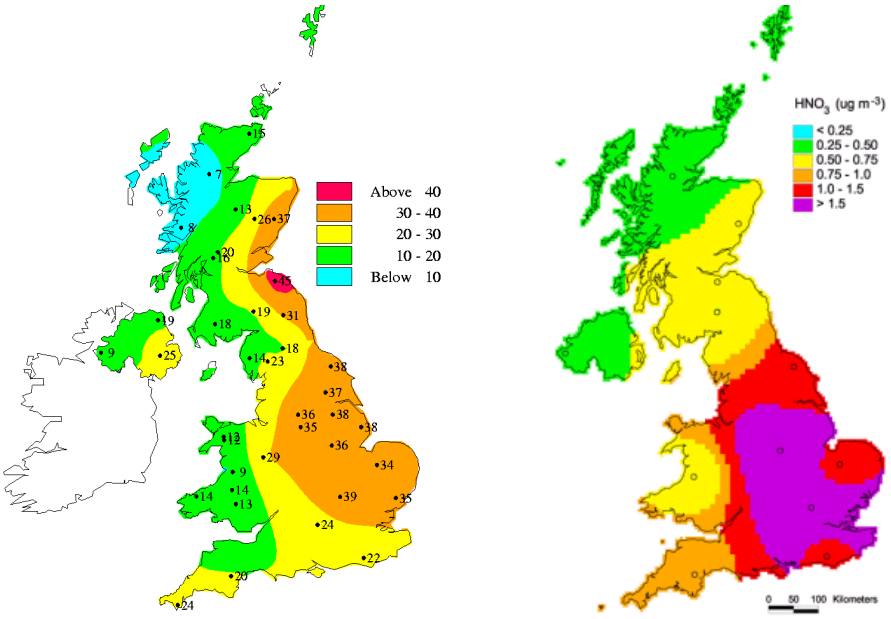
AEAT/ENV/R/1343 ISSUE 1

Management and Operation of the UK Acid Deposition Monitoring Network: Data Summary for 2001

A report produced for the Department for Environment, Food and Rural Affairs



Maps of the Precipitation-weighted Concentration of Nitrate (in μeq l^{-1}) and of gaseous Nitric Acid (in μg m^{-3}) for 2001

January 2003

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Management and Operation of the UK Acid Deposition Monitoring Network: Data Summary for 2001

A report produced for the Department for Environment, Food and Rural Affairs

G Hayman, S Hasler, K Vincent, H Lawrence, M Smith and M Davies (AEA Technology plc)

M Sutton, Y S Tang, U Dragosits, L Love and D Fowler (Centre for Ecology and Hydrology, Edinburgh)

L Sansom and H Page (Harwell Scientifics Ltd)

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Garry Hayman
AEA Technology plc
E5 Culham
Abingdon
OX14 3DB

Telephone 01235 463108
Facsimile 01235 463005

	Name	Signature	Date
Author	Garry Hayman		
Reviewed by	Keith Vincent		
Approved by	Garry Hayman		

Executive Summary

This is the first annual data report prepared on the contract *Management and Operation of the UK Acid Deposition Monitoring Network* (EPG 1/3/193), let by the Department for Environment, Food and Rural Affairs (DEFRA). This data report contains a comprehensive summary of the measurements made in the network for the year 2001.

The Acid Deposition Monitoring network was established in 1986 to monitor the composition of precipitation and hence to provide information on deposition of acidifying compounds in the United Kingdom. The aims of the rainwater sampling programme are to provide (1) high quality data which can be used to identify trends with time and (2) information on the spatial distribution of acid deposition in the United Kingdom. In addition to the sampling of rainwater at the network sites, a range of other measurements are made which provide a more complete understanding of precipitation chemistry in the United Kingdom.

Following the retendering of the monitoring contract in 2001, significant changes were made to the measurement programme and the acid deposition sampling at the Jenny Hurn site in Lincolnshire was discontinued. These changes were effective from the commencement of the new contract in November 2001.

The monitoring programme in 2001 was also affected by the restrictions imposed on access across certain parts of the United Kingdom following the outbreak of Foot and Mouth disease in February 2001. The sampling programme was interrupted at 19 of the then 39 operational sites for varying periods from a few weeks to several months. The sampling programme at Llyn Brianne was particularly affected. Effectively no sampling occurred from the end of January until mid-December since there was a further outbreak of Foot and Mouth disease in the Autumn which was compounded by changed site operator arrangements.

Highlights of the 2001 Measurement

Wet Deposition

Wet deposition can be very episodic with a significant fraction of the annual deposition occurring in a few precipitation events. The data capture criteria conventionally applied to the trace gas and aerosol measurements are therefore of limited utility in evaluating the suspension of sampling arising from the outbreak of Foot and Mouth disease on the calculation of annual mean concentrations and wet deposition budgets.

The measured rainfall in 2001 was compared to the range and mean of values measured previously for sites in the Acid Deposition Monitoring Network. The mean rainfall and its range were calculated for each site for the years since the start of monitoring (typically 1986 through to the present day). For the seven new sites established in 1999, the mean and range were calculated for the two years, 1999 and 2000. The rainwater volumes measured in 2001 at the majority of the sampling sites in lowlying, low rainfall and easily accessible areas were within the range of values measured previously. This was because the sampling programme was either unaffected by the outbreak of Foot and Mouth disease or that the impact had a small effect. However, those sites in the more remote, high rainfall areas were affected by the restriction of

access to site or other site operator problems as shown by the lower rainfall collected in 2001. It is likely that the annual mean concentrations and wet deposition budgets have been affected.

Corresponding plots were produced for the non seasalt sulphate and nitrate concentrations measured in 2001. Again, the annual mean precipitation-weighted concentration and its range were calculated for each site for the years since the start of monitoring (typically 1986 through to the present day). For the seven new sites established in 1999, the mean and range were calculated for the two years, 1999 and 2000. The annual mean non sea salt sulphate concentrations measured in 2001 are towards the lower end of the range of values. This might be expected since concentrations have continually decreased with the fall in sulphur emissions since the monitoring programme started. The annual mean nitrate concentration measured in 2001 were more or less typical of concentrations measured previously - there has been no significant trend at most of the sites.

The following questions was posed:

- **To what extent did extended sampling periods due to site restrictions effect the annual mean concentrations?**

  The precautions taken to prevent the spread of foot and mouth disease prevented access to many of the acid deposition monitoring sites. However, the severity of disruption caused to the sampling programme varied from site to site. There were many sites which continued to sample but that the exposure period was much longer than recommended. At some sites the extended period was only four weeks but much longer for others.

  In conclusion, it is not known to what extent the annual mean concentrations for non seasalt sulphate or nitrate have been affected but most values in 2001 appear more less typical of the values and trends measured previously. As the monitoring programme was suspended for more than 5 months at the Cow Green Reservoir (5113), Llyn Brianne (5124), Scoat Tarn (5159) and Whiteadder (5106) sites, the annual mean precipitation-weighted concentrations for 2001 have not been included for these sites in the Data Summary, as a precaution.

Statistically significant downward trends have been observed in the precipitation-weighted concentrations of non-marine sea sulphate at nearly all of the monitoring sites, with the strongest trends being observed at sites close to major sources (Bottesford, Jenny Hurn, Flatford Mills, Stoke Ferry and Woburn). There is a similar pattern present in the trends of acidity, with the near-field sites (Bottesford, Driby, Jenny Hurn, High Muffles, Thorganby and Woburn) again showing the strongest trends. For nitrate and ammonium, there is no statistically-significant trend in concentration at the majority of the monitoring sites. However, the following near field sites (Bottesford, Stoke Ferry, Thorganby and Compton) have marked downward trends for nitrate. These trends are consistent with the analysis presented in the report prepared by the Department's National Expert Group on Transboundary Air Pollution (NEGTAP).

Sulphur Dioxide, Particulate Sulphate and Nitrogen Dioxide

The annual mean sulphur dioxide concentration has decreased substantially at all sites over the period 1986 to 2001. For example, the annual mean concentration at High Muffles has

decreased from an annual mean concentration of 7.3 μg S m^{-3} in 1987 to 1.2 μg S m^{-3} in 2000 and 1.5 μg S m^{-3} in 2001. Particulate sulphate concentrations do not obviously exhibit the same degree of decrease as that observed for sulphur dioxide. The highest concentrations were observed at Stoke Ferry and Barcombe Mills for the first half of the sampling period - since that time concentrations at both sites have decreased by about 25%. The lowest concentrations are consistently measured at Strathvaich Dam.

The annual mean concentrations of nitrogen dioxide in 2001 were generally comparable to those observed in 2000 but higher than those determined in 1998 and 1999. This is consistent with the generally higher concentrations measured for a range of pollutants in 2001. It is likely that the meteorological conditions led to poorer dispersion and dilution of emissions. The highest concentrations were observed in the Midlands and southern England with an annual mean concentration of 12.4 ppb determined at Woburn in 2001. In the main, this reflects the proximity to the sampling sites of roads and other aspects of urbanisation.

The Nitric Acid Monitoring Network

The new monthly nitric acid monitoring network, established at 12 sites during 1999 by the Centre for Ecology and Hydrology (Bush), has continued to operate very smoothly. The network has provided a record with very few missing points.

The daily site at Barcombe Mills has only been operational since April 2000. Although most of the initial problems have been overcome, the day-to-day operation of the Chemspec system has been problematic with a large number of sampling problems leading to substantial down time in the early part of 2001. Since April 2001, the performance of the Chemspec system has improved significantly with little loss of data. This sampling programme was stopped in November 2001.

Valuable new data have been produced by the network on the behaviour of gaseous and aerosol species involved in transboundary and urban air pollution. In this report, the measurements made in the network in 2001 are presented. The measurement data have been used to derive the first maps of the spatial distribution of gaseous nitric acid and hydrogen chloride in the UK and of the the corresponding aerosol components - nitrate and chloride. Despite the poor performance of the daily system, the results indicate several periods when elevated concentrations of nitric acid were measured.

Use of the Measurement Data

The UK network also forms part of the wider network of the European Monitoring and Evaluation Programme. Results from this network are used to underpin the modelling studies which form the basis of negotiation of UNECE Protocols for controlling the transboundary transport of acidifying pollutants.

The measurements made in the networks have been and continue to be key inputs into the expert reviews of our understanding of acid deposition provided formerly by the Review Group on Acid Rain and more recently by the National Expert Group on Transboundary Air Pollution (NEGTAP). NEGTAP was established to advise DEFRA on transboundary air pollution issues and specifically whether the reductions in the emissions of acidifying pollutants have been effective in promoting the recovery of ecosystems affected by acid deposition.

Contents

Appendices

1. Introduction

This is the first annual data report prepared on the contract *Management and Operation of the UK Acid Deposition Monitoring Network* (EPG 1/3/193), let by the Department for Environment, Food and Rural Affairs (DEFRA). This data report contains a comprehensive summary of the measurements made in the network for the year 2001.

The Acid Deposition Monitoring network was established in 1986 to monitor the composition of precipitation and hence to provide information on deposition of acidifying compounds in the United Kingdom. The aims of the rainwater sampling programme are to provide (1) high quality data which can be used to identify trends with time and (2) information on the spatial distribution of acid deposition in the United Kingdom. In addition to the sampling of rainwater at the network sites, a range of other measurements are made which provide a more complete understanding of precipitation chemistry in the United Kingdom. The measurements made and their interpretation for the calendar years from 1986 to 2000 have been presented previously [*e.g.* Campbell *et al.,* 1994, 1998; Vincent *et al.,* 1995, 1996, 1998; Hayman *et al.*, 2000, 2001c, 2001d].

At the beginning of 2001, the monitoring programme comprised the measurement and determination of

- Precipitation Composition
  - Bulk rainwater sampling on a daily basis at Eskdalemuir
  - Bulk rainwater sampling on a weekly basis at 32 sites
  - Bulk rainwater sampling on a fortnightly basis at 7 sites
  - Wet-only rainwater sampling on a daily basis at Eskdalemuir
- Sulphur Dioxide – Sampling on a daily basis at 8 sites
- Particulate Sulphate – Sampling on a daily basis at 8 sites
- Nitrogen Dioxide – Diffusion tube measurements on a monthly basis at 32 sites
- Nitric Acid and Other Acid Gases
  - Denuder measurements on a monthly basis at 12 sites
  - Denuder measurements on a daily basis at Barcombe Mill

Following the retendering of the monitoring contract in 2001, significant changes were made to the measurement programme and the acid deposition sampling at the Jenny Hurn site in Lincolnshire was discontinued. These changes were effective from the commencement of the new contract in November 2001.

The monitoring programme in 2001 was affected by the restrictions imposed on access across certain parts of the United Kingdom following the outbreak of Foot and Mouth disease in February 2001. The sampling programme was interrupted at 19 of the then 39 operational sites for varying periods from a few weeks to several months.

The measurements made in the networks have provided key inputs into the comprehensive reviews of our understanding of acid deposition undertaken by the Review Group on Acid Rain [RGAR, 1990; RGAR, 1997]. In particular, the third and fourth reports of RGAR covered the

periods from 1986 to 1988 and from 1992 to 1994, respectively [RGAR, 1990; RGAR, 1997]. The results informed the deliberations of the National Expert Group on Transboundary Air Pollution (NEGTAP) which the Department established in 1999 to advise on transboundary air pollution issues and specifically whether the reductions in the emissions of acidifying pollutants have been effective in promoting the recovery of ecosystems affected by acid deposition. A report was published by NEGTAP in 2001 [NEGTAP, 2001].

This annual data report is structured as follows:

- a description of the sampling networks and the sampling techniques employed are presented in Section 2, together with the changes made to the network in 2001;
- an overview of the results from the Acid Deposition Networks for 2001 and concentration maps for non-seasalt sulphate, nitrate, ammonium, hydrogen ion and nitrogen dioxide are presented in Section 3, together with the trends in all acidifying components measured as part of the acid rain monitoring programme;
- a description of the nitric acid monitoring network and the measurements are presented in Section 4.

Summary tables of the weekly bulk precipitation composition data for 2001 at the individual sites are presented in Appendix 1. Time series graphs for data collected since 1986 and seasonal variation plots are presented, along with details of the sites themselves. Appendix 2 presents all the annual concentrations at each site since 1986, together with the annual rainfall amounts determined using the bulk rain collector. Appendix 3 describes the geostatistical techniques that have been used to calculate the concentration maps in this report. The individual measurements of sulphur dioxide and particulate sulphate made at the 8 daily sites are provided in Appendix 4, together with the monthly and annual mean concentrations calculated for each site. Appendix 5 provides a complete set of the measurements made in the HNO_3 Denuder Monitoring Network from commencement in the Autumn of 1999 to June 2001.

2. The Monitoring Programme

2.1 THE ACID DEPOSITION MONITORING NETWORK

2.1.1 Site Locations

The Acid Deposition Monitoring Network formerly comprised two monitoring networks in which rain water samples were collected and analysed. The aim of the first network, known as the "Primary" network, was to provide high quality and high frequency data which could be used to identify trends with time. The second network, the "Secondary" network, provided information on the spatial distribution of acid deposition in the UK. Originally there were 9 primary and 59 secondary sampling sites. Following recommendations from RGAR, both networks were reduced in size to the current 5 and 32 sites, respectively, in 1989. The spatial distribution of the sites is shown in Figure 2.1.

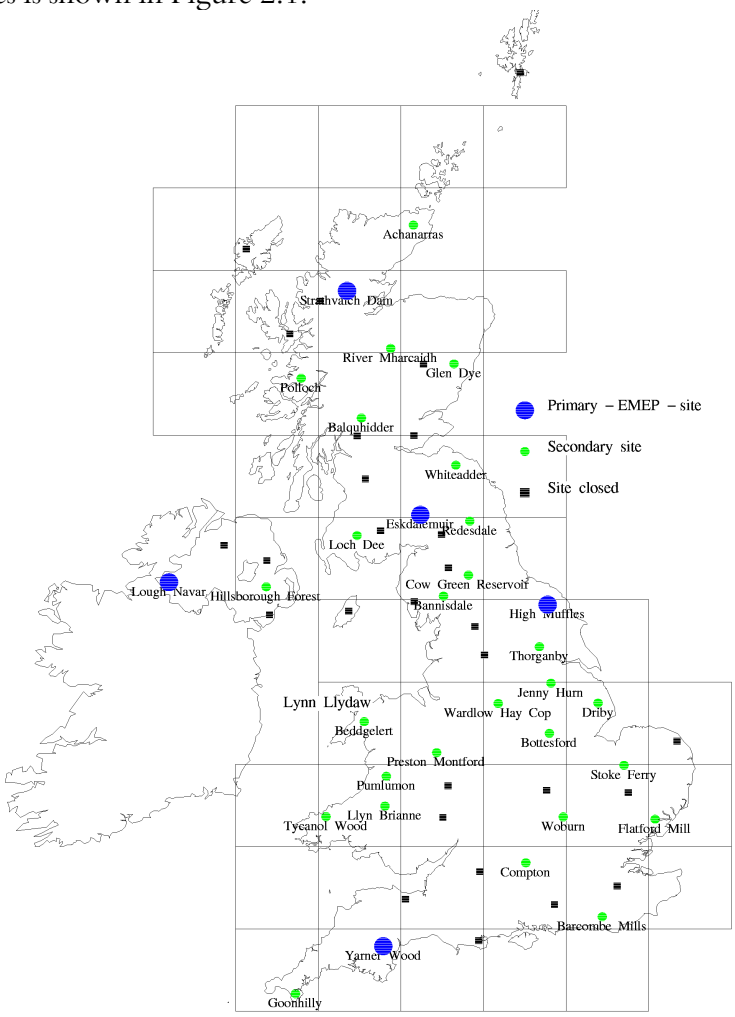


Figure 2.1: ***Location of the Current Primary and Secondary Sampling Sites (Also presented are the locations of the sites no longer operating. The 100 km squares show how the sampling site coverage meets the original coverage objective.)***

In recent years, the distinction between the "Primary" and "Secondary" networks has become blurred with the changes to the monitoring programme.

Seven new sites were established in the early part of 1999 to monitor rainwater composition in ecologically-sensitive locations. The locations of the sites are

- Lochnagar
- Scoat Tarn
- River Etherow
- Llyn Llagi
- Loch Chon/Tinker
- Beaghs Burn
- Crai Reservoir (Head of the Valleys)

The sites are shown in Figure 2.2.

The rainwater samples are collected on a fortnightly basis using bulk collectors.

Figure 2.2: ***The New Bulk Rainwater Sites.***

2.1.2 The Sampling Programme

In addition to the sampling of rainwater at all the network sites, a range of other measurements are made which provide a more complete understanding of precipitation chemistry in the United Kingdom. At the beginning of 2001, the monitoring programme comprised the measurements shown in Table 2.1. Following the retendering of the monitoring contract in 2001, significant changes were made to the measurement programme and the acid deposition sampling at the Jenny Hurn site in Lincolnshire was discontinued. These changes were effective from the commencement of the new contract in November 2001. The amended measurement programme is also shown in Table 2.1.

The sites in operation in 2001 are listed together with the local operators who perform the sample changeovers in Table 2.2 and Table 2.3. The sampling techniques used to make these measurements are summarised in Section 2.2.

Table 2.1: ***The Monitoring Programme at the Start and End of 2001.***

Monitoring Programme	Programme at Start of 2001	Programme at End of 2001
Precipitation Composition	➢ Bulk rainwater sampling on a daily basis at Eskdalemuir	– unchanged
	➢ Bulk rainwater sampling on a weekly basis at 32 sites ➢ Bulk rainwater sampling on a fortnightly basis at 7 sites	– sampling on a **fortnightly basis** at **38 sites** (note 1)
	➢ Wet-only rainwater sampling on a daily basis at Eskdalemuir	– **stopped**
Sulphur Dioxide	➢ Sampling on a daily basis at 8 sites	– sampling on a fortnightly basis at 8 sites (note 2)
Particulate Sulphate	➢ Sampling on a daily basis at 8 sites	– sampling on a daily basis at **5 sites**
Nitrogen Dioxide	➢ Diffusion tube measurements on a monthly basis at 32 sites	– sampling on a monthly basis at **31 sites** (note 1)
Nitric Acid and Other Acid Gases	➢ Denuder measurements on a monthly basis at 12 sites	– unchanged
	➢ Denuder measurements on a daily basis at Barcombe Mill	– **stopped**

Notes (1) The site at Jenny Hurn was closed at the end of November 2001; (2) A new filter-pack sampler, with increased sensitivity, was introduced into the Acid Deposition Monitoring and Rural SO_2 Monitoring Networks during 2001.

Table 2.2: *Network Sites and Measurements Made in 2001.*

Measurement:	**Precipitation**				**NO_2**	**SO_2**	**Part. SO_4**	**Denuder HNO_3-NO_3**
***Frequency*:** **SITE:**	*daily wet*	*daily bulk*	*week bulk*	*fort. bulk*	*monthly*	*daily*	*daily*	*monthly*
Yarner Wood			★ - 1	★ - 1	★	★ - 2	★	★ - 3
Lough Navar			★ - 1	★ - 1	★	★ - 2, 4	★	★ - 3
High Muffles			★ - 1	★ - 1	★	★ - 2	★	★ - 3
Eskdalemuir	★ - 5	★	★ - 1	★ - 1	★	★ - 2	★	★ - 3
Strathvaich Dam			★ - 1	★ - 1	★	★ - 2, 4	★ - 6	★ - 3
Barcombe Mills			★ - 1	★ - 1	★	★	★	★ - 3
Stoke Ferry			★ - 1	★ - 1	★	★	★ - 6	★ - 3
Glen Dye			★ - 1	★ - 1	★	★	★ - 6	
Goonhilly			★ - 1	★ - 1	★			
Compton			★ - 1	★ - 1	★			
Flatford Mill			★ - 1	★ - 1	★			
Woburn			★ - 1	★ - 1	★			
Tycanol Wood			★ - 1	★ - 1	★			
Llyn Brianne			★ - 1	★ - 1	★			
Pumlumon			★ - 1	★ - 1	★			
Preston Montford			★ - 1	★ - 1	★			
Bottesford			★ - 1	★ - 1	★			
Llyn Llydaw			★ - 1	★ - 1	★			
Wardlow Hay Cop			★ - 1	★ - 1	★			
Driby			★ - 1	★ - 1	★			
Jenny Hurn - 7			★ - 1		★			
Thornganby			★ - 1	★ - 1	★			
Bannisdale			★ - 1	★ - 1	★			
Hillsborough For			★ - 1	★ - 1	★			
Cow Green Res			★ - 1	★ - 1	★			
Loch Dee			★ - 1	★ - 1	★			
Redesdale			★ - 1	★ - 1	★			
Whiteadder			★ - 1	★ - 1	★			
Balquhidder			★ - 1	★ - 1	★			
Polloch			★ - 1	★ - 1	★			
Allt a' Mharcaidh			★ - 1	★ - 1	★			
Achanarras			★ - 1	★ - 1	★			
Crai Reservoir				★				
Beaghs Burn				★				
Loch Chon				★				
Lochnagar				★				
River Etherow				★				
Scoat Tarn				★				
Llyn Llagi				★				

Notes (1) The sampling frequency of the bulk deposition monitoring was changed from weekly to fortnightly with effect from November 2001; (2) The daily bubbler measurement programme was replaced with a fortnightly filter-pack measurement programme during 2001; (3) A site in the CEH HNO_3 Denuder Monitoring Network (see Section 4); (4) This site, together with those at Bush, Cwmystwyth and Sutton Bonington, was used as a overlap site for the introduction of the filter-pack sampler; (5) The daily wet-only measurement was stopped with effect from November 2001; (6) The daily particulate sulphate measurements were stopped with effect from November 2001; (7) This site was closed with effect from November 2001.

