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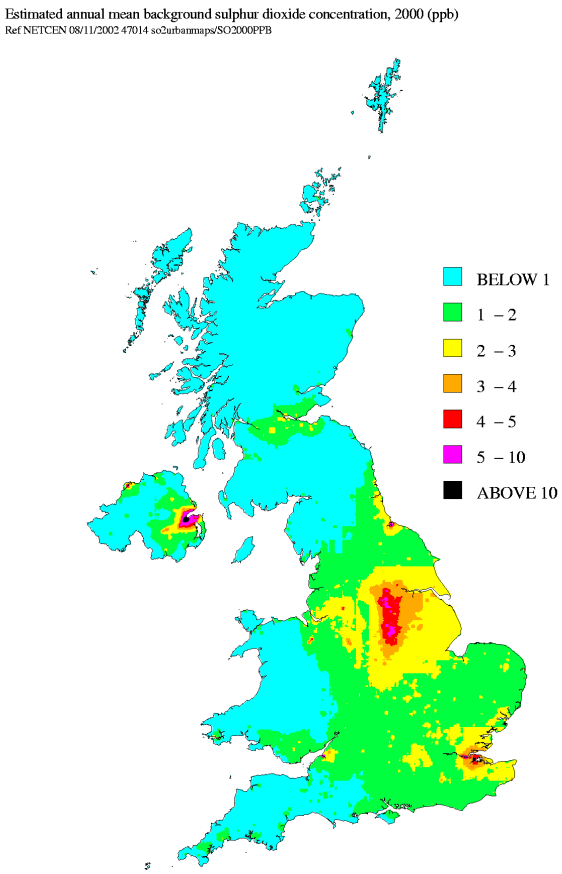
Rural Sulphur Dioxide Monitoring in the UK: 2000



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Rural Sulphur Dioxide Monitoring in the UK: 2000

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Executive Summary

Sulphur deposition is known to have acidifying effects on freshwater, soils and vegetation. For these effects to be assessed the total sulphur deposition must be estimated from both its wet and dry deposition pathways. The Department for Environment, Food and Rural Affairs has placed a contract with the Centre for Ecology and Hydrology at Edinburgh (CEH) on *Acid Deposition Processes in the UK* (EPG 1/3/166) to quantify *inter alia* the wet and dry deposition budgets of sulphur for the United Kingdom.

As part of this contract, AEA Technology manages and operates the UK Rural Sulphur Dioxide Monitoring Network. This network provides monthly and annually-averaged concentrations of SO_2, which are subsequently used to produce concentration maps for the UK. The dry sulphur deposition across the UK is then derived by CEH by combining the sulphur dioxide (SO_2) concentration field with estimated deposition velocities.

The concentrations measured at some of the sites in the UK Acid Deposition Monitoring and the UK Rural Sulphur Dioxide Monitoring networks, especially the daily sites in remote areas, are at or below the Limit of Detection (LOD) of the bubbler method. This will make it more difficult to determine reliable trends and could compromise the application of the monitoring data, for example, in identifying the cause of the non-linear response of ambient concentrations to change in emissions at such sites. A method intercomparison exercise was undertaken in collaboration with CEH at the Auchencorth Moss site near Edinburgh between September 1998 and May 1999 to evaluate potential replacement methods which will provide a lower Limit of Detection while retaining data integrity and consistency.

On the basis of the intercomparison exercise, the choice of methods to replace the bubbler method was limited to the denuder or the filter pack methods on the grounds of cost, improved sensitivity, method robustness, ease of operation and the quality of the measurements. The filter pack method was preferred for practical reasons and the new samplers were introduced into the monitoring network from April 2001. The 2000 concentration measurements have therefore been made using the existing bubbler method.

This report provides a complete dataset of the 2000 measurements for all sites in the UK Rural Sulphur Dioxide Monitoring Network. The preparation of this report was delayed by (a) the late delivery of measurement data from other monitoring networks and (b) the need to undertake a numerical modelling exercise to cover the gap in the SO_2 concentration field which arose from the closure of sites in Yorkshire which formed part of the Joint Environment Programme of the power generators. The measurement data have been provided to CEH for interpretation and further analysis as part of its programme of work.

Maps of the annual and monthly mean sulphur dioxide (SO_2) concentration fields have been derived for the UK. The spatial distribution of SO_2 is similar to that observed in previous years with the highest concentrations in the Yorkshire/Nottinghamshire and Thames estuary areas. The 2000 measurements show that SO_2 concentrations have continued to decline in rural areas, a trend which has been observed since the establishment of the network in the early 1990s. The trend for sites closest to emission sources is consistent with the reduction in UK SO_2 emissions calculated over this period.

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1 Introduction

Sulphur deposition is known to have acidifying effects on freshwater, soils and vegetation. For these effects to be assessed the total sulphur deposition must be estimated from both its wet and dry deposition pathways. The Department for Environment, Food and Rural Affairs (DEFRA) has placed a contract with the Centre for Ecology and Hydrology at Edinburgh (CEH) on *Acid Deposition Processes in the UK* (EPG 1/3/166) to quantify *inter alia* the wet and dry deposition budgets of sulphur for the United Kingdom.

As part of this contract, AEA Technology manages and operates the UK Rural Sulphur Dioxide Monitoring Network. This network provides monthly and annually-averaged concentrations of SO_2, which are subsequently used to produce concentration maps for the UK. The dry sulphur deposition across the UK is then derived by CEH by combining the sulphur dioxide (SO_2) concentration field with estimated deposition velocities.

This report provides a complete dataset of the 2000 measurements for all sites in the UK Rural Sulphur Dioxide Monitoring Network. The preparation of this report was delayed by (a) the late delivery of measurement data from other monitoring networks and (b) the need to undertake a numerical modelling exercise to cover the gap in the SO_2 concentration field which arose from the closure of sites in Yorkshire which formed part of the Joint Environment Programme of the power generators. The measurement data have been provided to CEH for interpretation and further analysis as part of its programme of work. The format of this report follows that used to report the measurements made in previous years [Hasler and Downing, 1998; Hasler *et al.,* 2001; Hayman *et al.*, 2001a, b].

The concentrations now being measured at some of the sites in the monitoring networks (*i.e.*, the UK Acid Deposition Monitoring networks and the UK Rural Sulphur Dioxide Monitoring network), especially the daily sites in remote areas, are at or below the Limit of Detection of the bubbler method. This will make it more difficult to determine reliable trends and could compromise the application of the monitoring data, for example, in identifying the cause of the non-linear response of ambient concentrations to change in emissions at such sites. A change in sampling method is required which will provide a lower Limit of Detection while retaining data integrity and consistency. An intercomparison exercise was undertaken in collaboration with CEH at the Auchencorth Moss site near Edinburgh between September 1998 and May 1999 to evaluate potential replacement methods. A summary of the intercomparison exercise and the results obtained were given in the 1999 Data Report [Hayman *et al.*, 2001b]. A more detailed description is provided in Hasler *et al.* [2000].

On the basis of the intercomparison exercise, the choice of methods to replace the bubbler method was limited to the denuder or the filter pack methods on the grounds of cost, improved sensitivity, method robustness, ease of operation and the quality of the measurements. The filter pack method was preferred for practical reasons and the new samplers were introduced into the monitoring network from April 2001. The 2000 concentration measurements have therefore been made using the existing bubbler method.

2 Network and Sampling Details

2.1 THE MONITORING SITES

At the start of 2000, the Rural Sulphur Dioxide Monitoring Network comprised 29 sites at which concentrations of SO_2 were measured on a weekly basis and one site (Bush) at which daily measurements were made. Siting criteria and individual site assessment are given in Downing and Campbell [1995]. In general, the monitoring sites are located in rural areas which are largely unaffected by local domestic and industrial sources but which are representative of the surrounding region.

The main focus of this report is to provide a summary of the measurements made in the Rural Sulphur Dioxide Monitoring Network in 2000 and to derive the SO_2 concentration field for the UK. The concentration field is however significantly improved by including data which have been obtained in other SO_2 monitoring networks. These include:

(i) the two bubbler sites funded by the National Assembly for Wales which are sampled weekly, and managed by NETCEN. These sites have now been incorporated into the Rural SO_2 Monitoring network (see Section 2.2).

(ii) the continuous monitoring sites operated as part of the Joint Environment Programme (JEP) of the power generating companies. The sites are located in Yorkshire (8 sites at the start of 2000) Nottinghamshire (2 sites) and the Thames Estuary (5 sites at the start of 2000).

(iii) five of the continuous monitoring sites from the Automatic Rural Network.

(iv) the two continuous monitoring sites operated by CEH Edinburgh at Sutton Bonington and Auchencorth Moss.

The sampling sites and their locations are presented in Figure 1 and listed in Table 1.

2.2 SITE CHANGES WITHIN THE NETWORK IN 2000

No changes occurred to the sites in the network or the monitoring programme undertaken during the year.

Following the retendering of the Acid Deposition Processes contract in 2000, the sites at Bylchau (site 5334) and Crai (site 5335), which were operated and managed under a contract let by the National Assembly of Wales, have now been incorporated into the Rural SO_2 Monitoring Programme.

2.3 THE SAMPLING TECHNIQUE

As in previous years, the 2000 concentration measurements at the Rural SO_2 Monitoring network and National Assembly of Wales sites were made using the hydrogen peroxide bubbler technique [Downing and Campbell, 1995]. In this sampling method, air is drawn through a filter to remove any particulate matter (including particulate sulphate) and a hydrogen peroxide

Table 1 - *Rural SO_2 Sampling Sites in the United Kingdom.*

Site Code	Site Name	Easting	Northing	Network and Measurement Technique
5002	Eskdalemuir	3235	6030	UK Acid Deposition
5004	Stoke Ferry	5700	2988	Monitoring Networks
5006	Lough Navar	192	5212	*- 8-port bubbler*
5007	Barcombe Mills	5437	1149	*- daily measurements*
5008	Yarner Wood	2786	789	
5009	High Muffles	4776	4939	
5010	Strathvaich Dam	2347	8750	
5011	Glen Dye	3642	7864	
5301	Brockhill 1	4002	2702	UK Rural SO_2 Monitoring
5303	Caenby 1	4993	3900	Network
5304	Camborne 1	1628	407	*- 8-port bubbler*
5305	Camphill 1	2274	6546	*- single-port bubbler*
5306	Cardington 2 *(1)*	5082	2464	*- weekly measurements*
5308	Corpach 1	2054	7782	
5309	Cresselly 1	2064	2062	
5310	Etton 1	4980	4445	
5312	Husborne Crawley 1	4964	2361	
5313	Little Horkesley 1	5971	2312	
5314	Marshfield 1	3255	1830	
5315	Ratcliffe 13	4408	3278	
5316	Rockbourne 1	4116	1181	
5317	Wakefield 24	4352	4132	
5318	Waunfawr 1	2533	3607	
5319	Fort Augustus 2	2366	8091	
5320	Loch Leven 2	3159	6990	
5321	Redesdale 2	3833	5961	
5322	Hebden Bridge 2	4011	4327	
5323	Preston Montford 2	3432	3143	
5324	Bentra	1587	5459	
5325	Pitlochry	2918	7599	
5326	Bush	3246	6638	
5329	Cam Forest	1070	5785	
5330	Cwmystwyth	2774	2745	
5331	Rosemaund	3564	2476	
5333	Fairseat	5622	1615	
5338	Forsinain	2906	9486	
5339	Appleacre	3665	5208	
5343	Benniguinea	2570	5772	*Site installed in August 1999*
5334	Bylchau	2959	3596	Welsh Rural SO_2 Network
5335	Crai	2861	2183	*- 8-port bubbler*
6002	Fleet Hall	5895	1893	JEP - Thames Estuary
6003	Hall Farm	5589	1848	*- UVF automatic analyser*
6004	Lower Shorne	5703	1728	
6005	Wingham	6243	1553	*site closed in 2000*
6006	Wormdale	5858	1634	
6007	Carr Lane *(5)*	4672	4274	JEP - Yorkshire
6008	Hemingbrough *(6)*	4669	4298	*- UVF automatic analyser*
6009	Cliffe	4659	4336	*site closed in 2000*
6010	North Duffield	4672	4373	*site closed in 1998*
6011	Wheldrake	4690	4448	*site closed in 1998*
6012	Dunnington	4674	4523	*site closed in 1998*
6013	Gateforth Hall *(3)*	4557	4296	*site closed in 2000*
6014	North Featherstone *(3)*	4427	4226	*site closed in 2000*
6015	North Howden *(3)*	4769	4305	*site closed in 2000*
6016	Sherburn in Elmet *(3)*	4494	4325	*site closed in 2000*
6017	Smeathalls Farm *(2)*	4513	4252	*site closed in 2000*
6018	Temple Hirst *(2)*	4625	4252	*site closed in 2000*
6019	Womersley *(4)*	-	-	*site closed in 2000*
7001	Bottesford	4797	3376	JEP - Nottinghamshire
7002	Jenny Hurn	4816	3982	*- UVF automatic analyser*
8001	Ladybower	4164	3892	Automatic Rural Network
8002	Lullington Heath	5538	1016	*- UVF automatic analyser*
8003	Harwell	4474	1863	
8004	Narberth	2146	2127	
8005	Rochester	5831	1762	
8006	Wicken Fen	5564	2692	
9001	Sutton Bonnington	4505	3267	CEH
9002	Auchencorth Moss	3221	6562	*- UVF automatic analyser*

Notes (1) Site not used for mapping purposes (see text); (2) This JEP site was opened in 1997; (3) This JEP site was opened in 1998; (4) This JEP site was opened in 1999; (5) This JEP site was closed in 1999; (6) This JEP site was closed in 1998.

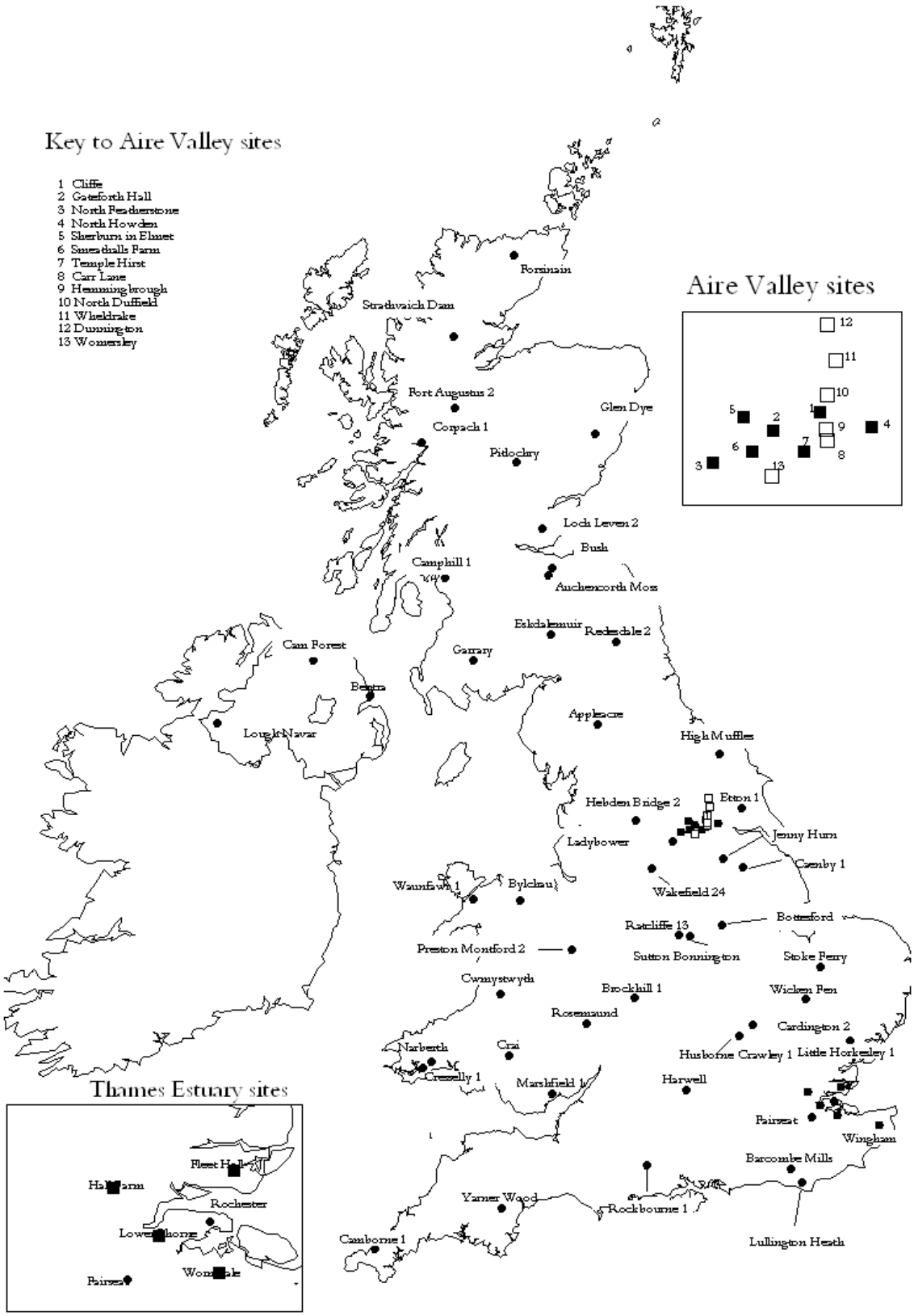

Figure 1 - ***Location of the Sites Used to Monitor and to Map SO_2 Concentrations.***
(The sites which are operational are denoted using filled symbols. The sites which have been closed are denoted using open symbols).

solution, where sulphur dioxide is absorbed and oxidised to sulphate. The sulphate concentration in the solution is determined by ion chromatography. The ambient concentration of sulphur dioxide is derived from the concentration of sulphate determined analytically and the volumes of the air drawn through the bubbler during the sampling period and of the H_2O_2 solution.

There are three versions of the bubbler used in the monitoring network:

- an 8-port bubbler is used at one site (Bush) and analysis of each daily sample is undertaken to give a daily measurement;
- an 8-port bubbler is used at 23 sites. The individual samples are bulked and a single analysis is undertaken to give a weekly measurement;
- a single-port bubbler is used at 6 sites. A single sample is collected and analysed to give a weekly measurement.

The single-port bubbler is used at the following 6 sites: Corpach (5308), Etton (5310), Marshfield (5314), Rockbourne (5316), Fort Augustus (5319) and Loch Leven (5320). The single-port bubbler was also operated in parallel with the 8-port bubblers located at Husborne Crawley (site codes: 5312 and 5336) and Ratcliffe (site codes: 5315 and 5337). The single-port bubbler measurements at both these sites ceased in May 1998.

2.4 EQUIPMENT MAINTENANCE

Regular equipment maintenance is needed to maximise data capture and sample quality. The sites within the network are visited annually to ensure all equipment is operated within acceptable working limits. The table shown in Appendix 1 summarises when the annual site maintenance and other visits occurred.

The bubbler units are subject to a small amount of air ingress which tends to increase if they are not regularly maintained. A well maintained bubbler unit has a leak rate between 3 and 5%, and all the bubbler units used within the network are operated within these limits. If a bubbler unit is found to have a leak rate greater than 5% the unit is modified to reduce the leak rate or replaced immediately.

The bubbler unit is based on a simple design with few moving parts. However, the motors within the sampling pumps occasionally fail. Consequently, the airflows at all sites are routinely monitored so that failing pumps can be identified and replaced before complete failure occurs. The sampling flowrate is maintained between 2 and 4 m^3 per day.

To ensure airflows are recorded accurately the airflow meters are calibrated at least once a year against a certified wet gas meter (standard meter). The accepted tolerance for bubbler meters is where their measured air volume is within 3% of that measured by the standard meter. If meters are found to fall outside this criteria they are withdrawn from use and replaced.

2.5 SENSITIVITY OF THE BUBBLER TECHNIQUE

The ion chromatograph used to determine the concentration of sulphate has an analytical limit of detection of 0.01 mg [SO_4^{2-} as S] per litre of solution. This implies that the bubbler method

has an intrinsic sensitivity of about 0.2 μg SO_2 as S m^{-3} or 0.15 ppb SO_2 for typical volumes of solution analysed and air flow rates. In practice, the sensitivity is 0.4 μg SO_2 as S m^{-3} (0.3 ppb SO_2) taking into account leak rates and other measurement errors.

2.6 DATA CAPTURE

Annual and monthly mean concentrations are only calculated if the data capture exceeds 75%. There are a number of reasons why the concentrations cannot be determined for individual samples. These include:

Frequent	• The electricity supply is interrupted and the sample collected is not representative of that week's concentration. • A failure of the pump/meter/bubbler occurs.
Occasional	• The bubbler is switched off by the site operator when the site operator is unavailable. • A long sampling period occurs when the site operator is unavailable (2 weeks plus usually) which because of the lack of fluid reservoir is not representative of that sampling period (H_2O_2 falls below dreschel stems in bottles). • An error or mix-up is made by the site operator. • The sample solution partially or completely leaks during transit because the sample container lids were not secured effectively. The total sample volume is unknown and the concentration in air can not then be calculated. • The parcel is lost during transit.
Rare	• The sample is lost during analysis or sample registration. • Vandalism at the monitoring site may cause the sample to be lost.

During 2000, there were no sites where the sampling programme was affected for extended periods, although equipment failure led to the loss of samples over periods of up to several weeks at certain sites. The specific instances of sample lost can all be explained by the reasons given above.

3 Results and Discussion

The complete data set of measurements for 2000 for (i) the 30 sites in the Rural Sulphur Dioxide Monitoring Network, (ii) the 8 sites in the UK Acid Deposition Monitoring Networks and (iii) the two sites operated for the National Assembly of Wales are given in Appendix 2. The data for individual sites are also presented graphically in Appendix 3. Monthly mean concentrations have only been calculated when the data capture is greater than75% and these are also presented in the Tables and Figures of Appendices 2 and 3.

3.1 ANNUAL MEAN CONCENTRATIONS

Annual mean concentrations have been calculated for those sites where the data capture was greater than 75%, as shown in **Table 2** for the sites listed in **Table 1**. The annual mean concentrations observed in 2000 were generally lower than those reported in earlier years [Hasler *et al.*, 2001; Hayman *et al.*, 2001a, b], as shown in **Table 2**.

All the JEP co-ordinated sites in Yorkshire were closed during 2000, although some were subsequently reopened later in the year by specific power generators. The data capture for the JEP Yorkshire sites was therefore well below the 75% threshold so that valid annual mean concentrations could not be derived[1]. Since the highest annual mean concentrations in previous years have been measured at these JEP sites, a numerical modelling exercise (see Section 4) was undertaken to calculate the concentration field for this area. The concentration calculated for the Cliffe site was 2.8 ppb and this was used in the subsequent mapping work (see Section 3.2).

The highest annual mean concentration in 2000 at the other sites was observed at Jenny Hurn (4.6 ppb). The next highest annual mean concentrations were measured at Cardington, Bedfordshire (2.9 ppb) and Rochester, Thames Estuary (2.8 ppb). These sites are influenced by major or nearby local SO_2 emission sources. The lowest annual mean concentrations were measured at Lough Navar (0.2 ppb) in Northern Ireland, Fort Augustus (0.1 ppb), Forsinain (0.2 ppb) and Strathvaich Dam (0.1 ppb) in Scotland. All of these sites are located in more remote and less populated areas of the UK, away from the direct influence of SO_2 emission sources.

Table 3 presents the maximum concentrations for a selection of sites. Many of the maximum daily and weekly SO_2 concentrations were observed during the autumn and winter. The maximum daily concentration (11.5 ppb) was measured at High Muffles (Yorkshire) in December, although this was significantly lower than the maximum concentration observed in 1998 (25.5 ppb). The maximum weekly concentration reached 9.5 ppb at the Ratcliffe site in Nottinghamshire. The remainder of the year showed generally low concentrations with no pronounced winter peak.

[1] The data for these sites have been provided on condition that neither the measurements made at the sites nor the statistics derived are explicitly reported. The company involved considers that the measurements have commercial value and that a third party could benefit through their inclusion in this report.

Table 2 - *Annual Mean Concentrations of SO_2 at Rural Locations for the Years 1997 to 2000.*

Site code	Site name	Annual Mean Concentration (ppb)			
		1997	1998	1999	2000
5002	Eskdalemuir	0.5	0.4	0.4	0.3
5004	Stoke Ferry	1.4	1.5	1.1	0.9
5006	Lough Navar	0.3	0.2	0.2	0.2
5007	Barcombe Mills	1.0	0.8	0.7	0.6
5008	Yarner Wood	0.7	0.5	0.4	0.3
5009	High Muffles	1.7	1.3	0.7	1.2
5010	Strathvaich Dam	0.4	0.3	0.3	0.1
5011	Glen Dye	0.6	0.4	0.3	0.3
5301	Brockhill 1	1.8	1.1	0.8	1.0
5303	Caenby 1	2.5	3.0	2.4	2.5
5304	Camborne 1	0.9	0.7	0.6	0.5
5305	Camphill 1	1.2	0.5	0.7	0.8
5306	Cardington 2 (see 1)	3.3	3.9	3.2	2.8
5308	Corpach 1	0.9	0.6	0.5	0.4
5309	Cresselly 1	1.2	0.8	0.7	0.7
5310	Etton 1	2.7	2.6	2.2	1.8
5312	Husborne Crawley 1	2.1	1.8	1.1	1.1
5313	Little Horkesley 1	2.1	1.7	1.2	1.1
5314	Marshfield 1	1.4	1.2	1.1	0.8
5315	Ratcliffe 13	2.8	2.5	2.0	2.1
5316	Rockbourne 1	1.2	0.9	0.6	0.5
5317	Wakefield 24	3.1	2.5	1.9	1.9
5318	Waunfawr 1	0.8	0.7	0.6	0.6
5319	Fort Augustus 2	0.3	0.5	-	0.1
5320	Loch Leven 2	-	1.4	1.3	1.0
5321	Redesdale 2	0.9	0.6	1.0	0.8
5322	Hebden Bridge 2	2.9	1.8	1.4	1.3
5323	Preston Montford 2	1.4	0.8	0.7	0.4
5324	Bentra	1.6	1.3	1.1	1.0
5325	Pitlochry	0.5	-	0.3	0.2
5326	Bush	1.4	1.0	0.9	0.9
5329	Cam Forest	0.6	0.4	0.4	0.3
5330	Cwmystwyth	1.1	0.8	0.6	0.4
5331	Rosemaund	1.0	1.0	0.8	0.5
5333	Fairseat	1.6	1.4	1.6	1.0
5338	Forsinain	0.2	0.3	0.3	0.2
5339	Appleacre	1.3	1.2	1.1	0.6
5340/5343	Garrary/Benniguinea	Note (2)	0.3	0.2	0.2
5334	Bylchau	1.0	0.7	0.4	0.3
5335	Crai	1.0	0.9	0.6	0.5
6002	Fleet Hall	(see 3)	(see 3)	(see 3)	(see 3)
6003	Hall Farm, N	(see 3)	(see 3)	(see 3)	(see 3)
6004	Lower Shorne	(see 3)	(see 3)	(see 3)	(see 3)
6005	Wingham	(see 3)	(see 3)	(see 3)	(see 3, 5)
6006	Wormdale	(see 3)	(see 3)	(see 3)	(see 3)
6007	Carr Lane	(see 3)	(see 3)	(see 3, 5)	-
6008	Hemingbrough	(see 3)	(see 3, 5)	-	-
6009	Cliffe	(see 3)	(see 3)	(see 3)	(see 3, 5)
6010	North Duffield	(see 3)	(see 3, 5)	-	-
6011	Wheldrake	(see 3)	(see 3, 5)	-	-
6012	Dunnington	(see 3)	(see 3, 5)	-	-
6013	Gateforth Hall	-	(see 3, 4)	(see 3)	(see 3, 5)
6014	North Featherstone	-	(see 3, 4)	(see 3)	(see 3, 5)
6015	North Howden	-	(see 3, 4)	(see 3)	(see 3, 5)
6016	Sherburn in Elmet	-	(see 3, 4)	(see 3)	(see 3, 5)
6017	Smeathalls Farm	-	(see 3, 4)	(see 3)	(see 3, 5)
6018	Temple Hirst	-	(see 3, 4)	(see 3)	(see 3, 5)
6019	Womersley	-	-	(see 3, 4)	(see 3, 5)
7001	Bottesford	2.7	3.9	3.9	2.3
7002	Jenny Hurn	4.8	4.0	4.0	4.6
8001	Ladybower	3.7	2.7	1.8	1.6
8002	Lullington Heath	1.7	1.4	1.2	1.0
8003	Harwell	-	-	1.0	1.3
8004	Narberth (1)	-	-	1.7	-
8005	Rochester	-	-	3.0	2.9
8006	Wicken Fen	-	-	1.0	0.9
9001	Sutton Bonnington	2.9	3.0	2.2	2.4
9002	Auchencorth Moss	0.7	0.6	0.5	0.5

Notes: '-' indicates that an annual mean concentration could not be determined as the data capture was less than 75%; (1) Site not used for mapping purposes (see text); (2) New site (less than 50% data capture); (3) The data for these sites have been provided solely for use in generating the SO_2 concentration map and on condition that neither the measurements made at the sites nor the statistics derived are explicitly reported; (4) JEP site was opened between 1997 and 2000; (5) JEP site was closed between 1997 and 2000.

Table 3 - *Maximum Daily or Weekly SO_2 Concentrations at Selected Sites.*

Site	Day or Week beginning	SO_2-S Concentration (μgSm^{-3})	(ppb)
5006	23/08/00	1.4	1.1
Lough Navar	22/07/00	1.2	0.9
(daily)	29/03/00	1.1	0.8
	22/12/00	1.0	0.8
	23/12/00	1.0	0.8
5008	25/01/00	3.2	2.4
Yarner Wood	19/03/00	2.9	2.1
(daily)	04/05/00	2.8	2.1
	27/12/00	2.2	1.6
	19/01/00	2.2	1.6
5009	28/12/00	15.3	11.5
High Muffles	17/12/00	13.6	10.2
(daily)	07/04/00	10.8	8.1
	27/12/00	9.9	7.4
	23/11/00	8.3	6.2
	20/06/00	8.3	6.2
	20/01/00	7.1	5.4
	03/10/00	6.5	4.9
	06/12/00	6.3	4.7
	05/12/00	6.2	4.6
5303	06/09/00	7.0	5.3
Caenby	15/08/00	7.0	5.2
(weekly)	24/10/00	5.9	4.4
	11/09/00	5.6	4.2
	14/11/00	5.5	4.1
5305	04/05/00	9.6	7.2
Camphill	29/06/00	3.9	2.9
(weekly)	27/04/00	3.7	2.8
	22/06/00	3.2	2.4
	23/03/00	3.0	2.3
5306	26/01/00	10.7	8.0
Cardington	08/03/00	9.4	7.0
(weekly)	30/08/00	9.0	6.7
	01/03/00	8.8	6.6
	27/12/00	8.0	6.0
5315	02/05/00	12.6	9.5
Ratcliffe	06/01/00	9.3	7.0
(weekly)	09/05/00	9.0	6.8
	30/12/99	6.4	4.8
	27/01/00	4.7	3.5
5317	20/12/00	9.6	7.2
Wakefield	03/05/00	9.0	6.7
(weekly)	05/04/00	7.2	5.4
	28/12/00	5.6	4.2
	10/05/00	5.5	4.1
5338	15/08/00	0.7	0.5
Forsinain	29/02/00	0.7	0.5
(weekly)	19/09/00	0.7	0.5
	01/08/00	0.7	0.5
	22/02/00	0.6	0.4

Lough Navar (Northern Ireland), Strathvaich Dam (Scotland) and Forsinain (Scotland) are remote sites and hence their maximum concentrations are expected to be much lower. The annual mean concentrations are comparable at the three sites: 0.2 ppb (Lough Navar), 0.1 ppb (Strathvaich Dam) and 0.2 ppb at Forsinain. However, higher maximum concentrations are observed at Lough Navar (1.1 ppb) as compared to Forsinain (0.5 ppb), which reflects the temporal resolution of sampling. Daily sampling is carried out at Lough Navar and therefore shorter term episodes of SO_2 are captured in the data set.

