

NILU: OR 42/2001
REFERENCE: O-8208
DATE: JULY 2001
ISBN: 82-425-1288-4

International Co-operative Programme on Materials, including Historic and Cultural Monuments

**Environmental data report
November 1998 to October 1999**

Jan F. Henriksen and Kari Arnesen

Prepared by the Environmental Sub-Centre
Norwegian Institute for Air Research
P.O.Box 100, NO-2027 Kjeller, Norway

Contents

	Page
Summary	3
1 Introduction	5
2 The measuring programme	6
3 Data from the monitoring test sites	6
4 Monthly mean concentrations.....	7
5 Calculation of monthly values.....	7
6 Yearly mean concentrations.....	8
6.1 Yearly mean values	8
6.2 Sun radiation and amount of precipitation	8
7 Results	9
8 Model for computation of solar radiation.....	11
9 Regularity and quality of the reported data	12
10 Evaluation of the data	13
10.1 The data distribution	13
10.2 Trend analysis	17
10.3 Solar radiation	20
11 References	22
Appendix A Calculated yearly mean values	23
Appendix B Reported monthly and yearly values.....	27
Appendix C National contact centres	65

Summary

The UN/ECE international co-operative programme of effects on materials is an international project that has been running for eight years at 39 test sites in 14 countries from 1987 to 1995. A second phase of the project started in 1997 with an adjusted number of test sites and countries participating. In the second phase 30 test sites and 19 countries participated. During the interim period 1995 to 1997 trend analysis for metal corrosion and exposure of the two materials glass and polymer continued. Norwegian Institute for Air Research has been a sub-centre and responsible for the environmental data storing, reporting and evaluation during the whole programme.

This report primarily presents the data for the period 1998 to 1999 of environmental measurements obtained in the ECE-ICP on materials programme. However, also the environmental data for the period 1997 to 1998 is included, since more data have been reported to the sub-centre after the last report was finalised. Only the test sites that are included in the second phase of the programme are included in this report. The exposure in most countries started late in October or in November in 1997, and the yearly average values have therefore been calculated from November to October. The monthly values for the two years are reported in Appendix B.

An evaluation of the regularity and quality of the total data base shows that sites belonging to the EMEP net of sites or to national surveillance programmes have the best regularity.

To obtain a good database for dose-response evaluation, it is important to have a wide range in the data for the most important parameters. The data obtained so far indicates that we have a good spread in the data for all important gases as well as for the most important meteorological data.

Earlier comparisons of the yearly values have shown that the SO₂ concentration has been reduced for almost all sites. The trend is that the concentration reduction has been 75% for the total database during the period 1987–1995. For NO₂ a reduction is also observed, mainly in the highest polluted areas. For the NO₂ data as a whole, a reduction of 40% can be seen. For O₃ no trend is observed. In this report scatterplots comparing the two years 1997-98 and 1998-99 have been made. No specific trend is observed for any of the gases except for site 43, where the first year had a mean value for SO₂ of 35 µg/m³ while the second year had 60.3 µg/m³.

International Co-operative Programme on Materials, including Historic and Cultural Monuments

Environmental data report November 1998 to October 1999

1 Introduction

Airborne acidifying pollutants are known to be one major cause of corrosion of different materials including the extensive damage that has been observed on historic and cultural monuments. In order to fill some important gaps of knowledge in this field the Executive Body for the Convention on Long-range Transboundary Air Pollution decided to launch an international co-operative programme. The programme was started in September 1987 and has involved exposure at 39 test sites in 12 European countries and in the United States and Canada. The first phase of the exposure programme finished in 1995. However during the eight years where the exposure programme has been carried out, a large change in the pollution situation in Europe has been observed. In the final environmental data report for the period 1987 to 1995 (Henriksen et al., 1997), the same trend has been observed for most of the 39 test sites. The SO₂ concentrations have been drastically reduced while the change in the NO₂ and O₃ levels have been minor. This new pollution situation where the importance of NO₂ and O₃ were in focus, led to a proposal of a second phase of the programme. The new 4 years exposure project was launched in the fall 1997 with redefined environmental measuring programme, a better combination of test sites for field exposure and with several new countries as partners in the projects (Swedish Corrosion Institute rev. 1993). For the period 1995 to 1997 the on-going activities were; environmental measurements, exposure of polymeric and glass materials as well as trend analysis. The environmental data for this period and the first year in the second phase was reported last year (Henriksen and Arnesen, 2000)

The aim of the new programme is to perform a quantitative evaluation of the effect of NO_x and other pollutants like ozone and sulphur pollutants in combination with climatic parameters on the atmospheric corrosion of important materials. For this purpose, measurements of gaseous pollutants, precipitation and climate parameters have been initiated at or nearby each test site, together with corrosion evaluation of the exposed test materials at each site.

A Task Force is organising the programme with Sweden as lead country and Swedish Corrosion Institute serving as the Main Research Centre. Sub-centres in different countries have been appointed, each responsible for their own materials group. The materials groups are:

Structural metals:

- Steel and zinc for trend analyses (Sub-centre responsible for evaluation: SVUOM Praha a.s., Prague, Czech Republic),

- Zinc for 4 year's of exposure (EMPA Corrosion/Surface Protection, Dübendorf, Switzerland)
- Copper and cast bronze (Bayerisches Landesamt für Denkmalpflege, Munich, Germany).

Stone materials, Portland limestone (Building Research Establishment Ltd., Department of Environment, Waterford, United Kingdom).

Paint coatings, steel with silicon alkyd paint (Norwegian Institute for Air Research, Kjeller, Norway).

Glass materials, Two types of glass M1 and M3 (Institute of Chemistry, Academy of Fine Arts, Vienna, Austria)

Norwegian Institute for Air Research has been the sub-centre for the environmental database through the whole programme.

The exposure programme has fewer materials than in the first phase, mainly because we have to use materials, which is sensitive enough for having sufficient reaction within 4 years of exposure.

2 The measuring programme

The measuring programme includes a normal environmental programme and an extended programme, as shown in Table 1.

Table 1: The measuring programme

Components to be measured		
Normal programme	Gas Precipitation Climate	SO ₂ , O ₃ , NO ₂ mm, pH, SO ₄ -S, NO ₃ -N, Cl ⁻ , conductivity Temperature, relative humidity and sun radiation
Extended programme	Gas Precipitation Particulates	HNO ₃ NH ₄ -N, Na, Ca, Mg, K, Total amount

The data are to be reported to the environmental sub-centre as monthly mean values, except for sun radiation and mm precipitation, which are reported as the sums. The data are presented as monthly and yearly values for the project period.

3 Data from the monitoring test sites

The data are sent to the environmental sub-centre as excel data files on diskette or as E-mail.

All data presented by the environmental sub-centre are given with the same accuracy as in the reporting forms agreed upon. For data series which include

values "below the detection limit", these are, by convention, replaced with one half of the reported detection limits when calculating the mean values.

4 Monthly mean concentrations

The average monthly data reported is for November 1997 to October 1998 and November 1998 to October 1999 are given in Appendix B. The results from both the first and second year are reported since more data for the first year has been obtained since the previous report was finished. The participating countries are reporting data on a monthly base and are responsible for the quality control of their own data.

5 Calculation of monthly values

For their own test sites the participants shall calculate the mean values in accordance with the following equations.

- Mean temperature (T_M)

T_i = measured values

$$T_M = \frac{\sum_1^i T_i}{i}$$

i = number of records

- Mean relative humidity (RH_M)

$$RH_M = \frac{\sum_1^i RH_i}{i}$$

- Sun radiation (sun) (for incomplete data sets

see chapter 6.2)

$$sh = \sum_1^i sh_i$$

If sunshine hours are reported as a substitute for sun radiation, sunshine hours shall report the number of hours where the test panels have been exposed to sunlight. A special designed program has been developed for transferring yearly values for sunshine hour to sun radiation.

- Mean gas concentrations G_M

$$G_M = \frac{\sum_1^i G_i}{i}$$

For some sites where complete information of the sampling period exists, another equation is used

$$G_M = \frac{\sum_1^i (n_i \cdot G_i)}{\sum_1^i n_i}$$

n_i = sampling period

- Precipitation (for incomplete data sets,
see chapter 6.2)

$$mm = \sum_1^i mm_i$$

- Weighted mean pH (pH_M)

$$pH_M = -\log \frac{\sum_1^i [mm_i \cdot (10^{-pH_i})]}{\sum_1^i mm_i}$$

- Weighted mean values for cations, anions and conductivity (C_M)

$$C_M = \frac{\sum_1^i (mm_i \cdot C_i)}{\sum_1^i mm_i}$$

6 Yearly mean concentrations

6.1 Yearly mean values

All values given for yearly mean values are calculated from the available monthly values. In Appendix A, the available yearly values for the two first years in the second phase of the programme are listed.

The calculation of the yearly values follows the procedure as for the monthly data. The quality of the yearly mean values depends on the amount of monthly values available. For the reported yearly values for gases and precipitation ions the following rules has been adopted:

- A yearly mean value for observations including 75% of the monthly values or more is accepted without any remarks
- A yearly mean value including between 50% and 75% of monthly data is accepted with an asterisk (*)
- A yearly value including less than 50% is reported with a (X) and is not recommended to be used for further statistical evaluations.

Temperature and relative humidity data will have seasonal variations and need a complete set of data. To complete the yearly results estimated values will be introduced in the same way as for sun radiation and amount of precipitation. See chapter 6.2

6.2 Sun radiation and amount of precipitation

Sun radiation and amount of precipitation are reported as the total sum and must be completed to a full year if the results shall be of any use. Since there are seasonal variations in the climatic factors the use of average values for adjusting the results can be incorrect. To complete the yearly results estimated values might be used. The estimated values can be formed by comparing similar sites, by

looking at reported values for other months from the same sites or from meteorological statistics. Only 4 estimated values are accepted for each parameter. If monthly values are available from the previous years, the missing monthly value is substituted with the mean value from the same month for the available years.

If more than 4 of the monthly values are missing no yearly value is reported.

7 Results

Environmental data for the ECE-ICP on materials programme has been collected since August 1987. From 1987 to 1995 data from 39 sites has been collected. For second exposure phase, the period 1997 to 2001, the programme was redefined and the number of sites with reporting data is now 31, since Poland has joined the programme. A list of all the test sites for phase one and two is given in Table 2. Based on the experience from the first phase of the programme the environmental parameters given in Table 1 were selected for the second phase. The main difference between data collected in the first and second phase is that Time of Wetness (TOW) should not be reported, that solar radiation should be reported instead of hours with sun and that ozone should be reported for all sites. It was also decided that all data should be reported to the environmental sub-centre as monthly values. The option of using passive samplers on a monthly base for measuring the gaseous pollutants was also introduced.

Optional particulates and HNO_3 can be reported in this phase of the programme. Particulates are reported for site 36 and 49 and HNO_3 for site 47. The data are reported in Appendix B.

For the analysis the environmental impact on material damages the environmental yearly mean values follow the exposure periods. The yearly mean values created are presented in Appendix A. In this report we are concentrating on the second phase of the exposure programme. The start of the second phase was for most test sites in October and November and for this phase the yearly values are calculated for the months November to October.

Table 2: List of test sites of exposure programme.

Test site no.	Test site name	Country	Location	Measuring period
1	Prague-Letnany	The Czech Republic	Urban	1987→
2	Kasperske Hory	"	Rural	1987-1995
3	Kopisty	"	Industry	1987→
4	Espoo	Finland	Urban	1987-1995
5	Ähtäri	"	Rural	1987→
6	Helsinki-Vallila	"	Industry	1987-1995
7	Waldhof-Langenbrügge	Federal Republic of Germany	Rural	1987→
8	Aschaffenburg	"	Urban	1987-1995
9	Langenfeld-Reusrath	"	Rural	1987→
10	Bottrop	"	Industry	1987→
11	Essen-Leithe	"	Rural	1987-1995
12	Garmisch-Partenkirchen	"	Rural	1987-1995
13	Rome	Italy	Urban	1987→
14	Casaccia	"	Rural	1987→
15	Milan	"	Urban	1987→
16	Venice	"	Urban	1987→
17	Vlaardingen	The Netherlands	Industry	1987-1995
18	Eibergen	"	Rural	1987-1995
19	Vredepeel	"	Rural	1987-1995
20	Wijnandsrade	"	Rural	1987-1995
21	Oslo	Norway	Urban	1987→
22	Borregaard	"	Industry	1987-1995
23	Birkenes	"	Rural	1987→
24	Stockholm South	Sweden	Urban	1987→
25	Stockholm Centre	"	Urban	1987-1995
26	Aspvreten	"	Rural	1987→
27	Lincoln Cathedral	United Kingdom	Urban	1987→
28	Wells Cathedral	"	Urban	1987-1995
29	Clatteringshaws Loch	"	Rural	1987-1995
30	Stoke Orchard	"	Rural, industry	1987-1995
31	Madrid	Spain	Urban	1987→
32	Bilbao	"	Industry	1987-1995
33	Toledo	"	Rural	1987→
34	Moscow	Russia	Urban	1987→
35	Lahemaa	Estonia	Rural	1987→
36	Lisbon-Jeronimo Monastery	Portugal	Urban	1987→
37	Dorset	Canada	Rural	1987→
38	Research Triangle Park	USA (NC)	Rural	1987-1995
39	Steubenville	USA (OH)	Industry	1987-1995

Table 2: cont.

40	Paris	France	Urban	1997→
41	Berlin	Germany	Urban	1997→
42	Athens	Greece	Urban	1997→
43	Tel Aviv	Israel	Urban	1997→
44	Svanvik	Norway	Rural, industry	1997→
45	Chaumont	Switzerland	Rural	1997→
46	London	United Kingdom	Urban	1997→
47	Los Angeles	USA (CA)	Urban	1997→
49	Antwerp	Belgium	Urban	1997→
50	Katowice	Poland	Urban, industry	1999→

8 Model for computation of solar radiation

Some countries are still reporting the solar radiation as hours with sun. To convert these data into solar radiation a model for computation of solar radiation received by a horizontal surface at sea level has been developed. The model is based on the discrete ordinate solution to the radiative transfer equation (Stamnes et al., 1988) and is modified to include the curvature of the atmosphere (Dahlback and Stamnes, 1991). The model includes all orders of multiple scattering and absorption, and the ground is treated as a Lambertian reflector. The optical properties are allowed to vary vertically. The atmosphere is divided into a suitable number of layers to resolve the optical properties adequately. The model includes molecular (Rayleigh) scattering as well as scattering and absorption by clouds.

The solar radiation received by a horizontal surface, E , may be written as

$$E = \iint F(\tau_{eff}, O_3, Z, A, \lambda, \tau_R) \cdot d\lambda \cdot dt$$

where F is the spectral global irradiance (direct + diffuse radiation). The integration is performed over a time period of 1 year and the wavelength is integrated from 290 nm to 2900 nm in order to cover the complete solar spectrum. The spectral irradiance F depends on the cloud optical depth τ_c , the total ozone abundance, O_3 , the solar zenith angle, Z , the surface albedo, A , the wavelength, λ , and the Raleigh scattering optical depth, τ_R . The most important factors controlling the annual integrated solar energy, E , are the cloud cover and the solar zenith angle. Atmospheric ozone is included in the model but are assumed to be constant since variations in the ozone amount is of minor importance on the radiation integrated over the complete solar spectrum. The effect of aerosols in the lower troposphere may be of importance at some locations but are neglected here. The surface albedo, A , was set to 0.2 which is close a climatological mean value for continental vegetation (Kondratyev, 1969).

The model used in this work is designed to compute the surface solar radiation using the annual number of sunhours and latitude as input. The annual numbers of

sun hours are used to determine an effective cloud optical depth, τ_{eff} . The effective cloud optical depth is assumed in the calculations to be constant throughout the year and is determined by

$$\tau_{\text{eff}} = \left(\frac{(S_0 - S)\tau_c}{S} \right)$$

where S_0 is the maximal number of annual sun hours, S is the actual number of sun hours and τ_c is the cloud optical depth on a cloudy day. The present model is a modification of a radiation model used to determine cloud optical depth (Dahlback, 1996) from irradiance measurements with a multi channel filter instrument in Oslo, Norway. Measurements from this station in the period 1994-1996 are used to determine a typical optical depth on a cloudy day and found to be around 20. The time and latitude dependent solar zenith angle with 1 hour time-resolution is used in the calculations of the annual integrated solar radiation, E in MJ/m^2 .

9 Regularity and quality of the reported data

The test sites represent areas from background level of pollutant to urban and industry levels. The background sites have had the best regularity for the data reported. Many of these sites belong to the EMEP monitoring programme and had long and good data records.

In urban and industrial areas it is generally more difficult to maintain the site. In programmes like ECE/ICP materials with long exposure periods, it is sometime necessary to move a test site due to local problems like new use of the property. In some countries the funding of the environmental measurements was limited in the period between the end of the first exposure phase and the start of the second. This situation has become much better. However for some countries, the regularity for reporting the data has been slower than expected. This is illustrated as lack of data for some sites in Appendix A and B.

The solar radiation data reported the first year created some unexpected problems. We found large deviation between sites where the values were expected to be comparable and large deviation from earlier reported data. To investigate this problem, a questionnaire was sent out to all participants during the last year to get information about the instruments used, the calibration routines performed and the denomination used. The result of these questionnaires indicates that the main problem came from misunderstandings in the denominations. Some have reported daily mean values instead of monthly sums and some have used W/m^2 instead of MJ/m^2 . The values have now been corrected and the data is much better correlated in this report.

For data reported in W/m^2 the formulas for calculating the values in $\text{MJ}/\text{m}^2 \cdot \text{month}$ are:

Months with 31 days $1 \text{ W}/\text{m}^2 = 60 \times 60 \times 24 \times 31 / 1000000 = 2.678 \text{ MJ}/\text{m}^2 \cdot \text{month}$

Months with 30 days $1 \text{ W}/\text{m}^2 = 60 \times 60 \times 24 \times 30 / 1000000 = 2.592 \text{ MJ}/\text{m}^2 \cdot \text{month}$

Months with 28 days $1 \text{ W}/\text{m}^2 = 60 \times 60 \times 24 \times 28 / 1000000 = 2.419 \text{ MJ}/\text{m}^2 \cdot \text{month}$

Four sites are still reporting hours with sun instead of solar radiation. These results are recalculated in accordance with the model described in Chapter 8.

10 Evaluation of the data

10.1 The data distribution

It is important for the evaluation of the dose-response correlation for materials with the environmental impact that we have as large spread as possible in the concentrations of the most important pollution parameters. In the following figures the yearly mean values for the exposure year 1997-1998 for the most important parameters are given.

In Figure 1 and 2 the spread in the SO₂ concentrations for the first and second year is shown. The numbering is in accordance with the numbers in Table 2. The values go from 35 µg/m³ for Tel Aviv down to 0.2 µg/m³ at the Scandinavian EMEP stations for the first year. The distribution is fairly good. Low values are dominating in the base as expected since the total amount of sulphur emission in Europe has been reduced during the years of this program. The situation is similar for the second year except that site Tel Aviv had a much higher mean value. This is also illustrated in the scatterplot shown in Figure 7 in Chapter 10.2.

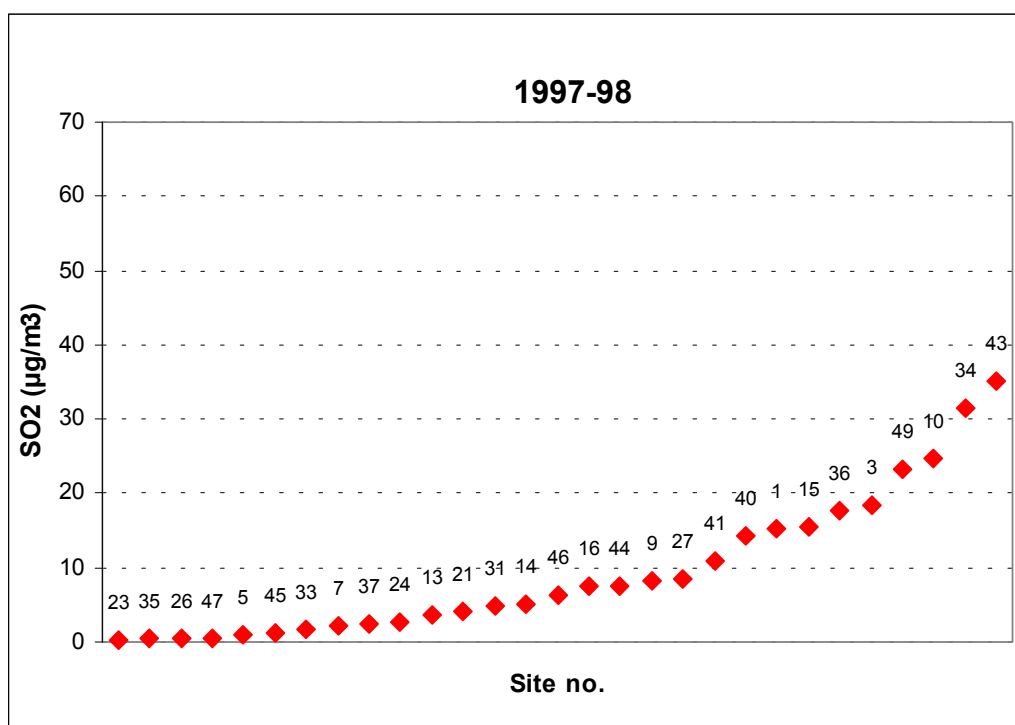


Figure 1: The spread in the yearly mean SO₂ concentrations at the test sites for the first year in phase 2 of the exposure programme.

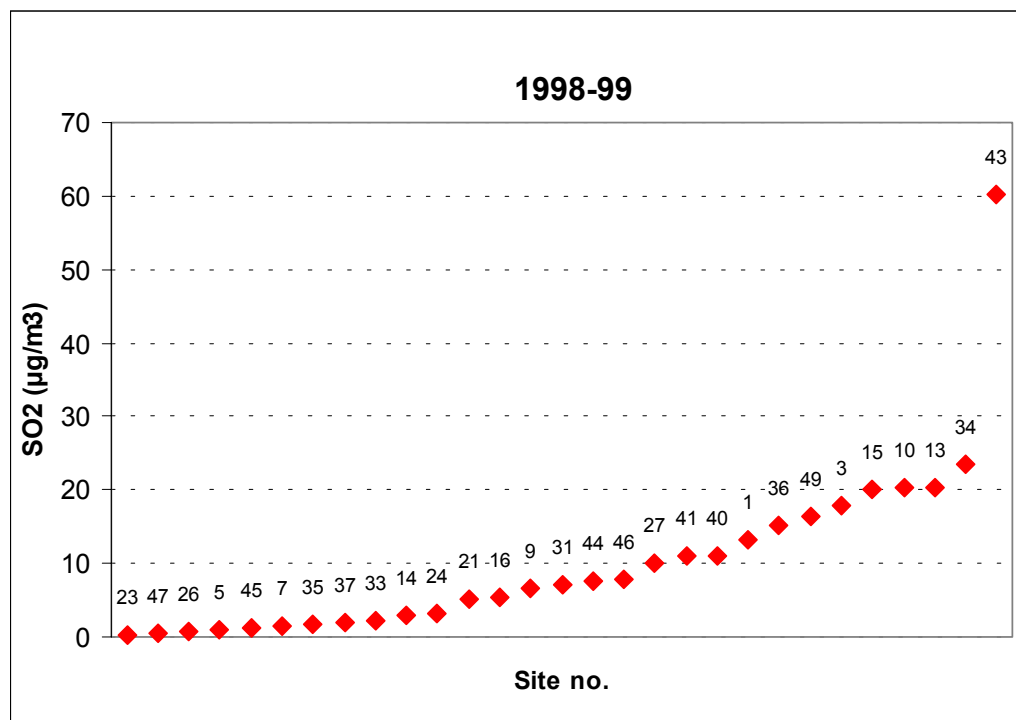


Figure 2: The spread in the yearly mean SO₂ concentrations at the test sites for the second year in phase 2 of the exposure programme

In Figure 3 and 4 the spread in the NO₂ concentrations for the first and second year is shown. The values go from 83 µg/m³ for Milan down to 0.7 µg/m³ at the EMEP station in Estonia for the first year. The distribution is fairly good. Low values are dominating in the base because of the number of EMEP sites in the programme. The distribution the second year was not so good. Some of the polluted sites had lower values except for Milan site 15.

