

EBAS data archive and the ACTRIS Data portal

CiGas data workshop, April 7-9, 2025, Online

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and the EBAS team

Data Centre for Atmospheric Data

nilu

Outline

- Overview of the 2023 data
- Data reporting for 2024
- ACTRIS data portal – what's new
- ACTRIS Virtual Research Environment (VRE)

VOC data for 2023 checked by TC (13 stations)

Data submission

	Station		VOC data for 2023		Mantis #
			Instrument	lev0 lev2	
1	CH0001G	Jungfrauoch	online_gc		4125, 4126
2	CH0053R	Beromünster	online_gc		4127, 4128
3	CV0001G	Cape Verde Atmospheric Obs.	online_gc		4129, 4130
4	CZ0003R	Kosetice (NOAK)	steel_canister		4149, 4150
5	DE0043G	Hohenpeissenberg	online_gc		4133, 4134
6	FI0050R	Hyytiälä	PTR-MS		4145, 4146
7	FI0096G	Pallas (Sammaltunturi)	online_gc		4135, 4136
8	FR0020R	SIRTA	PTR-MS		4147, 4148
9	FR0030R	Puy de Dôme	ads_tube		4123, 4124
			online_gc	No measurement	4143, 4144
10	GB0048R	Auchencorth Moss	online_gc		4137, 4138
11	GB1055R	Chilbolton Observatory	online_gc		4139, 4140
12	IT0009R	Mt Cimone	online_gc		4141, 4142
13	NO0042G	Zeppelin mountain (Ny-Ålesund)	online_gc		4119, 4120

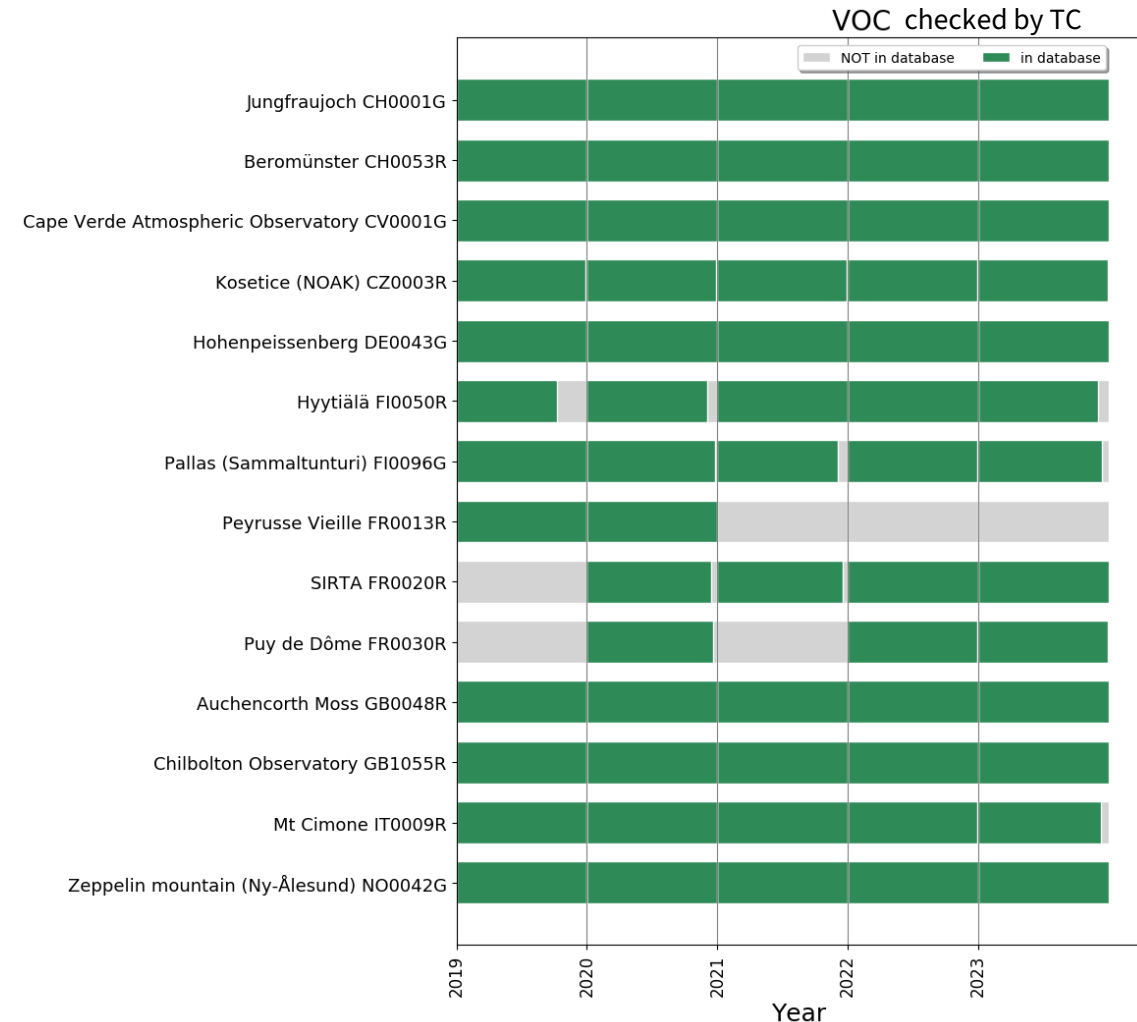
ACTRIS VOC: level 0 & level 2 are required