Overall, SO_2 concentrations in rural areas have decreased between 1997 and 2000. An indicator of air pollution based on the number of days that pollutant concentrations were above air quality standards, has been developed to give the general trend of air quality in the United Kingdom for both urban and rural environments (see web-site: http://www.sustainable-development.gov.uk/indicators/headline/h10.htm). As shown in **Figure 2**, the indicator was lower in 2000 compared to the high value observed in 1999 and comparable to that observed in 1998. The lower panel of **Figure 2** (taken from the DEFRA web-site) shows the downward trend in the number of exceedences observed at monitoring sites in both rural and urban locations.

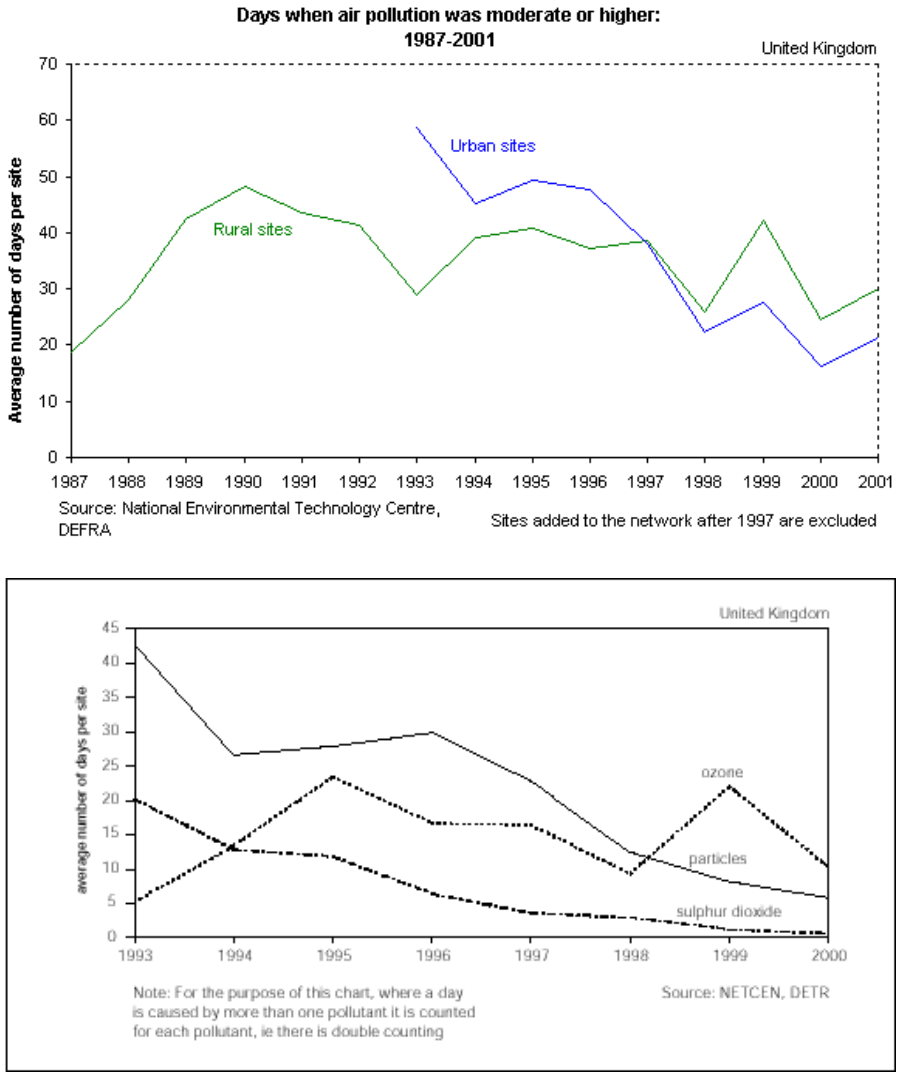

Figure 2 - ***Trends in the the Indicators of UK Urban and Rural Air Pollution (upper panel) and in the Average Number of Days of Moderate or Higher Air Pollution for Sulphur Dioxide, Ozone and Particulate Matter as PM_{10} (lower panel).***

Most of the decrease can be associated with the decline in UK SO_2 emission estimates during this period [Dore, 2002]. **Figure 3** presents both the monthly and running annual mean SO_2 concentrations measured at Eskdalemuir. This is used as an example to illustrate the substantial decline in SO_2 concentrations since the early 1980s. The average concentration at Eskdalemuir has decreased by a factor of ten since 1980 from 4.5 ppb to 0.3 ppb. **Figure 3** shows that the downward trend in the SO_2 concentrations follows the reduction in UK SO_2 emissions.

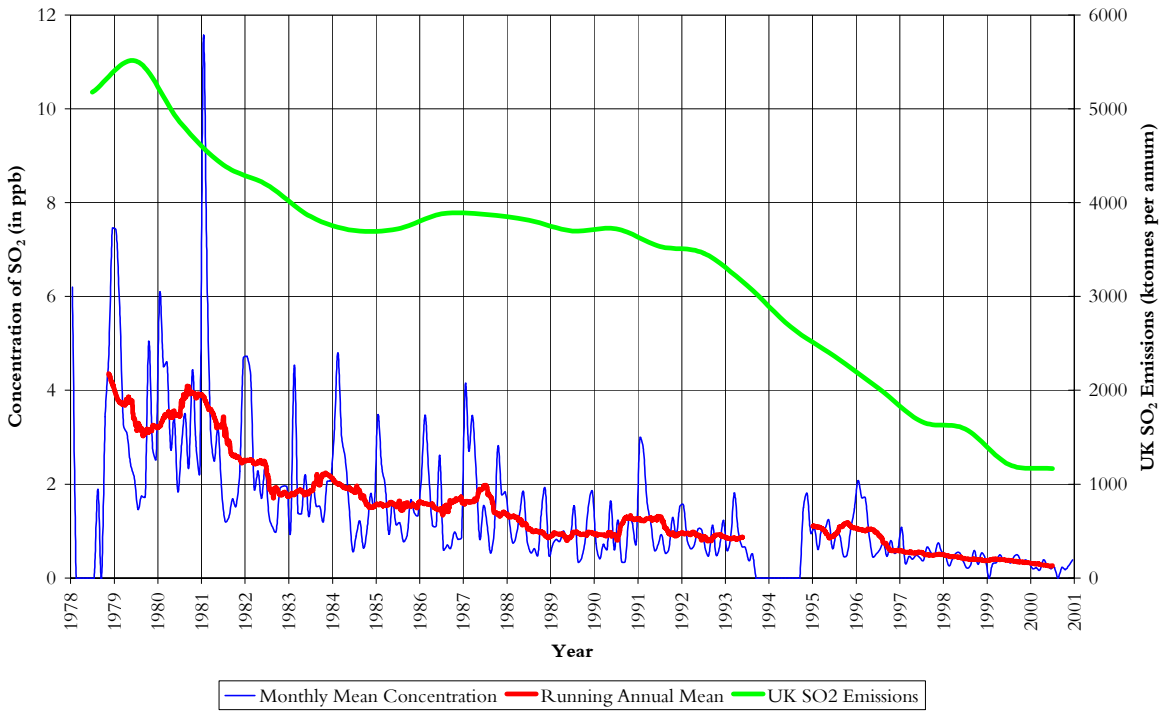

Figure 3 - ***Trends in the concentration of sulphur dioxide observed at Eskdalemuir since 1978 and in the annual UK emissions of sulphur dioxide.***

Figure 3 also suggests that the large seasonal variation, where higher concentrations are observed during cold winter months, are no longer apparent. Higher concentrations are expected during the winter period because of the relatively higher emissions at this time of the year, combined with poorer vertical dispersion of the emissions.

3.2 SPATIAL VARIATIONS

The sites with valid annual mean concentrations were used to derive the geographical distribution of the annual mean SO_2 concentrations for 2000, as shown in **Figure 4**. The annual concentration map was calculated using a geostatistical kriging method developed by Webster *et al.* [1991]. Appendix 4 provides a summary of the kriging method and the parameters used. The 2000 map included the calculated annual mean concentration of 2.8 ppb derived for the Cliffe site. Monthly mean SO_2 concentration maps are presented in Appendix 5, and have been calculated using bi-linear interpolation, a description of which is given by UNIRAS [1988].

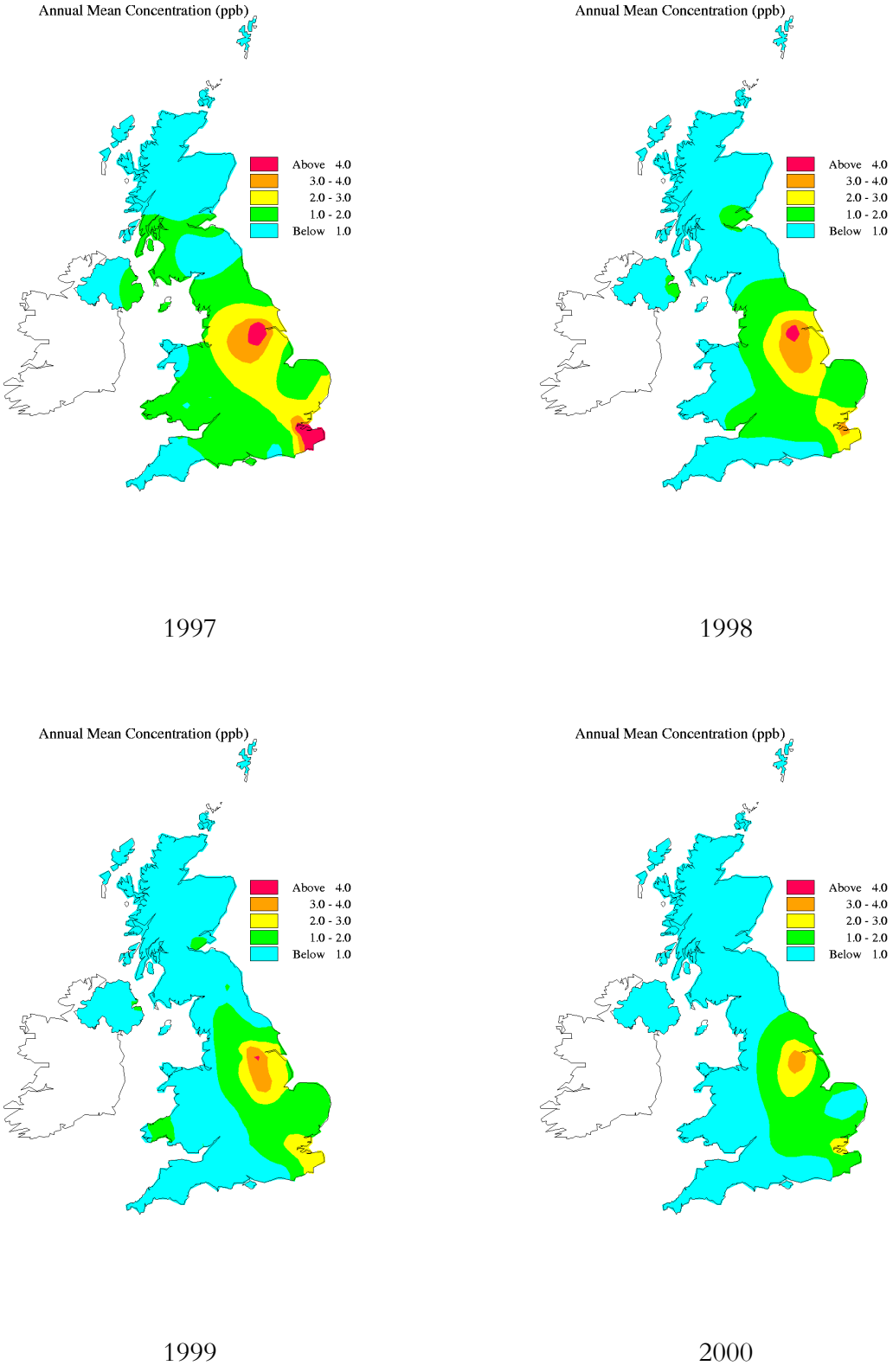

Figure 4 - *Maps of Rural SO_2 Concentrations (ppb) for the years 1997-2000.*

In 2000, the annual mean concentration at the Cardington site was 2.8 ppb compared to the nearby site at Husborne Crawley which had an annual mean of 1.1 ppb. As in earlier years, the Cardington data have not been used for mapping purposes because this site was originally established to determine the effect of specific factors which influenced local concentrations of SO_2 and not to determine regional patterns. The Cardington site is influenced by a local source, as has been shown in a modelling exercise undertaken by Vincent [2002][2]. Downing and Campbell [1995] showed that the exclusion of the Cardington data does not greatly influence the reliability of the maps since there are good representative sites nearby (Woburn originally and then Husborne Crawley on relocation).

Most of the sites in the Yorkshire/Nottinghamshire area and the Thames Estuary are JEP sites that employ UVF (ultraviolet fluorescence) continuous monitors, whereas the majority of the other sites across the UK use the hydrogen peroxide bubbler measurement technique. The method intercomparison exercise undertaken between September 1998 and June 1999 [see Hayman *et al.*, 2001b] showed that the 8-port bubbler method gave comparable measurements to those reported by a UV-F analyser.

It should be noted that the bubbler technique has a limit of detection in the region of 0.3 ppb and many of the concentrations measured at remote sites are at or below this threshold. Measurements, close to the limit of detection, will in consequence have greater inaccuracy.

Figure 4 also shows the corresponding maps for the years 1997-1999 for comparison. The spatial distribution of the annual mean concentration of SO_2 in 2000 is similar to that observed in earlier years [Hasler and Downing, 1998; Hasler *et al.*, 2001; Hayman *et al.*, 2000a, b] with the highest concentrations observed in the Yorkshire/ Nottinghamshire area and the Thames Estuary. The sites in these areas are located closest to major UK SO_2 sources. These maps confirm the overall downward trend in the annual mean concentration of SO_2.

The monthly mean concentration maps are presented in Appendix 5. The maps show that SO_2 concentrations were more elevated across the UK in winter months (January and December), although very few individual sites display a pronounced winter peak. The higher concentrations observed in the winter are generally a result of higher emissions combined with periods of poorer pollutant dispersion. Evidence of higher concentrations is also evident in May and September. The lowest concentrations across the UK were observed in the summer months (June and July) although very high monthly-averaged concentrations were measured at Jenny Hurn.

3.3 URBAN-ENHANCED MAP

The sites used to map the rural SO_2 concentration field are sited away from local sources of pollution so that they are representative of the region. The maps of the rural SO_2 concentration field presented in **Figure 4** show that the concentrations observed are highest in those regions with major sources (*i.e.,* Yorkshire, Thames Estuary, *etc*). However, the maps produced using the rural concentration field alone are not adequate to characterise fully the dry deposition to vegetation in the urban environment, or in rural locations that are on the fringes of urban areas. Hence, the deposition maps prepared using the rural concentration field alone would be inaccurate.

[2] To be included as part of the 2001 Data Report.

A simple methodology has been developed to estimate the correction needed [Stedman *et al.*, 2001a, 2001b]. The approach has been to take the difference in the urban SO_2 concentration (taken from automatic monitoring instruments in urban background locations) and the corresponding rural background and to correlate this with a simple dispersion of the emissions from line and area sources (*i.e.*, excluding point sources) within a 35 km x 35 km area, weighted by distance and direction from the receptor. A slight variant of this methodology was used to calculate the 2000 concentration map. The dispersion coefficients derived are then applied to the line and area sources in the National Atmospheric Emission Inventory to give the urban enhancement for each 1 km x 1km grid square covering the UK, as shown in **Figure 5**.

As the approach excludes the emissions from the major point sources, it is appropriate to include the JEP sites in the derivation of the base rural concentration field. However, sites such as Cardington which are unduly influenced by local sources should be excluded.

Figure 5 also shows the urban-enhanced concentration maps produced for 1997 to 1999. Data from 38, 51 and 50 automatic monitoring sites were used to prepare the maps for 1997, 1998 and 1999 respectively. Again, the strong downward trend in annual mean concentration is evident, as shown by the smaller areas of the high concentration regions in the Thames Estuary and in Yorkshire and Nottinghamshire.

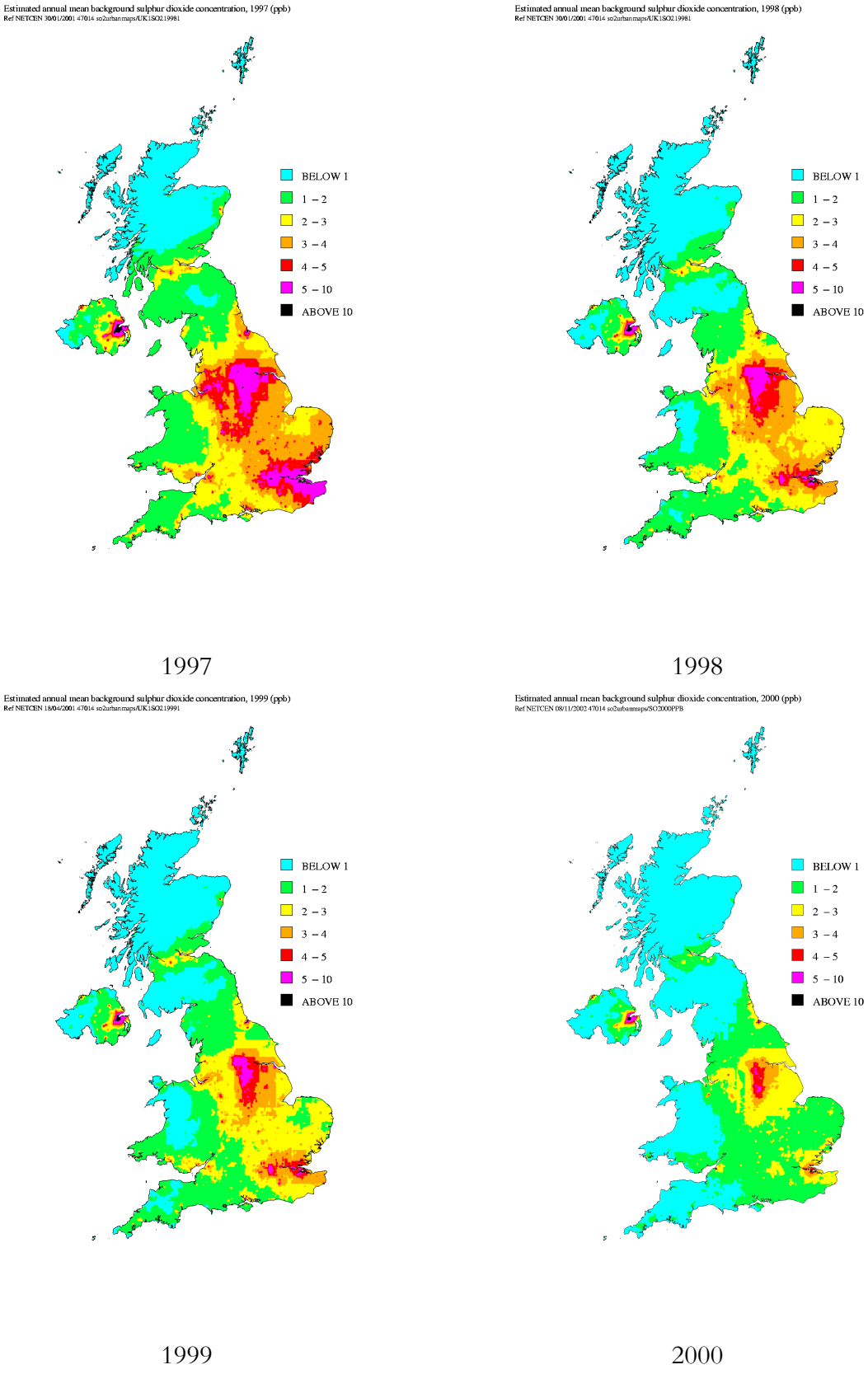

Figure 5 - ***Maps of Urban-enhanced SO_2 Concentrations (ppb) for 1997 to 2000.***

4 Modelled Concentration Field for 2000

The JEP co-ordinated monitoring sites in the Aire Valley of Yorkshire have historically provided high quality SO_2 concentration data using continuous monitoring instruments. These data have been used to improve the mapping of the rural concentration field. As many of the remaining JEP monitoring sites in the Aire Valley were closed during 2000, the data capture for these sites was therefore well below the 75% threshold applied to derive a valid annual mean concentration. Since the highest annual mean concentrations in previous years have been measured at these JEP sites and the other monitoring site would not necessarily provide an accurate description of the concentration field for this area, a numerical modelling exercise was undertaken to calculate the concentration field. This exercise was subsequently extended to cover the whole of the UK.

This section of the report describes this modelling work and is comprised of the following:

- a description of the netcen area source model (Section 4.1).
- a summaryof the relevant information about the Aire Valley (Section 4.2.1).
- the modelling of the SO_2 emission sources in the Aire Valley (Section 4.2.2);
- the production of the UK concentration map for 2000 (Section 4.3).

4.1 BRIEF DESCRIPTION OF THE NETCEN AREA MODEL

The assessment has made use of a modelling approach developed by **netcen**. This approach, referred to as the **netcen** area model, is based on dispersion kernels generated from the dispersion model ADMS and uses spatially-disaggregated emission inventories such as the National Atmospheric Emission Inventory.

The **netcen** area model was developed by **netcen** to model emissions for local authorities as part of the Review and Assessment process, as required for the Air Quality Strategy. Since then, it has been adapted to model a range of pollutants and to support the consultation documents prepared for the Air Quality Strategy for England, Wales, Scotland and Northern Ireland, namely:

- PM_{10} concentrations as part of the cost curve work [DEFRA 2001; Holland *et al.,* 2001];
- Sulphur dioxide [Abbott and Vincent, 1999; DEFRA, 2001] ;
- Benzo[a] pyrene [DEFRA, 2001; Coleman *et al.,* 2001].

Source sectors are modelled separately, thus allowing the characteristics of the emission source to be incorporated into the model. For example, emissions from roads will have a diurnal emission pattern and emissions from power stations will have a diurnal and seasonal emission pattern. This separation of the source sectors will also allow source apportionment studies to be carried out.

The concentrations predicted by the dispersion model were compared to the concentrations measured at the sampling sites forming the *Rural SO_2 Monitoring Network* and the continuous

monitoring sites operated by JEP. The modelled concentrations were then fitted to the measured concentrations using linear regression.

4.2 THE INPUT DATA

4.2.1 Location of Power Stations and Sampling Sites

Figure 6 presents a map of the locations of

- the power stations in the Aire Valley;
- other large point sources;
- automatic monitors (JEP sites, in red), and,
- other sampling sites used in the mapping of the SO_2 concentrations.

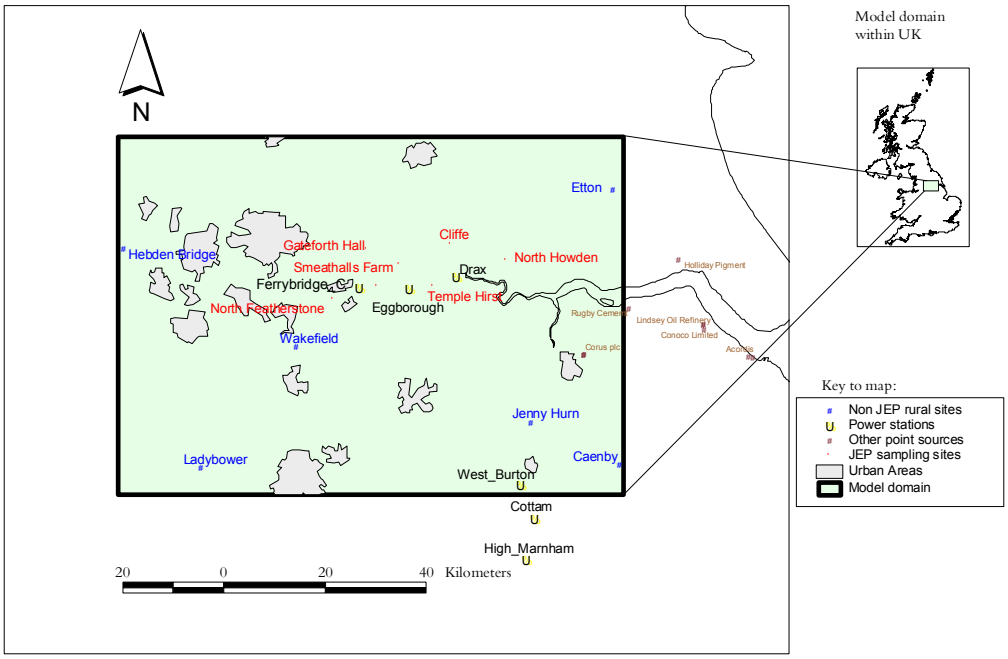

Figure 6 - *Aire Valley Modelling Domain.*

The sites at Caenby, Hebden Bridge, Wakefield and Etton form part of the Rural SO_2 Monitoring network. These sites employ a "bubbler" instrument to collect the sulphur dioxide concentration at weekly intervals. The other 2 sites at Jenny Hurn and Ladybower measure sulphur dioxide using automatic instruments. The concentrations at the former site are kindly provided by Powergen, the concentrations at the latter site are collected as part of the DEFRA rural network monitoring programme.

4.2.2 Emissions used in the Modelling Exercise

As the JEP concentration data for 1999 have been provided as monthly- and annual-averaged concentrations, a larger number of data points are available to validate the model results. Monthly SO_2 emissions for the power stations at Drax, Eggborough and Ferrybridge were therefore obtained from the Environment Agency's Public Register (see **Figure 7**). The annual-averaged emission estimate was used for emissions from other sources such as the refineries in the Humber Estuary and the Corus Steel plant. The emissions were modelled using the

dispersion model ADMS. Emissions from domestic sources were modelled as an area source, with a diurnal and seasonal emission profile applied.

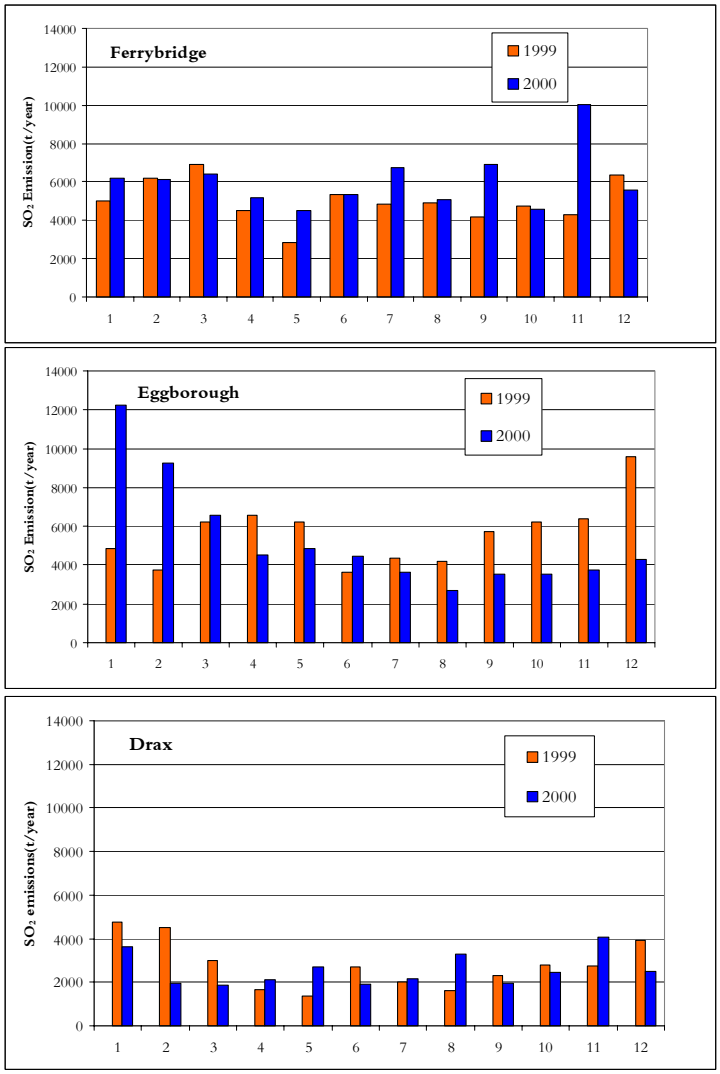

Figure 7 - *Monthly Sulphur Dioxide Emissions from Ferrybridge , Eggborough and Drax for 1999 and 2000.*

4.3 MODEL RESULTS

4.3.1 Model Results for 1999

Figure 8 is a comparison of measured and modelled sulphur dioxide concentrations determined for a number of sites in the modelling domain. *Only the relative magnitude of the concentrations can be presented for the JEP sites due to the data supply agreement with the data provider*[3]. Of the three JEP sites shown (Cliffe, Gateforth Hall and North Featherstone), the concentrations predicted at the Cliffe sampling site appear to be most highly correlated with the measured values. The source apportionment at North Featherstone is interesting. Emissions from the power stations are the

[3] The data for these sites have been provided on condition that neither the measurements made at the sites nor the statistics derived are explicitly reported. The company involved considers that the measurements have commercial value and that a third party could benefit through their inclusion in this report.

dominant source during the summer time, whereas domestic area sources dominate during winter time. The overall predicted concentration at North Featherstone appears to reproduce well the pattern in measured concentrations though the consistent underestimation suggests that the source strength is underestimated.

Table 4 presents the annual mean concentrations for those sites presented in **Figure 8**. For all sites, with the exception of and Jenny Hurn, the agreement between measured and modelled is better than 50 %. The underestimation at Jenny Hurn is difficult to explain. The month-by-month plot shows that some months are better predicted than others but the overall impression is that the available information about the sources is rather limited, and in turn, the prediction of concentration will be poor.