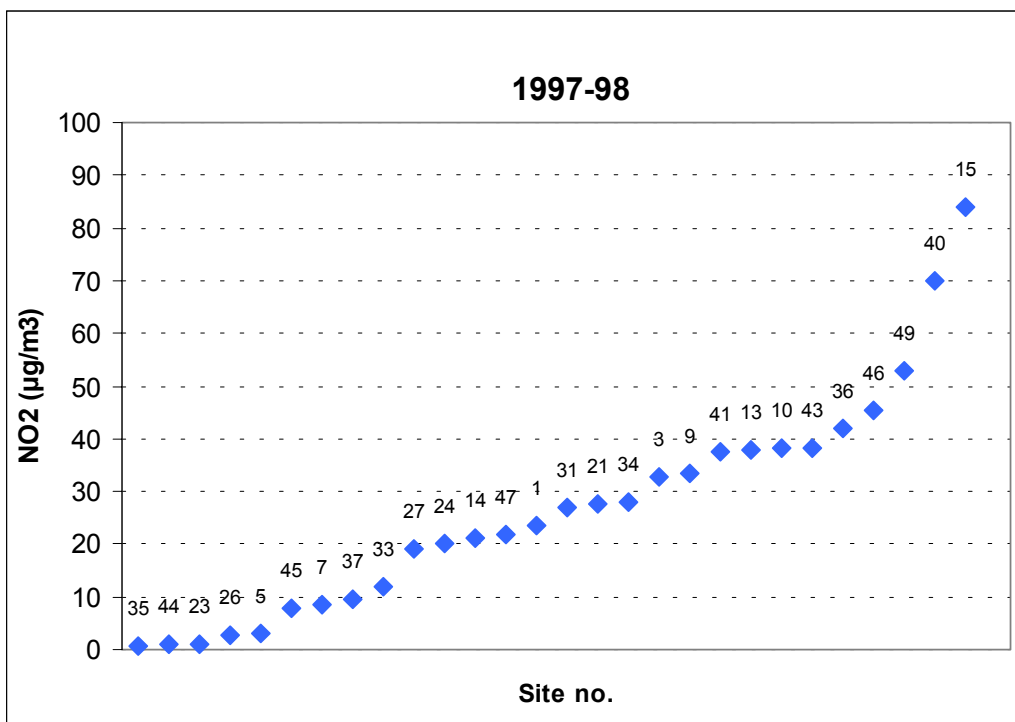


Figure 3: The spread in the yearly mean NO₂ concentrations at the test sites for the first year in phase 2 of the exposure programme.

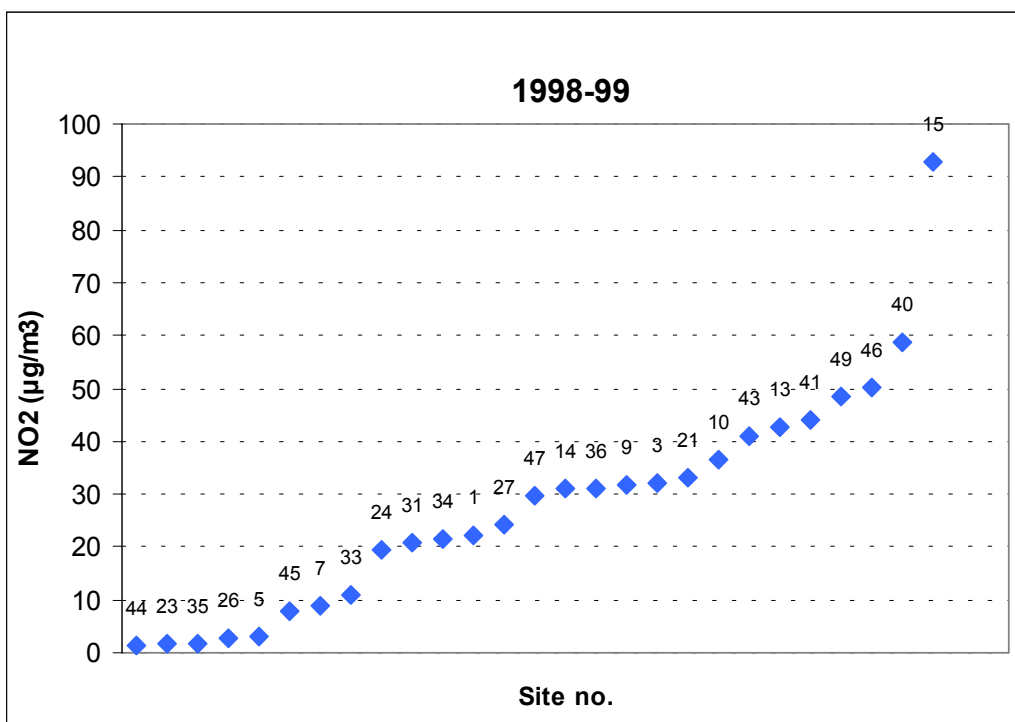


Figure 4: The spread in the yearly mean NO₂ concentrations at the test sites for the second year in phase 2 of the exposure programme.

In Figure 5 and Figure 6 the spread in the O_3 concentrations for the first and second year is shown. The values go from $88 \mu\text{g}/\text{m}^3$ for the EMEP station outside Toledo down to $21 \mu\text{g}/\text{m}^3$ in Berlin the first year. The distribution is as expected. It is a clustering of values around $50 \mu\text{g}/\text{m}^3$. The low values are observed in the big cities and high values in rural areas in the south and up in the alpine area. The situation is the same for the second year.

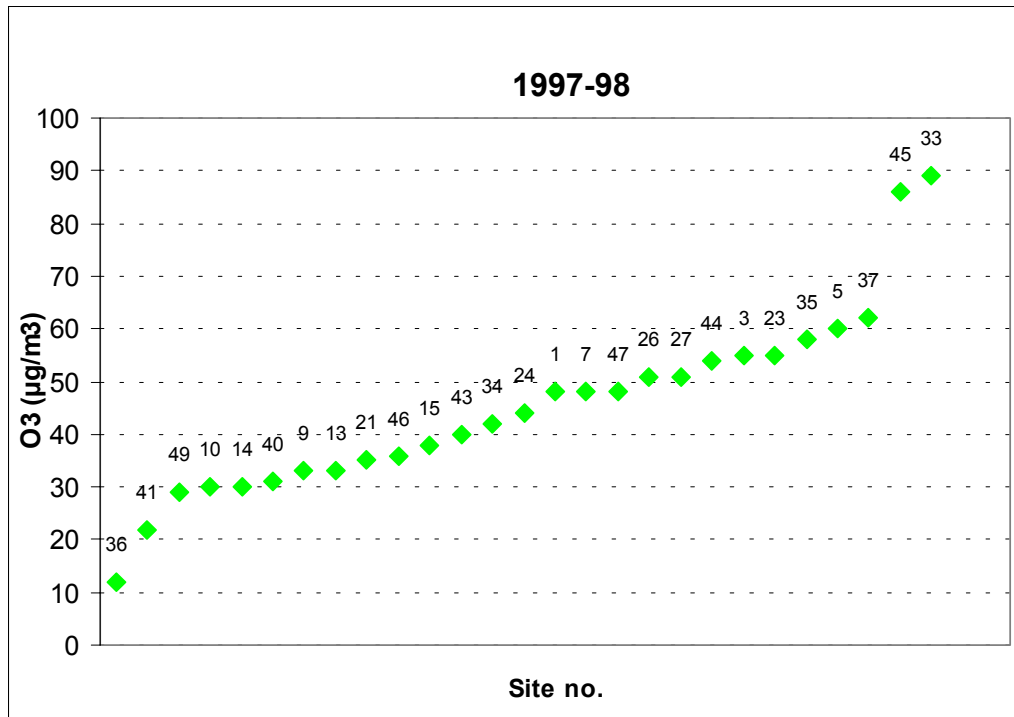


Figure 5: *The spread in the yearly mean O_3 concentrations at the test sites for the first year in phase 2 of the exposure programme.*

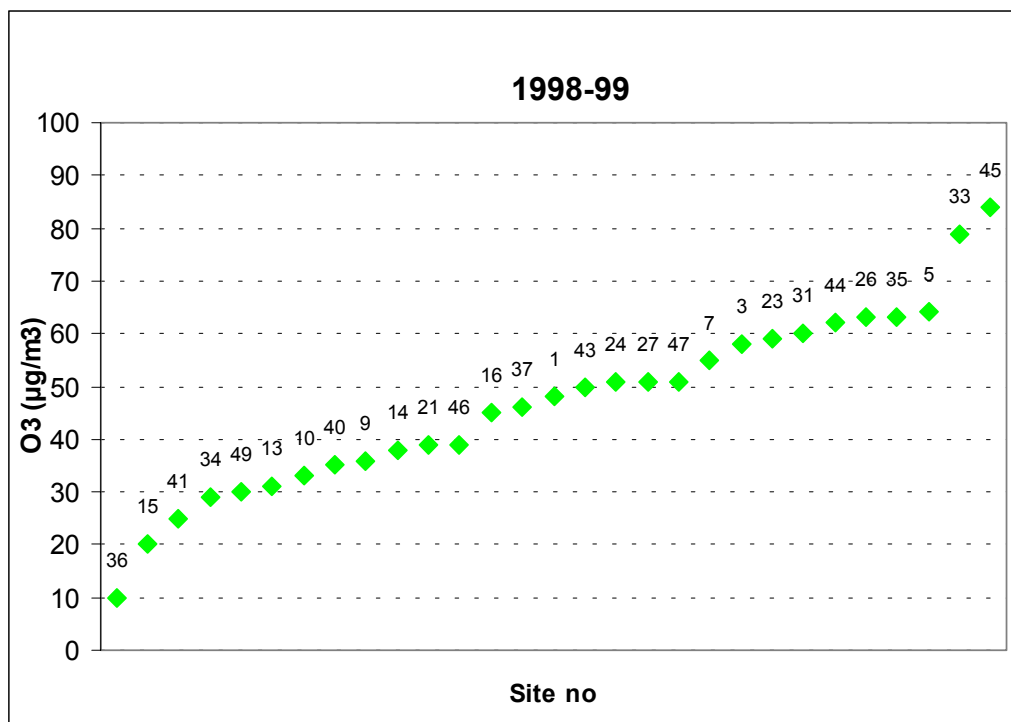


Figure 6: The spread in the yearly mean O₃ concentrations at the test sites for the second year in phase 2 of the exposure programme.

10.2 Trend analysis

During the time of the exposure programme some large changes have occurred in the pollution situation in Europe. In Report 34 (Henriksen and Arnesen, 2000) this was illustrated with scatter plots for some of the most important parameters like SO₂, NO₂ and O₃. The plots compared the data for 1987-88 with the data from 1997-98. The plots show a dramatic reduction in the SO₂ concentrations during the period. In average the reduction is close to 75% for SO₂, around 40% for NO₂ and no reduction for O₃. In this report we have checked if any change can be observed during the second phase of the programme. Scatter plots between the two first years of the programme has been made.

In Figure 7 a scatter plot of SO₂ for the two years 1997-98 and 1998-99 is shown. Most of the sites have comparable results for the two years. The largest deviation is observed for site 43 Tel Aviv, where the mean value for November 1997-October 1998 was 35 µg/m³ and the next year 60.3 µg/m³.

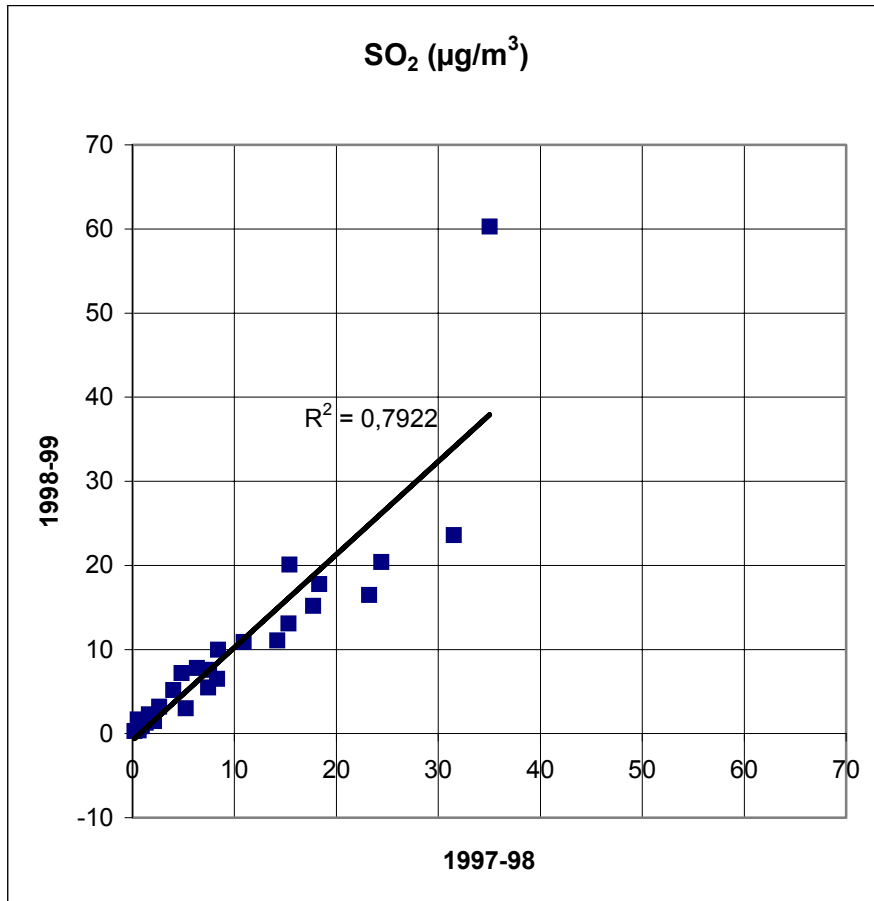


Figure 7: Scatterplot showing the change in the SO₂ concentrations for the same sites from 1997-98 to 1998-99.

The NO_2 values for the same two periods are shown in Figure 8. The plot shows that the NO_2 concentrations are comparable for the two years.

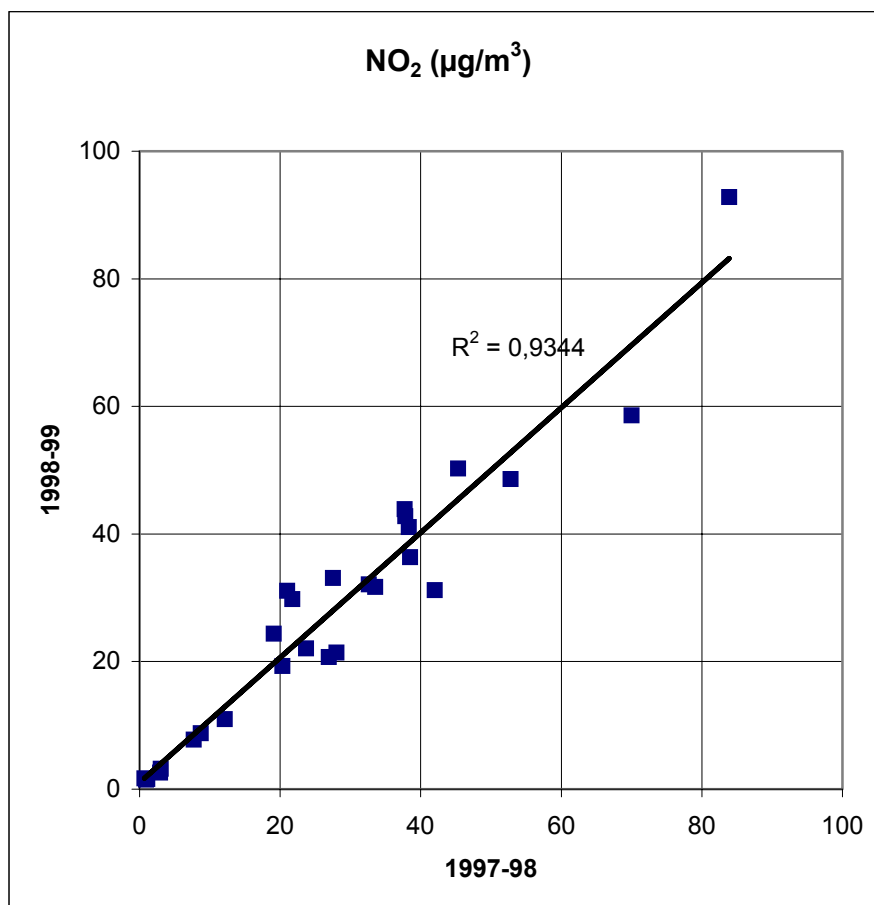


Figure 8: Scatterplot showing the change in the NO_2 concentrations for the same sites from 1997-98 to 1998-99.

Figure 9 shows the O_3 values for the same two periods. The plot shows small deviations in the O_3 levels between the two years.

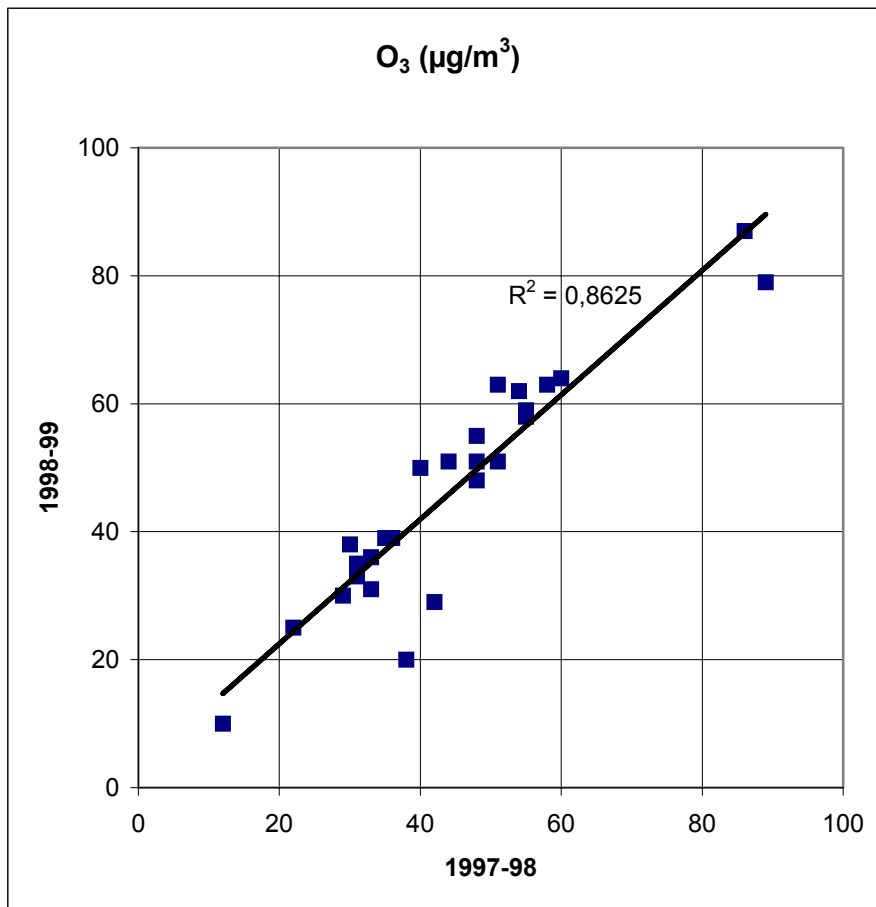


Figure 9: Scatterplot showing the change in the O_3 concentrations for the same sites from 1997-98 to 1998-99.

10.3 Solar radiation

In Figure 10 is the yearly sum for solar radiation given for all sites with data reported is shown. For some of the sites the values are reported without a final reconfirmation from the participating country. The sites are site 9, 10 47 and 49. Solar radiation data is not reported from site 34, 36 and 45 so far. By comparing the calculated data from sun hours with the data for solar radiation it looks like the calculation gives an underestimation of the real solar flux in the Mediterranean area. In the first phase of the programme the solar impact was reported as hours with sun. In chapter 8 a model for how sun hours can be recalculated into MJ/m² is described. For the sites where earlier data exist the mean values for the eight years have been introduced for comparison.