Table 2.3: ***Precipitation Composition Monitoring Sites, 2001 (those in bold are EMEP sites with the daily measurements made - wet-only sampling, sulphur dioxide and particulate sulphate - reported to EMEP).***

Site Code	Site Name	O.S. Reference	Altitude (m)	Operator
5003	Goonhilly	SW 723214	108	British Telecom
5008	**Yarner Wood**	**SX 786789**	**119**	**English Nature**
5007	Barcombe Mills	TQ 437149	10	South East Water plc
5129	Compton	SU 512804	105	AEA Technology plc
5154	Crai Reservoir	SN 288222	310	Welsh Water plc
5024	Flatford Mill	TM 077333	5	Field Studies Council
5127	Woburn	SP 964361	89	Rothamsted Experimental Station
5123	Tycanol Wood	SN 093364	205	Countryside Council for Wales
5124	Llyn Brianne	SN 822507	420	Environment Agency. Forest Enterprise
5150	Pumlumon	SN 823854	390	Centre for Ecology and Hydrology (Bangor)
5004	Stoke Ferry	TL 700988	15	Kings Lynn and West Norfolk Borough Council
5023	Preston Montford	SJ 432143	70	Field Studies Council
5121	Bottesford	SK 797376	32	PowerGen
5160	Llyn Llagi	SH 647483	490	CEH Bangor
5153	Llyn Llydaw	SH 556518	358	Countryside Council for Wales
5158	River Etherow	SK 125986	485	ENSIS
5120	Wardlow Hay Cop	SK 177739	350	English Nature
5136	Driby	TF 386744	47	Anglian Water
5118	Jenny Hurn	SK 816986	4	PowerGen (see note 1)
5117	Thorganby	SE 676428	8	Selby District Council
5009	**High Muffles**	**SE 776939**	**267**	**Forest Enterprise** (see note 2)
5111	Bannisdale	NY 515043	265	CEH Windermere (see note 3)
5149	Hillsborough Forest	J 243577	120	Department of Agriculture and Rural Development (NI)
5006	**Lough Navar**	**H 065545**	**130**	**Forestry Service, Northern Ireland**
5113	Cow Green Reservoir	NY 817298	510	English Nature
5159	Scoat Tarn	NY 158103	595	ENSIS
5107	Loch Dee	NX 468779	230	Scottish Environment Protection Agency/Forest Enterprise
5155	Beaghs Burn	D 165283	250	Department of Agriculture and Rural Development (NI)
5109	Redesdale	NY 833954	240	ADAS
5002	**Eskdalemuir**	**NT 235030**	**259**	**Meteorological Office**
5106	Whiteadder	NT 664633	250	East of Scotland Water
5156	Loch Chon	NN 429084	150	Freshwater Fisheries Laboratory
5152	Balquhidder 2	NN 545207	135	Mountain Environments
5151	Polloch	NM 792689	30	Forest Enterprise (see note 4)
5157	Loch Nagar	NO 252859	785	ENSIS
5011	Glen Dye	NO 642864	185	Scottish Environment Protection Agency;
5103	Allt a' Mharcaidh	NH 876052	274	Freshwater Fisheries Laboratory
5010	**Strathvaich Dam**	**NH 347750**	**270**	Clova Environmental Research and Testing Services
5140	Achanarras	ND 151550	98	Mrs J . Erridge

Notes (1) This site was closed in November 2001; (2) The site operator changed to Forestry Research at the end of 2001 following the retirement of the previous site operator; (3) David Rochelle took over as site operator from CEH Windermere with effect from November 2001. He had effectively been acting as the site operator; (4) Jim Kirby took over as site operator from Forest Enterprise with effect from November 2001. He had effectively been acting as the site operator.

The sampling programme in 2001 was significantly affected by the restrictions imposed on access across certain parts of the United Kingdom following the outbreak of Foot and Mouth disease in February 2001. The monitoring programme was interrupted at 19 of the then 39 operational sites for varying periods from a few weeks to several months, as shown in Table 2.4. The monitoring programme at Llyn Brianne was particularly affected by a further outbreak of Foot and Mouth disease in the Autumn combined with site operator changes. Effectively no sampling occurred from the end of January until mid-December.

2.2 SAMPLING TECHNIQUES

2.2.1 Precipitation

Weekly or Fortnightly precipitation samples were collected in bulk collectors at 39 sites using a collector designed by Hall [1986]. An assessment of the collection efficiency of the bulk collector is provided by Stone and Tily [1992]. For the two year period 1986 to 1987, the bulk collector was found to have collection efficiencies which ranged from 77% to 99% when compared to the 5 inch meteorological rain gauge.

Acid deposition occurs primarily by wet and dry deposition. The wet-only collector, developed at the Warren Spring Laboratory (which now forms part of AEA Technology), is a daily precipitation collector. The collector incorporates a number of features designed to measure the wet deposition component, minimise the effect of dry deposition, preserve sample integrity, record associated tipping bucket volume data and allow unattended operation for up to eight days.

2.2.2 Sulphur Dioxide and Particulate Sulphate

The concentrations of particulate sulphate and sulphur dioxide were determined by first collecting a sample using eight-port bubbler instruments (AGL, Hitchin). Particulate sulphate was collected by drawing air through a Whatman 40 filter. Sulphur dioxide is collected by passing the air through a hydrogen peroxide solution where sulphur dioxide is oxidised to sulphate. The sulphate concentrations are determined by ion chromatography.

In addition to the daily sampling reported here, further monitoring of sulphur dioxide - *The Rural SO_2 Monitoring Network* - is undertaken as part of the Acid Deposition Processes contract let by DEFRA to the Centre for Ecology and Hydrology, Edinburgh (CEH Edinburgh).

The concentrations of sulphur dioxide measured at some of the sites in the Acid Deposition Monitoring and the related 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. Following a method intercomparison exercise undertaken in collaboration with CEH Edinburgh at the Auchencorth Moss site near Edinburgh between September 1998 and May 1999 [Hasler *et al.*, 2000], a filter-pack sampler was selected as the replacement method on the grounds of cost, improved sensitivity, method robustness, ease of operation and the quality of the measurements. The filter pack method samplers were introduced into the monitoring networks from April 2001.

Table 2.4: ***Details of Sites Affected by the Outbreak of Foot and Mouth Disease.***

Site	Sampling Suspended	Sample type	Number of Samples Missed	Comments
Loch Chon (5156) Scotland	14/2/01 - 2/5/01	bulk precipitation - fortnightly	bulk precipitation = 5	Site Operator's organisation (FFL) has banned vehicles entering farm areas
Pumlumon (5150) Wales	20/2/01 - 1/5/01	bulk precipitation - weekly NO_2 - monthly	bulk precipitation = 9 NO_2= 2	Assume Foot and Mouth access restriction onto land
Llyn Llagi (5160) Wales	19/2/01 - 26/04/01	bulk precipitation - fortnightly	bulk precipitation = 4	Foot and Mouth access restriction onto land
Jenny Hurn (5118) England	27/2/01 - 27/3/01	bulk precipitation - weekly NO_2 - monthly	bulk precipitation = 3 NO_2 = 1	Powergen have suspended visits on grazing farmland as a precautionary measure (as a responsible company)
Bottesford (5121) England	27/2/01 - 27/3/01	bulk precipitation - weekly NO_2 - monthly	bulk precipitation = 3 NO_2 = 1	Powergen have suspended visits on grazing farmland as a precautionary measure (as a responsible company). This site also lies within a restricted region where a Foot and Mouth outbreak has been identified (Declaratory No12)
Scoat Tarn (5159) England	21/2/01 (Note 1)	bulk precipitation - fortnightly	bulk precipitation = 12	Foot and Mouth access restriction onto land
River Etherow (5158) England	20/2/01 - 31/5/01	bulk precipitation - fortnightly	bulk precipitation = 7	Foot and Mouth access restriction onto land
Glen Dye (5011) Scotland	20/2/01 - 17/4/01	bulk precipitation - weekly SO_2/SO_4 particles - daily NO_2 - monthly	bulk precipitation = 7 SO_2 = 56; SO_4 = 56 NO_2 = 2	Glen Dye Estate (privately owned) have denied entry onto land as a precautionary measure.
Strathvaich Dam (5010) Scotland	27/2/01 - 18/4/01	bulk precipitation - weekly SO_2/SO_4 particles - daily NO_2 - monthly	bulk precipitation = 6 SO_2 = 42; SO_4 = 42 NO_2 = 2	Strathvaich Dam Estate (privately owned) have denied entry onto land as a precautionary measure.
Lochnagar (5157) Scotland	21/2/01 - 20/3/01	bulk precipitation - fortnightly	bulk precipitation = 1	Still sampling but expecting to get permission denied for entry to Balmoral Estate.

Site	Sampling Suspended	Sample type	Number of Samples Missed	Comments
Bannisdale (5111) England	(Note 2)	Weekly bulk precipitation and monthly NO_2	bulk precipitation = 7 NO_2 = none	This site is still sampling. The LSO has arranged for local people at the site to do the sampling from this week (they will be taking stringent precautions by disinfecting themselves and their vehicle when entering and leaving isolated valley).
Cow Green Reservoir (5113) England	21/2/01 - 10/7/01	bulk precipitation - weekly NO_2 - monthly	bulk precipitation = 20 NO_2 = 5	Foot and Mouth access restriction onto land
Balquhidder (5152) Scotland	26/2/01 - 30/04/01	bulk precipitation - weekly NO_2 - monthly	bulk precipitation = 8 NO_2 = 1	Site on farmland. Considered best practise to restrict access to land
Tycanol Wood (5123)	21/2/01 - 27/6/01	bulk precipitation - weekly NO_2 - monthly	bulk precipitation = 17 NO_2 = 4	
Llyn Brianne (5124) Wales	22/2/01 (Note 3)	bulk precipitation - weekly NO_2 - monthly	bulk precipitation = 22 NO_2 = 5	It is the EA's policy (decided with MAFF) that all operations crossing farmland (apart from category 1 incidents) should be ceased until further notice.
Whiteadder (5106) Scotland	13/3/01 - 21/5/01 Stopped again 7/6/01	bulk precipitation - weekly NO_2 - monthly	bulk precipitation = 19 NO_2 = 4	Foot and Mouth access restriction onto farmland
Llyn Llydaw (5153) Wales	21/2/01 - 25/4/01	bulk precipitation - weekly NO_2 - monthly	bulk precipitation = 8 NO_2 = 2	Foot and Mouth access restriction onto land – National Park.
Wardlow Hay Cop (5120) England	25/2/01 - 21/5/01	bulk precipitation - weekly NO_2 - monthly	bulk precipitation = 11 NO_2 = 3	Foot and Mouth access restriction onto land
River Mharcaidh (5103) Scotland	26/2/01 - 19/3/01	bulk precipitation - weekly NO_2 - monthly	bulk precipitation = 2 NO_2 = none	Foot and Mouth access restriction onto land Site closed for 21 days.

Notes (2) Never stopped sampling but inconsistant sampling periods have led to sample loss; (3) Although this site was expected to restart in July, the recent outbreak of Foot and Mouth disease on the Brecons and in Crickhowell has prevented this. The management at the EA are still of the opinion that access to open moorland should be avoided.

2.2.3 Nitrogen Dioxide

Diffusion tubes have been used to measure nitrogen dioxide concentrations at the Primary and Secondary Network sites. Tubes are mounted on the upright of the rain collector stand and are exposed for twelve four or five week periods throughout each year.

2.2.4 Nitric Acid Denuder Technique

The denuder technique used to determine concentrations of nitric acid and other acid gases is described later in Section 4.1.

2.3 ANALYTICAL PROCEDURES

2.3.1 Sample Registration and Preparation

As for previous years, approximately 10,700 samples were received and analysed by the laboratory in 2001. Samples returned to AEA Technology were logged on a computerised sample register and their volumes recorded. Sample preparation and handling were carried out using standard operating procedures.

On receipt in the analytical laboratory rainwater samples were sub-sampled into polyethylene bottles (Nalgene). The pH and conductivity were recorded and the samples filtered through 1μm disposable filters to remove insoluble particulate material and micro-organisms that might compromise sample integrity before analysis. The samples were then stored at 4°C until analysis by ion chromatography. Samples were analysed for: sulphate, nitrate, chloride, phosphate, sodium, magnesium, calcium, potassium, pH and conductivity. Analysis was usually completed within one month.

2.3.2 Analysis

Samples were analysed using NAMAS accredited methods. All samples with exception of diffusion tubes are analysed using ion chromatography.

The rapid analysis of a large number of rain water samples in which concentrations vary over several orders of magnitude is a complex task. To verify the analytical results, the ion balance, I (Equation 1), is calculated for each rainwater sample.

$$I = \left| \frac{2(\Sigma c - \Sigma a)}{\Sigma c + \Sigma a} \right| \qquad \text{(Equation 1)}$$

where Σc = sum of cation concentrations in equivalents (μeq l^{-1}) and Σa = sum of anion concentrations in equivalents (μeq l^{-1}). A correction is estimated for the concentration of bicarbonate in samples which have a pH greater than 5.5. Samples which fall outside the criteria listed in Table 2.5 are submitted for reanalysis. The reanalysis is usually completed within four months of sampling.

With the introduction of new ion chromatographs [see Hayman *et al.*, 2001d], less than 10% of the samples fail the criteria and would need to be reanalysed.

Table 2.5: *Ion Balance Criteria Used to Select Samples for Reanalysis.*

Ionic strength concentration range ($\mu eq\ l^{-1}$)	Samples are resubmitted when the ion difference (%) is:
Less than 50	> 60
50-100	> 30
Greater than 100	> 15

2.4 DATA REPORTING CYCLE

Sample collection, analysis, reanalysis and verification is a continuous process. Figure 2.3 and Figure 2.4 define the reporting cycles for the measurements made in the monitoring programme. Reanalysis is only undertaken for the composition of precipitation using the ion balance as the criterion. Simple data verification is undertaken for the other measurements. The cycles show that the measurements made in *Year N* would be available by July of *Year N+1*. Although the existing cycles approach this, it is intended to adhere to these reporting cycles more closely.

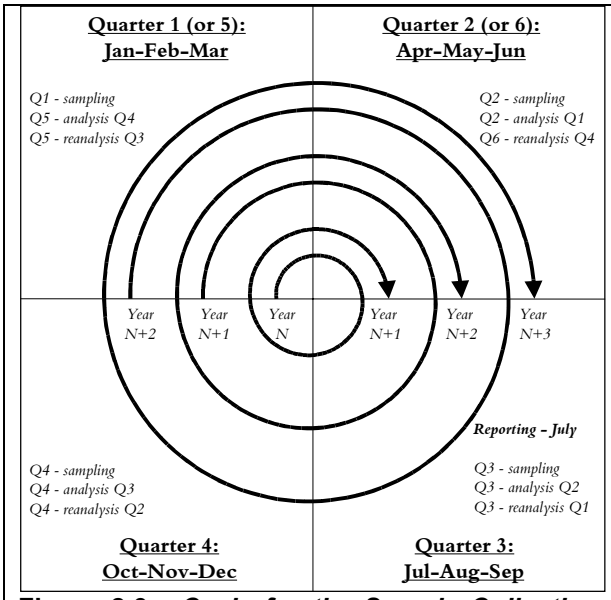


Figure 2.3 - *Cycle for the Sample Collection, Analysis, Reanalysis and Reporting of the Composition of Precipitation.*

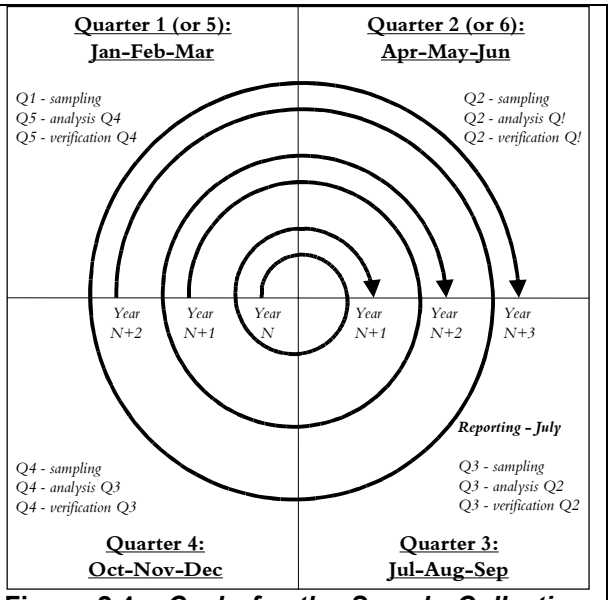


Figure 2.4 - *Cycle for the Sample Collection, Analysis and Verification and Reporting of the Other Measurements.*

3. 2001 Measurements and Trends

3.1 DATA SUMMARY

The complete set of precipitation measurements made in the Acid Deposition Monitoring Network during 2001 is provided in the following Appendices:

- Appendix 1 – Precipitation Composition from Weekly Bulk Collectors
- Appendix 2 – Annual Mean Precipitation-weighted Concentrations
- Appendix 3 – SO_2 and Particulate Sulphate Measurements and Statistics
- Appendix 4 – NO_2 Measurements and Statistics
- Appendix 5 – CEH HNO_3 Denuder Measurements and Statistics

Information is also provided in Appendix 1 about the site and the measurements made. Appendix 6 describes the geostatistical techniques that have been used to calculate the precipitation concentration maps in this report.

3.2 PRECIPITATION CHEMISTRY

3.2.1 The Measurements

The measurements of precipitation composition made using the weekly bulk collectors are presented in Appendix 1. It should be noted that the tables in Appendix 1 contain all the analytical results obtained, including those samples affected by contamination by birdstrike. A phosphate concentration >0.1 mg P l^{-1} (or >9.7 μeq l^{-1}) was taken as evidence of contamination. Although all these samples have been included in the tables, they were not included in the calculation of annual mean precipitation-weighted ion concentrations. The mean annual rainfall and the precipitation-weighted mean annual concentrations of all ions for the period from 1986 to 2001 are also tabulated in Appendix 2. The rainfall totals presented in Appendix 2, Table 10 include all samples collected and are therefore sometimes higher than the totals used for the calculation of the annual mean concentrations.

Appendix 1 also contains two plots which show (a) the trend in the annual precipitation-weighted mean concentrations for non-seasalt sulphate, nitrate, ammonium and hydrogen ion since the commencement of the site and (b) the trend in the annual rainfall and in the corresponding annual deposition of the four species. The trends shown in the two plots varies from site to site (Appendix 1), although in general annual precipitation-weighted mean non-seasalt sulphate and hydrogen ion concentrations have tended to decline whereas nitrate and ammonium have not changed much at all. A box has been included in Appendix 1 which contains a statistical summary of the trends of the four ions shown in the plots.

Previously, Appendix 1 also included a figure for each site which showed the seasonal variation in the concentrations. The seasonal plots presented previously [see Hayman *et al.*, 2000, 2001c, d] clearly showed that the largest concentrations of both non-seasalt sulphate and nitrate occur in the period from April to June at most of the sites. This is partly a consequence of the seasonal variation of emissions and of the oxidising capacity of the atmosphere, as demonstrated by the

seasonal variation observed in particulate sulphate (see Figure 3.1). However, the variation in concentration of particulate sulphate concentration is much smaller than that of non-seasalt sulphate in precipitation. The concentrations of ions in precipitation are also affected by the seasonal variation in rainfall amount. The monthly mean rainfall amount tends to be smaller in early summer than in the rest of the year and the inverse correlation between rainfall amount and the concentrations of non-seasalt sulphate, nitrate, ammonium results in a corresponding opposite seasonal variation.

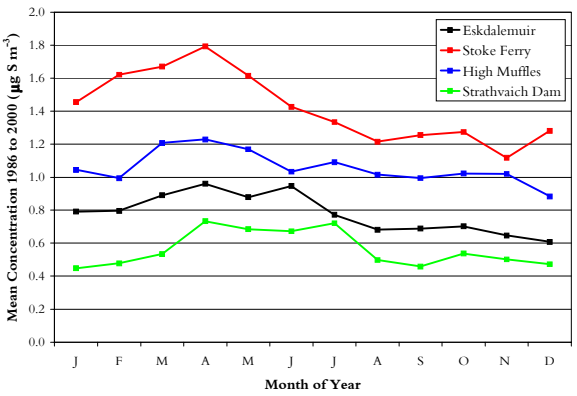


Figure 3.1: ***Seasonal Variation in the Particulate Sulphate Concentration at 4 of the 5 Primary Sites as Averages for the years 1986-2001.***

3.2.2 Impact of Foot and Mouth disease on Sample Collection in 2001

The sampling programme in 2001 was significantly affected by the restrictions imposed on access across certain parts of the United Kingdom following the outbreak of Foot and Mouth disease in February 2001. The monitoring programme was interrupted at 19 of the then 39 operational sites for varying periods from a few weeks to several months, as shown earlier in Table 2.4. The sampling programme at Llyn Brianne was particularly affected. Effectively no sampling occurred from the end of January until mid-December since there was a further outbreak of Foot and Mouth disease in the Autumn which was compounded by changed site operator arrangements.

Wet deposition can be very episodic with a significant fraction of the annual deposition occurring in a few precipitation events. The data capture criteria conventionally applied to the trace gas and aerosol measurements are therefore of limited utility in evaluating the suspension of sampling on the calculation of annual mean concentrations and wet deposition budgets. As an attempt to evaluate the impact, the measured rainfall in 2001 was compared to the range and mean of values measured previously for sites in the Acid Deposition Monitoring Network, as shown in Figure 3.2. The mean rainfall and its range were calculated for each site for the years since the start of monitoring (typically 1986 through to the present day). For the seven new sites established in 1999, the mean and range were calculated for the two years, 1999 and 2000.

Figure 3.2 shows that the rainwater volumes measured in 2001 at the majority of the sampling sites in lowlying, low rainfall and easily accessible areas were within the range of values measured previously. This was because the sampling programme was either unaffected by the outbreak of Foot and Mouth disease or that the impact had a small effect. However, those sites in the more remote, high rainfall areas were affected by the restriction of access to site or other site operator problems as shown by the lower rainfall collected in 2001. It is likely that the annual mean concentrations and wet deposition budgets have been affected.

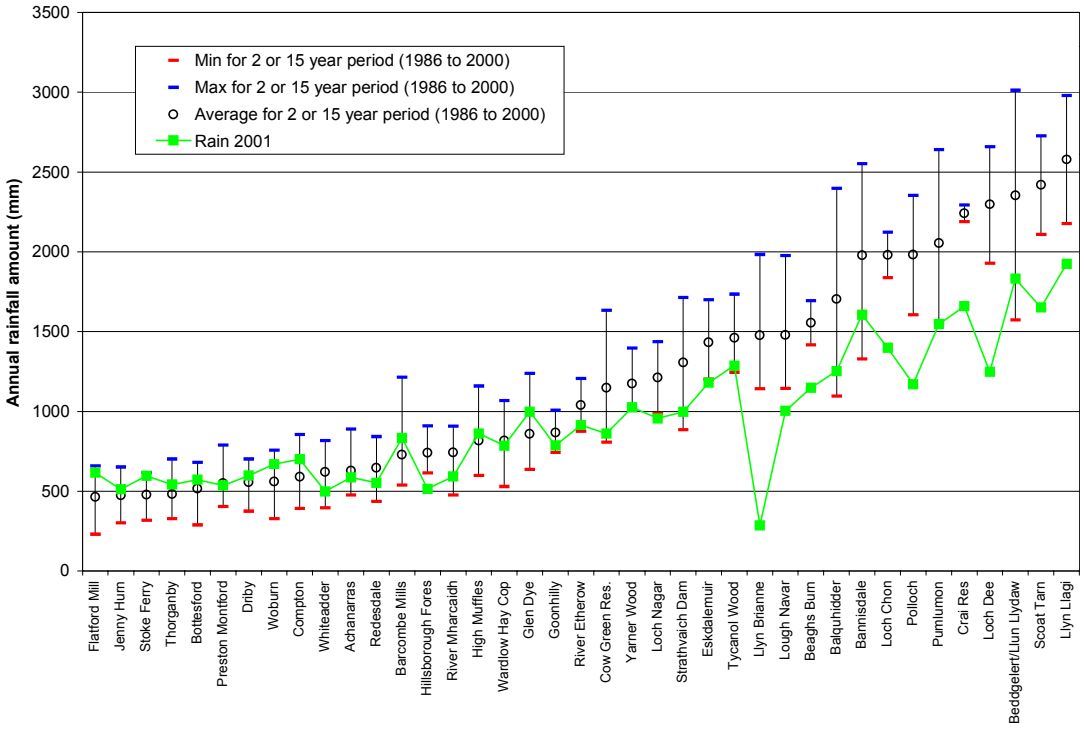


Figure 3.2: ***Rainwater Volume measured at Acid Deposition Monitoring Sites in 2001 compared with the Range and Average values measured previously (see text).***

Corresponding plots were produced for the non seasalt sulphate and nitrate concentrations measured in 2001, as shown in Figure 3.3. Again, the annual precipitation-weighted concentration and its range were calculated for each site for the years since the start of monitoring (typically 1986 through to the present day). For the seven new sites established in 1999, the mean and range were calculated for the two years, 1999 and 2000.

The upper panel of Figure 3.3 shows that the non sea salt sulphate concentration measured in 2001 is towards the lower end of the range of values. This might be expected since concentrations have continually decreased with the fall in sulphur emissions since the monitoring programme started. The lower panel of Figure 3.3 shows that the nitrate concentration measured in 2001 were more or less typical of concentrations measured previously - there has been no significant trend at most of the sites.

The following questions can be posed:

- **To what extent did extended sampling periods due to site restrictions effect the annual mean concentrations?**

  The precautions taken to prevent the spread of foot and mouth disease prevented access to manyt of the acid deposition monitoring sites. However, the severity of disruption caused to the sampling programme varied from site to site. For example, Table 3.1[1] shows that there were many sites which continued to sample but that the exposure period was much

[1] Table 3.1 is a more extensive listing of interrruptions to the sampling programme than that given in Table 2.4 as it includes not only the interruptions due to access restrictions imposed by the outbreak of Foot and Mouth disease but also extended sampling periods or lost samples which sometimes occur in a normal sampling year.

longer than recommended. At some sites the extended period was only four weeks but much longer for others. This was most severe for the sample collections at Cow Green Reservoir (5113), Llyn Brianne (5124), Scoat Tarn (5159) and Whiteadder (5106), and to a lesser extent at Tycanol Wood (5123) and Loch Dee (5107).