The relatively high concentration measured at Jenny Hurn results in this site playing an important role in producing high concentrations for this region of the UK (defined as concentrations of 4 ppb or greater).

Table 4 - ***Measured and Modelled Annual Mean Sulphur Dioxide Concentrations at a Number of Sites within the Model Domain for 1999 and 2000.***

Site	1999		2000	
	Measured (ppb)	Modelled (ppb)	Measured (ppb)	Modelled (ppb)
Caenby	2.41	3.07	2.47	3.17
Wakefield	1.89	1.54	1.9	2.75
Etton	2.03	1.65	1.76	1.90
Jenny Hurn	4.05	1.80	4.55	2.29

4.3.2 UK Concentration Map for 2000

The method used in the production of the sulphur dioxide concentration map for 2000 is that applied previously to the calculation of sulphur dioxide concentration maps (Abbott and Vincent, 1999 and DEFRA, 2001). Before the concentration map is presented, it is useful to review the sulphur dioxide concentrations measured at the rural sites in recent years (1997 to 2001). The sulphur dioxide concentrations have declined significantly over this period, as was shown previously in **Table 2**.

The main points to note for mapping purposes are that:

- the rural concentration field in remote areas was certainly at the detection limit of the old bubbler instrument.
- sites such as Preston Montford and Marshfield which would have been used to extend the high concentrations over the Welsh border have much reduced concentrations. The typical concentration in rural Wales is now typically in the range 0.5 to 0.7 ppb.
- concentrations for most rural parts of southern England now range from 0.5 to 1 ppb. Values higher than these are only really observed for the regions of England where there is significant power generation.

The sulphur dioxide concentrations measured in rural areas were used to fine tune the model output to ensure that the final predicted concentrations matched the concentrations measured at

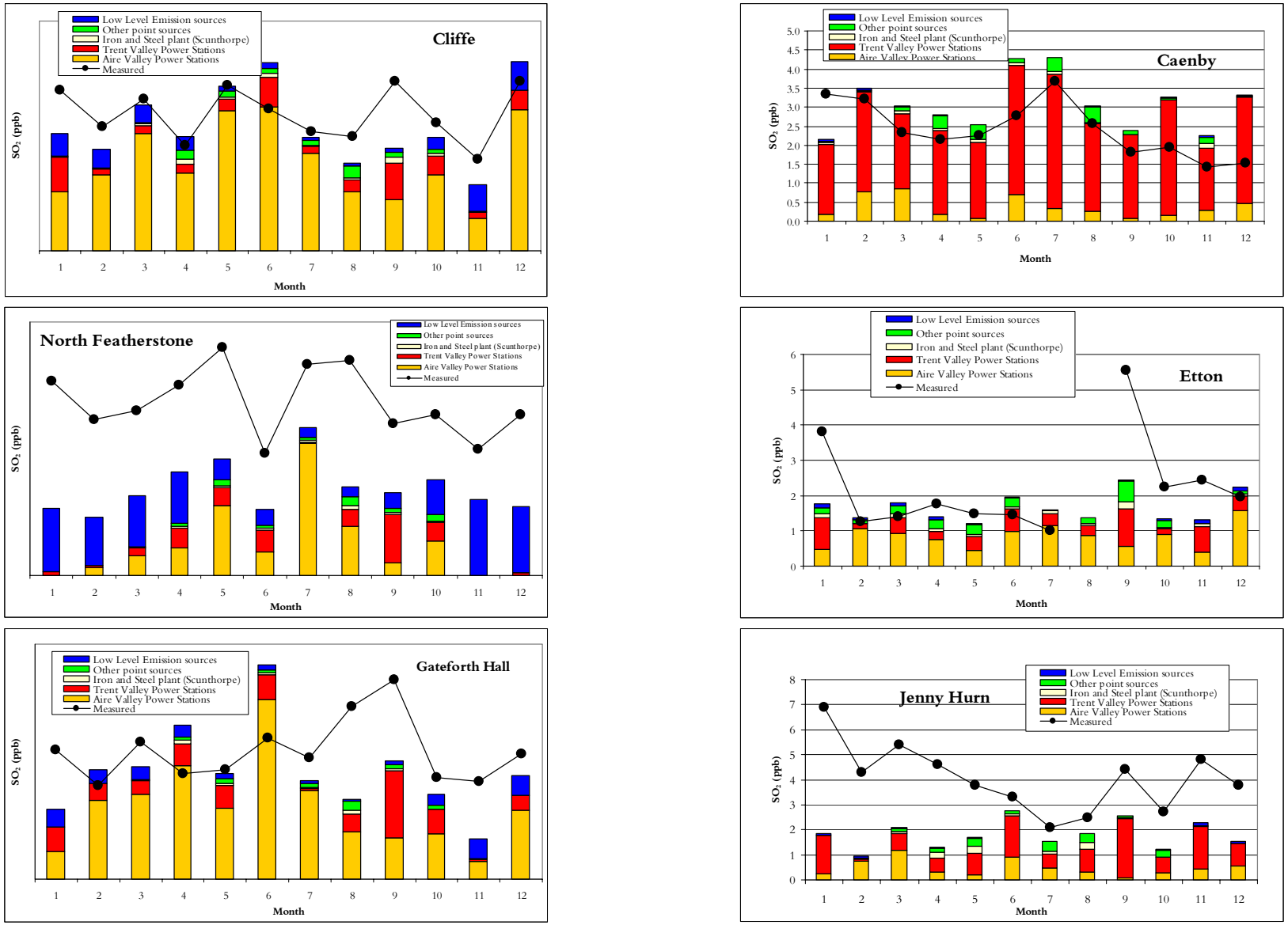

Figure 8 - *A comparion of Modelled and Measured Monthly Sulphur Dioxide Concentrations (for 1999).*

these sites. The "calibration" plot for 2000 is shown in **Figure 9**. Linear regression analysis of modelled and measured concentrations at rural monitoring sites was carried out to establish the values of constants, A and B in the formula:

Measured Annual Average = A + B × Modelled point sources + Modelled Area Sources

For the 2000 data, the constants A and B were determined to be 1.23 and 0.90 respectively.

The number of sites used to derive the calibration plot is significantly fewer than in previous years, for example **Figure 10** shows the calibration plot for 1998 when the number of continuous monitors in rural areas (*i.e.*, at JEP-operated sites) was significantly higher.

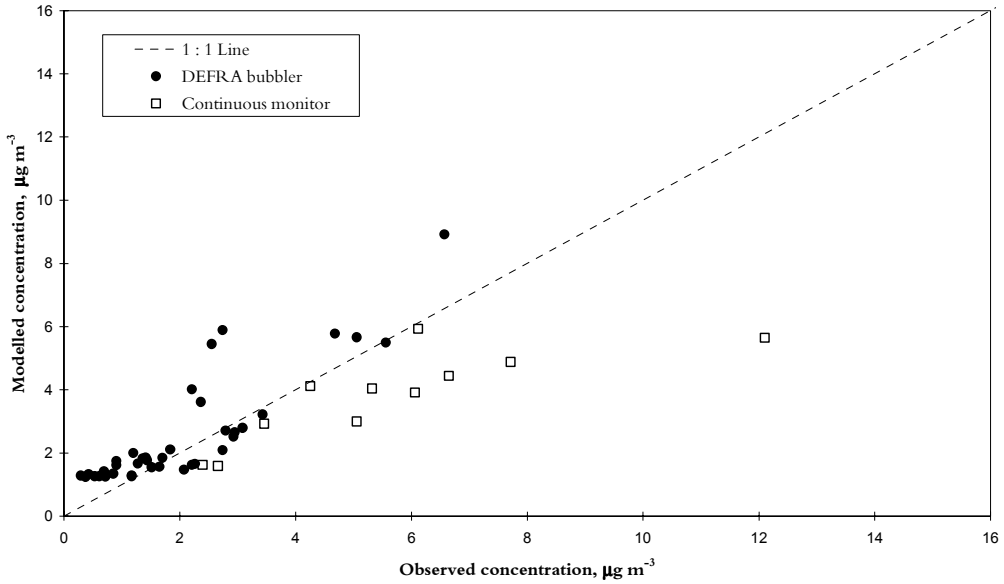

Figure 9 - *Model Calibration Plot for the 2000 Dataset.*

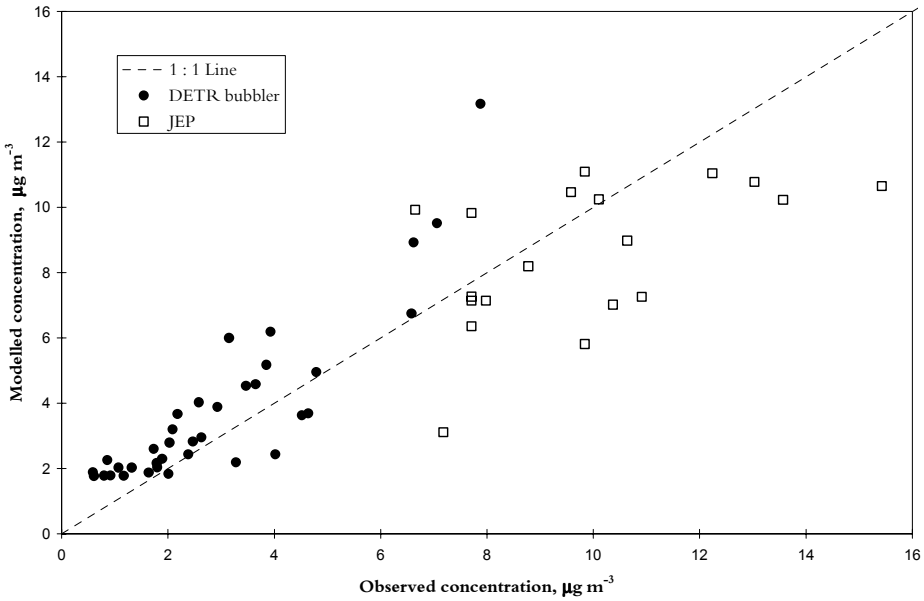

Figure 10 - *Model Calibration Plot for the 1998 Dataset.*

The residual concentrations were then calculated at each monitoring site:

Residual = Measured - Regression Model

These residual contributions are associated partly with errors in the model and partly with the contributions from more distant sources, not modelled in this study. They include, for example, contributions from emissions from sources on continental Europe.

The residual concentrations were then interpolated across the country to provide a map of residuals using a simple kriging procedure. The final map was calculated from:

Mapped Value = A + B × Modelled Part A + Modelled Area Sources + Residual

The left-hand panel of **Figure 11** presents the modelled SO_2 concentration map for 2000. This map is compared with the urban-enhanced SO_2 concentration map derived using the semi-empirical methodology of Stedman *et al.* [2001a, b; see Section 3.3] (right-hand panel). While the general patterns are similar, the modelled map (left-hand panel) generally shows lower concentrations across the country, as evidenced by the extent of the green area defining the 1-2 ppb band. As the two approaches use the same emission inventories, the difference is presumably due to the treatment of dispersion. The semi-empirical approach matches the calculated SO_2 concentrations to those observed in urban environments (which are generally higher) with a presumed dispersion behaviour. On the other hand, the modelling approach which uses actual meteorological data and is therefore more realistic in terms of dispersion, matches the calculated concentrations to those observed at rural sites. It is likely that these differences are significant in terms of the deposition budgets and the impact of dry deposition of sulphur on critical load exceedences.

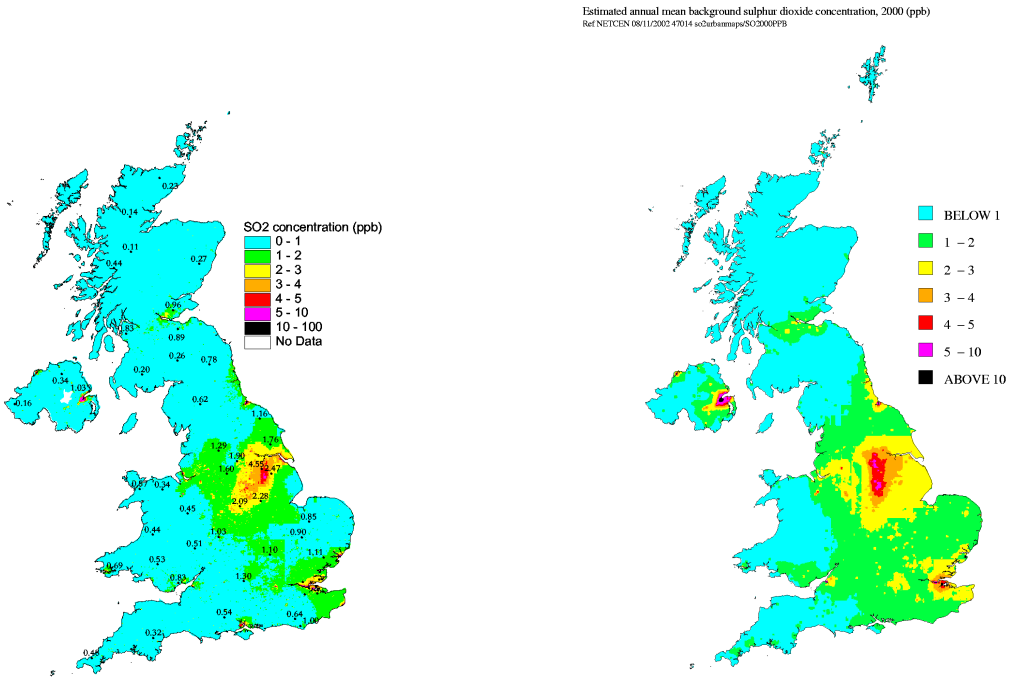

Figure 11 - Urban-enhanced SO_2 Concentration Maps for 2000 derived using the netcen Area Source Model (left-hand panel) and the Semi-Empirical Approach of Stedman *et al.* (right-hand panel).

4.4 CONCLUSIONS

The production of UK scale concentration maps is crucially dependent on the availability of sampling sites in rural areas. In previous years the availability of continuous monitors operated by the power generators have provided very useful detail on sulphur dioxide concentrations. The amount of data available from the power generating companies declined in 2000. The characterisation of the rural concentration field will become more difficult than was the case in earlier years.

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With special thanks to all the site operators whose commitment to the network has helped provide such a comprehensive and high quality data set.

We would also like to take this opportunity to thank Steve Baker (AEA Technology) for his contribution to the smooth operation of the monitoring networks. We wish him well in his new career.

Appendix 1

ANNUAL SITE MAINTENANCE AND OTHER SITE VISITS

Site Code	Site Name	Date of Annual Site Visit	Other Site Visits/Comments
5002	Eskdalemuir (1)	11/8/00	Replaced bubbler and inlet during site maintenance visit.
5004	Stoke Ferry (1)	6/1/00	Replaced valve during site maintenance visit.
		3/10/00	Replaced glass inlet funnel during site maintenance visit.
5006	Lough Navar (1)	6/12/00	Site maintenance visit.
5007	Barcombe Mills (1)	15/3/00	Replaced pump during site maintenance visit.
5008	Yarner Wood (1)	4/7/00	Site maintenance visit.
		25/10/00	Site maintenance visit.
5009	High Muffles (1)	20/7/00	Site maintenance visit.
5010	Strathvaich Dam (1)	24/1/00	Replaced pump during site maintenance visit.
		5/8/00	Replaced meter and inlet manifold during site maintenance visit.
5011	Glen Dye (1)	8/8/00	Funnel replaced during site maintenance visit.
5301	Brockhill 1	26/5/00	Meter replaced during site maintenance visit.
5303	Caenby 1	-	Replacement pump sent to site operator (23/5/00).
		20/10/00	Meter replaced during annual site maintenance visit.
5304	Camborne 1	5/7/00	Annual site maintenance visit.
5305	Camphill 1	2/8/00	Meter and pump replaced during annual site maintenance visit.
5306	Cardington 2	2/10/00	Annual site maintenance visit.
5308	Corpach 1	4/8/00	Meter replaced meter during annual site maintenance visit.
5309	Cresselly 1	-	Replacement pump sent to site operator (13/1/00).
		23/5/00	Bubbler replaced during annual site maintenance visit.
5310	Etton 1	19/10/00	Meter replaced during annual site maintenance visit.
5312	Husborne Crawley 1	2/10/00	Bubbler replaced during annual site maintenance visit.
5313	Little Horkesley 1	4/10/00	Inlet funnel and tubing replaced during annual site maintenance visit.
5314	Marshfield 1	22/5/00	Annual site maintenance visit.
5315	Ratcliffe 13	5/12/00	Inlet funnel replaced during annual site maintenance visit.
5316	Rockbourne 1	3/7/00	Annual site maintenance visit.
5317	Wakefield 24	18/10/00	Annual site maintenance visit.
5318	Waunfawr 1	8/11/00	Annual site maintenance visit.
5319	Fort Augustus 2	4/8/00	Meter, inlet tubing and inlet replaced during annual site maintenance visit.
5320	Loch Leven 2	10/8/00	Meter replaced during annual site maintenance visit.
5321	Redesdale 2	19/7/00	Annual site maintenance visit.
5322	Hebden Bridge 2	-	Replacement pump sent to site operator (18/2/00).
		-	Replacement pump sent to site operator (23/5/00).
		-	Replacement meter sent to site operator (14/6/00).
		18/10/00	Meter replaced during annual site maintenance visit.
5323	Preston Montford 2	-	Replacement meter sent to site operator (26/7/00).
		9/11/00	Meter, inlet tubing and funnel replaced during site maintenance visit.
5324	Bentra	5/12/00	Inlet and tubing replaced during annual site maintenance visit.
5325	Pitlochry	9/8/00	Pump and tubing replaced during annual site maintenance visit.
5326	Bush	10/8/00	Meter replaced during annual site maintenance visit.
5329	Cam Forest	7/12/00	Annual site maintenance visit.
5330	Cwmystwyth	24/5/00	Bubbler replaced during annual site maintenance visit.
5331	Rosemaund	25/5/00	Pump, meter, valve, and inlet tubing replaced during annual site maintenance visit.
5333	Fairseat	5/10/00	Inlet tubing and funnel replaced during annual site maintenance visit.
5338	Forsinain	25/1/00	Pump and inlet funnel replaced during annual site maintenance visit.
		-	Bubbler replaced during annual site maintenance visit (7/8/00).
5339	Appleacre	18/7/00	Inlet funnel and meter replaced during annual site maintenance visit.
5343	Benniguinea	1/8/00	Annual site maintenance visit.
5334	Bylchau	9/11/00	Annual site maintenance visit.
5335	Crai	23/5/00	Inlet tubing replaced during annual site maintenance visit.

Note (1) These sites are operated as part of the UK Acid Deposition Monitoring Networks and are visited more frequently given the more extensive monitoring programmes undertaken at most of the sites.

Appendix 2

DAILY, WEEKLY AND MONTHLY SO_2 CONCENTRATIONS

National Environmental Technology Centre

Daily Sites Analysed:

5002 Eskdalemuir
5004 Stoke Ferry
5006 Lough Navar
5007 Barcombe Mills
5008 Yarner Wood
5009 High Muffles
5010 Strathvaich Dam
5011 Glen Dye
5326 Bush

Variables Analysed	Units	Specified Variable Limit
sulphur dioxide as S	$\mu g\ m^{-3}$	1.000

Time Period Covered:

January 2000 - December 2000

National Environmental Technology Centre
Site: 5002 Eskdalemuir - Sulphur Dioxide as S (SO2 - S)
Concentration in air (μg S m^{-3})

Daily measurements - Summary for January 2000 to December 2000

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.29	0.16	0.33	0.44	1.36	0.17	1.52	N	<0.20	0.71	<0.22	<0.23
2 - 3	0.20	<0.19	<0.15	0.21	0.41	0.51	0.31	N	0.27	0.52	0.72	0.29
3 - 4	0.31	<0.14	0.35	0.42	0.13	0.35	0.19	N	0.21	<0.20	<0.24	<0.23
4 - 5	<0.14	<0.10	0.21	2.76	0.26	0.15	0.44	N	0.90	<0.23	<0.25	0.37
5 - 6	<0.13	<0.13	0.27	1.06	0.15	0.15	0.30	N	<0.17	<0.21	0.42	<0.24
6 - 7	0.16	<0.12	0.14	0.56	0.25	0.18	0.14	N	<0.19	<0.20	<0.23	0.23
7 - 8	<0.14	0.17	<0.12	0.97	0.19	0.20	0.16	N	<0.28	0.30	0.37	0.32
8 - 9	0.21	<0.13	<0.12	0.35	0.42	0.28	0.13	N	<0.19	0.20	1.11	<0.24
9 - 10	0.18	0.18	<0.13	0.20	0.52	0.24	0.28	N	<0.19	0.27	0.83	<0.25
10 - 11	0.20	0.27	0.13	0.22	0.14	0.31	0.34	N	<0.22	<0.20	0.47	<0.25
11 - 12	0.20	<0.13	0.14	0.18	0.12	0.22	0.55	N	0.27	0.26	<0.24	<0.23
12 - 13	0.13	0.15	0.15	0.65	0.71	0.16	0.22	1.85	<0.18	0.60	<0.27	<0.23
13 - 14	0.34	<0.14	<0.11	1.22	0.93	0.16	0.12	0.80	<0.19	0.26	<0.27	<0.24
14 - 15	0.88	0.18	0.16	0.42	1.33	0.26	0.14	0.43	<0.19	0.34	<0.22	0.95
15 - 16	0.61	0.11	<0.14	0.40	0.31	0.20	0.38	0.89	0.53	<0.23	N	1.18
16 - 17	0.17	0.26	<0.12	0.34	0.49	0.68	0.21	0.60	0.21	<0.22	N	0.27
17 - 18	0.16	0.22	0.20	0.21	0.39	0.36	0.36	0.82	<0.18	0.22	N	0.45
18 - 19	0.28	0.34	0.16	0.53	0.14	0.34	0.21	0.41	<0.22	N	N	0.34
19 - 20	0.30	0.79	0.12	0.36	0.29	0.42	0.27	1.66	0.76	N	N	1.25
20 - 21	0.11	1.13	0.11	0.19	0.17	<0.13	0.17	1.46	<0.19	N	N	1.31
21 - 22	0.18	0.15	0.16	0.23	0.17	0.15	0.33	0.29	0.29	N	N	1.08
22 - 23	1.07	2.32	0.40	0.15	0.24	0.10	0.16	0.34	<0.20	N	0.25	0.98
23 - 24	0.50	0.22	1.08	0.23	0.17	<0.08	0.15	0.27	0.72	N	<0.26	0.26
24 - 25	0.47	0.22	0.16	0.53	0.26	0.33	0.32	0.19	0.21	N	0.36	<0.27
25 - 26	0.57	0.27	0.25	0.20	0.16	0.55	0.27	1.22	0.60	0.51	0.53	<0.23
26 - 27	0.15	0.18	0.38	0.37	0.19	<0.10	0.22	0.24	<0.21	0.24	0.38	0.51
27 - 28	<0.12	0.19	0.40	0.75	0.19	0.93	0.23	1.13	0.25	<0.21	0.39	0.48
28 - 29	<0.15	N	0.12	0.75	0.13	0.18	N	0.24	0.25	<0.24	0.31	1.98
29 - 30	<0.12	0.13	0.13	0.30	0.26	0.11	N	0.35	0.77	<0.19	0.57	1.54
30 - 31	<0.12		0.16	0.27	0.18	0.10	N	0.29	1.05	<0.20	0.31	0.32
31 - 1	0.13		0.63		0.17		N	0.25		<0.23		0.47
Arithmetric Mean (3)	0.27	0.29	0.22	0.52	0.35	0.27	0.30	-	0.29	0.24	0.35	0.51
Standard Deviation (3)	0.24	0.46	0.21	0.51	0.32	0.20	0.27	-	0.28	0.18	0.26	0.50
Sample Size	31	28	31	30	31	30	27	20	30	24	23	31

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5004 Stoke Ferry - Sulphur Dioxide as S (SO2 - S)
Concentration in air (μg S m^{-3})

Daily measurements - Summary for January 2000 to December 2000

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	N	4.26	2.20	0.63	0.87	0.60	1.06	0.51	0.55	0.52	1.06	0.46
2 - 3	N	2.34	1.65	1.08	N	1.22	0.37	0.53	0.55	0.73	1.05	0.38
3 - 4	N	1.81	2.41	2.03	N	1.58	0.54	0.66	0.58	0.49	0.74	0.59
4 - 5	0.55	1.31	2.06	4.78	<0.19	0.20	1.71	1.43	1.07	0.91	1.90	0.64
5 - 6	1.21	1.44	1.63	2.70	0.83	0.90	1.01	0.46	0.63	1.98	0.76	1.02
6 - 7	1.11	0.62	1.02	0.60	1.53	0.80	0.34	1.26	0.49	3.72	0.84	1.53
7 - 8	0.87	0.78	0.53	0.92	0.41	0.82	1.04	2.94	0.82	0.68	2.16	0.71
8 - 9	0.64	0.79	0.22	2.03	0.27	0.63	1.21	1.44	0.21	1.02	3.03	0.43
9 - 10	1.35	0.86	1.54	0.64	N	1.29	0.39	0.41	1.66	0.67	1.04	0.38
10 - 11	1.50	0.82	1.13	1.34	N	0.99	0.48	0.81	0.33	0.35	1.56	0.53
11 - 12	1.31	1.27	1.34	1.15	0.40	0.43	1.01	0.60	1.72	1.18	0.34	0.36
12 - 13	0.58	0.64	0.82	0.58	0.27	0.26	1.31	1.72	0.67	0.30	1.42	0.31
13 - 14	1.39	1.12	1.70	0.64	1.43	0.66	0.89	0.28	0.81	8.04	1.22	0.44
14 - 15	1.19	0.99	1.78	2.94	0.94	0.86	2.12	0.37	0.22	0.74	1.21	1.33
15 - 16	1.17	1.15	2.08	1.67	0.91	0.79	0.53	0.58	0.39	0.94	10.99	3.35
16 - 17	3.81	1.04	4.94	1.74	N	1.11	0.80	0.53	<0.20	1.03	1.23	2.07
17 - 18	3.89	1.71	2.38	1.57	N	2.67	1.70	0.66	0.40	2.42	1.93	5.54
18 - 19	1.36	0.84	0.54	N	1.50	1.60	N	0.40	0.42	0.77	1.55	0.64
19 - 20	1.40	0.78	0.55	N	0.90	N	N	0.41	0.31	0.60	1.06	0.62
20 - 21	3.25	0.90	0.69	0.28	0.41	0.63	0.91	1.32	0.27	1.52	2.23	0.99
21 - 22	3.68	1.19	0.80	0.15	0.24	0.51	0.56	0.36	0.73	1.53	0.96	0.88
22 - 23	2.25	2.86	0.73	0.43	1.29	0.62	0.33	0.69	0.24	0.70	0.61	0.58
23 - 24	0.90	1.15	1.19	0.25	<0.21	1.72	0.22	0.25	0.89	1.04	2.08	0.82
24 - 25	1.59	1.16	0.54	0.41	1.34	0.67	0.30	0.79	0.27	0.73	1.25	0.27
25 - 26	2.80	0.68	0.98	N	1.10	0.60	0.58	0.66	0.64	0.52	0.57	0.41
26 - 27	3.60	1.05	0.86	N	0.67	0.61	N	0.79	0.52	0.45	0.90	N
27 - 28	2.18	0.53	2.79	1.11	0.21	1.78	1.41	0.35	0.53	0.95	0.73	0.82
28 - 29	1.94	0.75	0.68	1.82	0.80	0.59	0.56	0.59	0.21	0.55	1.86	2.44
29 - 30	1.50	N	1.63	0.36	0.67	0.38	0.82	1.45	0.60	0.48	0.80	3.89
30 - 31	0.72		3.23	0.32	0.61	0.45	0.46	0.43	0.28	0.56	1.21	4.93
31 - 1	1.36		1.35		0.51		0.64	0.59		1.26		0.88
Arithmetric Mean (3)	1.75	1.24	1.48	1.24	0.73	0.90	0.83	0.78	0.57	1.21	1.61	1.27
Standard Deviation (3)	1.03	0.79	0.98	1.06	0.45	0.55	0.48	0.56	0.38	1.45	1.87	1.39
Sample Size	28	28	31	26	25	29	28	31	30	31	30	30

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5006 Lough Navar - Sulphur Dioxide as S (SO2 - S)
Concentration in air (μg S m^{-3})

Daily measurements - Summary for January 2000 to December 2000

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.15	0.16	0.37	0.10	0.44	0.19	0.64	0.12	0.12	<0.14	0.15	<0.13
2 - 3	0.16	0.14	<0.11	0.14	0.25	N	0.46	0.14	0.14	<0.12	0.29	<0.14
3 - 4	0.36	0.20	0.20	0.30	0.18	0.17	0.40	0.15	0.19	<0.13	<0.14	<0.15
4 - 5	0.27	0.18	0.15	0.50	0.40	<0.14	0.54	0.12	0.14	<0.12	<0.14	<0.14
5 - 6	0.21	0.33	0.51	0.56	N	<0.11	N	0.14	0.13	<0.12	<0.15	0.13
6 - 7	0.21	0.14	0.18	0.69	0.73	0.07	0.16	0.14	0.15	<0.13	0.15	<0.15
7 - 8	0.16	0.18	0.15	0.52	N	<0.11	0.13	0.23	0.17	<0.13	<0.14	0.26
8 - 9	0.16	0.25	0.21	0.17	0.64	0.13	<0.14	0.38	0.11	<0.13	<0.13	<0.14
9 - 10	0.17	0.18	0.27	0.51	0.65	<0.10	0.16	0.16	<0.12	<0.13	0.18	<0.15
10 - 11	0.14	0.17	0.13	N	0.52	0.14	<0.11	0.26	<0.13	<0.12	<0.14	0.17
11 - 12	0.24	0.13	0.15	0.47	0.49	<0.13	0.10	0.23	0.13	<0.14	<0.14	0.21
12 - 13	0.16	0.11	0.14	0.36	0.54	0.13	0.14	0.16	0.12	<0.13	<0.15	0.22
13 - 14	0.48	0.17	0.13	0.44	0.44	0.15	0.13	0.20	0.36	<0.13	<0.20	<0.14
14 - 15	0.31	0.16	0.15	0.21	0.40	0.10	0.11	0.16	0.13	0.14	<0.19	0.20
15 - 16	0.19	0.16	0.12	<0.20	N	0.21	0.13	0.23	0.14	0.24	0.48	<0.14
16 - 17	<0.13	0.18	0.13	0.15	0.18	0.44	0.11	0.16	<0.12	N	0.22	<0.14
17 - 18	0.14	0.20	0.14	0.54	0.13	0.11	0.13	0.16	0.16	N	<0.20	<0.16
18 - 19	0.13	0.16	0.11	0.18	0.17	0.19	0.18	0.23	0.16	N	<0.20	0.26
19 - 20	0.12	0.17	0.18	0.21	N	0.34	0.17	0.13	0.22	N	<0.21	0.23
20 - 21	0.16	0.18	0.18	0.13	0.17	0.26	0.14	0.16	0.15	N	0.15	0.18
21 - 22	0.34	0.22	0.18	0.16	0.48	0.12	0.16	0.75	0.16	N	0.20	0.98
22 - 23	0.13	0.29	0.11	0.22	0.20	0.10	1.21	0.72	0.21	N	0.17	1.05
23 - 24	<0.12	0.23	0.14	0.14	0.12	0.16	0.28	1.44	0.15	0.14	0.20	1.04
24 - 25	0.16	0.18	0.15	0.40	0.12	0.13	0.56	0.29	<0.11	<0.14	<0.15	0.47
25 - 26	0.19	0.29	0.19	0.19	0.11	0.13	0.48	0.64	0.25	0.13	0.15	0.47
26 - 27	0.39	0.21	0.11	0.14	0.11	0.31	0.72	0.15	<0.13	<0.14	<0.15	0.42
27 - 28	0.31	0.15	0.41	0.14	0.13	0.29	0.20	0.14	<0.13	0.13	0.20	0.32
28 - 29	0.13	0.17	0.16	0.18	<0.12	0.28	0.13	0.20	0.15	<0.13	<0.14	0.30
29 - 30	0.43	0.31	1.08	0.24	0.13	0.63	0.20	0.17	<0.12	<0.13	<0.13	0.56
30 - 31	0.17		0.39	0.28	0.23	0.19	0.14	0.40	0.32	0.24	<0.15	0.31
31 - 1	0.17		0.19		N		0.36	0.14		<0.13		0.17
Arithmetric Mean (3)	0.21	0.19	0.22	0.29	0.31	0.18	0.28	0.28	0.15	0.09	0.13	0.28
Standard Deviation (3)	0.10	0.05	0.19	0.17	0.20	0.13	0.25	0.27	0.07	0.05	0.09	0.28
Sample Size	31	29	31	29	26	29	30	31	30	24	30	31

