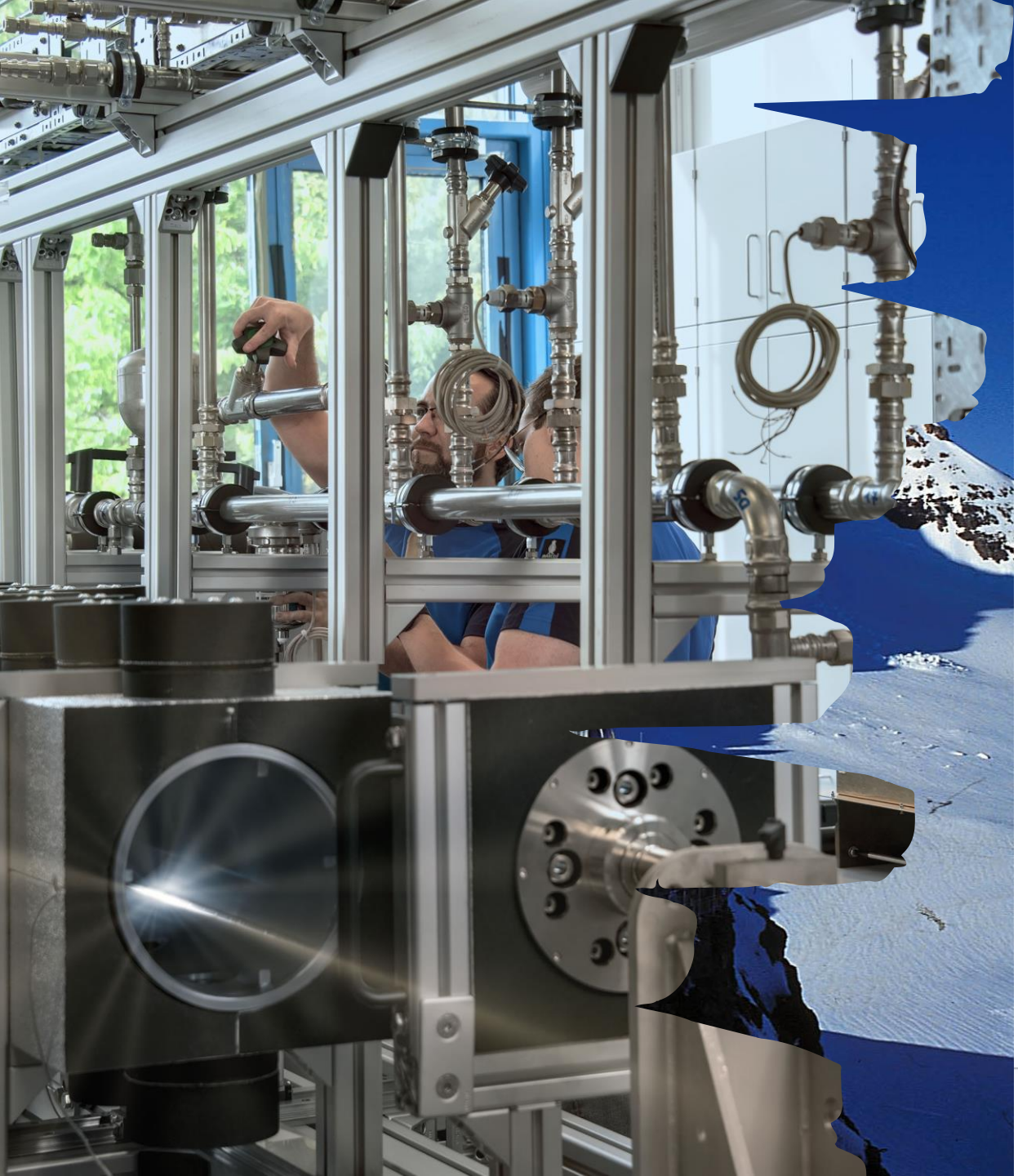


ACTRiS CiGas

Deutscher Wetterdienst
Wetter und Klima aus einer Hand
DWD
Germany

IMT Lille Douai
France

UNIVERSITY OF HELSINKI
Finland

Empa
Switzerland

JÜLICH
Forschungszentrum
Germany

NOx Data Submission Meeting 2024/02/08

This project receives funding from the European Union's Horizon 2020 research and innovation programme under grant agreements No 654109 and 739530

