EMEP/CCC-Report 5/2011

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

The twenty-seventh and twenty-eighth intercomparison of analytical methods within EMEP

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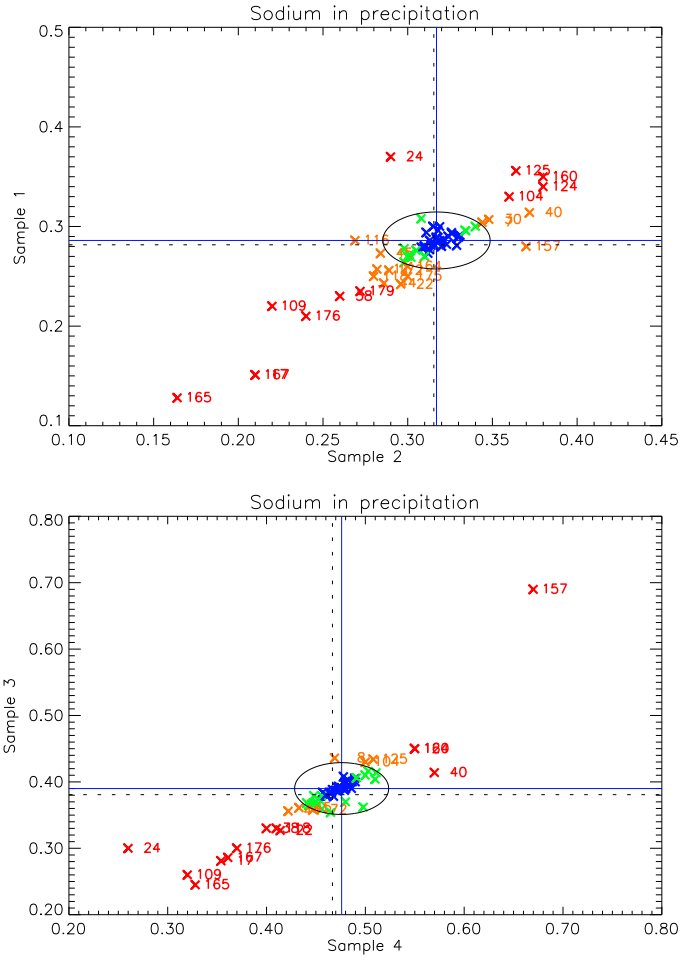

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1. Introduction

41 different laboratories in European countries are performing chemical analysis of air and precipitation samples within EMEP (Co-operative Programme for Monitoring and Evaluation of Long-range Transmission of Air Pollutants in Europe). Since the measurement programme is based on individual national networks, the participating laboratories apply different sampling and analytical methods. Most of the methods used are described in the manual for sampling and chemical analysis (EMEP/CCC, 1995).

In order to improve the data comparability and to get a picture of the different laboratories' performance, interlaboratory comparisons are organised by the Chemical Co-ordinating Centre (CCC) at the Norwegian Institute for Air Research (NILU). So far twenty-six intercomparisons have been arranged (Hanssen, 1988, 1990; Hanssen et al., 1983; Hanssen and Ladegård, 1984, 1985, 1987; Hanssen and Skjelmoen, 1992, 1994, 1995, 1996, 1997, 2001; Thrane, 1978, 1980a, 1980b, 1981; Uggerud et al., 2001, 2002, 2003, 2004; Hjellbrekke et al., 2005; Uggerud and Hjellbrekke, 2007, 2008, 2009).

Since 2000 the laboratory intercomparisons within EMEP have also been open for participation of laboratories from other networks.

This report gives the results of the twenty-seventh and twenty-eighth inter-laboratory tests.

2. Organisation of the intercomparison

2.1 The twenty-seventh intercomparison

The samples for the twenty-seventh intercomparison (see Table 2) were prepared and distributed to 84 laboratories in July 2009.

Most of the laboratories had returned their results to the CCC within one month after the deadline given as 15 November 2009. A total of 71 laboratories have returned their results. This includes 36 EMEP-laboratories.

Expected values were released on the CCC home page in December 2009. In accordance with the decision of the Steering Body of EMEP, the results are presented in such a way that the different laboratories are identified. Tables 3a and 3b give the names of the participating laboratories together with the numbers used when presenting the results in tables and figures.

Information received on the analytical methods used is given in Tables 4–9.

2.2 The twenty-eighth intercomparison

The samples for the twenty-eighth intercomparison (see Table 29) were prepared and distributed to 72 laboratories in July 2010.

Most of the laboratories had returned their results to the CCC within one month after the deadline given as 12 November 2010. A total of 61 laboratories have returned their results. This includes 33 EMEP-laboratories.

Expected values were released on the CCC home page in January 2011. In accordance with the decision of the Steering Body of EMEP, the results are presented in such a way that the different laboratories are identified. Tables 3a and 3b give the names of the participating laboratories together with the numbers used when presenting the results in tables and figures.

Information received on the analytical methods used is given in Tables 31–36.

3. Data handling

The data reported for the twenty-seventh intercomparison from the participants are presented in Tables 13-28 and Figures 2-17. An overview of all results is presented in Tables 10 and 11.

The data reported for the twenty-eighth intercomparison from the participants are presented in Tables 40-55 and Figures 18-33. An overview of all results is presented in Tables 37 and 38.

3.1 Data analysis

The reported values are presented in the tables in decreasing order together with the number of the laboratory. The expected (theoretical) value, the number of results, the arithmetic mean value, the median, the standard deviation and the relative standard deviation in percent are also given. After the first statistical run with all results included, the calculation was repeated with the outliers excluded. The outliers (unused) are defined as the results more than two standard deviations from the mean value in the first run.

Reported results expressed as percent deviation from expected value are presented in Table 10 and Table 11 for EMEP 27th and in Table 37 and Table 38 for EMEP 28th.

3.2 Youden plot

The Youden plot is a graphical method to analyse inter-laboratory data where the samples are ordered in pairs with similar concentrations. One plot is made for each pair of samples and gives results for all participating laboratories. The plots visualize both systematic and random errors.

The plot is drawn as a scatter plot where each point represents a pair of concentrations for one laboratory. The expected values for the two samples are drawn as solid blue lines. The arithmetic average of the measured values

excluding outliers is drawn as dotted lines. The solid lines divide the plot in four quadrants and a 45° reference line going through the intercept of the solid lines may be added.

If errors are due to random factors, the points will be evenly distributed around the mean value and situated in all four quadrants.

If systematic errors dominate, the results will be close to 45° reference line, and be situated in the upper right quadrant (overestimation) or lower left quadrant (underestimation).

Drawing a line from a given point perpendicular on the 45° reference line gives two line segments, one from the point to the intercept on the reference line (a), and one continuing from the intercept to the point representing the expected values (b). The lengths of these line segments are measures of the random and systematic errors respectively.

Ellipses with radii corresponding to the data quality objectives (DQO, Table 1) are added in each plot. The data points are colour coded depending on the magnitude of errors as given in Table 1.

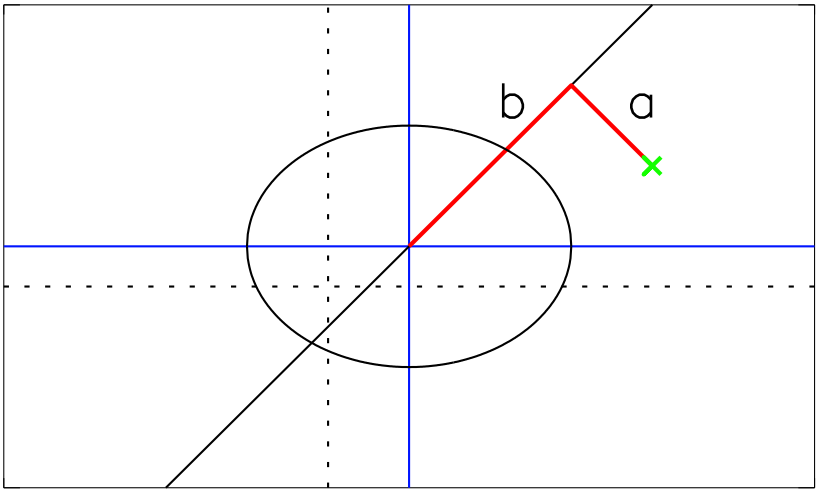


Figure 1: Youden plot showing concentrations for a pair of samples (green), expected values (blue lines), average of measured values (dotted lines) and random and systematic errors (red lines)

In Figures 2–33 the reported data are presented in Youden plots.

Table 1: Youden plot parameters.

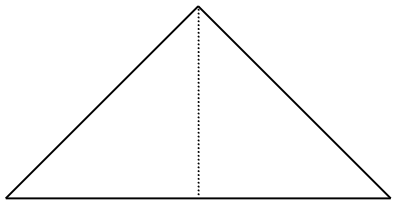
Radii	**Components**
10%	SO_2 in abs.sol, NO_2 in abs.sol.
20%	SO_2, HNO_3 and NH_3 in impregnated filter
Radii = DQO	**Components**
10% accuracy or better	SO_4^{2-} -, NO_3^-
15% accuracy or better	NH_4^+, Cl^-, Ca^{2+}, K^+, Mg^{2+}, Na^+ , cond, H+ (from pH)
0.1 units	pH
Criteria	**Colour**
Within 0.5*DQO	Blue
Within DQO	Green
Within 2*DQO	Orange
> 2*DQO	Red

3.3 Estimating random and systematic errors from laboratory comparisons

Table 12 and Table 39 presents relative random and relative systematic errors obtained by the different laboratories in the analysis of each parameter in the precipitation samples. The calculation method and assumptions used are given in Chapter 3.3.1 and Chapter 3.3.2.

3.3.1 Estimating random errors

Systematic errors or bias in the laboratory analyses give a constant shift in the results from the expected ones at a particular concentration level. It is assumed that laboratories taking part in comparisons will obtain results near the expected ones when this bias is removed, and that the differences between expected and obtained results more often will be close to zero than not. A triangular distribution, based upon this assumption, can be used to quantify the random errors in the laboratory results (Eurachem/CITAC, 2000).



The triangle distribution is symmetric with a baseline 2a. The height in the triangle will be 1/a when the triangle area equals 1. The standard uncertainty is given by

$$u(x) = \frac{a}{\sqrt{6}} \qquad (1)$$

and more than 95 % of the data will be within ± 2·u(x). The distance from -a to a (i.e. 2a) is called the range. When applied on the laboratory comparison results, the range equals the distance between the largest and smallest of the four differences between expected and found concentrations. As long as the bias can be assumed to be constant for the samples in the comparison of a specific component, it cannot have an effect on the distance corresponding to 2a. The bias may be dependent upon the concentrations, but can be considered approximate constant for the concentrations used here in the comparison of the main components in precipitation, since the differences between the concentrations are small.

L and T represent the laboratories' and the expected concentrations respectively, and D is the difference. The difference for the lowest concentration is

$$D_1 = L_1 - T_1 \tag{2}$$

and the differences are D_1, D_2, D_3, D_4 in increasing order.

The range is $D_4 - D_1$ and the standard uncertainty for the differences u(D) becomes

$$u(D) = \frac{(D_4 - D_1)}{(2 \cdot \sqrt{6})}. \tag{3}$$

The average expected concentration T for the four samples is given by

$$T = \frac{(T_1 + T_2 + T_3 + T_4)}{4} \tag{4}$$

The relative standard uncertainty, RSD, for 4 samples is given by $\frac{u(D)}{T}$, or

$$RSD = \frac{2 \cdot (D_4 - D_1 \cdot 100)}{\sqrt{6} \cdot (T_1 + T_2 + T_3 + T_4)}\%, \tag{5}$$

and 95 per cent of the laboratory results in this comparison are expected to be within ±2 · RSD.

If the data quality objectives (DQO) likewise are looked upon as 95 percentiles, then 95 per cent of the laboratory analytical results should not be more than 10 or 15 per cent from the correct values (10 per cent for S and N containing components and 15 per cent for other components).

Correspondingly, the values 2·RSD should therefore be less than 10 or 15 per cent in order to comply with the DQO.

3.3.2 Estimating systematic errors

An estimation of bias in single measurements requires a long data series, and four samples as we normally have in laboratory comparison, are merely able to give an indication of the bias or a very coarse estimate.

Coarse estimates have been performed here in the cases where the four samples had similar concentrations and where all four laboratory results were either higher or lower than the expected concentrations. The median of the differences D_i, as defined above, was taken as a measure of the bias, B, in these cases.

$$B = \text{median}[D_i] \tag{6}$$

A relative bias, RB, was also calculated based upon the average expected concentration T, as defined in (4).

$$RB = \frac{4 \cdot \text{median}[D_i]}{(T_1 + T_2 + T_3 + T_4)} \cdot 100\% \tag{7}$$

4. Results – 27th intercomparison

4.1 Sulphur dioxide in absorbing solution (A-samples)

Four samples and one blank solution were distributed to the laboratories that use the hydrogen peroxide absorption solution method. For those laboratories that reported a blank value this has been subtracted from the reported results.

7 laboratories have reported values for SO_2 in absorbing solution. 71% of the reported values are within 10% of expected value. One laboratory reports 3 values above 30% of expected value.

The results are presented in Table 13 and Figure 2.

4.2 Sulphur dioxide and nitric acid on impregnated filter (B-samples)

Five impregnated filter samples (including one blank) for determination of sulphur dioxide were analysed by 21 laboratories. The value reported for the blank filter was subtracted from the other values before the data were used.

This year the amount of sulphur on the distributed filters was a factor of 10 higher than usual. The amount of sulphur on the distributed filters corresponds to air concentrations between 5.6-28.8 µg S m^{-3} when 25 m^3 is sampled.

In addition to sulphate, nitrate was added to the same impregnated filters for determination of HNO_3-N. The value reported for the blank filter was subtracted from the other values before using the data.

The amount of nitrogen on the distributed filters corresponds to air concentrations between 0.52 µg N m^{-3}–1.18 µg N m^{-3} when 25 m^3 sampling volume is used.

80% of the reported results for sulphur dioxide and 75% of the reported results for nitric acid are within 10% of expected value.

The results are presented in Tables 14 and 15 and Figures 3 and 4.

4.3 Nitrogen dioxide in absorbing solution (C-samples)

The four samples distributed were made to represent both absorption solutions and extracts from iodide-impregnated glass filters. The samples contain known amounts of sodium nitrite diluted in water. In order to assure sample stability and to give the laboratories the opportunity to use the matrix they use in their daily routine, the distributed samples were to be diluted 1:10. The results should be reported as the diluted concentrations.

The 10 times diluted samples correspond to air concentrations between 2.60-5.15µg NO_2-N m^{-3}, when 70 ml absorbing solution and 1.4 m^3 are used. If 4 ml extraction solution and 0.7 m^3 sampling volume are used, the samples correspond to air concentrations between 0.30-0.59 µg NO_2-N m^{-3}.

15 laboratories have reported results. 38% of the reported results are within 10% of expected value. Four laboratories report results that deviates more than 20% from expected value, all of which above the expected value.

The results are presented in Table 16 and Figure 5.

4.4 Ammonia on impregnated filters (J-samples)

Six impregnated filters inclusive two unidentified blank filters were sent to 22 laboratories. All laboratories have reported their analytical results. The two blank values reported by each laboratory were averaged and subtracted from the other values reported before the data were used. The results are shown in Table 17 and Figure 6.

The amount of nitrogen on the filters correspond to air concentrations between 0.40-1.20 µg N m^{-3}, if 25 m^3 sampling volume is used.

31% of the reported values are within 10% of expected value. Four laboratories report values outside DQO. These values are distributed both above and below expected value.

4.5 Precipitation (G-samples)

Four precipitation samples were distributed and 2872 single results from 71 laboratories were reported. 79 results were identified as outliers. This is less than 3% of the data, which is a decrease compared to earlier rounds.

Results for sulphate and sodium are overall in good agreement with expected value. For both parameters, only 6 laboratories report results outside DQO. Standard deviation when outliers are excluded varies between 7-10%, which is comparable to earlier rounds.

The reported results for nitrate are mostly in good agreement with expected value. Only 5 laboratories report values outside DQO, which is an improvement compared to last year. In addition, the results for ammonium has improved compared to emep25 and emep26.

Determination of calcium and chloride seems to be troublesome for many laboratories. 35% of the laboratories report Ca-values outside DQO. Even so, this is an improvement compared to last year. More than 32 % of the laboratories report Cl-values outside DQO, which is an increase compared to earlier year's results.

The results are presented in Tables18-28 and in Figures 7-17.

5. Results – 28th intercomparison

5.1 Sulphur dioxide in absorbing solution (A-samples)

Four samples and one blank solution were distributed to the laboratories that use the hydrogen peroxide absorption solution method. For those laboratories that reported a blank value this has been subtracted from the reported results.

8 laboratories have reported values for SO_2 in absorbing solution. 57% of the reported values are within 10% of expected value. One laboratory reports 3 values above 30% of expected value.

The results are presented in Table 40 and Figure 18.

5.2 Sulphur dioxide and nitric acid on impregnated filter (B-samples)

Five impregnated filter samples (including one blank) for determination of sulphur dioxide were distributed to 26 laboratories. 17 laboratories reported results. The value reported for the blank filter was subtracted from the other values before the data were used.

The amount of sulphur on the distributed filters corresponds to air concentrations between 0.72-2.56 µg S m^{-3} when 25 m^3 is sampled.

In addition to sulphate, nitrate was added to the same impregnated filters for determination of HNO_3-N. The value reported for the blank filter was subtracted from the other values before using the data.

The amount of nitrogen on the distributed filters corresponds to air concentrations between 0.59 µg N m^{-3}–1.05 µg N m^{-3} when 25 m^3 sampling volume is used.

84% of the reported results for sulphur dioxide are within 10% of expected value. This is an increase compared to last year. 68 % of the reported results for nitric acid are within 10% of expected value. This is a decrease compared to last year.

The results are presented in Tables 41 and 42 and Figures 19 and 20.

5.3 Nitrogen dioxide in absorbing solution (C-samples)

The four samples distributed were made to represent both absorption solutions and extracts from iodide-impregnated glass filters. The samples contain known amounts of sodium nitrite diluted in water. In order to assure sample stability and to give the laboratories the opportunity to use the matrix they use in their daily routine, the distributed samples were to be diluted 1:10. The results should be reported as the diluted concentrations.

The 10 times diluted samples correspond to air concentrations between 2.9-4.45µg NO_2-N m^{-3}, when 70 ml absorbing solution and 1.4 m^3 are used. If 4 ml extraction solution and 0.7 m^3 sampling volume are used, the samples correspond to air concentrations between 0.33-0.62 µg NO_2-N m^{-3}.

C-samples were distributed to 24 laboratories. 16 laboratories have reported results. 80% of the reported results are within 10% of expected value. This is much better than last year's result. Two laboratories report results that deviates more than 20% from expected value. All of these deviating results are above expected value.

The results are presented in Table 43 and Figure 21.

5.4 Ammonia on impregnated filters (J-samples)

Six impregnated filters inclusive two unidentified blank filters were sent to 27 laboratories. 17 laboratories have reported their analytical results. The two blank values reported by each laboratory were averaged and subtracted from the other values reported before the data were used. The results are shown in Table 44 and Figure 22.

The amount of nitrogen on the filters correspond to air concentrations between 0.44-1.44 µg N m^{-3}, if 25 m^3 sampling volume is used.

62% of the reported values are within 10% of expected value. Four laboratories report values outside DQO.

5.5 Precipitation (G-samples)

Four precipitation samples were distributed and 2861 single results from 61 laboratories were reported. 120 results were identified as outliers. This is 4,2% of the data, which is an increase compared to last year, but comparable to earlier rounds.

Results for nitrate, sodium, potassium and ammonia are overall in good agreement with expected value. For all of these parameters, only 6 laboratories or less, report results outside DQO. Standard deviation when outliers are excluded varies mostly between 4-10%, which is comparable to earlier rounds.

The reported results for chloride show an improvement. 15% of the reported results are outside DQO, compared to 32% in emep27.

Determination of calcium seems to be troublesome for many laboratories. 28% of the laboratories report Ca-values outside DQO. Even so, this is an improvement compared to emep26 and emep27.

The results are presented in Tables 45-55 and in Figures 23-33.

6. Summary

A total of 71 laboratories participated in the twenty-seventh intercomparison. 36 of these laboratories are within the EMEP network. For the twenty-eight intercomparison 61 laboratories participated, out of which 33 are within EMEP.

As in earlier intercomparisons, outliers are defined as values that deviates more than two standard deviations from the mean value. Outliers occur for all samples and parameters. Out of a total of 3200 single results reported for emep27, 101 are defined as outliers. This is close to 3% of the reported data, which is very good.

For emep28, 139 out of a total of 3156 results are defined as outliers. This is 4.4% of the reported data, which is an increase compared to the two last rounds.

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Appendix 1

Tables – 27th intercomparison

Table 2: Samples distributed for the twenty-seventh interlaboratory test.

A.	5 synthetic samples for determination of SO_2, consisting of 0.3% H_2O_2 absorbing solution and containing different concentrations of sulphuric acid. One of the samples was an unidentified blank.
B.	5 KOH-impregnated Whatman 40 filters, comprising 1 blank and 4 filters to which different amounts of sulphuric acid and nitrate salt have been added.
C.	4 synthetic samples for determination of NO_2 consisting of sodium nitrite diluted in water.
J.	6 Whatman 40 filters impregnated with 3% oxalic acid, comprising 2 blank and 4 filters to which different amounts of ammonium salt solution have been added.
G.	4 synthetic precipitation samples, containing SO_4^{2-}, NO_3^-, NH_4^+, H^+, Na^+, Mg^{2+} and Cl^-, and Ca^{2+} and K^+.

Table 3a: EMEP laboratories participating in the twenty-seventh laboratory intercomparison. The numbers in front of the names are used in tables and figures.

Armenia	(45)	Dept of Environm. Health and Research
Austria	(1)	Umweltbundesamt Zweigstelle Sud, Klagenfurt
Belgia	(2)	Flemish Environment Agency, Antwerpen
Czech Republic	(3)	Czech Hydrometeorological Institute, Praha
Denmark	(4)	National Environmental Research Institute. Air Pollution Laboratory
Estonia	(38)	Estonian Environmental Research Centre, Tallinn
Finland	(5)	Finnish Meteorological Institute. Air Quality Department
France	(41)	Micro Pollutants Technology
Georgia	(43)	Centre for Monitoring and Prognostication, Tbilisi
Germany	(7)	IfE Leipzig GmbH, Umweltlabor
Germany	(8)	Umweltbundesamt, Messtelle Schauinsland
Hungary	(10)	Institute for Atmospheric Physics
Iceland	(11)	Innovation Center Iceland
Ireland	(12)	Met. Eirann, Dublin
Italy	(13)	C.N.R. Istituto Inquinamento Atmosferico
Italy	(30)	Joint Research Centre, Ispra
Kazakhstan	(44)	Hydrometeorological Monitoring, Astana
Latvia	(33)	Air Pollution Observation Laboratory
Lithuania	(32)	Environmental Physics and Chemistry Laboratory
Netherlands	(14)	National Institute of Public Health and Environmental Protection (RIVM)
Norway	(15)	Norwegian Institute for Air Research (NILU)
Macedonia	(40)	Hydrometeorological Institute, Skopje
Moldova	(42)	State Hydrometeorological Service, Chisinau
Poland	(16)	Institute of Meteorology and Water Management, Warsaw
Poland	(39)	Environmental Monitoring Laboratory, Institute of Environmental Protection
Poland	(46)	Diabla Gora station
Portugal	(17)	Laboratorio Santo Andre
Russian Federation	(22)	Institute of Global Climate and Ecology
Serbia	(24)	Rep. Hydrometeorological Institute of Serbia
Slovakia	(31)	Slovak Hydrometeorological Institute
Slovenia	(36)	Hydrometeorological Institute of Slovenia
Spain	(19)	Centro Nacional de Sanidad Ambiental
Sweden	(20)	Swedish Environmental Research Institute (IVL), Gothenburg
Switzerland	(21)	Swiss Federal Laboratories for Materials Testing (EMPA)
United Kingdom	(23)	AEA Technology, National Environmental Technology Centre
United Kingdom	(167)	CEH Edinburgh

Table 3b: Participating laboratories outside the EMEP network.

Canada	(26)	Meteorological Service of Canada, Toronto
United States of America	(27)	Illinois State Water Survey
Germany	(104)	Hessige Landwirtschafliche
Germany	(108)	Institut f. Bondenkunde und Standortlehre, Dredsten
Germany	(109)	Bügen-Institute, dep. of Soil Science of Temporal and Boreal Ecosystems
Germany	(110)	Thüringer Landesanstalt für Landwirtschaft (TTL), Jena
Germany	(112)	Niedersächsische Forstliche Versuchsanstalt (NVF)
Germany	(113)	Landesforstanstalt Eberswalde, abt. Waldökologie
Italy	(114)	C.N.R. Istituto Italiano di Idrobiologia
Germany	(115)	Bayerische Landesanstalt f. Wald- und Forstwirtshaft
Switzerland	(116)	Institute for Applied Plant Biology
Germany	(118)	Forstliche Versuchs-und Forschungsansta
Germany	(120)	Landwirtschaftliche Untersuchungs- und Forschungsanstalt (LUFA)
Germany	(121)	Landeslabor Schleswig-Holstein
Belgium	(124)	Laboratorium voor Bondemkunde, Gent
Germany	(125)	Bayerisches Landesamt für Umweltschutz, Augsburg
Italy	(126)	APPA Laboratorio Biologico Provinciale
Italy	(140)	C.N.R. Istituto di Ricerca sulle Acque
Luxembourg	(146)	Cellule de Recherche en environment et Biotechnologies Public Research Center-Gabriel Lippman
Spain	(150)	Fundación Centro de Estudios ambentials del meditirrain
Norway	(152)	Norwegian Forest Research Institute, Ås
Slovenia	(153)	Slovenian Forestry Institute, Ljubljana
United Kingdom	(155)	Environmental Research Branch, Forest Research
Hungary	(157)	Ecological Laboratory of Forest research Institute
Japan	(158)	Acid Deposition and Oxidant Research Center (ADOCRC), Niigata
Ireland	(160)	Collite, Wicklow
Thailand	(163)	Environmental Researching and Training Center (ERTC)
Thailand	(164)	Pollution Control Department (PCD)
Viet Nam	(165)	Institute of Meteorology and Hydrology
Poland	(166)	Forest Research Institute, Laboratory of Forest Habitat Chemistry
France	(172)	UMR SAS INRA
Russian Federation	(175)	Primorsky Environmental Pollution Monitoring center
Russian Federation	(176)	Main Geophysical Observatory
Russian Federation	(179)	Murmansk Environmental Monitoring Centre
Germany	(180)	vTI-Institut für Agrarrelevante Klimaforschung

Table 4: Analytical methods used at the participating laboratories for the determination of sulphur dioxide in absorbing solution (A).

Method	Laboratory
1. Ion chromatography	15, 17, 19, 23, 36, 45
2. Spectrophotometry	173

Table 5: Analytical methods used at the participating laboratories for the determination of sulphur dioxide on impregnated filters (B).

Method	Laboratory
1. Ion chromatography	3, 4, 5, 8, 15, 22, 31 33, 36, 38, 41, 45, 116 158, 163,165, 172
2. Capillary Electrophoresis	39
3. Spectrophotometry	16, 11

Table 6: Analytical methods used at the participating laboratories for determination of nitric acid on impregnated filters (B).

Method	Laboratory
1. Ion chromatography	3, 4, 5, 8, 15, 20, 31 33, 36, 41, 45, 116 158, 163,165, 172
2. Capillary Electrophoresis	39
3. Spectrophotometry	16

Table 7: Analytical method for determination of ammonia on impregnated filters (J).

Method	Laboratory
1. Spectrophotometry	3, 4, 10, 15, 16, 19, 20, 32, 33, 39, 45, 116, 172
3 Ion chromatography	5, 8, 13, 31, 36, 38, 41, 158, 165

Table 8: Analytical method used for NO_2 in absorbing solution (C).

Method	Laboratory
1. Spectrophotometry	3, 8, 10, 15, 16, 20, 23, 31, 32, 33, 36, 39, 45, 173
2. Ion chromatography	19

Table 9: Analytical methods used for the determination of chemical constituents in precipitation samples.

Lab no	Network	SO_4^{2+}	NH_4^+	NO_3^-	Na^+	Mg^{2+}	Cl^-	Ca^{2+}	K^+
1	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
2	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
3	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AAS	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AAS
4	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AES	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AES
5	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
7	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
8	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
10	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AAS	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AAS
11	EMEP	ICP-AES	Spectrophotometry	Spectrophotometry	ICP-AES	ICP-AES	Spectrophotometry	ICP-AES	ICP-AES
12	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
13	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
14	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	ICP-MS	ICP-MS	Ion chromatography	ICP-MS	ICP-MS
15	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
16	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AAS	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AAS
17	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
19	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AAS	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AAS
20	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography			Ion chromatography		
21	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
22	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
23	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
24	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AAS	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AAS
26	Other	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AAS	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AAS
27	Other	Ion chromatography	Spectrophotometry	Ion chromatography	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES
30	EMEP	Ion chromatography	Ion chromatography	Spectrophotometry	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
31	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
32	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AAS		Ion chromatography	Flame-AAS	Flame-AAS
33	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	ICP-MS	ICP-MS	Ion chromatography	Ca methods, ICP-MS	ICP-MS
36	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
38	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
39	EMEP	CE	Spectrophotometry	CE	Flame-AES	ICP-AES	CE	ICP-AES	Flame-AES
40	EMEP		Spectrophotometry	Spectrophotometry	Flame-AAS	Flame-AAS	Spectrophotometry	Flame-AAS	Flame-AAS
41	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
42	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
43	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Na methods, Flame photometry		Ion chromatography	titration	Flame photometry
44	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
45	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	ICP-MS	ICP-MS	Ion chromatography	ICP-MS	ICP-MS
46	EMEP								
104	ICP-Forest	Ion chromatography	CFA	CFA	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES
108	EMEP	ICP-AES	Spectrophotometry	Spectrophotometry	ICP-AES	ICP-AES	Potensiometric method	ICP-AES	ICP-AES
109	EMEP	ICP-AES	Spectrophotometry	Spectrophotometry	ICP-AES	ICP-AES	Photometry Hg(SCN)2	ICP-AES	ICP-AES

Table 9, cont.

Lab no	Network	SO_4^{2+}	NH_4^+	NO_3^-	Na^+	Mg^{2+}	Cl^-	Ca^{2+}	K^+
110	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES
112	ICP-Forest	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	ICP-AES	Ion chromatography	ICP-AES	Ion chromatography
113	Other			NO3 methods		ICP-AES		ICP-AES	
114	ICP-Forest	Ion chromatography	Spectrophotometry	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
115	ICP-Forest	Ion chromatography	Ion chromatography	Ion chromatography	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES
116	Other	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AES	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AES
118	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES
120	ICP-Forest	ICP-AES	Spectrophotometry	Spectrophotometry	ICP-AES	ICP-AES	Spectrophotometry	ICP-AES	ICP-AES
121		Spectrophotometry	Spectrophotometry	Spectrophotometry	ICP-AES	ICP-AES	Spectrophotometry	ICP-AES	
124	Other	Ion chromatography	Ion chromatography	Ion chromatography	Flame-AAS	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AAS
125	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
126	ICP-Forest	Ion chromatography	Spectrophotometry	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
140	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
146	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
150	Other	Ion chromatography	Spectrophotometry	Ion chromatography	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES
152	ICP-Forest	Ion chromatography	SFA	Ion chromatography	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES
153	ICP-Forest	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
155	ICP-Forest	Ion chromatography	Spectrophotometry, Colorimetry	Ion chromatography	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES
157	ICP-Forest	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AES	Flame-AES	Ion chromatography	Flame-AES	Flame-AES
158	EANET	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
160	EMEP	Ion chromatography	Colorimetry FIA	Colorimetry FIA	ICPMS	ICPMS	Ion chromatography	ICPMS	ICPMS
163	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
164	EMEP								
165	EANET	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
166	ICP-Forest	Ion chromatography	Ion chromatography	Ion chromatography	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES
167	EMEP	Ion chromatography	FIA	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
172	Other	Ion chromatography	Spectrophotometry	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
175	WMO-GAW	Nephelometry	Spectrophotometry	Spectrophotometry	Flame-AAS	Flame-AAS	Titration	Flame-AAS	Flame-AAS
176	WMO-GAW	Ion chromatography	Ion chromatography	Ion chromatography					
179	WMO-GAW	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AAS	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AAS
180	Other	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography

Table 10: Reported results for precipitation samples expressed as % deviation from expected value.

Precipitation																																		
Lab no	SO_4^{2-} % deviation from expected value				NH_4^+ % deviation from expected value				NO_3^- % deviation from expected value				Na^+ % deviation from expected value				Mg^{2+} % deviation from expected value				Cl^- % deviation from expected value				Ca^{2+} % deviation from expected value				K^+ % deviation from expected value				pH pH-units from expected value				Cond % deviation from expected value			
	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4
1	1	-1	0	0	7	4	2	2	2	0	0	0	1	0	1	-1	0	-2	-1	-1	-5	-8	-6	-6	-3	-9	-7	-7	-4	-5	-6	-4	0.09	0.09	0.06	0.08	-15	-11	-4	-10
2	4	5	6	8	13	12	12	12	2	4	4	4	-8	-6	-5	-4	5	10	8	6	13	11	12	8	-15	-11	-4	-3	-2	-1	-1	-1	-0.19	-0.245	-0.27	-0.3	-3	-3	-1	-3
3	2	1	2	1	22	15	6	9	1	0	0	0	0	0	-2	-4	-1	-1	-1	-2	-2	-2	0	-1	2	-6	-7	-5	7	9	12	13	0.009	0.021	0.002	0.009	1	2	2	0
4	-2	-2	0	-2	-2	-4	-4	-2	-1	-1	-1	-1	-1	2	-5	1	-7	-6	-8	-8		1	0	-3	8	0	1	-8	-5	-7	0	-4	0.04	0.02	0.01	0.01	-4	-3	2	0
5	0	-1	-1	-2	-1	-1	-2	-1	2	2	1	1	3	5	4	3	2	3	3	1	4	3	2	2	4	4	3	4	5	4	3	-1	0.03	0.03	0.02	0.02	-2	-2	0	-1
7	-3	-1	-4	-2	8	3	0	2	-5	-4	-3	-1	6	9	4	7	5	5	2	3	21	18	11	6	56	11	18	15	3	7	2	1	0.09	0.09	0.08	0.09	-10	-6	0	-5
8	-1	-3	-1	-2	2	6	7	7	-1	-2	2	-1	-2	0	12	-1	-2	-1	-2	-3	-3	-3	-3	-5	49	-1	6	-6	-7	-5	-3	-1	0.06	0.06	0.06	0.06	-11	-13	-9	-10
10	6	6	9	7	-11	-12	-11	-9	2	5	3	4	-3	-6	-6	-6	2	6	4	3	-1	-3	-7	-2	13	4	9	9	6	3	6	3	0.08	0.08	0.05	0.08	0	-1	1	-1
11	-7	-7	-1	-2	-23	-17	-12	-10	7	8	8	8	-10	-11	-8	-4	1	2	1	2	10	18	10	7	3	0	-1	-3	16	-6	-18	7	-0.1	-0.13	-0.15	-0.12	-8	-7	-4	-4
12	-4	-5	-2	-3	-10	-4	0	2	-4	-5	-5	-5	1	4	3	3	-4	-19	-12	-6	19	13	11	7	-2	-7	-5	-3	-5	-7	-6	-4					1	-1	1	-2
13	2	1	-1	0	-2	-5	0	-2	-1	0	2	2	0	1	3	1	-1	1	1	4	-3	-7	-6	-5	-3	-1	-3	-2	0	-4	-1	-7	0.13	0.13	0.1	0.13	-7	-8	0	-7
14	-3	-3	-2	-2	-10	-12	-13	-10	-7	-8	-7	-7	-5	-5	-3	-6	-9	-11	-7	-12	-29	-32	-28	-28	-2	-7	-5	-3	-3	2	-4	5	0.15	0.15	0.19	0.09	8	4	5	3
15	-3	2	3	-1	12	7	8	9	-4	3	0	1	5	7	5	5	-3	-16	-3	-3	-17	-6	0	1	8	-7	1	1	4	3	6	3	0.05	0.05	0.04	0.05	1	-6	4	1
16	0	0	1	0	2	4	-2	-2	-5	-4	-3	-3	5	-1	-6	-7	-6	-4	-10	-8	-2	-2	-2	-3	24	16	4	4	-15	-12	-19	-16	0.04	0.02	0	0.01	-6	-3	1	-1
17	-1	-2	-3	-4	27	12	20	19	4	1	-1	-1	-47	-34	-28	-26	-23	-35	-26	-23	-38	-7	-9	-10	-8	1	10	8	-28	-20	-25	-37	0.06	0.09	0.05	0.09	1	1	2	2
19	-12	-12	-5	-6	-11	-1	-2	2	-7	-6	-5	-5	0	-1	-3	-3	-1	1	1	-1					21	10	19	5	2	2	2	3	0.166	0.131	0.125	0.127	1	-1	2	1
20	-8	-12	-2	-6	1	1	3	3	2	0	-1	-1									-2	-2	0	0									0.05	0.06	0.05	0.06	-2	-2	3	-1
21	1	0	2	1	-5	1	1	2	0	0	0	0	1	0	-1	-1	0	-2	-2	-1	5	2	2	1	16	4	3	2	3	2	1	-1	0.02	0.03	0.02	0.03	-2	-3	-1	-3
22	4	1	6	-4	11	15	9	4	-2	-3	1	1	-15	-7	-16	-13	-23	-27	-22	-26	-17	-21	-26	-18	40	4	-4	-25	-10	-18	-12	-16	0.07	0.09	0.09	0.15	-8	-8	-6	-8
23	3	-4	-2	-3	4	4	7	4	7	6	6	6	-3	-1	5	0	-3	2	-3	0	31	-4	-3	-2	1	1	6	4	-4	-8	-3	-6	0	0	0	0	-15	-13	-7	-9
24	-11	-8	-9	-8	-41	-34	-43	-20	-18	-15	-14	-14	29	-9	-23	-45	10	8	7	13	52	48	28	12	351	250	179	153	-37	-41	-47	-41	0.13	0.28	0.22	0.28	-7	-6	0	-5
26	-2	-3	-1	-2	-3	-3	-2	-2	3	2	0	-1	-2	0	-2	-3	-1	-1	-1	-2	1	0	-1	0	7	2	1	0	-1	-1	-1	-1	0.02	0.06	0.01	0.03				
27	-1	-2	-1	-2	0	-1	-1	0	-1	-2	-2	-3	3	3	3	2	3	1	2	2	-1	-1	-1	0	7	2	2	2	-1	0	-1	2	0.04	0.06	0.02	0.04	-5	-6	-2	-4
30	3	1	1	-1	5	2	-1	1	-2	-3	-2	-2	7	10	7	6	2	1	4	2	-23	31	-2	2	2	5	1	0	-5	-5	-6	-9	-0.02	-0.04	-0.06	-0.01	-13	-13	-12	-15
31	-4	-3	-3	-2	37	49	29	20	0	1	1	2	-5	-2	-3	-2	-8	-12	-12	-10	-5	-4	-4	-3	-13	-13	-13	-12	-12	-17	-11	-15	0.06	0.06	0.06	0.06	0	-1	2	0
32	-7	-7	2	-5	12	4	4	4	1	-2	2	2	-2	-2	-3	-3					-7	-1	-4	-8	-22	-7	6	1	-12	-2	-6	-4	0.05	0.03	0	0.02	-3	-3	-1	-4
33	2	-1	2	-1	-4	-3	-7	-3	-4	-5	0	-3	-2	-2	-3	-3	-3	-16	-13	-11	9	-1	7	-2	-12	-14	-16	-12	-5	-7	-6	-12	0.11	0.09	0.09	0.11	-2	-3	3	-1
36	-4	-5	-2	-3	4	4	4	4	-4	-4	-4	-4	-2	-2	-3	-3	0	1	-3	-1	-1	1	2	2	-5	-3	-1	-3	-6	-7	-10	-14	0.06	0.06	0.09	0.12	-10	-12	-10	-13
38	3	7	-1	0	-10	-9	-5	-5	-7	-11	-3	-3	-20	-18	-15	-16	-68	-76	-71	-76	-17	-20	-19	-16			-78	-77	-5	-7	-6	-12	0.27	0	0.03	-0.06	1	22	9	10
39	10	14	9	1	8	-7	0	-5	6	5	6	5	-6	-5	-6	-7	-1	-1	-1	-2	1	2	-4	0	5	0	-1	0	-1	0	1	5								
40					-3	-6	-7	-10	1	1	5	4	10	17	6	20	-4	-1	-5	-2	82	77	81	71	126	0	2	6	-5	-4	-4	-1	-0.12	-0.21	-0.31	-0.23	27	-15	-5	-23
41	8	9	6	10	11	3	3	0	-5	-3	-2	1	1	4	0	-1	1	8	3	0	-1	-5	-4	-2	-10	-24	-25	-15	-2	3	-8	-6	0.05	0.5	-0.04	0.04	-14	-20	155	17
42	-19	-48	-20	-16	-3	-5	-4	-6	-39	-13	-23	-26	-2	-3	-6	-6	-1	-3	0	2	-15	91	70	59	54	35	31	14	5	4	6	10								
43	168	169	163	179	49	40	39	83	-10	-11	-4	0									704	-10	-17	-1									0.05	-0.02	0.08	0.12	-1	10	76	45
44	36	37	37	34	-13	-33	-28	-30	47	43	46	46	-15	-10	-9	-11	-37	-37	-66	-68	9	10	22	11	-18	-14	-13	-12	-30	-26	-35	-41	0.07	0.06	0.05	0.06	-7	-9	-5	-5
45	3	2	2	2	-19	57	123	148	0	0	1	1	-5	-10	-7	-9	-14	-19	-16	-16	-4	-3	0	0	-12	-14	-11	-11	-14	-22	-19	-21	-0.09	-0.17	-0.224	-0.178	-1	-1	1	-2
46																																	0.05	0.05	0.03	0.03	-4	-5	7	1
104	-6	-6	-5	-5	4	-1	0	-2	-14	-10	-11	-11	15	14	10	5	-3	-5	-5	-8	32	27	23	13	18	22	16	7	19	18	18	18	0.1	0.08	0.04	0.07	31	6	58	14
108	-4	-3	0	-1	-3	-4	-5	-1	-16	-13	-17	-11	-2	1	-3	-3	-10	-16	-13	-11	9	60	100	73	96	64	40	38	-10	-12	0	-19	0.71	0.29	0.21	0.26	-16	-10	-7	-8

Table 10, cont.

