

Training course on data formatting and data submission to EBAS

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Outline

- ❖ Agenda and practical information
- ❖ Presentation of the participants
- ❖ NILU, introduction
- ❖ EMEP
- ❖ The EBAS database
 - ✓ General information and what's new
 - ✓ Web interface
- ❖ Nasa Ames format

Agenda and practical information

Wednesday 8 October

- | | |
|--------------|---|
| 09.00-12.00 | Introduction presentations |
| 12.00-13.00 | Lunch (invited by NILU) |
| 13.00- 15.00 | Hands-on training |
| 15.00-15.30 | Fruits and coffee. Move to room 2A and 2B |
| 15.30-16.00 | Introduction to data format for physical, optical properties of aerosols (WDCA, ACTRIS – Markus Fiebig) |
| 16.00- 18.00 | Hands-on training |
| 19.00 | Dinner (Egon in Lillestrøm -paid individually) |

Thursday 9 October

- | | |
|-------------|--|
| 09.00-12.00 | Sum up yesterday –general problems in plenum
Hands-on training continue |
| 12.00-12.30 | Lunch (invited by NILU) |
| 12.30-13.30 | Hands-on training continue and sum up |
| 13.30 | Adjourn |
| 13.30- | An opening for further training if needed/wanted |

Lab tour in between for those interested

NILU – Making a difference for the environment



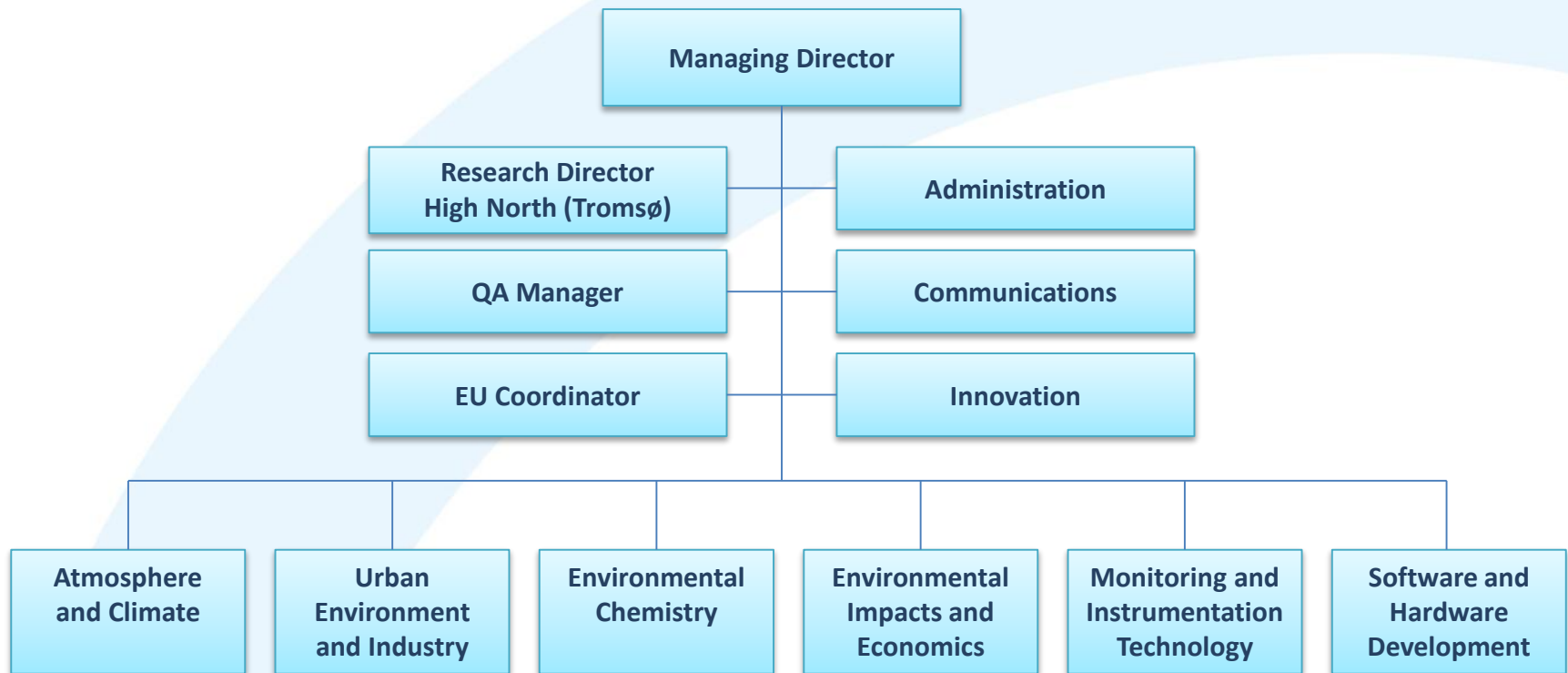
About NILU

- Founded in 1969
- Independent foundation from 1986
- Board members appointed by the
 - Norwegian Ministry of the Environment
 - The Research Council of Norway

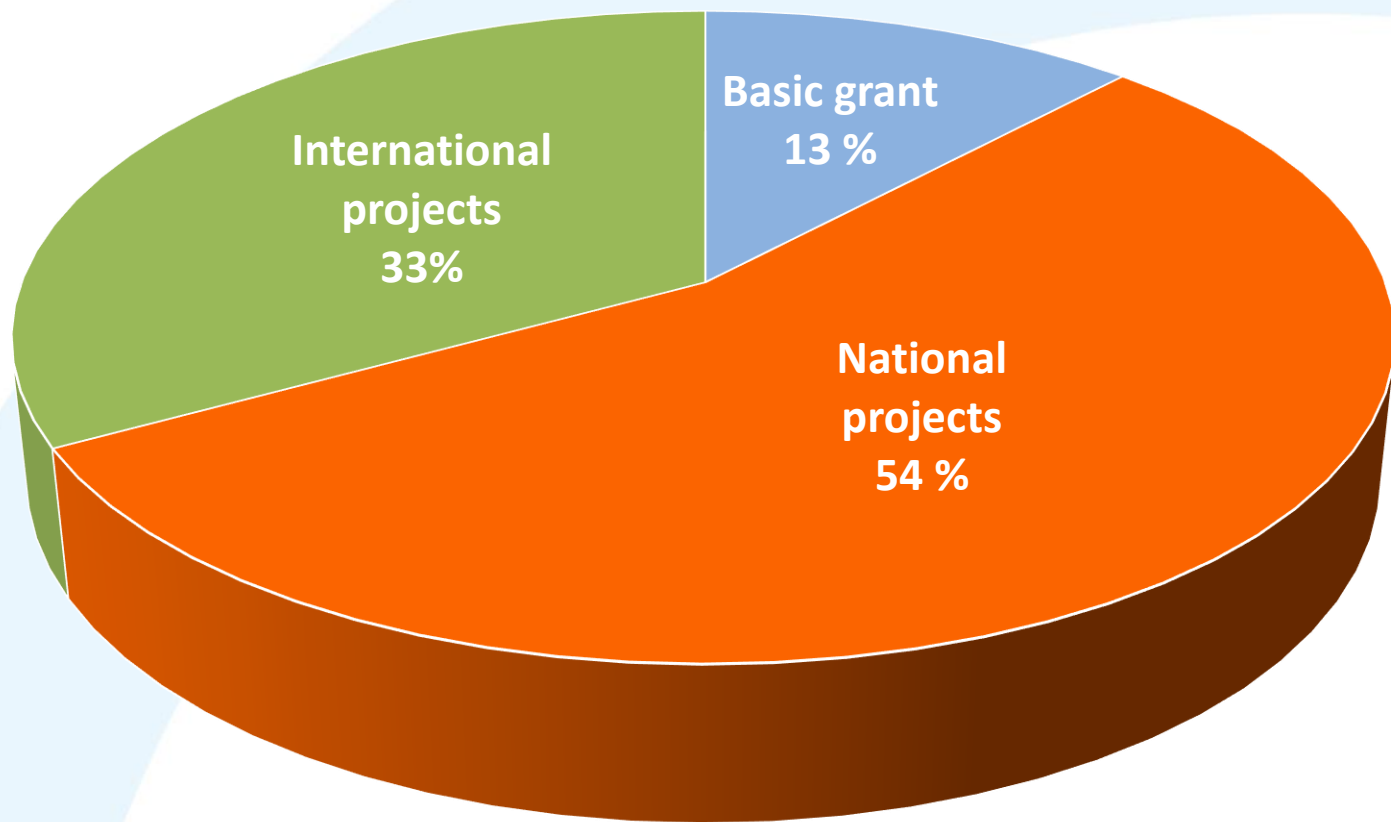
Vision

Research for a clean atmosphere

NILU's organization



Project portfolio 2013



Our research

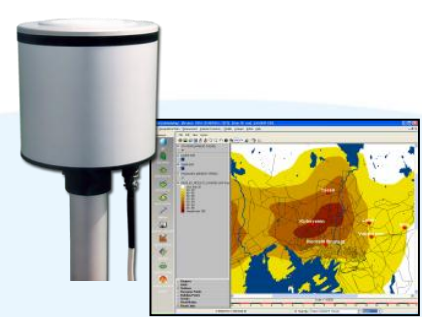
Through research, NILU shall increase the understanding of processes and consequences related to

- atmospheric composition
 - climate change
 - air quality
 - hazardous substances
- and their environmental effects.



NILU's work philosophy

Research



Products



Money

Qualifications

Research needs



Qualifications



Publishing

Research based services



Observatories from pole to pole

NILU is monitoring climate change and long-range transport of air pollutants at four observatories:

- Zeppelin in the Arctic
- Troll in Antarctica
- Birkenes and ALOMAR in Norway

NILU contributes measurements to several monitoring programs from these observatories as well as from several regional monitoring stations.