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5007 Barcombe Mills - Sulphur Dioxide as S (SO2 - S)
Concentration in air (μg S m^{-3})

Daily measurements - Summary for January 2000 to December 2000

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.55	0.40	2.08	0.56	0.58	0.44	0.76	0.60	0.31	0.22	0.29	0.36
2 - 3	0.63	0.83	1.20	0.90	1.64	0.49	0.34	0.57	0.76	<0.17	0.24	0.46
3 - 4	0.50	1.42	1.55	2.77	1.61	0.41	0.36	0.29	0.44	N	0.59	0.53
4 - 5	0.59	0.95	1.83	0.86	4.02	0.60	0.43	0.37	1.02	N	0.61	0.59
5 - 6	0.48	1.14	1.23	2.58	3.49	2.15	N	0.53	0.47	N	0.39	N
6 - 7	0.53	1.29	N	1.16	1.25	0.52	0.44	0.50	0.40	N	0.28	N
7 - 8	0.33	0.87	N	2.20	2.05	0.77	1.14	0.61	0.34	N	1.04	N
8 - 9	0.48	0.48	N	1.56	2.09	0.95	0.40	0.70	0.37	N	1.29	N
9 - 10	0.50	0.78	N	1.96	2.16	0.87	0.25	0.49	0.29	N	0.93	N
10 - 11	0.52	0.62	N	0.85	1.78	0.66	0.48	0.47	0.32	N	0.69	N
11 - 12	0.62	0.69	N	0.95	0.83	0.43	0.95	0.58	0.63	N	0.38	N
12 - 13	0.39	0.69	N	0.77	1.66	0.43	0.78	1.10	0.38	N	0.27	0.33
13 - 14	3.93	0.56	N	1.61	1.63	0.49	1.20	0.52	0.38	N	0.50	0.17
14 - 15	2.29	0.31	N	2.45	1.71	1.13	0.75	0.24	0.49	N	0.29	0.42
15 - 16	1.11	0.56	0.95	0.87	1.65	0.51	0.95	0.54	0.40	N	0.44	0.96
16 - 17	2.08	0.32	1.62	0.97	0.81	0.72	0.47	0.48	0.49	N	0.52	0.54
17 - 18	5.43	0.25	2.31	0.79	0.50	0.90	0.98	0.54	0.51	0.53	0.61	0.39
18 - 19	1.92	0.46	0.92	1.30	0.50	1.35	1.11	1.29	0.28	0.24	0.23	0.23
19 - 20	1.15	1.32	1.28	1.46	0.50	0.93	1.03	0.36	0.24	0.17	0.43	0.43
20 - 21	1.14	0.63	1.48	0.53	1.12	0.97	1.91	0.59	0.23	0.19	0.26	0.44
21 - 22	3.06	0.58	1.14	0.66	0.58	0.48	1.50	0.41	0.43	0.40	0.23	0.66
22 - 23	2.42	1.23	3.89	0.57	0.81	1.12	0.29	0.70	0.41	0.31	<0.12	0.52
23 - 24	2.37	0.82	N	0.67	0.50	0.43	0.38	0.89	0.45	0.19	0.22	0.48
24 - 25	3.68	1.23	0.58	1.18	0.69	1.00	1.05	1.09	0.28	0.39	0.18	1.49
25 - 26	1.65	0.41	0.38	0.70	0.61	1.00	0.53	3.09	0.22	0.46	0.14	0.64
26 - 27	0.84	1.46	0.58	0.76	0.50	0.84	1.10	0.34	0.43	0.61	0.24	0.93
27 - 28	1.81	0.67	1.38	1.26	0.39	1.58	0.58	0.29	<0.16	N	0.21	1.98
28 - 29	0.76	0.30	1.30	1.05	0.28	1.59	0.46	0.33	<0.17	0.18	0.93	0.69
29 - 30	0.46	0.87	0.66	0.90	0.41	0.79	0.44	0.53	0.32	0.25	0.52	1.26
30 - 31	0.51		1.09	1.08	N	1.67	0.88	0.63	0.17	0.19	0.76	1.13
31 - 1	0.46		1.34		N		0.58	1.09		0.49		0.91
Arithmetric Mean (3)	1.39	0.76	-	1.20	1.25	0.87	0.75	0.67	0.39	-	0.46	0.69
Standard Deviation (3)	1.26	0.36	-	0.62	0.92	0.44	0.39	0.52	0.19	-	0.30	0.43
Sample Size	31	29	21	30	29	30	30	31	30	16	30	24

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5008 Yarner Wood - Sulphur Dioxide as S (SO2 - S)
Concentration in air (μg S m^{-3})

Daily measurements - Summary for January 2000 to December 2000

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.18	0.41	0.50	0.19	1.12	0.21	0.20	0.20	0.15	<0.12	<0.10	0.14
2 - 3	0.19	0.34	0.39	0.37	0.49	0.16	0.24	0.32	0.22	0.17	<0.13	0.19
3 - 4	0.21	0.20	0.37	0.73	0.89	0.23	0.37	0.29	0.60	<0.10	0.11	0.22
4 - 5	0.30	0.27	0.34	2.15	2.79	0.16	N	0.19	0.35	0.12	0.23	0.19
5 - 6	0.28	0.43	0.46	1.47	1.62	0.21	0.19	0.19	N	0.10	<0.13	0.33
6 - 7	0.33	0.18	0.22	0.77	1.50	0.29	0.30	0.36	N	0.16	2.06	0.19
7 - 8	0.27	0.15	0.20	1.01	1.30	0.50	0.37	0.38	N	<0.11	0.22	0.33
8 - 9	0.17	0.17	0.20	0.21	0.85	0.47	0.17	0.21	N	0.09	0.25	0.14
9 - 10	0.20	0.28	0.13	0.75	1.69	0.27	0.13	0.21	N	<0.12	0.25	0.16
10 - 11	0.22	N	0.32	N	0.58	0.20	0.19	0.19	N	<0.10	<0.16	0.19
11 - 12	0.31	0.41	0.21	N	0.87	0.13	0.21	0.26	N	<0.10	0.19	0.13
12 - 13	0.38	0.18	0.35	0.65	0.24	0.13	<0.18	0.28	N	<0.14	0.15	0.14
13 - 14	0.56	0.30	0.27	0.44	0.26	<0.13	0.21	0.27	0.17	<0.18	<0.15	0.12
14 - 15	2.12	0.21	0.21	1.58	0.24	N	0.36	0.17	0.12	<0.14	0.57	0.14
15 - 16	1.45	0.47	0.19	N	0.31	0.25	0.34	0.17	<0.12	<0.12	0.13	0.20
16 - 17	1.32	0.24	0.26	0.58	0.28	0.81	0.71	0.19	0.15	<0.19	0.16	0.15
17 - 18	0.80	0.30	0.97	0.19	0.21	0.68	0.50	0.19	<0.13	0.14	0.18	0.13
18 - 19	1.41	0.17	1.11	0.16	0.16	1.45	0.42	<0.14	<0.13	N	0.21	0.19
19 - 20	2.16	0.36	2.85	0.22	0.18	0.31	0.67	0.20	<0.13	N	0.15	0.45
20 - 21	1.46	0.97	0.71	0.23	0.13	0.23	0.54	0.32	0.19	N	0.15	0.54
21 - 22	1.44	0.46	1.40	0.20	0.16	0.18	1.62	0.13	0.14	N	0.23	1.86
22 - 23	0.32	0.39	1.21	0.22	0.18	N	0.48	0.49	0.15	N	0.20	1.44
23 - 24	1.06	0.17	0.29	0.25	0.19	0.24	0.24	0.89	0.27	N	0.12	1.24
24 - 25	0.91	0.17	0.27	0.20	0.22	0.29	0.23	0.89	0.18	N	0.14	0.83
25 - 26	3.21	0.28	0.18	0.16	0.23	0.33	0.63	0.84	0.13	0.18	0.20	0.44
26 - 27	1.37	0.34	0.20	0.16	0.16	1.29	0.32	0.17	0.15	0.11	0.10	0.73
27 - 28	1.00	0.17	N	0.26	0.11	1.31	0.22	0.10	<0.13	<0.13	0.15	2.18
28 - 29	0.29	0.16	0.20	0.24	0.11	1.50	0.15	0.13	0.13	0.15	0.45	0.21
29 - 30	0.18	0.33	0.45	0.33	0.17	1.47	0.19	0.21	<0.12	<0.13	0.17	1.04
30 - 31	0.20		1.06	1.30	0.17	0.40	0.33	1.03	0.12	0.12	N	0.35
31 - 1	0.33		0.63		0.57		0.41	0.45		<0.14		0.20
Arithmetric Mean (3)	0.79	0.30	0.54	0.56	0.58	0.49	0.37	0.32	0.16	0.09	0.24	0.48
Standard Deviation (3)	0.75	0.17	0.56	0.52	0.63	0.46	0.29	0.25	0.12	0.04	0.37	0.54
Sample Size	31	28	30	27	31	28	30	31	22	24	29	31

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5009 High Muffles - Sulphur Dioxide as S (SO2 - S)
Concentration in air (μg S m^{-3})

Daily measurements - Summary for January 2000 to December 2000

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.85	0.48	1.34	2.40	0.58	0.75	1.16	0.50	0.48	5.83	0.52	6.02
2 - 3	1.72	0.22	0.88	0.21	1.05	0.23	0.14	2.59	0.76	0.63	0.77	3.36
3 - 4	0.35	0.85	1.61	0.15	0.20	0.16	0.11	1.24	0.59	6.54	0.29	3.27
4 - 5	2.79	0.46	0.63	0.70	0.16	0.10	0.18	0.46	1.51	1.38	0.32	4.11
5 - 6	5.22	1.25	0.66	0.35	0.21	0.16	0.35	0.30	0.67	0.68	1.23	6.17
6 - 7	0.97	2.57	0.33	4.51	0.32	0.94	0.20	1.17	0.37	0.99	0.27	6.25
7 - 8	0.89	1.81	0.23	10.82	0.42	0.55	0.60	0.17	1.21	2.89	0.23	3.87
8 - 9	0.37	0.52	0.28	0.46	0.29	3.56	0.32	0.62	0.37	0.18	2.15	1.12
9 - 10	0.76	1.57	0.14	0.50	0.84	2.82	0.73	N	0.43	1.91	1.59	1.93
10 - 11	2.69	0.35	0.14	0.37	0.26	0.85	0.20	1.76	0.40	1.29	2.57	1.10
11 - 12	0.53	0.73	0.37	1.57	0.27	0.54	1.48	1.04	2.73	0.93	2.74	1.02
12 - 13	0.73	0.13	0.31	0.36	0.53	0.90	0.99	2.75	1.21	1.56	0.94	3.56
13 - 14	2.50	0.28	0.17	0.33	0.82	0.24	0.17	0.63	1.00	1.95	0.74	0.43
14 - 15	0.18	2.45	0.69	0.26	4.12	0.78	1.24	0.41	0.62	2.39	3.30	2.35
15 - 16	2.12	1.25	0.18	0.39	3.30	0.48	0.16	N	0.21	2.34	N	3.54
16 - 17	0.69	1.24	0.89	0.17	5.84	1.43	0.28	0.37	0.67	0.89	N	6.00
17 - 18	4.18	1.29	0.85	2.05	0.25	3.96	1.40	0.21	0.77	4.33	N	13.56
18 - 19	1.01	0.51	0.33	5.12	0.28	2.99	2.22	4.27	1.59	1.14	N	0.90
19 - 20	0.53	0.88	0.37	3.06	0.37	4.91	2.43	1.38	0.51	1.32	N	5.24
20 - 21	7.15	N	0.27	3.95	2.09	8.26	0.52	1.11	2.98	2.13	N	0.98
21 - 22	1.24	N	0.30	2.11	0.58	1.17	1.19	0.45	2.31	1.62	N	1.07
22 - 23	0.76	N	1.80	0.81	0.53	1.39	0.13	0.19	1.12	5.38	1.62	0.66
23 - 24	2.73	N	0.50	1.73	2.60	N	0.13	0.25	1.26	1.45	8.27	0.46
24 - 25	2.15	0.47	3.47	1.12	0.45	0.80	0.21	1.35	1.16	0.90	3.63	0.23
25 - 26	0.58	1.11	0.71	3.14	0.20	0.26	0.54	1.66	1.92	0.30	3.15	0.34
26 - 27	0.37	2.65	0.57	3.00	2.36	0.86	3.28	1.28	1.63	0.68	0.35	5.33
27 - 28	0.32	1.28	0.17	3.23	0.33	0.65	1.85	0.21	3.88	1.18	3.88	9.93
28 - 29	0.31	1.48	0.23	0.28	1.19	0.22	0.84	0.84	4.25	1.18	4.73	15.28
29 - 30	0.16	0.61	0.28	1.36	0.71	0.25	1.32	0.60	0.93	0.88	4.46	3.39
30 - 31	0.15		0.20	0.70	0.65	1.09	0.41	0.69	0.29	0.37	5.34	2.18
31 - 1	0.46		0.98		2.09		1.70	4.61		0.70		3.00
Arithmetric Mean (3)	1.47	1.06	0.64	1.84	1.09	1.42	0.85	1.14	1.26	1.80	2.31	3.76
Standard Deviation (3)	1.62	0.73	0.68	2.22	1.33	1.81	0.80	1.13	1.04	1.61	2.06	3.67
Sample Size	31	25	31	30	31	29	31	29	30	31	23	31

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5010 Strathvaich Dam - Sulphur Dioxide as S (SO2 - S)
Concentration in air (μg S m^{-3})

Daily measurements - Summary for January 2000 to December 2000

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	<0.30	0.11	0.15	<0.10	0.14	0.10	<0.14	0.24	<0.19	1.37	<0.12	0.16
2 - 3	<0.29	<0.08	0.17	0.14	0.17	0.12	<0.14	0.21	<0.17	0.12	<0.12	<0.14
3 - 4	<0.28	<0.10	0.14	0.15	0.18	0.12	0.14	0.14	<0.17	<0.16	0.12	<0.13
4 - 5	<0.27	0.14	0.21	0.14	0.21	0.13	<0.11	0.14	<0.18	<0.13	<0.15	0.16
5 - 6	<0.31	0.09	0.18	0.22	0.16	0.15	0.12	0.22	0.37	<0.13	<0.12	<0.12
6 - 7	0.29	0.11	0.18	0.59	0.24	<0.14	0.10	0.14	<0.16	<0.13	0.13	0.17
7 - 8	<0.28	0.07	0.16	0.38	0.53	0.15	<0.14	0.13	<0.15	0.16	<0.12	0.24
8 - 9	0.27	0.12	<0.11	N	0.32	0.20	<0.13	0.18	<0.15	<0.12	<0.13	<0.13
9 - 10	<0.28	0.11	0.12	0.16	0.36	0.13	0.16	0.16	<0.18	0.24	<0.13	<0.13
10 - 11	<0.31	0.14	<0.11	0.15	0.12	0.12	<0.12	0.16	0.14	<0.13	0.16	<0.14
11 - 12	<0.29	0.37	<0.11	0.13	0.15	0.13	<0.14	0.17	<0.17	0.40	0.62	<0.12
12 - 13	<0.27	0.14	0.17	0.17	0.22	<0.13	<0.15	0.20	<0.17	<0.13	0.14	<0.12
13 - 14	<0.31	0.09	0.13	0.18	0.24	<0.13	<0.12	0.18	<0.13	<0.13	<0.13	<0.12
14 - 15	<0.28	0.13	0.11	0.13	0.52	<0.12	<0.14	0.19	<0.14	<0.13	<0.19	<0.14
15 - 16	<0.30	0.12	0.15	0.23	0.14	<0.11	<0.16	0.14	<0.13	<0.14	0.23	<0.12
16 - 17	<0.29	<0.09	0.11	0.16	0.20	0.27	0.14	0.19	<0.13	<0.13	<0.13	<0.12
17 - 18	<0.30	0.15	0.13	0.15	0.12	0.26	<0.15	0.20	<0.17	N	<0.16	1.02
18 - 19	<0.28	0.14	0.18	0.16	0.19	0.16	0.16	0.14	<0.16	N	0.29	0.77
19 - 20	<0.26	0.11	<0.12	0.83	0.28	0.18	0.19	0.14	0.51	N	0.27	0.86
20 - 21	<0.23	0.29	0.13	0.19	0.34	<0.15	0.21	0.14	0.36	N	0.50	0.43
21 - 22	<0.27	0.10	0.12	0.13	0.22	0.21	0.38	0.17	1.02	N	0.99	0.33
22 - 23	<0.26	0.27	0.15	0.12	0.16	<0.14	0.31	0.15	<0.12	N	0.16	<0.14
23 - 24	<0.26	<0.10	0.22	0.13	0.16	<0.14	0.26	0.12	1.17	N	0.18	0.15
24 - 25	<0.21	0.10	0.11	0.14	0.27	0.16	0.33	<0.15	0.29	0.18	0.21	0.09
25 - 26	0.10	0.16	0.17	0.29	0.16	0.13	0.20	0.23	0.23	0.12	0.38	0.12
26 - 27	0.13	0.13	0.14	0.18	0.14	<0.12	0.32	0.20	0.15	<0.12	0.16	0.12
27 - 28	0.13	0.19	0.15	0.30	0.16	0.47	0.24	0.16	<0.13	<0.14	0.16	0.21
28 - 29	0.11	0.13	0.21	0.67	0.17	0.13	0.17	0.12	0.25	0.27	0.31	0.17
29 - 30	0.15	0.51	<0.12	0.51	0.13	<0.14	0.19	0.21	0.52	<0.13	0.14	0.11
30 - 31	0.14		<0.12	0.15	<0.12	<0.12	0.17	0.21	0.19	<0.12	0.40	<0.14
31 - 1	0.17		0.11		0.11		0.41	<0.18		0.13		1.01
Arithmetric Mean (3)	0.15	0.15	0.13	0.24	0.21	0.13	0.16	0.17	0.22	0.17	0.21	0.23
Standard Deviation (3)	0.04	0.10	0.05	0.18	0.11	0.09	0.10	0.04	0.27	0.27	0.20	0.28
Sample Size	31	29	31	29	31	30	31	31	30	24	30	31

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5011 Glen Dye - Sulphur Dioxide as S (SO2 - S)
Concentration in air (μg S m^{-3})

Daily measurements - Summary for January 2000 to December 2000

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.27	<0.18	0.41	<0.20	0.18	0.22	0.13	0.26	0.32	1.11	<0.19	0.51
2 - 3	0.22	0.29	0.36	<0.20	0.23	0.18	0.26	0.58	0.14	0.53	<0.19	0.86
3 - 4	0.24	0.27	0.18	<0.19	<0.17	0.22	0.15	0.28	0.27	0.69	0.22	0.58
4 - 5	0.54	<0.19	0.18	0.38	0.18	0.20	0.22	0.28	0.76	<0.17	<0.17	0.70
5 - 6	0.83	<0.21	<0.19	0.51	0.32	0.26	0.18	0.20	N	<0.17	0.19	0.45
6 - 7	0.80	0.39	0.29	1.23	0.36	0.37	0.19	0.20	0.23	<0.18	<0.20	0.72
7 - 8	0.21	0.25	<0.16	0.22	0.26	0.49	0.16	0.33	<0.17	0.38	<0.19	0.56
8 - 9	<0.21	0.25	0.16	0.20	0.44	0.63	0.16	0.27	0.17	<0.19	<0.19	0.23
9 - 10	0.88	0.32	0.25	<0.19	0.41	0.32	0.18	0.25	0.17	0.46	<0.19	0.21
10 - 11	0.41	0.19	<0.18	N	0.30	0.39	<0.18	0.16	<0.20	0.34	1.04	0.34
11 - 12	<0.22	0.29	<0.18	<0.20	0.23	<0.15	0.16	0.46	<0.22	0.21	0.49	0.94
12 - 13	<0.21	<0.19	<0.17	0.23	0.48	0.15	1.09	0.69	<0.22	<0.19	0.99	0.67
13 - 14	<0.22	0.23	<0.19	<0.20	0.57	0.17	<0.15	0.44	0.52	<0.19	<0.19	<0.18
14 - 15	<0.23	0.25	0.20	0.20	3.65	0.19	<0.16	0.21	0.19	0.38	N	<0.20
15 - 16	<0.19	0.46	<0.17	0.63	2.02	0.17	0.15	N	<0.18	0.85	N	<0.20
16 - 17	<0.19	0.19	<0.19	<0.20	0.65	0.23	0.17	0.20	<0.16	<0.19	N	<0.19
17 - 18	<0.20	0.33	<0.18	<0.21	0.16	0.62	0.18	0.24	0.32	N	N	1.35
18 - 19	<0.20	<0.22	0.61	0.19	0.19	0.85	0.24	0.22	0.35	N	N	1.60
19 - 20	<0.20	<0.21	<0.18	0.76	0.21	0.27	0.24	0.19	0.40	N	N	0.65
20 - 21	<0.21	0.98	<0.16	0.44	0.82	0.79	0.23	0.18	0.81	N	N	2.52
21 - 22	<0.20	0.18	<0.19	0.46	0.73	0.34	0.22	N	1.92	N	0.43	0.26
22 - 23	<0.20	1.55	<0.18	0.50	0.36	0.24	0.21	0.21	<0.19	N	<0.19	<0.19
23 - 24	<0.20	0.61	<0.19	1.04	0.62	0.23	0.18	0.93	0.74	N	0.23	<0.19
24 - 25	0.20	<0.21	0.26	2.43	0.19	0.23	0.50	0.25	0.34	0.32	0.31	<0.20
25 - 26	<0.19	<0.18	0.45	<0.19	0.16	0.32	0.27	1.48	0.40	<0.13	0.90	0.20
26 - 27	<0.20	0.53	0.36	<0.19	0.51	0.24	0.29	0.26	0.25	0.25	0.19	<0.21
27 - 28	0.20	<0.20	<0.22	1.11	0.22	0.35	0.62	<0.20	0.23	0.15	0.90	0.23
28 - 29	0.21	0.21	0.45	<0.19	0.30	0.17	0.32	<0.21	0.73	0.46	0.97	<0.22
29 - 30	<0.18	0.43	<0.21	<0.13	0.20	0.19	0.19	0.32	1.15	0.62	0.71	<0.22
30 - 31	0.25		<0.19	0.32	0.19	<0.18	0.31	0.79	<0.15	0.22	1.87	0.20
31 - 1	<0.20		<0.21		0.29		0.38	0.75		0.37		1.70
Arithmetic Mean (3)	0.23	0.31	0.19	0.41	0.50	0.31	0.25	0.37	0.38	0.34	0.45	0.53
Standard Deviation (3)	0.23	0.31	0.14	0.51	0.68	0.19	0.19	0.30	0.40	0.27	0.47	0.58
Sample Size	31	29	31	29	31	30	31	29	29	24	23	31

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5326 Bush - Sulphur Dioxide as S (SO2 - S)
Concentration in air (μg S m^{-3})

Daily measurements - Summary for January 2000 to December 2000

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	N	0.29	2.57	1.01	10.94	0.37	4.84	0.31	1.15	1.38	0.30	0.51
2 - 3	N	0.33	0.34	0.90	3.49	1.09	1.75	0.55	1.25	0.32	0.83	0.31
3 - 4	N	0.35	2.60	0.37	1.56	0.92	1.62	0.86	1.47	<0.21	1.20	0.47
4 - 5	N	0.49	0.72	0.70	3.75	1.30	3.63	0.38	0.39	0.30	0.25	0.42
5 - 6	N	0.41	0.68	4.80	1.22	1.10	1.50	0.38	0.30	5.12	0.87	0.51
6 - 7	N	0.38	0.20	1.22	2.97	0.56	1.36	0.32	0.30	0.37	4.98	0.65
7 - 8	0.32	0.46	0.23	1.65	1.54	0.34	0.36	0.31	<0.23	0.22	0.84	0.80
8 - 9	N	0.31	0.15	3.85	2.82	0.39	0.19	0.45	<0.21	<0.20	0.72	0.97
9 - 10	N	0.60	0.54	3.02	5.18	1.36	0.29	0.27	<0.16	0.64	4.74	0.33
10 - 11	N	0.37	N	1.61	0.42	0.37	2.78	0.37	1.43	1.24	1.21	0.43
11 - 12	N	0.49	N	2.50	0.76	0.26	2.38	0.41	0.52	0.62	0.69	0.58
12 - 13	N	0.32	N	2.71	2.06	0.50	0.48	0.46	0.53	0.67	0.50	0.48
13 - 14	N	0.47	N	0.34	1.71	0.32	0.18	1.40	0.17	2.75	0.62	0.24
14 - 15	0.41	0.56	1.29	0.99	0.94	0.33	0.32	0.41	0.29	0.29	2.51	1.26
15 - 16	4.11	0.30	0.39	0.60	0.53	0.35	1.41	0.46	4.45	0.43	1.05	3.40
16 - 17	0.53	1.10	0.31	0.96	0.33	5.75	2.64	0.37	0.51	0.30	0.51	2.75
17 - 18	1.29	0.39	0.44	1.38	0.28	0.97	1.94	0.54	0.18	0.33	N	2.40
18 - 19	1.13	0.84	0.52	0.55	0.20	0.40	0.40	0.45	0.20	0.42	N	1.75
19 - 20	1.51	1.13	0.26	0.90	1.42	2.21	1.98	1.58	1.80	0.43	N	2.18
20 - 21	1.80	1.53	0.31	0.37	0.36	0.31	1.25	1.48	0.45	1.14	N	1.95
21 - 22	0.84	0.53	0.43	0.38	4.34	0.37	5.85	2.23	1.83	0.39	N	2.78
22 - 23	0.70	1.44	2.39	0.60	0.25	0.32	2.70	0.80	0.39	1.34	N	4.16
23 - 24	0.82	0.50	0.78	0.90	0.27	0.24	2.66	0.76	1.35	0.45	N	N
24 - 25	1.52	0.37	0.74	0.75	0.30	1.89	0.45	0.75	0.97	0.25	0.80	N
25 - 26	2.04	0.35	0.56	0.36	0.22	1.71	0.81	1.71	0.35	0.17	0.49	N
26 - 27	0.32	0.43	5.44	0.25	N	1.50	4.25	0.45	1.39	0.21	0.45	N
27 - 28	0.52	0.29	0.76	0.68	N	3.14	0.51	0.39	0.29	0.46	0.78	N
28 - 29	0.26	0.41	8.29	3.20	N	1.50	0.64	6.20	0.42	0.65	0.98	N
29 - 30	0.40	0.47	7.10	2.07	N	3.56	1.98	2.19	1.59	0.25	0.61	3.53
30 - 31	0.31		3.24	1.36	N	3.66	0.78	0.46	1.36	0.63	0.90	N
31 - 1	0.30		0.57		0.38		0.43	0.63		0.28		N
Arithmetric Mean (3)	-	0.55	1.55	1.37	1.86	1.24	1.69	0.91	0.85	0.72	1.17	1.43
Standard Deviation (3)	-	0.33	2.15	1.15	2.34	1.30	1.45	1.13	0.89	0.97	1.25	1.22
Sample Size	19	29	27	30	26	30	31	31	30	31	23	23

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre

Weekly Sites Analysed:

5301 Brockhill 1
5303 Caenby 1
5304 Camborne 1
5305 Camphill 1
5306 Cardington 2
5308 Corpach 1
5309 Cresselly 1
5310 Etton 1
5312 Husborne Crawley 1
5313 Little Horkesley 1
5314 Marshfield 1
5315 Ratcliffe 13
5316 Rockbourne 1
5317 Wakefield 24
5318 Waunfawr 1
5319 Fort Augustus 2
5320 Loch Leven 2
5321 Redesdale 2
5322 Hebden Bridge 2
5323 Preston Montford 2
5324 Bentra
5325 Pitlochry
5329 Cam Forest
5330 Cwmystwyth
5331 Rosemaund
5333 Fairseat
5334 Bylchau
5335 Crai
5338 Forsinain
5339 Appleacre
5343 Benniguinea

Variables Analysed	Units	Specified Variable Limit
sulphur dioxide as S	$\mu g\ m^{-3}$	1.000

Time Period Covered:

January 2000 - December 2000

National Environmental Technology Centre
Site: 5301 Brockhill 1 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	07/01 - 14/01	1.48	04/02 - 11/02	1.20	03/03 - 10/03	1.01	31/03 - 07/04	2.06	28/04 - 05/05	2.28	02/06 - 09/06	1.75
	14/01 - 21/01	2.49	11/02 - 18/02	1.51	10/03 - 17/03	0.73	07/04 - 14/04	2.97	05/05 - 19/05	N	09/06 - 16/06	1.07
	21/01 - 28/01	2.78	18/02 - 25/02	2.37	17/03 - 24/03	2.38	14/04 - 28/04	N	19/05 - 26/05	1.77	16/06 - 23/06	1.30
	28/01 - 04/02	2.00	25/02 - 03/03	1.25	24/03 - 31/03	2.79			26/05 - 02/06	1.24	23/06 - 30/06	1.47
Arithmetic Mean		2.19		1.58		1.73		-		-		1.39
Standard Deviation		0.57		0.54		1.01		-		-		0.29
Valid Samples		4		4		4		2		3		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	30/06 - 07/07	1.16	04/08 - 11/08	0.67	25/08 - 08/09	0.72	29/09 - 06/10	0.37	03/11 - 10/11	1.34	01/12 - 08/12	0.67
	07/07 - 14/07	1.31	11/08 - 18/08	0.65	08/09 - 15/09	0.77	06/10 - 13/10	0.46	10/11 - 17/11	1.38	08/12 - 15/12	N
	14/07 - 21/07	1.55	18/08 - 25/08	0.97	15/09 - 22/09	1.06	13/10 - 20/10	0.73	17/11 - 24/11	N	15/12 - 22/12	N
	21/07 - 28/07	2.03			22/09 - 29/09	0.76	20/10 - 27/10	0.76	24/11 - 01/12	1.15	22/12 - 05/01	N
	28/07 - 04/08	0.84					27/10 - 03/11	0.53				
Arithmetic Mean		1.38		0.76		0.83		0.57		1.29		-
Standard Deviation		0.45		0.18		0.16		0.17		0.12		-
Valid Samples		5		3		4		5		3		1

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5303 Caenby 1 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	04/01 - 11/01	1.36	01/02 - 15/02	3.06	29/02 - 07/03	4.35	04/04 - 11/04	1.27	02/05 - 09/05	2.15	30/05 - 06/06	3.97
	11/01 - 18/01	1.97	15/02 - 22/02	3.92	07/03 - 14/03	3.42	11/04 - 18/04	2.22	09/05 - 16/05	1.61	06/06 - 13/06	5.02
	18/01 - 01/02	3.12	22/02 - 29/02	2.72	14/03 - 21/03	3.15	18/04 - 25/04	1.92	16/05 - 23/05	3.61	13/06 - 20/06	2.40
					21/03 - 28/03	3.36	25/04 - 02/05	1.35	23/05 - 30/05	3.44	20/06 - 27/06	3.38
					28/03 - 04/04	3.13					27/06 - 04/07	1.58
Arithmetic Mean		2.15		3.23		3.48		1.69		2.70		3.27
Standard Deviation		0.89		0.62		0.50		0.46		0.98		1.34
Valid Samples		3		3		5		4		4		5

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	04/07 - 11/07	1.43	01/08 - 08/08	3.48	29/08 - 06/09	5.07	02/10 - 10/10	3.22	31/10 - 07/11	4.01	28/11 - 05/12	1.90
	11/07 - 18/07	3.39	08/08 - 15/08	3.35	06/09 - 11/09	7.04	10/10 - 17/10	3.58	07/11 - 14/11	4.26	05/12 - 12/12	2.89
	18/07 - 01/08	N	15/08 - 22/08	6.96	11/09 - 19/09	5.61	17/10 - 24/10	N	14/11 - 21/11	5.46	12/12 - 19/12	3.82
			22/08 - 29/08	2.24	19/09 - 26/09	2.94	24/10 - 31/10	5.92	21/11 - 28/11	2.97	19/12 - 27/12	1.10
					26/09 - 02/10	1.88					27/12 - 01/01	4.94
Arithmetic Mean		-		4.01		4.51		4.24		4.17		2.93
Standard Deviation		-		2.05		2.08		1.46		1.03		1.52
Valid Samples		2		4		5		3		4		5

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5304 Camborne 1 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	03/01 - 10/01	0.47	31/01 - 07/02	0.58	28/02 - 06/03	0.56	03/04 - 10/04	1.20	01/05 - 08/05	1.55	29/05 - 05/06	0.44
	10/01 - 17/01	1.08	07/02 - 14/02	0.70	06/03 - 13/03	0.51	10/04 - 17/04	0.86	08/05 - 15/05	0.86	05/06 - 12/06	0.51
	17/01 - 24/01	1.11	14/02 - 21/02	0.50	13/03 - 20/03	0.65	17/04 - 24/04	0.41	15/05 - 22/05	0.60	12/06 - 19/06	0.66
	24/01 - 31/01	1.83	21/02 - 28/02	0.45	20/03 - 27/03	1.24	24/04 - 01/05	0.75	22/05 - 29/05	0.37	19/06 - 26/06	0.45
					27/03 - 03/04	0.89					26/06 - 03/07	0.98
Arithmetic Mean		1.12		0.56		0.77		0.81		0.84		0.61
Standard Deviation		0.56		0.11		0.30		0.33		0.51		0.23
Valid Samples		4		4		5		4		4		5

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	03/07 - 10/07	0.62	31/07 - 07/08	0.52	04/09 - 11/09	0.36	02/10 - 09/10	0.27	30/10 - 06/11	0.38	04/12 - 11/12	0.77
	10/07 - 17/07	0.56	07/08 - 14/08	0.48	11/09 - 18/09	0.28	09/10 - 16/10	<0.25	06/11 - 13/11	0.40	11/12 - 18/12	0.47
	17/07 - 24/07	0.76	14/08 - 21/08	0.58	18/09 - 25/09	0.42	16/10 - 23/10	0.54	13/11 - 20/11	0.33	18/12 - 25/12	0.82
	24/07 - 31/07	0.78	21/08 - 28/08	0.66	25/09 - 02/10	<0.21	23/10 - 30/10	0.24	20/11 - 27/11	0.66	25/12 - 01/01	0.91
			28/08 - 04/09	0.63					27/11 - 04/12	0.43		
Arithmetic Mean		0.68		0.58		0.29		0.29		0.44		0.74
Standard Deviation		0.11		0.08		0.14		0.18		0.13		0.19
Valid Samples		4		5		4		4		5		4

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5305 Camphill 1 - Sulphur Dioxide as S (SO2 - S)
Concentration in air (μg S m^{-3})

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	30/12 - 06/01	0.27	03/02 - 10/02	0.33	02/03 - 09/03	0.25	30/03 - 06/04	0.77	04/05 - 11/05	9.64	01/06 - 08/06	1.39
	06/01 - 13/01	0.32	10/02 - 17/02	0.33	09/03 - 16/03	0.19	06/04 - 13/04	1.67	11/05 - 18/05	1.49	08/06 - 15/06	0.50
	13/01 - 20/01	N	17/02 - 24/02	0.49	16/03 - 23/03	0.30	13/04 - 20/04	1.04	18/05 - 25/05	0.43	15/06 - 22/06	0.95
	20/01 - 27/01	0.44	24/02 - 02/03	0.16	23/03 - 30/03	3.02	20/04 - 27/04	0.50	25/05 - 01/06	0.45	22/06 - 29/06	3.16
	27/01 - 03/02	0.38					27/04 - 04/05	3.74				
Arithmetic Mean		0.35		0.33		0.94		1.54		3.00		1.50
Standard Deviation		0.07		0.14		1.39		1.30		4.45		1.16
Valid Samples		4		4		4		5		4		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	29/06 - 06/07	3.87	03/08 - 10/08	0.39	31/08 - 07/09	0.71	28/09 - 05/10	0.93	02/11 - 09/11	0.67	30/11 - 07/12	0.39
	06/07 - 13/07	1.15	10/08 - 17/08	0.47	07/09 - 14/09	0.75	05/10 - 12/10	N	09/11 - 16/11	N	07/12 - 14/12	0.45
	13/07 - 20/07	1.35	17/08 - 24/08	N	14/09 - 21/09	0.37	12/10 - 19/10	0.49	16/11 - 23/11	0.13	14/12 - 21/12	N
	20/07 - 28/07	2.24	24/08 - 31/08	0.95	21/09 - 28/09	0.68	19/10 - 26/10	N	23/11 - 30/11	0.52	21/12 - 04/01	N
	28/07 - 03/08	0.79					26/10 - 02/11	0.29				
Arithmetic Mean		1.88		0.60		0.63		-		0.44		-
Standard Deviation		1.24		0.30		0.17		-		0.28		-
Valid Samples		5		3		4		3		3		2

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5306 Cardington 2 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	29/12 - 05/01	4.82	02/02 - 09/02	5.58	01/03 - 08/03	8.82	29/03 - 05/04	1.47	03/05 - 10/05	0.90	31/05 - 07/06	2.76
	05/01 - 12/01	3.70	09/02 - 17/02	7.27	08/03 - 15/03	9.37	05/04 - 12/04	1.82	10/05 - 17/05	1.41	07/06 - 14/06	3.15
	12/01 - 19/01	6.73	17/02 - 23/02	4.48	15/03 - 22/03	3.89	12/04 - 19/04	2.12	17/05 - 24/05	3.67	14/06 - 21/06	2.70
	19/01 - 26/01	7.42	23/02 - 01/03	5.10	22/03 - 29/03	3.03	19/04 - 27/04	1.33	24/05 - 31/05	3.01	21/06 - 29/06	1.69
	26/01 - 02/02	10.68					27/04 - 03/05	1.77				
Arithmetic Mean		6.67		5.61		6.28		1.70		2.25		2.57
Standard Deviation		2.69		1.20		3.28		0.31		1.31		0.62
Valid Samples		5		4		4		5		4		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	29/06 - 05/07	1.49	02/08 - 09/08	2.24	30/08 - 06/09	8.98	04/10 - 11/10	3.85	01/11 - 07/11	3.13	29/11 - 06/12	0.71
	05/07 - 12/07	1.27	09/08 - 16/08	2.38	06/09 - 13/09	3.71	11/10 - 18/10	4.74	07/11 - 15/11	5.09	06/12 - 14/12	2.36
	12/07 - 19/07	2.33	16/08 - 23/08	3.19	13/09 - 20/09	1.82	18/10 - 25/10	3.33	15/11 - 22/11	6.37	14/12 - 20/12	5.83
	19/07 - 26/07	1.34	23/08 - 30/08	2.24	20/09 - 27/09	2.46	25/10 - 01/11	4.02	22/11 - 29/11	2.40	20/12 - 27/12	1.76
	26/07 - 02/08	3.58			27/09 - 04/10	2.12					27/12 - 03/01	7.98
Arithmetic Mean		2.00		2.51		3.82		3.99		4.25		3.73
Standard Deviation		0.98		0.46		2.97		0.58		1.82		3.06
Valid Samples		5		4		5		4		4		5

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5308 Corpach 1 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	07/01 - 12/01	<0.33	02/02 - 09/02	N	01/03 - 09/03	<0.19	29/03 - 05/04	0.61	03/05 - 10/05	1.40	31/05 - 07/06	0.60
	12/01 - 19/01	0.24	09/02 - 16/02	<0.27	09/03 - 15/03	N	05/04 - 12/04	N	10/05 - 17/05	0.95	07/06 - 14/06	0.24
	19/01 - 26/01	0.66	16/02 - 23/02	0.26	15/03 - 22/03	0.33	12/04 - 19/04	0.49	17/05 - 24/05	0.41	14/06 - 21/06	1.42
	26/01 - 02/02	1.10	23/02 - 01/03	N	22/03 - 29/03	0.74	19/04 - 26/04	N	24/05 - 31/05	N	21/06 - 28/06	1.18
							26/04 - 03/05	0.79				
Arithmetic Mean		0.54		-		0.39		-		0.92		0.86
Standard Deviation		0.43		-		0.33		-		0.50		0.54
Valid Samples		4		2		3		3		3		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	28/06 - 05/07	N	02/08 - 09/08	0.44	30/08 - 06/09	N	04/10 - 11/10	0.35	01/11 - 08/11	0.36	29/11 - 06/12	0.22
	05/07 - 12/07	0.57	09/08 - 16/08	0.31	06/09 - 13/09	0.33	11/10 - 18/10	0.27	08/11 - 15/11	N	06/12 - 13/12	0.55
	12/07 - 19/07	0.71	16/08 - 23/08	1.00	13/09 - 20/09	0.52	18/10 - 25/10	0.39	15/11 - 22/11	0.47	13/12 - 21/12	N
	19/07 - 26/07	1.63	23/08 - 30/08	N	20/09 - 27/09	0.43	25/10 - 01/11	0.51	22/11 - 29/11	N	21/12 - 03/01	0.35
	26/07 - 02/08	1.32			27/09 - 04/10	0.25						
Arithmetic Mean		1.06		0.58		0.38		0.38		-		0.37
Standard Deviation		0.50		0.37		0.12		0.10		-		0.17
Valid Samples		4		3		4		4		2		3

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5309 Cresselly 1 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	05/01 - 12/01	0.87	02/02 - 09/02	0.81	01/03 - 08/03	0.67	29/03 - 05/04	0.67	03/05 - 10/05	3.41	31/05 - 07/06	0.57
	12/01 - 19/01	1.64	09/02 - 16/02	0.74	08/03 - 15/03	1.00	05/04 - 12/04	4.83	10/05 - 17/05	1.78	07/06 - 14/06	0.64
	19/01 - 26/01	0.50	16/02 - 23/02	0.90	15/03 - 22/03	0.86	12/04 - 19/04	1.06	17/05 - 24/05	1.82	14/06 - 22/06	0.71
	26/01 - 02/02	1.19	23/02 - 01/03	0.69	22/03 - 29/03	N	19/04 - 26/04	1.16	24/05 - 31/05	0.97	22/06 - 28/06	0.68
							26/04 - 03/05	1.27				
Arithmetic Mean		1.05		0.79		0.84		1.80		2.00		0.65
Standard Deviation		0.48		0.09		0.17		1.71		1.02		0.06
Valid Samples		4		4		3		5		4		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	28/06 - 05/07	0.97	02/08 - 09/08	0.80	30/08 - 06/09	0.76	04/10 - 11/10	0.34	01/11 - 08/11	0.51	29/11 - 06/12	0.23
	05/07 - 12/07	N	09/08 - 16/08	0.41	06/09 - 20/09	0.76	11/10 - 20/10	0.41	08/11 - 15/11	0.40	06/12 - 13/12	0.22
	12/07 - 19/07	0.71	16/08 - 23/08	0.76	20/09 - 27/09	0.51	20/10 - 25/10	0.74	15/11 - 22/11	0.32	13/12 - 20/12	0.62
	19/07 - 26/07	0.93	23/08 - 30/08	1.31	27/09 - 04/10	0.50	25/10 - 01/11	0.42	22/11 - 29/11	0.25	20/12 - 03/01	0.60
	26/07 - 02/08	1.03										
Arithmetic Mean		0.91		0.82		0.63		0.48		0.37		0.42
Standard Deviation		0.14		0.37		0.15		0.18		0.11		0.23
Valid Samples		4		4		4		4		4		4

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5310 Etton 1 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	04/01 - 13/01	4.17	01/02 - 07/02	3.60	01/03 - 07/03	3.47	04/04 - 18/04	2.27	02/05 - 09/05	0.42	30/05 - 06/06	1.17
	13/01 - 18/01	1.14	07/02 - 15/02	3.17	07/03 - 14/03	0.69	18/04 - 25/04	4.21	09/05 - 16/05	2.66	06/06 - 13/06	2.81
	18/01 - 25/01	1.13	15/02 - 24/02	2.77	14/03 - 21/03	0.77	25/04 - 02/05	3.35	16/05 - 23/05	2.49	13/06 - 20/06	N
	25/01 - 01/02	1.56	24/02 - 01/03	2.15	21/03 - 28/03	1.62			23/05 - 30/05	2.35	20/06 - 27/06	1.79
					28/03 - 04/04	1.13					27/06 - 04/07	1.14
Arithmetic Mean		2.00		2.92		1.53		3.27		1.98		1.73
Standard Deviation		1.46		0.61		1.14		0.97		1.05		0.78
Valid Samples		4		4		5		3		4		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	04/07 - 11/07	0.34	01/08 - 09/08	N	29/08 - 05/09	4.07	03/10 - 10/10	3.44	31/10 - 07/11	1.32	28/11 - 05/12	2.95
	11/07 - 18/07	0.49	09/08 - 15/08	3.37	05/09 - 13/09	2.10	10/10 - 17/10	5.18	07/11 - 14/11	1.96	05/12 - 12/12	N
	18/07 - 25/07	0.27	15/08 - 22/08	3.62	13/09 - 19/09	3.86	17/10 - 24/10	2.60	14/11 - 21/11	2.51	12/12 - 19/12	3.78
	25/07 - 01/08	1.78	22/08 - 29/08	1.89	19/09 - 26/09	2.86	24/10 - 31/10	0.19	21/11 - 28/11	3.64	19/12 - 02/01	1.45
					26/09 - 03/10	4.56						
Arithmetic Mean		0.72		2.96		3.49		2.85		2.36		2.73
Standard Deviation		0.71		0.93		0.99		2.07		0.99		1.18
Valid Samples		4		3		5		4		4		3

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5312 Husborne Crawley 1 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	04/01 - 11/01	0.84	01/02 - 08/02	1.26	29/02 - 07/03	0.97	04/04 - 11/04	2.46	02/05 - 10/05	4.36	30/05 - 06/06	1.29
	11/01 - 18/01	3.41	08/02 - 15/02	0.61	07/03 - 14/03	0.97	11/04 - 19/04	2.99	10/05 - 16/05	5.77	06/06 - 13/06	0.83
	18/01 - 25/01	4.27	15/02 - 22/02	0.99	14/03 - 21/03	2.07	19/04 - 25/04	0.80	16/05 - 23/05	1.22	13/06 - 20/06	1.80
	25/01 - 01/02	1.86	22/02 - 29/02	0.98	21/03 - 28/03	1.75	25/04 - 02/05	1.74	23/05 - 30/05	1.02	20/06 - 27/06	1.11
					28/03 - 04/04	1.68					27/06 - 04/07	1.69
Arithmetic Mean		2.60		0.96		1.49		1.99		3.09		1.34
Standard Deviation		1.54		0.27		0.49		0.95		2.35		0.40
Valid Samples		4		4		5		4		4		5

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	04/07 - 11/07	1.62	01/08 - 08/08	0.77	29/08 - 05/09	1.31	03/10 - 10/10	1.21	31/10 - 07/11	0.76	28/11 - 05/12	0.60
	11/07 - 18/07	1.19	08/08 - 15/08	0.72	05/09 - 12/09	0.78	10/10 - 17/10	1.08	07/11 - 14/11	0.88	05/12 - 12/12	0.51
	18/07 - 25/07	1.72	15/08 - 22/08	1.17	12/09 - 19/09	0.59	17/10 - 24/10	1.03	14/11 - 21/11	0.81	12/12 - 19/12	0.93
	25/07 - 01/08	1.32	22/08 - 29/08	1.03	19/09 - 26/09	0.81	24/10 - 31/10	1.19	21/11 - 28/11	0.85	19/12 - 26/12	1.37
					26/09 - 03/10	0.57					26/12 - 02/01	3.00
Arithmetic Mean		1.46		0.92		0.81		1.13		0.83		1.28
Standard Deviation		0.25		0.21		0.30		0.09		0.05		1.02
Valid Samples		4		4		5		4		4		5

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5313 Little Horkesley 1 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	05/01 - 12/01	1.80	02/02 - 09/02	1.35	01/03 - 08/03	2.07	29/03 - 05/04	1.97	03/05 - 10/05	2.59	31/05 - 07/06	1.20
	12/01 - 19/01	2.30	09/02 - 16/02	1.43	08/03 - 15/03	1.29	05/04 - 12/04	2.54	10/05 - 17/05	1.72	07/06 - 14/06	1.17
	19/01 - 26/01	2.03	16/02 - 23/02	2.11	15/03 - 22/03	1.48	12/04 - 19/04	1.31	17/05 - 24/05	0.93	14/06 - 21/06	N
	26/01 - 02/02	3.01	23/02 - 01/03	1.48	22/03 - 29/03	1.79	19/04 - 26/04	1.45	24/05 - 31/05	0.99	21/06 - 28/06	1.47
							26/04 - 03/05	1.18				
Arithmetic Mean		2.28		1.59		1.66		1.69		1.56		1.28
Standard Deviation		0.52		0.35		0.35		0.56		0.78		0.16
Valid Samples		4		4		4		5		4		3

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	28/06 - 05/07	1.15	03/08 - 09/08	1.04	30/08 - 06/09	1.05	04/10 - 11/10	1.59	01/11 - 08/11	1.12	29/11 - 06/12	1.26
	05/07 - 12/07	0.66	09/08 - 16/08	1.60	06/09 - 13/09	0.95	11/10 - 18/10	1.93	08/11 - 15/11	1.28	06/12 - 13/12	1.23
	12/07 - 19/07	0.98	16/08 - 23/08	1.07	13/09 - 20/09	1.22	18/10 - 25/10	2.24	15/11 - 22/11	1.12	13/12 - 20/12	2.25
	19/07 - 26/07	1.28	23/08 - 30/08	1.06	20/09 - 27/09	1.08	25/10 - 01/11	0.79	22/11 - 29/11	1.23	20/12 - 03/01	2.46
	26/07 - 03/08	1.07			27/09 - 04/10	0.90						
Arithmetic Mean		1.03		1.19		1.04		1.64		1.19		1.80
Standard Deviation		0.23		0.27		0.13		0.62		0.08		0.65
Valid Samples		5		4		5		4		4		4

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5314 Marshfield 1 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	04/01 - 11/01	0.57	01/02 - 08/02	0.62	29/02 - 07/03	N	04/04 - 11/04	2.51	02/05 - 09/05	1.92	30/05 - 06/06	1.03
	11/01 - 18/01	1.56	08/02 - 15/02	1.08	07/03 - 14/03	1.06	11/04 - 18/04	1.28	09/05 - 15/05	1.31	06/06 - 13/06	0.79
	18/01 - 25/01	1.23	15/02 - 22/02	N	14/03 - 21/03	1.24	18/04 - 26/04	0.34	15/05 - 23/05	0.59	13/06 - 20/06	1.24
	25/01 - 01/02	1.15	22/02 - 29/02	N	21/03 - 28/03	1.64	26/04 - 02/05	1.34	23/05 - 30/05	0.80	20/06 - 27/06	0.98
					28/03 - 04/04	1.61					27/06 - 04/07	1.21
Arithmetic Mean		1.13		-		1.39		1.37		1.16		1.05
Standard Deviation		0.41		-		0.28		0.89		0.60		0.18
Valid Samples		4		2		4		4		4		5

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	04/07 - 11/07	0.68	01/08 - 08/08	0.62	29/08 - 05/09	1.97	05/10 - 10/10	0.35	31/10 - 07/11	0.75	28/11 - 05/12	0.54
	11/07 - 18/07	1.52	08/08 - 15/08	1.19	05/09 - 12/09	0.90	10/10 - 17/10	0.37	07/11 - 14/11	0.77	05/12 - 12/12	1.13
	18/07 - 25/07	1.91	15/08 - 22/08	1.20	12/09 - 19/09	0.72	17/10 - 24/10	0.65	14/11 - 21/11	0.49	12/12 - 19/12	1.27
	25/07 - 01/08	1.36	22/08 - 29/08	2.70	19/09 - 26/09	0.62	24/10 - 31/10	0.64	21/11 - 28/11	0.99	19/12 - 28/12	1.66
					26/09 - 05/10	0.73					28/12 - 02/01	1.12
Arithmetic Mean		1.37		1.43		0.99		0.50		0.75		1.14
Standard Deviation		0.51		0.89		0.56		0.16		0.21		0.40
Valid Samples		4		4		5		4		4		5

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5315 Ratcliffe 13 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	30/12 - 06/01	6.35	03/02 - 10/02	2.03	02/03 - 09/03	2.85	30/03 - 06/04	3.44	02/05 - 09/05	12.61	30/05 - 06/06	2.85
	06/01 - 13/01	9.33	10/02 - 17/02	1.77	09/03 - 16/03	2.39	06/04 - 11/04	3.54	09/05 - 16/05	9.04	06/06 - 13/06	3.28
	13/01 - 20/01	2.67	17/02 - 23/02	1.86	16/03 - 23/03	2.07	11/04 - 18/04	3.40	16/05 - 23/05	3.07	13/06 - 20/06	1.41
	20/01 - 27/01	3.21	23/02 - 02/03	1.03	23/03 - 30/03	3.28	18/04 - 25/04	1.65	23/05 - 30/05	1.35	20/06 - 27/06	1.39
	27/01 - 03/02	4.71					25/04 - 02/05	3.55			27/06 - 04/07	3.06
Arithmetic Mean		5.25		1.67		2.65		3.11		6.52		2.40
Standard Deviation		2.69		0.44		0.53		0.82		5.23		0.92
Valid Samples		5		4		4		5		4		5

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	04/07 - 11/07	4.56	01/08 - 08/08	2.09	29/08 - 05/09	1.57	03/10 - 10/10	1.69	31/10 - 07/11	N	28/11 - 05/12	1.36
	11/07 - 18/07	1.61	08/08 - 15/08	1.69	05/09 - 12/09	0.70	10/10 - 17/10	2.79	07/11 - 14/11	1.85	05/12 - 12/12	0.99
	18/07 - 25/07	4.32	15/08 - 22/08	1.50	12/09 - 19/09	1.78	17/10 - 24/10	1.47	14/11 - 21/11	1.37	12/12 - 19/12	1.40
	25/07 - 01/08	3.18	22/08 - 29/08	1.43	19/09 - 26/09	1.69	24/10 - 31/10	2.34	21/11 - 28/11	1.51	19/12 - 27/12	1.67
					26/09 - 03/10	0.70					27/12 - 02/01	2.49
Arithmetic Mean		3.42		1.68		1.29		2.07		1.58		1.58
Standard Deviation		1.35		0.30		0.54		0.60		0.25		0.56
Valid Samples		4		4		5		4		3		5

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5316 Rockbourne 1 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	05/01 - 12/01	0.34	02/02 - 09/02	0.48	01/03 - 08/03	0.57	29/03 - 05/04	1.79	03/05 - 10/05	1.53	31/05 - 07/06	0.60
	12/01 - 19/01	1.72	09/02 - 15/02	0.52	08/03 - 15/03	0.76	05/04 - 12/04	1.52	10/05 - 17/05	0.87	07/06 - 14/06	0.36
	19/01 - 26/01	1.91	15/02 - 23/02	1.02	15/03 - 22/03	1.24	12/04 - 19/04	0.71	17/05 - 24/05	0.39	14/06 - 21/06	0.73
	26/01 - 02/02	0.82	23/02 - 01/03	0.43	22/03 - 29/03	1.08	19/04 - 26/04	0.38	24/05 - 31/05	0.32	21/06 - 28/06	0.72
							26/04 - 03/05	0.58				
Arithmetic Mean		1.20		0.61		0.91		1.00		0.78		0.60
Standard Deviation		0.74		0.27		0.31		0.62		0.56		0.17
Valid Samples		4		4		4		5		4		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	28/06 - 05/07	0.68	02/08 - 09/08	0.35	30/08 - 06/09	0.49	04/10 - 11/10	0.38	01/11 - 09/11	0.95	29/11 - 06/12	0.36
	05/07 - 12/07	0.44	09/08 - 16/08	0.49	06/09 - 20/09	N	11/10 - 18/10	0.49	09/11 - 15/11	0.36	06/12 - 14/12	0.32
	12/07 - 19/07	0.67	16/08 - 23/08	0.45	20/09 - 27/09	0.46	18/10 - 26/10	0.44	15/11 - 22/11	0.85	14/12 - 20/12	0.89
	19/07 - 27/07	0.76	23/08 - 30/08	0.88	27/09 - 04/10	<0.13	26/10 - 01/11	0.20	22/11 - 29/11	0.53	20/12 - 28/12	1.48
	27/07 - 02/08	N									28/12 - 03/01	0.82
Arithmetic Mean		0.64		0.54		0.34		0.38		0.67		0.77
Standard Deviation		0.14		0.23		0.24		0.13		0.28		0.48
Valid Samples		4		4		3		4		4		5

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5317 Wakefield 24 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	29/12 - 05/01	2.43	02/02 - 09/02	1.29	01/03 - 08/03	1.27	30/03 - 05/04	2.51	03/05 - 10/05	8.95	31/05 - 07/06	0.87
	05/01 - 12/01	2.40	09/02 - 16/02	1.65	08/03 - 15/03	0.64	05/04 - 12/04	7.22	10/05 - 17/05	5.49	07/06 - 14/06	1.16
	12/01 - 19/01	1.49	16/02 - 23/02	3.55	15/03 - 22/03	1.19	12/04 - 19/04	2.78	17/05 - 24/05	0.92	14/06 - 21/06	2.41
	19/01 - 26/01	1.63	23/02 - 01/03	1.79	22/03 - 30/03	3.73	19/04 - 26/04	2.84	24/05 - 31/05	0.90	21/06 - 28/06	4.36
	26/01 - 02/02	1.49					26/04 - 03/05	3.13				
Arithmetic Mean		1.89		2.07		1.71		3.70		4.07		2.20
Standard Deviation		0.48		1.01		1.37		1.98		3.91		1.59
Valid Samples		5		4		4		5		4		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	28/06 - 05/07	4.23	02/08 - 09/08	0.60	30/08 - 06/09	2.20	04/10 - 11/10	1.29	01/11 - 09/11	1.82	29/11 - 06/12	3.16
	05/07 - 12/07	0.82	09/08 - 16/08	0.91	06/09 - 13/09	0.87	11/10 - 18/10	1.59	09/11 - 15/11	2.23	06/12 - 13/12	2.88
	12/07 - 19/07	1.10	16/08 - 23/08	0.92	13/09 - 20/09	0.69	18/10 - 25/10	2.15	15/11 - 22/11	2.44	13/12 - 20/12	5.44
	19/07 - 26/07	2.87	23/08 - 30/08	2.37	20/09 - 27/09	3.09	25/10 - 01/11	1.09	22/11 - 29/11	3.35	20/12 - 28/12	9.63
	26/07 - 02/08	1.19			27/09 - 04/10	1.88					28/12 - 03/01	5.64
Arithmetic Mean		2.04		1.20		1.75		1.53		2.46		5.35
Standard Deviation		1.46		0.79		0.99		0.46		0.65		2.71
Valid Samples		5		4		5		4		4		5

