

Sentinel-5 Precursor Mission Status and Purpose of Second Products Release Workshop

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28 September 2018 - ESRIN

Sentinel-5 Precursor COPERNICUS ATMOSPHERE MISSION IN POLAR ORBIT



The Sentinel-5 Precursor (S5p) is the first **atmospheric Sentinel** mission focusing on global observations of the atmospheric composition for **air quality** and **climate**.

The TROPOspheric Monitoring Instrument (**TROPOMI**) is the payload of the S5p mission and was jointly developed by **The Netherlands and ESA**.

S5p provides **enhanced radiometric sensitivity & spatial resolution** enabling sampling of small-scale variabilities specifically in the lower troposphere.

Launched on Oct. 13 2017 with a 7 years design lifetime.

Commissioning Phase

finalised successfully on 24 April 2018.

Ramp-up Phase started on April 25.

TROPOMI

- ▶UV-VIS-NIR-SWIR nadir view grating spectrometer.
- ▶ Spectral range: 270-500, 675-775, 2305-2385 nm
- Spectral Resolution: 0.25-1.1 nm
- ▶ Spatial Resolution: 3.5x7km²
- ▶ Global daily coverage at 13:30 local solar time.



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Sentinel-5 Precursor Level Products



Product	Wavelength	Application
Ozone	UV, UVIS	Ozone layer monitoring, UV-index forecast, Climate monitoring
NO ₂	UVIS	Air quality forecast and monitoring
СО	SWIR	Air quality forecast and monitoring
CH ₂ O	UVIS	Air quality forecast and monitoring
SO ₂	UVIS	Air quality forecast and monitoring, Climate monitoring, Volcanic plume detection
Aerosol	UVIS, NIR	Air quality forecast and monitoring, Climate monitoring, Volcanic plume detection
CH ₄	SWIR	Climate monitoring
Clouds	UVIS, NIR	Climate monitoring
UV-Index	UVIS	UV index forecast (provided by FMI)

- ➤ Routine dissemination of global L1B & 2 products over design lifetime
- ➤ Near real time (NRT & Offline) service for most data products (Offline only: L1B, CH4)



Sentinel-5P Commissioning Phase Outcome - Ramp-up Phase



Algorithm Investigations for product quality improvement:

- Band 2/3 radiometric inconsistency (impact on O3 profiles only)
- Verify the NIR stray-light correction based on the dedicated phase E1 (limb)
 measurements, verify sun diffuser reflectance characterisation
- **TROPOMI Operations:** QWG/Experts to investigate possible impact of reduced along-track spatial resolution of 5.5 km on all Level 2 processors
- **Spacecraft Operations:** QWG/Experts to investigate possible off-set operations in order to fill the small gap over the equator on all processors
- **First Sentinel-5P Steering Group Meeting** on July 10: follow up implementation of reduced spatial resolution
- **Ramp-up phase** has started on April 25 Start full qualified operations after the Routine Operations Readiness Review (**RORR**) Meeting planned during **early 2019**.
- First Product Release was announced on July 11

Validation Workshop Presentations:

https://nikal.eventsair.com/QuickEventWebsitePortal/sentinel-5p-first-product-release-workshop/sentinel-5p















Sentinel-5 Precursor Mission Status



https://sentinel.esa.int/web/sentinel/missions/sentinel-5p/

mission-status - Reports covering a time period of 2 weeks

http://www.tropomi.eu/mission-status - L1 Portal, L2 Data Quality, Routine Validation

The TROPOMI instrument continues measuring in **nominal operations baseline** with the 360 orbit repeat cycle that started on **April 30**.



Sentinel-5 Precursor Product Releases



Product	Main Parameter	
UV Aerosol Index	Aerosol index	
Cloud Properties	Fraction, optical depth, top height	
Nitrogen Dioxide (NO ₂)	Total and tropospheric columns	
Total Ozone (O ₃)	NRT total column	
Carbon Monoxide (CO)	Offline total column	
NPP_CLOUD	Cloud mask from VIIRS	
Sulphur Dioxide (SO2)	Total column	
Formaldehyde (HCHO)	Total column	
Tropospheric Ozone	Tropospheric column	
Total Ozone (O ₃)	Total column	
Carbon Monoxide (CO)	NRT total column	
Methane (CH4)	Offline total column	
Aerosol Layer Height	Mid-level pressure	
Ozone Profiles	Total and tropospheric profiles	
UV (FMI – co-laborative GS)	UV dose	
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Staggered Product
Releases to the Public