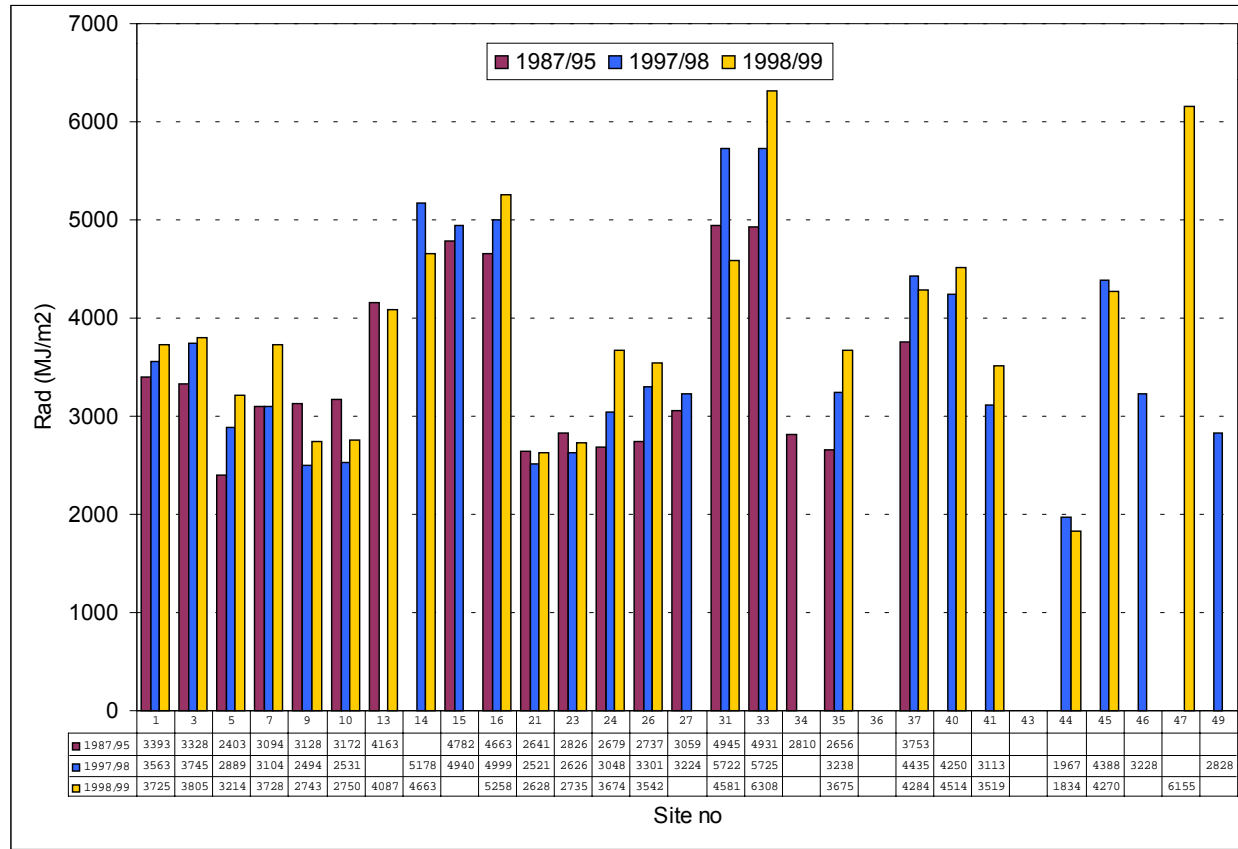


Figure 10: Yearly values for solar radiation for the sites for the first and second year of the second phase compared with the results from the mean value of the first phase.

11 References

- Dahlback, A. and Stamnes, K. (1991). A new spherical model for computing the radiation field available for photolysis and heating at twilight. *Planet. Space Sci.*, 39, 671-683.
- Dahlback, A. (1996) Measurements of biologically effective UV-doses, total ozone abundance and cloud effects with multi-channel moderate bandwidth filter instruments. *Appl. Opt.*, 35, 6514-6521.
- Henriksen, J.F., Dahlback A., Arnesen, K., Elvedal U. and Rode, A. (1997) International co-operative programme on materials including historic and cultural monuments. Final environmental data report, September 1987 to August 1995. Kjeller, Norwegian Institute for Air Research (UN/ECE International Co-operative Programme on Effects on Materials, including Historic and Cultural Monuments. Report No. 21) (NILU OR 39/97).
- Henriksen, J.F. and Arnesen, K. (2000) International co-operative programme on materials including historic and cultural monuments. Environmental data report, September 1995 to October 1998. Kjeller, Norwegian Institute for Air Research (UN/ECE International Co-operative Programme on Effects on Materials, including Historic and Cultural Monuments. Report No. 34) (NILU OR 15/2000).
- Kondratyev, K. Y. (1969). Radiation in the Atmosphere. New York, Academic Press.
- Stamnes, K., Tsay, S.-C., Wiscombe W. and Jayaweera, K. (1988) Numerically stable algorithm for discrete-ordinate-method radiative transfer in multiple scattering and emitting layered media. *Appl. Opt.*, 27, 2502-2509.
- Swedish Corrosion Institute (1993) Description of test sites. Rev. version. Stockholm (UN/ECE International Co-operative Programme on Effects on Materials, including Historic and Cultural Monuments. Report No. 2).

Appendix A

Calculated yearly mean values

November 1997 to October 1998
November 1998 to October 1999

Table A1: Yearly mean values for all parameters and sites for the exposure periods 1997-98 and 1998-99.

St	Date	CLIMATE			GASES			PRECIPITATION					PREC.-OPTION					
		Temp C	Rh %	Sun MJ/m2	SO2 ug/m3	NO2 ug/m3	O3 ug/m	mm	pH	SO4-S mg/l	NO3-N mg/l	Cl mg/l	Cond uS/cm	NH4-N mg/l	Na mg/l	Ca mg/l	Mg mg/l	K mg/l
1	9798	9,9	76	3563	15,3	23,7	48	521,9	5,56	11,34	2,19	1,95	27,6					
1	9899	9,6	76	3725	13,1	22,1	48	405,3	4,75	5,40	0,61	2,61	28,2					
3	9798	9,9	76	3745	18,3	32,6	55	419,5	4,62	34,03	2,77	1,73	44,6					
3	9899	9,4	77	3805	17,8	32,1	58	413,9	4,40	14,46	0,84	1,53	55,3					
5	9798	3,5	80	2889	0,9	3,0	60	741,8	4,74	0,25	0,21	0,15	10,7	0,14	0,08	0,07	0,02	0,09
5	9899	4,6	79	3214	0,9	3,2	64	613,6	4,68	0,30	0,26	0,13	12,4	0,17	0,07	0,07	0,02	0,04
7	9798	9,1	83	3104	2,1	8,7	48	785,7	5,04	0,64	0,57	0,73	17,6	0,60	0,37	0,49	0,14	0,12
7	9899	9,4	78	3728	1,5	8,8	55	503,0	5,23	0,69	0,67	1,56	20,9	0,69	0,79	0,62	0,18	0,11
9	9798	10,9	80	2494	8,3	33,5	33	930,0										
9	9899	11,2	78	2743	6,5	31,7	36	795,6										
10	9798	11,5	81	2531	24,6	38,2	30	1044,3	4,84	0,99	0,46	1,20	22,1	0,76	0,75	0,57	0,14	0,11
10	9899	11,6	80	2750	20,4	36,4	33	824,2	4,55	0,89	0,36	1,67	22,1	0,44	0,93	0,32	0,10	0,04
13	9798	20,7	64		3,7	37,8	33											
13	9899	19,1	65	4087	20,4	42,8	31											
14	9798	14,5	74	5178	5,2	21,0	30											
14	9899	16,4	66	4663	3,0	31,1	38											
15	9798	14,5	69	4940	15,4	83,9	38	1076,6										
15	9899	11,3	78		20,1	92,8	20											
16	9798	13,5	83	4999	7,4				6,10									
16	9899	13,9	80	5258	5,5		45	624,4										
21	9798	6,6	78	2521	4,0	27,5	35		5,20	0,85	0,55	0,87	20,7	0,68	0,51	0,97	0,11	0,36
21	9899	7,0	78	2628	5,2	33,1	39	888,2	4,61	0,62	0,47	0,64	20,8	0,73	0,39	0,26	0,06	0,12
23	9798	6,2	79	2626	0,2	1,1	55	1744,4	4,50	0,61	0,47	1,50	25,5	0,43	0,83	0,11	0,10	0,08
23	9899	6,2	82	2735	0,3	1,6	59	1688,5	4,52	0,60	0,45	1,82	26,7	0,39	1,01	0,09	0,12	0,08
24	9798	6,7	76	3048	2,6	20,3	44	463,0	4,63	0,54	0,38	0,48	17,1	0,41	0,25	0,14	0,04	0,05
24	9899	8,0	77	3674	3,2	19,3	51	479,0	4,68	0,44	0,34	0,36	14,3	0,34	0,20	0,14	0,03	0,02
26	9798	5,9	87	3301	0,6	2,9	51	479,2	4,59	0,41	0,37	0,57	17,3	0,32	0,20	0,24	0,06	0,10
26	9899	6,5	84	3542	0,8	2,6	63	317,1	4,57	0,56	0,41	0,56	18,6	0,40	0,23	0,31	0,06	0,11
27	9798	10,2		3224	8,4	19,1	51	667,2	4,73	1,90	0,69	3,53		1,18	1,87		0,32	0,14
27	9899	5,3			10,0	24,4	51		5,56	1,03	0,31	2,74		0,64	1,53		0,26	0,12
31	9798	8,2	80		4,8	26,9			5,83	0,77	0,26	1,05	12,5	0,24	0,28	0,59	0,08	0,04
31	9899	15,6	53	4581	7,2	20,7	60	+486,7	2,15	3,00	1,76	5,61	77,2	1,87	1,96	4,43	0,65	0,53
33	9798	10,5	66	+5725	1,6	12,1	89		5,76	0,57	0,27	0,89	10,7	0,23	0,33	0,36	0,06	0,06
33	9899	14,0	55	+6308	2,3	11,0	79	+490,3	5,91	0,49	0,22	0,84	9,8	0,14	0,37	0,42	0,06	0,08
34	9798	6,5	74		31,5	28,0	42											
34	9899	7,0	70		23,6	21,4	29											

St	Date	CLIMATE			GASES			PRECIPITATION					PREC.-OPTION					
		Temp C	Rh %	Sun MJ/m2	SO2 ug/m3	NO2 ug/m3	O3 ug/m	mm	pH	SO4-S mg/l	NO3-N mg/l	Cl mg/l	Cond uS/cm	NH4-N mg/l	Na mg/l	Ca mg/l	Mg mg/l	K mg/l
35	9798	5,4	82	3238	0,5	0,7	58		5,16	1,64	0,24	0,78	19,4	0,24	0,31	1,90	0,19	0,18
35	9899	6,3	79	3675	1,7	1,7	63	617,7	4,80	1,79	0,37	0,51	17,4	0,25	0,29	0,55	0,08	0,22
36	9798	17,9	63		17,7	42,0	12	251,5	5,98	13,30	5,02	13,30	75,3	1,36	6,82	9,71	0,97	0,51
36	9899	17,1	68		15,2	31,2	10	188,3	6,56	15,79	5,27	14,27	135,1	0,88	6,90	12,24	1,07	0,94
37	9798	7,4	75	4435	2,4	9,7	62	788,0	4,31	0,76	0,52	0,11	24,2	0,34	0,05	0,20	0,03	0,03
37	9899	8,3	73	4284	1,9		46		4,25	0,81	0,68	0,13	42,1	0,44	0,05	0,11	0,02	0,03
40	9798	13,4	67	4250	14,2	70,0	31	571,6	5,71	1,81	0,72	2,47	43,7	0,90	1,29	3,91	0,16	0,50
40	9899	13,7	67	4514	11,1	58,6	35	557,4	5,87	1,81	1,02	2,52	45,9	0,72	1,57	5,81	0,19	0,43
41	9798	10,4	77	3113	10,9	37,7	22	486,2		6,98	4,34	2,09		3,93	1,51	3,89	0,24	2,22
41	9899	10,7	74	3519	10,9	43,9	25	414,6		4,26	3,26	1,36		2,61	1,01	1,38	0,23	0,37
43	9798	24,6	83		35,0	38,3	40	484,9	5,64	0,47	0,44	3,53		0,31	2,94	0,38	0,64	0,07
43	9899	26,5	88		60,3	41,1	50	321,2										
44	9798	0,2	80	1967	7,5	0,9	54	344,0	4,77	0,57	0,12	1,87	20,7	0,23	1,02	0,18	0,15	0,11
44	9899	1,8	78	1834	7,6	1,5	62	472,2	4,87	0,39	0,14	0,71	12,4	0,21	0,39	0,09	0,07	0,08
45	9798	6,9	77	4388	1,3	7,7	86	1052,9	4,99	0,27	0,21	0,18	9,4	0,24	0,15	0,31	0,03	0,03
45	9899	6,3	80	4270	1,3	8,0	84	1203,8	4,93	0,27	0,23	0,18	10,0	0,24	0,11	0,27	0,02	0,03
46	9798	12,2		3228	6,3	45,3	36	706,0	5,65	0,54	0,26	4,08			2,19		0,32	0,19
46	9899	7,6			7,8	50,3	39		6,88	0,44	0,16	7,46			4,08		0,56	0,31
47	9798	17,4	61		0,6	21,7	48		5,77									
47	9899	16,4	62	4103	0,4	29,8	51		5,89	8,31	0,41	3,37	25,7					
49	9798	11,8	75	+2828	23,2	52,8	29		5,03	1,43	0,16	3,41	3,5					
49	9899	12,0	75		16,5	48,6	30		4,83	1,71	0,10	4,15	4,3					

Appendix B
Reported monthly and yearly values

November 1997 - October 1999

November 1997-October 1998

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (01) Prague-Letnany Czech Republic

Date	M A N D A T O R Y											
	C L I M A T E			G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm	
Nov97	3.3	89.	86.	19.9	27.3	13.	52.6	7.30	19.30	2.30	1.00	50.0
Dec97	1.9	90.	53.	17.5	22.4	24.	38.1	6.30	17.30	2.90	1.00	18.0
Jan98	1.4	83.	88.	19.4	25.0	31.	9.9	6.70	19.40	1.00	5.70	47.0
Feb98	4.5	76.	152.	24.1	42.0	40.	22.3	4.50	27.20	1.80	7.10	50.0
Mar98	4.7	70.	290.	17.5	20.6	57.	23.6	7.30	13.20	2.20	3.70	32.0
Apr98	10.8	66.	400.	11.2	19.5	67.	5.4	7.60	4.90	58.40	1.70	172.0
May98	15.2	64.	563.	13.5	16.8	77.	36.7	6.20	23.30	4.40	1.80	48.0
Jun98	18.3	70.	497.	7.6	23.8	67.	85.9	7.00	6.40	1.00	1.50	27.0
Jul98	18.1	75.	504.	11.3	16.5	58.	70.4	6.80	5.60	1.00	1.50	17.0
Aug98	18.6	64.	515.	12.7	19.8	72.	19.0	5.10	13.60	1.00	3.50	27.0
Sep98	13.4	84.	267.	11.8	21.0	40.	73.2	5.40	4.30	1.00	0.60	9.0
Oct98	9.2	84.	148.	17.5	29.1	31.	84.8	5.60	8.70	1.00	2.40	16.0
Mean	9.9	76.	3563.	15.3	23.7	48.	521.9	5.56	11.34	2.19	1.95	27.6

Date	O P T I O N											
	P R E C I P I T A T I O N					G A S E S		P A R T		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N		
mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d			
Nov97								89.0				
Dec97								56.0				
Jan98								68.0				
Feb98								30.0				
Mar98								40.0				
Apr98												
May98												
Jun98												
Jul98												
Aug98												
Sep98												
Oct98												
Mean								62.1				

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (03) Kopisty Czech Republic

Date	M A N D A T O R Y											
	C L I M A T E			G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm	
Nov97	2.8	90.	78.	16.0	38.9		16.1	4.50	88.10	5.90	2.00	72.0
Dec97	1.6	91.	50.	14.8	30.9		35.5	4.40	38.30	3.90	1.50	57.0
Jan98	1.0	86.	85.	26.9	36.7	55.	15.9	4.30	58.90	4.20	2.40	58.0
Feb98	4.5	79.	169.	18.8	45.0	21.	10.9	4.40	105.40	7.80	5.70	98.0
Mar98	4.8	75.	313.	26.2	33.2	35.	28.2	4.60	43.00	7.50	3.10	59.0
Apr98	11.0	68.	429.	16.8	34.8	53.	17.0	4.60	104.10	11.10	2.70	99.0
May98	15.4	66.	593.	15.8	23.6	62.	9.2	5.00	113.60	1.30	4.40	150.0
Jun98	18.2	69.	578.	15.1	28.0	65.	66.8	4.60	28.80	1.00	1.50	35.0
Jul98	18.3	67.	509.	18.4	24.4	85.	51.4	4.90	26.00	1.00	1.30	37.0
Aug98	18.2	63.	529.	20.0	27.0	82.	29.4	5.10	27.80	1.00	1.90	46.0
Sep98	13.4	82.	263.	16.7	28.0	51.	73.3	4.50	14.00	1.00	0.60	25.0
Oct98	9.2	81.	149.	14.1	40.7	37.	65.8	4.90	4.30	2.20	1.50	21.0
Mean	9.9	76.	3745.	18.3	32.6	55.	419.5	4.62	34.03	2.77	1.73	44.6

Date	O P T I O N											
	P R E C I P I T A T I O N					G A S E S		P A R T		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N		
mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d			
Nov97												
Dec97												
Jan98												
Feb98												
Mar98												
Apr98												
May98												
Jun98												
Jul98												
Aug98												
Sep98												
Oct98												
Mean												

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (05) Ahtari

Finland

Date	M A N D A T O R Y											
	C L I M A T E			G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm	
Nov97	-2.2	88.	23.	0.6	3.9	42.	40.6	4.38	0.45	0.37	0.13	21.0
Dec97	-5.1	87.	8.	1.0	5.2	48.	27.5	4.53	0.24	0.31	0.14	15.0
Jan98	-4.8	87.	20.	1.1	3.5	50.	65.6	4.63	0.22	0.26	0.18	12.0
Feb98	-8.6	79.	70.	3.0	4.2	70.	59.9	4.65	0.19	0.32	0.33	13.0
Mar98	-7.7	72.	263.	2.0	4.2	81.	39.8	4.76	0.19	0.16	0.17	9.0
Apr98	0.3	63.	360.	1.4	3.5	92.	13.4	4.61	0.36	0.21	0.12	12.0
May98	7.2	71.	475.	0.3	2.2	72.	43.8	4.93	0.38	0.20	0.08	10.0
Jun98	12.5	76.	506.	0.3	1.9	63.	115.0	4.87	0.30	0.15	0.10	10.0
Jul98	15.4	77.	512.	0.1	1.6	58.	97.7	4.89	0.20	0.14	0.13	8.0
Aug98	12.1	85.	322.	0.1	1.6	44.	118.3	4.86	0.18	0.12	0.05	7.0
Sep98	9.2	84.	239.	0.3	2.2	52.	37.3	4.84	0.43	0.28	0.18	12.0
Oct98	3.8	89.	91.	0.2	2.2	52.	82.9	4.71	0.21	0.23	0.24	11.0
Mean	3.5	80.	2889.	0.9	3.0	60.	741.8	4.74	0.25	0.21	0.15	10.7

Date	O P T I O N											
	P R E C I P I T A T I O N					G A S E S		P A R T		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N		
mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d			
Nov97	0.16	0.06	0.05	0.01	0.06							
Dec97	0.08	0.07	0.03	0.01	0.04							
Jan98	0.08	0.10	0.04	0.02	0.04							
Feb98	0.15	0.17	0.05	0.03	0.05							
Mar98	0.06	0.08	0.06	0.01	0.03							
Apr98	0.14	0.06	0.07	0.01	0.04							
May98	0.27	0.05	0.13	0.02	0.13							
Jun98	0.17	0.07	0.11	0.02	0.22							
Jul98	0.11	0.08	0.08	0.02	0.09							
Aug98	0.11	0.03	0.01	0.00	0.03							
Sep98	0.26	0.12	0.22	0.03	0.20							
Oct98	0.10	0.13	0.04	0.02	0.06							
Mean	0.14	0.08	0.07	0.02	0.09							

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (07) Waldhof-Langenbrugge

Germany

Date	M A N D A T O R Y											
	C L I M A T E			G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm	
Nov97	3.9	92.	69.	5.2	13.3	23.	62.5	5.20	0.44	0.35	0.17	10.9
Dec97	2.3	92.	36.	3.9	13.4	24.	51.5	4.80	0.77	0.70	1.18	23.0
Jan98	3.5	90.	66.	2.4	11.4	38.	52.9	5.00	0.51	0.50	1.63	18.5
Feb98	5.9	83.	98.	4.1	17.3	39.	13.2	5.80	1.00	0.75	2.64	25.1
Mar98	5.7	80.	233.	2.4	7.4	56.	60.2	5.30	0.53	0.49	0.83	15.9
Apr98	9.1	83.	282.	1.2	6.4	56.	70.0	5.00	0.85	0.99	0.38	24.4
May98	12.7	70.	573.	0.7	5.3	74.	18.8	4.90	1.34	0.79	0.58	30.9
Jun98	16.1	78.	495.	0.7	5.9	60.	108.1	5.00	0.73	0.67	0.31	18.8
Jul98	16.0	78.	484.	0.5	5.2	57.	80.5	5.00	0.75	0.70	0.57	18.4
Aug98	16.2	75.	459.	0.8	5.4	64.	66.5	5.50	0.45	0.36	0.91	13.0
Sep98	13.4	85.	173.	1.3	5.9	40.	50.1	5.00	0.73	0.58	0.31	19.3
Oct98	8.4	85.	136.	1.5	7.5	44.	151.4	5.00	0.49	0.37	0.92	13.5
Mean	9.4	83.	3104.	2.1	8.7	48.	785.7	5.04	0.64	0.57	0.73	17.6

Date	O P T I O N											
	P R E C I P I T A T I O N					G A S E S		P A R T		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N		
mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d			
Nov97	0.20	0.05	0.28	0.28	0.12		30.1		0.8			
Dec97	0.51	0.59	0.55	0.15	0.14		21.3		0.7			
Jan98	0.40	0.94	0.37	0.16	0.13		14.2		0.7			
Feb98	1.03	1.44	0.65	0.20	0.19		36.9		0.7			
Mar98	0.47	0.42	0.40	0.15	0.11		18.6		0.9			
Apr98	1.36	0.12	0.61	0.15	0.16		19.1		0.7			
May98	1.29	0.22	0.93	0.24	0.18		33.3		0.6			
Jun98	0.73	0.18	0.65	0.12	0.09		15.1		0.6			
Jul98	0.75	0.30	0.51	0.11	0.10		14.6		0.8			
Aug98	0.42	0.46	0.44	0.10	0.19		15.9		0.5			
Sep98	0.73	0.10	0.55	0.10	0.09		19.3					
Oct98	0.31	0.49	0.40	0.11	0.09		12.6					
Mean	0.60	0.37	0.49	0.14	0.12		17.9		0.7			

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (09) Langenfeld-Reusrath Germany

Date	M A N D A T O R Y											
	C L I M A T E			G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm	
Nov97	6.3	86.	79.	9.4	38.0	11.	42.9					
Dec97	4.8	85.	43.	10.3	32.7	17.	86.8					
Jan98	4.6	81.	61.	11.1	37.2	24.	36.8					
Feb98	6.3	78.	122.	15.5	50.1	20.	3.6					
Mar98	7.9	76.	191.	9.2	35.6	39.	76.4					
Apr98	9.7	80.	230.	6.1	33.3	44.	96.7					
May98	15.5	72.	418.	7.2	31.8	59.	23.5					
Jun98	16.7	80.	385.	5.8	25.1	49.	165.1					
Jul98	16.7	80.	317.	5.8	25.4	40.	74.0					
Aug98	17.6	73.	360.	7.4	32.1	45.	38.7					
Sep98	15.2	85.	198.	5.5	31.0	30.	138.1					
Oct98	10.0	90.	90.	6.4	30.0	21.	147.4					
Mean	10.9	80.	2494.	8.3	33.5	33.	930.0					

Date	O P T I O N											
	P R E C I P I T A T I O N					G A S E S		P A R T		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N		
mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d	mg/m2d	mg/m2d	mg/m2d
Nov97												
Dec97												
Jan98												
Feb98												
Mar98												
Apr98												
May98												
Jun98												
Jul98												
Aug98												
Sep98												
Oct98												
Mean												