Certifications and accreditations

ISO certified in accordance with
NS-EN ISO 9001:2008 –
Quality management systems and
NS-EN ISO 14001:2004 -
Environmental management
systems

NILU's field measurements and
chemical laboratories
are accredited in accordance with
NS-EN ISO/IEC 17025

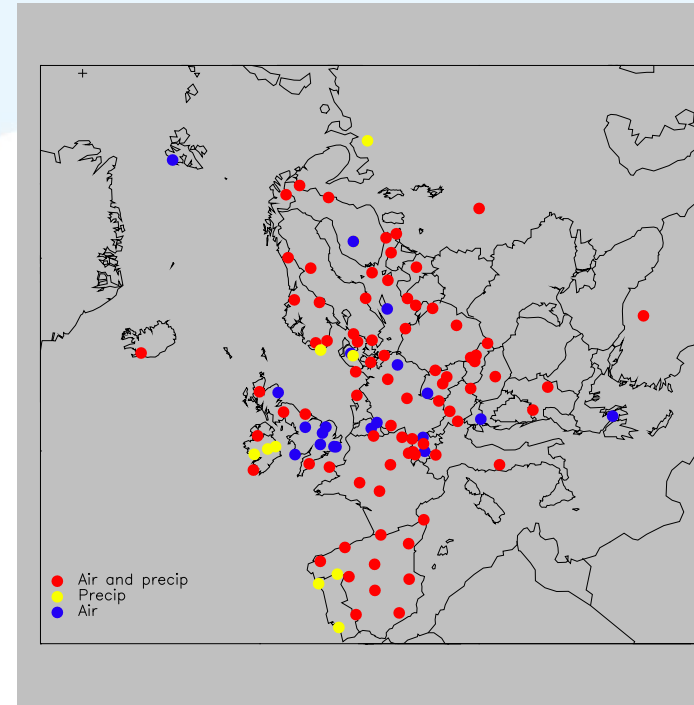
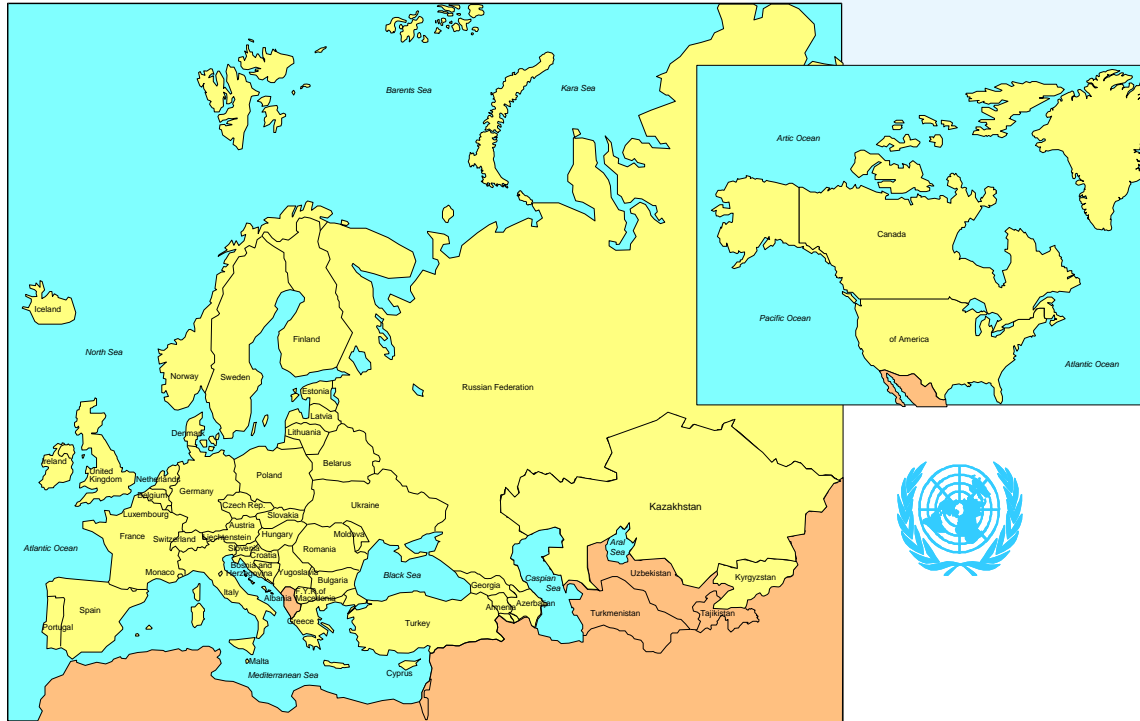


UN-ECE Convention on Long-Range Transboundary Air Pollution

(51 Parties)

- 8 Specific protocols, where the first is

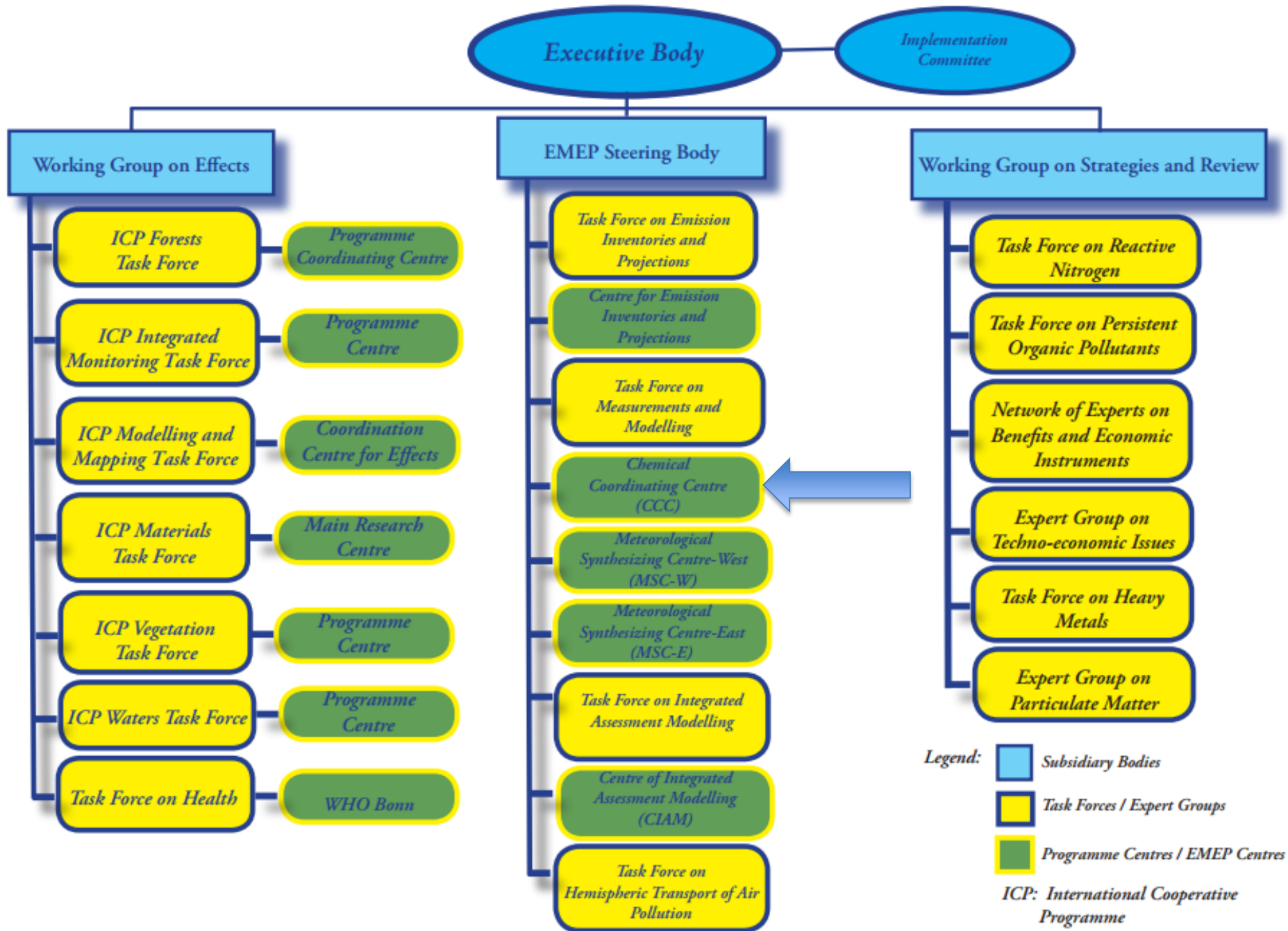
European Monitoring and Evaluation Programme (EMEP) (42 Parties)



The EMEP vision;

To be the main science based and policy-driven instrument for international cooperation in atmospheric monitoring and modelling activities, emission inventories and projections, and integrated assessment to help solve transboundary air pollution problems in Europe

INTERGOVERNMENTAL BODIES, EXPERT GROUPS AND SCIENTIFIC CENTRES

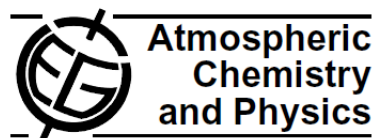


Tasks of the EMEP CCC

- ❖ **Develop and coordinate the observation activities** required to assess air pollution across the EMEP geographical domain
- ❖ **Secure and improve quality** and representativeness of observations
- ❖ Quality assurance and quality control of data submitted by Parties
- ❖ **Archival and dissemination** of observation data and associated meta-data.
- ❖ **Assessment** of data and provide information to stakeholders about results from monitoring activities
- ❖ Serve the **interest of EMEP monitoring activities** with respect to relevant activities under other frameworks to ensure harmonization, efficient use of resources and multiple usage of data.