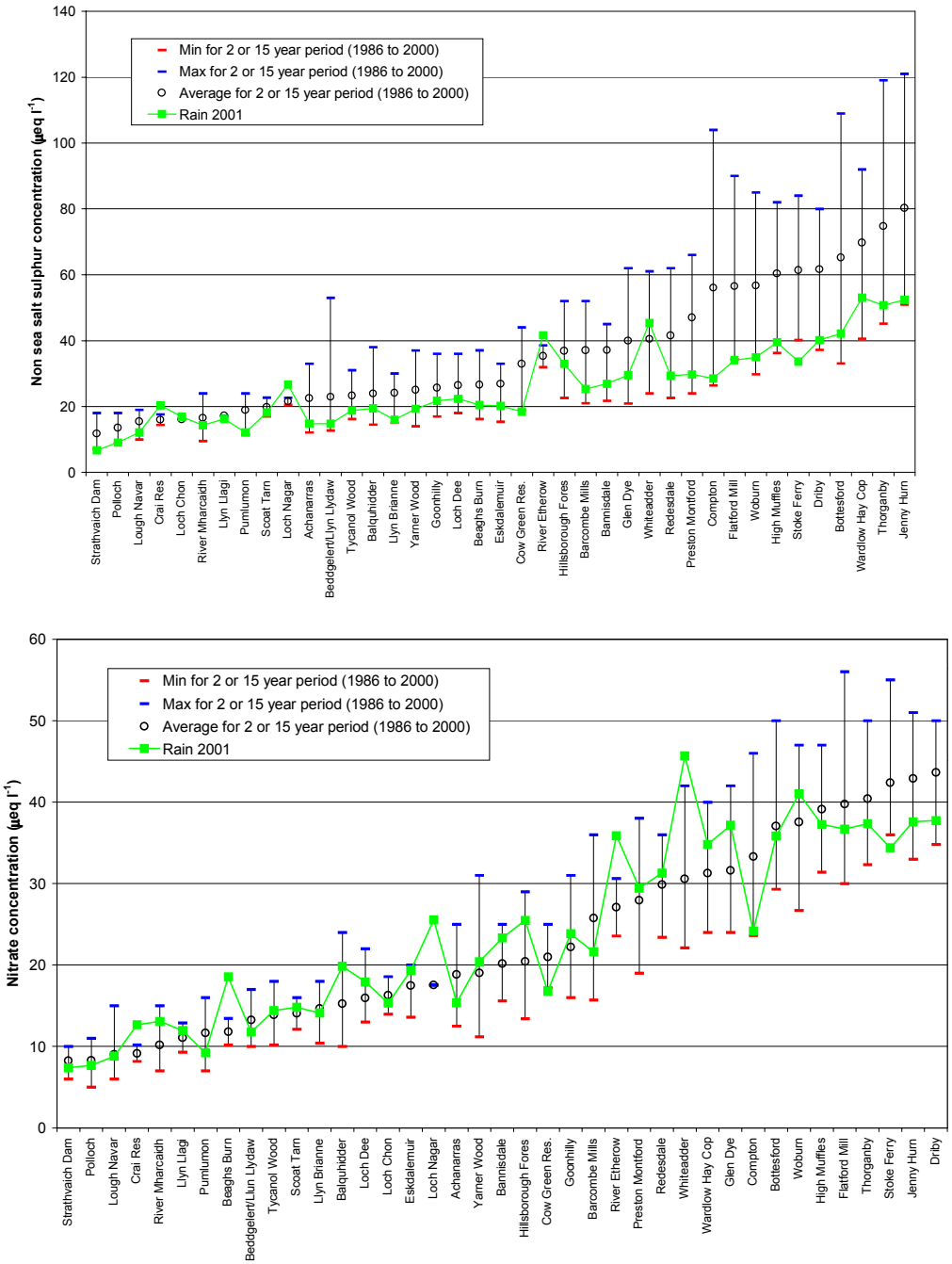


Figure 3.3: ***Concentrations of Non Seasalt Sulphur (upper panel) and Nitrate (lower panel) measured Acid Deposition Monitoring Sites in 2001 compared with the Range and Average values measured previously (see text).***

The nitrate concentration measured at Whiteadder is an obvious outlier for sites within the Acid Deposition Monitoring Network. The value is approximately fifty percent of the annual mean calculated for the 15 year period 1986 to 2000 and 4 µeq l^{-1} more than the

previous concentration measured (42 μeq l^{-1} measured in 1988). The reasons for this are unclear.

Table 3.1: ***A Qualitative Description of the Likelihood to which Annual Means are affected by the Outbreak of Foot and Mouth Disease (FMD) or Other Site Operations.***

Site	Site code	Problems	Period/s affected	Annual Mean affected	Rainwater volume (mm)
Eskdalemuir	5002	No	not affected	No	
Goonhilly	5003	No	not affected	No	
Stoke Ferry	5004	No	not affected	No	
Lough Navar	5006	No	not affected	No	
Barcombe Mills	5007	No	not affected	No	
Yarner Wood	5008	No	not affected	No	
High Muffles	5009	No	not affected	No	
Strathvaich Dam	5010	Yes, FMD	long sampling period 27/2/01 to 17/4/01	small chance	1149
Glen Dye	5011	Yes, FMD	long sampling period 20/2/01 to 17/4/01	small chance	2895
Preston Montford	5023	No	not affected	No	
Flatford Mill	5024	No	not affected	No	
River Mharcaidh	5103	Yes, FMD	long sampling period 26/2/01 to 19/3/01	small chance	352
Whiteadder	5106	Yes, FMD	long sampling period 20/2/01 to 13/3/01 long sampling period 13/3/01 to 22/5/01 long sampling period 22/5/01 to 31/7/01	likely	211 829 1180
Loch Dee	5107	Yes, Site operator	no sample collection 27/2/01 to 7/3/01 no sample collection 17/4/01 to 24/1/01? sample lost in transit 1/10/01 to 9/10/01 no sample collection 27/11/01 to 2/1/02	likely	
Redesdale	5109	Yes, sample lost	bottle broke in transit 12/6/01 to 19/6/01	likely	
Bannisdale	5111	Yes, Site operator	erratic sample change over	small chance	
Cow Green Reservoir	5113	Yes, FMD	no sample collection 21/2/01 to 10/7/01	likely	
Thorganby	5117	No	not affected	No	
Jenny Hurn	5118	Yes, FMD	long sampling period 27/2/01 to 27/3/01	small chance	514
Wardlow Hay Cop	5120	Yes, FMD	long sampling period 4/3/01 to 20/5/01	likely	3371
Bottesford	5121	Yes, FMD	long sampling period 27/2/01 to 27/3/01	small chance	678
Tycanol Wood	5123	Yes, FMD	long sample period 21/2/01 to 27/6/01 sample not submitted for analysis	likely	3316
Llyn Brianne	5124	Yes, FMD	no sample collection 22/2/01 to 13/12/01	likely	
Woburn	5127	No	not affected	No	
Compton	5129	Yes, Site operator	access problems- 2 three week sample periods	small chance	
Driby	5136	Yes, Sample lost	sample leaked in bag 14/3/01 to 21/3/01	likely	
Achanarras	5140	Yes, Sample lost	sample leaked in bag 30/5/01 to 6/6/01	likely	
Hillsborough Forest	5149	Yes, FMD	long sample period 22/2/01 to 15/3/01 - slurry reported nearby	likely to affect ammonia	
Pumlumon	5150	Yes, FMD	long sample period 20/2/01 to 27/4/01 but bottle smashed in transit	likely	
Polloch	5151	Yes, Site operator	long sampling period 4/9/01 to 4/12/01	likely	3230
Balquhidder	5152	Yes, FMD	long sampling period 26/2/01 to 1/5/01	likely	1720
Llyn Llydaw	5153	Yes, FMD	long sampling period 21/2/01 to 25/4/01	likely	3324
Crai Res	5154	Yes, Site operator	long sampling period 17/8/01 to 14/9/01	small chance	789
Beaghs Burn	5155	Yes, FMD	but sampling not affected	No	
Loch Chon	5156	Yes, FMD	long sampling period 14/2/01 to 2/5/01	small chance	1825
Loch Nagar	5157	Yes, Site operations Yes, FMD	Long sampling period 24/1/01 to 21/2/01 – adverse weather long sampling period 24/1/01 to 21/2/01	small chance	227 234
River Etherow	5158	Yes, FMD	long sampling period 20/2/01 to 31/5/01	small chance	2810
Scoat Tarn	5159	Yes, FMD	Long sampling period 21/2/01 to 4/8/01 - sample discarded	likely	3343
Llyn Llagi	5160	Yes, FMD	long sampling period 19/2/01 to 26/4/01	small chance	1319

In Table 3.1, the qualitative terms "likely" or "small chance" used to assess whether the annual mean has been affected are defined below:

Probability description for affect on annual mean	Definition
Small chance	sample collection time is extended beyond that recommended (typically less than 8 weeks)
Likely	prolonged exposure, bottle overflow, sample/s lost (typically 8 weeks or more)

In conclusion, it is not known to what extent the annual mean concentrations for non seasalt sulphate or nitrate have been affected but most values in 2001 appear more less typical of the values and trends measured previously. Since the monitoring programme was suspended or affected for more than 5 months at the Cow Green Reservoir (5113), Llyn Brianne (5124), Scoat Tarn (5159) and Whiteadder (5106) sites, the annual mean precipitation-weighted concentrations for 2001 have not been included as a precaution.

A further investigation is needed to determine why the nitrate (and hydrogen ion concentrations) at Whiteadder were so high although this may be a result that sampling was suspended for more than 5 months and the samples collected do not adequately represent the annual mean concentrations.

3.2.3 Concentration Maps for 2001

The spatial patterns of the annual mean precipitation-weighted concentration of acidity, non-sea sulphate, nitrate and ammonium are presented in Figure 3.4 to Figure 3.7 for the original 32 bulk rainwater sites in the networks for the years 1999 to 2001. The parameters used in the interpolation are presented in Appendix 6. There are no hydrogen ion maps for 2000 as the acidity measurements were removed from the 2000 dataset.

The same figures also present the maps that are based on the measurements from the original 32 bulk rainwater sites in the network and the 7 new sites established in 1999. The inclusion of the measurements from the new sites makes small local differences.

For the datasets up to and including the 1997 dataset, deposition maps were determined from the concentration maps using rainfall fields supplied by the Meteorological Office. As these data are no longer purchased through this contract, only concentration maps are now presented.

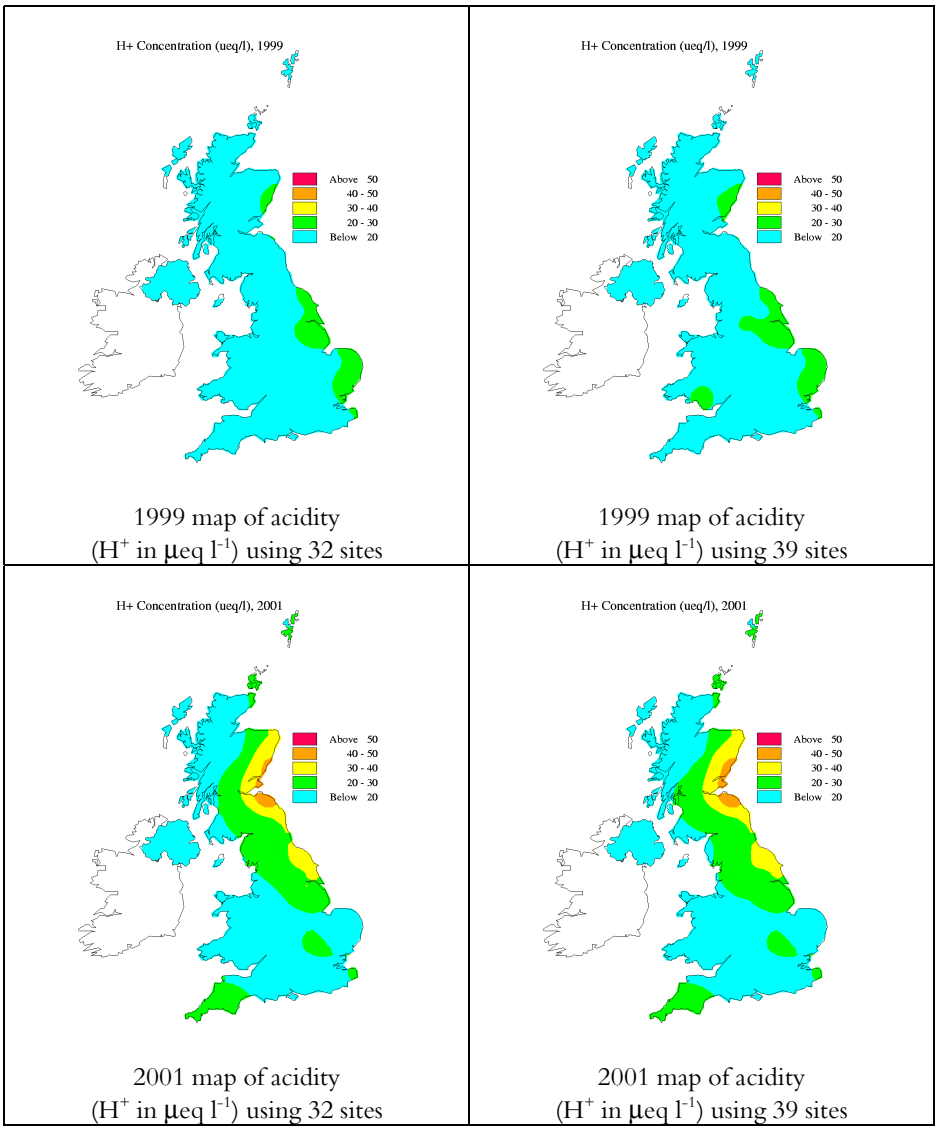


Figure 3.4: ***Precipitation-weighted concentration maps of Acidity for 1999 and 2001***

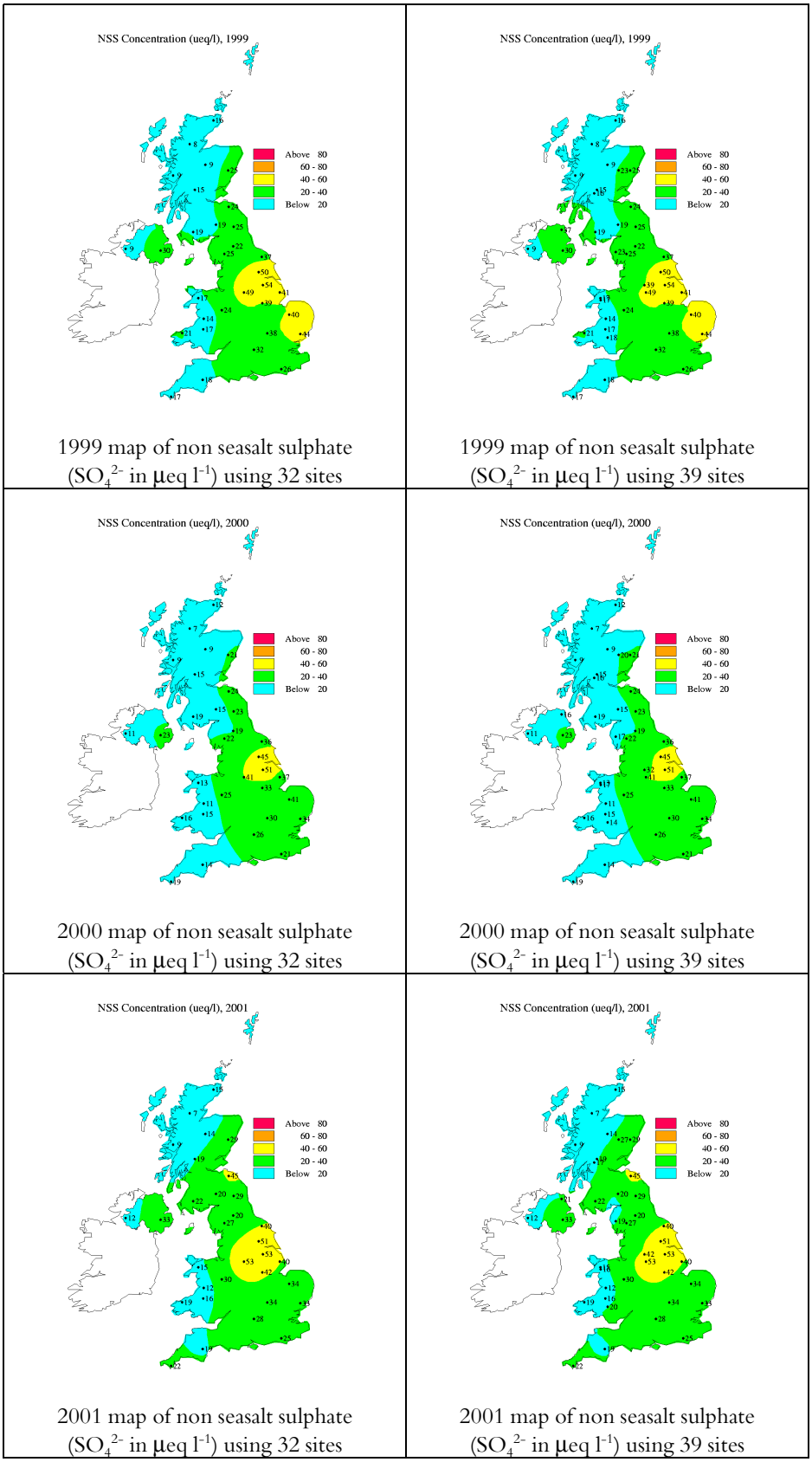


Figure 3.5: ***Precipitation-weighted Concentration Maps of Non Seasalt Sulphate for 1999-2001.***

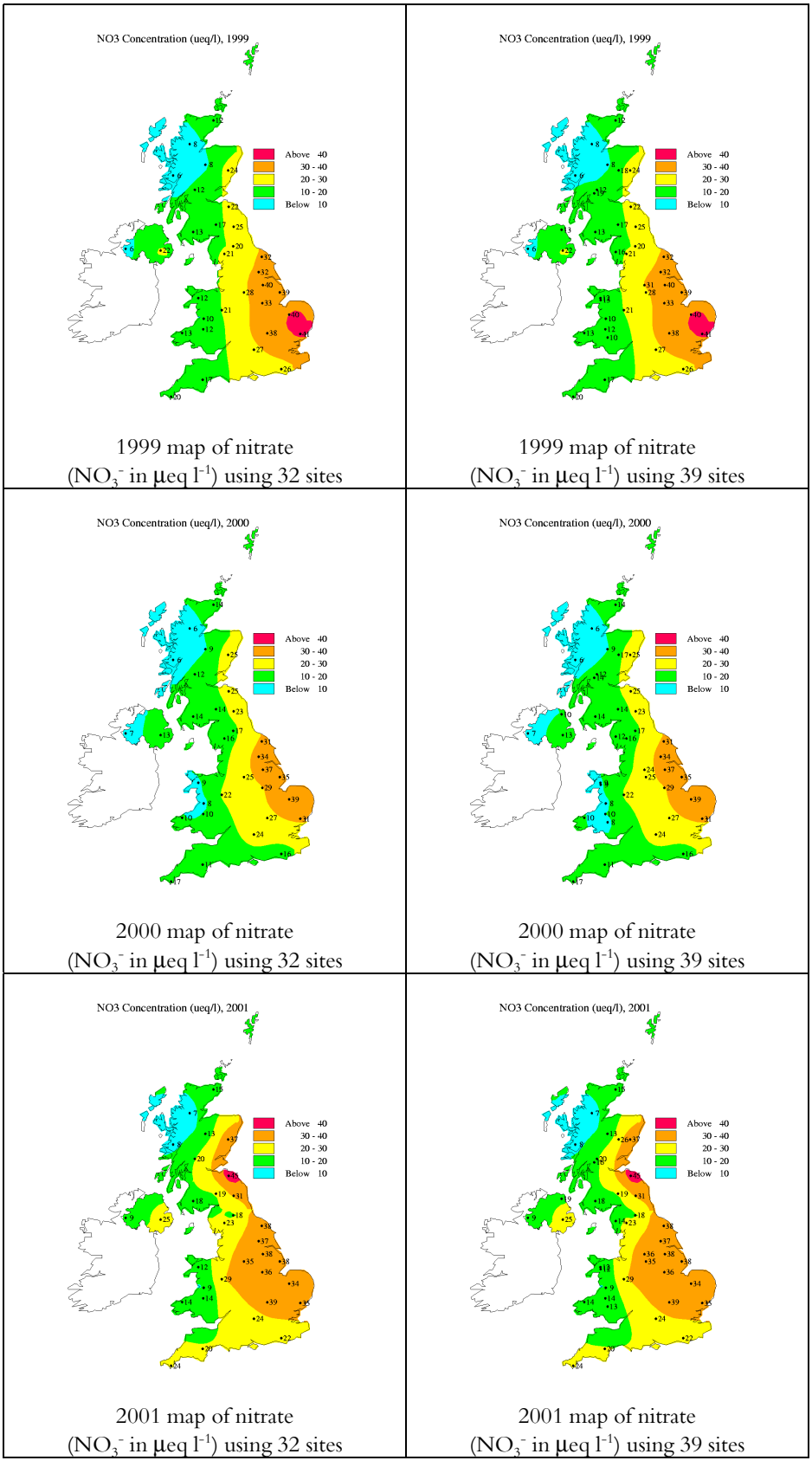


Figure 3.6: ***Precipitation-weighted Concentration Maps of Nitrate for 1999-2001.***

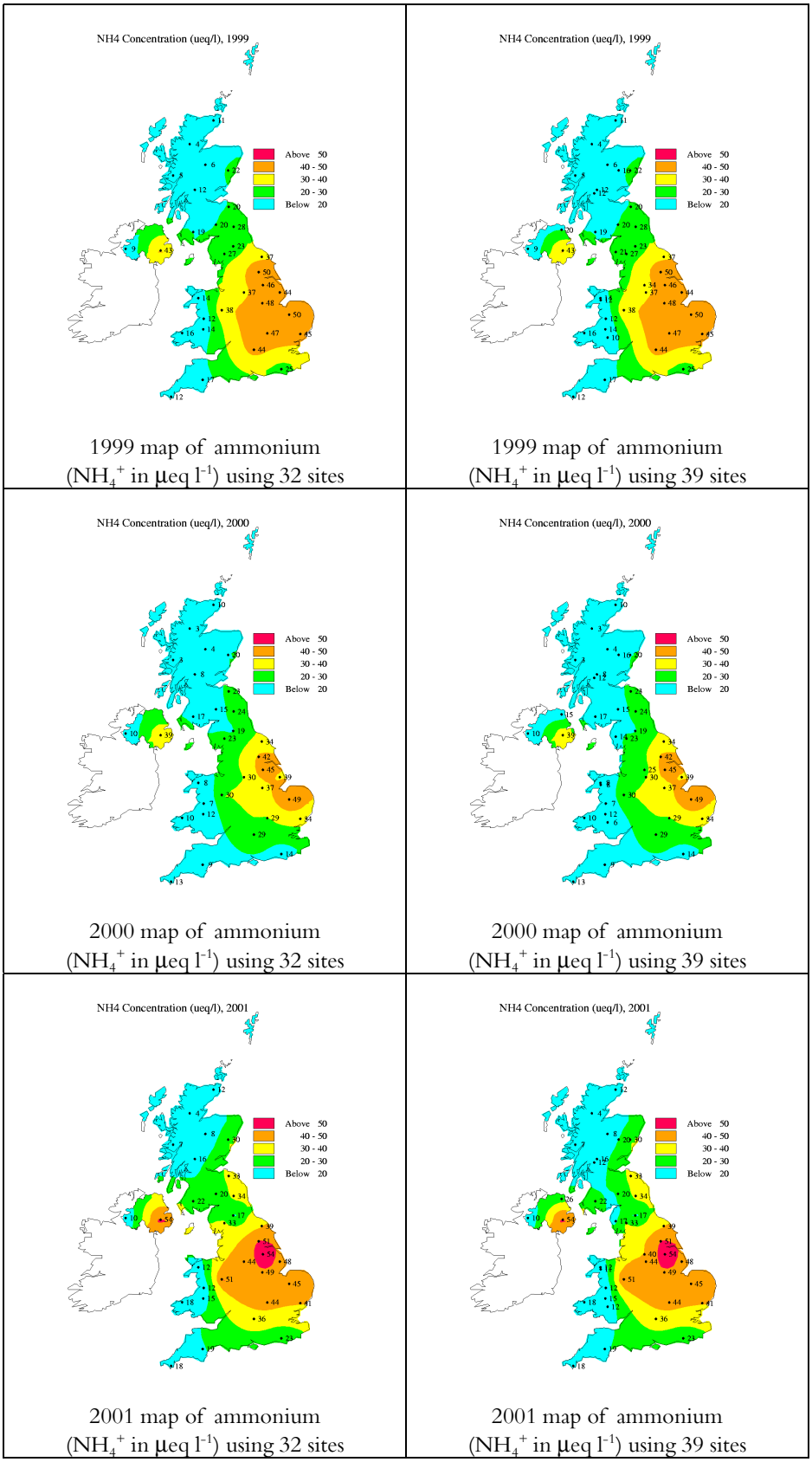


Figure 3.7: ***Precipitation-weighted Concentration Maps of Ammonium for 1999-2001.***

3.2.4 Precipitation Chemistry Trends

Figure 3.8 and Figure 3.9 show the monthly total and running annual average[2] of the monthly total deposition for non-seasalt sulphate and nitrate at each of the primary sites in the network. The data shown in these figures were derived from the samples collected by the weekly bulk collectors. The plots show that there is (a) a large month-to-month variation in deposition at all sites, (b) a variation in the average deposition between sites and (c) a variation in the long-term trends in deposition over the period 1986 to 2001.

The spatial variation in the long-term trend in wet deposition is, perhaps, surprisingly small between these sites. For the sites at Yarner Wood, Barcombe Mills, Stoke Ferry, Eskdalemuir and Glen Dye, the average monthly deposition of sulphate was between 0.3 to 0.5 kg S hectare^{-1} month^{-1} and nitrate deposition around 0.3 kg N hectare^{-1} month^{-1}. There was greater wet deposition of sulphate at the High Muffles site (0.5 to 0.7 kg S hectare^{-1} month^{-1}) than at the other sites. The wet deposition of nitrate was however similar to that at the other sites. The Strathvaich Dam and Lough Navar sites received less deposition of both pollutants, around 0.2 to 0.3 kg S hectare^{-1} month^{-1} and around 0.1 to 0.2 kg N hectare^{-1} month^{-1}.