Precipitation																																		
Lab no	SO_4^{2-} % deviation from expected value				NH_4^+ % deviation from expected value				NO_3^- % deviation from expected value				Na^+ % deviation from expected value				Mg^{2+} % deviation from expected value				Cl^- % deviation from expected value				Ca^{2+} % deviation from expected value				K^+ % deviation from expected value				pH pH-units from expected value				Cond % deviation from expected value			
	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4
109	-7	-7	0	-1		-14	-9	-8	0	0	0	-1	-23	-31	-33	-33	10	45	17	13				-19	27	7	23	15	-14	-17	-12	-12	0.16	0.09	0.05	0.12	-18	-9	3	-5
110	4	4	22	-1	42	-9	-13	-12	13	0	18	5	5	1	-2	-2	1	2	2	-2				7	10	2	1	-1	0	3	0	-4					-5	-5	-4	-5
112	2	1	3	1	-13	-9	-8	-6	3	2	0	0	0	1	0	0	-3	-4	-3	-3	1	19	14	11	11	7	6	3	-9	-8	-6	-4	0.13	0.11	0.1	0.11				
113																	-6	266	-10	-6					45	31	25	12					0.4	0.25	0.15	0.14	-38	-34	-24	-25
114	-4	-4	-2	-2	-3	-4	-5	-5	-4	0	0	-1	-2	1	0	1	10	-4	-3	-3	-7	-6	-7	-5	-2	14	12	61	-10	-12	-12	-4	0.13	0.12	0.1	0.11	-7	-2	3	0
115	-1	-4	5	0	-22	-29	-13	-22	2	-2	-3	-5	3	-2	-1	-2	-9	-8	-9	-10	71	60	48	31	20	6	-2	-3	3	-11	-5	-7	0.01	-0.01	-0.01	2.26	-10	-10	-10	36
116	-2	0	-1	0	37	33	31	32	-6	-5	-5	-3	0	-15	-7	5	0	-2	0	23	-3	1	-4	-5	8	29	1	49	5	-5	14	48	0.12	0.11	0.11	0.1	-7	0	4	3
118	-2	0	2	-1	-5	-5	-6	-5	-16	0	0	-3	-13	-12	-15	-14	-5	-4	-7	-6	-12	-15	-15	-14	8	0	-5	-8	-14	-12	-18	-12	-0.01	0.01	-0.03	0	-7	-9	-7	-7
120	-7	-6	-5	-7	18	-3	-5	1	-4	-2	-1	2	1	2	-1	1	-4	-4	-5	-6	-12	-10	-4	-16	0	-2	-7	-7	9	3	6	10	0.09	0.04	0.03	0.04	0	-3	0	0
121	-9	-7	-3	-9	4	1	0	0	-1	-1	-1	0	1	4	3	1	3	-4	-3	-3	-33	-31	-31	-31	8	7	1	6	0				0.05	0.04	0.15	0.11	3	3	11	6
124	0	6	-2	-2	-3	2	0	-1	-4	3	-3	-3	19	20	15	16	-10	-4	-3	-11	24	37	26	18	-2	0	6	1	-14	-2	-12	-4	0.05	0.03	0.05	0.06	-10	-6	-5	-5
125	0	-1	-1	-1	5	1	5	6	-2	-4	-4	-4	24	15	11	7	-3	-7	-6	-7	68	-1	-3	1	8	10	3	4	93	4	14	0								
126	-5	-5	-3	-4	-8	-7	-6	-6	-1	-2	-3	-4	-6	-2	-3	-3	-10	-4	-13	-11	-7	-6	-4	-2	18	21	12	6	-5	-7	-6	-12	0.19	0.12	0.13	0.14	-10	-7	-4	-3
140	-3	-4	-1	-1	-11	-8	-7	-5	-4	-5	-6	-5	-6	-5	0	1	10	-4	-3	5	-7	-10	-7	-5	-31	-21	-11	-8	4	-2	6	3	0.13	0.06	0.01	0.11	-29	-22	-12	-23
146	-3	-4	-3	-3	5	2	2	2	-5	-5	-4	-5	-2	-1	-1	-1	15	27	-1	7	-13	-14	-12	-11	214	71	9	20	-9	-9	-14	-19	0.18	0.1	0.05	0.08	-4	-3	1	-5
150	1	1	2	0	10	4	1	1	-4	-2	-3	-3	8	-3	-2	-3	10	-5	-4	-4	2	15	2	3	-25	-28	-21	-24	-1	-13	-6	-12	0.64	0.49	0.42	0.48	-15	-8	-11	-10
152	-14	-15	-13	-15	-5	7	-2	4	-20	-19	-17	-17	-3	-4	-3	-4	-6	-8	-8	-8	4	-6	-26	-34	21	14	10	5	-4	-5	-6	-8	0.08	0.06	0.06	0.06	-8	-8	-1	-4
153	-13	-17	-12	-30	-3	2	-5	-5	-23	-27	-28	-47	-6	-2	0	1	10	8	26	21	-7	-15	-15	-37	57	29	17	15	9	-7	24	47	0.11	0.11	0.11	0.12	-4	-2	0	-3
155	-7	-8	-7	-7	-1	-10	-16	2	-8	-7	-4	-2	2	3	2	1	4	2	3	3	-17	-16	-16	-13	29	13	8	7	10	2	-1	0	0.04	0.04	0.04	0.05	-1	-1	1	-1
157	-18	-13	-11	-14	4	2	-5	-5	-4	0	-5	-3	-2	17	77	41	-10	-4	-13	-11	45	-6	-4	1	155	114	54	34	131	76	18	54	0.24	0.06	-0.02	-0.04	-14	-6	-5	-5
158	2	1	0	1	11	9	9	8	4	3	4	6	2	4	6	7	3	2	6	7	-6	-6	-5	-6	-5	-1	4	6	0	0	1	1	0.07	0.06	0.09	0.1	-6	-8	-5	-9
160	-4	-4	-5	-6	-3	2	0	-5	3	0	2	-1	22	20	15	16	23	358	337	344				-71	312	221	179	140	86	13	65	69								
163	0	0	0	0	2	2	1	2	-2	-1	-1	-1	3	5	4	3	6	6	8	6	-7	-6	-5	-4	13	16	19	15	-2	-2	-3	-5	0.12	0.12	0.11	0.1	-2	-2	-1	-3
164	-12	-10	-9	-10	4	2	4	5	-16	-11	-7	-7	-9	-5	-5	-5	-23	-28	-22	-19	-33	-25	-19	-19	-31	-29	-27	-26	-14	-12	-12	-12	0.04	0.02	0.02	0	-5	-4	-10	-12
165	2	2	2	0	0	2	-2	3	3	1	0	0	-55	-48	-37	-31	-21	7	-2	6	-48	-42	-33	-24	154	101	25	18	8	-11	-24	18	0.05	0.02	-0.05	-0.02	-8	-8	3	-3
166	2	2	1	1	0	2	5	6	5	2	0	0	-2	4	0	2	3	5	4	2	-1	-1	-3	-2	4	4	3	3					0.04	0.01	0.04	0.05	3	3	6	4
167	-1	3	9	8	2	-4	-2	-5	-3	-2	-2	-2	-47	-34	-27	-24	3	-4	-2	-1	66	52	31	29	-14	-22	0	-11	-36	-25	-19	-51								
172	1	3	2	3	32	21	19	16	3	4	1	1	-10	-9	-8	-6	-45		-50	-49	-4	-12	-7	-7	-15	-31	-22	-24	-6	-9	-14	-18	-0.23	-0.24	-0.31	-0.27	-3	-2	0	-1
175	1	-4	4	8	28	-4	-16	-10	0	-2	1	-1	-13	-5	-3	-3	20	19	20	21	9	-1	-48	-34	90	33	40	22	18	13	176	12	0.07	0.05	0.05	0.04	-7	-3	-5	-5
176	177	176	176	171	-10	23	12	19	308	304	300	298	-27	-24	-23	-22					71	-10	-11	-8					-37	-46	-53	-63	0.08	0.03	0.03	0.03	-3	-3	0	-5
179	-6	-2	0	11	0	-1	-1	-2	-1	97732	-1	0	-18	-14	-9	-2	26	18	17	13	-9	-15	-19	-20	1	0	-1	-1	0	-3	-4	-5								
180	1	1	2	0	-1	-3	-1	-1	3	3	2	1	3	0	2	1	5	0	4	2	-5	-5	-3	-4	25	1	11	5	2	8	11	13								

SO_4^{2-} and NO_3^- between ± 10 and 20%

SO_4^{2-} and NO_3^- more than + 20%

NH_4^+, NO_3^-, Cl^-, Na^+, Mg^{2+}, Ca^{2+}, K^+ and cond: between ± 15-25%

NH_4^+, NO_3^-, Cl^-, Na^+, Mg^{2+}, Ca^{2+}, K^+ and cond: more than ± 25%

pH: between ± 0,1-0,2 pH-units

pH: more than ± 0,2 pH- units

Table 11: Reported results for filter samples expressed as % deviation from expected value.

Air and aerosols																			
	Absorbing solution				Impregnated filter				Impregnated filter				Absorbing solution				Impregnated filter			
	SO_2-S % deviation from expected value				SO_2-S % deviation from expected value				HNO_3-N % deviation from expected value				NO_2-N % deviation from expected value				NH_3-N % deviation from expected value			
	A1	A3	A4	A5	B1	B2	B4	B5	B1	B2	B4	B5	C1	C2	C3	C4	J1	J2	J3	J6
3					-10	-13	-5	-6	-1	-9	-1	-3	-17	1	-8	-8	4	-4	-5	0
4					-2	-2	1	1	-12	-14	-4	-7					1	-4	-5	-3
5					2	2	2	2	1	1	2	4					-4	-4	-6	-7
8					2	4	6	2	2	-5	5	2	-2	0	1	1	-3	2	0	-2
10													-17	-10	-9	-9	-16	-17	-20	-17
11					-2	0	1	1												
12													-8	-4	-5	-3				
13																	-1	-4	-4	1
15	17	15	11	10	-20	10	-10	-4	4	7	-1	2	15	7	9	7	6	5	1	14
16					-1	-1	3	1	-2	-5	-2	-3	-2	-2	-1	-1	-3	-7	-11	-2
17	4	1	1	1																
19	7	-3	-10	-6									46	52	51	51	11	-2	2	2
20									-95	-95	-95	-95	208	207	218	219	3	1	5	-1
22					8	9	10	8												
23	-5	-3	-1	0									-26	-15	-15	-12				
31					-8				-4				-6	-3	-8	-6	-2	-13	-16	-5
32													2	8	5	8	8	5	-1	2
33					1	8	5	2	-1	1	1	-2					-1	-1	-1	-13
36	2	3	7	3	-5	-4	-2	-3	0	2	-2	0	-8	-4	-6	-6	0	-5	-5	-1
38					-53	-78	-52	-40									5	2	3	5
39					0	-3	-7	-5	-12	-20	-26	-31	-12	-13	-13	-6	-6	-10	-10	-6
41					2	1	2	-4	-2	1	-8	-7					-28	-22	-23	-22
45	3	3	5	4	32	20	15	21	40	21	19	21	60	70	67	71	-8	-11	17	29
116					-3	6	0	-22	-21	-21	-7	-22					38	23	22	26
158					-2	-1	-1	-1	4	2	7	4					-12	-19	-21	-5
163					0	1	3	3	0	-6	3	2								
164					-3	-5	4	4	-5	-12	-1	-2								
165					13	2	22	2	-4	-4	-9	-8					8	9	4	-7
172					1	0	-3	2	-3	3	-1	-1					13	15	6	8
173	42	45	39	0									-4	-4	-5	-3				

Results between 10 and 20% or between -10 and -20% from expected value

more than ± 20% from expected value

Table 12: Relative random and systematic errors obtained by the different laboratories in the analysis of each parameter in the precipitation samples.

Lab. no.	SO_4^{2-}		NO^{3-}		NH_4^+		Mg^{2+}		H^+ calc	
	Random error %	Systematic error %	Random error %	Systematic error %	Random error %	Systematic error %	Random error %	Systematic error %	Random error %	Systematic error %
1	1	0	1	0	1	3	1	-1	7	-17
2	1	6	1	4	3	12	0	7	22	71
3	0	1	1	0	3	13	0	-1	3	-1
4	1	-2	0	-1	1	-3	2	-8	4	-3
5	1	-1	0	1	1	-1	1	2	3	-5
7	1	-2	1	-3	2	3	2	3	6	-18
8	1	-2	2	-1	4	6	1	-2	4	-12
10	1	7	1	4	2	-12	1	3	7	-16
11	3	-5	2	8	0	-14	1	2	11	30
12	2	-4	1	-5	4	-2	4	-9		
13	1	0	1	1	2	-2	2	1	10	-25
14	1	-3	1	-8	3	-12	3	-10	11	-29
15	2	1	2	0	2	8	4	-4	4	-10
16	0	0	0	-4	2	-1	2	-8	4	-3
17	1	-2	2	0	6	20	3	-25	8	-14
19	5	-10	0	-5	4	-1	1	0	10	-27
20	5	-8	1	0	2	2			5	-11
21	1	1	0	0	2	1	1	-1	3	-5
22	3	3	2	0	3	9	5	-24	6	-19
23	3	-2	1	6	2	5	2	-2	6	-3
24	3	-8	2	-15	9	-29	3	9	17	-33
26	1	-2	1	1	0	-2	1	-1	7	-5
27	1	-1	1	-2	0	0	1	2	6	-8
30	2	1	1	-2	2	1	1	3	5	8
31	1	-3	1	1	8	30	1	-10	4	-12
32	4	-6	2	1	2	5			5	-6
33	1	0	2	-3	2	-4	3	-11	7	-21
36	2	-3	1	-4	1	4	1	0	3	-16
38	4	2	3	-4	1	-7	15	-72	28	-2
39	7	9	1	6	5	-3	0	-1		
40			2	3	5	-7	2	-3	19	58
41	3	9	2	-2	3	3	2	2	42	-9
42	19	-19	8	-27	2	-4	2	0		
43	36	176	4	-6	34	39			10	-11
44	7	36	9	45	14	-30	19	-54	5	-13
45	1	2	1	1	88	94	2	-15	16	40
46										
104	2	-6	2	-11	2	0	2	-4	8	-17
108	2	-2	2	-13	1	-3	1	-12	31	-50
109	4	-5	1	0			8	14	13	-21
110	7	5	8	8	17	-11	1	2		
112	0	2	1	1	0	-9	1	-3	8	-23
113							81	-8	23	-40
114	1	-3	1	-1	2	-4	7	-3	9	-24
115	3	0	3	-3	7	-20	2	-9	30	0
116	1	-1	1	-5	8	32	11	0	7	-22
118	1	-1	5	-2	2	-6	2	-6	3	2
120	2	-7	3	-1	7	0	1	-5	8	-9
121	3	-8	0	-1	1	0	3	-3	2	-14
124	4	-1	3	-3	1	-1	4	-7	3	-9
125	0	-1	2	-4	3	4	2	-5		
126	2	-4	2	-2	1	-7	4	-12	11	-26
140	2	-2	2	-5	0	-7	6	1	13	-17
146	1	-3	1	-5	1	2	8	13	15	-20
150	0	1	1	-3	2	2	7	-3	24	-71
152	4	-15	2	-18	4	2	1	-8	5	-13
153	7	-18	17	-28	3	-4	7	18	7	-22
155	2	-7	2	-5	9	-5	1	3	3	-9
157	6	-14	2	-3	4	-2	4	-12	25	-7
158	1	1	2	4	2	9	2	4	3	-16
160	0	-4	1	1	3	-1	137	277		
163	0	0	0	-1	1	1	1	7	8	-22
164	3	-10	2	-9	2	4	4	-20	4	-4
165	1	2	1	0	3	1	14	2	9	-1
166	1	2	2	1	3	4	1	3	3	-6
167	3	5	0	-2	3	-3	2	-1		
172	1	2	1	2	2	21			18	78
175	5	2	1	0	14	-9	5	20	5	-11
176	35	178	52	301	13	17			7	-7
179	7	-1		0	1	-1	9	14		
180	0	1	1	2	1	-1	3	3		

Table 12, cont.

Lab. no.	Na+		Cl-		K+		Cond.	
	Random error %	Systematic error %	Random error %	Systematic error %	Random error %	Systematic error %	Random error %	Systematic error %
1	1	0	2	-7	1	-5	6	-11
2	0	-5	1	11	1	-1	1	-3
3	2	-1	1	-1	1	10	1	1
4	3	0			3	-5	2	-2
5	1	4	0	3	3	3	1	-1
7	2	6	3	13	3	3	4	-6
8	6	-1	2	-3	3	-4	4	-11
10	2	-6	3	-3	2	5	1	-1
11	2	-8	3	10	15	-1	2	-6
12	1	3	2	11	2	-6	1	0
13	1	1	2	-6	2	-3	4	-7
14	2	-4	7	-28	3	0	3	4
15	1	6	6	-2	1	4	4	1
16	5	-4	1	-2	2	-15	3	-2
17	3	-31	10	-12	5	-25	0	2
19	2	-2			0	2	1	1
20			1	-1			2	-2
21	1	-1	1	2	2	2	1	-2
22	5	-14	6	-21	4	-12	3	-8
23	3	0	11	-3	2	-5	5	-12
24	33	-16	10	34	6	-44	3	-6
26	1	-1	1	0	0	-1		
27	0	3	0	-1	1	-1	2	-5
30	1	7	17	0	0	-6	3	-14
31	1	-3	0	-4	4	-13	1	0
32	1	-2	4	-5	5	-4	1	-3
33	1	-2	4	3	1	-7	2	-1
36	1	-2	1	2	1	-9	3	-11
38	2	-16	4	-18	1	-7	11	8
39	2	-5	2	1	2	0		
40	8	11	14	75	2	-4	20	-11
41	2	1	2	-3	4	-4	57	-1
42	2	-4	37	75	1	6		
43			224	-5			24	26
44	3	-10	7	12	3	-32	3	-6
45	3	-8	1	-1	4	-18	1	-1
46							4	-2
104	2	11	3	23	4	19	14	24
108	2	-2	40	75	6	-12	5	-10
109	10	-31			4	-14	9	-8
110	3	-1			3	0	1	-5
112	0	0	6	15	3	-7		
113			25	-94			10	-32
114	1	0	1	-6	4	-11	4	-1
115	2	-1	5	50	6	-5	18	-9
116	8	-4	3	-3	17	9	5	1
118	3	-13	4	-14	3	-15	3	-7
120	1	1	8	-9	3	7	2	0
121	1	2	7	-30			2	5
124	2	17	5	26	6	-7	3	-6
125	4	12	22	1	46	9		
126	1	-4	1	-4	1	-7	4	-6
140	2	-2	1	-7	3	4	10	-24
146	0	-1	2	-12	2	-12	2	-4
150	4	-2	5	3	6	-7	4	-9
152	1	-3	20	-16	0	-6	4	-6
153	2	-1	18	-14	17	16	2	-3
155	0	2	2	-15	5	1	1	-1
157	34	34	16	-1	58	63	5	-6
158	3	5	2	-5	1	1	3	-7
160	2	17			36	56		
163	1	4	0	-5	1	-2	1	-2
164	1	-6	3	-23	3	-12	2	-7
165	1	-41	2	-35	14	-1	5	-6
166	2	1	1	-2			0	3
167	3	-30	7	41	11	-33		
172	0	-8	3	-9	2	-11	1	-2
175	3	-4	23	-23	63	18	2	-4
176	3	-23	27	-10	3	-48	2	-4
179	4	-11	8	-16	1	-4		
180	1	1	1	-4	3	9		

Table 13: Analytical results for sulphur dioxide in absorbing solution.

SO2-S in absorbing solution
Sample no.: A1
Theoretical value: 0.120
Unit: µg S/ml

Run 1:

Number of laboratories:	7
Arithmetic mean value:	0.132
Median:	0.125
Standard deviation	0.019
Rel. st. deviation (%)	14.196

Run 2:

Number of laboratories:	6
Arithmetic mean value:	0.125
Median:	0.124
Standard deviation	0.009
Rel. st. deviation (%)	6.950

Results in decreasing order:

173	0.170 (*)	45	0.123
15	0.140	36	0.122
19	0.128	23	0.114
17	0.125		

SO2-S in absorbing solution
Sample no.: A2
Theoretical value: 0.200
Unit: µg S/ml

Run 1:

Number of laboratories:	7
Arithmetic mean value:	0.218
Median:	0.207
Standard deviation	0.034
Rel. st. deviation (%)	15.679

Run 2:

Number of laboratories:	6
Arithmetic mean value:	0.206
Median:	0.204
Standard deviation	0.013
Rel. st. deviation (%)	6.447

Results in decreasing order:

173	0.290 (*)	17	0.201
15	0.230	23	0.195
36	0.207	19	0.194
45	0.207		

SO2-S in absorbing solution
Sample no.: A4
Theoretical value: 0.280
Unit: µg S/ml

Run 1:

Number of laboratories:	7
Arithmetic mean value:	0.301
Median:	0.296
Standard deviation	0.044
Rel. st. deviation (%)	14.538

Run 2:

Number of laboratories:	6
Arithmetic mean value:	0.286
Median:	0.289
Standard deviation	0.021
Rel. st. deviation (%)	7.283

Results in decreasing order:

173	0.390 (*)	17	0.282
15	0.310	23	0.277
36	0.299	19	0.251
45	0.296		

SO2-S in absorbing solution
Sample no.: A5
Theoretical value: 0.400
Unit: µg S/ml

Run 1:

Number of laboratories:	7
Arithmetic mean value:	0.408
Median:	0.405
Standard deviation	0.019
Rel. st. deviation (%)	4.749

Run 2:

Number of laboratories:	7
Arithmetic mean value:	0.408
Median:	0.405
Standard deviation	0.019
Rel. st. deviation (%)	4.749

Results in decreasing order:

15	0.440	23	0.401
45	0.418	173	0.400
36	0.414	19	0.377
17	0.405		

Table 14: Analytical results for sulphur dioxide on impregnated filter.

SO2-S on impregnated filter
Sample no.: B1
Theoretical value: 200.400
Unit: ug S/filter

Run 1:

Number of laboratories:	21
Arithmetic mean value:	195.901
Median:	198.800
Standard deviation	30.308
Rel. st. deviation (%)	15.471

Run 2:

Number of laboratories:	19
Arithmetic mean value:	197.625
Median:	198.800
Standard deviation	13.609
Rel. st. deviation (%)	6.886

Results in decreasing order:

45	264.507 (*)	158	196.010	
165	227.000	11	195.951	
22	217.280	4	195.670	
41	205.130	164	195.310	
5	204.620	116	194.290	
8	204.000	36	190.710	
172	201.690	31	183.736	
33	201.466	3	180.520	
163	200.810	15	161.190	
39	200.700	38	94.540	(*)
16	198.800			

SO2-S on impregnated filter
Sample no.: B3
Theoretical value: 140.300
Unit: ug S/filter

Run 1:

Number of laboratories:	20
Arithmetic mean value:	137.129
Median:	141.065
Standard deviation	26.853
Rel. st. deviation (%)	19.582

Run 2:

Number of laboratories:	19
Arithmetic mean value:	142.744
Median:	141.680
Standard deviation	9.771
Rel. st. deviation (%)	6.845

Results in decreasing order:

45	168.601	11	140.451	
15	153.990	172	139.670	
22	153.320	16	139.000	
33	151.230	158	138.740	
116	148.090	4	137.750	
8	146.000	39	135.700	
5	143.120	36	134.510	
165	143.000	164	133.260	
163	141.810	3	122.220	
41	141.680	38	30.440	(*)

SO2-S on impregnated filter
Sample no.: B4
Theoretical value: 560.800
Unit: ug S/filter

Run 1:

Number of laboratories:	20
Arithmetic mean value:	559.015
Median:	568.990
Standard deviation	78.637
Rel. st. deviation (%)	14.067

Run 2:

Number of laboratories:	19
Arithmetic mean value:	574.156
Median:	571.280
Standard deviation	41.081
Rel. st. deviation (%)	7.155

Results in decreasing order:

165	684.000	4	566.700	
45	644.857	11	564.251	
22	615.960	116	561.890	
8	595.000	158	554.890	
33	586.249	36	549.310	
164	581.330	172	543.810	
16	576.800	3	534.920	
163	575.810	39	522.700	
5	572.210	15	506.990	
41	571.280	38	271.340	(*)

SO2-S on impregnated filter
Sample no.: B5
Theoretical value: 721.000
Unit: ug S/filter

Run 1:

Number of laboratories:	20
Arithmetic mean value:	706.965
Median:	728.226
Standard deviation	85.947
Rel. st. deviation (%)	12.157

Run 2:

Number of laboratories:	19
Arithmetic mean value:	721.550
Median:	730.551
Standard deviation	57.500
Rel. st. deviation (%)	7.969

Results in decreasing order:

45	871.469	4	725.900	
22	780.350	16	725.700	
164	748.130	158	716.110	
163	740.810	36	697.610	
165	734.000	41	694.780	
8	734.000	15	691.990	
5	733.960	39	682.700	
33	733.145	3	674.220	
172	732.840	116	561.190	
11	730.551	38	429.840	(*)

Table 15: Analytical results for nitric acid on impregnated filter.

HNO3-N on impregnated filter
Sample no.: B1
Theoretical value: 16.360
Unit: ug N/filter

Run 1:

Number of laboratories:	19
Arithmetic mean value:	15.408
Median:	16.100
Standard deviation	4.024
Rel. st. deviation (%)	26.118

Run 2:

Number of laboratories:	18
Arithmetic mean value:	16.221
Median:	16.130
Standard deviation	1.964
Rel. st. deviation (%)	12.109

Results in decreasing order:

45	22.914	41	16.092	
15	17.090	172	15.860	
158	17.080	31	15.780	
8	16.700	165	15.700	
5	16.460	164	15.490	
163	16.359	4	14.430	
36	16.290	39	14.400	
33	16.206	116	12.860	
3	16.160	20	0.778	(*)
16	16.100			

HNO3-N on impregnated filter
Sample no.: B3
Theoretical value: 13.090
Unit: ug N/filter

Run 1:

Number of laboratories:	18
Arithmetic mean value:	11.983
Median:	12.550
Standard deviation	3.110
Rel. st. deviation (%)	25.953

Run 2:

Number of laboratories:	17
Arithmetic mean value:	12.651
Median:	12.600
Standard deviation	1.324
Rel. st. deviation (%)	10.464

Results in decreasing order:

45	15.783	8	12.500	
15	13.990	16	12.470	
172	13.460	163	12.359	
36	13.390	3	11.860	
158	13.300	164	11.530	
5	13.270	4	11.270	
33	13.226	39	10.500	
41	13.192	116	10.360	
165	12.600	20	0.634	(*)

HNO3-N on impregnated filter
Sample no.: B4
Theoretical value: 24.540
Unit: ug N/filter

Run 1:

Number of laboratories:	18
Arithmetic mean value:	22.892
Median:	24.210
Standard deviation	5.828
Rel. st. deviation (%)	25.457

Run 2:

Number of laboratories:	17
Arithmetic mean value:	24.167
Median:	24.220
Standard deviation	2.242
Rel. st. deviation (%)	9.277

Results in decreasing order:

45	29.305	3	24.200	
158	26.230	36	24.040	
8	25.700	16	24.000	
163	25.359	4	23.440	
5	25.120	116	22.760	
33	24.669	41	22.652	
172	24.350	165	22.400	
15	24.290	39	18.100	
164	24.220	20	1.228	(*)

HNO3-N on impregnated filter
Sample no.: B5
Theoretical value: 29.450
Unit: ug N/filter

Run 1:

Number of laboratories:	18
Arithmetic mean value:	27.063
Median:	28.878
Standard deviation	7.121
Rel. st. deviation (%)	26.313

Run 2:

Number of laboratories:	17
Arithmetic mean value:	28.568
Median:	28.966
Standard deviation	3.246
Rel. st. deviation (%)	11.361

Results in decreasing order:

45	35.533	164	28.790	
5	30.650	16	28.550	
158	30.530	3	28.450	
163	30.159	4	27.510	
8	30.100	41	27.302	
15	29.990	165	27.000	
36	29.550	116	22.960	
172	29.220	39	20.400	
33	28.966	20	1.470	(*)

Table 16: Analytical results for nitrogen dioxide in absorbing solution.

NO2-N in absorbing solution
Sample no.: C1
Theoretical value: 0.052
Unit: ug N/ml

Run 1:

Number of laboratories:	16
Arithmetic mean value:	0.060
Median:	0.051
Standard deviation	0.029
Rel. st. deviation (%)	49.031

Run 2:

Number of laboratories:	15
Arithmetic mean value:	0.053
Median:	0.050
Standard deviation	0.012
Rel. st. deviation (%)	22.716

Results in decreasing order:

20	0.160 (*)	173	0.050
45	0.083	31	0.049
19	0.076	12	0.048
15	0.060	36	0.048
33	0.053	39	0.046
32	0.053	10	0.043
8	0.051	3	0.043
16	0.051	23	0.039

NO2-N in absorbing solution
Sample no.: C2
Theoretical value: 0.103
Unit: ug N/ml

Run 1:

Number of laboratories:	16
Arithmetic mean value:	0.123
Median:	0.102
Standard deviation	0.059
Rel. st. deviation (%)	48.217

Run 2:

Number of laboratories:	15
Arithmetic mean value:	0.109
Median:	0.101
Standard deviation	0.024
Rel. st. deviation (%)	22.236

Results in decreasing order:

20	0.326 (*)	16	0.101
45	0.175	31	0.100
19	0.157	12	0.099
32	0.111	36	0.099
15	0.110	173	0.099
33	0.105	10	0.094
3	0.104	39	0.090
8	0.103	23	0.088

NO2-N in absorbing solution
Sample no.: C3
Theoretical value: 0.079
Unit: ug N/ml

Run 1:

Number of laboratories:	16
Arithmetic mean value:	0.093
Median:	0.076
Standard deviation	0.046
Rel. st. deviation (%)	48.970

Run 2:

Number of laboratories:	15
Arithmetic mean value:	0.083
Median:	0.075
Standard deviation	0.018
Rel. st. deviation (%)	22.253

Results in decreasing order:

20	0.251 (*)	12	0.075
45	0.132	173	0.075
19	0.119	36	0.074
33	0.086	31	0.073
15	0.086	3	0.073
32	0.083	10	0.071
8	0.080	39	0.069
16	0.078	23	0.067

NO2-N in absorbing solution
Sample no.: C4
Theoretical value: 0.086
Unit: ug N/ml

Run 1:

Number of laboratories:	16
Arithmetic mean value:	0.103
Median:	0.084
Standard deviation	0.050
Rel. st. deviation (%)	48.302

Run 2:

Number of laboratories:	15
Arithmetic mean value:	0.091
Median:	0.083
Standard deviation	0.020
Rel. st. deviation (%)	22.095

Results in decreasing order:

20	0.274 (*)	12	0.083
45	0.147	173	0.083
19	0.130	36	0.081
33	0.095	39	0.081
32	0.093	31	0.081
15	0.092	3	0.079
8	0.087	10	0.078
16	0.085	23	0.076

Table 17: Analytical results for ammonia on impregnated filter. The reported results are corrected for an average blank value (J2 and J4).

NH3-N on impregnated filter
Sample no.: J1
Theoretical value: 16.040
Unit: ug N/filter

Run 1:

Number of laboratories:	22
Arithmetic mean value:	16.111
Median:	15.964
Standard deviation	1.990
Rel. st. deviation (%)	12.353

Run 2:

Number of laboratories:	20
Arithmetic mean value:	16.041
Median:	15.964
Standard deviation	1.167
Rel. st. deviation (%)	7.274

Results in decreasing order:

116	22.110 (*)	33	15.908	
172	18.100	13	15.800	
19	17.731	31	15.639	
32	17.250	8	15.550	
165	17.250	16	15.480	
15	17.027	5	15.460	
38	16.795	39	15.065	
3	16.720	45	14.697	
20	16.460	158	14.160	
4	16.160	10	13.545	
36	16.020	41	11.505	(*)

NH3-N on impregnated filter
Sample no.: J3
Theoretical value: 24.060
Unit: ug N/filter

Run 1:

Number of laboratories:	22
Arithmetic mean value:	23.292
Median:	23.135
Standard deviation	2.417
Rel. st. deviation (%)	10.377

Run 2:

Number of laboratories:	21
Arithmetic mean value:	22.997
Median:	23.120
Standard deviation	2.032
Rel. st. deviation (%)	8.834

Results in decreasing order:

116	29.480 (*)	4	23.120
165	26.150	5	23.110
15	25.328	13	23.000
32	25.310	36	22.960
172	25.300	16	22.340
38	24.575	39	21.665
8	24.450	45	21.500
20	24.380	31	21.000
33	23.902	10	20.037
19	23.589	158	19.390
3	23.150	41	18.686

NH3-N on impregnated filter
Sample no.: J5
Theoretical value: 30.080
Unit: ug N/filter

Run 1:

Number of laboratories:	22
Arithmetic mean value:	29.204
Median:	29.280
Standard deviation	3.343
Rel. st. deviation (%)	11.447

Run 2:

Number of laboratories:	21
Arithmetic mean value:	28.840
Median:	28.800
Standard deviation	2.946
Rel. st. deviation (%)	10.215

Results in decreasing order:

116	36.840 (*)	13	28.800
45	35.106	3	28.720
172	32.000	4	28.690
20	31.460	36	28.690
165	31.350	5	28.380
38	31.085	39	27.065
19	30.677	16	26.890
15	30.477	31	25.360
8	30.050	10	24.190
33	29.767	158	23.900
32	29.760	41	23.224

NH3-N on impregnated filter
Sample no.: J6
Theoretical value: 10.030
Unit: ug N/filter

Run 1:

Number of laboratories:	22
Arithmetic mean value:	10.010
Median:	9.865
Standard deviation	1.193
Rel. st. deviation (%)	11.915

Run 2:

Number of laboratories:	20
Arithmetic mean value:	9.730
Median:	9.840
Standard deviation	0.812
Rel. st. deviation (%)	8.346

Results in decreasing order:

45	12.985 (*)	8	9.850
116	12.640 (*)	16	9.830
15	11.428	4	9.720
172	10.800	158	9.520
38	10.545	31	9.511
32	10.250	39	9.455
19	10.215	5	9.360
13	10.100	165	9.350
3	10.020	33	8.693
36	9.890	10	8.325
20	9.880	41	7.848

Table 18: Analytical results for sulphate in precipitations samples.

Sulphate in precipitation
Sample no.: G1
Theoretical value: 1.141
Unit: µg/l

Run 1:

Number of laboratories:	68
Arithmetic mean value:	1.179
Median:	1.130
Standard deviation	0.349
Rel. st. deviation (%)	29.569

Run 2:

Number of laboratories:	66
Arithmetic mean value:	1.121
Median:	1.130
Standard deviation	0.085
Rel. st. deviation (%)	7.551

Results in decreasing order:

176	3.160 (*)	115	1.130
43	3.059 (*)	167	1.130
44	1.557	116	1.123
39	1.254	118	1.120
41	1.232	4	1.116
10	1.210	26	1.113
2	1.191	15	1.110
22	1.190	14	1.110
110	1.190	146	1.110
30	1.177	140	1.110
45	1.176	7	1.105
23	1.173	108	1.100
38	1.170	160	1.100
166	1.166	114	1.100
165	1.162	36	1.099
3	1.161	31	1.098
158	1.161	12	1.090
33	1.160	126	1.085
112	1.160	179	1.077
13	1.160	104	1.070
172	1.158	11	1.060
21	1.153	109	1.060
1	1.150	120	1.060
150	1.150	155	1.060
175	1.150	32	1.057
180	1.148	20	1.045
5	1.146	121	1.040
163	1.140	24	1.019
124	1.140	19	1.004
125	1.138	164	1.000
16	1.136	153	0.990
27	1.131	152	0.980
17	1.131	157	0.930
8	1.130	42	0.924

Sulphate in precipitation
Sample no.: G2
Theoretical value: 1.183
Unit: µg/l

Run 1:

Number of laboratories:	68
Arithmetic mean value:	1.218
Median:	1.166
Standard deviation	0.367
Rel. st. deviation (%)	30.179

Run 2:

Number of laboratories:	66
Arithmetic mean value:	1.157
Median:	1.161
Standard deviation	0.110
Rel. st. deviation (%)	9.467

Results in decreasing order:

176	3.260 (*)	17	1.162
43	3.180 (*)	4	1.161
44	1.617	27	1.159
39	1.352	179	1.159
41	1.288	108	1.150
38	1.260	8	1.150
10	1.259	14	1.150
124	1.250	26	1.149
2	1.241	31	1.147
110	1.230	146	1.141
167	1.214	115	1.140
172	1.213	114	1.140
45	1.210	140	1.140
15	1.210	160	1.140
166	1.209	175	1.140
165	1.205	23	1.133
112	1.200	36	1.126
22	1.195	12	1.120
3	1.193	126	1.118
158	1.192	120	1.110
30	1.192	104	1.110
180	1.192	11	1.100
150	1.190	109	1.100
13	1.190	32	1.100
21	1.184	121	1.100
16	1.182	24	1.087
118	1.180	155	1.083
116	1.180	164	1.070
163	1.180	20	1.042
7	1.173	19	1.040
5	1.171	157	1.030
33	1.170	152	1.003
1	1.170	153	0.980
125	1.170	42	0.610

Sulphate in precipitation
Sample no.: G3
Theoretical value: 0.707
Unit: µg/l

Run 1:

Number of laboratories:	68
Arithmetic mean value:	0.742
Median:	0.704
Standard deviation	0.211
Rel. st. deviation (%)	28.399

Run 2:

Number of laboratories:	66
Arithmetic mean value:	0.706
Median:	0.703
Standard deviation	0.052
Rel. st. deviation (%)	7.417

Results in decreasing order:

176	1.950 (*)	5	0.703
43	1.860 (*)	13	0.703
44	0.968	125	0.702
110	0.863	140	0.700
167	0.771	38	0.700
39	0.770	26	0.700
10	0.769	27	0.700
22	0.752	8	0.699
2	0.750	11	0.699
41	0.748	116	0.699
115	0.740	36	0.696
175	0.733	20	0.695
112	0.730	12	0.690
15	0.730	114	0.690
45	0.722	124	0.690
165	0.721	14	0.690
118	0.720	23	0.690
33	0.720	126	0.688
172	0.720	31	0.687
32	0.720	146	0.684
21	0.720	121	0.684
150	0.720	17	0.684
180	0.719	7	0.676
3	0.719	19	0.674
166	0.714	160	0.670
30	0.713	120	0.670
16	0.712	104	0.670
108	0.710	155	0.656
109	0.710	24	0.645
179	0.709	164	0.640
1	0.707	157	0.630
163	0.707	153	0.620
158	0.704	152	0.613
4	0.704	42	0.566

Sulphate in precipitation
Sample no.: G4
Theoretical value: 0.818
Unit: µg/l

Run 1:

Number of laboratories:	68
Arithmetic mean value:	0.848
Median:	0.810
Standard deviation	0.254
Rel. st. deviation (%)	29.903

Run 2:

Number of laboratories:	66
Arithmetic mean value:	0.806
Median:	0.810
Standard deviation	0.062
Rel. st. deviation (%)	7.690

Results in decreasing order:

43	2.283 (*)	33	0.810
176	2.220 (*)	108	0.810
44	1.093	7	0.805
179	0.911	26	0.804
41	0.903	4	0.803
167	0.887	31	0.802
175	0.883	27	0.802
2	0.880	5	0.800
10	0.875	114	0.800
172	0.845	8	0.800
45	0.836	11	0.800
112	0.830	14	0.800
166	0.828	124	0.800
3	0.828	36	0.797
39	0.828	23	0.795
21	0.826	146	0.790
158	0.823	12	0.790
150	0.820	17	0.788
115	0.820	126	0.788
38	0.820	22	0.785
165	0.819	104	0.781
180	0.819	32	0.780
16	0.818	160	0.770
163	0.817	20	0.768
13	0.816	19	0.767
116	0.815	120	0.760
1	0.814	155	0.758
110	0.813	24	0.756
30	0.812	121	0.741
125	0.812	164	0.740
109	0.810	157	0.700
118	0.810	152	0.693
140	0.810	42	0.686
15	0.810	153	0.570

Table 19: Analytical results for nitrate in precipitations samples.

Nitrate in precipitation
Sample no.: G1
Theoretical value: 0.311
Unit: µg/l

Run 1:
Number of laboratories: 69
Arithmetic mean value: 0.318
Median: 0.307
Standard deviation 0.120
Rel. st. deviation (%) 37.850

Run 2:
Number of laboratories: 68
Arithmetic mean value: 0.304
Median: 0.307
Standard deviation 0.031
Rel. st. deviation (%) 10.187

Results in decreasing order:

176	1.270 (*)	4	0.307
44	0.456	30	0.306
110	0.352	163	0.306
23	0.334	22	0.306
11	0.332	125	0.305
39	0.329	167	0.302
166	0.328	114	0.300
17	0.324	12	0.300
158	0.323	15	0.300
26	0.320	33	0.300
172	0.320	157	0.300
112	0.320	124	0.300
160	0.320	150	0.300
180	0.319	140	0.299
165	0.319	36	0.299
1	0.318	120	0.298
2	0.318	16	0.297
20	0.317	146	0.296
10	0.317	41	0.296
115	0.316	7	0.294
5	0.316	116	0.292
32	0.314	38	0.290
3	0.314	14	0.290
40	0.313	19	0.290
45	0.312	155	0.286
175	0.312	43	0.279
31	0.311	104	0.267
109	0.310	118	0.260
21	0.310	164	0.260
8	0.309	108	0.260
179	0.309	24	0.254
13	0.309	152	0.250
27	0.308	153	0.240
126	0.307	42	0.189
121	0.307		

Nitrate in precipitation
Sample no.: G2
Theoretical value: 0.369
Unit: µg/l

Run 1:
Number of laboratories: 69
Arithmetic mean value: 5.605
Median: 0.364
Standard deviation 43.414
Rel. st. deviation (%) 774.503

Run 2:
Number of laboratories: 68
Arithmetic mean value: 0.379
Median: 0.364
Standard deviation 0.140
Rel. st. deviation (%) 36.923

Results in decreasing order:

179	361.000 (*)	121	0.364
176	1.490	126	0.363
44	0.528	8	0.363
11	0.400	115	0.363
23	0.392	120	0.362
39	0.389	167	0.362
10	0.389	27	0.362
172	0.384	175	0.361
2	0.382	32	0.360
158	0.381	150	0.360
124	0.380	41	0.359
15	0.380	22	0.358
180	0.379	30	0.357
166	0.378	16	0.354
26	0.376	125	0.354
5	0.376	7	0.353
112	0.375	36	0.353
40	0.374	140	0.352
31	0.374	116	0.351
17	0.372	146	0.351
165	0.371	12	0.350
118	0.370	33	0.350
160	0.370	19	0.347
114	0.370	155	0.343
109	0.370	14	0.340
157	0.370	104	0.332
3	0.370	38	0.330
1	0.369	164	0.330
13	0.369	43	0.330
45	0.369	42	0.323
110	0.368	108	0.320
21	0.368	24	0.315
20	0.368	152	0.300
4	0.366	153	0.270
163	0.364		

Nitrate in precipitation
Sample no.: G3
Theoretical value: 0.432
Unit: µg/l

Run 1:
Number of laboratories: 69
Arithmetic mean value: 0.445
Median: 0.429
Standard deviation 0.161
Rel. st. deviation (%) 36.262

Run 2:
Number of laboratories: 68
Arithmetic mean value: 0.426
Median: 0.428
Standard deviation 0.038
Rel. st. deviation (%) 8.910

Results in decreasing order:

176	1.730 (*)	120	0.428
44	0.632	121	0.428
110	0.510	179	0.428
11	0.468	163	0.427
39	0.459	17	0.426
23	0.457	30	0.424
40	0.455	167	0.422
158	0.451	41	0.422
2	0.448	27	0.422
10	0.443	7	0.421
8	0.442	124	0.420
180	0.442	126	0.420
160	0.440	150	0.420
13	0.440	38	0.420
32	0.440	16	0.419
31	0.438	115	0.417
175	0.438	43	0.415
172	0.438	125	0.414
45	0.437	155	0.414
22	0.437	146	0.413
5	0.434	36	0.413
165	0.434	116	0.412
112	0.434	19	0.411
1	0.433	157	0.410
3	0.432	12	0.410
166	0.432	140	0.404
33	0.430	164	0.400
15	0.430	14	0.400
109	0.430	104	0.386
118	0.430	24	0.372
21	0.430	108	0.360
114	0.430	152	0.360
26	0.430	42	0.335
20	0.429	153	0.310
4	0.429		

Nitrate in precipitation
Sample no.: G4
Theoretical value: 0.495
Unit: µg/l

Run 1:
Number of laboratories: 69
Arithmetic mean value: 0.508
Median: 0.490
Standard deviation 0.185
Rel. st. deviation (%) 36.401

Run 2:
Number of laboratories: 68
Arithmetic mean value: 0.486
Median: 0.490
Standard deviation 0.048
Rel. st. deviation (%) 9.854

Results in decreasing order:

176	1.970 (*)	26	0.490
44	0.725	8	0.489
11	0.536	17	0.489
158	0.524	4	0.488
23	0.524	7	0.488
110	0.521	20	0.488
39	0.521	155	0.487
2	0.516	167	0.484
10	0.515	30	0.483
40	0.515	27	0.482
120	0.507	38	0.480
13	0.507	124	0.480
32	0.504	150	0.480
31	0.504	157	0.480
41	0.502	33	0.480
5	0.500	116	0.480
180	0.500	118	0.480
15	0.500	16	0.479
22	0.500	36	0.475
172	0.500	125	0.473
45	0.499	126	0.473
165	0.497	19	0.472
179	0.497	146	0.472
1	0.496	12	0.470
166	0.495	140	0.470
43	0.495	115	0.468
21	0.494	14	0.460
112	0.494	164	0.460
3	0.493	108	0.440
121	0.493	104	0.440
163	0.492	24	0.426
160	0.490	152	0.410
109	0.490	42	0.366
114	0.490	153	0.260
175	0.490		

Table 20: Analytical results for ammonium in precipitations sample.