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (10) Bottrop Germany

Date	M A N D A T O R Y											
	C L I M A T E			G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm	
Nov97	7.1	86.	71.	29.4	45.5	10.	29.9	4.97	1.16	0.62	1.03	21.0
Dec97	5.2	87.	37.	33.7	39.8	15.	100.7	4.66	0.97	0.54	1.38	22.7
Jan98	5.1	82.	58.	31.4	41.9	21.	72.2	4.88	0.83	0.33	2.37	21.9
Feb98	7.3	77.	118.	34.1	53.1	18.	9.2	5.04	5.67	1.83	6.37	83.8
Mar98	8.0	77.	187.	24.7	37.5	36.	82.7	5.19	1.27	0.54	1.90	25.1
Apr98	10.3	81.	248.	26.2	38.9	36.	106.4	4.69	1.22	0.76	0.57	25.5
May98	16.1	73.	427.	17.4	30.9	54.	50.3	5.58	1.32	0.66	0.59	22.0
Jun98	17.2	80.	364.	17.4	32.6	44.	135.2	4.78	0.89	0.43	0.43	18.0
Jul98	17.4	79.	351.	14.9	28.3	40.	55.1	5.44	1.55	0.53	1.47	41.0
Aug98	18.1	75.	374.	17.1	35.2	45.	69.7	5.98	1.10	0.44	0.68	20.0
Sep98	15.5	86.	207.	22.1	39.3	24.	157.6	4.86	0.52	0.25	0.62	13.4
Oct98	10.2	90.	89.	26.2	35.0	19.	175.3	4.66	0.73	0.27	1.86	21.5
Mean	11.5	81.	2531.	24.6	38.2	30.	1044.3	4.84	0.99	0.46	1.20	22.1

Date	O P T I O N											
	P R E C I P I T A T I O N					G A S E S		P A R T		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N		
mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d	mg/m2d	mg/m2d	mg/m2d
Nov97	0.75	0.57	0.95	0.10	0.09							
Dec97	0.67	0.71	0.39	0.10	0.08							
Jan98	0.57	1.44	0.38	0.18	0.08							
Feb98	4.35	3.78	2.92	0.59	0.43							
Mar98	1.08	1.11	0.65	0.13	0.07							
Apr98	1.27	0.29	0.58	0.06	0.07							
May98	1.58	0.35	0.56	0.08	0.39							
Jun98	0.60	0.26	0.57	0.05	0.08							
Jul98	0.93	1.89	1.10	1.04	0.22							
Aug98	1.30	0.42	0.52	0.07	0.29							
Sep98	0.27	0.36	0.30	0.04	0.07							
Oct98	0.32	1.07	0.63	0.10	0.05							
Mean	0.76	0.75	0.57	0.14	0.11							

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (13) Rome

Italy

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm
Nov97	14.9	72.		3.5	10.2	9.	80.0					
Dec97	10.9	72.		4.1	10.6	6.	60.0					
Jan98	11.9	72.	124.	7.8	45.3	5.	123.1					
Feb98	13.1	65.	196.	11.2	42.3	14.	113.4					
Mar98	13.6	56.	310.	2.8	26.1	35.	78.4					
Apr98	17.2	66.	420.	1.3	34.5	52.	128.2					
May98	21.6	66.	558.	1.6	41.2	48.	161.2					
Jun98	26.7	59.	630.	1.2	44.3	54.	16.4					
Jul98	29.3	56.	682.	4.1	51.8	62.	2.6					
Aug98	29.8	56.	558.	3.1	47.2	46.	18.4					
Sep98	24.1	66.	360.	2.5	51.4	39.	133.6					
Oct98	19.9	74.	248.	1.2	48.1	25.	210.1					
Mean	19.4	65.		3.7	37.8	33.	1125.4					

Date	O P T I O N										
	P R E C I P I T A T I O N					G A S E S			P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
Nov97											
Dec97											
Jan98											
Feb98											
Mar98											
Apr98											
May98											
Jun98											
Jul98											
Aug98											
Sep98											
Oct98											
Mean											

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (14) Casaccia

Italy

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm
Nov97	10.1	78.	270.	3.5	10.2	9.	38.2					
Dec97	7.2	76.	217.	4.1	10.6	6.	32.1					
Jan98	5.7	75.	124.	8.5	56.5	4.	31.5					
Feb98	9.0	77.	252.	7.9	4.8	3.	42.1					
Mar98	9.3	71.	403.	6.5	5.7	32.	40.2					
Apr98	12.5	82.	540.	5.9	11.2	53.	39.8					
May98	17.1	78.	651.	5.4	15.0	62.						
Jun98	21.8	69.	720.	2.4	31.5	32.						
Jul98	24.5	65.	744.	5.0	38.5	51.						
Aug98	21.6	65.	589.	7.8		48.						
Sep98	19.7	73.	420.	2.3		32.	164.2					
Oct98	15.6	76.	248.	2.6	26.0	28.	188.4					
Mean	14.5	74.	5178.	5.2	21.0	30.						

Date	O P T I O N										
	P R E C I P I T A T I O N					G A S E S			P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
Nov97											
Dec97											
Jan98											
Feb98											
Mar98											
Apr98											
May98											
Jun98											
Jul98											
Aug98											
Sep98											
Oct98											
Mean											

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (15) Milan

Italy

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm
Nov97	8.8	81.	150.	24.5	87.1	9.	122.6					
Dec97	5.1	83.	124.	31.4	86.1	8.	168.8					
Jan98	4.5	80.	155.	30.7	89.4	9.	56.4					
Feb98	9.1	66.	252.	39.1	129.4	16.	35.6					
Mar98	10.3	58.	465.	19.1	89.1	30.	9.1					
Apr98	12.3	70.	390.	8.6	74.9	43.	120.8					
May98	18.6	61.	620.	4.6	82.3	57.	126.4					
Jun98	22.4	61.	690.	4.1	73.5	73.	94.6					
Jul98	24.7	60.	744.	3.4	64.3	78.	89.1					
Aug98	25.1	59.	651.	2.6	49.8	81.	57.6					
Sep98	19.1	69.	420.	4.2	86.7	33.	148.2					
Oct98	14.1	78.	279.	12.6	94.1	18.	47.4					
Mean	14.5	69.	4940.	15.4	83.9	38.	1076.6					

Date	O P T I O N										
	P R E C I P I T A T I O N					G A S E S		P A R T	P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
Nov97							46.8				
Dec97							46.9				
Jan98							52.3				
Feb98							75.3				
Mar98							46.7				
Apr98							28.1				
May98							36.7				
Jun98							39.2				
Jul98							38.3				
Aug98							32.2				
Sep98							40.3				
Oct98							42.8				
Mean							41.5				

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (16) Venice

Italy

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm
Nov97	8.8	89.	150.	7.6			30.1	7.40				
Dec97	5.1	91.	124.	13.1			87.1					
Jan98	4.4	86.	124.	13.5			31.6					
Feb98	6.9	79.	252.	11.1			24.0					
Mar98	8.1	77.	434.	8.6			21.0					
Apr98	11.4	88.	420.	4.6			49.1	5.90				
May98	17.1	79.	651.	6.8			55.4					
Jun98	21.1	80.	720.	4.7			100.6					
Jul98	23.4	79.	744.	4.8			45.1					
Aug98	23.9	73.	651.	5.1			14.2					
Sep98	18.1	83.	450.	3.1			115.2					
Oct98	13.6	87.	279.	5.3			168.8					
Mean	13.5	83.	4999.	7.4			742.2	6.10				

Date	O P T I O N										
	P R E C I P I T A T I O N					G A S E S		P A R T	P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
Nov97											
Dec97											
Jan98											
Feb98											
Mar98											
Apr98											
May98											
Jun98											
Jul98											
Aug98											
Sep98											
Oct98											
Mean											

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (21) Oslo

Norway

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov97	1.4	85.		3.9	29.6		49.0					
Dec97	-1.1	89.		4.1	29.5	13.	36.8	4.73	0.71	0.73	0.85	22.6
Jan98	-1.1	83.		5.2	32.9	16.	30.3	5.82	0.84	0.63	0.96	19.4
Feb98	1.3			44.7	28.		14.4	6.55	1.08	0.45	1.52	10.3
Mar98	0.7	71.		4.3	34.1	51.	30.0	5.66	1.11	0.92	2.58	30.0
Apr98	4.2	78.		2.9	25.0	47.	66.0	5.30	1.24	0.79	0.73	25.5
May98	11.6	63.		2.1	21.6	52.	13.5	7.32	0.81	0.67	0.64	42.3
Jun98	13.2	76.		5.2	20.0	43.	44.1	4.61	1.18	0.67	0.69	26.4
Jul98	15.4			6.0	18.5		30.6	5.53	0.77	0.52	1.06	18.6
Aug98	14.3	74.			19.3	37.	99.2	5.85	0.91	0.44	0.67	21.7
Sep98	12.3	84.		2.2	23.9	32.	37.2	5.25	0.55	0.33	0.55	13.4
Oct98	5.3	82.		3.8	31.3	30.	72.0	5.34	0.30	0.28	0.65	10.1
Mean	6.6	78.	2521.	4.0	27.5	35.	523.1	5.20	0.85	0.55	0.87	20.7

Date	P R E C I P I T A T I O N					G A S E S		P A R T	P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d	
Nov97											
Dec97	0.56	0.48	0.69	0.08	0.08						
Jan98	0.54	0.59	1.38	0.10	0.09						
Feb98	0.57	1.02	2.22	0.15	0.16						
Mar98	1.09	1.50	1.13	0.22	0.12						
Apr98	0.91	0.41	1.23	0.11	0.13						
May98	0.75	0.39	4.04	0.17	5.95						
Jun98	0.36	0.42	1.13	0.12	0.39						
Jul98	0.41	0.64	0.97	0.11	0.11						
Aug98	1.10	0.41	0.71	0.12	0.26						
Sep98	0.46	0.32	0.55	0.07	0.14						
Oct98	0.26	0.35	0.29	0.06	0.29						
Mean	0.68	0.51	0.97	0.11	0.36						

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (23) Birkenes

Norway

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov97	0.5	84.		0.4	3.5	37.	181.7	4.44	0.69	0.63	1.99	28.9
Dec97	-0.8	89.		0.4	4.0	32.	155.6	4.24	0.81	0.79	1.62	36.3
Jan98	-1.7	84.		0.1	1.0	47.	142.2	4.57	0.42	0.45	1.35	20.7
Feb98	3.1	82.		0.1	0.6	66.	40.7	4.74	0.64	0.27	6.83	35.9
Mar98	0.6	69.		0.2	0.8	71.	89.9	4.55	0.71	1.01	2.79	33.6
Apr98	3.0	85.		0.3	0.5	72.	225.4	4.51	0.74	0.49	1.34	25.4
May98	10.8	71.		0.2	0.4	73.	82.5	4.48	0.86	0.39	0.46	21.4
Jun98	12.2	75.		0.2	0.6	62.	178.9	4.57	0.51	0.41	0.78	19.3
Jul98	14.4	74.		0.2	0.5	55.	171.6	4.55	0.47	0.33	0.88	19.6
Aug98	12.5	73.		0.1	0.3	48.	75.7	4.51	0.42	0.20	0.68	17.2
Sep98	11.2	85.		0.2	0.5	45.	173.8	4.39	0.85	0.48	1.04	40.0
Oct98	5.5	80.		0.1	0.3	57.	226.4	4.73	0.29	0.19	1.82	16.0
Mean	6.2	79.	2626.	0.2	1.1	55.	1744.4	4.50	0.61	0.47	1.50	25.5

Date	P R E C I P I T A T I O N					G A S E S		P A R T	P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d	
Nov97	0.59	1.14	0.09	0.14	0.10						
Dec97	0.55	0.91	0.06	0.10	0.09						
Jan98	0.32	0.79	0.05	0.09	0.06						
Feb98	0.25	3.95	0.20	0.45	0.21						
Mar98	0.98	1.55	0.14	0.19	0.09						
Apr98	0.50	0.70	0.10	0.09	0.08						
May98	0.53	0.25	0.12	0.03	0.08						
Jun98	0.38	0.42	0.06	0.05	0.05						
Jul98	0.28	0.46	0.06	0.06	0.04						
Aug98	0.30	0.38	0.04	0.04	0.04						
Sep98	0.51	0.60	0.46	0.12	0.10						
Oct98	0.14	1.01	0.04	0.11	0.07						
Mean	0.43	0.83	0.11	0.10	0.08						

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (24) Stockholm South Sweden

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm
Nov97	1.2	81.	47.	3.7	24.0	23.	44.0	4.25	1.09	0.64	0.52	33.0
Dec97	-0.1	86.	11.	4.5	24.1	21.	47.0	4.31	0.79	0.51	0.65	29.0
Jan98	0.3	84.	35.	4.2	21.7	33.	40.0	4.59	0.35	0.43	0.52	16.5
Feb98	1.5	79.	76.	3.0	20.0	47.	30.0	4.78	0.31	0.28	0.69	12.8
Mar98	0.2	69.	220.	3.7	25.5	55.	9.0	4.84	0.62	0.46	0.85	16.9
Apr98	3.7	73.	333.	3.6	21.5	63.	32.0	4.49	1.01	0.49	0.57	25.5
May98	10.5	59.	581.	2.1	16.9	66.	29.0	5.14	0.87	0.38	0.19	14.2
Jun98	13.1	73.	435.	1.0	15.9	53.	20.0	4.86	0.45	0.31	0.23	11.9
Jul98	16.1	72.	522.	0.7	19.2	52.	15.0	4.98	0.24	0.32	0.13	8.9
Aug98	14.4	73.	403.	0.7	12.9	45.	18.0	5.56	0.29	0.24	0.22	8.1
Sep98	12.7	78.	264.	1.4	20.4	39.	41.0	4.84	0.47	0.29	0.22	12.7
Oct98	6.9	82.	121.	2.3	21.7	33.	138.0	4.83	0.29	0.29	0.57	11.8
Mean	6.7	76.	3048.	2.6	20.3	44.	463.0	4.63	0.54	0.38	0.48	17.1

Date	P R E C I P I T A T I O N					G A S E S		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d
Nov97	0.57	0.22	0.13	0.03	0.07					
Dec97	0.40	0.34	0.09	0.03	0.06					
Jan98	0.36	0.29	0.05	0.03	0.04					
Feb98	0.25	0.39	0.11	0.04	0.02					
Mar98	0.65	0.42	0.23	0.04	0.05					
Apr98	0.80	0.16	0.22	0.04	0.07					
May98	0.76	0.09	0.29	0.05	0.15					
Jun98	0.33	0.13	0.23	0.04	0.05					
Jul98	0.25	0.10	0.17	0.03	0.03					
Aug98	0.30	0.14	0.18	0.03	0.03					
Sep98	0.34	0.12	0.18	0.03	0.04					
Oct98	0.29	0.32	0.09	0.04	0.03					
Mean	0.41	0.25	0.14	0.04	0.05					

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (26) Aspvreten Sweden

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm
Nov97	1.7	95.	34.	0.9	3.9	35.	43.9	4.27	0.29	0.76	0.88	30.4
Dec97	-0.5	95.	21.	1.0	5.3	34.	55.0	4.34	0.15	0.42	0.51	23.2
Jan98	-0.2	93.	37.	0.6	5.2	42.	35.1	4.68	0.29	0.37	0.46	13.4
Feb98	1.5	89.	82.	0.6	3.5	57.	5.0	5.30	0.15	0.14	0.83	6.2
Mar98	-1.2	82.	233.	0.8	2.3	69.	33.7	4.72	0.29	0.30	0.61	12.0
Apr98	2.7	86.	340.	1.2	2.5	72.	33.1	4.80	0.61	0.39	0.71	16.8
May98	8.6	78.	621.	0.5	1.7	43.	60.4	4.80	0.71	0.32	0.38	16.0
Jun98	12.2	85.	477.	0.4	1.7	61.	55.8	4.60	0.56	0.33	0.44	18.2
Jul98	14.9	84.	576.	0.4	1.4	56.	41.2	4.70	0.28	0.27	0.34	12.8
Aug98	13.4	76.	453.	0.2	1.7	49.	50.2	4.80	0.40	0.30	0.42	13.4
Sep98	11.4		277.	0.4	2.2	49.	40.7	4.70	0.52	0.26	0.35	15.3
Oct98	5.7	89.	150.	0.4	3.1	48.	25.1	4.50	0.32	0.29	1.89	16.6
Mean	5.9	87.	3301.	0.6	2.9	51.	479.2	4.59	0.41	0.37	0.57	17.3

Date	P R E C I P I T A T I O N					G A S E S		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d
Nov97	0.65	0.24	0.32	0.07	0.09					
Dec97	0.25	0.26	0.14	0.05	0.11					
Jan98	0.19	0.22	0.15	0.05	0.13					
Feb98	0.08	0.43	0.07	0.06	0.04					
Mar98	0.19	0.29	0.11	0.06	0.09					
Apr98	0.40	0.22	0.37	0.08	0.09					
May98	0.51	0.10	0.34	0.04	0.07					
Jun98	0.34	0.08	0.21	0.03	0.08					
Jul98	0.18	0.12	0.15	0.07	0.14					
Aug98	0.27	0.15	0.28	0.08	0.13					
Sep98	0.30	0.18	0.17	0.07	0.13					
Oct98	0.14	0.50	0.48	0.10	0.12					
Mean	0.32	0.20	0.24	0.06	0.10					

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (27) Lincoln Cathedral United Kingdom

Date	M A N D A T O R Y											
	C L I M A T E			G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm	
Nov97	8.1		77.				67.8	5.39	1.33	0.46	2.72	
Dec97	5.3		47.				65.5	4.91	1.21	0.36	3.59	
Jan98	4.6		73.				49.5	4.41	0.80	0.22	8.57	
Feb98	7.1		169.				73.0	5.59	1.48	0.51	7.01	
Mar98	7.6		216.				9.3	4.02	1.26	0.43	2.74	
Apr98	7.7		312.	9.2	17.1	58.	57.2	4.05	2.90	1.01	4.22	
May98	12.1		535.	9.2	17.1	58.	94.9	5.29	2.66	1.03	1.72	
Jun98	14.2		471.	9.0	16.1	50.	20.8	4.47	1.21	0.34	1.18	
Jul98	15.6		507.	4.1	15.7	50.	111.9	4.86	2.45	0.98	1.54	
Aug98	15.7		470.	6.8	19.4	45.	23.4	5.39	1.33	0.44	1.21	
Sep98	14.0		187.	11.6	22.5	46.	42.8	5.13	3.47	1.42	5.51	
Oct98	10.1		160.	8.7	26.0	47.	51.1	5.87	0.76	0.17	2.09	
Mean	10.2		3224.	8.4	19.1	51.	667.2	4.73	1.90	0.69	3.53	

Date	O P T I O N											
	P R E C I P I T A T I O N					G A S E S		P A R T		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N		
mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d	mg/m2d		
Nov97	0.61	1.46		0.28	0.12							
Dec97	1.14	2.01		0.35	0.15							
Jan98	0.24	5.00		0.74	0.31							
Feb98	0.85	3.54		0.63	0.23							
Mar98	0.45	1.48		0.30	0.12							
Apr98	3.58	2.37		0.32	0.17							
May98	1.58	1.04		0.21	0.09							
Jun98	1.48	0.65		0.10	0.07							
Jul98	0.70	0.40		0.11	0.06							
Aug98	0.78	0.70		0.17	0.08							
Sep98	1.53	3.08		0.42	0.21							
Oct98	0.86	1.13		0.19	0.10							
Mean	1.18	1.87		0.32	0.14							

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (31) Madrid Spain

Date	M A N D A T O R Y											
	C L I M A T E			G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm	
Nov97	9.7	79.		4.8			173.5	5.80	0.73	0.25	1.02	12.0
Dec97	6.7	80.			26.9		50.1	5.95	0.91	0.29	1.14	14.4
Jan98	5.0	81.		12.0	27.3		76.1	5.80	1.07	0.40	0.93	18.3
Feb98	7.0	78.		5.2	22.5		0.0					
Mar98	9.5	50.		21.8	14.0	52.	35.7	6.64	1.02	0.38	1.60	29.3
Apr98	6.9	66.		3.1	8.1	74.	49.7	6.40	0.52	0.31	1.19	14.7
May98	11.4	64.		7.9	14.6	70.	171.1	6.19	0.71	0.46	0.80	16.6
Jun98	18.1	44.		25.0	10.1	75.	41.4	6.27	0.65	0.43	0.80	14.7
Jul98	21.7	32.		21.4	16.7	88.	0.0					
Aug98	25.2	36.		19.4	36.3	80.	36.3	6.31	1.44	0.84	0.89	31.1
Sep98	19.5	58.		5.8	35.1	62.	104.5	6.46	0.57	0.32	1.29	13.6
Oct98	13.6	64.		3.0	35.5	44.	26.6	6.10	0.47	0.32	1.01	11.1
Mean	12.9	61.	5722.	11.8	22.5	68.	765.0	6.05	0.77	0.37	1.03	16.0

Date	O P T I O N											
	P R E C I P I T A T I O N					G A S E S		P A R T		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N		
mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d	mg/m2d		
Nov97	0.19	0.28	0.60	0.08	0.03							
Dec97	0.42	0.26	0.54	0.09	0.06							
Jan98	0.55	0.34	0.60	0.10	0.09							
Feb98												
Mar98	0.88	1.00	2.19	0.27	0.40							
Apr98	0.33	0.48	0.98	0.12	0.11							
May98	0.46	0.42	0.99	0.11	0.14							
Jun98	0.64	0.25	0.93	0.10	0.05							
Jul98												
Aug98	1.26	0.44	2.08	1.16	0.20							
Sep98	0.13	0.31	0.62	0.19	0.07							
Oct98	0.36	0.38	0.44	0.13	0.06							
Mean	0.42	0.38	0.87	0.17	0.10							

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (33) Toledo

Spain

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov97	9.2	77.	93.	0.5	6.2	74.	158.6	5.74	0.47	0.17	1.37	8.9
Dec97			+90.									
Jan98	5.9	78.	218.	2.0	10.7	68.	53.8	5.64	0.57	0.29	0.89	11.4
Feb98	8.5	72.	303.	3.2	23.7	78.	54.1	5.65	0.36	0.17	0.91	7.6
Mar98	12.3	50.	554.	1.6	8.1	97.	13.3	6.01	0.55	0.31	0.60	10.8
Apr98	9.9	68.	584.	0.9	8.3	92.	93.6	6.25	0.56	0.26	0.94	9.3
May98	13.5	65.	673.	0.5	6.8	99.	163.7	5.60	0.60	0.36	0.54	12.4
Jun98			834.	0.9	9.0	95.	35.0	6.14	0.62	0.37	0.58	9.6
Jul98			878.	4.0	13.6	109.	0.0					
Aug98			733.	2.8	13.8	105.	10.0	6.50	3.05	1.45	1.53	57.7
Sep98			515.	0.9	14.4	80.	69.0	5.83	0.66	0.25	0.81	12.0
Oct98	14.1	51.	430.	0.6	18.3	79.	38.0	5.78	0.28	0.12	0.59	4.2
Mean			5725.	1.6	12.1	89.		5.76	0.57	0.27	0.89	10.7

Date	P R E C I P I T A T I O N					O P T I O N G A S E S		P A R T I C L E S D E P .		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d
Nov97	0.04	0.48	0.19	0.07	0.06					
Dec97										
Jan98	0.20	0.37	0.24	0.06	0.02					
Feb98	0.04	0.44	0.21	0.05	0.00					
Mar98	0.24	0.19	0.64	0.10	0.13					
Apr98	0.18	0.45	0.39	0.07	0.07					
May98	0.43	0.15	0.24	0.04	0.04					
Jun98	0.28	0.26	0.55	0.08	0.06					
Jul98										
Aug98	2.18	0.66	3.75	0.31	0.38					
Sep98	0.22	0.23	0.60	0.07	0.10					
Oct98	0.10	0.11	0.28	0.04	0.00					
Mean	0.23	0.33	0.36	0.06	0.06					

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (34) Moscow

Russia

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov97												
Dec97	-8.7	75.			55.0	21.		6.73	2.10		2.30	61.8
Jan98	-5.5	90.			37.0	27.		6.65	2.77		1.84	56.0
Feb98	-8.3	77.			39.0	40.		6.32	1.13		2.26	61.8
Mar98	-1.6	68.			33.7	41.		6.43	2.21		1.79	40.8
Apr98	-4.1	63.			28.6	63.		6.65	1.80		1.63	68.7
May98	13.0	63.			40.0	21.1	62.	6.88	2.14		1.57	61.3
Jun98	21.3	71.			44.7	24.5	64.	6.89				43.1
Jul98	20.2	80.			42.1	19.3	52.	6.56	1.22		1.97	42.4
Aug98	16.0	83.			16.1	12.6	40.	6.83	0.48		1.16	31.7
Sep98	11.6	68.			20.2	18.2	30.	6.93	0.82		0.55	43.2
Oct98	6.3	75.			25.7	19.4	25.	6.83	1.10		1.30	27.4
Mean	6.5	74.			31.5	28.0	42.					