The concentrations of non-sea salt sulphate and nitrate in rainwater (and also of sulphur dioxide, and particulate sulphate) are clearly decreasing in some regions of the United Kingdom while in other regions the change in concentration is less easy to discern. At all sites, the wet deposition of sulphate has tended to decrease, albeit with varying significance. The greatest decreases were observed at Stoke Ferry and Barcombe Mills, both of which are close to major UK sources. The trend in nitrate deposition is more variable; there is no significant change.

Maximum monthly deposition totals of both nitrate and non-seasalt sulphate were as large at Yarner Wood and Glen Dye as at High Muffles, even though the latter is close to the largest UK point sources of sulphur dioxide. This illustrates the importance of episodic meteorological conditions at these sites. The impact of the March 1996 episode of long-range transported sulphate and nitrate can be clearly seen in the monthly curves for Glen Dye.

Analysis of the data has been undertaken to quantify the significance of the trends. The concentration data have been analysed using a linear least squares approach. The regression coefficient, or slope of the trend line, will have units of μeq l^{-1} year^{-1}. Associated with the regression analysis is a value called the F statistic. The F statistic is a measure of how successfully the linear regression can account for the variation in the dataset. It is formally defined as the ratio of the variance due to regression, standardised by the respective degrees of freedom (MS_R), to the variance about the regression also standardised by the respective degrees of freedom (MS_E). The value of the F statistic can be compared to points on an appropriate F distribution curve. If the value is greater than a certain (critical F) value, it is assumed that a real, statistically significant, change in the concentration has occurred.

In the analysis presented below, a 5% significance level has been used. This means that there is a 5% chance that the trend is not signifcant. Further, the "strength" of the observed trend is quantified using multiples of the ratio of the calculated F statistic to the critical F value. These multiples (more or less arbitrarily defined) are presented in Table 3.2.

[2] In this report, the running annual mean is an average over 365 days and is centred on the midpoint of the interval. It removes the seasonal variation, thereby allowing the underlying trend to be discerned more clearly.

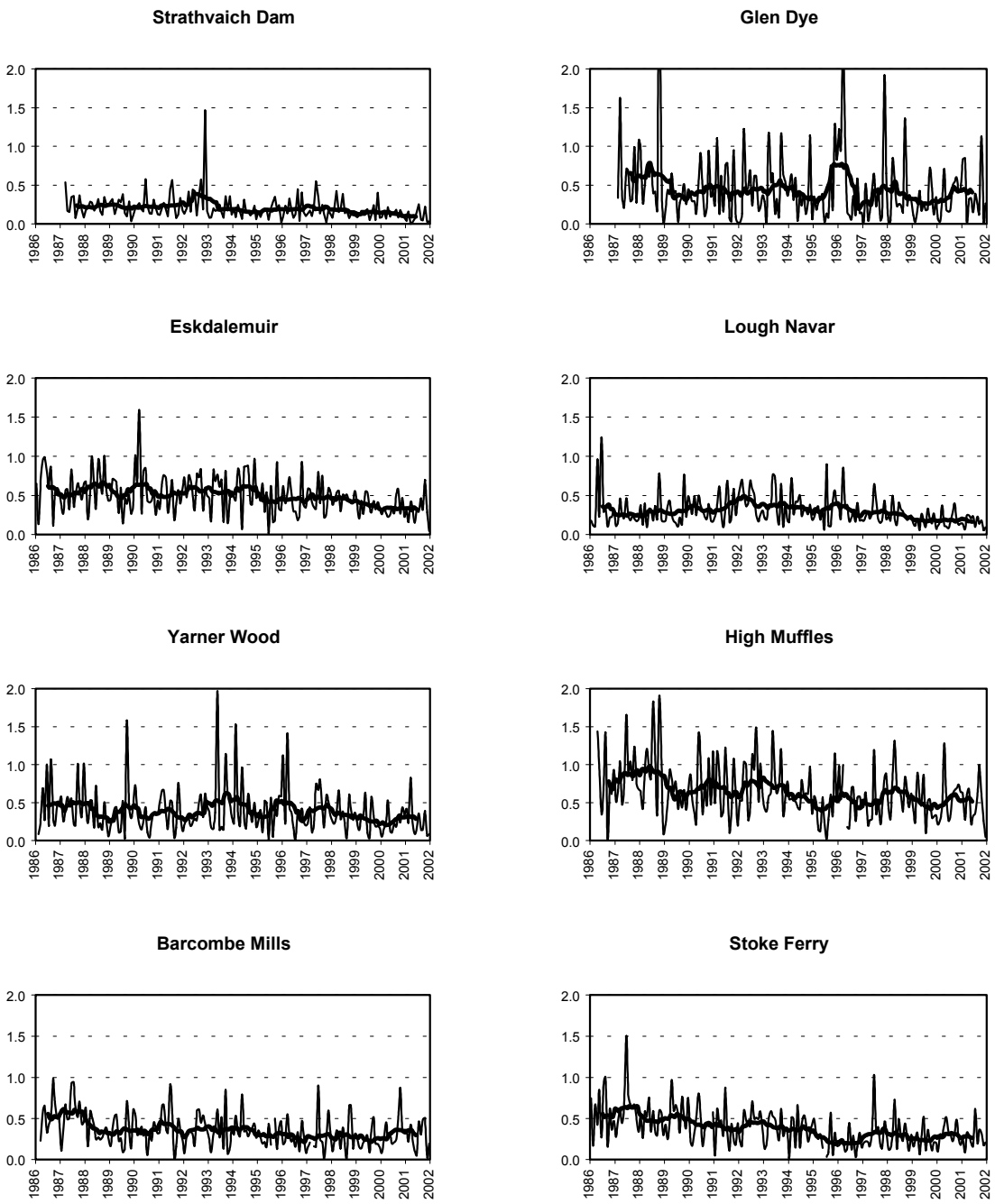


Figure 3.8: ***Monthly mean and running annual mean of wet deposited non-seasalt sulphate (kg S hectare^{-1} month^{-1})***

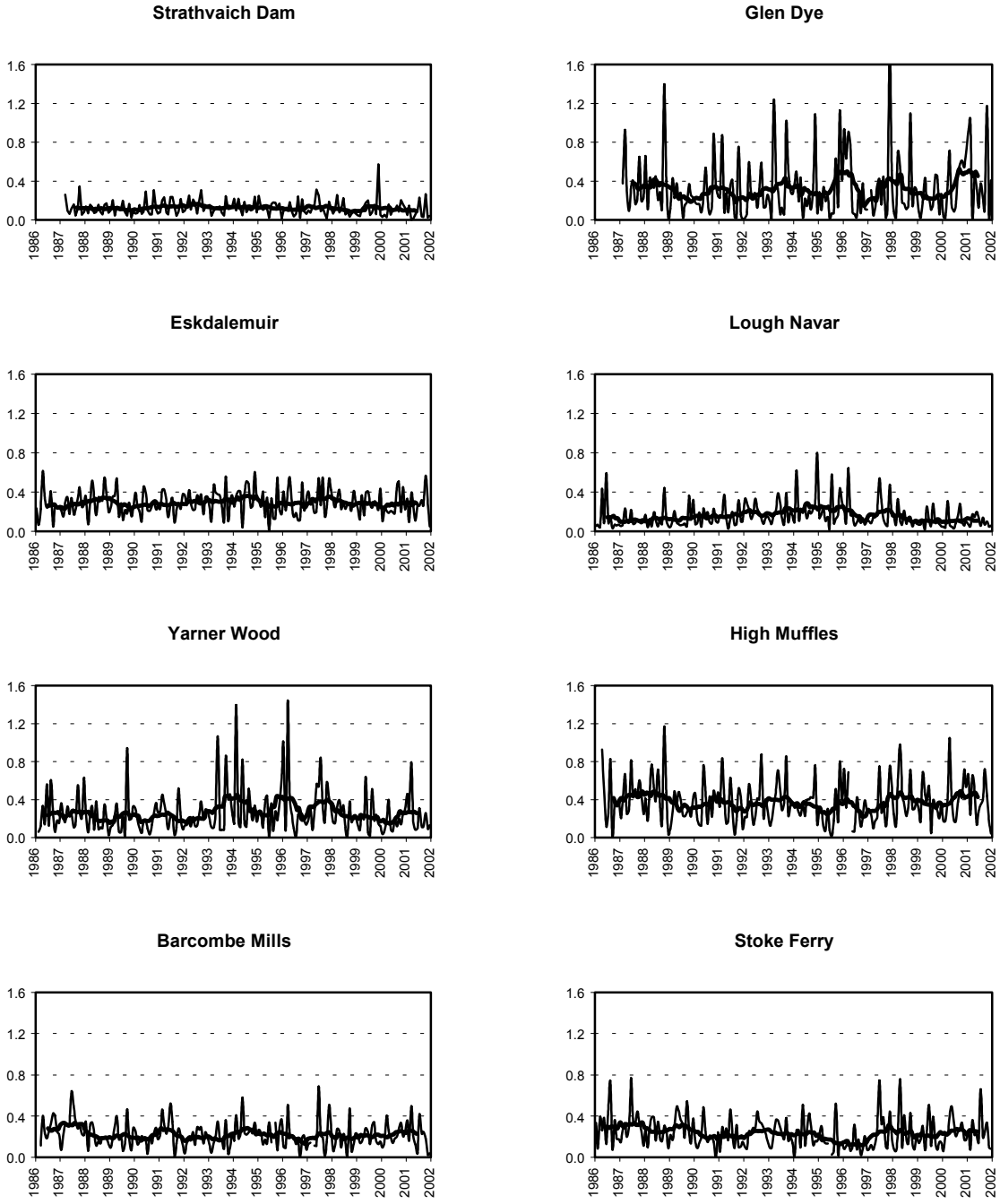


Figure 3.9: ***Monthly mean and running annual mean of wet deposited nitrate (kg N hectare^{-1} month^{-1})***

Table 3.2: ***Strength of the Significance of the Trend.***

Ratio	Value of ratio	Symbol	Comment
F calculated/F critical	ratio < 1	-	No Significant trend
F calculated/F critical	1 < ratio < 2	+	Significant trend detected
F calculated/F critical	2 < ratio < 5	++	Moderate trend detected
F calculated/F critical	5 < ratio < 10	+++	Strong trend detected
F calculated/F critical	10 < ratio < 20	++++	Very strong trend detected
F calculated/F critical	ratio > 20	+++++	Exceptionally strong trend detected

Table 3.3 presents a summary of the trend analysis performed on the non-sea salt sulphate and nitrate concentrations measured at the sampling sites in the acid rain monitoring network. Sites that show a very strong trend are situated in relatively dry locations, often downwind of major sources. Values of "$F_{calculated}/F_{critical}$" less than one indicate that no statistically significant trend can be detected. This most often occurs for sites which are in the more remote parts of the United Kingdom.

Table 3.3: ***Summary of the Trend Analysis for nss-Sulphate and Nitrate Observed at the Acid Deposition Monitoring Network Sites and its Significance.***

Sampling site	Site Code	Sulphate			Nitrate		
		μeql year^{-1}	% change year^{-1}	Trend Status	μeql year^{-1}	% change year^{-1}	Trend Status
Achanarras	5140	-1.04	-3.48	+++	-0.39	-1.83	-
Allt a' Mharcaidh	5103	-0.73	-3.34	++	0.04	0.38	-
Balquhidder	5152	-0.72	-2.48	+	0.03	0.20	-
Bannisdale	5111	-1.14	-2.53	++	0.11	0.54	-
Barcombe Mills	5007	-1.70	-3.47	+++	-0.57	-1.92	+
Bottesford	5121	-4.30	-4.48	+++++	-0.86	-1.97	++
Compton	5129	-3.62	-4.44	++++	-0.99	-2.47	++
Cow Green Reservoir	5113	-1.24	-3.01	+++	-0.22	-0.96	-
Driby	5136	-2.83	-3.47	+++	-0.48	-1.03	-
Eskdalemuir	5002	-0.92	-2.77	+++	0.01	0.04	-
Flatford Mill	5024	-3.12	-3.98	++++	-0.65	-1.47	+
Glen Dye	5011	-1.46	-2.87	+	-0.07	-0.22	-
Goonhilly	5003	-0.70	-2.29	+	0.02	0.08	-
High Muffles	5009	-2.63	-3.33	+++	-0.61	-1.40	+
Hillsborough Forest	5149	-1.60	-3.14	++	-0.11	-0.49	-
Jenny Hurn	5118	-4.13	-3.77	++++	-0.54	-1.15	+
Llyn Brianne	5124	-0.82	-2.76	+++	-0.05	-0.32	-
Llyn Llydaw	5153	-1.48	-4.41	++	-0.23	-1.65	-
Loch Dee	5107	-0.91	-2.75	++	-0.05	-0.33	-
Lough Navar	5006	-0.40	-2.19	++	0.03	0.37	-
Polloch	5151	-0.93	-4.16	++	-0.38	-3.15	+
Preston Montford	5023	-2.15	-3.47	++	-0.25	-0.82	-
Pumlumon	5150	-0.87	-3.31	++	-0.23	-1.68	-
Redesdale	5109	-1.81	-3.33	+++	-0.18	-0.58	-
Stoke Ferry	5004	-3.23	-3.85	++++	-0.75	-1.58	++
Strathvaich Dam	5010	-0.49	-3.21	++	-0.06	-0.64	-
Thorganby	5117	-3.12	-3.23	++	-0.75	-1.64	++
Tycanol Wood	5123	-0.60	-2.18	++	-0.01	-0.10	-
Wardlow Hay Cop	5120	-2.54	-2.90	+++	-0.12	-0.38	-
Whiteadder	5106	-1.51	-2.89	++	-0.21	-0.63	-
Woburn	5127	-3.34	-4.16	+++++	-0.41	-1.00	-
Yarner Wood	5008	-0.68	-2.28	+	0.10	0.55	-

Although the primary focus of the monitoring programme has been on the deposition of nitrate and non seasalt sulphate, there is increasing interest in the other components of rainwater, such as the base cations (Na, K, Mg and Ca).

3.3 SULPHUR DIOXIDE AND PARTICULATE SULPHATE

3.3.1 The 2001 Measurements

A summary of the measurements of sulphur dioxide and of particulate sulphate made at the eight daily sites is presented in Appendices 3.1 and 3.2 respectively.

The measurement of sulphur dioxide concentrations is also made in the Rural SO_2 Monitoring Network which is covered by a separate DEFRA contract (EPG 1/3/166 *Acid Deposition Processes in the UK*, under sub-contract from CEH Edinburgh). The mapping of the sulphur dioxide concentration is undertaken under that contract and is not discussed in this report. Data reports have been prepared for the years 1995 to 1999 by Vincent and Campbell [1996], Hasler and Downing [1998], Hasler *et al.* [2001], and Hayman *et al.* [2001a, b], respectively.

3.3.2 Trends in Sulphur Dioxide

Figure 3.10 shows both the monthly mean concentrations and running annual mean concentrations of sulphur dioxide at Eskdalemuir. As reported previously, the largest change in the concentration occurred between 1980 and 1990, during which time the average concentration decreased by a factor of three from around 4.5 ppb to 1.5 ppb. From 1990 to 2001, the concentration has decreased by a similar factor of two to three, to 0.4 ppb. The figure shows that the downward trend in the SO_2 concentrations follows the reduction in UK SO_2 emissions [Dore *et al.*, 2002], at least in the early years.

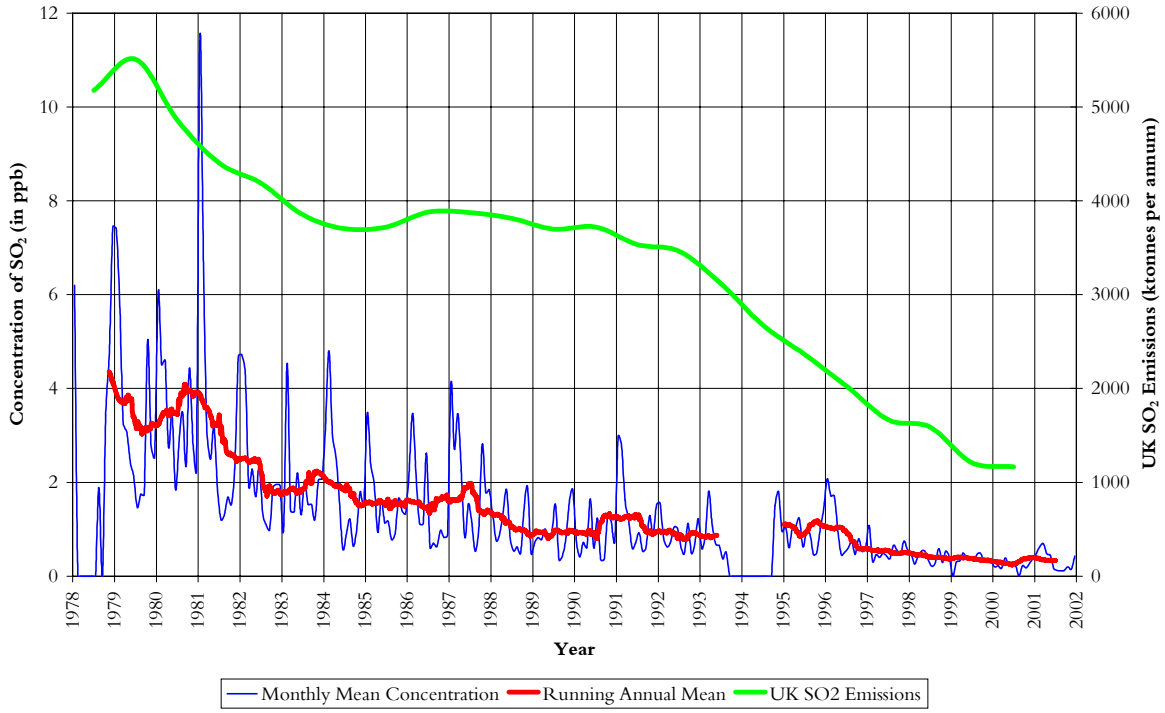


Figure 3.10: ***Trends in the concentration of sulphur dioxide observed at Eskdalemuir since 1978.***

Figure 3.10 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.

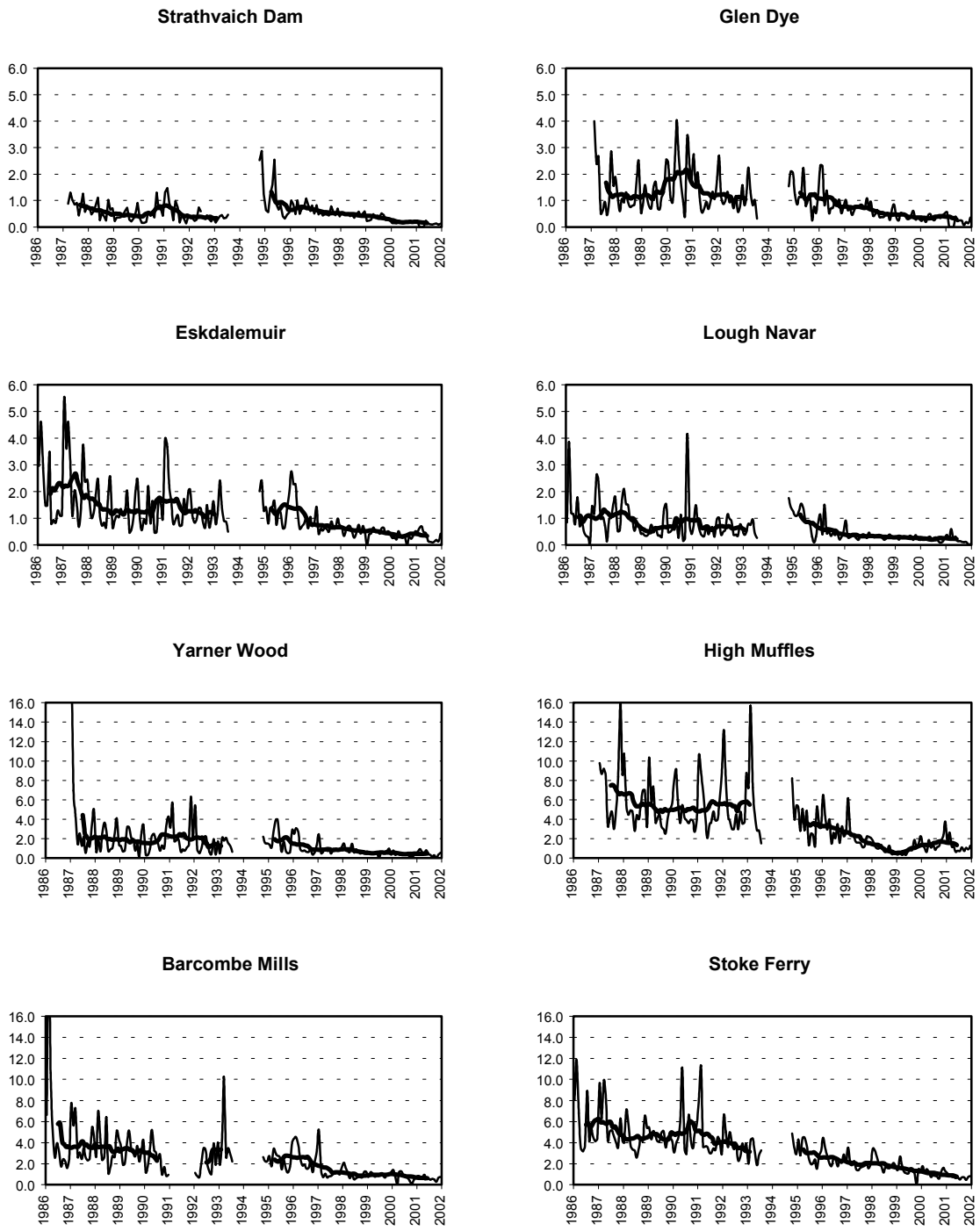


Figure 3.11: ***Monthly and Running Annual Mean Concentrations of Sulphur Dioxide at the Daily Sites, 1986 to 2001 (µg S m^{-3}).***

The monthly and running annual mean concentrations of sulphur dioxide measured at each of the primary sites are presented in Figure 3.11. The strong seasonal variation is particularly noticeable at the High Muffles site, close to major sulphur dioxide sources, although, even here in recent years, the large seasonal variation is no longer apparent. The annual mean sulphur dioxide concentration has decreased substantially at all sites with the exception of Strathvaich Dam over the period 1986 to 2001. For example, the annual mean at High Muffles has decreased from an annual mean concentration of 7.3 μg S m^{-3} in 1987 to 1.2 μg S m^{-3} in 2000 and 1.5 μg S m^{-3} in 2001.

At the low concentrations now observed at some sites, only very careful quality assurance and control of sampling can deliver valid data.

3.3.3 Trends in Particulate Sulphate

Figure 3.12 shows the monthly mean and running annual mean concentrations of particulate sulphate at Eskdalemuir. The decrease in the concentration of particulate sulphate is much less marked than that of sulphur dioxide. There is more variation around the running annual mean and there is an apparent increase in concentration from 1978 to 1984 followed by a decrease to 2001. Over the period from 1978 to 2001 the average concentration declined from around 1.0 μg [SO_4 as S] m^{-3} to about 0.4 μg [SO_4 as S] m^{-3} in 2002. The high monthly mean concentration in March 1996, associated with a period of extended easterly flow, was one of the highest over the full time series and illustrates how the month-to-month variation is large relative to the long-term trend.