Historical development

Atmos. Chem. Phys., 12, 5447–5481, 2012
www.atmos-chem-phys.net/12/5447/2012/
doi:10.5194/acp-12-5447-2012
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Introduction to the European Monitoring and Evaluation Programme (EMEP) and observed atmospheric composition change during 1972–2009

K. Tørseth, W. Aas, K. Breivik, A. M. Fjæraa, M. Fiebig, A. G. Hjellbrekke, C. Lund Myhre, S. Solberg, and K. E. Yttri

NILU – Norwegian Institute for Air Research, P.O. Box 100, 2027 Kjeller, Norway

<http://www.atmos-chem-phys.net/12/5447/2012/acp-12-5447-2012.html>



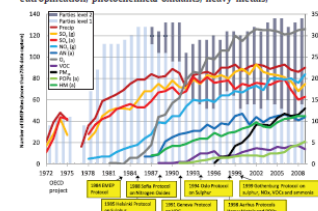
emep

Convention on Long-range Transboundary Air Pollution
emep Co-operative programme for monitoring and evaluation of the long-range transmission of air pollutants in Europe

Observed atmospheric composition change during 1972–2009 www.emep.int

The main objective of the European Monitoring and Evaluation Programme (EMEP) is to provide governments with information on the deposition and concentration of air pollutants, as well as the quantity and significance of the long-range transmission of air pollutants across boundaries.

A network of stations undertakes observations of chemical and physical variables linked to damage to human health and the environment, in particular acidification, eutrophication, photochemical oxidants, heavy metals, persistent organic pollutants and particulate matter. The information provided by EMEP is also fundamental for improving the knowledge of climate change and to assess rural and urban air quality. Supplemented with emission inventories, modelling of atmospheric chemistry and deposition, and integrated assessment modelling, the work of EMEP forms the basis for legally binding emission reduction protocols under the UNECE Convention on Long-range Transboundary Air Pollution (www.uneece.org/emv/trap).



Development of the measurement programme. Bars represent the number of parties/countries submitting data according to the level-1 and level-2 monitoring requirements, respectively. Lines indicate the number of sites for which measurements of the various variables have been measured (g) = gaseous, (a) = aerosol, AN = NH₃, NH₄, and/or HNO₃/NO₂.



The Birkenes Observatory is located in southern Norway.

History

European harmonized monitoring of atmospheric composition was initiated in the early 1970s, when a project had been funded by the Organisation for Economic Co-operation and Development (OECD) to study long range transport of air pollutants. Political consensus was reached on the need for an international coordinated action and this subsequently led to the establishment of the Convention on Long Range Transboundary Air Pollution (CLRTAP) in 1979. The network of monitoring sites established for the OECD project was later continued under the European Monitoring and Evaluation Programme (EMEP), and the program was extended to

include a wide range of substances which are subject to atmospheric transport across national boundaries. Since the measurements need to be made in a comparable way at all sites and consistent in time to allow the assessment of temporal and spatial trends, the Chemical Coordinating Centre EMEP (EMEP-CCC) was established in 1977 to harmonize these efforts. The measurements are widely used by the scientific community and have served as a basis for an extensive number of scientific studies during nearly 40 years.

http://www.nilu.no/projects/ccc/emep_monitoring/EMEP-booklet_final.pdf

EMEP Monitoring strategy, 2010-2019

<http://www.unece.org/env/documents/2009/EB/ge1/ece.eb.air.ge.1.2009.15.e.pdf>

**UNITED
NATIONS**

E



**Economic and Social
Council**

Distr.
GENERAL

ECE/EB.AIR/GE.1/2009/15
23 June 2009

Original: ENGLISH

ECONOMIC COMMISSION FOR EUROPE

**EXECUTIVE BODY FOR THE CONVENTION ON LONG-RANGE
TRANSBOUNDARY AIR POLLUTION**

Steering Body to the Cooperative Programme for Monitoring and
Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP)

Thirty-third session
Geneva, 7–9 September 2009
Item 6 (a) of the provisional agenda

EMEP Monitoring programme:

Level 1

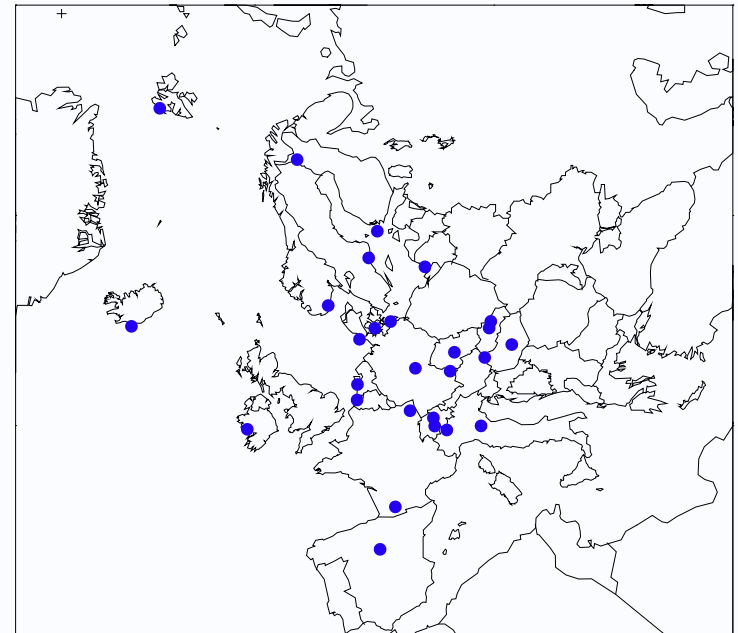
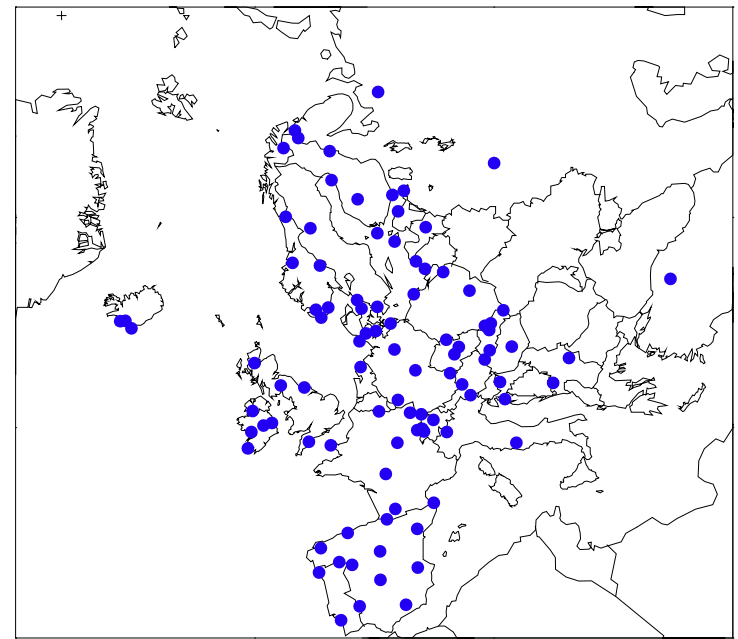
- Main ions in precipitation and in air
- heavy metals in precipitations
- ozone
- gas particle nitrogen ratios (low cost)
- PM_{10} and $PM_{2.5}$ mass
- meteorology

at ca 125 sites

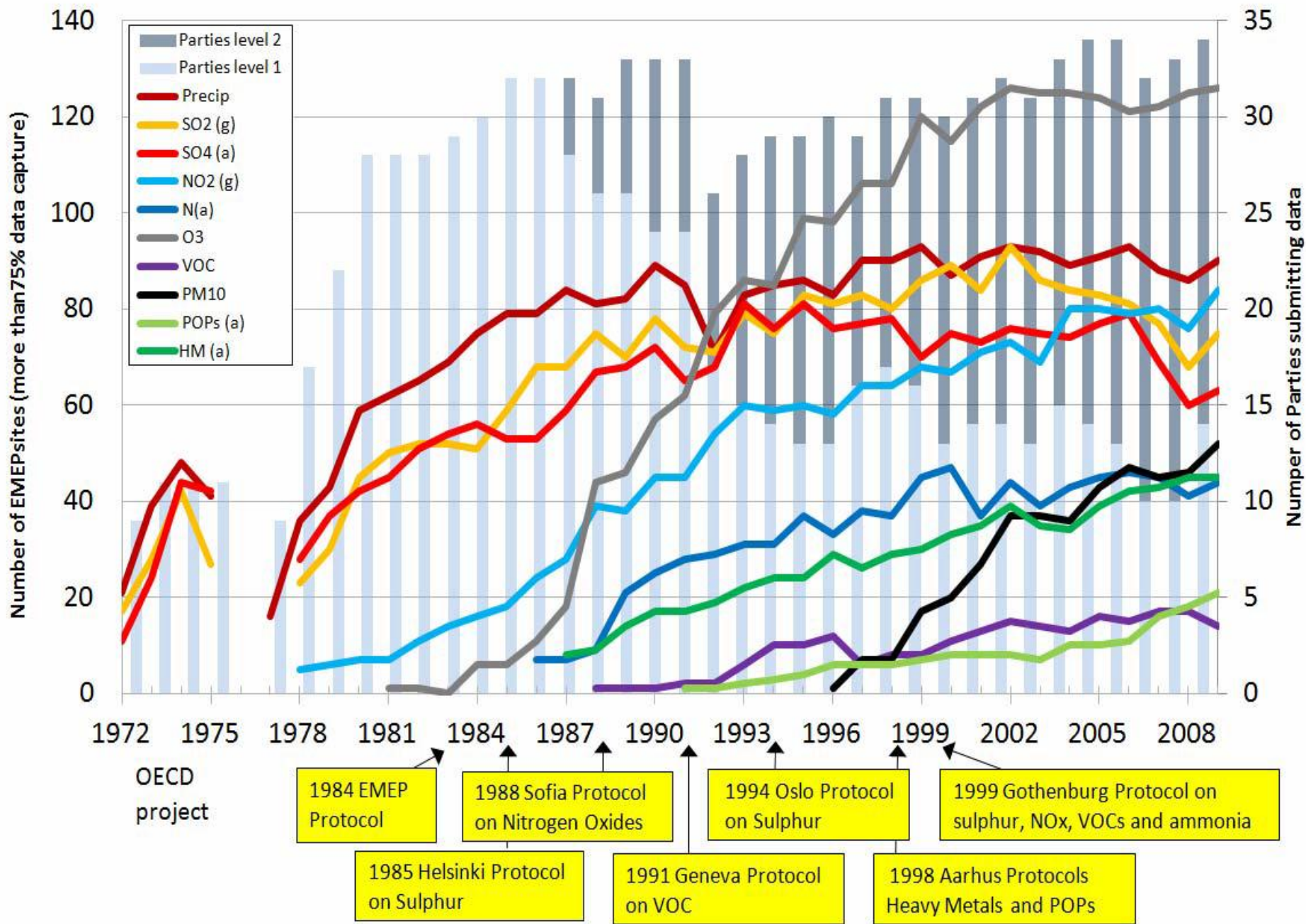
Level 2, supersite (joint EMEP/GAW)