Ammonium in precipitation
Sample no.: G1
Theoretical value: 0.134
Unit: µg/l

Run 1:
Number of laboratories: 68
Arithmetic mean value: 0.138
Median: 0.134
Standard deviation 0.020
Rel. st. deviation (%) 14.810

Run 2:
Number of laboratories: 63
Arithmetic mean value: 0.135
Median: 0.134
Standard deviation 0.015
Rel. st. deviation (%) 10.827

Results in decreasing order:

43	0.199 (*)	179	0.134	
110	0.190 (*)	27	0.134	
31	0.184 (*)	166	0.134	
116	0.183 (*)	5	0.133	
172	0.177	180	0.133	
175	0.171	155	0.132	
17	0.170	4	0.131	
3	0.164	13	0.131	
120	0.158	108	0.130	
2	0.152	114	0.130	
15	0.150	124	0.130	
32	0.150	153	0.130	
109	< 0.150			
158	0.149	26	0.130	
22	0.149	40	0.130	
41	0.149	160	0.130	
150	0.147	42	0.130	
7	0.145	33	0.128	
39	0.145	21	0.127	
1	0.144	118	0.127	
30	0.141	152	0.127	
146	0.141	126	0.123	
125	0.141	12	0.120	
164	0.140	38	0.120	
104	0.140	14	0.120	
36	0.140	176	0.120	
157	0.140	10	0.119	
23	0.140	19	0.119	
121	0.139	140	0.119	
167	0.137	44	0.116	
163	0.137	112	0.116	
8	0.137	45	0.109	
16	0.137	115	0.105	
20	0.136	11	0.103	
165	0.134	24	0.079 (*)	

Ammonium in precipitation
Sample no.: G2
Theoretical value: 0.187
Unit: µg/l

Run 1:
Number of laboratories: 69
Arithmetic mean value: 0.189
Median: 0.188
Standard deviation 0.028
Rel. st. deviation (%) 14.570

Run 2:
Number of laboratories: 62
Arithmetic mean value: 0.187
Median: 0.188
Standard deviation 0.014
Rel. st. deviation (%) 7.662

Results in decreasing order:

45	0.293 (*)	121	0.188	
31	0.278 (*)	19	0.186	
43	0.261 (*)	27	0.186	
116	0.248 (*)	104	0.186	
176	0.230	179	0.186	
172	0.226	5	0.184	
3	0.215	120	0.182	
22	0.215	33	0.182	
17	0.210	26	0.182	
2	0.209	180	0.182	
158	0.204	114	0.180	
152	0.200	4	0.180	
15	0.200	12	0.180	
8	0.198	108	0.180	
32	0.195	167	0.179	
23	0.195	175	0.179	
1	0.194	42	0.178	
16	0.194	13	0.178	
150	0.194	118	0.177	
36	0.194	40	0.175	
41	0.193	126	0.174	
7	0.193	39	0.174	
166	0.191	140	0.172	
165	0.191	110	0.170	
146	0.191	112	0.170	
124	0.190	38	0.170	
30	0.190	155	0.168	
153	0.190	14	0.165	
157	0.190	10	0.164	
160	0.190	109	0.160	
163	0.190	11	0.156	
164	0.190	115	0.132 (*)	
125	0.189	44	0.125 (*)	
21	0.188	24	0.124 (*)	
20	0.188			

Ammonium in precipitation
Sample no.: G3
Theoretical value: 0.241
Unit: µg/l

Run 1:
Number of laboratories: 69
Arithmetic mean value: 0.244
Median: 0.239
Standard deviation 0.046
Rel. st. deviation (%) 18.659

Run 2:
Number of laboratories: 66
Arithmetic mean value: 0.240
Median: 0.239
Standard deviation 0.023
Rel. st. deviation (%) 9.621

Results in decreasing order:

45	0.537 (*)	27	0.239	
43	0.336 (*)	179	0.239	
116	0.316	180	0.239	
31	0.310	5	0.237	
17	0.290	152	0.237	
172	0.286	19	0.236	
2	0.271	167	0.235	
176	0.270	26	0.235	
22	0.263	165	0.235	
158	0.262	16	0.235	
15	0.260	42	0.232	
23	0.258	4	0.231	
8	0.257	38	0.230	
3	0.256	108	0.230	
166	0.253	114	0.230	
125	0.252	153	0.230	
32	0.250	120	0.230	
36	0.250	157	0.230	
164	0.250	126	0.226	
41	0.249	118	0.226	
20	0.248	140	0.225	
1	0.246	33	0.224	
146	0.245	40	0.223	
21	0.244	112	0.222	
163	0.243	109	0.220	
150	0.243	10	0.214	
39	0.241	11	0.211	
104	0.241	14	0.210	
7	0.241	110	0.210	
121	0.241	115	0.210	
124	0.240	175	0.202	
160	0.240	155	0.202	
13	0.240	44	0.173	
12	0.240	24	0.138 (*)	
30	0.239			

Ammonium in precipitation
Sample no.: G4
Theoretical value: 0.294
Unit: µg/l

Run 1:
Number of laboratories: 69
Arithmetic mean value: 0.303
Median: 0.293
Standard deviation 0.066
Rel. st. deviation (%) 21.694

Run 2:
Number of laboratories: 67
Arithmetic mean value: 0.294
Median: 0.293
Standard deviation 0.028
Rel. st. deviation (%) 9.487

Results in decreasing order:

45	0.730 (*)	41	0.293
43	0.538 (*)	5	0.292
116	0.387	180	0.292
31	0.353	124	0.290
17	0.350	108	0.290
176	0.350	26	0.289
172	0.342	13	0.288
2	0.328	16	0.288
3	0.321	179	0.288
15	0.320	4	0.287
158	0.318	104	0.287
8	0.316	33	0.284
125	0.312	114	0.280
166	0.312	153	0.280
164	0.310	167	0.280
23	0.307	38	0.280
36	0.307	157	0.280
152	0.307	160	0.280
32	0.305	39	0.279
22	0.305	140	0.279
20	0.304	42	0.278
165	0.302	118	0.278
155	0.301	126	0.277
7	0.301	112	0.275
19	0.300	109	0.270
12	0.300	10	0.267
1	0.299	14	0.266
163	0.299	40	0.265
21	0.299	11	0.265
146	0.299	175	0.264
120	0.297	110	0.260
30	0.296	24	0.234
150	0.296	115	0.229
121	0.295	44	0.205
27	0.293		

Table 21: Analytical results for pH in precipitations samples.

pH in precipitation
Sample no.: G1
Theoretical value: 4.270
Unit: pH-unit

Run 1:

Number of laboratories:	62
Arithmetic mean value:	4.357
Median:	4.330
Standard deviation	0.144
Rel. st. deviation (%)	3.301

Run 2:

Number of laboratories:	58
Arithmetic mean value:	4.337
Median:	4.330
Standard deviation	0.078
Rel. st. deviation (%)	1.795

Results in decreasing order:

108	4.980 (*)	31	4.330	
150	4.910 (*)	17	4.330	
113	4.670 (*)	36	4.330	
38	4.540	124	4.320	
157	4.510	15	4.320	
126	4.460	20	4.320	
146	4.450	32	4.320	
19	4.436	43	4.320	
109	4.430	41	4.320	
14	4.420	165	4.320	
24	4.400	46	4.320	
140	4.400	121	4.320	
112	4.400	166	4.310	
114	4.400	16	4.310	
13	4.400	27	4.310	
116	4.390	155	4.310	
163	4.390	4	4.310	
33	4.380	164	4.310	
153	4.380	5	4.300	
104	4.370	21	4.290	
1	4.360	23	4.290	
120	4.360	26	4.290	
7	4.360	115	4.280	
10	4.350	3	4.279	
152	4.350	118	4.260	
176	4.350	30	4.250	
44	4.340	45	4.180	
175	4.340	11	4.170	
22	4.340	40	4.150	
158	4.340	2	4.080	
8	4.330	172	4.040	(*)

pH in precipitation
Sample no.: G2
Theoretical value: 4.220
Unit: pH-unit

Run 1:

Number of laboratories:	62
Arithmetic mean value:	4.283
Median:	4.280
Standard deviation	0.125
Rel. st. deviation (%)	2.911

Run 2:

Number of laboratories:	57
Arithmetic mean value:	4.283
Median:	4.280
Standard deviation	0.075
Rel. st. deviation (%)	1.748

Results in decreasing order:

41	4.720 (*)	140	4.280	
150	4.710 (*)	152	4.280	
108	4.510	157	4.280	
24	4.500	23	4.270	
113	4.470	15	4.270	
14	4.370	175	4.270	
19	4.351	46	4.270	
13	4.350	121	4.260	
126	4.340	155	4.260	
114	4.340	120	4.260	
163	4.340	124	4.250	
153	4.330	32	4.250	
116	4.330	5	4.250	
112	4.330	21	4.250	
146	4.320	176	4.250	
17	4.310	3	4.241	
33	4.310	16	4.240	
22	4.310	164	4.240	
109	4.310	165	4.240	
7	4.310	4	4.240	
1	4.310	166	4.230	
104	4.300	118	4.230	
10	4.300	38	4.220	
158	4.280	115	4.210	
8	4.280	43	4.200	
20	4.280	30	4.180	
26	4.280	11	4.090	
27	4.280	45	4.050	
31	4.280	40	4.010	(*)
36	4.280	172	3.980	(*)
44	4.280	2	3.975	(*)

pH in precipitation
Sample no.: G3
Theoretical value: 4.570
Unit: pH-unit

Run 1:

Number of laboratories:	62
Arithmetic mean value:	4.607
Median:	4.620
Standard deviation	0.115
Rel. st. deviation (%)	2.487

Run 2:

Number of laboratories:	57
Arithmetic mean value:	4.623
Median:	4.620
Standard deviation	0.065
Rel. st. deviation (%)	1.407

Results in decreasing order:

150	4.990 (*)	109	4.620	
24	4.790	104	4.610	
108	4.780	166	4.610	
14	4.760	155	4.610	
121	4.720	15	4.610	
113	4.720	120	4.600	
126	4.700	38	4.600	
19	4.695	46	4.600	
153	4.680	176	4.600	
116	4.680	21	4.590	
163	4.680	27	4.590	
112	4.670	5	4.590	
114	4.670	164	4.590	
13	4.670	26	4.580	
36	4.660	140	4.580	
33	4.660	23	4.580	
158	4.660	4	4.580	
22	4.660	3	4.572	
7	4.650	16	4.570	
43	4.650	32	4.570	
1	4.630	115	4.560	
8	4.630	157	4.550	
152	4.630	118	4.540	
31	4.630	41	4.530	
124	4.620	165	4.520	
146	4.620	30	4.510	
175	4.620	11	4.420	
10	4.620	45	4.346	(*)
17	4.620	2	4.300	(*)
20	4.620	40	4.260	(*)
44	4.620	172	4.260	(*)

pH in precipitation
Sample no.: G4
Theoretical value: 4.520
Unit: pH-unit

Run 1:

Number of laboratories:	62
Arithmetic mean value:	4.609
Median:	4.580
Standard deviation	0.303
Rel. st. deviation (%)	6.570

Run 2:

Number of laboratories:	61
Arithmetic mean value:	4.573
Median:	4.580
Standard deviation	0.116
Rel. st. deviation (%)	2.529

Results in decreasing order:

115	6.780 (*)	124	4.580
150	5.000	152	4.580
24	4.800	8	4.580
108	4.780	166	4.570
22	4.670	155	4.570
113	4.660	15	4.570
126	4.660	41	4.560
13	4.650	175	4.560
19	4.647	27	4.560
109	4.640	120	4.560
43	4.640	21	4.550
153	4.640	46	4.550
36	4.640	26	4.550
121	4.630	176	4.550
114	4.630	5	4.540
112	4.630	32	4.540
33	4.630	4	4.530
140	4.630	16	4.530
158	4.620	3	4.529
116	4.620	23	4.520
163	4.620	164	4.520
7	4.610	118	4.520
17	4.610	30	4.510
14	4.610	165	4.500
10	4.600	157	4.480
146	4.600	38	4.460
1	4.600	11	4.400
104	4.590	45	4.342
20	4.580	40	4.290
31	4.580	172	4.250
44	4.580	2	4.220

Table 22: Analytical results for strong acid calculated from pH.

Strong acid calculated from pH
Sample no.: G1
Theoretical value: 53.000
Unit:

Run 1:

Number of laboratories:	62
Arithmetic mean value:	45.999
Median:	46.770
Standard deviation	12.586
Rel. st. deviation (%)	27.361

Run 2:

Number of laboratories:	58
Arithmetic mean value:	45.775
Median:	46.770
Standard deviation	8.223
Rel. st. deviation (%)	17.964

Results in decreasing order:

172	91.000 (*)	31	46.770	
2	83.180 (*)	175	46.000	
40	70.790	44	45.710	
11	67.610	158	45.710	
45	66.070	22	45.710	
30	56.230	10	44.670	
118	55.000	152	44.670	
3	52.600	176	44.670	
115	52.480	120	43.650	
26	51.290	1	43.650	
21	51.290	7	43.650	
23	51.290	104	42.660	
5	50.120	153	42.000	
164	49.000	33	41.690	
166	48.980	163	40.740	
155	48.980	116	40.740	
27	48.980	24	39.810	
16	48.980	13	39.810	
4	48.980	140	39.810	
46	48.000	112	39.810	
41	48.000	114	39.810	
43	48.000	14	38.020	
15	47.860	109	37.150	
124	47.860	19	36.640	
121	47.860	146	35.480	
20	47.860	126	34.670	
165	47.860	157	30.900	
32	47.860	38	28.840	
36	46.770	113	21.380	
17	46.770	150	12.300 (*)	
8	46.770	108	10.470 (*)	

Strong acid calculated from pH
Sample no.: G2
Theoretical value: 60.000
Unit:

Run 1:

Number of laboratories:	62
Arithmetic mean value:	54.211
Median:	52.480
Standard deviation	15.372
Rel. st. deviation (%)	28.356

Run 2:

Number of laboratories:	56
Arithmetic mean value:	52.229
Median:	52.480
Standard deviation	7.843
Rel. st. deviation (%)	15.016

Results in decreasing order:

2	105.930 (*)	140	52.480	
172	105.000 (*)	152	52.480	
40	97.720 (*)	157	52.480	
45	89.130 (*)	158	52.480	
11	81.280	8	52.480	
30	66.070	20	52.480	
43	63.000	26	52.480	
115	61.660	27	52.480	
38	60.260	104	50.120	
118	59.000	10	50.120	
166	58.880	33	48.980	
164	58.000	109	48.980	
4	57.540	17	48.980	
16	57.540	1	48.980	
165	57.540	7	48.980	
3	57.410	22	48.980	
32	56.230	146	47.860	
21	56.230	153	47.000	
5	56.230	112	46.770	
176	56.230	116	46.770	
124	56.230	114	45.710	
155	54.950	126	45.710	
121	54.950	163	45.710	
120	54.950	13	44.670	
46	54.000	19	44.570	
175	54.000	14	42.660	
23	53.700	113	33.880	
15	53.700	24	31.620	
31	52.480	108	30.900	
36	52.480	150	19.500 (*)	
44	52.480	41	19.000 (*)	

Strong acid calculated from pH
Sample no.: G3
Theoretical value: 27.000
Unit:

Run 1:

Number of laboratories:	62
Arithmetic mean value:	25.640
Median:	23.995
Standard deviation	7.914
Rel. st. deviation (%)	30.866

Run 2:

Number of laboratories:	58
Arithmetic mean value:	23.871
Median:	23.990
Standard deviation	4.063
Rel. st. deviation (%)	17.019

Results in decreasing order:

172	55.000 (*)	109	23.990	
40	54.950 (*)	124	23.990	
2	50.120 (*)	146	23.990	
45	45.080 (*)	10	23.990	
11	38.020	17	23.990	
30	30.900	20	23.990	
165	30.200	44	23.990	
41	30.000	1	23.440	
118	29.000	152	23.440	
157	28.180	8	23.440	
115	27.540	31	23.440	
32	26.920	7	22.390	
16	26.920	43	22.000	
3	26.790	36	21.880	
140	26.300	33	21.880	
4	26.300	158	21.880	
23	26.300	22	21.880	
26	26.300	13	21.380	
164	26.000	114	21.380	
5	25.700	112	21.380	
27	25.700	153	21.000	
21	25.700	163	20.890	
120	25.120	116	20.890	
176	25.120	19	20.180	
38	25.120	126	19.950	
46	25.000	113	19.050	
155	24.550	121	19.050	
166	24.550	14	17.380	
15	24.550	108	16.600	
104	24.550	24	16.220	
175	24.000	150	10.230	

Strong acid calculated from pH
Sample no.: G4
Theoretical value: 30.000
Unit:

Run 1:

Number of laboratories:	62
Arithmetic mean value:	27.261
Median:	26.300
Standard deviation	8.861
Rel. st. deviation (%)	32.505

Run 2:

Number of laboratories:	57
Arithmetic mean value:	25.912
Median:	26.300
Standard deviation	4.487
Rel. st. deviation (%)	17.315

Results in decreasing order:

2	60.260 (*)	124	26.300	
172	56.000 (*)	152	26.300	
40	51.290 (*)	8	26.300	
45	45.500 (*)	104	25.700	
11	39.810	1	25.120	
38	34.670	10	25.120	
157	33.110	146	25.120	
165	31.620	7	24.550	
30	30.900	17	24.550	
23	30.200	14	24.550	
164	30.000	116	23.990	
118	30.000	163	23.990	
3	29.580	158	23.990	
16	29.510	112	23.440	
4	29.510	114	23.440	
32	28.840	121	23.440	
5	28.840	140	23.440	
26	28.180	33	23.440	
21	28.180	153	23.000	
176	28.180	43	23.000	
46	28.000	109	22.910	
175	28.000	36	22.910	
41	28.000	19	22.540	
27	27.540	13	22.390	
120	27.540	113	21.880	
15	26.920	126	21.880	
166	26.920	22	21.380	
155	26.920	108	16.600	
20	26.300	24	15.850	
31	26.300	150	10.000	
44	26.300	115	0.170 (*)	

Table 23: Analytical results for chloride in precipitations samples.

Chloride in precipitation
Sample no.: G1
Theoretical value: 0.193
Unit: µg/l

Run 1:
Number of laboratories: 64
Arithmetic mean value: 0.221
Median: 0.190
Standard deviation 0.176
Rel. st. deviation (%) 79.667

Run 2:
Number of laboratories: 63
Arithmetic mean value: 0.200
Median: 0.189
Standard deviation 0.051
Rel. st. deviation (%) 25.469

Results in decreasing order:

43	1.552 (*)	20	0.189	
40	0.352	16	0.189	
176	0.330	8	0.188	
115	0.330	116	0.187	
125	0.324	13	0.187	
167	0.320	45	0.186	
19	< 0.310			
110	< 0.300			
24	0.293	172	0.185	
157	0.280	1	0.184	
104	0.254	31	0.184	
23	0.253	180	0.183	
109	< 0.250			
124	0.240	158	0.182	
7	0.234	163	0.180	
12	0.230	114	0.180	
2	0.218	126	0.180	
11	0.213	140	0.180	
44	0.211	153	0.180	
108	0.210	32	0.180	
175	0.210	179	0.175	
33	0.210	118	0.170	
21	0.202	120	0.170	
5	0.201	146	0.167	
152	0.200	42	0.163	
4	< 0.200			
150	0.196	22	0.161	
39	0.195	15	0.160	
26	0.195	155	0.160	
112	0.195	38	0.160	
36	0.192	30	0.149	
10	0.192	14	0.137	
27	0.191	121	0.130	
166	0.191	164	0.130	
41	0.191	17	0.119	
3	0.190	165	0.100	

Chloride in precipitation
Sample no.: G2
Theoretical value: 0.212
Unit: µg/l

Run 1:
Number of laboratories: 65
Arithmetic mean value: 0.218
Median: 0.206
Standard deviation 0.052
Rel. st. deviation (%) 23.702

Run 2:
Number of laboratories: 61
Arithmetic mean value: 0.209
Median: 0.205
Standard deviation 0.036
Rel. st. deviation (%) 17.097

Results in decreasing order:

42	0.406 (*)	8	0.206	
40	0.376 (*)	10	0.205	
115	0.340 (*)	31	0.204	
108	0.340 (*)	23	0.203	
167	0.322	180	0.202	
24	0.314	41	0.201	
19	< 0.310			
110	< 0.300			
124	0.290	126	0.200	
30	0.277	114	0.200	
104	0.270	157	0.200	
112	0.252	152	0.200	
11	0.251	15	0.200	
7	0.250	158	0.199	
109	< 0.250			
150	0.244	163	0.199	
12	0.240	17	0.198	
2	0.235	13	0.197	
44	0.234	1	0.194	
5	0.218	120	0.190	
39	0.216	140	0.190	
21	0.216	176	0.190	
36	0.215	43	0.190	
4	0.214	172	0.187	
116	0.214	146	0.183	
26	0.213	118	0.180	
33	0.210	153	0.180	
125	0.210	179	0.180	
32	0.210	155	0.178	
175	0.210	38	0.170	
166	0.209	22	0.167	
27	0.209	164	0.160	
20	0.208	121	0.146	
3	0.208	14	0.145	
16	0.207	165	0.122	
45	0.206			

Chloride in precipitation
Sample no.: G3
Theoretical value: 0.270
Unit: µg/l

Run 1:
Number of laboratories: 65
Arithmetic mean value: 0.272
Median: 0.261
Standard deviation 0.065
Rel. st. deviation (%) 23.945

Run 2:
Number of laboratories: 61
Arithmetic mean value: 0.264
Median: 0.260
Standard deviation 0.040
Rel. st. deviation (%) 15.205

Results in decreasing order:

108	0.540 (*)	157	0.260	
40	0.490 (*)	31	0.260	
42	0.459 (*)	32	0.260	
115	0.400	39	0.260	
167	0.355	116	0.260	
24	0.345	120	0.260	
124	0.340	126	0.260	
104	0.332	41	0.258	
44	0.330	158	0.257	
19	< 0.310			
112	0.309	163	0.257	
2	0.302	13	0.255	
12	0.300	1	0.253	
110	< 0.300			
7	0.299	10	0.251	
11	0.298	172	0.250	
33	0.290	140	0.250	
36	0.276	114	0.250	
		109	< 0.250	
21	0.275	17	0.245	
5	0.275	176	0.240	
150	0.275	146	0.238	
3	0.271	153	0.230	
20	0.271	118	0.230	
45	0.270	155	0.228	
15	0.270	43	0.224	
4	0.269	38	0.220	
27	0.268	164	0.220	
26	0.267	179	0.220	
30	0.265	22	0.201	
16	0.264	152	0.200	
23	0.263	14	0.194	
166	0.262	121	0.185	
125	0.262	165	0.182	
8	0.261	175	0.140	(*)
180	0.261			

Chloride in precipitation
Sample no.: G4
Theoretical value: 0.347
Unit: µg/l

Run 1:
Number of laboratories: 68
Arithmetic mean value: 0.340
Median: 0.340
Standard deviation 0.074
Rel. st. deviation (%) 21.721

Run 2:
Number of laboratories: 64
Arithmetic mean value: 0.333
Median: 0.339
Standard deviation 0.045
Rel. st. deviation (%) 13.649

Results in decreasing order:

108	0.600 (*)	166	0.339	
40	0.592 (*)	10	0.339	
42	0.550 (*)	31	0.338	
115	0.455	4	0.337	
167	0.446	16	0.335	
124	0.410	163	0.333	
104	0.392	180	0.333	
24	0.389	13	0.330	
44	0.385	114	0.330	
112	0.384	116	0.330	
2	0.376	140	0.330	
11	0.372	8	0.330	
12	0.370	1	0.327	
110	0.370	158	0.326	
7	0.368	172	0.322	
150	0.359	176	0.320	
5	0.355	32	0.320	
30	0.354	17	0.311	
		19	< 0.310	
36	0.353	146	0.309	
125	0.352	155	0.302	
15	0.350	118	0.300	
157	0.350	120	0.290	
21	0.349	38	0.290	
39	0.348	22	0.285	
20	0.348	109	0.280	
26	0.346	164	0.280	
27	0.346	179	0.278	
45	0.346	165	0.264	
3	0.345	14	0.250	
43	0.343	121	0.241	
41	0.341	152	0.230	
23	0.341	175	0.230	
126	0.340	153	0.220	
33	0.340	160	0.100	(*)

Table 24: Analytical results for sodium in precipitations samples.

Sodium in precipitation
Sample no.: G1
Theoretical value: 0.286
Unit: µg/l

Run 1:

Number of laboratories:	67
Arithmetic mean value:	0.277
Median:	0.281
Standard deviation	0.040
Rel. st. deviation (%)	14.561

Run 2:

Number of laboratories:	63
Arithmetic mean value:	0.282
Median:	0.281
Standard deviation	0.026
Rel. st. deviation (%)	9.375

Results in decreasing order:

43	< 1.000			
24	0.370	(*)	8	0.281
125	0.356		33	0.280
160	0.350		108	0.280
124	0.340		114	0.280
104	0.330		32	0.280
40	0.314		157	0.280
150	0.308		42	0.279
30	0.307		36	0.279
7	0.304		10	0.278
16	0.300		23	0.277
110	0.300		152	0.276
15	0.300		45	0.273
180	0.296		31	0.273
5	0.296		14	0.272
163	0.296		126	0.270
27	0.294		140	0.270
115	0.294		153	0.270
155	0.293		39	0.269
158	0.291		2	0.264
120	0.290		164	0.260
121	0.290		11	0.257
12	0.290		172	0.256
1	0.289		118	0.250
41	0.289		175	0.250
21	0.288		44	0.243
13	0.287		22	0.242
3	0.286		179	0.235
19	0.286		38	0.230
112	0.286		109	0.220
116	0.286		176	0.210
4	0.282		17	0.151 (*)
26	0.281		167	0.151 (*)
146	0.281		165	0.128 (*)
166	0.281			

Sodium in precipitation
Sample no.: G2
Theoretical value: 0.317
Unit: µg/l

Run 1:

Number of laboratories:	67
Arithmetic mean value:	0.309
Median:	0.313
Standard deviation	0.038
Rel. st. deviation (%)	12.333

Run 2:

Number of laboratories:	63
Arithmetic mean value:	0.315
Median:	0.315
Standard deviation	0.027
Rel. st. deviation (%)	8.489

Results in decreasing order:

43	< 0.100			
160	0.380		19	0.313
124	0.380		31	0.312
40	0.372		115	0.311
157	0.370		126	0.310
125	0.364		33	0.310
104	0.360		153	0.310
30	0.348		36	0.310
7	0.344		32	0.310
15	0.340		150	0.308
5	0.334		42	0.308
163	0.334		152	0.305
158	0.331		39	0.302
41	0.330		14	0.301
121	0.330		164	0.300
12	0.330		175	0.300
166	0.329		140	0.300
27	0.326		2	0.298
155	0.326		10	0.298
120	0.324		22	0.296
4	0.323		24	0.290
13	0.321		172	0.289
108	0.320		44	0.286
114	0.320		45	0.284
110	0.319		11	0.282
112	0.319		118	0.280
3	0.318		179	0.272
180	0.318		116	0.269
1	0.317		38	0.260
21	0.317		176	0.240
26	0.316		109	0.220 (*)
8	0.316		167	0.210 (*)
16	0.315		17	0.210 (*)
146	0.314		165	0.164 (*)
23	0.313			

Sodium in precipitation
Sample no.: G3
Theoretical value: 0.390
Unit: µg/l

Run 1:

Number of laboratories:	67
Arithmetic mean value:	0.382
Median:	0.384
Standard deviation	0.055
Rel. st. deviation (%)	14.448

Run 2:

Number of laboratories:	64
Arithmetic mean value:	0.381
Median:	0.384
Standard deviation	0.034
Rel. st. deviation (%)	8.875

Results in decreasing order:

43	< 1.000			
157	0.690	(*)	150	0.383
124	0.450		33	0.380
160	0.450		36	0.380
8	0.436		108	0.380
125	0.434		126	0.380
104	0.430		175	0.380
30	0.416		32	0.380
40	0.414		19	0.379
158	0.414		152	0.379
15	0.410		14	0.379
23	0.408		31	0.378
163	0.406		2	0.371
5	0.405		4	0.370
7	0.404		164	0.370
13	0.403		39	0.368
12	0.400		42	0.368
121	0.400		10	0.366
27	0.400		16	0.365
180	0.397		116	0.362
155	0.396		45	0.361
1	0.393		11	0.359
112	0.391		172	0.358
41	0.391		44	0.356
166	0.390		179	0.354
140	0.390		118	0.330
153	0.390		38	0.330
114	0.390		22	0.327
115	0.388		176	0.300
146	0.387		24	0.300
120	0.387		167	0.286
21	0.386		17	0.281
26	0.384		109	0.260 (*)
3	0.384		165	0.245 (*)
110	0.384			

Sodium in precipitation
Sample no.: G4
Theoretical value: 0.476
Unit: µg/l

Run 1:

Number of laboratories:	67
Arithmetic mean value:	0.462
Median:	0.467
Standard deviation	0.057
Rel. st. deviation (%)	12.292

Run 2:

Number of laboratories:	63
Arithmetic mean value:	0.467
Median:	0.468
Standard deviation	0.038
Rel. st. deviation (%)	8.147

Results in decreasing order:

43	1.000			
157	0.670	(*)	110	0.466
40	0.570		179	0.465
124	0.550		26	0.464
160	0.550		150	0.464
158	0.511		19	0.462
7	0.510		36	0.461
125	0.508		32	0.460
30	0.503		33	0.460
15	0.500		175	0.460
104	0.500		108	0.460
116	0.498		126	0.460
163	0.491		3	0.457
12	0.490		11	0.456
5	0.489		152	0.456
27	0.487		2	0.455
166	0.486		164	0.450
155	0.483		42	0.448
13	0.482		14	0.448
153	0.480		172	0.447
121	0.480		10	0.446
4	0.480		16	0.443
114	0.480		39	0.441
140	0.480		45	0.433
120	0.479		44	0.422
180	0.479		22	0.414
23	0.478		118	0.410
112	0.476		38	0.400
1	0.473		176	0.370
21	0.472		167	0.361
41	0.472		17	0.354
146	0.470		165	0.328 (*)
8	0.469		109	0.320 (*)
31	0.468		24	0.260 (*)
115	0.467			

Table 25: Analytical results for magnesium in precipitations samples.

Magnesium in precipitation
Sample no.: G1
Theoretical value: 0.155
Unit: µg/l

Run 1:

Number of laboratories:	66
Arithmetic mean value:	0.150
Median:	0.154
Standard deviation	0.022
Rel. st. deviation (%)	14.641

Run 2:

Number of laboratories:	62
Arithmetic mean value:	0.153
Median:	0.154
Standard deviation	0.014
Rel. st. deviation (%)	9.091

Results in decreasing order:

179	0.195	(*)	42	0.154
160	0.190		13	0.153
175	0.186		26	0.153
146	0.178		8	0.152
24	0.170		125	0.151
140	0.170		15	0.150
109	0.170		33	0.150
153	0.170		23	0.150
150	0.170		104	0.150
114	0.170		112	0.150
163	0.164		120	0.149
2	0.163		40	0.149
180	0.163		12	0.149
7	0.162		118	0.147
155	0.161		16	0.146
166	0.160		113	0.145
121	0.160		152	0.145
27	0.159		4	0.144
167	0.159		31	0.142
158	0.159		14	0.141
30	0.158		115	0.141
10	0.158		108	0.140
5	0.158		124	0.140
110	0.157		126	0.140
41	0.157		157	0.140
11	0.157		45	0.134
21	0.155		165	0.122
1	0.155		164	0.120
116	0.155		22	0.119
36	0.155		17	0.119
3	0.154		44	0.097 (*)
19	0.154		172	0.085 (*)
39	0.154		38	0.050 (*)

Magnesium in precipitation
Sample no.: G2
Theoretical value: 0.083
Unit: µg/l

Run 1:

Number of laboratories:	65
Arithmetic mean value:	0.088
Median:	0.081
Standard deviation	0.048
Rel. st. deviation (%)	54.175

Run 2:

Number of laboratories:	63
Arithmetic mean value:	0.080
Median:	0.081
Standard deviation	0.013
Rel. st. deviation (%)	16.222

Results in decreasing order:

160	0.380	(*)	116	0.081
113	0.304	(*)	1	0.081
109	0.120		42	0.081
146	0.105		118	0.080
175	0.099		120	0.080
179	0.098		121	0.080
2	0.091		124	0.080
153	0.090		140	0.080
24	0.090		126	0.080
41	0.090		157	0.080
165	0.089		16	0.080
163	0.088		167	0.080
10	0.088		114	0.080
7	0.087		112	0.080
166	0.087		150	0.079
155	0.085		104	0.079
23	0.085		4	0.078
5	0.085		125	0.077
11	0.085		115	0.076
158	0.085		152	0.076
110	0.085		14	0.074
27	0.084		31	0.073
30	0.084		33	0.070
19	0.084		15	0.070
36	0.084		108	0.070
13	0.084		45	0.067
180	0.083		12	0.067
26	0.082		22	0.061
40	0.082		164	0.060
39	0.082		17	0.054
			172	< 0.050
3	0.082		44	0.052
8	0.082		38	0.020
21	0.081			

Magnesium in precipitation
Sample no.: G3
Theoretical value: 0.103
Unit: µg/l

Run 1:

Number of laboratories:	66
Arithmetic mean value:	0.103
Median:	0.101
Standard deviation	0.046
Rel. st. deviation (%)	44.762

Run 2:

Number of laboratories:	65
Arithmetic mean value:	0.098
Median:	0.100
Standard deviation	0.016
Rel. st. deviation (%)	16.481

Results in decreasing order:

160	0.450	(*)	112	0.100
153	0.130		114	0.100
175	0.124		140	0.100
109	0.120		121	0.100
179	0.120		124	0.100
2	0.111		36	0.100
163	0.111		23	0.100
24	0.110		15	0.100
158	0.109		150	0.099
30	0.107		104	0.098
10	0.107		120	0.098
180	0.107		40	0.098
166	0.107		125	0.097
155	0.106		118	0.096
41	0.106		14	0.096
5	0.106		152	0.095
7	0.105		4	0.095
110	0.105		115	0.094
27	0.105		113	0.093
13	0.104		16	0.093
11	0.104		12	0.091
19	0.104		31	0.091
116	0.103		157	0.090
42	0.103		108	0.090
1	0.102		33	0.090
3	0.102		126	0.090
146	0.102		45	0.087
39	0.102		22	0.080
26	0.102		164	0.080
165	0.101		17	0.076
8	0.101		172	0.052
167	0.101		44	0.035
21	0.101		38	0.030

Magnesium in precipitation
Sample no.: G4
Theoretical value: 0.124
Unit: µg/l

Run 1:

Number of laboratories:	66
Arithmetic mean value:	0.125
Median:	0.122
Standard deviation	0.057
Rel. st. deviation (%)	45.461

Run 2:

Number of laboratories:	65
Arithmetic mean value:	0.118
Median:	0.122
Standard deviation	0.020
Rel. st. deviation (%)	17.090

Results in decreasing order:

160	0.550	(*)	39	0.122
116	0.153		26	0.121
153	0.150		40	0.121
175	0.150		121	0.120
179	0.140		114	0.120
24	0.140		8	0.120
109	0.140		112	0.120
146	0.133		15	0.120
158	0.133		150	0.119
2	0.132		120	0.117
163	0.132		118	0.117
165	0.131		113	0.116
140	0.130		12	0.116
13	0.129		125	0.115
10	0.128		104	0.114
7	0.128		4	0.114
155	0.128		16	0.114
166	0.127		152	0.114
11	0.127		115	0.112
30	0.127		31	0.112
42	0.126		124	0.110
27	0.126		157	0.110
5	0.126		126	0.110
180	0.126		108	0.110
41	0.124		33	0.110
1	0.123		14	0.109
19	0.123		45	0.104
21	0.123		164	0.100
167	0.123		17	0.095
23	0.123		22	0.092
36	0.123		172	0.063
3	0.122		44	0.040
110	0.122		38	0.030

Table 26: Analytical results for calcium in precipitations samples.

Calcium in precipitation
Sample no.: G1
Theoretical value: 0.102
Unit: µg/l

Run 1:
Number of laboratories: 66
Arithmetic mean value: 0.131
Median: 0.110
Standard deviation 0.071
Rel. st. deviation (%) 54.378

Run 2:
Number of laboratories: 63
Arithmetic mean value: 0.119
Median: 0.109
Standard deviation 0.039
Rel. st. deviation (%) 32.882

Results in decreasing order:

43	< 0.500			
24	0.460 (*)	118	0.110	
160	0.420 (*)	26	0.109	
146	0.320 (*)	27	0.109	
157	0.260	39	0.107	
165	0.259	166	0.106	
40	0.231	5	0.106	
108	0.200	11	0.105	
175	0.194	30	0.104	
153	0.160	3	0.104	
7	0.159	179	0.103	
42	0.157	23	0.103	
8	0.152	120	0.102	
113	0.148	124	0.100	
22	0.143	114	0.100	
155	0.132	12	0.100	
109	0.130	14	0.100	
180	0.128	1	0.099	
16	0.126	13	0.099	
19	0.123	158	0.097	
152	0.123	36	0.097	
115	0.122	17	0.094	
104	0.120	41	0.092	
126	0.120	33	0.090	
21	0.118	45	0.090	
163	0.115	31	0.089	
10	0.115	167	0.088	
112	0.113	2	0.087	
110	0.112	172	0.087	
121	0.110	44	0.084	
125	0.110	32	0.080	
15	0.110	150	0.076	
4	0.110	140	0.070	
116	0.110	164	0.070	
		38	< 0.040	

Calcium in precipitation
Sample no.: G2
Theoretical value: 0.140
Unit: µg/l

Run 1:
Number of laboratories: 66
Arithmetic mean value: 0.159
Median: 0.143
Standard deviation 0.066
Rel. st. deviation (%) 41.332

Run 2:
Number of laboratories: 63
Arithmetic mean value: 0.147
Median: 0.142
Standard deviation 0.031
Rel. st. deviation (%) 21.067

Results in decreasing order:

43	< 0.500			
24	0.490 (*)	26	0.143	
160	0.450 (*)	23	0.142	
157	0.300 (*)	180	0.142	
165	0.281	17	0.141	
146	0.239	124	0.140	
108	0.230	4	0.140	
42	0.190	11	0.140	
175	0.186	40	0.140	
113	0.184	39	0.140	
153	0.180	179	0.140	
116	0.180	118	0.140	
104	0.171	158	0.139	
126	0.170	13	0.139	
163	0.163	8	0.138	
16	0.163	120	0.137	
152	0.160	36	0.136	
114	0.160	3	0.132	
155	0.158	32	0.130	
7	0.156	15	0.130	
19	0.154	12	0.130	
125	0.154	14	0.130	
109	0.150	1	0.128	
121	0.150	2	0.125	
112	0.150	31	0.122	
115	0.149	44	0.120	
30	0.147	33	0.120	
22	0.146	45	0.120	
21	0.146	140	0.110	
10	0.145	167	0.109	
5	0.145	41	0.107	
166	0.145	150	0.101	
27	0.143	164	0.100	
110	0.143	172	0.096	
		38	< 0.040	

Calcium in precipitation
Sample no.: G3
Theoretical value: 0.179
Unit: µg/l

Run 1:
Number of laboratories: 67
Arithmetic mean value: 0.193
Median: 0.183
Standard deviation 0.063
Rel. st. deviation (%) 32.420

Run 2:
Number of laboratories: 64
Arithmetic mean value: 0.186
Median: 0.182
Standard deviation 0.027
Rel. st. deviation (%) 14.272

Results in decreasing order:

160	0.500 (*)	27	0.182	
24	0.500 (*)	30	0.181	
43	< 0.500			
157	0.275	26	0.180	
175	0.251	116	0.180	
108	0.250	110	0.180	
42	0.234	121	0.180	
165	0.224	15	0.180	
113	0.223	4	0.180	
109	0.220	167	0.179	
163	0.213	39	0.178	
19	0.213	36	0.178	
7	0.212	179	0.178	
153	0.210	11	0.177	
104	0.207	115	0.176	
114	0.200	13	0.173	
126	0.200	2	0.171	
180	0.199	22	0.171	
17	0.197	12	0.170	
152	0.197	14	0.170	
146	0.196	118	0.170	
10	0.196	1	0.167	
155	0.193	120	0.167	
23	0.190	3	0.167	
112	0.190	140	0.160	
32	0.190	45	0.159	
8	0.190	31	0.156	
124	0.190	44	0.156	
158	0.187	33	0.150	
16	0.187	150	0.141	
125	0.185	172	0.140	
21	0.184	41	0.134	
166	0.184	164	0.130	
5	0.184	38	0.040 (*)	
40	0.183			

Calcium in precipitation
Sample no.: G4
Theoretical value: 0.217
Unit: µg/l

Run 1:
Number of laboratories: 67
Arithmetic mean value: 0.230
Median: 0.221
Standard deviation 0.067
Rel. st. deviation (%) 28.955

Run 2:
Number of laboratories: 64
Arithmetic mean value: 0.223
Median: 0.221
Standard deviation 0.034
Rel. st. deviation (%) 15.028

Results in decreasing order:

24	0.550 (*)	32	0.220	
160	0.520 (*)	15	0.220	
43	< 0.500			
114	0.350	124	0.220	
116	0.324	30	0.218	
108	0.300	26	0.217	
157	0.290	39	0.216	
175	0.265	110	0.214	
146	0.261	179	0.214	
165	0.257	13	0.213	
7	0.250	2	0.211	
109	0.250	36	0.211	
163	0.250	11	0.211	
153	0.250	14	0.210	
42	0.247	12	0.210	
113	0.244	115	0.210	
10	0.237	3	0.207	
17	0.234	8	0.204	
104	0.232	1	0.202	
155	0.232	120	0.201	
121	0.230	118	0.200	
126	0.230	4	0.200	
40	0.229	140	0.200	
158	0.229	45	0.194	
19	0.228	167	0.193	
180	0.228	31	0.192	
152	0.227	44	0.190	
5	0.226	33	0.190	
16	0.226	41	0.184	
23	0.226	150	0.166	
125	0.225	172	0.164	
166	0.223	22	0.163	
112	0.223	164	0.160	
27	0.222	38	0.050 (*)	
21	0.221			

Table 27: Analytical results for potassium in precipitations samples.

Potassium in precipitation
Sample no.: G1
Theoretical value: 0.221
Unit: µg/l

Run 1:

Number of laboratories:	66
Arithmetic mean value:	0.222
Median:	0.216
Standard deviation	0.056
Rel. st. deviation (%)	25.397

Run 2:

Number of laboratories:	63
Arithmetic mean value:	0.212
Median:	0.215
Standard deviation	0.026
Rel. st. deviation (%)	12.058

Results in decreasing order:

43	<	1.000			
157		0.510	(*)	41	0.216
125		0.426	(*)	14	0.215
160		0.410	(*)	23	0.212
166	<	0.410			
104		0.262		152	0.212
175		0.260		1	0.212
11		0.256		40	0.211
155		0.242		12	0.210
153		0.240		126	0.210
120		0.240		33	0.210
165		0.238		38	0.210
3		0.236		4	0.210
10		0.234		30	0.209
5		0.232		172	0.207
42		0.232		36	0.207
116		0.231		8	0.205
140		0.230		146	0.202
15		0.230		112	0.201
115		0.228		108	0.200
21		0.228		114	0.200
7		0.227		22	0.198
19		0.226		32	0.195
180		0.225		31	0.194
13		0.221		118	0.190
158		0.220		45	0.190
121		0.220		109	0.190
110		0.220		124	0.190
179		0.220		164	0.190
150		0.219		16	0.188
39		0.219		17	0.159
26		0.218		44	0.155
27		0.218		167	0.141
2		0.217		176	0.140
163		0.217		24	0.140

Potassium in precipitation
Sample no.: G2
Theoretical value: 0.204
Unit: µg/l

Run 1:

Number of laboratories:	65
Arithmetic mean value:	0.195
Median:	0.194
Standard deviation	0.031
Rel. st. deviation (%)	15.707

Run 2:

Number of laboratories:	62
Arithmetic mean value:	0.195
Median:	0.194
Standard deviation	0.018
Rel. st. deviation (%)	9.302

Results in decreasing order:

43	<	1.000			
166	<	0.410			
157		0.360	(*)	152	0.194
104		0.241		1	0.194
160		0.230		30	0.193
175		0.230		11	0.192
3		0.222		4	0.190
180		0.221		12	0.190
7		0.219		38	0.190
42		0.213		33	0.190
125		0.212		126	0.190
41		0.211		153	0.190
5		0.211		23	0.189
10		0.211		36	0.189
120		0.210		112	0.188
110		0.210		146	0.186
15		0.210		172	0.185
21		0.209		115	0.182
14		0.209		165	0.182
19		0.208		114	0.180
155		0.208		108	0.180
158		0.205		164	0.180
39		0.204		118	0.180
27		0.203		16	0.180
26		0.202		150	0.177
2		0.201		109	0.170
140		0.200		31	0.169
32		0.200		22	0.167
124		0.200		17	0.164
163		0.200		45	0.160
179		0.197		167	0.153
13		0.195		44	0.150
				121	< 0.150
40		0.195		24	0.120 (*)
116		0.194		176	0.110 (*)
8		0.194			

Potassium in precipitation
Sample no.: G3
Theoretical value: 0.170
Unit: µg/l

Run 1:

Number of laboratories:	65
Arithmetic mean value:	0.168
Median:	0.163
Standard deviation	0.047
Rel. st. deviation (%)	27.843

Run 2:

Number of laboratories:	63
Arithmetic mean value:	0.161
Median:	0.163
Standard deviation	0.023
Rel. st. deviation (%)	14.238

Results in decreasing order:

43	<	1.000			
175		0.470	(*)	40	0.163
166	<	0.410			
160		0.280	(*)	115	0.161
153		0.210		112	0.160
104		0.201		38	0.160
157		0.200		33	0.160
125		0.194		126	0.160
116		0.193		32	0.160
3		0.190		12	0.160
180		0.188		150	0.159
42		0.181		152	0.159
15		0.180		1	0.159
120		0.180		30	0.159
10		0.180		41	0.157
140		0.180		36	0.153
5		0.175		31	0.152
7		0.174		124	0.150
19		0.174		164	0.150
21		0.172		114	0.150
158		0.172		109	0.150
				121	< 0.150
39		0.171		22	0.149
108		0.170		172	0.147
4		0.170		146	0.146
110		0.170		118	0.140
2		0.169		11	0.140
155		0.169		167	0.138
27		0.169		16	0.138
13		0.169		45	0.137
26		0.168		165	0.130
23		0.166		17	0.127
163		0.165		44	0.110
8		0.165		24	0.090
14		0.164		176	0.080
179		0.163			

Potassium in precipitation
Sample no.: G4
Theoretical value: 0.136
Unit: µg/l

Run 1:

Number of laboratories:	65
Arithmetic mean value:	0.132
Median:	0.130
Standard deviation	0.029
Rel. st. deviation (%)	21.701

Run 2:

Number of laboratories:	59
Arithmetic mean value:	0.129
Median:	0.130
Standard deviation	0.016
Rel. st. deviation (%)	12.778

Results in decreasing order:

43	<	1.000			
166	<	0.410			
160		0.230	(*)	110	0.130
157		0.210	(*)	112	0.130
116		0.201	(*)	114	0.130
153		0.200	(*)	124	0.130
165		0.160		179	0.129
104		0.160		163	0.129
3		0.154		41	0.128
180		0.153		23	0.128
175		0.152		13	0.127
120		0.150		115	0.127
42		0.150		152	0.125
121	<	0.150			
11		0.146		30	0.124
14		0.143		150	0.120
39		0.143		118	0.120
15		0.140		109	0.120
19		0.140		164	0.120
10		0.140		33	0.120
140		0.140		38	0.120
27		0.139		126	0.120
7		0.137		36	0.117
158		0.137		31	0.116
155		0.136		16	0.114
125		0.136		22	0.114
21		0.135		172	0.111
2		0.135		108	0.110
40		0.134		146	0.110
5		0.134		45	0.108
8		0.134		17	0.086
26		0.134		44	0.080
1		0.131		24	0.080
12		0.130		167	0.067 (*)
4		0.130		176	0.050 (*)
32		0.130			

Table 28: Analytical results for conductivity in precipitations samples.