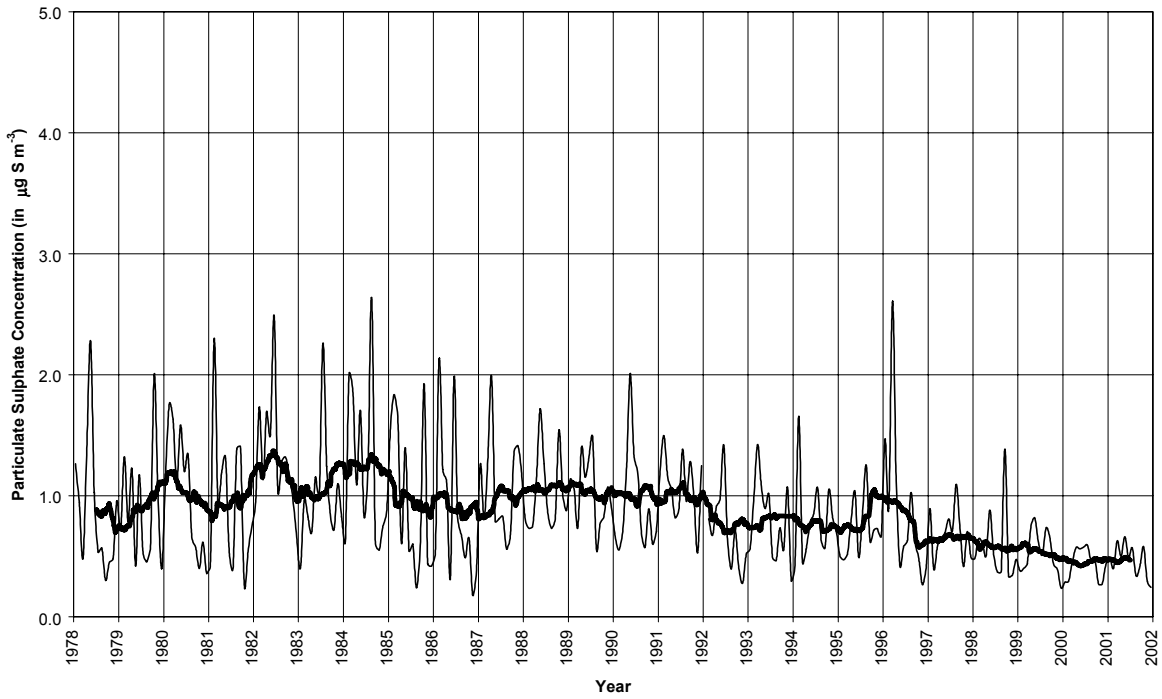


Figure 3.12: ***Trends in the particulate sulphate concentration observed at Eskdalemuir since 1978.***

Sulphate concentrations at the other daily sites do not obviously exhibit the same degree of decrease as that observed for sulphur dioxide, as shown in Figure 3.13. The highest

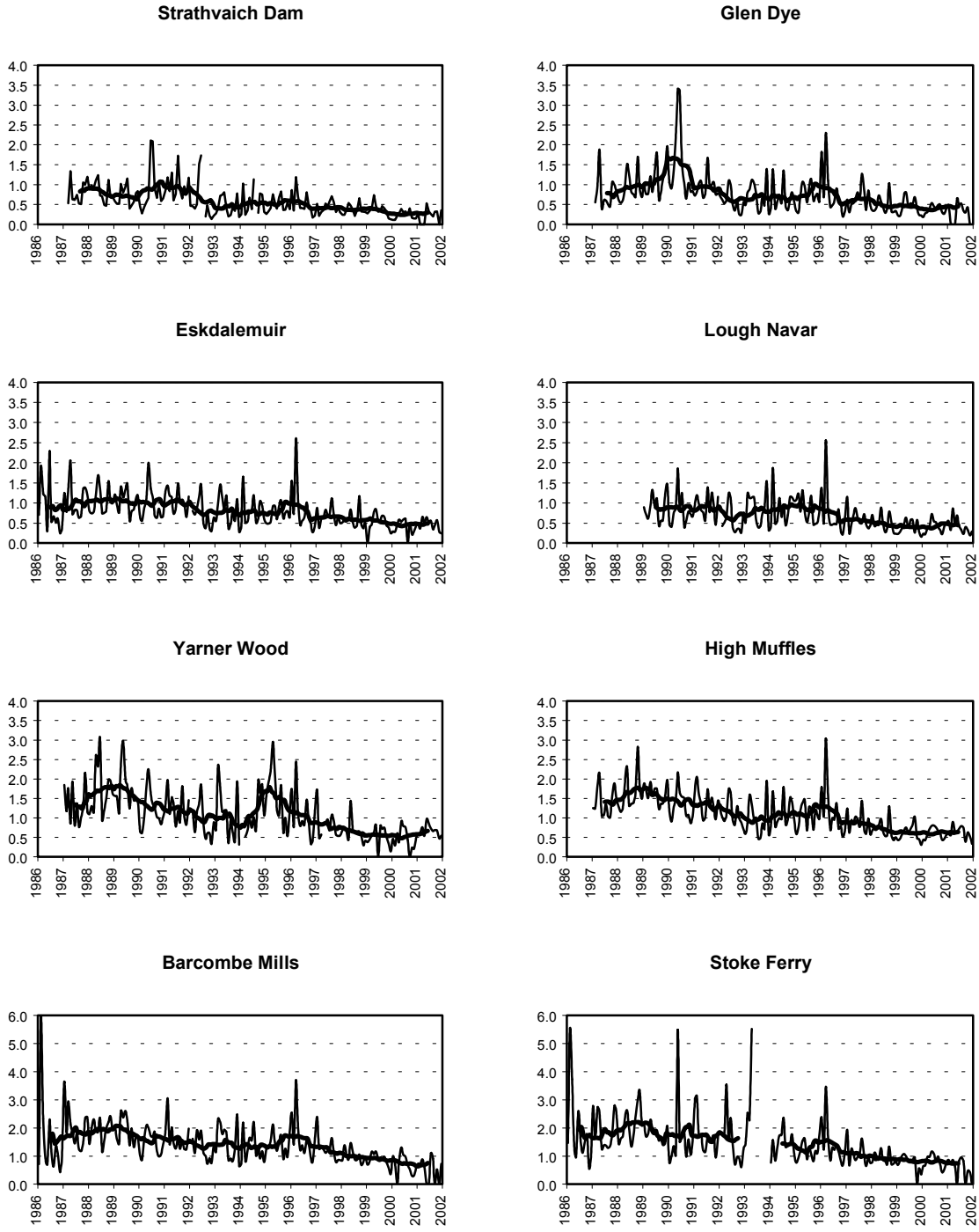


Figure 3.13: ***Monthly and Running Annual Mean Concentrations of Particulate Sulphate at the Daily Sites, 1986 to 2001 (µg S m^{-3}).***

concentrations were observed at Stoke Ferry and Barcombe Mills for the first half of the sampling period - since that time concentrations at both sites decreased by about 25%. The lowest concentrations were consistently measured at Strathvaich Dam.

3.4 NITROGEN DIOXIDE

3.4.1 The 2001 Measurements

The nitrogen dioxide diffusion tube measurements made in 2001 are presented in Appendix 4. The determination of nitrogen dioxide at the rural locations in the acid rain network provides a key input to the mapping of nitrogen dioxide in the United Kingdom [Stedman, 1997].

3.4.2 Concentration Map

The diffusion tube measurements have been used to produce a map of the rural nitrogen dioxide concentrations in the UK for 2001, as shown in Figure 3.14 (right-hand panel). The highest concentrations were observed in the Midlands and southern England with an annual mean concentration of 12.4 ppb determined at Woburn in 2001. In the main, this reflects the proximity to the sampling sites of roads and other aspects of urbanisation.

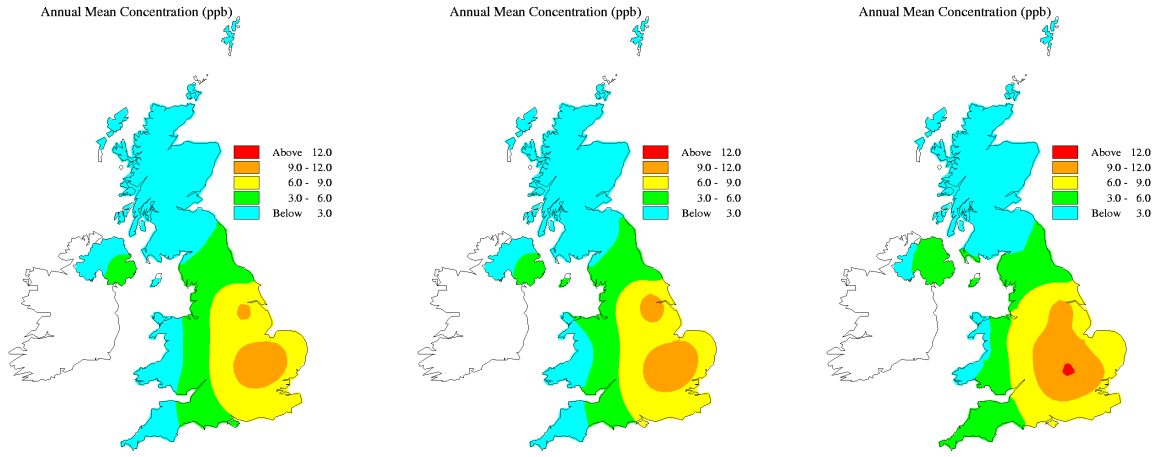


Figure 3.14: ***Interpolated concentration maps of nitrogen dioxide (in ppb) for 1999 (left-hand panel), 2000 (centre panel) and 2001 (right-hand panel)***

The same figure also shows the 1999 and 2000 maps for comparison. The maps show little difference in the spatial patterns between 1999 and 2001 but clear evidence that the concentrations observed in 2001 were higher than those measured in the previous years.

3.4.3 Trends in Nitrogen Dioxide

Figure 3.15 presents the annual average concentrations for nitrogen dioxide determined at 8 of the sites in the monitoring network. The annual mean concentrations in 2001 were generally comparable to those measured in 2000 but higher than those measured in 1998 and 1999. This is consistent with the generally higher concentrations measured for a range of pollutants in 2001. It is likely that the meteorological conditions led to poorer dispersion and dilution of emissions.

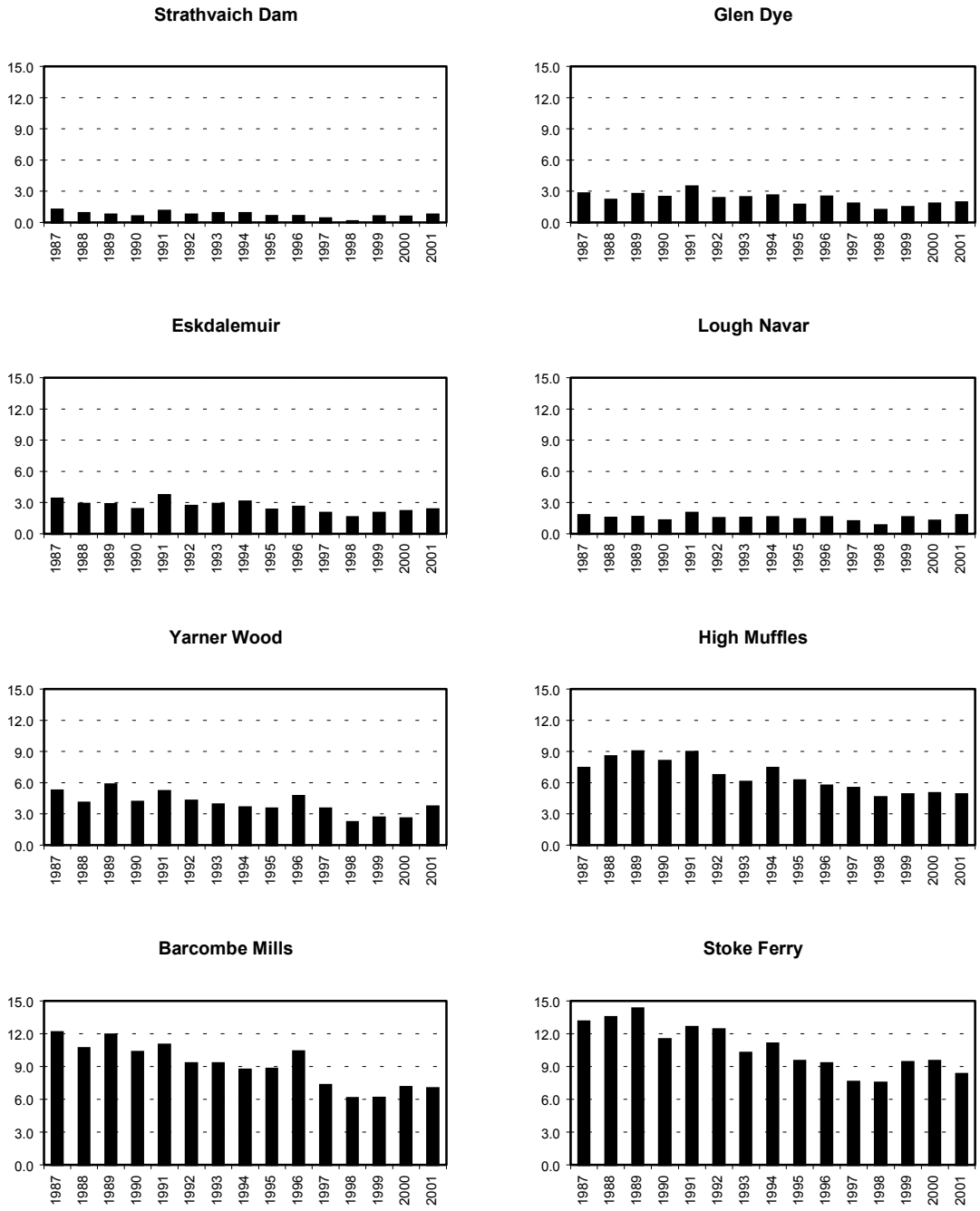


Figure 3.15: ***Annual average nitrogen dioxide concentration (ppb).***

UK total emissions of nitrogen oxides have decreased since 1990 with the switch from coal to gas for power generation and the introduction of catalytic converters on petrol-engined vehicles. Given the relatively poor precision of the passive sampler method at low concentrations, the fall in nitrogen dioxide concentrations can only be observed at the relatively high concentration sites such as High Muffles, Stoke Ferry and Barcombe Mills. This is in marked contrast to the lack of a general trend in NO_2 at UK urban diffusion tube monitoring sites where the mean concentration may be limited by availability of atmospheric oxidant rather than nitrogen oxides.

4. Nitric Acid Monitoring Network

The UK Nitric Acid Monitoring Network has been in operation since September 1999, providing data on nitric acid, particulate nitrate and other species as part of the UK acid deposition monitoring programme. In this Section, a summary is provided of the sampling methods and measurement data for 2001. The data are compared against those made in previous years.

4.1 METHODS, SITES AND DATA COLLECTION

A map of the monthly HNO_3 monitoring network is shown in Figure 4.1.

Nitric acid and related species are monitored on a monthly basis at 12 locations using the CEH DELTA denuder system, in an integrated fashion with the UK Ammonia Monitoring Network. The aim of these measurements is to explore spatial patterns, compare results with dispersion models, seasonality and contribute to national N deposition estimates.

At the Barcombe Mills site in a high HNO_3 concentration area of South East England, daily monitoring has also been implemented using a high sensitivity annular denuder system (ChemSpec daily sampling system) (April 2000 to November 2001). The aim of the daily measurements was to explore the dynamics of HNO_3 formation and concentrations in relation to other photochemical pollutants, in order to improve the process based atmospheric chemistry and dispersion models.

Figure 4.1: ***Map of 12 monitoring sites for HNO_3, NO_3^- and related acid gas/particle measurements.***

4.1.1 Monthy Sampling

The sampling train used in the CEH DELTA system is shown Figure 4.2. HNO_3, SO_2 and HCl are removed by the first set of K_2CO_3/ glycerol coated denuders, and a second set of citric acid coated denuders removes NH_3. Two sets of filter packs at the end of the sampling train removes the aerosol components - NO_3^-, SO_4^{2-}, Cl^- and NH_4^+.

Returned samples are stored in a cold room at 4 °C until analysis. For the denuders, 5 ml of 0.05 % H_2O_2 is added to both the first and second denuders, while the initial uncoated short

length of Teflon inlet is not extracted. (Tests have shown that <1% of the total is captured in this portion.). Filters from the filter packs are also extracted in 0.05 % H_2O_2. Extracted aqueous samples from the denuders and filter packs are sent to Harwell Scientifics Ltd on a monthly basis for chemical analysis. Denuder sample extracts are analysed for NO_3^-, SO_4^{2-} and Cl^- and filter sample extracts are analysed for NO_3^-, SO_4^{2-}, Cl^-, Na^+, Mg^{2+} and Ca^{2+}.

The amount of a gas collected (Q) on a denuder due to air sampling is given by:

$$Q = (c_e - c_b) \star v \qquad (1)$$

where c_e is the liquid concentration of an exposed tube, c_b is the liquid concentration of a blank tube and v is the liquid volume of the extraction solution. The air concentrations (χ_a) of the gas of interest is then determined as:

$$\chi_a = Q / V \qquad (2)$$

where V is the effective volume of air sampled. For denuder samples this is found directly from the gas meter readings, and is typically 15 m^3 per month.

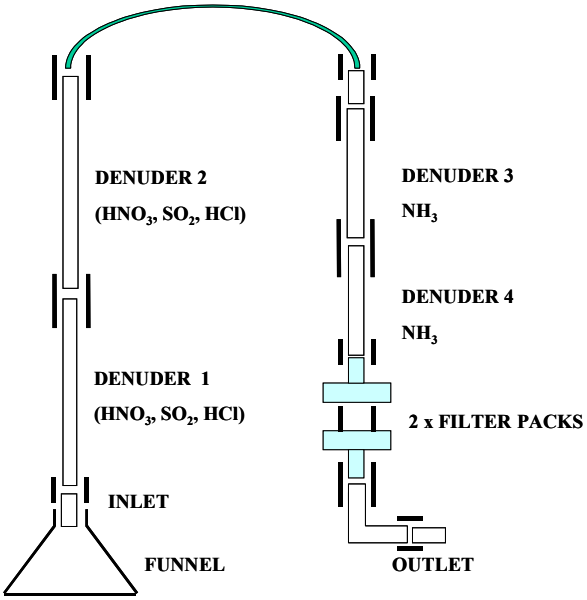


Figure 4.2: ***Sampling train for monthly air measurements.***

The use of two denuders in series allow for the determination of capture efficiency, by comparing the amounts of trace gas in both. An infinite series correction factor, based on the capture efficiency, is applied for trace gas not captured. The corrected air concentration of the gas ($\chi_{a\,(corrected)}$) is then determined as:

$$\chi_{a\,(corrected)} = \chi_{a\,(Denuder\ 1)} * \frac{1}{[1-(\chi_{a\,(Denuder\ 2)} / \chi_{a\,(Denuder\ 1)})]} \qquad (3)$$

At a typical capture efficiency of 90 % in the first denuder, the correction represents 1 % of the corrected air concentration. At 80 %, 75 % and 70 % capture, the correction amounts to 6 %, 11 % and 17 % of the total, respectively. Below 60 % capture efficiency, the correction amounts to greater than 50 % and should not be applied. The air concentration of the trace gas is then determined as:

$$\chi_a = \chi_{a\,(Denuder\ 1)} + \chi_{a\,(Denuder\ 2)} \qquad (4)$$

4.1.2 Daily Sampling

The Chemspec™ model 2500 air sampling system, manufactured by R&P Co. Inc., was installed at the Barcombe Mill site in February 2001 and daily measurements commenced in April 2001. The principle of operation and calculation are the same as for the DELTA system, except that the ChemSpec is tuned for daily sampling. This consists of two annular denuder in series followed by a two-stage filter pack holding 47 mm filters and sampling at 15 l min^{-1}. The measurements were continued until the end of the contract period in November 2001.

4.2 NITRIC ACID NETWORK MEASUREMENTS

4.2.1 Denuder Capture Efficiency

The use of 2 glass denuders in series allows the capture efficiency of every sample to be assessed, by comparing the amount of HNO_3/SO_2/HCl in both tubes. A collection efficiency correction is applied to the measurement based on the capture efficiency. Where less than 75% of the total captured is recorded in the first denuder, data becomes less certain. It is possible that there is some loss of the gas which is then collected on the filter pack. At a typical capture efficiency of 90% in the first denuder, the correction represent 1% of the corrected air concentration. At 80%, 75% and 70% capture, the correction amounts to 6%, 11% and 17% of the total, respectively. The absolute amount of the correction is added to the value for the acid gas, and subtracted from the aerosol value. The monthly averaged denuder capture efficiency from the 12 monitoring sites for HNO_3, SO_2 and HCl are shown in Figure 4.3. The quality control using a double denuder system confirms that the capture efficiency in the denuders is adequate and that the correction factors are small (typically ~ 1 %).

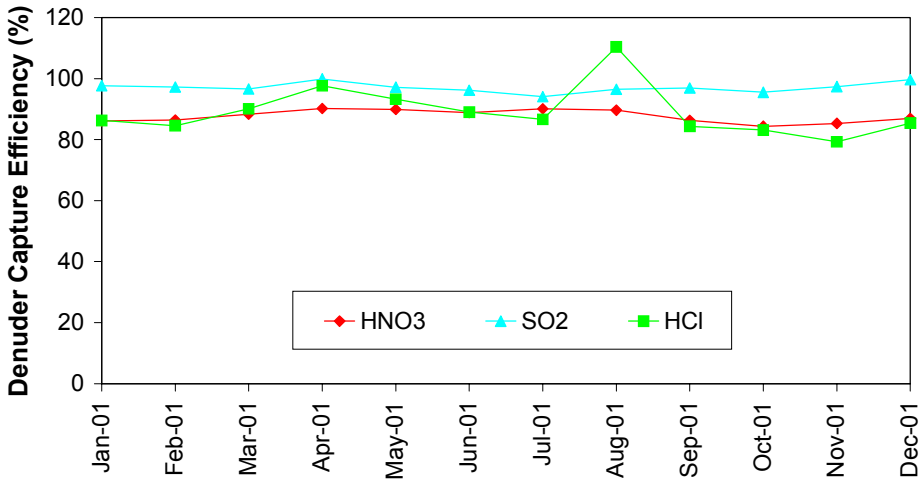


Figure 4.3 ***Monthly mean denuder capture efficiency for NH_3, HNO_3, SO_2 and HCl from the 12 monitoring sites (= amount in 1st Denuder / (Amounts captured in 1st + 2nd Denuders)*100 %). The outlier for HCl in August 2001 is due to low concentrations and scatter in blank values.***

4.2.2 Monthly Measurements

The monthly measurements of acidic trace gases, acidic aerosol and base cations made in 2001 can be found in Appendix 5.1. Statistical summaries of the measurements made in 2001 of the acid gas, and the acid and base cation aerosol components are given in Table 4.1, Table 4.2 and Table 4.3, respectively.

Table 4.1: ***Summary of statistics for Monthly Measurements of Acidic Trace Gases in 2001 (Jan – Dec 2001).***

Summary (Jan-01 to Dec-01): Gaseous Components

		HNO_3 (nmoles m^{-3})					SO_2 (nmoles m^{-3})					HCl (nmoles m^{-3})				
No.	Name	Mean	Min	Max	SD	N	Mean	Min	Max	SD	N	Mean	Min	Max	SD	N
1	Bush OTC	10.7	5.5	18.5	3.7	12	28.7	14.2	57.2	12.6	12	5.8	1.9	9.5	2.5	12
21	Glensaugh	8.6	1.4	16.6	4.6	12	14.5	1.7	35.5	11.3	12	8.4	2.5	16.2	3.2	12
24	Rothamstead	31.9	4.3	47.1	11.5	12	48.6	7.5	86.5	22.7	12	9.0	2.5	13.7	3.4	12
30	Strathvaich Dam	4.1	0.3	11.0	3.1	12	3.4	0.7	9.4	2.5	12	5.3	1.9	12.2	2.7	12
31	Eskdalemuir	8.0	3.1	17.1	3.4	12	15.1	5.7	29.1	8.2	12	5.2	1.9	7.5	1.6	12
32	High Muffles	16.7	9.9	24.1	3.9	12	52.2	26.9	108.2	22.5	12	8.7	3.3	23.5	5.0	12
33	Stoke Ferry	22.7	11.8	30.0	6.0	12	38.9	8.1	59.3	14.8	12	9.2	3.9	14.5	3.3	12
34	Yarner Wood	13.4	6.2	27.6	6.3	12	19.7	7.0	35.5	10.1	12	11.9	3.3	54.8	13.8	12
83	Barcombe Mills	23.1	9.0	32.3	7.7	10	31.4	5.2	51.3	15.7	10	11.5	1.8	19.0	5.4	10
40	Sutton Bonington	34.9	24.3	49.9	7.0	12	80.6	37.3	118.7	25.9	12	9.1	5.5	13.2	2.8	12
45	Lough Navar	4.4	1.2	13.4	3.5	12	6.7	1.6	17.7	5.5	12	3.1	0.6	4.6	1.1	12
70	Cwmystwyth	9.7	3.3	20.7	5.6	12	19.3	5.5	43.4	14.3	12	7.1	2.1	23.0	5.5	12

Table 4.2: ***Summary of Statistics for Monthly Measurements of Acidic Aerosols in 2001 (Jan – Dec 2001).***

Summary (Jan-01 to Dec-01): Aerosol Components

		NO_3^- (nmoles m^{-3})					SO_4^{2-} (nmoles m^{-3})					Cl^- (nmoles m^{-3})				
No.	Name	Mean	Min	Max	SD	N	Mean	Min	Max	SD	N	Mean	Min	Max	SD	N
1	Bush OTC	22.5	9.6	37.2	8.3	12	12.1	6.2	20.3	4.5	12	23.4	13.0	30.9	5.5	12
21	Glensaugh	16.1	3.1	27.3	6.7	12	8.4	3.2	14.8	3.0	12	17.8	6.2	38.0	10.2	12
24	Rothamsted	54.5	5.2	89.7	20.0	12	20.8	1.5	31.1	7.5	12	25.0	5.9	45.6	12.8	12
30	Strathvaich Dam	6.4	1.4	17.1	4.5	12	6.3	3.1	13.2	3.0	12	18.2	12.0	33.7	7.2	12
31	Eskdalemuir	15.4	6.6	23.8	5.1	12	9.7	4.5	13.5	3.2	12	17.4	9.1	23.3	5.6	12
32	High Muffles	32.8	19.1	48.8	8.6	12	15.0	8.3	19.2	3.7	12	24.4	8.9	37.9	8.4	12
33	Stoke Ferry	58.1	37.6	85.5	13.5	12	20.9	13.9	29.9	5.0	12	30.2	8.9	54.2	13.0	12
34	Yarner Wood	33.1	12.2	69.4	16.3	12	15.4	11.5	23.6	3.7	12	39.9	15.8	71.3	18.6	12
83	Barcombe Mills	54.9	21.8	103.9	27.9	10	24.1	14.1	41.8	10.1	10	53.0	17.2	102.2	33.8	10
40	Sutton Bonington	58.2	43.2	88.6	12.8	12	23.0	17.2	35.2	5.3	12	32.3	10.2	58.7	15.1	12
45	Lough Navar	16.0	3.5	40.8	11.9	12	9.9	4.4	16.3	3.9	12	30.1	16.1	54.6	11.3	12
70	Cwmystwyth	23.5	12.4	48.2	10.1	12	12.9	7.5	20.2	3.9	12	30.7	13.5	82.6	18.5	12

Table 4.3: ***Summary of Statistics for Monthly Measurements of Base Cations in 2001 (Jan – Dec 2001).***

Summary (Jan-00 to Dec-00): inorganic ions

		Ca^{2+} (nmoles m^{-3})					Mg^{2+} (nmoles m^{-3})					Na^+ (nmoles m^{-3})				
No.	Name	Mean	Min	Max	SD	N	Mean	Min	Max	SD	N	Mean	Min	Max	SD	N
1	Bush OTC	0.6	0.0	1.2	0.4	9	1.8	0.4	3.1	0.9	12	27.1	13.1	44.5	8.5	12
21	Glensaugh	0.7	0.5	2.2	0.7	4	2.0	0.0	3.9	1.4	12	21.5	5.5	40.7	12.1	12
24	Rothamsted	1.0	0.4	1.8	0.5	10	2.2	0.0	4.2	1.1	12	26.0	6.2	42.4	11.0	12
30	Strathvaich Dam	0.5	0.2	1.5	0.4	9	1.8	0.2	3.3	0.8	12	19.7	8.3	39.2	8.9	12
31	Eskdalemuir	0.4	0.2	1.2	0.3	9	1.7	0.9	2.8	0.5	12	20.9	10.2	27.4	5.8	12
32	High Muffles	0.8	0.5	1.7	0.3	11	2.4	1.5	3.6	0.6	12	26.9	7.6	38.2	8.1	12
33	Stoke Ferry	1.5	0.7	2.2	0.5	12	3.1	1.6	4.4	1.0	12	34.1	10.9	46.7	11.9	12
34	Yarner Wood	1.2	0.3	2.0	0.5	12	3.9	2.0	6.3	1.4	12	44.3	21.0	64.6	15.9	12
83	Barcombe Mills	1.8	0.5	12.1	3.4	10	5.7	2.6	9.6	2.7	10	63.2	25.2	115.0	32.6	10
40	Sutton Bonington	1.3	0.3	2.8	0.6	12	2.9	1.9	4.5	0.9	12	28.7	5.3	40.1	11.0	12
45	Lough Navar	0.9	0.1	1.7	0.5	11	2.8	1.4	4.7	1.0	12	31.5	16.3	46.6	9.9	12
70	Cwmystwyth	0.8	0.0	1.7	0.5	11	2.4	0.5	3.5	0.8	12	26.6	11.8	40.1	9.3	12

The monthly-averaged concentrations of gaseous nitric acid (HNO_3) and particulate nitrate (NO_3^-) determined at each site are shown in Figure 4.4. The individual plots illustrate that the concentrations of both species are reasonably stable at a monthly level, and have a weak seasonal variability. Although not apparent at all sites, concentrations of HNO_3 are often seen to be highest in summer (*e.g.*, linked to photochemical activity), while concentrations of NO_3^- were largest in Spring 2001.