Date	P R E C I P I T A T I O N					O P T I O N G A S E S		P A R T I C L E S D E P .		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d
Nov97										
Dec97	0.78									
Jan98	0.88									
Feb98	1.34									
Mar98	0.74									
Apr98	0.70									
May98	0.81									
Jun98										
Jul98	0.37									
Aug98	0.72									
Sep98	0.86									
Oct98	0.59									
Mean										

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (35) Lahemaa

Estonia

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm
Nov97	0.9	88.	40.		0.9							
Dec97	-4.1	88.	24.		1.1							
Jan98	-0.6	90.	28.	0.4	1.0	52.	39.9	5.36	2.67	0.36	1.40	33.8
Feb98	-3.8	84.	85.	0.8	0.9	60.	41.8	5.34	1.83	0.43	1.48	25.3
Mar98	-4.0	81.	281.	0.6	0.8	70.	23.0	4.92	5.60	0.65	1.82	30.0
Apr98	3.5	72.	380.	0.5	0.5	72.	31.2	5.50	5.20	0.45	0.53	34.7
May98	9.1	74.	541.		0.5	68.	85.4	5.44	1.54	0.22	0.57	18.8
Jun98	14.5	78.	524.		0.5	60.	151.0	5.30	1.71	0.25	0.59	25.6
Jul98	15.9	81.	527.		0.4		103.0	5.29	1.44	0.14	0.55	12.4
Aug98	13.9	85.	370.		0.4	44.	181.0	4.96	0.65	0.09	0.54	12.8
Sep98	11.9	79.	281.	0.3	0.5	44.	20.4	6.18	1.36	0.20	0.80	13.8
Oct98	6.3	80.	157.	0.3	0.5	48.	75.4	4.91	0.96	0.39	1.36	14.6
Mean	5.4	82.	3238.	0.5	0.7	58.	5.16	1.64	0.24	0.78	19.4	

Date	P R E C I P I T A T I O N										G A S E S			P A R T I C L E S D E P.		
	P R E C I P I T A T I O N					G A S E S					P A R T I C L E S D E P.					
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	mg/m2d	mg/m2d	mg/m2d			
Nov97																
Dec97																
Jan98	0.16	0.93	2.95	0.36	0.20											
Feb98	0.11	0.65	0.45	0.11	0.15											
Mar98	0.43	0.64	2.40	0.18	0.98											
Apr98	0.36	0.37	1.73	0.12	0.21											
May98	0.22	0.25	3.48	0.10	0.30											
Jun98	0.34	0.27	3.43	0.24	0.20											
Jul98	0.22	0.19	0.63	0.13	0.15											
Aug98	0.16	0.08	1.24	0.14	0.02											
Sep98	0.16	0.30	0.91	0.19	0.04											
Oct98	0.33	0.58	0.75	0.37	0.24											
Mean	0.24	0.31	1.90	0.19	0.18											

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (36) Lisbon-Jeronimo

Portugal

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm
Nov97	16.1	62.		11.9	45.2	14.	35.4	6.37	4.64	2.79	9.90	46.8
Dec97	14.5	62.	50.	11.6	41.5	8.	20.3	6.05	8.48	4.20	10.19	49.8
Jan98	13.6	63.	61.	13.5	41.9	5.	13.5	6.18	11.15	2.65	23.46	100.4
Feb98	14.5	58.	100.	12.5	49.0	5.	32.4	5.20	6.79	1.59	9.80	47.9
Mar98	16.7	46.	155.	21.8	61.5	5.	16.7	6.80	23.49	5.16	6.69	103.2
Apr98	16.9	52.	137.	11.1	35.7	8.	16.2	6.78	14.53	3.56	17.15	9.8
May98	17.9	71.		22.1	44.4	10.	18.7	6.85	11.69	3.82	25.26	98.0
Jun98	20.7	63.		21.4	30.4	9.	43.2	6.90	8.58	4.85	5.49	6.1
Jul98	22.0	63.		19.8	13.3	11.	0.0					
Aug98	22.2	69.		24.9	50.9	16.	0.0					
Sep98	21.1	73.		18.6	45.0	37.	41.3	6.90	30.54	12.34	18.17	178.3
Oct98	18.1	69.		23.2	45.5	19.	13.8	7.45	11.54	4.13	22.06	146.9
Mean	17.9	63.		17.7	42.0	12.	251.5	5.98	13.30	5.02	13.30	75.3

Date	P R E C I P I T A T I O N										G A S E S			P A R T I C L E S D E P.		
	P R E C I P I T A T I O N					G A S E S					P A R T I C L E S D E P.					
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	mg/m2d	mg/m2d	mg/m2d			
Nov97	0.83	9.95	3.37	0.71	0.31					162.1	21.2	4.7				
Dec97	0.34	5.52	5.46	0.77	0.38					82.2	12.5	2.2				
Jan98	0.73	12.50	7.32	1.77	0.71					125.5	25.1	4.0				
Feb98	1.34	5.43	2.92	0.64	0.17					15.2	11.1	3.2				
Mar98	1.37	3.62	19.55	0.71	0.56					64.9	20.5	6.4				
Apr98	1.10	7.11	8.64	1.19	0.56					59.8	11.8	3.0				
May98		11.44	8.30	0.91	0.66					103.0	23.2	12.9				
Jun98	0.64	3.28	6.13	0.48	0.31					8.4	5.1	1.5				
Jul98										10.8	3.2	5.5				
Aug98										46.5	4.1	7.2				
Sep98	3.71		21.70	1.53	1.04					17.1	2.9	0.7				
Oct98	0.43		17.03	1.83	0.49					9.3	6.0	2.2				
Mean	1.36	6.82	9.71	0.97	0.51					58.7	12.3	3.5				

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (37) Dorset

Canada

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov97	-0.5	82.	131.	2.1	9.0	48.	92.0	4.54	0.40	0.34	0.06	17.0
Dec97	-5.7	80.	122.	3.6	14.4	52.	61.0	4.21	0.60	0.73	0.13	26.0
Jan98	-6.4	82.	106.	5.3	11.9	56.	95.0	4.37	0.42	0.37	0.08	17.0
Feb98	-3.6	72.	224.	2.8	8.4	70.	121.0	4.33	0.38	0.46	0.06	21.0
Mar98	-2.1	77.	294.	2.3	5.0	76.	87.0	4.45	0.70	0.53	0.20	21.0
Apr98	5.7	59.	544.	1.7		80.	28.0	4.27	0.77	0.53	0.11	25.0
May98	14.9	69.	633.	2.2		80.	37.0	4.18	1.93	0.94	0.24	46.0
Jun98	16.6	76.	556.	1.3		62.	66.0	4.36	0.77	0.49	0.11	23.0
Jul98	17.7	75.	657.	1.9		58.	48.0	4.45	0.78	0.41	0.06	23.0
Aug98	18.6	77.	532.	2.1		64.	52.0	4.26	0.90	0.45	0.12	17.0
Sep98	13.2	78.	375.	1.9		54.	43.0	3.97	2.35	0.96	0.18	59.0
Oct98	7.2	75.	261.	2.0		46.	58.0	4.24	0.90	0.55	0.13	26.0
Mean	7.4	75.	4435.	2.4	9.7	62.	788.0	4.31	0.76	0.52	0.11	24.2

Date	P R E C I P I T A T I O N					G A S E S		P A R T Conc ug/m3	P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Cl		SO4-S	NO3-N	
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	mg/m2d		mg/m2d	mg/m2d	
Nov97	0.19	0.03	0.08	0.01	0.01	8.4		0.2	0.3	0.2	
Dec97	0.48	0.06	0.19	0.02	0.02	20.0		0.2	0.3	0.1	
Jan98	0.15	0.04	0.06	0.01	0.01	20.0		0.3	0.7	0.2	
Feb98	0.12	0.04	0.05	0.01	0.01	13.6		0.2	0.5	0.2	
Mar98	0.34	0.16	0.37	0.06	0.03	17.0					
Apr98	0.28	0.04	0.23	0.03	0.05	8.4	0.2	0.7	0.2		
May98	1.22	0.06	0.63	0.10	0.19	11.2	0.3	0.8	0.2		
Jun98	0.35	0.03	0.27	0.04	0.03	4.2	0.3	0.7	0.1		
Jul98	0.33	0.02	0.21	0.05	0.02	10.6	0.3	0.7	0.1		
Aug98	0.40	0.05	0.30	0.06	0.03	13.0	0.5	1.1	0.1		
Sep98	0.69	0.03	0.36	0.05	0.05	7.4	0.3	0.6	0.1		
Oct98	0.42	0.04	0.17	0.03	0.03	7.6	0.3	0.5	0.1		
Mean	0.34	0.05	0.20	0.03	0.03	11.8	0.3	0.6	0.1		

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (40) Paris

France

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov97	10.1	80.	109.	21.4	70.5	10.	95.5	6.30	2.04	0.73	1.82	49.1
Dec97	7.5	78.	75.	21.7	64.2	11.	57.1	5.80	1.43	0.32	2.18	30.5
Jan98	6.4	73.	120.	20.9	60.4	15.	63.1	4.88	1.92	0.47	2.28	32.2
Feb98	7.9	70.	199.	32.9	98.8	8.	46.1	6.70	3.28	0.49	7.39	87.7
Mar98	10.3	62.	300.	19.9	72.0	23.	3.8	5.70	18.42	3.59	18.35	186.7
Apr98	11.1	69.	368.	10.2	74.7	39.	49.0	7.27	1.45	0.61	1.97	49.0
May98	18.0	56.	669.	9.4	73.8	59.	30.4	5.51	1.80	3.43	2.99	60.6
Jun98	19.2	59.	672.	5.1	63.8	50.	16.8	7.06	1.10	0.47	1.56	37.9
Jul98	19.3	61.	553.	5.2	59.1	42.	59.2	6.95	1.05	0.59	1.05	29.1
Aug98	21.2	56.	632.	8.0	67.4	58.	13.0	7.00	1.37	0.59	1.52	39.0
Sep98	17.5	69.	374.	8.4	71.4	34.	59.4	6.81	0.98	0.46	1.69	29.4
Oct98	12.9	74.	179.	7.9	63.7	22.	78.2	6.83	1.72	0.55	2.06	36.9
Mean	13.4	67.	4250.	14.2	70.0	31.	571.6	5.71	1.81	0.72	2.47	43.7

Date	P R E C I P I T A T I O N					G A S E S		P A R T Conc ug/m3	P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Cl		SO4-S	NO3-N	
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	mg/m2d		mg/m2d	mg/m2d	
Nov97	0.76	0.94	4.00	0.12	0.20						
Dec97	0.55	1.09	1.90	0.10	0.00						
Jan98	0.25	0.91	2.60	0.11	0.74						
Feb98	0.28	3.13	7.00	0.49	0.21						
Mar98	0.08										
Apr98	2.38	1.40	3.20	0.10	1.18						
May98	1.69	2.24	7.00	0.22	1.43						
Jun98	1.20	1.07	4.10	0.11	0.85						
Jul98	1.23	0.72	3.40	0.14	0.54						
Aug98	1.25	0.94	4.60	0.15	0.37						
Sep98	0.83	1.04	3.20	0.12	0.37						
Oct98	0.68	1.36	4.50	0.18	0.45						
Mean	0.90	1.29	3.91	0.16	0.50						

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (41) Berlin

Germany

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov97	3.5	84.	78.	19.0	34.0	6.	15.6		4.54	1.99	3.26	
Dec97	1.7	87.	43.	13.0	32.0	10.	41.8		3.17	2.35	0.75	
Jan98	-1.8	84.	70.	10.0	31.0	15.	48.2		6.88	2.64	2.07	
Feb98	6.3	76.	109.	10.0	28.0	23.	24.7		18.96	7.07	8.30	
Mar98	5.5	73.	244.	11.0	47.0	24.	39.3		6.56	4.06	2.68	
Apr98	11.1	75.	306.	12.0	40.0	24.	34.0		6.97	6.22	0.90	
May98	16.2	68.	517.	12.0	55.0	27.	23.3		8.36	6.48	1.84	
Jun98	18.4	71.	482.	8.0	40.0	31.	57.8		5.20	4.48	0.69	
Jul98	18.0	71.	474.	6.0	37.0	31.	38.7		4.56	5.64	0.77	
Aug98	17.9	71.	420.	8.0	39.0	31.	51.8		13.32	6.14	2.59	
Sep98	15.0	80.	239.	14.0	44.0	16.	26.9		7.95	5.92	1.78	
Oct98	9.3	81.	131.	8.0	25.0	27.	84.1		3.78	2.41	2.37	
Mean	10.4	77.	3113.	10.9	37.7	22.	486.2		6.98	4.34	2.09	

Date	P R E C I P I T A T I O N					G A S E S		PART Conc ug/m3	P A R T I C L E S D E P .		
	NH4-N	Na	Ca	Mg	K	HNO3	Cl		SO4-S	NO3-N	
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	mg/m2d		mg/m2d	mg/m2d	
Nov97	3.26	0.48	3.74	0.04	1.73		52.0				
Dec97	2.69	0.89	3.43	0.15	0.22		48.0				
Jan98	6.22	1.49	2.82	0.28	0.87		14.0	1.5	7.6	2.6	
Feb98	5.19	5.82	9.90	0.73	1.13		28.0	3.1	15.2	5.2	
Mar98	3.41	2.30	2.06	0.20	0.63		21.0	0.6	10.6	4.8	
Apr98	3.54	0.77	2.33	0.20	0.87		22.0	0.4	8.8	4.4	
May98	4.36	1.22	3.51	0.20	0.62		31.0	1.2	8.6	5.2	
Jun98	3.00	0.89	2.35	0.20	0.54		48.0	1.2	10.9	0.1	
Jul98	6.92	0.81	2.59	0.20	0.88		69.0	1.8	16.5	0.2	
Aug98	4.33	1.40	12.68	0.32	14.16		44.0	3.0	12.2	0.1	
Sep98	3.50	0.83	2.42	0.18	0.82		14.0	0.6	9.8	0.4	
Oct98	2.43	1.80	1.29	0.20	1.00						
Mean	3.93	1.51	3.89	0.24	2.22		36.3	1.5	11.1	2.1	

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (43) Tel Aviv

Israel

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov97	20.5	71.		12.9	26.8	14.	68.5	5.28	0.29	0.80	1.36	
Dec97	16.2	75.		20.7	24.2	13.	114.8	5.70	0.38	0.41	2.73	
Jan98	14.0	79.		12.7	21.9	11.	114.7	5.47	0.36	0.33	2.71	
Feb98	15.0	75.		14.9	20.4	17.	38.2	5.67	0.47	0.70	2.56	
Mar98	15.9	71.		10.7	15.7	24.	137.8	6.89	0.73	0.30	6.24	
Apr98	26.8	89.		48.4	56.5	65.	1.7					
May98	28.6	93.		63.6	44.0	51.	7.2					
Jun98	29.7	90.		46.9	42.7	53.	0.0					
Jul98	32.6	92.		51.4	49.2	64.	0.0					
Aug98	33.6	88.		35.5	43.4	54.	0.0					
Sep98	32.3	84.		49.8	54.9	55.	0.0					
Oct98	30.0	86.		52.2	59.7	55.	2.0					
Mean	24.6	83.		35.0	38.3	40.	484.9	5.64	0.47	0.44	3.53	

Date	P R E C I P I T A T I O N					G A S E S		PART Conc ug/m3	P A R T I C L E S D E P .		
	NH4-N	Na	Ca	Mg	K	HNO3	Cl		SO4-S	NO3-N	
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	mg/m2d		mg/m2d	mg/m2d	
Nov97	0.41	1.16	0.21	0.27	0.04						
Dec97	0.29	2.26	0.38	0.50	0.06						
Jan98	0.36	2.29	0.26	0.50	0.06						
Feb98	0.45	2.22	0.38	0.51	0.06						
Mar98	0.19	5.12	0.55	1.08	0.12						
Apr98											
May98											
Jun98											
Jul98											
Aug98											
Sep98											
Oct98											
Mean	0.31	2.94	0.38	0.64	0.07						

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (44) Svanvik

Norway

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov97	-7.1			8.1	2.7		21.8	5.35	0.38	0.14	2.68	16.4
Dec97	-9.2			4.7	2.5		14.5	5.65	0.40	0.19	2.83	17.4
Jan98	-12.0			9.7	1.1	49.	18.0	5.24	0.37	0.26	1.42	13.8
Feb98	-20.8			7.9	1.5	66.	22.4	5.02	0.47	0.13	3.03	18.5
Mar98	-10.3			12.2	0.8	67.	27.5	5.15	0.61	0.08	7.15	32.8
Apr98	-4.1			5.1	0.5	63.	18.6	4.38	1.47	0.23	7.53	48.6
May98	3.2			3.3	0.4	60.	8.0	4.68				
Jun98	7.2			19.8	0.3	49.	70.3	4.44	0.79	0.08	0.41	18.6
Jul98	13.4			3.9	0.3	47.	44.4	5.03	0.30	0.08	0.17	6.5
Aug98	10.6			5.7	0.4	42.	21.4	5.17	0.72	0.17	0.23	60.0
Sep98	5.7	79.		6.3	0.3	49.	60.5	4.96	0.27	0.08	0.77	10.1
Oct98	1.2	80.		3.2	0.4	50.	16.6	4.50	0.88	0.11	0.67	22.9
Mean	0.2		1967.	7.5	0.9	54.	344.0	4.77	0.57	0.12	1.87	20.7

Date	P R E C I P I T A T I O N					G A S E S		P A R T	P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d	
Nov97	0.23	1.57	0.39	0.19	0.12						
Dec97	0.35	1.62	0.37	0.18	0.19						
Jan98	0.33	0.90	0.17	0.09	0.18						
Feb98	0.20	1.60	0.15	0.22	0.10						
Mar98	0.19	3.91	0.20	0.49	0.25						
Apr98	0.50	3.74	0.25	0.48	0.22						
May98											
Jun98	0.17	0.23	0.08	0.05	0.04						
Jul98	0.15	0.12	0.23	0.06	0.09						
Aug98	0.58	0.18	0.46	0.23	0.19						
Sep98	0.12	0.42	0.05	0.06	0.04						
Oct98	0.31	0.33	0.08	0.07	0.06						
Mean	0.23	1.02	0.18	0.15	0.11						

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (45) Chaumont

Switzerland

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov97	3.2	82.	141.	0.9	10.2	67.	64.2	5.00	0.14	0.17	0.13	7.0
Dec97	0.3	83.	90.	1.5	8.7	63.	115.7	4.83	0.12	0.19	0.25	8.9
Jan98	0.2	79.	135.	1.7	7.6	66.	87.5	4.86	0.16	0.16	0.26	8.6
Feb98	3.0	67.	275.	2.1	8.9	84.	17.1	5.35	0.39	0.28	0.12	9.2
Mar98	2.4	68.	351.	2.0	8.0	87.	35.8	5.35	0.38	0.27	0.32	9.7
Apr98	4.2	81.	389.	0.9	6.9	95.	154.4	5.02	0.32	0.18	0.10	9.5
May98	11.0	68.	668.	1.5	7.0	117.	54.9	5.18	0.26	0.29	0.05	10.3
Jun98	13.0	75.	624.	0.8	7.6	98.	80.1	5.23	0.38	0.23	0.18	9.4
Jul98	14.8	73.	612.	1.1	6.6	93.	65.4	5.01	0.53	0.30	0.12	15.1
Aug98	15.1	72.	572.	1.2	6.8	113.	93.7	5.01	0.37	0.23	0.10	9.7
Sep98	9.9	87.	336.	0.8	8.0	82.	167.7	5.01	0.27	0.21	0.21	9.1
Oct98	6.0	87.	195.	0.5	5.7	66.	116.4	4.92	0.20	0.16	0.27	8.3
Mean	6.9	77.	4388.	1.3	7.7	86.	1052.9	4.99	0.27	0.21	0.18	9.4

Date	P R E C I P I T A T I O N					G A S E S		P A R T	P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d	
Nov97	0.14	0.08	0.16	0.03	0.01						
Dec97	0.09	0.15	0.06	0.03	0.01						
Jan98	0.08	0.14	0.09	0.04	0.02						
Feb98	0.41	0.08	0.64	0.03	0.04						
Mar98	0.46	0.19	0.45	0.07	0.05						
Apr98	0.25	0.08	0.29	0.02	0.03						
May98	0.50	0.09	0.32	0.02	0.04						
Jun98	0.36	0.35	0.49	0.05	0.04						
Jul98	0.48	0.17	1.09	0.06	0.09						
Aug98	0.32	0.09	0.33	0.03	0.04						
Sep98	0.19	0.19	0.38	0.04	0.03						
Oct98	0.14	0.15	0.05	0.02	0.04						
Mean	0.24	0.15	0.31	0.03	0.03						