- PM composition (EC/OC, mineral dust)
- Aerosol physical and optical properties
- CH_4
- Tracers (CO and halocarbons)
- POPs
- Heavy metals in air and aerosols
- VOC
- + all level 1 activities

20-30 sites



Both levels are mandatory



Development at different levels

Observational

- infrastructure incl. new method
- number of species monitored
- number of (super) sites
- **database**
- monitoring / research

Quality (QA/QC)

- reference methods
- Intercalibrations
- Metadata info.
- Harmonization between networks

Integration and cross disciplinary

- topics: health, ecosystem, climate
- scales: local, regional, global
- Policy and research

Framework [48] EMEP_NRT EMEP_preliminary EUCAARI EUSAAR EUSAAR_NRT EUSAAR_preliminary GAW-WDCA	Country [72] >>All Argentina Armenia Australia Austria Belarus Belgium	Station [1068] >>All Abastumani Abbeville Abington (CT15) Abisko Acadia National Park-McFarland Hill Achenkirch	Matrix [24] >>All aerosol air air+aerosol air+pm10 instrument met
Instrument type [95] >>All abs_solution abs_tube ads_tube aerosol_sampler aethalometer air_UK	Component [713] >>All 1-2-3-trimethylbenzene 1-2-4-trimethylbenzene 1-3-5-trimethylbenzene 1-3-butadiene 1-3-butadiene_statistics 1-butene	From >>All To >>All	

Available datasets: 59737
[Reset](#) [List datasets](#)

Map (Populate) (Show large)



Additional resources

- Air mass trajectories
- Measurement network (EMEP)
- Measurement network (GAW)
- Data submission
- EMEP/CCC reports
- Quality assurance
- EMEP manual
- EMEP laboratory intercomparisons
- TFMM
- HTAP
- Measurement programme/strategy (pdf)
- Contact persons

EBAS - <http://ebas.nilu.no/>

Some EBAS History

- Originally the data archive of the European part of the UN Convention for Long-Range Transport of Air Pollution (CLRTAP), the European Monitoring and Evaluation Programme (EMEP)
 - Name is derived from EMEP data**BASE**.
- Today's relational database used since the mid-90s on varying hardware.
- Since about year 2000 also used by other projects and frameworks.
- Web-interface since 2009, linking also other tools.

Why is data reporting important?

- *National obligations to EMEP (and other programme)*
- *Public funding: visibility and access is often a prerequisite*

Atmospheric measurements are hard work by many people and considerable amount of money is invested



Reporting makes the data available for various users, now and in the future, to contribute to solve the central environmental questions within air quality and climate

Many programmes and project have a defined goal to provide access to data for many users, i.e.:

- ✓ EMEP
- ✓ GAW-Aerosol (GAW-WDCA)
- ✓ EU infrastructure projects ACTRIS, InGOS..

Additional value of reporting and sharing data

- **Improve funding** situation by demonstrating the use and value of data.
- **Improved data quality** by improving methods and measurement practice as more data are used.
- **Facilitate collaboration** and interactions between measurement communities.
- **Illustrate project progress**: The data centre is a prominent PR instrument for projects.
- EU commission **judges projects** by number and rank of data users/data sets etc.

Users of EBAS

Data Providers:

- **Policy Frameworks:** EMEP, HELCOM, CAMP, AMAP
Data is owned by country or agency contributing to framework.
- **Scientific Networks:** GAW (WDCA)
Data is owned by data provider or PI unless also part of policy framework
- **Research Projects:** ACTRIS, EUSAAR, EUCAARI,
Varying data ownership, but usually data provider / PI.

Data Users:

- The providing frameworks themselves.
- EEA, ECMWF, Aerocom, ...

Most of the data in ebas are public, though some regulations:

Regulate the use of data in accordance with the data providers (and programs) intention

- Lot of effort behind, **visibility** to the data providers.
- Facilitate the involvement of the data providers to ensure proper use of data when necessary.
- Reduce misinterpretations (balance between data use, data analysis, depending on use etc).
- Make the funding source visible, also important for future funding situation.

Re-distribute data to third parties from the database?

NILU will not do any re-distribution of data because:

- Important not to duplicate –track changes/updates in data.
Data users should **use the primary data source**
- Not “our data”, associated to programs.
- No proper acknowledgment.
- Data base is dependent on trust
- Data can be misused and misinterpreted.

Solution:

- Develop mechanisms/interface for getting data to keep better control of the use. This will also avoid duplications and several versions of same data available and distributed.
- Data sharing agreements/protocols.

Why new database and what is changed?

- ❖ Formalized names of **data owners**, submitter and organizations
- ❖ More information on **data characteristics and quality**
 - ❖ every parameter has now a notation of the statistical meaning (e.g. arithmetic mean (=default), median, stddev, percentiles,..)
 - ❖ additional characteristics to describe the parameter (size bins, wavelengths, instr temperature..).
- ❖ **Multicolumn** –easier to submit (and retrieve) data from same instrument (i.e. filterpack and precipitation)
- ❖ Metadata changing over time
- ❖ Full **history of data changes**.

Changes can be tracked and historical data versions can be retrieved from the database. This enable data users to 'cite' exactly the data they retrieved from the database.
- ❖ Possibilities to submit data of different degree of aggregation (information)
 - Level 0 : data as they come from the instrument (raw data)
 - Level 1. Data in the original time resolution, but processed and corrected
 - Level 2: The data as they appear in EBAS. For the high time resolution data these are aggregated into hourly measurements.

Modes of Data Submission

1. Regular, Annual Data Submission

- Final, fully quality assured data (including uncertainty, and variability where applicable.)
- Deadlines depend on framework reported to: EMEP: **31 July following year**,

2. Advanced Data Reporting

- Designed to establish traceability of data back to the time of measurement.

3. Near-Real-Time Data Reporting

- Data should be available to the user within max. 3 hours of measurement.
- Data is being processed and screened automatically, lower quality and higher uncertainty as with regularly reported data accepted.

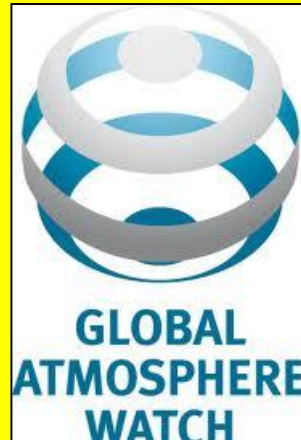
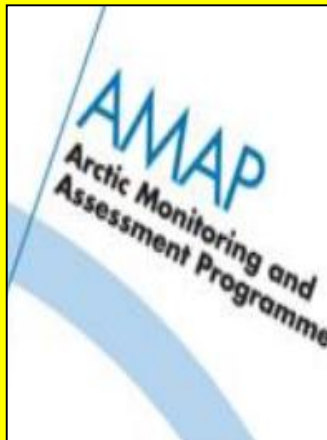
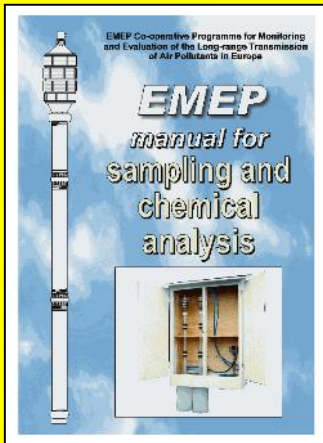
What is “Traceability”?

- Whole chain of data acquisition / processing / QA can be traced back to the time of measurement.
- Allows to reprocess the data.
- Separates DA / processing / QA chain into well defined steps, great tool for finding the cause of failing intercomparison.
- Data is documented also for a user in 15 years from now.
- Higher level frameworks are moving to requiring this feature.

Data quality and quality control

- Essential to have **harmonized measurements** to be able to do comparison over **time** and **space**
- Standard operation procedures and reference methods developed
- Regular field and laboratory intercomparison
- Reporting guidelines, incl metadata info etc

Monitoring frameworks:



Infrastructure projects



Sources of uncertainties

Sampling and analytical method

- Detection limit
- Interference
- Instrument drift, calibration
- Positive or negative artefact

Assessed by:

*Lab- and field
intercomparison
Ion balance plot*

Sampling procedure

- Contamination
- Temperature and period for storage
- Transport

*Field inter-comparison;
model comparison*

Representativity.