VOC lev0 template:

In contrast to level 2, the level 0 VOC data also include the [calibration data](#), e.g., target gas data. The flags 683, 684 and 685 shown in the short list of the flags below are specifically for level 0 data.

[PTR-MS lev0 template \(draft version\) in 2024](#)

Data overview in EBAS

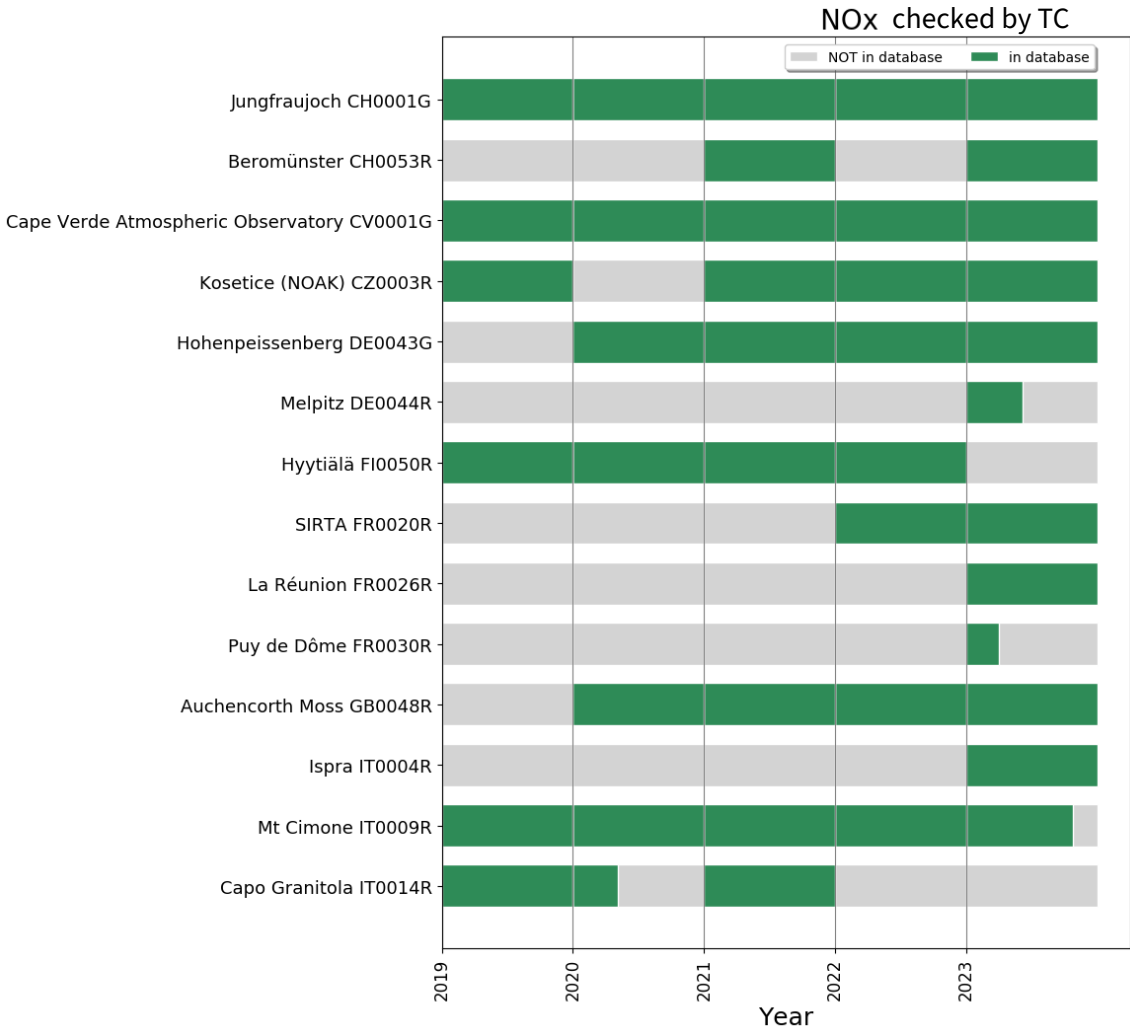


NOx data for 2023 checked by TC (12 stations)

Data submission

	Station	NOx data for 2023				Mantis #
		lev0	lev1	lev2	lev3	
1	CH0001G Jungfrauoch - NO (photolytic)	Met	NO+O3			4736, 4737
	Jungfrauoch - NO2 (laser)	Met	NO2+O3			4738, 4739
2	CH0053R Beromünster - NO (molybdenum)	NO+Met	NO+O3			4820, 4821
	Beromünster - NO2 (CAPS)	NO2+Met	NO2+O3			4822, 4823
3	CV0001G Cape Verde Atmospheric Obs.		NOx			4743, 4744
4	CZ0003R Kosetice (NOAK)					4748, 4749
5	DE0043G Hohenpeissenberg	NOx+Met	NOx+O3			4753, 4754
6	DE0044R Melpitz	NOx	NOx			4758, 4759
7	FI0050R Hyytiälä	Met		in EBAS (EMEP)		4763, 4764
8	FI0096G Pallas - molybdenum		O3	in EBAS (EMEP)		4840, 4841
9	FR0020R SIRTÀ	NOx+Met	NOx+O3			4768, 4769
10	FR0026R La Réunion	NOx+Met, O3	NOx +O3		NF:O3	4773, 4774
11	FR0030R Puy de Dôme - photolytic	NOx+Met	NOx+O3			4838, 4839
	Puy de Dôme - molybdenum	NOx+Met	NOx+O3	in EBAS (EMEP)		4778, 4779
12	GB0048R Auchencorth Moss - photolytic	NOx	NOx+O3+aws(lev2)			4960, 4961
	Auchencorth Moss - CAPS		NO2+O3+aws(lev2)			4958, 4959