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (46) London

UK

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov97	9.9		86.				54.2	6.59	0.41	0.15	7.58	
Dec97	7.3		53.				46.8	6.96	0.03	0.03	5.26	
Jan98	6.8		74.				63.6	5.66	0.70	0.17	12.82	
Feb98	8.3		140.				4.8	5.89	0.68	0.16	12.91	
Mar98	9.3		203.				49.0	5.62	0.47	0.20	5.91	
Apr98	9.7		293.	6.6	47.8	38.	110.5		0.56	0.36	0.17	
May98	14.8		544.	6.6	47.8	38.	34.5	6.85	0.26	0.17	3.16	
Jun98	16.1		451.	4.6	36.5	38.	104.7	5.76	0.23	0.20	0.91	
Jul98	17.2		400.	5.5	41.4	41.	35.8	4.68	3.36	1.45	4.01	
Aug98	18.4		534.	3.3	43.7	37.	20.0	6.68	0.03	0.09	0.44	
Sep98	16.6		291.	11.1	52.0	33.	74.5	5.95	0.89	0.39	5.42	
Oct98	12.3		159.	6.1	48.0	26.	107.6	6.79	0.06	0.03	2.57	
Mean	12.2		3228.	6.3	45.3	36.	706.0	5.65	0.54	0.26	4.08	

Date	O P T I O N P R E C I P I T A T I O N					G A S E S		P A R T I C L E S D E P .		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d
Nov97		4.14		0.58	0.32					
Dec97		2.85		0.41	0.24					
Jan98		7.07		0.96	0.51					
Feb98		7.12		0.96	0.51					
Mar98		3.21		0.46	0.26					
Apr98		0.00		0.04	0.05					
May98		1.67		0.26	0.16					
Jun98		0.41		0.09	0.08					
Jul98		2.15		0.32	0.19					
Aug98		0.15		0.06	0.06					
Sep98		2.94		0.42	0.24					
Oct98		1.34		0.21	0.14					
Mean		2.19		0.32	0.19					

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (47) Los Angeles

USA (CA)

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov97	18.3	42.		0.3	9.5	33.	7.5	5.40				
Dec97	15.3	45.		0.5	4.1	31.	11.4	5.10				
Jan98	14.8	52.		1.0	33.0	51.	11.6	5.90				
Feb98	13.6	53.		0.0	19.0	44.	52.9	6.30				
Mar98	15.7	54.		0.0	22.0	49.	13.4	6.10				
Apr98	15.3	50.	681.	0.1	24.0	54.	4.2	5.90				
May98	15.1	80.	149.	0.5	16.0	52.	9.3	5.90				
Jun98	17.1	82.	681.	0.8	20.0	56.	0.4					
Jul98	21.7	76.	763.	1.8	26.0	55.	0.0					
Aug98	23.4	63.	710.	1.4	34.0	60.	0.0					
Sep98	19.8	80.	498.	0.1	27.0	52.	0.7					
Oct98	18.9	60.	456.	0.4	26.0	45.	5.70	0.15	0.24	0.56	31.3	
Mean	17.4	61.		0.6	21.7	48.	5.77					

Date	O P T I O N P R E C I P I T A T I O N					G A S E S		P A R T I C L E S D E P .		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d
Nov97										2.6
Dec97										3.4
Jan98										8.5
Feb98										
Mar98										
Apr98										4.6
May98										3.6
Jun98										1.7
Jul98										1.8
Aug98										2.9
Sep98										4.9
Oct98										2.2
Mean										3.6

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (49) Antwerpen Belgium

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm
Nov97			+100.									
Dec97	5.8	82.	47.	24.0		12.						
Jan98	5.1	78.	67.	25.0	67.0	20.						
Feb98	5.0	75.	160.	42.0	65.0	27.						
Mar98	8.4	75.	195.	27.0	56.0	32.						
Apr98	10.0	76.	281.	22.0	54.0	28.						
May98	16.2	66.	457.	18.0	51.0	50.						
Jun98	16.7	73.	467.	20.0	44.0	35.						
Jul98	17.3	72.	414.	23.0	44.0	33.	26.4	5.40	3.60	1.00	3.00	3.5
Aug98	18.5	68.	462.	23.0	49.0	42.	35.3	5.40	1.90	1.00	3.00	4.7
Sep98	15.8	80.	265.	18.0	53.0	18.	161.0	4.90	0.90	0.00	3.00	2.9
Oct98	10.8	81.	113.	13.0	45.0	17.	157.6	5.10	1.50	0.00	4.00	3.9
Mean	11.8	75.	2828.	23.2	52.8	29.	5.03	1.43	0.16	3.41	3.5	

Date	O P T I O N P R E C I P I T A T I O N					G A S E S		P A R T Conc	P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Cl		SO4-S	NO3-N	
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d	
Nov97											
Dec97											
Jan98							4.8	3.2			
Feb98							4.6	5.4			
Mar98							3.1	9.7			
Apr98							5.4	0.0			
May98							3.8	9.4			
Jun98							2.6	8.3			
Jul98							2.4	0.0			
Aug98							3.0	9.4			
Sep98							2.9	7.0			
Oct98							2.2	8.1			
Mean							2.6	7.2			

November 1998-October 1999

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (01) Prague-Letnany Czech Republic

Date	M A N D A T O R Y											
	C L I M A T E			G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm	
Nov98	1.5	87.	84.	17.4	25.6	13.	31.7	6.30	5.40	1.00	3.30	15.0
Dec98	0.4	84.	73.	21.5	27.0	24.	8.3	4.80	13.20	1.20	5.60	43.0
Jan99	1.3	87.	73.	16.6	21.8	37.	34.9	5.10	2.30	0.40	2.00	22.5
Feb99	-0.1	83.	124.	19.2	26.0	49.	33.1	4.20	4.80	0.70	3.00	32.5
Mar99	5.8	73.	257.	13.9	22.4	47.	22.5	4.30	4.50	0.50	0.80	25.0
Apr99	9.9	70.	396.	7.8	23.1	60.	22.6	6.10	7.00	1.10	1.40	
May99	15.0	65.	581.	11.0	21.6	71.	55.9	6.10	9.50	0.90	3.10	
Jun99	16.4	74.	487.	10.3	16.6	61.	63.1	6.90	2.70	0.40	1.60	30.0
Jul99	20.0	70.	604.	8.2	15.7	69.	40.7	4.20	6.60	0.50	3.90	
Aug99	18.5	65.	500.	8.2	21.8	63.	33.1	6.30	4.10	0.40	5.80	52.9
Sep99	17.6	71.	356.	11.4	19.0	55.	38.9	4.70	4.70	0.30	0.80	18.9
Oct99	9.3	83.	190.	11.3	24.3	28.	20.5	5.20	5.80	0.60	1.50	21.0
Mean	9.6	76.	3725.	13.1	22.1	48.	405.3	4.75	5.40	0.61	2.61	28.2

Date	O P T I O N										
	P R E C I P I T A T I O N					G A S E S		P A R T		P A R T I C L E S D E P.	
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d		
Nov98											
Dec98											
Jan99											
Feb99											
Mar99											
Apr99											
May99											
Jun99											
Jul99											
Aug99											
Sep99											
Oct99											
Mean											

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (03) Kopisty Czech Republic

Date	M A N D A T O R Y											
	C L I M A T E			G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm	
Nov98	1.1	86.	87.	18.2	36.7	27.	43.1	7.10	3.70	1.00	1.80	33.0
Dec98	-0.4	86.	76.	17.4	37.3	26.	16.2	4.20	23.50	0.60	4.10	68.0
Jan99	0.8	87.	83.	20.9	37.3	30.	23.0	4.30	17.10	0.70	0.80	54.0
Feb99	0.0	80.	168.	17.7	48.1	54.	50.1	4.60	7.60	0.50	1.70	31.0
Mar99	5.5	77.	266.	18.8	38.8	54.	21.3	4.40	16.90	0.80	1.00	52.0
Apr99	10.0	81.	402.	22.2	35.3	99.	27.0	5.00	26.30	0.80	3.70	
May99	15.1	65.	584.	18.7	17.7	81.	22.1	6.70	37.70	1.20	5.40	133.6
Jun99	16.3	71.	497.	22.6	24.5	76.	76.0	4.20	20.80	1.00	0.40	42.8
Jul99	20.2	74.	577.	15.0	19.6	80.	30.8	3.90	9.30	1.20	0.80	71.8
Aug99	17.9	67.	497.	15.6	25.8	74.	24.6	4.30	11.90	0.70	1.40	103.3
Sep99	17.3	76.	365.	19.0	30.1	53.	57.6	4.50	6.10	0.70	0.50	45.4
Oct99	9.3	79.	203.	7.8	33.6	44.	22.1	5.00	11.60	0.90	1.20	63.0
Mean	9.4	77.	3805.	17.8	32.1	58.	413.9	4.40	14.46	0.84	1.53	55.3

Date	O P T I O N										
	P R E C I P I T A T I O N					G A S E S		P A R T		P A R T I C L E S D E P.	
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d		
Nov98											
Dec98											
Jan99											
Feb99											
Mar99											
Apr99											
May99											
Jun99											
Jul99											
Aug99											
Sep99											
Oct99											
Mean											

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (05) Ahtari

Finland

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov98	-4.8	90.	23.	1.1	3.8	45.	17.6	4.49	0.37	0.35	0.25	19.0
Dec98	-5.8	90.	11.	1.2	3.8	49.	55.9	4.61	0.23	0.27	0.20	13.0
Jan99	-10.1	87.	21.	1.8	3.9	54.	39.4	4.45	0.26	0.45	0.16	18.0
Feb99	-9.7	85.	62.	2.2	4.9	67.	47.5	4.68	0.16	0.25	0.19	11.0
Mar99	-3.0	81.	203.	2.1	7.2	86.	34.2	4.53	0.39	0.46	0.18	19.0
Apr99	3.8	70.	362.	0.6	3.3	89.	22.9	4.41	0.73	0.56	0.14	25.0
May99	5.8	63.	560.	0.3	2.3	87.	30.5	4.67	0.48	0.32	0.19	16.0
Jun99	16.9	64.	612.	0.3	2.6	86.	17.4	4.71	0.32	0.26	0.10	12.0
Jul99	15.9	71.	581.	0.2	1.6	52.	97.5	4.74	0.31	0.21	0.12	11.0
Aug99	11.9	77.	421.	0.2	1.3	56.	92.1	4.83	0.18	0.14	0.05	8.0
Sep99	9.3	82.	288.	0.4	2.0	55.	33.4	4.70	0.23	0.22	0.09	10.0
Oct99	4.8	87.	70.	0.2	2.0	46.	125.2	4.82	0.34	0.20	0.12	10.0
Mean	4.6	79.	3214.	0.9	3.2	64.	613.6	4.68	0.30	0.26	0.13	12.4

Date	P R E C I P I T A T I O N					G A S E S		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d
Nov98	0.15	0.14	0.06	0.02	0.04					
Dec98	0.09	0.11	0.03	0.02	0.04					
Jan99	0.08	0.07	0.04	0.01	0.04					
Feb99	0.06	0.10	0.04	0.02	0.04					
Mar99	0.29	0.07	0.09	0.02	0.04					
Apr99	0.45	0.05	0.17	0.03	0.06					
May99	0.33	0.13	0.13	0.03	0.05					
Jun99	0.20	0.06	0.09	0.02	0.10					
Jul99	0.20	0.07	0.08	0.02	0.03					
Aug99	0.12	0.03	0.02	0.01	0.03					
Sep99	0.12	0.04	0.03	0.01	0.02					
Oct99	0.20	0.06	0.13	0.02	0.05					
Mean	0.17	0.07	0.07	0.02	0.04					

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (07) Waldhof-Langenbrugge

Germany

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov98	1.2	93.	73.	3.1	15.3	21.	57.5	4.90	0.58	0.63	1.55	22.0
Dec98	1.1	87.	46.	3.6	15.5	34.	43.2	5.40	0.57	0.47	1.17	17.0
Jan99	2.9	88.	56.	1.8	11.3	36.	35.0	4.87	0.81	0.97	1.69	27.7
Feb99	1.3	89.	101.	1.4	10.3	52.	51.5	5.25	1.07	0.61	8.30	42.6
Mar99	5.2	80.	240.	1.8	8.1	57.	32.8	5.15	0.53	0.77	0.70	17.5
Apr99	9.3	74.	417.	1.0	6.2	70.	24.3	5.91	0.78	0.80	0.67	18.8
May99	13.6	67.	577.	0.8	5.5	76.	57.2	5.56	0.69	0.72	0.49	17.7
Jun99	15.3	69.	554.	0.5	5.1	67.	35.1	5.40	0.64	0.66	0.25	15.1
Jul99	19.6	64.	626.	0.5	5.2	76.	32.7	5.01	0.93	0.87	0.47	24.2
Aug99	17.3	71.	466.	0.7	6.0	69.	59.1	5.70	0.56	0.60	0.53	15.1
Sep99	17.0	73.	380.	1.7	8.0	66.	38.4	5.38	0.42	0.50	0.22	11.4
Oct99	9.1	84.	192.	1.6	9.2	36.	36.2	5.32	0.70	0.68	0.73	17.7
Mean	9.4	78.	3728.	1.5	8.8	55.	503.0	5.23	0.69	0.67	1.56	20.9

Date	P R E C I P I T A T I O N					G A S E S		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d
Nov98	0.50	0.80	0.53	0.19	0.11					22.9
Dec98	0.51	0.60	0.44	0.15	0.13					22.4
Jan99	0.79	0.87	0.64	0.18	0.03					16.6
Feb99	0.59	4.40	0.66	0.43	0.15					18.6
Mar99	0.37	0.29	0.73	0.15	0.15					22.9
Apr99	1.10	0.28	0.65	0.13	0.20					24.2
May99	1.11	0.22	0.69	0.12	0.17					27.0
Jun99	0.68	0.10	0.72	0.11	0.08					13.1
Jul99	1.11	0.16	0.67	0.20	0.16					17.2
Aug99	0.72	0.27	0.52	0.14	0.08					17.9
Sep99	0.32	0.10	0.55	0.11	0.05					27.5
Oct99	0.61	0.35	0.80	0.21	0.08					14.8
Mean	0.69	0.79	0.62	0.18	0.11					20.6

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (09) Langenfeld-Reusrath Germany

Date	M A N D A T O R Y											
	C L I M A T E			G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm	
Nov98	3.8	89.	81.	8.0	40.9	12.	98.8					
Dec98	3.9	89.	42.	7.7	38.3	17.	50.0					
Jan99	5.3	85.	59.	7.1	33.4	21.	87.0					
Feb99	3.4	85.	219.	8.7	34.5	30.	54.2					
Mar99	8.1	76.	582.	6.5	31.7	36.	79.5					
Apr99	10.6	74.	240.	6.3	28.2	48.	68.8					
May99	15.3	66.	336.	5.5	27.8	52.	37.4					
Jun99	16.2	69.	259.	5.6	25.2	54.	80.2					
Jul99	20.4	67.	349.	5.2	26.7	59.	39.2					
Aug99	18.5	72.	267.	5.5	29.4	47.	79.6					
Sep99	18.6	78.	194.	5.6	34.0	41.	73.6					
Oct99	10.9	84.	115.	5.8	30.1	20.	47.3					
Mean	11.2	78.	2743.	6.5	31.7	36.	795.6					

Date	O P T I O N											
	P R E C I P I T A T I O N					G A S E S		P A R T		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N		
mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d	mg/m2d	mg/m2d	mg/m2d
Nov98												
Dec98												
Jan99												
Feb99												
Mar99												
Apr99												
May99												
Jun99												
Jul99												
Aug99												
Sep99												
Oct99												
Mean												

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (10) Bottrop Germany

Date	M A N D A T O R Y											
	C L I M A T E			G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm	
Nov98	4.2	90.	71.	25.7	47.0	11.	87.6	4.57	0.67	0.29	1.28	21.2
Dec98	4.7	89.	39.	26.3	43.2	15.	56.6	4.51	1.23	0.47	2.28	23.4
Jan99	5.9	87.	51.	34.3	38.1	20.	93.5					
Feb99	3.4	88.	177.	19.9	38.7	28.	59.8					
Mar99	8.1	81.	555.	21.9	37.6	30.	92.6					
Apr99	11.1	78.	221.	18.4	31.1	45.	53.5					
May99	15.4	72.	347.	17.8	32.9	49.	80.1					
Jun99	17.0	71.	329.	14.1	25.8	52.	70.8					
Jul99	20.9	70.	374.	11.4	30.0	56.	42.1					
Aug99	18.6	76.	265.	11.9	34.3	40.	88.9					
Sep99	19.1	78.	204.	17.9	40.0	33.	36.3					
Oct99	11.2	85.	117.	24.9	38.5	15.	62.4					
Mean	11.6	80.	2750.	20.4	36.4	33.	824.2	4.55	0.89	0.36	1.67	22.1

Date	O P T I O N											
	P R E C I P I T A T I O N					G A S E S		P A R T		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N		
mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d	mg/m2d	mg/m2d	mg/m2d
Nov98	0.22	0.75	0.26	0.07	0.03							
Dec98	0.78	1.22	0.41	0.15	0.06							
Jan99												
Feb99												
Mar99												
Apr99												
May99												
Jun99												
Jul99												
Aug99												
Sep99												
Oct99												
Mean	0.44	0.93	0.32	0.10	0.04							

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (13) Rome

Italy

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm
Nov98	13.6	69.	150.	16.9	32.4	16.	41.8					
Dec98	10.2	68.	124.	23.9	26.5	5.	78.4					
Jan99	10.7	68.	155.			8.						
Feb99	10.0	64.	168.		35.9	15.						
Mar99	14.1	62.	310.		61.4	30.						
Apr99	17.1	66.	360.		60.6	41.						
May99	23.1	67.	527.		48.8	47.						
Jun99	26.7	55.	600.		48.2	58.						
Jul99	28.0	59.	589.		41.0	53.						
Aug99	29.6	62.	496.		29.8	51.						
Sep99	25.5	66.	360.		40.6	33.						
Oct99	20.9	71.	248.		45.1	15.						
Mean	19.1	65.	4087.	20.4	42.8	31.						

Date	O P T I O N P R E C I P I T A T I O N										G A S E S			P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N						
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d						
Nov98																
Dec98																
Jan99																
Feb99																
Mar99																
Apr99																
May99																
Jun99																
Jul99																
Aug99																
Sep99																
Oct99																
Mean																

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (14) Casaccia

Italy

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm
Nov98	9.5	79.	180.	3.0	25.2		34.4					
Dec98	6.4	78.	155.	7.2	20.3	12.	88.8					
Jan99	8.5	69.	186.	5.2	35.1	10.	32.4					
Feb99	7.9	66.	224.	5.8	31.6	18.	40.2					
Mar99	11.5	61.	341.	2.5	19.5	35.						
Apr99	14.3	65.	420.	1.4	23.4	44.						
May99	21.2	68.	496.	1.2	30.1	50.						
Jun99	23.9	57.	630.	1.1	33.4	61.						
Jul99	25.2	59.	620.	2.3	38.1	58.						
Aug99	26.8	60.	558.	1.5	37.1	55.						
Sep99	22.7	65.	450.	1.8	41.1	47.						
Oct99	18.7	68.	403.	3.6	38.2	30.						
Mean	16.4	66.	4663.	3.0	31.1	38.						

Date	O P T I O N P R E C I P I T A T I O N										G A S E S			P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N						
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d						
Nov98																
Dec98																
Jan99																
Feb99																
Mar99																
Apr99																
May99																
Jun99																
Jul99																
Aug99																
Sep99																
Oct99																
Mean																

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (15) Milan Italy

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm
Nov98	7.1	75.	180.	26.1	118.3	13.	45.9					
Dec98	3.3	78.	124.	39.1	121.9	12.	47.1					
Jan99												
Feb99												
Mar99												
Apr99												
May99												
Jun99												
Jul99												
Aug99												
Sep99	20.6	76.	390.	4.5	68.0	34.	164.2					
Oct99	14.1	82.	248.	10.7	62.8	19.	126.2					
Mean				20.1	92.8	20.						