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5318 Waunfawr 1 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	05/01 - 12/01	0.57	02/02 - 09/02	0.77	01/03 - 08/03	0.97	29/03 - 05/04	0.98	03/05 - 10/05	2.03	31/05 - 07/06	0.51
	12/01 - 19/01	0.43	09/02 - 16/02	0.70	08/03 - 15/03	0.38	05/04 - 12/04	0.74	10/05 - 17/05	1.62	07/06 - 14/06	0.60
	19/01 - 26/01	1.13	16/02 - 23/02	1.30	15/03 - 22/03	1.11	12/04 - 19/04	1.11	17/05 - 24/05	0.79	14/06 - 21/06	0.41
	26/01 - 02/02	1.29	23/02 - 01/03	1.30	22/03 - 29/03	1.10	19/04 - 26/04	0.72	24/05 - 31/05	0.36	21/06 - 28/06	0.31
							26/04 - 03/05	0.95				
Arithmetic Mean		0.85		1.02		0.89		0.90		1.20		0.46
Standard Deviation		0.42		0.33		0.34		0.16		0.76		0.13
Valid Samples		4		4		4		5		4		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	28/06 - 05/07	0.78	02/08 - 09/08	0.32	30/08 - 06/09	0.49	28/09 - 04/10	0.52	01/11 - 08/11	0.65	28/11 - 05/12	0.39
	05/07 - 12/07	0.63	09/08 - 16/08	N	06/09 - 13/09	1.24	04/10 - 11/10	0.76	08/11 - 16/11	0.60	05/12 - 13/12	0.45
	12/07 - 19/07	0.58	16/08 - 23/08	0.42	13/09 - 20/09	0.40	11/10 - 18/10	0.77	15/11 - 22/11	0.75	13/12 - 20/12	1.08
	19/07 - 26/07	0.92	23/08 - 30/08	0.78	20/09 - 28/09	0.39	18/10 - 25/10	0.31	22/11 - 28/11	0.72	20/12 - 03/01	1.04
	26/07 - 02/08	0.27					25/10 - 01/11	0.50				
Arithmetic Mean		0.64		0.51		0.63		0.57		0.68		0.74
Standard Deviation		0.24		0.24		0.41		0.20		0.07		0.37
Valid Samples		5		3		4		5		4		4

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5319 Fort Augustus 2 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	05/01 - 17/01	0.07	31/01 - 07/02	N	28/02 - 06/03	0.14	03/04 - 10/04	N	03/05 - 08/05	N	30/05 - 05/06	0.15
	17/01 - 24/01	0.12	07/02 - 14/02	N	06/03 - 13/03	0.12	10/04 - 17/04	0.12	08/05 - 15/05	N	05/06 - 12/06	0.15
	24/01 - 31/01	N	14/02 - 21/02	0.09	13/03 - 20/03	0.17	17/04 - 25/04	0.20	15/05 - 22/05	0.14	12/06 - 19/06	0.17
			21/02 - 28/02	0.11	20/03 - 27/03	0.23	25/04 - 03/05	N	22/05 - 30/05	0.11	19/06 - 26/06	0.09
					27/03 - 03/04	0.20					26/06 - 04/07	N
Arithmetic Mean		0.09		-		0.17		-		-		0.14
Standard Deviation		0.04		-		0.04		-		-		0.04
Valid Samples		2		2		5		2		2		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	04/07 - 11/07	0.12	01/08 - 18/08	N	04/09 - 11/09	<0.10	02/10 - 09/10	<0.12	30/10 - 03/11	<0.17	04/12 - 11/12	0.13
	11/07 - 18/07	0.15	18/08 - 26/08	N	11/09 - 18/09	N	09/10 - 16/10	<0.13	03/11 - 13/11	0.09	11/12 - 18/12	0.18
	18/07 - 26/07	N	26/08 - 04/09	0.19	18/09 - 25/09	0.36	16/10 - 23/10	<0.12	13/11 - 21/11	<0.11	18/12 - 28/12	0.33
	26/07 - 01/08	0.14			25/09 - 02/10	0.32	23/10 - 30/10	<0.13	21/11 - 27/11	N		
									27/11 - 04/12	0.11		
Arithmetic Mean		0.14		-		0.24		0.06		0.09		0.21
Standard Deviation		0.01		-		0.17		0.00		0.02		0.11
Valid Samples		3		1		3		4		4		3

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5320 Loch Leven 2 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	03/01 - 10/01	1.42	01/02 - 07/02	3.17	28/02 - 06/03	2.02	05/04 - 11/04	2.60	02/05 - 08/05	0.59	30/05 - 12/06	0.67
	10/01 - 17/01	1.80	07/02 - 14/02	2.79	06/03 - 14/03	N	11/04 - 17/04	0.42	08/05 - 15/05	0.94	12/06 - 19/06	1.67
	17/01 - 24/01	0.35	14/02 - 21/02	0.75	14/03 - 21/03	0.71	17/04 - 25/04	N	15/05 - 23/05	0.55	19/06 - 26/06	N
	24/01 - 01/02	1.16	21/02 - 28/02	3.15	21/03 - 27/03	0.30	25/04 - 02/05	N	23/05 - 30/05	1.43	26/06 - 03/07	N
					27/03 - 05/04	0.84						
Arithmetic Mean		1.18		2.46		0.97		-		0.88		-
Standard Deviation		0.61		1.16		0.74		-		0.41		-
Valid Samples		4		4		4		2		4		2

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	03/07 - 10/07	0.55	31/07 - 09/08	N	29/08 - 05/09	1.19	02/10 - 09/10	0.69	30/10 - 06/11	0.61	04/12 - 11/12	1.60
	10/07 - 17/07	0.33	09/08 - 14/08	0.64	05/09 - 11/09	0.78	09/10 - 16/10	0.82	06/11 - 13/11	0.55	11/12 - 18/12	1.29
	17/07 - 24/07	0.94	14/08 - 21/08	1.35	11/09 - 18/09	N	16/10 - 23/10	1.72	13/11 - 20/11	0.91	18/12 - 27/12	N
	24/07 - 31/07	1.75	21/08 - 29/08	0.71	18/09 - 25/09	2.30	23/10 - 30/10	1.08	20/11 - 27/11	2.61	27/12 - 03/01	2.42
					25/09 - 02/10	1.11			27/11 - 04/12	1.76		
Arithmetic Mean		0.89		0.90		1.34		1.08		1.29		1.77
Standard Deviation		0.62		0.39		0.66		0.46		0.88		0.59
Valid Samples		4		3		4		4		5		3

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5321 Redesdale 2 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	29/12 - 04/01	1.71	01/02 - 08/02	1.88	29/02 - 07/03	1.80	04/04 - 11/04	1.95	02/05 - 09/05	0.68	30/05 - 06/06	1.15
	04/01 - 12/01	1.93	08/02 - 15/02	N	07/03 - 14/03	1.18	11/04 - 18/04	N	09/05 - 16/05	0.94	06/06 - 13/06	1.97
	12/01 - 18/01	1.49	15/02 - 22/02	N	14/03 - 21/03	1.55	18/04 - 25/04	2.21	16/05 - 23/05	1.05	13/06 - 20/06	1.41
	18/01 - 25/01	1.04	22/02 - 29/02	N	21/03 - 28/03	2.85	25/04 - 02/05	2.23	23/05 - 30/05	0.89	20/06 - 27/06	0.60
	25/01 - 01/02	0.83			28/03 - 04/04	0.92					27/06 - 04/07	1.53
Arithmetic Mean		1.40		-		1.66		2.13		0.89		1.33
Standard Deviation		0.46		-		0.74		0.16		0.15		0.51
Valid Samples		5		1		5		3		4		5

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	04/07 - 11/07	0.65	01/08 - 08/08	0.80	29/08 - 05/09	0.88	03/10 - 10/10	0.70	31/10 - 07/11	0.17	28/11 - 04/12	<0.27
	11/07 - 18/07	0.83	08/08 - 15/08	0.60	05/09 - 11/09	0.89	10/10 - 17/10	0.87	07/11 - 14/11	<0.20	04/12 - 12/12	<0.21
	18/07 - 25/07	0.93	15/08 - 22/08	1.84	11/09 - 19/09	0.83	17/10 - 24/10	0.28	14/11 - 21/11	0.25	12/12 - 19/12	0.20
	25/07 - 01/08	1.01	22/08 - 29/08	1.30	19/09 - 27/09	1.27	24/10 - 31/10	0.19	21/11 - 28/11	0.28	19/12 - 27/12	0.26
					27/09 - 03/10	1.55					27/12 - 02/01	<0.27
Arithmetic Mean		0.86		1.14		1.09		0.51		0.20		0.17
Standard Deviation		0.16		0.55		0.31		0.33		0.08		0.06
Valid Samples		4		4		5		4		4		5

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5322 Hebden Bridge 2 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	29/12 - 05/01	1.45	02/02 - 09/02	0.83	01/03 - 08/03	1.05	29/03 - 05/04	1.59	03/05 - 10/05	2.75	31/05 - 07/06	1.57
	05/01 - 12/01	0.76	09/02 - 16/02	1.33	08/03 - 15/03	0.43	05/04 - 12/04	2.62	10/05 - 17/05	2.80	07/06 - 14/06	N
	12/01 - 19/01	0.76	16/02 - 23/02	1.93	15/03 - 22/03	1.32	12/04 - 19/04	1.53	17/05 - 24/05	0.93	14/06 - 16/06	N
	19/01 - 26/01	1.22	23/02 - 01/03	0.88	22/03 - 29/03	3.17	19/04 - 26/04	0.94	24/05 - 31/05	1.38	16/06 - 21/06	3.52
	26/01 - 02/02	0.85					26/04 - 03/05	2.94			21/06 - 28/06	1.32
Arithmetic Mean		1.01		1.24		1.49		1.92		1.97		2.13
Standard Deviation		0.31		0.51		1.18		0.83		0.95		1.20
Valid Samples		5		4		4		5		4		3

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	28/06 - 05/07	4.62	02/08 - 09/08	N	30/08 - 06/09	1.91	04/10 - 11/10	0.77	01/11 - 08/11	1.40	29/11 - 06/12	0.81
	05/07 - 12/07	0.82	09/08 - 16/08	0.83	06/09 - 20/09	1.03	11/10 - 18/10	1.53	08/11 - 15/11	1.05	06/12 - 13/12	1.18
	12/07 - 19/07	0.87	16/08 - 23/08	2.62	20/09 - 27/09	1.83	18/10 - 25/10	1.48	15/11 - 22/11	2.01	13/12 - 20/12	3.92
	19/07 - 26/07	1.91	23/08 - 30/08	2.24	27/09 - 04/10	1.55	25/10 - 01/11	0.59	22/11 - 29/11	1.27	20/12 - 27/12	6.04
	26/07 - 02/08	1.25									27/12 - 03/01	2.88
Arithmetic Mean		1.89		1.90		1.58		1.09		1.43		2.96
Standard Deviation		1.58		0.94		0.40		0.48		0.41		2.13
Valid Samples		5		3		4		4		4		5

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5323 Preston Montford 2 - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	05/01 - 14/01	0.28	03/02 - 09/02	0.20	01/03 - 08/03	0.29	29/03 - 05/04	1.11	03/05 - 10/05	3.17	31/05 - 07/06	0.25
	14/01 - 19/01	0.68	09/02 - 15/02	0.37	08/03 - 15/03	0.24	05/04 - 12/04	1.14	10/05 - 17/05	2.91	07/06 - 14/06	0.34
	19/01 - 26/01	0.58	15/02 - 23/02	0.50	15/03 - 21/03	0.40	12/04 - 19/04	0.93	17/05 - 24/05	<0.23	14/06 - 21/06	1.10
	26/01 - 03/02	0.68	23/02 - 01/03	<0.26	21/03 - 29/03	1.05	19/04 - 26/04	0.37	24/05 - 31/05	0.46	21/06 - 28/06	N
							26/04 - 03/05	0.97				
Arithmetic Mean		0.55		0.30		0.49		0.90		1.66		0.57
Standard Deviation		0.19		0.17		0.38		0.31		1.60		0.46
Valid Samples		4		4		4		5		4		3

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	28/06 - 05/07	N	02/08 - 09/08	0.30	30/08 - 06/09	0.30	04/10 - 11/10	<0.23	01/11 - 08/11	0.36	29/11 - 06/12	0.00
	05/07 - 12/07	N	09/08 - 16/08	0.38	06/09 - 13/09	0.19	11/10 - 18/10	<0.23	08/11 - 15/11	0.37	06/12 - 13/12	0.57
	12/07 - 19/07	N	16/08 - 23/08	N	13/09 - 20/09	0.22	18/10 - 25/10	<0.25	15/11 - 22/11	0.59	13/12 - 20/12	1.05
	19/07 - 26/07	N	23/08 - 30/08	0.67	20/09 - 27/09	0.27	25/10 - 01/11	<0.26	22/11 - 29/11	0.23	20/12 - 27/12	1.62
	26/07 - 02/08	N			27/09 - 04/10	0.37					27/12 - 03/01	0.49
Arithmetic Mean		-		0.45		0.27		0.12		0.39		0.75
Standard Deviation		-		0.19		0.07		0.01		0.15		0.61
Valid Samples		0		3		5		4		4		5

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5324 Bentra - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	29/12 - 05/01	2.52	01/02 - 08/02	N	01/03 - 07/03	1.04	04/04 - 11/04	2.85	02/05 - 09/05	1.64	30/05 - 06/06	1.06
	05/01 - 12/01	N	08/02 - 16/02	1.80	07/03 - 15/03	N	11/04 - 18/04	1.16	09/05 - 17/05	0.85	06/06 - 13/06	1.15
	12/01 - 18/01	N	16/02 - 22/02	1.71	15/03 - 21/03	0.50	18/04 - 26/04	0.71	17/05 - 24/05	N	13/06 - 21/06	1.14
	18/01 - 25/01	0.76	22/02 - 01/03	1.42	21/03 - 28/03	0.95	26/04 - 02/05	2.52	24/05 - 30/05	1.56	21/06 - 27/06	1.06
	25/01 - 01/02	N			28/03 - 04/04	1.17					27/06 - 04/07	2.04
Arithmetic Mean		-		1.64		0.91		1.81		1.35		1.29
Standard Deviation		-		0.20		0.29		1.04		0.43		0.42
Valid Samples		2		3		4		4		3		5

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	04/07 - 11/07	0.89	01/08 - 08/08	1.08	29/08 - 05/09	1.50	04/10 - 10/10	0.81	31/10 - 07/11	0.84	28/11 - 05/12	2.53
	11/07 - 18/07	N	08/08 - 15/08	N	05/09 - 12/09	0.89	10/10 - 17/10	N	07/11 - 14/11	N	05/12 - 12/12	N
	18/07 - 25/07	N	15/08 - 22/08	1.37	12/09 - 19/09	0.78	17/10 - 24/10	2.26	14/11 - 21/11	N	12/12 - 19/12	1.54
	25/07 - 01/08	1.17	22/08 - 29/08	0.95	19/09 - 04/10	1.21	24/10 - 31/10	0.91	21/11 - 28/11	1.92	19/12 - 27/12	1.67
											27/12 - 03/01	1.59
Arithmetic Mean		-		1.13		1.09		1.32		-		1.84
Standard Deviation		-		0.22		0.33		0.81		-		0.47
Valid Samples		2		3		4		3		2		4

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5325 Pitlochry - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	30/12 - 06/01	0.19	03/02 - 10/02	<0.16	02/03 - 09/03	<0.17	30/03 - 07/04	0.28	04/05 - 11/05	0.26	01/06 - 09/06	0.17
	06/01 - 13/01	<0.18	10/02 - 17/02	0.34	09/03 - 16/03	0.35	07/04 - 13/04	0.44	11/05 - 19/05	0.45	09/06 - 15/06	0.20
	13/01 - 20/01	N	17/02 - 24/02	0.58	16/03 - 23/03	N	13/04 - 20/04	0.76	19/05 - 25/05	0.28	15/06 - 23/06	0.22
	20/01 - 27/01	0.25	24/02 - 02/03	0.14	23/03 - 30/03	0.29	20/04 - 27/04	0.41	25/05 - 01/06	0.10	23/06 - 29/06	0.14
	27/01 - 03/02	0.25					27/04 - 04/05	0.53				
Arithmetic Mean		0.20		0.28		0.24		0.48		0.27		0.18
Standard Deviation		0.08		0.22		0.14		0.18		0.14		0.04
Valid Samples		4		4		3		5		4		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	29/06 - 06/07	N	03/08 - 10/08	0.33	31/08 - 07/09	<0.19	28/09 - 05/10	0.22	31/10 - 03/11	N	30/11 - 07/12	0.26
	06/07 - 13/07	<0.12	10/08 - 18/08	0.19	07/09 - 14/09	<0.20	05/10 - 12/10	<0.25	03/11 - 09/11	0.20	07/12 - 14/12	<0.25
	13/07 - 20/07	0.24	18/08 - 24/08	0.22	14/09 - 21/09	<0.19	12/10 - 19/10	<0.21	09/11 - 16/11	<0.24	14/12 - 21/12	0.34
	20/07 - 27/07	0.23	24/08 - 31/08	0.24	21/09 - 28/09	<0.23	19/10 - 31/10	0.14	16/11 - 23/11	0.25	21/12 - 27/12	N
	27/07 - 03/08	0.25							23/11 - 30/11	0.28	27/12 - 03/01	N
Arithmetic Mean		0.20		0.25		0.10		0.15		0.21		-
Standard Deviation		0.09		0.06		0.01		0.05		0.07		-
Valid Samples		4		4		4		4		4		3

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5329 Cam Forest - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	31/12 - 07/01	<0.22	31/01 - 04/02	0.50	03/03 - 10/03	0.28	31/03 - 07/04	0.41	05/05 - 12/05	0.64	02/06 - 09/06	0.24
	07/01 - 14/01	0.31	04/02 - 11/02	0.19	10/03 - 17/03	0.39	07/04 - 14/04	0.39	12/05 - 19/05	0.42	09/06 - 16/06	0.36
	14/01 - 21/01	0.33	11/02 - 18/02	N	17/03 - 24/03	0.26	14/04 - 21/04	0.59	19/05 - 26/05	0.20	16/06 - 23/06	0.39
	21/01 - 31/01	0.20	18/02 - 25/02	<0.21	24/03 - 31/03	0.61	21/04 - 05/05	0.33	26/05 - 02/06	0.26	23/06 - 30/06	0.49
			25/02 - 03/03	<0.23								
Arithmetic Mean		0.24		0.23		0.38		0.43		0.38		0.37
Standard Deviation		0.10		0.19		0.16		0.11		0.20		0.10
Valid Samples		4		4		4		4		4		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	30/06 - 07/07	0.73	04/08 - 18/08	0.27	01/09 - 08/09	<0.21	29/09 - 06/10	1.62	03/11 - 10/11	0.26	01/12 - 08/12	0.30
	07/07 - 14/07	0.28	18/08 - 25/08	N	08/09 - 15/09	0.27	06/10 - 13/10	4.14	10/11 - 17/11	0.12	08/12 - 15/12	<0.23
	14/07 - 21/07	0.37	25/08 - 01/09	0.57	15/09 - 22/09	<0.22	13/10 - 20/10	0.40	17/11 - 24/11	<0.24	15/12 - 22/12	0.25
	21/07 - 28/07	0.66			22/09 - 29/09	<0.22	20/10 - 27/10	0.45	24/11 - 01/12	0.24	22/12 - 29/12	N
	28/07 - 04/08	0.34					27/10 - 03/11	1.28				
Arithmetic Mean		0.47		0.42		0.15		1.58		0.19		0.22
Standard Deviation		0.20		0.21		0.08		1.53		0.08		0.10
Valid Samples		5		2		4		5		4		3

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5330 Cwmystwyth - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	29/12 - 04/01	0.63	01/02 - 07/02	0.55	01/03 - 08/03	0.61	04/04 - 11/04	1.33	28/04 - 07/05	N	05/06 - 13/06	0.60
	04/01 - 13/01	1.54	07/02 - 15/02	0.45	08/03 - 15/03	0.43	11/04 - 18/04	1.36	07/05 - 24/05	N	13/06 - 20/06	1.06
	13/01 - 19/01	1.06	15/02 - 23/02	1.14	15/03 - 21/03	0.63	18/04 - 28/04	N	24/05 - 05/06	0.51	20/06 - 27/06	0.58
	19/01 - 26/01	0.77	23/02 - 01/03	0.65	21/03 - 04/04	1.11					27/06 - 04/07	0.95
	26/01 - 01/02	1.15										
Arithmetric Mean		1.03		0.70		0.69		-		-		0.80
Standard Deviation		0.35		0.31		0.29		-		-		0.25
Valid Samples		5		4		4		2		1		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	04/07 - 12/07	0.66	05/08 - 10/08	0.39	31/08 - 07/09	0.30	29/09 - 05/10	0.32	31/10 - 03/11	<0.56	01/12 - 12/12	0.47
	12/07 - 20/07	0.27	10/08 - 18/08	<0.17	07/09 - 15/09	0.17	05/10 - 16/10	<0.13	03/11 - 10/11	<0.22	12/12 - 20/12	0.43
	20/07 - 27/07	0.68	18/08 - 24/08	0.36	15/09 - 21/09	0.47	16/10 - 23/10	0.44	10/11 - 17/11	0.53	20/12 - 29/12	0.61
	27/07 - 05/08	0.30	24/08 - 31/08	0.70	21/09 - 29/09	0.21	23/10 - 31/10	0.26	17/11 - 24/11	0.28		
									24/11 - 01/12	0.42		
Arithmetric Mean		0.48		0.38		0.28		0.27		0.32		0.51
Standard Deviation		0.23		0.25		0.13		0.16		0.16		0.09
Valid Samples		4		4		4		4		5		3

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5331 Rosemaund - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	29/12 - 05/01	0.30	02/02 - 11/02	0.36	03/03 - 08/03	1.31	29/03 - 05/04	2.66	04/05 - 10/05	2.80	31/05 - 07/06	1.15
	05/01 - 19/01	0.59	11/02 - 16/02	0.52	08/03 - 15/03	1.71	05/04 - 12/04	0.43	10/05 - 17/05	N	07/06 - 14/06	0.69
	19/01 - 26/01	0.91	16/02 - 23/02	0.95	15/03 - 22/03	1.42	12/04 - 19/04	2.33	17/05 - 24/05	N	14/06 - 21/06	0.57
	26/01 - 02/02	0.44	23/02 - 03/03	1.13	22/03 - 29/03	0.47	19/04 - 26/04	1.25	24/05 - 25/05	N	21/06 - 28/06	0.64
							26/04 - 04/05	N	25/05 - 31/05	1.17		
Arithmetic Mean		0.56		0.74		1.23		1.67		-		0.76
Standard Deviation		0.26		0.36		0.53		1.02		-		0.26
Valid Samples		4		4		4		4		2		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	28/06 - 05/07	0.35	03/08 - 09/08	0.54	30/08 - 06/09	0.48	04/10 - 11/10	<0.32	01/11 - 08/11	0.44	29/11 - 06/12	0.36
	05/07 - 12/07	0.38	09/08 - 16/08	0.39	06/09 - 13/09	<0.25	11/10 - 18/10	<0.32	08/11 - 15/11	<0.36	06/12 - 13/12	0.36
	12/07 - 19/07	0.39	16/08 - 23/08	0.40	13/09 - 20/09	<0.30	18/10 - 25/10	N	15/11 - 22/11	<0.33	13/12 - 21/12	0.25
	19/07 - 26/07	0.83	23/08 - 30/08	0.25	20/09 - 27/09	<0.29	25/10 - 01/11	0.35	22/11 - 29/11	0.50	21/12 - 27/12	0.46
	26/07 - 03/08	0.29			27/09 - 04/10	<0.31					27/12 - 03/01	0.43
Arithmetic Mean		0.45		0.39		0.21		0.22		0.32		0.37
Standard Deviation		0.22		0.12		0.15		0.11		0.17		0.08
Valid Samples		5		4		5		3		4		5

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5333 Fairseat - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	29/12 - 04/01	1.49	01/02 - 08/02	1.07	29/02 - 07/03	1.18	04/04 - 11/04	N	02/05 - 09/05	4.84	30/05 - 06/06	1.38
	04/01 - 11/01	1.16	08/02 - 15/02	1.15	07/03 - 14/03	N	11/04 - 18/04	1.28	09/05 - 16/05	5.24	06/06 - 13/06	0.70
	11/01 - 18/01	3.48	15/02 - 22/02	1.70	14/03 - 21/03	3.45	18/04 - 25/04	0.68	16/05 - 23/05	1.13	13/06 - 20/06	1.05
	18/01 - 25/01	N	22/02 - 29/02	1.33	21/03 - 28/03	2.11	25/04 - 02/05	1.73	23/05 - 30/05	0.72	20/06 - 27/06	N
	25/01 - 01/02	N			28/03 - 04/04	1.34						
Arithmetic Mean		-		1.31		2.02		1.23		2.98		1.04
Standard Deviation		-		0.28		1.03		0.53		2.39		0.34
Valid Samples		3		4		4		3		4		3

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	27/06 - 05/07	1.76	01/08 - 08/08	N	29/08 - 05/09	0.98	03/10 - 10/10	1.17	31/10 - 07/11	N	28/11 - 05/12	0.38
	05/07 - 11/07	1.76	08/08 - 15/08	1.34	05/09 - 12/09	0.57	10/10 - 17/10	0.90	07/11 - 14/11	0.96	05/12 - 12/12	0.96
	11/07 - 18/07	1.64	15/08 - 22/08	0.59	12/09 - 19/09	0.42	17/10 - 24/10	0.83	14/11 - 21/11	0.98	12/12 - 19/12	0.61
	18/07 - 25/07	2.59	22/08 - 29/08	1.00	19/09 - 26/09	0.33	24/10 - 31/10	N	21/11 - 28/11	0.50	19/12 - 28/12	1.36
	25/07 - 01/08	1.08			26/09 - 03/10	0.41					28/12 - 02/01	N
Arithmetic Mean		1.77		0.98		0.54		0.97		0.81		0.83
Standard Deviation		0.54		0.38		0.26		0.18		0.27		0.43
Valid Samples		5		3		5		3		3		4

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5334 Bylchau - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	29/12 - 06/01	N	03/02 - 10/02	0.26	01/03 - 08/03	0.21	30/03 - 12/04	1.32	03/05 - 10/05	2.50	31/05 - 07/06	<0.17
	06/01 - 13/01	<0.18	10/02 - 16/02	0.21	08/03 - 16/03	0.20	12/04 - 20/04	0.63	10/05 - 25/05	0.39	07/06 - 14/06	0.28
	13/01 - 20/01	0.23	16/02 - 23/02	0.54	16/03 - 22/03	0.39	20/04 - 27/04	0.47	25/05 - 31/05	0.32	14/06 - 21/06	0.34
	20/01 - 27/01	0.58	23/02 - 01/03	0.25	22/03 - 30/03	0.77	27/04 - 03/05	0.90			21/06 - 06/07	0.68
	27/01 - 03/02	0.27										
Arithmetic Mean		0.29		0.31		0.39		0.83		1.07		0.35
Standard Deviation		0.21		0.15		0.27		0.37		1.24		0.25
Valid Samples		4		4		4		4		3		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	06/07 - 13/07	0.81	02/08 - 11/08	0.21	31/08 - 14/09	0.10	05/10 - 12/10	0.17	02/11 - 09/11	<0.21	01/12 - 06/12	<0.29
	13/07 - 19/07	0.42	11/08 - 16/08	0.43	14/09 - 21/09	0.62	12/10 - 18/10	0.28	09/11 - 15/11	<0.25	06/12 - 13/12	0.22
	19/07 - 02/08	0.40	16/08 - 23/08	0.43	21/09 - 05/10	0.27	18/10 - 26/10	0.22	15/11 - 01/12	0.10	13/12 - 21/12	0.27
			23/08 - 31/08	1.14			26/10 - 02/11	0.20			21/12 - 27/12	1.27
											27/12 - 03/01	0.37
Arithmetic Mean		0.54		0.55		0.33		0.22		0.11		0.46
Standard Deviation		0.23		0.41		0.27		0.05		0.01		0.46
Valid Samples		3		4		3		4		3		5

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5335 Crai - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	30/12 - 07/01	0.44	04/02 - 11/02	0.41	03/03 - 10/03	0.27	04/04 - 07/04	1.98	28/04 - 05/05	2.02	02/06 - 09/06	0.56
	07/01 - 14/01	0.42	11/02 - 18/02	0.31	10/03 - 17/03	0.68	07/04 - 14/04	1.55	05/05 - 12/05	3.73	09/06 - 16/06	0.46
	14/01 - 21/01	0.81	18/02 - 25/02	1.05	17/03 - 24/03	0.63	14/04 - 20/04	1.71	12/05 - 19/05	0.61	16/06 - 23/06	0.47
	21/01 - 28/01	1.99	25/02 - 03/03	0.54	24/03 - 04/04	0.96	20/04 - 28/04	0.61	19/05 - 26/05	0.38	23/06 - 30/06	1.10
	28/01 - 04/02	0.36							26/05 - 02/06	0.40		
Arithmetic Mean		0.80		0.58		0.64		1.46		1.43		0.65
Standard Deviation		0.68		0.33		0.28		0.60		1.46		0.31
Valid Samples		5		4		4		4		5		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	30/06 - 10/07	0.38	04/08 - 11/08	0.32	01/09 - 08/09	0.38	29/09 - 06/10	0.37	03/11 - 10/11	0.32	01/12 - 07/12	0.42
	10/07 - 14/07	0.45	11/08 - 21/08	0.32	08/09 - 15/09	0.46	06/10 - 13/10	<0.22	10/11 - 17/11	0.23	07/12 - 15/12	0.23
	14/07 - 21/07	0.37	21/08 - 25/08	1.05	15/09 - 22/09	0.64	13/10 - 23/10	0.44	17/11 - 24/11	0.32	15/12 - 22/12	0.78
	21/07 - 28/07	0.87	25/08 - 01/09	1.06	22/09 - 29/09	0.52	23/10 - 27/10	<0.43	24/11 - 01/12	0.76	22/12 - 29/12	0.73
	28/07 - 04/08	0.44					27/10 - 03/11	0.26				
Arithmetic Mean		0.50		0.69		0.50		0.28		0.41		0.54
Standard Deviation		0.21		0.42		0.11		0.13		0.24		0.26
Valid Samples		5		4		4		5		4		4

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5338 Forsinain - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start - End		Start - End		Start - End		Start - End		Start - End		Start - End	
	04/01 - 13/01	<0.24	01/02 - 08/02	N	29/02 - 07/03	0.72	04/04 - 10/04	0.42	02/05 - 09/05	<0.24	30/05 - 06/06	<0.18
	13/01 - 18/01	<0.35	08/02 - 15/02	0.33	07/03 - 14/03	0.43	10/04 - 18/04	N	09/05 - 17/05	N	06/06 - 13/06	0.51
	18/01 - 25/01	0.29	15/02 - 22/02	N	14/03 - 21/03	0.50	18/04 - 25/04	0.33	17/05 - 23/05	<0.28	13/06 - 20/06	<0.21
	25/01 - 01/02	0.29	22/02 - 29/02	0.59	21/03 - 28/03	0.56	25/04 - 02/05	0.24	23/05 - 30/05	<0.25	20/06 - 27/06	<0.24
					28/03 - 04/04	0.38					27/06 - 04/07	0.29
Arithmetic Mean		0.22		-		0.52		0.33		0.13		0.22
Standard Deviation		0.09		-		0.13		0.09		0.01		0.18
Valid Samples		4		2		5		3		3		5

