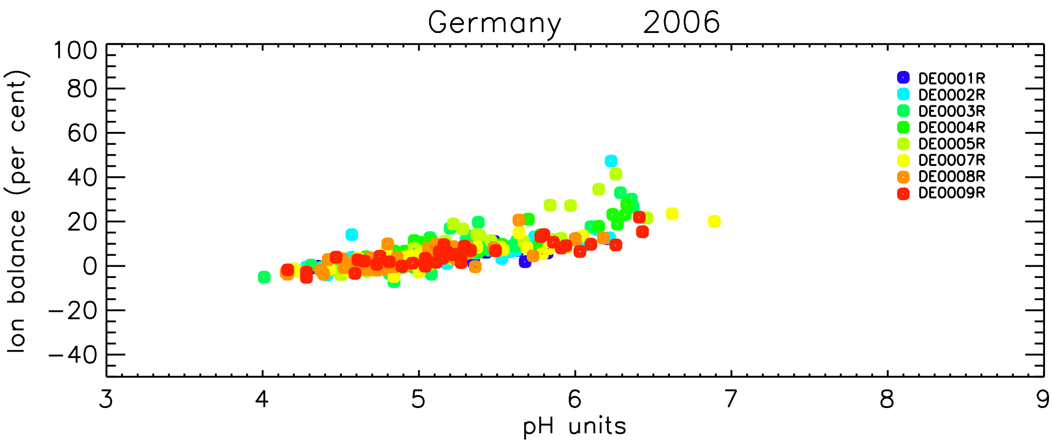
EMEP/CCC-Report 3/2008

EMEP Co-operative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe

Data quality 2006, quality assurance, and field comparisons



Norwegian Institute for Air Research
PO Box 100, NO-2027 Kjeller, Norway
Chemical Co-ordinating Centre of EMEP (CCC)

NILU	:	EMEP/CCC-Report 3/2008
REFERENCE	:	O-95024
DATE	:	NOVEMBER 2008

EMEP Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe

Data quality 2006, quality assurance, and field comparisons

Edited by Wenche Aas

Norwegian Institute for Air Research
P.O. Box 100, N-2027 Kjeller, Norway

Contents

Summary

This report is mainly concerned with the quality of the 2006 data and new results from field and laboratory comparisons.

The requirement with respect to data completeness for the main components in precipitation and air, i.e. 90 per cent, is generally met. For heavy metals, VOC and POPs the data capture is lower, especially for air samples mainly due to less sampling frequencies, i.e. once or twice a week.

To obtain a reliable estimate of the concentration level it is generally stated that 75% of the measurements should be above the detection limit. Heavy metals and POP measurements have generally more problems to meet this requirement than the main components, but also for these latter measurements there are labs that need to look into whether their methods are suited for low background concentration levels, e.g. the SO_2 measurements in France are mainly under the detection limit.

The ion balance for many countries was within ± 20 per cent, which indicate valid data when pH is less than 5.5. For higher pH values there is often a systematic difference that is not yet fully understood. However, it should be emphasized that the ion balance does not give an exact assessment of the quality, but some labs (e.g. SK, RU) have very scattered ion balance plot indicating that their QA/QC routines needs to be improved.

Laboratory comparison of the main components in precipitation and air is carried out annually. The main message is that the laboratory performances in general are satisfactory, but that there nevertheless is room for improvements for some components like chloride, calcium, and potassium. Laboratory comparison of heavy metals is also performed annually. The measurements of high concentration samples give no major problem for the priority element Cd and Pb. Several countries have problems measuring low concentration samples and detection limit is too high for several elements in some countries (HU, IT, EE, DK).

In the framework of EUSAAR a laboratory intercomparison of TC, OC and EC has been conducted. TC measurements are generally satisfactory with an average RSD of 11%. Somewhat higher for OC and unsatisfactory high for EC measurements.

Field comparison between filterpack and Delta low cost denuders has been done at Birkenes, NO01. The comparison is satisfactory for sulphur and sea-salt components, less good for nitrogen species and calcium. For calcium it is probably due to larger particles captured by the filterpack. The difference in nitrogen concentrations are more difficult to explain because it does not seem like there is a systematic bias. Further investigations are needed.

Annex 5 contains detection limits and estimates of precision, both for the complete measurement methods applied, and for the chemical method in the laboratories. This Annex is based on the information and data the participants themselves have forwarded to the CCC.

Data quality 2006, quality assurance, and field comparisons

1. Introduction

The aim of quality assurance is to provide data with sufficiently good and known quality, and this series of reports is intended to document the EMEP data quality and the progress made. The present report is relevant for the 2006 data. All data included in the EMEP program is covered by this data quality report, most of the information available on the data quality is, however, on acidifying and eutrophying components.

Much of the information given here are collected from the participating laboratories, this being data on detection limits and precision. CCC organizes annually different types of comparisons, and the EMEP Laboratory inter-comparison and results from field comparisons with reference instrumentation provide important information of the data quality. Information of both these types of comparisons is used in a new flagging system of data quality.

Calculations of ion balances in precipitation samples are important supplementary information to evaluate the data quality; however, the ion balance (IB) check is mainly a control of the analytical procedure, and contamination or other field problems are not detected by this control. In addition, at high pH and/or at low ion strength the IB test is more uncertain. A flagging system has been developed to fully get use of the information from the ion balance test, however the flags are not implemented to the database yet.

2. Measurement programme and data completeness

EMEP's measurement programme in 2006 is given in Table 1. Details on the sampling program and measurement frequency at the different sites are found in the different data reports (Hjellbrekke and Fjæraa, 2008; Fjæraa and Hjellbrekke, 2008; Aas and Breivik, 2008; Solberg, 2008).

Many Parties do not fulfil the measurement program. There is in general a big lack of measurements of particles, VOC, POPs and heavy metals. The monitoring strategy developed for 2004–2009 (EB.AIR/GE.1/2004/5) aims to improve this situation, and a better spatial coverage is expected in the future. A positive trend is especially seen for particulate matter. Few Parties measure all the inorganic species in air including base cations.

According to the Data Quality Objectives (DQO) of EMEP (Annex 1), the data completeness should be at least 90 per cent for main ions and heavy metals. In Annex 2 there is a summary of the data capture for all the EMEP data for 2006.
For the precipitation components most participants broadly met the DQO, but the data completeness for the air components is less satisfactory.

Table 1: EMEP's measurement programme (level 1 and 2) in 2006.

	Components	Measurement period	Measurement frequency
Gas	SO_2, NO_2, NH_3, HNO_3	24 hours	Daily
	O_3	Hourly means stored	Continuously
	Light hydrocarbons C_2-C_7	10-15 mins	Twice weekly
	Ketones and aldehydes (VOC)	8 hours	Twice weekly
	Hg	Hourly/24 hours	Continuously/ Weekly
Particles	SO_4^{2-}, NH_4^+, NO_3^-, Ca^{2+}, Mg^{2+}, Na^+, K^+, Cl^-	24 hours	Daily
	Cd, Pb (first priority), Cu, Zn, As, Cr, Ni (second priority)	Weekly/24 hours	Weekly
	PM_{10} mass	24 hours	Daily
Gas + particles	HNO_3(g)+NO_3^-(p), NH_3(g)+NH_4^-(p)	24 hours	Daily
	POPs (PAH, PCB, HCB, chlordane, lindane, α-HCH, DDT/DDE)	Daily/weekly	Once weekly
Precipitation	Amount, SO_4^{2-}, NO_3^-, Cl^-, pH, NH_4^+, Na^+, Mg^{2+}, Ca^{2+}, K^+, conductivity	24 hours/weekly	Daily/weekly
	Hg, Cd, Pb (first priority), Cu, Zn, As, Cr, Ni (second priority)	Weekly	Weekly
	POPs (PAH, PCB, HCB, chlordane, lindane, α-HCH, DDT/DDE)	Weekly	Weekly

For heavy metals, VOC and POPs the data capture is lower than for the main components, especially for air samples. The reason is that several countries analyse e.g. one or two air samples weekly. This will give poor data completeness, but the seasonal distribution is anyhow satisfactory, and the annual average will probably give a reasonable estimate even though there are no measurements on the majority of the days.

Even though percentage of measurements above detection limit is not defined in the DQO it is important that most of the data is measurable, otherwise the uncertainty in the average will become quite high. The exact level of what is acceptable depend somewhat on the concentration level and the component in question. In Annex 3 it is given a summary of the number of samples below the detection limit for main components and heavy metals. Limits of 75%, 50% and 25% are given. Heavy metal and POP measurements have more problems than the main components.

3. Ion balances

The ion balance is a good test on consistency and errors in the analytical results, but will not necessarily reveal a contamination of the sample. This will depend on whether or not the contamination occurred before the analysis started. The ion balance will also fail to discover errors related to the precipitation sampling.

The ion balances for all precipitation samples from 2006 are presented in Annex 4, as a function of pH. Ion balances for samples with pH < 5 were, for many countries, better than 15–20%, indicating fairly good accuracy in the determination of the individual ions. Some results give very scattered plot of the ion balance, i.e. in SK and RU. This may indicate that the quality assurance routines need to be improved.

At some sites there were many samples with pH > 5. This is particularly the case in Mediterranean countries due to alkaline dust as clearly seen from the Portuguese and Spanish results, as well as at other continental sites and in the far north of Europe. It is an experience made that ion balances become markedly poorer with increasing pH above 5–6. Some countries seem to have systematic deficit of anions, i.e. in contrast to the large spread in the ion balances seen in the Mediterranean. This is seen at many sites, e.g. in Croatia, Italy and Norway. In other countries, e.g. in Denmark and Ireland, the systematic anion deficit does not occur.

The reason for the poor ion balances at pH values above 5–6 is not yet fully understood. One contributing factor is certainly due to unmeasured ion species present in the sample, i.e. organic acids and bicarbonate. Biological degradation of some precipitation components may also contribute. The systematic deficit of anions at pH above 5–6 is a general problem, which also occurs in other networks in other parts of the world. The current situation with the very poor ion balances for samples with pH above 5 is highly unsatisfactory since we will only have limited information about the consistency of these results. Countries having weakly acidic samples as a larger fraction of their precipitation could supplement their current pH measurements with titration for determining weak acid concentrations, preferably as described in the Manual (EMEP/CCC, 1996). This is, however, not done at any sites today.

4. Accuracy, detection limits and precision

A request for quality assurance data for the main components was made earlier this year: measurement and laboratory lower detection limit and precision results from control samples, and detection limits and precision for monitors. The information collected on detection limits and precision is given in Annex 5.

There are various ways of defining the measurement and laboratory precision and detection limit. The methods for calculating these data are defined in the EMEP Manual (EMEP/CCC, 1996). To quantify the precision in the measurements, parallel sampling is necessary and the precision should be given as M.MAD and CoV, relative standard deviation (RSD) is also an informative parameter. M.MAD expresses the spread of the data and equals the standard deviation if the population has a normal distribution. CoV expresses the relative spread of the data, and, similar to the M.MAD, approaches the relative standard deviation for a normal distributed population. Both parameters are non-parametric statistics, which make them particularly useful for measurements with spikes in the data. The definitions of M.MAD and CoV are (Sirois and Vet, 1994):

$$M.MAD = \frac{1}{0.6754} median\left(\left|e_i - median\left(e_i\right)\right|\right)$$

where e_i is the error in the two measurements

$$CoV = \frac{M.MAD}{median\left(\overline{C}\right)} * 100\%$$

where $\overline{C}$ is the average of the two corresponding results. If a reference method is used to evaluate the national/local measurements, the median of the reference measurements is used.

The detection limit is calculated using three times the standard deviation of the field blanks and given in the same unit as the measurement data. By using split samples and laboratory blank samples, laboratory precisions and detection limits can be assessed in a similar way.

5. Field intercomparisons

5.1 Introduction

Laboratory comparisons and field studies are organized in order to quantify systematic differences and errors and, as far as possible, to assess the measurement accuracies. Field comparisons mainly for main components in air have been carried out, and so far completed in several countries. Updated information on this is found on the EMEP web pages, http://www.nilu.no/projects/ccc/qa/index.htm. The comparisons are carried out at an EMEP site using a set of reference instruments that corresponds to the specifications in the EMEP Manual.

In 2006 and 2007 there were two field intercomparisons for main components in air. One in Montelibretti comparing Italian measurements with EMEP/CCC, and one comparison in Canada comparing EMEP, CAPMON and EASTNet measurements. Neither of these campaigns are completely evaluated and will therefore be presented next year.

5.2 Comparison between Delta denuder and filterpack measurements at Birkenes

The EMEP monitoring program included Delta denuder measurements, or low cost denuders as they also are called, in the monitoring strategy for 2004-2009 (EB:AIR/GE.1/2004.5) to improve the spatial coverage of nitrogen gas-particle distribution in Europe. Presently most Parties are measuring inorganic gas and aerosol speciation using the filter pack method. As well known, this method is biased for nitrogen gas-particle separation due to the volatile nature of NH_4NO_3 and the possibility for NH_3 and HNO_3 to be absorbed on the front aerosol filter. However, the method is recognized to provide reliable results for the sum of particulate and gaseous phase. The recommended method to get the gas-particle partitioning correctly is to use denuders. Daily measurement using denuders has however proven to be too costly and demanding for most Parties to priority. Therefore monthly measurements using Delta denuders (Sim and Sutton, 2007) has been recommended as a supplement to check how well the filter pack measurements do regarding the gas-particle distribution, and to have an independent measurement for model intercomparison. The performance of the Delta denuder compared with the filter pack method has been evaluated for the one year measurements at Birkenes, Figure 1–Figure 6 and Table 1.

Somewhat surprisingly the comparison of the sea salt ions Na, Cl and Mg is best. It is expected that the Delta denuder, which has much lover flow rate than the filter pack, may have problems to capture the larger particles. It seems like this is not a problem for sea salt particles. But for calcium this might be an issue, the filter pack sample more calcium than the Delta denuder system, however, it seems odd that calcium are associated with larger particles captured by the filter pack only. One explanation can be the high blank values used for the Delta denuder (0.1 $\mu g/m^3$). A relatively large fraction of calcium is probably associated with large particles from re-suspension of nearby dust sources.

For sulphur the Delta denuder gives a bit higher concentration both for SO_2 and SO_4. It is difficult to point out the reason for this. For sulphate it is mainly two month with high concentration levels that cause this while the rest of the period has good fit. For SO_2 it's also relatively large deviations also in the month with low concentration level during the winter. This can partly be explained by the fact that most of the daily filter pack samples in these periods (Aug, Oct, Dec) are below the detection limit. These data are then given the value of half the detection limit causing an additional uncertainty in the average monthly estimate. However, even if data are given detection limit value instead, it will still be less than the Delta denuder for this month.

The low levels for HNO_3 using filter pack are also mainly below the detection limit. Furthermore the bias might be due to absorption of HNO_3 on the front aerosol filter. However it does not seem like NO_3 is systematically biased in any direction. For NH_3 the filter pack is generally higher than the Delta denuder. Maybe this is due to volatilisation of NH_4NO_3 from the front filter, but then one should have expected the same tendency for HNO_3. The comparison of nitrogen species does not improve much by looking at the sum of gas and particulate indicating there is no systematic bias in any of the methods. For the filter pack there is an uncertainty due to a large fraction of HNO_3 being below the detection limit and relatively high blank values for NH_4NO_3 for the aerosol filters. For the Delta denuder, it can be a problem with ions carried over from the denuder to the connection tubes. A comparison done in Switzerland shows that the Delta denuders systematically gives lower values compared to impregnated filters due to this effect (Gehrig, 2008). Further investigation are necessary to identify the main sources of errors.

Table 2: Average air concentration and standard deviation using Delta denuders and filter pack, Birkenes, November 2006 – December 2007.

	SO_2	SO_4	HNO_3	NO_3	Sum N ox	NH_3	NH_4	sum N red	Ca	Mg	Cl	Na
Average Delta denuder	0.08	0.31	0.07	0.10	0.17	0.16	0.22	0.38	0.03	0.05	0.43	0.45
Average filter pack	0.06	0.27	0.04	0.13	0.17	0.27	0.16	0.42	0.05	0.06	0.48	0.43
Average	0.07	0.29	0.05	0.12	0.17	0.21	0.19	0.40	0.04	0.06	0.46	0.44
SD	0.02	0.08	0.03	0.04	0.04	0.10	0.15	0.18	0.02	0.01	0.09	0.07
RSO %	32 %	28 %	48 %	32 %	23 %	46 %	77 %	45 %	51 %	18 %	20 %	15 %

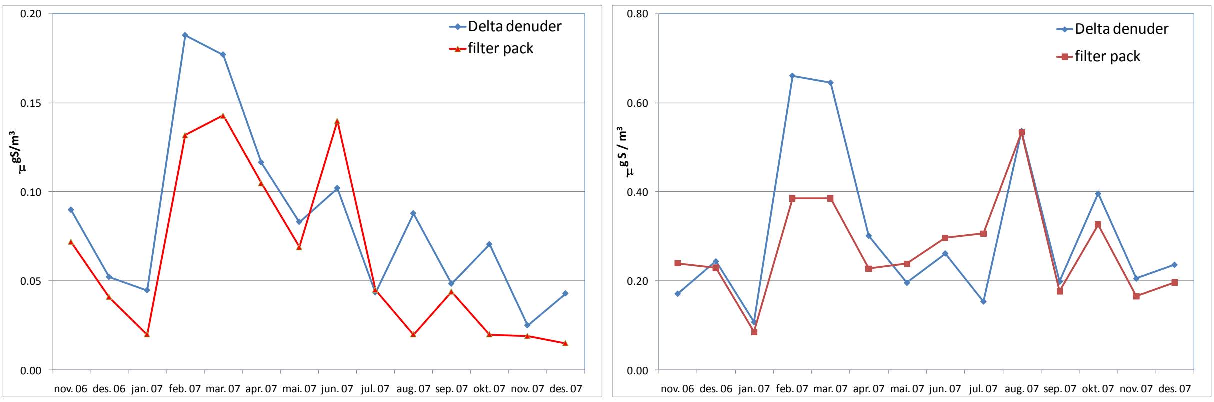


Figure 1: Monthly mean of SO_2 and SO_4 at Birkenes using Delta denuder and filter pack.

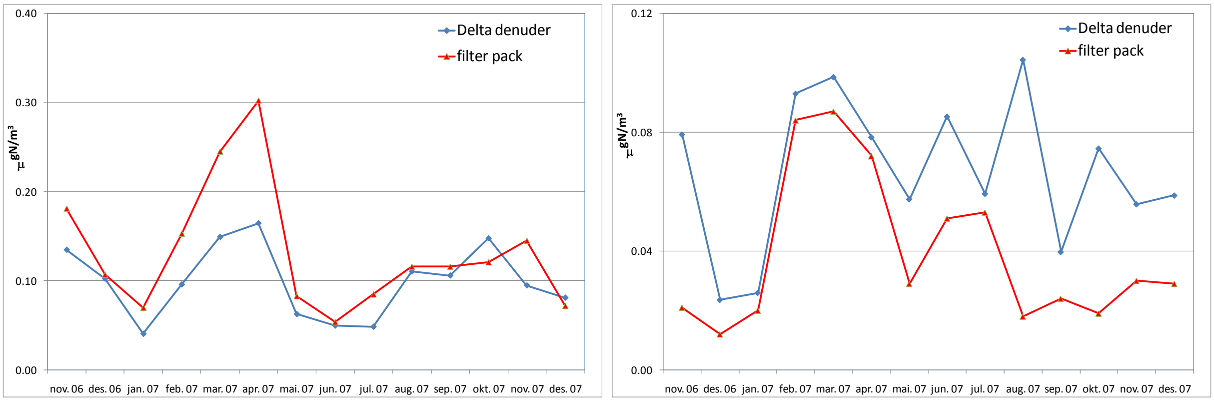


Figure 2: Monthly mean of NO_3 and HNO_3 at Birkenes using Delta denuder and filter pack.

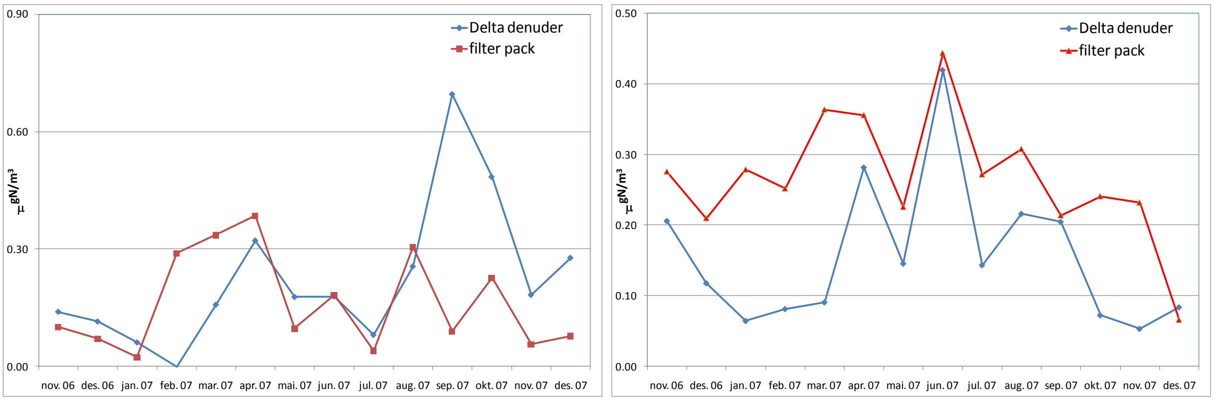


Figure 3: Monthly mean of NH_4 and NH_3 at Birkenes using Delta denuder and filter pack.

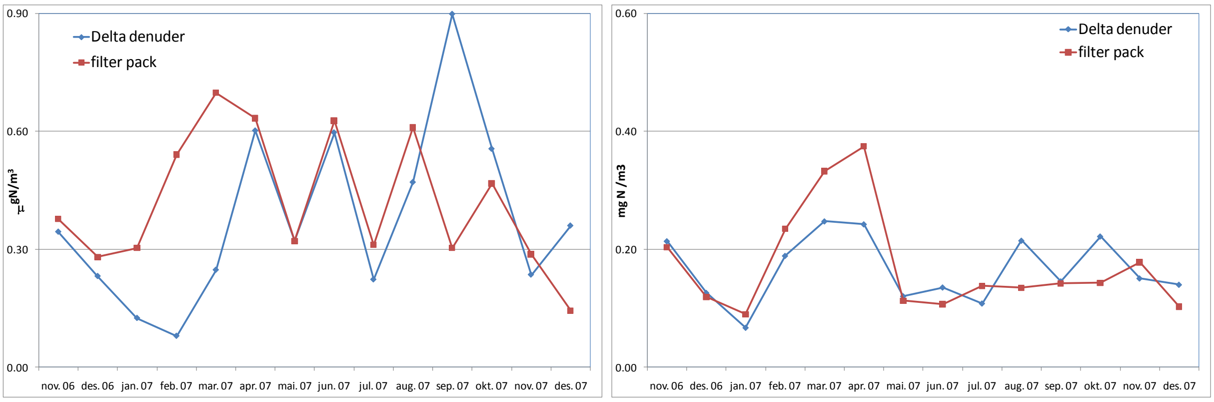


Figure 4: Monthly mean of sum(NH_4+NH_3) and sum (HNO_3+NO_3) at Birkenes using Delta denuder and filter pack.

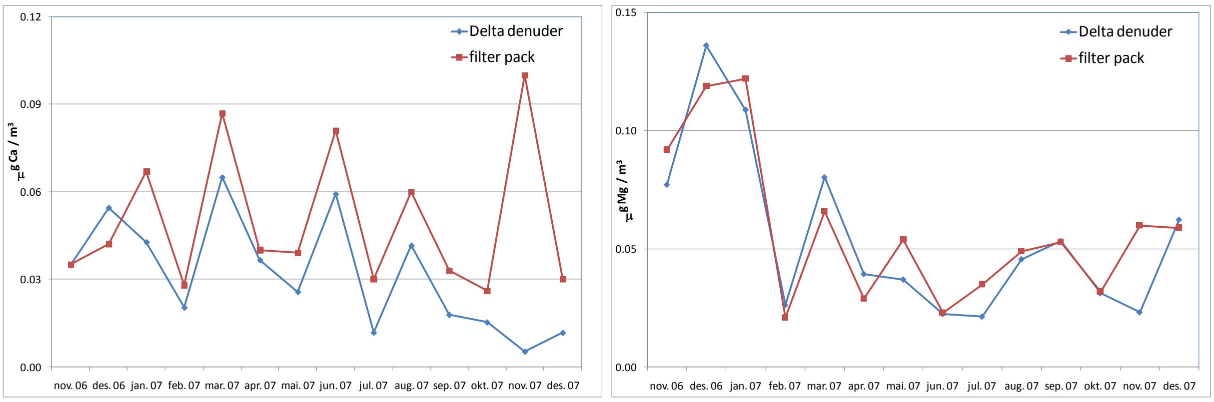


Figure 5: Monthly mean of Ca and Mg at Birkenes using Delta denuder and filter pack.

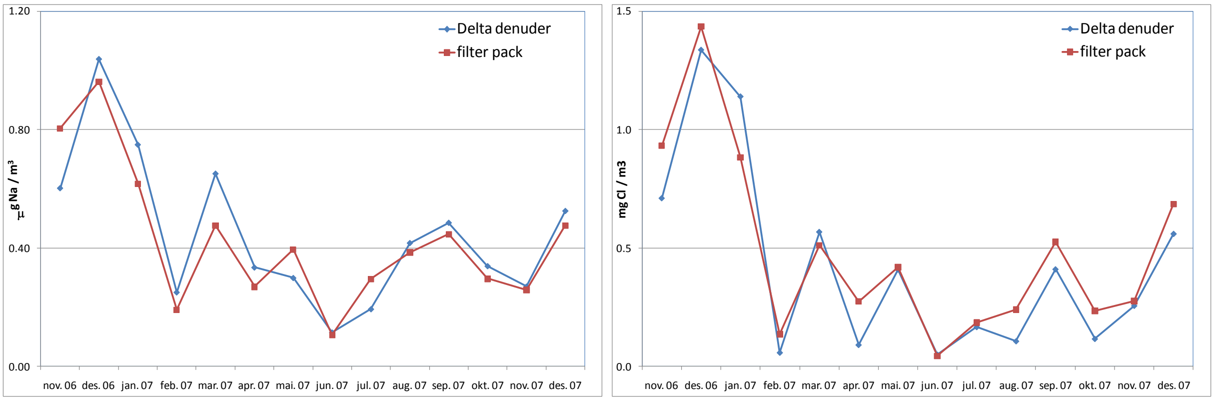


Figure 6: Monthly mean of sum Na and Cl at Birkenes using Delta denuder and filter pack.

6. Results from laboratory comparisons

6.1 Main components

The twenty-third intercomparison (Uggerud and Hjellbrekke, 2007a) of main components in air and precipitation is relevant for the data reported for 2006. The results of the systematic and random errors are shown in Table 3 and Table 4, respectively. The details on how these calculations are done are presented in Aas et al. (2003).

The results are mostly good. Except for a few labs, i.e. HU and UK that have difficulties with some of the elements. This is not necessarily the general performance for the laboratory since only one outlier may cause the problems. It is necessary to look at the performance for several years if one needs a general picture. However, large deviations are signs of QA/QC problems in the lab, and the lab routines need to be checked extra carefully. Another point is than some of the results are not representative for the data reported. I.e., Spain makes it quite poor for SO_2, but the data reported to EMEP is by monitors and therefore not affected by the performance in the lab.

Table 3: Random errors (RSD%) in the 23rd laboratory intercomparison for precipitation and air.

		Precipitation										Air and aerosols			
		SO42	NH4	NO3	Na	Mg	Cl	Ca	K	pH	Cond	SO2	HNO3	NH3	NO2
1	AT	0.4	1.5	1.6	1.2	5.8	8.3	1.1	0.8	1.7	1.9				
2	BE	3.4	8.3	4.8	2.2	2.7	5.3	3.0	2.0	21.6	3.5				
21	CH	0.3	0.5	2.1	0.2	0.8	1.3	0.9	1.9	0.0	0.8	1.0			
24	CS	0.7	6.2	0.7	19.6	9.2	4.8	13.5	6.4	0.0	0.6				5.0
3	CZ	0.9	12.5	1.5	13.1	18.4	1.1	12.6	5.2	0.7	1.9	1.0	5.7	1.4	8.1
7	DE	1.4	1.5	1.2	0.8	0.7	1.0	0.4	0.5	0.7	1.1	2.0	3.8	5.0	0.9
8	DE03	0.9	1.5	1.4	1.4	1.9	1.4	4.4	2.4	0.1	1.8				
4	DK	0.3	0.5	1.6	1.9	5.4	5.0	43.5	3.0	0.1	0.8	2.0	1.9	2.8	0.7
38	EE	0.9	1.0	1.6	0.5	1.9	1.5	2.5	0.5	12.9	28.4	5.0	3.8	2.1	0.5
19	ES	1.9	1.2	1.8		1.9				0.5	0.3	14.5		2.0	0.9
5	FI	0.5	0.9	1.5	2.1	0.8	1.4	1.4	1.3	0.0	0.4	2.0	3.8	2.2	
6	FR	0.2	6.0	1.4	5.5	2.7	2.4	4.1	1.0	0.4	4.1	0.8			
35	HR	0.6	11.3	1.3	8.6		4.4		11.3	0.2	0.8				
10	HU	20.3	0.6	11.8	3.5	0.8	92.9	4.1	1.0	0.6	0.2			11.6	2.7
12	IE	0.4	2.6	3.3	1.5	8.8	1.1	2.7	2.0	0.2	1.0				1.8
11	IS	1.1		2.9	6.5	1.2	1.1	11.0	19.1	0.4	2.0	6.0	3.8		
13	IT01	25.3	3.4	3.2	2.0	2.3	2.6	0.4	1.9	0.6	4.4			4.1	
30	IT04	1.5	1.3	1.7	2.2	6.5	4.0	2.3	2.0	1.0	0.9				
32	LT	1.9	3.5	3.3	3.8		7.6	22.2	4.7	0.2	2.5	2.0	3.8	8.4	1.8
33	LV	2.2	1.2	1.4	5.7	3.8	4.6	2.0	1.7	0.5	1.2	4.0	1.9	5.1	0.9
14	NL	1.8	1.1	1.8	2.9	4.2	8.9	3.0	3.4	0.6	1.4				
15	NO	0.3	3.4	1.3	2.2	2.3	3.0	1.4	1.0	0.1	1.0	3.0	1.9	8.6	2.7
16	PL	1.5	3.9	1.1	3.1	1.2	1.9	2.1	5.9	0.1	1.6	2.0	1.9		1.4
39	PL05	1.3	2.3	4.7	0.9	1.2	3.5	0.5	0.3	0.2	2.7	8.1	3.8	4.4	2.3
17	PT	5.0	1.9	1.0	3.5	2.3	7.5	15.8		0.3	2.0	9.5			
22	RU	1.1	16.2	5.7	12.2	13.4	18.2	10.1	5.4	0.7	0.9	6.0	5.7		55.2
20	SE	1.4	0.7	1.3	2.1	2.3	1.6	34.3	3.2	0.2	1.3	2.0	3.8	1.0	0.9
36	SI	0.4	2.2	1.4	1.1	3.8	0.8	4.4	6.1	0.2	2.1	4.0	1.9	2.8	3.2
31	SK	3.7	4.1	3.5	6.9	5.8	3.1	13.0	12.0			2.0	1.9	8.8	1.8
23	UK	2.2	19.1	2.1	32.3	11.5	29.7	15.6	6.6	0.6	1.6	1.5			

1-2 DQO   > 2 DQO

Table 4: Systematic errors (RB%) in the 23rd laboratory intercomparison for precipitation and air.