- Local farming (NH₃)
- Nearby roads (NO_x; O₃)
- Dust (PM, Ca..)
- Local heating (SO₂, PM, EC/OC)

*Repr. studies, i.e
passive sampling. Model
comparison*

Lab intercomparisons annually for inorganic, heavy metals, EC/OC (EC Ispra). POPs now and then

	Precipitation											Air and aerosols		
	SO ₄ ²⁻	NO ₃	NH ₄	pH	Mg	Na	Cl	Ca	K	Cond	SO ₂	HNO ₃	NH ₃	
1 AT	0.6	0.2	1.4	0.3	3.1	1.3	4.2	2.8	1.6	0.9				
21 CH	0.7	0.6	1.0	0.0	1.2	0.4	1.1	0.7	2.9	0.3	1.0			
24 CS	0.4	0.7	1.0	0.1	2.8	1.4	2.1	2.2	1.3	0.5				
3 CZ	0.9	0.3	10.5	0.5	1.2	2.3	1.3	3.2	1.3	1.2	8.1	3.3		
7 DE	0.6	0.5	1.1	0.1	0.8	1.2	0.9	0.7	1.0	3.0				
8 DE Leipzig	0.1	0.3	0.7	0.0	0.8	0.4	0.8	0.5	0.3	1.4	5.1	2.1	8.3	
4 DK	0.3	0.3	1.2	0.0	1.2	5.1	3.2	3.0	2.1	1.8	1.8	3.8		
38 EE	1.2	1.4	32.7	1.3	2.0	2.7	4.1	6.7	0.8	3.1	7.2			
19 ES	6.3	7.0	4.1	0.3	0.4	1.8	12.0	1.0	0.7	0.9	22.5		3.8	
5 FI	0.9	1.7	2.6	0.3	2.8	11.2	9.6	2.3	2.8	0.8	5.0	2.1	4.8	
6 FR	0.4	0.9	1.0	0.2	3.5	1.6	2.1	3.5	1.3	1.9	1.3			
23 GB	0.9	0.9	1.9	0.3	18.5	15.2	1.8	6.2	10.3	4.0	1.5			
10 HU	2.7	2.9	1.2	0.3	0.8	2.1	18.2	2.2	8.5	2.1			18.4	
35 HR	1.2	2.0	0.8	0.2	9.8	3.7	1.3	8.8	8.3	1.1				
12 IE	0.5	1.1	2.6	0.2	2.0	1.3	1.8	2.0	2.1	0.4				
11 IS	2.0	6.0	11.4	0.3	2.4	0.7	12.5	1.5	5.2	1.6	8.0	5.9	4.8	
13 IT	1.0	0.7	3.8	0.5	2.4	3.2	3.3	1.8	2.8	2.1			8.2	
30 IT	0.5	3.4	11.4	1.0	1.2	0.3	3.6	1.7	9.5	1.2				
32 LT	3.2	0.6	3.0	0.1	2.1	3.1	45.1	1.6	1.0	1.0	2.8	2.8	14.6	
33 LV	2.3	2.4	1.2	0.2	1.6	0.2	6.8	1.8	0.7	0.6	4.4	12.4	6.3	
40 MK	9.9	89.2	1.3	31.3	1.1	183.1	7.1	16.6	1.2	1.2				
14 NL	0.5	3.5	0.5	0.3	3.9	2.0	5.6	1.8	7.0	1.2				
15 NO	0.5	0.7	1.2	0.2	3.5	1.4	1.1	1.5	0.5	1.4	8.1	5.5	5.7	
16 PL	0.9	0.7	3.4	0.2	2.0	2.7	1.6	3.7	4.1	1.0	1.8	1.0		
39 PL05	1.5	2.4	0.8	0.4	0.4	0.5	2.5	0.8	0.8	1.3	8.6	1.8	6.2	
17 PT	11.2	2.5	4.9	0.9	5.1	4.1	22.3	3.5	5.4	1.9	4.6			
22 RU	3.9	6.7	1.8	0.2	9.1	10.5	31.0	24.1	7.8	0.9	13.7	3.8		
20 SE	0.1	0.2	2.9	0.2	2.4	0.5	1.4	2.8	0.7	1.4	4.0	2.6	4.6	
36 SI	0.6	2.1	2.2	0.2	2.0	1.3	7.0	1.3	0.3	1.3	4.5	2.1	3.0	
31 SK	4.5	1.3	38.4	0.2	10.2	5.4	3.9	13.5	17.3	0.5	2.5	1.9	10.0	
34 TR	0.7	2.6	11.8	0.3	4.7	2.0	2.9	4.5	3.6	6.6	3.0	1.6	26.5	

1-2 DQO > 2 DQO

Spread: 2RSD %



	Precipitation											Air and aerosols		
	SO ₄ ²⁻	NO ₃ -N	NH ₄ -N	pH	Mg	Na	Cl	Ca	K	Cond	SO ₂ -S	NO ₂	NH ₃	
1 AT	1	0	-1	-2	-9	-3	-11	-3	-5	-2				
21 CH	2	1	2	1	3	1	-1	4	7	0			-9	
24 CS	0	-2	-1	0	-2	-6	3	0	0	-1				
3 CZ	3	-1	20	0	6	-2	-2	14	-3	1	-12	-6		
7 DE	5	-1	-3	-1	0	-1	-2	0	-3	-5	2	4	4	
8 DE	1	0	-2	2	1	-1	-3	4	-3	-5				
4 DK	0	0	1	1	-11	8	-3	-1	-10	-3	-5	-3		
38 EE	-1	-1	-107	-8	-17	-9	1	-28	-8	-11	-13			
19 ES	-7	1	8	3	1	2	-38	-2	2	2	-20		9	
5 FI	3	4	1	1	4	4	8	6	4	3	4	10	-7	
6 FR	-1	0	-1	0	-9	4	-2	7	-4	-3	-8			
10 HU	-1	11	-1	1	2	-6	-11	5	2	0			-24	
35 CR	4	3	-2	2	51	-1	0	22	-1	-5				
12 IE	-1	-1	3	0	4	-5	-2	0	-4	1				
11 IS	-1	13	24	1	-3	1	7	-8	-8	-4	-10	25	6	
13 IT	4	-1	3	-1	-4	-2	-3	2	0	-3			14	
30 IT	-7	-12	-35	3	0	2	0	-2	-37	0				
32 LT	4	0	7	1	0	0	-2	40	0	-1	2	-3	5	
33 LV	-1	-6	5	0	2	1	-7	2	0	-1	7	-15	3	
40 MK	1	-7	-4	-4	1	6	-21	-1	4	3				
14 NL	2	14	-5	2	-4	6	-21	-1	4	3				
15 NO	3	2	11	2	11	2	-2	2	2	1	0	-6	-11	
16 PL	0	-1	-1	1	2	5	-1	12	13	-4	4	2		
39 PL05	3	2	1	0	0	2	4	2	0	-4	9	6	-13	
17 PT	-4	-1	-1	-6	17	-42	-72	-12	-34	0	-11			
22 RU	-2	-3	-30	2	-6	-7	-28	0	-5	-6	0	-8		
20 SE	-1	0	4	1	-11	-2	-5	-11	-3	-1	-4	-3	-4	
36 SI	-1	8	1	1	-6	3	21	-2	-6	-2	3	8	-2	
31 SK	-3	-4	39	1	-16	7	-4	-30	19	2	6	3	4	
34 TY	2	-2	3	1	0	4	-2	2	-10	-8	-7	-16	-10	
23 UK	1	0	4	-2	-24	29	-32	-9	-18	-6	-3			

systematic bias more than +- 20 % bias between 10 and 20 % or between -10 and -20 % bias

Bias: RB %



Using NASA Ames 1001 Format for Reporting. Why?

1. Simplicity

- Pure ASCII text, human readable, readily opened or edited by simple means (any editor or spreadsheet application).
- Explanation relatively short, yet contains necessary metadata.

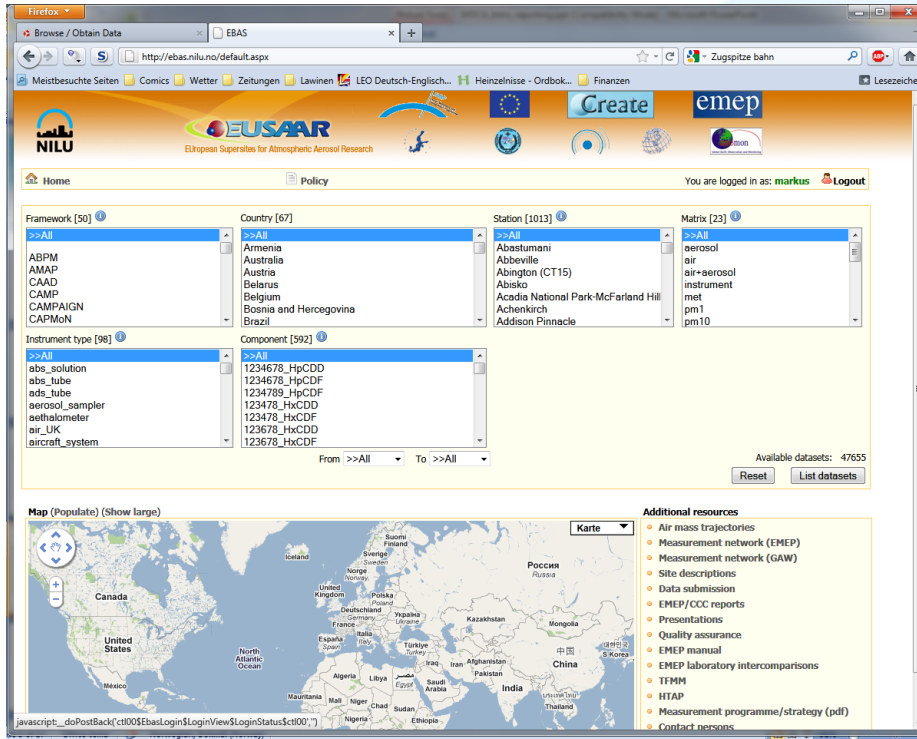
2. Reduce Format Confusion

- Don't increase number of existing formats (NASA Ames, Narsto, NetCDF, HDF, ...) unnecessarily as long as metadata can be transported in old format, even though some features are old-fashioned.
- Existing libraries can be used to handle files.