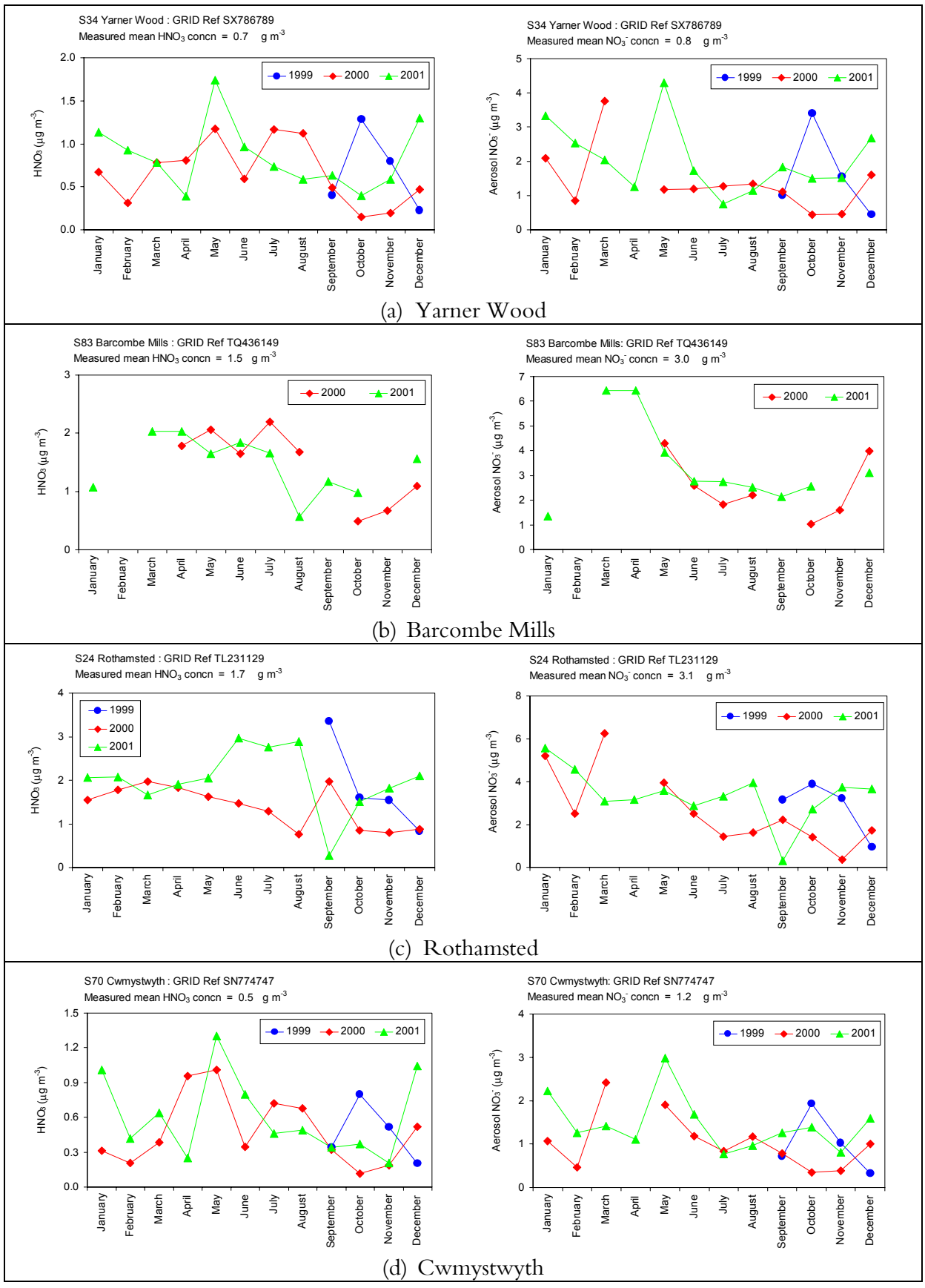


Figure 4.4: ***Measurements of Gaseous HNO_3 and aerosol NO_3^- made in the Nitric Acid Monitoring Network between September 1999 andJune 2001.***

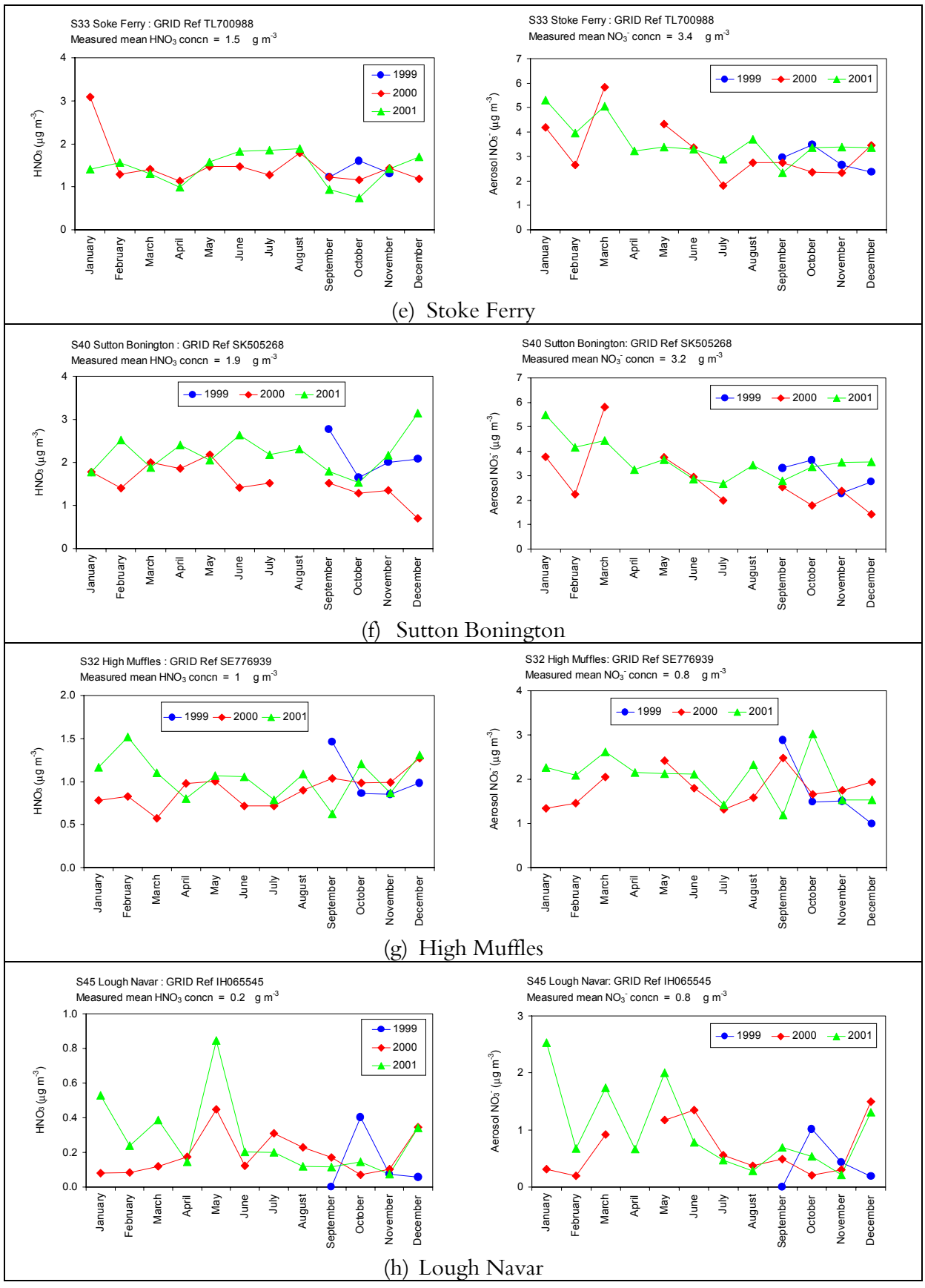


Figure 4.4: ***Measurements of Gaseous HNO3 and aerosol NO3- made in the Nitric Acid Monitoring Network between September 1999 andJune 2001.*** **(cont)**

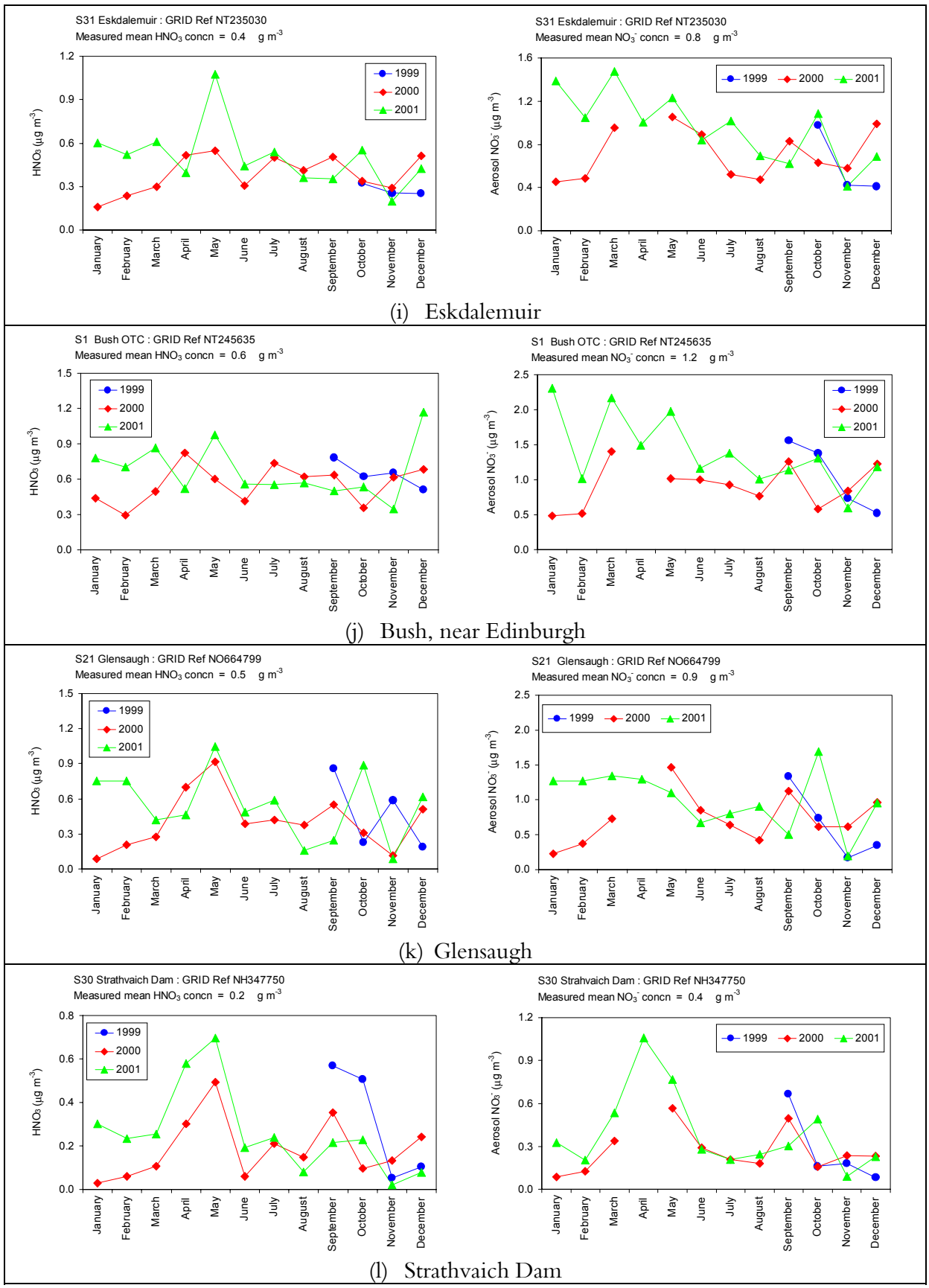


Figure 4.4: ***Measurements of Gaseous HNO3 and aerosol NO3- made in the Nitric Acid Monitoring Network between September 1999 andJune 2001.*** **(continued)**

Figure 4.5 shows the annual cycle in the concentrations of the 3 gas phase and the 6 aerosol components, based on an average of the measurements made at the 12 sites in 2001.

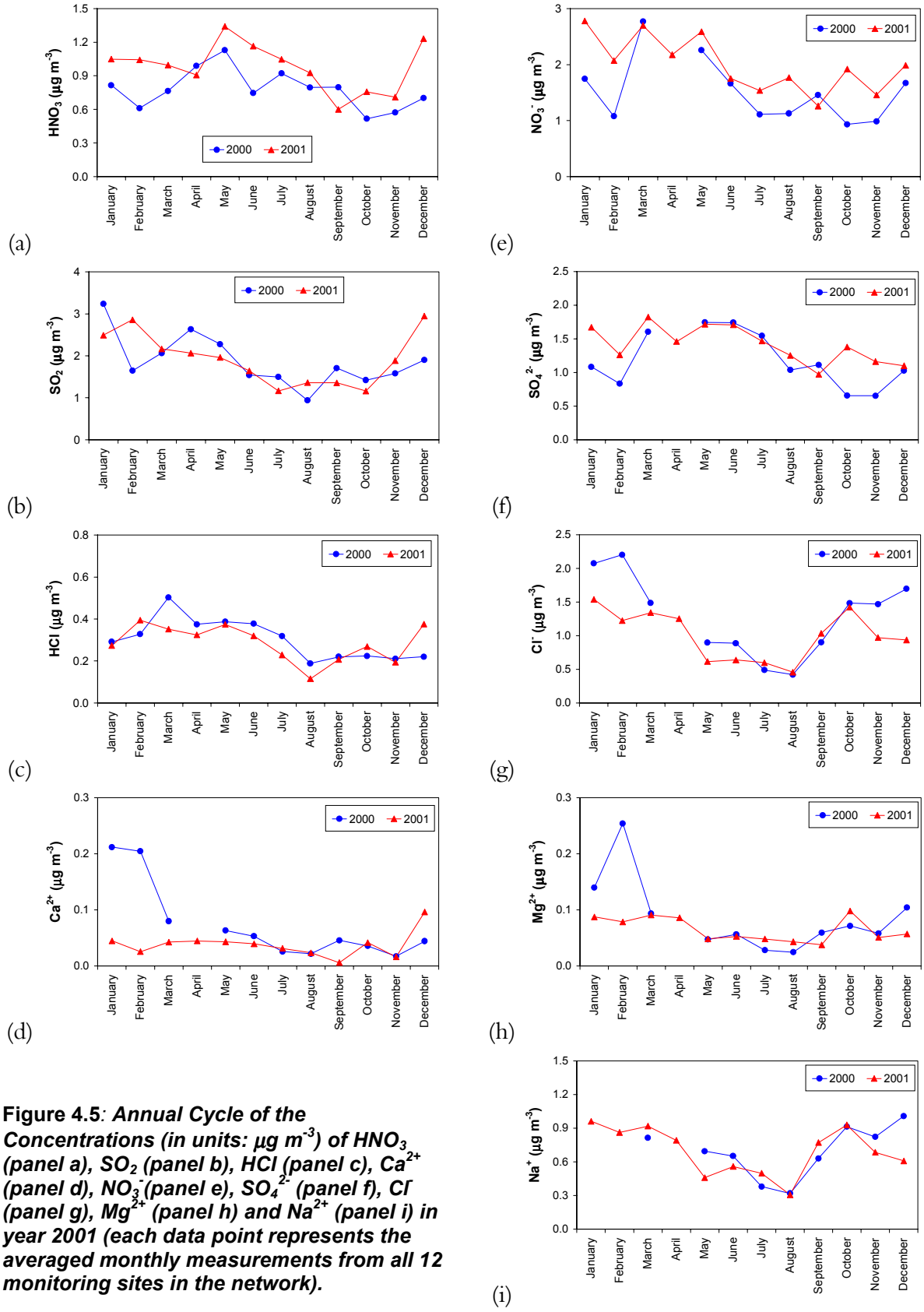


Figure 4.5: ***Annual Cycle of the Concentrations (in units: µg m^{-3}) of HNO_3 (panel a), SO_2 (panel b), HCl (panel c), Ca^{2+} (panel d), NO_3^- (panel e), SO_4^{2-} (panel f), Cl^- (panel g), Mg^{2+} (panel h) and Na^{2+} (panel i) in year 2001 (each data point represents the averaged monthly measurements from all 12 monitoring sites in the network).***

The results from the other measurements are illustrated by scatter plots of the concentration between gas and aerosol phases of the different components (Figure 4.6)[3]. There is some correlation between the concentrations of all the pollutants, and much of this may be related to correlation in the emission distribution of precursor gases or the effect of long-range transport of aerosol across the UK and from Europe.

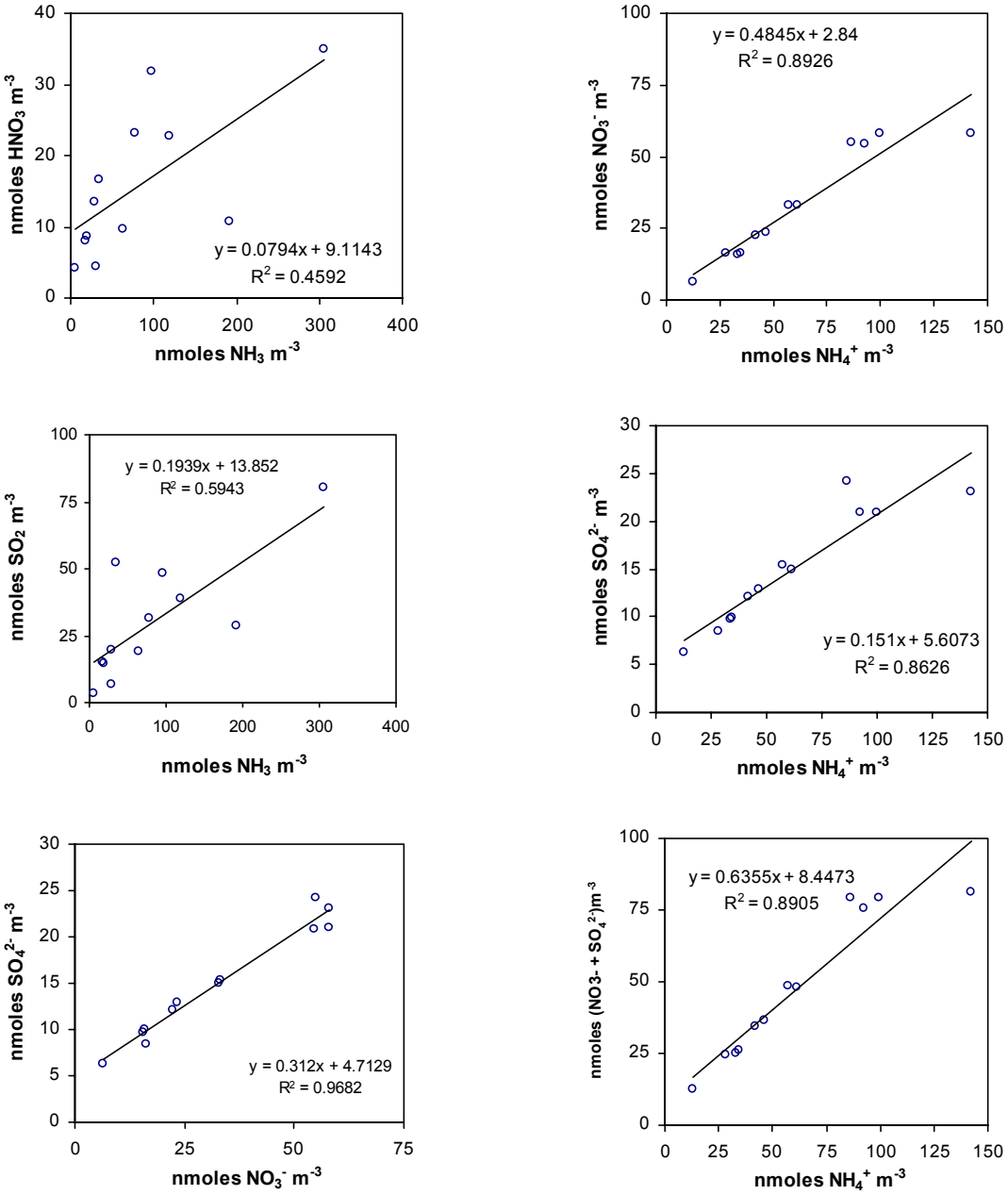


Figure 4.6: ***Scatter plots of showing the relationships between concentrations of HNO_3, SO_2, NO_3^-, and SO_4^{2-} from the monthly measurements at 12 sites (units: nmol m^{-3}).***

The comparison of the gas phase concentrations shows that there is more NH_3 than either SO_2 or HNO_3 at these sites (on molar basis), while SO_2 is in excess over HNO_3. The correlations

[3] The NH_3 and NH_4^+ measurements are made under a separate contract *Ammonia Monitoring in the UK* (EPG 1/3/136), let by DEFRA to CEH Edinburgh. The measurements are reported under that contract. but are available from the CARA website at the address: http://www.nbu.ac.uk/cara/UKNAMN/UKNAMN.htm.

are highest for the aerosol components. This reflects the longer residence time of these measurements leading to more representative sampling as well as the close coupling between acidic and basic aerosol components. As with the gases, reduced nitrogen (NH_4^+) is in molar excess over SO_4^{2-} and NO_3^-. However, aerosol NO_3^- is in molar excess over SO_4^{2-} and is even somewhat larger in terms of equivalents of H^+.

Interpolated concentration fields for 2001 across the UK from the 12 monitoring sites are shown in Figure 4.7. A bilinear interpolation procedure was used to provide the mean concentration field at a grid resolution of 10 km x 10 km. The spatial distributions of HNO_3 and NO_3^- are seen to be rather different to that of HCl and Cl^-. Both the nitrogen species are largest in central and south east England, with the lowest concentrations of HNO_3 in Scotland and Northern Ireland. HNO_3 is seen to be more spatially variable than NO_3^- aerosol, reflecting the long atmospheric residence time of the latter.