13	IT0004R Ispra	NOx+O3	Met			4783, 4784
14	IT0009R Mt Cimone	NOx+Met	NOx+O3			4833, 4834
	Mt Cimone	NOx+Met	NOx+O3			4788, 4789
15	IT0014R Capo Granitola	no NOx measurements for 2023				4973, 4974

Data overview in EBAS



ACTRIS NOx – Instrument types in EBAS

- **Chemiluminescence_photolytic:** **11** sites
 - 6 sites using Teledyne, T200UP
 - no NO_counts for lev0
- **Chemiluminescence_molybdenum:** **2** sites
 - only NO
- **CAPS (NO2):** **2** sites
- **Tunable_diode_laser_abs_spectrometer:** **1** site
- **CE-DOAS:** **new**

ACTRIS Vocabulary

Alphabetical

Hierarchy

gas chromatograph - mass spectrometer
high performance liquid chromatograph
high performance liquid chromatograph - mass spectrometer
laser-induced fluorescence spectrometer
light absorption spectrometer
cavity ring-down spectrometer
cavity-enhanced absorption spectrometer
filter absorption photometer
Fourier Transform Infrared Spectrometer
▲ **iterative cavity-enhanced differential optical absorption spectrometer**
 Airyx ICAD
 Airyx ICAD HG
cavity ring-down spectrometer
non-dispersive infrared spectrophotometer
off-axis integrated cavity output spectrometer
thermal dissociation cavity ring-down spectrometer
▲ **tunable diode laser absorption spectrometer**
 Miro MGA-8
 Miro MGA-NO2
UV-Visible spectrometer
mass spectrometer
proton transfer mass spectrometer
tunable diode laser absorption spectrometer
▲ UV-Visible spectrometer