	Precipitation										Air and aerosols			
	SO42-S	NO3-N	NH4-N	pH	Mg	Na	Cl	Ca	K	Cond	SO2-S	NO2	NH3	HNO3
1 AT	0	3	0.9	2.3	-6.1	-8.6	-3.3	-3.5	0.6	-0.1				
2 BE	13.5	35.1	11.3	13.5	38.1	19.6	8.5	26.9	2.3	2.5				
21 CH	1	1.3	0.8	1.2	0.5	-2.5	3.5	4.5	0.2	1.8	1			
24 CS	2	-0.3	-0.2	44	18.4	6.9	-26	-36	0.5			4		
3 CZ	2.5	-11	-0.8	-3	-5.6	-0.3	1.5	-2.7	-0.3	-0.5	1	-2	-22	0
8 DE03	4.8	-3.6	5.5	2.4	1.9	-0.9	-0.7	-5.2	0.9	-4.3	0	1	0	0
7 DE	15.7	-3.7	-1	3.1	1.2	-1.5	-1.7	0	-2.3					
4 DK	0.5	0.6	1.3	3.8	-12	-0.6	-6.5	-5	0.9	3.2	-3	1	-1	5
38 EE	-2.9	-4.6	2.4	-2.1	-9.4	10.9	-8.7	-12	9.5	-6.4	-9	-2	7	2
19 ES	-1.9	4.5	-2.3		0.5				3.7	0.2	-26	-3	-2	
5 FI	-1.1	-1	0.8	2.8	4.2	1.7	3.5	3.9	0.5	2.2	4		-2	5
6 FR	-1	2.7	-0.2	4.6	-10	-5.5	-1.7	-7	0.4	-1.9	-1			
35 HR	2.3	6.1	2.3	12.2		3.1		-22	1.2	-10		9		
10 HU	46.1	0	18.9	-13	2.4	170	4.1	5.2	-0.1	-5		1	-27	
12 IE	-2.4	1.2	5.4	0.7	9.9	0.6	-4.4	-6.2	0.7	3.6		6		
11 IS	-2.8		5.1	-0.4	-2.4	-14	-2.6	-10	-1.3	0.8	-9			2
13 IT01	64.9	4	8.2	3.8	-2.8	5.4	0.4	1.4	-0.1	-4			5	
30 IT04	1.9	1.2	-10	4.2	8.5	7.8	4.8	-12	0.8					
32 LT	-5.6	17.4	7.9	0.2		-4.5	-22	-11	0.7	-0.2	-6	11	-6	-5
33 LV	-9.4	-0.1	-4.5	-13	-3.8	-9.7	-0.9	-2.9	-0.8	-3.3	4	7	-2	14
14 NL	15.4	-1.6	-5	-4.3	-8	-28	-1.3	0	2.3	-3.8				
15 NO	-0.7	-0.1	-1.8	2.4	-0.5	-5.1	-11	-2.7	1.1	-6.8	1	-7	3	9
16 PL	-1.1	-4.9	-2.4	-4.6	0	-2.9	2	-8.3	0	0.8	1	-3		5
39 PL05	2.3	8	-5.6	2.3	-0.5	4.6	1.7	-0.8	-0.1	2.1	-14	-6	-6	-2
17 PT	-19	5.6	-6.6	-38	-55	-10	-25		1.4		9			
22 RU	5.5	1.6	10.2	19.9	24.9	1.5	28.7	0.2	3	-1.2	5	3		5
20 SE	-5.7	2.4	-0.3	0.1	-6.1	-0.6	0.7	-8.5	0.4	-0.9	-3	4	-2	2
36 SI	-5.2	5.8	1.9	3.2	-8.5	-4.9	-6.7	-9.1	1.8	-38	-1		2	0
31 SK	7.1	4.8	4.5	-2.1	-33	2.6	-37	2.5		-6.6	4	-3	4	0
23 UK	3.2	-13	2.3	21.3	3.3	17.8	8.1	-6.2	-0.9	1.4				

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

6.2 Heavy metals

The data quality objectives (DQO) in EMEP states that the accuracy in the laboratory should be better than 15% and 25% for high and low concentrations of heavy metals, respectively (Annex 1). One important measure to check the data quality is the laboratory ring test. There is a marked improvement in the laboratory performance for both lead and cadmium since the beginning of the laboratory comparison in 1995. The intercomparison completed last year is relevant for the 2006 data (Uggerud and Hjellbrekke, 2007b). In Table 5, there is a summary of the results from this laboratory intercomparison. Sweden and Iceland were not participating because these measurements were analyzed in Norway. The measurements of high concentration samples are generally satisfactory, especially for the first priority element Pb and Cd. However, at many EMEP sites these high concentrations are not very representative. Estonia has large errors and too high detection limit. This is also true for DK, HU and IT. In addition, there are some countries reporting measurements data without participation in the laboratory intercomparison: Belgium, Ireland, Portugal, and Spain. Data from these countries are of unknown quality; and it is therefore strongly recommended that they take part in the annual laboratory inter-comparison.

Table 5: Average per cent error (absolute) in low and high concentration samples, results from heavy metal laboratory intercomparison in 2006.

	As		Cd		Cr		Cu		Pb		Ni		Zn	
	low	high	low	high	low	high	low	high	low	high	low	high	low	high
AT	4	2	<DL	4	3	6	0	4	0	3	<DL	5	<DL	11
BE	12	4	8	3	26	2	22	10	1	5	16	14	16	12
CZ	15	1	13	7	7	12	25	14	5	0	20	4	0	1
DK	25	11	146	11	<DL	26	100	34	15	21	<DL	31	<DL	<DL
FI	21	20	13	12	28	11	7	8	9	11	6	8	10	11
DE	11	8	12	3	1	0	5	0	3	0	<DL	0	6	0
DE	1	0	2	2	3	2	1	3	3	6	1	5	1	2
HU	<DL	<DL	17	2	<DL	<DL	<DL	<DL	25	8	<DL	<DL	<DL	<DL
IT	<DL	<DL	16	4	<DL	<DL	10	4	51	10	<DL	<DL	11	865
NL	5	2	7	2	49	3	3	3	1	2	6	1	4	3
NO	1	3	2	1	2	0	1	1	6	2	6	2	11	3
PL	<DL	<DL	0	0	0	0	4	0	9	3	12	0	0	4
PL05	<DL	0	<DL	0	0	1	6	3	6	5	<DL	0	<DL	0
UK	8	6	18	2	20	6	5	4	2	3	2	1	4	7
LT	4	3	23	5	10	13	21	3	19	4	11	5	6	5
LV	41	8	15	1	9	10	3	3	4	6	9	18	9	9
SI	1	1	5	4	7	2	1	1	10	10	11	2	1	7
EE	<DL	5	<DL	12	<DL	3	<DL	7	21	3	<DL	9	<DL	90

1/2 - 1 DQO   1 - 2 DQO   > 2 DQO

6.3 Intercomparison of Total Carbon, Organic Carbon and Elemental Carbon within EUSAAR

by Jean Phillippe Putaud and Fabrizia Garvelli, JRC, Ispra

6.3.1 Introduction

Various analytical methodologies exist for quantification of the ambient aerosol content of carbonaceous material. In the few intercomparisons published (e.g. Schmid et al., 2001) large differences have been reported. Given the high relative contribution of carbonaceous matter in ambient aerosols it is important that high quality data are produced by the various laboratories and that these data are comparable.

To overcome some of the large differences observed a new and unified protocol for sampling and analysis of Elemental Carbon (EC), Organic carbon (OC) and Total Carbon (TC) is currently being developed within the EU funded project EUSAAR (European Supersites for Atmospheric Aerosol Research), for subsequent adaption by the EMEP TFMM (Task force on measurements and modelling) and the GAW scientific advisory board. As a part of this project intercomparisons will be conducted. Here we present some of the results from the first intercomparison conducted in 2007.

6.3.2 Aim

The purpose of the first intercomparison was to establish the comparability between various laboratories before a common analytical protocol is adapted.

6.3.3 Samples

Filter punches from four different high volume filter samples were distributed among the laboratories participating in the intercomparison. The filters were picked to span the wide range of concentrations encountered in various parts of the European rural background environment.

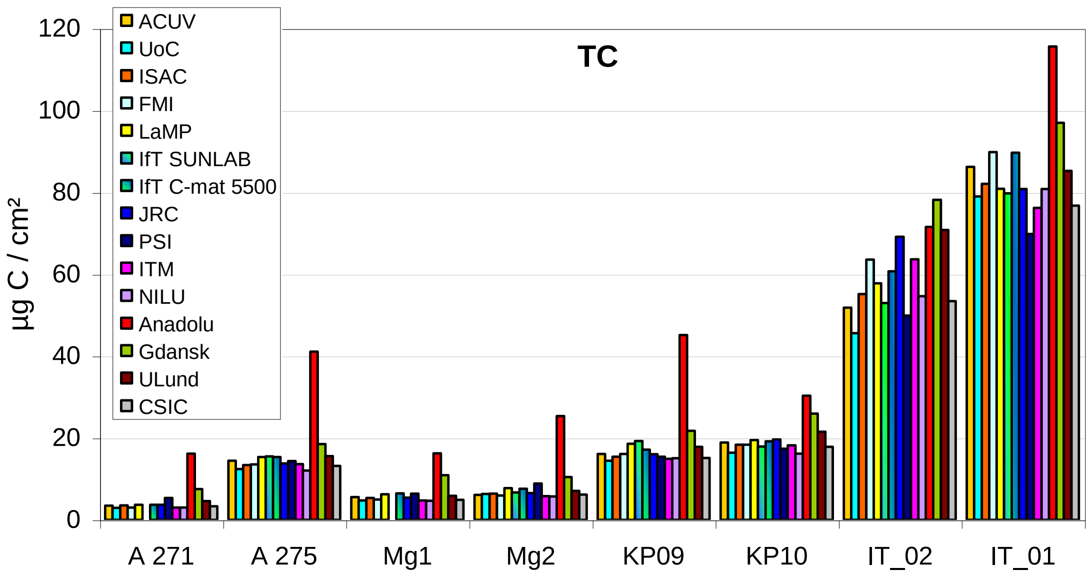
6.3.4 Results

TC

TC was reported by 14 laboratories, among which 12 were partners of the EUSAAR project and two were associate EUSAAR partners. The results are presented graphically in Figure 7a and Figure 7b.

Among the EUSAAR partners, the average relative standard deviation to the average concentration of TC obtained by the EUSAAR partners was ± 11%, which is acceptable. The largest relative standard deviations observed was -21% and + 32%. This show that large inter laboratory differences could occur, and in particular for filters with a low Carbon loading.

The TC concentrations reported by the two EUSAAR associates were systematically higher compared to the average reported by the EUSAAR partners, i.e. by as much as a factor of 4.5 at the highest. The deviations were particularly high for low Carbon filter loadings.



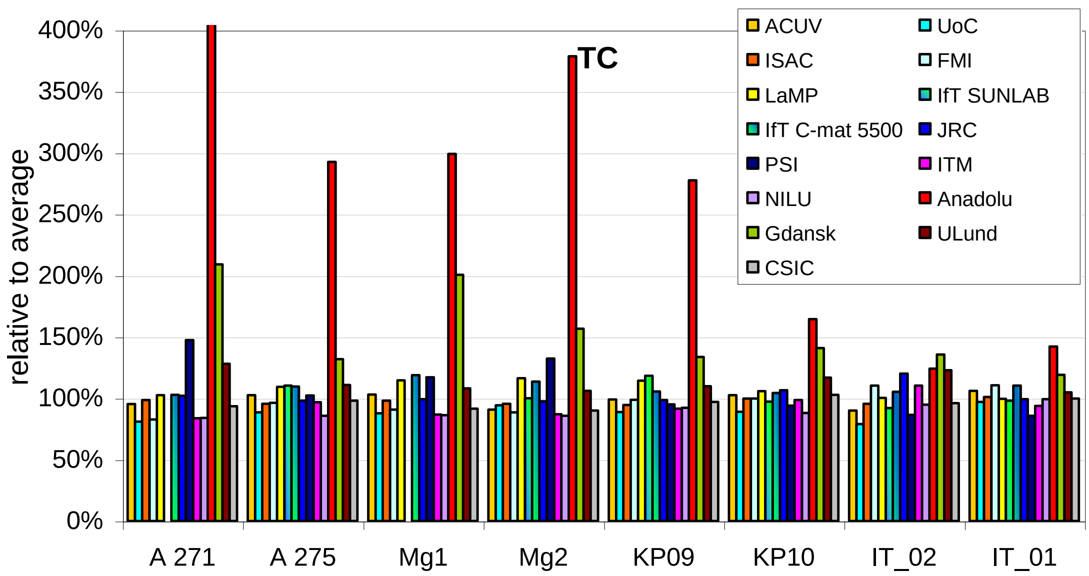


Figure 7: Amount of TC reported by the participants (a) in µgC/cm², and (b) relative to the average among EUSAAR participants

EC

The sample with lowest EC loading (A271) were excluded from the analysis, because of severe variation in the in the results reported by the various laboratories. Most laboratories did not demonstrate EC in this sample, which nicely illustrates the difficulties of providing accurate and reliable EC concentrations at levels below 0.5 µg EC cm^{-2}.

Levels of EC were reported by 10 EUSAAR partners and by one of the EUSAAR associates. Among those laboratories which used thermal optical methods, i.e. methods accounting for charring of OC during analysis, the average relative standard deviation of the mean EC concentration was ± 40%, which is not acceptable. For the two laboratories which used the EUSAAR_1 protocol the relative standard deviation was 13%, but not systematic. For the remaining sites using thermal optical instrumentation and operating according to some NIOSH derived protocol (e.g. quartz par.), the relative standard deviation was ± 29%. For these laboratories the performance was satisfactory for high EC filter loadings, whereas it was poor for low EC loadings.

NIOSH derived protocols typically provided lower EC values compared to EUSAAR_1. This could be explained by the higher temperature in the first stage of the analysis (the Helium mode) of the NIOSH derived protocols (850°C) compared to the EUSAAR_1 protocol (650°C). This could lead to too early combustion of EC, which then is accounted for as OC. Although the highest temperature in the IMPROVE protocol is 550°C only, the EC concentrations obtained by this protocol typically fall between the average values of the NIOSH derived protocols and the EUSAAR_1 protocol.

The results obtained with a thermal-only method, i.e. no charring correction, by one of the EUSAAR partners showed systematically higher EC levels compared to the thermal-optical mean values by a factor of 3.8. This substantial over-estimation of EC by thermal-only methods confirms that of Schmid et al. (2001).

Attempts to quantify the samples content of EC as the difference between two TC analysis, treating one of them thermally to remove OC, made by one of the EUSAAR associates was not successful and did not show any correlation with the data reported by the EUSAAR partners. This collaborates to the statement made by Schmid et al. (2001) that only thermal optical methods should be used when attempting to separate TC into EC and OC.

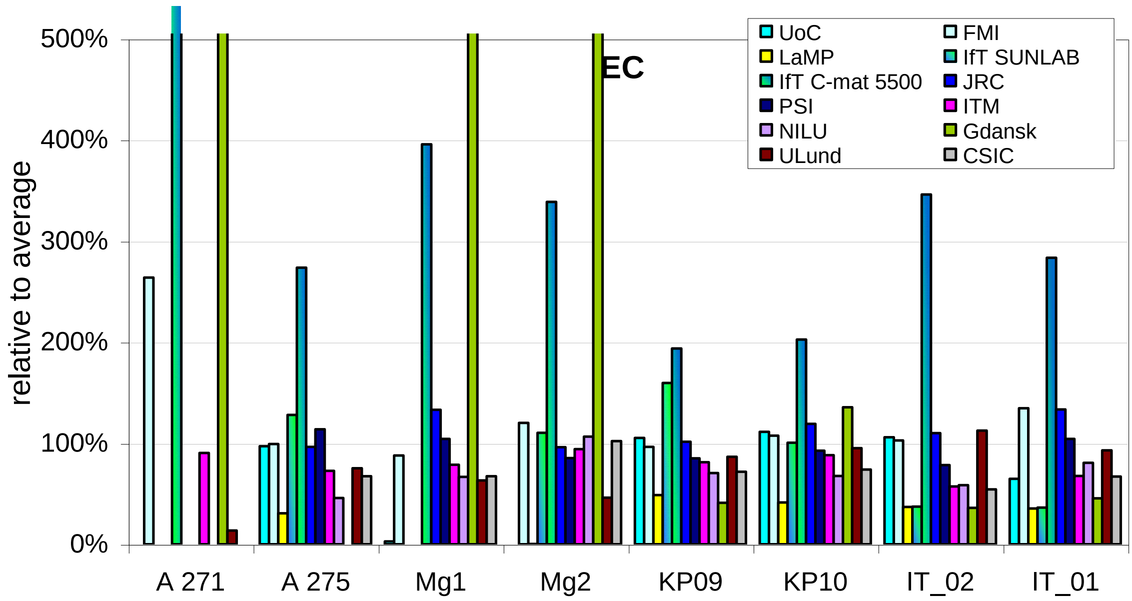


Figure 8: Amount of EC reported by the participants relative to the average among EUSAAR participants

OC

OC accounted for more than 80% of the samples TC content, thus the results for OC closely resembles that of TC.

Amongst the EUSAAR partners the average relative standard deviation of OC to the mean OC concentration was ±15%. The largest relative deviations amongst the EUSAAR partners were -25% and +36%. These results are satisfactory, but as seen for TC improvement is greatly needed for samples with a low Carbon filter loading.

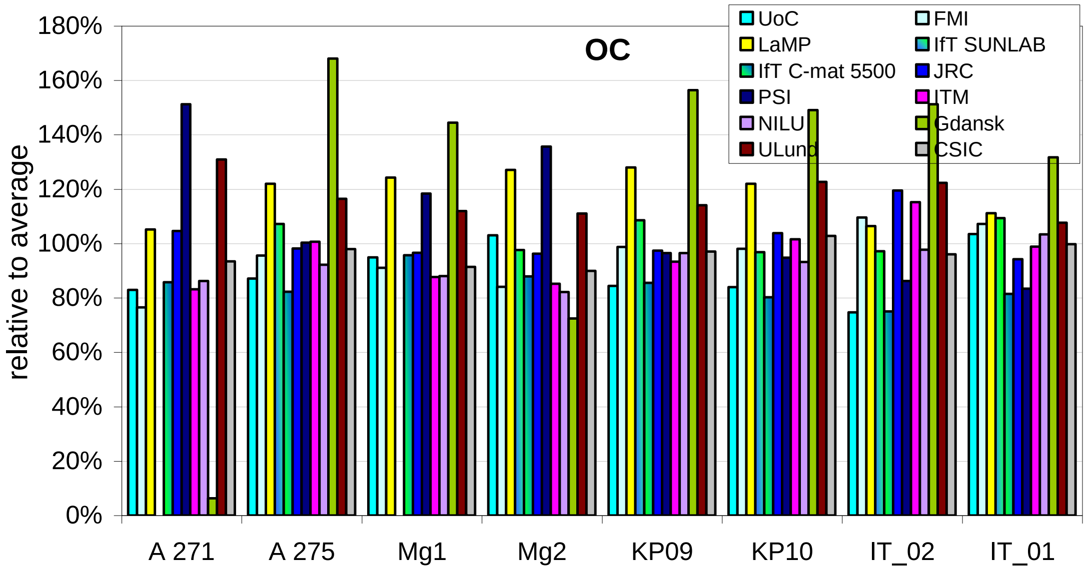


Figure 9: Amount of OC reported by the participants in µgC/cm².

6.3.5 Conclusions

- **TC**

The EUSAAR partners generally determine the TC content of the PM_{10} ambient aerosol Quartz fibre filters with a sufficiently good agreement, i.e. relative standard deviation ± 11%. For samples with a low TC loading (< 5 µg C cm^{-2}) the differences are unacceptably large.

- **EC**

The EUSAAR partners are not able to measure EC with a sufficiently good comparability even when using state-of-the-art thermal-optical techniques. A mean relative standard deviation of ±45% is observed with respect to the average EC concentration reported by the various partners. The mean relative standard deviation observed for the two laboratories using the EUSAAR_1 protocol (±13%) was better compared to those laboratories using the NIOSH derived protocols (±29%).

The EUSAAR_1 protocol systematically leads to lower EC values compared to the NIOSH derived protocols, whereas the IMPROVE protocol seems to provide levels which fall between the NIOSH and the EUSAAR_1 protocols.

Methods which do not account for charring artefacts, i.e. non thermal-optical methods, do not provide reliable results and should not be used to attempt separation of TC into EC and OC.

Extensive testing of the EUSAAR_1 protocol has resulted in some improvements with respect to the split point between EC and OC, which has led to a revised version of the protocol, namely EUSAAR_2. At present an inter comparison testing the performance of the EUSAAR_2 protocol is taking place. The aim for this second intercomparison is that the uncertainties demonstrated in the first intercomparison should be considerably minimized.

7. QA flags for 2006

The data quality (DQ) flag is divided in two two-digit numbers, the leftmost two digits describing the performance in field comparisons and the two rightmost being based on the laboratory comparisons, the definitions are found in Annex 6. The two-digit flags are furthermore defined by letting the first digit represent an estimate of the systematic error and the second digit the random error. Most of the SO_2 and NO_2 in air and SO_4 in aerosols data have been given a four-digit DQ flag. The rest of the air data have not been assigned any flag due to few field- and laboratory comparisons for these components. For precipitation data there has been very few field comparisons and therefore only two flags representing the performance in the laboratory comparisons are given. Details on how these flags are defined are found in Aas et al. (2003).

It should be noted that the field comparisons have been far less both in number and in length with respect to different meteorological situations than desirable, and that the DQ flag cannot be expected to give a precise estimate of the quality. The flags will give a data user a quick overview of the expected errors in a data set and hopefully also give the user reasonable estimates of systematic deviations from a reference and of random errors in the data.

One may also group the different flags in a simpler classification, i.e. A, B, and C or as shown in Table A6.1 and Table A6.2 in three colour codes. The data series flagged with any of the red flags (C) will be classified as invalid data. The rest of the data are classified as valid data although those marked with a green colour (A) is considered by CCC as the most accurate data in the EMEP database. The data user may create other criteria or quality groups depending on the use of the data.

Several countries have never participated in field comparisons, and some countries have changed their measurement method since they took part. The comparisons carried out so far are therefore far from sufficient to express the comparability of all measurements. There are probably many comparisons performed outside EMEP, and if this information is made available, further updates of the flags will be done.

The results obtained in one comparison are used to flag data for all the years this method has been in use at the site. A poor performance in a field comparison can therefore influence the flagging for many years of data. If the data quality is determined to a large extent by the sampling method then this seems to be an acceptable approach. If on the other hand the sampling is fairly simple and the laboratory work determines most of the overall measurement quality, then the performance in the annual laboratory comparisons will more important than the results from a field comparison. Details on the flags for SO_2 and SO_4 in air and CCC's recommendations on whether the field or laboratory flag should be prioritised is shown in Annex 5 in Aas et al. (2004).

In Table 6 and Table 7 the flags relevant for 2006 are listed. The field flags are based on last results in the latest field intercomparison that the country has participated in, while the laboratory flag is based on the results in the 23rd laboratory intercomparison (Uggerud et al., 2007). For SO_4 in air, only field flags are shown since this component is taken out from the laboratory intercomparison. SO_4 in precipitation should be representative for the laboratory performance also for SO_4 on filters.

As seen there are very few measurements that should be considered invalid (marked in red); however, the B category is rather big for especially SO_2 and NO_2 measurements. It is up to the data user to select which data to be used based on the quality flags depending on the accuracy needed.

Table 6: QA flag and category for main components in precipitation.

Code	SO4		NO3		NH4		pH		Mg		Na		Cl		K		Ca		Cond	
AT	0	A	0	A	0	A	0	A	20	A	0	A	20	A	0	A	0	A	0	A
BE	30	B	30	B	50	B	1	A	50	B	30	B	30	B	50	B	10	A	0	A
CH	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A
CS	0	A	0	A	0	A	0	A	30	B	71	C	10	A	60	B	60	B	0	A
CZ	0	A	0	A	40	B	0	A	21	B	0	A	0	A	0	A	0	A	0	A
DE	30	B	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A
DE	0	A	10	A	0	A	0	A	0	A	0	A	0	A	20	A	0	A	20	A
DK	0	A	0	A	0	A	0	A	40	B	0	A	0	A	0	A	22	B	0	A
EE	0	A	0	A	0	A	10	A	20	A	0	A	30	B	40	B	20	A	61	B
ES	0	A	0	A	0	A	0	A	0	A									0	A
FI	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A
FR	0	A	0	A	0	A	0	A	40	B	0	A	20	A	20	A	0	A	0	A
HR	0	A	0	A	10	A	0	A			30	B	0	A	60	B			0	A
HU	71	C	30	B	0	A	0	A	0	A	40	B	73	C	10	A	0	A	0	A
IE	0	A	10	A	0	A	0	A	10	A	0	A	0	A	20	A	0	A	0	A
IS	0	A	10	A			0	A	0	A	0	A	40	B	41	B	0	A	0	A
IT	71	C	10	A	0	A	0	A	0	A	0	A	10	A	0	A	0	A	30	B
IT	0	A	40	B	0	A	0	A	10	A	0	A	10	A	40	B	0	A	0	A
LT	20	A	10	A	30	B	0	A	0	A	0	A	0	A	40	B	61	B	20	A
LV	20	A	0	A	0	A	0	A			40	B	20	A	0	A	0	A	0	A
NL	30	B	20	A	0	A	0	A	20	A	0	A	60	B	0	A	0	A	0	A
NO	0	A	0	A	0	A	0	A	0	A	0	A	20	A	0	A	40	B	0	A
PL	0	A	0	A	0	A	0	A	0	A	0	A	0	A	20	A	0	A	0	A
PL	0	A	20	A	10	A	0	A	0	A	0	A	0	A	0	A	0	A	20	A
PT	40	B	20	A	10	A	0	A	80	C	60	B	20	A			61	B	20	A
RU	10	A	30	B	1	A	0	A	50	B	30	B	1	A	0	A	50	B	0	A
SE	20	A	0	A	0	A	0	A	20	A	0	A	0	A	20	A	2	B	0	A
SI	20	A	0	A	10	A	0	A	20	A	0	A	0	A	20	A	20	A	40	B
SK	10	A	0	A	0	A			60	B	0	A	0	A	0	A	60	B		
UK	0	A	0	A	41	B	0	A	0	A	52	B	31	B	20	A	11	B	0	A

Table 7: QA flag and category for main components in air.

	SO2			NO2			SO4		sNO3			sNH4		
	qa flagg	field	lab	qa flagg	field	lab	qa flagg	field	qa flagg	field	lab	qa flagg	field	lab
AT	22--	B												
CH	3200	B	A	33--	B									
CS				53--	B									
CZ	1200	B	A	--00	-	A			--00	-	A	--60		B
DE	0100	A	A	--00	-	A	00--	A	--00	-	A	--00		A
DK	0000	A	A	--00	-	A	00--	A	--00	-	A	--00		A
EE	1220	B	A	6200	B	A			--00	-	A	--10		A
ES	32--	B		30--	B		00--	A		-		--00		A
FI	1000	A	A	-	-		00--	A	--00	-	A	--00		A
FR	2000	B	A	-	-		20--	B						
GB	1000	B	A	5300	B	A	00--	A						
HR				--10		A								
HU				1300	B	A						--60		B
IE	00--	A		5010	B	A								
IS	--20		A						--00		A	--10		A
IT														
LT	1020	B	A	3230	B	B	10--	B	1000	B	A	--20		A
LV	5000	B	A	0210	B	A	22--	B	2230	B	B	0200	A	A
NL	11--	B		03--	-		00--	A					-	
NO	0000	A	A	0020	A	A	00--	A	--10		A	--00		A
PL	0000	A	A	4300	B	A	01--	A	--00		A			
PL05	2040	B	B	5220	B	A	32--	B	--00		A	--20		A
PT	--10		A											
RU	--00		A	--02		B			--00		A			
SE	0000	A	A	1000	B	A	00--	A	--00		A	--00		A
SI	0000	A	A	-	-		20--	B	--00		A	--00		A
SK	--00	-	A	5300	B	A			--00		A	--00		A
TR	00--	A												

8. Audits

Audit is not being done regularly from CCC, but will be done when needed. It is recommended regular audits at all EMEP sites, at least as an internal control every year, but also with visitors from e.g. neighbouring countries. Forms to be used for auditing main components in air and precipitation, and ozone can be downloaded from EMEP's homepage, http://www.nilu.no/projects/ccc/qa/index.htm. It is recommended that all the external auditing is reported to CCC.

9. References

Aas, W. and Breivik, K. (2008) Heavy metals and POP measurements, 2006. Kjeller, Norwegian Institute for Air Research (EMEP/CCC-Report 4/2008).

Aas, W., Hanssen, J.E. and Schaug, J. (2007) Field intercomparison of main components in air in EMEP. *Water Air Soil Pollut. Focus., 7*, 25-31.

Aas, W., Hjellbrekke, A.-G., Manø, S., Schaug, J. and Uggerud, H.T. (2004) Data quality 2002, quality assurance, and field comparisons. Kjeller, Norwegian Institute for Air Research (EMEP/CCC-Report 4/2004).

Aas, W., Hjellbrekke, A.-G. and Schaug, J. (2003) Data quality 2001, quality assurance, and field comparisons. Kjeller, Norwegian Institute for Air Research (EMEP/CCC-Report 6/2003).

EMEP/CCC (1996) Manual for sampling and chemical analysis. Revised November 2001. Kjeller, Norwegian Institute for Air Research (EMEP/CCC-Report 1/95).

Gehrig, R., Hüglin, C., Fischer, A., Zellweger, C. and Wettstein, E. (2008) Comparison of NH_3/NH_4 and HNO_3/NO_3 measurements with DELTA minidenuders and impregnated filter methods. Presentation at the 9th Task Force on Measurement and Modelling, Bordeaux, France, 23-25 April 2008. URL: http://www.nilu.no/projects/ccc/tfmm/bordeaux08/Gehrig-TFMM2008.ppt

Hjellbrekke, A.-G. and Fjæraa, A.M. (2008) Data report 2006. Acidifying and eutrophying compounds and particulate matter. Kjeller, Norwegian Institute for Air Research (EMEP/CCC-Report 1/2008).

Fjæraa, A.M. and Hjellbrekke, A.-G. (2008) Ozone measurements 2006. Kjeller, Norwegian Institute for Air Research (EMEP/CCC-Report 2/2008).

Schmid, H., Laskus, L., Abraham, H.J., Baltensperger, U., Lavanchy, V., Bizjak, M., Burba, P., Cachier, H., Crow, D., Chow, J., Gnauk, T., Even, A., ten Brink, H.M., Giesen, K.P., Hitzenberger, R., Hueglin, E., Maenhaut, W., Pio, C., Carvalho, A., Putaud, J.P., Toom-Sauntry, D. and Puxbaum, H. (2001) Results of the "carbon conference" international aerosol carbon round robin test stage 1. *Atmos. Environ.*, *35*, 2111-2121.

Sirois, A. and Vet, R.J. (1994) Estimation of the precision of precipitation chemistry measurements in the Canadian air and precipitation monitoring network (CAPMoN). In: *EMEP Workshop on the Accuracy of Measurements*. *Passau*, *1993*. Ed. by T. Berg and J. Schaug. Kjeller, Norwegian Institute for Air Research (EMEP/CCC-Report 2/94). pp. 67-85.

Solberg, S. (2008) VOC measurements 2006. Kjeller, Norwegian Institute for Air Research (EMEP/CCC-Report 5/2008).

Tang, Y.S. and Sutton, M.A (2007) Operation manual for the CEH DELTA system. For sampling gaseous NH_3, HNO_3, HONO, SO_2, HCl and aerosol NH_4^+, NO_3^-, NO_2^-, SO_4^{2-}, Cl^-, Na^+, Ca^{2+}, Mg^{2+}. Edinburgh, Centre for Ecology and Hydrology. URL: http://www.nilu.no/projects/ccc/manual/download/DELTA_FullProtocol_v3.pdf

Uggerud, H. and Hjellbrekke, A.-G. (2007a) The twenty-third and twenty-fourth intercomparison of analytical methods within EMEP. Kjeller, Norwegian Institute for Air Research (EMEP/CCC-Report 5/2007).