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start - End		Start - End		Start - End		Start - End		Start - End		Start - End	
	04/07 - 11/07	<0.22	01/08 - 08/08	0.68	29/08 - 05/09	0.22	03/10 - 10/10	<0.12	31/10 - 07/11	0.19	28/11 - 05/12	0.33
	11/07 - 18/07	N	08/08 - 15/08	0.54	05/09 - 12/09	<0.12	10/10 - 17/10	N	07/11 - 14/11	0.28	05/12 - 12/12	N
	18/07 - 25/07	0.32	15/08 - 22/08	0.72	12/09 - 19/09	<0.14	17/10 - 24/10	0.24	14/11 - 21/11	0.21	12/12 - 19/12	0.26
	25/07 - 01/08	0.55	22/08 - 29/08	0.28	19/09 - 26/09	0.71	24/10 - 31/10	0.21	21/11 - 28/11	0.17	19/12 - 27/12	<0.17
					26/09 - 03/10	0.22					27/12 - 03/01	0.28
Arithmetic Mean		0.33		0.55		0.26		0.17		0.21		0.24
Standard Deviation		0.22		0.20		0.27		0.10		0.05		0.11
Valid Samples		3		4		5		3		4		4

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5339 Appleacre - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	29/12 - 05/01	0.91	02/02 - 09/02	1.02	01/03 - 08/03	1.29	29/03 - 05/04	1.55	03/05 - 10/05	0.76	31/05 - 07/06	0.25
	05/01 - 12/01	0.98	09/02 - 16/02	1.39	08/03 - 15/03	0.86	05/04 - 12/04	1.74	10/05 - 17/05	0.80	07/06 - 14/06	0.28
	12/01 - 19/01	1.60	16/02 - 23/02	2.08	15/03 - 22/03	1.09	12/04 - 19/04	1.40	17/05 - 24/05	0.28	14/06 - 21/06	0.90
	19/01 - 26/01	1.76	23/02 - 01/03	1.07	22/03 - 29/03	1.63	19/04 - 26/04	0.74	24/05 - 31/05	0.27	21/06 - 28/06	0.36
	26/01 - 02/02	1.02					26/04 - 03/05	1.48				
Arithmetic Mean		1.25		1.39		1.22		1.38		0.53		0.45
Standard Deviation		0.39		0.48		0.33		0.38		0.29		0.31
Valid Samples		5		4		4		5		4		4

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	28/06 - 05/07	0.78	02/08 - 09/08	0.21	30/08 - 06/09	0.70	04/10 - 11/10	0.28	01/11 - 08/11	0.59	29/11 - 06/12	0.59
	05/07 - 12/07	0.36	09/08 - 16/08	0.18	06/09 - 13/09	0.76	11/10 - 18/10	0.46	08/11 - 15/11	0.61	06/12 - 13/12	0.58
	12/07 - 19/07	0.35	16/08 - 23/08	0.53	13/09 - 20/09	0.32	18/10 - 24/10	0.89	15/11 - 22/11	0.72	13/12 - 20/12	0.96
	19/07 - 26/07	0.42	23/08 - 30/08	0.82	20/09 - 27/09	0.95	24/10 - 01/11	0.22	22/11 - 29/11	0.57	20/12 - 27/12	1.13
	26/07 - 02/08	0.52			27/09 - 04/10	1.13					27/12 - 03/01	0.79
Arithmetic Mean		0.49		0.44		0.77		0.46		0.62		0.81
Standard Deviation		0.18		0.30		0.31		0.31		0.07		0.24
Valid Samples		5		4		5		4		4		5

Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
Site: 5343 Benniguinea - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Weekly measurements, collection-day - non standard
Summary for January 2000 to December 2000

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
	07/01 - 14/01	0.29	04/02 - 11/02	0.14	03/03 - 10/03	0.22	31/03 - 07/04	0.56	28/04 - 05/05	0.53	02/06 - 09/06	0.15
	14/01 - 21/01	0.31	11/02 - 22/02	0.19	10/03 - 17/03	0.20	07/04 - 14/04	0.51	05/05 - 12/05	N	09/06 - 16/06	0.26
	21/01 - 28/01	0.21	22/02 - 25/02	0.49	17/03 - 24/03	0.35	14/04 - 20/04	0.39	12/05 - 19/05	0.40	16/06 - 23/06	0.60
	28/01 - 04/02	0.22	25/02 - 03/03	0.25	24/03 - 31/03	0.28	20/04 - 28/04	0.23	19/05 - 25/05	0.19	23/06 - 30/06	N
									25/05 - 02/06	0.15		
Arithmetic Mean		0.26		0.27		0.26		0.42		0.32		0.34
Standard Deviation		0.05		0.16		0.07		0.15		0.18		0.23
Valid Samples		4		4		4		4		4		3

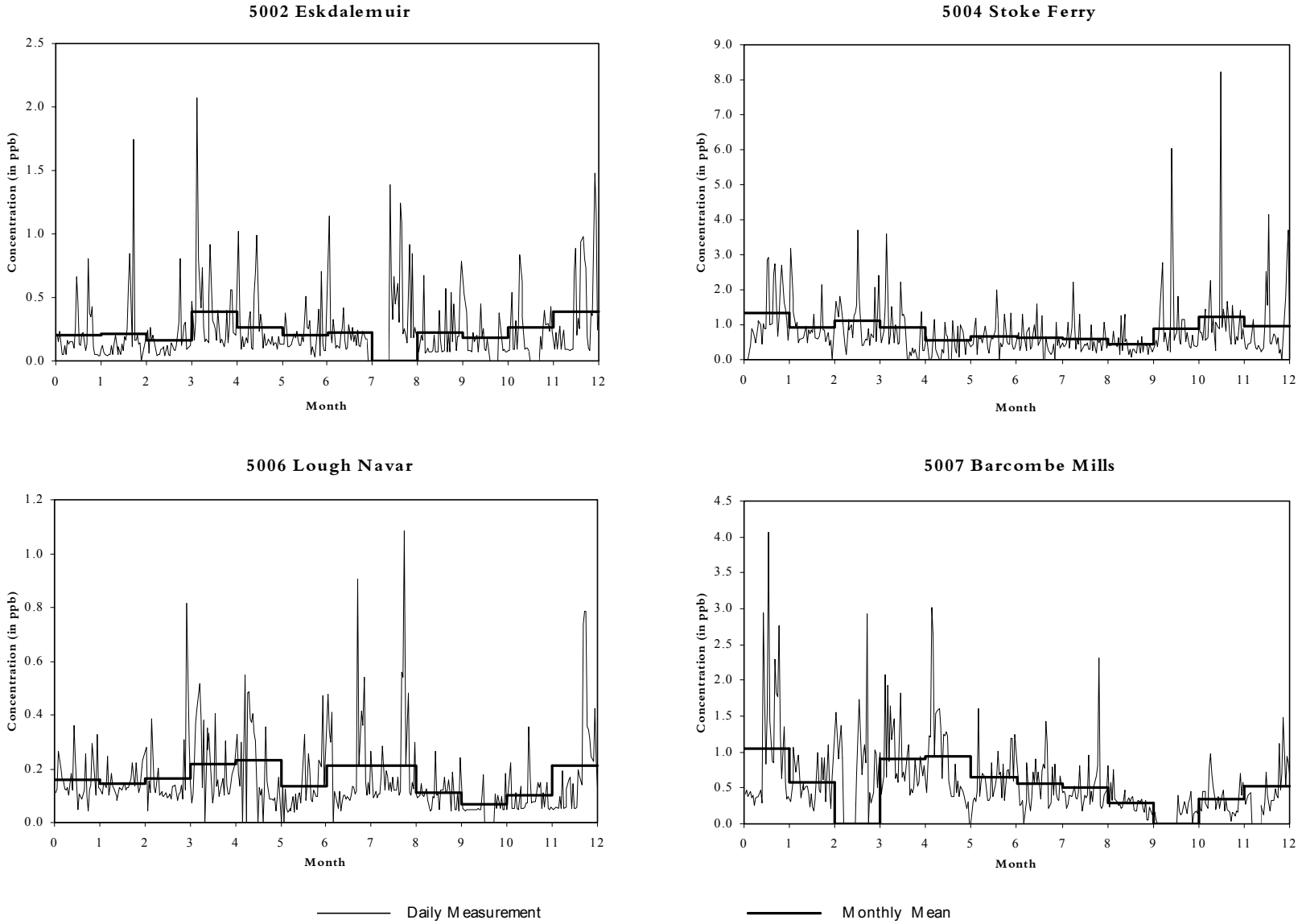
MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	30/06 - 07/07	0.34	04/08 - 11/08	0.18	04/09 - 08/09	<0.25	03/10 - 09/10	<0.12	03/11 - 10/11	0.12	01/12 - 08/12	0.20
	07/07 - 14/07	0.25	11/08 - 18/08	0.25	08/09 - 15/09	0.28	09/10 - 13/10	<0.33	10/11 - 17/11	N	08/12 - 15/12	0.14
	14/07 - 21/07	0.26	18/08 - 25/08	N	15/09 - 22/09	0.30	13/10 - 20/10	0.19	17/11 - 24/11	0.26	15/12 - 27/12	N
	21/07 - 28/07	0.24	25/08 - 04/09	0.18	22/09 - 03/10	0.34	20/10 - 27/10	0.14	24/11 - 01/12	0.21	27/12 - 05/01	0.27
	28/07 - 04/08	0.32					27/10 - 03/11	0.15				
Arithmetic Mean		0.28		0.20		0.26		0.14		0.20		-
Standard Deviation		0.05		0.04		0.10		0.05		0.07		-
Valid Samples		5		3		4		5		3		3

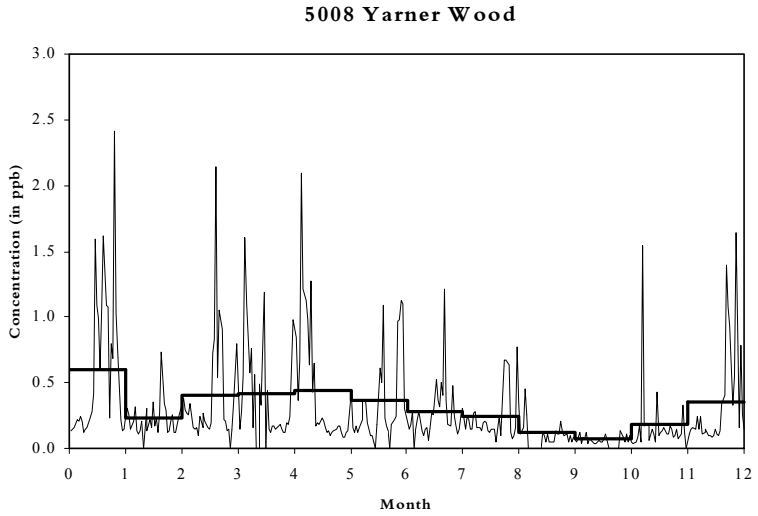
Notes (1) N = no measurement; (2) Measurements preceded by < are below the Limit of Detection. The measurement has been included in the calculation of the statistical parameters at 50% of its value; (3) Statistical parameters calculated only if data capture is greater than 75%.

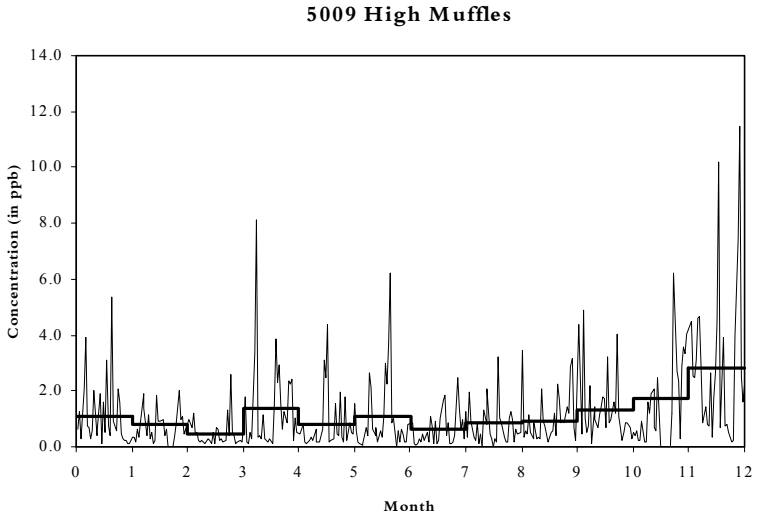
Appendix 3

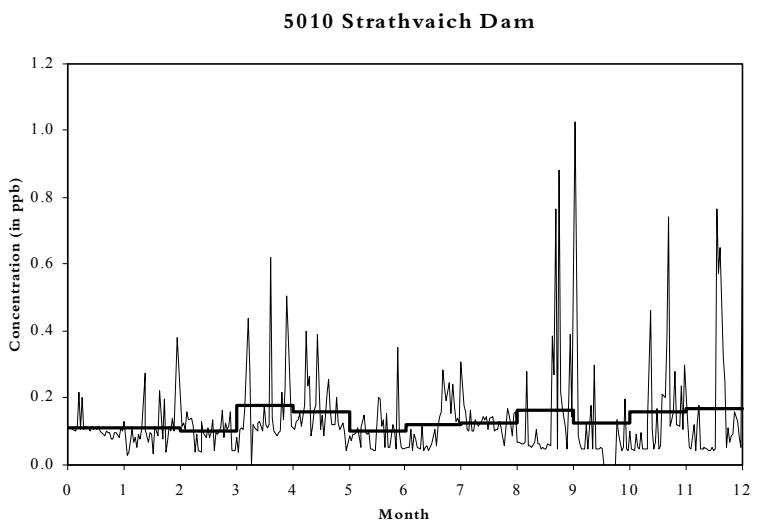
GRAPHS OF MEASURED AND MONTHLY MEAN SO_2 CONCENTRATIONS

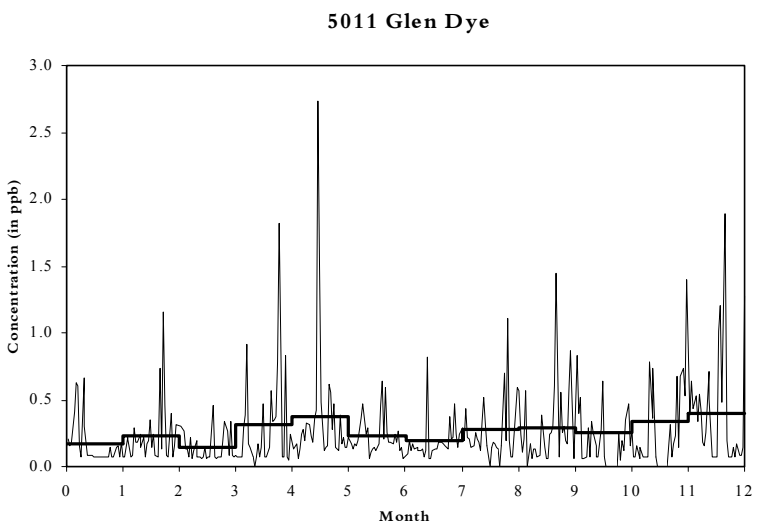
Note: In the graphs that follow, the monthly-averaged concentration has been set to zero if the data capture was less than 75% for the month.


5002 Eskdalemuir
5004 Stoke Ferry
5006 Lough Navar
5007 Barcombe Mills
Concentration (in ppb)
Month
Daily Measurement
Monthly Mean



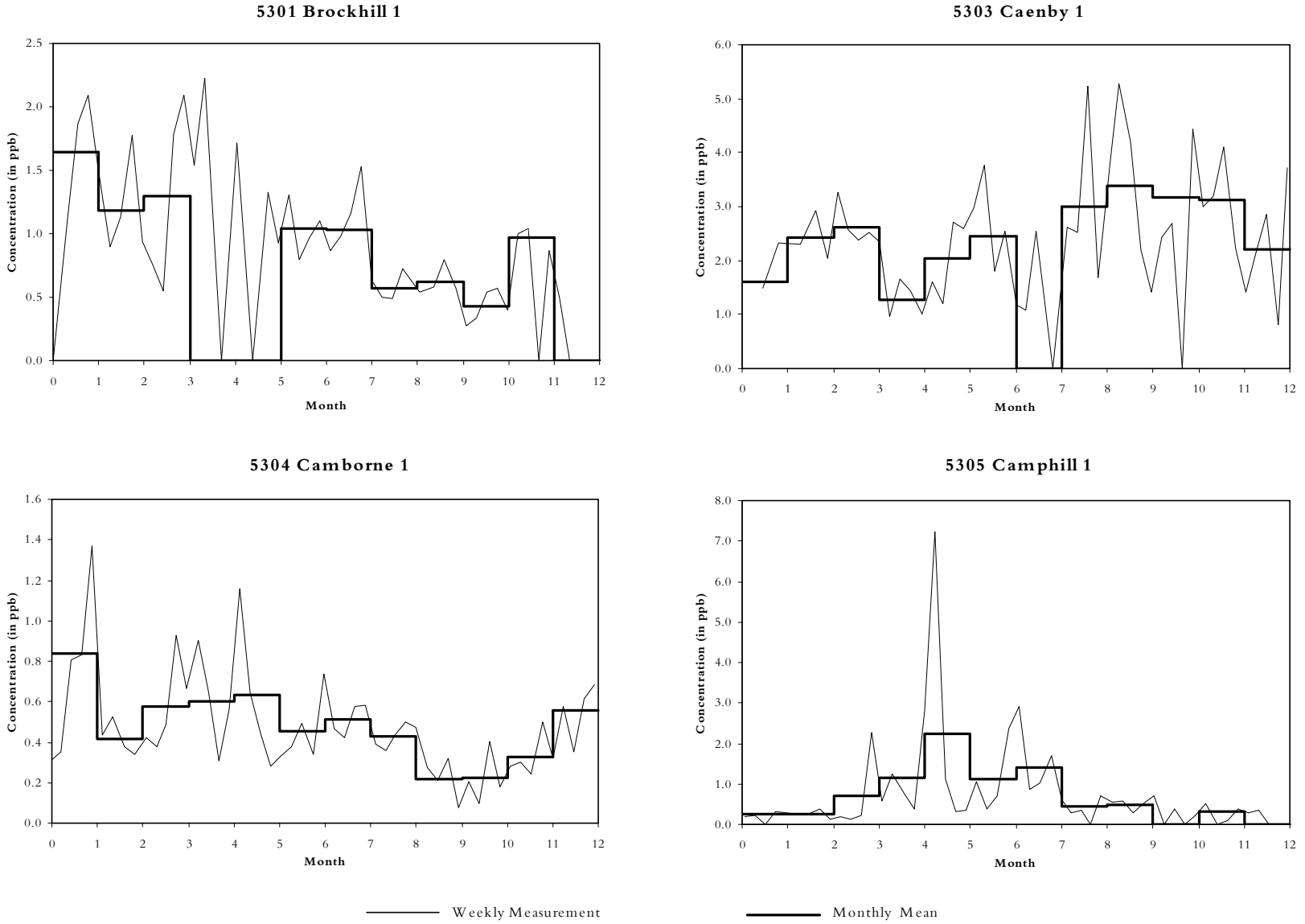


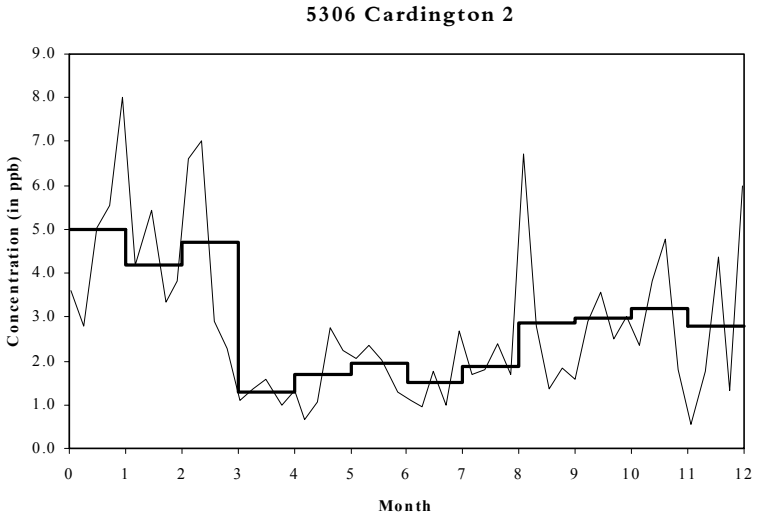


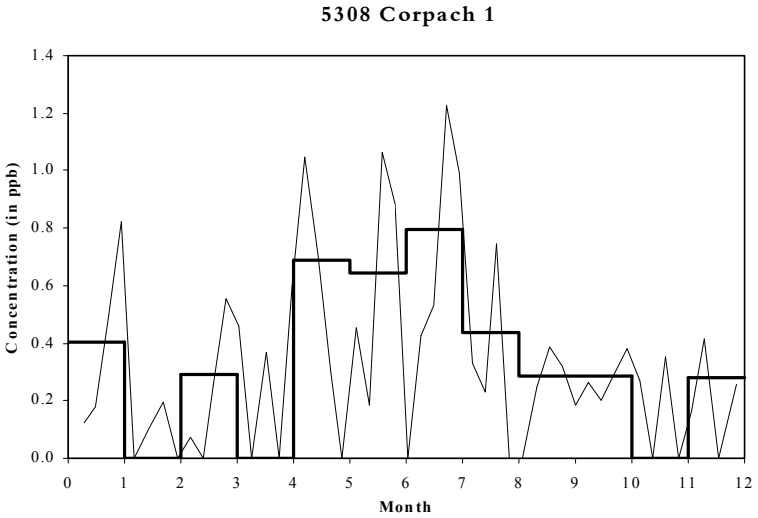


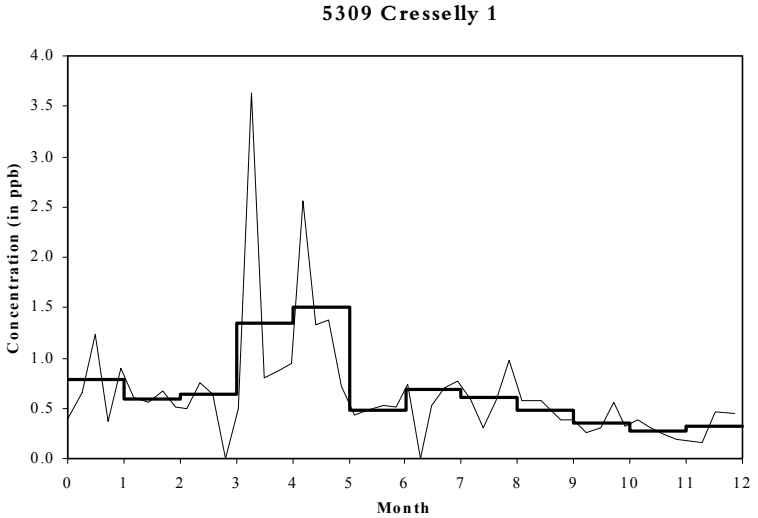
Daily Measurement

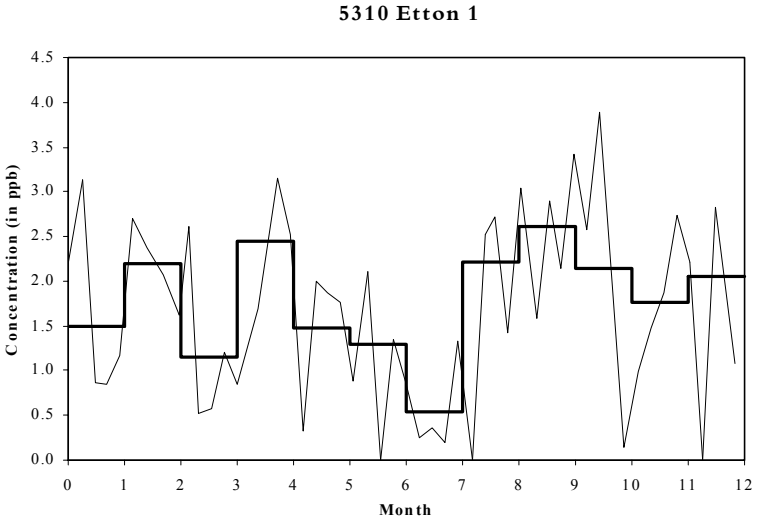
Monthly Mean


5301 Brockhill 1
5303 Caenby 1
5304 Camborne 1
5305 Camphill 1
Concentration (in ppb)
Month
Weekly Measurement
Monthly Mean