VOC data submission for 2024

	Station	Instrument	VOC data for 2024	
			lev0	lev2
1	BE0007R TMNT09 Vielsalm 	ads_tube		
		online_gc		
2	CH0001G Jungfrauoch	online_gc		
3	CH0053R Beromünster	online_gc		
4	CV0001G Cape Verde Atmospheric Obs.	online_gc		
5	CZ0003R Kosetice (NOAK)	steel_canister		
6	DE0043G Hohenpeissenberg 	online_gc		
		PTR-MS		
7	FI0050R Hyytiälä	PTR-MS		
8	FI0096G Pallas (Sammaltunturi)	online_gc		
9	FR0020R SIRTÀ	PTR-MS		
10	FR0030R Puy de Dôme	ads_tube		
		online_gc	No measurement for 2024	
11	GB0048R Auchencorth Moss	online_gc		
12	GB1055R Chilbolton Observatory	online_gc		
13	IT0009R Mt Cimone	online_gc		
14	NO0042G Zeppelin mountain (Ny-Ålesund)	online_gc		

ACTRIS VOC

Data reporting requirements:

- **level 0**
- **level 2**

PTR-MS level 0 Template

https://ebas-submit.nilu.no/templates/VOC/PTR-MS_level0

Template for submission of PTR-MS data - Level 0

This template should be used for submitting data measured by PTR-MS instruments. MS instruments produce huge data volumes as raw output. Therefore the data level 0 is a "condensed raw format" to avoid those huge data volumes and contains only count rates.

In contrast to level 1 and level 2, the level 0 data also include the calibration data, e.g., target gas data and zero measurements. The flags 686 and 687 shown in the short list of the flags below are specifically for level 0 data.

Points to note

Clicking on a specific line in the example template will provide a detailed explanation and possible options for each of the metadata elements. Please contact ebas@nilu.no in case of broken links etc.

- Level 0 contains count rates, not concentrations or mixing ratios.
- Zero measurements shall be flagged with flag 686.
- Calibrations shall be flagged with flag 687 and the variable `status`, `Status type=calibration standard` shall be set to indicate which calibration gas was used (integer, refers to metadata elements `calibration standard ID` and `secondary standard ID`). See data lines 3 and 4 in the template below for examples of calibrations with different standards. Line 3 shows an example of a calibration with the calibration standard (NPL (passivated aluminum cylinder), Batch: D914017) Line 4 is a calibrations with the secondary standard (Target gas).
- Instrument malfunctions shall be flagged with flag 699.
- The starttime and endtime should be set to the sampling period. These data would not have irregular timing and a time interval set to 0.

Need further discussion!

NOx data submission for 2024

	Station	NOx data for 2024	
		lev0	lev1
1	CH0001G Jungfrauoch		
2	CH0053R Beromünster		
3	CV0001G Cape Verde Atmospheric Obs.	met	NOx+O3
4	CZ0003R Kosetice (NOAK)		NOx+O3(lev2)+met(lev2)
5	DE0043G Hohenpeissenberg	NOx+Met	NOx+O3
6	DE0044R Melpitz		
7	FI0050R Hyytiälä	Met	
8	FI0096G Pallas (Sammaltunturi)		
9	FR0020R SIRTa	NOx+Met	NOx+O3
10	FR0026R La Réunion	Met	
11	Puy de Dôme - photolytic	NOx+Met	NOx+O3
	Puy de Dôme - molybdenum	NOx+Met	NOx+O3
12	Auchencorth Moss - photolytic	NOx+Met	NOx+O3
	Auchencorth Moss - CAPS	NO2+met	NO2+O3
13	IT0004R Ispra		
14	IT0009R Mt Cimone	NOx+Met	NOx+O3
15	IT0014R Capo Granitola	no NOx measurements for 2024	

ACTRIS NOx

Data reporting requirements:

- Nox: level 0, level 1
- Ozone: level 1
- Met: level 0 (+ level 2)

ACTRIS Data Centre and Data Portal

<https://www.actris.eu/data-centre>



ACTRIS DC Units

- In-situ (NILU / EBAS)
- ARES
- CLU
- GRES
- ASC
- DVAS (NILU)

object of interest

Entity whose Property is observed.