Uggerud, H.T. and Hjellbrekke, A.-G. (2007b) Analytical intercomparison of heavy metals in precipitation, 2005 and 2006. Kjeller, Norwegian Institute for Air Research (EMEP/CCC-Report 4/2007).

10. List of participating institutions and the national quality assurance managers (NQAM)

Country	Institute	NQAM
Austria	Umweltbundesamt	Marina Froölich
Belgium	VMM	Jasmine Dumollin
Croatia	Meteorological and Hydrological Service of Croatia	Sonja Vidic
The Czech Republic	Czech Hydrometerological Institute	Nadezda Melichova
Denmark	National Environmental Research Institute	Lone Grundahl
Estonia	Estonian Environmental Research Lab. Ltd	Toivo Truuts
Finland	Finnish Meteorological Institute	Veijo Pohjola
France	l'Ecole des Mines de Douai Laboratories Wolff	Patrice Coddeville
Germany	Umweltbundesamt	Markus Wallasch
Greece	Ministry of Environment Physical Planning and Public works Environmental Chemical Processes Laboratory, University of Crete	Anastasios Adamopoulos GR02: Nikos Mihalopoulos
Hungary	Hungarian Meteorological Service, Institute for Atmospheric Physics	Zita Ferenczi
Island	The Icelandic Meteorological office	Johanna Thorlacius
Ireland	Environmental Protection Agency	Concannon Colman (EPA), Margaret Ryan (met service)
Italy	CNR Instituto Inquinamento Atmosferico	Cinzia Perrino
EU at Ispra, IT04	Joint Research Center (JRC)	Jean-Philippe Putaud
Latvia	Latvian Hydrometeorological Institute	Iraida Lyulko
Lithuania	Institute of Physics	Dalia Sopauskiene and Vidmantas Ulevicius (HM and POP)
The Netherlands	National Institute for public Helath and Environmental Protection (RIVM)	Arien Stolk
Norway	Norwegian Institute for Air Research (NILU)	Erik Andresen (Main), Marit Vadset (HM) Stein Manø (POP)
Poland	Institute of Meteorology and Water Management and Institute of Environmental Protection	Barbara Obminska and for PL05: Anna Degorska
Portugal	Instituto de Meteorologia	Amelia Lopes
Russia	Institute of Global Climate and Ecology	Alexey Ryaboshapko
Serbia	Republic Hydrometeorological Service of Serbia	Liljana Novakovic
Slovenia	Environment Agency - Slovenia	Marijana Murovec
Slovak Republic	Slovak Hydrometeorological Institute	Marta Mitosinkova
Spain	Subdirección General de Calidad Ambiental	Alberto González Ortiz
Sweden	Swedish Environmental Research Institute (IVL)	Karin Sjöberg
Switzerland	Swiss Federal Laboratory of testing Materials and Research (EMPA)	Robert Gehrig/ Claudia Zellweger
Turkey	The Ministry of Health of the Republic of Turkey	Lütfü Kiliclar
United Kingdom	AEA Technology	Keith Vincent

Annex 1

Data quality objectives

DQO for the acidifying and eutrophying compounds

- 10% accuracy or better for oxidized sulphur and oxidized nitrogen in single analysis in the laboratory,
- 15% accuracy or better for other components in the laboratory,
- 0.1 units for pH,
- 15–25% uncertainty for the combined sampling and chemical analysis (components to be specified later),
- 90% data completeness of the daily values.
- The targets, with respect to precision and detection limit follow the DQO of the WMO GAW precipitation programme (WMO, 2004):

Measurement parameter	Detection limits	Precision	
		Overall	Laboratory
pH (pH units)		± 0.1 pH unit at pH > 5 ± 0.03 pH unit at pH < 5	± 0.04 pH unit at pH > 5 ± 0.02 pH unit at pH < 5
SO_4^{2-} (mg S L^{-1})	0.02	0.02	0.01
NO_3^- (mg N L^{-1})	0.02	0.01	0.01
Cl^- (mg L^{-1})	0.04	0.02	0.02
NH_4^+ (mg N L^{-1})	0.02	0.02	0.01
Ca^{++} (mg L^{-1})	0.02	0.02	0.01
Mg^{++} (mg L^{-1})	0.01	0.01	0.01
Na^+ (mg L^{-1})	0.02	0.01	0.01
K^+ (mg L^{-1})	0.02	0.01	0.01
Standard Gauge Precipitation Depth (mm)	0.02	0.2 daily 0.3 weekly	n/a n/a
Sample Depth (mm)	0.2	0.1 daily 0.3 weekly	n/a n/a

n/a: Not applicable

The targets for the wet analysis of components extracted from air filters are the same as for precipitation. For SO_2 the limit above for sulphate is valid for the medium volume method with impregnated filter. For NO_2 determined as NO_2^- in solution the accuracy for the lowest concentrations is 0.01 mg N/l.

DQO for heavy metals

- 90% completeness
- 30% accuracy in annual average
- Accuracy in laboratory (c= concentration):

Pb:	15%	if c > 1 µg Pb/l
	25%	if c < 1 µg Pb/l
Cd:	15%	if c > 0.5 µg Cd/l
	25%	if c < 0.5 µg Cd/l
Cr:	15%	if c > 1 µg Cr/l
	25%	if c < 1 µg Cr/l
Ni:	15%	if c > 1 µg Ni/l
	25%	if c < 1 µg Ni/l
Cu:	15%	if c > 2 µg Cu/l
	25%	if c < 2 µg Cu/l
Zn:	15%	if c > 10 µg Zn/l
	25%	if c < 10 µg Zn/l
As:	15%	if c > 1 µg As/l
	25%	if c < 1 µg As/l
Hg:	15%	if c > 0.01 µg Hg/l
	25%	if c < 0.01 µg Hg/l

Annex 2

Data capture

Table A2.1: Data capture for main components in precipitation in 2006, in per cent.

Code	mm	pH	SO_4	XSO_4	NH_4	NO_3	Na	Mg	Cl	Ca	K	cond
AT0002R	100	100	100	100	100	100	100	100	100	100	100	100
AT0005R	100	100	100	100	100	100	99	100	99	100	100	100
AT0048R	100	100	100	100	100	100	100	100	99	100	100	100
BY0004R	100	95	88	82	72	89	85	83	45	82	83	83
CH0002R	100	100	98	98	98	98	98	98	98	98	98	100
CH0004R	100	100	100	100	100	100	100	100	100	100	100	100
CH0005R	99	100	99	99	99	99	99	99	99	99	99	100
CS0005R	100	100	100	100	100	100	100	100	100	99	100	99
CZ0001R	100	97	97	97	98	97	97	97	97	97	97	97
CZ0003R	100	96	93	93	96	93	85	85	93	85	85	95
DE0001R	85	100	100	100	100	100	100	100	100	100	100	100
DE0002R	100	96	99	99	98	99	99	98	99	95	98	94
DE0003R	100	100	100	100	100	100	99	99	100	99	99	100
DE0004R	100	99	99	99	99	99	99	99	99	99	99	99
DE0005R	100	100	100	100	100	100	100	100	100	100	100	100
DE0007R	100	100	100	100	99	100	99	99	100	99	99	100
DE0008R	100	100	100	100	99	100	99	99	100	99	99	100
DE0009R	94	100	100	100	100	100	100	100	100	100	100	100
DK0005R	100	100	100	100	100	100	100	100	100	100	100	-
DK0008R	100	100	100	100	100	100	100	100	100	100	100	-
DK0022R	100	100	100	100	100	100	100	100	100	100	100	-
DK0031R	100	100	100	100	100	100	100	100	100	100	100	-
EE0009R	100	87	100	100	100	100	100	100	100	100	100	92
EE0011R	100	100	100	100	100	100	100	100	100	100	100	100
ES0007R	100	80	78	78	78	78	77	77	78	77	77	80
ES0008R	100	80	88	88	88	80	87	87	88	87	87	80
ES0009R	100	72	92	92	92	71	91	91	92	91	91	72
ES0011R	100	97	97	97	97	97	97	97	97	97	97	97
ES0012R	100	75	75	75	75	75	75	75	75	75	75	75
ES0013R	100	96	93	93	93	93	86	86	93	86	86	96
ES0014R	100	93	93	93	93	93	93	93	93	93	93	93
ES0015R	100	91	89	89	88	89	87	87	89	87	87	91
ES0016R	100	93	93	93	92	93	92	92	93	92	92	93
FI0004R	100	100	100	100	100	100	100	100	100	100	100	100
FI0009R	100	100	100	100	100	100	100	100	100	100	100	100
FI0017R	100	97	97	97	97	97	97	97	97	97	97	97
FI0022R	100	100	100	100	100	100	100	100	100	100	100	100
FR0008R	100	99	99	99	99	99	99	99	99	99	99	99
FR0009R	100	99	99	99	99	99	99	99	99	99	99	99
FR0010R	100	89	88	88	88	88	88	88	88	88	88	89
FR0012R	100	96	95	95	95	95	95	95	95	95	95	96
FR0013R	100	96	96	96	96	96	96	96	96	96	96	96
FR0014R	100	99	99	99	99	99	99	98	99	99	99	99
FR0015R	100	98	98	98	98	98	98	98	98	98	98	98
FR0016R	100	94	94	94	94	94	94	94	94	94	94	94
FR0017R	100	89	89	89	89	89	89	89	89	89	89	89
GB0002R	100	77	100	100	100	100	100	100	100	100	77	77
GB0006R	98	96	97	97	96	97	97	97	97	97	96	96
GB0013R	100	92	100	100	92	100	100	100	100	100	92	91
GB0014R	97	96	100	100	96	100	100	100	100	100	96	96
GB0015R	99	96	100	100	100	100	100	100	100	100	94	100
GB0048R	56	95	96	96	95	96	96	96	96	96	95	94
HR0002R	36	98	98	98	95	98	96	98	97	98	98	98
HR0004R	36	99	99	99	99	99	97	99	99	99	99	99
HU0002R	100	100	100	100	99	100	99	100	100	100	100	100

Table A2.1, cont.

Code	mm	pH	SO_4	XSO_4	NH_4	NO_3	Na	Mg	Cl	Ca	K	cond
IE0001R	100	98	98	98	98	98	98	98	98	98	98	98
IE0005R	100	91	91	91	91	91	91	91	91	91	91	91
IE0007R	84	97	97	97	97	97	97	98	97	97	97	97
IE0009R	78	88	88	88	88	88	88	88	88	88	88	88
IS0002R	100	100	100	100	-	100	100	100	100	100	100	100
IS0090R	100	100	100	100	100	100	100	100	100	100	100	94
IS0091R	100	100	100	100	100	100	100	100	100	100	100	100
IT0001R	100	100	100	100	100	100	100	100	100	100	100	100
IT0004R	100	99	100	100	100	100	100	100	100	100	100	98
LT0015R	100	100	100	100	100	100	100	-	100	100	100	100
LV0010R	100	98	94	94	97	94	96	96	94	96	96	98
LV0016R	99	95	75	75	94	75	81	81	75	81	80	95
NO0001R	100	98	99	99	99	99	99	99	99	99	99	98
NO0015R	100	94	98	98	96	98	98	98	98	97	96	97
NO0039R	100	97	100	100	98	100	100	100	100	99	99	98
NO0055R	100	88	98	98	97	98	97	98	97	98	96	89
PL0002R	100	99	99	99	99	99	99	99	99	99	99	99
PL0003R	100	100	100	100	100	100	100	100	100	100	100	100
PL0004R	100	98	98	98	98	98	98	98	98	98	98	98
PL0005R	100	100	100	100	99	100	98	98	100	98	98	92
PT0001R	100	82	82	82	82	82	82	82	82	82	82	82
PT0003R	100	91	91	91	91	91	91	91	91	91	91	91
PT0004R	100	97	97	97	97	97	97	97	97	97	97	97
RU0001R	82	99	100	100	100	100	100	100	100	100	100	100
RU0013R	100	97	100	100	100	100	100	100	100	100	100	100
RU0016R	100	98	100	100	100	100	100	100	100	100	100	100
RU0020R	100	99	100	100	100	100	100	100	100	100	100	100
SE0005R	100	100	100	100	100	100	100	100	100	100	97	98
SE0011R	100	100	100	100	100	100	100	100	100	100	100	100
SE0014R	100	100	99	99	99	99	99	99	99	99	99	98
SI0008R	100	97	99	99	99	99	99	99	99	99	99	97
SK0002R	100	64	93	93	86	93	88	88	92	88	87	64
SK0004R	100	73	91	91	88	90	88	88	91	88	87	73
SK0005R	96	86	95	95	94	95	95	95	95	95	95	86
SK0006R	100	71	91	91	90	91	88	90	89	89	89	71
SK0007R	100	90	99	99	97	99	98	99	99	99	92	92
TR0001R	100	21	20	-	15	20	18	18	19	17	17	21

Table A2.2: Data capture for main components in air in 2006, in per cent.

Code	SO_2	NO_2	SO_4	SO_4	sumNO_3	NO_3	HNO_3	sumNH_4	NH_4	NH_3	Na	Mg	Cl	Ca	K
AT0002R	99	97	99	99	-	99	99	-	99	99	99	99	-	99	99
AT0005R	94	90	-	-	-	-	-	-	-	-	-	-	-	-	-
AT0048R	94	95	-	-	-	-	-	-	-	-	-	-	-	-	-
BE0001R	-	27	-	-	-	-	-	-	-	-	-	-	-	-	-
BE0032R	-	93	-	-	-	-	-	-	-	-	-	-	-	-	-
BE0035R	-	92	-	-	-	-	-	-	-	-	96	96	-	96	95
CH0001G	100	70	100	-	-	-	-	-	-	-	100	100	-	99	99
CH0002R	99	99	99	-	100	-	-	99	-	-	99	99	-	99	95
CH0003R	-	99	-	-	-	-	-	-	-	-	98	99	-	98	96
CH0004R	100	99	-	-	-	-	-	-	-	-	100	100	-	99	98
CH0005R	100	90	90	-	87	-	-	88	-	-	99	99	98	99	99
CS0005R	90	92	-	-	-	-	-	-	-	-	100	-	99	98	98
CZ0001R	96	100	97	-	97	-	-	95	-	-	96	-	95	94	94
CZ0003R	-	100	-	-	90	-	-	91	-	-	98	-	99	100	100
DE0001R	92	81	96	95	91	95	92	90	95	91	96	96	-	96	95
DE0002R	93	70	98	98	93	98	94	93	98	94	100	100	-	99	99
DE0003R	94	94	99	99	99	99	99	98	99	98	99	99	-	99	95
DE0007R	95	97	98	97	94	98	95	94	98	95	98	99	-	98	96
DE0008R	100	88	-	-	-	-	-	-	-	-	-	-	-	-	-
DE0009R	95	95	100	100	95	100	95	96	100	96	100	100	-	99	98
DE0044R	-	-	99	-	-	99	-	-	99	-	99	99	98	99	99
DK0003R	100	-	99	99	99	-	-	100	-	100	100	-	99	98	98
DK0005R	96	94	95	95	95	-	-	96	-	96	96	-	95	94	94
DK0008R	99	59	99	99	99	-	-	99	-	99	98	-	99	100	100
DK0031R	97	-	97	97	97	-	-	98	-	97	97	-	97	99	99
EE0009R	100	100	-	-	-	-	-	-	-	-	-	-	-	-	-
EE0011R	100	100	-	-	-	-	-	-	-	-	-	-	-	-	-
ES0007R	98	97	95	-	98	95	-	99	-	-	-	-	-	-	-
ES0008R	98	96	90	-	98	90	-	98	-	94	-	-	-	-	-
ES0009R	97	95	12	-	98	12	-	96	6	87	8	12	10	14	11
ES0010R	96	95	93	-	95	93	-	94	-	-	-	-	-	-	-
ES0011R	99	94	96	-	99	96	-	100	-	-	-	-	-	-	-
ES0012R	99	97	97	-	97	97	-	99	-	-	-	-	-	-	-
ES0013R	98	98	95	-	97	95	-	97	-	-	-	-	-	-	-
ES0014R	96	97	95	-	94	95	-	95	-	-	-	-	-	-	-
ES0015R	68	68	95	-	97	95	-	97	-	-	-	-	-	-	-
ES0016R	98	96	93	-	96	93	-	97	-	-	-	-	-	-	-
ES0017R	-	-	12	-	-	12	-	-	12	-	12	12	12	12	12
FI0009R	94	93	93	-	93	-	-	98	-	-	-	-	-	-	-
FI0017R	96	99	98	-	98	-	-	100	-	-	-	-	-	-	-
FI0022R	100	98	100	-	100	-	-	100	-	-	-	-	-	-	-
FI0037R	98	91	100	-	100	-	-	100	-	-	-	-	-	-	-
FI0096G	-	99	-	-	-	-	-	-	-	-	-	-	-	-	-
FR0008R	96	-	96	-	-	-	-	-	-	-	-	-	-	-	-
FR0009R	27	-	27	-	27	-	-	27	-	-	-	-	-	-	-
FR0010R	96	-	95	-	-	-	-	-	-	-	-	-	-	-	-
FR0012R	92	-	92	-	-	-	-	-	-	-	-	-	-	-	-
FR0013R	27	-	27	-	27	-	-	27	-	-	-	-	-	-	-
FR0014R	99	-	98	-	-	-	-	-	-	-	-	-	-	-	-
FR0015R	93	-	91	-	-	-	-	-	-	-	-	-	-	-	-
FR0016R	96	-	96	-	-	-	-	-	-	-	-	-	-	-	-
FR0017R	91	-	90	-	-	-	-	-	-	-	-	-	-	-	-
GB0002R	-	-	97	-	-	-	-	-	-	-	-	-	-	-	-
GB0006R	-	-	79	-	-	100	100	-	100	100	-	-	-	-	-
GB0007R	-	-	84	-	-	-	-	-	-	-	-	-	-	-	-
GB0013R	-	-	75	-	-	100	100	-	100	100	-	-	-	-	-
GB0014R	-	87	-	-	-	100	100	-	100	100	-	-	-	-	-
GB0016R	-	-	-	-	-	91	91	-	91	100	-	-	-	-	-

Table A2.2, cont.

Code	SO_2	NO_2	SO_4	SO_4	sumNO_3	NO_3	HNO_3	sumNH_4	NH_4	NH_3	Na	Mg	Cl	Ca	K
GR0001R	75	90	-	-	-	-	-	-	-	-	-	-	-	-	-
HU0002R	88	92	89	-	-	89	89	-	89	89	-	-	-	-	-
IE0001R	100	96	100	100	100	-	-	100	-	-	100	100	-	100	100
IE0005R	-	-	100	100	-	100	-	-	100	-	100	100	-	100	100
IE0006R	-	-	95	95	-	95	-	-	95	-	95	95	-	95	95
IE0008R	-	-	90	90	-	90	-	-	90	-	90	90	-	90	90
IS0002R	79	-	80	80	-	-	-	-	-	-	80	80	80	80	80
IS0091R	-	-	100	100	-	100	-	-	-	-	-	-	100	-	-
IT0001R	95	95	95	-	-	95	95	-	94	95	-	-	-	-	-
IT0004R	97	93	92	-	-	91	-	-	91	-	-	-	-	-	-
LT0015R	100	98	99	-	100	-	-	100	-	-	-	-	-	-	-
LV0010R	98	99	99	99	99	96	-	100	100	-	100	100	97	100	92
LV0016R	96	98	98	-	97	94	-	97	98	-	-	-	-	-	-
NL0007R	96	11	-	-	-	-	-	-	-	90	-	-	-	-	-
NL0008R	92	-	95	-	-	-	-	-	-	-	-	-	95	47	-
NL0009R	92	99	99	-	-	99	-	-	99	-	-	-	99	42	-
NL0010R	97	90	87	-	-	87	-	-	87	87	-	-	87	-	-
NO0001R	99	96	99	99	99	99	99	99	-	99	100	77	100	77	100
NO0015R	99	88	100	100	99	100	99	98	100	98	100	76	100	76	100
NO0039R	96	99	96	96	96	96	96	96	96	96	96	73	96	73	96
NO0042G	95	-	95	95	95	95	95	94	94	95	94	77	95	77	94
NO0055R	96	99	100	100	96	100	96	100	100	-	100	72	100	71	100
PL0002R	96	96	96	-	96	96	-	96	96	-	-	-	-	-	-
PL0003R	100	100	100	-	100	100	-	100	100	-	-	-	-	-	-
PL0004R	99	98	99	-	99	99	-	99	99	-	-	-	-	-	-
PL0005R	98	99	98	-	98	-	-	98	-	-	-	-	-	-	-
RU0001R	60	-	60	-	-	59	-	-	60	-	-	-	-	-	-
RU0016R	77	-	77	-	-	77	-	-	77	-	-	-	-	-	-
SE0005R	97	99	98	-	97	-	-	97	-	-	-	-	-	-	-
SE0008R	99	99	99	-	-	-	-	-	-	-	-	-	-	-	-
SE0011R	100	99	100	-	100	-	-	100	-	-	-	-	-	-	-
SE0014R	100	100	100	-	100	-	-	100	-	-	-	-	-	-	-
SI0008R	99	-	99	99	99	-	-	99	-	-	99	99	99	99	99
SK0002R	99	99	99	-	-	99	99	-	-	-	-	-	-	-	-
SK0004R	98	99	98	97	-	98	98	-	98	98	98	98	-	98	98
SK0005R	99	98	99	-	-	99	99	-	-	-	-	-	-	-	-
SK0006R	98	99	98	-	-	98	98	-	-	-	-	-	-	-	-
SK0007R	100	100	100	-	-	100	99	-	-	-	-	-	-	-	-
TR0001R	39	93	92	-	27	38	28	38	39	90	-	-	-	-	-

Table A2.3: Data capture for particulate matter in air in 2006, in per cent.

Code	PM_{10}	$PM_{2.5}$	PM_1
AT0002R	99	98	99
AT0005R	95	-	-
AT0048R	99	-	-
CH0001G	95	-	-
CH0002R	99	96	97
CH0003R	99	-	-
CH0004R	100	96	100
CH0005R	99	-	-
CY0002R	95	-	-
CZ0001R	38	-	-
CZ0003R	54	53	-
DE0001R	93	-	-
DE0002R	98	100	99
DE0003R	96	97	-
DE0007R	100	-	-
DE0008R	100	-	-
DE0009R	100	-	-
DE0044R	99	99	-
DK0005R	93	-	-
ES0007R	94	93	-
ES0008R	88	92	-
ES0009R	86	87	-
ES0010R	92	91	-
ES0011R	95	93	-
ES0012R	96	95	-
ES0013R	95	91	-
ES0014R	93	90	-
ES0015R	93	89	-
ES0016R	92	88	-
GB0006R	99	-	-
GB0036R	98	98	-
GB0043R	90	-	-
GR0001R	95	-	-
GR0002R	73	-	-
IE0031R	-	69	-
IT0001R	92	83	-
IT0004R	-	91	-
NL0007R	90	-	-
NL0009R	91	-	-
NL0010R	90	-	-
NO0001R	100	98	97
PL0005R	98	-	-
SE0011R	75	31	-
SE0012R	98	49	-
SE0035R	98	-	-
SI0008R	93	96	-
SK0004R	86	-	-
SK0005R	85	-	-
SK0006R	87	-	-

Table A2.4: Data capture for heavy metals in precipitation in 2006, in per cent.

Code	Pb	Cd	Zn	Hg	Ni	As	Cu	Co	Cr	Mn	V	Fe	mm
BE0014R	100	100	100	100	100	100	100	-	100	-	-	-	99
CZ0001R	100	-	-	-	100	-	-	-	-	100	-	-	100
CZ0003R	98	98	-	-	98	-	-	-	-	97	-	-	100
DE0001R	100	100	100	97	100	100	100	100	100	100	100	100	92
DE0002R	99	99	98	-	99	99	99	99	99	99	99	99	100
DE0003R	100	100	100	-	98	100	98	100	100	100	100	100	99
DE0007R	97	97	97	-	97	93	97	97	97	97	97	97	100
DE0008R	94	94	94	-	92	94	88	94	94	94	94	94	100
DE0009R	100	100	100	100	100	100	93	100	100	100	-	100	100
DK0008R	100	100	100	-	100	100	100	-	100	-	-	-	100
DK0020R	100	100	-	-	100	100	100	-	100	-	-	-	91
DK0022R	100	100	100	-	100	100	93	-	100	-	-	-	100
DK0031R	100	-	86	-	100	-	97	-	-	-	-	-	100
EE0009R	-	100	-	-	-	100	100	-	-	-	-	-	100
EE0011R	100	-	100	-	-	-	-	-	-	-	-	-	100
ES0008R	100	100	100	-	100	100	100	-	100	-	-	-	88
ES0009R	100	100	100	-	100	100	100	-	100	-	-	-	73
FI0008R	100	100	100	-	100	100	100	100	100	100	100	100	100
FI0017R	100	100	100	-	100	100	100	100	100	100	100	100	100
FI0022R	100	100	100	-	100	100	100	100	100	100	100	100	100
FI0036R	100	100	100	-	100	100	100	100	100	100	100	100	100
FI0053R	100	100	100	-	100	100	100	100	100	100	100	100	100
FI0092R	100	100	100	-	100	100	100	100	100	100	100	100	100
FI0093R	100	100	100	-	100	100	100	100	100	100	100	100	100
FI0096G	-	-	-	100	-	-	-	-	-	-	-	-	97
GB0006R	97	97	97	-	97	97	97	-	100	-	-	-	94
GB0013R	97	97	97	-	97	97	97	-	97	-	-	-	91
GB0017R	74	74	74	100	74	74	74	-	74	-	-	-	93
GB0091R	87	90	90	100	90	90	90	-	90	-	-	-	100
HU0002R	100	100	-	-	-	-	-	-	-	-	-	-	-
IE0001R	100	100	100	100	100	100	100	-	100	100	100	-	100
IS0090R	100	100	100	-	100	100	100	-	100	100	100	100	100
IS0091R	100	100	100	-	100	100	100	-	100	100	100	100	100
IT0001R	96	100	100	-	-	-	99	-	-	-	-	-	100
LT0015R	100	100	100	-	100	100	100	-	100	-	-	-	99
LV0010R	100	100	100	-	100	84	96	-	-	100	-	-	100
LV0016R	88	88	88	-	87	86	83	-	-	85	-	-	99
NO0001R	98	98	98	99	98	37	98	98	98	-	98	-	100
NO0039R	100	100	100	-	-	-	-	-	-	-	-	-	100
NO0047R	100	100	100	-	100	100	100	100	100	-	-	-	100
NO0055R	100	100	100	-	-	-	-	-	-	-	-	-	100
NO0056R	100	100	100	-	-	-	-	-	-	-	-	-	100
PL0004R	100	100	68	-	100	-	100	-	95	-	-	-	92
PL0005R	100	100	100	99	100	100	88	-	100	-	-	-	99
PT0001R	82	82	82	-	82	-	82	-	-	82	-	-	-
PT0003R	91	-	91	-	91	-	91	-	-	91	-	-	-
PT0004R	97	97	97	-	97	-	97	-	-	97	-	-	-
SE0014R	-	-	-	100	-	-	-	-	-	-	-	-	97
SE0051R	100	100	100	-	95	100	100	-	95	100	100	-	100
SE0097R	100	100	100	-	100	100	100	-	100	100	100	-	100
SK0002R	93	100	94	-	94	92	90	-	70	-	-	-	100
SK0004R	100	100	31	-	31	31	31	-	31	-	-	-	100
SK0005R	100	100	95	-	100	97	99	-	87	-	-	-	100
SK0006R	100	100	48	-	48	48	48	-	48	-	-	-	100
SK0007R	100	100	50	-	50	50	50	-	50	-	-	-	100

Table A2.5: Data capture for heavy metals in air in 2006, in per cent.

Code	Pb	Cd	Zn	Hg	Ni	As	Cu	Co	Cr	Mn	V	Fe
AT0002R	17	14	-	-	14	7	-	-	-	-	-	-
AT0005R	15	8	-	-	8	1	-	-	-	-	-	-
AT0048R	14	4	-	-	7	1	-	-	-	-	-	-
BE0014R	89	89	89	100	89	89	89		89			
CZ0001R	38	38	-	-	38	38	38	-	-	38	-	-
CZ0003R	53	53	-	-	53	53	53	-	-	53	-	-
DE0001R	92	92	92	-	92	92	92	92	-	90	92	92
DE0002R	100	100	99	-	100	100	100	100	-	100	100	100
DE0003R	85	85	84	-	85	85	85	85	-	85	85	85
DE0007R	100	100	99	-	100	100	100	100	-	100	100	100
DE0008R	100	100	97	-	100	100	95	100	-	97	100	100
DE0009R	100	100	100	-	97	100	97	100	-	100	100	100
DK0003R	98	-	98	-	98	98	98	-	98	98	-	98
DK0005R	95	-	95	-	95	95	95	-	94	94	-	95
DK0008R	99	-	100	-	100	100	100	-	100	100	-	100
DK0031R	99	-	100	-	99	99	99	-	99	99	-	99
ES0008R	12	12	-	-	-	-	12	-	-	-	-	-
ES0009R	12	-	12	-	12	12	12	-	12	-	-	-
ES0010R	-	-	-	10	-	-	-	-	-	-	-	-
FI0036R	98	98	98	-	98	98	98	98	98	98	98	98
FI0096G	-	-	-	23	-	-	-	-	-	-	-	-
GB0013R	96	96	96	102	96	96	96	-	96	-	-	-
GB0017R	83	83	83	84	83	83	83	-	83	-	-	-
GB0091R	99	99	99	100	99	99	99	-	99	-	-	-
HU0002R	81	82	-	-	-	-	-	-	-	-	-	-
IE0031R	-	-	-	87	-	-	-	-	-	-	-	-
IS0091R	100	100	100	100	100	100	100	-	100	100	100	100
LT0015R	99	99	99	-	99	99	99	-	99	-	-	-
LV0010R	100	100	98	-	-	92	100	-	-	-	-	-
LV0016R	100	100	100	-	100	96	98	-	-	100	-	-
NL0008R	47	47	47	-	47	47	-	-	-	-	-	-
NO0001R	99	99	99	56	99	99	99	99	99	-	99	-
NO0042G	29	29	29	68	29	29	29	29	29	29	29	-
PL0005R	100	100	100	14	100	100	100	-	100	-	-	-
SE0014R	82	82	-	17	82	82	-	-	-	-	-	-
SI0008R	16	16	-	-	16	16	-	-	-	-	-	-
SK0002R	85	85	85	-	81	85	83	-	81	83	-	-
SK0004R	84	84	84	-	84	84	84	-	84	84	-	-
SK0005R	85	85	83	-	85	83	85	-	83	80	-	-
SK0006R	87	84	87	-	85	87	87	-	87	87	-	-
SK0007R	91	91	91	-	81	91	91	-	81	83	-	-

Table A2.6: Data capture for ozone in 2006, in per cent.