TOP

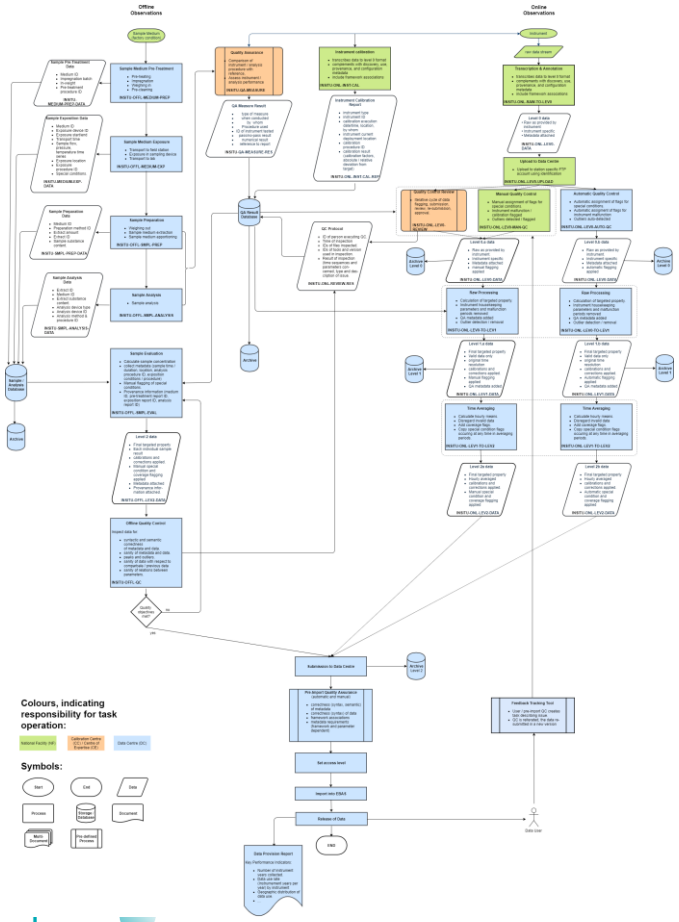
1. ACTRIS NOx in situ data reporting: tasks, responsibilities, and deadlines. (Robert)
2. ACTRIS NOx in situ data reporting: practical aspects (Yong)
3. Progress on real-time data submission of NOx data in the CAMS2-21a project (Benni)

Background

Data must be submitted according to the SOP
Measurement Guideline
and the

ACTRIS Data Management Plan
until May 31st

Data Management Plan



Defines responsibilities and
Data levels:

Until 2022:

Stations submitted corrected level 0 or level 2 data or the TC corrected data

From 2023:

The Stations only submit uncorrected data. The TC does the corrections

NO2 data measured with Molybdenum converters cannot be accepted

Data Levels

NOx implementation of ACTRIS In Situ data levels:
Level 0: data as provided by instrument, amount fraction and raw counts.
Level 0a: data as provided by instrument, amount fraction and raw counts, flags applied.
Level 1: calibrations applied, original time resolution.
Level 1a: calibrations applied, original time resolution, flags applied.
Level 2: hourly averages, offset correction applied, not sample line corrected.
Level 3: generated directly from level 1, offset correction applied, hourly averages, sample line corrected.

Data Levels

NOx implementation of ACTRIS In Situ data levels:

Level 0a: data as provided by instrument, amount fraction and raw counts, flags applied.

Level 1a: calibrations applied, original time resolution, flags applied.

Level 2: hourly averages, offset correction applied, not sample line corrected.

Level 3: generated directly from level 1, offset correction applied, hourly averages, sample line corrected.

What is needed to produce level 3

Time from entry inlet line to entry of converter: 4.3 s
Duration of stay in converter or bypass line: 0.2 s
Duration of stay in converter: 2.5 s
Converter temperature: 308.15 K

converter_efficiency, %
pressure, hPa, Location=inlet, Matrix=instrument
temperature, K, Location=inlet, Matrix=instrument

NO_x Data Level 2

O_3 Data level 1 (calibrated)

