

# Update from EMEP-CCC

- EMEP/EBAS data identification
- Chemicals of emerging concern
- Near-real time data for CAMS
- CCC-Webpage revision

Kjetil Tørseth, Markus Fiebig and Wenche Aas

**nilu**

# Strong push to ensure that research data are «FAIR»

## FAIR principles address:

- Data serving as basis for articles not accessible.
- Data aren't documented, or metadata use custom conventions, or no conventions.
- Data stored in inaccessible format.
- Access conditions not clarified or arbitrary
- Data originators expect attribution when their data are used



<https://force11.org/info/about-force11/>

# The Data FAIRness Principles

## Findable

F1: (Meta)data have eternal PID.  
F2: Rich metadata.

F3: Indexed in search portal and similar.

F4: Metadata include PID.

## Accessible

A1: (Meta)data retrievable by PID with standardised protocol  
A1.1: open and free protocol

A1.2: authentication / authorization possible

A2: Metadata always accessible

## Interoperable

I1: (Meta)data use formal, accessible, shared, broadly applicable language.

I2: (Meta)data use FAIR vocabulary.  
I3: (Meta)data include qualified references

## Reusable

R1: (Meta)data have a plurality of accurate and relevant attributes.  
R1.1: (meta)data have data usage

license.  
R1.2. (meta)data document provenance.  
R1.3. (meta)data meet domain-relevant community standards.

# Findable in Data Search Portals



**Data Search**

**Variables** ⓘ  
Search or select one or more items

**Facilities** ⓘ  
Search or select one or more items

**Facility types** ⓘ  
Search or select one or more items

**Timeliness** ⓘ  
Search or select one or more items

**Matrix** ⓘ  
Search or select one or more items

**Start date**  
01/01/1970

**End date**  
04/18/2024

[Clear Search](#)

[Advanced Search](#)

<input type="checkbox"/>	Title	Matrix
<input type="checkbox"/>	Drizzle data derived from	



**GEOS Portal**

scattering

**FILTERS** ▾

**Measurements of volume backwards scattering coefficient...**  
(Organisation: WIS GISC DWD)  
This service provides nephelometer measurements of volume backwards...

**Measurements of volume scattering coefficient in air due...**  
(Organisation: WIS GISC DWD)  
This service provides nephelometer measurements of volume scattering...

**Measurements of volume backwards scattering coefficient in air due to dried aerosol particles at Granada, Spain (20170430 - 20180425)** 👁️ 1 ⭐ 0.0

This service provides nephelometer measurements of volume backwards scattering coefficient in air due to dried aerosol particles observed at Granada, Spain (20170430 - 20180425). The observations contain level 1.5 data. The time resolution is 1h. The observations are stored in the EBAS database (<http://ebas.nilu.no/>).

[See more](#) ➤

**Measurements of volume backwards scattering coefficient...**  
(Organisation: WIS GISC DWD)  
This service provides nephelometer measurements of volume backwards...

**Measurements of volume scattering coefficient in air due...**  
(Organisation: WIS GISC DWD)  
This service provides nephelometer measurements of volume scattering...

**Ground based in situ**

**Measurements of volume**

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# FAIR Vocabulary

- <https://vocabulary.actris.nilu.no>
- Well-defined terms («concepts») instead of freetext.
- Concepts may be used as search categories.
- All concepts have definitions.
- All concepts should be understandable for non-experts.
- Well-defined relations between concepts (ontology).
- Website is only the interface for humans, may display only part of content.
- Underlying database (triple-store) is machine readable.

The screenshot displays the ACTRIS Vocabulary interface. At the top, there is a navigation bar with links for 'Vocabularies', 'About', 'Feedback', 'Sparql Endpoint', 'REST API', and 'Help', along with a language selector set to 'English'. The main header reads 'ACTRIS Vocabulary' and includes a search box. On the left, a hierarchical tree under 'Alphabetical' shows categories like 'data source', 'experiment', 'instrument', and 'instrument type', with 'filter absorption photometer' selected. The right panel provides details for this concept, including its breadcrumb path, preferred term, definition, broader and narrower concepts, creator, URI, and download options.

data source > instrument > instrument type > light absorption spectrometer > filter absorption photometer	
data source > experiment > experiment technique > light absorption spectrometer > filter absorption photometer	
PREFERRED TERM	<b>filter absorption photometer</b>
DEFINITION	Instrument designed for measuring the particle light absorption coefficient by means of measuring the light attenuation across a filter while the filter is being loaded with sample particles.
BROADER CONCEPT	light absorption spectrometer
NARROWER CONCEPTS	Aerosol AE31 Aerosol AE33 NOAA Continuous Light Absorption Photometer Thermo 5012
CREATOR	<a href="https://orcid.org/0000-0002-3380-3470">https://orcid.org/0000-0002-3380-3470</a>
URI	<a href="https://vocabulary.actris.nilu.no/actris_vocab/filterabsorptionphotometer">https://vocabulary.actris.nilu.no/actris_vocab/filterabsorptionphotometer</a>
Download this concept:	RDF/XML TURTLE JSON-LD

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# How EBAS Landing Pages Implement FAIRness