Code	O_3	Code	O_3	Code	O_3	Code	O_3	Code	O_3
AT0002R	95	CZ0003R	97	FR0008R	92	GB0044R	92	SE0011R	99
AT0005R	94	DE0001R	96	FR0008R	92	GB0045R	86	SE0012R	94
AT0030R	95	DE0002R	96	FR0008R	94	GR0001R	91	SE0013R	100
AT0032R	95	DE0003R	96	FR0008R	94	HU0002R	67	SE0014R	100
AT0034G	92	DE0007R	94	FR0009R	95	IE0031R	99	SE0032R	95
AT0037R	96	DE0008R	94	FR0010R	99	IT0001R	99	SE0035R	98
AT0038R	94	DE0009R	96	FR0012R	95	IT0004R	93	SE0039R	100
AT0040R	86	DK0005R	98	FR0013R	97	LT0015R	94	SI0008R	96
AT0041R	95	DK0031R	96	FR0014R	99	LV0010R	85	SI0031R	95
AT0042R	94	DK0041R	90	FR0015R	88	MT0001R	80	SI0032R	94
AT0043R	95	EE0009R	97	FR0016R	96	NL0007R	70	SI0033R	88
AT0044R	94	EE0011R	100	FR0017R	95	NL0009R	99	SK0002R	71
AT0045R	96	ES0007R	97	GB0002R	99	NL0010R	93	SK0004R	89
AT0046R	95	ES0008R	98	GB0006R	99	NO0001R	98	SK0005R	96
AT0047R	96	ES0009R	95	GB0013R	96	NO0015R	99	SK0006R	75
AT0048R	94	ES0010R	96	GB0014R	90	NO0039R	100	SK0007R	98
AT0049R	41	ES0011R	98	GB0015R	84	NO0042G	98		
BE0001R	87	ES0012R	97	GB0031R	92	NO0043R	100		
BE0032R	87	ES0013R	97	GB0032R	99	NO0052R	95		
BE0035R	92	ES0014R	98	GB0033R	98	NO0055R	100		
BG0053R	76	ES0015R	68	GB0034R	74	NO0056R	100		
CH0001G	97	ES0016R	97	GB0035R	99	PL0002R	95		
CH0003R	95	FI0009R	100	GB0036R	94	PL0003R	100		
CH0004R	95	FI0017R	99	GB0037R	95	PL0004R	100		
CH0005R	95	FI0022R	98	GB0038R	89	PL0005R	95		
CY0002R	98	FI0037R	88	GB0039R	92	PT0004R	96		
CZ0001R	86	FI0096G	99	GB0043R	92	SE0005R	100		

Table A2.7: The number of samples of hydrocarbons (HC) and carbonyls (Carb) in 2006.

Station	Number of samples	
	Hydrocarbons	Carbonyls
Birkenes	-	101
Pallas	96	-
Utö	98	102
Waldhof	103	-
Schauinsland	91	-
Neuglobsow	102	-
Schmücke	96	-
Zingst	101	-
Hohenpeissenberg[1)]	342	-
Košetice	103	101
Starina	93	-
Rigi[1)]	226	-
Donon	91	50
Peyrusse Vieille	59	50
La Tardière	95	52
Campisábalos	-	100

[1)] Refer to days with monitoring data

Table A2.8: Data capture for POPs in 2006, in per cent.

	precip	precip + dry dep	air	sampling frequency
BE0014R	98			
CZ0003R	100		14	1 day a week
DE0001R	100			
DE0009R	100			
ES0008R			3	24-31/10 and 26-31/12
FI0096R		23	23	1 week a month
GB0014R			100	biweekly sampling, 3 monthly analysis
IS0091R	100		100	biweekly
LV0010R			100	monthly
LV0016R			100	monthly
NL0091R	100			
NO0042G			29	2 days a week
NO0001R	100		14	1 day a week
SE0012R		36	21	1 week a month
SE0014R		100	96	biweekly

Annex 3

Below detection limit

Table A3.1: Number of samples below the detection limit for main components in precipitation in 2006, in per cent.

Code	pH	SO_4	XSO_4	NH_4	NO_3	Na	Mg	Cl	Ca	K	cond
AT0002R	0	0	0	1	0	4	1	10	0	18	0
AT0005R	0	0	0	0	0	0	10	25	0	32	0
AT0048R	0	0	0	0	0	11	24	18	2	34	0
BY0004R	0	0	0	0	0	0	0	0	0	0	0
CH0002R	0	0	0	0	0	2	1	0	16	19	0
CH0004R	0	0	0	0	0	0	0	0	22	9	0
CH0005R	0	0	0	0	0	5	3	0	18	10	0
CS0005R	0	0	0	0	0	0	0	0	0	0	0
CZ0001R	0	0	0	0	0	0	0	0	7	0	0
CZ0003R	0	1	1	0	1	0	0	1	7	1	0
DE0001R	0	0	0	0	0	0	0	0	0	0	0
DE0002R	0	0	0	0	0	5	10	0	3	44	1
DE0003R	0	0	0	0	0	21	47	6	13	64	0
DE0004R	0	0	0	0	0	7	22	0	5	63	0
DE0005R	0	0	0	0	0	26	53	7	16	58	0
DE0007R	0	0	0	0	0	3	18	0	3	35	0
DE0008R	0	0	0	0	0	11	21	0	4	40	0
DE0009R	0	0	0	0	0	0	0	0	0	3	0
DK0005R	0	0	0	0	0	0	0	0	0	0	
DK0008R	0	0	0	0	0	0	0	0	0	0	
DK0022R	0	0	0	0	0	0	0	0	0	0	
DK0031R	0	0	0	0	0	0	0	0	0	0	
EE0009R	0	1	1	27	11	6	31	6	0	25	0
EE0011R	0	0	0	0	0	0	17	0	0	13	0
ES0007R	0	2	2	4	4	0	0	36	0	0	3
ES0008R	0	0	0	2	0	0	0	0	0	0	0
ES0009R	0	4	4	1	0	0	0	38	0	0	6
ES0011R	0	0	0	23	24	2	0	8	0	2	6
ES0012R	0	2	2	9	4	0	0	16	0	0	0
ES0013R	0	0	0	14	15	1	1	27	0	1	11
ES0014R	0	0	0	0	0	0	0	7	0	0	0
ES0015R	0	1	1	3	9	2	0	21	0	0	10
ES0016R	0	3	3	10	31	1	1	6	0	7	5
FI0004R	0	0	0	0	0	0	0	0	0	0	0
FI0009R	0	0	0	0	0	0	0	0	0	0	0
FI0017R	0	0	0	0	0	0	0	0	0	0	0
FI0022R	0	0	0	0	0	0	0	0	2	0	0
FR0008R	0	0	0	1	0	13	54	5	4	51	0
FR0009R	0	0	0	1	0	4	25	1	3	34	0
FR0010R	0	0	0	1	0	4	45	1	2	22	0
FR0012R	0	1	1	8	1	4	26	2	2	44	0
FR0013R	0	0	0	3	1	1	19	0	1	29	0
FR0014R	0	0	0	0	0	15	57	8	6	57	0
FR0015R	0	0	0	2	2	2	11	2	1	24	0
FR0016R	0	0	0	12	1	25	51	16	0	39	0
FR0017R	0	0	0	7	2	4	43	5	2	49	0
GB0002R	0	0	0	0	0	0	0	0	0	0	0
GB0006R	0	0	0	5	0	4	4	0	4	0	0
GB0013R	0	0	0	5	0	4	4	0	4	0	0
GB0014R	0	0	0	0	0	0	0	0	0	0	0
GB0015R	0	0	0	0	0	0	0	0	4	9	0
GB0048R	0	0	0	0	0	1	6	0	2	5	0
HR0002R	0	0	0	0	0	0	0	0	0	0	0
HR0004R	0	0	0	0	0	0	0	0	0	0	0
HU0002R	0	2	2	25	7	0	13	3	0	0	0

Table A3.1, cont.

Code	pH	SO_4	XSO_4	NH_4	NO_3	Na	Mg	Cl	Ca	K	cond
IE0001R	0	0	0	35	10	0	8	0	9	6	0
IE0005R	0	2	2	1	7	1	24	0	3	36	0
IE0007R	0	0	0	44	18	0	14	0	14	21	0
IE0009R	0	0	0	17	16	0	10	0	8	6	0
IS0002R	0	0	0		32	0	15	0	12	24	0
IS0090R	0	0	0	0	9	0	0	0	0	6	0
IS0091R	0	0	0	33	5	2	0	0	0	0	0
IT0001R	0	0	0	0	0	0	0	0	0	0	0
IT0004R	0	0	0	0	0	0	0	0	0	0	0
LT0015R	0	0	0	0	0	0		0	0	0	0
LV0010R	0	0	0	3	0	0	3	0	1	22	0
LV0016R	0	0	0	0	0	1	7	2	5	12	0
NO0001R	0	1	1	1	1	1	9	1	5	8	0
NO0015R	0	3	3	1	4	0	11	0	7	1	0
NO0039R	0	6	6	0	5	0	6	0	2	1	0
NO0055R	0	2	2	0	0	0	8	0	6	0	0
PL0002R	0	0	0	0	0	0	0	0	0	0	0
PL0003R	0	0	0	0	0	0	0	0	0	0	0
PL0004R	0	0	0	0	0	0	0	0	0	0	0
PL0005R	0	0	0	1	3	3	0	5	0	0	0
PT0001R	0	0	0	10	18	18	49	0	10	74	0
PT0003R	0	0	0	55	60	0	0	0	18	42	0
PT0004R	0	0	0	47	58	0	0	0	5	42	0
RU0001R	0	0	0	0	0	0	0	0	0	0	0
RU0013R	0	0	0	0	0	0	0	0	0	0	0
RU0016R	0	0	0	0	0	0	0	0	0	0	0
RU0020R	0	0	0	0	0	0	0	0	0	0	0
SE0005R	0	0	0	10	0	56	38	12	20	73	0
SE0011R	0	0	0	0	0	10	2	0	8	57	0
SE0014R	0	0	0	1	0	5	2	0	2	46	0
SI0008R	0	0	0	0	0	6	10	2	8	28	0
SK0002R	0	0	0	0	0	0	0	0	0	0	0
SK0004R	0	0	0	3	0	0	0	0	0	0	0
SK0005R	0	0	0	0	0	0	6	0	0	6	0
SK0006R	0	0	0	1	0	0	1	0	0	1	0
SK0007R	0	0	0	0	0	0	0	0	0	0	0
TR0001R	0	0		0	0	0	0	0	0	0	0

between25 and 50% below the detection limit

between 50 and 75% below the detection limit

more than 75% below the detection limit

Table A3.2: Number of samples below the detection limit for main components in air in 2006, in per cent.

Code	SO_2	NO_2	SO_4	XSO_4	SNO_3	NO_3	HNO_3	SNH_4	NH_4	NH_3	Na	Mg	Cl	Ca	K
AT0002R	0	0	0	0		0	0		0	0	0	3.32		0	0
AT0005R	0	0													
AT0048R	0	0													
BE0001R		0													
BE0032R		0													
BE0035R		0													
CH0001G	7	0	11												
CH0002R	0	0	0		0			0							
CH0003R		0													
CH0004R	0	0													
CH0005R	0	0	1		0			0							
CS0005R	0	0													
CZ0001R	0	14	0		0			0							
CZ0003R		12			0			0							
DE0001R	1	0	1	1	7	3	1	7	14	1	3	3		5	4
DE0002R	0	0	0	0	1	2	0	0	9	0	6	29		28	10
DE0003R	0	0	1	1	16	7	0	21	30	1	21	45		28	30
DE0007R	1	0	0	0	3	2	1	3	7	6	2	20		10	14
DE0008R	2	0									6	7		22	3
DE0009R	0	0	0	0	1	1	0	2	11	2	0	0	0	0	0
DE0044R			0			0			0						
DK0003R	0		0	0	0			0		4	0		0	0	0
DK0005R	0	1	0	0	0			0		18	0		1	0	0
DK0008R	0	0	0	0	0			0		30	0		1	0	0
DK0031R	3		0	0	0			0		15	0		1	0	0
EE0009R	1	0													
EE0011R	2	2													
ES0007R	0	0	0		0	0		0							
ES0008R	0	0	0		0	0		0		2					
ES0009R	0	0	0		0	0		0	0	4	0	0	0	0	0
ES0010R	0	0	0		0	0		0							
ES0011R	0	0	0		0	0		0							
ES0012R	0	0	0		0	0		1							
ES0013R	0	0	0		0	0		1							
ES0014R	0	0	0		0	0		2							
ES0015R	0	0	0		0	0		0							
ES0016R	0	0	0		0	0		0							
ES0017R			0			0			0		0	0	5	0	0
FI0009R	1	0	0		0			0							
FI0017R	0	0	0		0			0							
FI0022R	0	0	0		0			0							
FI0037R	0	0	0		0			0							
FI0096G		0													
FR0008R	55		0												
FR0009R	1		0		0			0							
FR0010R	61		1												
FR0012R	59		0												
FR0013R	1		0		0			0							
FR0014R	71		0												
FR0015R	44		0												
FR0016R	93		0												
FR0017R	73		0												
GB0002R			0												
GB0006R			0			0	0		0	0					
GB0007R			0												
GB0013R			0			0	0		0	0					

Table A3.2, cont.

Code	SO_2	NO_2	SO_4	XSO_4	SNO_3	NO_3	HNO_3	SNH_4	NH_4	NH_3	Na	Mg	Cl	Ca	K
GB0014R		0				0	0		0	0					
GB0016R						0	0		0	0					
GR0001R	0	0													
HU0002R	3	0	2			7	2		5	1					
IE0001R	1	3	3	3	1			1			2	22		14	22
IE0005R			1	1		1			3		0	10		4	1
IE0006R			4	4		0			1		0	1		1	0
IE0008R			1	1		0			0		0	1		0	0
IS0002R	9		0	0							0	2	0	1	0
IS0091R			0	0		0							0		
IT0001R	0	0	0			0	0		0	0					
IT0004R	0	0	0			0			0						
LT0015R	0	0	0		0			0							
LV0010R	0	1	4	4	0	1		0	2		8	17	21	17	36
LV0016R	1	10	1		1	1		0	3						
NL0007R	0	0								0					
NL0008R	0		0										0	0	
NL0009R	0	0	0			0			0				0	0	
NL0010R	0	0	0			0			0	0			0		
NO0001R	11	1	1	1	0	4	37	0		0	0	11	20	13	13
NO0015R	41	5	4	4	0	11	77	0	37	0	5	26	27	25	32
NO0039R	30	2	6	6	0	12	66	0	34	0	8	39	40	34	31
NO0042G	20		5	5	0	14	72	0	43	2	2	11	16	14	56
NO0055R	21	10	2	2	0	11	64	0	27		3	25	26	20	33
PL0002R	2	0	1		0	0		0	0						
PL0003R	0	0	4		0	0		0	1						
PL0004R	4	0	1		0	0		0	0						
PL0005R	0	0	0		0			0							
RU0001R	0		0			0			0						
RU0016R	0		0			0			0						
SE0005R	56	71	3		2			26							
SE0008R	1	1	0												
SE0011R	1	0	0		0			0							
SE0014R	1	0	1		0			1							
SI0008R	1		0	0	0			0			5	7	23	3	1
SK0002R	0	12	0			28	6								
SK0004R	0	3	0	0		0	0		0	0	0	49		7	0
SK0005R	0	1	0			0	0								
SK0006R	0	1	0			1	0								
SK0007R	0	0	0			1	0								
TR0001R	0	8	3		1	0	3	0	0	5					

- (light yellow) between25 and 50% below the detection limit
- (orange) between 50 and 75% below the detection limit
- (red) more than 75% below the detection limit

Table A3.3: Number of samples below the detection limit for heavy metals in precipitation in 2006, in per cent.

Code	Pb	Cd	Zn	Hg	Ni	As	Cu	Co	Cr	Mn	V	Fe
BE0014R	17	63	44	0	51	100	2		98			
CZ0001R	6				45					11		
CZ0003R	11	0			57					4		
DE0001R	0	0	0	0	0	0	0	0	0	0	0	0
DE0002R	0	0	0		0	0	0	0	0	0	0	0
DE0003R	0	0	0		0	0	0	0	0	0	0	0
DE0007R	0	0	0		0	0	0	0	0	0	0	0
DE0008R	0	0	0		0	0	0	0	0	0	0	0
DE0009R	0	3	0	0	0	3	0	0	0	0		0
DK0008R	0	0	0		0	0	0		0			
DK0020R	0	0			0	0	0		0			
DK0022R	0	0	0		0	0	0		0			
DK0031R	0		0		0		0					
EE0009R		42				92	8					
EE0011R	83		58									
ES0008R	0	9	0		0	4	2		0			
ES0009R	3	45	0		8	8	8		0			
FI0008R	0	0	0		0	0	0	9	18	0	0	9
FI0017R	0	0	0		0	0	0	0	8	0	0	0
FI0022R	0	0	0		0	0	0	0	25	0	0	8
FI0036R	0	0	0		0	0	0	0	36	0	0	0
FI0053R	0	0	0		0	0	0	0	17	0	0	0
FI0092R	0	0	0		0	0	0	0	25	0	0	0
FI0093R	0	0	0		0	0	0	0	8	0	0	0
FI0096G				0								
GB0006R	18	0	18		9	0	0		25			
GB0013R	5	0	5		0	0	0		18			
GB0017R	0	0	0	0	0	0	0		0			
GB0091R	6	0	0	0	0	0	0		19			
HU0002R	0	0										
IE0001R	100	100	17	100	100	100	50		100	0	92	
IS0090R	0	50	0		2	25	0		23	0	0	0
IS0091R	2	53	0		17	8	0		13	0	0	2
IT0001R	6	0	0				3					
LT0015R	0	0	0		0	0	0		0			
LV0010R	0	11	13		18	61	0			53		
LV0016R	5	12	7		19	66	5			68		
NO0001R	2	85	2	0	87	30	44	96	90		21	
NO0039R	18	100	22									
NO0047R	0	47	0		7	13	4	13	64			
NO0055R	7	98	0									
NO0056R	2	67	2									
PL0004R	0	0	0		0		0		0			
PL0005R	0	0	0	36	0	0	0		0			
PT0001R	97	100	21		79		31			67		
PT0003R	73		13		76		56			73		
PT0004R	81	100	35		93		47			79		
SE0014R				0								
SE0051R	0	0	0		0	42	0		0	0	0	0
SE0097R	0	0	0		0	67	0		0	0	0	0
SK0002R	0	0	0		0	0	0		0			
SK0004R	0	0	0		0	0	0		0			
SK0005R	0	0	0		0	0	0		0			
SK0006R	0	0	0		0	0	0		0			
SK0007R	0	0	0		0	0	0		0			

between25 and 50% below the detection limit

between 50 and 75% below the detection limit

more than 75% below the detection limit

Table A3.4: Number of samples below the detection limit for heavy metals in air in 2006, in per cent.

Code	Pb	Cd	Zn	Hg	Ni	As	Cu	Co	Cr	Mn	V	Fe
AT0002R	0	0			0	0						
AT0005R	0	0			0	0						
AT0048R	0	0			0	0						
BE0014R	0	37	22	0	3	15	4		15			
CZ0001R	0	0			0	1	1			1		
CZ0003R	1	3			0	2	3			2		
DE0001R	0	0	0		0	0	0	0		0	0	0
DE0002R	0	0	0		0	0	0	0		0	0	0
DE0003R	0	0	0		0	0	0	0		0	0	0
DE0007R	0	0	0		0	0	0	0		0	0	0
DE0008R	0	0	0		0	0	0	0		0	0	0
DE0009R	0	0	0		0	0	0	0		0	0	0
DK0003R	3		7		12	5	6		54	5		2
DK0005R	1		5		5	12	5		58	5		1
DK0008R	4		15		8	12	14		69	8		5
DK0031R	5		10		15	19	16		65	11		6
ES0008R	2	14					0					
ES0009R	0		30		67	39	5		95			
ES0010R				0								
FI0036R	0	0	0		0	2	0	8	6	0	0	0
FI0096G				0								
GB0013R	4	16	57	0	4	0	31		61			
GB0017R	2	10	50	0	2	6	27		37			
GB0091R	4	14	78	0	20	2	54		58			
HU0002R	17	30										
IE0031R				0								
IS0091R	0	0	0	0	0	0	0		0	0	0	0
LT0015R	0	0	0		0	0	0		0			
LV0010R	2	6	0			16	2					
LV0016R	2	0	0		6	2	2			2		
NL0008R	0	0	0		0	0						
NO0001R	26	23	15	0	35	37	31	44	89		18	
NO0042G	8	49	35	0	61	29	27	27	82	18	22	
PL0005R	0	0	0	14	0	0	0		0			
SE0014R	0	0		0	0	0						
SI0008R	100	100			64	83						
SK0002R	0	0	0		0	8	0		0	0		
SK0004R	0	0	0		0	0	0		0	0		
SK0005R	0	0	0		0	0	0		0	0		
SK0006R	0	0	0		0	0	0		0	0		
SK0007R	0	0	0		0	0	0		0	0		

- between25 and 50% below the detection limit
- between 50 and 75% below the detection limit
- more than 75% below the detection limit

Table A3.5: Number of samples below the detection limit for particulate matter in 2006, in per cent.

Code	PM_{10}	$PM_{2.5}$	PM_1
AT0002R	0	0	0
AT0005R	0		
AT0048R	0		
CH0001G	35		
CH0002R	0	0	0
CH0003R	0		
CH0004R	0	0	0
CH0005R	1		
CY0002R	0		
CZ0001R	0		
CZ0003R	0	0	
DE0001R	0		
DE0002R	0	0	0
DE0003R	1	1	
DE0007R	0		
DE0008R	1		
DE0009R	0		
DE0044R	0	0	
DK0005R	0		
ES0007R	0	0	
ES0008R	0	0	
ES0009R	0	0	
ES0010R	0	0	
ES0011R	0	0	
ES0012R	0	0	
ES0013R	0	0	
ES0014R	0	0	
ES0015R	0	0	
ES0016R	0	0	
GB0006R	0		
GB0036R	0	0	
GB0043R	0		
GR0001R	0		
GR0002R	0		
IE0031R		0	
IT0001R	0	0	
IT0004R		0	
NL0007R	0		
NL0009R	0		
NL0010R	0		
NO0001R	1	0	1
PL0005R	0		
SE0011R	2	8	
SE0012R	11	20	
SE0035R	9		
SI0008R	0	0	
SK0004R	0		
SK0005R	0		
SK0006R	0		

between25 and 50% below the detection limit
between 50 and 75% below the detection limit
more than 75% below the detection limit

Table A3.6: Number of samples below the detection limit for POPs in air in 2006, in per cent.

Code	Component	% BDL	Code	Component	% BDL	Code	Component	% BDL	Code	Component	% BDL
CZ0003R	HCB	2	FI0096G	pp_DDT	0	NO0042G	N9methylphenanthrene	0	NO0042G	fluorene	0
CZ0003R	PCB_101	21	FI0096G	pyrene	0	NO0042G	PCB_101	0	NO0042G	inden_123cd_pyrene	22
CZ0003R	PCB_118	56	GB0014R	PCB_101	0	NO0042G	PCB_105	0	NO0042G	naphtalene	0
CZ0003R	PCB_138	42	GB0014R	PCB_118	0	NO0042G	PCB_114	77	NO0042G	op_DDD	23
CZ0003R	PCB_153	4	GB0014R	PCB_138	0	NO0042G	PCB_118	0	NO0042G	op_DDE	6
CZ0003R	PCB_180	40	GB0014R	PCB_153	0	NO0042G	PCB_122	109	NO0042G	op_DDT	2
CZ0003R	PCB_28	0	GB0014R	PCB_180	0	NO0042G	PCB_123	96	NO0042G	perylene	46
CZ0003R	PCB_52	2	GB0014R	PCB_28	0	NO0042G	PCB_128	11	NO0042G	phenanthrene	0
CZ0003R	alpha_HCH	2	GB0014R	PCB_52	0	NO0042G	PCB_138	0	NO0042G	pp_DDD	28
CZ0003R	anthracene	2	GB0014R	anthracene	0	NO0042G	PCB_141	0	NO0042G	pp_DDE	0
CZ0003R	benz_a_anthracene	4	GB0014R	benz_a_anthracene	0	NO0042G	PCB_149	0	NO0042G	pp_DDT	6
CZ0003R	benzo_a_pyrene	10	GB0014R	benzo_a_pyrene	0	NO0042G	PCB_153	0	NO0042G	pyrene	0
CZ0003R	benzo_b_fluoranthene	6	GB0014R	benzo_ghi_perylene	0	NO0042G	PCB_156	47	NO0042G	retene	0
CZ0003R	benzo_ghi_perylene	12	GB0014R	chrysene	0	NO0042G	PCB_157	96	NO0042G	sum_DDT	0
CZ0003R	benzo_k_fluoranthene	6	GB0014R	fluoranthene	0	NO0042G	PCB_167	57	NO0042G	sum_PCB	0
CZ0003R	fluoranthene	0	GB0014R	inden_123cd_pyrene	0	NO0042G	PCB_170	15	NO0042G	trans_CD	2
CZ0003R	fluorene	0	GB0014R	phenanthrene	0	NO0042G	PCB_18	0	NO0042G	trans_NO	0
CZ0003R	gamma_HCH	0	GB0014R	pyrene	0	NO0042G	PCB_180	0	SE0012R	PCB_101	0
CZ0003R	naphtalene	0	IS0091R	HCB	0	NO0042G	PCB_183	0	SE0012R	PCB_118	0
CZ0003R	phenanthrene	0	IS0091R	PCB_101	0	NO0042G	PCB_187	0	SE0012R	PCB_138	0
CZ0003R	pp_DDD	42	IS0091R	PCB_105	95	NO0042G	PCB_189	102	SE0012R	PCB_153	0
CZ0003R	pp_DDE	0	IS0091R	PCB_118	41	NO0042G	PCB_194	74	SE0012R	PCB_180	0
CZ0003R	pp_DDT	25	IS0091R	PCB_138	5	NO0042G	PCB_206	98	SE0012R	PCB_28	0
CZ0003R	pyrene	0	IS0091R	PCB_153	0	NO0042G	PCB_209	94	SE0012R	PCB_52	0
ES0008R	acenaphthene	0	IS0091R	PCB_156	100	NO0042G	PCB_28	0	SE0012R	alpha_HCH	0
ES0008R	acenaphtylene	0	IS0091R	PCB_180	83	NO0042G	PCB_31	0	SE0012R	anthracene	100
ES0008R	anthracene	0	IS0091R	PCB_28	0	NO0042G	PCB_33	0	SE0012R	benz_a_anthracene	0
ES0008R	benz_a_anthracene	0	IS0091R	PCB_31	0	NO0042G	PCB_37	0	SE0012R	benzo_a_pyrene	0
ES0008R	benzo_a_pyrene	0	IS0091R	PCB_52	0	NO0042G	PCB_47	0	SE0012R	benzo_ghi_perylene	0
ES0008R	benzo_b_fluoranthene	0	IS0091R	alpha_HCH	0	NO0042G	PCB_52	0	SE0012R	fluoranthene	0
ES0008R	benzo_ghi_perylene	0	IS0091R	beta_HCH	96	NO0042G	PCB_66	0	SE0012R	gamma_HCH	0
ES0008R	benzo_k_fluoranthene	0	IS0091R	cis_CD	0	NO0042G	PCB_74	0	SE0012R	inden_123cd_pyrene	0
ES0008R	chrysene	0	IS0091R	dieldrin	4	NO0042G	PCB_99	0	SE0012R	phenanthrene	0
ES0008R	dibenzo_ah_anthracene	0	IS0091R	gamma_HCH	0	NO0042G	acenaphthene	0	SE0012R	pp_DDE	0
ES0008R	fluorene	0	IS0091R	op_DDT	96	NO0042G	acenaphthylene	10	SE0012R	pyrene	0
ES0008R	inden_123cd_pyrene	0	IS0091R	pp_DDD	96	NO0042G	alpha_HCH	0	SE0014R	PCB_101	0
ES0008R	naphtalene	0	IS0091R	pp_DDE	83	NO0042G	anthanthrene	78	SE0014R	PCB_118	0
ES0008R	phenanthrene	0	IS0091R	pp_DDT	100	NO0042G	anthracene	28	SE0014R	PCB_138	0
ES0008R	pyrene	0	IS0091R	trans_CD	70	NO0042G	benz_a_anthracene	20	SE0014R	PCB_153	0
FI0096G	PCB_101	0	IS0091R	trans_NO	4	NO0042G	benzo_a_fluoranthene	62	SE0014R	PCB_180	0
FI0096G	PCB_118	0	LV0010R	benzo_a_pyrene	0	NO0042G	benzo_a_fluorene	22	SE0014R	PCB_28	0
FI0096G	PCB_138	0	LV0016R	benzo_a_pyrene	15	NO0042G	benzo_a_pyrene	38	SE0014R	PCB_52	0
FI0096G	PCB_153	0	NO0001R	HCB	0	NO0042G	benzo_b_fluorene	30	SE0014R	alpha_HCH	0
FI0096G	PCB_180	0	NO0001R	PCB_101	0	NO0042G	benzo_bjk_fluoranthenes	0	SE0014R	anthracene	0
FI0096G	PCB_28	0	NO0001R	PCB_118	0	NO0042G	benzo_e_pyrene	14	SE0014R	benz_a_anthracene	0
FI0096G	PCB_52	0	NO0001R	PCB_138	0	NO0042G	benzo_ghi_fluoranthene	10	SE0014R	benzo_a_pyrene	0
FI0096G	alpha_HCH	0	NO0001R	PCB_153	0	NO0042G	benzo_ghi_perylene	14	SE0014R	benzo_b_fluoranthene	0
FI0096G	anthracene	0	NO0001R	PCB_180	0	NO0042G	biphenyl	0	SE0014R	benzo_ghi_perylene	0
FI0096G	benz_a_anthracene	0	NO0001R	PCB_28	0	NO0042G	chrysene_triphenylene	0	SE0014R	benzo_k_fluoranthene	0
FI0096G	benzo_a_pyrene	0	NO0001R	PCB_52	0	NO0042G	cis_CD	0	SE0014R	chrysene_triphenylene	0
FI0096G	benzo_b_fluoranthene	0	NO0001R	alpha_HCH	0	NO0042G	cis_NO	11	SE0014R	fluoranthene	0
FI0096G	benzo_ghi_perylene	0	NO0001R	gamma_HCH	0	NO0042G	coronene	48	SE0014R	gamma_HCH	0
FI0096G	benzo_k_fluoranthene	0	NO0001R	sum_PCB	0	NO0042G	cyclopenta_cd_pyrene	40	SE0014R	inden_123cd_pyrene	0
FI0096G	chrysene_triphenylene	0	NO0042G	HCB	0	NO0042G	dibenzo_ac_ah_anthracenes	48	SE0014R	phenanthrene	0
FI0096G	fluoranthene	0	NO0042G	N1methylnaphtalene	2	NO0042G	dibenzo_ae_pyrene	58	SE0014R	pp_DDD	0
FI0096G	gamma_HCH	0	NO0042G	N1methylphenanthrene	0	NO0042G	dibenzo_ah_pyrene	80	SE0014R	pp_DDE	0
FI0096G	inden_123cd_pyrene	0	NO0042G	N2methylanthracene	60	NO0042G	dibenzo_ai_pyrene	78	SE0014R	pp_DDT	0
FI0096G	phenanthrene	0	NO0042G	N2methylnaphtalene	0	NO0042G	dibenzofuran	0	SE0014R	pyrene	0
FI0096G	pp_DDD	0	NO0042G	N2methylphenanthrene	0	NO0042G	dibenzothiophene	0			
FI0096G	pp_DDE	0	NO0042G	N3methylphenanthrene	0	NO0042G	fluoranthene	0			

between25 and 50% below the detection limit

between 50 and 75% below the detection limit

more than 75% below the detection limit

Table A3.7: Number of samples below the detection limit for POPs in precipitation in 2006, in per cent.