3. Keep threshold low

- More modern, binary formats exist (NetCDF, HDF), but need special editors and steep learning curve to assemble.
- NASA Ames can be assembled with simple tools rather quickly.

The EBAS Web interface 1 / 3

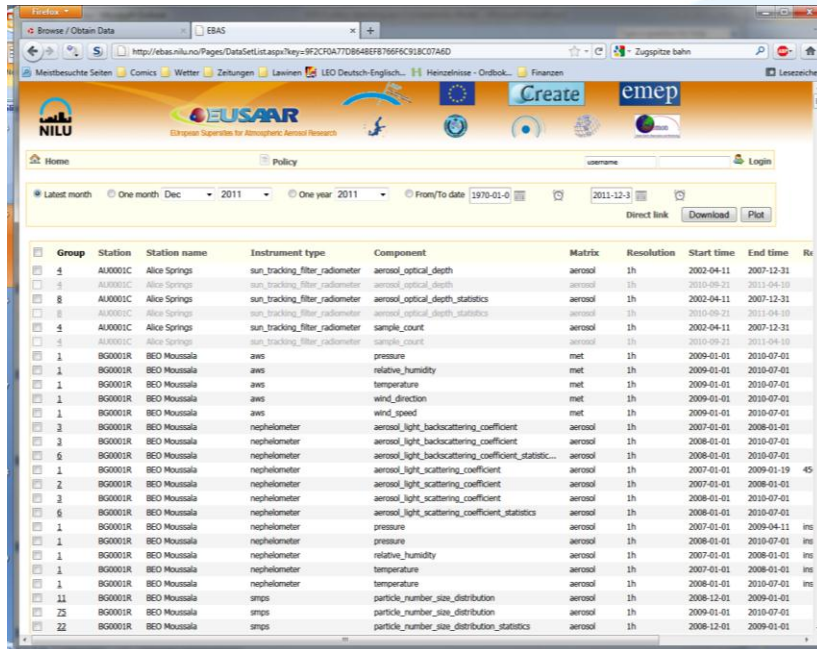


<http://ebas.nilu.no>

EBAS web-interface functions:

- Search datasets by criteria: Framework, country, station, matrix, instrument type, component.
- Visualise distribution of stations on map.
- Manage access to restricted data.
- Links to other resources, e.g. trajectory calculations for station.
- Plot, browse, compare datasets.
- Download data.

The EBAS Web Interface 2 / 3



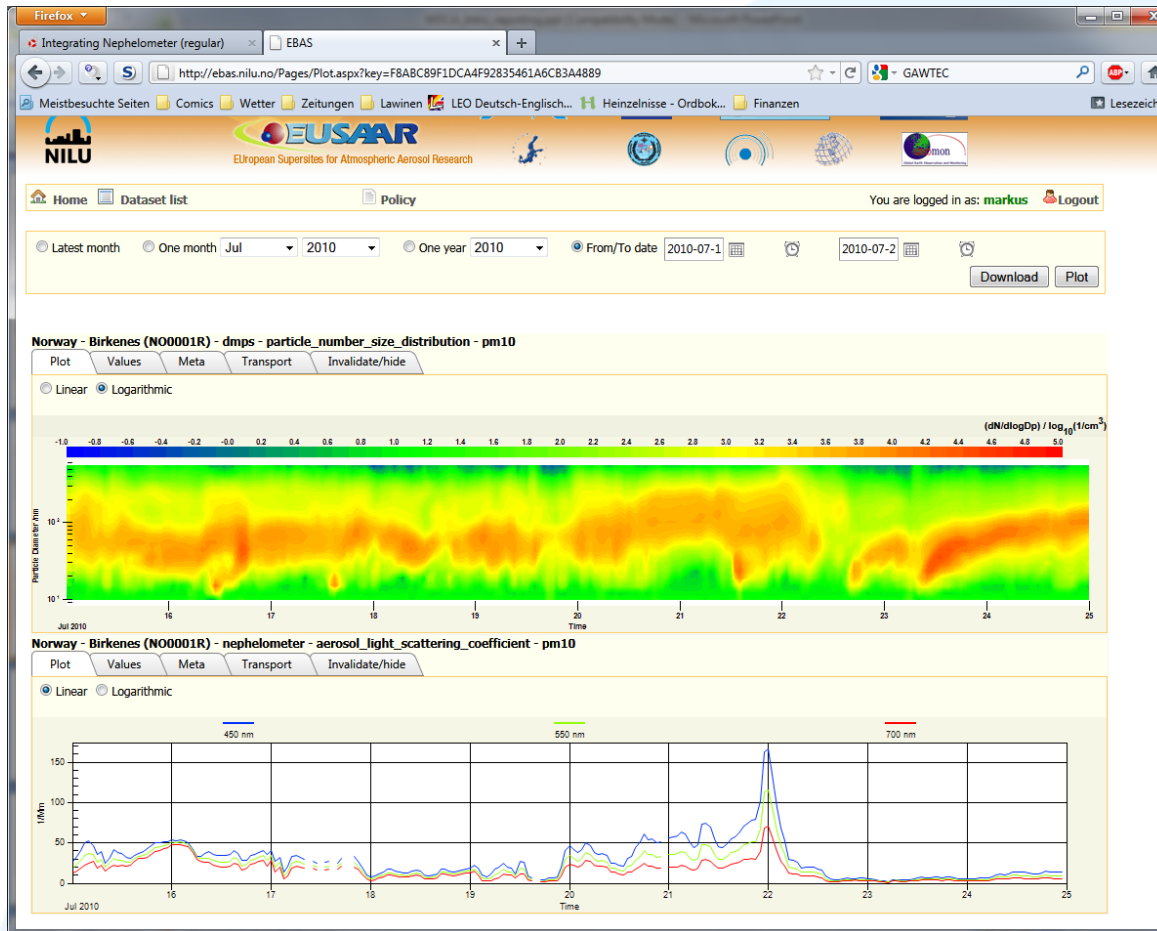
The screenshot shows the EBAS web interface in a Firefox browser. The address bar displays the URL: <http://ebas.nilu.no/Pages/DataSetList.aspx?Key=9F2CFA770B648E8766FC918C07A6D>. The page header includes the NILU logo, the EUSAAR logo (European Supervised for Atmospheric Aerosol Research), and the emep logo. Below the header, there are navigation options for 'Home' and 'Policy', a search bar, and a 'Login' button. A date range selector is set to 'Latest month' for 'Dec' in '2011', with a 'From/To date' range of '1970-01-01' to '2011-12-31'. Below this, there are 'Direct link', 'Download', and 'Plot' buttons. The main content is a table with the following columns: Group, Station, Station name, Instrument type, Component, Matrix, Resolution, Start time, and End time. The table lists various datasets from Alice Springs and BE0 Mousala stations.

Group	Station	Station name	Instrument type	Component	Matrix	Resolution	Start time	End time	Rs
4	AI0001C	Alice Springs	sun_tracking_fiber_radiometer	aerosol_optical_depth	aerosol	1h	2002-04-11	2007-12-31	
5	AI0001C	Alice Springs	sun_tracking_fiber_radiometer	aerosol_optical_depth	aerosol	1h	2010-04-21	2011-04-10	
8	AI0001C	Alice Springs	sun_tracking_fiber_radiometer	aerosol_optical_depth_statistics	aerosol	1h	2002-04-11	2007-12-31	
8	AI0001C	Alice Springs	sun_tracking_fiber_radiometer	aerosol_optical_depth_statistics	aerosol	1h	2010-09-21	2011-04-10	
4	AI0001C	Alice Springs	sun_tracking_fiber_radiometer	sample_count	aerosol	1h	2002-04-11	2007-12-31	
5	AI0001C	Alice Springs	sun_tracking_fiber_radiometer	sample_count	aerosol	1h	2010-09-21	2011-04-10	
1	BG0001R	BE0 Mousala	aws	pressure	met	1h	2009-01-01	2010-07-01	
1	BG0001R	BE0 Mousala	aws	relative_humidity	met	1h	2009-01-01	2010-07-01	
1	BG0001R	BE0 Mousala	aws	temperature	met	1h	2009-01-01	2010-07-01	
1	BG0001R	BE0 Mousala	aws	wind_direction	met	1h	2009-01-01	2010-07-01	
1	BG0001R	BE0 Mousala	aws	wind_speed	met	1h	2009-01-01	2010-07-01	
3	BG0001R	BE0 Mousala	nephelometer	aerosol_light_backscattering_coefficient	aerosol	1h	2007-01-01	2008-01-01	
3	BG0001R	BE0 Mousala	nephelometer	aerosol_light_backscattering_coefficient	aerosol	1h	2008-01-01	2010-07-01	
6	BG0001R	BE0 Mousala	nephelometer	aerosol_light_backscattering_coefficient_statistics	aerosol	1h	2008-01-01	2010-07-01	
1	BG0001R	BE0 Mousala	nephelometer	aerosol_light_scattering_coefficient	aerosol	1h	2007-01-01	2009-01-19	45
2	BG0001R	BE0 Mousala	nephelometer	aerosol_light_scattering_coefficient	aerosol	1h	2007-01-01	2008-01-01	
3	BG0001R	BE0 Mousala	nephelometer	aerosol_light_scattering_coefficient	aerosol	1h	2008-01-01	2010-07-01	
6	BG0001R	BE0 Mousala	nephelometer	aerosol_light_scattering_coefficient_statistics	aerosol	1h	2008-01-01	2010-07-01	
1	BG0001R	BE0 Mousala	nephelometer	pressure	aerosol	1h	2007-01-01	2009-04-11	ins
1	BG0001R	BE0 Mousala	nephelometer	pressure	aerosol	1h	2008-01-01	2010-07-01	ins
1	BG0001R	BE0 Mousala	nephelometer	relative_humidity	aerosol	1h	2007-01-01	2008-01-01	ins
1	BG0001R	BE0 Mousala	nephelometer	temperature	aerosol	1h	2007-01-01	2008-01-01	ins
1	BG0001R	BE0 Mousala	nephelometer	temperature	aerosol	1h	2008-01-01	2010-07-01	ins
11	BG0001R	BE0 Mousala	smps	particle_number_size_distribution	aerosol	1h	2008-12-01	2009-01-01	
25	BG0001R	BE0 Mousala	smps	particle_number_size_distribution	aerosol	1h	2009-01-01	2010-07-01	
22	BG0001R	BE0 Mousala	smps	particle_number_size_distribution_statistics	aerosol	1h	2008-12-01	2009-01-01	

Search result page of EBAS web-interface:

- Lists datasets that meet search criteria set on home page.
- Datasets that are present, but access restricted, are displayed in grey.
- Time period for plotting or download to be selected on top (select appropriate radio button!).