1,1,1,2,2,3,4,5,5,5-decafluoropentane
1,1,1,2,3,3,3-heptafluoropropane
1,1,1,2-tetrafluoroethane
1,1,1,3,3,3-hexafluoropropane
1,1,1,3,3-pentafluorobutane
1,1,1,3,3-pentafluoropropane
1,1,1-trifluoroethane
1,1,2-trichlorotrifluoroethane
1,1-dichloro-1-fluoroethane
1,1-difluoroethane
1,2,3,4,5-pentabromobenzene
1,2,3,4,6,7,8-heptachlorodibenzofuran
1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin
1,2,3,4,7,8,9-heptachlorodibenzofuran
1,2,3,4,7,8-hexachlorodibenzofuran
[show all 911 values]

Data Portal

<https://data.actris.eu/search>

Help Large Data Extract

Data Search

Number of data objects matching your search: 331356

Variable matrix ⓘ
Search or select one or more items

Facility types ⓘ
Search or select one or more items

Variables ⓘ
Search or select one or more items

Object of interest ⓘ
Search or select one or more items

ACTRIS National Facility - In Progress ⓘ
Select options

Other Facilities ⓘ
Select options

Countries
Search or select one or more items

Facilities (737)

Map showing facility locations across Europe and North Africa.

object group

- aerosol related
- cloud related
- context objects
- elements
- inorganics
- organics
- other groups

organics

- halogenated organics
- nitrogenous organics
- non-methane hydrocarbons
- organic ions
- organic mass groups
- organic tracers
- oxygenated volatile organic compounds
- persistent organic pollutants
- pollen
- polycyclic aromatic hydrocarbons
- silicium containing organics
- sulfur containing organics
- volatile organic compounds

ACTRIS Data Portal

<https://data.actris.eu/search>

Data Search

Number of data objects matching your search: 857

Variable matrix

× gas phase

Facility types

× observation platform, fixed

Variables

× nitrogen dioxide mass concentration

Object of interest

× nitrogen dioxide

ACTRIS National Facility - In Progress

Select options

Advanced

Instruments

Search or select one or more items

Product type

Search or select one or more items

Repository

× IN-SITU - In situ data

Framework

× ACTRIS

Facilities (196)



Showing 1 to 10 of 89 rows 10 rows per page										
☐	Title	Matrix	Variables	Object of interest	Facility	Instruments	Start Time	End Time	Inspect	Download
☒	Nitrogen_dioxide at Beromünster	gas phase	nitrogen dioxide mass concentration	nitrogen dioxide	Beromunster	cavity attenuated phase shift spectrometer	2020-12-31 23:00:00 UTC	2021-12-31 23:00:00 UTC		
☒	Nitrogen oxides at Hyytiälä	gas phase	nitrogen dioxide mass concentration,nitric oxide mass concentration	nitrogen dioxide,nitric oxide	Hyytiälä	chemiluminescence detector, molybdenum converter	2011-12-31 23:00:00 UTC	2013-03-11 23:00:00 UTC		
☒	Nitrogen_dioxide at Tänäkon	gas phase	nitrogen dioxide mass concentration	nitrogen dioxide	Tänäkon	chemiluminescence detector, molybdenum converter	2012-12-31 23:00:00 UTC	2013-12-31 23:00:00 UTC		
☒	Nitrogen_dioxide at Chaumont	gas phase	nitrogen dioxide mass concentration	nitrogen dioxide	Chaumont	chemiluminescence detector, molybdenum converter	2012-12-31 23:00:00 UTC	2013-12-31 23:00:00 UTC		

Add items to basket

Remove basket items

Unselect items

Search

1 2 3 4 5 ... 9

ACTRIS Data Portal

<https://data.actris.eu/search>

Basket

The basket contains your selected datasets.