Code	Comp	% BDL	Code	Comp	% BDL	Code	Comp	% BDL	Code	Comp	% BDL
BE0014R	alpha_HCH	100	DE0001R	benz_a_anthracene	0	DE0009R	inden_123cd_pyrene	0	IS0091R	dieldrin	8
BE0014R	dieldrin	100	DE0001R	benzo_a_pyrene	0	DE0009R	op_DDD	0	IS0091R	gamma_HCH	4
BE0014R	endrin	100	DE0001R	benzo_bjk_fluoranthenes	0	DE0009R	op_DDE	0	IS0091R	op_DDT	96
BE0014R	gamma_HCH	38	DE0001R	benzo_ghi_perylene	0	DE0009R	op_DDT	0	IS0091R	pp_DDD	88
BE0014R	heptachlor	100	DE0001R	dibenzo_ah_anthracene	0	DE0009R	phenanthrene	0	IS0091R	pp_DDE	96
BE0014R	pp_DDD	100	DE0001R	dieldrin	0	DE0009R	pp_DDD	0	IS0091R	pp_DDT	63
BE0014R	pp_DDE	100	DE0001R	endrin	0	DE0009R	pp_DDE	0	IS0091R	trans_CD	71
BE0014R	pp_DDT	100	DE0001R	fluoranthene	0	DE0009R	pp_DDT	0	IS0091R	trans_NO	42
CZ0003R	PCB_101	84	DE0001R	gamma_HCH	0	DE0009R	pyrene	0	NL0091R	gamma_HCH	83
CZ0003R	PCB_118	100	DE0001R	heptachlor	0	FI0096R	PCB_101	0	NO0001R	HCB	0
CZ0003R	PCB_138	89	DE0001R	inden_123cd_pyrene	0	FI0096R	PCB_118	0	NO0001R	PCB_101	2
CZ0003R	PCB_153	79	DE0001R	op_DDD	0	FI0096R	PCB_138	0	NO0001R	PCB_118	4
CZ0003R	PCB_180	87	DE0001R	op_DDE	0	FI0096R	PCB_153	0	NO0001R	PCB_138	2
CZ0003R	benzo_k_fluoranthene	25	FI0096G	PCB_153	0	IS0091R	op_DDT	30	SE0012R	fluoranthene	0
CZ0003R	beta_HCH	79	FI0096G	PCB_180	0	IS0091R	pp_DDD	96	SE0012R	gamma_HCH	10
CZ0003R	chrysene	9	FI0096G	PCB_52	100	IS0091R	pp_DDE	96	SE0012R	inden_123cd_pyrene	44
CZ0003R	dibenzo_ah_anthracene	87	FI0096G	alpha_HCH	0	IS0091R	pp_DDT	57	SE0012R	phenanthrene	0
CZ0003R	gamma_HCH	25	FI0096G	anthracene	8	IS0091R	trans_CD	91	SE0012R	pyrene	0
CZ0003R	indeno_123cd_pyrene	47	FI0096G	benzo_a_pyrene	0	IS0091R	trans_NO	87	SE0014R	PCB_101	0
CZ0003R	phenanthrene	0	FI0096G	benzo_ghi_perylene	0	NO0001R	HCB	0	SE0014R	PCB_118	0
CZ0003R	pp_DDD	94	FI0096G	fluoranthene	0	NO0001R	PCB_101	0	SE0014R	PCB_138	0
CZ0003R	pp_DDE	88	FI0096G	gamma_HCH	0	NO0001R	PCB_118	0	SE0014R	PCB_153	0
CZ0003R	pp_DDT	100	FI0096G	inden_123cd_pyrene	0	NO0001R	PCB_138	0	SE0014R	PCB_180	0
CZ0003R	pyrene	0	FI0096G	phenanthrene	0	NO0001R	PCB_153	0	SE0014R	PCB_52	58
DE0001R	HCB	0	FI0096G	pyrene	0	NO0001R	PCB_180	0	SE0014R	alpha_HCH	0
DE0001R	PCB_101	0	IS0091R	HCB	9	NO0001R	PCB_28	0	SE0014R	anthracene	0
DE0001R	PCB_118	0	IS0091R	PCB_101	32	NO0001R	PCB_52	0	SE0014R	benzo_a_pyrene	0
DE0001R	PCB_138	0	IS0091R	PCB_105	50	NO0001R	alpha_HCH	0	SE0014R	benzo_ghi_perylene	0
DE0001R	PCB_153	0	IS0091R	PCB_118	27	NO0001R	gamma_HCH	0	SE0014R	fluoranthene	0
DE0001R	PCB_180	0	IS0091R	PCB_138	9	NO0001R	sum_PCB	0	SE0014R	gamma_HCH	0
DE0001R	PCB_28	0	IS0091R	PCB_153	18	SE0012R	PCB_101	0	SE0014R	inden_123cd_pyrene	0
DE0001R	PCB_52	0	IS0091R	PCB_156	91	SE0012R	PCB_118	0	SE0014R	phenanthrene	0
DE0001R	alpha_HCH	0	IS0091R	PCB_180	32	SE0012R	PCB_138	0	SE0014R	pyrene	0
DE0001R	anthracene	0	IS0091R	PCB_28	70	SE0012R	PCB_153	0			
DE0001R	benz_a_anthracene	0	IS0091R	PCB_31	70	SE0012R	PCB_180	0			
DE0001R	benzo_a_pyrene	0	IS0091R	PCB_52	74	SE0012R	PCB_28	0			
DE0001R	benzo_ghi_perylene	0	IS0091R	alpha_HCH	0	SE0012R	PCB_52	0			
DE0001R	dibenzo_ah_anthracene	0	IS0091R	beta_HCH	100	SE0012R	alpha_HCH	20			
DE0001R	dieldrin	0	IS0091R	cis_CD	78	SE0012R	anthracene	0			
DE0001R	endrin	0	IS0091R	dieldrin	4	SE0012R	benzo_a_pyrene	0			
DE0001R	fluoranthene	0	IS0091R	gamma_HCH	0	SE0012R	benzo_ghi_perylene	33			

The Swedish and Finnish data are precipitation + dry deposition, the rest is precipitation only

- (light yellow) between25 and 50% below the detection limit
- (orange) between 50 and 75% below the detection limit
- (red) more than 75% below the detection limit

Table A3.8: Number of samples below the detection limit for VOC in 2006, in per cent.

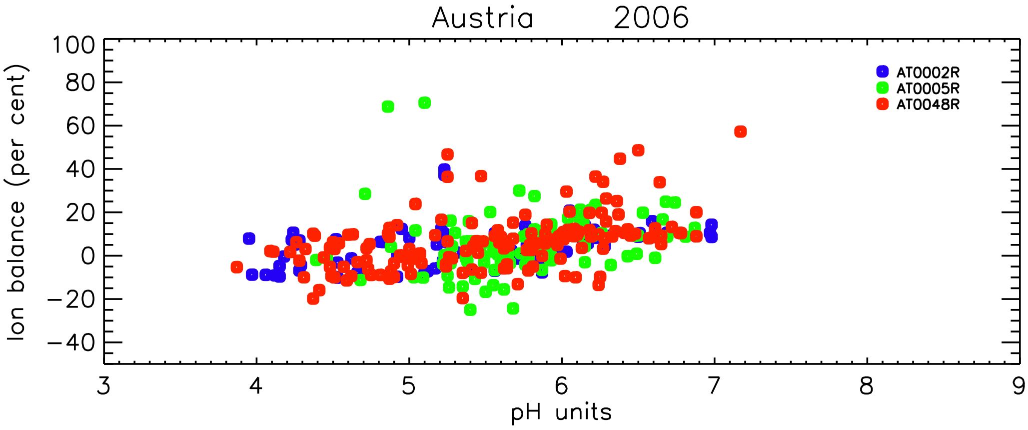
Site	Comp	% BDL
CH0005R	benzene	0
CH0005R	butadiene	0
CH0005R	butane	0
CH0005R	ethane	0
CH0005R	ethene	0
CH0005R	ethylbenzene	0
CH0005R	ethyne	0
CH0005R	hexane	0
CH0005R	isobutane	0
CH0005R	isoprene	0
CH0005R	mpxylene	0
CH0005R	oxylene	0
CH0005R	pentane	0
CH0005R	propane	0
CH0005R	propene	0
CH0005R	toluene	0
CZ0003R	benzene	1
CZ0003R	butane	0
CZ0003R	butenes	0
CZ0003R	ethane	0
CZ0003R	ethene	0
CZ0003R	ethylbenzene	9
CZ0003R	ethyne	0
CZ0003R	hexane	1
CZ0003R	isobutane	0
CZ0003R	isopentane	0
CZ0003R	isoprene	32
CZ0003R	mpxylene	3
CZ0003R	octane	55
CZ0003R	pentane	0
CZ0003R	pentenes	12
CZ0003R	propane	0
CZ0003R	propene	0
CZ0003R	toluene	0
DE0002R	N2methylpentane	0
DE0002R	benzene	0
DE0002R	but_1_ene	0
DE0002R	butadiene	0
DE0002R	butane	0
DE0002R	cis_2_butene	0
DE0002R	cis_2_pentene	0
DE0002R	ethane	0
DE0002R	ethene	0
DE0002R	ethyne	0
DE0002R	heptane	0
DE0002R	hexane	0
DE0002R	i_butene	0
DE0002R	isobutane	0
DE0002R	isopentane	0
DE0002R	isoprene	0
DE0002R	mpxylene	0
DE0002R	oxylene	0
DE0002R	pentane	0
DE0002R	pentenes	0
DE0002R	propane	0
DE0002R	propene	0
DE0002R	toluene	0
DE0002R	trans_2_butene	0
DE0003R	N2methylpentane	0
DE0003R	benzene	0
DE0003R	but_1_ene	0
DE0003R	butadiene	0
DE0003R	butane	0
DE0003R	cis_2_butene	0
DE0003R	cis_2_pentene	0
DE0003R	ethane	0
DE0003R	ethene	0
DE0003R	ethyne	0
DE0003R	heptane	0
DE0003R	hexane	0
DE0003R	i_butene	0
DE0003R	isobutane	0
DE0003R	isopentane	0
DE0003R	isoprene	0
DE0003R	mpxylene	0
DE0003R	oxylene	0
DE0003R	pentane	0
DE0003R	pentenes	0
DE0003R	propane	0
DE0003R	propene	0
DE0003R	toluene	0
DE0003R	trans_2_butene	0
DE0007R	N2methylpentane	0
DE0007R	benzene	0
DE0007R	but_1_ene	0
DE0007R	butadiene	0
DE0007R	butane	0
DE0007R	cis_2_butene	0
DE0007R	cis_2_pentene	0
DE0007R	ethane	0
DE0007R	ethene	0
DE0007R	ethyne	0
DE0007R	heptane	0
DE0007R	hexane	0
DE0007R	i_butene	0
DE0007R	isobutane	0
DE0007R	isopentane	0
DE0007R	isoprene	0
DE0007R	mpxylene	0
DE0007R	oxylene	0
DE0007R	pentane	0
DE0007R	pentenes	0
DE0007R	propane	0
DE0007R	propene	0
DE0007R	toluene	0
DE0007R	trans_2_butene	0
DE0008R	N2methylpentane	0
DE0008R	benzene	0
DE0008R	but_1_ene	0
DE0008R	butadiene	0
DE0008R	butane	0
DE0008R	cis_2_butene	0
DE0008R	cis_2_pentene	0
DE0008R	ethane	0
DE0008R	ethene	0
DE0008R	ethyne	0
DE0008R	heptane	0
DE0008R	hexane	0
DE0008R	i_butene	0
DE0008R	isobutane	0
DE0008R	isopentane	0
DE0008R	isoprene	0
DE0008R	mpxylene	0
DE0008R	oxylene	0
DE0008R	pentane	0
DE0008R	pentenes	0
DE0008R	propane	0
DE0008R	propene	0
DE0008R	toluene	0
DE0008R	trans_2_butene	0
DE0009R	N2methylpentane	0
DE0009R	benzene	0
DE0009R	but_1_ene	0
DE0009R	butadiene	0
DE0009R	butane	0
DE0009R	cis_2_butene	0
DE0009R	cis_2_pentene	0
DE0009R	ethane	0
DE0009R	ethene	0
DE0009R	ethyne	0
DE0009R	heptane	0
DE0009R	hexane	0
DE0009R	i_butene	0
DE0009R	isobutane	0
DE0009R	isopentane	0
DE0009R	isoprene	0
DE0009R	mpxylene	0
DE0009R	oxylene	0
DE0009R	pentane	0
DE0009R	pentenes	0
DE0009R	propane	0
DE0009R	propene	0
DE0009R	toluene	0
DE0009R	trans_2_butene	0
DE0043G	benzene	0
DE0043G	but_1_ene	0
DE0043G	butadiene	0
DE0043G	butane	0
DE0043G	cis_2_butene	0
DE0043G	cis_2_pentene	0
DE0043G	ethane	0
DE0043G	ethene	0
DE0043G	ethylbenzene	0
DE0043G	ethyne	0
DE0043G	heptane	0
DE0043G	hexane	0
DE0043G	isobutane	0
DE0043G	isopentane	0
DE0043G	isoprene	0
DE0043G	mpxylene	0
DE0043G	oxylene	0
DE0043G	pentane	0
DE0043G	propane	0
DE0043G	propene	0
DE0043G	toluene	0
DE0043G	trans_2_pentene	0
ES0009R	N2butanone	10
ES0009R	N2methylpropenal	53
ES0009R	N2propenal	24
ES0009R	benzene	0
ES0009R	benzenecarbaldehyde	1
ES0009R	but_1_ene	45
ES0009R	butadiene	13
ES0009R	butanales	40
ES0009R	butane	0
ES0009R	cis_2_butene	0
ES0009R	cis_2_pentene	34
ES0009R	ethanal	0
ES0009R	ethane	34
ES0009R	ethene	77
ES0009R	ethyne	81
ES0009R	heptane	2
ES0009R	hexanal	4
ES0009R	hexane	100
ES0009R	isobutane	0
ES0009R	isoprene	15
ES0009R	methanal	2
ES0009R	pentanal	7
ES0009R	pentane	2
ES0009R	propane	0
ES0009R	propene	0
ES0009R	toluene	0
ES0009R	trans_2_butene	21
ES0009R	trans_2_pentene	77
FI0009R	N2methylpentane	19
FI0009R	N3methylpentane	43
FI0009R	benzene	0
FI0009R	but_1_ene	12
FI0009R	butadiene	88
FI0009R	butane	0
FI0009R	cis_2_butene	97
FI0009R	cis_2_pentene	95
FI0009R	cyclohexane	0
FI0009R	ethane	0
FI0009R	ethene	0
FI0009R	ethyne	0
FI0009R	heptane	13
FI0009R	hexane	15
FI0009R	isobutane	0
FI0009R	isoprene	75
FI0009R	pentane	0
FI0009R	propane	0
FI0009R	propene	0
FI0009R	trans_2_butene	68
FI0009R	trans_2_pentene	94
FI0096G	N2methylpentane	31
FI0096G	N3methylpentane	51
FI0096G	benzene	0
FI0096G	but_1_ene	33
FI0096G	butadiene	95
FI0096G	butane	0
FI0096G	cis_2_butene	97
FI0096G	cis_2_pentene	95
FI0096G	cyclohexane	5
FI0096G	ethane	0
FI0096G	ethene	0
FI0096G	ethyne	0
FI0096G	heptane	28
FI0096G	hexane	32
FI0096G	isoprene	65
FI0096G	pentane	4
FI0096G	propane	0
FI0096G	propene	0
FI0096G	trans_2_butene	53
FI0096G	trans_2_pentene	96
FR0008R	N2butanone	2
FR0008R	N2methylpentane	6
FR0008R	N2methylpropenal	43
FR0008R	N2oxopropanal	57
FR0008R	N2propenal	92
FR0008R	N3methylpentane	21
FR0008R	benzene	0
FR0008R	benzenecarbaldehyde	55
FR0008R	but_1_ene	0
FR0008R	butanales	16
FR0008R	butane	0
FR0008R	cyclohexane	34
FR0008R	ethanal	0
FR0008R	ethane	0
FR0008R	ethanedial	67
FR0008R	ethene	0
FR0008R	ethylbenzene	11
FR0008R	ethyne	0
FR0008R	heptane	26
FR0008R	hexanal	33
FR0008R	hexane	1
FR0008R	isobutane	0
FR0008R	isoheptane	63
FR0008R	isooctane	19
FR0008R	isopentane	0
FR0008R	isoprene	8
FR0008R	methanal	0
FR0008R	mpxylene	2
FR0008R	neohexane	31
FR0008R	neopentane	100
FR0008R	octane	0
FR0008R	oxylene	56
FR0008R	pentane	0
FR0008R	propanal	0
FR0008R	propane	0
FR0008R	propanone	0
FR0008R	propene	1
FR0008R	toluene	0
FR0013R	N2butanone	5
FR0013R	N2methylpropenal	44
FR0013R	N2oxopropanal	68
FR0013R	N2propenal	98
FR0013R	benzene	0
FR0013R	benzenecarbaldehyde	48
FR0013R	but_1_ene	4
FR0013R	butanales	14
FR0013R	butane	0
FR0013R	cyclohexane	29
FR0013R	ethanal	0
FR0013R	ethane	0
FR0013R	ethanedial	67
FR0013R	ethene	0
FR0013R	ethylbenzene	8
FR0013R	ethyne	0
FR0013R	heptane	22
FR0013R	hexanal	26
FR0013R	hexane	3
FR0013R	isobutane	0
FR0013R	isoheptane	78
FR0013R	isooctane	42
FR0013R	isopentane	0
FR0013R	isoprene	22
FR0013R	methanal	4
FR0013R	mpxylene	3
FR0013R	neopentane	103
FR0013R	octane	45
FR0013R	oxylene	36
FR0013R	pentane	0
FR0013R	propanal	6
FR0013R	propane	0
FR0013R	propanone	2
FR0013R	propene	0
FR0013R	toluene	0
FR0015R	N2butanone	0
FR0015R	N2methylpentane	17
FR0015R	N2methylpropenal	49
FR0015R	N2oxopropanal	57
FR0015R	N2propenal	98
FR0015R	N3methylpentane	12
FR0015R	benzene	0
FR0015R	benzenecarbaldehyde	11
FR0015R	but_1_ene	0
FR0015R	butanales	6
FR0015R	butane	0
FR0015R	cyclohexane	28
FR0015R	ethanal	0
FR0015R	ethane	0
FR0015R	ethanedial	56
FR0015R	ethene	0
FR0015R	ethylbenzene	2
FR0015R	heptane	18
FR0015R	hexanal	26
FR0015R	hexane	3
FR0015R	isobutane	0
FR0015R	isoheptane	55
FR0015R	isooctane	13
FR0015R	isopentane	0
FR0015R	isoprene	29
FR0015R	methanal	0
FR0015R	mpxylene	0
FR0015R	neohexane	31
FR0015R	neopentane	100
FR0015R	octane	0
FR0015R	oxylene	10
FR0015R	pentane	0
FR0015R	propanal	2
FR0015R	propane	0
FR0015R	propanone	0
FR0015R	propene	0
FR0015R	toluene	0
NL0009R	benzene	0
NL0009R	but_1_ene	0
NL0009R	cis_2_butene	0
NL0009R	cyclohexane	0
NL0009R	ethene	0
NL0009R	ethylbenzene	0
NL0009R	heptane	0
NL0009R	hexane	0
NL0009R	mpxylene	0
NL0009R	octane	0
NL0009R	oxylene	0
NL0009R	pentane	0
NL0009R	propane	0
NL0009R	propene	0
NL0009R	toluene	0
NL0009R	trans_2_butene	0
NO0042G	benzene	0
NO0042G	toluene	0
SK0006R	benzene	0
SK0006R	butane	0
SK0006R	butenes	0
SK0006R	ethane	0
SK0006R	ethene	0
SK0006R	ethyne	0
SK0006R	hexane	0
SK0006R	i_butene	0
SK0006R	isopentane	0
SK0006R	isoprene	0
SK0006R	oxylene	0
SK0006R	pentane	0
SK0006R	pentenes	0
SK0006R	propane	0
SK0006R	propene	0
SK0006R	toluene	0

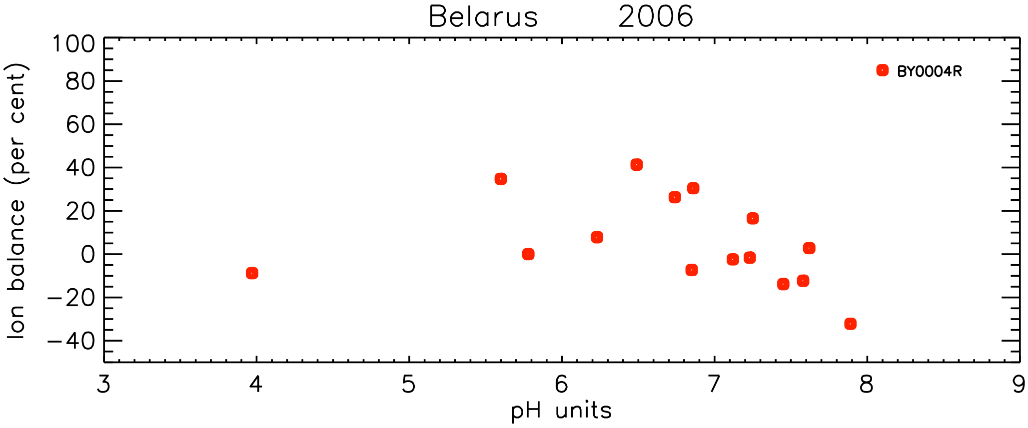
between25 and 50% below the detection limit
between 50 and 75% below the detection limit
more than 75% below the detection limit

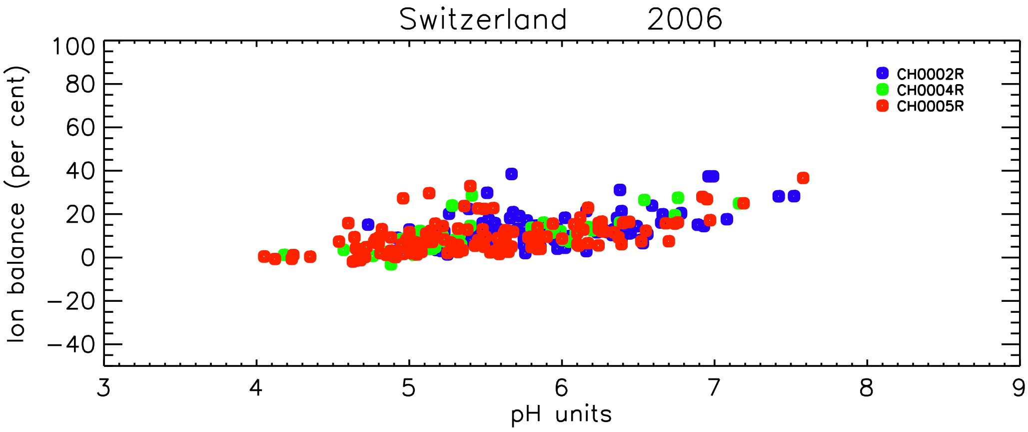
Annex 4

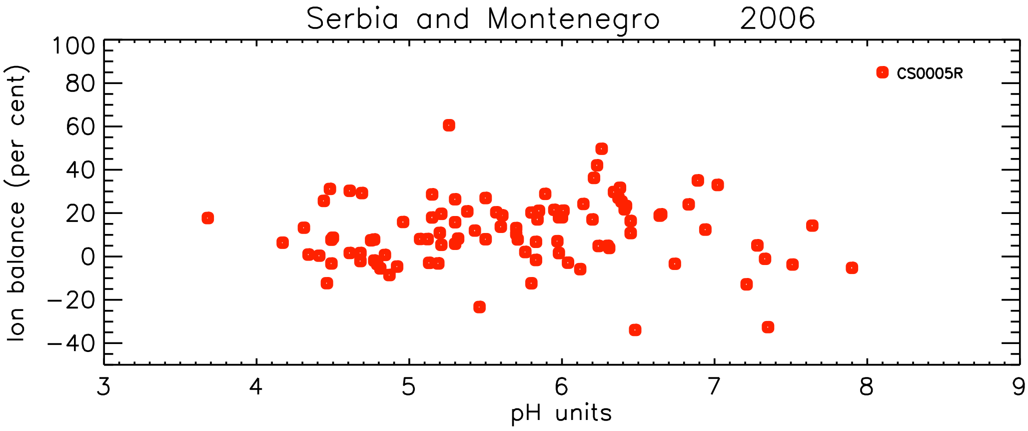
Ion balances in precipitation samples 2006

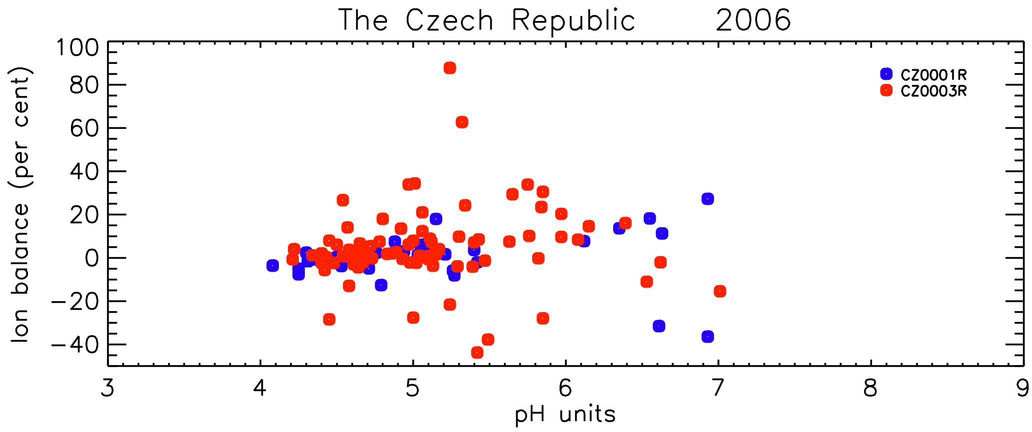
Units: Ion balance (per cent)

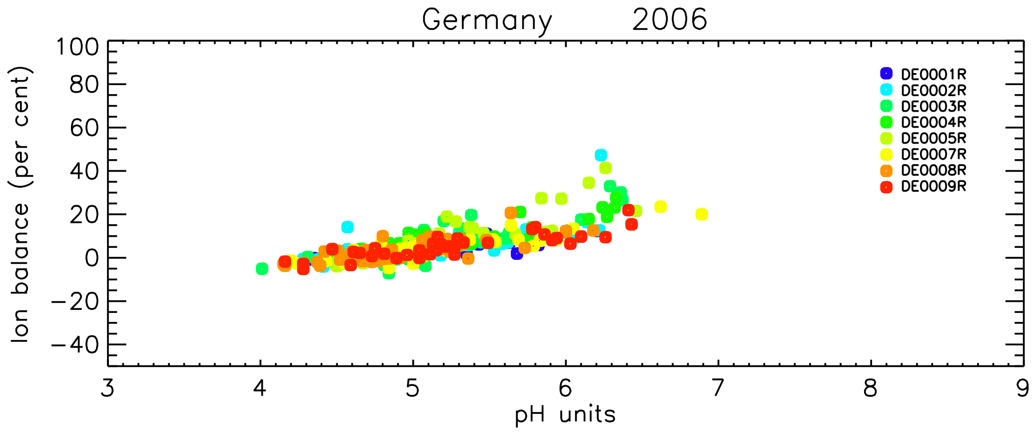

Austria 2006
Ion balance (per cent)
pH units
AT0002R
AT0005R
AT0048R

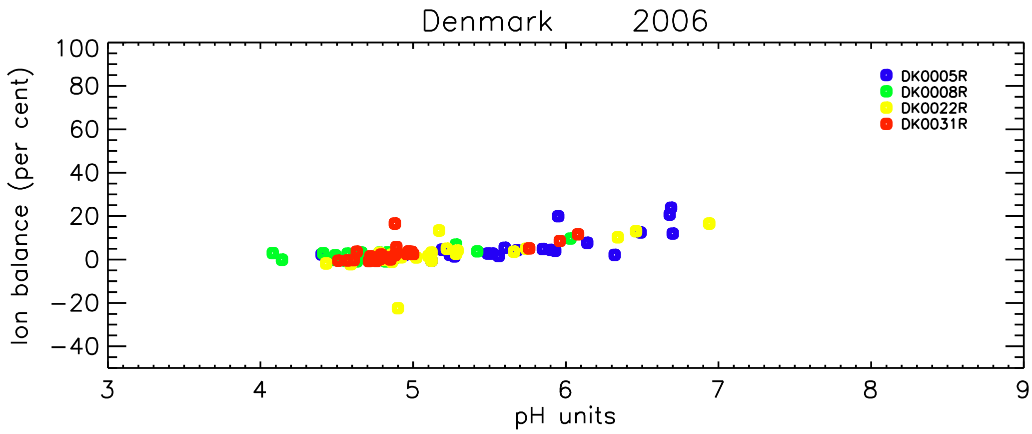

Belarus 2006
Ion balance (per cent)
pH units
BY0004R

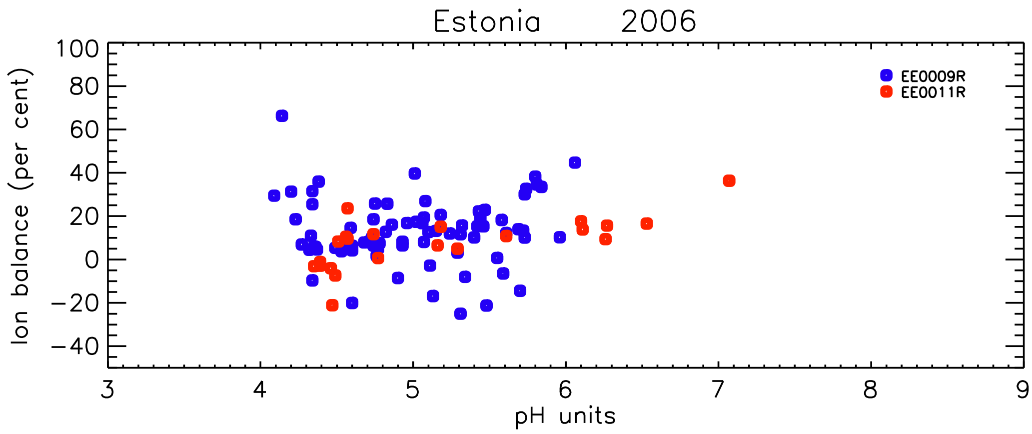

Switzerland 2006
Ion balance (per cent)
pH units
CH0002R
CH0004R
CH0005R

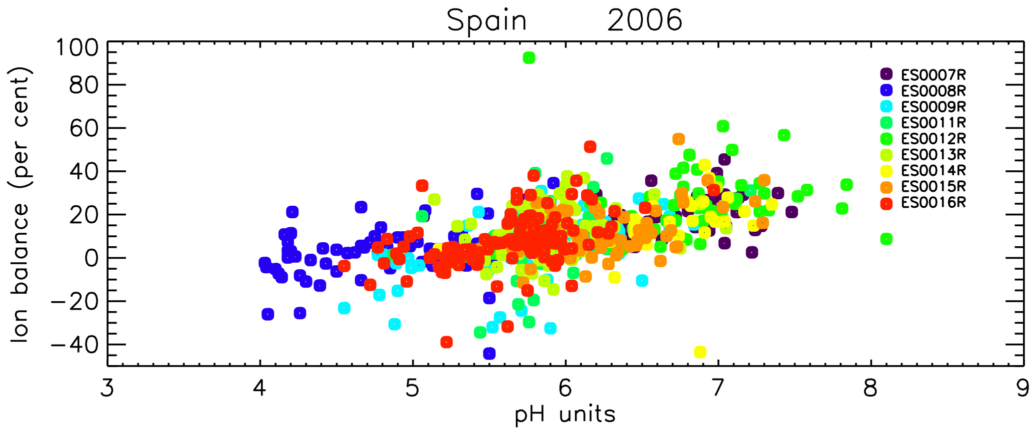

Serbia and Montenegro 2006
Ion balance (per cent)
pH units
CS0005R

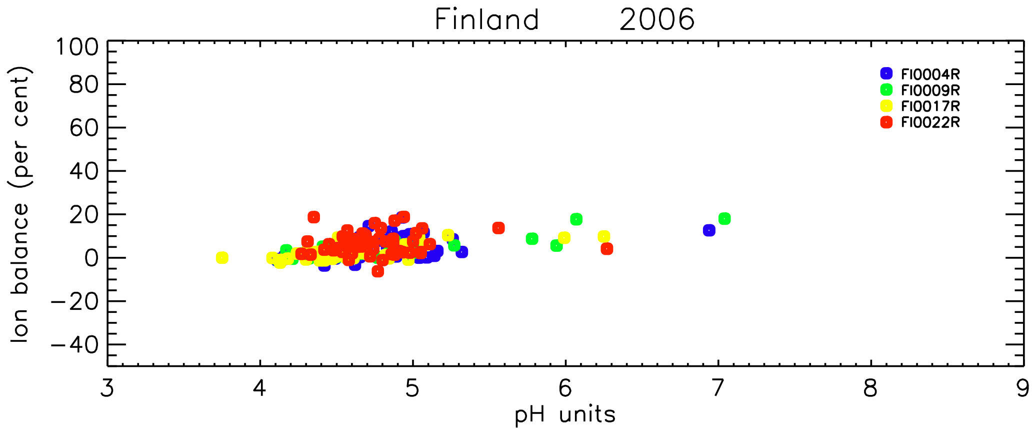

The Czech Republic 2006
Ion balance (per cent)
pH units
CZ0001R
CZ0003R
100
80
60
40
20
0
−20
−40
3
4
5
6
7
8
9