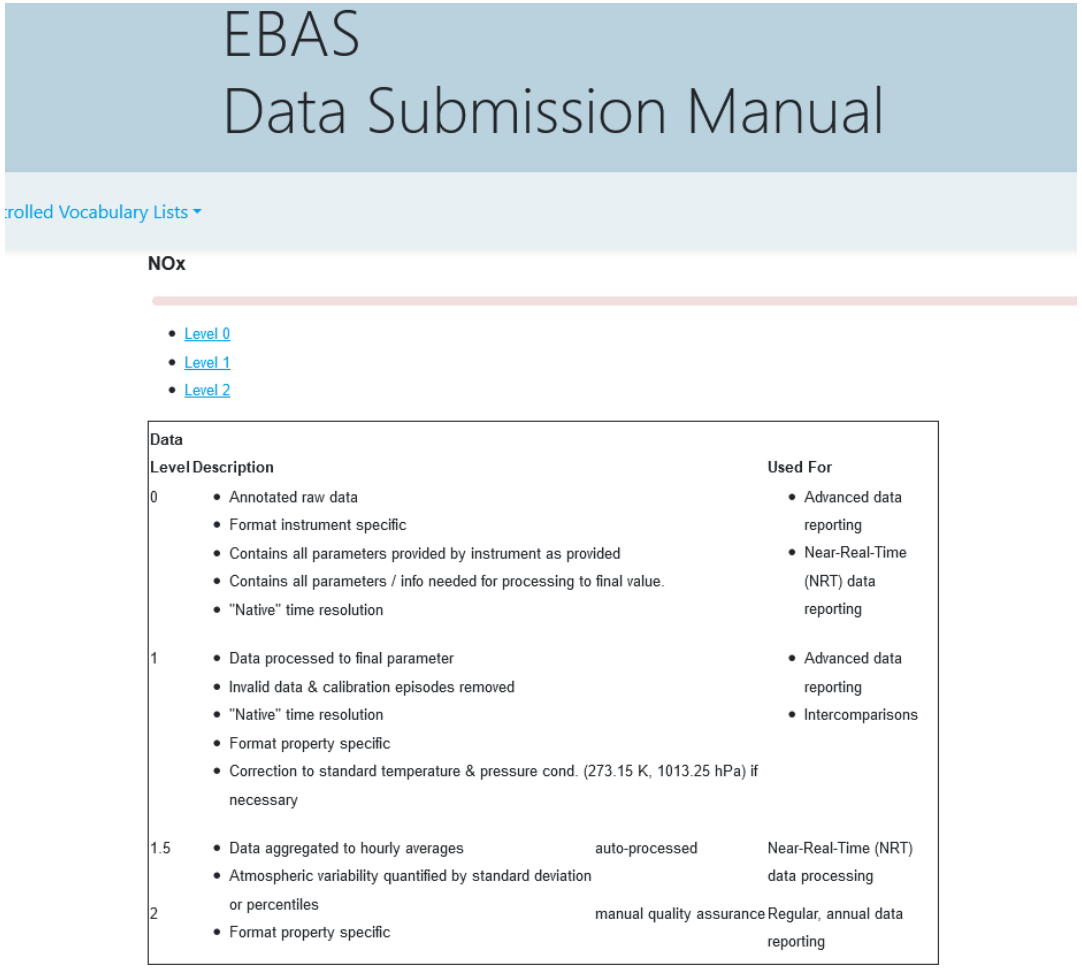
Met Data level 0 (raw)

Schedule for Submission of the 2023 Nox Data

March 15th:	NFs:	provide level 0a NO_x Data and level 1a NOx Data provide Level 1 O_3 Data / level 0 Met Data
April 09th-11th:	TC / NFs:	QA/QC Workshop
April 30th:	TC / NFs:	QC issues iterated
May 31st:	TC	Level 2 and Level 3 NOx Data produced

New Data templates

https://ebas-submit.nilu.no/templates/NOx/all



EBAS
Data Submission Manual

rolled Vocabulary Lists

NOx

- Level 0
- Level 1
- Level 2

Data Level	Description		Used For
0	• Annotated raw data • Format instrument specific • Contains all parameters provided by instrument as provided • Contains all parameters / info needed for processing to final value. • "Native" time resolution		• Advanced data reporting • Near-Real-Time (NRT) data reporting
1	• Data processed to final parameter • Invalid data & calibration episodes removed • "Native" time resolution • Format property specific • Correction to standard temperature & pressure cond. (273.15 K, 1013.25 hPa) if necessary		• Advanced data reporting • Intercomparisons
1.5	• Data aggregated to hourly averages • Atmospheric variability quantified by standard deviation or percentiles	auto-processed	Near-Real-Time (NRT) data processing
2	• Format property specific	manual quality assurance	Regular, annual data reporting

New Data templates

https://ebas-submit.nilu.no/templates/NOx/lev0

Please stick to the “Reduced” Flag list

Group 0: Valid data		
Flag	**Validity**	**Description**
000	V	valid data, no flag
Group 1: Exception flags for accepted, irregular data		
Flag	**Validity**	**Description**
147	V	Below theoretical detection limit or formal Q/A limit, but a value has been measured and reported and is considered valid
Group 5: Chemical problem		
Flag	**Validity**	**Description**
559	V	Unspecified contamination or local influence, but considered valid
Group 6: Mechanical or instrumental problem		
Flag	**Validity**	**Description**
686	I	Invalid due to zero check. Used for Level 0.
687	I	Invalid due to span check. Used for Level 0.
699	I	Mechanical problem, unspecified reason
Group 9: Missing flags		
Flag	**Validity**	**Description**
999	M	Missing measurement, unspecified reason

New Data templates

https://ebas-submit.nilu.no/templates/NOx/lev0

Level 0a: data as provided by instrument, amount fraction and raw counts, flags applied.