Search datasets

Remove All

Download all files

Download all

Data coverage for the selected datasets in the basket

Find datasets matching a specific period

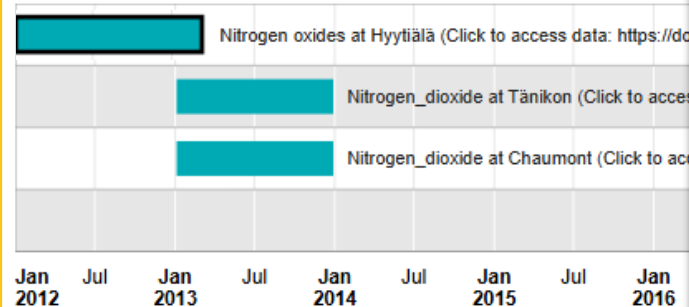
Start Date:

dd.mm.åååå



End Date:

dd.mm.åååå



Jan 2012 Jul Jan 2013 Jul Jan 2014 Jul Jan 2015 Jul Jan 2016

Nitrogen oxides at Hyytiälä

1 January 2012 - 12 March 2013

Download

Summary

Data coverage

Product information

Variable(s) pressure, nitrogen_dioxide, relative_humidity, nitrogen_monoxide, temperature

Product type [Observation](#)

Instrument type(s) Chemiluminescence Molybdenum

Timeliness [Scheduled](#)

Start time 1 January 2012

Stop time 12 March 2013

Framework GAW-WDCGG-node, ACTRIS, EMEP

Facility information

Facility name Hyytiälä (FI0050R)

Facility type [Observation platform, fixed](#)

Coordinates [61.85°N, 24.283333°E](#)

Altitude 181.0 m

File information

PID <https://doi.org/10.48597/YESU-NU7G>

Filename YESU-NU7G.nc

Format(s) HDF5 (NetCDF4)

Filesize 884.7 kB

Version v3

Last modified 1 May 2014 00:00:00

Data Access [OPENDAP](#)
[DAP4](#)
[HTTPServer](#)

Metadata access [NCML](#)
[UDDC](#)
[ISO](#)

Provenance (to be completed)

Software [ebas-io](#)

Version history [Concept DOI](#)

Citation & acknowledgements

Licence [CC BY 4.0](#)

Citation string Kulmala, M. GAW-WDCGG-node, ACTRIS, EMEP, 2012-2013, Nitrogen oxides at Hyytiälä, data hosted by EBAS at NILU, DOI: <https://doi.org/10.48597/YESU-NU7G>

Please include the following information in your publication. You may edit the text to suit publication standards.

Acknowledgements Data used in this <study/report/figure/etc.> were accessed from EBAS (<https://ebas.nilu.no>) hosted by NILU. Specifically, the use included data affiliated with the framework: GAW-WDCGG-node, ACTRIS, EMEP

Originator(s)

Markku, Kulmala

Principal investigator(s)