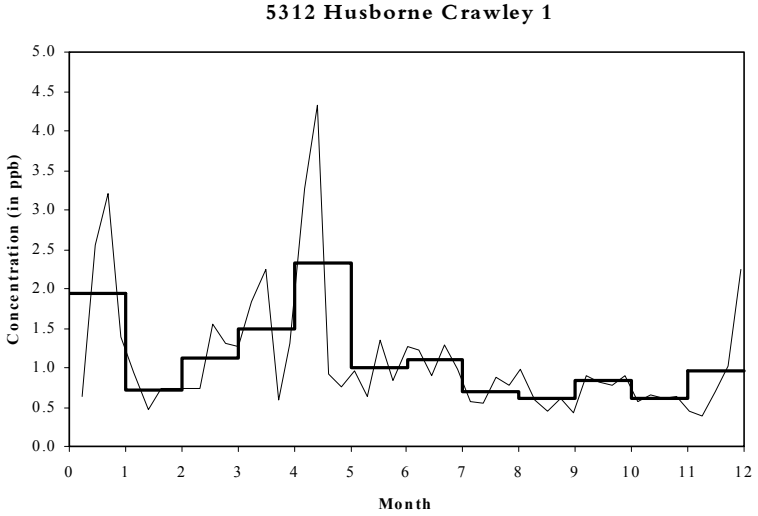


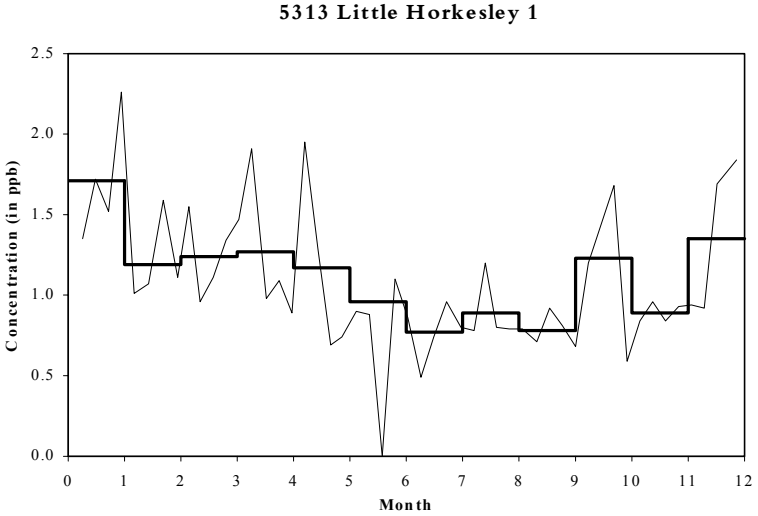


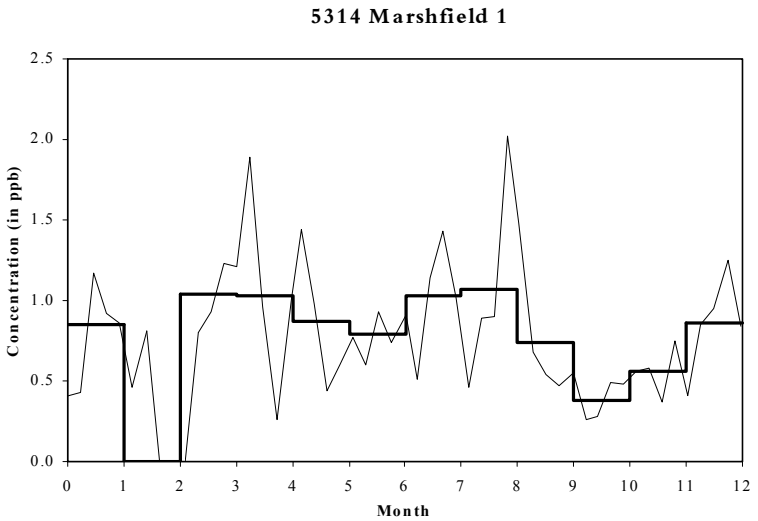


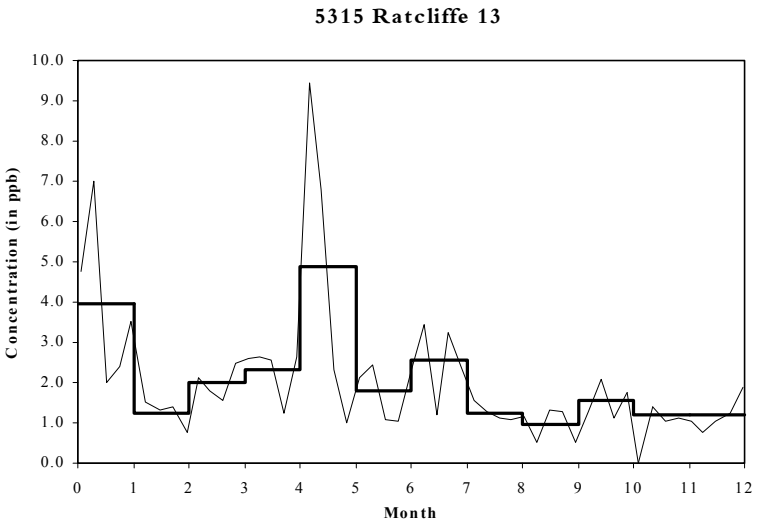
Weekly Measurement

Monthly Mean



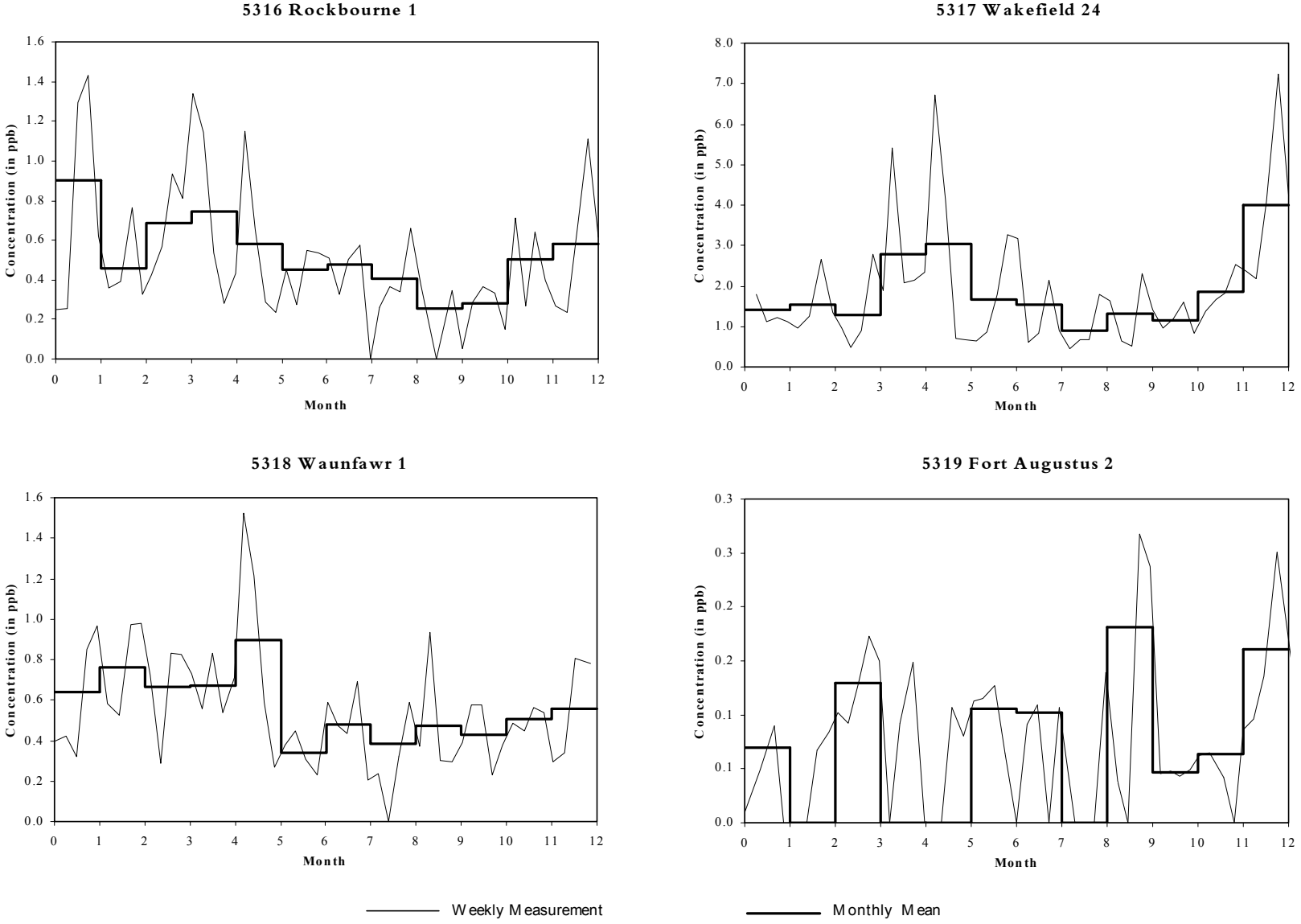


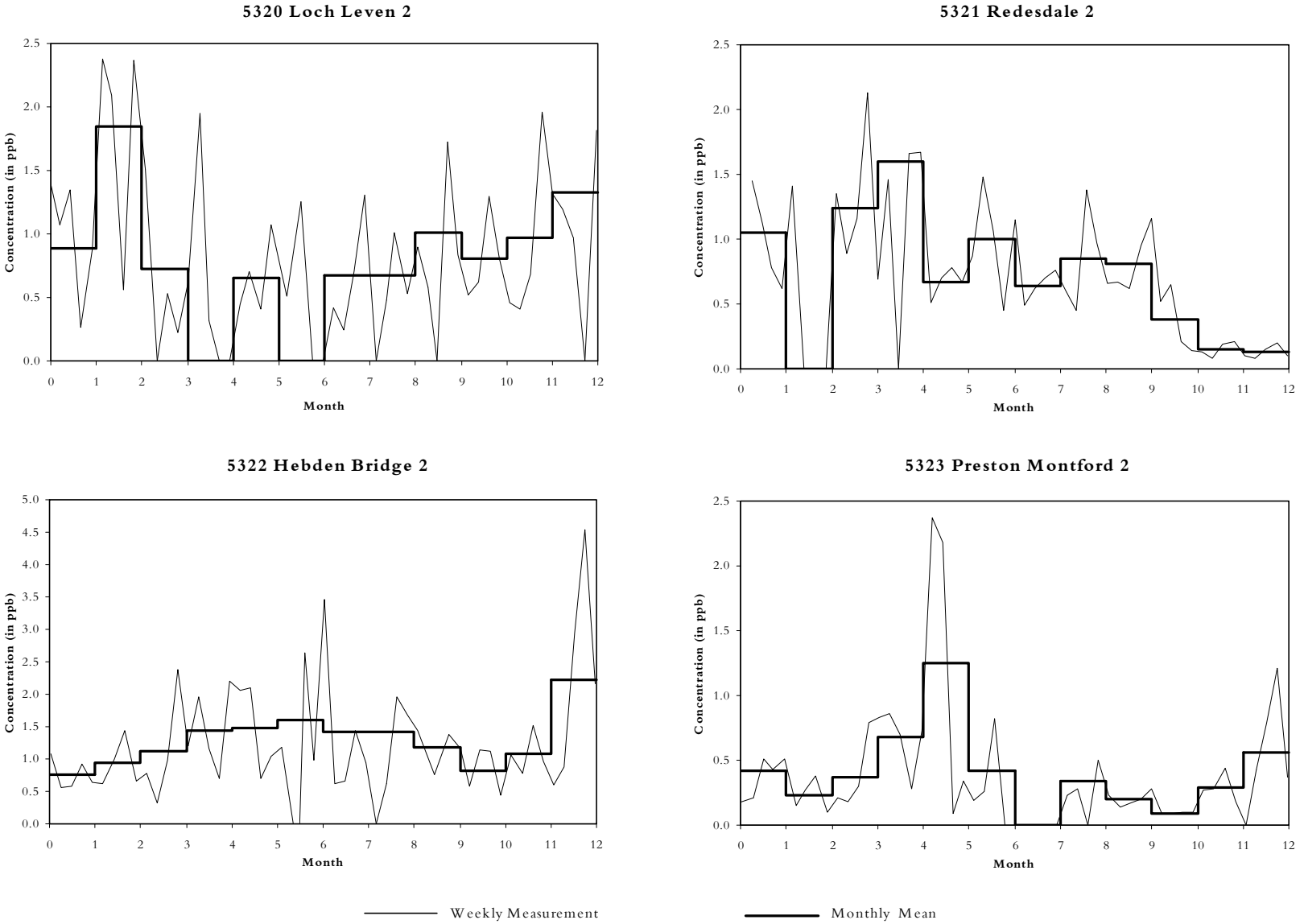


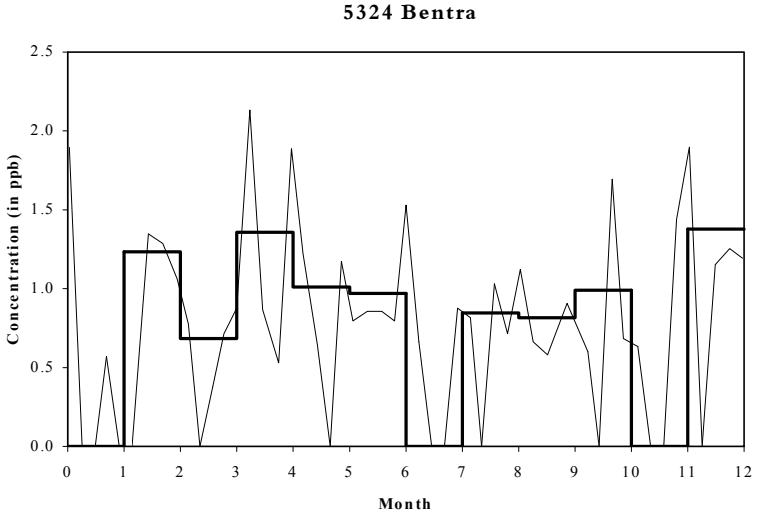


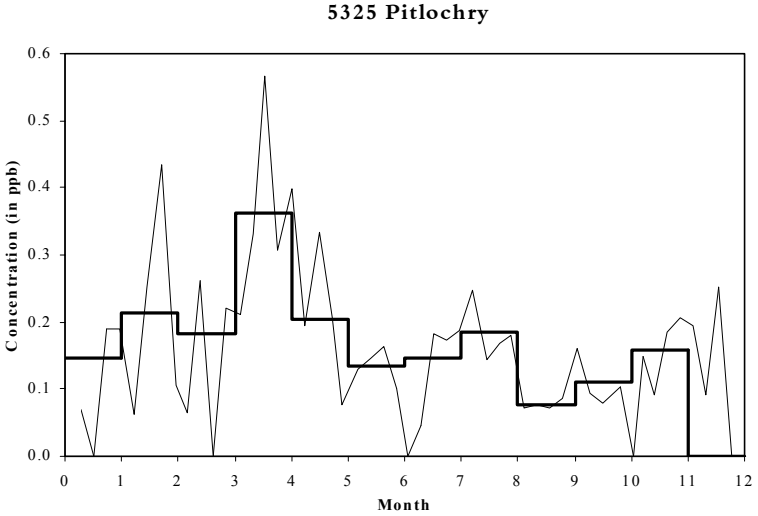
Weekly Measurement

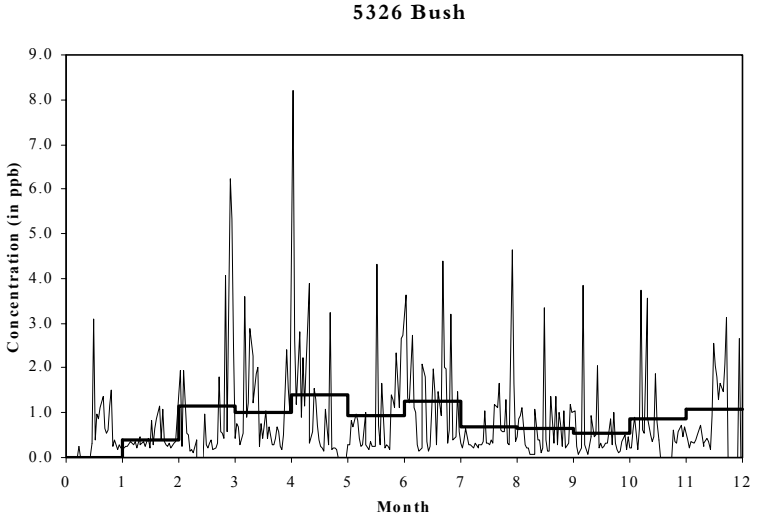
Monthly Mean

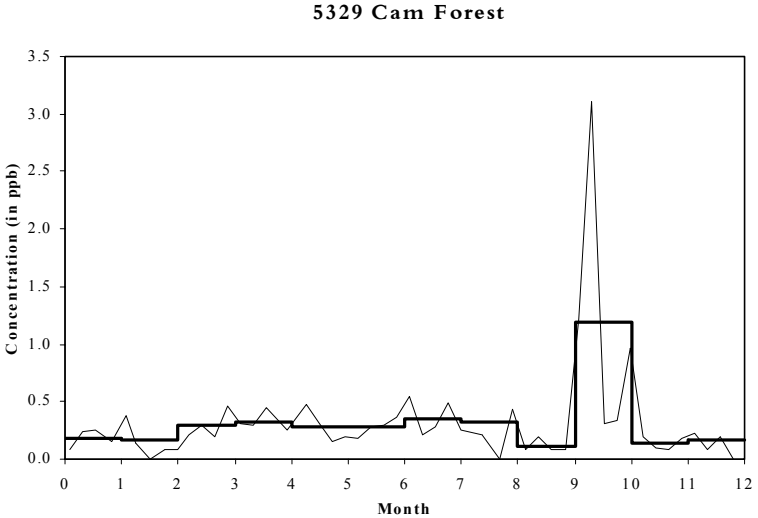

5316 Rockbourne 1
5317 Wakefield 24
5318 Waunfawr 1
5319 Fort Augustus 2
Concentration (in ppb)
Month
Weekly Measurement
Monthly Mean


5320 Loch Leven 2
5321 Redesdale 2
5322 Hebden Bridge 2
5323 Preston Montford 2
Concentration (in ppb)
Month
Weekly Measurement
Monthly Mean



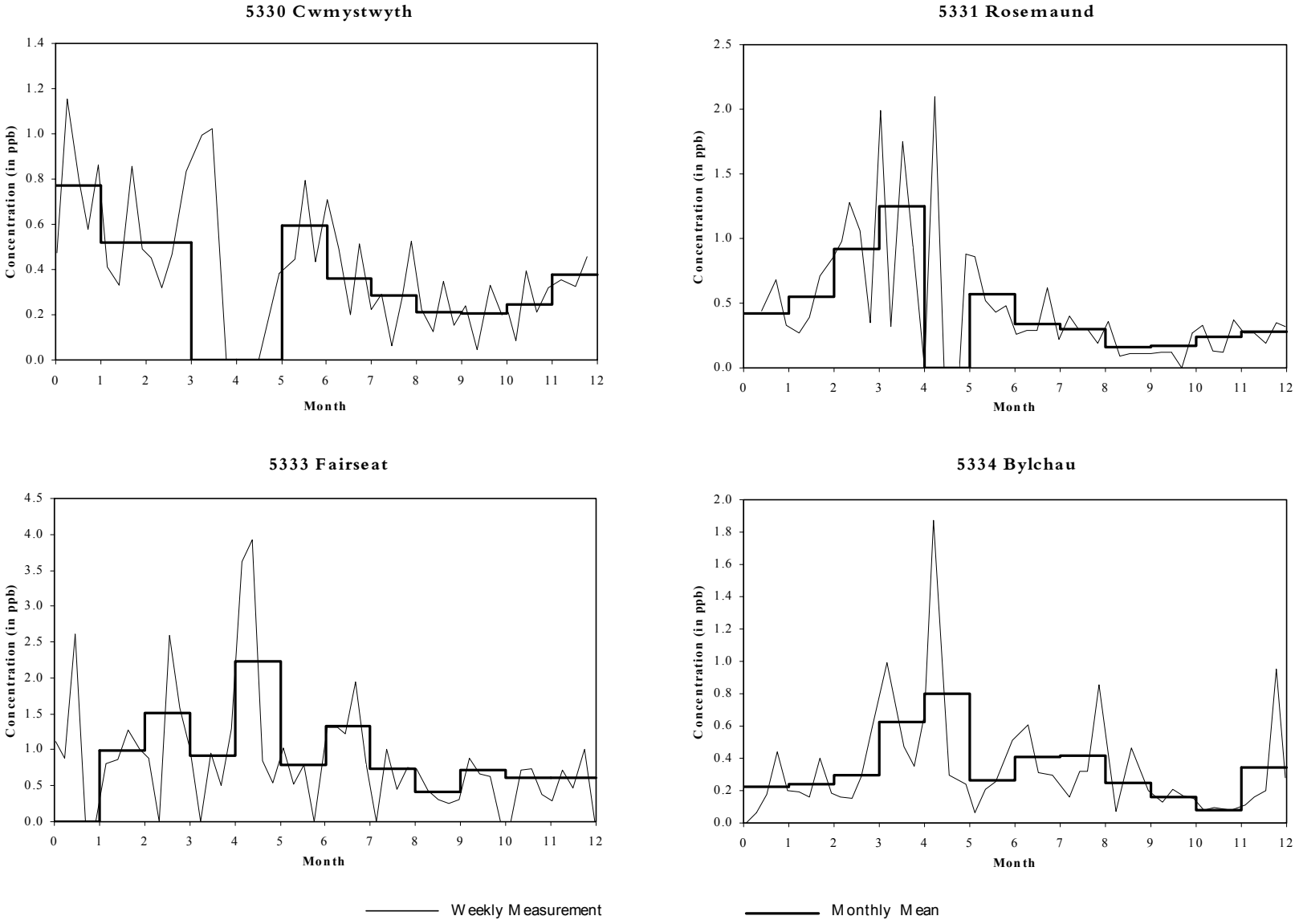


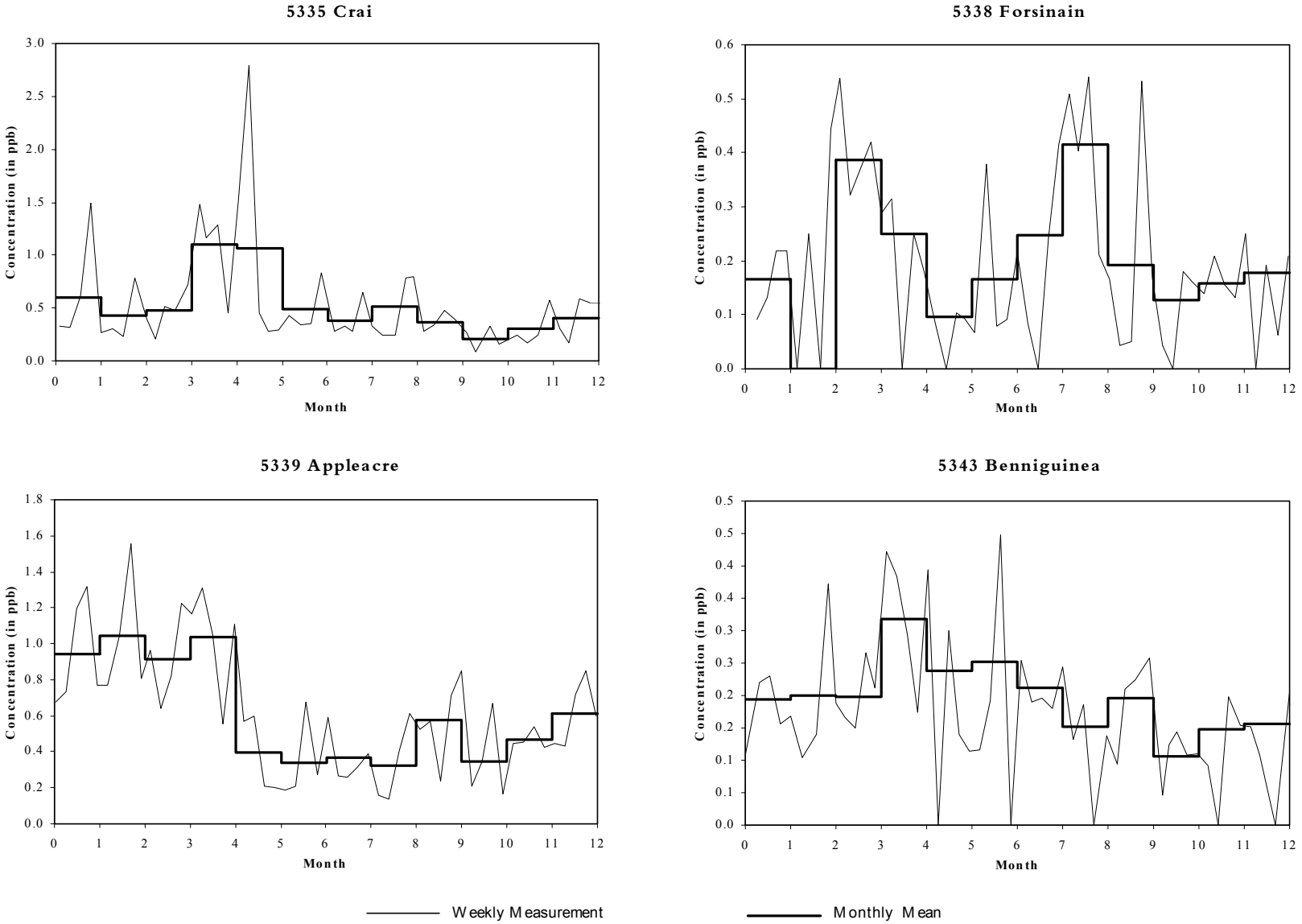




Daily/Weekly Measurement

Monthly Mean


5330 Cwmystwyth
5331 Rosemaund
5333 Fairseat
5334 Bylchau
Concentration (in ppb)
Month
Weekly Measurement
Monthly Mean


5335 Crai
Concentration (in ppb)
Month
5338 Forsinain
Concentration (in ppb)
Month
5339 Appleacre
Concentration (in ppb)
Month
5343 Benniguinea
Concentration (in ppb)
Month
Weekly Measurement
Monthly Mean

Appendix 4

GEOSTATISTICS

GEOSTATISTICS

The use of geostatistics in the analysis of United Kingdom precipitation composition concentrations is described by Webster *et al.* (1991). A geostatistics analysis may also be made of UK sulphur dioxide concentrations. A brief discussion is reproduced here. In a geostatistical treatment of spatial variability the concentration of sulphur dioxide in ambient air, averaged over a time period of one year, is treated as a regionalised random variable. It is assumed that the values at the sites are drawn from the distribution of a random variable with a constant mean. The variance, however, depends on the separation of the sites. For example, within one 20 km grid square the variance would probably be smaller than within a 200 km square. The dependence of the variance on separation (usually termed the lag) is described by a quantity known as the semi-variance:

$$\gamma(h) = \frac{1}{2}\frac{\Sigma(z_1 - z_2)^2}{n} \qquad 1$$

Where there are n pairs of data z_1, z_2 separated by a distance h. A plot of the semi-variance against lag is called a **variogram**.

It can be shown that the variogram function (usually termed the variogram model) must be selected from one of a few allowed forms, each of which has one or more variable parameters which must be fitted to the experimental data. Models that are allowed are:

Exponential

$$\gamma(h) = c_0 + c_1(1 - e^{-\frac{h}{a}}) \qquad 2$$

Spherical

$$\gamma(h) = c_0 + c_1(\frac{3}{2}\frac{h}{a} - \frac{1}{2}(\frac{h}{a})^3) \qquad 3$$

Linear

$$\gamma(h) = c_0 + \omega h^{\theta} \qquad 4$$

The parameter c_0, known as the "nugget", is the residual variance for collocated measurements and is a result of measurement error or variability on a scale smaller than the separation of the measurement sites. The "range", "a", is a measure of the separation beyond which the measurements are uncorrelated, and the "sill", "c_0+c_1", is the maximum semi-variance. The linear model applies when the regionalised varia has an unlimited capacity for spatial dispersion. There is no sill and the parameter w is called the factor and q the exponent.

Once a variogram model has been found it can be used in an interpolation procedure known as kriging to produce contour maps from irregularly spaced data. In the kriging process the interpolated value is expressed as a linear combination of the measured data $l_1 z_1 + l_2 z_2 + \ldots$. Using the variogram model the variance of the interpolated estimate can be expressed in terms of the l_i and this variance is then minimised subject to the constraint that the l_i sum to 1. The result is the

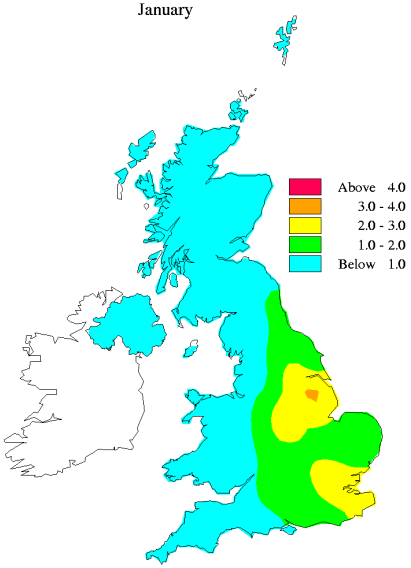
best unbiased linear estimate in that it has the smallest error in the statistical sense. A further advantage of using kriging is that the interpolation variance is known for each interpolated estimate and this can be mapped along with the concentration to provide a measure of the reliability of the map.

An exponential model is fitted to the experimental points in the variogram for SO_2, using a sill of 1.5 ppb, a range of 280 km and a nugget of 0.35 ppb.

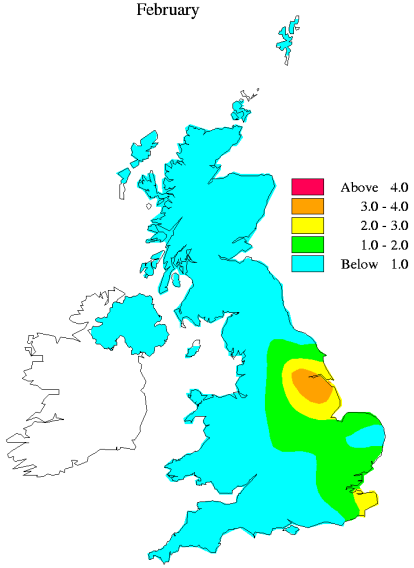
Appendix 5

MONTHLY MEAN SO_2 CONCENTRATION MAPS

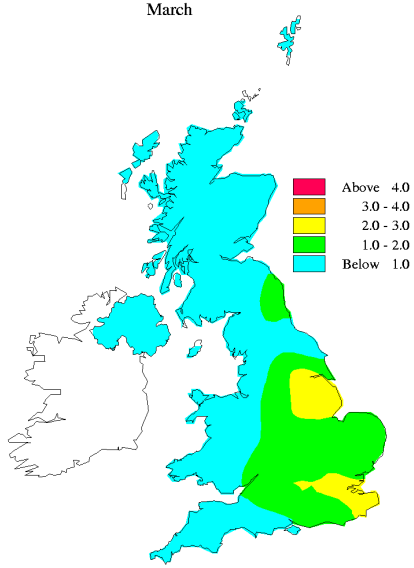
January



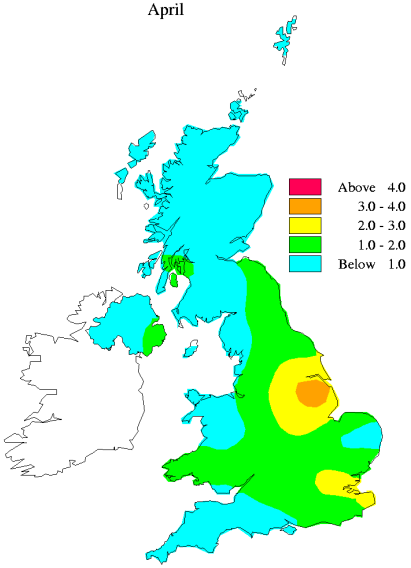
February



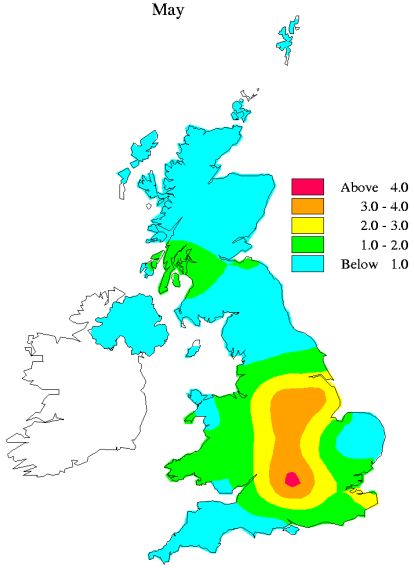
March



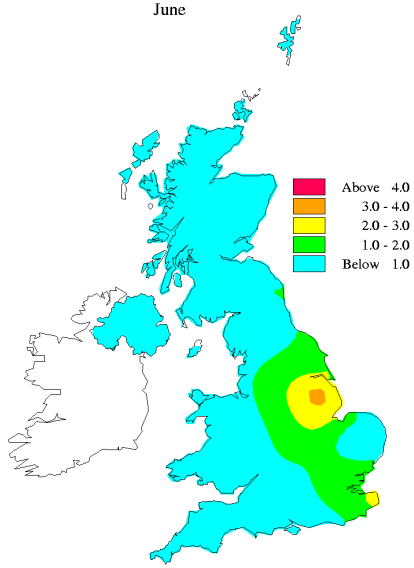
April



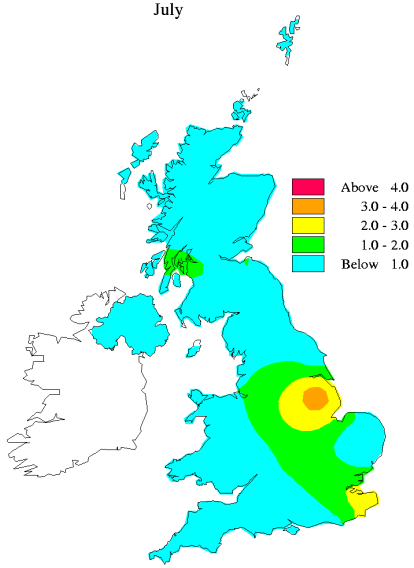
May



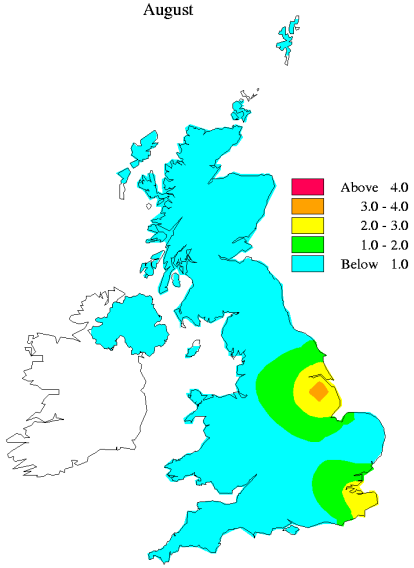
June



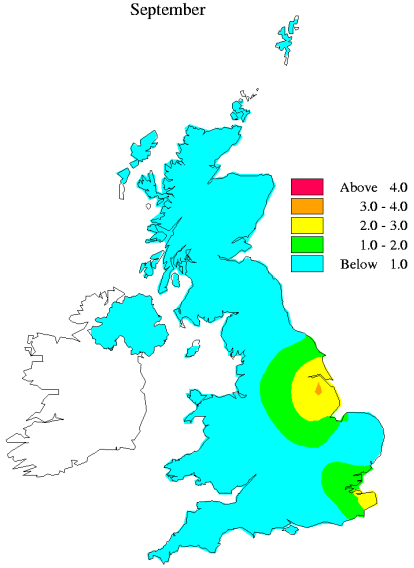
July



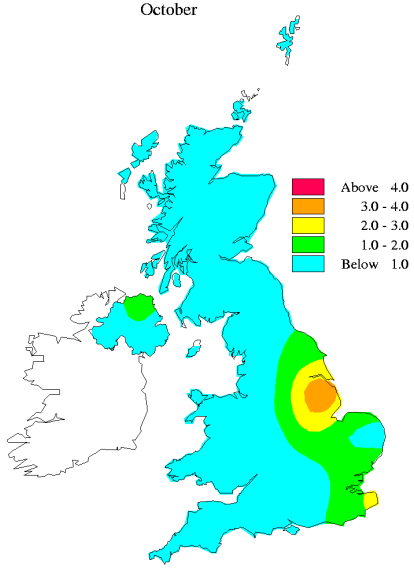
August



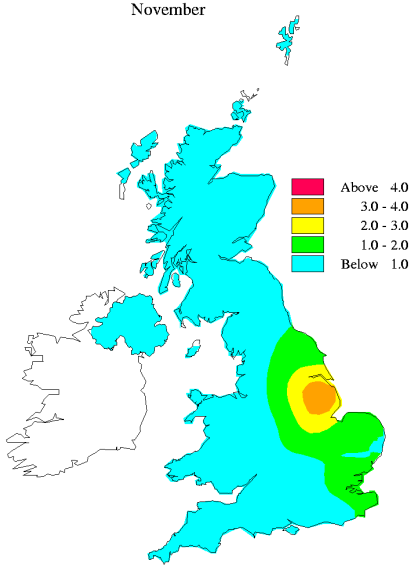
September



October



November



December