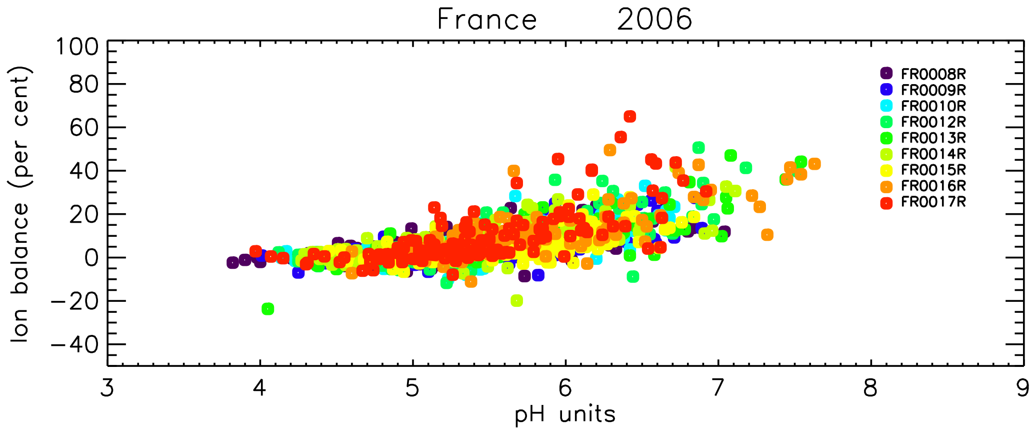

Germany 2006
Ion balance (per cent)
pH units
DE0001R
DE0002R
DE0003R
DE0004R
DE0005R
DE0007R
DE0008R
DE0009R
100
80
60
40
20
0
−20
−40
3
4
5
6
7
8
9

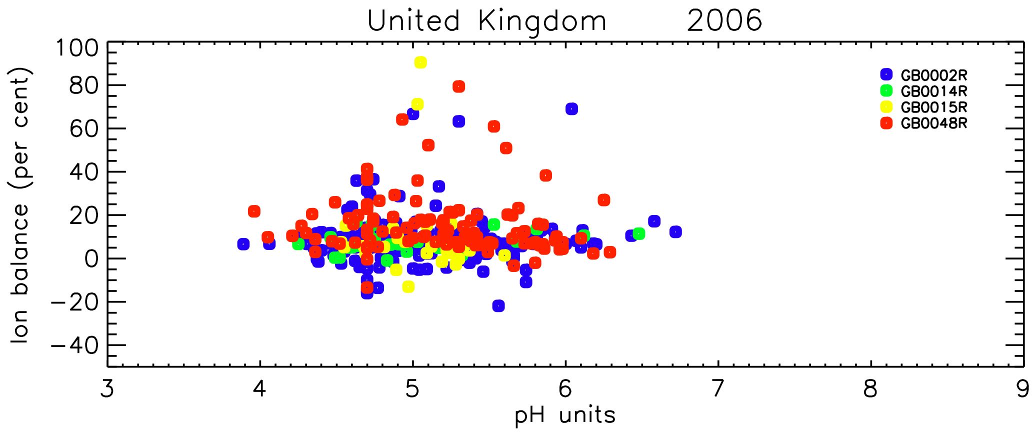

Denmark 2006
Ion balance (per cent)
pH units
DK0005R
DK0008R
DK0022R
DK0031R
100
80
60
40
20
0
−20
−40
3
4
5
6
7
8
9

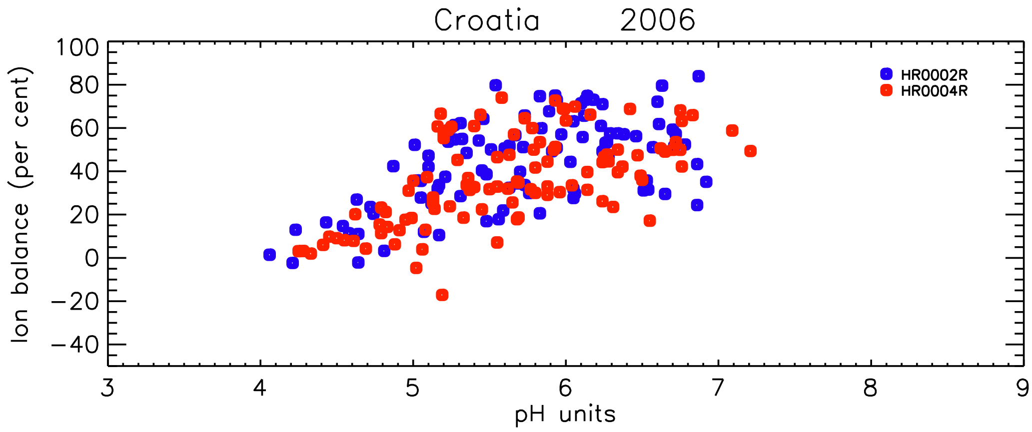

Estonia 2006
Ion balance (per cent)
pH units
EE0009R
EE0011R
100
80
60
40
20
0
−20
−40
3
4
5
6
7
8
9

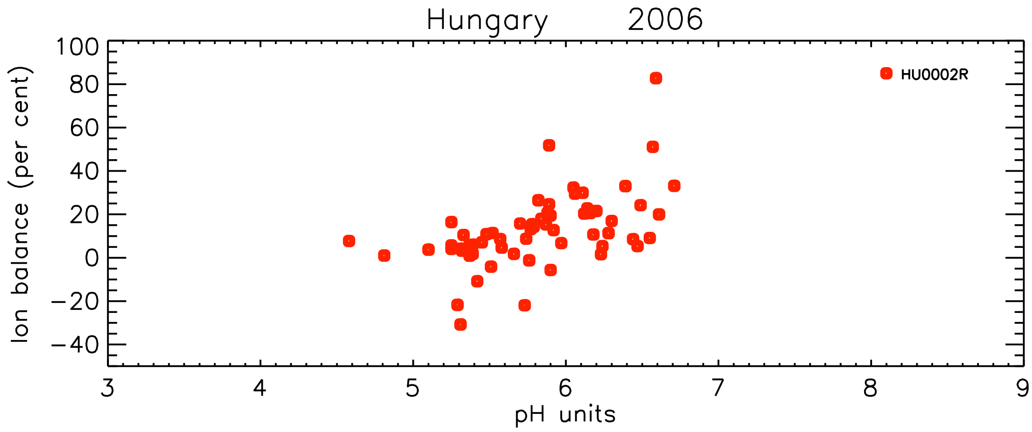

Spain 2006
Ion balance (per cent)
pH units
ES0007R
ES0008R
ES0009R
ES0011R
ES0012R
ES0013R
ES0014R
ES0015R
ES0016R

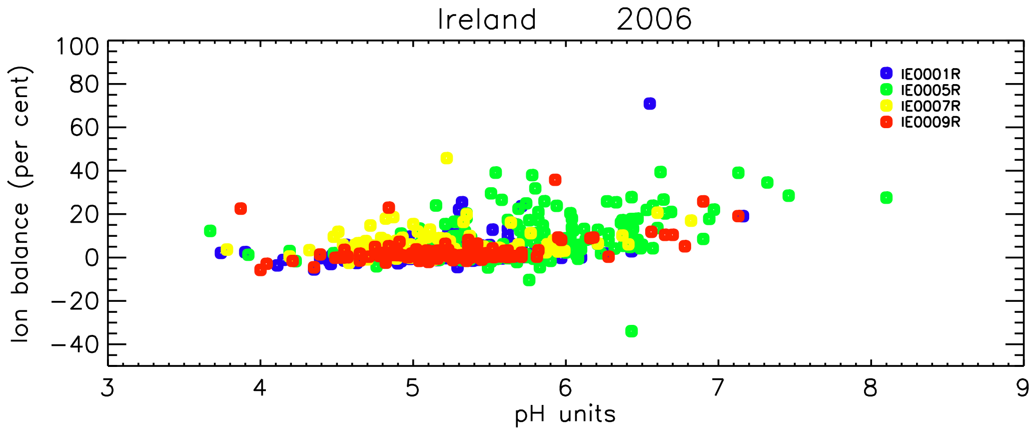

Finland 2006
Ion balance (per cent)
pH units
FI0004R
FI0009R
FI0017R
FI0022R

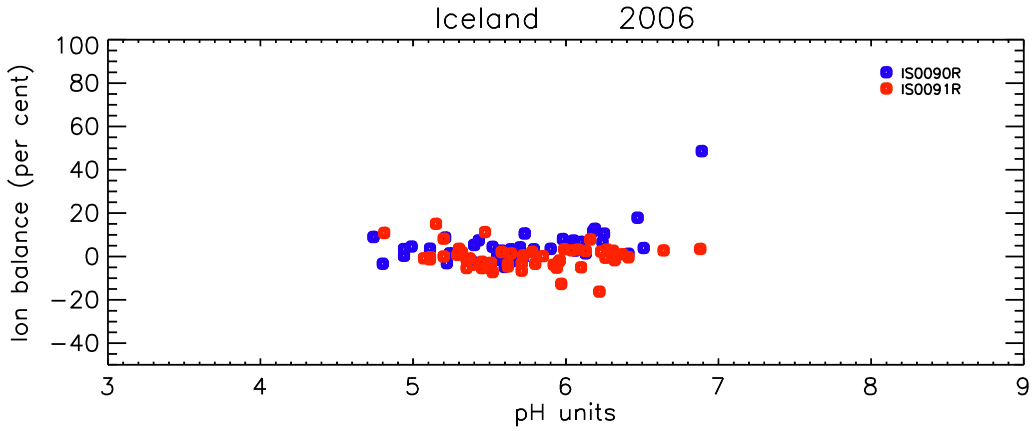

France 2006
Ion balance (per cent)
pH units
FR0008R
FR0009R
FR0010R
FR0012R
FR0013R
FR0014R
FR0015R
FR0016R
FR0017R

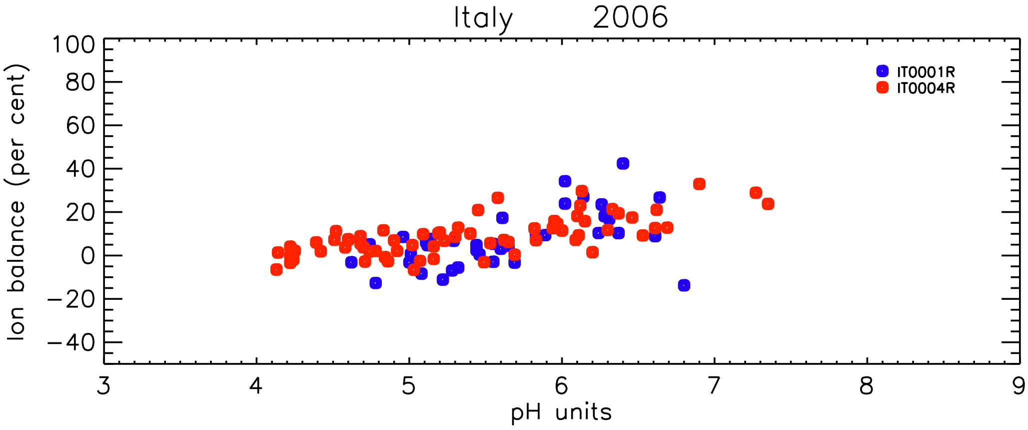

United Kingdom 2006
Ion balance (per cent)
pH units
GB0002R
GB0014R
GB0015R
GB0048R

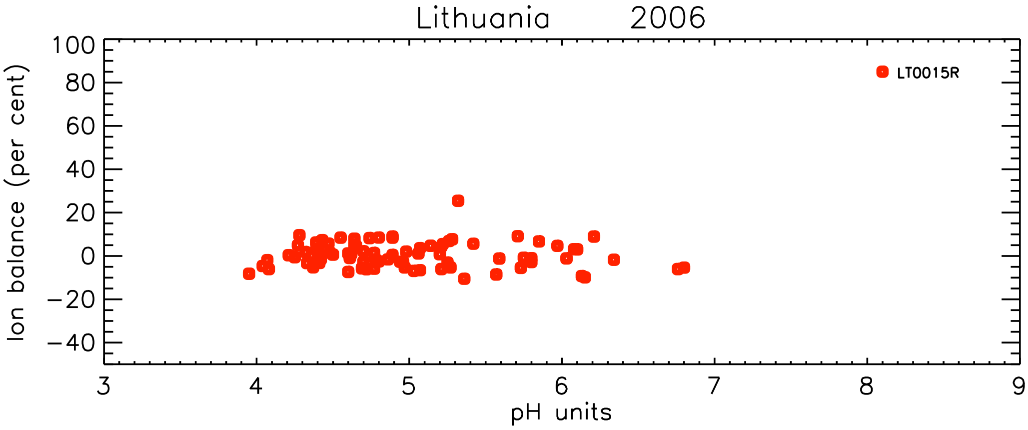

Croatia 2006
Ion balance (per cent)
100
80
60
40
20
0
−20
−40
3
4
5
6
7
8
9
pH units
HR0002R
HR0004R

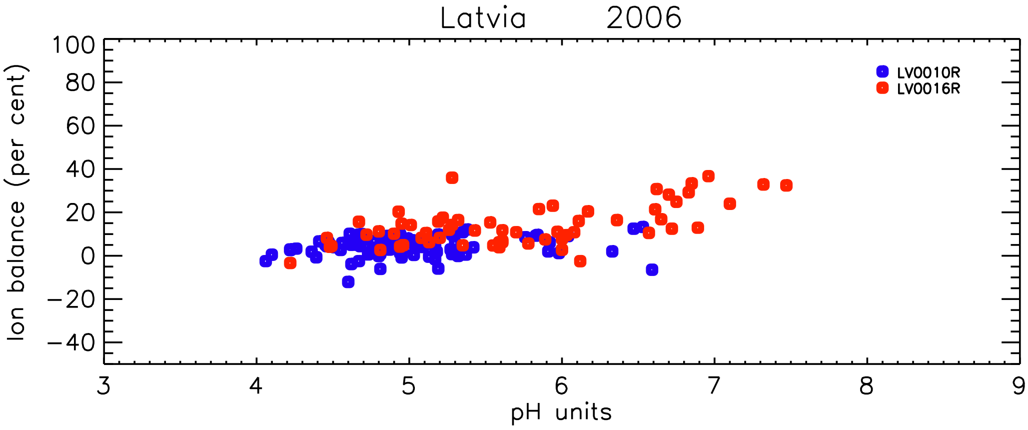

Hungary 2006
Ion balance (per cent)
100
80
60
40
20
0
−20
−40
3
4
5
6
7
8
9
pH units
HU0002R

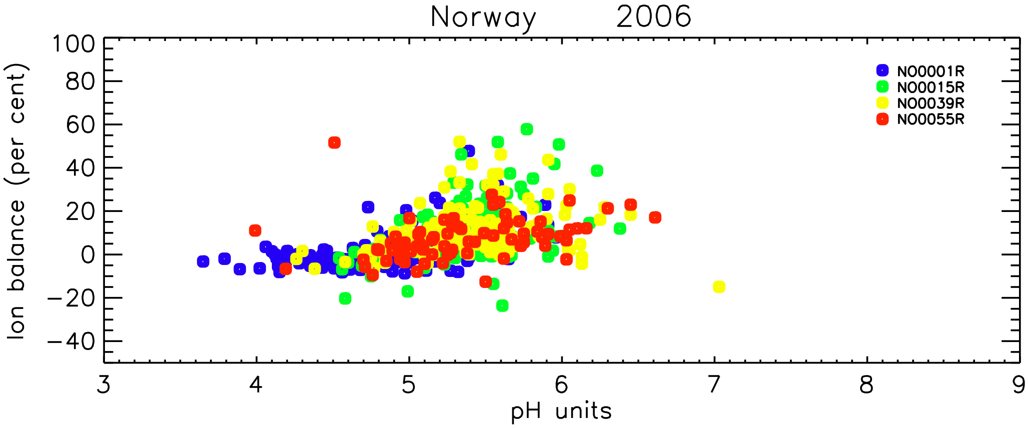

Ireland 2006
Ion balance (per cent)
100
80
60
40
20
0
−20
−40
3
4
5
6
7
8
9
pH units
IE0001R
IE0005R
IE0007R
IE0009R

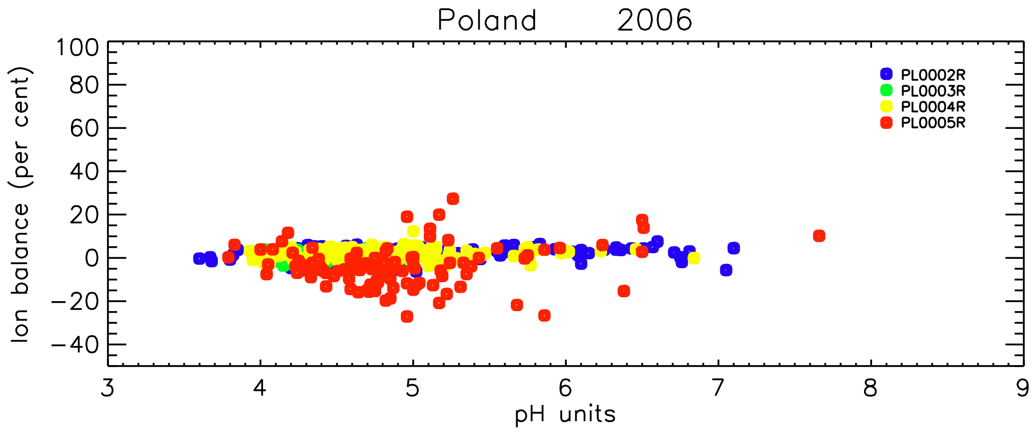

Iceland 2006
Ion balance (per cent)
100
80
60
40
20
0
−20
−40
3
4
5
6
7
8
9
pH units
IS0090R
IS0091R

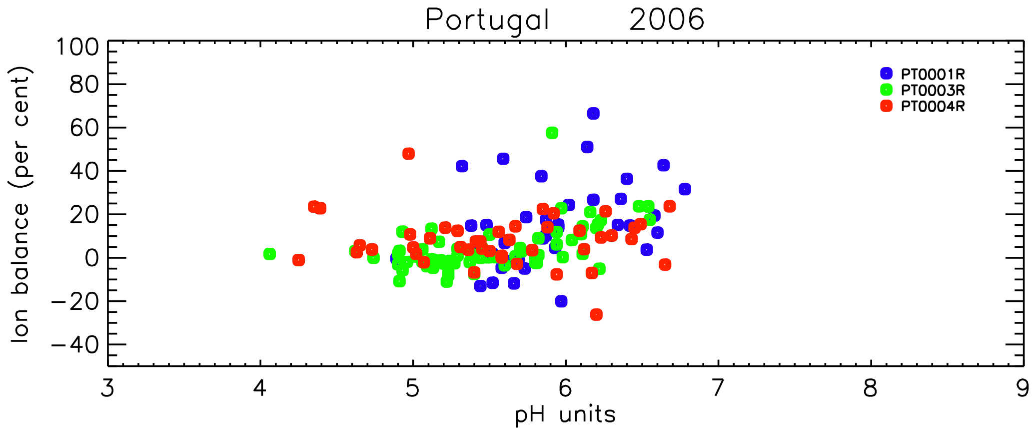

Italy 2006
Ion balance (per cent)
pH units
IT0001R
IT0004R

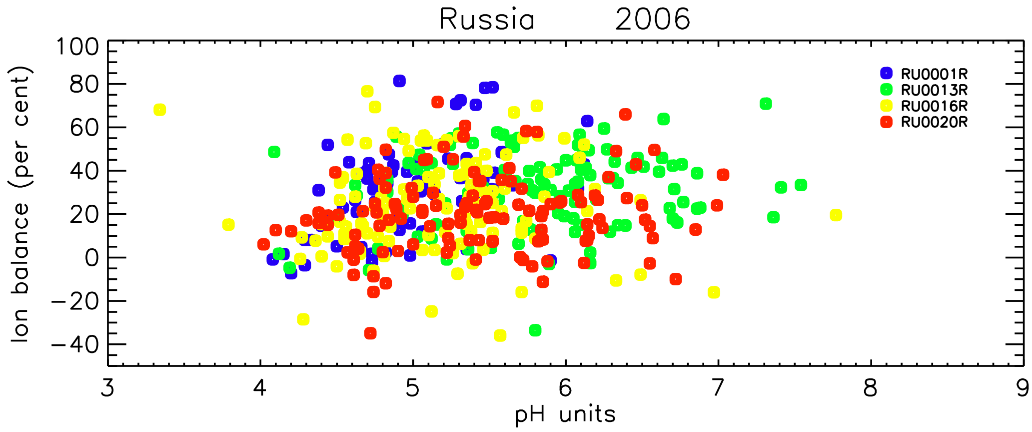

Lithuania 2006
Ion balance (per cent)
pH units
LT0015R

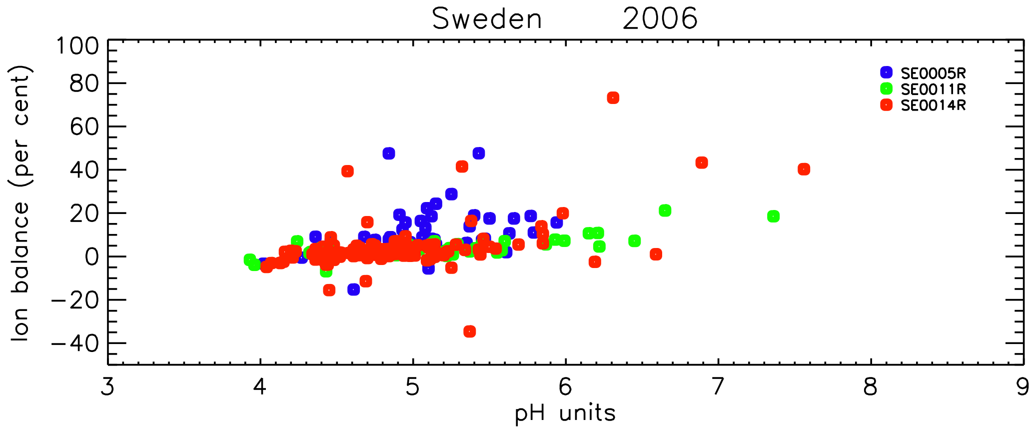

Latvia 2006
Ion balance (per cent)
pH units
LV0010R
LV0016R

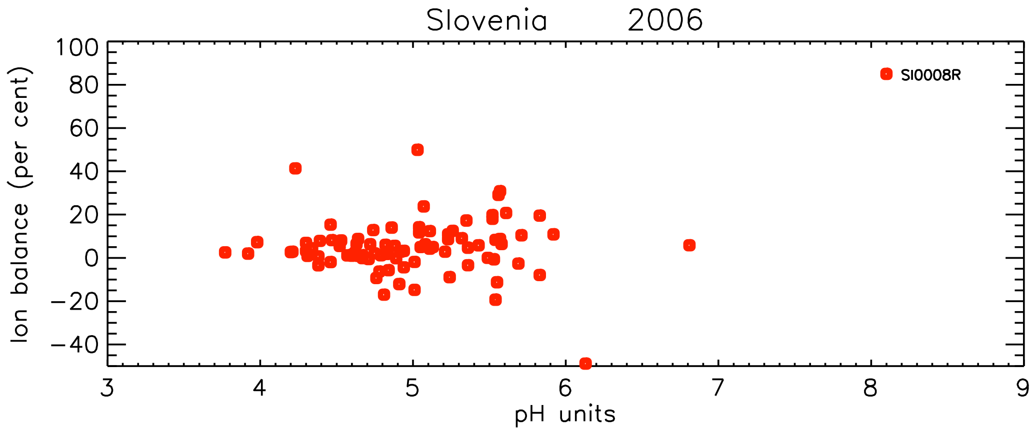

Norway 2006
Ion balance (per cent)
pH units
NO0001R
NO0015R
NO0039R
NO0055R

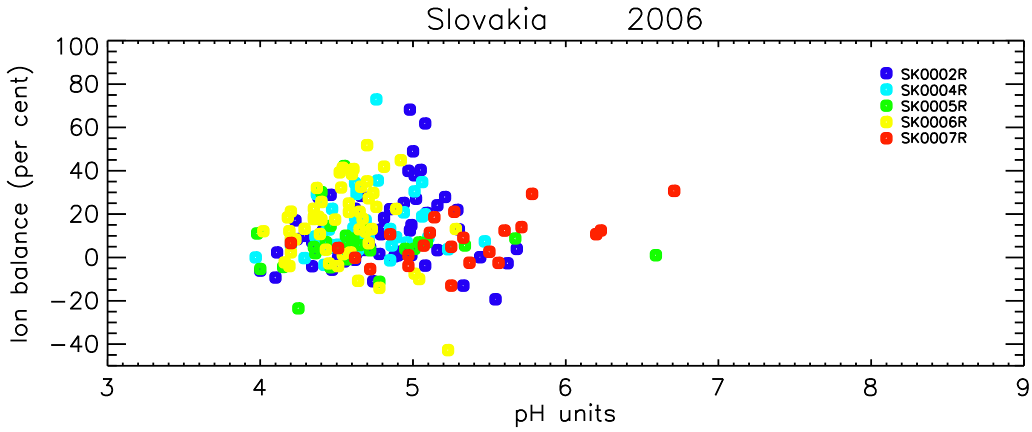

Poland 2006
PL0002R
PL0003R
PL0004R
PL0005R
Ion balance (per cent)
pH units
100
80
60
40
20
0
−20
−40
3
4
5
6
7
8
9

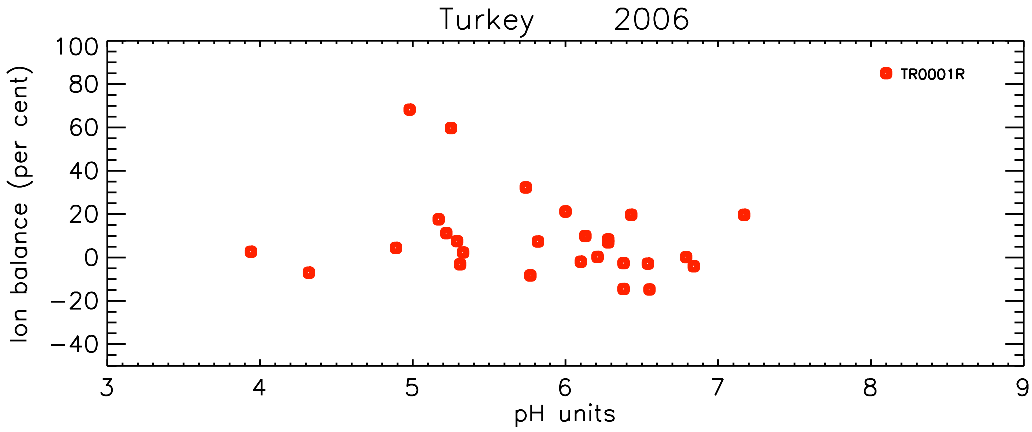

Portugal 2006
PT0001R
PT0003R
PT0004R
Ion balance (per cent)
pH units
100
80
60
40
20
0
−20
−40
3
4
5
6
7
8
9


Russia 2006
RU0001R
RU0013R
RU0016R
RU0020R
Ion balance (per cent)
pH units
100
80
60
40
20
0
−20
−40
3
4
5
6
7
8
9


Sweden 2006
SE0005R
SE0011R
SE0014R
Ion balance (per cent)
pH units
100
80
60
40
20
0
−20
−40
3
4
5
6
7
8
9


Slovenia 2006
SI0008R
Ion balance (per cent)
pH units


Slovakia 2006
SK0002R
SK0004R
SK0005R
SK0006R
SK0007R
Ion balance (per cent)
pH units


Turkey 2006
TR0001R
Ion balance (per cent)
pH units

Annex 5

Detection limits and precision

Table A5.1: Detection limits and precision of ozone.

Country	Precision	Detection limit	Instrument
Austria* AT02,04 AT05	1 ppb	0.4 ppb 0.5 ppb	Horiba APOA 350E Horiba APOA 360
Belgium	0.5%	1 ppb	APi Model 400E
Czech Republic	RSD: 10%	2 µg/m^3	Thermo Electron Series 49
Denmark	Uncertainty (95% conf. int.): 5%	1 ppb	API Model 400 and 400A
Estonia*		2 µg/m^3	Thermo Environmental Instruments TEI 49 C
Finland FI04 FI09 FI17 FI22 FI36	2 µg/m^3	2 µg/m^3	Dasibi 1008 Horiba APOA 360 TEI 49 C Horiba APOA 360 TEI 49 C
France* FR08,09,10, 12,13,14,15,16	2 µg/m^3	2 µg/m^3	Environnement SA, O341M
Germany*		2.0 µg/m^3	
Greece	1 ppb	0.5 ppb	Horiba APOA 360
Hungary		1 ppb	Thermo Environmental Instrument, Model 49
Ireland* (IE01)	0.5% of readings above 50 ppb	0.6 ppb	API Model 400
Italy (IT01)	2 µg/m^3	1 µg/m^3	API Model 400
Italy, EU* (IT04)	2 ppb	2 ppb	Thermo Environmental Instrument, Model 49
Latvia	1%	1 ppb	O341M Ozone Analyzer
Netherlands*	1%	4 µg/m^3	Thermo Environmental Instruments TEI 49 W
Norway	2 µg/m^3	2 µg/m^3	API Model 400
Poland* PL05	2 µg or 1%, whichever is greater RSD 1.8%	2 µg/m^3 1 ppb	Monitor Labs Inc. ML-9810 Monitor Labs Inc. ML-9810
Portugal* PT04	1 ppb	1 ppb	Dasibi Environmental corp. 1008 PC
Russia*	2 µg/m^3	2 µg/m^3	Dasibi Environmental corp., DAS 1008 PC
Slovakia	2 µg/m^3	2 µg/m^3	TEI M49 ; API M400 ; Horiba APOA 360
Slovenia, SI08,32 SI31,33	1 ppb RSD: 0.5%	1 ppb 1 µg/m^3	Thermo Environmental Model 49 C API Model 400A
Spain*	2% 2 µg/m^3	1 ppb 2 µg/m^3	MCV, S.A. Model 48 AUV MCV, S.A. Model 0341 M
Sweden, SE11,12,14 SE32 SE05,13,35,39	uncertainty (95% conf. int.): 5%	1 ppb 1 ppb 1 ppb	Monitor Labs, ML 9810 (ML 9810 B at SE 12) Thermo Environmental Instrument, Model 49C Monitor Labs, ML 8810
Switzerland	uncertainty (95% conf. int.): 3%	2 µg/m^3	Thermo Environmental Instruments TEI 49C
UK*, all sites except: GB32 GB43 GB44	2 ppb		Monitor Labs, ML 8810 TECO, TE49 Ambirack API Model 400

*Data from AT, DE, EE, ES, FR, IE, IT, NL, PL, PT, RU and UK are taken from earlier years

Table A5.2: Detection limits and precision of sulphur dioxide.