Conductivity in precipitation
Sample no.: G1
Theoretical value: 29.000
Unit: µS/cm

Run 1:

Number of laboratories:	62
Arithmetic mean value:	27.510
Median:	27.635
Standard deviation	2.794
Rel. st. deviation (%)	10.156

Run 2:

Number of laboratories:	58
Arithmetic mean value:	27.455
Median:	27.635
Standard deviation	1.578
Rel. st. deviation (%)	5.746

Results in decreasing order:

104	38.000 (*)	110	27.600	
40	36.700 (*)	27	27.500	
14	31.300	158	27.200	
121	29.900	16	27.200	
166	29.800	118	27.100	
17	29.340	114	27.100	
15	29.200	13	27.000	
19	29.200	24	27.000	
38	29.200	175	27.000	
12	29.200	44	27.000	
3	29.180	116	26.980	
31	29.000	11	26.800	
120	29.000	22	26.600	
10	28.900	165	26.600	
45	28.800	152	26.600	
155	28.700	7	26.220	
43	28.600	36	26.200	
33	28.500	115	26.100	
5	28.500	124	26.000	
21	28.480	126	26.000	
163	28.400	8	25.800	
20	28.300	30	25.300	
2	28.200	157	25.000	
172	28.100	41	24.920	
176	28.000	1	24.770	
32	28.000	150	24.700	
153	27.970	23	24.600	
46	27.960	108	24.400	
146	27.900	109	23.900	
4	27.900	140	20.500 (*)	
164	27.670	113	18.000 (*)	

Conductivity in precipitation
Sample no.: G2
Theoretical value: 32.000
Unit: µS/cm

Run 1:

Number of laboratories:	62
Arithmetic mean value:	30.409
Median:	30.800
Standard deviation	2.436
Rel. st. deviation (%)	8.010

Run 2:

Number of laboratories:	58
Arithmetic mean value:	30.600
Median:	31.000
Standard deviation	1.584
Rel. st. deviation (%)	5.178

Results in decreasing order:

38	39.100 (*)	164	30.600	
43	35.200	110	30.500	
104	34.000	46	30.480	
14	33.200	27	30.200	
121	33.100	7	30.170	
166	32.900	24	30.000	
3	32.800	157	30.000	
17	32.250	124	30.000	
116	31.900	15	30.000	
19	31.800	11	29.900	
31	31.730	126	29.800	
12	31.700	165	29.600	
155	31.700	152	29.500	
10	31.650	150	29.400	
45	31.600	13	29.400	
172	31.400	158	29.400	
5	31.400	22	29.300	
114	31.400	109	29.200	
163	31.400	44	29.000	
20	31.250	118	29.000	
153	31.220	115	28.800	
16	31.200	108	28.800	
33	31.200	1	28.630	
21	31.180	36	28.100	
32	31.130	23	27.800	
4	31.100	30	27.800	
2	31.000	8	27.700	
120	31.000	40	27.300	
146	31.000	41	25.490 (*)	
175	31.000	140	24.900 (*)	
176	31.000	113	21.100 (*)	

Conductivity in precipitation
Sample no.: G3
Theoretical value: 19.000
Unit: µS/cm

Run 1:

Number of laboratories:	62
Arithmetic mean value:	19.566
Median:	19.000
Standard deviation	4.536
Rel. st. deviation (%)	23.184

Run 2:

Number of laboratories:	59
Arithmetic mean value:	18.664
Median:	18.940
Standard deviation	1.120
Rel. st. deviation (%)	6.003

Results in decreasing order:

41	48.400 (*)	176	19.000	
43	33.500 (*)	7	18.940	
104	30.000 (*)	153	18.940	
121	21.000	21	18.900	
38	20.800	163	18.900	
46	20.260	2	18.900	
166	20.100	152	18.800	
14	20.000	32	18.800	
116	19.800	27	18.600	
15	19.700	110	18.300	
33	19.600	11	18.300	
20	19.550	1	18.300	
165	19.500	126	18.230	
114	19.500	124	18.000	
109	19.500	40	18.000	
17	19.440	44	18.000	
3	19.440	157	18.000	
31	19.430	175	18.000	
19	19.400	158	18.000	
4	19.300	22	17.900	
12	19.200	108	17.700	
155	19.200	23	17.600	
10	19.150	118	17.600	
45	19.100	8	17.200	
16	19.100	36	17.100	
146	19.100	115	17.100	
24	19.000	164	17.070	
5	19.000	150	16.930	
120	19.000	140	16.800	
13	19.000	30	16.700	
172	19.000	113	14.400	

Conductivity in precipitation
Sample no.: G4
Theoretical value: 22.000
Unit: µS/cm

Run 1:

Number of laboratories:	62
Arithmetic mean value:	21.521
Median:	21.390
Standard deviation	2.351
Rel. st. deviation (%)	10.923

Run 2:

Number of laboratories:	59
Arithmetic mean value:	21.283
Median:	21.380
Standard deviation	1.485
Rel. st. deviation (%)	6.975

Results in decreasing order:

43	32.000 (*)	153	21.380	
115	30.000 (*)	126	21.300	
41	25.780	11	21.200	
104	25.000	32	21.200	
38	24.300	152	21.100	
121	23.400	27	21.100	
166	22.800	124	21.000	
14	22.700	146	21.000	
116	22.550	157	21.000	
17	22.460	175	21.000	
15	22.300	44	21.000	
19	22.200	176	21.000	
46	22.160	24	21.000	
3	22.070	109	20.900	
31	22.000	7	20.810	
120	22.000	110	20.800	
114	22.000	118	20.500	
4	21.900	13	20.400	
20	21.870	22	20.200	
10	21.800	108	20.200	
155	21.800	23	20.100	
33	21.800	158	20.000	
5	21.800	150	19.840	
16	21.700	1	19.770	
172	21.700	8	19.700	
45	21.600	164	19.380	
12	21.500	36	19.200	
21	21.450	30	18.800	
163	21.400	140	17.000	
2	21.400	40	17.000	
165	21.400	113	16.600 (*)	

Appendix 2

Figures – 27th intercomparison

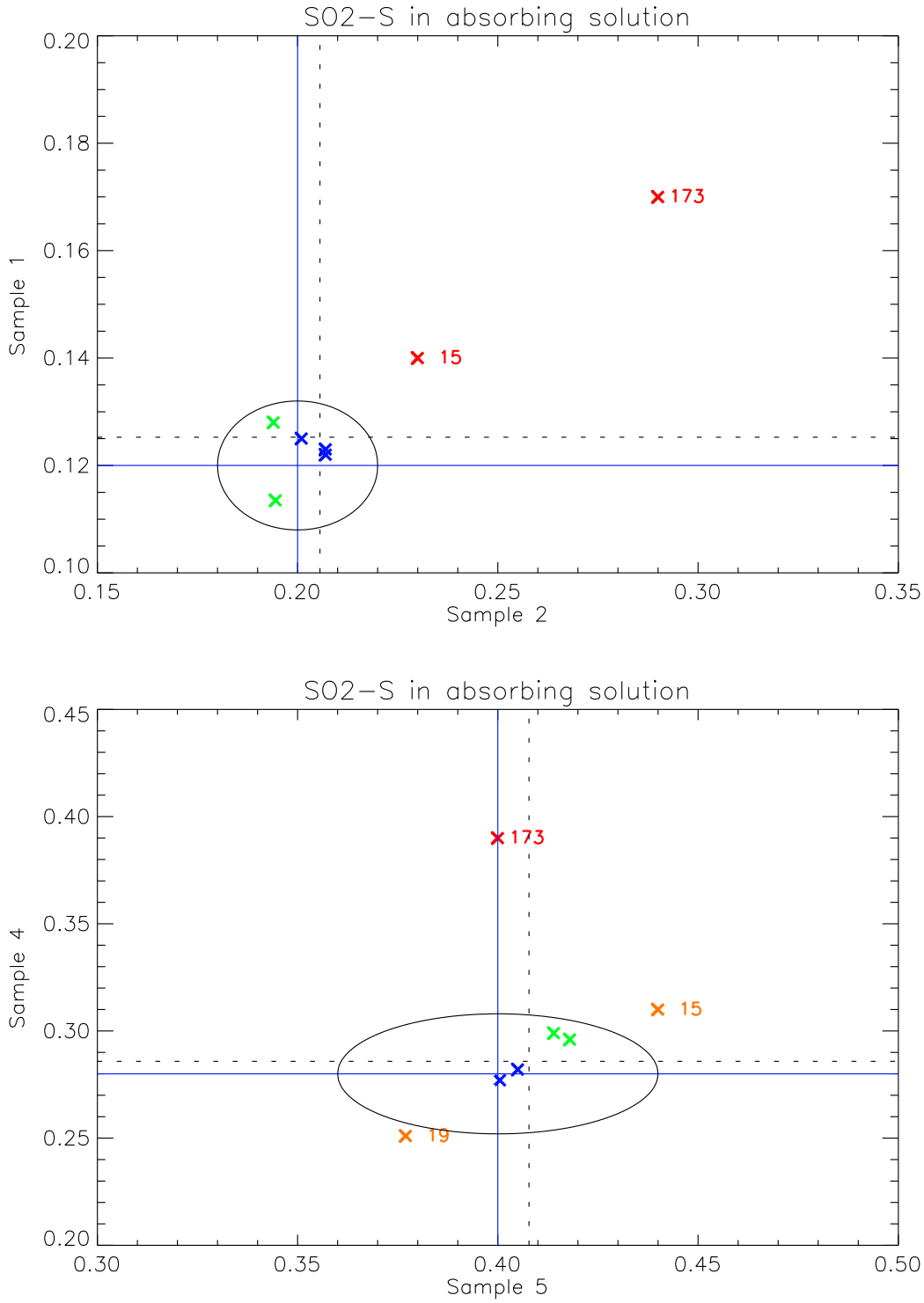

Figure 2: Youden plot of SO_2-S in absorbing solution.

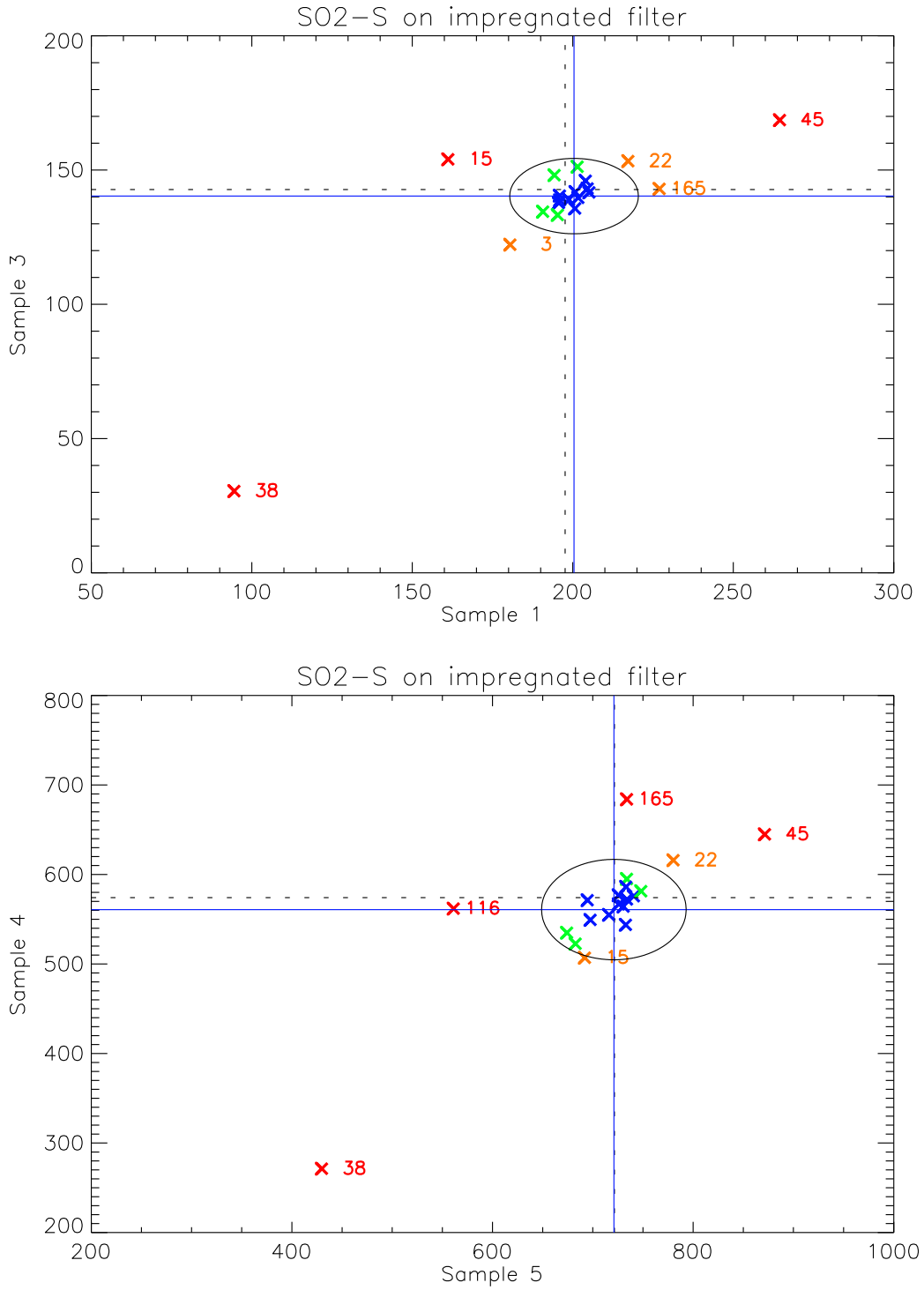

Figure 3: Youden plot of SO_2-S on impregnated filter.

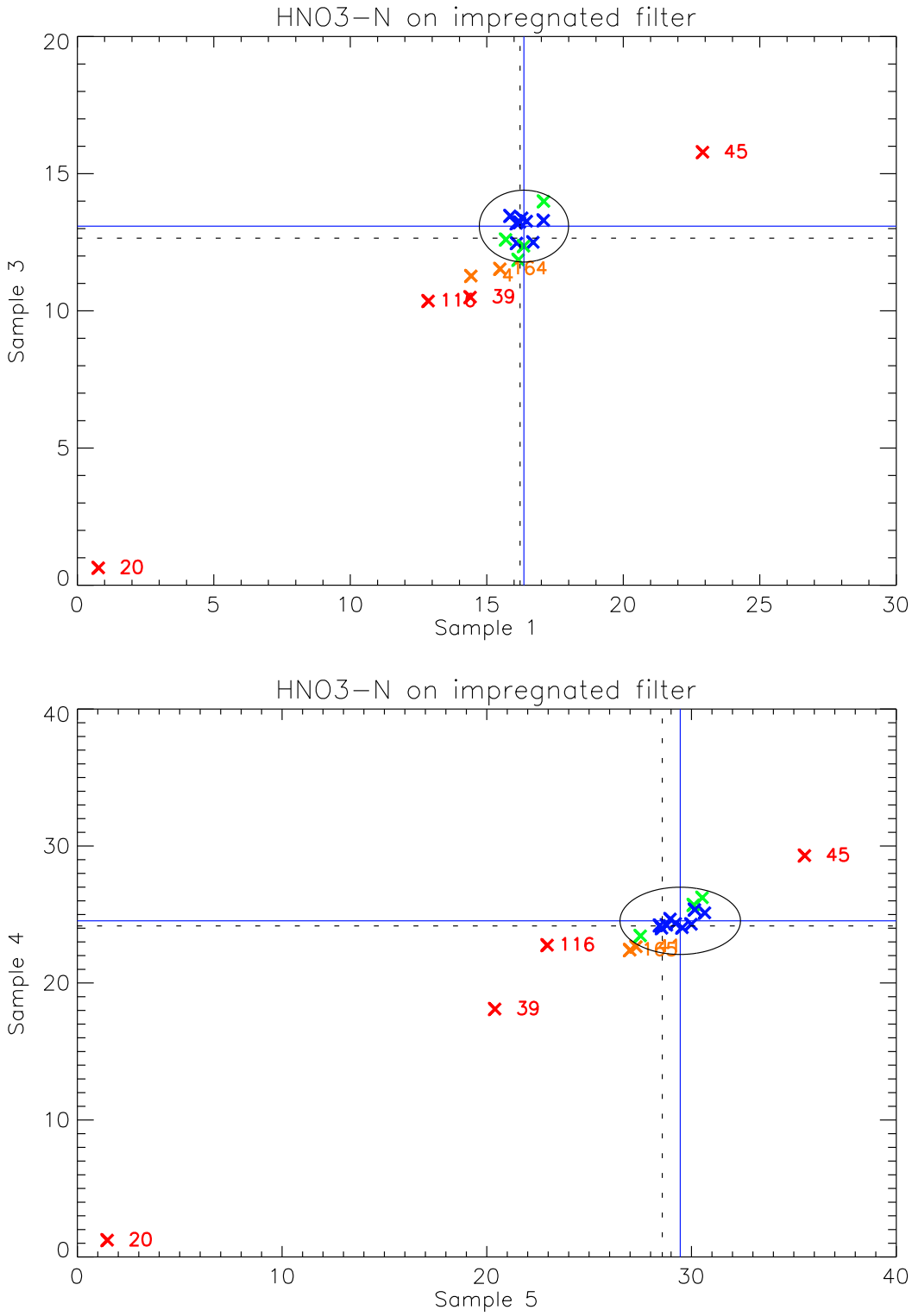

Figure 4: Youden plot of HNO_3-N on impregnated filter.

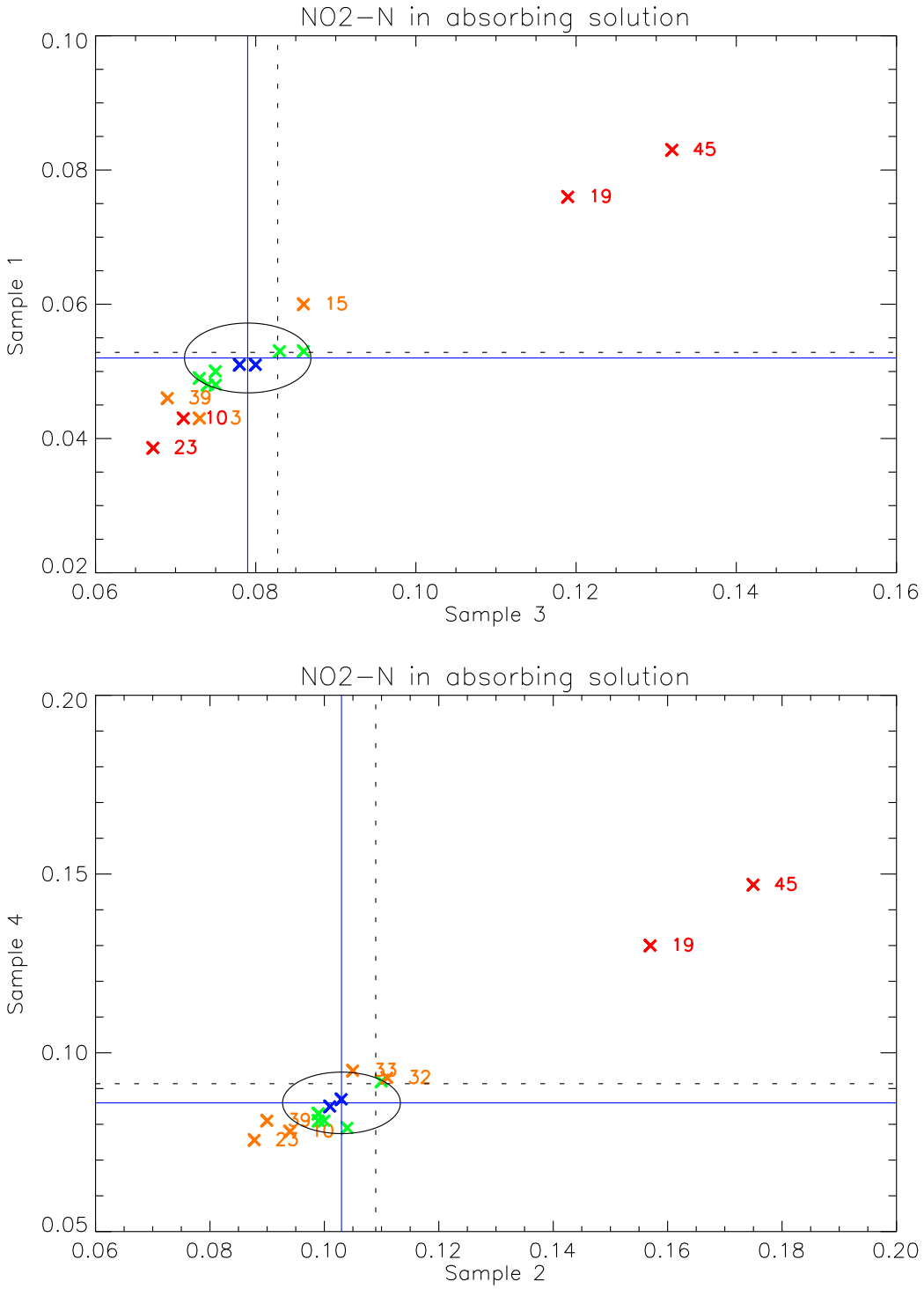

Figure 5: Youden plot of NO_2-N in absorbing solution.

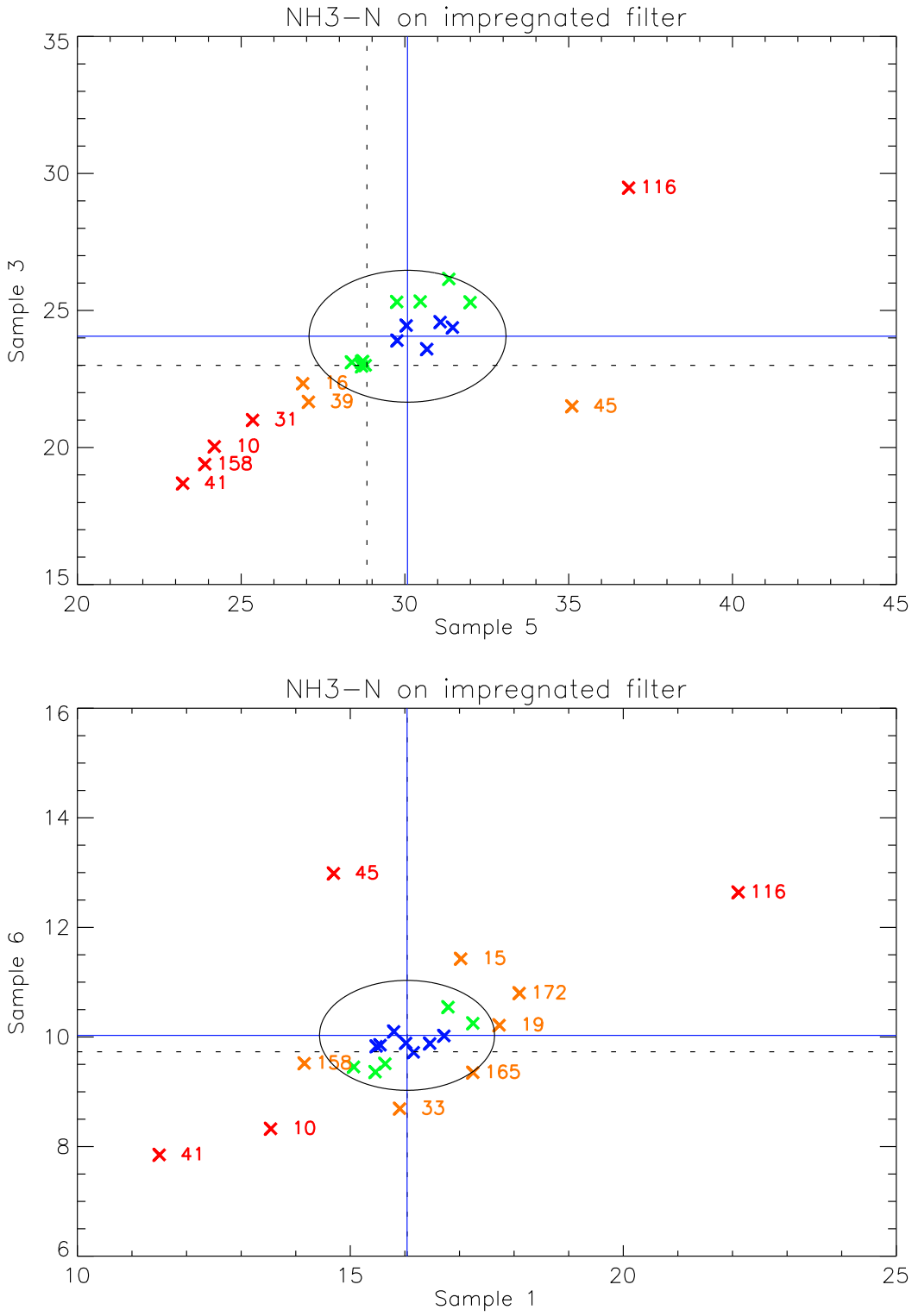

Figure 6: Youden plot of NH_3-N on impregnated filter.

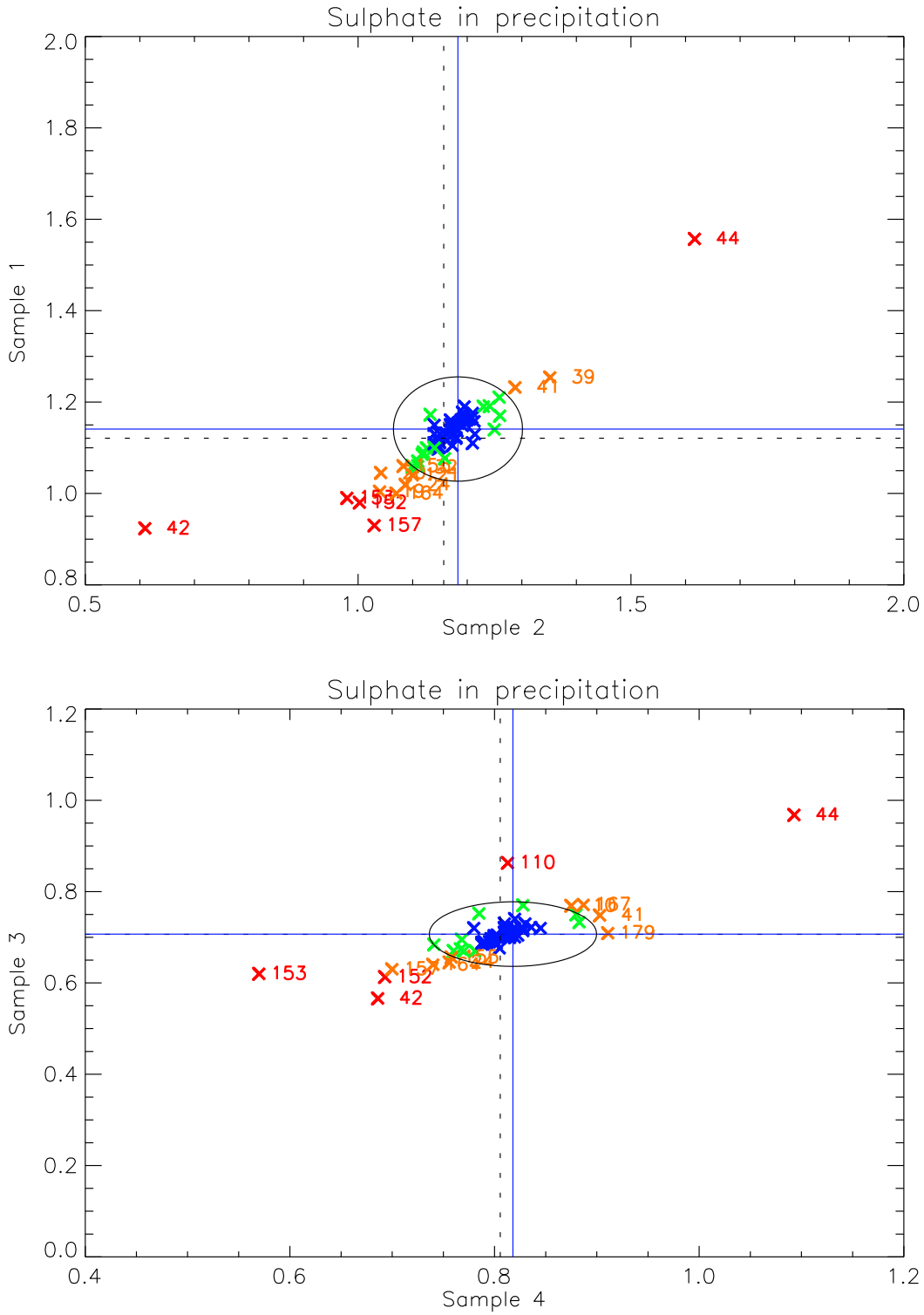

Figure 7: Youden plot of SO_4-S in precipitation.

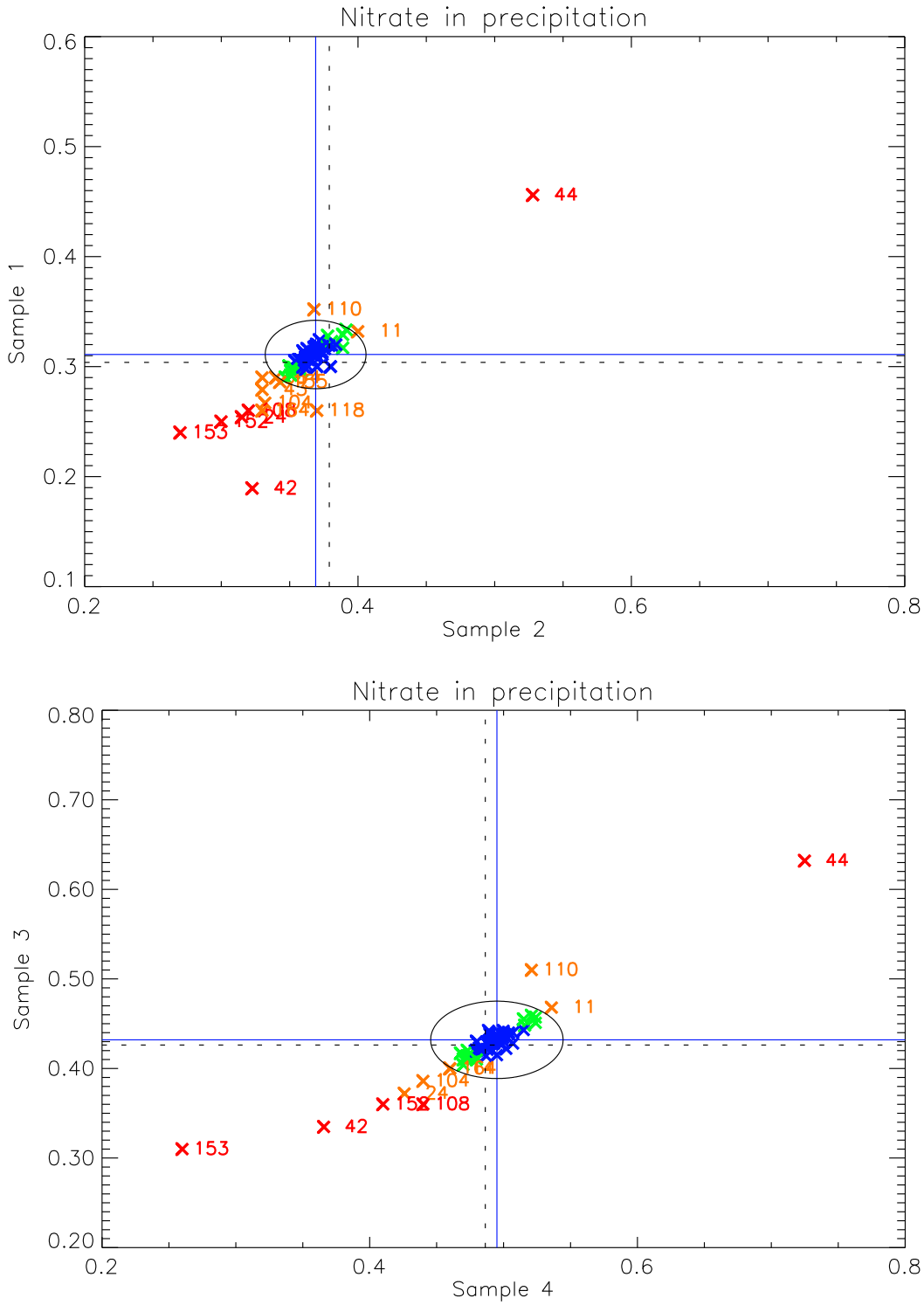

Figure 8: Youden plot of NO_3-N in precipitation.

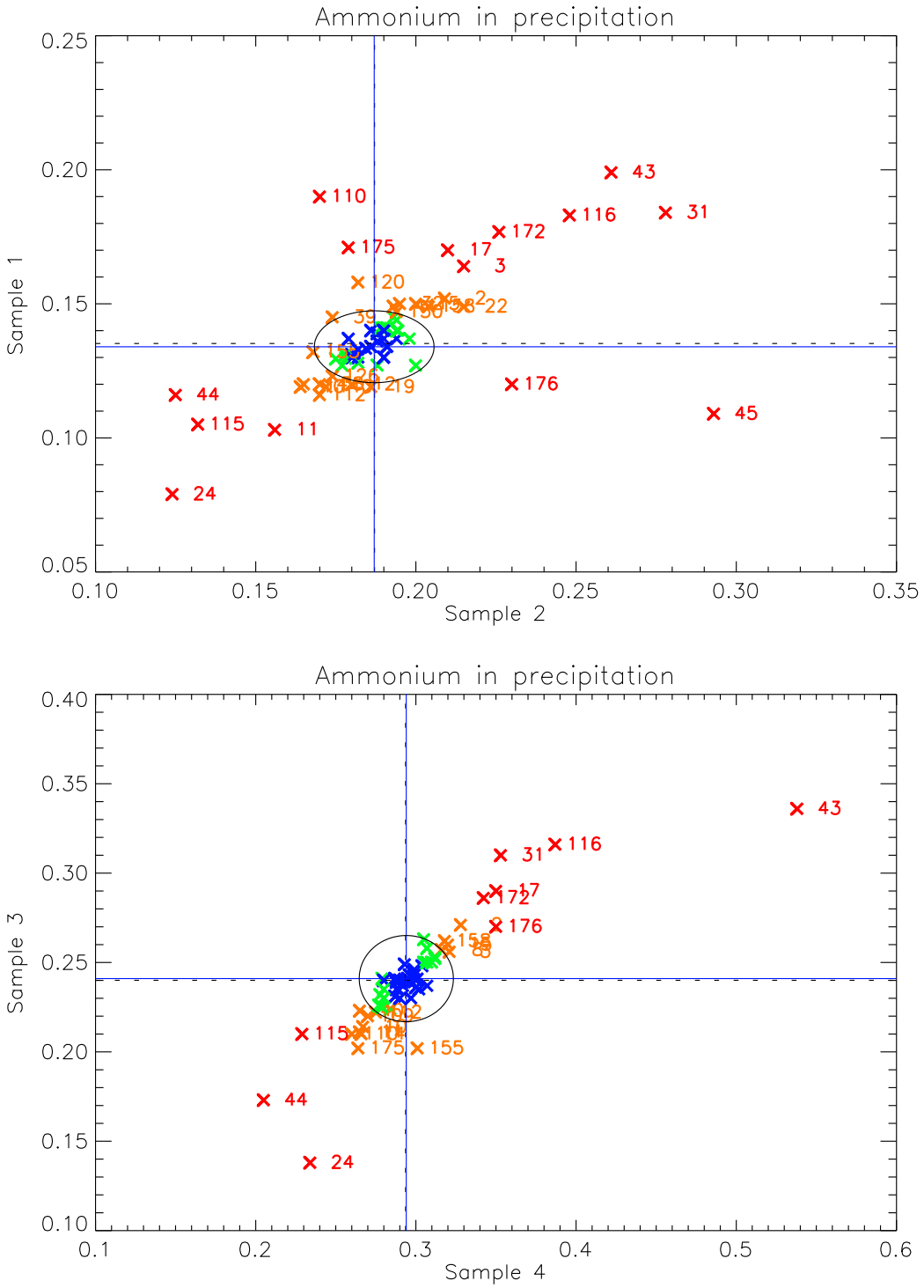

Figure 9: Youden plot of NH_4-N in precipitation.

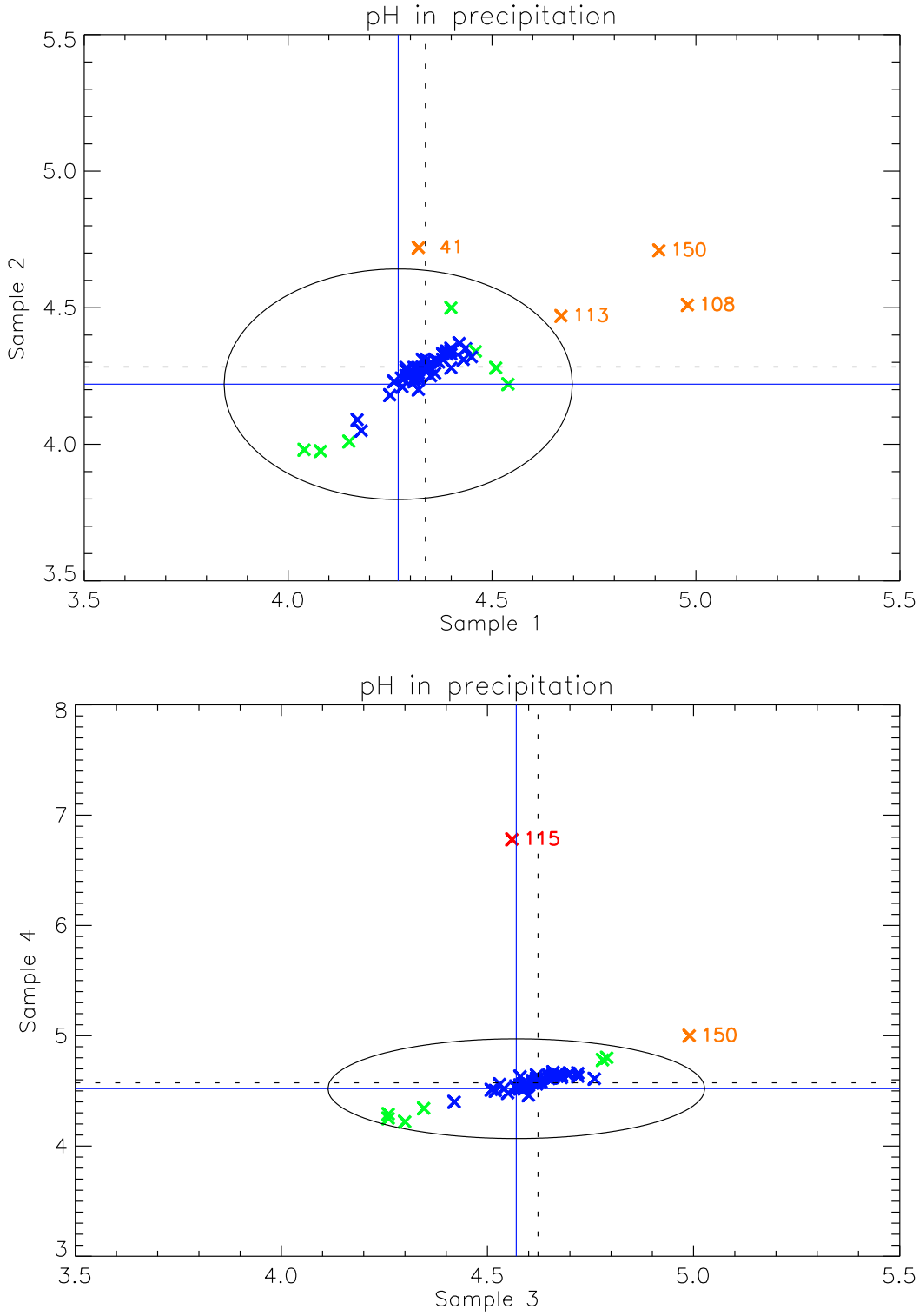

Figure 10: Youden plot of pH in precipitation.

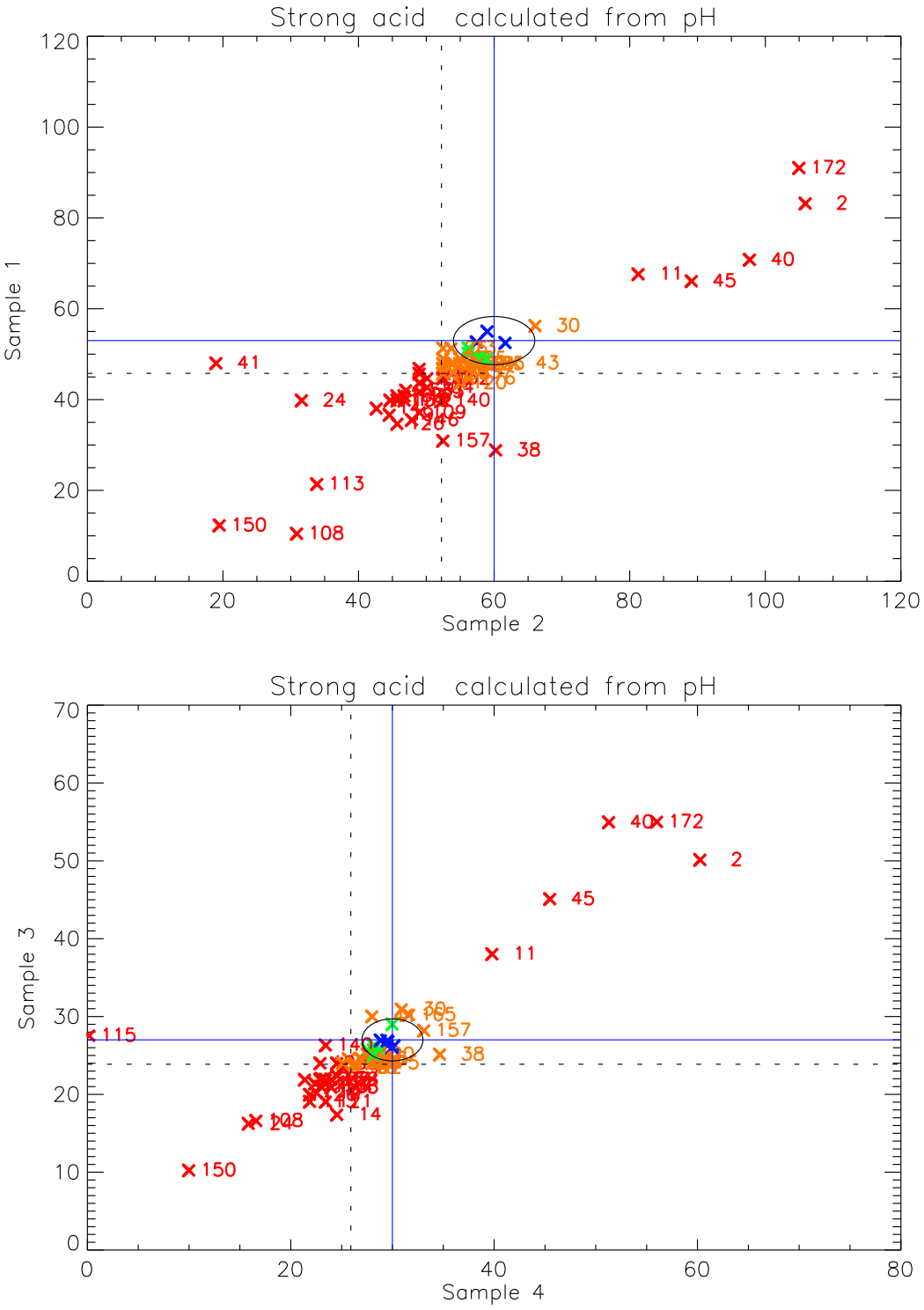

Figure 11: Youden plot of strong acid in precipitation.

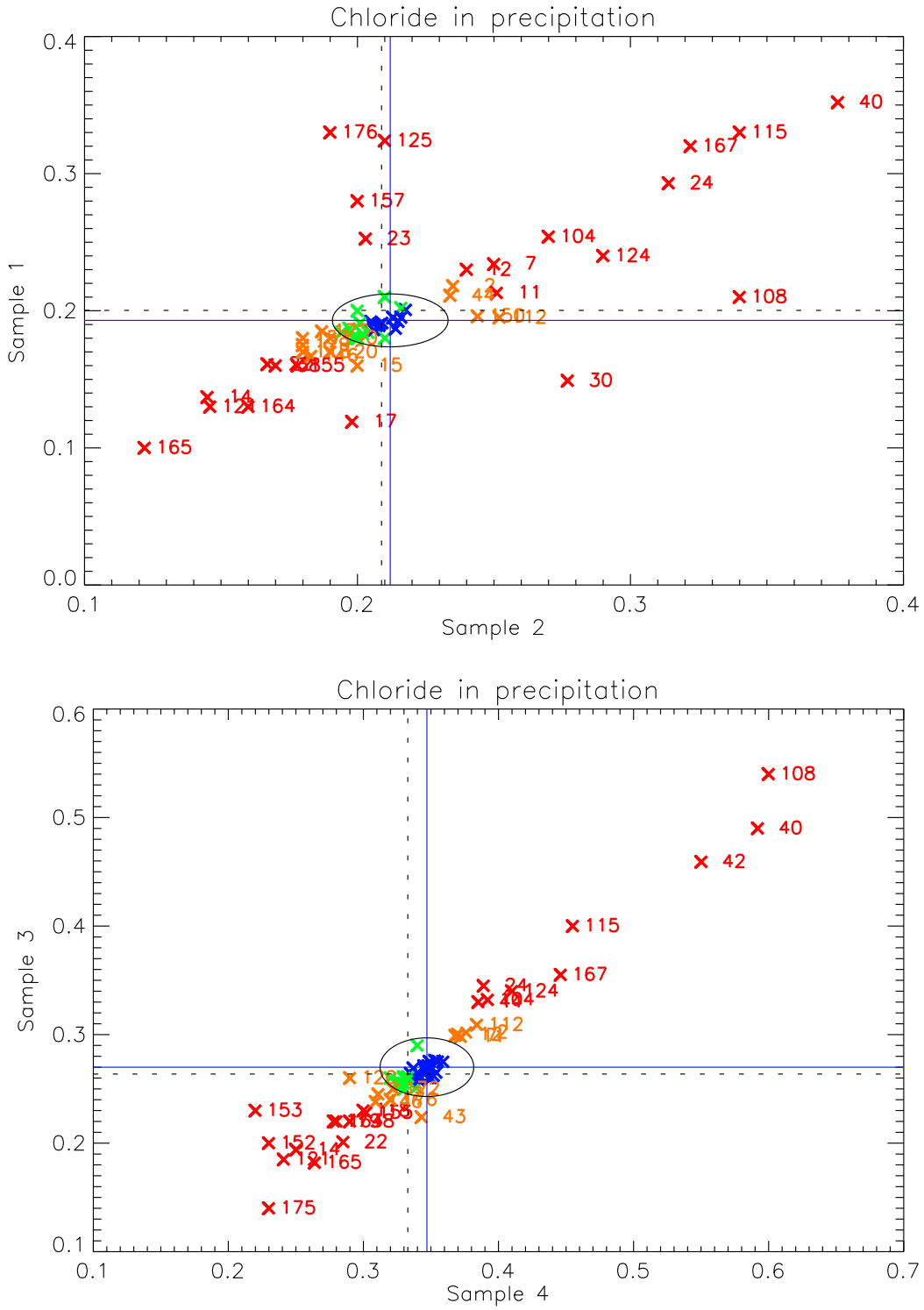

Figure 12: Youden plot of Cl in precipitation.