Markku, Kulmala

ACTRIS Data Portal

<https://data.actris.eu/search>

- National Facility

Data Search

Number of data objects matching your search: 2001

Variable matrix 1

Search or select one or more items

Facility types 1

Search or select one or more items

Variables 1

Search or select one or more items

Object of interest 1

Search or select one or more items

ACTRIS National Facility - In Progress 1

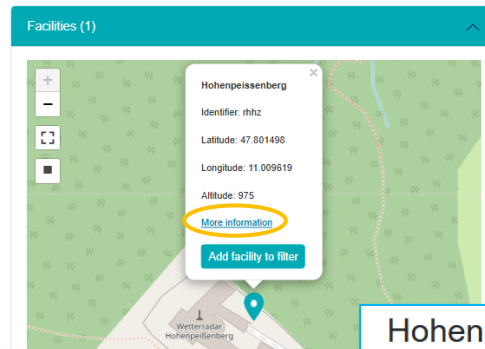
x Hohenpeissenberg

Other Facilities 1

Select options

Countries

Search or select one or more items



Hohenpeissenberg

Facility Information Model Products

Facility name: Hohenpeissenberg

Latitude: 47.801498

Longitude: 11.009619

Altitude: 975.0

Country code: DE

Facility type: observation platform, fixed

ACTRIS National Facility: <https://actris-nf-labelling.out.ocp.f>

Facility website: <https://www.dwd.de/EN/research/>

WMO region: Europe

Facility identifier: rhz

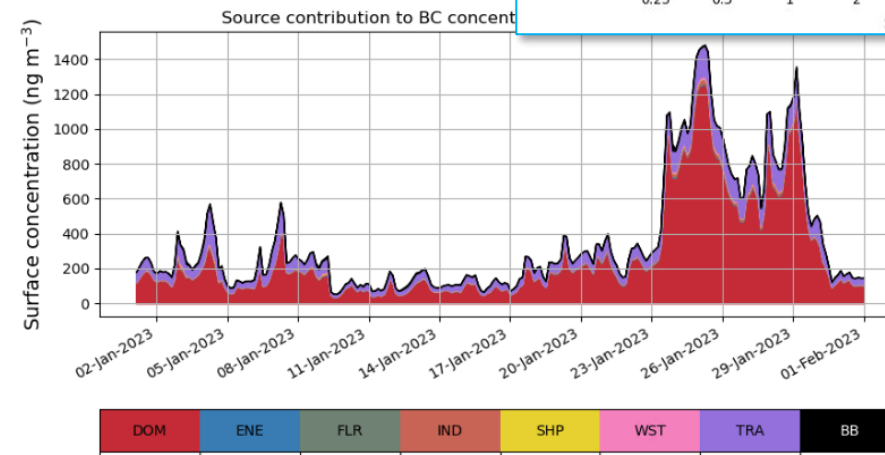
Hohenpeissenberg

Facility Information Model Products

FLEXPART products for BC measure

For support and more information please submit a request here: <https://flexp>

STATION	YEAR	MONTH	HEIGHT	PRODUCT	
DE0043G	2023	January	0	Source Spec	TOTAL VIEW
SUBMIT					

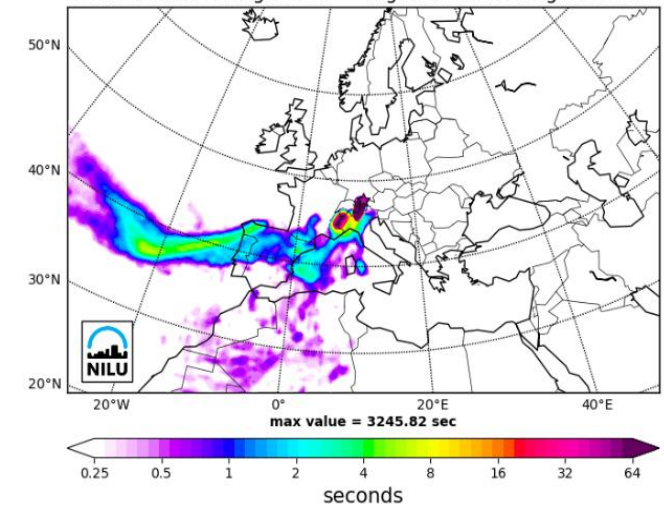


FLEXPART products for BC measurements

For support and more information please submit a request here: <https://flexpart-request.nilu.no/support>

STATION	YEAR	MONTH	HEIGHT	PRODUCT	
DE0043G	2023	January	0	Footprint	regional FIRST -10 PREV NEXT +10 LAST VIEW PLOT NETCDF 2/248
SUBMIT					

Footprint emission sensitivity for BC
from 01-Jan-2023 03:00:00 to 01-Jan-2023 06:00:00
Lowest release height: 0 m Highest release height: 100 m



ACTRIS Data portal – VRE (<https://data.actris.eu/vre>)

Welcome to the ACTRIS Virtual Research Environment (VRE)

The ACTRIS VRE provides a cutting-edge platform for accessing, analyzing, and sharing atmospheric data. Designed for researchers in the ACTRIS community, the VRE integrates data and computational resources in a cloud-based environment, powered by JupyterHub. By using Python-based tools and pre-built examples, researchers can streamline their workflow and collaborate effectively.

Who Can Use the VRE?

The ACTRIS VRE is available to all ACTRIS researchers and collaborators who wish to access its services. Whether you're new to data analysis or an experienced user, the environment is built to support a range of skill levels.