<https://doi.org/10.48597/AMG9->



Aerosol light scattering at Birkenes II  
1 January 2010 - 1 January 2023

Download

Summary Data coverage

Product Information

Variable(s) Aerosol Light Scattering Coefficient, Aerosol Light Backscattering Coefficient, Relative Humidity, Temperature, Pressure

Product type [Observation](#)

Instrument type(s) [Neohelometer](#)

Timeliness [Scheduled](#)

Start time 1 January 2010

Stop time 1 January 2023

Framework NILU, GAW-WDCA, ACTRIS

Instrument model(s) TSI/3563

Facility Information

Facility name Birkenes II (NO0002R)

Facility type [Observation platform, fixed](#)

Coordinates [58.38853°N, 8.252°E](#)

Altitude 219 m

File Information

PID <https://doi.org/10.48597/8>

Filename BPPN-MZBH.nc

Format(s) HDF5 (NetCDF4)

Filesize 52.06 MB

Version v1

Last modified 23 June 2023 16:39:36

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 Fiebig, M., Lunder, C. NILU, GAW-WDCA, ACTRIS, EMEP, 2010-2023, Aerosol light scattering at Birkenes II, data hosted by EBAS at NILU, DOI: <https://doi.org/10.48597/BPPN-MZBH>

**Catalog** <https://thredds.nilu.no/thredds/catalog.html>

Dataset	Size	Last Modified
<a href="#">EBAS/</a>		--
<a href="#">ACTRIS_NRT/</a>		--
<a href="#">EBAS_DOI/</a>		--
<a href="#">EBAS_NRT/</a>		--

**TDS installation for EBAS data at ATMOS see [Info](#) [Documentation](#)**

F1: (Meta)data have eternal PID.  
F4: Metadata include PID

A1: (Meta)data retrievable by PID with standardised protocol

I3: (Meta)data include qualified references

R1.1: (meta)data have data usage license.

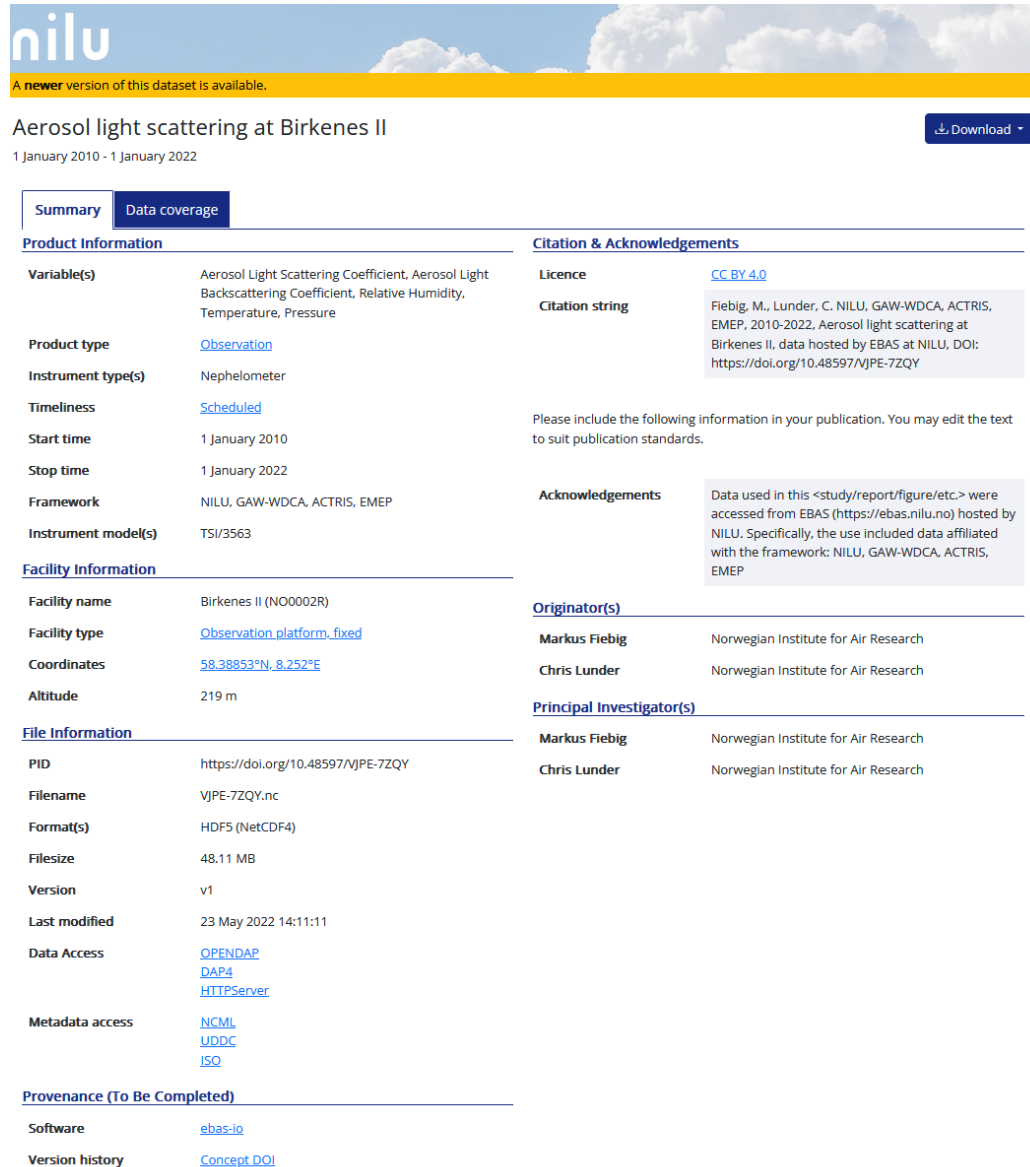
R1.2: (meta)data document provenance.