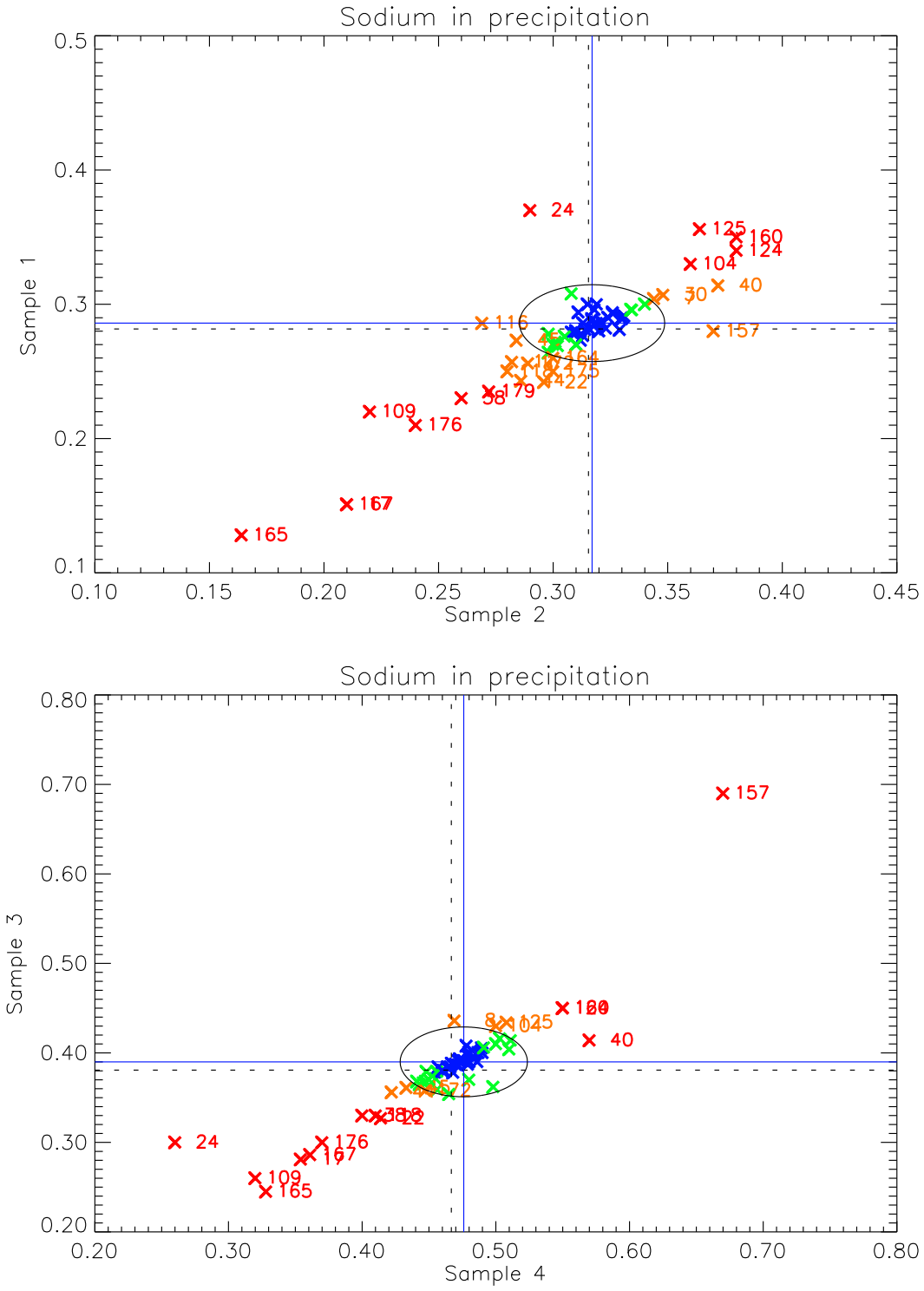

Figure 13: Youden plot of Na in precipitation.

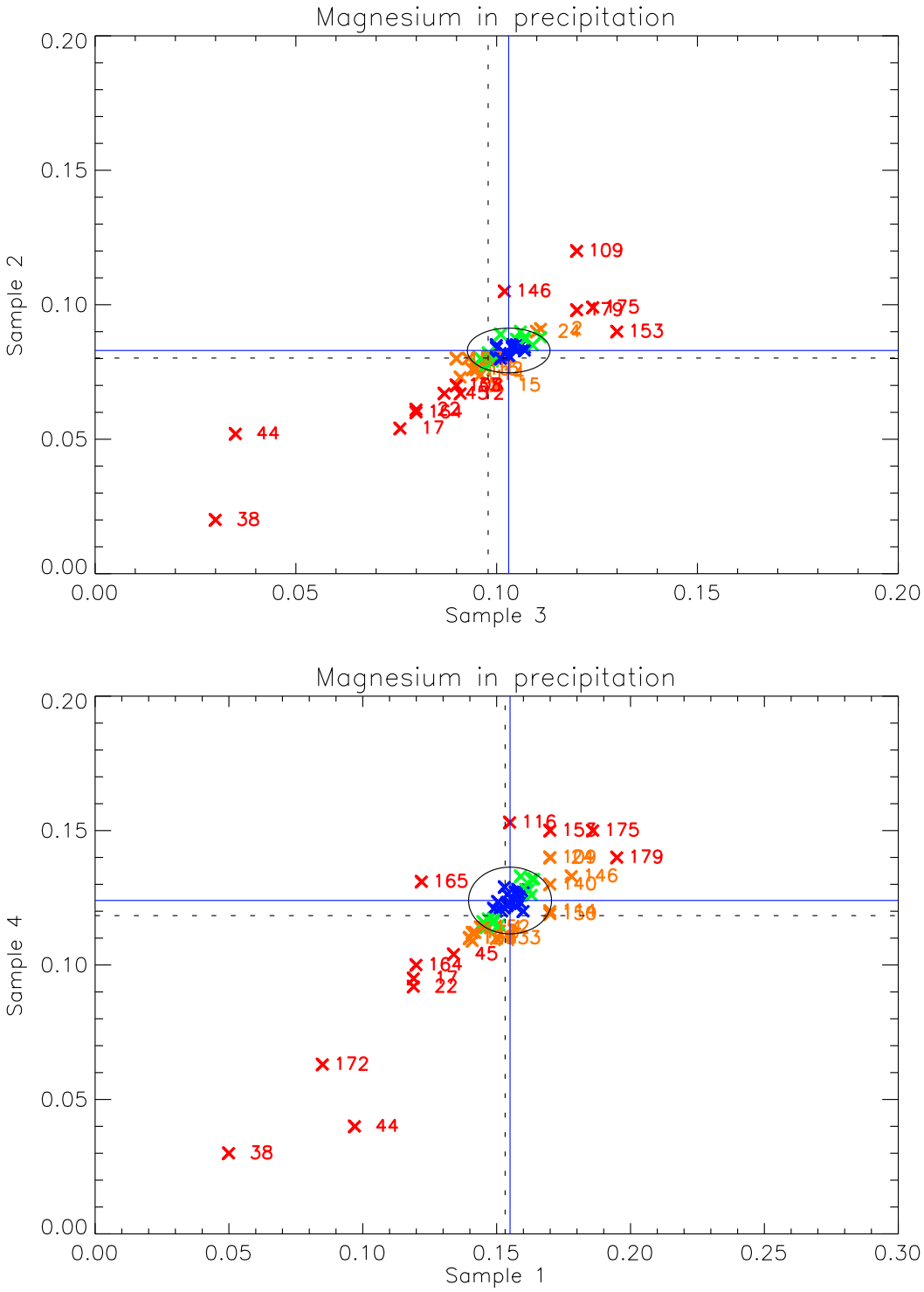

Figure 14: Youden plot of Mg in precipitation.

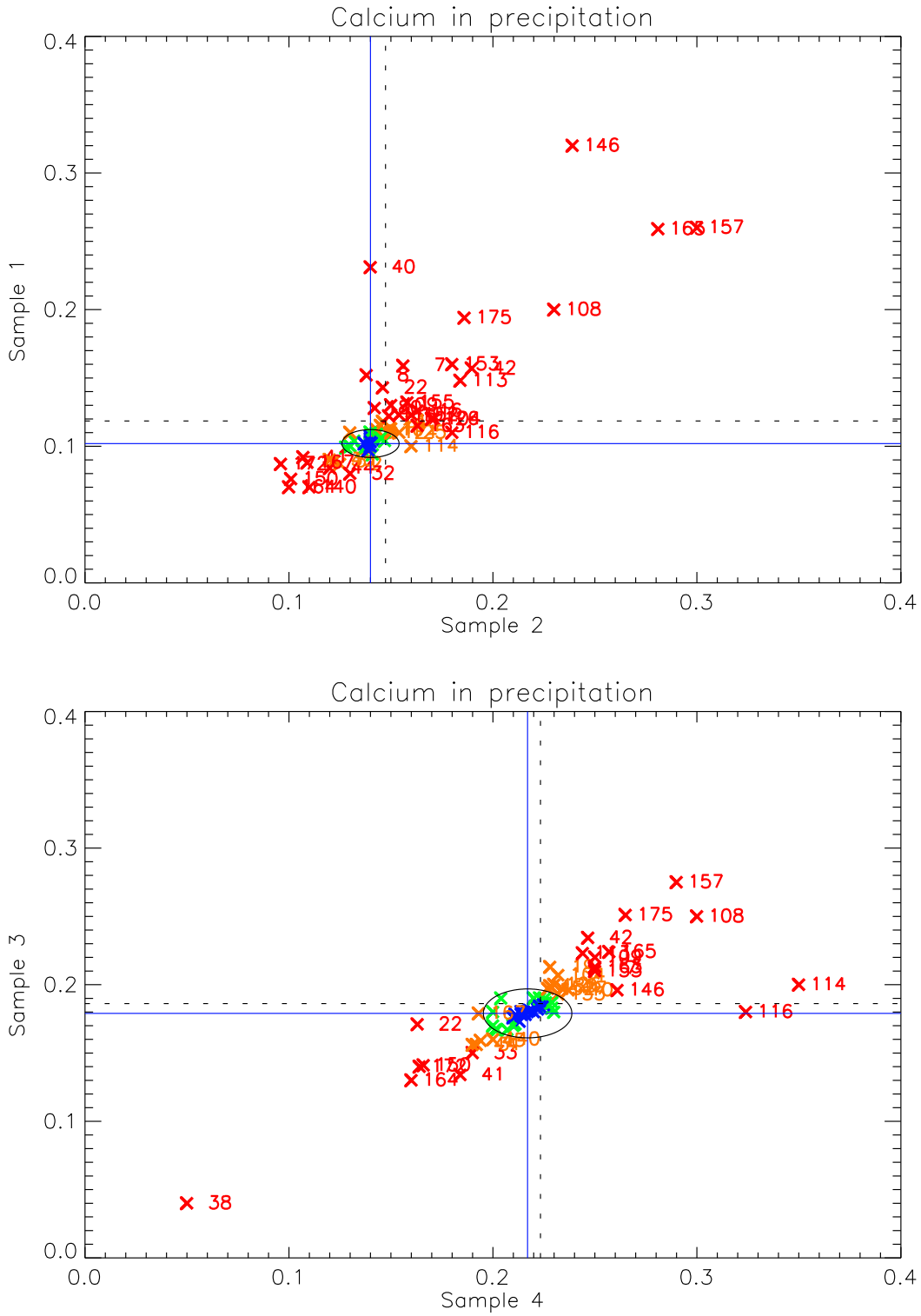

Figure 15: Youden plot of Ca in precipitation.

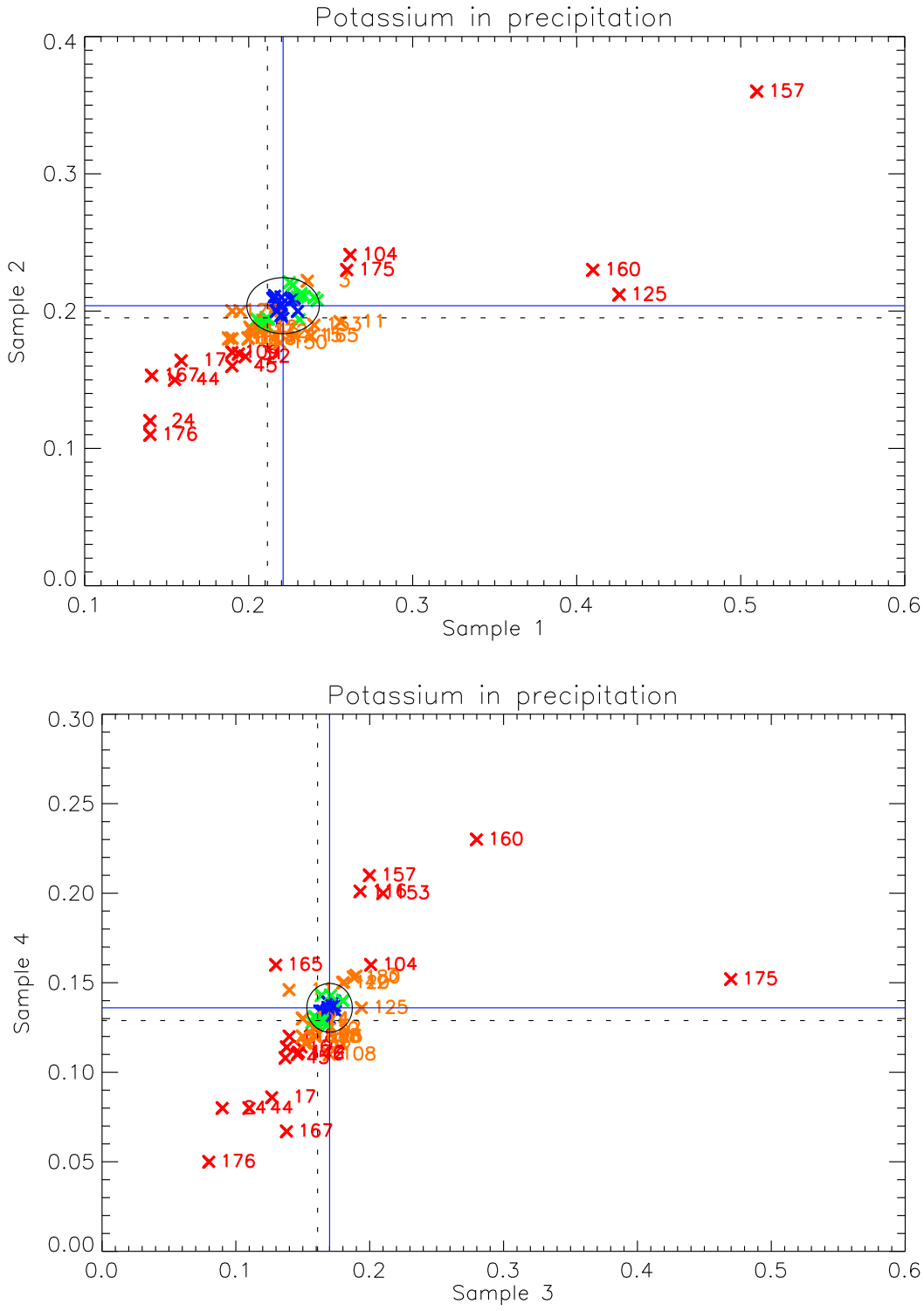

Figure 16: Youden plot of K in precipitation.

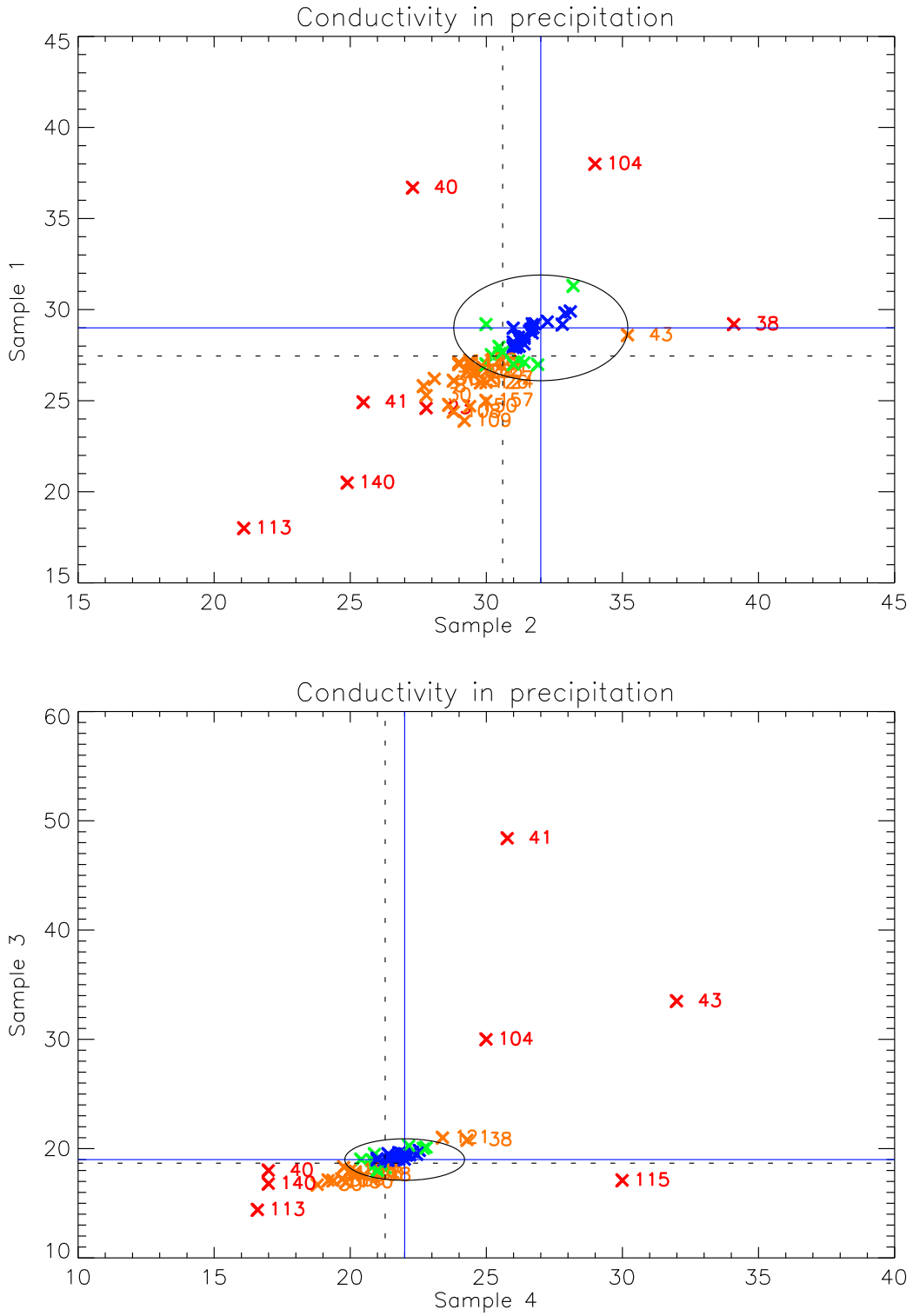

Figure 17: Youden plot of conductivity in precipitation.

Appendix 3

Tables – 28th intercomparison

Table 29: Samples distributed for the twenty-eighth interlaboratory test.

A.	5 synthetic samples for determination of SO_2, consisting of 0.3% H_2O_2 absorbing solution and containing different concentrations of sulphuric acid. One of the samples was an unidentified blank.
B.	5 KOH-impregnated Whatman 40 filters, comprising 1 blank and 4 filters to which different amounts of sulphuric acid and nitrate salt have been added.
C.	4 synthetic samples for determination of NO_2 consisting of sodium nitrite diluted in water.
J.	6 Whatman 40 filters impregnated with 3% oxalic acid, comprising 2 blank and 4 filters to which different amounts of ammonium salt solution have been added.
G.	4 synthetic precipitation samples, containing SO_4^{2-}, NO_3^-, NH_4^+, H^+, Na^+, Mg^{2+} and Cl^-, and Ca^{2+} and K^+.

Table 30a: EMEP laboratories participating in the twenty-eighth laboratory intercomparison. The numbers in front of the names are used in tables and figures.

Armenia	(45)	Dept of Environm. Health and Research
Belgia	(2)	Flemish Environment Agency, Antwerpen
Croatia	(35)	Meteorological and Hydrological Service of Croatia
Czech Republic	(3)	Czech Hydrometeorological Institute, Praha
Denmark	(4)	National Environmental Research Institute. Air Pollution Laboratory
Estonia	(38)	Estonian Environmental Research Centre, Tallinn
Finland	(5)	Finnish Meteorological Institute. Air Quality Department
France	(41)	Micro Pollutants Technology
Georgia	(43)	Centre for Monitoring and Prognostication, Tbilisi
Germany	(7)	IfE Leipzig GmbH, Umweltlabor
Germany	(8)	Umweltbundesamt, Messtelle Schauinsland
Hungary	(10)	Institute for Atmospheric Physics
Ireland	(12)	Met. Eirann, Dublin
Italy	(13)	C.N.R. Istituto Inquinamento Atmosferico
Italy	(30)	Joint Research Centre, Ispra
Latvia	(33)	Air Pollution Observation Laboratory
Lithuania	(32)	Environmental Physics and Chemistry Laboratory
Netherlands	(14)	National Institute of Public Health and Environmental Protection (RIVM)
Norway	(15)	Norwegian Institute for Air Research (NILU)
Macedonia	(40)	Hydrometeorological Institute, Skopje
Moldova	(42)	State Hydrometeorological Service, Chisinau
Poland	(16)	Institute of Meteorology and Water Management, Warsaw
Poland	(46)	Diabla Gora station
Portugal	(17)	Laboratorio Santo Andre
Russian Federation	(22)	Institute of Global Climate and Ecology
Serbia	(24)	Rep. Hydrometeorological Institute of Serbia
Slovakia	(31)	Slovak Hydrometeorological Institute
Slovenia	(36)	Hydrometeorological Institute of Slovenia
Spain	(19)	Centro Nacional de Sanidad Ambiental
Sweden	(20)	Swedish Environmental Research Institute (IVL), Gothenburg
Switzerland	(21)	Swiss Federal Laboratories for Materials Testing (EMPA)
United Kingdom	(23)	AEA Technology, National Environmental Technology Centre
United Kingdom	(167)	CEH Edinburgh

Table 30b: Participating laboratories outside the EMEP network.

Canada	(26)	Meteorological Service of Canada, Toronto
United States of America	(27)	Illinois State Water Survey
Germany	(104)	Hessige Landwirtschafliche
Finland	(107)	The Finnish Forest Institute
Germany	(110)	Thüringer Landesanstalt für Landwirtschaft (TTL), Jena
Germany	(112)	Niedersächsische Forstliche Versuchsanstalt (NVF)
Germany	(115)	Bayerische Landesanstalt f. Wald- und Forstwirtshaft
Switzerland	(116)	Institute for Applied Plant Biology
Germany	(118)	Forstliche Versuchs-und Forschungsansta
Germany	(120)	Landwirtschaftliche Untersuchungs- und Forschungsanstalt (LUFA)
Germany	(121)	Landeslabor Schleswig-Holstein
Belgium	(124)	Laboratorium voor Bondemkunde, Gent
Germany	(125)	Bayerisches Landesamt für Umweltschutz, Augsburg
Italy	(126)	APPA Laboratorio Biologico Provinciale
Spain	(150)	Fundación Centro de Estudios ambentials del meditirrain
Slovenia	(153)	Slovenian Forestry Institute, Ljubljana
United Kingdom	(155)	Environmental Research Branch, Forest Research
Hungary	(157)	Ecological Laboratory of Forest research Institute
Japan	(158)	Acid Deposition and Oxidant Research Center (ADOCRC), Niigata
Slovenia	(161)	National Institute of Chemistry, Ljubljana
Thailand	(163)	Environmental Researching and Training Center (ERTC)
Thailand	(164)	Pollution Control Department (PCD)
Poland	(166)	Forest Research Institute, Laboratory of Forest Habitat Chemistry
France	(172)	UMR SAS INRA
Russian Federation	(176)	Main Geophysical Observatory
Russian Federation	(178)	Environmental Chemistry and EANET Monitoring Laboratory. Limnological Institute RAS/SB, Irkutsk
Russian Federation	(179)	Murmansk Environmental Monitoring Centre
Germany	(180)	vTI-Institut für Agrarrelevante Klimaforschung

Table 31: Analytical methods used at the participating laboratories for the determination of sulphur dioxide in absorbing solution (A).

Method	Laboratory
3. Ion chromatography	15, 17, 19, 23, 36, 159, 173
4. Spectrophotometry	178

Table32: Analytical methods used at the participating laboratories for the determination of sulphur dioxide on impregnated filters (B).

Method	Laboratory
4. Ion chromatography	3, 4, 5, 8, 15, 20, 22, 31, 32, 33, 36, 38, 41, 158, 163, 178
5. Spectrophotometry	16

Table 33: Analytical methods used at the participating laboratories for determination of nitric acid on impregnated filters (B).

Method	Laboratory
1. Ion chromatography	3, 4, 5, 8, 15, 20, 22, 31, 32, 33, 38, 41, 158, 163, 178
2. Spectrophotometry	16

Table34: Analytical method for determination of ammonia on impregnated filters (J).

Method	Laboratory
1. Spectrophotometry	3, 4, 8, 10, 15, 19, 32, 33
3 Ion chromatography	5, 13, 31, 36, 38, 41, 158, 178, 180

Table 35: Analytical method used for NO_2 in absorbing solution (C).

Method	Laboratory
1. Spectrophotometry	3, 8, 10,12, 15, 16, 23, 24, 31, 32, 33, 35, 36, 42, 173
2. Ion chromatography	19

Table 36: Analytical methods used for the determination of chemical constituents in precipitation samples.

Lab no	Network	SO_4^{2+}	NH_4^+	NO_3^-	Na^+	Mg^{2+}	Cl^-	Ca^{2+}	K^+
2	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
3	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AAS	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AAS
4	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AES	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AES
5	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
7	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
8	EMEP	Ion chromatography		Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
10	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AAS	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AAS
12	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
13	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
14	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	ICP-MS	ICP-MS	Ion chromatography	ICP-MS	ICP-MS
15	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
16	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AAS	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AAS
17	EMEP	Ion chromatography		Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
19	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AAS	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AAS
20	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography		Ion chromatography
21	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
22	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
23	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
24	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
26	Other	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AAS	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AAS
27	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES
30	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	
31	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
32	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AAS		Ion chromatography	Flame-AAS	Flame-AAS
33	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AES	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AES
35	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
36	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
38	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
40	EMEP		Spectrophotometry	Spectrophotometry			Spectrophotometry		
41	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
42	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
43	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	flame photometry	titration	Ion chromatography	titration	flame photometry
45	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
46	EMEP								
104	ICP-Forest	Ion chromatography	CFA	CFA	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES
107	ICP-Forest	Ion chromatography	Spectrophotometry	Ion chromatography	Na methods		Ion chromatography		
110	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES
112	ICP-Forest	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	ICP-AES	Ion chromatography	ICP-AES	Ion chromatography
115	ICP-Forest	Ion chromatography	Ion chromatography	Ion chromatography	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES
116	Other	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AES	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AES
118	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES

Table 36, cont.

Lab no	Network	SO_4^{2+}	NH_4^+	NO_3^-	Na^+	Mg^{2+}	Cl^-	Ca^{2+}	K^+
120	ICP-Forest	ICP-AES	Spectrophotometry	Spectrophotometry	ICP-AES	ICP-AES	Spectrophotometry	ICP-AES	ICP-AES
121	EMEP	Spectrophotometry	Spectrophotometry	Spectrophotometry	ICP-AES	ICP-AES	Potensiometric method	ICP-AES	ICP-AES
124	Other	Ion chromatography	Ion chromatography	Ion chromatography	Flame-AAS	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AAS
125	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
126		Ion chromatography	Spectrophotometry	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
150	Other	Ion chromatography	Spectrophotometry	Ion chromatography	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES
153	ICP-Forest	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
155	ICP-Forest	Ion chromatography	Spectrophotometry	Ion chromatography	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES
157	ICP-Forest	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AAS	Flame-AAS	Ion chromatography	Flame-AAS	Flame-AAS
158	EANET	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
161	EMEP	Ion chromatography		Ion chromatography			Ion chromatography		
163	EMEP	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
164	EANET								
166	ICP-Forest	Ion chromatography	Ion chromatography	Ion chromatography	ICP-AES	ICP-AES	Ion chromatography	ICP-AES	ICP-AES
167	EMEP	Ion chromatography	Ammonia Flow Injection Analysis	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
167	EMEP	Ion chromatography	Ammonia Flow Injection Analysis	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
172	EMEP		Spectrophotometry						
176	EMEP	Spectrophotometry	Spectrophotometry	Spectrophotometry	Flame-AES	Flame-AAS	Potensiometric method	Flame-AAS	Flame-AES
178	EANET	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography
179	EMEP	Ion chromatography	Spectrophotometry	Ion chromatography	Flame-AAS				Flame-AAS
180	Other	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography	Ion chromatography

Table 37: Reported results for precipitation samples expressed as % deviation from expected value.

Precipitation																																		
Lab no	SO_4^{2-} % deviation from expected value				NH_4^+ % deviation from expected value				NO_3^- % deviation from expected value				Na^+ % deviation from expected value				Mg^{2+} % deviation from expected value				Cl^- % deviation from expected value				Ca^{2+} % deviation from expected value				K^+ % deviation from expected value				pH pH-units from expected value				Cond % deviation from expected value			
	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4
2	9	11	9	8	20	16	15	14	-3	-2	-3	-1	-7	-6	-10	-7	6	5	7	3	6	11	6	4	-39	-20	-14	-17	-1	-1	-3	-5	-0.31	-0.25	-0.32	-0.32	-90	-90	-90	-90
3	1	1	0	0	18	11	9	8	-2	-1	-2	-3	0	3	-3	-4	-7	-4	-6	-5	-1	7	0	2	1	10	1	3	0	-3	-6	-3	0.058	0.064	0.031	0.031	-2	-3	9	1
4	-4	-3	-4	-3	-1	-3	-2	-2	-4	-3	-3	-3	-7	-3	-7	-5	-6	-6	-6	-5	10	10	6	8	-1	-2	-4	-4	-7	-8	-9	-8	0.04	0.04	0.04	0.04				
5	1	1	1	0	-2	-3	-5	-2	0	2	0	0	9	9	7	4	0	0	-2	-1	3	5	2	0	1	0	-1	-1	15	16	10	6	0.02	0.02	0.02	0.02	-1	-4	0	-1
7	7	7	4	4	-3	-3	-2	0	2	3	2	2	-4	-4	-6	-7	6	4	2	0	11	11	5	2	5	5	2	-3	0	0	1	3	0.11	0.08	0.07	0.07	-21	-15	-6	-7
8	-3	-2	-3	-4	0	0	-2	-2	0	-1	-1	-6	-4	-1	-4	-3	0	0	0	-1	-4	0	-2	-2	2	0	-2	-1	-3	-3	-4	-3	0.06	0.06	0.05	0.05	-4	-5	6	4
10	-1	4	-1		-6	-6	-6	-6	-6	-3	-1		-5	-4	-8	-8	-2	-2	-3	-2	-10	-19	-7		-16	6	-1	6	3	1	-3	-5	0.11	0.1	0.11		8	-1	2	
12	-1	-2	-1	-2	0	3	1	2	0	-2	-3	-2	-2	2	-1	-2	-6	-12	-12	-6	-9	-2	-5	-6	-69	-41	-38	-36	-7	-8	-9	-8	0.04	0.03	0.03	0.03	1	-2	-3	-1
13	6	4	1	4	13	12	9	9	6	-2	-3	0	16	15	9	11	-3	-4	-3	4	17	19	12	10	15	-2	-1	8	3	5	2	-2	0.24	0.36	0.31	0.31	-27	-21	-10	-16
14	-4	-5	-6	-9	5	-2	-2	-2	-6	25	-7	-4	3	1	12	5	-2	-1	4	1	-5	-21	-15	-10	4	5	9	8	-2	-5	-2	-4	0.12	0.11	0.14	0.14	5	2	7	5
15	1	4	14	6	3	1	0	1	-2	-1	-3	0	4	4	2	0	-1	-4	-6	-6	-23	-16	-5	-4	-10	-7	-10	-8	0	-3	1	5	0.07	0.08	0.07	0.07	3	1	6	4
16	-1	-2	-2	-2	4	-7	-5	-6	-3	-4	-4	-3	1	1	0	-1	1	-1	-2	1	6	6	1	-1	10	3	-1	3	14	1	-2	-1	0.03	0.02	0.03	0.03	0	-2	1	0
17	0	-2	-5	-5					15	8	7	3	10	-5	17	11	27	34	25	10	47	16	3	-1	119	34	26	36	23	26	43	16	-0.37	-0.13	-0.42	-0.42	-16	-9	0	-13
19	-6	-6	-3	-5	6	7	5	5	-10	-7	-7	-6	11	15	9	7	3	8	7	4					4	18	4	3	-2	1	-4	-8	0.21	0.27	0.22	0.22	-3	-5	-2	-1
20	3	1	1	-1	0	3	1	-1	0	-2	-3	-2	2	5	2	0	-3	-11	-5	-3	4	4	3	0					3	1	2	-2	0.1	0.03	0.08	0.08	0	-1	4	3
21	5	5	4	4	4	1	2	3	2	2	2	3	6	6	4	2	3	0	2	2	3	6	1	2	2	0	-1	-1	8	7	5	3	0.05	0.05	0.04	0.04	-2	-4	0	-1
22	-5	-7	-10	-10	36	28	20	16	-9	-7	-5	-4	21	-4	6	-4	1	-11	-10	-4	8	-4	-3	-12	44	-7	-20	-17	2	-7	-9	-13	0.07	0.05	0.05	0.05	-13	-17	-12	-12
23	-3	-3	-3	-3	7	6	8	8	3	3	3	3	-3	1	-1	1	0	4	4	3	-12	-5	-6	-5	14	11	6	12	-3	-2	0	-5	0	0.02	0	0	-20	-17	-11	-13
24	-1	0	2	-3	-9	-8	-1	1	-6	-6	-5	-6	-7	-6	-8	-8	-12	-14	-12	-10	-16	-10	-1	-6	-2	-5	-2	3	-11	-11	-12	-14	-0.44	-0.41	-0.52	-0.52	-4	-13	0	0
26	-2	-2	-2	-2	2	0	0	0	2	0	0	-1	-1	-2	-1	-3	-4	-4	-2	-2	1	7	2	1	5	3	3	1	-8	-8	-5	-7								
27	-1	-2	-1	-2	1	1	1	0	-1	-1	-1	-2	4	2	0	-1	0	0	1	0	-1	3	0	0	4	3	2	1	0	-2	-3	-5	0.04	0.05	0.02	0.02	-2	-3	2	1
30	-7	-7	-9	-9	6	-2	1	5	-6	-4	-3	-2	2	-1	-1	-4	10	8	7	4	4	4	-1	-9	15	18	20	18	-17	-16	-20	-22	0.38	0.06	0.07	0.07	1	-3	3	0
31	-1	-1	-3	-2	15	8	6	3	-4	-2	-3	-2	0	1	-3	-3	-2	-2	-8	-10	-4	4	-3	-4	3	1	-5	-7	-3	-3	-16	-8	0.06	0.06	0.06	0.06	1	-2	3	1
32	0	1	1	1	3	-8	-9	-8	-4	-2	-1	-1	-7	-2	2	0					-1	6	0	-1	4	-22	-11	3	-2	-5	-4	-2	0.05	0.03	0.01	0.01	-11	-10	-4	-4
33	4	4	1	3	-12	-11	-5	-11	19	20	24	15	11	10	7	6	-9	-7	-3	-3	10	9	8	7	3	-7	-6	0	0	-3	-7	-8	0.04	0.05	0.04	0.04	1	-1	5	3
35	3	2	-5	2	6	0	-2	2	-4	-3	-3	-1	6	0	1	-3	-8	-16	-10	-8	-18	-9	-9	-6	-23	-19	-15	-15	3	3	1	1	0.05	0.05	0.05	0.05	0	-2	0	-6
36	-1	-2	-2	-2	-1	-4	-2	1	-5	-4	-5	-4	2	4	3	1	1	-1	1	3	-19	-15	-16	-13	16	7	-1	3	2	3	5	7	0.1	0.1	0.1	0.1	-7	-8	-4	-8
38	2	3	0	1	0	-2	-3	-1	-6	0	-3	-2	-11	-11	-11	-15	10	-4	17	-10	-16	-7	-9	-13	88	50	72	52	-22	-20	-20	-22	0.13	0.05	0	0	-1	-24	17	55
40					15	13	5	1	-11	-12	-10	4									16	10	5	6									-0.61	-0.65	-0.74	-0.74				
41	-3	-3	-6	-6	15	11	4	4	-16	-16	-17	-17	-1	-1	-2	-6	28	25	21	20	5	1	-5	-13	11	29	24	7	6	15	9	10	0.2	0.08	0.08	0.08	-28	-30	-26	-26
42	-29	-34	-10	-36	6	-12	-4	-1	143	4	222	-20	26	27	21	27	28	23	12	27	574	449	343	85	124	60	55	68	39	19	18	26	0.06	0.04	-0.02	-0.02	-16	-18	-15	-12
43	12	8	12	9	-90	-56	-94	-66	9	9	2	-2									31	683	13	-2									0.67	0.32	1.64	1.64	-21	-6	162	-8
45	20	22		19	3	-2	-2	-1	-1	-1	-1	-2	8	7	2	0	3	5	5	3	-6	-1	-2	-2	28	25	10	13	4	3	-3	-3	-0.1	-0.07	-0.12	-0.12	-1	-3	1	0
46																																	0.03	0.03	0.02	0.02				
104	200	201		198	0	-2	-3	2	-13	-14	-14	-14	-12	-11	-13	-12	-12	-13	-14	-12	-3	9	-1	0	-10	-12	-16	-15	-2	-11	-16	-10	2.99	1.68	1.14	1.14	-26	-7	-5	0
107	195	198		210	-5	-3	-2	0	-6	-4	1	-5									-6	-3	-4	-12									0.02	-0.03	-0.01	-0.01	-2	-3	-3	-2
110	6	-1	6	-2	-25	-25	-21	-25	45	10	28	11	-2	2	-4	0	-3	-4	-3	-3	121			36	-38	-22	-22	-17	3	9	12	18	-0.12	-0.09	-0.23	-0.23	-17	-13	-7	-4
112	1	1	1	1	0	3	3	2	3	3	2	0	7	9	6	4	3	-4	-3	-3	4	9	21	13	4	5	-1	-2	8	5	2	-2	0.13	0.13	0.13	0.13	-5	-8	-3	-4
115	0	1	3	1	2	-7	-8	-7	2	2	0	0	6	7	5	0	-8	-11	-10	-10	69	47	39	34	14	3	1	3	6	5	0	4	0.13	0.12	0.14	0.14	-10	-12	-9	-9
116	1	-1	3	-4	24	25	19	17	-6	-6	-6	-5	12	5	4	0	1	1	7	6	18	21	9	8	50	15	57	20	11	4	5	3	0.07	0.06	0.13	0.13	0	-11	0	4
118	3	3	3	2	-5	-6	-6	-6	0	-2	-3	-2	-11	-14	-18	-15	-4	-2	-5	-4	-9	-7	-9	-9	-17	-8	-11	-12	-12	-12	-14	-15	0.02	0.01	-0.01	-0.01	-7	-10	-8	-7
120	-5	-6	-6	-4	19	18	10	14	-8	-8	-8	-6	7	7	4	4	-12	-12	-15	-11	-3	35	34	39	-14	-16	-19	-16	7	4	2	-4	0.04	0.05	0.04	0.04	0	-3	0	0
121	-8	-9	-6	-8	-6	-5	-7	-3	-1	0	-1	-1	-9	-7	1	-10	-10	-8	-7	-11	17	9	2	-5	18	69	0	-2	-7	-8	-9		0.16	0.06	0.03	0.03	-4	-1	8	6
124	4	-1	-8	-5	-16	-11	-13	-4	-4	-8	-1	-4	9	7	5	0	-2	0	0	-2	18	21	3	-2	41	10	0	1	13	-8	-10	-10	0.02	0.02	0.1	0.1	-7	-7	0	0
125	-1	0	1	0	-7	-5	-4	-5	-1	-2	-1	-1	-11	-9	-10	-11	-19	-16	-15	-15	122	8	4	2	2	2	-1	0	-9	-7	-7	-7								
126	-11	-12	-10	-7	-23	2	-9	16	-13	-11	-7	-4	-16	-14	-15	-91	-31	-40	-42	-33	-9	-2	-5	-6	-6	11	-22	-26	-12	-12	-14	-8	0.02	0.08	-0.04	-0.04	-5	-14	2	13

Table 37, cont.

Precipitation																																		
Lab no	SO_4^{2-} % deviation from expected value				NH_4^+ % deviation from expected value				NO_3^- % deviation from expected value				Na^+ % deviation from expected value				Mg^{2+} % deviation from expected value				Cl^- % deviation from expected value				Ca^{2+} % deviation from expected value				K^+ % deviation from expected value				pH pH-units from expected value				Cond % deviation from expected value			
	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4
150	0	-2	-2	-3	11	12	4	5	-4	-5	-6	-6	11	10	1	-4	7	7	4	1	12	-4	-5	-6	4	4	-2	-6	14	17	20	35	0.13	0.1	0.03	0.03	-4	-6	-3	-3
153	-3	-2	-3	-3	-7	-4	-3	-2	-5	-4	-5	-4	-4	0	0	-1	-3	-10	-5	-7	-9	-5	-9	-8	-21	-19	-4	-11	-10	-6	-8	-17	0.19	0.14	0.24	0.24	-10	-8	-7	-6
155	-8	-9	-4	-6	-3	-6	-6	-7	-3	0	0	0	7	6	3	1	-1	0	2	1	-6	-5	-6	-6	-1	1	-3	-5	0	5	-3	-7	0.08	0.08	0.08	0.08	0	-3	1	0
157	0	2	4	9	0	-2	-6	-5	0	10	12	11	20	9	19	-2	31	-16	-13	-10	69	66	21	20	4	18	9	13	13	-3	-14	5								
158	0	3	3	3	11	6	3	2	-2	0	0	1	6	7	5	3	0	-1	1	1	-4	5	4	7	2	1	1	0	3	3	5	4	0.02	0.03	0.01	0.01	-2	-3	1	-1
161	12	11	13	10					3	3	5	5									10	9	3	0																
163	-1	-1	-2	-1	3	2	1	1	-3	-2	-2	-2	7	7	5	2	6	5	9	7	-7	-3	-5	-5	16	12	15	13	2	2	1	-1	0.07	0.06	0.05	0.05	-2	-4	0	-1
164	0	4	5	10	6	68	-3	-18	13	20	24	29	7	5	2	2	-3	-4	-3	-3	-9	-2	3	7	4	-8	-1	-7	3	1	2	-2	0.02	0.03	0	0	-5	-7	-9	-6
166	4	2	4	5	1	-1	-7	0	1	-3	-3	1	-8	-5	-10	-5	-1	-1	-1	-2	-3	-1	-2	-5	2	1	-3	-3	-5	-3	-9	-10	0.07	0.06	0.03	0.03	-2	-5	-1	-2
167	12	14	25	-3	-10	-9	-10	-5	1	1	22	-17	-5	-4	49	-42	-13	-12	18	-29	21	19	44	-14	-88	-58	-36	-44	-27	-16	-40	-7								
172					13	9	8	6																							-0.42	-0.39	-0.46	-0.46				
176	-24	-8	-16	-23	19	-2	-3	26	3	3	-7	4	64	5	6	4	-24	-16	-32	-25	17	45	-9	13	25	-8	-22	-17	175	39	71	57	-0.03	0.03	0.03	0.03	7	-7	-5	-4
178	-2	-3	-4	-3	-13	-1	-4	-5	25	28	26	28	24	29	20	18	6	24	16	13	2	4	3	2	56	44	36	37	-56	-50	-51	-54	-0.01	-0.01	-0.03	-0.03	0	-2	3	2
179	10	225		195	1	-5	-3	-2	5	5	5	6	4	-11	21	-1	34	18	17	4	-14	-16	-22	-20	6	-28	-7	5	8	-17	-13	-16								
180	3	3	-2	-5	2	2	1	1	2	0	0	-1	2	6	5	1	3	8	6	3	3	2	-1	-6	25	10	4	6	-15	-13	-22	-23								

SO_4^{2-} and NO_3^- between ± 10 and 20%

SO_4^{2-} and NO_3^- more than + 20%

NH_4^+, NO_3^-, Cl^-, Na^+, Mg^{2+}, Ca^{2+}, K^+ and cond: between ± 15-25%

NH_4^+, NO_3^-, Cl^-, Na^+, Mg^{2+}, Ca^{2+}, K^+ and cond: more than ± 25%

pH: between ± 0,1-0,2 pH-units

pH: more than ± 0,2 pH- units

Table 38: Reported results for filter samples expressed as % deviation from expected value.

	Air and aerosols																			
	Absorbing solution				Impregnated filter				Impregnated filter				Absorbing solution				Impregnated filter			
	SO_2-S % deviation form expected value				SO_2-S % deviation form expected value				HNO_3-N % deviation form expected value				NO_2-N % deviation form expected value				NH_3-N % deviation form expected value			
	A1	A3	A4	A5	B1	B 2	B 4	B 5	B1	B 2	B 4	B 5	C1	C2	C3	C4	J1	J 2	J 3	J 6
3					7	7	3	5	1	4	4	7	-10	-7	-10	-4	1	0	-4	-1
4					-17	-13	-6	-2	-20	-9	-10	-5					1	-4	-3	-1
5					1	1	2	2	-9	0	1	3					0	-3	-3	-8
8					-1	-1	0	1	-2	-1	0	3	-2	-1	-1	-1	-11	3	-3	-3
10													-16	-9	-9	-8	-22	-20	-26	-28
12													-3	1	-3	0				
13																	20	10	7	10
15	-9	-8	1	14	7	1	0	3	-5	-2	-1	1	5	-4	12	-6	19	12	11	7
16					5	-3	1	0	-8	-4	-1	1	0	-4	0	-3				
17	-7	-3	-9	-5																
19	-6	8	19	25									38	41	47	48	-20	-3	-8	-24
20					-1	-1	4	6	-14	-14	-10	-9								
22					-9	-10	-5	-2	-3	1	5	11								
23	3	1	1	5									-2	-1	0	-1				
24													-5	-6	-3	-5				
31					-14	-15	-12	-11	-6	-4	-3	0	-2	-4	-4	-5	-5	-8	2	-7
32					2	4	2	1	-7	7	8	9	3	5	0	5	0	13	1	5
33					5	5	5	7	-5	-6	-4	0	9	7	9	8	0	-10	8	3
35													-3	-4	-4	-3				
36	14	14	14	7	22	18	5	3	-13	-5	-5	-2	0	-4	-4	-4	-10	0	-5	-2
38					-7	-2	2	2									5	0	5	5
41					-3	-1	0	1	-23	-14	-14	-9					25	17	10	26
42													176	253	312	243				
158					13	15	4	9	1	2	0	6					-7	-10	-14	-2
159	19	42	59	73																
163					-3	-1	-1	1	-3	-1	2	3								
173	-31	-8	0	2									-3	-5	-4	-7				
178	-5	-5	-5	-6	29	-8	2	3	12	5	15	7					-21	-30	-43	
180																	-1	-15	-1	-6

Results between 10 and 20% or between -10 and -20% from expected value

more than ± 20% from expected value

Table 39: Relative random and systematic errors obtained by the different laboratories in the analysis of each parameter in the precipitation.