NOx measurements by chemiluminescence photometry use either a photolytic or molybdenum converter for transforming NO2 into NO. It is well established that molybdenum converters convert not only NO2, but also other reactive nitrogen species. Please note that ACTRIS requires the use of photolytic converters. EMEP and GAW recommends photolytic converters for rural and remote sites. Thus, when submitting data it is essential to specify the type of instrument and converter being used.
This is specified in the metadata element

Instrument type
(
chemiluminescence_photolytic
or
chemiluminescence_molybdenum)

New Data templates

https://ebas-submit.nilu.no/templates/NOx/lev0

Zero measurements shall be flagged with flag 686 and the variable status, Status type=zero mode
shall be set to indicate whether it was an internal or external zero measurement (0: N/A, 1: internal zero, 2: external zero). See data lines 3 and 4 in the template below for an example for internal and external zero measurements

Comment:

start_time	end_time	p_inlet	p_det	T_inlet	T_det	cal	zero	NO#	NOc#	NO_sens	cvt_eff	numflag	NO	NO_ac	NO_pr	NO_dl	numflag_NO	NO2	NO2_ac	NO2_pr	NO2_dl	numflag_NO2
0.000000	0.000694	839.400	921.400	299.700	290.210	0	0	258	5200	1.283	45.351	0.000000000	0.331	0.0800	0.0070	0.005	0.000000000	10.080	0.0700	0.0060	0.010	0.000000000
0.000694	0.001385	839.766	921.787	299.750	291.232	0	0	510	4780	1.283	45.351	0.000000000	0.596	0.0454	0.0066	0.004	0.000000000	9.765	0.0690	0.0077	0.012	0.000000000
0.001385	0.002083	839.821	921.833	299.761	291.987	0	1	21	23	1.283	45.351	0.686000000	0.476	0.0234	0.0087	0.004	0.686000000	9.832	0.0654	0.0072	0.012	0.686000000
0.002083	0.002778	839.801	921.788	299.886	292.232	0	2	9	21	1.283	45.351	0.686000000	0.836	0.0632	0.0077	0.005	0.686000000	9.922	0.0643	0.0075	0.015	0.686000000
0.002778	0.003472	839.633	921.654	300.021	292.012	1	0	644	4766	1.283	45.351	0.687000000	0.839	0.0712	0.0082	0.006	0.687000000	10.032	0.0704	0.0084	0.012	0.687000000
0.003472	0.004167	839.601	921.522	299.988	291.987	3	0	523	4802	1.283	45.351	0.687000000	0.341	0.0673	0.0052	0.004	0.687000000	9.989	0.0720	0.0060	0.011	0.687000000
0.004167	0.004861	839.801	921.788	421.122	291.232	0	0	7342	96379	1.283	45.351	0.699000000	73.832	3.2349	9.7289	8.234	0.699000000	83.234	32.2724	62.1346	7.234	0.699000000
0.004861	0.005556	9999.999	9999.999	9999.999	9999.999	99	99	9999	99999	99.999	999.999	0.999000000	99.999	99.9999	99.9999	99.999	0.999000000	99.999	99.9999	99.9999	99.999	0.999000000

New Data templates

https://ebas-submit.nilu.no/templates/NOx/lev0

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 5 and 6 in the template below for an example for calibrations with different standads.

Comment:

start_time	end_time	p_inlet	p_det	T_inlet	T_det	cal	zero	NO#	NOc#	NO_sens	cvt_eff	numflag	NO	NO_ac	NO_pr	NO_dl	numflag_NO	NO2	NO2_ac	NO2_pr	NO2_dl	numflag_NO2
0.000000	0.000694	839.400	921.400	299.700	290.210	0	0	258	5200	1.283	45.351	0.000000000	0.331	0.0800	0.0070	0.005	0.000000000	10.080	0.0700	0.0060	0.010	0.000000000
0.000694	0.001385	839.766	921.787	299.750	291.232	0	0	510	4780	1.283	45.351	0.000000000	0.596	0.0454	0.0066	0.004	0.000000000	9.765	0.0690	0.0077	0.012	0.000000000
0.001385	0.002083	839.821	921.833	299.761	291.987	0	1	21	23	1.283	45.351	0.686000000	0.476	0.0234	0.0087	0.004	0.686000000	9.832	0.0654	0.0072	0.012	0.686000000
0.002083	0.002778	839.801	921.788	299.886	292.232	0	2	9	21	1.283	45.351	0.686000000	0.836	0.0632	0.0077	0.005	0.686000000	9.922	0.0643	0.0075	0.015	0.686000000
0.002778	0.003472	839.633	921.654	300.021	292.012	1	0	644	4766	1.283	45.351	0.687000000	0.839	0.0712	0.0082	0.006	0.687000000	10.032	0.0704	0.0084	0.012	0.687000000
0.003472	0.004167	839.601	921.522	299.988	291.987	3	0	523	4802	1.283	45.351	0.687000000	0.341	0.0673	0.0052	0.004	0.687000000	9.989	0.0720	0.0060	0.011	0.687000000
0.004167	0.004861	839.801	921.788	421.122	291.232	0	0	7342	96379	1.283	45.351	0.699000000	73.832	3.2349	9.7289	8.234	0.699000000	83.234	32.2724	62.1346	7.234	0.699000000
0.004861	0.005556	9999.999	9999.999	9999.999	9999.999	99	99	9999	99999	99.999	999.999	0.999000000	99.999	99.9999	99.9999	99.999	0.999000000	99.999	99.9999	99.9999	99.999	0.999000000

New Data templates

https://ebas-submit.nilu.no/templates/NOx/lev0

```
Standard method:                SOP=ACTRIS_NOxy_2014
Calibration scale:
Calibration standard ID:        "Status calibration standard: 1, Manufacturer: NPL, Batch: A473; Status calibration standard: 2, Manufacturer: Linde, Batch: D736671"
Secondary standard ID:    "Status calibration standard: 3, Manufacturer: In House Aluminium cylinder (Luxfer) ... description; Batch: 123; Status calibration standard: 4, Manufacturer: In House
Aluminium cylinder (Luxfer) ... description; Batch: 456"
```

Calibration standard ID

Description

Freetext but recommendes syntax includes maunfacturer and batch number. This refers to the ***primary*** standard(s) used for calibration (as compared to metadata element Secondary standard ID). If more than one, please separate with semicolon.

Syntax:

Calibration standard ID: <Freetext>

Example:

Calibration standard ID: "Manufacturer: Linde, Batch: 1234567"

New Data templates

https://ebas-submit.nilu.no/templates/NOx/lev0

```
Standard method:                SOP=ACTRIS_NOxy_2014
Calibration scale:
Calibration standard ID:        "Status calibration standard: 1, Manufacturer: NPL, Batch: A473; Status calibration standard: 2, Manufacturer: Linde, Batch: D736671"
Secondary standard ID:    "Status calibration standard: 3, Manufacturer: In House Aluminium cylinder (Luxfer) ... description; Batch: 123; Status calibration standard: 4, Manufacturer: In House
Aluminium cylinder (Luxfer) ... description; Batch: 456"
```

Secondary standard ID

Description

A secondary standard is derived from a primary standard. It is equivalent to the term "target gas" used by some communities. This metadata field is freetext, but it is recommended that the syntax includes manufacturer and batch number of the secondary standard/target gas. A definition or short description of this standard is also advisable to include. If more than one secondary standard is used, separate by semicolon.

Syntax:

Secondary standard ID: <Freetext>

Example:

Secondary standard ID: "Manufacturer: Linde, Batch: 1234567"
Secondary standard ID: "Manufacturer: Linde, Batch: 1234567; Manufacturer: Linde, Batch: 7654321"