R1.3: (meta)data meet domain-relevant community standards





# A2: Metadata always accessible



The screenshot shows the NILU dataset landing page for 'Aerosol light scattering at Birkenes II'. The page features a blue header with the NILU logo and a yellow banner indicating a newer version is available. The main content is organized into several sections: Product Information, Facility Information, File Information, Citation & Acknowledgements, and Provenance. The Product Information section includes details on variables, product type, instrument, and timeliness. Facility Information provides location and altitude data. File Information lists the dataset's PID, filename, format, and size. Citation & Acknowledgements includes a citation string and a license (CC BY 4.0). Provenance lists the software used and the concept DOI.

**Summary** **Data coverage**

**Product Information**

Variable(s)	Aerosol Light Scattering Coefficient, Aerosol Light Backscattering Coefficient, Relative Humidity, Temperature, Pressure
Product type	<a href="#">Observation</a>
Instrument type(s)	Nephelometer
Timeliness	<a href="#">Scheduled</a>
Start time	1 January 2010
Stop time	1 January 2022
Framework	NILU, GAW-WDCA, ACTRIS, EMEP
Instrument model(s)	TSI/3563

**Facility Information**

Facility name	Birkenes II (NO0002R)
Facility type	<a href="#">Observation platform, fixed</a>
Coordinates	<a href="#">58.38853°N, 8.252°E</a>
Altitude	219 m

**File Information**

PID	<a href="https://doi.org/10.48597/VJPE-7ZQY">https://doi.org/10.48597/VJPE-7ZQY</a>
Filename	VJPE-7ZQY.nc
Format(s)	HDF5 (NetCDF4)
Filesize	48.11 MB
Version	v1
Last modified	23 May 2022 14:11:11
Data Access	<a href="#">OPENDAP</a> <a href="#">DAP4</a> <a href="#">HTTPServer</a>
Metadata access	<a href="#">NCML</a> <a href="#">UDDC</a> <a href="#">ISO</a>

**Citation & Acknowledgements**

**Licence** [CC BY 4.0](#)

**Citation string** Fiebig, M., Lunder, C. NILU, GAW-WDCA, ACTRIS, EMEP, 2010-2022, Aerosol light scattering at Birkenes II, data hosted by EBAS at NILU, DOI: <https://doi.org/10.48597/VJPE-7ZQY>

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: NILU, GAW-WDCA, ACTRIS, EMEP

**Originator(s)**

Markus Fiebig	Norwegian Institute for Air Research
Chris Lunder	Norwegian Institute for Air Research

**Principal Investigator(s)**

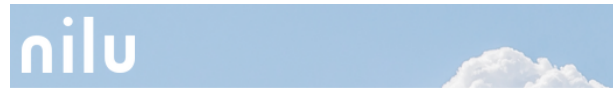
Markus Fiebig	Norwegian Institute for Air Research
Chris Lunder	Norwegian Institute for Air Research

**Provenance (To Be Completed)**

Software	<a href="#">ebas-io</a>
Version history	<a href="#">Concept DOI</a>

- Each dataset version has its own DOI and landing page.
- Also obsolete dataset versions are still accessible by the same interfaces.
- Obsolete datasets are clearly marked as such.

# Landing Page Types: Version and Concept



## Aerosol light scattering at Birkenes II

Concept Summary Versions

### Product Information

**Variable(s)** Aerosol Light Scattering Coefficient, Aerosol Light Backscattering Coefficient, Relative Humidity, Temperature, Pressure