Country	Measurements		Laboratory	
	Precision	**Detection limit; µg S/m³**	**Precision**	**Detection limit**
Austria* [1]	0.7 ppb	0.1 ppb		
Belgium	1%	1 ppb		
Czech Republic	CoV: 12.62% M.MAD : 0.194 µg SO_2/m³	0.024	RSD : 3% uncertainty: 5.6%	0.024 mg S/l
Denmark	M.MAD: 0.02 µgS/m³; CoV: 5.0%	0.02	M.MAD: 0.005 µg S/m³; CoV: 1.3%	0.01 µg S/m³
Estonia*		0.48		
Finland		0.04	M.MAD: 0.003 µg S/m³ CoV: 1.0%	0.01 µg S/m³
France* Abs. sol.			at 0.01<c<0.1 mg S/l: RSD = 8-12% at 0.1<c<0.5 mg S/l: RSD = 1-3%	0.1 mg S/L
France* Filterpack	M.MAD 0.19 CoV: 5.4%	0.01		0.02 mg S/l
Germany*	M.MAD: < 0.02			0.01 µg/m³
Greece	1 ppb	0.5 ppb	1 ppb	0.5 ppb
Hungary	M.MAD: 0.139, CoV: 10.95	0.25		
Iceland		0.01	RSD: 4% at 1 mg S/l	0.02 mg S/l
Ireland*				0.05 µgS/m³
Italy (IT01)	RSD: 7.0% at 2.0 µg S/m³	0.1		0.002 mg S/l
Italy, EU* (IT04) [2]	0.5 ppb	1 ppb		
Latvia		0.04	RSD: 1.5%	0.014 mg S/l
Lithuania*	0.021	0.021 µg S/m³	at c<0.7 µg S/m³: 2.4% RSD; at c>0.7 µgS/m3: 0.5-1.0 % RSD	0.017 mg S/l
Netherlands* [4]	1%	1.5		
Norway	M.MAD 0.04; CoV: 12%	0.03		0.01 µg S/m3
Poland*		0.2		0.04 mg S/l
PL05	M.MAD = 0.13; CoV= 11.2%	0.1	RSD: 0.73%	0.09 mg S/l
Serbia and Montenegro				2.50 µg S/m³
Slovakia			CoV: 5.00%	0.1 µg S/filter
Slovenia		0.042	RSD: 4.2% (at 0.334 mg S/l)	0.044 mg S/l
Spain*	1% or 0.2 ppb	0.08 ppb		
Sweden	uncertainty (95% conf. int): 13%	0.02	uncertainty (95% conf. int.): 5%	0.01 µg S/m³
Switzerland CH01	RSD: 4%	0.04		
[3]CH02, CH04, CH05	uncertainty (95% conf. int.): 9%	0.3		
Turkey	M.MAD 0.0803; CoV: 9,13%	0.0705	M.MAD: 0.011; CoV: 2.03%	0.0436 mg S/l
UK*				0.01 mg S/l

[1] AT, Monitor, (TEI 43BS to 15th December, after that TEI 43 C trace level)
[2] IT04. Monitor Environment SA, AF 21M
[3] CH02, CH04, CH05: TEI 43C TL
[4] NL: TEI 43W

*Data from AT, DE, EE, ES, FR, IE, IT, NL, PL and UK are taken from earlier years

Table A5.3: Detection limits and precision of nitrogen dioxide.

Country	Measurements		Laboratory	
	Precision	Detection limit, µg N/m^3	Precision	Detection limit
Austria* [1]	1 ppb	0.5 ppb		
Belgium[5] (BE01) (BE02)	1 ppb	1ppb		
Czech Republic	RSD: 12%	0.23	RSD: 3.4%	0.06 mg NO_2/l
Denmark		0.07	M.MAD: 0.01 µg N/m^3; CoV: 1.3%	0.07 µg N/m^3
Estonia*		0.07		
Finland [6]		0.07		
France*		0.7 ppb		
Greece	1 ppb	0.5 ppb	1 ppb	0.5 ppb
Hungary		0.07		0.01
Ireland*				0.1 µg N/m^3
Italy (IT01)	0.6 µg N/m^3	0.3		
Italy, EU* (IT04)[2]	0.5 ppb	0.5 ppb		
Latvia		0.10	RSD: 2.8%	0.005 mg N/l
Lithuania		0.08	RSD 3.75-6.9% at c<2.0 µg N/m^3	0.03 mg N/l
Netherlands* [4]	1%	0.3		
Norway	M.MAD: 0.13; CoV: 5%	0.03	RSD: 7.0% at c=0.03 mgN/l RSD: 4.6% at c=0.17 mgN/l RSD: 4.2% at c=0.08 mgN/l	0.03 µg N/m^3
Poland*		0.2	RSD: 1.0% at 0.304 mgN/l RSD: 5.9 % at 0.015 mgN/l	0.008 mg N/l
PL05	M.MAD: 0.37; CoV: 24.5%	0.02	RSD: 3.17%	0.02 mg N/l
Serbia and Montenegro				0.3 µg N/m^3
Slovakia			CoV: 2.39%	0.003 mg N/l
Slovenia[7]				
Spain*	0.05 ppb	0.03 ppb		
Sweden	uncertainty (95% conf.int.): 6%	0.3		0.02 mg N/l
Switzerland[3] CH04, CH05	uncertainty (95% conf. int.): 10%	0.06		
CH02, CH03	uncertainty (95% conf. int.): 7%	0.3		
CH01	uncertainty (95% conf. int.): 10%	0.02		
Turkey	M.MAD: 0.0803; CoV: 9.13%	0.1120	M.MAD: 0.1184; CoV: 16.87%	0.0146 mg N/l
UK*	3.5 ppb			

[1]AT: Monitor, HORIBA APNA 360
[2]IT04: Monitor, Thermo Environment 42C
[3]CH04 and CH05: Monitor Labs 9841A; CH02 and CH03: APNA 360; CH01: Eco Physics CLD 770AL ppt + PLC 760
[4] NL: TEI 43W
[5] BE: TEI 42C
[6] FI: Monitors, Thermo Environment 42TCL, 42i, 42S
[7]SI: No data reported for 2006 (mechanical problems with sampler)

*Data from AT, EE, ES, FR, IE, IT, NL, PL and UK are taken from earlier years

Table A5.4: Detection limits and precision of sulphate in air.

Country	Measurements		Laboratory	
	Precision	Detection limit, μg S/m^3	Precision	Detection limit
Austria*		0.05 μg/m^3	RSD: 2.3%	0.0028 μg/m^3
Czech Republic	M.MAD: 0.225 μg/m^3, CoV: 8.6%	0.021	RSD: 3% uncertainty: 6.4%	0.021 mg S/l
Denmark	M.MAD: 0.05 μg S/m^3 CoV: 6.5%	0.01	M.MAD: 0.01 μg S/m^3, CoV: 1.2%	0.01 μg S/m^3
Estonia*		0.53		
Finland		0.04	M.MAD: 0.02 μg S/m^3; CoV: 1.26%	0.01 μg S/m^3
France* Prefil. air			at 0.01<c<0.1 mg S/l: RSD = 8-12% at 0.1<c<0.5 mg S/l: RSD = 1-3%	0.2 μg S/filter
Filterpack	M.MAD 0.058 CoV: 6.1%	0.01		0.02 mg S/l
Germany*	M.MAD < 0.02 μg/m^3			0.01 μg/m^3
Hungary	M.MAD: 0.103 CoV: 7.60	0.11		0.03 μg S/m^3
Iceland		0.01	RSD: 4% at 1 mg S/l	0.05 mg S/l
Ireland*				0.02 μg/m^3
Italy (IT01)	RSD: 1.3% at 1 μg S/m^3	0.01		0.002 mg S/l
Italy, EU* (IT04)		0.009 ppm	CoV: 1.3%	0.004 mg S/l
Latvia		0.04	RSD: 2.4%	0.02 mg S/l
Lithuania		0.024	RSD: 7.2% at c<1.0 μgS/m^3 RSD: 1.0% at c>1.0 μgS/m^3	0.024 mg S/l
Netherlands*			SD: 0.3 μg/m^3	1.2 μg/m^3
Norway	M.MAD 0.009 μg S/m^3 at c<2.4 μg S/m^3	0.01		0.01 μg S/m^3
Poland*		0.18		0.04 mg S/l
PL05	M.MAD: 0.08; CoV=10.4%	0.1	RSD: 4%	0.09 mg S/l
Russia*	RU16: M.MAD 0.02; CoV=2.15%		CoV: 1.75 μg/m^3	0.02 mg/l
Slovakia			CoV: 2.75%	0.2 μg S/filter
Slovenia		0.007	RSD: 4.2% (at 0.334 mg S/l)	0.044 ml S/l
Spain* (in PM_{10})				0.02 μg S/m^3
Sweden	uncertainty (95% conf. int.): 13%	0.005 μg SO_4-S/m^3		0.005 mg S/l
Switzerland	RSD: 10%	0.04		
Turkey	M.MAD: 0.0803; CoV: 9.13%	0.0398	M.MAD: 0.0102; CoV: 2.20%	0.0396 mg S/l
UK*			RSD: 2%	0.01 mg S/l

*Data from AT, DE, EE, ES, FR, IE, IT, NL, RU and UK are taken from earlier years

Table A5.5: Detection limits and precision of nitrate and nitric acid in air.

Country	Measurements		Laboratory	
	Precision	Detection limit, µg N/m³	Precision	Detection limit
Austria*		HNO_3: 0.020 µg/m³ NO_3: 0.011 µg/m³	HNO_3: RSD: 1.7%	HNO_3: 0.0006 µg/m³ NO_3: 0.0009 µg/m³
Czech Republic	aNO_3: M.MAD: 0.252 µg/m³, CoV: 7.49%	HNO_3: 0.015 µg N/m³ NO_3^*: 0.005 µg N/m³	RSD: 2% uncertainty: 4.4%	HNO_3: 0.015 mg N/l NO_3^*: 0.005 mg N/l
Denmark	M.MAD: 0.04 µg N/m³, CoV: 7,3%	0.03	NO_3; M.MAD: 0,01 µg N/m³, CoV: 0.7% HNO_3: M.MAD: 0.003 µg N/m³, CoV: 9.2%	NO_3: 0.01 µg N/m³ HNO_3: 0.01 µg N/m³
Finland		0.02	M.MAD: 0.001 µg N/m³ CoV: HNO_3 = 5.0% and NO_3 = 0.9%	0.005 µg N/m³
Germany*	< 0.02 µg/m³ M.MAD			0.01 µg/m³
Hungary	HNO_3: M.MAD: 0.027 µg/m³, CoV: 15.81 NO_3: M.MAD: 0.065 µg/m³, CoV: 5.70	HNO_3: 0.06; NO_3: 0.07		HNO_3: 0.08; NO_3: 0.01
Ireland*				0.02 ng N/m³
Italy (IT01)	HNO_3: RSD: 6.2% at 0.25 µg N/m³ NO_3: RSD: 1.5% at 1 µg N/m³	HNO_3: 0.01 NO_3: 0.01		0.002 mg N/l
Italy, EU* (IT04)		0.024	CoV: 1.2%	0.011 mg N/l
Latvia		HNO_3, NO_3: 0.01	RSD: HNO_3 1.2%, NO_3 2.9%	HNO_3: 0.006 mg N/l NO_3: 0.015 mg N/l
Lithuania		0.014	RSD 0.5-1.2% at c=0.3-1.0 µg N/m³	0.013 mg N/l
Norway	M.MAD 0.012 at <1.6 µg N/m³	0.02		0.01 µg N/m³
Poland*		0.02		0.01 mg N/l
PL05	M.MAD: 0.11; CoV: 16.9%	0.2	RSD: 2%	0.05 mg N/l
Russia*	NO_3: M.MAD 0.01			0.01 mg/l
Slovakia			HNO_3: CoV 4.4%; NO_3: CoV 4.37%	HNO_3: 0.14 µg N/filter; NO_3: 0.4 µg N/filter
Slovenia		NO_3^-: 0.012 HNO_3: 0.007	RSD: 1.6% (at 0.113 mg N/l)	0.006 mg N/l
Spain* [1]				0.01 µg N/m³
Sweden	uncertainty (95% conf. int.): 12%	NO_3-N: 0.005; HNO_3-N: 0.002		0.006 mg N/l
Switzerland	RSD: 8%	0.04		
Turkey	M.MAD: 0.0803; CoV: 9.13%	NO_3: 0.0390 HNO_3: 0.0748	NO_3: M.MAD: 0.0062; CoV: 4.03% HNO_3: M.MAD: 0.0062; CoV: 18.49%	NO_3: 0.0423 mg N/l HNO_3: 0.0528 mg N/l

[1] From 05.09.2005

*Data from AT, DE, ES, IE, IT and RU are taken from earlier years

Table A5.6: Detection limits and precision of ammonia and ammonium in air.

Country	Measurements		Laboratory	
	Precision	**Detection limit, µg N/m^3**	**Precision**	**Detection limit**
Austria*		NH_3: 0.10 μg/m^3 NH_4: 0.013 μg/m^3	NH_4: M.MAD: 0.03 μg N/m^3, CoV: 4.1% NH_3: M.MAD: 0.01 μg N/m^3, CoV: 1.4%	NH_4^+: 0.01 μg N/m^3 NH_3: 0.01 μg N/m^3
Czech Republic	sNH4: M.MAD: 0.315 μg/m^3 CoV: 12.10% uncertainty: sNH4: 0.16-0.7 μg/m^3: 17% 0.7-4.0 μg/m^3: 11%	NH_4: 0.04 μg/m^3 NH_3^*: 0.05 μg/m^3	NH_4: 0.16-0.7 mg/l: 11% 0.7-4.0 mg/l: 3.2% NH_3: 0.16-0.7 mg/l: 9% 0.7-4.0 mg/l: 3%	NH_4^+: 0.04 mg N/l NH_3: 0.05 mg N/l
Denmark	M.MAD: 0.13 μg N/m^3 CoV: 6.6%	0.04	NH_4: M.MAD: 0.01 μg N/m^3; CoV: 1.0% NH_3: M.MAD: 0.003 μg N/m^3; CoV: 1.0%	NH_4^+: 0.01 μg N/m^3 NH_3: 0.01 μg N/m^3
Finland		0.04	M.MAD: 0.004 μg N/m^3; CoV: 1.5%	0.01 μg/m^3
France*	M.MAD 0.385 μg N/m^3 CoV: 14.5%	0.1		0.02 mg N/l
Germany*	M.MAD < 0.02 µg/m^3			0.01 µg/m^3
Hungary	NH_3: M.MAD: 0.063, CoV: 9.60 NH_4: M.MAD: 0.115, CoV: 5.61	NH_3: 0.11 NH_4: 0.02	NH_3: M.MAD: 0.001, CoV: 0.001 NH_4: M.MAD: 0.001, CoV: 0.001	NH_4: 0.004 μg N/m^3
Ireland*				0.08 μg N/m^3
Italy (IT01)	NH_3: RSD: 3.9% at 1 µg N/m^3 NH_4: RSD: 4.2% at 2 µg N/m^3	0.1		0.001 mg N/l
Italy, EU* (IT04)		0.17	CoV: 2.4%	0.074 mg N/l
Latvia		NH_3: 0.10 NH_4: 0.09	RSD: NH_4: 4%; NH_3: 2%	NH_4; 0.03 mg N/l NH_3: 0.02 mg N/l
Lithuania		0.027	RSD: 4.0% at c<1.0 μg N/m^3 RSD 0.6-1.8% at c>1.0 μg N/m^3	0.04 mg N/l
Netherlands*	NH_3: RSD: <2%	NH_3: 0.1	NH_4, SD: 0.05 μg/m^3	NH_4: 0.2 μg/m^3
Norway				0.05-0.1 μg N/m^3
Poland*		0.06		0.03 mg N/l
PL05	M.MAD: 0.24; CoV: 20.8%	0.03	RSD: 1.64%	0.01 mg N/l
Russia*	NH_4: RU01: M.MAD 0.05; CoV=5.37% NH_4: RU16: M.MAD 0.03; CoV=5.13% NH_4: RU18: M.MAD 0.01; CoV=0.84%		NH_4: M.MAD: 0.01 μg/m^3 CoV: 3.39 μg/m^3	NH_4: 0.02 mg/l
Slovakia				NH_3-N: 0.06 mg/l; NH_4-N: 0.06 mg/l
Slovenia		NH_4^+: 0.06 NH_3: 0.06	RSD: 2.0% (at 0.298 mg N/L)	0.018 mg N/l
Spain* [1]		0.03	2.68 %	0.01 μg N/m^3
Sweden	uncertainty (95% conf. int.): 13%	NH_3-N: 0.03; NH_4-N: 0.02		0.02 mg N/l
Switzerland	RSD: 7%	0.2		
Turkey		NH_4: 0.0935 μg N/m^3 NH_3: 0.0717 μg N/m^3	NH_4: M.MAD: 0.0142; CoV: 3.79% NH_3: M.MAD: 0.0224; CoV: 6.42%	NH_4: 0.0339 mg N/l NH_3: 0.0438 mg N/l

[1] From 05.09.2005

*Data from AT, DE, ES, FR, IE, IT, NL, PL and RU are taken from earlier years

Table A5.7: Detection limits and precision of calcium in air.

Country	Measurements		Laboratory	
	Precision	Detection limit, µg/m^3	Precision	Detection limit
Latvia		0.05	4% CoV	0.02 mg/l
Norway				0.02 µg/m^3
Slovakia				0.11 mg/l
Spain				0.02*

* From 05.09.2005

Table A5.8: Detection limits and precision of chloride in air.

Country	Measurements		Laboratory	
	Precision	Detection limit, µg/m^3	Precision	Detection limit
Latvia		0.13	4.4% CoV	0.07 mg/l
Norway				0.02 µg/m^3
Spain				0.07*

* From 05.09.2005

Table A5.9: Detection limits and precision of magnesium in air.

Country	Measurements		Laboratory	
	Precision	Detection limit, µg/m^3	Precision	Detection limit
Latvia		0.02	4% CoV	0.02 mg/l
Norway				0.02 µg/m^3
Slovakia				0.04 mg/l

Table A5.10: Detection limits and precision of potassium in air.

Country	Measurements		Laboratory	
	Precision	Detection limit, µg/m^3	Precision	Detection limit
Latvia		0.09	3.3% CoV	0.02 mg/l
Norway				0.02 µg/m^3
Slovakia				0.06 mg/l
Spain				0.01*

* From 05.09.2005

Table A5.11: Detection limits and precision of sodium in air.

Country	Measurements		Laboratory	
	Precision	Detection limit, µg/m^3	Precision	Detection limit
Denmark		0.06 µg/m^3	M.MAD: 0.001 µg/m^3 CoV: 2.5%	0.03 µg/m^3
Latvia		0.04	3% CoV	0.03 mg/l
Norway				0.02 µg/m^3
Slovakia				0.05 mg/l
Spain				0.04*

* From 05.09.2005

Table A5.12: Detection limits and precision of sulphate in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, mg S/l	Precision	Detection limit, mg S/l
Austria*		0.012	RSD: 0.92%	0.002
Belarus*				0.100
Belgium		0.017		0.017
Czech Republic	CoV: 5.5% M.MAD: 0.153 mg/l	0.013	Uncertainty: SO_4^{2-}: 5%	0.013
Denmark			M.MAD: 0.01 mg S/l; CoV: 1.9%	0.04
Estonia*		0.347		0.221
Finland			M.MAD: 0.006 mg S/l; CoV: 2.0%	0.02
France*			at c<0.2 mg S/l: RSD = 5-10% at 0.2<c<0.5 mg S/l: RSD = 3-5% at 0.5<c<5 mg S/l: RSD = 1-3%	0.02
Germany*				0.01
Hungary	CoV: 2.03% M.MAD: 0.063 mg/l		M.MAD=0.019; CoV=1.25%	ca. 0.03*
Iceland		0.1	RSD: 4% at 1 mg S/l	0.05
Ireland*				0.02
Italy (IT01)	RSD: 1.1% at 1 mg S/l	0.01	RSD: 0.8% at 0.5 mg S/l RSD: 1.6% at 0.05 mg S/l	0.002
Italy, EU* (IT04)			CoV: 1.3%	0.004
Latvia		0.03	CoV: 3.9%	0.012
Lithuania			RSD: 3.4% at c<0.5 mg S/l RSD: 1.0% at c>0.5 mg S/l	0.02
Netherlands*			SD: 0.2	0.07
Norway	M.MAD: 0.03, CoV: 7%		SD: 0.041 at c=2.23 mgS/l SD: 0.019 at c=0.85 mgS/l	0.01
Poland*			RSD: 1% at 6.7 mg S/l RSD: 1.8% at 0.67 mg S/l RSD: 2% at 0.33 mgS/l	0.03
PL05	M.MAD: 0.03; CoV: 2.7%	0.1	M.MAD: 0.01; CoV: 2.0%	0.09
Portugal*			0.75%	0.04
Russia*	RU01: M.MAD: 0.02; CoV: 4.6% RU16: M.MAD: 0.02; CoV: 0.05% RU18: M.MAD: 0.01; CoV: 0.75%		CoV: 0.78%	0.02
Serbia and Montenegro				0.15
Slovakia			CoV: 7.8%	0.017
Slovenia		0.12	RSD: 4.2% (at 0.334 mg S/l)	0.044
Spain*			CoV: 1.4 %	0.07
Sweden	uncertainty (95% conf. int.): 5%)	0.005		0.005
Switzerland	M.MAD: 0.01 mg S/l			0.01
Turkey			M.MAD: 0.017; CoV: 1.54%	0.031
UK*			1%	0.01

*Data from AT, BY, DE, EE, ES, FR, IE, IT, NL, PL, PT, RU and UK are taken from earlier years

Table A5.13: Detection limits and precision of nitrate in precipitation.

Country	Measurements		Laboratory	
	Precision	**Detection limit mg N/l**	**Precision**	**Detection limit mg N/l**
Austria*		0.013	RSD: 0.7%	0.001
Belarus*				0.100
Belgium		0.014		0.014
Czech Republic	CoV: 5.4% M.MAD: 0.155 mg/l	0.009	NO_3^-: uncertainty: 7%	0.009
Denmark			M.MAD: 0.01 mg N/l; CoV: 1.6%	0.01
Estonia*		0.302		0.167
Finland			M.MAD: 0.003 mg N/l; CoV: 1.5%	0.01
France*			at c<0.2 mg N/l: RSD = 5-10% at 0.2<c<0.5 mg N/l: RSD = 3-5% at 0.5<c<5 mg N/l: RSD = 1-3%	0.02
Germany*				0.01
Hungary	CoV: 5.81% M.MAD: 0.147 mg/l		M.MAD=0.003; CoV=0.25%	ca. 0.03*
Iceland		0.1	RSD: 7% at 1 mg N/l	0.01
Ireland*				0.01
Italy (IT01)	RSD: 1.4% at 1 mg N/l	0.01	RSD: 0.7% at 0.5 mg N/l RSD: 1.5% at 0.05 mg N/l	0.002
Italy, EU* (IT04)			CoV: 1.2%	0.011
Latvia		0.05	CoV: 1.9%	0.0052
Lithuania			RSD: 5.1% at c<0.5 mg N/l RSD: 1.8% at c>0.5 mg N/l	0.013
Netherlands*			SD: 0.01	0.06
Norway	M.MAD: 0.03, CoV: 8%		SD: 0.023 at c=0.86 mg N/ml SD: 0.016 at c=0.39 mg N/ml	0.01
Poland*			RSD: 1.7% at 4.5 mg N/l RSD: 1.9% at 0.45 mg N/l RSD: 2.0% at 0.23 mg N/l	0.015
PL05	M.MAD: 0.02; CoV: 4.3%	0.09	M.MAD: 0.02; CoV: 5.9%	0.09
Portugal*			0.25%	0.02
Russia*	RU16: M.MAD: 0.01			0.01
Serbia and Montenegro				0.05
Slovakia			CoV: 7.3%	0.01
Slovenia		0.02	RSD: 1.6% (at 0.113 mg N/l)	0.006
Spain*			CoV: 1.2%	0.08
Sweden	uncertainty (95% conf. int.): 6%	0.006		0.006
Switzerland	M.MAD: 0.01 mg N/l			0.01
Turkey			M.MAD: 0.007; CoV: 1.53%	0.035
UK*			1%	0.01

*Data from AT, BY, DE, EE, ES, FR, IE, IT, NL, PL, PT, RU and UK are taken from earlier years

Table A5.14: Detection limits and precision of ammonium in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, mg N/l	Precision	Detection limit, mg N/l
Austria*		0.02	RSD 2.98%	0.007
Belarus*				0.050
Belgium		0.016		0.016
Czech Republic	CoV: 11.4% M.MAD: 0.169 mg/l	0.014	uncertainty: N: ≤0.09 mg/l: ≥42% 0.09 mg/l: 42% 0.8 mg/l: 5% 3.0 mg/l: 1%	0.014
Denmark			M.MAD: 0.01 mg N/l; CoV: 1.66%	0.02
Estonia*		0.064		0.077
Finland			M.MAD: 0.001 mg N/l; CoV: 0.5%	0.002
France*			at c<0.2 mg N/l: RSD = 5-10% at 0.2<c<0.5 mg N/l: RSD = 3-5% at 0.5<c<5 mg N/l: RSD = 1-3%	0.03
Germany*				0.01
Hungary	CoV: 7.66% M.MAD: 0.062 mg/l		M.MAD=0.002; CoV=0.61%	ca. 0.04*
Ireland*				0.04
Italy (IT01)	RSD: 0.8% at 0.5 mg N/l	0.005	RSD: 0.5% at 0.5 mg N/l RSD: 1.8% at 0.05 mg N/l	0.001
Italy, EU* (IT04)			CoV: 2.4%	0.014
Latvia		0.06	CoV: 1.8%	0.015
Lithuania			RSD: 3.3% at c<1.0 mg N/l RSD: 1.0% at c>1.0 mg N/l	0.04
Netherlands*			SD: 0.01	0.03
Norway	M.MAD: 0.06, CoV: 20%		SD: 0.016 at c=0.64 mg/l SD: 0.013 at c=0.32 mgN/l	0.01
Poland*			RSD: 2.7% at 1 mg/l RSD: 4.6% at 0.1 mg/l	0.03
PL05	M.MAD: 0.04; CoV: 10.9%	0.01	M.MAD: 0.01; CoV: 1.2%	0.01
Portugal*			0.79%	0.03
Russia*	RU18: M.MAD: 0.01; CoV: 0.85%		CoV: 2.24%; M.MAD: 0.02	0.02
Serbia and Montenegro				0.01
Slovakia			CoV: 6.89%	0.01
Slovenia		0.08	RSD: 2.0% (at 0.298 mg N/l)	0.018
Spain*			CoV: 2.7%	0.08
Sweden	uncertainty (95% conf. int.): 5% (0.01-1 mg/l) uncertainty (95% conf. int.): 2% (1-10 mg/l)	0.02		0.02
Switzerland	M.MAD: 0.02 mg N/l			0.01
Turkey			M.MAD: 0.017; CoV: 3.81%	0.034
UK*			1%	0.01

*Data from AT, BY, DE, EE, ES, FR, IE, IT, NL, PL, PT, RU and UK are taken from earlier years

Table A5.15: Detection limits and precision of calcium in precipitation.