New Data templates

https://ebas-submit.nilu.no/templates/NOx/lev0

```
end time of measurement, days from the file reference point
pressure, hPa, Location=inlet, Matrix=instrument
pressure, hPa, Location=detector, Matrix=instrument
temperature, K, Location=inlet, Matrix=instrument
temperature, K, Location=detector, Matrix=instrument
status, no unit, Status type=calibration standard, Matrix=instrument, Comment=See metadata elements "Calibration standard ID" and "Secondary standard ID"
status, no unit, Status type=zero mode, Matrix=instrument, "Comment=0: N/A, 1: internal zero, 2: external zero"
NO #counts, cps
NO converter #counts, cps
NO sensitivity, (pmol/mol)/cps
converter efficiency, %
numflag, no unit
nitrogen monoxide, nmol/mol, Calibration scale=NPL
nitrogen monoxide, nmol/mol, Statistics=expanded uncertainty 2sigma
nitrogen monoxide, nmol/mol, Statistics=precision
nitrogen monoxide, nmol/mol, Statistics=detection limit
numflag, no unit
nitrogen dioxide, nmol/mol, Calibration scale=NPL+GPT
nitrogen dioxide, nmol/mol, Statistics=expanded uncertainty 2sigma
nitrogen dioxide, nmol/mol, Statistics=precision
nitrogen dioxide, nmol/mol, Statistics=detection limit
numflag, no unit
0
```

```
Comment:
start time  end time  p inlet    p det  T inlet    T det cal  zero  NO#  NOc# NO sens cvt eff      numflag      NO   NO ac   NO pr  NO dl   numflag NO     NO2  NO2 ac  NO2 pr NO2 dl  numflag NO2
0.000000    0.000694  839.400  921.400  299.700  290.210   0     0  258  5200   1.283  45.351  0.000000000  0.331  0.0800  0.0070  0.005  0.000000000  10.080  0.0700  0.0060  0.010  0.000000000
0.000694    0.001385  839.766  921.787  299.750  291.232   0     0  510  4780   1.283  45.351  0.000000000  0.596  0.0454  0.0066  0.004  0.000000000   9.765  0.0690  0.0077  0.012  0.000000000
0.001385    0.002083  839.821  921.833  299.761  291.987   0     1   21    23   1.283  45.351  0.686000000  0.476  0.0234  0.0087  0.004  0.686000000   9.832  0.0654  0.0072  0.012  0.686000000
0.002083    0.002778  839.801  921.788  299.886  292.232   0     2    9    21   1.283  45.351  0.686000000  0.836  0.0632  0.0077  0.005  0.686000000   9.922  0.0643  0.0075  0.015  0.686000000
0.002778    0.003472  839.633  921.654  300.021  292.012   1     0  644  4766   1.283  45.351  0.687000000  0.839  0.0712  0.0082  0.006  0.687000000  10.032  0.0704  0.0084  0.012  0.687000000
0.003472    0.004167  839.601  921.522  299.988  291.987   3     0  523  4802   1.283  45.351  0.687000000  0.341  0.0673  0.0052  0.004  0.687000000   9.989  0.0720  0.0060  0.011  0.687000000
0.004167    0.004861  839.801  921.788  421.122  291.232   0     0 7342 96379   1.283  45.351  0.699000000 73.832  3.2349  9.7289  8.234  0.699000000  83.234 32.2724 62.1346  7.234  0.699000000
0.004861    0.005556 9999.999 9999.999 9999.999 9999.999  99    99 9999 99999  99.999 999.999  0.999000000 99.999 99.9999 99.9999 99.999  0.999000000  99.999 99.9999 99.9999 99.999  0.999000000
```