**Product type** [Observation](#)

**Instrument type(s)** Nephelometer

**Timeliness** [Scheduled](#)

**Start time** 01/01/2010 00:00:00

**Stop time** 01/01/2023 00:00:00

**Framework** NILU, GAW-WDCA, ACTRIS, EMEP

**Instrument model(s)** TSI/3563

### Facility Information

**Facility name** Birkenes II (NO0002R)

**Facility type** [Observation platform, fixed](#)

**Coordinates** [58.38853°N, 8.252°E](#)

**Altitude** 219 m



## Aerosol light scattering at Birkenes II

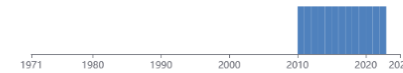
Concept Summary Versions

### Latest Version

**DOI** <https://doi.org/10.48597/BPPN-MZ8H>

**Start time** 1 January 2010

**Stop time** 1 January 2023

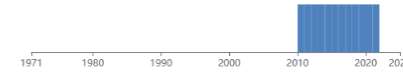


### Previous Versions

**DOI** <https://doi.org/10.48597/VJPE-7ZQY>

**Start time** 1 January 2010

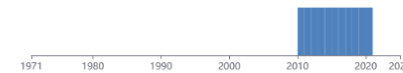
**Stop time** 1 January 2022



**DOI** <https://doi.org/10.48597/9VFY-E5BY>

**Start time** 1 January 2010

**Stop time** 1 January 2021



**DOI** <https://doi.org/10.48597/K4H6-UUVQ>

**Start time** 1 January 2010

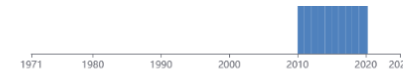
**Stop time** 1 January 2020



**DOI** <https://doi.org/10.48597/V4V7-3Y58>

**Start time** 1 January 2010

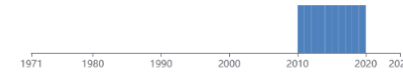
**Stop time** 16 April 2020



**DOI** <https://doi.org/10.48597/XZ5V-59U2>

**Start time** 1 January 2010

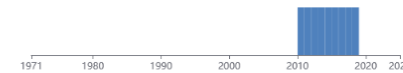
**Stop time** 1 January 2020



**DOI** <https://doi.org/10.48597/D5AH-3EM6>

**Start time** 1 January 2010

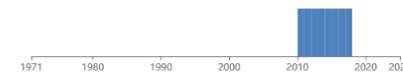
**Stop time** 1 January 2019



**DOI** <https://doi.org/10.48597/78US-592K>

**Start time** 1 January 2010

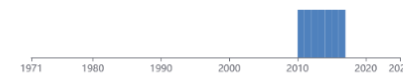
**Stop time** 1 January 2018



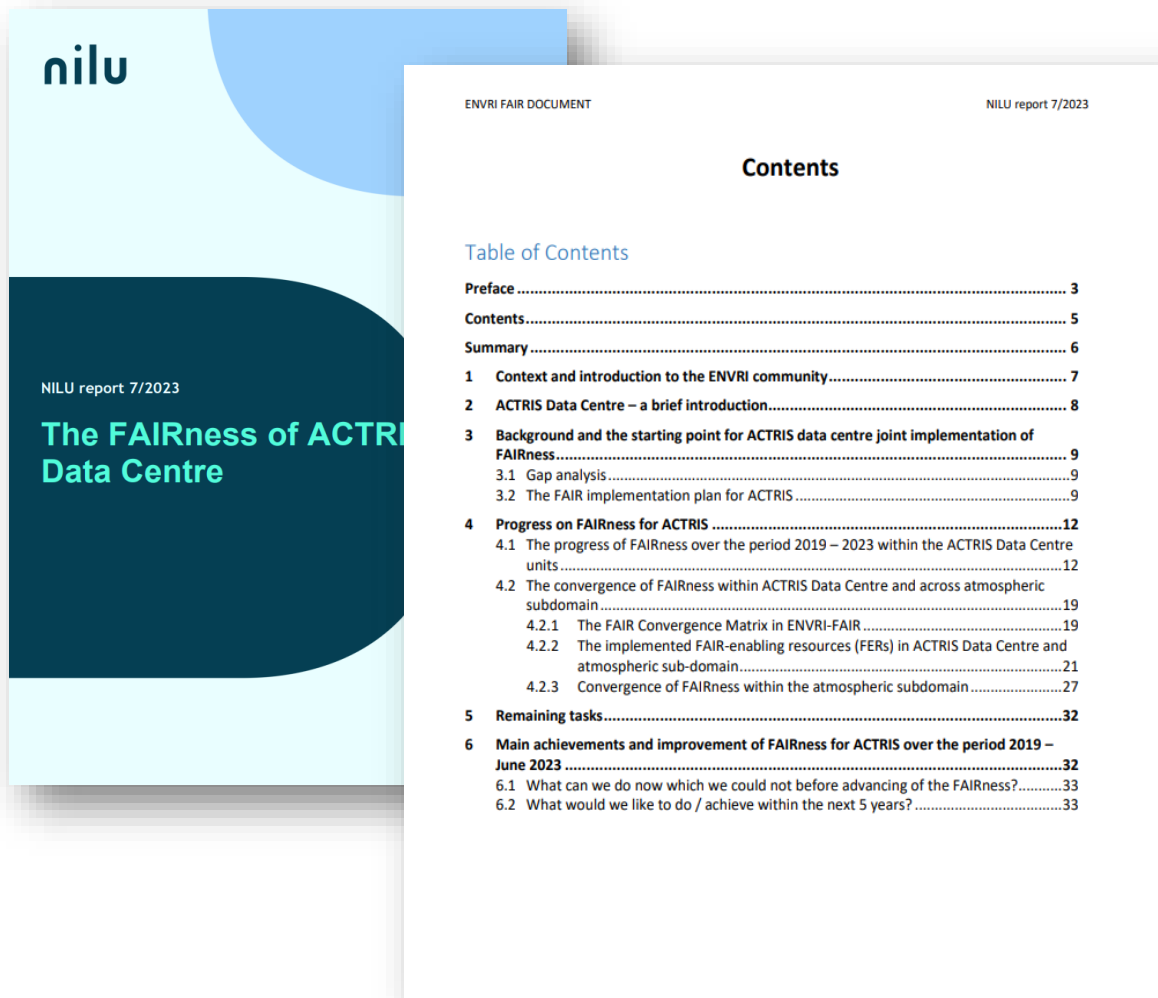
**DOI** <https://doi.org/10.48597/K9TX-67NY>