11 July 2018

October 2018

December 2018 - tbc

Early 2019 - tbc

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Open Copernicus Data Policy



Access during the Ramp-up Phase - Pre-operational Hub:

https://s5phub.copernicus.eu/dhus/#/home

Login credentials are: s5pguest/s5pguest

Download since early July: \sim 260 TB, \sim 70 T products

Sentinel EO browser:

https://apps.sentinel-hub.com/eo-browser/

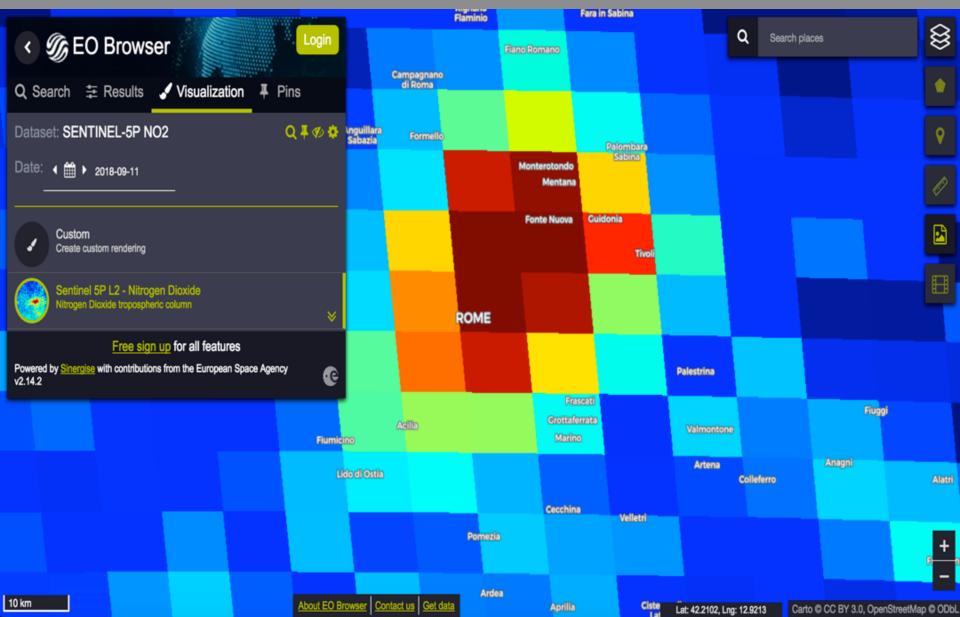
200.000 accesses per month

 Access during nominal Operations – Open Data Access Hub: https://scihub.copernicus.eu/



https://apps.sentinel-hub.com/eo-browser/





Sentinel-5 Precursor Expert Hub



Product	Reprocessed	Offline	NRT
Total Ozone	Nov 2017 - V1.1.2	August 01 – V1.1.2	
Trop. Ozone		Since Nov 2017 - V1.1.2	
SO ₂	April 30 - V1.1.2	May 27 - V1.1.1 August 01 - V1.1.2	May 27 – V1.1.1 Since August 01 – V1.1.2
НСНО	April 30 - V1.1.2	May 27 - V1.1.1 August 01 - V1.1.2	May 27 - V1.1.1 Since August 01 - V1.1.2

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Purpose of the Sentinel-5 Precursor First Products Release Workshop



- Gather Mission Performance Centre (MPC) and S5p-Validation
 Team (53 projects) Cal/Val Experts to assess the uncertainty
 characterisation of the Sentinel-5 Precursor pre-operational SO2,
 trop. Ozone, and HCHO products
- Use a common platform (S5PVT domain <u>http://s5pvt.skytek.com/</u>) to exchange information/documentation
- Provide a recommendation to ESA on product release to the public
- Follow up for the MPC: Deliver draft Sentinel-5 Precursor product Readme files to ESA (including information coming from the S5PVT)
- ESA: release of new S5p products during October 2018 to the public





Sentinel-5 Precursor First Products Release Workshop — Agenda — 28 Sep.

09:00 - 09:15 Introduction (ESA - C. Zehner)

09:15 - 10:45 Ozone Total Column (Offline)

20 Minutes: BIRA/IASB - C. Lerot

20 Minutes: BIRA/IASB - T. Verhoelst

20 Minutes: University of Thessaloniki - K. Garane

10 Minutes: DLR - K.P. Heue

Product Release Recommendation

10:45 - 12:15 Tropospheric Ozone (Offline)

25 Minutes: DLR - K.P. Heue

25 Minutes: BIRA/IASB - D. Hubert

10 Minutes: University of Bremen - K.U. Eichmann

Product Release Recommendation

14:00 - 15:30 Formaldehyde (Offline & NRT)

20 Minutes: BIRA/IASB - I. De Smedt

15 Minutes: BIRA/IASB - C. Vigouroux/G. Pinardi

10 Minutes: DLR - K. L. Chan

10 Minutes: University Bremen – A. Richter

15 Minutes: University Bremen - K.U. Eichmann

Product Release Recommendation

15:30 - 17:00 Sulphur Dioxide (Offline & NRT)

30 Minutes: BIRA/IASB - N. Theys (including contributions of N. Krotkov/NASA and V. Fioletev/Env. Canada)

20 Minutes: MPIC - S. Beirle (for T. Wagner)

15 Minutes: University of Manchester - M. Burton

Product Release Recommendation

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