Lab. no.	SO_4^{2-}		NO^{3-}		NH_4^+		Mg^{2+}		H^+ calc	
	Random error %	Systematic error %	Random error %	Systematic error %	Random error %	Systematic error %	Random error %	Systematic error %	Random error %	Systematic error %
2	2	9	1	-2	2	16	1	5	19	92
3	0	0	1	-2	1	10	2	-6	5	-10
4	1	-3	0	-3	1	-3	1	-6	2	-8
5	1	1	1	0	2	-3	1	0	1	-5
7	2	6	1	2	1	-2	3	2	7	-17
8	0	-3	3	-1	1	-1	0	0	3	-11
10					2	-6	0	-3	26	-26
12	0	-1	1	-2	1	2	1	-8	2	-7
13	2	4	3	-1	1	10	4	-3	14	-46
14	2	-6	13	-5	3	-2	2	0	4	-24
15	4	5	1	-1	1	1	2	-4	4	-14
16	0	-2	0	-4	4	-6	1	0	1	-6
17	2	-3	3	8			9	23	99	82
19	2	-5	0	-7	1	6	1	6	12	-41
20	2	1	1	-2	2	1	2	-4	8	-10
21	1	5	1	2	1	2	1	2	3	-10
22	1	-8	1	-6	2	24	4	-6	4	-11
23	1	-3	1	3	2	7	1	3	2	0
24	2	-1	1	-5	3	-4	2	-11	23	186
26	0	-2	1	0	1	0	1	-3		
27	1	-1	1	-1	0	1	0	0	4	-8
30	0	-8	1	-4	3	3	3	6	27	-13
31	1	-1	0	-3	3	7	4	-5	3	-14
32	0	1	1	-2	5	-9			5	-7
33	1	3	4	19	3	-9	4	-4	3	-8
35	3	2	1	-3	3	1	1	-10	2	-10
36	0	-2	1	-5	2	-2	2	1	5	-21
38	1	1	2	-3	1	-2	11	5	13	-9
40			7	-9	4	8			50	396
41	1	-4	4	-17	2	7	7	21	13	-17
42	12	-33	103	56	6	-3	10	23	13	-3
43	2	10	5	4	23	-72			29	-68
45	3	20	1	-1	2	-2	0	4		
46									2	-6
104	28	204	3	-14	2	-1	2	-13	24	-94
107	17	206	3	-5	1	-2			6	4
110	3	2	10	21	6	-24				
112	0	1	1	2	1	3	3	-3	6	-26
115	1	1	1	1	4	-8	1	-9	6	-25
116	3	0	1	-6	2	22	2	3	1	-18
118	1	3	1	-2	2	-6	1	-5	3	0
120	1	-5	1	-8	2	15	3	-13	3	-8
121	2	-8	0	-1	2	-4	3	-9	13	-11
124	4	-3	3	-4	4	-10	1	-1	4	-10
125	1	0	0	-1	1	-5	5	-15		
126	3	-10	2	-8	14	-4	4	-37	20	1
150	1	-2	2	-6	2	7	3	4	11	-22
153	1	-3	1	-4	1	-3	2	-6	5	-32
155	3	-7	1	0	3	-6	1	0	4	-17
157	3	3	6	11	3	-4	21	-11		
158	1	2	1	0	2	4	1	0	3	-3
161	2	12	2	4						
163	0	-1	0	-2	0	2	2	8	4	-12
164	4	4	11	22	35	1	1	-3	3	-6
166	1	4	2	-1	4	-1	1	-1	5	-11
167	9	15	18	1	2	-8	20	-12		
172					0	8			24	177
176	7	-17	5	3	14	6	8	-29	7	-6
178	1	-3	7	27	3	-5	4	14	2	5
179	101	179	1	5	2	-3	15	14		
180	3	1	1	0	0	1	1	4		

Table 39, cont.

Lab. no.	Na+		Cl-		K+		Cond.	
	Random error %	Systematic error %	Random error %	Systematic error %	Random error %	Systematic error %	Random error %	Systematic error %
2	2	-7	2	6	1	-2	15	-90
3	4	-1	3	1	2	-3	4	-1
4	2	-5	2	8	1	-8		
5	1	7	2	2	6	13	2	-1
7	3	-4	3	7	1	1	7	-12
8	1	-3	1	-2	1	-4	5	0
10	3	-6			3	-1		
12	2	-1	3	-6	1	-8	1	-2
13	3	13	2	13	3	2	9	-20
14	4	5	6	-15	2	-3	1	5
15	1	2	4	-10	3	0	1	4
16	1	0	3	3	6	0	1	0
17	9	11	14	8	12	28	7	-11
19	3	9			3	-3	2	-2
20	2	2	1	3	2	1	2	1
21	1	4	1	2	3	6	2	-1
22	9	1	9	-3	5	-8	5	-13
23	1	0	2	-7	1	-3	5	-16
24	3	-6	4	-9	1	-12	7	-2
26	2	-2	2	2	2	-7		
27	2	1	1	0	1	-2	2	-1
30	3	-1	7	1	1	-18	2	1
31	2	-1	4	-3	5	-5	2	1
32	3	-1	3	0	2	-3	4	-8
33	1	8	1	8	3	-5	2	2
35	3	1	2	-9	1	2	2	-1
36	1	2	2	-15	1	5	3	-7
38	6	-10	5	-10	3	-21	32	6
40			3	9			2	-16
41	3	-1	9	-2	5	8	6	-27
42	8	22	114	375	10	22	4	-14
43			243	18			62	-7
45	2	4	1	-2	3	0	2	-1
46							5	-4
104	4	-11	4	0	5	-10	11	-6
107			6	-5			1	-2
110	2	-1			4	12	6	-11
112	1	6	8	13	4	4	3	-4
115	3	5	3	44	3	5	3	-9
116	3	4	3	11	4	5	7	0
118	6	-15	3	-8	1	-13	2	-7
120	1	6	23	33	4	3	2	0
121	6	-6	8	5			4	2
124	3	5	9	8	10	-9	3	-4
125	3	-9	34	5	2	-8		
126	50	-13	3	-6	3	-13	12	-2
150	6	4	7	-4	5	20	2	-4
153	1	-1	3	-8	3	-9	3	-8
155	1	4	2	-5	4	-1	2	0
157	8	11	15	38	11	0		
158	1	4	5	4	1	4	2	-2
161			3	5				
163	1	4	2	-5	1	1	2	-2
164	1	4	6	1	2	1	1	-7
166	2	-7	2	-2	2	-7	2	-2
167	43	-3	26	16	13	-24		
172							3	0
176	16	6	20	15	56	58	7	-4
178	4	22	1	3	8	-54	2	1
179	12	1	7	-18	12	-12		
180	2	3	4	0	3	-17		

Table 40: Analytical results for sulphur dioxide in absorbing solution.

SO2-S in absorbing solution
Sample no.: A1
Theoretical value: 0.160
Unit: µg S/ml

Run 1:

Number of laboratories:	8
Arithmetic mean value:	0.155
Median:	0.151
Standard deviation	0.025
Rel. st. deviation (%)	15.885

Run 2:

Number of laboratories:	8
Arithmetic mean value:	0.155
Median:	0.151
Standard deviation	0.025
Rel. st. deviation (%)	15.885

Results in decreasing order:

159	0.190	19	0.150
36	0.183	17	0.149
23	0.164	15	0.146
178	0.151	173	0.110

SO2-S in absorbing solution
Sample no.: A3
Theoretical value: 0.240
Unit: µg S/ml

Run 1:

Number of laboratories:	8
Arithmetic mean value:	0.252
Median:	0.237
Standard deviation	0.040
Rel. st. deviation (%)	15.996

Run 2:

Number of laboratories:	7
Arithmetic mean value:	0.240
Median:	0.232
Standard deviation	0.021
Rel. st. deviation (%)	8.633

Results in decreasing order:

159	0.340 (*)	17	0.232
36	0.274	178	0.228
19	0.260	15	0.220
23	0.243	173	0.220

SO2-S in absorbing solution
Sample no.: A4
Theoretical value: 0.320
Unit: µg S/ml

Run 1:

Number of laboratories:	8
Arithmetic mean value:	0.352
Median:	0.324
Standard deviation	0.070
Rel. st. deviation (%)	19.931

Run 2:

Number of laboratories:	7
Arithmetic mean value:	0.330
Median:	0.324
Standard deviation	0.032
Rel. st. deviation (%)	9.615

Results in decreasing order:

159	0.510 (*)	23	0.324
19	0.380	173	0.320
36	0.364	178	0.305
15	0.324	17	0.290

SO2-S in absorbing solution
Sample no.: A5
Theoretical value: 0.440
Unit: µg S/ml

Run 1:

Number of laboratories:	8
Arithmetic mean value:	0.503
Median:	0.465
Standard deviation	0.113
Rel. st. deviation (%)	22.480

Run 2:

Number of laboratories:	7
Arithmetic mean value:	0.466
Median:	0.461
Standard deviation	0.048
Rel. st. deviation (%)	10.328

Results in decreasing order:

159	0.760 (*)	23	0.461
19	0.550	173	0.450
15	0.503	17	0.416
36	0.469	178	0.414

Table 41 Analytical results for sulphur dioxide on impregnated filter.

SO2-S on impregnated filter
Sample no.: B1
Theoretical value: 18.000
Unit: ug S/filter

Run 1:

Number of laboratories:	18
Arithmetic mean value:	18.216
Median:	18.030
Standard deviation	2.168
Rel. st. deviation (%)	11.904

Run 2:

Number of laboratories:	17
Arithmetic mean value:	17.923
Median:	17.900
Standard deviation	1.832
Rel. st. deviation (%)	10.219

Results in decreasing order:

178	23.196 (*)	8	17.900	
36	21.920	20	17.800	
158	20.370	163	17.540	
15	19.300	41	17.470	
3	19.290	38	16.700	
33	18.927	22	16.400	
16	18.900	31	15.436	
32	18.270	31	15.436	
5	18.160	4	14.880	

SO2-S on impregnated filter
Sample no.: B2
Theoretical value: 22.000
Unit: ug S/filter

Run 1:

Number of laboratories:	18
Arithmetic mean value:	21.760
Median:	21.750
Standard deviation	2.014
Rel. st. deviation (%)	9.255

Run 2:

Number of laboratories:	17
Arithmetic mean value:	21.509
Median:	21.720
Standard deviation	1.763
Rel. st. deviation (%)	8.197

Results in decreasing order:

36	26.020 (*)	163	21.720	
158	25.230	8	21.700	
3	23.550	38	21.500	
33	23.126	16	21.360	
32	22.890	178	20.303	
15	22.300	22	19.700	
5	22.130	4	19.080	
20	21.800	31	18.743	
41	21.780	31	18.743	

SO2-S on impregnated filter
Sample no.: B4
Theoretical value: 48.100
Unit: ug S/filter

Run 1:

Number of laboratories:	18
Arithmetic mean value:	47.896
Median:	48.785
Standard deviation	2.529
Rel. st. deviation (%)	5.280

Run 2:

Number of laboratories:	16
Arithmetic mean value:	48.616
Median:	49.010
Standard deviation	1.508
Rel. st. deviation (%)	3.101

Results in decreasing order:

33	50.623	16	48.570	
36	50.290	41	48.110	
158	50.060	15	48.000	
20	49.800	8	47.900	
3	49.400	163	47.640	
32	49.270	22	45.650	
178	49.249	4	45.280	
5	49.020	31	42.137	(*)
38	49.000	31	42.137	(*)

SO2-S on impregnated filter
Sample no.: B5
Theoretical value: 64.100
Unit: ug S/filter

Run 1:

Number of laboratories:	18
Arithmetic mean value:	64.648
Median:	65.070
Standard deviation	3.333
Rel. st. deviation (%)	5.156

Run 2:

Number of laboratories:	16
Arithmetic mean value:	65.613
Median:	65.200
Standard deviation	1.911
Rel. st. deviation (%)	2.913

Results in decreasing order:

158	69.620	163	65.040	
33	68.360	41	64.920	
20	67.800	32	64.800	
3	67.220	8	64.500	
178	66.191	16	63.840	
15	65.900	22	62.840	
36	65.840	4	62.540	
5	65.300	31	56.929	(*)
38	65.100	31	56.929	(*)

Table 42: Analytical results for nitric acid on impregnated filter.

HNO3-N on impregnated filter
Sample no.: B1
Theoretical value: 14.720
Unit: ug N/filter

Run 1:

Number of laboratories:	17
Arithmetic mean value:	13.769
Median:	13.887
Standard deviation	1.210
Rel. st. deviation (%)	8.788

Run 2:

Number of laboratories:	15
Arithmetic mean value:	13.748
Median:	13.887
Standard deviation	0.840
Rel. st. deviation (%)	6.107

Results in decreasing order:

178	16.527 (*)	31	13.887	
3	14.870	32	13.660	
158	14.810	16	13.530	
8	14.400	5	13.450	
22	14.350	36	12.880	
163	14.215	20	12.600	
15	14.000	4	11.720	
33	13.960	41	11.330	(*)
31	13.887			

HNO3-N on impregnated filter
Sample no.: B2
Theoretical value: 18.000
Unit: ug N/filter

Run 1:

Number of laboratories:	17
Arithmetic mean value:	17.525
Median:	17.700
Standard deviation	1.083
Rel. st. deviation (%)	6.178

Run 2:

Number of laboratories:	17
Arithmetic mean value:	17.525
Median:	17.700
Standard deviation	1.083
Rel. st. deviation (%)	6.178

Results in decreasing order:

32	19.240	31	17.316
178	18.972	31	17.316
3	18.730	16	17.280
158	18.340	36	17.070
22	18.130	33	16.938
5	17.930	4	16.440
163	17.905	41	15.420
8	17.800	20	15.400
15	17.700		

HNO3-N on impregnated filter
Sample no.: B4
Theoretical value: 19.630
Unit: ug N/filter

Run 1:

Number of laboratories:	17
Arithmetic mean value:	19.437
Median:	19.470
Standard deviation	1.377
Rel. st. deviation (%)	7.085

Run 2:

Number of laboratories:	16
Arithmetic mean value:	19.239
Median:	19.435
Standard deviation	1.144
Rel. st. deviation (%)	5.946

Results in decreasing order:

178	22.613 (*)	15	19.400	
32	21.150	31	18.964	
22	20.630	31	18.964	
3	20.490	33	18.766	
163	19.945	36	18.600	
5	19.900	4	17.660	
158	19.710	20	17.600	
8	19.600	41	16.970	
16	19.470			

HNO3-N on impregnated filter
Sample no.: B5
Theoretical value: 26.180
Unit: ug N/filter

Run 1:

Number of laboratories:	17
Arithmetic mean value:	26.596
Median:	26.500
Standard deviation	1.506
Rel. st. deviation (%)	5.664

Run 2:

Number of laboratories:	17
Arithmetic mean value:	26.596
Median:	26.500
Standard deviation	1.506
Rel. st. deviation (%)	5.664

Results in decreasing order:

22	29.190	16	26.400
32	28.500	31	26.195
3	28.090	31	26.195
178	28.047	33	26.160
158	27.640	36	25.740
163	27.055	4	25.000
8	27.000	20	23.800
5	26.920	41	23.700
15	26.500		

Table 43: Analytical results for nitrogen dioxide in absorbing solution.

NO2-N in absorbing solution
Sample no.: C1
Theoretical value: 0.058
Unit: ug N/ml

Run 1:

Number of laboratories:	16
Arithmetic mean value:	0.065
Median:	0.057
Standard deviation	0.026
Rel. st. deviation (%)	40.624

Run 2:

Number of laboratories:	15
Arithmetic mean value:	0.058
Median:	0.057
Standard deviation	0.007
Rel. st. deviation (%)	11.790

Results in decreasing order:

42	0.160 (*)	23	0.057
19	0.080	31	0.057
33	0.063	12	0.056
15	0.061	35	0.056
32	0.060	173	0.056
16	0.058	24	0.055
36	0.058	3	0.052
8	0.057	10	0.049

NO2-N in absorbing solution
Sample no.: C2
Theoretical value: 0.085
Unit: ug N/ml

Run 1:

Number of laboratories:	16
Arithmetic mean value:	0.099
Median:	0.082
Standard deviation	0.055
Rel. st. deviation (%)	55.213

Run 2:

Number of laboratories:	15
Arithmetic mean value:	0.085
Median:	0.082
Standard deviation	0.010
Rel. st. deviation (%)	11.975

Results in decreasing order:

42	0.300 (*)	16	0.082
19	0.120	31	0.082
33	0.091	35	0.082
32	0.089	36	0.082
12	0.086	173	0.081
8	0.084	24	0.080
23	0.084	3	0.079
15	0.082	10	0.077

NO2-N in absorbing solution
Sample no.: C3
Theoretical value: 0.068
Unit: ug N/ml

Run 1:

Number of laboratories:	16
Arithmetic mean value:	0.082
Median:	0.067
Standard deviation	0.054
Rel. st. deviation (%)	65.071

Run 2:

Number of laboratories:	15
Arithmetic mean value:	0.069
Median:	0.066
Standard deviation	0.009
Rel. st. deviation (%)	13.615

Results in decreasing order:

42	0.280 (*)	12	0.066
19	0.100	24	0.066
15	0.076	31	0.065
33	0.074	35	0.065
16	0.068	36	0.065
23	0.068	173	0.065
32	0.068	10	0.062
8	0.067	3	0.061

NO2-N in absorbing solution
Sample no.: C4
Theoretical value: 0.108
Unit: ug N/ml

Run 1:

Number of laboratories:	16
Arithmetic mean value:	0.125
Median:	0.105
Standard deviation	0.067
Rel. st. deviation (%)	53.299

Run 2:

Number of laboratories:	15
Arithmetic mean value:	0.109
Median:	0.105
Standard deviation	0.015
Rel. st. deviation (%)	13.630

Results in decreasing order:

42	0.370 (*)	35	0.105
19	0.160	3	0.104
33	0.117	36	0.104
32	0.113	24	0.103
12	0.108	31	0.103
8	0.107	15	0.101
23	0.106	173	0.100
16	0.105	10	0.099

Table 44: Analytical results for ammonia on impregnated filter. The reported results are corrected for an average blank value (J1 and J4).

NH3-N on impregnated filter
Sample no.: J2
Theoretical value: 14.020
Unit: ug N/filter

Run 1:

Number of laboratories:	17
Arithmetic mean value:	13.802
Median:	13.990
Standard deviation	1.907
Rel. st. deviation (%)	13.819

Run 2:

Number of laboratories:	17
Arithmetic mean value:	13.802
Median:	13.990
Standard deviation	1.907
Rel. st. deviation (%)	13.819

Results in decreasing order:

41	17.493	180	13.870	
13	16.800	31	13.309	
15	16.680	158	13.000	
38	14.705	36	12.650	
4	14.140	8	12.500	
3	14.104	19	11.270	
33	14.078	178	11.035	
5	14.065	10	10.951	
32	13.990			

NH3-N on impregnated filter
Sample no.: J3
Theoretical value: 20.050
Unit: ug N/filter

Run 1:

Number of laboratories:	17
Arithmetic mean value:	19.471
Median:	19.395
Standard deviation	2.456
Rel. st. deviation (%)	12.615

Run 2:

Number of laboratories:	16
Arithmetic mean value:	19.814
Median:	19.700
Standard deviation	2.075
Rel. st. deviation (%)	10.474

Results in decreasing order:

41	23.463	19	19.380	
32	22.640	4	19.160	
15	22.530	31	18.409	
13	22.000	33	18.128	
8	20.600	158	17.990	
36	20.150	180	17.080	
3	20.015	10	16.082	
38	20.005	178	13.989	(*)
5	19.395			

NH3-N on impregnated filter
Sample no.: J5
Theoretical value: 36.090
Unit: ug N/filter

Run 1:

Number of laboratories:	17
Arithmetic mean value:	34.681
Median:	35.040
Standard deviation	4.857
Rel. st. deviation (%)	14.005

Run 2:

Number of laboratories:	16
Arithmetic mean value:	35.552
Median:	35.450
Standard deviation	3.376
Rel. st. deviation (%)	9.496

Results in decreasing order:

15	40.150	5	34.905	
41	39.543	8	34.900	
33	38.828	3	34.605	
13	38.500	36	34.410	
38	37.905	19	33.210	
31	36.719	158	31.090	
32	36.450	10	26.722	
180	35.860	178	20.741	(*)
4	35.040			

NH3-N on impregnated filter
Sample no.: J6
Theoretical value: 11.030
Unit: ug N/filter

Run 1:

Number of laboratories:	16
Arithmetic mean value:	10.852
Median:	10.830
Standard deviation	1.387
Rel. st. deviation (%)	12.777

Run 2:

Number of laboratories:	14
Arithmetic mean value:	10.838
Median:	10.830
Standard deviation	0.917
Rel. st. deviation (%)	8.463

Results in decreasing order:

41	13.943	(*)	36	10.790
13	12.100		158	10.760
15	11.840		8	10.700
38	11.605		180	10.410
32	11.540		31	10.309
33	11.377		5	10.145
3	10.895		19	8.390
4	10.870		10	7.963	(*)

Table 45:Analytical results for sulphate in precipitations samples.

Sulphate in precipitation
Sample no.: G1
Theoretical value: 1.069
Unit: µg/l

Run 1:

Number of laboratories:	58
Arithmetic mean value:	1.140
Median:	1.070
Standard deviation	0.397
Rel. st. deviation (%)	34.845

Run 2:

Number of laboratories:	56
Arithmetic mean value:	1.067
Median:	1.068
Standard deviation	0.081
Rel. st. deviation (%)	7.548

Results in decreasing order:

104	3.210 (*)	164	1.070
107	3.156 (*)	17	1.066
45	1.286	150	1.064
161	1.200	12	1.060
167	1.195	27	1.060
43	1.193	125	1.060
179	1.173	163	1.060
2	1.160	31	1.059
7	1.143	16	1.058
13	1.130	24	1.056
110	1.130	10	1.053
21	1.122	36	1.053
166	1.117	26	1.048
33	1.110	178	1.047
124	1.110	8	1.040
20	1.100	23	1.038
35	1.100	41	1.036
118	1.100	153	1.033
180	1.100	14	1.030
38	1.090	4	1.029
5	1.083	120	1.017
112	1.080	22	1.011
116	1.080	19	1.010
15	1.077	30	0.990
3	1.075	155	0.988
32	1.074	121	0.983
158	1.071	126	0.950
115	1.070	176	0.810
157	1.070	42	0.760

Sulphate in precipitation
Sample no.: G2
Theoretical value: 1.087
Unit: µg/l

Run 1:

Number of laboratories:	58
Arithmetic mean value:	1.201
Median:	1.087
Standard deviation	0.513
Rel. st. deviation (%)	42.685

Run 2:

Number of laboratories:	55
Arithmetic mean value:	1.084
Median:	1.080
Standard deviation	0.081
Rel. st. deviation (%)	7.453

Results in decreasing order:

179	3.532 (*)	24	1.083
104	3.270 (*)	31	1.080
107	3.243 (*)	110	1.080
45	1.329	116	1.080
167	1.242	163	1.080
161	1.210	124	1.079
2	1.206	12	1.070
43	1.173	27	1.070
7	1.163	36	1.070
21	1.138	150	1.069
13	1.130	16	1.067
33	1.130	17	1.065
164	1.130	26	1.063
10	1.128	153	1.061
15	1.127	8	1.060
180	1.121	4	1.058
38	1.120	23	1.051
118	1.120	41	1.049
158	1.115	178	1.049
35	1.111	14	1.030
157	1.110	19	1.020
166	1.106	120	1.020
32	1.102	30	1.010
20	1.100	22	1.008
112	1.100	176	1.000
115	1.100	155	0.994
5	1.098	121	0.990
3	1.095	126	0.960
125	1.090	42	0.720

Sulphate in precipitation
Sample no.: G3
Theoretical value: 0.770
Unit: µg/l

Run 1:

Number of laboratories:	58
Arithmetic mean value:	0.857
Median:	0.767
Standard deviation	0.376
Rel. st. deviation (%)	43.840

Run 2:

Number of laboratories:	55
Arithmetic mean value:	0.771
Median:	0.764
Standard deviation	0.057
Rel. st. deviation (%)	7.343

Results in decreasing order:

107	2.522 (*)	10	0.764
179	2.473 (*)	27	0.764
104	2.300 (*)	12	0.760
167	0.965	163	0.758
45	0.942	180	0.758
15	0.875	36	0.757
161	0.870	16	0.756
43	0.866	150	0.756
2	0.840	26	0.754
110	0.820	19	0.750
164	0.810	23	0.749
21	0.804	31	0.749
7	0.800	153	0.747
157	0.800	8	0.745
166	0.799	4	0.742
116	0.793	155	0.742
158	0.792	178	0.741
115	0.791	35	0.729
118	0.790	17	0.728
24	0.783	41	0.726
13	0.780	120	0.724
20	0.780	121	0.722
33	0.780	14	0.720
112	0.780	124	0.709
125	0.779	30	0.700
32	0.778	42	0.694
5	0.776	22	0.691
3	0.771	126	0.690
38	0.770	176	0.650

Sulphate in precipitation
Sample no.: G4
Theoretical value: 0.875
Unit: µg/l

Run 1:

Number of laboratories:	57
Arithmetic mean value:	0.955
Median:	0.860
Standard deviation	0.405
Rel. st. deviation (%)	42.392

Run 2:

Number of laboratories:	54
Arithmetic mean value:	0.862
Median:	0.859
Standard deviation	0.069
Rel. st. deviation (%)	8.049

Results in decreasing order:

107	2.710 (*)	110	0.860
104	2.610 (*)	16	0.859
179	2.578 (*)	31	0.859
45	1.044	26	0.857
161	0.960	27	0.856
164	0.960	24	0.853
43	0.956	150	0.852
157	0.950	167	0.851
2	0.948	4	0.848
15	0.928	23	0.848
166	0.923	153	0.847
13	0.910	178	0.845
21	0.910	8	0.842
7	0.909	120	0.839
33	0.900	116	0.837
158	0.897	180	0.833
35	0.895	17	0.830
118	0.890	19	0.830
115	0.886	124	0.827
32	0.880	41	0.826
38	0.880	155	0.824
112	0.880	126	0.810
5	0.875	121	0.807
3	0.874	14	0.800
125	0.874	30	0.800
20	0.870	22	0.784
163	0.862	176	0.670
12	0.860	42	0.560
36	0.860		

Table 46: Analytical results for nitrate in precipitations samples.

Nitrate in precipitation
Sample no.: G1
Theoretical value: 0.310
Unit: µg/l

Run 1:
Number of laboratories: 59
Arithmetic mean value: 0.317
Median: 0.308
Standard deviation 0.065
Rel. st. deviation (%) 20.434

Run 2:
Number of laboratories: 57
Arithmetic mean value: 0.307
Median: 0.305
Standard deviation 0.022
Rel. st. deviation (%) 7.286

Results in decreasing order:

42	0.755 (*)	3	0.305
110	0.450 (*)	15	0.305
178	0.386	158	0.305
33	0.370	155	0.302
17	0.358	163	0.302
164	0.350	2	0.301
43	0.337	16	0.300
13	0.330	31	0.299
179	0.327	124	0.299
112	0.320	150	0.299
161	0.320	35	0.298
176	0.320	4	0.297
23	0.318	32	0.297
115	0.316	36	0.296
7	0.315	153	0.294
21	0.315	10	0.291
26	0.315	116	0.291
180	0.315	14	0.290
167	0.314	24	0.290
166	0.313	30	0.290
8	0.311	38	0.290
5	0.310	107	0.290
12	0.310	120	0.286
20	0.310	22	0.283
118	0.310	19	0.280
157	0.310	40	0.277
27	0.308	126	0.271
45	0.308	104	0.270
121	0.308	41	0.260
125	0.308		

Nitrate in precipitation
Sample no.: G2
Theoretical value: 0.408
Unit: µg/l

Run 1:
Number of laboratories: 59
Arithmetic mean value: 0.408
Median: 0.402
Standard deviation 0.033
Rel. st. deviation (%) 8.181

Run 2:
Number of laboratories: 54
Arithmetic mean value: 0.402
Median: 0.401
Standard deviation 0.020
Rel. st. deviation (%) 5.051

Results in decreasing order:

178	0.521 (*)	125	0.401	
14	0.510 (*)	12	0.400	
33	0.490 (*)	13	0.400	
164	0.490 (*)	20	0.400	
110	0.450	32	0.400	
157	0.450	118	0.400	
43	0.443	163	0.400	
17	0.442	2	0.398	
179	0.429	31	0.398	
42	0.423	166	0.397	
7	0.420	4	0.396	
112	0.420	10	0.396	
161	0.420	35	0.395	
176	0.420	16	0.393	
23	0.419	36	0.391	
21	0.416	30	0.390	
5	0.415	107	0.390	
115	0.415	153	0.390	
167	0.412	150	0.387	
38	0.410	24	0.384	
155	0.409	116	0.384	
180	0.409	19	0.380	
26	0.408	22	0.379	
158	0.408	120	0.376	
121	0.407	124	0.374	
27	0.405	126	0.362	
3	0.404	40	0.359	
15	0.403	104	0.350	
8	0.402	41	0.341	(*)
45	0.402			

Nitrate in precipitation
Sample no.: G3
Theoretical value: 0.421
Unit: µg/l

Run 1:
Number of laboratories: 59
Arithmetic mean value: 0.437
Median: 0.415
Standard deviation 0.127
Rel. st. deviation (%) 29.115

Run 2:
Number of laboratories: 58
Arithmetic mean value: 0.421
Median: 0.414
Standard deviation 0.037
Rel. st. deviation (%) 8.838

Results in decreasing order:

42	1.357 (*)	163	0.413
110	0.540	3	0.412
178	0.530	12	0.410
33	0.520	13	0.410
164	0.520	15	0.410
167	0.512	20	0.410
157	0.470	30	0.410
17	0.450	31	0.410
179	0.441	38	0.410
161	0.440	118	0.410
23	0.432	166	0.410
21	0.430	2	0.408
43	0.430	4	0.408
112	0.430	35	0.407
7	0.428	16	0.406
107	0.427	24	0.402
5	0.423	153	0.402
115	0.423	22	0.400
155	0.422	36	0.400
158	0.422	116	0.396
180	0.421	150	0.396
26	0.419	14	0.390
121	0.418	19	0.390
27	0.417	126	0.390
45	0.417	176	0.390
124	0.416	120	0.388
8	0.415	40	0.381
10	0.415	104	0.360
32	0.415	41	0.348
125	0.415		

Nitrate in precipitation
Sample no.: G4
Theoretical value: 0.512
Unit: µg/l

Run 1:
Number of laboratories: 58
Arithmetic mean value: 0.508
Median: 0.504
Standard deviation 0.042
Rel. st. deviation (%) 8.246

Run 2:
Number of laboratories: 53
Arithmetic mean value: 0.507
Median: 0.504
Standard deviation 0.024
Rel. st. deviation (%) 4.822

Results in decreasing order:

164	0.660 (*)	27	0.503	
178	0.656 (*)	45	0.503	
33	0.590	12	0.500	
110	0.570	20	0.500	
157	0.570	30	0.500	
179	0.543	31	0.500	
161	0.540	38	0.500	
40	0.535	43	0.500	
176	0.530	118	0.500	
17	0.529	3	0.499	
21	0.525	16	0.498	
23	0.525	4	0.497	
7	0.523	22	0.494	
166	0.519	124	0.494	
158	0.515	14	0.490	
5	0.513	126	0.490	
115	0.512	153	0.490	
155	0.511	36	0.489	
13	0.510	107	0.488	
15	0.510	116	0.486	
112	0.510	150	0.482	
180	0.509	8	0.481	
2	0.507	120	0.481	
121	0.507	19	0.480	
32	0.506	24	0.480	
125	0.506	104	0.440	
26	0.505	167	0.424	(*)
35	0.505	41	0.423	(*)
163	0.504	42	0.410	(*)

Table 47: Analytical results for ammonium in precipitations sample.

Ammonium in precipitation
Sample no.: G1
Theoretical value: 0.160
Unit: µg/l

Run 1:
Number of laboratories: 58
Arithmetic mean value: 0.162
Median: 0.163
Standard deviation 0.026
Rel. st. deviation (%) 16.126

Run 2:
Number of laboratories: 56
Arithmetic mean value: 0.163
Median: 0.163
Standard deviation 0.016
Rel. st. deviation (%) 9.799

Results in decreasing order:

22	0.218 (*)	166	0.162	
116	0.199	179	0.162	
2	0.192	27	0.161	
120	0.191	8	0.160	
176	0.190	12	0.160	
3	0.188	20	0.160	
31	0.184	38	0.160	
40	0.184	104	0.160	
41	0.184	112	0.160	
172	0.181	157	0.160	
13	0.180	4	0.158	
150	0.178	36	0.158	
158	0.177	5	0.157	
23	0.172	7	0.156	
19	0.170	155	0.155	
30	0.170	107	0.152	
164	0.170	118	0.152	
35	0.169	10	0.151	
42	0.169	121	0.151	
14	0.168	125	0.149	
16	0.166	153	0.149	
21	0.166	24	0.145	
15	0.165	167	0.144	
45	0.165	33	0.141	
163	0.165	178	0.139	
32	0.164	124	0.135	
26	0.163	126	0.124	
115	0.163	110	0.120	
180	0.163	43	0.016 (*)	

Ammonium in precipitation
Sample no.: G2
Theoretical value: 0.214
Unit: µg/l

Run 1:
Number of laboratories: 58
Arithmetic mean value: 0.216
Median: 0.210
Standard deviation 0.032
Rel. st. deviation (%) 14.626

Run 2:
Number of laboratories: 56
Arithmetic mean value: 0.215
Median: 0.210
Standard deviation 0.019
Rel. st. deviation (%) 9.053

Results in decreasing order:

164	0.360 (*)	14	0.210	
22	0.274	30	0.210	
116	0.267	38	0.210	
120	0.252	104	0.210	
2	0.249	157	0.210	
40	0.241	176	0.210	
13	0.240	45	0.209	
150	0.239	4	0.208	
3	0.237	5	0.208	
41	0.237	7	0.208	
172	0.233	107	0.208	
31	0.232	153	0.206	
19	0.230	36	0.205	
23	0.228	179	0.204	
158	0.226	121	0.203	
12	0.220	125	0.203	
20	0.220	10	0.202	
112	0.220	155	0.202	
126	0.219	118	0.201	
180	0.219	16	0.199	
163	0.218	115	0.198	
21	0.217	32	0.197	
15	0.216	24	0.196	
27	0.216	167	0.194	
26	0.215	33	0.191	
8	0.213	124	0.190	
35	0.213	42	0.189	
166	0.211	110	0.160	
178	0.211	43	0.093 (*)	

Ammonium in precipitation
Sample no.: G3
Theoretical value: 0.267
Unit: µg/l

Run 1:
Number of laboratories: 58
Arithmetic mean value: 0.261
Median: 0.261
Standard deviation 0.038
Rel. st. deviation (%) 14.555

Run 2:
Number of laboratories: 57
Arithmetic mean value: 0.265
Median: 0.261
Standard deviation 0.019
Rel. st. deviation (%) 7.296

Results in decreasing order:

22	0.320	14	0.261	
116	0.318	35	0.261	
2	0.308	36	0.261	
120	0.295	45	0.261	
3	0.291	38	0.260	
13	0.290	104	0.260	
23	0.288	153	0.260	
172	0.287	164	0.260	
31	0.284	176	0.260	
40	0.281	179	0.258	
19	0.280	42	0.257	
41	0.279	125	0.256	
150	0.278	178	0.256	
112	0.275	33	0.254	
158	0.275	5	0.253	
21	0.272	16	0.253	
163	0.271	155	0.252	
12	0.270	118	0.251	
20	0.270	10	0.250	
30	0.270	157	0.250	
180	0.270	121	0.249	
27	0.269	166	0.248	
26	0.268	115	0.245	
15	0.267	32	0.244	
24	0.263	126	0.242	
7	0.262	167	0.240	
8	0.262	124	0.231	
107	0.262	110	0.210	
4	0.261	43	0.016 (*)	

Ammonium in precipitation
Sample no.: G4
Theoretical value: 0.294
Unit: µg/l

Run 1:
Number of laboratories: 58
Arithmetic mean value: 0.293
Median: 0.294
Standard deviation 0.035
Rel. st. deviation (%) 11.982

Run 2:
Number of laboratories: 55
Arithmetic mean value: 0.296
Median: 0.294
Standard deviation 0.020
Rel. st. deviation (%) 6.740

Results in decreasing order:

176	0.370 (*)	26	0.294	
116	0.345	107	0.293	
22	0.342	166	0.293	
126	0.340	42	0.292	
2	0.336	45	0.291	
120	0.335	20	0.290	
13	0.320	38	0.290	
3	0.318	8	0.289	
23	0.318	179	0.289	
172	0.313	5	0.288	
19	0.310	153	0.288	
30	0.310	4	0.287	
150	0.310	14	0.287	
41	0.306	121	0.285	
21	0.302	124	0.283	
31	0.302	157	0.280	
158	0.301	167	0.280	
12	0.300	178	0.280	
35	0.300	125	0.278	
104	0.300	16	0.277	
112	0.300	10	0.276	
180	0.298	118	0.275	
40	0.297	115	0.272	
163	0.297	155	0.272	
15	0.296	32	0.271	
24	0.296	33	0.261	
36	0.296	164	0.240	
27	0.295	110	0.220 (*)	
7	0.294	43	0.101 (*)	

Table 48: Analytical results for pH in precipitations samples.

pH in precipitation
Sample no.: G1
Theoretical value: 4.300
Unit: pH-unit

Run 1:

Number of laboratories:	54
Arithmetic mean value:	4.391
Median:	4.354
Standard deviation	0.445
Rel. st. deviation (%)	10.128

Run 2:

Number of laboratories:	53
Arithmetic mean value:	4.336
Median:	4.350
Standard deviation	0.192
Rel. st. deviation (%)	4.430

Results in decreasing order:

104	7.290	(*)	21	4.350
43	4.970		32	4.350
30	4.680		35	4.350
13	4.540		4	4.340
19	4.510		12	4.340
41	4.500		27	4.340
153	4.490		33	4.340
121	4.460		120	4.340
38	4.430		16	4.330
112	4.430		46	4.330
115	4.430		5	4.320
150	4.430		107	4.320
14	4.420		118	4.320
7	4.410		124	4.320
10	4.410		126	4.320
20	4.400		158	4.320
36	4.400		164	4.320
155	4.380		23	4.300
15	4.370		178	4.290
22	4.370		176	4.270
116	4.370		45	4.200
163	4.370		110	4.180
166	4.370		2	3.990
8	4.360		17	3.930
31	4.360		172	3.880
42	4.360		24	3.860
3	4.358		40	3.690

pH in precipitation
Sample no.: G2
Theoretical value: 4.270
Unit: pH-unit

Run 1:

Number of laboratories:	54
Arithmetic mean value:	4.326
Median:	4.320
Standard deviation	0.274
Rel. st. deviation (%)	6.333

Run 2:

Number of laboratories:	52
Arithmetic mean value:	4.308
Median:	4.320
Standard deviation	0.127
Rel. st. deviation (%)	2.954

Results in decreasing order:

104	5.950	(*)	33	4.320
13	4.630		35	4.320
43	4.590		38	4.320
19	4.540		120	4.320
153	4.410		4	4.310
112	4.400		42	4.310
115	4.390		12	4.300
14	4.380		20	4.300
10	4.370		32	4.300
36	4.370		46	4.300
150	4.370		158	4.300
7	4.350		164	4.300
15	4.350		176	4.300
41	4.350		5	4.290
126	4.350		16	4.290
155	4.350		23	4.290
3	4.334		124	4.290
8	4.330		118	4.280
30	4.330		178	4.260
31	4.330		107	4.240
116	4.330		45	4.200
121	4.330		110	4.180
163	4.330		17	4.140
166	4.330		2	4.020
21	4.320		172	3.880
22	4.320		24	3.860
27	4.320		40	3.620 (*)

pH in precipitation
Sample no.: G3
Theoretical value: 4.520
Unit: pH-unit

Run 1:

Number of laboratories:	54
Arithmetic mean value:	4.569
Median:	4.556
Standard deviation	0.325
Rel. st. deviation (%)	7.119

Run 2:

Number of laboratories:	51
Arithmetic mean value:	4.532
Median:	4.551
Standard deviation	0.154
Rel. st. deviation (%)	3.408

Results in decreasing order:

43	6.160	(*)	3	4.551
104	5.660	(*)	12	4.550
13	4.830		16	4.550
153	4.760		121	4.550
19	4.740		150	4.550
14	4.660		166	4.550
115	4.660		176	4.550
112	4.650		5	4.540
116	4.650		27	4.540
10	4.630		46	4.540
36	4.620		32	4.530
124	4.620		158	4.530
20	4.600		23	4.520
41	4.600		38	4.520
155	4.600		164	4.520
7	4.590		107	4.510
15	4.590		118	4.510
30	4.590		42	4.500
31	4.580		178	4.490
8	4.570		126	4.480
22	4.570		45	4.400
35	4.570		110	4.290
163	4.570		2	4.200
4	4.560		17	4.100
21	4.560		172	4.060
33	4.560		24	4.000
120	4.560		40	3.780 (*)

pH in precipitation
Sample no.: G4
Theoretical value: 4.480
Unit: pH-unit

Run 1:

Number of laboratories:	52
Arithmetic mean value:	4.499
Median:	4.510
Standard deviation	0.211
Rel. st. deviation (%)	4.698

Run 2:

Number of laboratories:	48
Arithmetic mean value:	4.520
Median:	4.515
Standard deviation	0.094
Rel. st. deviation (%)	2.078

Results in decreasing order:

104	5.320	(*)	12	4.510
13	4.790		27	4.510
19	4.730		32	4.510
153	4.680		33	4.510
43	4.630		120	4.510
112	4.610		121	4.510
14	4.590		166	4.510
116	4.590		3	4.509
150	4.590		5	4.500
36	4.580		20	4.500
115	4.580		30	4.500
124	4.570		38	4.500
155	4.560		46	4.500
7	4.550		23	4.480
31	4.550		158	4.480
41	4.550		118	4.470
15	4.540		107	4.450
22	4.530		178	4.440
163	4.530		42	4.400
8	4.520		45	4.400
16	4.520		110	4.370
21	4.520		126	4.350
35	4.520		2	4.170
164	4.520		24	4.010 (*)
176	4.520		172	3.990 (*)
4	4.510		40	3.680 (*)

Table 49: Analytical results for strong acid calculated from pH.

Strong acid calculated from pH
Sample no.: G1
Theoretical value: 50.000
Unit:

Run 1:

Number of laboratories:	52
Arithmetic mean value:	50.077
Median:	43.752
Standard deviation	32.567
Rel. st. deviation (%)	65.033

Run 2:

Number of laboratories:	48
Arithmetic mean value:	41.927
Median:	43.652
Standard deviation	13.202
Rel. st. deviation (%)	31.488

Results in decreasing order:

40	204.174 (*)	8	43.652
24	138.038 (*)	31	43.652
172	131.826 (*)	42	43.652
17	117.490 (*)	15	42.658
2	102.329	22	42.658
176	53.703	116	42.658
178	51.286	163	42.658
23	50.119	166	42.658
5	47.863	155	41.687
107	47.863	20	39.811
118	47.863	36	39.811
124	47.863	7	38.905
126	47.863	10	38.905
158	47.863	14	38.019
164	47.863	38	37.154
16	46.774	112	37.154
46	46.774	115	37.154
4	45.709	150	37.154
12	45.709	121	34.674
27	45.709	153	32.359
33	45.709	41	31.623
120	45.709	19	30.903
21	44.668	13	28.840
32	44.668	30	20.893
35	44.668	43	10.715
3	43.853	104	0.051

Strong acid calculated from pH
Sample no.: G2
Theoretical value: 53.000
Unit:

Run 1:

Number of laboratories:	52
Arithmetic mean value:	53.788
Median:	47.863
Standard deviation	33.537
Rel. st. deviation (%)	62.351

Run 2:

Number of laboratories:	49
Arithmetic mean value:	46.678
Median:	47.863
Standard deviation	12.133
Rel. st. deviation (%)	25.993

Results in decreasing order:

40	239.883 (*)	38	47.863
24	138.038 (*)	120	47.863
172	131.826 (*)	8	46.774
2	95.499	30	46.774
17	72.444	31	46.774
107	57.544	116	46.774
178	54.954	121	46.774
118	52.481	163	46.774
5	51.286	166	46.774
16	51.286	3	46.345
23	51.286	7	44.668
124	51.286	15	44.668
12	50.119	41	44.668
20	50.119	126	44.668
32	50.119	155	44.668
46	50.119	10	42.658
158	50.119	36	42.658
164	50.119	150	42.658
176	50.119	14	41.687
4	48.978	115	40.738
42	48.978	112	39.811
21	47.863	153	38.905
22	47.863	19	28.840
27	47.863	43	25.704
33	47.863	13	23.442
35	47.863	104	1.122

Strong acid calculated from pH
Sample no.: G3
Theoretical value: 30.000
Unit:

Run 1:

Number of laboratories:	52
Arithmetic mean value:	32.647
Median:	27.542
Standard deviation	25.281
Rel. st. deviation (%)	77.437

Run 2:

Number of laboratories:	49
Arithmetic mean value:	27.441
Median:	27.542
Standard deviation	11.175
Rel. st. deviation (%)	40.722

Results in decreasing order:

40	165.959 (*)	21	27.542
24	100.000 (*)	33	27.542
172	87.096 (*)	120	27.542
17	79.433	8	26.915
2	63.096	22	26.915
126	33.113	35	26.915
178	32.359	163	26.915
42	31.623	31	26.303
107	30.903	7	25.704
118	30.903	15	25.704
23	30.200	30	25.704
38	30.200	20	25.119
164	30.200	41	25.119
32	29.512	155	25.119
158	29.512	36	23.988
5	28.840	124	23.988
27	28.840	10	23.442
46	28.840	112	22.387
12	28.184	116	22.387
16	28.184	14	21.878
121	28.184	115	21.878
150	28.184	19	18.197
166	28.184	153	17.378
176	28.184	13	14.791
3	28.119	104	2.188
4	27.542	43	0.692

Strong acid calculated from pH
Sample no.: G4
Theoretical value: 33.000
Unit:

Run 1:

Number of laboratories:	50
Arithmetic mean value:	36.312
Median:	30.551
Standard deviation	29.594
Rel. st. deviation (%)	81.500

Run 2:

Number of laboratories:	47
Arithmetic mean value:	29.928
Median:	30.200
Standard deviation	8.171
Rel. st. deviation (%)	27.304

Results in decreasing order:

40	208.930 (*)	8	30.200
172	102.329 (*)	16	30.200
24	97.724 (*)	21	30.200
2	67.608	35	30.200
126	44.668	164	30.200
42	39.811	176	30.200
178	36.308	22	29.512
107	35.481	163	29.512
118	33.884	15	28.840
23	33.113	7	28.184
158	33.113	31	28.184
5	31.623	41	28.184
20	31.623	155	27.542
30	31.623	124	26.915
38	31.623	36	26.303
46	31.623	115	26.303
3	30.974	14	25.704
4	30.903	116	25.704
12	30.903	150	25.704
27	30.903	112	24.547
32	30.903	43	23.442
33	30.903	153	20.893
120	30.903	19	18.621
121	30.903	13	16.218
166	30.903	104	4.786

Table 50: Analytical results for chloride in precipitations samples.