**Start time** 1 January 2010

**Stop time** 1 January 2017



# NILU report on FAIRness of ACTRIS Data Centre



Document the **achievements** and **convergence** of FAIRness within ACTRIS Data Centre and across atmospheric subdomain (ACTRIS, ICOS-atm, SIOS-atm, IAGOS, EISCAT-3d)

Explains

- FAIR Implementation Profile (FIP)
- FAIR-enabling resources (FERs) in ACTRIS Data Centre and full atmospheric sub-domain
- FAIRness gap analysis and assessments
- Convergence of FAIRness within the atmospheric subdomain and common solutions

**Document status and solutions for ACTRIS DC including and EBAS**

Implementation as part of ENVRI-FAIR and ACTRIS-Norway  
Lund Myhre et al, 2024 [NILU Brage: The FAIRness of ACTRIS Data Centre \(unit.no\)](#)

# Where to find the DOIs...

## In NASA-Ames file:

```

93-1001
Fiebig, Markus; Lunder, Chris
NO01L, Norwegian Institute for Air Research, NILU,
Lunder, Chris; Bäcklund, Are
ACTRIS-EMEP-GAW-WDCA-NILU
1-1
2022-01-01-2023-06-23
0.041667
days from file reference point
11
1-1-1-1-1-1-1-1-1-1-1
999.999999.9999.99999.9999.9999.9999.9999.9999.9999.9999
end time of measurement, days from the file reference
aerosol_light_scattering_coefficient, 1/Mm, Waveleng
aerosol_light_scattering_coefficient, 1/Mm, Waveleng
aerosol_light_scattering_coefficient, 1/Mm, Waveleng
aerosol_light_scattering_coefficient, 1/Mm, Waveleng
aerosol_light_scattering_coefficient, 1/Mm, Waveleng
aerosol_light_scattering_coefficient, 1/Mm, Waveleng
aerosol_light_scattering_coefficient, 1/Mm, Waveleng
aerosol_light_scattering_coefficient, 1/Mm, Waveleng
aerosol_light_scattering_coefficient, 1/Mm, Waveleng
aerosol_light_scattering_coefficient, 1/Mm, Waveleng
numflag, no unit
0
68
Data definition: .....EBAS_1.1
Data license: ..... "https://creativecommons
Citation: ..... "Fiebig, M., Lunder, C
Set type code: .....TU
Timezone: .....UTC
File name: .....NO0002R.20220101000000
Represents DOI: .....
Contains data from DOI: ..... "https://doi.org/10.48
File creation: .....
Export state: .....20240403100048240170
Export filter: .....exclude-900,exclude-in
Startdate: .....20220101000000
Revision date: .....20230623070057
Version: .....1
Version description: .....initial revision, Adis
Data level: .....2
Period code: .....1y
Resolution code: .....1h
Sample duration: .....1h
Orig time res: .....30s
    
```

## In NetCDF file:

```

// global attributes:
:Conventions = "CF-1.8, ACDD-1.3";
:featureType = "timeSeries";
:title = "Aerosol light scattering at Birkenes II";
:keywords = "pml0, EMEP, aerosol_light_scattering_coef
:id = "BPPN-MZBH.nc";
:naming_authority = "no.norway.norway.no";
:project = "ACTRIS, EMEP, GAW, WDC, NILU";
:acknowledgement = "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: NILU, GAW-WDCA, ACTRIS, EMEP";
:doi = "https://doi.org/10.48597/BPPN-MZBH";
:license = "https://creativecommons.org/licenses/by/4.0/";
:citation = "Fiebig, M., 1 January 2010 - 1 January 2023";
:summary = "Aerosol light scattering at Birkenes II";
:source = "surface observations";
:institution = "NO01L, Norwegian Institute for Air Research";
:processing_level = "2";
:date_created = "2023-06-23T07:00:57Z";
:date_metadata_modified = "2023-06-23T07:00:57Z";
:creator_name = "Markus Fiebig";
:creator_type = "person";
:creator_email = "Markus.Fiebig@nilu.no";
:creator_institution = "NILU";
:contributor_name = "Markus Fiebig";
:contributor_role = "data provider";
:publisher_type = "institution";
:publisher_name = "NILU";
:publisher_institution = "NILU";
:publisher_email = "ebas@nilu.no";
:publisher_url = "http://www.nilu.no";
:geospatial_bounds = "point";
:geospatial_bounds_crs = "EPSG:31466";
:geospatial_lat_min = 58.97;
:geospatial_lat_max = 59.03;
:geospatial_lon_min = 15.0;
:geospatial_lon_max = 15.0;
    
```