The EBAS Web-interface 3 / 3



Plot page for selected datasets:

- Screen, evaluate, compare between instruments, compare between stations, ...
- Download datasets (data is automatically grouped by instrument).

Why do we ask providers to format the data?

1. Avoid errors

- Reformating data and frequent iterations with provider induce misunderstanding and errors.

2. Scientific standard of provider

- Yearly submission is essence of a year's work, data (often) remains property of PI, they are responsible for the quality (policy dependent).

3. Work load at data centre:

- EBAS receives over 6000 datasets annually. Submitting formatted data frees resources for other services, e.g. dissemination.

Online formatting templates

http://ebas-submit.nilu.no/

Web Site

REGISTER LOGIN

March 16, 2013

Submitting Data to the EBAS Database

The EBAS atmospheric database, originally designed for the [European Monitoring and Evaluation Programme \(EMEP\)](#), archives today data on atmospheric composition from ground stations around the globe as well as aircraft platforms. Co-operating frameworks and projects include:

- [The WMO Global Atmosphere Watch Programme](#)
- [The Convention on Long-Range Transboundary Air Pollution](#)
- [The EU-project Aerosols, Clouds, and Trace gases Research InfraStructure Network \(ACTRIS\)](#)

Data providers benefit from improved data dissemination through EBAS with an increased number of collaborations. Data submitted to EBAS are protected by a [fair-use data policy](#).

Submission Format

Data submitted to EBAS need to be formatted in the EBAS NASA-Ames format by the data provider. The EBAS NASA-Ames format is based on the ASCII text NASA-Ames 1001 format, but contains additional metadata specifications ensuring proper documentation, and is designed to be easily understandable (see [reasoning behind this setup](#)). On this site, you will find format templates for parameters hosted in EBAS.

Submission Procedure

The normal mode of submitting data to EBAS is the regular, annual data submission. The deadline for a submission depends on the framework or project the dataset is associated with. EBAS also offers advanced data reporting that establishes complete traceability of the measurement and data analysis process. Participation in the advanced data reporting scheme is voluntary unless required by the associated project or framework. The usual steps for submitting data for the first time include:

- 1. Registering your station with GAW SIS:**
If the framework your station is associated with has a collaboration agreement with the [WMO GAW](#) programme, you need to register your station with the [GAW station information system \(GAW SIS\)](#) by filling out a [request form](#).
- 2. Initial contact with EBAS:**
Please establish the initial contact with EBAS by writing an e-mail to ebas@nilu.no. In your mail, please indicate the station you are intending to report data for, the GAW SIS station ID if relevant, and the parameters you intend to report. In return, you will receive three further IDs: 1) the EBAS station code; 2) the EBAS platform code; 3) a code for your lab analysing the data, which you will need for the metadata in your submission. The reason for having several station codes lies in several frameworks collaborating. The three letter GAW IDs and the IDs used in the CLRTAP EMEP database EBAS were introduced independently and are maintained for consistency.
- 3. Quality assure your data:**
This step will probably take longest of all steps in this data submission guideline, and is prerequisite for any further use of the data. Please make sure that you followed the respective standard operating procedure (SOP) valid for your instrument, both during data collection and data processing and evaluation. There will likely be periods for which the data is invalid due to calibrations or malfunctions, and there may be additional conditions (activity around the station, etc.) you will want to convey to the data user. EBAS uses a system of flags for this purpose. Each flag is assigned a three digit integer number. A list of these flags can be found at <http://www.nilu.no/projects/ccc/flags/flags.html>. The list of flags is comprehensive, but may not be complete. If there is a condition you think is not covered, please send an e-mail to ebas@nilu.no for guidance or an extension of the list of flags.
- 4. Assemble / Update Metadata Header:**
 - a. First-time submitters:**
In assembling the header with metadata for a first-time data submission, it is probably easiest just to copy the respective template valid for the parameter to be reported (see menu on the left), and adapt it to the station and protocols used for data collection and processing. Each line in the online template is a link pointing to an explanation of the content. The explanation always begins with a specification of the syntax used. Items enclosed in "<*>" mark a place holder to be replaced with content or key words as described. Please follow the syntax exactly since many lines contain a keyword identifying the content, and these keywords are recognised by string comparison.
 - b. Experienced submitters:**
If you have submitted data for a given parameter to EBAS before, you can copy the header from the previous year to start with, and update at least the fields containing a date or time. However, please make sure to check through the metadata items and update them in case any changes occurred in your setup. Especially for later trend analysis, it is rather important that any changes that may have caused a rupture in the dataset are documented in the metadata.
- 5. Format data, join header and data sections:**
The data section of an EBAS NASA-Ames file consists of a fixed width, fixed number format ASCII table, with the number formats specified in the file header. Please refer to the parameter specific pages for examples (menu on left). Once the data section is constructed, please join header and data section into one file, and name the file using the file name stated in the header.
- 6. Submit Data:**
The files containing the data submissions are uploaded to EBAS's anonymous FTP-site, which is accessible at:
<ftp://ebas-submissions.nilu.no/incoming>

Sponsoring
Projects:



Online formatting templates

Submitting Data to the EBAS Database

Regular, Annual Data Reporting
Advanced Data Reporting
Full List of Flags Used for Data Reporting

NO_x (regular)
Cloud Condensation Nucleus Counter (link to WDCA)
Condensation Particle Counter (link to WDCA)
Diff./Scanning Mob. Particle Sizer (links to WDCA)
Filter Absorption Photometer (links to WDCA)
Integrating Nephelometer (links to WDCA)
Radiometric Aerosol Optical Depth (links to WDCA)
Particulate Mass Conc., gravim. (links to WDCA)
Particulate Mass Conc., online (links to WDCA)
ACSM (regular)
VOC

Submitting Data to the EBAS Database

was originally designed for the [European Monitoring and Evaluation Programme \(EMEP\)](#), archives today data on atmospheric composition from ground stations around the globe as well as aircraft projects include: [EMEP](#), [Gawis Programme](#), [Transboundary Air Pollution](#), [Global Trace gases Research InfraStructure Network \(ACTRIS\)](#)

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- 2. Initial contact with EBAS:**
Please establish the initial contact with EBAS by writing an e-mail to ebas@nilu.no. In your mail, please indicate the station you are intending to report data for, the GAWSYS station ID if relevant, and the parameters you intend to report. In return, you will receive three further IDs: 1) the EBAS station code; 2) the EBAS platform code; 3) a code for your lab analysing the data, which you will need for the metadata in your submission. The reason for having several station codes lies in several frameworks collaborating. The three letter GAW IDs and the IDs used in the CLRTAP EMEP database EBAS were introduced independently and are maintained for consistency.
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Online formatting templates

http://ebas-submit.nilu.no/

Web Site

REGISTER LOGIN

Submit Data Data Policy

Submit Data March 16, 2013

Submitting Data to the EBAS Database

Regular, Annual Data Reporting
Advanced Data Reporting
Full List of Flags Used for Data Reporting

NO_x (regular)
Cloud Condensation Nucleus Counter (link to WDCA)
Condensation Particle Counter (link to WDCA)
Diff./Scanning Mob. Particle Size (links to WDCA)
Filter Absorption Photometer (links to WDCA)
Integrating Nephelometer (links to WDCA)
Radiometric Aerosol Optical Depth (links to WDCA)
Particulate Mass Conc., gravim. (links to WDCA)
Particulate Mass Conc., online (links to WDCA)
ACSM (regular)
VOC

Designed for the European Monitoring and Evaluation Programme (EMEP), archives today data on atmospheric composition from ground stations around the globe as well as aircraft projects include:
GAW Programme
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Global Trace gases Research Infrastructure Network (ACTRIS)

Data submitted to EBAS with an increased number of collaborations. Data submitted to EBAS are protected by a [fair-use data policy](#).

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Online formatting templates

The screenshot shows a web browser window displaying the WMO Global Atmosphere Watch website. The URL in the address bar is <http://gaw-wdca.org/SubmitData/RegularAnnualDataReporting/regularformatcommentsheaderline01DMPS/tabid/4488/Default.aspx>. The page features the WMO logo and the text "WMO Global Atmosphere Watch World Data Centre for Aerosols" along with the NILU logo. A navigation menu includes links for Home, Submit Data, Browse / Obtain Data, Publications, Contributors, Contact, and Software. The breadcrumb trail reads "Submit Data > Regular, Annual Data Reporting > regular format - comments header line 01 DMPS" and the date "March 16, 2013" is displayed. A sidebar on the left lists reporting options: Regular, Annual Data Reporting (selected), Advanced Data Reporting, Near-Real-Time Data Reporting, and Submission Status. The main content area is titled "Line 1: Total number of header lines and format number" and shows the example text "135 1001". Below this, a note states: "Total number of lines in header and NASA-Ames format number (for our use always 1001), separated by a space." The footer contains the same navigation menu as the top of the page.