Chloride in precipitation
Sample no.: G1
Theoretical value: 0.154
Unit: µg/l

Run 1:
Number of laboratories: 58
Arithmetic mean value: 0.181
Median: 0.158
Standard deviation 0.122
Rel. st. deviation (%) 67.398

Run 2:
Number of laboratories: 57
Arithmetic mean value: 0.166
Median: 0.157
Standard deviation 0.043
Rel. st. deviation (%) 26.037

Results in decreasing order:

42	1.038 (*)	178	0.157
125	0.342	26	0.155
110	0.340	3	0.153
19	< 0.310		
115	0.260	32	0.153
157	0.260	27	0.152
17	0.227	104	0.150
43	0.202	120	0.150
167	0.187	166	0.150
116	0.181	8	0.148
124	0.181	31	0.148
13	0.180	158	0.148
121	0.180	14	0.147
176	0.180	45	0.145
40	0.179	155	0.145
150	0.173	107	0.144
7	0.171	163	0.143
4	0.170	12	0.140
33	0.170	118	0.140
161	0.170	126	0.140
22	0.167	153	0.140
2	0.163	164	0.140
16	0.163	10	0.138
41	0.162	23	0.136
20	0.160	179	0.132
30	0.160	38	0.130
112	0.160	24	0.129
180	0.159	35	0.127
5	0.158	36	0.125
21	0.158	15	0.118

Chloride in precipitation
Sample no.: G2
Theoretical value: 0.193
Unit: µg/l

Run 1:
Number of laboratories: 57
Arithmetic mean value: 0.241
Median: 0.200
Standard deviation 0.207
Rel. st. deviation (%) 85.992

Run 2:
Number of laboratories: 55
Arithmetic mean value: 0.203
Median: 0.200
Standard deviation 0.030
Rel. st. deviation (%) 14.824

Results in decreasing order:

43	1.511 (*)	30	0.200
42	1.060 (*)	31	0.200
157	0.320	178	0.200
19	< 0.310		
110	< 0.300		
115	0.283	27	0.199
176	0.280	180	0.197
120	0.260	41	0.195
124	0.234	8	0.193
116	0.233	45	0.192
13	0.230	166	0.192
167	0.229	12	0.190
17	0.224	126	0.190
2	0.214	164	0.190
7	0.214	107	0.188
4	0.213	163	0.188
40	0.212	22	0.186
121	0.211	150	0.186
33	0.210	23	0.184
104	0.210	153	0.183
112	0.210	155	0.183
161	0.210	38	0.180
125	0.208	118	0.180
3	0.206	35	0.176
26	0.206	24	0.174
16	0.205	36	0.164
32	0.205	179	0.163
21	0.204	15	0.162
5	0.203	10	0.157
158	0.203	14	0.152
20	0.200		

Chloride in precipitation
Sample no.: G3
Theoretical value: 0.232
Unit: µg/l

Run 1:
Number of laboratories: 57
Arithmetic mean value: 0.250
Median: 0.232
Standard deviation 0.108
Rel. st. deviation (%) 43.464

Run 2:
Number of laboratories: 56
Arithmetic mean value: 0.236
Median: 0.232
Standard deviation 0.028
Rel. st. deviation (%) 11.688

Results in decreasing order:

42	1.028 (*)	3	0.231
167	0.334	30	0.230
115	0.323	104	0.230
120	0.310	24	0.229
19	< 0.310		
110	< 0.300		
112	0.280	180	0.229
157	0.280	45	0.228
43	0.262	166	0.228
13	0.260	8	0.227
116	0.253	22	0.226
33	0.250	31	0.225
2	0.247	107	0.222
4	0.247	41	0.221
7	0.244	12	0.220
40	0.243	15	0.220
125	0.241	126	0.220
158	0.241	150	0.220
20	0.240	163	0.220
161	0.240	155	0.219
164	0.240	23	0.217
178	0.240	10	0.216
124	0.239	35	0.212
17	0.238	153	0.212
121	0.237	38	0.210
5	0.236	118	0.210
26	0.236	176	0.210
16	0.235	14	0.197
21	0.235	36	0.194
27	0.233	179	0.180
32	0.232		

Chloride in precipitation
Sample no.: G4
Theoretical value: 0.309
Unit: µg/l

Run 1:
Number of laboratories: 57
Arithmetic mean value: 0.314
Median: 0.306
Standard deviation 0.049
Rel. st. deviation (%) 15.714

Run 2:
Number of laboratories: 53
Arithmetic mean value: 0.303
Median: 0.302
Standard deviation 0.024
Rel. st. deviation (%) 7.861

Results in decreasing order:

42	0.571 (*)	43	0.303
120	0.430 (*)	8	0.302
110	0.420 (*)	45	0.302
115	0.413 (*)	124	0.302
157	0.370	15	0.297
112	0.350	31	0.296
176	0.350	23	0.295
13	0.340	166	0.295
4	0.333	121	0.294
116	0.333	163	0.294
33	0.330	180	0.292
158	0.330	150	0.291
164	0.330	12	0.290
40	0.328	24	0.290
2	0.321	35	0.290
3	0.316	126	0.290
7	0.315	155	0.290
178	0.315	153	0.284
21	0.314	30	0.280
125	0.314	118	0.280
26	0.313	14	0.277
19	< 0.310		
5	0.310	107	0.273
20	0.310	22	0.271
104	0.310	38	0.270
161	0.310	41	0.270
27	0.309	36	0.269
32	0.307	167	0.267
16	0.306	179	0.247
17	0.306		

Table 51: Analytical results for sodium in precipitations samples.

Sodium in precipitation
Sample no.: G1
Theoretical value: 0.225
Unit: µg/l

Run 1:

Number of laboratories:	55
Arithmetic mean value:	0.233
Median:	0.230
Standard deviation	0.028
Rel. st. deviation (%)	11.961

Run 2:

Number of laboratories:	54
Arithmetic mean value:	0.231
Median:	0.230
Standard deviation	0.021
Rel. st. deviation (%)	9.014

Results in decreasing order:

43	< 0.672		
176	0.370 (*)	30	0.230
42	0.285	36	0.229
178	0.280	180	0.229
22	0.273	16	0.227
157	0.270	3	0.226
13	0.260	31	0.224
116	0.252	41	0.223
19	0.250	26	0.222
33	0.250	12	0.220
150	0.250	110	0.220
17	0.247	23	0.218
5	0.246	7	0.217
124	0.245	8	0.217
45	0.242	153	0.215
120	0.241	10	0.214
112	0.240	167	0.214
155	0.240	2	0.210
163	0.240	4	0.210
164	0.240	24	0.210
115	0.239	32	0.210
21	0.238	166	0.206
35	0.238	121	0.205
158	0.238	38	0.200
179	0.235	118	0.200
15	0.233	125	0.200
27	0.233	104	0.199
14	0.231	126	0.190
20	0.230		

Sodium in precipitation
Sample no.: G2
Theoretical value: 0.304
Unit: µg/l

Run 1:

Number of laboratories:	55
Arithmetic mean value:	0.310
Median:	0.310
Standard deviation	0.026
Rel. st. deviation (%)	8.291

Run 2:

Number of laboratories:	53
Arithmetic mean value:	0.307
Median:	0.308
Standard deviation	0.021
Rel. st. deviation (%)	6.840

Results in decreasing order:

43	< 0.672		
178	0.391 (*)	23	0.308
42	0.385 (*)	31	0.308
13	0.350	14	0.306
19	0.350	16	0.306
33	0.334	35	0.305
150	0.334	153	0.304
5	0.332	41	0.302
112	0.330	8	0.301
157	0.330	30	0.300
115	0.326	26	0.298
124	0.326	32	0.297
158	0.326	4	0.295
163	0.325	7	0.293
45	0.324	167	0.293
120	0.324	10	0.291
155	0.322	22	0.291
21	0.321	166	0.290
180	0.321	17	0.288
20	0.320	2	0.286
116	0.320	24	0.286
164	0.320	121	0.283
176	0.320	125	0.278
15	0.316	179	0.272
36	0.315	104	0.271
3	0.312	38	0.270
12	0.310	118	0.260
27	0.310	126	0.260
110	0.310		

Sodium in precipitation
Sample no.: G3
Theoretical value: 0.293
Unit: µg/l

Run 1:

Number of laboratories:	55
Arithmetic mean value:	0.300
Median:	0.299
Standard deviation	0.031
Rel. st. deviation (%)	10.422

Run 2:

Number of laboratories:	54
Arithmetic mean value:	0.297
Median:	0.299
Standard deviation	0.025
Rel. st. deviation (%)	8.471

Results in decreasing order:

43	< 0.672		
167	0.437 (*)	45	0.299
42	0.354	35	0.297
179	0.354	150	0.297
178	0.351	121	0.295
157	0.350	16	0.293
17	0.342	27	0.292
14	0.327	153	0.292
13	0.320	12	0.290
19	0.320	30	0.290
33	0.314	23	0.289
5	0.313	26	0.289
22	0.310	41	0.287
112	0.310	31	0.285
176	0.310	3	0.284
115	0.309	8	0.282
180	0.308	110	0.280
124	0.307	7	0.276
158	0.307	4	0.273
163	0.307	24	0.271
21	0.306	10	0.270
116	0.306	2	0.264
120	0.304	125	0.264
155	0.302	166	0.263
36	0.301	38	0.260
20	0.300	104	0.256
32	0.300	126	0.250
164	0.300	118	0.240
15	0.299		

Sodium in precipitation
Sample no.: G4
Theoretical value: 0.469
Unit: µg/l

Run 1:

Number of laboratories:	55
Arithmetic mean value:	8.701
Median:	0.468
Standard deviation	61.156
Rel. st. deviation (%)	702.826

Run 2:

Number of laboratories:	54
Arithmetic mean value:	0.455
Median:	0.467
Standard deviation	0.072
Rel. st. deviation (%)	15.747

Results in decreasing order:

43	< 0.672	179	0.465
42	0.594	27	0.464
178	0.553	16	0.463
17	0.521	153	0.463
13	0.520	12	0.460
19	0.500	157	0.460
33	0.495	8	0.457
14	0.494	35	0.455
		31	0.454
5	0.490	26	0.453
112	0.490	150	0.451
120	0.490	30	0.450
176	0.490	3	0.449
158	0.484	22	0.449
164	0.480	166	0.446
163	0.479	4	0.444
21	0.477	41	0.442
155	0.476	2	0.435
36	0.475	7	0.434
23	0.473	24	0.432
180	0.473	10	0.431
15	0.471	121	0.422
115	0.471	125	0.417
20	0.470	104	0.413
45	0.470	38	0.400
110	0.470	118	0.400
116	0.469	167	0.272
124	0.469	126	0.040
32	0.468		

Table 52: Analytical results for magnesium in precipitations samples.

Magnesium in precipitation
Sample no.: G1
Theoretical value: 0.145
Unit: µg/l

Run 1:

Number of laboratories:	54
Arithmetic mean value:	0.145
Median:	0.144
Standard deviation	0.018
Rel. st. deviation (%)	12.232

Run 2:

Number of laboratories:	48
Arithmetic mean value:	0.142
Median:	0.143
Standard deviation	0.010
Rel. st. deviation (%)	7.160

Results in decreasing order:

179	0.195 (*)	155	0.144	
157	0.190 (*)	166	0.144	
42	0.186 (*)	10	0.142	
41	0.185 (*)	14	0.142	
17	0.184 (*)	31	0.142	
30	0.160	124	0.142	
38	0.160	13	0.140	
150	0.155	20	0.140	
7	0.154	110	0.140	
163	0.154	153	0.140	
178	0.154	164	0.140	
2	0.153	26	0.139	
19	0.150	118	0.139	
45	0.150	4	0.136	
112	0.150	12	0.136	
21	0.149	3	0.135	
180	0.149	115	0.134	
16	0.147	35	0.133	
22	0.146	33	0.132	
36	0.146	121	0.130	
116	0.146	104	0.128	
43	< 0.145			
5	0.145	24	0.127	
8	0.145	120	0.127	
23	0.145	167	0.126	
27	0.145	125	0.118	
158	0.145	176	0.110	
15	0.144	126	0.100 (*)	

Magnesium in precipitation
Sample no.: G2
Theoretical value: 0.083
Unit: µg/l

Run 1:

Number of laboratories:	54
Arithmetic mean value:	0.082
Median:	0.081
Standard deviation	0.010
Rel. st. deviation (%)	12.132

Run 2:

Number of laboratories:	49
Arithmetic mean value:	0.080
Median:	0.081
Standard deviation	0.006
Rel. st. deviation (%)	7.776

Results in decreasing order:

43	< 0.145			
17	0.111 (*)	31	0.081	
41	0.104 (*)	118	0.081	
178	0.103 (*)	3	0.080	
42	0.102 (*)	13	0.080	
179	0.098	15	0.080	
19	0.090	26	0.080	
30	0.090	38	0.080	
180	0.090	110	0.080	
150	0.089	112	0.080	
2	0.087	164	0.080	
45	0.087	4	0.078	
163	0.087	33	0.077	
7	0.086	121	0.076	
23	0.086	153	0.075	
116	0.084	20	0.074	
5	0.083	22	0.074	
8	0.083	115	0.074	
21	0.083	12	0.073	
27	0.083	120	0.073	
124	0.083	167	0.073	
155	0.083	104	0.072	
14	0.082	24	0.071	
16	0.082	35	0.070	
36	0.082	125	0.070	
158	0.082	157	0.070	
166	0.082	176	0.070	
10	0.081	126	0.050 (*)	

Magnesium in precipitation
Sample no.: G3
Theoretical value: 0.103
Unit: µg/l

Run 1:

Number of laboratories:	54
Arithmetic mean value:	0.102
Median:	0.101
Standard deviation	0.012
Rel. st. deviation (%)	11.712

Run 2:

Number of laboratories:	51
Arithmetic mean value:	0.103
Median:	0.101
Standard deviation	0.009
Rel. st. deviation (%)	8.700

Results in decreasing order:

43	< 0.145			
17	0.129 (*)	16	0.101	
41	0.125	26	0.101	
167	0.122	10	0.100	
38	0.120	13	0.100	
179	0.120	33	0.100	
178	0.119	110	0.100	
42	0.115	112	0.100	
163	0.112	164	0.100	
2	0.110	20	0.098	
19	0.110	118	0.098	
30	0.110	153	0.098	
116	0.110	3	0.097	
180	0.109	4	0.097	
45	0.108	15	0.097	
14	0.107	121	0.096	
23	0.107	31	0.095	
150	0.107	22	0.093	
7	0.105	35	0.093	
21	0.105	115	0.093	
155	0.105	12	0.091	
27	0.104	24	0.091	
36	0.104	157	0.090	
158	0.104	104	0.089	
8	0.103	120	0.088	
124	0.103	125	0.088	
166	0.102	176	0.070 (*)	
5	0.101	126	0.060 (*)	

Magnesium in precipitation
Sample no.: G4
Theoretical value: 0.134
Unit: µg/l

Run 1:

Number of laboratories:	54
Arithmetic mean value:	0.131
Median:	0.131
Standard deviation	0.013
Rel. st. deviation (%)	10.268

Run 2:

Number of laboratories:	49
Arithmetic mean value:	0.131
Median:	0.131
Standard deviation	0.008
Rel. st. deviation (%)	6.220

Results in decreasing order:

42	0.170 (*)	124	0.131	
41	0.161 (*)	166	0.131	
178	0.151	20	0.130	
17	0.148	33	0.130	
43	< 0.145			
163	0.143	110	0.130	
116	0.142	112	0.130	
13	0.140	164	0.130	
19	0.140	22	0.128	
30	0.140	118	0.128	
179	0.140	3	0.127	
2	0.138	4	0.127	
23	0.138	12	0.126	
36	0.138	15	0.126	
45	0.138	153	0.124	
180	0.138	35	0.123	
21	0.137	31	0.121	
14	0.136	115	0.121	
16	0.136	24	0.120	
150	0.136	38	0.120	
155	0.135	157	0.120	
158	0.135	120	0.119	
7	0.134	121	0.119	
27	0.134	104	0.118	
5	0.133	125	0.114	
8	0.133	176	0.100 (*)	
10	0.131	167	0.095 (*)	
26	0.131	126	0.090 (*)	

Table 53: Analytical results for calcium in precipitations samples.

Calcium in precipitation
Sample no.: G1
Theoretical value: 0.096
Unit: µg/l

Run 1:
Number of laboratories: 54
Arithmetic mean value: 0.104
Median: 0.100
Standard deviation 0.033
Rel. st. deviation (%) 32.139

Run 2:
Number of laboratories: 49
Arithmetic mean value: 0.101
Median: 0.100
Standard deviation 0.018
Rel. st. deviation (%) 17.708

Results in decreasing order:

43	< 0.299			
42	0.215 (*)	150	0.100	
17	0.210 (*)	157	0.100	
38	0.180 (*)	164	0.100	
178	0.150	31	0.099	
116	0.144	33	0.099	
22	0.138	8	0.098	
124	0.135	21	0.098	
45	0.123	125	0.098	
176	0.120	158	0.098	
180	0.120	166	0.098	
121	0.113	3	0.097	
36	0.111	5	0.097	
163	0.111	4	0.095	
13	0.110	155	0.095	
23	0.110	24	0.094	
30	0.110	126	0.090	
115	0.109	15	0.086	
41	0.107	104	0.086	
16	0.106	120	0.083	
179	0.102	10	0.081	
7	0.101	118	0.080	
26	0.101	153	0.076	
14	0.100	35	0.074	
19	0.100	110	0.060	
27	0.100	2	0.059	
32	0.100	12	0.030 (*)	
112	0.100	167	0.012 (*)	

Calcium in precipitation
Sample no.: G2
Theoretical value: 0.153
Unit: µg/l

Run 1:
Number of laboratories: 54
Arithmetic mean value: 0.158
Median: 0.157
Standard deviation 0.034
Rel. st. deviation (%) 21.260

Run 2:
Number of laboratories: 49
Arithmetic mean value: 0.156
Median: 0.156
Standard deviation 0.022
Rel. st. deviation (%) 14.149

Results in decreasing order:

43	< 0.299			
121	0.259 (*)	125	0.156	
42	0.245 (*)	158	0.155	
38	0.230 (*)	31	0.154	
178	0.220	155	0.154	
17	0.205	166	0.154	
41	0.197	5	0.153	
45	0.192	8	0.153	
19	0.180	21	0.153	
30	0.180	4	0.150	
157	0.180	13	0.150	
116	0.176	24	0.146	
163	0.172	33	0.143	
23	0.170	15	0.142	
126	0.170	22	0.142	
124	0.169	118	0.140	
3	0.168	164	0.140	
180	0.168	176	0.140	
36	0.164	104	0.135	
10	0.162	120	0.129	
7	0.160	35	0.124	
14	0.160	153	0.124	
112	0.160	2	0.123	
150	0.159	32	0.120	
16	0.157	110	0.120	
26	0.157	179	0.110	
27	0.157	12	0.090 (*)	
115	0.157	167	0.065 (*)	

Calcium in precipitation
Sample no.: G3
Theoretical value: 0.192
Unit: µg/l

Run 1:
Number of laboratories: 54
Arithmetic mean value: 0.194
Median: 0.190
Standard deviation 0.038
Rel. st. deviation (%) 19.703

Run 2:
Number of laboratories: 51
Arithmetic mean value: 0.187
Median: 0.190
Standard deviation 0.026
Rel. st. deviation (%) 14.039

Results in decreasing order:

38	0.330 (*)	10	0.190	
116	0.301 (*)	13	0.190	
43	< 0.299			
42	0.297 (*)	112	0.190	
178	0.262	164	0.190	
17	0.242	8	0.189	
41	0.239	150	0.189	
30	0.230	24	0.188	
163	0.220	155	0.187	
45	0.211	166	0.187	
14	0.210	4	0.185	
157	0.210	153	0.185	
23	0.204	31	0.183	
19	0.200	33	0.181	
180	0.199	179	0.178	
26	0.197	15	0.173	
7	0.196	32	0.170	
27	0.195	118	0.170	
115	0.194	2	0.166	
3	0.193	35	0.164	
158	0.193	104	0.161	
121	0.192	120	0.155	
124	0.192	22	0.154	
16	0.191	110	0.150	
21	0.191	126	0.150	
36	0.191	176	0.150	
125	0.191	167	0.122	
5	0.190	12	0.120	

Calcium in precipitation
Sample no.: G4
Theoretical value: 0.204
Unit: µg/l

Run 1:
Number of laboratories: 54
Arithmetic mean value: 0.206
Median: 0.205
Standard deviation 0.038
Rel. st. deviation (%) 18.258

Run 2:
Number of laboratories: 50
Arithmetic mean value: 0.204
Median: 0.205
Standard deviation 0.025
Rel. st. deviation (%) 12.296

Results in decreasing order:

42	0.343 (*)	158	0.205	
38	0.310 (*)	125	0.203	
43	< 0.299			
178	0.279	5	0.202	
17	0.277	8	0.202	
116	0.245	21	0.202	
30	0.240	112	0.200	
45	0.231	121	0.200	
157	0.230	7	0.198	
163	0.230	166	0.198	
23	0.228	4	0.195	
13	0.220	155	0.193	
14	0.220	150	0.192	
41	0.219	164	0.190	
180	0.217	31	0.189	
10	0.216	15	0.187	
179	0.214	153	0.181	
3	0.211	118	0.180	
24	0.211	35	0.173	
36	0.211	104	0.173	
16	0.210	120	0.171	
19	0.210	110	0.170	
32	0.210	176	0.170	
115	0.210	2	0.169	
26	0.207	22	0.169	
27	0.206	126	0.150	
124	0.206	12	0.130 (*)	
33	0.205	167	0.114 (*)	

Table 54: Analytical results for potassium in precipitations samples.

Potassium in precipitation
Sample no.: G1
Theoretical value: 0.204
Unit: µg/l

Run 1:
Number of laboratories: 55
Arithmetic mean value: 0.209
Median: 0.205
Standard deviation 0.055
Rel. st. deviation (%) 26.272

Run 2:
Number of laboratories: 53
Arithmetic mean value: 0.205
Median: 0.205
Standard deviation 0.022
Rel. st. deviation (%) 10.766

Results in decreasing order:

43	< 0.726			
176	0.560 (*)	155	0.204	
42	0.284	3	0.203	
17	0.250	15	0.203	
5	0.235	27	0.203	
150	0.233	2	0.201	
16	0.232	19	0.200	
124	0.230	32	0.200	
157	0.230	14	0.199	
116	0.227	23	0.199	
21	0.220	104	0.199	
112	0.220	8	0.197	
179	0.220	31	0.197	
120	0.218	166	0.193	
115	0.217	4	0.190	
41	0.216	12	0.190	
45	0.213	121	0.190	
10	0.211	26	0.188	
13	0.210	125	0.186	
20	0.210	153	0.183	
35	0.210	24	0.182	
110	0.210	118	0.180	
158	0.210	126	0.180	
164	0.210	180	0.174	
22	0.209	30	0.170	
36	0.208	38	0.160	
163	0.208	167	0.148	
7	0.205	178	0.090 (*)	
33	0.205			

Potassium in precipitation
Sample no.: G2
Theoretical value: 0.238
Unit: µg/l

Run 1:
Number of laboratories: 55
Arithmetic mean value: 0.234
Median: 0.234
Standard deviation 0.030
Rel. st. deviation (%) 12.738

Run 2:
Number of laboratories: 52
Arithmetic mean value: 0.234
Median: 0.233
Standard deviation 0.020
Rel. st. deviation (%) 8.716

Results in decreasing order:

43	< 0.726			
176	0.330 (*)	31	0.232	
17	0.300 (*)	8	0.231	
42	0.284	166	0.231	
150	0.279	3	0.230	
5	0.275	15	0.230	
41	0.273	33	0.230	
110	0.260	157	0.230	
21	0.255	14	0.227	
13	0.250	32	0.225	
112	0.250	153	0.224	
115	0.250	22	0.222	
155	0.249	125	0.221	
116	0.247	4	0.220	
120	0.247	12	0.220	
36	0.246	26	0.218	
158	0.246	121	0.218	
35	0.244	124	0.218	
45	0.244	104	0.213	
163	0.242	24	0.211	
10	0.240	118	0.210	
16	0.240	126	0.210	
19	0.240	180	0.207	
20	0.240	167	0.201	
164	0.240	30	0.200	
7	0.238	179	0.197	
2	0.235	38	0.190	
23	0.234	178	0.118 (*)	
27	0.234			

Potassium in precipitation
Sample no.: G3
Theoretical value: 0.187
Unit: µg/l

Run 1:
Number of laboratories: 55
Arithmetic mean value: 0.182
Median: 0.181
Standard deviation 0.032
Rel. st. deviation (%) 17.362

Run 2:
Number of laboratories: 51
Arithmetic mean value: 0.180
Median: 0.181
Standard deviation 0.017
Rel. st. deviation (%) 9.365

Results in decreasing order:

43	< 0.726			
176	0.320 (*)	10	0.181	
17	0.267 (*)	19	0.180	
150	0.224	32	0.180	
42	0.220	8	0.179	
110	0.210	26	0.178	
5	0.206	3	0.175	
41	0.204	33	0.173	
36	0.197	125	0.173	
116	0.197	153	0.172	
21	0.196	121	0.171	
158	0.196	166	0.171	
13	0.190	4	0.170	
20	0.190	12	0.170	
112	0.190	22	0.170	
120	0.190	124	0.169	
164	0.190	24	0.164	
7	0.189	179	0.163	
15	0.188	118	0.160	
35	0.188	126	0.160	
163	0.188	157	0.160	
115	0.187	31	0.157	
23	0.186	104	0.157	
14	0.184	30	0.150	
16	0.184	38	0.150	
27	0.182	180	0.145	
45	0.182	167	0.113 (*)	
155	0.182	178	0.091 (*)	
2	0.181			

Potassium in precipitation
Sample no.: G4
Theoretical value: 0.153
Unit: µg/l

Run 1:
Number of laboratories: 54
Arithmetic mean value: 0.149
Median: 0.147
Standard deviation 0.023
Rel. st. deviation (%) 15.509

Run 2:
Number of laboratories: 51
Arithmetic mean value: 0.147
Median: 0.147
Standard deviation 0.014
Rel. st. deviation (%) 9.826

Results in decreasing order:

43	< 0.726			
176	0.240 (*)	120	0.147	
150	0.206 (*)	2	0.146	
42	0.193	10	0.146	
110	0.180	23	0.146	
17	0.177	27	0.146	
41	0.168	125	0.143	
36	0.164	155	0.143	
5	0.162	167	0.143	
15	0.160	26	0.142	
157	0.160	31	0.141	
115	0.159	33	0.141	
158	0.159	4	0.140	
7	0.158	12	0.140	
116	0.158	19	0.140	
21	0.157	126	0.140	
35	0.154	166	0.138	
16	0.152	104	0.137	
163	0.151	124	0.137	
121	< 0.150			
13	0.150	22	0.133	
20	0.150	24	0.132	
32	0.150	118	0.130	
112	0.150	179	0.129	
164	0.150	153	0.127	
3	0.149	30	0.120	
8	0.148	38	0.120	
45	0.148	180	0.118	
14	0.147	178	0.071 (*)	

Table 55: Analytical results for conductivity in precipitations samples.

Conductivity in precipitation
Sample no.: G1
Theoretical value: 27.000
Unit: µS/cm

Run 1:
Number of laboratories: 53
Arithmetic mean value: 25.010
Median: 26.200
Standard deviation 3.869
Rel. st. deviation (%) 15.468

Run 2:
Number of laboratories: 52
Arithmetic mean value: 25.440
Median: 26.290
Standard deviation 2.299
Rel. st. deviation (%) 9.037

Results in decreasing order:

10	29.100	46	26.120	
176	29.000	24	26.000	
14	28.280	150	26.000	
15	27.900	8	25.900	
31	27.300	121	25.800	
33	27.300	112	25.700	
12	27.200	126	25.600	
30	27.200	164	25.540	
20	27.100	36	25.100	
172	27.100	118	25.000	
116	27.000	124	25.000	
120	27.000	115	24.300	
35	26.960	153	24.170	
155	26.930	32	24.000	
16	26.900	22	23.500	
178	26.900	40	23.000	
45	26.800	42	22.800	
5	26.700	17	22.650	
38	26.600	110	22.400	
21	26.510	23	21.700	
27	26.500	7	21.460	
166	26.500	43	21.300	
107	26.400	104	20.000	
158	26.400	13	19.700	
163	26.400	41	19.570	
3	26.380	2	2.670	(*)
19	26.200			

Conductivity in precipitation
Sample no.: G2
Theoretical value: 30.000
Unit: µS/cm

Run 1:
Number of laboratories: 53
Arithmetic mean value: 27.332
Median: 28.400
Standard deviation 3.945
Rel. st. deviation (%) 14.433

Run 2:
Number of laboratories: 52
Arithmetic mean value: 27.801
Median: 28.450
Standard deviation 1.994
Rel. st. deviation (%) 7.172

Results in decreasing order:

14	30.720	43	28.200	
15	30.200	150	28.200	
121	29.800	104	28.000	
10	29.700	124	28.000	
33	29.700	176	28.000	
20	29.600	164	27.870	
31	29.500	36	27.700	
178	29.500	112	27.700	
16	29.400	153	27.540	
35	29.370	17	27.400	
12	29.300	32	27.150	
30	29.200	118	27.000	
155	29.140	116	26.710	
3	29.100	115	26.500	
27	29.100	24	26.000	
45	29.100	40	26.000	
107	29.000	110	26.000	
120	29.000	126	25.700	
158	29.000	7	25.540	
46	28.870	22	24.800	
5	28.800	23	24.800	
163	28.800	42	24.500	
21	28.740	13	23.700	
172	28.700	38	22.900	
19	28.600	41	20.880	
166	28.500	2	2.940	(*)
8	28.400			

Conductivity in precipitation
Sample no.: G3
Theoretical value: 20.000
Unit: µS/cm

Run 1:
Number of laboratories: 53
Arithmetic mean value: 19.969
Median: 20.000
Standard deviation 5.326
Rel. st. deviation (%) 26.670

Run 2:
Number of laboratories: 51
Arithmetic mean value: 19.684
Median: 20.000
Standard deviation 1.397
Rel. st. deviation (%) 7.095

Results in decreasing order:

43	52.400	(*) 163	20.000	
38	23.300	21	19.990	
3	21.780	116	19.940	
121	21.500	166	19.900	
14	21.370	19	19.700	
8	21.200	12	19.500	
46	21.130	107	19.400	
15	21.100	112	19.400	
33	21.000	150	19.340	
20	20.900	36	19.300	
178	20.600	32	19.200	
30	20.500	104	19.000	
31	20.500	176	19.000	
27	20.400	7	18.880	
126	20.400	110	18.700	
10	20.300	153	18.630	
172	20.300	118	18.500	
155	20.200	115	18.100	
16	20.100	164	18.100	
45	20.100	13	18.000	
158	20.100	23	17.900	
35	20.060	22	17.600	
17	20.050	42	17.100	
5	20.000	40	17.000	
24	20.000	41	14.830	
120	20.000	2	2.040	(*)
124	20.000			

Conductivity in precipitation
Sample no.: G4
Theoretical value: 23.000
Unit: µS/cm

Run 1:
Number of laboratories: 52
Arithmetic mean value: 22.151
Median: 22.745
Standard deviation 3.687
Rel. st. deviation (%) 16.646

Run 2:
Number of laboratories: 50
Arithmetic mean value: 22.276
Median: 22.745
Standard deviation 1.543
Rel. st. deviation (%) 6.924

Results in decreasing order:

38	35.700	(*) 12	22.700	
126	25.900	163	22.700	
121	24.300	107	22.600	
14	24.250	166	22.500	
15	24.000	150	22.200	
8	23.900	110	22.100	
116	23.840	112	22.100	
33	23.700	32	22.000	
20	23.600	176	22.000	
178	23.400	153	21.710	
31	23.300	164	21.590	
3	23.260	35	21.540	
27	23.200	118	21.500	
30	23.100	7	21.490	
155	23.070	36	21.200	
24	23.000	43	21.200	
104	23.000	115	21.000	
120	23.000	46	20.850	
124	23.000	22	20.200	
172	23.000	42	20.200	
16	22.900	23	20.100	
45	22.900	17	20.070	
5	22.800	13	19.400	
19	22.800	40	19.000	
158	22.800	41	17.060	
21	22.790	2	2.340	(*)

Appendix 4

Figures – 28th intercomparison

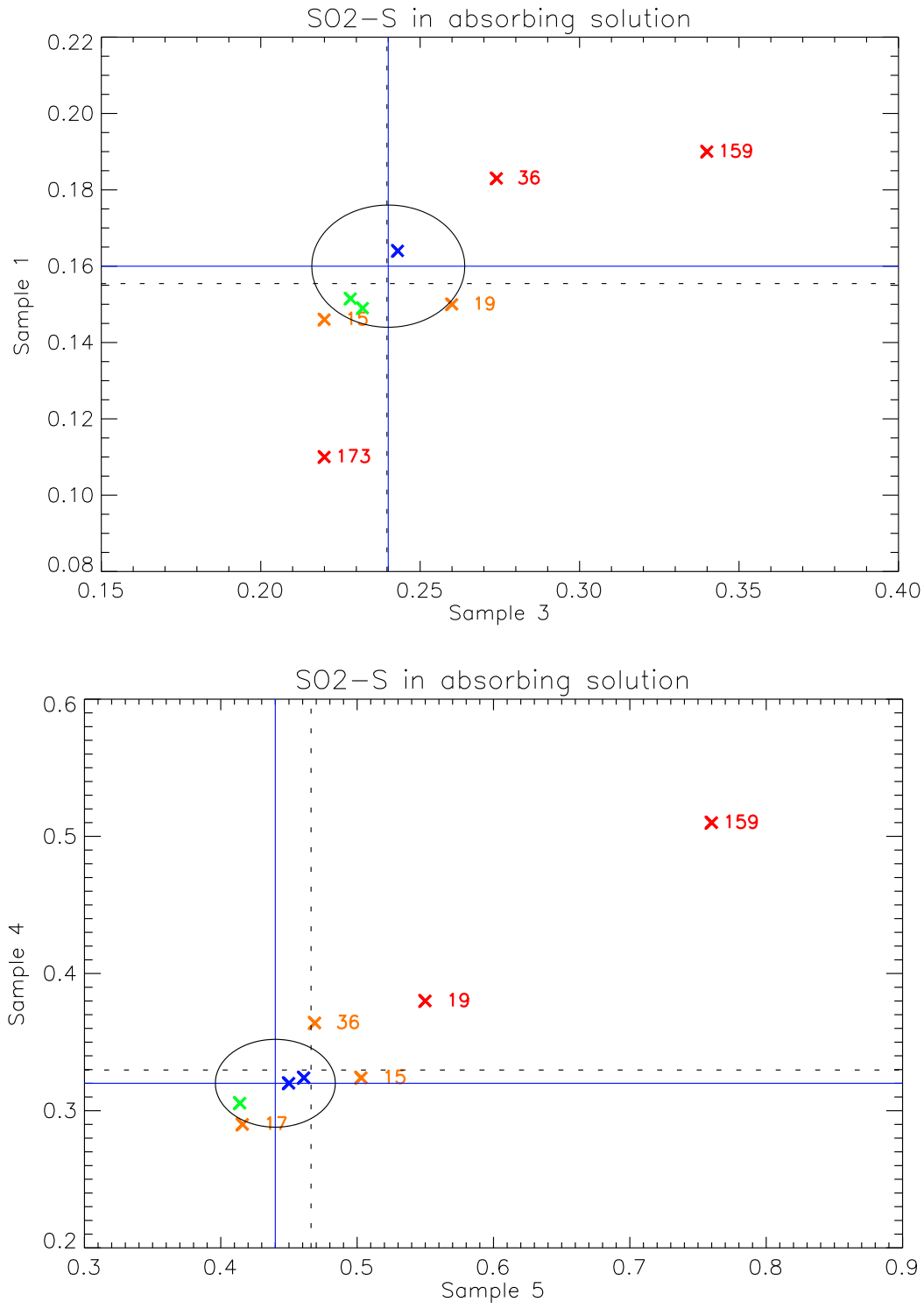

Figure 18: Youden plot of SO_2-S in absorbing solution.

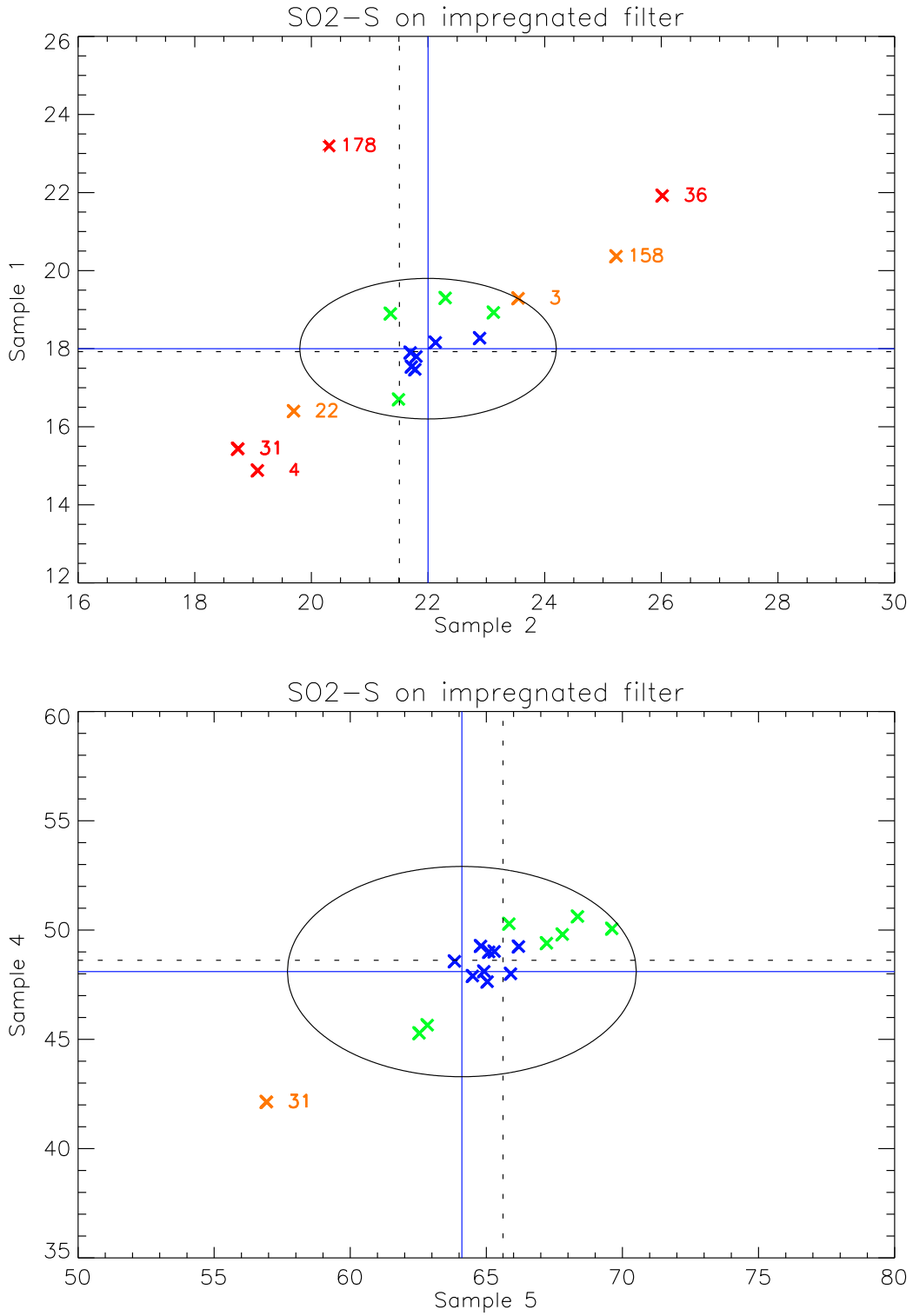

Figure 19: Youden plot of SO_2-S on impregnated filter.

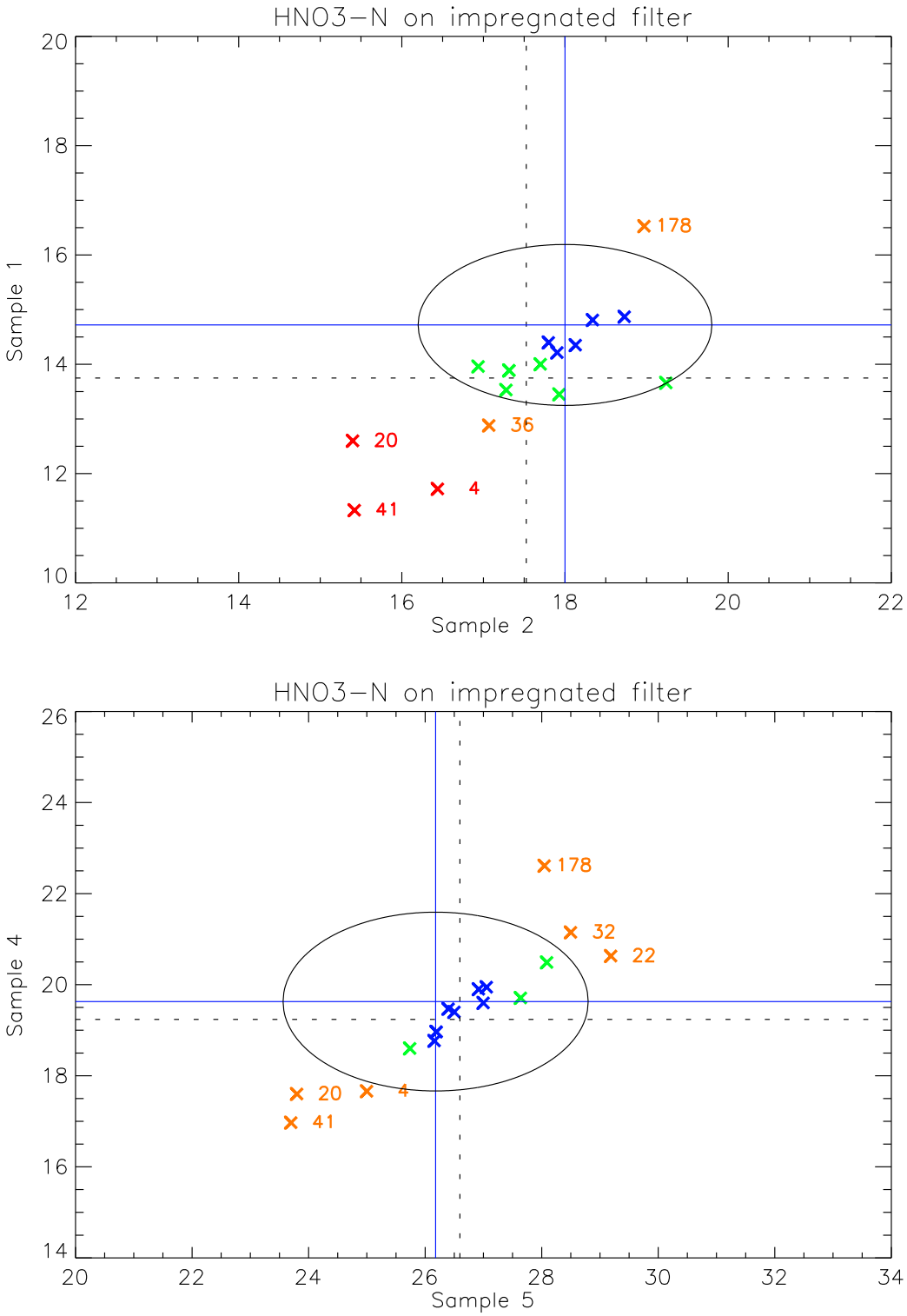

Figure 20: Youden plot of HNO_3-N on impregnated filter.

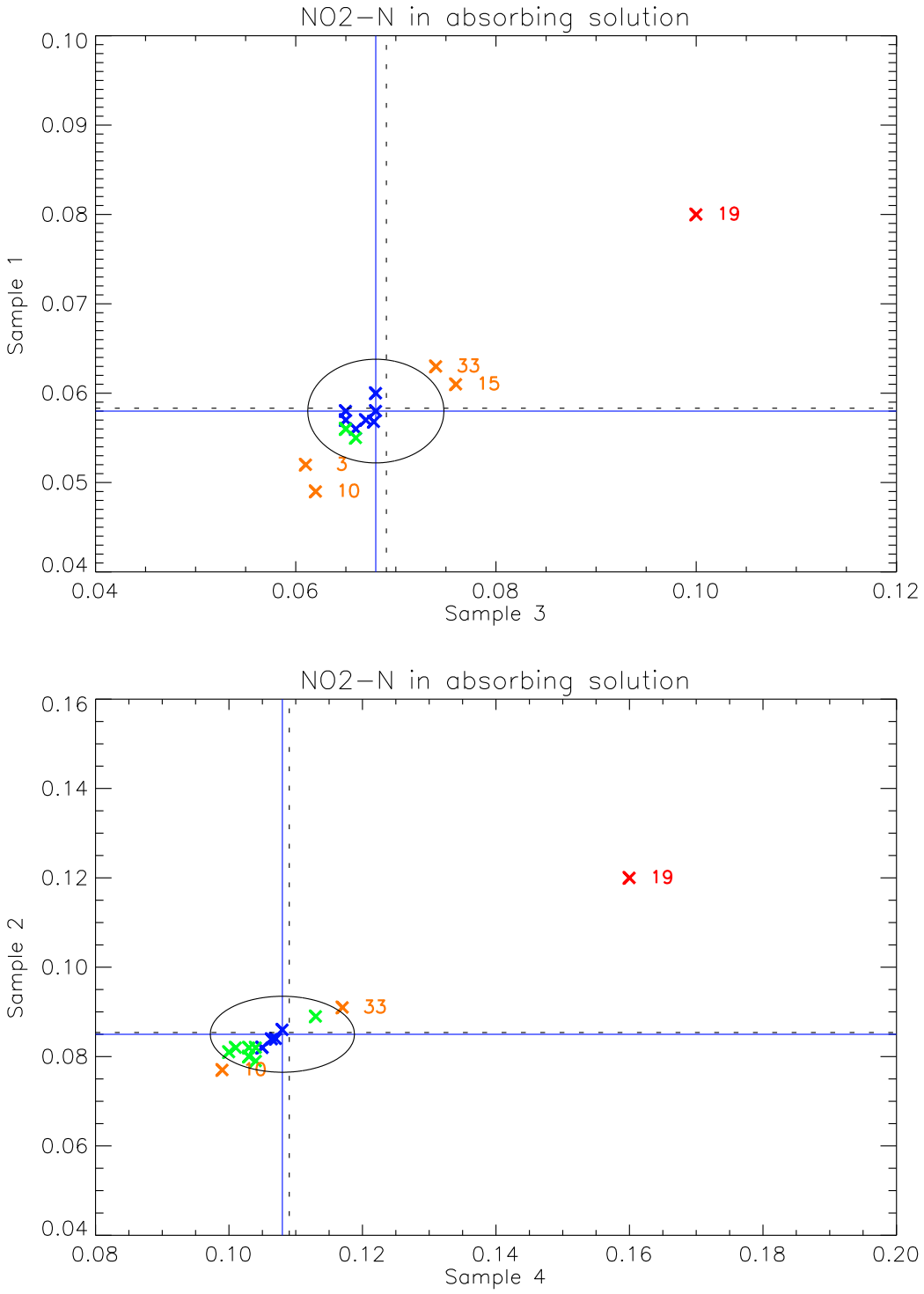

Figure 21: Youden plot of NO_2-N in absorbing solution.