## On landing page:

**Aerosol light scattering at Birkenes II**

Download

Summary | Data coverage

Product Information		Citation & Acknowledgements	
<b>Variable(s)</b>	Aerosol Light Scattering Coefficient, Aerosol Light Backscattering Coefficient, Relative Humidity, Temperature, Pressure	<b>Licence</b>	CC BY 4.0
<b>Product type</b>	<a href="#">Observation</a>	<b>Citation string</b>	Fiebig, M., Lunder, C. NILU, GAW-WDCA, ACTRIS, EMEP, 2010-2023, Aerosol light scattering at Birkenes II, data hosted by EBAS at NILU, DOI: <a href="https://doi.org/10.48597/BPPN-MZBH">https://doi.org/10.48597/BPPN-MZBH</a>
<b>Instrument type(s)</b>	Nephelometer	Please include the following information in your publication. You may edit the text to suit publication standards.	
<b>Timeliness</b>	<a href="#">Scheduled</a>	<b>Acknowledgements</b>	Data used in this <study/report/figure/etc.> were accessed from EBAS ( <a href="https://ebas.nilu.no">https://ebas.nilu.no</a> ) hosted by NILU. Specifically, the use included data affiliated with the framework: NILU, GAW-WDCA, ACTRIS, EMEP
<b>Start time</b>	1 January 2010		
<b>Stop time</b>	1 January 2023		
<b>Framework</b>	NILU, GAW-WDCA, ACTRIS, EMEP		
<b>Instrument model(s)</b>	TSI/3563		
Facility Information			

# Outlook: See Where Your Data Has Been Used!

The image shows a screenshot of the OpenAIRE EXPLORE website. The main page displays the article "Changes in black carbon emissions over Europe due to COVID-19 lockdowns". A red box highlights the article title and a "View all 20 versions" link. A sidebar on the right provides detailed metrics for the article, including citations, popularity, influence, impulse, views, and downloads. The sidebar also includes social media engagement statistics and a "UsageCounts" section. The main content area shows the abstract of the article.

**OpenAIRE EXPLORE** Search Deposit Link Data sources Funders

Atmospheric Chemistr... View all 20 versions Link to Share Cite Claim

## Changes in black carbon emissions over Europe due to COVID-19 lockdowns

Publication » Article, Other literature type, Preprint • 05 Oct 2020 • Norway, Austria, Spain, Spain, France, Finland, Spain • Publisher: Copernicus GmbH • Funded by: EC | ACTRIS-2, AKA | Centre of Excellence in A...

Authors: N. Evangeliou; S. M. Platt; S. Eckhardt; C. Lund Myhre; P. Laj; P. Laj; P. Laj; +17 Authors

DOI: 10.5194/acp-2020-1005, 10.5194/acp-21-2675-2021  
HANDLE: 20.500.11765/12705, 20.500.12666/533, 11353/10.1622269, 10261/237011, 10481/67117, 10138/344415

Summary Subjects Related research (2) Metrics

Overview Impact Social Usage

**IMPACT BY BIP!**

- Citations: 48
- Popularity: TOP 1%
- Influence: TOP 10%
- Impulse: TOP 1%

**USAGE BY UsageCounts**

- Views: 357
- Downloads: 429

Blogged by 1  
Tweeted by 9  
21 readers on Mendeley

natural sciences  
earth and related environmental sciences

Funded by

Abstract

Following the emergence of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) responsible for COVID-19 in December 2019 in Wuhan (China) and its spread to the rest of the world, the World Health Organization declared a global pandemic in March 2020. Without effective treatment in the initial pandemic phase, social distancing and mandatory quarantines were introduced as the only available preventative measure. In contrast to the detrimental societal impacts, air quality improved in all countries in which strict lockdowns were applied, due to lower pollutant emissions. Here we investigate the effects of the COVID-19 lockdowns in Europe on ambient black carbon (BC), which affects climate and damages health, using in situ observations from 17 European stations in a Bayesian inversion framework. BC emissions declined by 23 kt in Europe (20% in Italy, 40% in Germany, 34% in Spain, 22% in France) during lockdowns compared to the same period in the previous 5 years, which is partially attributed to COVID-19 measures. BC



# Towards a harmonized approach for atmospheric monitoring of Chemicals of Emerging Concern (CECs)

Workshop 8-10 November 2023 at NILU, Kjeller, Norway.

## Thematic sessions:

- Siloxane and Chloro-paraffins
- PFAS
- Flame retardant
- Microplastic and plastic additives

Close cooperation and with support to the work of the Arctic Monitoring Program (AMAP) and the global monitoring plan (GMP).

Presentations available at

[https://projects.nilu.no/ccc/tfmm/kjeller\\_2023/index.html](https://projects.nilu.no/ccc/tfmm/kjeller_2023/index.html)

Report with recommendations in progress.



## Executive summary

Recommendations with aim to standardize monitoring practices, fill knowledge gaps, and enhance understanding of emerging pollutants in the atmosphere. A general recommendation was to conduct measurement campaigns.