	Measurements		Laboratory	
Country	**Precision**	**Detection limit, mg/l**	**Precision**	**Detection limit, mg/l**
Austria*		0.34	RSD: 2.02%	0.003
Belarus*				0.001
Belgium		0.020		0.020
Czech Republic	CoV: 13.5% M.MAD: 0.107 mg/l	0.033	RSD:5.0% uncertainty: 11%	0.033
Denmark			M.MAD: 0.01 mg/l; CoV: 3.1%	0.03
Estonia*		0.407		0.382
Finland			M.MAD: 0.001 mg/l; CoV: 2.2%	0.005
France*			at c<0.2 mg/l: RSD = 10-20% at 0.2<c<0.5 mg/l: RSD = 5-10% at 0.5<c<5 mg/l: RSD = 1-5%	0.02
Germany*				0.01
Hungary	CoV: 6.62% M.MAD: 0.068 mg/l		M.MAD: 0.008; CoV: 3.83%	ca. 0.01*
Iceland		0.1	RSD: 1-3% at 1<c<6 mg Ca/l	0.02
Ireland*				0.05
Italy (IT01)	RSD: 1.8% at 1 mg Ca/l	0.01	RSD: 1.2% at 0.5 mg Ca/l RSD: 3.6% at 0.05 mg Ca/l	0.002
Italy, EU* (IT04)			CoV: 16%	0.014
Latvia		0.24	CoV: 4.0%	0.02
Lithuania			RSD: 5.5% at c<0.2 mg Ca/l RSD: 1.5% at c>0.2 mg Ca/l	0.02
Netherlands*			SD: 0.01	0.06
Norway	M.MAD: 0.03; CoV: 59%		SD: 0.010 at c=0.27 mg/l SD: 0.006 at c=0.15 mg/l	0.01
Poland*			RSD: 0.9% at 2 mg/l RSD: 1.8% at 0.8 mg/l RSD: 2.1% at 0.4 mg/l	0.03
PL05	M.MAD: 0.03; CoV: 8%	0.001	M.MAD: 0.003; CoV: 1.8%	0.001
Portugal*			1.31%	0.06
Russia*	RU01: M.MAD: 0.04; CoV: 13.5% RU13: M.MAD: 0.04; CoV: 5.2% RU16: M.MAD: 0.02; CoV: 1.18% RU18: M.MAD: 0.05; CoV: 7.01%		CoV: 5.88%; M.MAD: 0.03	0.04
Serbia and Montenegro				0.05
Slovakia			CoV: 8.64%	0.03
Slovenia		0.18	RSD: 7.5% (at 0.300 mg/l)	0.07
Spain*			CoV: 7.4%	0.04
Sweden	uncertainty (95% conf. int.): 31%	0.05		0.05
Switzerland	M.MAD: 0.02 mg/l			0.05
Turkey			M.MAD: 0.007; CoV: 0.60%	0.055
UK*			1%	0.02

*Data from AT, BY, DE, EE, ES, FR, IE, IT, NL, PL, PT, RU and UK are taken from earlier years

Table A5.16: Detection limits and precision of potassium in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, mg/l	Precision	Detection limit, mg/l
Austria*		0.014	RSD: 2.85%	0.005
Belarus*				0.050
Belgium		0.010		0.010
Czech Republic	CoV: 10.4% M.MAD: 0.015 mg/l	0.007	RSD: 6% uncertainty: 12%	0.007
Denmark			M.MAD: 0.01 mg/l; CoV: 4.0%	0.03
Estonia*		0.095		0.1
Finland			M.MAD: 0.002 mg/l; CoV: 3.5%	0.006
France*			at c<0.2 mg/l: RSD = 10-20% at 0.2<c<0.5 mg/l: RSD = 5-10% at 0.5<c<5 mg/l: RSD = 1-5%	0.02
Germany*				0.01
Hungary	CoV: 5.24% M.MAD: 0.010 mg/l		M.MAD: 0.002; CoV: 2.22%	ca. 0.01*
Iceland		0.1	RSD: 5-10% at 1<c<6 mg K/l	0.4
Ireland*				0.05
Italy (IT01)	RSD: 1.4% at 1 mg K/l	0.01	RSD: 1.5% at 0.5 mg K/l RSD: 3.0% at 0.05 mg K/l	0.03
Italy, EU* (IT04)			CoV: 3.7%	0.005
Latvia		0.07	CoV: 3.3%	0.02
Lithuania			RSD: 8.1% at c<0.5 mg K/l	0.02
Netherlands*			SD: 0.01	0.04
Norway	M.MAD: 0.03; CoV: 59%		SD: 0.027; c=0.61 mg/l SD: 0.015; c=0.20 mg/l	0.01
Poland*			RSD: 1.0% at 0.5 mg/l RSD: 2.9% at 0.1 mg/l RSD: 2.4% at 0.05 mg/l	0.02
PL05	M.MAD: 0.026; CoV: 22.5%	0.003	M.MAD: 0.004; CoV: 6.7%	0.002
Portugal*			1.69%	0.077
Russia*	RU01: M.MAD: 0.01; CoV: 2.41% RU13: M.MAD: 0.03; CoV: 4.15% RU16: M.MAD: 0.04; CoV: 5.01% RU18: M.MAD: 0.04; CoV: 5.1%		CoV: 5.20%; M.MAD: 0.02	0.03
Serbia and Montenegro				0.01
Slovakia			CoV: 7.48%	0.03
Slovenia		0.03	RSD: 6.6% (at 0.100 mg/l)	0.019
Spain*			CoV: 18%	0.05
Sweden	uncertainty (95% conf. int.): 10% (0.08-1 mg/l) 6% (1-15 mg/l)	0.08		0.08
Switzerland	M.MAD: 0.01 mg/l			0.01
Turkey			M.MAD: 0.006; CoV: 2.4%	0.018
UK*			1%	0.02

*Data from AT, BY, DE, EE, ES, FR, IE, IT, NL, PL, PT, RU and UK are taken from earlier years

Table A5.17: Detection limits and precision of chloride in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, mg/l	Precision	Detection limit, mg/l
Austria*		0.034	RSD: 2.65%	0.009
Belarus*				0.050
Belgium		0.030		0.030
Czech Republic	CoV: 14.5% M.MAD: 0.072 mg/l	0.018	Uncertainty: 6%	0.018
Denmark			M.MAD: 0.09 mg/l; CoV: 2.5%	0.05
Estonia*		0.463		0.155
Finland			M.MAD: 0.003 mg/l; CoV: 1.4%	0.01
France*			at c<0.2 mg/l: RSD = 10-20% at 0.2<c<0.5 mg/l: RSD = 5-10% at 0.5<c<5 mg/l: RSD = 1-5%	0.05
Germany*				0.01
Hungary	CoV: 11.51% M.MAD: 0.052 mg/l		M.MAD: 0.032; CoV: 13.17%	ca. 0.1*
Iceland		0.1	RSD: 4% at 1 mg Cl/l	0.1
Ireland*				0.05
Italy (IT01)	RSD: 0.7% at 0.5 mg Cl/l	0.005	RSD: 0.6% at 0.5 mg Cl/l RSD: 1.1% at 0.05 mg Cl/l	0.001
Italy, EU* (IT04)			CoV: 2.1%	0.009
Latvia		0.09	CoV: 4.4%	0.07
Lithuania			RSD: 4.7% at c<0.5 mg Cl/l RSD: 2.3% at c>0.5 mg Cl/l	0.01
Netherlands*			SD: 0.04	0.18
Norway	M.MAD: 0.16, CoV: 22%		SD: 0.028 at c=1.16 mg/l SD: 0.02 at c=0.46 mg/l	0.01
Poland*			RSD: 1.9% at 10 mg/l RSD: 2% at 1 mg/l RSD: 2.6% at 0.5 mg/l	0.02
PL05	M.MAD: 0.12; CoV: 24.5%	0.06	M.MAD: 0.02; CoV: 5.6%	0.06
Portugal*			0.53%	0.03
Russia*	RU01: M.MAD: 030; CoV: 2.70% RU13: M.MAD: 0.04; CoV: 2.15% RU16: M.MAD: 0.05; CoV: 3.12% RU18: M.MAD: 0.04; CoV: 4.10%			0.03
Serbia and Montenegro				0.04
Slovakia			CoV: 7.63%	0.04
Slovenia		0.05	RSD: 3.1% (at 0.500 mg/l)	0.05
Spain*			CoV: 4.9%	0.31
Sweden	uncertainty (95% conf. int.): 8% (0.05-1 mg/l) uncertainty (95% conf. int.): 5% (1-32 mg/l)	0.05		0.05
Switzerland	M.MAD: 0.02 mg/l			0.03
Turkey			M.MAD: 0.069; CoV: 7.9%	0.059
UK*			1%	0.02

*Data from AT, BY, DE, EE, ES, FR, IE, IT, NL, PL, PT, RU and UK are taken from earlier years

Table A5.18: Detection limits and precision of magnesium in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, mg/l	Precision	Detection limit, mg/l
Austria*		0.023	RSD: 1.34%	0.002
Belarus*				0.001
Belgium		0.010		0.010
Czech Republic	CoV: 10.6% M.MAD: 0.015 mg/l	0.001	RSD: 3% uncertainty: 7%	0.001
Denmark			M.MAD: 0.02 mg/l; CoV: 6.8%	0.02
Estonia*		0.077		0.089
Finland			M.MAD: 0.001 mg/l; CoV: 2.1%	0.003
France*			at c<0.2 mg/l: RSD = 10-20% at 0.2<c<0.5 mg/l: RSD = 5-10% at 0.5<c<5 mg/l: RSD = 1-5%	0.02
Germany*				0.01
Hungary	CoV: 3.47% M.MAD: 0.010 mg/l		M.MAD: 0.004; CoV: 6.85%	ca. 0.01*
Iceland		0.1	RSD: 1-3% at 1<c<6 mg Mg/l	0.005
Ireland*				0.05
Italy (IT01)	RSD: 1.1% at 0.5 mg Mg/l	0.005	RSD: 0.8% at 0.5 mg Mg/l RSD: 3.2% at 0.05 mg Mg/l	0.001
Italy, EU* (IT04)			CoV: 2.2%	0.002
Latvia		0.04	CoV: 4.0%	0.020
Netherlands*			SD: 0.01	0.02
Norway	M.MAD: 0.01, CoV: 30%		SD: 0.012 at c=0.31 mg/l SD: 0.007; c=0.19 mg/l	0.01
Poland*			RSD: 1.0% at 0.25mg/l RSD: 1.0% at 0.1 mg/l RSD: 2.4% at 0.025 mg/l	0.007
PL05	M.MAD: 0.004; CoV: 13.4%	0.001	M.MAD: 0.001; CoV: 2.9%	0.0001
Portugal*			0.60%	0.03
Russia*	RU01: M.MAD: 0.01 RU13: CoV: 1.84% RU18: M.MAD: 0.03; CoV: 0.64%		CoV: 8.17%; M.MAD: 0.09	0.001
Serbia and Montenegro				0.005
Slovakia			CoV: 8.12%	0.01
Slovenia		0.03	RSD: 8.6% (at 0.100 mg/l)	0.02
Spain*			CoV: 7.2%	0.02
Sweden	uncertainty (95% conf. int.): 18%	0.03		0.03
Switzerland	M.MAD: 0.01 mg/l			0.003
Turkey			M.MAD: 0.002; CoV: 1.03%	0.0074
UK*			1%	0.01

*Data from AT, BY, DE, EE, ES, FR, IE, IT, NL, PL, PT, RU and UK are taken from earlier years

Table A5.19: Detection limits and precision of sodium in precipitation.

Country	Measurements		Laboratory	
	Precision	**Detection limit, mg/l**	**Precision**	**Detection limit, mg/l**
Austria*		0.030	RSD: 1.8%	0.003
Belarus*				0.050
Belgium		0.050		
Czech Republic	CoV: 15.5% M.MAD: 0.019 mg/l	0.004	RSD: 3% uncertainty: 6%	0.004
Denmark		DK03: 0.09 $\mu g/m^3$ DK05: 0.14 $\mu g/m^3$ DK08: 0.09 $\mu g/m^3$	M.MAD: 0.10 mg/l; CoV: 2.5%	0.04
Estonia*		0.095		0.1
Finland			M.MAD: 0.001 mg/l; CoV: 0.9%	0.002
France*			at c<0.2 mg/l: RSD = 10-20% at 0.2<c<0.5 mg/l: RSD = 5-10% at 0.5<c<5 mg/l: RSD = 1-5%	0.02
Germany*				0.01
Hungary	CoV: 10.65% M.MAD: 0.073 mg/l		M.MAD: 0.010 mg/l; CoV: 4.71%	ca. 0.01*
Iceland		0.1	RSD: 1-3% at 1<c<6 mg Na/l	0.01
Ireland*				0.05
Italy (IT01)	RSD: 0.9% at 0.5 mg Na/l	0.005	RSD: 1.3% at 0.5 mg Na/l RSD: 2.0% at 0.05 mg Na/l	0.001
Italy, EU* (IT04)			CoV: 2.1%	0.011
Latvia		0.08	CoV: 3.0%	0.03
Lithuania			RSD: 2.4-5.7%	0.02
Netherlands*			SD: 0.01	0.05
Norway	M.MAD: 0.09, CoV: 22%		SD: 0.025 at c=0.75 mg/l SD: 0.011 at c=0.30 mg/l	0.01
Poland*			RSD: 0.8% at 1 mg/l RSD: 1.4% at 0.4 mg/l RSD: 2.3% at 0.2 mg/l	0.02
PL05	M.MAD: 0.023; CoV: 14.6%	0.002	M.MAD: 0.004; CoV: 4.6%	0.0005
Portugal*			0.54%	0.025
Russia*	RU01: M.MAD: 0.02; CoV: 3.71% RU13: M.MAD: 0.03; CoV: 2.10% RU16: M.MAD: 0.02; CoV: 0.75% RU18: M.MAD: 0.03; CoV: 3.12%		CoV: 0.45%	0.01
Serbia and Montenegro				0.02
Slovakia			CoV: 8.25%	0.04
Slovenia		0.087	RSD: 2.8% (at 0.200 mg/l)	0.017
Spain*			CoV: 14%	0.1
Sweden	uncertainty (95% conf. int.): 9%	0.12		0.12
Switzerland	M.MAD: 0.02 mg/l			0.01
Turkey			M.MAD: 0.013; CoV: 1.79%	0.067
UK*			1%	0.01

*Data from AT, BY, DE, EE, ES, FR, IE, IT, NL, PL, PT, RU and UK are taken from earlier years

Table A5.20: Detection limits and precision of arsenic in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, µg/l	Precision	Detection limit, µg/l
Belgium		0.25		0.50
Estonia		0.2		
Finland			M.MAD: 0.008 µg/l; CoV: 10.5%	0.006
Germany				0.004
Iceland				0.1
Latvia			CoV: 5.5%	1.2
Lithuania			SD: 0.02	0.05
Netherlands			SD: 0.02	0.06
Norway*				0.01
Poland PL05			7.5%	0.05
Slovakia			CoV: 1.62%	0.04
Spain				1.50
Sweden*				0.1
UK				0.04 mg/l

* NILU is analysing these samplers. Given as lower quantification limit.

Table A5.21: Detection limits and precision of cadmium in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, µg/l	Precision	Detection limit, µg/l
Belgium		0.025		0.050
Czech Republic	CoV: 2.32% M.MAD: 0.021 µg/l	0.01	RSD: 7% uncertainty: 14%	0.01
Estonia		0.01		
Finland			M.MAD: 0.002 µg/l CoV: 3.0%	0.002
Germany				0.003
Iceland				0.005
Latvia			CoV: 5.7%	0.04
Lithuania			SD: 0.002	0.006
Netherlands			SD: 0.002	0.01
Norway*				0.1
Poland PL05			8.2%	0.001
Slovakia			CoV: 1.57%	0.03
Spain				0.15
Sweden*				0.1
UK				0.04 mg/l

* NILU is analysing these samplers. Given as lower quantification limit.

Table A5.22: Detection limits and precision of chromium in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, µg/l	Precision	Detection limit, µg/l
Belgium		0.25		0.50
Finland			M.MAD: 0.04 µg/l; CoV: 21.8%	0.02
Germany				0.01
Iceland				0.2
Lithuania			SD: 0.05	0.2
Netherlands			SD: 0.08	0.3
Norway*				0.5
Poland PL05				0.02
Slovakia			CoV: 1.49%	0.04
Spain				1.15
Sweden*				0.5
UK				0.008 mg/l

* NILU is analysing these samplers. Given as lower quantification limit.

Table A5.23: Detection limits and precision of copper in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, µg/l	Precision	Detection limit, µg/l
Belgium		0.50		1.00
Estonia		26		
Finland			M.MAD: 0.057 µg/l; CoV: 4.7%	0.05
Germany				0.01
Iceland				0.1
Latvia			CoV: 4.6%	0.4
Lithuania			SD: 0.1	0.3
Netherlands			SD: 0.05	0.2
Norway*				0.5
Poland PL05				0.01
Slovakia			CoV: 2.06%	0.2
Spain				0.42
Sweden*				0.5
UK				0.003 mg/l

* NILU is analysing these samplers. Given as lower quantification limit.

Table A5.24: Detection limits and precision of iron in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, µg/l	Precision	Detection limit, µg/l
Belgium		7.5		15
Czech Republic	CoV: 1.02%, M.MAD : 0.012mg/l	6	RSD: 7% uncertainty: 15%	6
Finland			M.MAD: 3.21 µg/l CoV: 9.6%	1.5
Germany				0.5
Iceland				10
Netherlands			SD: 3	13

Table A5.25: Detection limits and precision of manganese in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, µg/l	Precision	Detection limit, µg/l
Belgium		0.375		0.75
Czech Republic	CoV: 10.75% M.MAD: 0.839 µg/l	0.4	RSD: 6% uncertainty: 12%	0.4
Finland			M.MAD: 0.073 µg/l CoV: 3.4%	0.005
Iceland				0.1
Latvia			CoV: 6.0%	10
Sweden*				0.5

* NILU is analysing these samplers. Given as lower quantification limit.

Table A5.26: Detection limits and precision of nickel in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, µg/l	Precision	Detection limit, µg/l
Belgium		0.25		0.50
Czech Republic	CoV: 9.12% M.MAD: 0.210 µg/l	0.6	RSD: 8% uncertainty: 16%	0.6
Finland			M.MAD: 0.04 µg/l CoV: 15.5%	0.02
Germany				0.2
Iceland				0.2
Latvia			CoV: 5.0%	0.9
Lithuania			SD: 0.1	0.3
Netherlands			SD: 0.05	0.06
Norway*				0.5
Poland PL05				0.03
Slovakia			CoV: 2.13%	0.1
Spain				3.57
Sweden*				0.5
UK				0.009 mg/l

* NILU is analysing these samplers. Given as lower quantification limit.

Table A5.27: Detection limits and precision of lead in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, µg/l	Precision	Detection limit, µg/l
Belgium		0.25		0.50
Czech Republic	CoV: 10.73% M.MAD: 0.325 µg/l	0.5	RSD: 8% uncertainty: 15%	0.5
Estonia		0.6		
Finland			M.MAD: 0.049 µg/l CoV: 3.7%	0.03
Germany				0.002
Iceland				0.01
Latvia			CoV: 5.0%	0.9
Lithuania			SD: 0.03	0.09
Netherlands			SD: 0.02	0.06
Norway*				0.1
Poland PL05				0.03
Slovakia			CoV: 1.75%	0.2
Spain				2.07
Sweden*				0.1
UK				0.002 mg/l

* NILU is analysing these samplers. Given as lower quantification limit.

Table A5.28: Detection limits and precision of zinc in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, µg/l	Precision	Detection limit, µg/l
Belgium		5		10
Czech Republic	CoV: 8.92% M.MAD: 0.002 mg/l	3	RSD: 6% uncertainty: 11%	3
Finland			M.MAD: 0.183 µg/l CoV: 3.1%	0.03
Germany				0.2
Iceland				0.1
Latvia			CoV: 6.0%	10
Lithuania			SD: 0.3	1.0
Netherlands			SD: 0.5	1.9
Norway*				0.5
Poland PL05	M.MAD: 2.0 µg Zn/l; CoV: 24%	0.2	M.MAD: 0.2; CoV 2%	0.05
Slovakia			CoV: 1.57%	1.7
Spain				0.16
Sweden*				0.5
UK				0.1 mg/l

* NILU is analysing these samplers. Given as lower quantification limit.

Table A5.29: Detection limits and precision of vanadium (V) in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, ng/m^3	Precision	Detection limit
Finland				0.003
Iceland				0.01 µg/l
Norway*				0.5
Sweden*				0.5

* NILU is analysing these samplers. Given as lower quantification limit.

Table A5.30: Detection limits and precision of cobalt (Co) in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, ng/m^3	Precision	Detection limit
Finland				0.002
Norway*				0.1
Sweden*				0.1

* NILU is analysing these samplers. Given as lower quantification limit.

Table A5.31: Detection limits and precision of aluminium (Al) in precipitation.

Country	Measurements		Laboratory	
	Precision	Detection limit, ng/m^3	Precision	Detection limit
Finland				0.4 µg/l

Table A5.32: Detection limits and precision of arsenic in air.

Country	Measurements		Laboratory	
	Precision	Detection limit, ng/m^3	Precision	Detection limit
Belgium		0.17		0.35 ng/m^3
Czech Republic	CoV: 8.56% M.MAD: 0.052 ng/m^3	0.02	ana RSD: 10% (unc_analysis) (exp) uncertainty: 20%	0.107 μg/l
Denmark		1		
Finland***				0.0001 ng/m^3
Germany				0.004 μg/l
Iceland		0.002		
Latvia		0.06	CoV: 3.0%	1.7 μg/l
Lithuania			SD: 0.3	1 ng/m^3
Netherlands			0.04	0.2 ng/m^3
Norway**				0.04 ng/m^3
Poland PL05		0.1		0.08 μg/filter
Slovakia			CoV: 3.59%	4.7 ng/filter
Slovenia				0.05 μg/filter
Spain*				0.1
Sweden**				0.03 ng/m^3

* From 05.09.2005 (only ES09)
** NILU is analysing the samplers, lower quantification limit given.
*** Sampling volume 400 m^3

Table A5.33: Detection limits and precision of cadmium in air.

Country	Measurements		Laboratory	
	Precision	Detection limit, ng/m^3	Precision	Detection limit
Belgium		0.02		0.03 ng/m^3
Czech Republic	CoV: 15.1% M.MAD: 0.021 ng/m^3	0.005	ana RSD: 10% exp ana uncertainty: 20%	0.022 μg/l
Denmark		2		
Finland***				0.002 ng/m^3
Germany				0.003 μg/l
Iceland		0.004		
Lativia		0.02	CoV: 2.0%	0.30 μg/l
Lithuania			SD: 0.01	0.03 ng/m^3
Netherlands			0.01	0.04 ng/m^3
Norway**				0.004 ng/m^3
Poland PL05		0.1		0.1 μg/filter
Slovakia			CoV: 1.51%	1.0 ng/filter
Slovenia				0.025 ng/m^3
Spain*				0.02 ng/m^3
Sweden**				0.025 μg/m^3

* From 05.09.2005 (only ES09)
** NILU is analysing the samplers, lower quantification limit given.
*** Sampling volume 400 m^3

Table A5.34: Detection limits and precision of chromium in air.

Country	Measurements		Laboratory	
	Precision	Detection limit, ng/m^3	Precision	Detection limit
Belgium		0.417		0.35 ng/m^3
Denmark		3		
Finland**				0.002 ng/m^3
Iceland		0.085		
Norway				0.2-1 ng/m^3
Poland PL05		1		0.75 µg/filter
Slovakia			CoV: 1.41%	8 ng/filter
Spain*				1.55

* From 05.09.2005 (only ES09)
** Sampling volume 400 m^3

Table A5.35: Detection limits and precision of copper in air.

Country	Measurements		Laboratory	
	Precision	Detection limit, ng/m^3	Precision	Detection limit
Belgium		0.35		0.69 ng/m^3
Czech Republic	comb. uncertainty: 26%	0.04	exp ana uncertainty: 10%	0.195 µg/l
Denmark		0.5		
Finland**				0.002 ng/m^3
Germany				0.01 µg/l
Iceland		0.009		
Latvia		0.17	CoV: 1.5%	4.0 µg/l
Lithuania			SD: 0.01	0.5 ng/m^3
Norway				0.2 ng/m^3
Poland PL05		1		0.80 µg/filter
Slovakia			CoV: 2.61%	4 ng/filter
Spain*				0.18 ng/m^3

* From 05.09.2005 (only ES09)
** Sampling volume 400 m^3

Table A5.36: Detection limits and precision of manganese in air.

Country	Measurements		Laboratory	
	Precision	Detection limit, ng/m^3	Precision	Detection limit
Belgium		0.417		0.35 ng/m^3
Czech Republic	comb uncertainty: 14%	0.015	exp ana uncertainty: 20%	0.076 µg/l
Denmark		1		
Finland*				0.001 ng/m^3
Germany				0.002 µg/l
Iceland		0.021		
Latvia		0.29	CoV: 2.0%	11.0 µg/l
Norway				0.01 ng/m^3

* Sampling volume 400 m^3

Table A5.37: Detection limits and precision of nickel in air.

Country	Measurements		Laboratory	
	Precision	Detection limit, ng/m^3	Precision	Detection limit
Belgium		0.17		0.35 ng/m^3
Czech Republic	ana uncertainty: 23%	0.01	comb. uncertainty: 46%	0.481 µg/l
Denmark		0.5		
Finland***				0.001 ng/m^3
Germany				0.01 µg/l
Iceland		0.016		
Latvia		0.11	CoV: 4.0%	5.3 µg/l
Lithuania			SD: 0.2	0.8 ng/m^3
Norway**				0.09 ng/m^3
Poland PL05		1		0.72 µg/filter
Slovakia			CoV: 1.90%	10 ng/filter
Slovenia				0.1 µg/filter
Spain*				0.83
Sweden**				0.09 ng/m^3

* From 05.09.2005 (only ES09)
** NILU is analysing the samplers, lower quantification limit given.
*** Sampling volume 400 m^3

Table A5.38: Detection limits and precision of lead in air.

Country	Measurements		Laboratory	
	Precision	Detection limit, ng/m^3	Precision	Detection limit
Belgium		0.17		0.35 ng/m^3
Czech Republic	CoV: 9.01% M.MAD: 0.734 ng/m^3	0.01	ana RSD: 3% exp ana uncertainty: 6%	0.05 µg/l
Denmark		1		
Finland***				0.002 ng/m^3
Germany				0.002 µg/l
Iceland		0.044		
Latvia		0.08	CoV: 2.0%	2.0 µg/l
Lithuania			SD: 0.1	0.5 ng/m^3
Netherlands			0.06	0.2 ng/m^3
Norway				0.1 ng/m^3
Poland PL05		0.4		0.28 µg/filter
Slovakia			CoV: 2.29%	3 ng/filter
Slovenia				1.0 µg/filter
Spain*				0.19 ng/m^3
Sweden**				0.1 ng/m^3

* From 05.09.2005 (only ES09)
** NILU is analysing the samplers, lower quantification limit given.
*** Sampling volume 400 m^3

Table A5.39: Detection limits and precision of zinc in air.

Country	Measurements		Laboratory	
	Precision	**Detection limit, ng/m^3**	**Precision**	**Detection limit**
Belgium		3.5		6.9 ng/m^3
Denmark		0.3		
Finland**				0.002 ng/m^3
Iceland		0.19		
Latvia		0.77	CoV: 3.5%	20 µg/l
Lithuania			SD: 0.6	2 ng/m^3
Netherlands			3.6	15 ng/m^3
Norway				0.2 ng/m^3
Poland PL05				
Slovakia			CoV: 1.69%	70 ng/filter
Spain*				5.28

* From 05.09.2005 (only ES09)
** Sampling volume 400 m^3

Table A5.40: Detection limits and precision of aluminium in air.

Country	Measurements		Laboratory	
	Precision	**Detection limit, ng/m^3**	**Precision**	**Detection limit**
Finland*				0.04 ng/m^3

* Sampling volume 400 m^3

Table A5.41: Detection limits and precision of cobalt in air.

Country	Measurements		Laboratory	
	Precision	**Detection limit, ng/m^3**	**Precision**	**Detection limit**
Finland*				0.02 ng/m^3

* Sampling volume 400 m^3

Table A5.42: Detection limits and precision of iron in air.

Country	Measurements		Laboratory	
	Precision	**Detection limit, ng/m^3**	**Precision**	**Detection limit**
Finland*				0.01 ng/m^3
Iceland				0.90 ng/m^3

* Sampling volume 400 m^3

Table A5.43: Detection limits and precision of vanadium in air.

Country	Measurements		Laboratory	
	Precision	**Detection limit, ng/m^3**	**Precision**	**Detection limit**
Finland*				0.1 ng/m^3
Iceland				0.04 ng/m^3

* Sampling volume 400 m^3

Table A5.44: Detection limits and precision of measurements of particulate matter.

Country	**Precision**	**Detection limit**
Belgium	No measurements since 2003	
Czech Republic	1 $\mu g/m^3$	5 $\mu g/m^3$
Germany (PM_{10})		1 $\mu g/m^3$
Italy IT01 (PM_{10})	2.00%	2 $\mu g/m^3$
Lithuania ($PM_{2.5}$)	1 $\mu g/m^3$	3 $\mu g/m^3$
Netherlands		10 $\mu g/m^3$
Norway (PM_{10})	RSD: 5%	0.2 $\mu g/m^3$
Poland PL05 (PM_{10})		1 $\mu g/m^3$
Slovakia (TSP)	CoV: 0.24% and 0.16%	0.06 mg/filter
Slovenia (PM_{10} and $PM_{2.5}$)		1 $\mu g/m^3$
Spain (PM_{10} and $PM_{2.5}$)	2.00%	1 $\mu g/m^3$
Sweden (PM_{10}, hr mean)	Uncertainty (95% conf. int.): 14%	3 $\mu g/m^3$
Switzerland ($PM_{10}/PM_{2.5}/PM_1$)	Uncertainty (95% conf. int.): 10%	1 $\mu g/m^3$
UK	4 $\mu g\ m^{-3}$	

Table A5.45: Detection limits and precision of volatile organic carbons, VOC.

Compound	Laboratory detection limit. [ppb]						
	Czech Republic	France	Germany	Finland	Spain	Slovak Republic	UK
VOC (general)		0.01	0.01		0.01	0.01	0.01
Ethane	0.055			0.006			
Ethene	0.020			0.008			
Ethyne	0.041			0.020			
Propane	0.008			0.007			
Propene	0.011			0.010			
Propyne	0.003			0.013			
N-butane	0.003			0.007			
2-methyl propane (i-butane)	0.005			0.008			
2-methyl propene (i-butene)	0.006			0.008			
1-butene	0.009			0.008			
Trans-2-butene	0.004			0.009			
Cis-2-butene	0.008			0.007			
1,3-butadiene	0.009			0.009			
N-pentane	0.003			0.007			
2-methyl butane (i-pentane)	0.008			0.007			
1-pentene							
Trans-2-pentene	0.012			0.011			
Cis-2-pentene	0.009			0.010			
2-methyl pentane	0.003			0.008			
3-methyl pentane	0.012			0.006			
Isoprene	0.006			0.010			
N-hexane	0.011			0.006			
Hexene							
Cyclohexane	0.003			0.006			
N-heptane	0.023			0.005			
Benzene	0.012			0.004			
Methyl benzene (toluene)	0.021						
Ethyl benzene	0.019						
1,3-dimethyl benzene (m-xylene)	0.058						
1,2-dimethyl benzene (o-xylene)	0.013						
1,3,5-trimethyl benzene	0.013						
1,2,4-trimethyl benzene	0.007						
2 and 3-methyl pentane (combined areas)	5.8						
OC in general					0.05 ng/l		
		in ug/m^3					
methanal		0.03					
ethanal		0.025					
propanone		0.03					
propenal		0.03					
propanal		0.03					
MVK		0.025					
butanal+isobutanal		0.04					
benzaldéhyde		0.03					
pentanal+tolualdehyde		0.04					
hexanal		0.03					
glyoxal		0.025					
methylglyoxal		0.03					
methylpropenal		0.025					
ethylmethylketone		0.03					

Table A5.46: Detection limits and precision of persistent organic pollutants (POP).

Compound	Laboratory detection limit						
	Czech Republic pg/m³	Norway pg/m³	UK pg/m³	Iceland ng/period	Latvia pg/m³	Sweden pg/m³	Sweden ng/m²day
PCB 28	1	0.7		0.4 – 0.5		0.05	0.03
PCB 31	1	0.5		0.4			
PCB 52	1	0.2		0.2		0.05	0.03
PCB 101	1	0.06		0.1 – 0.2		0.05	0.03
PCB 105	1	0.01		0.1 – 0.2			
PCB 118	1	0.05		0.2		0.05	0.03
PCB 138	1	0.05		0.2		0.03	0.02
PCB 153	1	0.05		0.2		0.03	0.02
PCB 156	1	0.05		0.1 – 0.2			
PCB 180	1	0.02		0.2		0.03	0.02
alfa-HCH	1	0.1		0.2		0.03	0.02
beta-HCH	1			0.2 – 0.5		0.03	0.02
gamma-HCH	1	0.3		0.2		0.03	0.02
delta-HCH	1						
HCB	1	0.05		0.1			
p,p'-DDE	1	0.05		0.2		0.03	0.02
p,p'-DDD	1	0.05		0.2		0.03	0.02
p,p'-DDT	1	0.05		0.2		0.03	0.02
o,p'-DDT				0.2			
Hexachlorbenzene	1	0.05					
Pentachlorbenzene	1						
tr-chlordane		0.06		01. – 0.2		0.03	0.02
cis-chlordane		0.08		0.1 – 0.2		0.03	0.02
tr-nonachlor		0.04		0.1 – 0.2		0.03	0.02
cis-nonachlor		0.02					
Dieldrin				0.1			
Toxaphene				0.1 – 0.2			
PBDE 47						0.03	0.02
PBDE 100						0.03	0.02
PBDE 99						0.03	0.02
PAH (general)		1					
Naphtalene	5						
Acenaphthylene	5						
Acenaphthene	5						
Fluorene	5						
Phenanthrene	5					0.5	0.3
Anthracene	5					0.1	0.1
Fluoranthene	5					2	0.5
Pyrene	5					2	0.5
Benz[a]antracene	5					1	0.5
Chrysene	5					0.5	0.3
Benzo[b]fluorantene	5					1	0.5
Benzo[k]fluorantene	5					0.5	0.1
Benzo[a]pyrene	5		< 10		< 50	1	0.3
Indeno[123cd]pyrene	5					8	0.4
Dibenz[ah]anthracene	5					1	0.6
Benzo[ghi]perylene	5					3	2

Annex 6

Classification of the QA flags

Table A6.1: Criteria used for classification of data quality based on field comparison results.

	M.MAD CoV	≤ 0.25 µg S/m^3	[0, 25 %]	≤ 0.50 µg S or N/m^3	< 25%, 50 %]	> 0.50 µg S or N/m^3 and < 50%, → >
Regression slope (a) Ref = a^xLab	[1.50, → >	80	81	82	83	84
	[1.30, 1.50]	60	61	62	63	64
	[1.20, 1.30]	40	41	42	43	44
	[1.10, 1.20]	20	21	22	23	24
	[0.90, 1.10]	00	01	02	03	04
	[0.80, 0.90]	10	11	12	13	14
	[0.70, 0.80]	30	31	32	33	34
	[0.50, 0.70]	50	51	52	53	54
	< ←, 0.50]	70	71	72	73	84

Table A6.2: Criteria used for classification of data quality based on laboratory comparison results.

	2RSD %	<0, 1*DQO]	<1*DQO - 2*DQO]	<2*DQO - 4*DQO]	<4*DQO, → >
RB %	< ←, -40 >	80	81	82	83
	[-40, -20 >	60	61	62	63
	[-20, -10 >	40	41	42	43
	[-10, - 5 >	20	21	22	23
	[-5, +5]	00	01	02	03
	< 5, 10]	10	11	12	13
	< 10, 20]	30	31	32	33
	< 20, 40]	50	51	52	53
	< 40, -→ >	70	71	72	73