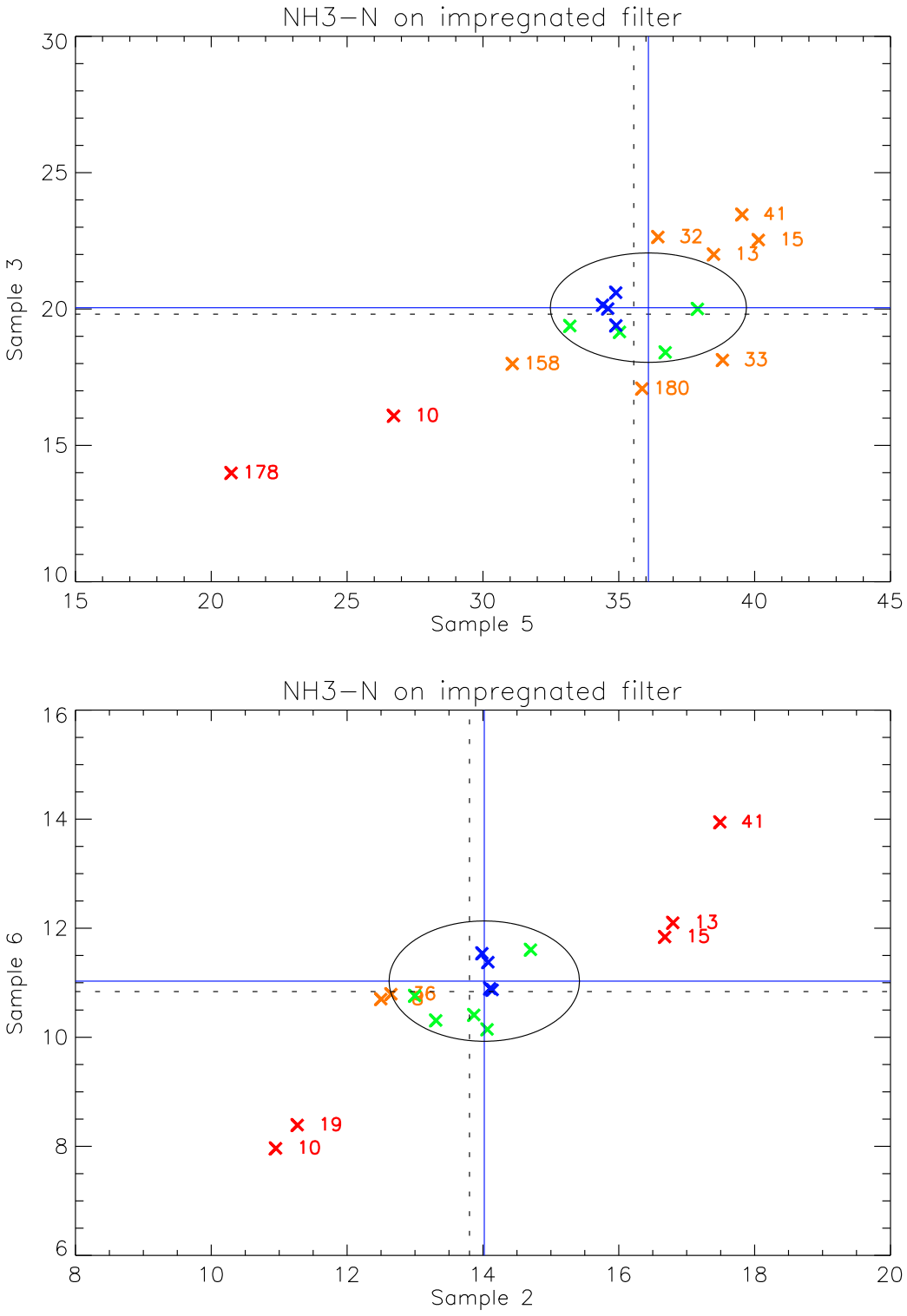

Figure 22: Youden plot of NH_3-N on impregnated filter.

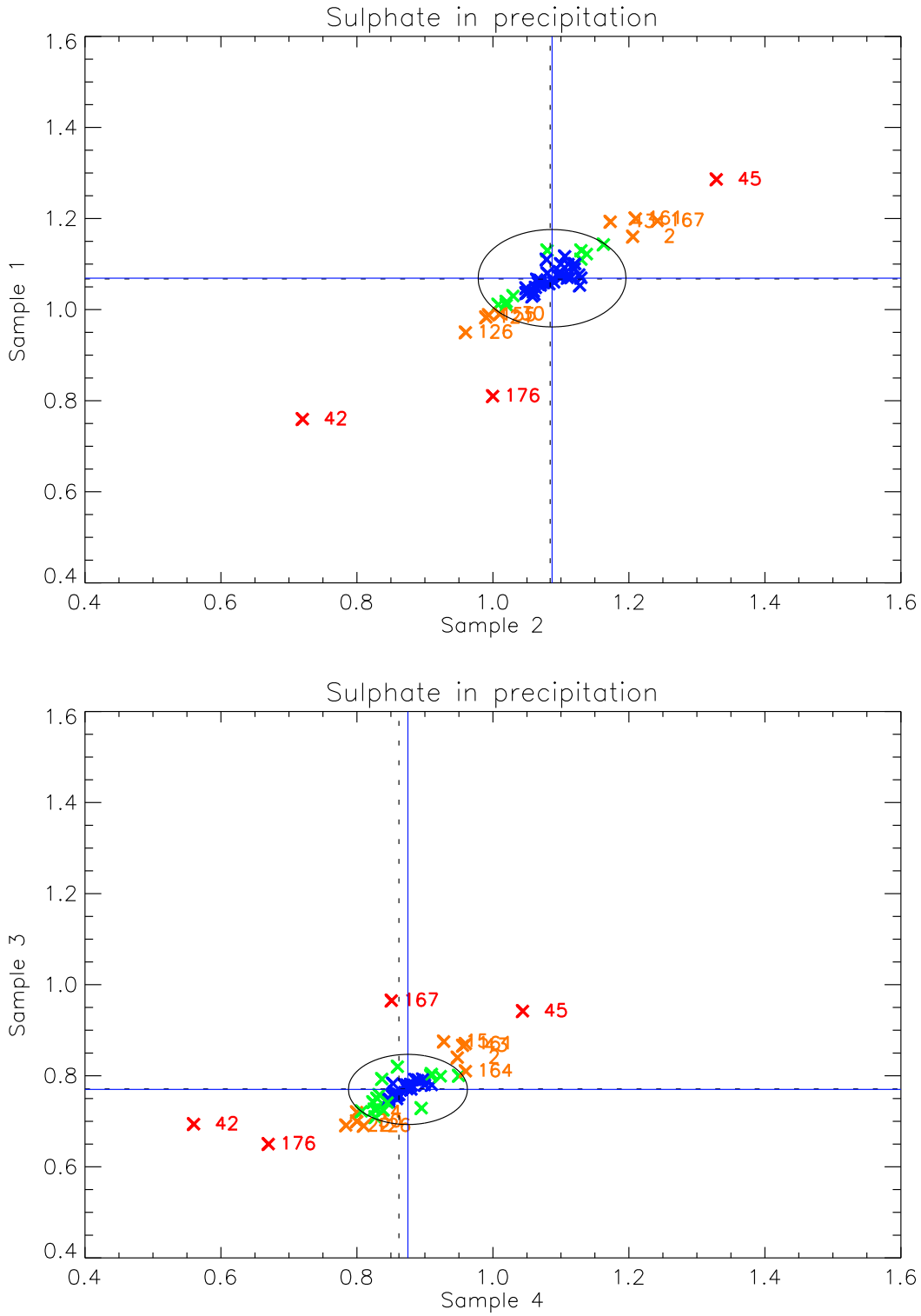

Figure 23: Youden plot of SO_4-S in precipitation.

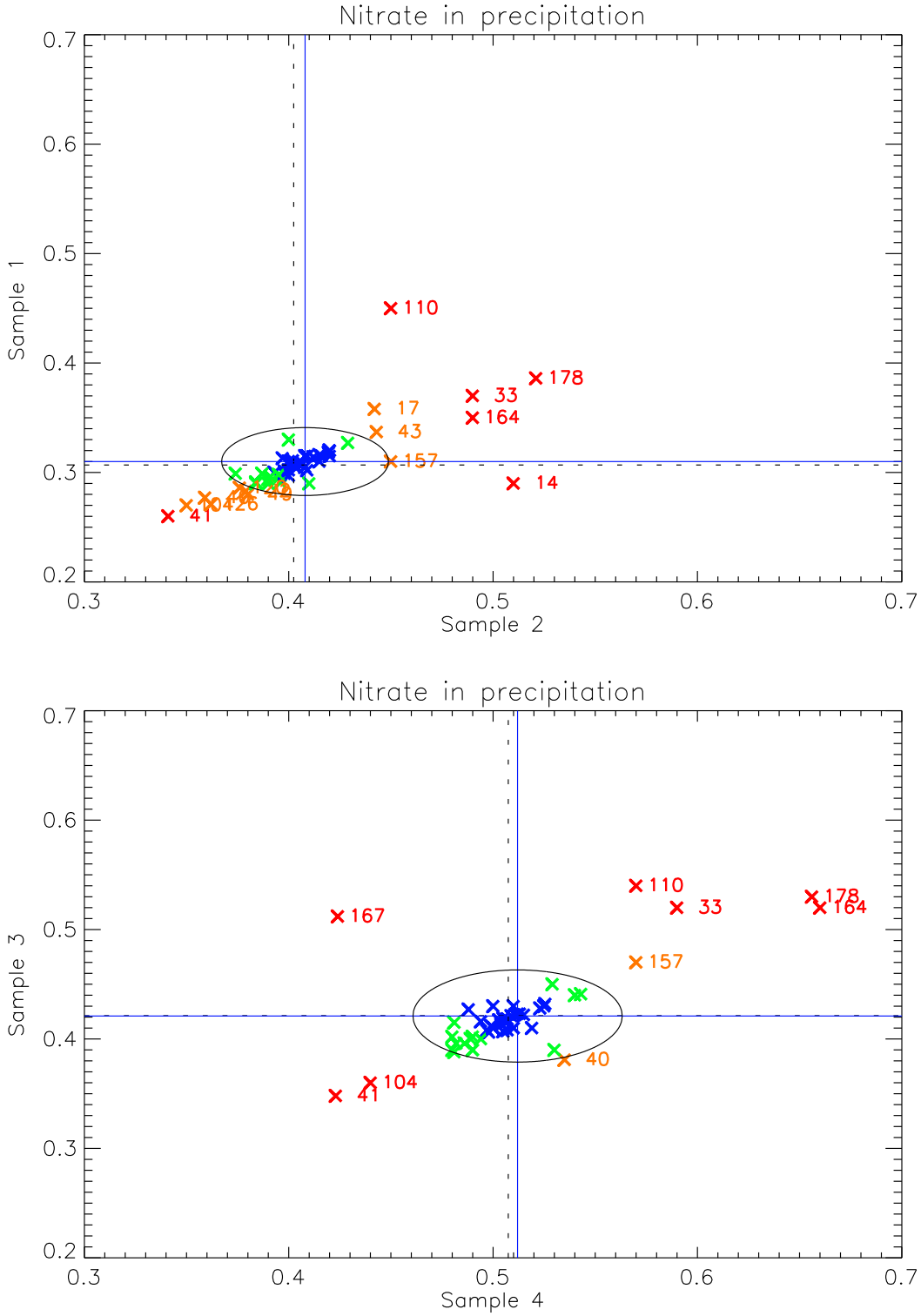

Figure 24: Youden plot of NO_3-N in precipitation.

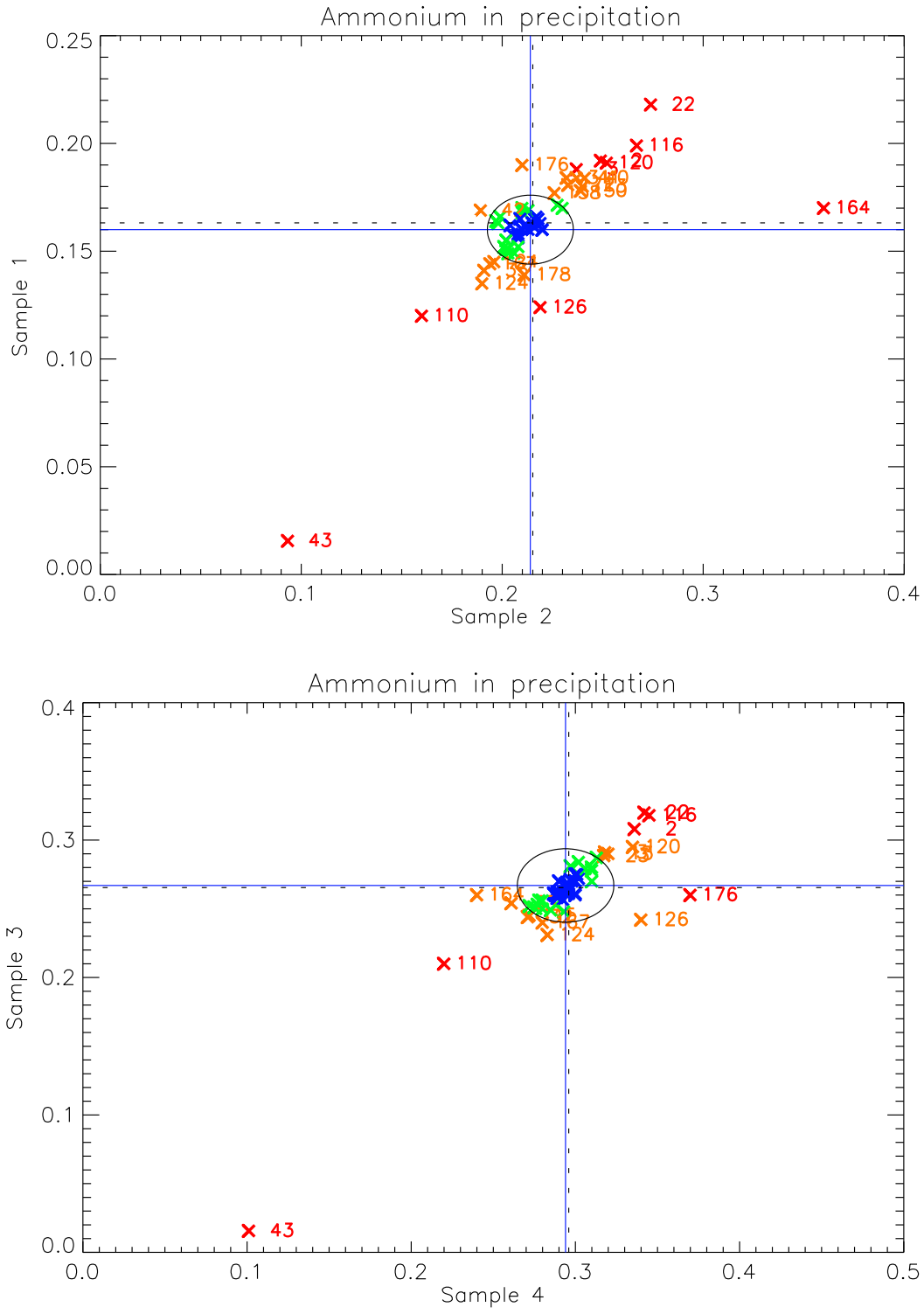

Figure 25: Youden plot of NH_4-N in precipitation.

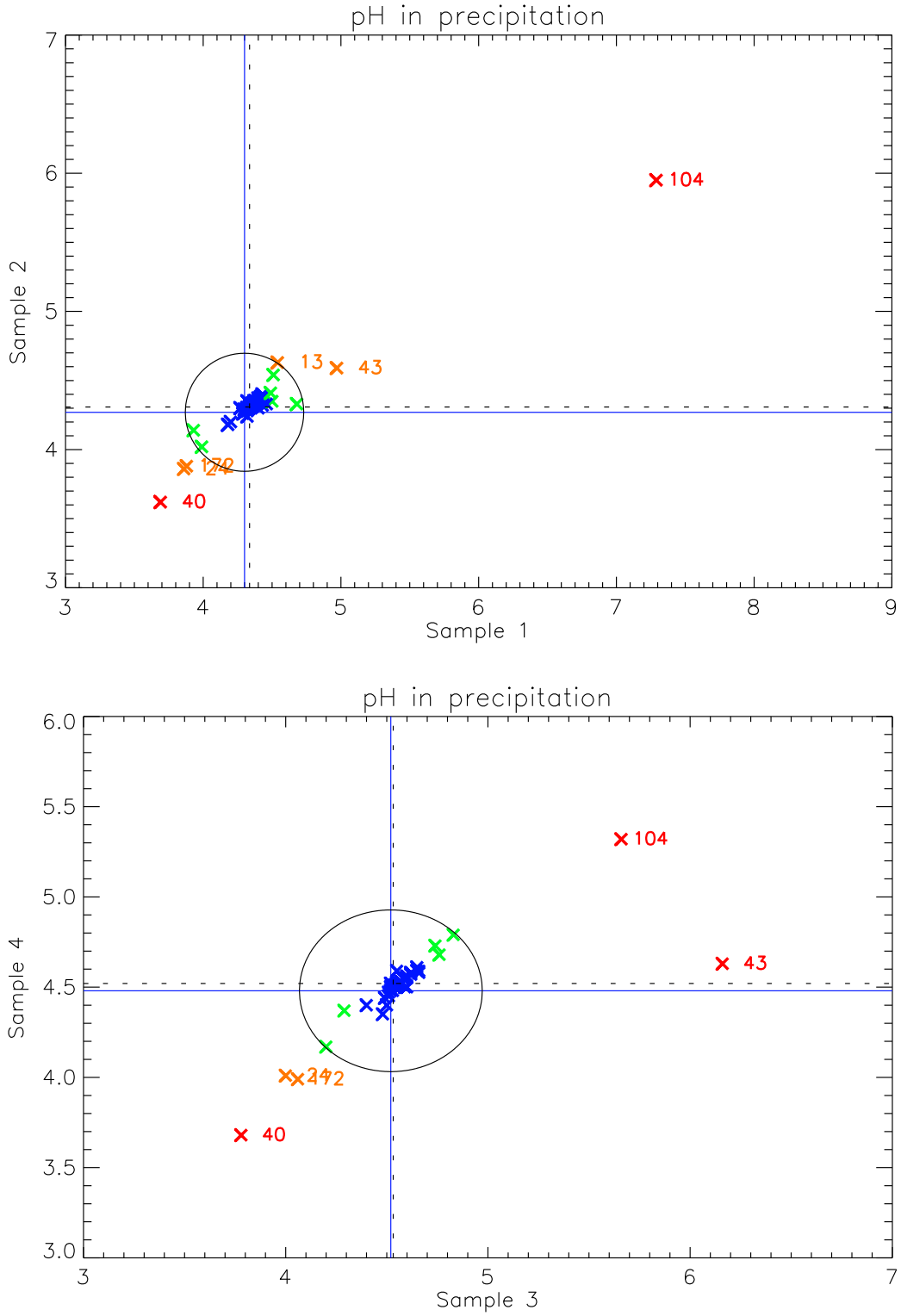

Figure 26: Youden plot of pH in precipitation.

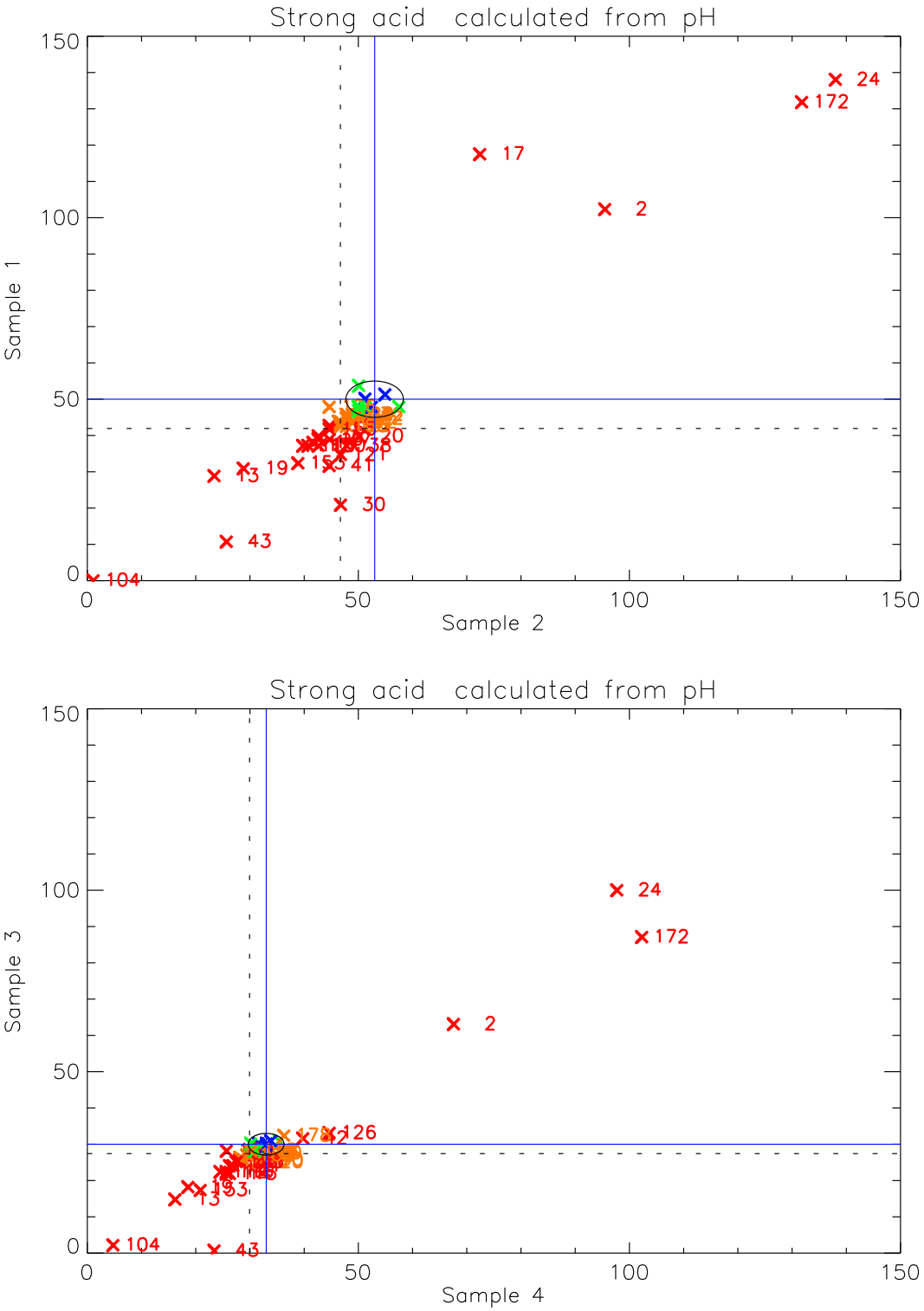

Figure 27: Youden plot of strong acid in precipitation.

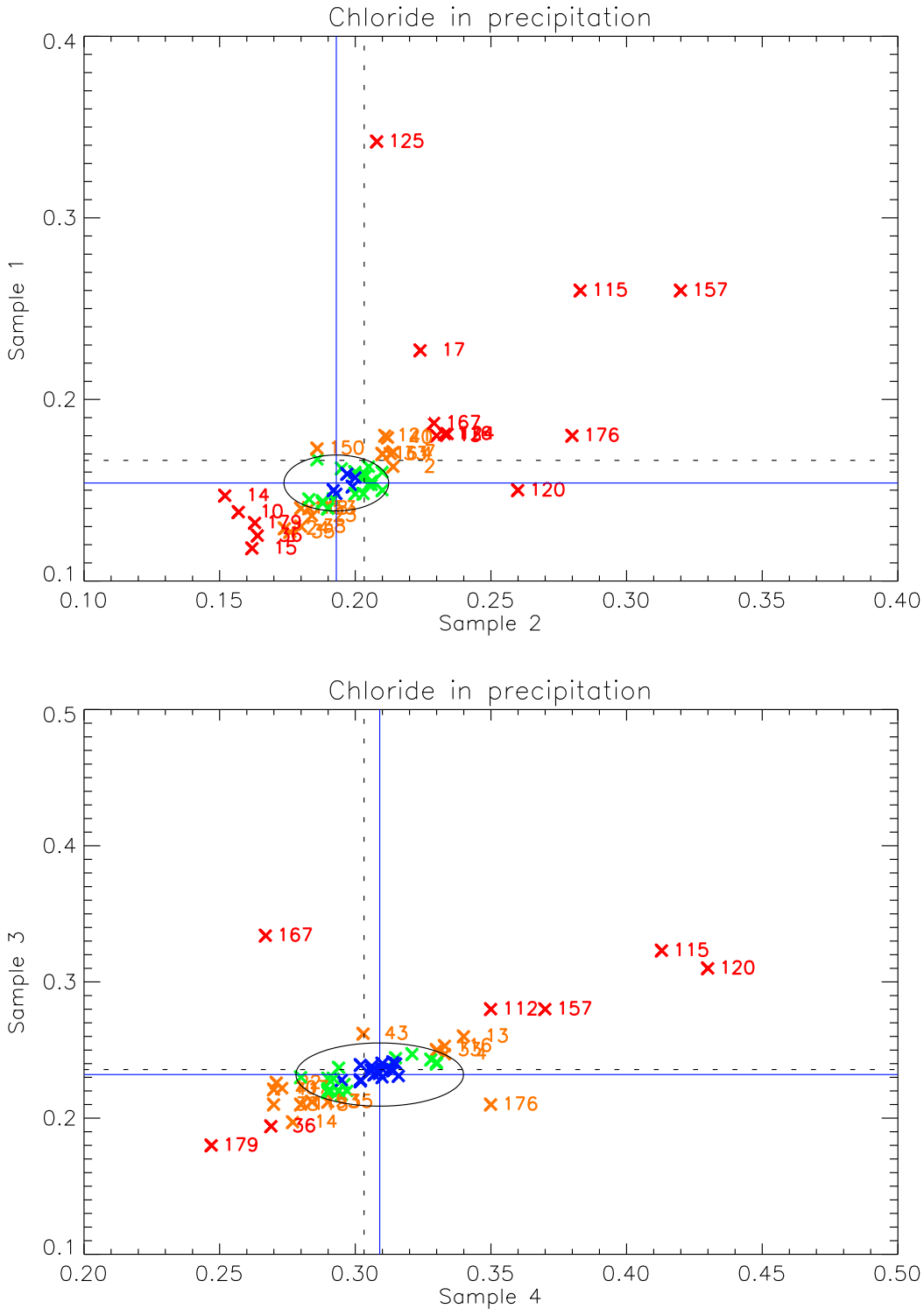

Figure 28: Youden plot of Cl in precipitation.

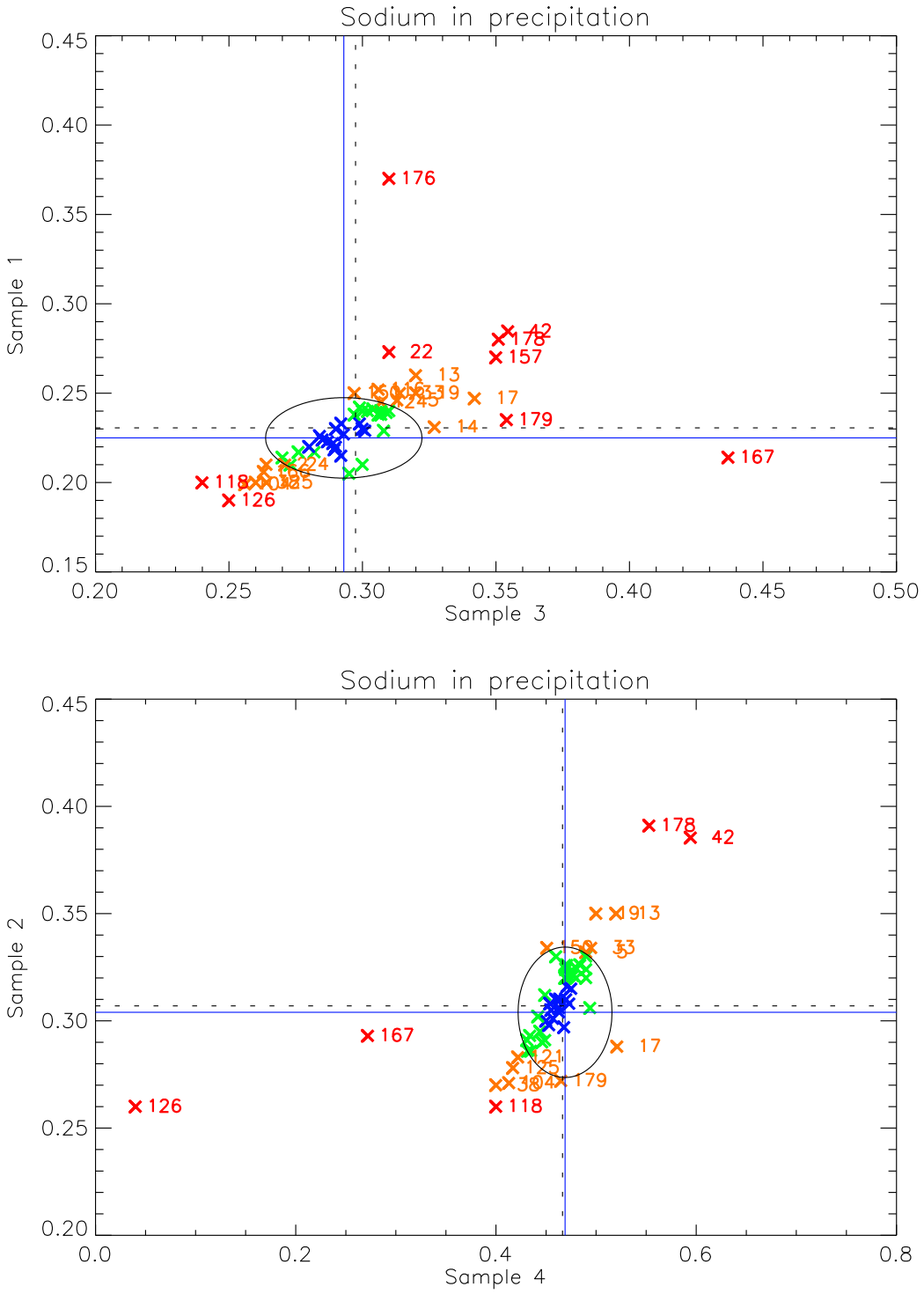

Figure 29: Youden plot of Na in precipitation.

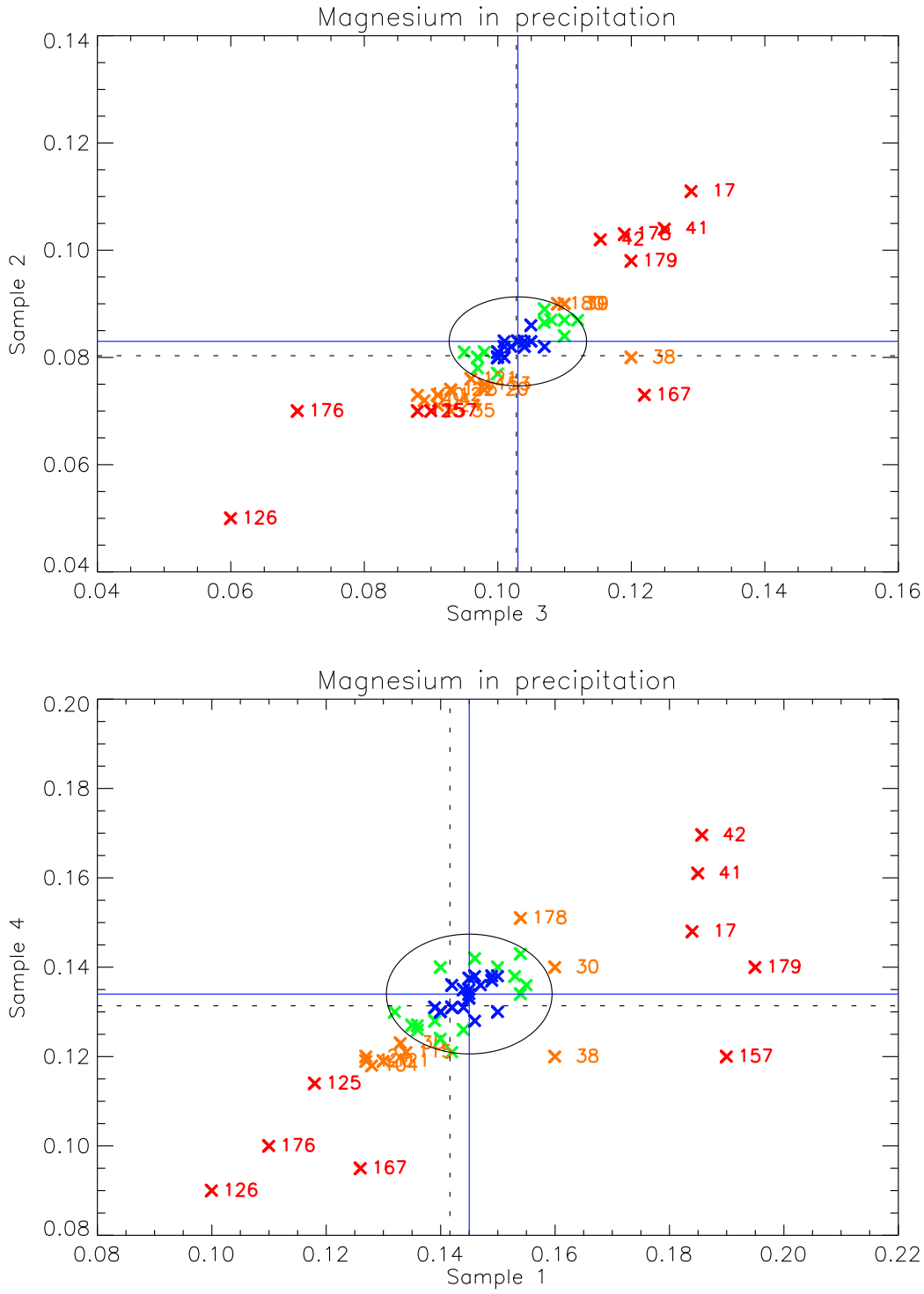

Figure 30: Youden plot of Mg in precipitation.

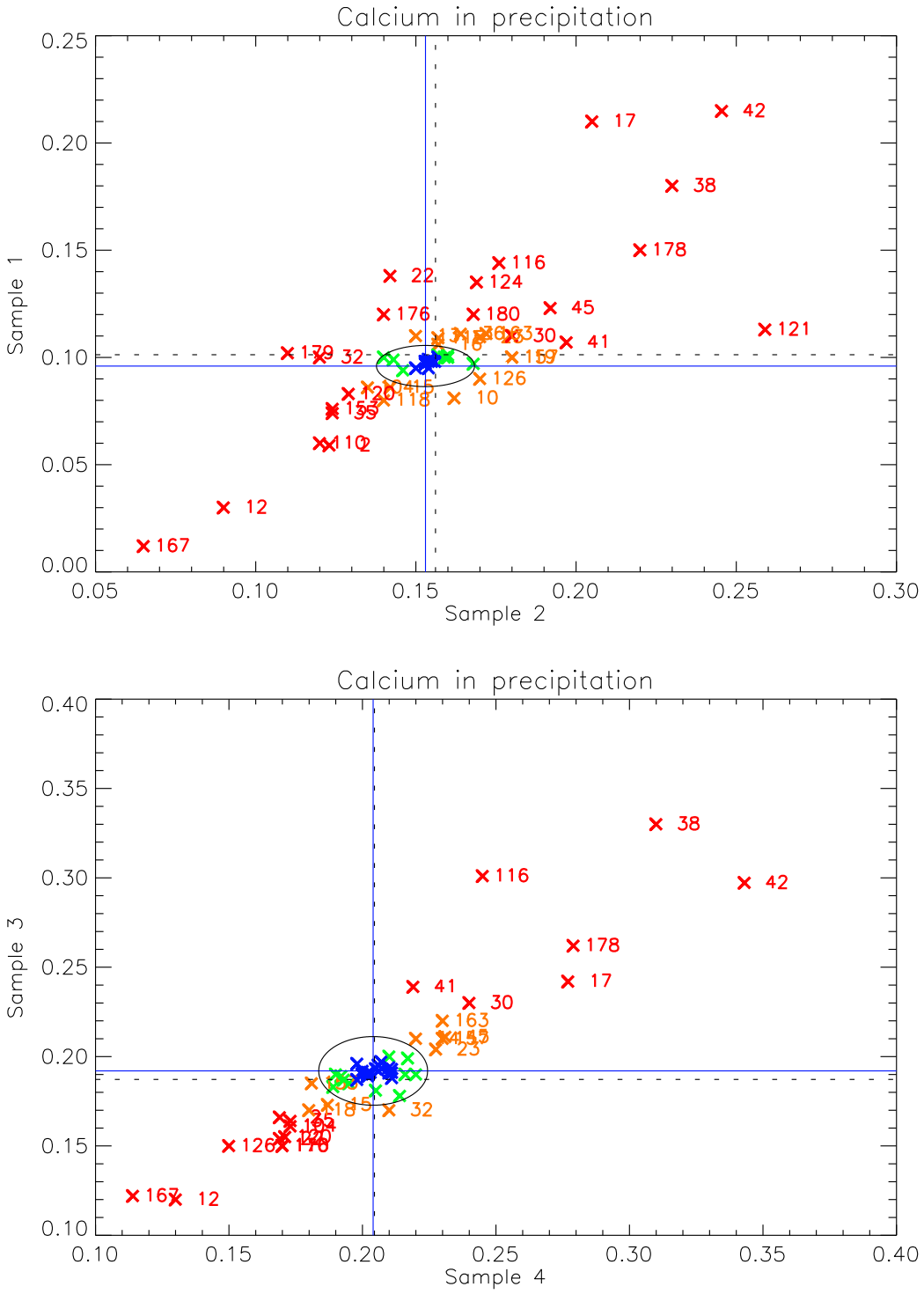

Figure 31: Youden plot of Ca in precipitation.

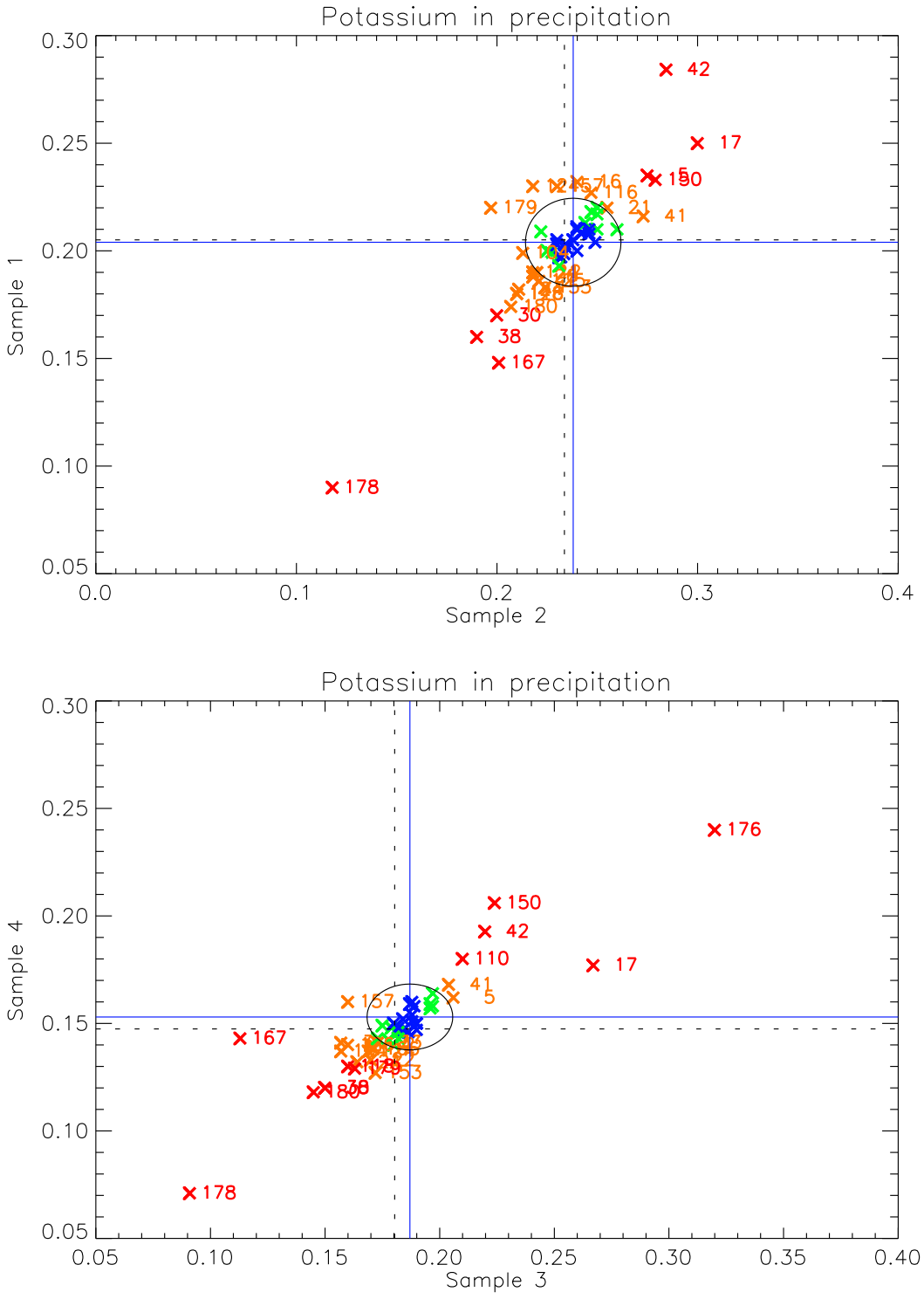

Figure 32: Youden plot of K in precipitation.

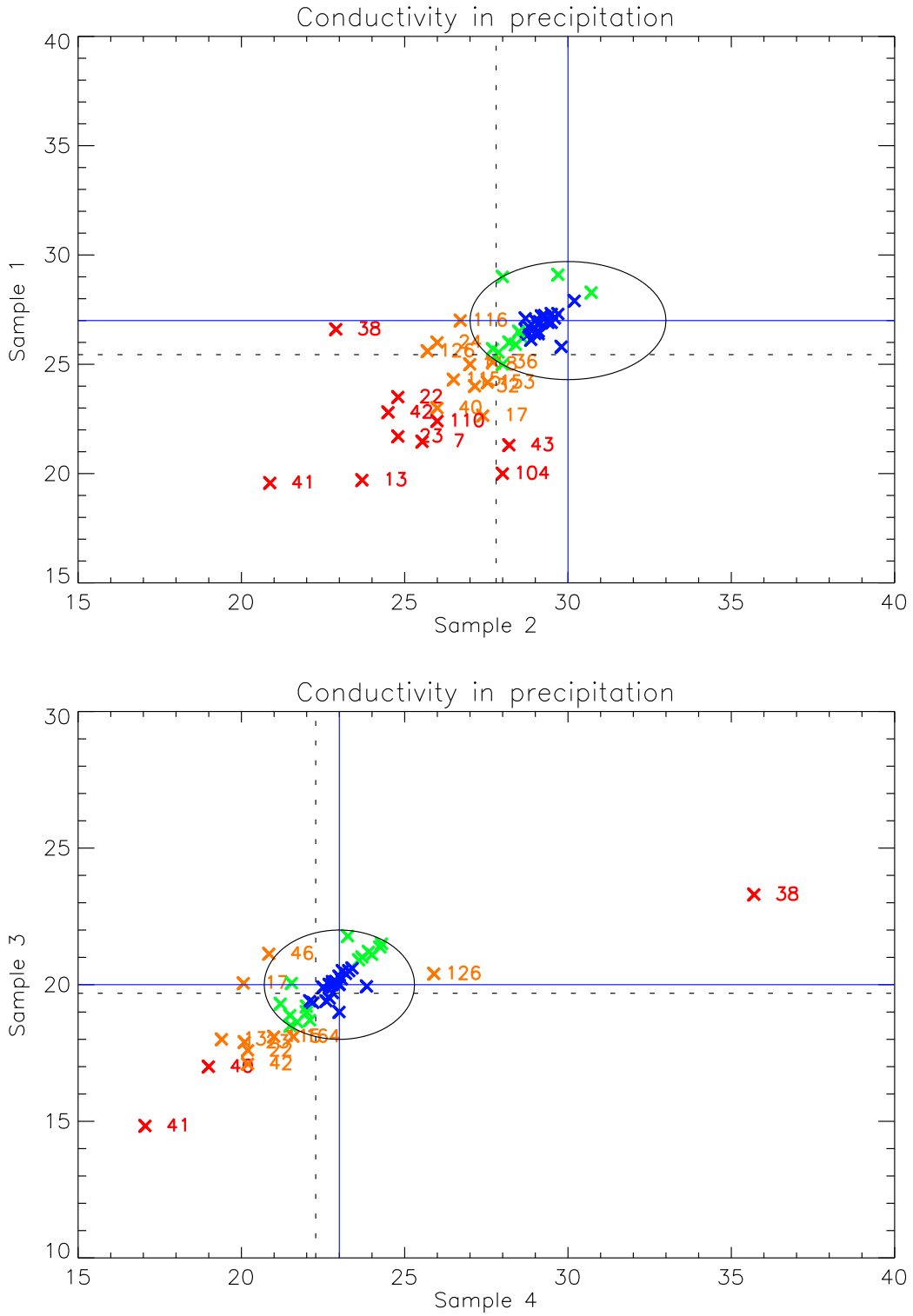

Figure 33: Youden plot of conductivity in precipitation.