Quality of data - List of flags

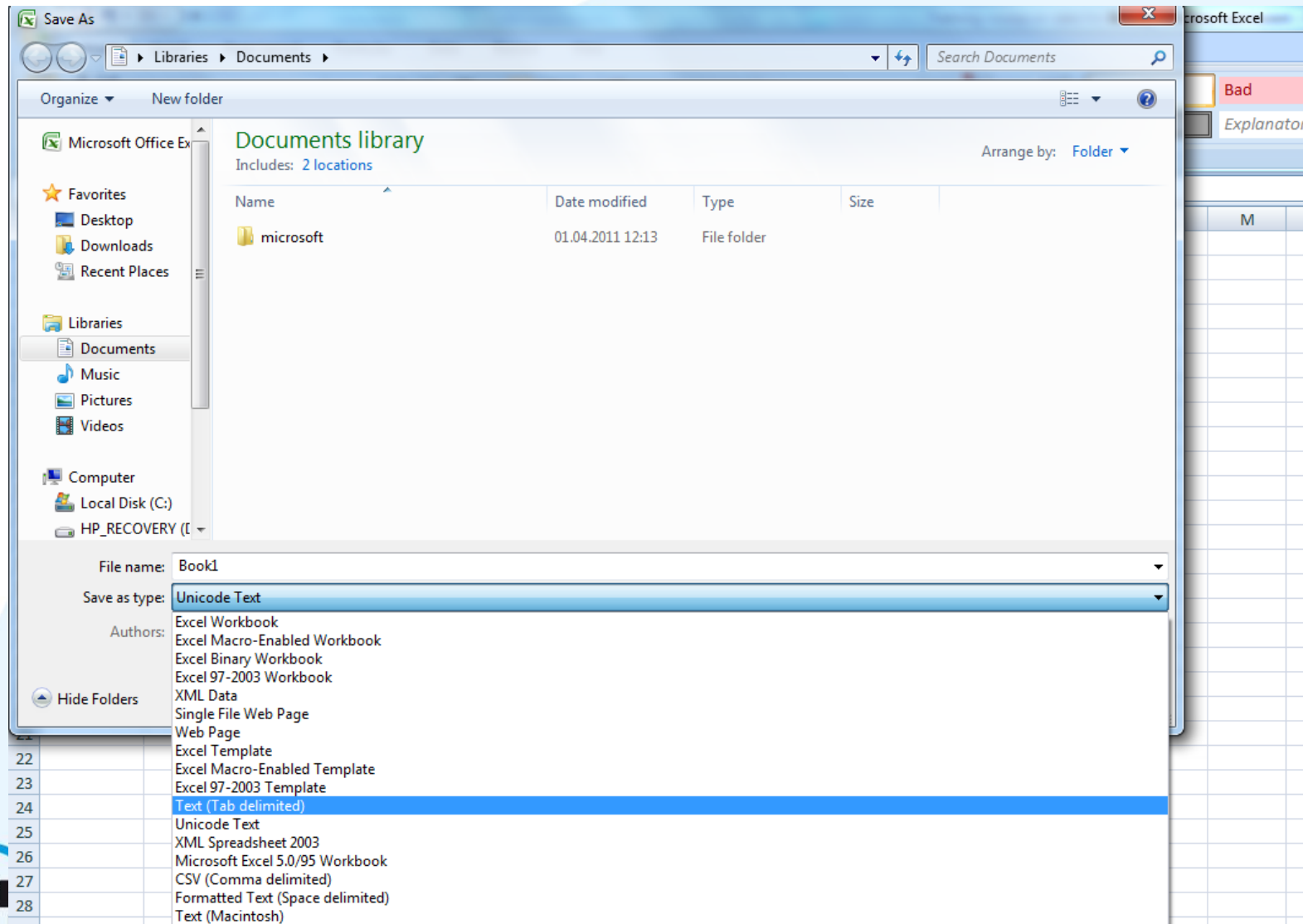
- A complete list of flags used in the database is found at <http://www.nilu.no/projects/ccc/flags/flags.html>
- Flags are grouped in three categories:
- V (valid measurement)
- I (invalid measurement)
- H (hidden and invalid measurements).

List of flags used in the EMEP data base

All flags are grouped in three categories: V (valid measurement), I (invalid measurement) or H (hidden and invalid measurements).

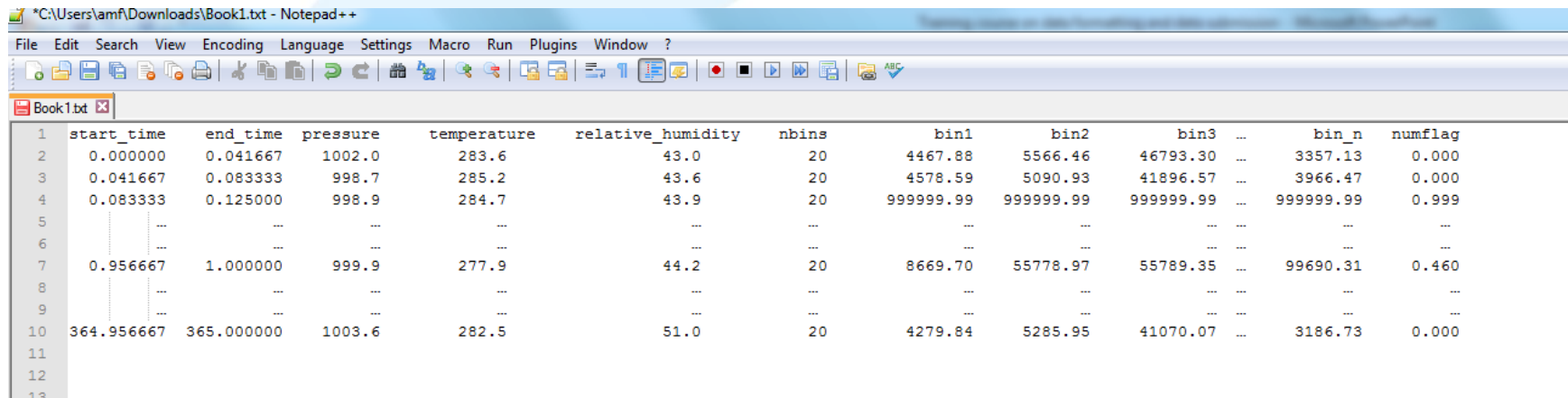
Flag	V/I/H	Description
Group 9: Missing flags		
999	I	Missing measurement, unspecified reason
990	I	Precipitation not measured due to snow-fall. Needed for historic data, should not be needed for new data
980	I	Missing due to calibration or zero/span check
900	H	Hidden and invalidated by data originator
Group 8: Flags for undefined data elements		
899	I	Measurement undefined, unspecified reason
890	I	Concentration in precipitation undefined, no precipitation
Group 7: Flags used when the value is unknown		
799	I	Measurement missing (unspecified reason), data element contains estimated value
798	V	Measurement missing (unspecified reason), data element contains estimated value. Considered valid.
797	V	Data element taken from co-located instrument
784	I	Low precipitation, concentration estimated
783	I	Low precipitation, concentration unknown
782	V	Low precipitation, concentration estimated
781	V	Value below detection limit, data element contains detection limit
780	V	Value below detection or quantification limit, data element contains estimated or measured value.
771	V	Value above range, data element contains upper range limit
770	V	Value above range, data element contains estimated value
750	I	H ⁺ not measured in alkaline sample
741	V	Non refractory AMS concentrations. Don't include compounds that volatilis above 600 deg C
740	V	Probably biased gas/particle ratio
701	I	Less accurate than usual, unspecified reason. (Used only with old data, for new data see groups 6 and 5)
Group 6: Mechanical or instrumental problem		
699	I	Mechanical problem, unspecified reason
681	I	Low data capture
680	V	Undefined wind direction
679	V	Unspecified meteorological condition
678	V	Hurricane
677	I	Icing or hoar frost in the intake
676	V	station inside cloud (visibility < 1000 m)
675	V	no visibility data available

Save file as .txt



Open file in notepad 2 or notepad

++



*C:\Users\amf\Downloads\Book1.txt - Notepad++

File Edit Search View Encoding Language Settings Macro Run Plugins Window ?

Book1.txt

	start_time	end_time	pressure	temperature	relative_humidity	nbins	bin1	bin2	bin3	...	bin_n	numflag
1	0.000000	0.041667	1002.0	283.6	43.0	20	4467.88	5566.46	46793.30	...	3357.13	0.000
2	0.041667	0.083333	998.7	285.2	43.6	20	4578.59	5090.93	41896.57	...	3966.47	0.000
3	0.083333	0.125000	998.9	284.7	43.9	20	999999.99	999999.99	999999.99	...	999999.99	0.999
4	...	...	...	...	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...	...	...	...	...
7	0.956667	1.000000	999.9	277.9	44.2	20	8669.70	55778.97	55789.35	...	99690.31	0.460
8	...	...	...	...	...	...	...	...	...	...	...	...
9	...	...	...	...	...	...	...	...	...	...	...	...
10	364.956667	365.000000	1003.6	282.5	51.0	20	4279.84	5285.95	41070.07	...	3186.73	0.000
11												
12												
13												

Upload your data

- ftp ebas-submissions.nilu.no /incoming
- Anonymous server – login=anonymous, pwd=your email
- To prevent abuse of this server, it is configured in "blind-drop" mode. It accepts uploads only and ignores directory requests, i.e. you won't be able to see the files you just uploaded, and you won't be able to delete them once they are uploaded.
- See also <http://ebas-submit.nilu.no/>
- After upload of data; machine and manual inspection inside NILU
- Feedback to user / interaction if errors
- Data made public in EBAS when OK.

Thank you!

Questions?



Zeppelin



Troll



Birkenes



Alomar