New Data templates

https://ebas-submit.nilu.no/templates/NOx/lev0

```
end time of measurement, days from the file reference point
pressure, hPa, Location=inlet, Matrix=instrument
pressure, hPa, Location=detector, Matrix=instrument
temperature, K, Location=inlet, Matrix=instrument
temperature, K, Location=detector, Matrix=instrument
status, no unit, Status type=calibration standard, Matrix=instrument, Comment=See metadata elements "Calibration standard ID" and "Secondary standard ID"
status, no unit, Status type=zero mode, Matrix=instrument, "Comment=0: N/A, 1: internal zero, 2: external zero"
NO #counts, cps
NO converter #counts, cps
NO sensitivity, (pmol/mol)/cps
converter efficiency, %
numflag, no unit
nitrogen monoxide, nmol/mol, Calibration scale=NPL
nitrogen monoxide, nmol/mol, Statistics=expanded uncertainty 2sigma
nitrogen monoxide, nmol/mol, Statistics=precision
nitrogen monoxide, nmol/mol, Statistics=detection limit
numflag, no unit
nitrogen dioxide, nmol/mol, Calibration scale=NPL+GPT
nitrogen dioxide, nmol/mol, Statistics=expanded uncertainty 2sigma
nitrogen dioxide, nmol/mol, Statistics=precision
nitrogen dioxide, nmol/mol, Statistics=detection limit
numflag, no unit
0
```

```
Comment:
start time  end time  p inlet    p det  T inlet    T det cal  zero  NO#  NOc# NO sens cvt eff      numflag      NO   NO ac   NO pr  NO dl   numflag NO     NO2  NO2 ac  NO2 pr NO2 dl  numflag NO2
0.000000    0.000694  839.400  921.400  299.700  290.210   0     0  258  5200   1.283  45.351  0.000000000  0.331  0.0800  0.0070  0.005  0.000000000  10.080  0.0700  0.0060  0.010  0.000000000
0.000694    0.001385  839.766  921.787  299.750  291.232   0     0  510  4780   1.283  45.351  0.000000000  0.596  0.0454  0.0066  0.004  0.000000000   9.765  0.0690  0.0077  0.012  0.000000000
0.001385    0.002083  839.821  921.833  299.761  291.987   0     1   21    23   1.283  45.351  0.686000000  0.476  0.0234  0.0087  0.004  0.686000000   9.832  0.0654  0.0072  0.012  0.686000000
0.002083    0.002778  839.801  921.788  299.886  292.232   0     2    9    21   1.283  45.351  0.686000000  0.836  0.0632  0.0077  0.005  0.686000000   9.922  0.0643  0.0075  0.015  0.686000000
0.002778    0.003472  839.633  921.654  300.021  292.012   1     0  644  4766   1.283  45.351  0.687000000  0.839  0.0712  0.0082  0.006  0.687000000  10.032  0.0704  0.0084  0.012  0.687000000
0.003472    0.004167  839.601  921.522  299.988  291.987   3     0  523  4802   1.283  45.351  0.687000000  0.341  0.0673  0.0052  0.004  0.687000000   9.989  0.0720  0.0060  0.011  0.687000000
0.004167    0.004861  839.801  921.788  421.122  291.232   0     0 7342 96379   1.283  45.351  0.699000000 73.832  3.2349  9.7289  8.234  0.699000000  83.234 32.2724 62.1346  7.234  0.699000000
0.004861    0.005556 9999.999 9999.999 9999.999 9999.999  99    99 9999 99999  99.999 999.999  0.999000000 99.999 99.9999 99.9999 99.999  0.999000000  99.999 99.9999 99.9999 99.999  0.999000000
```

New Data templates

https://ebas-submit.nilu.no/templates/NOx/lev1

Level 1a: calibrations applied, original time resolution, flags applied.

- When processing data from lev0 to lev1: Calibration and zero measurements in lev0 shall be used
- All values with **invalid flags** in lev0 will be taken out in lev1 (value = MISSING VALUE, flag = 999)
- All **valid flags** are taken over into lev1.
- NOx shall be calculated from NO and NO_2 measurements.

New Data templates

https://ebas-submit.nilu.no/templates/NOx/lev1

Level 1a: calibrations applied, original time resolution, flags applied.

Group 0: Valid data		
Flag	**Validity**	**Description**
000	V	valid data, no flag
Group 1: Exception flags for accepted, irregular data		
Flag	**Validity**	**Description**
147	V	Below theoretical detection limit or formal Q/A limit, but a value has been measured and reported and is considered valid
Group 5: Chemical problem		
Flag	**Validity**	**Description**
559	V	Unspecified contamination or local influence, but considered valid
Group 9: Missing flags		
Flag	**Validity**	**Description**
999	M	Missing measurement, unspecified reason

New Data templates

https://ebas-submit.nilu.no/templates/NOx/lev1

Level 1a: calibrations applied, original time resolution, flags applied.

```
end_time_of_measurement, days_from_the_file_reference_point
pressure, hPa, Location=inlet, Matrix=instrument
temperature, K, Location=inlet, Matrix=instrument
numflag, no_unit
nitrogen_monoxide, nmol/mol, Calibration_scale=NPL
nitrogen_monoxide, nmol/mol, Statistics=expanded_uncertainty_2sigma
nitrogen_monoxide, nmol/mol, Statistics=precision
nitrogen_monoxide, nmol/mol, Statistics=detection_limit
numflag, no_unit
nitrogen_dioxide, nmol/mol, Calibration_scale=NPL+GPT
nitrogen_dioxide, nmol/mol, Statistics=expanded_uncertainty_2sigma
nitrogen_dioxide, nmol/mol, Statistics=precision
nitrogen_dioxide, nmol/mol, Statistics=detection_limit
numflag, no_unit
NOx, nmol/mol
NOx, nmol/mol, Statistics=expanded_uncertainty_2sigma
NOx, nmol/mol, Statistics=precision
NOx, nmol/mol, Statistics=detection_limit
numflag, no_unit
```

New Data templates

https://ebas-submit.nilu.no/templates/NOx/lev1

Level 0a: data as provided by instrument, amount fraction and raw counts, flags applied..