Date	O P T I O N										
	P R E C I P I T A T I O N				G A S E S		P A R T	P A R T I C L E S D E P.			
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
Nov98											63.2
Dec98											90.6
Jan99											
Feb99											
Mar99											
Apr99											
May99											
Jun99											
Jul99											
Aug99											
Sep99											
Oct99											
Mean											77.1

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (16) Venice Italy

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm
Nov98	7.1	77.	180.	7.9			13.6					
Dec98	2.4	84.	124.	11.1			13.4					
Jan99	3.3	88.	158.	5.5		6.	33.2					
Feb99	4.4	75.	240.	10.4		18.	19.0					
Mar99	9.2	82.	363.	5.0		39.	41.6					
Apr99	13.1	84.	483.	3.9		54.	90.8					
May99	18.3	80.	583.	3.3		60.	32.6					
Jun99	21.1	75.	692.	3.8		68.	137.4					
Jul99	23.2	75.	703.	3.5		65.	101.8					
Aug99	22.6	79.	905.	2.5		53.	29.2					
Sep99	21.9	81.	446.	4.5		45.	31.4					
Oct99	20.1	83.	381.	4.9		40.	80.4					
Mean	13.9	80.	5258.	5.5		45.	624.4					

Date	O P T I O N										
	P R E C I P I T A T I O N				G A S E S		P A R T	P A R T I C L E S D E P.			
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
Nov98											
Dec98											
Jan99											
Feb99											
Mar99											
Apr99											
May99											
Jun99											
Jul99											
Aug99											
Sep99											
Oct99											
Mean											

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (21) Oslo

Norway

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov98	-0.7	87.		6.5	32.7	17.	27.3	4.41	1.33	1.04	2.17	40.7
Dec98	-0.6	81.		6.6	40.6	18.	53.2	4.50	0.81	0.59	1.85	29.0
Jan99	-2.1	81.		6.7	38.3	22.	55.0	4.57	0.62	0.45	1.40	22.6
Feb99	-2.1	81.		4.6	49.6	33.	35.9	5.07	0.48	0.27	0.90	13.3
Mar99	0.4	78.		5.8	34.2	39.	133.0	4.48	0.67	0.57	0.38	23.5
Apr99	7.1	72.		2.8	27.1	55.	39.3	4.67	0.60	0.77	0.47	24.2
May99	9.6	68.		3.5	26.1	69.	39.4	4.71	0.83	0.67	0.56	23.3
Jun99	14.0	80.		6.3	25.2	56.	174.4	4.62	0.56	0.37	0.34	17.7
Jul99	17.4	73.		7.6	23.4	54.	90.9	4.70	0.41	0.27	0.28	13.7
Aug99	15.9	70.		6.4		50.	24.9	4.51	0.98	0.61	0.40	29.4
Sep99	14.1	84.		3.4	32.4	41.	128.8	4.59	0.62	0.40	0.41	20.6
Oct99	6.7	78.		2.6	34.1	16.	86.1	4.81	0.43	0.36	0.74	15.9
Mean	7.0	78.	2628.	5.2	33.1	39.	888.2	4.61	0.62	0.47	0.64	20.8

Date	P R E C I P I T A T I O N					G A S E S		P A R T		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N		
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d		
Nov98	0.84	1.20	1.04	0.18	0.45							
Dec98	0.67	1.16	0.35	0.10	0.44							
Jan99		0.79	0.26	0.09	0.06							
Feb99		0.53	0.42	0.05	0.04							
Mar99		0.25	0.15	0.03	0.08							
Apr99		0.32	0.35	0.08	0.05							
May99		0.39	0.62	0.11	0.13							
Jun99		0.22	0.13	0.04	0.07							
Jul99		0.18	0.17	0.04	0.06							
Aug99		0.25	0.64	0.10	0.13							
Sep99		0.23	0.21	0.05	0.06							
Oct99		0.44	0.15	0.05	0.19							
Mean	0.73	0.39	0.26	0.06	0.12							

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (23) Birkenes

Norway

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov98	-2.3	87.		0.2	1.3	41.	106.1	4.15	1.08	0.98	3.39	49.4
Dec98	-0.1	81.		0.2	0.7	52.	82.4	4.18	0.83	0.47	5.67	54.1
Jan99	-1.3	93.		0.3	2.7	56.	225.0	4.55	0.57	0.47	3.78	34.6
Feb99	-2.0	80.		0.2	1.5	67.	101.7	4.92	0.27	0.13	2.22	15.3
Mar99	1.1	86.		0.5	2.5	75.	154.9	4.43	0.81	0.62	1.39	31.4
Apr99	5.8	76.		0.3	1.2	75.	81.7	4.78	0.22	0.25	0.38	13.0
May99	8.0	72.		0.4	1.5	75.	89.4	4.73	0.45	0.30	1.04	17.2
Jun99	12.3	79.		0.3	1.3	67.	217.2	4.60	0.48	0.37	0.51	18.5
Jul99	16.1	72.		0.3	1.3	60.	42.1	4.46	0.61	0.49	0.70	24.0
Aug99	14.4	82.		0.2	1.2	54.	181.0	4.80	0.41	0.33	1.16	15.9
Sep99	13.2	89.		0.4	1.8	47.	224.2	4.52	0.73	0.48	0.69	24.8
Oct99	6.3	90.		0.1	1.8	41.	182.8	4.51	0.66	0.46	1.81	28.4
Mean	6.2	82.	2735.	0.3	1.6	59.	1688.5	4.52	0.60	0.45	1.82	26.7

Date	P R E C I P I T A T I O N					G A S E S		P A R T		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N		
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d		
Nov98	0.65	1.87	0.10	0.22	0.13							
Dec98	0.45	3.29	0.13	0.43	0.18							
Jan99	0.30	2.05	0.11	0.27	0.13							
Feb99	0.11	1.21	0.05	0.14	0.05							
Mar99	0.68	0.82	0.07	0.09	0.07							
Apr99	0.22	0.24	0.03	0.02	0.04							
May99	0.27	0.62	0.11	0.07	0.07							
Jun99	0.35	0.33	0.05	0.04	0.04							
Jul99	0.40	0.41	0.08	0.05	0.06							
Aug99	0.31	0.60	0.08	0.07	0.05							
Sep99	0.47	0.36	0.12	0.05	0.07							
Oct99	0.39	0.97	0.09	0.11	0.06							
Mean	0.39	1.01	0.09	0.12	0.08							

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (24) Stockholm South Sweden

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3	mg/l	mg/l	mg/l	mg/l	mg/l	
Nov98	0.2	83.	43.	4.0	23.3	29.	17.0	4.46	0.77	0.67	0.58	25.6
Dec98	0.3	86.	18.	3.9		35.	37.0	4.41	0.46	0.40	0.83	19.5
Jan99	-1.4	86.	36.	5.5	21.7	35.	48.0	4.63	0.35	0.37	0.65	15.6
Feb99	-1.4	82.	100.	5.0	29.7	42.	26.0	4.80	0.36	0.34	0.62	12.8
Mar99	1.7	84.	182.	4.3	20.1	56.	50.0	4.45	0.69	0.60	0.33	22.8
Apr99	7.2	77.	371.	2.3	18.6	61.	61.0	4.84	0.40	0.30	0.27	12.5
May99	9.9	65.	629.	2.7	14.3	73.	20.0	4.75	0.29	0.17	0.08	8.8
Jun99	16.9	70.	671.	2.3	15.2	76.	41.0	4.67	0.41	0.27	0.12	14.5
Jul99	19.7	66.	686.	2.1	11.5	63.	17.0	4.82	0.42	0.25	0.36	11.8
Aug99	16.8	69.	498.	2.6	19.0	53.	69.0	4.90	0.30	0.24	0.18	9.4
Sep99	15.6	77.	306.	1.9	20.8	53.	56.0	4.88	0.42	0.18	0.09	9.1
Oct99	8.1	81.	134.	2.2	17.9	35.	37.0	4.69	0.55	0.42	0.63	15.9
Mean	8.0	77.	3674.	3.2	19.3	51.	479.0	4.68	0.44	0.34	0.36	14.3

Date	P R E C I P I T A T I O N					G A S E S		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d
Nov98	0.55	0.29	0.27	0.05	0.05					
Dec98	0.26	0.40	0.14	0.04	0.02					
Jan99	0.29	0.39	0.08	0.04	0.02					
Feb99	0.36	0.35	0.10	0.04	0.00					
Mar99	0.69	0.17	0.13	0.02	0.00					
Apr99	0.42	0.18	0.12	0.04	0.03					
May99	0.22	0.09	0.15	0.03	0.02					
Jun99	0.16	0.08	0.16	0.03	0.02					
Jul99	0.26	0.23	0.12	0.04	0.06					
Aug99	0.27	0.09	0.09	0.02	0.02					
Sep99	0.33	0.04	0.09	0.01	0.04					
Oct99	0.28	0.34	0.41	0.08	0.04					
Mean	0.34	0.20	0.14	0.03	0.02					

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (26) Aspvreten Sweden

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3	mg/l	mg/l	mg/l	mg/l	mg/l	
Nov98	-1.0	92.	44.	1.1	3.8	41.	17.1	4.40	1.00	0.61	1.68	31.6
Dec98	-1.2	95.	21.	1.0	4.5	49.	29.1	4.30	0.60	0.55	0.33	25.2
Jan99	-2.4	90.	22.	1.1	4.5	50.	30.8	4.59	0.39	0.42	0.79	18.1
Feb99	-2.7	80.	84.	0.9	4.2	60.	17.0	4.45	0.44	0.42	0.76	19.6
Mar99	0.6	88.	173.	1.3	2.4	73.	25.9	4.28	0.87	0.84	0.82	32.2
Apr99	5.7	83.	371.	0.6	2.1	78.	13.9	4.62	0.40	0.33	0.18	13.9
May99	7.7	73.	601.	0.5	1.3	81.	16.2	4.69	0.40	0.24	0.23	13.3
Jun99	12.9	80.	645.	0.8	1.6	81.	75.1	4.98	0.42	0.25	0.09	11.6
Jul99	17.6	73.	672.	0.5	1.3	71.	2.9	4.69	0.61	0.61	0.60	16.0
Aug99	14.8	78.	470.	0.4	1.7	62.	39.2	4.75	0.39	0.30	0.70	15.3
Sep99	14.1	85.	304.	0.7	1.8	64.	34.5	4.56	0.77	0.37	0.47	16.9
Oct99	7.4	85.	135.	0.4	2.6	48.	15.4	4.60	0.97	0.60	1.46	25.0
Mean	6.5	84.	3542.	0.8	2.6	63.	317.1	4.57	0.56	0.41	0.56	18.6

Date	P R E C I P I T A T I O N					G A S E S		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d
Nov98	0.41	0.37	0.80	0.13	0.19					
Dec98	0.22	0.18	0.12	0.07	0.13					
Jan99	0.26	0.33	0.26	0.06	0.06					
Feb99	0.19	0.43	0.18	0.07	0.06					
Mar99	0.65	0.48	0.23	0.09	0.09					
Apr99	0.33	0.11	0.20	0.05	0.09					
May99	0.23	0.16	0.20	0.04	0.09					
Jun99	0.41	0.07	0.23	0.05	0.07					
Jul99	0.51	0.33	0.36	0.08	0.15					
Aug99	0.35	0.19	0.36	0.06	0.16					
Sep99	0.61	0.17	0.31	0.05	0.15					
Oct99	0.67	0.47	0.87	0.10	0.12					
Mean	0.40	0.23	0.31	0.06	0.11					

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (27) Lincoln Cathedral United Kingdom

Date	C L I M A T E		M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm	
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N		Cl
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l		mg/l
Nov98	5.0		83.	12.0	41.0	36.	97.8	5.72	0.98	0.29	3.22	
Dec98	4.3		52.	8.9	29.0	36.	64.3	5.39	1.11	0.33	2.00	
Jan99	5.0		80.	14.1	29.5	40.	95.9					
Feb99	4.8		137.	15.3	29.8		20.6					
Mar99	7.2		258.	8.9	17.0	64.	83.3					
Apr99			549.	5.6	12.0	72.	70.2					
May99												
Jun99				13.7	16.4	53.						
Jul99				7.9	14.0	61.						
Aug99				6.3	20.0	59.						
Sep99				10.0	26.0	40.						
Oct99				7.2	34.0	50.						
Mean				10.0	24.4	51.		5.56	1.03	0.31	2.74	

Date	P R E C I P I T A T I O N					G A S E S		P A R T	P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d	
Nov98	0.52	1.79		0.29	0.14						
Dec98	0.81	1.13		0.22	0.10						
Jan99											
Feb99											
Mar99											
Apr99											
May99											
Jun99											
Jul99											
Aug99											
Sep99											
Oct99											
Mean	0.64	1.53		0.26	0.12						

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (31) Madrid Spain

Date	C L I M A T E		M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm	
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N		Cl
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l		mg/l
Nov98	9.3	70.		3.5	37.6	30.	43.6	6.14	0.40	0.18	0.85	7.5
Dec98	3.2	65.		2.9	53.0	20.	38.4	6.02	0.71	0.33	1.29	16.7
Jan99	2.4	67.		7.0	38.0	27.	26.6	2.46	2.76	3.13	4.80	101.5
Feb99	4.1	56.		5.0	8.1	38.	16.1	3.04	2.89	1.38	3.89	85.9
Mar99	7.1	55.		4.0	11.7	62.	23.1	2.93	4.97	2.46	6.68	121.9
Apr99	10.1	49.		8.0	3.0	74.	39.1	1.90	3.60	2.19	7.41	91.8
May99	14.6	53.		11.0	17.0	65.	30.6	2.60	2.18	1.34	4.31	53.0
Jun99	19.6	43.		10.0	26.9	80.	0.0					
Jul99	27.4	35.		9.0	31.7	81.	53.4	3.27	1.26	0.68	0.98	26.7
Aug99	26.5	38.		7.0	26.0	78.	5.5	5.15	0.98	0.60	1.61	29.6
Sep99	23.5	58.		6.0	20.0	57.	76.2	2.86	1.95	1.03	4.13	51.0
Oct99	20.6	74.		5.0	24.1	39.	53.9	1.56	5.75	3.06	12.59	138.8
Mean	14.0	55.	4581.	6.5	24.8	54.	406.5	2.24	2.50	1.46	4.69	64.0

Date	P R E C I P I T A T I O N					G A S E S		P A R T	P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d	
Nov98	0.33	0.13	0.44	0.09	0.05						
Dec98	0.64	0.36	0.72	0.14	0.07						
Jan99	2.89	2.75	5.41	0.67	1.03						
Feb99	0.98	1.97	6.98	0.65	0.97						
Mar99	5.03	1.56	8.45	0.73	0.60						
Apr99	0.40	3.58	4.09	0.41	0.21						
May99	1.53	1.53	2.63	0.38	0.40						
Jun99											
Jul99	0.73	0.36	1.58	0.16	0.28						
Aug99	0.86	0.00	0.00	0.00	0.00						
Sep99	1.67	0.95	3.47	0.53	0.36						
Oct99	3.08	4.01	7.38	1.66	0.94						
Mean	1.59	1.61	3.65	0.54	0.43						

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (33) Toledo

Spain

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov98	8.9	67.	276.	0.9	13.5	59.	23.9	5.72	0.48	0.20	0.64	8.1
Dec98	6.1	63.	240.	2.4	17.0	59.	34.6	5.75	0.37	0.16	0.54	10.1
Jan99	5.4	65.	+136.	1.0	21.6	57.	+107.0					
Feb99	7.4	60.	339.	8.0	7.8	69.	15.4	5.74	0.91	0.17	0.48	11.6
Mar99	9.8	58.	526.	3.3	15.0	82.	20.4	6.24	0.77	0.32	0.88	16.2
Apr99	12.8	51.	679.	0.5	20.6	90.	55.4	5.74	0.63	0.26	0.87	10.4
May99	16.9	55.	748.	0.8	4.1	84.	61.2	6.02	0.50	0.27	0.81	10.3
Jun99	21.0	42.	835.	5.6	11.7	108.	12.4	6.34	0.80	0.70	0.83	20.4
Jul99	25.6	33.	859.	1.8	6.4	109.	1.2	5.99	2.06	0.92	1.34	38.6
Aug99	24.2	35.	801.	0.9	4.0	87.	3.2	6.40	0.37	0.23	0.61	7.8
Sep99	18.2	55.	550.	0.8	3.3	75.	43.2	6.32	0.28	0.13	0.70	4.8
Oct99	12.3	77.	319.	1.1	7.3	64.	112.4	5.90	0.39	0.16	1.09	8.5
Mean	14.0	55.	6308.	2.3	11.0	79.	490.3	5.91	0.49	0.22	0.84	9.8

Date	P R E C I P I T A T I O N					O P T I O N G A S E S		P A R T P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d
Nov98	0.14	0.20	0.56	0.07	0.00					
Dec98	0.14	0.30	0.33	0.06	0.09					
Jan99										
Feb99	0.22	0.83	0.46	0.06	0.02					
Mar99	0.36	0.41	0.83	0.08	0.12					
Apr99	0.21	0.28	0.41	0.06	0.10					
May99	0.20	0.30	0.48	0.06	0.09					
Jun99	0.46	0.30	1.21	0.11	0.12					
Jul99	1.00									
Aug99	0.09	0.14	0.58	0.08	0.16					
Sep99	0.03	0.15	0.23	0.04	0.07					
Oct99	0.03	0.53	0.29	0.06	0.06					
Mean	0.14	0.37	0.42	0.06	0.08					

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (34) Moscow

Russia

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov98	-7.4	80.		31.2	15.6	25.			6.66	1.79	1.70	46.0
Dec98	-4.2	82.		30.0	14.0	33.			6.73	1.62	2.80	55.9
Jan99	-4.4	83.		22.8	22.3				6.60	1.82	3.40	29.8
Feb99	-3.1	79.		15.6	17.5				6.69	1.59	3.27	56.4
Mar99	-0.6	61.		22.1	16.0				6.00	1.90	0.83	32.6
Apr99	9.3	61.		28.5	19.3				6.50	2.70	0.45	
May99	9.7	59.		26.6	18.4				7.30	1.70	0.29	50.0
Jun99	21.4	52.		30.0	25.1				6.35	3.00	0.82	
Jul99	21.5	63.		21.4	29.8				6.45	1.20	0.43	
Aug99	16.6	68.		20.4	31.0				6.60	0.80	0.17	
Sep99	10.4	74.		16.6	26.0				6.60	0.70	0.58	41.8
Oct99	6.3	75.		18.0	22.1				6.70	0.60	0.22	42.8
Mean	7.0	70.		23.6	21.4	29.						

Date	P R E C I P I T A T I O N					O P T I O N G A S E S		P A R T P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d
Nov98	0.66									
Dec98	0.91									
Jan99	0.79									
Feb99	0.99									
Mar99	0.94									
Apr99	0.94									
May99	0.92									
Jun99	0.54									
Jul99	1.02									
Aug99	0.85									
Sep99	0.82									
Oct99	0.81									
Mean										

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (35) Lahemaa

Estonia

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov98	-4.2	84.	59.	0.5	0.8	44.	31.3	4.38	1.44	0.56	0.45	27.0
Dec98	-2.3	86.	21.	0.5	0.6	50.	53.7	4.58	1.99	0.44	0.90	32.6
Jan99	-4.0	88.	34.	4.2	2.4	47.	70.0	4.50		0.53	0.55	20.2
Feb99	-6.3	85.	102.	4.1	2.4	66.	50.4	4.58		0.37	0.58	15.4
Mar99	-0.3	79.	254.	4.5	2.0	88.	13.4	4.40		1.02	0.83	36.5
Apr99	6.4	74.	350.	2.2	2.0	79.	43.5	5.47		0.67	0.61	20.6
May99	7.3	66.	588.	0.7	1.5	80.	4.9	5.60		0.69	0.73	21.1
Jun99	17.2	76.	671.	1.3	1.7	79.	81.7	5.58		0.34	0.38	13.3
Jul99	18.6	71.	683.	0.5	1.5	67.	29.4	5.77		0.12	0.73	10.9
Aug99	15.1	78.	494.	0.5	1.5	56.	72.4	5.19		0.18	0.18	11.2
Sep99	13.1	78.	313.	0.7	1.6	52.	48.2	4.97		0.30	0.35	11.3
Oct99	7.5	81.	106.	0.6	2.0	50.	118.8	4.89		0.24	0.52	14.2
Mean	6.3	79.	3675.	1.7	1.7	63.	617.7	4.80	1.79	0.37	0.51	17.4

Date	P R E C I P I T A T I O N					G A S E S		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d
Nov98	0.21	0.10	0.81	0.09	0.04					
Dec98	0.35	0.12	0.15	0.09	0.01					
Jan99	0.15	0.24	0.17	0.05	0.19					
Feb99	0.11	0.22	0.18	0.04	0.05					
Mar99	0.58	0.65	1.29	0.13	0.22					
Apr99	0.68	0.35	1.24	0.12	0.28					
May99	0.43	0.30	1.85	0.16	0.34					
Jun99	0.30	0.37	0.91	0.11	0.46					
Jul99	0.26	0.69	0.80	0.09	0.44					
Aug99	0.17	0.22	0.28	0.05	0.26					
Sep99	0.05	0.20	0.58	0.08	0.14					
Oct99	0.20	0.35	0.52	0.06	0.23					
Mean	0.25	0.29	0.55	0.08	0.22					

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (36) Lisbon-Jeronimo

Portugal

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov98	15.7	70.		20.3	32.6		7.4	6.80	41.23	8.33	16.77	174.8
Dec98	11.3	71.		28.1	55.8	4.	5.2	6.85	75.94	11.10	14.59	241.8
Jan99	11.3	75.		14.0	47.2		24.2	7.05	6.98	1.44	7.00	209.1
Feb99	11.9	64.		10.5	45.8		6.9	6.33	16.11	15.01	12.87	248.3
Mar99	14.8	67.		16.2	53.0	14.	16.4	6.64	35.29	11.05	34.27	142.3
Apr99	16.5	65.		15.5	35.3	16.	6.9	5.95	22.65	7.99	31.12	30.9
May99	18.1	70.		10.2	28.2	10.	25.1	6.64	11.44	4.44	16.52	99.9
Jun99	21.1	59.		13.8	29.1	10.	0.0					
Jul99	22.8	64.		13.7	12.2	9.	0.0					
Aug99	22.6	67.		11.0	2.1	8.	15.7	6.15	40.15	15.46	11.47	176.5
Sep99	20.9	72.		14.6	23.1	8.	31.3	7.00	5.59	2.41	7.55	158.5
Oct99	18.4	72.		14.4	9.6	7.	49.2	6.59	3.37	1.40	12.62	67.6
Mean	17.1	68.		15.2	31.2	10.	188.3	6.56	15.79	5.27	14.27	135.1

Date	P R E C I P I T A T I O N					G A S E S		P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d
Nov98		6.75	25.35	1.35	4.45			16.4	7.0	2.0
Dec98		9.79	37.01	1.88	2.43			66.6	27.2	5.0
Jan99	1.78	4.29	3.59	0.59	0.35			33.4	15.4	1.9
Feb99		6.20	24.90	1.40	0.76			22.5	8.8	1.5
Mar99	1.46	17.49	13.38	1.81	1.97			146.9	22.7	4.6
Apr99	0.05	18.99	25.80	2.28	2.45			84.9	15.5	5.7
May99	1.57	3.63	4.27	0.56	0.23			19.6	5.1	2.2
Jun99								12.7	3.5	3.6
Jul99								36.2	11.0	8.2
Aug99	0.73	4.00	38.23	1.85	1.55			16.1	6.5	2.8
Sep99	0.53	4.76	9.30	0.79	0.38			49.1	9.6	2.5
Oct99	0.28	6.74	5.48	0.92	0.55			103.6	4.6	2.7
Mean	0.88	6.90	12.24	1.07	0.94			62.7	9.9	2.8

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (37) Dorset

Canada

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov98	1.5	79.	78.	1.8		44.	60.0	4.19	0.95	0.69	0.15	35.0
Dec98	-3.8	82.	81.	2.0		48.	73.0	4.31	0.70	0.68	0.11	48.0
Jan99	10.6	77.	108.									
Feb99	-2.0	71.	203.									
Mar99	1.1	63.	420.									
Apr99	5.2	57.	522.									
May99	13.7	63.	643.									
Jun99	17.0	75.	562.									
Jul99	19.6	74.	602.									
Aug99	16.0	77.	500.									
Sep99	14.2	82.	338.									
Oct99	6.2	77.	227.									
Mean	8.3	73.	4284.	1.9		46.	4.25	0.81	0.68	0.13		42.1

Date	P R E C I P I T A T I O N					G A S E S		PART Conc ug/m3	P A R T I C L E S D E P .		
	NH4-N	Na	Ca	Mg	K	HNO3	Cl		SO4-S	NO3-N	
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	mg/m2d		mg/m2d	mg/m2d	
Nov98	0.47	0.06	0.12	0.02	0.04	8.6		0.3	0.3	0.2	
Dec98	0.42	0.05	0.11	0.02	0.03	14.0		0.3	0.5	0.3	
Jan99											
Feb99											
Mar99											
Apr99											
May99											
Jun99											
Jul99											
Aug99											
Sep99											
Oct99											
Mean	0.44	0.05	0.11	0.02	0.03	11.3		0.3	0.4	0.3	

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (40) Paris

France

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov98	6.7	73.	124.	20.3	67.9	11.	37.4	6.92	3.07	0.41	4.60	55.8
Dec98	6.9	79.	71.	21.3	85.4	13.	35.2	6.05	1.54	0.41	2.60	31.2
Jan99	7.7	75.	119.	14.6	85.6	19.	37.4	7.36	4.12	0.63	5.76	101.9
Feb99	6.3	71.	164.	17.7	80.3	23.	47.8	7.50	2.26	0.50	3.56	71.3
Mar99	10.3	68.	310.	12.0	67.0	30.	41.0	5.78	2.12	1.71	5.72	55.7
Apr99	12.6	66.	436.	8.0	53.1	44.	57.4	6.98	2.33	2.94	3.02	57.5
May99	17.9	60.	639.	5.0	42.0	55.	77.6	7.28	1.68	1.21	1.51	46.8
Jun99	18.4	59.	629.	5.0	41.1	55.	50.0	4.92	1.22	1.38	0.86	29.0
Jul99	22.6	56.	727.	4.9	37.9	63.	25.0	6.80	0.98	0.74	0.42	26.4
Aug99	21.4	58.	615.	4.2	37.5	53.	36.8	6.72	0.80	0.46	0.99	27.6
Sep99	19.8	66.	411.	6.2	50.8	37.	83.6	6.76	0.70	0.40	0.65	19.0
Oct99	13.3	72.	269.	13.5	54.5	17.	28.2	6.87	1.87	0.68	3.05	44.6
Mean	13.7	67.	4514.	11.1	58.6	35.	557.4	5.87	1.81	1.02	2.52	45.9

