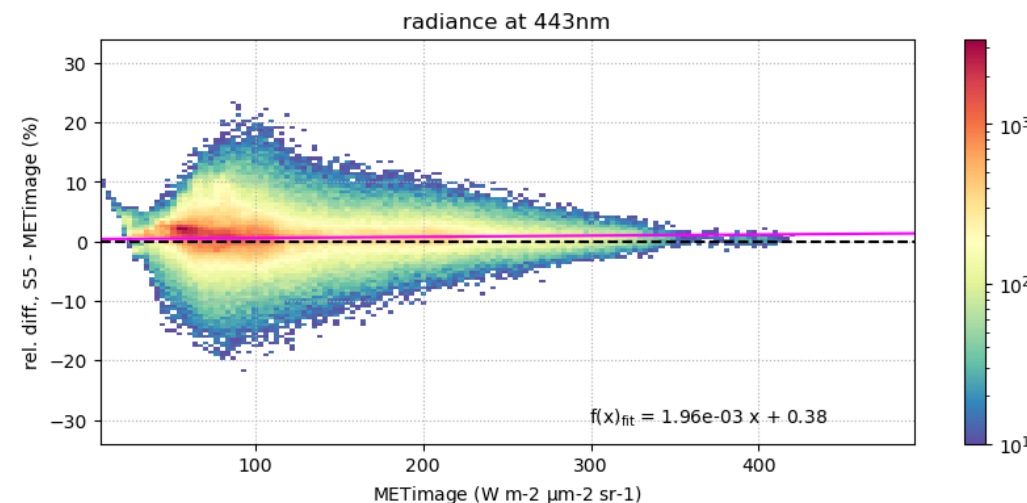
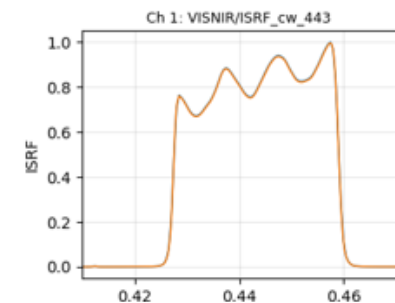
Effects due to

- viewing geometry
- parallax effects at sharp edges
- sun glint
- straylight
- radiometric calibration
- geometrical calibration
- polarization?
- ...





Based on preliminary
VII and S5 L1B
products, generated at
EUMETSAT



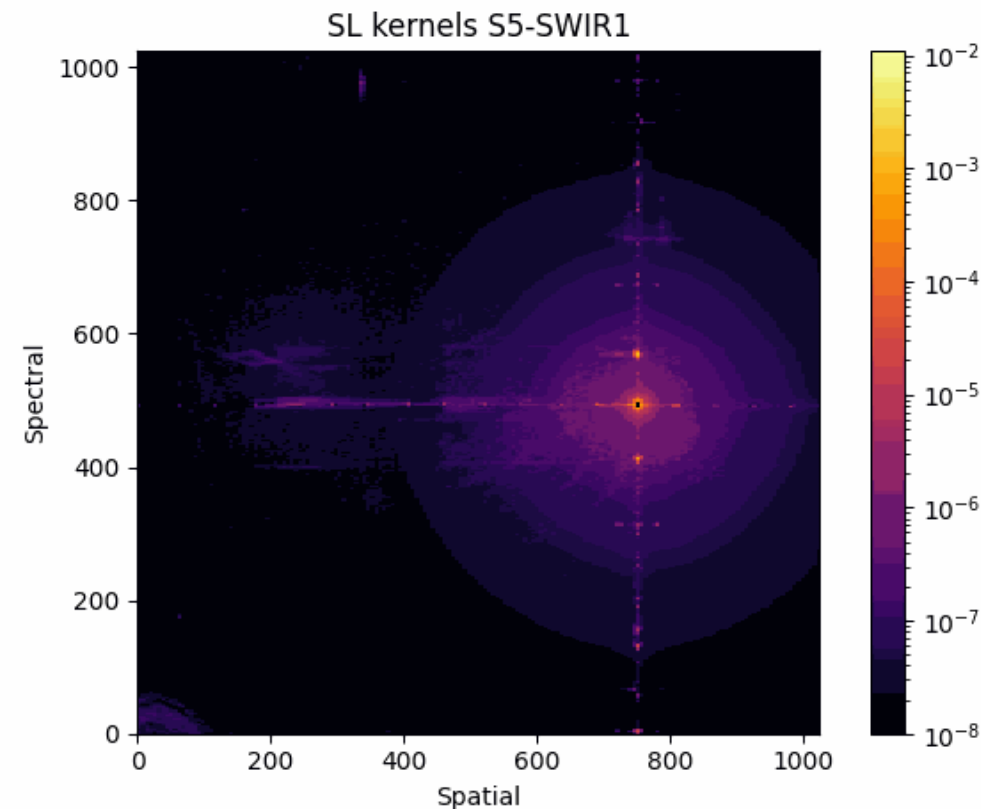
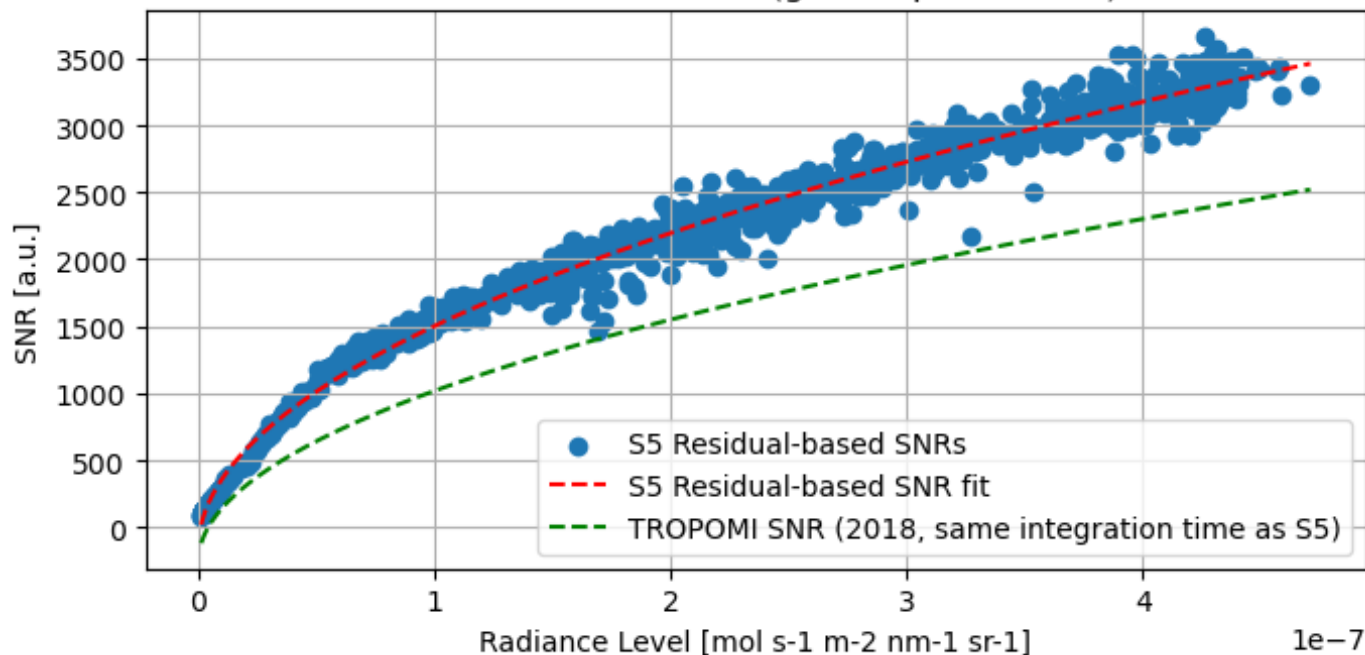
Result:

- Radiances in good agreement over homogeneous surfaces.
- Larger deviations observed over cloudy scenes and in regions affected by sun glint.
- Some viewing angle dependent deviations found, with opposite signs in the two hemispheres (hypothesis: residual polarization sensitivity).

Sentinel-5 - L1 commissioning status

band2, # evaluated spectra: 906

SNR vs radiance level (ground pixel = 100)



- Sentinel-5 UVN data provides excellent SNR, thanks to, e.g., avoiding pseudo-noise from inhomogeneous slit illumination (→ slit homogenizer). Some improvements in radiometric calibration needed. In-orbit dynamic calibration to be fully tested and put into operation.
- Sentinel-5 SWIR data so far suffers from RTS noise and residual stray light and needs more work.
- Instrument operational timeline under optimization.

Sentinels operational L2 product suite

www.eumetsat.int

	S4	S5	S5P
O ₃	TOC & TRC	TOC & PRO	TOC, TRC, PRO
NO ₂	TOC & TRC	TOC & TRC	TOC & TRC
SO ₂	TOC	TOC & layer height	TOC & Layer height
HCHO	TOC	TOC	TOC
CHOCHO	TOC	TOC	
Aerosol	AOD, Layer height UV index	AOD, Layer height, UV index	Layer height, UV index
CH ₄		TOC	TOC
CO		TOC	TOC
Cloud	AUX	AUX	AUX
Surface	AUX	climatology	climatology
UV		Near surface downwelling	Near surface downwelling
H ₂ O	TOC	TOC	TOC
BrO		TOC	
OCIO		TOC	
SiF		x	

S4 L2OP consortium lead by DLR



S5 L2PP consortium lead by S&T



- Similar to S4 case, S5 Cal/Val activities will start after
 - ESA L2 commissioning activities are finished and final L2 algorithms delivered
 - EUMETSAT ground segment updated and successful Product Validation Review Board

Joint ESA-EUMETSAT Approach to Calibration & Validation (Cal/Val) for Sentinel-4 and Sentinel-5 Operational Mission Products



- Joint Announcement of Opportunity Call issued July 2024
 - To trigger & coordinate Cal/Val activities
 - establish in-flight data quality, verify that performance targets are met, using independent reference data
- >20 Proposals received and accepted
- **Cal/Val Projects** → **Cal/Val Reviews** → **Public Releases**



S4 | Veihelmann | AC-VC#22 | June 2026

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→ THE EUROPEAN SPACE AGENCY

- Staggered approach to Cal/Val
 - L1 + first batch of L2 products in late Summer
 - Remaining L2 products in Q4 2026. SWIR products (CO, CH4) might take longer





Thank you!
Questions are welcome.