### **PFAS:**

- Alignment of sampling methods (Nordic countries align with those in Canada)
- Expansion of EMEP monitoring at existing POP sites
- Expand target analytes: inclusion of GenX (HFPO-DA)

### **Flame Retardants:**

- Monitoring Extension: Include regulated PBDEs and dechlorane in existing EMEP monitoring.
- Attention to OPFRs

### **Chlorinated Paraffins:**

- Reinvestigation of existing data.
- Reanalysis of previous samples.
- Dedicated workshop on sampling and analytical methods.

### **Siloxanes:**

- Expand the program on the regulated siloxanes.
- Investigate in new measurement techniques, PTR-MS.
- comparative sampling campaign with ABN and thermal desorption tubes.

### **Microplastics and plastic additives:**

- Prepare and distribute guidelines to avoid contamination
- Develop measures to make microplastics data available in EBAS
- Prioritize total deposition sampling approaches
- Develop a wider range of standard reference materials
- Focus on plastic additive chemicals.

**Decision 2019/1**

**Monitoring strategy for the Cooperative Programme for  
Monitoring and Evaluation of the Long-range Transmission  
of Air Pollutants in Europe for the period 2020–2029**

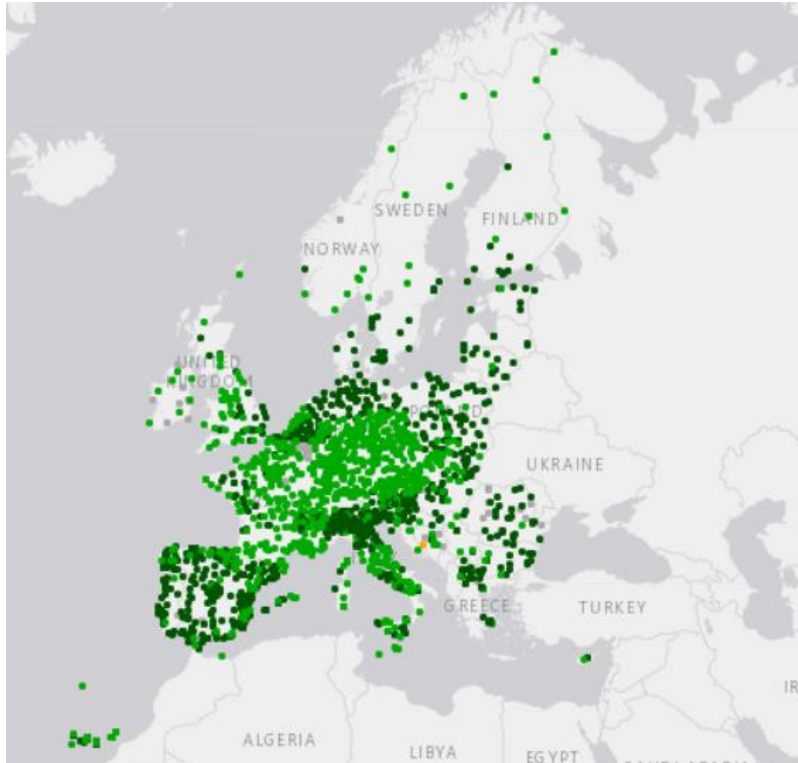
12. EMEP will, where relevant and appropriate, continue its efforts to increase the monitoring and reporting of parameters and data timelines, facilitating more rapid access to air pollution information (“Near Real Time” or “Real Real Time” data delivery). Such efforts will be based on voluntary contributions from Parties and will follow the guidance of the EMEP Steering Body.

18. EMEP observations are also made available to users and stakeholders through initiatives such as the Global Earth Observation System of Systems and the European Union’s Earth Observation Programme (COPERNICUS).