Comment:

start_time	end_time	p_inlet	p_det	T_inlet	T_det	cal	zero	NO#	NOc#	NO_sens	cvt_eff	numflag	NO	NO_ac	NO_pr	NO_dl	numflag_NO	NO2	NO2_ac	NO2_pr	NO2_dl	numflag_NO2
0.000000	0.000694	839.400	921.400	299.700	290.210	0	0	258	5200	1.283	45.351	0.000000000	0.331	0.0800	0.0070	0.005	0.000000000	10.080	0.0700	0.0060	0.010	0.000000000
0.000694	0.001385	839.766	921.787	299.750	291.232	0	0	510	4780	1.283	45.351	0.000000000	0.596	0.0454	0.0066	0.004	0.000000000	9.765	0.0690	0.0077	0.012	0.000000000
0.001385	0.002083	839.821	921.833	299.761	291.987	0	1	21	23	1.283	45.351	0.686000000	0.476	0.0234	0.0087	0.004	0.686000000	9.832	0.0654	0.0072	0.012	0.686000000
0.002083	0.002778	839.801	921.788	299.886	292.232	0	2	9	21	1.283	45.351	0.686000000	0.836	0.0632	0.0077	0.005	0.686000000	9.922	0.0643	0.0075	0.015	0.686000000
0.002778	0.003472	839.633	921.654	300.021	292.012	1	0	644	4766	1.283	45.351	0.687000000	0.839	0.0712	0.0082	0.006	0.687000000	10.032	0.0704	0.0084	0.012	0.687000000
0.003472	0.004167	839.601	921.522	299.988	291.987	3	0	523	4802	1.283	45.351	0.687000000	0.341	0.0673	0.0052	0.004	0.687000000	9.989	0.0720	0.0060	0.011	0.687000000
0.004167	0.004861	839.801	921.788	421.122	291.232	0	0	7342	96379	1.283	45.351	0.699000000	73.832	3.2349	9.7289	8.234	0.699000000	83.234	32.2724	62.1346	7.234	0.699000000
0.004861	0.005556	9999.999	9999.999	9999.999	9999.999	99	99	9999	99999	99.999	999.999	0.999000000	99.999	99.9999	99.9999	99.999	0.999000000	99.999	99.9999	99.9999	99.999	0.999000000

NF

Level 1a: calibrations applied, original time resolution, flags applied.

Comment:

start_time	end_time	p_inlet	T_inlet	numflag	NO	NO_ac	NO_pr	NO_dl	numflag_NO	NO2	NO2_ac	NO2_pr	NO2_dl	numflag_NO2	NOx	NOx_ac	NOx_pr	NOx_dl	numflag_NOx
0.000000	0.000694	839.400	299.700	0.000000000	0.331	0.0800	0.0070	0.005	0.000000000	10.080	0.0700	0.0060	0.010	0.000000000	10.411	0.1500	0.0125	0.010	0.000000000
0.000694	0.001385	839.766	299.750	0.000000000	0.596	0.0454	0.0066	0.004	0.000000000	9.765	0.0690	0.0077	0.012	0.000000000	11.361	0.1144	0.0142	0.012	0.000000000
0.001385	0.002083	839.821	299.761	0.000000000	99.999	99.9999	99.9999	99.999	0.999000000	99.999	99.9999	99.9999	99.999	0.999000000	999.999	99.9999	99.9999	99.999	0.999000000
0.002083	0.002778	839.801	299.886	0.000000000	99.999	99.9999	99.9999	99.999	0.999000000	99.999	99.9999	99.9999	99.999	0.999000000	999.999	99.9999	99.9999	99.999	0.999000000
0.002778	0.003472	839.633	300.021	0.000000000	99.999	99.9999	99.9999	99.999	0.999000000	99.999	99.9999	99.9999	99.999	0.999000000	999.999	99.9999	99.9999	99.999	0.999000000
0.003472	0.004167	839.601	299.988	0.000000000	99.999	99.9999	99.9999	99.999	0.999000000	99.999	99.9999	99.9999	99.999	0.999000000	999.999	99.9999	99.9999	99.999	0.999000000
0.004167	0.004861	839.801	339.122	0.000000000	99.999	99.9999	99.9999	99.999	0.999000000	99.999	99.9999	99.9999	99.999	0.999000000	999.999	99.9999	99.9999	99.999	0.999000000
0.004861	0.005556	9999.999	9999.999	0.999000000	99.999	99.9999	99.9999	99.999	0.999000000	99.999	99.9999	99.9999	99.999	0.999000000	999.999	99.9999	99.9999	99.999	0.999000000

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