Figure 4.7 shows the distribution of annual mean SO_2 concentrations for 2001. The largest annual concentrations of 7.6 μg m^{-3} occurred at the Sutton Bonington site, derived from the DELTA measurements. It should be noted that a separate DEFRA network is dedicated to measurement of SO_2 concentrations. The DELTA system provides these estimates as an added benefit which is useful for the QA of the SO_2 network. SO_2 concentrations generally decreased towards the West and North of the UK, with the lowest concentrations of < 0.5 μg SO_2 m^{-3} in northern Scotland.

HCl and Cl^- concentrations are largest in the south east and south west of England (Barcombe Mills, Yarner Wood) and lowest in the west of the country (Lough Navar, Eskdalemuir and Cwmystwyth) and most of Scotalnd. The distribution may reflect the dual contribution to atmospheric Cl^- anthropogenic and marine sources. The highest HCl concentrations in the south may be derived from emission or reaction with HNO_3 to produce HCl. In contrast, the larger concentration of Cl^- in the south west probably reflects a marine contribution to the aerosol.

The concentrations of base cations varies greatly depending on the species. In all cases, however (Ca^{2+}, Mg^{2+} and Na^+), concentrations are the largest at Barcombe Mills. This may reflect a large contribution of marine aerosol to this site, as well as possible agricultural sources of base cation emission in the vicinity.

4.2.3 Daily measurements

After some initial problems in the first quarter of 2001, data collection re-commenced on the 11th April 2001, and had been running smoothly until the closure of the daily sampling site on the 6th November 2001. A few gaps in the data set from the period April 2001 to July 2001 were due to absence of the site operator, or because of site operator error. Nevertheless, despite these problems, this system has produced a substantial data series of daily concentrations. Results are given in Figure 4.8, Figure 4.9 and Figure 4.10 for HNO_3, SO_2 and HCl concentrations. The same figures show the corresponding concentrations of aerosol NO_3^-, SO_4^{2-} and Cl^-.

A complete set of the measurements made from April 2001 to the cessation of the measurements in November 2001 can be found in Appendix 5.2.

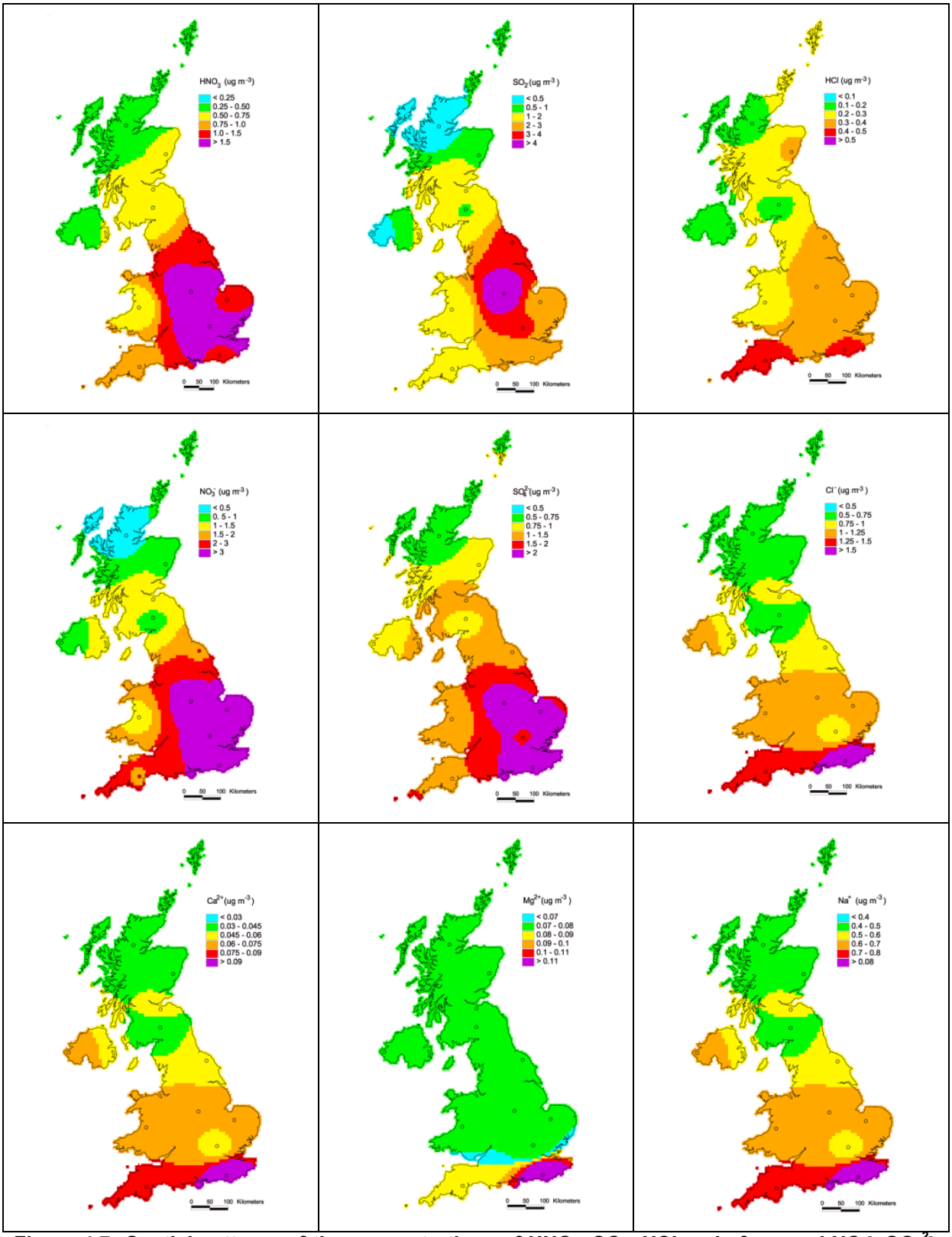


Figure 4.7: ***Spatial patterns of the concentrations of HNO_3, SO_2, HCl and of aerosol NO_3^-, SO_4^{2-}, Cl^-, Ca^{2+}, Mg^{2+} and Na^+ concentrations in the UK from the averaged monthly measurements (Jan-01 to Dec-01).***

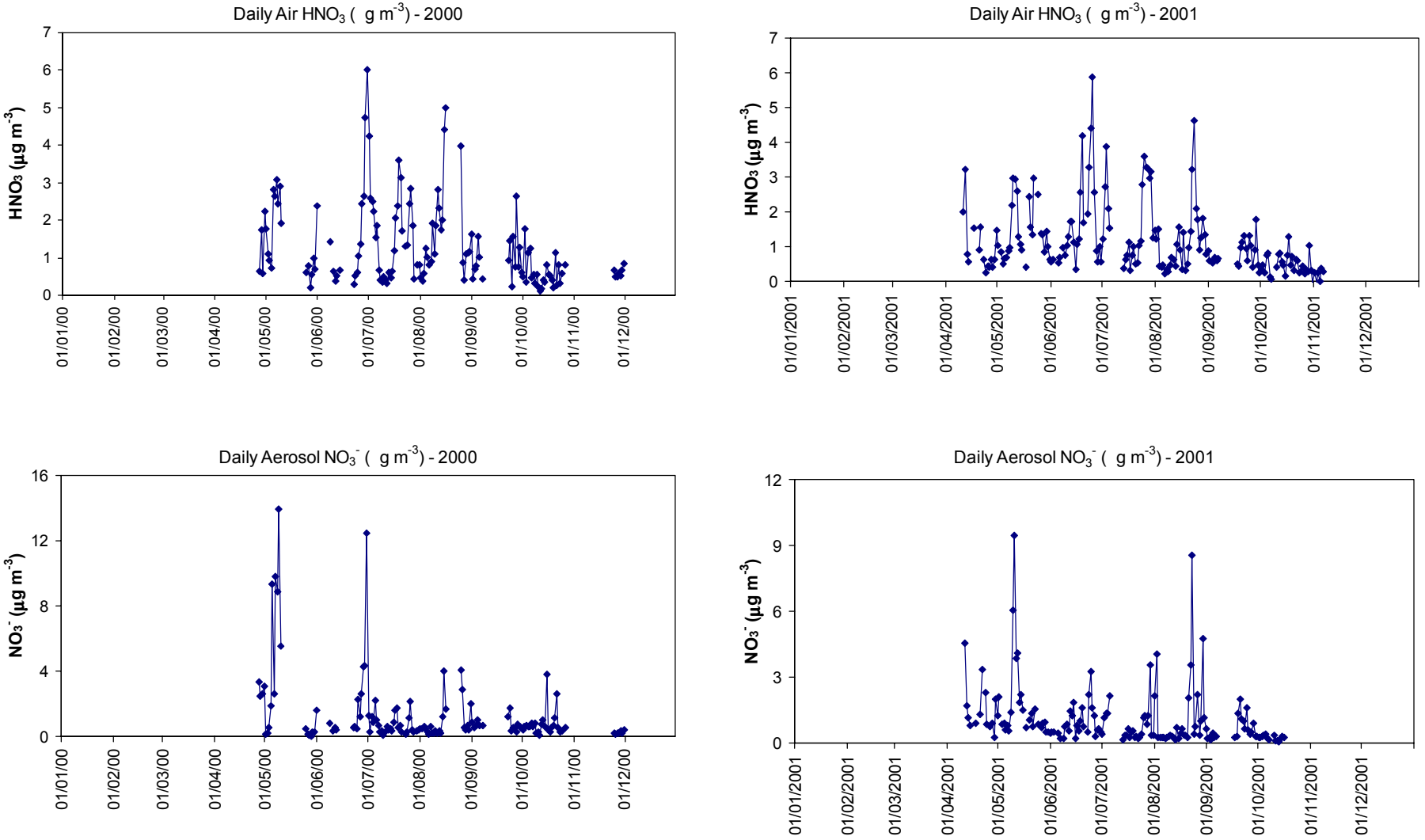


Figure 4.8: ***Record of Daily HNO_3 and Aerosol NO_3^- Concentrations at Barcombe Mills, Sussex from Commencement to June 2001.***

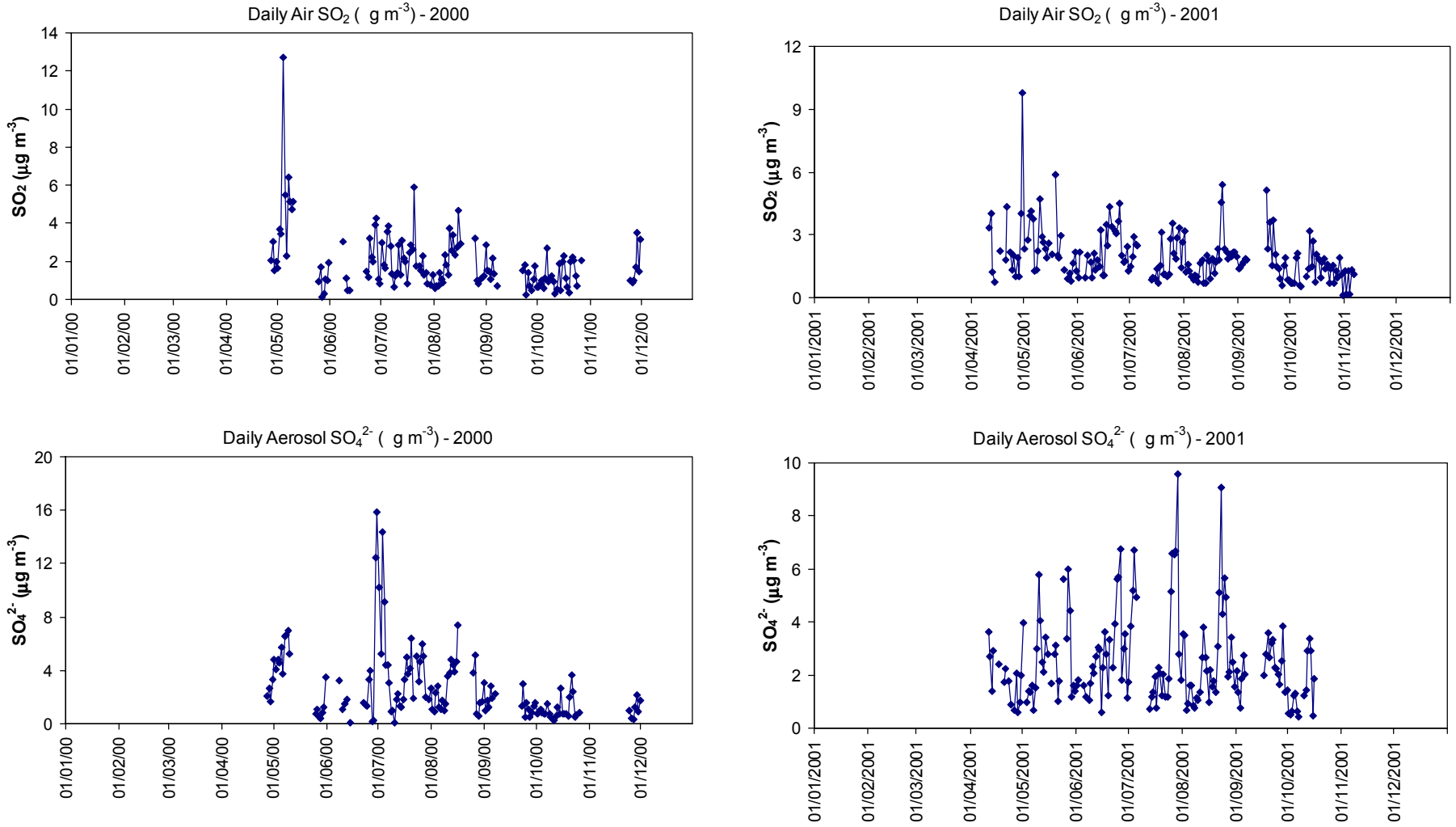


Figure 4.9: ***Record of Daily SO_2 and Aerosol SO_4^{2-} Concentrations at Barcombe Mills, Sussex from Commencement to June 2001.***

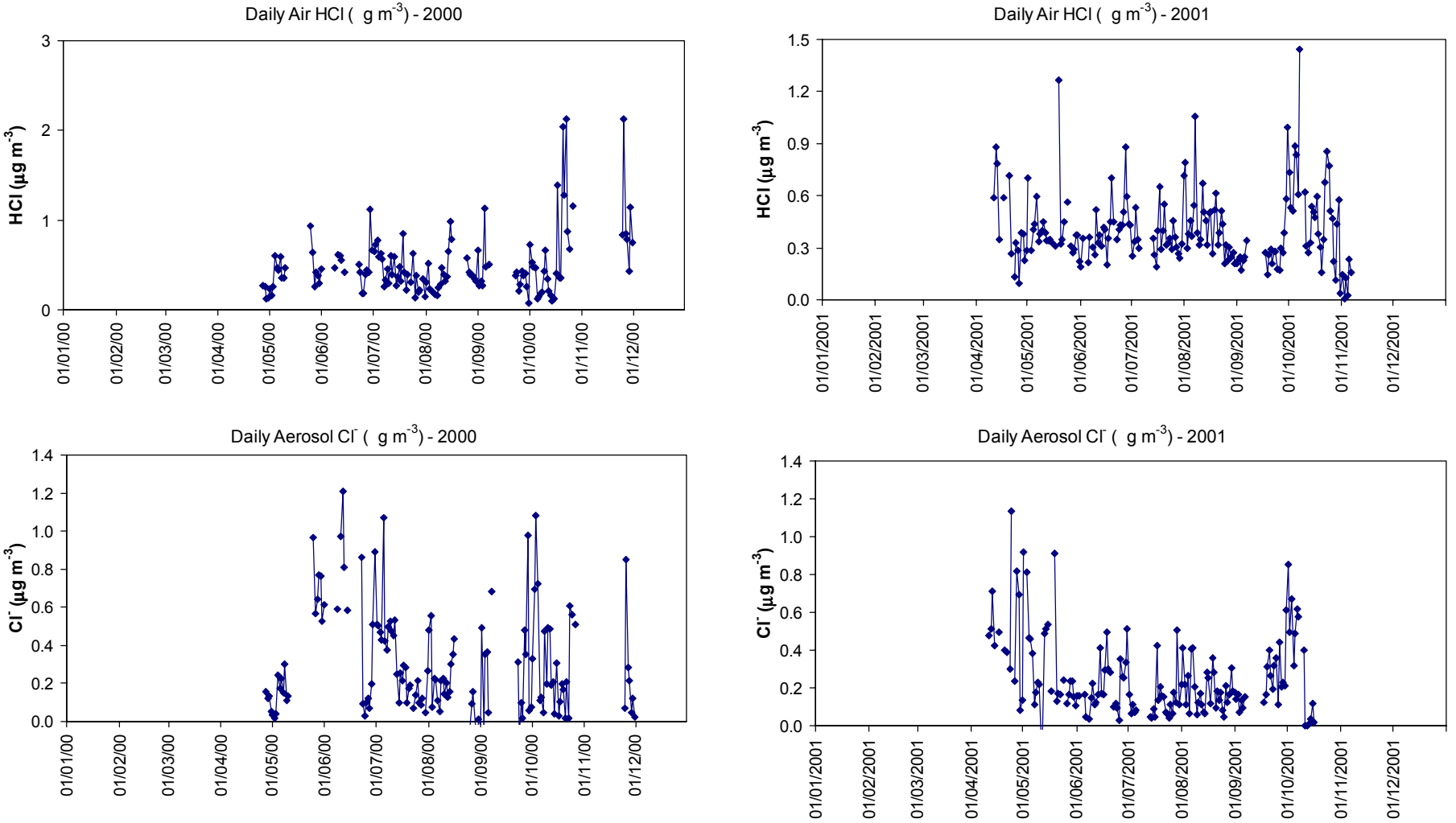


Figure 4.10: ***Record of Daily HCl and Aerosol Cl⁻ Concentrations at Barcombe Mills, Sussex from Commencement to June 2001.***

4.3 DISCUSSION

4.3.1 Measurement Methods

A modification of the CEH DEnuder for Long-Term Atmospheric sampling (DELTA) system was used to provide the monthly sampling of acid gases and other aerosol at 12 sites in the UK Nitric Acid Monitoring Network. Daily sampling (using classical annular denuder technology) was implemented at one site, Barcombe Mills in East Sussex. Following teething problems at the beginning of the year, the Chemspec daily sampling system has operated without fault since April 2001, although sampling was discontinued at the end of the first phase of the monitoring network (6th November 2001).

The full suite of species analysed from the network included: gaseous HNO_3, HCl, SO_2 and aerosol NO_3^-, Cl^-, SO_4^{2-}, Na^+, Ca^{2+}, Mg^{2+}. Monthly values from the 12 sites provided a basic estimate of the spatial variability of these components across the UK, as well as their main seasonal and inter-annual trends can be made, whilst the daily values from the Barcombe site provided high time-resolution data to analyze particular pollution events.

4.3.2 Spatial Patterns in Acid Gas and Aerosol Concentrations

The main features of the spatial distribution in the pollutants measured are shown in the annual maps (Figure 4.7). In general, there is a reasonable correlation between the concentrations of the different pollutants at the 12 monthly monitoring sites, and for some species there are very high spatial correlations. In the case of the gases this can be attributed to the regional distribution of sources being similar, while for aerosol the chemistry must obviously balance between major cations and anions. Figure 4.6 shows that there is in general a low correlation between concentrations of gaseous NH_3 and those of SO_2 and HNO_3, and this may be attributed to the different sources of these pollutants, with NH_3 predominantly from agricultural sources, and SO_2 and HNO_3 from combustion sources.

It should be noted that the maps (Figure 4.7) of the acid gas and aerosol concentrations are constructed using bi-linear interpolation. This is because the number of sites is not sufficient to permit more sophisticated interpolation methods (*e.g.*, kryging) and provides no estimate of uncertainty in the interpolation. It is clear, however, from the maps that each part of the country is fully dependent on only one point in the interpolation and that, while there is a high correlation between the pollutants measured at the sites, there are major differences in concentrations between all adjacent sites. It is clear therefore, that the present network of 12 sites is an absolute minimum and that an increase in site density would be warranted. Such an increase (*e.g.*, to 20-30 sites) would allow interpolation uncertainties to be quantified and could also be expected to change the estimates of regional dry deposition budgets. For example, with the current UK dry deposition of HNO_3 at ~60 kt N yr^{-1}, there could easily be errors of 20 kt N yr^{-1} due to use of only 12 sites in the present network.

4.3.3 Temporal Trends in Acid Gas and Aerosol Concentrations

The daily sampling at Barcombe Mills illustrates the high temporal structure of these pollutants. The variation in HNO_3 reflects a close linkage to production in photochemical episodes as well as a relatively short lifetime before it is removed either by dry deposition or conversion to aerosol NO_3^-. Although, NO_3^- aerosol has a longer lifetime in the atmosphere (of a few days)

there is still substantial temporal variability, reflecting either the effect of different wind directions and the different composition of air masses advected over the site.

These points illustrate the potential of these data for detailed further analysis of air chemistry interactions. By contrast, the monthly site data provide information on the overall seasonal behaviour of the different pollutants. Figure 4.4 illustrate the monthly changes at each site. After two full years of monitoring, there are distinctive seasonal trends, which are replicated, at most of the sites in the network. Figure 4.5 shows the average seasonal changes for 2000 and 2001 from all of the sites, and indicate more clearly the main differences for the pollutants. HNO_3, HCl and NO_3^- have a maximum during late spring and early summer, which may reflect the importance of photochemical production processes. Conversely, SO_2, Na^+ and Cl^- have maxima during winter, reflecting the importance of combustion processes for SO_2 and marine sources in winter for sea salt. The reasons for the observed seasonal trends in SO_4^{2-}, Mg^{2+} and Ca^{2+} are less clear.

5. Other Topics

5.1 19TH EMEP INTERCOMPARISON

The expected results of the samples used in the 19th EMEP Laboratory Intercomparison (undertaken in 2001) were reported to AEA Technology by NILU at the beginning of 2002. A brief summary is provided here comparing the measured and expected concentrations values for the rainwater samples and of the sulphur dioxide and nitrogen dioxide in the absorbing solution analysis.

The measured concentrations are compared to the expected concentrations by means of a x-y plot. The difference (or precision) between the measured and expected value was quantified using the mean percentage difference.

5.1.1 Rainwater Samples

Unlike previous years NILU appeared to provide 4 low concentration synthetic rainwater samples (previous years intercomparisons involved analysis of two samples with a higher concentration and two of a lower concentration). Figure 5.1 shows that all analytes were analysed well.

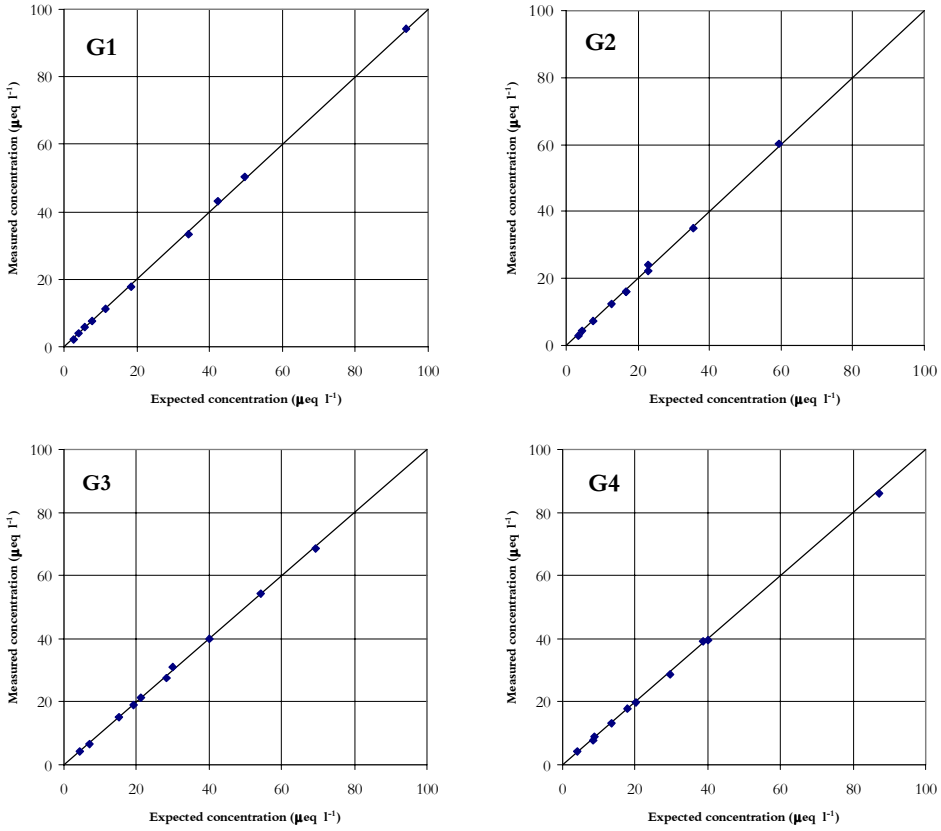


Figure 5.1: ***A Comparison of Measured and Expected Rainwater Ion Concentrations, pH values and Conductivity for 4 Samples (G1-G4).***

The measured and expected values are listed in Table 5.1, together with the mean percentage difference. For most of the measurements, the difference is so small that the agreement between measured and expected can be regarded as excellent or very good. Only for the monovalent cations and particularly the potassium concentration is the agreement less good, although, even here, the absolute differences are less than 1 $\mu eq\ l^{-1}$.