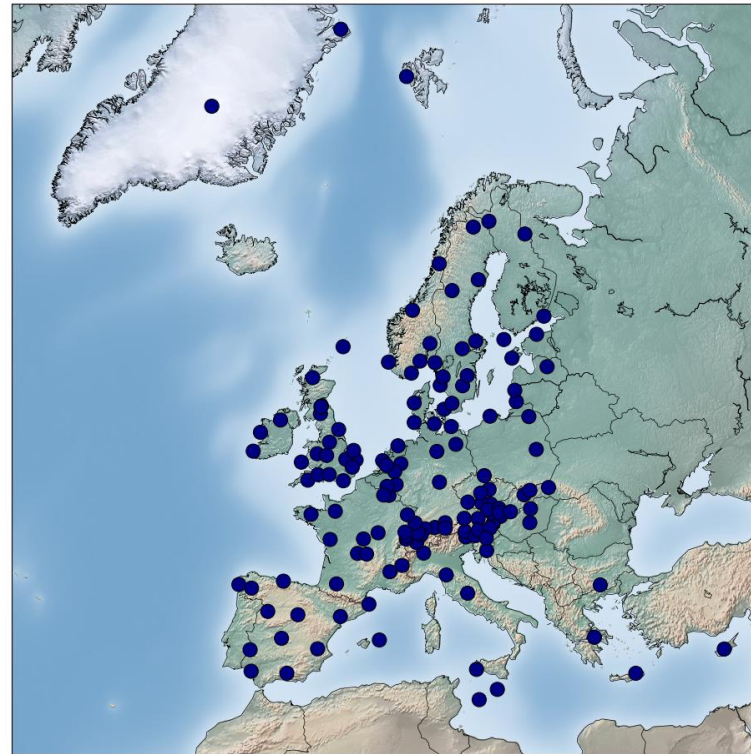


# Mapping of sites/instruments providing data to CAMS via EEA versus data reported to EBAS (EMEP, WMO-GAW or ACTRIS)

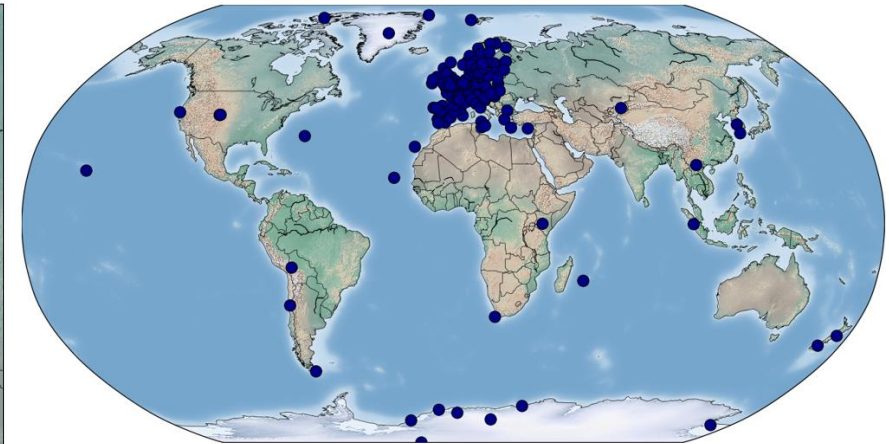
## Ozone stations



EEA



EBAS



# Findings

- Many discrepancies in station metadata and observation data between EBAS and EEA makes it challenging to map stations
- Large overlap in stations (since most countries report data from EMEP stations also to the EEA)
- Some stations are only available in EBAS, and could potentially be included in future CAMS delivery;
  - Ozone ~15 sites
  - NO<sub>2</sub> ~10 sites
  - PM<sub>2,5</sub> ~8 sites
- Work ongoing to establish methods for RRT data QA
- Operationalisation pending on later discussions



## EBAS

Data access and submission



## LABORATORY INTERCOMPARISON

Information on and submission of results from EMEPs annual lab intercomparisons



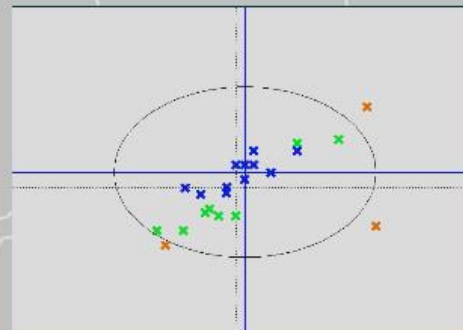
## REPORTS

List of downloadable reports



## MONITORING STRATEGY

EMEP monitoring strategy 2020-2029



## QA MEASURE

Annual results based on laboratory intercomparison



## TFMM

EMEP Task Force on measurements and modelling

## About EMEP

The cooperative program for monitoring and assessment of the long-range transmission of air pollution to the Convention on Long-Range Transboundary Air Pollution (CLRTAP). The main objectives are to regularly provide governments with data and information on CLRTAP with qualified scientific support, to develop and further improve protocols on emission reduction and on monitoring and assessment of the convention.

[Read more](#)

## EMEP/CCC Reports

Report name	Authors	Report number	Filename
Data Report 2021 Particulate matter, carbonaceous and inorganic compounds	Anne-Gunn Hjellbrekke	EMEP/CCC-Report 1/2023	EMEP_CCC-Report 1_2023 Data Report 2021 FINAL.pdf
Ozone measurements 2021	Anne-Gunn Hjellbrekke and Sverre Solberg	EMEP/CCC-Report 2/2023	EMEP_CCC-Report_2_2023_Ozone_measurements_2021_FINAL.pdf
Heavy metals and POP measurements 2021	Wenche Aas, William Frederik Hartz, Katrine Aspmo Pfaffhuber, Helene Lunder Halvorsen and Nora Yttri	EMEP/CCC-Report 3/2023	EMEP_CCC-Report 3_2023 Heavy metals and POP - FINAL.pdf
VOC measurements 2021	Sverre Solberg, Anja Claude and Stefan Reimann	EMEP/CCC-Report 4/2023	EMEP_CCC-Report_4_2023_VOC_measurements_2021_versjon_2.pdf
Data Report 2020 Particulate matter, carbonaceous and inorganic compounds	Anne-Gunn Hjellbrekke	EMEP/CCC-Report 1/2022	EMEP_CCC-Report_1_2022_Data_Report_2020.pdf
Ozone measurements 2020	Anne-Gunn Hjellbrekke and Sverre Solberg	EMEP/CCC-Report 2/2022	EMEP_CCC-Report_2_2022_Ozone_measurements_2020.pdf