Getting Started with JupyterHub

To begin using the ACTRIS VRE:

1. Visit [ACTRIS VRE JupyterHub](#).
2. Create an account and log in.
3. Explore the available notebooks and tutorials to start analyzing ACTRIS data.

List of notebooks

Getting Started

[Introduction to A](#)

Search and Access

[Search and acces](#)
[Search and acces](#)
[Search and acces](#)
[Search and acces](#)
[Search and acces](#)
[Search and acces](#)

Analyse ACTRIS data

[Analyse ACTRIS data/Monthly annual plots NO₂.ipynb](#)
[Analyse ACTRIS data/Trends and climatology NO₂.ipynb](#)
[Analyse ACTRIS data/ Combining datasets EC OC.ipynb](#)

Integrated products

[Integrated products/ PM1 from wood burning and traffic.ipynb](#)
[Integrated products/ Equivalent black carbon \(eBC\).ipynb](#)
[Integrated products/ FLEXPART footprint emission for black carbon.ipynb](#)
[Integrated products/ FLEXPART and observed eBC timeseries.ipynb](#)
[Integrated products/ Single scattering albedo \(SSA\).ipynb](#)
[Integrated products/ Ultrafine particles \(ufps\).ipynb](#)

Plot the timeserie

```
fig, ax1 = plt.subplots(figsize=(10, 6))

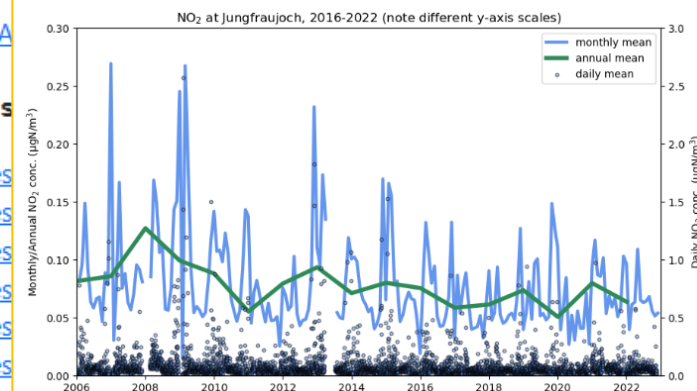
# Define colors for each type of data
daily_color = 'cornflowerblue'
monthly_color = 'cornflowerblue'
annual_color = 'seagreen'

# Plot monthly and annual means on the primary y-axis
ax1.plot(monthly_times, monthly_values, label='monthly mean', linewidth=3, color=monthly_color)
ax1.plot(annual_times, annual_values, label='annual mean', linewidth=4, color=annual_color)
ax1.set_ylabel('Monthly/Annual NO2 conc. (µg/m3·35)')
ax1.set_ylim(0, 0.3)

# Create a secondary y-axis, and plot daily means on the the secondary y-axis
ax2 = ax1.twinx()
ax2.scatter(daily_times, daily_values, label='daily mean', alpha=0.5, s=10, color=daily_color, edgecolors='black')
ax2.set_ylabel('Daily NO2 conc. (µg/m3·35)')
ax2.set_ylim(0, 3)
ax2.set_xlabel(daily_times[0], daily_times[-1])

# Combine legends from both axes
lines_1, labels_1 = ax1.get_legend_handles_labels()
lines_2, labels_2 = ax2.get_legend_handles_labels()
ax2.legend(lines_1 + lines_2, labels_1 + labels_2, loc='upper right')

plt.title('NO2 at Jungfraujoch, 2016-2022 (note different y-axis scales)')
plt.show()
```



Tools and tutorials

- Tools: <https://ebas-submit.nilu.no/tools>
- E-learning tutorials <https://ebas.nilu.no/delivery/tools-and-tutorials/>
 - about the general in-situ data submission (14:16 mins)

Instruments registered in EBAS:

https://ebas-submit.nilu.no/templates/comments/all_instrument_types_manufacturers

Analytical Instrument in EBAS:

https://ebas-submit.nilu.no/templates/comments/analytical_instruments

Need help?

- New instruments?
- New components?
- New calibration scales?
- Questions about the templates
-

Contact the EBAS-team: ebas@nilu.no