Date	P R E C I P I T A T I O N					G A S E S		PART Conc ug/m3	P A R T I C L E S D E P .		
	NH4-N	Na	Ca	Mg	K	HNO3	Cl		SO4-S	NO3-N	
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	mg/m2d		mg/m2d	mg/m2d	
Nov98	0.71	2.91	7.20	0.31	0.72						
Dec98	0.83	1.77	1.80	0.15	0.36						
Jan99	1.22	3.62	14.60	0.45	0.73						
Feb99	0.78	2.23	11.20	0.24	0.50						
Mar99	1.30	3.39	3.30	0.37	0.66						
Apr99	1.67	1.99	6.40	0.24	0.69						
May99	0.03	0.87	8.20	0.16	0.24						
Jun99	0.41	0.57	2.50	0.06	0.35						
Jul99	0.52	0.29	3.40	0.05	0.23						
Aug99	0.38	0.64	4.70	0.10	0.27						
Sep99	0.44	0.32	2.30	0.06	0.15						
Oct99	0.99	1.98	3.90	0.21	0.55						
Mean	0.72	1.57	5.81	0.19	0.43						

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (41) Berlin

Germany

Date	M A N D A T O R Y						P R E C I P I T A T I O N					
	C L I M A T E			G A S E S			mm	pH	SO4-S mg/l	NO3-N mg/l	Cl mg/l	Cond uS/cm
	Temp C	Rh %	Sun MJ/m2	SO2 ug/m3	NO2 ug/m3	O3 ug/m3						
Nov98	1.9	88.	67.	17.0	34.0	11.	36.7	5.50	3.81	2.75		
Dec98	1.2	86.	56.	12.0	32.0	16.	36.5	6.66	5.06	1.56		
Jan99	3.5	84.	72.	9.0	29.0	15.	32.7	4.62	4.35	1.57		
Feb99	1.8	83.	109.	7.0	29.0	24.	58.3	4.23	2.35	2.57		
Mar99	6.2	77.	220.	13.0	42.0	20.	33.3	3.68	3.42	0.81		
Apr99	11.0	70.	376.	12.0	51.0	30.	34.2	3.65	3.23	0.57		
May99	15.3	62.	562.	12.0	58.0	37.	26.8	5.45	3.94	0.72		
Jun99	17.5	65.	495.	9.0	54.0	32.	38.1	3.75	2.65	0.28		
Jul99	21.5	61.	578.	10.0	50.0	37.	28.9	4.07	3.32	0.83		
Aug99	19.3	63.	445.	9.0	51.0	32.	55.5	2.19	2.02	0.67		
Sep99	18.9	69.	360.	12.0	60.0	26.	16.9	2.66	2.63	0.36		
Oct99	10.7	79.	179.	9.0	37.0	17.	16.7	6.27	3.95	3.61		
Mean	10.7	74.	3519.	10.9	43.9	25.	414.6	4.26	3.26	1.36		

Date	P R E C I P I T A T I O N					G A S E S		PART Conc ug/m3	P A R T I C L E S D E P .		
	NH4-N mg/l	Na mg/l	Ca mg/l	Mg mg/l	K mg/l	HNO3 ug/m3	Cl mg/m2d		SO4-S mg/m2d	NO3-N mg/m2d	
	Nov98	4.31	1.83	2.92	0.38	0.38		12.0	1.8	11.8	4.0
Dec98	2.87	0.85	0.40	0.20	0.32		14.0	1.7	12.2	3.8	
Jan99	3.24	1.33	1.55	0.20	0.23		52.0				
Feb99	1.93	1.39	0.66	0.20	0.20		128.0				
Mar99	4.23	0.69	0.91	0.20	0.25		95.0				
Apr99	1.78	0.55	0.83	0.20	0.35		167.0				
May99	3.39	0.94	0.56	0.20	0.59		195.0				
Jun99	1.88	0.52	0.70	0.20	0.30		183.0				
Jul99	1.81	1.78	2.17	0.31	0.57		232.0				
Aug99	1.25	0.46	1.37	0.20	0.37		263.0				
Sep99	4.89	0.55	2.50	0.20	0.33		89.0				
Oct99	1.91	1.45	4.70	0.29	1.01		68.0				
Mean	2.61	1.01	1.38	0.23	0.37		133.0	1.8	12.0	3.9	

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (43) Tel Aviv

Israel

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm
Nov98	26.3	92.		46.3	55.1	46.						1.0
Dec98	21.8	88.		103.3	53.1	37.						150.8
Jan99	19.9	93.		79.5	56.2	39.						74.6
Feb99	19.9	91.		86.2	55.6	47.						27.8
Mar99	22.2	87.		45.2	46.0	52.						44.8
Apr99	23.9	88.		54.9	47.4	59.						21.9
May99	28.8	88.		59.4	36.1	54.						0.0
Jun99	29.9	87.		53.2	25.6	55.						0.0
Jul99	31.6	88.		47.0	0.0	59.						0.0
Aug99	32.8	85.		50.0	30.5	59.						0.0
Sep99	31.5	82.		35.8	39.3	49.						0.0
Oct99	29.3	85.		63.1	48.8	40.						0.3
Mean	26.5	88.		60.3	41.1	50.						321.2

Date	O P T I O N										
	P R E C I P I T A T I O N				G A S E S			P A R T		P A R T I C L E S D E P.	
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
Nov98											
Dec98											
Jan99											
Feb99											
Mar99											
Apr99											
May99											
Jun99											
Jul99											
Aug99											
Sep99											
Oct99											
Mean											

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (44) Svanvik

Norway

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N							
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond		
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm		
Nov98	12.2	85.		6.1	1.7	36.			14.7	5.11	0.51	0.19	0.60	11.7
Dec98	10.2	82.		1.0	0.8	52.			23.7	5.08	0.43	0.28	3.25	20.0
Jan99	17.0	81.		15.0	3.6	51.			10.3	4.77	0.65	0.28	2.38	21.5
Feb99	14.1	81.		10.4	3.3	73.			10.7	4.83	0.44	0.30	0.56	13.6
Mar99	-6.2	78.		18.6	1.9	81.			11.1	4.83	0.97	0.35	1.21	21.7
Apr99	-0.6	72.		7.3	1.2	92.			6.8	4.47	1.59	0.31	1.80	39.0
May99	1.4	70.		11.7	0.7	68.			14.7	4.78	0.97	0.26	4.28	33.1
Jun99	12.3	64.		5.2	1.0	63.			17.5	4.56	0.87	0.24	0.40	20.3
Jul99	13.8	72.		7.1	0.7	44.			92.2	4.56	0.57	0.15	0.31	17.0
Aug99	9.7	79.		3.7	0.6	41.			162.5	5.16	0.12	0.05	0.21	5.1
Sep99	8.5	81.		1.0	1.2	81.			18.7	4.99	0.36	0.22	0.50	12.3
Oct99	2.6	88.		4.1	1.1	58.			89.3	5.05	0.29	0.10	0.59	9.5
Mean	1.8	78.	1834.	7.6	1.5	62.			472.2	4.87	0.39	0.14	0.71	12.4

Date	O P T I O N										
	P R E C I P I T A T I O N				G A S E S			P A R T		P A R T I C L E S D E P.	
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
Nov98	0.46	0.31	0.10	0.08	0.12						
Dec98	0.58	1.75	0.11	0.21	0.13						
Jan99	0.38	1.21	0.13	0.18	0.09						
Feb99	0.40	0.27	0.06	0.05	0.04						
Mar99	0.58	0.69	0.21	0.16	0.09						
Apr99	0.77	1.15	0.26	0.21	0.11						
May99	0.49	2.64	0.30	0.33	0.25						
Jun99	0.42	0.31	0.15	0.06	0.08						
Jul99	0.17	0.12	0.09	0.07	0.13						
Aug99	0.05	0.11	0.04	0.02	0.03						
Sep99	0.22	0.28	0.14	0.05	0.14						
Oct99	0.16	0.30	0.08	0.04	0.04						
Mean	0.21	0.39	0.09	0.07	0.08						

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (45) Chaumont

Switzerland

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm
Nov98	-1.3	82.	139.	1.7	7.5	65.	94.7	4.78	0.19	0.18	0.15	9.7
Dec98	-0.5	75.	122.	1.5	6.6	70.	48.3	4.76	0.17	0.21	0.41	10.6
Jan99	0.5	74.	151.	1.2	5.7	72.	73.3	4.87	0.17	0.18	0.26	9.2
Feb99	-3.4	88.	174.	2.6	8.0	74.	141.3	4.88	0.17	0.17	0.32	9.3
Mar99	2.4	77.	351.	1.5	10.9	88.	65.7	4.87	0.24	0.25	0.15	10.2
Apr99	4.6	82.	389.	0.9	9.1	98.	141.2	5.16	0.30	0.24	0.23	10.9
May99	11.7	80.	524.	0.8	7.5	93.	119.2	5.05	0.35	0.29	0.12	10.4
Jun99	11.3	79.	588.	0.9	7.8	100.	105.6	4.96	0.35	0.30	0.12	10.7
Jul99	15.2	78.	693.	1.0	7.0	102.	111.8	4.84	0.39	0.29	0.07	11.5
Aug99	15.0	80.	517.	1.2	7.7	96.	81.4	4.87	0.47	0.36	0.15	13.4
Sep99	13.3	82.	381.	1.2	8.2	95.	131.8	4.93	0.27	0.19	0.13	8.8
Oct99	7.0	86.	241.	0.7	9.9	60.	89.5	5.16	0.14	0.12	0.14	5.3
Mean	6.3	80.	4270.	1.3	8.0	84.	1203.8	4.93	0.27	0.23	0.18	10.0

Date	P R E C I P I T A T I O N					G A S E S		P A R T I C L E S		D E P .	
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d	
Nov98	0.10	0.07	0.02	0.01	0.02						
Dec98	0.09	0.22	0.02	0.03	0.01						
Jan99	0.12	0.14	0.04	0.02	0.01						
Feb99	0.13	0.17	0.11	0.02	0.01						
Mar99	0.23	0.05	0.16	0.01	0.02						
Apr99	0.30	0.12	0.73	0.03	0.03						
May99	0.36	0.08	0.42	0.04	0.04						
Jun99	0.38	0.08	0.35	0.03	0.05						
Jul99	0.35	0.05	0.30	0.02	0.03						
Aug99	0.45	0.13	0.49	0.04	0.04						
Sep99	0.18	0.11	0.15	0.02	0.02						
Oct99	0.11	0.07	0.14	0.02	0.02						
Mean	0.24	0.11	0.27	0.02	0.03						

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (46) London

UK

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	Cond
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	uS/cm
Nov98	7.5		106.	13.0	64.0	47.	91.1	7.04	0.63	0.24	7.42	
Dec98	7.9		59.	5.8	49.0	30.	55.6	6.71	0.14	0.03	7.53	
Jan99	7.3		76.	10.1	52.5	35.	66.0					
Feb99	6.3		160.	8.2	50.6		19.0					
Mar99	9.2		250.	6.6	42.0	39.	31.0					
Apr99			447.	7.3	32.0	55.	36.0					
May99												
Jun99				5.2	40.0	48.						
Jul99				6.8	44.0	48.						
Aug99				7.2	29.0	38.						
Sep99				9.6	94.0	25.						
Oct99				5.9	56.0	25.						
Mean				7.8	50.3	39.		6.88	0.44	0.16	7.46	

Date	P R E C I P I T A T I O N					G A S E S		P A R T I C L E S		D E P .	
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
	mg/l	mg/l	mg/l	mg/l	mg/l	ug/m3	ug/m3	mg/m2d	mg/m2d	mg/m2d	
Nov98		4.06		0.56	0.31						
Dec98		4.12		0.57	0.32						
Jan99											
Feb99											
Mar99											
Apr99											
May99											
Jun99											
Jul99											
Aug99											
Sep99											
Oct99											
Mean		4.08		0.56	0.31						

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (47) Los Angeles

USA (CA)

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov98	15.8	57.	324.	0.5	20.0	37.		6.55	22.00	31.00	33.00	292.0
Dec98	14.2	40.	275.	1.2	46.0	37.	0.0					
Jan99	14.1	54.	295.	0.3	33.0	34.	5.5	6.05	9.80	1.40	2.60	28.7
Feb99	13.1	60.	333.	0.4	47.0	67.	3.3	6.30	13.00	0.09	2.80	41.5
Mar99	11.5	74.	496.	0.3	27.0	54.	110.2	5.85	9.00	0.47	2.20	25.1
Apr99	13.5	63.	558.	0.2	26.0	64.	0.0					26.0
May99	14.9	77.	642.	0.0	20.0	62.	26.2	6.05	4.50	0.00	8.50	
Jun99	16.5	78.	738.	0.0	21.0	54.	0.0					
Jul99	20.5	66.	769.	0.9	28.0	50.	0.0					
Aug99	20.8	64.	716.				0.0					
Sep99	18.7	71.	519.				0.0					
Oct99	22.8	38.	490.				0.0					
Mean	16.4	62.	6155.	0.4	29.8	51.		5.89	8.31	0.41	3.37	25.7

Date	O P T I O N										
	P R E C I P I T A T I O N					G A S E S		P A R T	P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
Nov98										3.1	
Dec98										4.5	
Jan99										2.1	
Feb99											
Mar99											
Apr99											
May99											
Jun99											
Jul99											
Aug99											
Sep99											
Oct99											
Mean										3.2	

ECE-PROGRAMME ON EFFECTS ON MATERIALS

SITE: (49) Antwerpen

Belgium

Date	C L I M A T E			M A N D A T O R Y G A S E S			P R E C I P I T A T I O N					Cond uS/cm
	Temp	Rh	Sun	SO2	NO2	O3	mm	pH	SO4-S	NO3-N	Cl	
	C	%	MJ/m2	ug/m3	ug/m3	ug/m3			mg/l	mg/l	mg/l	
Nov98	4.7	82.	106.	29.0	64.0	20.	71.9	5.00	1.60	0.00	3.00	4.0
Dec98	8.3	83.	52.	22.0	51.0		69.7	4.70	1.50	0.00	5.00	4.0
Jan99	6.3	79.	82.	17.0	53.0	17.	67.2	5.00	1.10	0.00	2.00	2.7
Feb99	4.4	79.	118.	26.0	57.0	23.	62.8	4.60	2.20	0.00	10.00	6.7
Mar99	8.4	75.	254.	22.0	59.0	20.	37.4	4.60	2.20	1.00	2.00	4.4
Apr99	10.8	73.	344.	13.0	47.0		54.8	5.70	2.00	0.00	2.00	4.0
May99	15.5	66.	507.	12.0	38.0	39.						
Jun99	16.3	69.	518.	10.0	44.0	47.						
Jul99	20.3	67.	580.	9.0	37.0	55.						
Aug99	18.5	71.		10.0	47.0	39.						
Sep99	18.5	75.		12.0	56.0	26.						
Oct99	11.7	79.		16.0	30.0	9.						
Mean	12.0	75.		16.5	48.6	30.		4.83	1.71	0.10	4.15	4.3

Date	O P T I O N										
	P R E C I P I T A T I O N					G A S E S		P A R T	P A R T I C L E S D E P.		
	NH4-N	Na	Ca	Mg	K	HNO3	Conc	Cl	SO4-S	NO3-N	
Nov98										4.4	4.3
Dec98										2.8	7.3
Jan99										2.2	7.3
Feb99										2.9	9.3
Mar99										2.8	0.0
Apr99										2.4	9.8
May99										2.5	9.6
Jun99										2.2	0.0
Jul99										2.5	0.0
Aug99										2.4	9.8
Sep99										3.3	0.0
Oct99										2.7	9.8
Mean										3.0	6.7

Appendix C

National contact centres

National contact centre

Austria
Mr. Manfred Schreiner
Institute of Chemistry, Academy of Fine Arts
Schillerplatz 3
A-1010 Wien

Phone: +43 1 58816 261
Fax: +43 1 58816 121
E-mail: mschreiner@fchws1.akbild.ac.at

Belgium
Mr. René Van Grieken
Department of Chemistry, University of Antwerp (UIA)
Universiteitsplein 1
B-2610 WILRIJK

Phone: +32 3 820 2362
Fax: +32 3 820 2376
E-mail: vgrieken@uia.ua.ac.be

Canada
Mr. Jean-Jacques Hechler
61 Oakland Avenue
Quebec, Westmount H3Y 1P1

Phone: +1 514 4865 238
E-mail: hechler@sympatico.ca

Czech Republic
Mrs. Katerina Kreislova
SVUJOM Ltd.
U Mestanského pivovaru 4
CZ-17004 PRAHA 7 Prague

Phone: +420 2 80 99 96
Fax: +420 2 80 10 17
E-mail: kreislova@mbox.vol.cz

Estonia
Mr. Ott Roots
Ministry of the Environment, Environmental Management and Technology Department
8 Rävåla pst
EE-10143 Tallinn

Phone: +372 660 4629
Fax: +372 660 4522
E-mail: ott.roots@ekm.envir.ee

Finland
Mrs. Tuija Kaunisto
VTT Manufacturing Technology
P.O.Box 1704
FIN-02044 Espoo

Phone: +358 9 4565 435
Fax: +358 9 4567 010
E-mail: tuija.kaunisto@vtt.fi

France

Mr. Roger-Alexandre Lefèvre
LISA - Université Paris XII
Avenue du Général de Gaulle 61
F-94010 Creteil

Phone: +33 1 4517 1676
Fax: +33 1 4517 1675
E-mail: lefevre@univ-paris12.fr

Germany

Mrs. Anke Doktor
Bayerisches Landesamt für Denkmalpflege, Dept. R/ZL
Hofgraben 4
D-80539 München

Phone: +49 89 2114 324
Fax: +49 89 2114 300
E-mail: anke.doktor@gmx.de

Israel

Mr. Jacques Neguer
Israel Antiquities Authority, Conservation Department
P.O. Box 586
91004 Jerusalem

Phone: +972 2 6204 701
Fax: +972 2 6260 105
E-mail: neguer@yahoo.com

Italy

Mr. Stephan Doytchinov
ENEA - Environmental Department
301 S.P. Anguillarese, Santa Maria di Galeria, P.O.Box 2400
I-00100 Rome, CR Casaccia

Phone: +39 06 3048 3972
Fax: +39 06 3048 6487
E-mail: doytchinov@casaccia.enea.it

Norway

Mr. Jan Henriksen
NILU - Norwegian Institute for Air Research
P.O.Box 100
N-2027 Kjeller

Phone: +47 63 898 162
Fax: +47 63 898 050
E-mail: jan.fredrik.henriksen@nilu.no

Poland

Mrs Joanna Kobus
Institute of Precision Mechanics
Duchnicka 3
00-967 Warsaw

Phone: +48 22 5602847
Fax: +48 22 663 43 32
E-mail: asia@imp.edu.pl

Portugal
Mr. Luis Aires Barros
Technical University of Lisbon, Laboratory of Mineralogy
Av. Rovisco Pais
P-1096 Lisboa Codex

Phone: +351 1 8400 806
Fax: +351 1 8400 806
E-mail: pcd2045@alfa.ist.utl.pt

Russian Federation
Mr Vladimir Dolin/Mr. Alexandre Mikhailov*
Institute of Physical Chemistry
Academy of Sciences
31 Leninski Prospect
Moscow 117915

Phone: +7 095 330 1501
Fax: +7 095 334 9805

*Mr. Alexandre Mikhailov
Swedish Corrosion Institute
Roslagsvägen 101, Hus 25
SE-104 05 Stockholm
Sweden

Phone: +46 8 674 1768
Fax: +46 8 674 1780
E-mail: am@corr-institute.se

Spain
Mr. Javier Serra
Ministerio de Fomento, Dirección General de la Vivienda
Paseo de la Castellana 67
E-28071 Madrid

Phone: +34 91 597 8387
Fax: + 34 91 597 8510
E-mail: jserra@mfom.es

Sweden
Mr. Vladimir Kucera (Chairman)
Swedish Corrosion Institute
Roslagsvägen 101, Hus 25
SE-104 05 Stockholm

Phone: +46 8 674 1725
Fax: +46 8 674 1780
E-mail: yk@corr-institute.se

Mr. Johan Tidblad (Head of Programme Centre)
Swedish Corrosion Institute
Roslagsvägen 101, Hus 25
SE-104 05 Stockholm

Phone: +46 8 674 1733
Fax: +46 8 674 1780
E-mail: jt@corr-institute.se

Switzerland
Mr. Markus Faller
EMPA - Corrosion/Surface Protection
Ueberlandstrasse 129
CH-8600 Dübendorf

Phone: +41 1 823 4236
Fax: +41 1 823 4015
E-mail: markus.faller@empa.ch

United Kingdom
Mr. Tim Yates
BRE-Building Research Establishment, Ltd.
Garston
Watford WD2 7JR

Phone: +44 1923 664 341
Fax: +44 1923 664 786
E-mail: yatest@bre.co.uk

United States of America
Mr. David Scott
Getty Conservation Institute/Museum services
1200 Getty Center Drive, Suite 700
Los Angeles, California 90049-1684

Phone: +1 310 440 7325
Fax: +1 310 440 7702



Norwegian Institute for Air Research (NILU)

P.O. Box 100, N-2027 Kjeller, Norway

REPORT SERIES Scientific Report	REPORT NO. OR 42/2001	ISBN 82-425-1288-4 ISSN 0807-7207	
DATE	SIGN.	NO. OF PAGES 70	PRICE NOK 125,-
TITLE International Co-operative Programme on Materials, including Historic and Cultural Monuments Environmental data report November 1998 to October 1999		PROJECT LEADER Jan F. Henriksen	
		NILU PROJECT NO. O-8208	
AUTHOR(S) Jan F. Henriksen and Kari Arnesen		CLASSIFICATION * A	
		CONTRACT REF. SFT 990416	
REPORT PREPARED FOR Statens forurensningstilsyn P.O.Box 8100 Dep 0032 OSLO			
ABSTRACT This report presents the database for the second phase of the ECE ICP material programme. Besides presenting the available data for the two exposure years 1997/98 and 1998/99, the report presents the spread in the yearly mean values for the exposure sites.			
NORWEGIAN TITLE			
KEYWORDS Environment	Pollution	Precipitation	
ABSTRACT (in Norwegian)			

* Classification A *Unclassified (can be ordered from NILU)*
 B *Restricted distribution*
 C *Classified (not to be distributed)*