Table 5.1: ***A Comparison of Measured and Expected Analyte Concentrations for Synthetic Rainwater Samples measured as part of the 19th EMEP intercomparison.***

Species	Sample code	Expected value $\mu eq\ l^{-1}$ or $\mu S\ cm^{-1}$ or pH unit	Measured value $\mu eq\ l^{-1}$ or $\mu S\ cm^{-1}$ or pH unit	Mean difference (%)
SO_4-S	G1	94.12	94.26	0.14
SO_4-S	G2	59.47	60.20	1.21
SO_4-S	G3	69.41	68.68	-1.06
SO_4-S	G4	87.31	86.15	-1.34
NO_3-N	G1	49.81	50.19	0.76
NO_3-N	G2	35.50	35.12	-1.07
NO_3-N	G3	54.25	54.19	-0.12
NO_3-N	G4	40.18	39.55	-1.59
NH_4-N	G1	34.35	33.48	-2.57
NH_4-N	G2	22.90	22.35	-2.46
NH_4-N	G3	40.08	39.76	-0.79
NH_4-N	G4	20.04	19.70	-1.69
pH	G1	4.12	4.09	-0.85
pH	G2	4.52	4.44	-1.85
pH	G3	4.46	4.39	-1.49
pH	G4	4.19	4.15	-0.89
Mg	G1	7.65	7.57	-0.98
Mg	G2	12.74	12.59	-1.20
Mg	G3	15.29	15.14	-0.98
Mg	G4	8.92	8.89	-0.37
Na	G1	18.56	17.75	-4.50
Na	G2	16.69	16.01	-4.20
Na	G3	28.24	27.49	-2.69
Na	G4	29.65	28.67	-3.36
Cl	G1	5.72	5.90	3.07
Cl	G2	7.35	7.28	-1.00
Cl	G3	21.24	21.38	0.68
Cl	G4	17.97	17.89	-0.47
Ca	G1	11.47	11.33	-1.27
Ca	G2	16.73	16.22	-3.11
Ca	G3	19.12	18.86	-1.36
Ca	G4	13.38	13.27	-0.83
K	G1	2.60	2.28	-13.48
K	G2	3.26	2.84	-13.70
K	G3	7.16	6.44	-10.57
K	G4	8.47	7.59	-10.85
Conductivity	G1	42.44	43.00	1.30
Conductivity	G2	22.75	24.00	5.35
Conductivity	G3	30.10	31.00	2.96
Conductivity	G4	38.77	39.00	0.60

5.1.2 NO_2 and SO_2 in Absorbing Solution

Table 5.2 and Figure 5.2 shows the measured concentration of NO_2 was higher than the expected value. Samples C3 and C4 were better predicted than C1 and C2. Figure 5.3 and Table 5.3 shows that the SO_2 concentration is consistently over predicted, suggesting a systematic overread in all measured samples. We will be pursuing this with HSL.

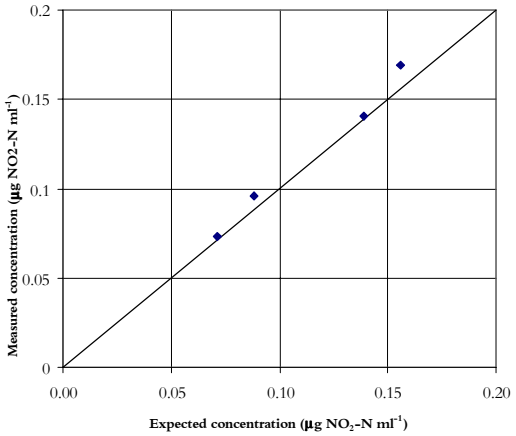


Figure 5.2: ***A Comparison of Measured and Expected NO_2 in absorbing solution.***

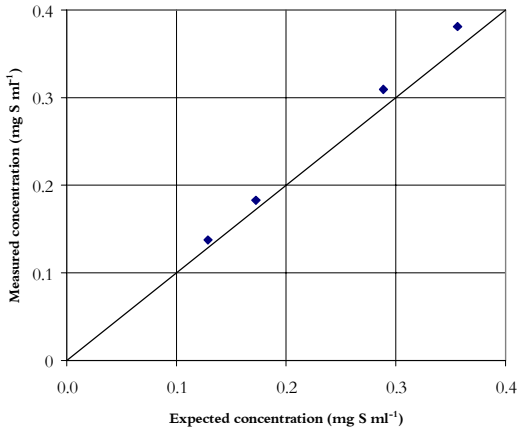


Figure 5.3: ***A Comparison of Measured and Expected SO_2 in absorbing solution.***

Table 5.2: ***A Comparison of Measured and Expected NO_2 Concentrations in the Absorbing Solutions.***

Sample code	Expected value µg NO_2-N ml^{-1}	Measured value µg NO_2-N ml^{-1}	Mean difference (%)
C1	0.088	0.096	8.70
C2	0.156	0.169	8.20
C3	0.139	0.141	1.60
C4	0.071	0.073	2.68

Table 5.3: ***A Comparison of Measured and Expected SO_2 Concentrations in the Absorbing Solutions.***

Sample code	Expected value mg SO_2-S ml^{-1}	Measured value mg SO_2-S ml^{-1}	Mean difference (%)
A1	0.357	0.382	6.86
A2	0.128	0.137	6.61
A3	0.172	0.183	6.01
A4	0.289	0.309	6.85

5.1.3 Overall Review of UK Performance

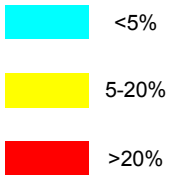
EMEP have now published its overall review of the 19th Laboratory Intercomparison [Aas *et al.*, 2002]. Table 5.4 (Table 9 in the EMEP Report) presents a summary of the results in precipitation is given. An overview of the result for the main air components is given in Table 5.5 (Table 10 in the EMEP Report).

Table 5.4: ***Results from the 19th Laboratory Intercalibration of Precipitation, Average percent Error compared with Expected Value, for 'pH diff' it is shown as Average Deviation in pH unit from Expected Value.***

Lab \ component	SO_4-S	NO_3-N	NH_4-N	Mg	Na	Cl	Ca	K	Cond.	pH diff	pH (H^+)
1 AT	1.1	1.0	1.6	4.3	5.8	14	8.2	5.0	3.7	0.03	7.2
3 CS	1.6	4.4	10	1.1	1.2	11	3.5	2.3	1.3	0.06	12
4 DK	1.2	1.0	0.9	6.3	7.8	3.9	4.5	11	3.3	0.05	11
5 FI	1.1	1.2	1.4	1.5	0.3	1.6	0.9	8.7	1.7	0.02	4.5
6 FR	1.1	2.1	8.2	17	3.6	5.2	17	9.0	5.3	0.01	4.3
7 DE(Leip.)	4.1	3.7	3.1	2.6	0.5	8.4	2.2	3.7	3.7	0.05	11
8 DE(Schau.)	0.8	0.6	4.5	1.5	2.0	3.3	2.6	1.1			
10 HU	1.8	1.6	3.8	15	28	9.2	25	19	0.7	0.16	31
11 IS	2.8	9.4	1.6	3.8	9.9	7.4	2.1	10	9.6	0.02	5.5
12 IE (MET)	0.6	0.6	35	1.6	2.4	5.1	7.3	7.7	2.8	0.01	2.8
13 IT-CNR	9.2	3.1	2.7	1.5	17	3.2	2.9	6.1	5.4	0.06	14
14 NL	1.7	1.5	4.1	2.6	1.8	2.9	1.4	4.1	2.2	0.11	23
15 NO	3.6	4.2	2.9	3.1	3.4	2.4	4.7	3.4	1.3	0.06	13
16 PL	2.2	4.2	4.2	1.1	3.2	5.9	2.1	7.1	1.7	0.02	5.9
17 PT	6.6	3.4	11	6.5	4.9	1.7	16	51	5.5	0.11	23
18 RO	8.9		68			12			15	0.11	28
19 ES	1.6	3.6	9.5	0.6	3.4	9.6	5.6	4.7	4.2	0.21	38
20 SE	15	1.0	0.4	20	9.3	5.7	12	12	4.8	0.02	5.4
21 CH	1.3	0.8	2.5	0.4	1.4	1.8	2.4	10	0.4	0.05	11
22 RU	4.5	4.1	2.8	6.7	5.8	32	22	8.5	7.4	0.07	15
23 GB	***0.9***	***0.9***	***1.9***	***0.9***	***3.6***	***1.3***	***1.6***	***11***	***2.6***	***0.06***	***14***
24 YU		124	20	1.8	4.6	51	3.4	7.7	12	0.11	29
26 CA	2.5	1.7	1.3	3.0	0.3	0.6	4.7	5.6		0.03	6.1
27 US-I	0.6	0.5	6.9	5.2	2.2	1.4	0.5	5.4	1.5	0.04	9.8
30 IT(ISP)	0.4	1.2	1.5	4.3	1.1	5.5	4.2	9.7	3.5	0.01	2.2
31 SK	1.2	1.8	4.1	3.9	3.3	2.6	1.1	2.9	3.1	0.04	9.3
32 LT											
33 LV	1.0	0.8	2.2	2.2	5.6	84	15	5.2	3.4	0.0002	6.7
34 TR	0.6	0.7	3.0	19	2.2	6.0	111	16	6.3	0.05	11
35 CR	1.8	1.3	1.9	1.3	1.6	2.9	3.2	3.3	7.6	0.09	18
36 SI	2.0	2.6	1.0	1.7	0.3	3.4	0.5	1.5	16	0.25	40
37 IE (ESB)											
38 EE	8.5	15	3.5	7.2	6.7	43	24	3.4	4.4	0.002	6.1
39 PL (Env.)	6.3	4.7	9.4	1.9	0.7	6.5	1.4	1.2	11	0.01	7.4
40 MK		50	5.2	9.9	38	21	8.4	49	13	0.52	235

Table 5.5: ***Results from the 19th laboratory intercalibration of main components in air, average percent error compared with expected value.***

Lab \ component	SO_2 impr	SO_2 abs	HNO_3	NH_3	NO_2
3 CS	1.1		0.6		4.2
4 DK	5.2		3.7	6.4	4.4
5 FI	0.5		0.8	3.1	
6 FR		12			
8 DE	4.0		0.7		
10 HU				29	2.8
11 IS	12		17	0.2	
12 IE	0.7				4.4
13 IT	0.4		0.9	3.5	
15 NO	3.4	12	3.7	5.7	0.1
16 PL	4.2		4.4	15	2.7
17 PT		9.6			
19 ES	1.2	19	13	9.6	1370
20 SE	2.0		4.4	2.7	1.4
21 CH		5.5			
22 RU	12		11	11	1.5
23 UK	***3.6***	***0.3***			***5.5***
24 YU					1.1
30 IT				3.4	
31 SK	4.2		1.1	40	11
33 LV	25		30	43	6.7
34 TU	3.9		11		3.2
35 HR					0.3
36 SI	4.8		6.3		3.5
38 EE	33				2.0
39 PL Env.	2.7		2.6	2.8	4.6



5.1.4 Concluding Remarks

The results of the 19th EMEP Laboratory Intercomparison of the main components in precipitation and air have been presented. Overall, the results (a) showed that the problem with the pH measurements had been resolved and (b) confirmed that the performance of the new ion chromatographs was very good for the other ions determined in rainwater samples.

The EMEP report concluded that the determination of rainwater composition was generally good in all countries, except for some elements (potassium and chloride especially) where there was room for improvement. EMEP acknowledged that the determination of pH was difficult and only a few laboratories achieved a 5 per cent difference or smaller (the UK difference was 5.5%). However, as the data quality objective (DQO) for pH is 0.1 unit, most of the laboratories were within this DQO, as shown in Table 5.4 where the colour limits for pH are given at 0.05, 0.1 and 0.2 average pH units difference from the expected value. The determination of the main air components was described as quite acceptable, even though there was a need for improvement at a few laboratories for some components.

The UK results are mostly within 5% of the expected result providing evidence that the working procedures and quality control and quality asssurance processes used in the UK monitoring programme are delivering data that are reliable and robust. As part of netcen's

programme of continuous improvement, we will work with our colleagues at Harwell Scientifics Ltd to ensure that all the UK measurements fall within the 5 per cent difference or smaller band.

6. References

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We would like to acknowledge the dedication and contribution of the network manager Sandra Hasler (AEA Technology) who was involved in the monitoring programme until March 2002.

Appendices

CONTENTS

Appendix 1
Weekly data, 2001

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Notes to Appendix 1

There are two pages of information for each site. The first includes site characteristics, time and seasonal trends; the second page presents individual concentrations for all samples collected (including those samples contaminated with bird strike). Also included are the Ordnance Survey co-ordinates, latitude and longitude and altitude of the site and the average rainfall for the 5 x 5 km square containing the site for the years 1941 to 1970.

Abbreviations for monitoring equipment, which also includes co-located sampling instrumentation, are given below:

- WOC — Wet-only collector for daily measurement of rainfall composition
- DT — Monthly diffusion tube. Measurement for nitrogen dioxide
- Daily SO_2 — Daily measurements of SO_2, by hydrogen peroxide bubbler and of particulate sulphate on a Whatman 40 filter with ion chromatographic analysis
- Weekly SO_2 — Weekly measurements of SO_2 by hydrogen peroxide bubbler with ion chromatographic analysis
- ozone — Hourly measurements surface ozone
- SO_2 — Hourly measurements of SO_2
- NO_x — Hourly measurements of NO_x
- HNO_3 Denuder — Monthly measurements of nitric acid, sulphur dioxide, hydrogen chloride and acid and base aerosol components using the CEH DELTA samplers
- Met — Meteorological measurements.
- UKAWMN — Catchment monitored by the UK Acid Waters Monitoring Network.
- EMEP — Daily data from this site are made available to EMEP

In the tables of data, a '-' indicates a missing value. A dry week is indicated by a complete row of '-'s. Some weeks only have rainfall volumes reported; this is because no analyses were carried out on very low volume rainfall samples or on samples that were visibly contaminated. Individual ion concentrations or conductivities are missing for some low volume weeks, due to there being insufficient sample for complete analysis. A '< *Value*' indicates that the concentration was less than the detection limit of the analysis. Annual precipitation-weighted mean concentrations and rainfall total are included at the bottom of the table.

A phosphate concentration was also determined for each rainwater sample. A phosphate concentration > 0.1 mg P l^{-1} (or > 9.7 μeq l^{-1}) was taken as evidence of contamination by birds. Although all these samples have been included in the tables, they were not included in the calculation of annual means. The rainfall totals presented in Appendix 2, Table 10 include all samples collected and are therefore sometimes higher than the totals presented in this section.

Goonhilly

2001

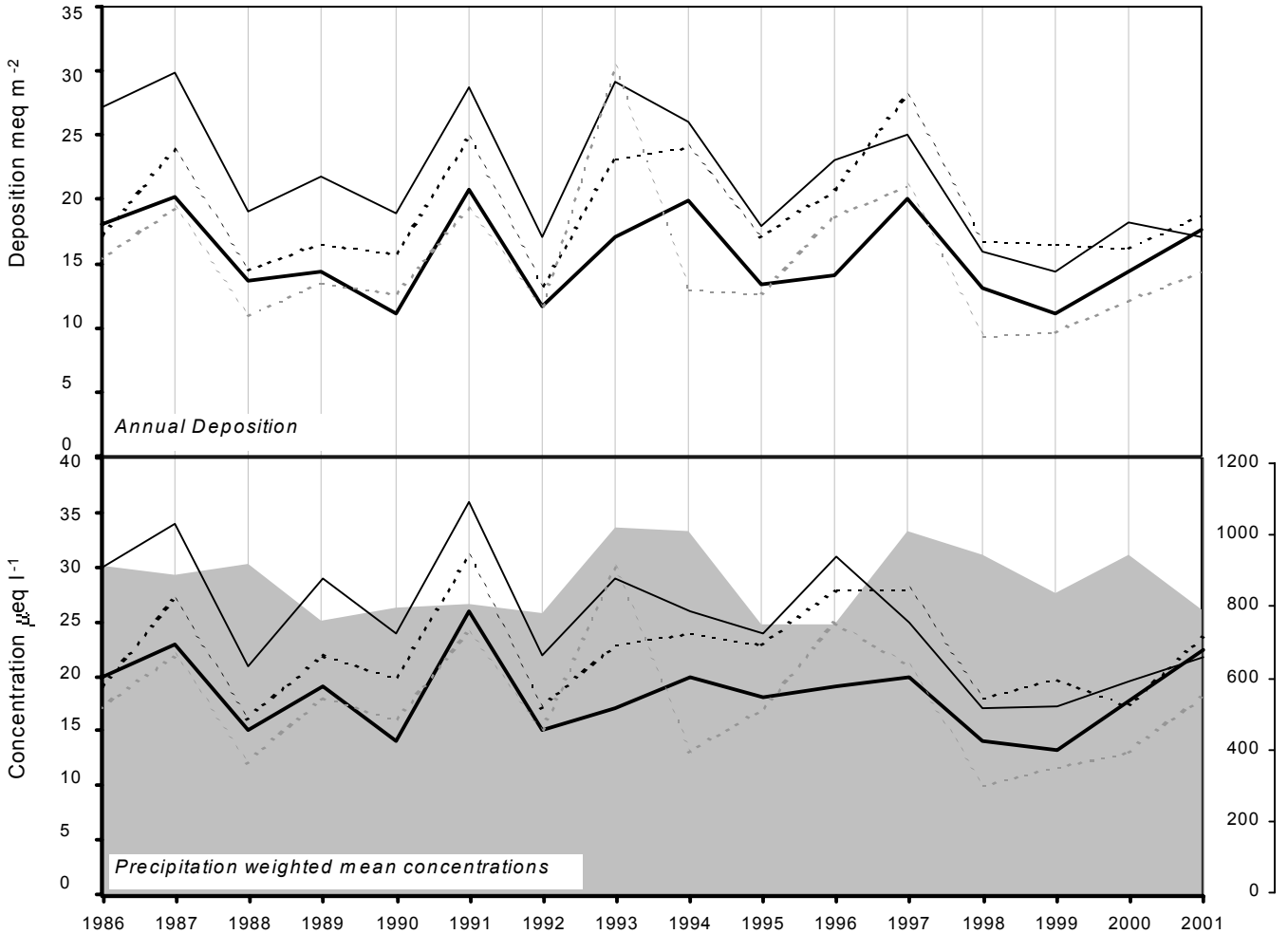
Site Code:	**5003**
Easting:	**1723**
Northing:	**214**
Latitude:	**50 02 54 N**
Longitude:	**05 10 52 W**
Altitude (m):	**108**
Rainfall (mm):	**973**

[30 year mean 1940 - 1971]

Site Environment:
Open moorland, Satellite tracking station

Other measurements:
DT

Site Operator:
British Telecom



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-0.11 ueq/l (-0.60 %/year): 15 years' data
\- No significant trend detected

non-marine sulphate
-0.70 ueq/l (-2.29 %/year): 16 years' data
\+ Significant trend detected

nitrate
0.02 ueq/l (0.08 %/year): 16 years' data
\- No significant trend detected

ammonium
-0.21 ueq/l (-1.10 %/year): 16 years' data
\- No significant trend detected

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
03/01/01	10/01/01	5.0	42.3	9.8	7.4	271.1	61.4	13.1	331.4	5.6	< 1.0	9.7	53.0	53.0	13.0
10/01/01	17/01/01	4.0	149.7	135.5	84.9	798.8	183.1	44.0	952.2	17.5	< 1.0	53.5	173.0	173.0	15.1
17/01/01	02/02/01	4.7	42.2	27.2	15.6	219.0	49.8	11.3	264.6	4.6	< 1.0	15.8	51.0	51.0	18.7
02/02/01	07/02/01	5.0	46.8	4.3	3.3	322.3	70.9	14.4	372.7	6.9	< 1.0	8.0	58.0	58.0	26.3
07/02/01	15/02/01	4.6	52.0	23.6	15.8	170.8	38.6	10.6	197.5	3.9	< 1.0	31.5	42.0	42.0	31.4
15/02/01	23/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23/02/01	01/03/01	4.8	42.4	14.4	10.6	240.3	55.3	11.5	289.2	5.1	< 1.0	13.5	51.0	51.0	21.2
01/03/01	07/03/01	4.3	85.6	81.3	77.5	290.2	63.5	15.8	342.9	6.4	< 1.0	50.7	79.0	79.0	20.0
07/03/01	15/03/01	4.8	56.2	8.7	6.4	346.6	82.0	17.6	442.8	7.5	< 1.0	14.5	69.0	69.0	28.7
15/03/01	29/03/01	4.5	47.6	26.3	18.7	184.5	42.4	9.9	214.4	4.1	< 1.0	25.3	47.0	47.0	130.8
29/03/01	05/04/01	4.6	45.2	12.6	8.8	210.1	47.7	10.5	240.8	4.3	< 1.0	19.9	48.0	48.0	30.6
05/04/01	11/04/01	4.9	77.1	9.5	7.4	526.8	120.4	23.9	705.6	11.1	< 1.0	13.6	98.0	98.0	16.6
11/04/01	20/04/01	7.2	267.2	86.7	768.4	495.6	111.7	36.9	529.2	141.3	460.4	207.5	176.0	176.0	3.0
20/04/01	26/04/01	5.0	22.6	6.4	4.2	104.0	23.9	7.4	124.3	2.2	< 1.0	10.1	25.0	25.0	37.0
26/04/01	03/05/01	5.1	23.8	8.5	10.4	106.1	26.1	9.7	129.8	2.4	< 1.0	11.0	25.0	25.0	25.1
03/05/01	11/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11/05/01	18/05/01	4.9	33.6	24.5	15.9	144.3	33.4	16.1	158.7	4.3	< 1.0	16.2	34.0	34.0	16.1
18/05/01	24/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24/05/01	31/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31/05/01	07/06/01	7.2	137.4	31.9	289.6	330.9	77.4	28.4	426.6	171.5	235.2	97.5	114.0	114.0	3.6
07/06/01	14/06/01	6.4	51.0	20.6	63.1	130.8	33.6	8.4	136.5	37.9	25.5	35.2	34.0	34.0	7.9
14/06/01	20/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	12.2
20/06/01	27/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27/06/01	06/07/01	4.5	42.6	43.7	37.5	59.5	14.0	13.0	64.1	3.1	< 1.0	35.4	31.0	31.0	35.5
06/07/01	11/07/01	4.8	30.2	17.2	19.9	71.4	15.7	7.7	82.0	2.0	< 1.0	21.6	25.0	25.0	25.4
11/07/01	19/07/01	4.6	38.9	11.9	6.5	171.4	37.1	8.7	202.4	3.3	< 1.0	18.2	39.0	39.0	8.7
19/07/01	27/07/01	4.5	34.7	14.4	5.0	94.4	21.4	9.1	107.8	2.0	< 1.0	23.3	30.0	30.0	8.8
27/07/01	01/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01/08/01	10/08/01	6.4	91.6	56.7	64.1	212.9	50.5	68.9	254.5	5.5	< 1.0	66.0	58.0	58.0	12.3
10/08/01	17/08/01	4.8	56.3	37.4	18.6	175.8	38.0	17.6	184.9	6.6	< 1.0	35.2	42.0	42.0	5.7
17/08/01	22/08/01	4.5	42.5	20.9	27.1	96.0	20.4	7.3	104.1	2.2	< 1.0	30.9	31.0	31.0	12.5
22/08/01	30/08/01	4.7	122.3	94.9	57.5	146.2	36.6	45.3	120.0	5.4	< 1.0	104.7	-	-	1.8
30/08/01	05/09/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1
05/09/01	12/09/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12/09/01	19/09/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5
19/09/01	26/09/01	4.7	66.0	81.2	56.8	120.1	28.4	28.7	116.2	4.4	< 1.0	51.6	41.0	41.0	3.6
26/09/01	03/10/01	4.6	46.6	23.5	10.5	266.8	60.4	15.7	307.3	5.5	< 1.0	14.4	56.0	56.0	21.3
03/10/01	11/10/01	4.7	65.6	12.2	7.0	395.7	88.3	18.5	457.8	8.2	< 1.0	17.9	73.0	73.0	28.6
11/10/01	18/10/01	5.0	195.4	160.5	89.5	493.1	122.6	185.7	550.3	14.5	< 1.0	136.1	121.0	121.0	3.2
18/10/01	25/10/01	5.0	64.2	26.6	22.5	350.9	75.5	19.9	397.2	8.5	< 1.0	21.9	65.0	65.0	9.7
25/10/01	31/10/01	4.8	22.6	10.5	5.3	101.4	22.3	6.6	118.1	2.3	< 1.0	10.4	24.0	24.0	38.7
31/10/01	07/11/01	-	2213.2	38.6	21197.9	912.0	155.9	46.0	2835.6	3599.1	8976.0	2103.3	2430.0	2430.0	2.9
07/11/01	21/11/01	5.2	152.3	37.5	43.4	962.3	182.9	50.8	1143.9	21.8	< 1.0	36.4	168.0	168.0	6.3
21/11/01	28/11/01	5.3	34.9	8.9	15.2	198.5	40.9	9.7	226.4	4.0	< 1.0	11.0	37.0	37.0	18.4
28/11/01	13/12/01	4.7	37.1	12.1	4.9	226.1	47.3	9.4	258.2	4.5	< 1.0	9.8	44.0	44.0	56.8
13/12/01	19/12/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19/12/01	02/01/02	5.0	48.2	18.2	23.6	274.7	57.4	12.6	331.7	5.7	< 1.0	15.2	54.0	54.0	28.2

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5003	48.9	23.8	18.3	225.5	50.4	14.5	266.2	5.0	-	21.7	22.5	50.2	787.3

Yarner Wood

2001

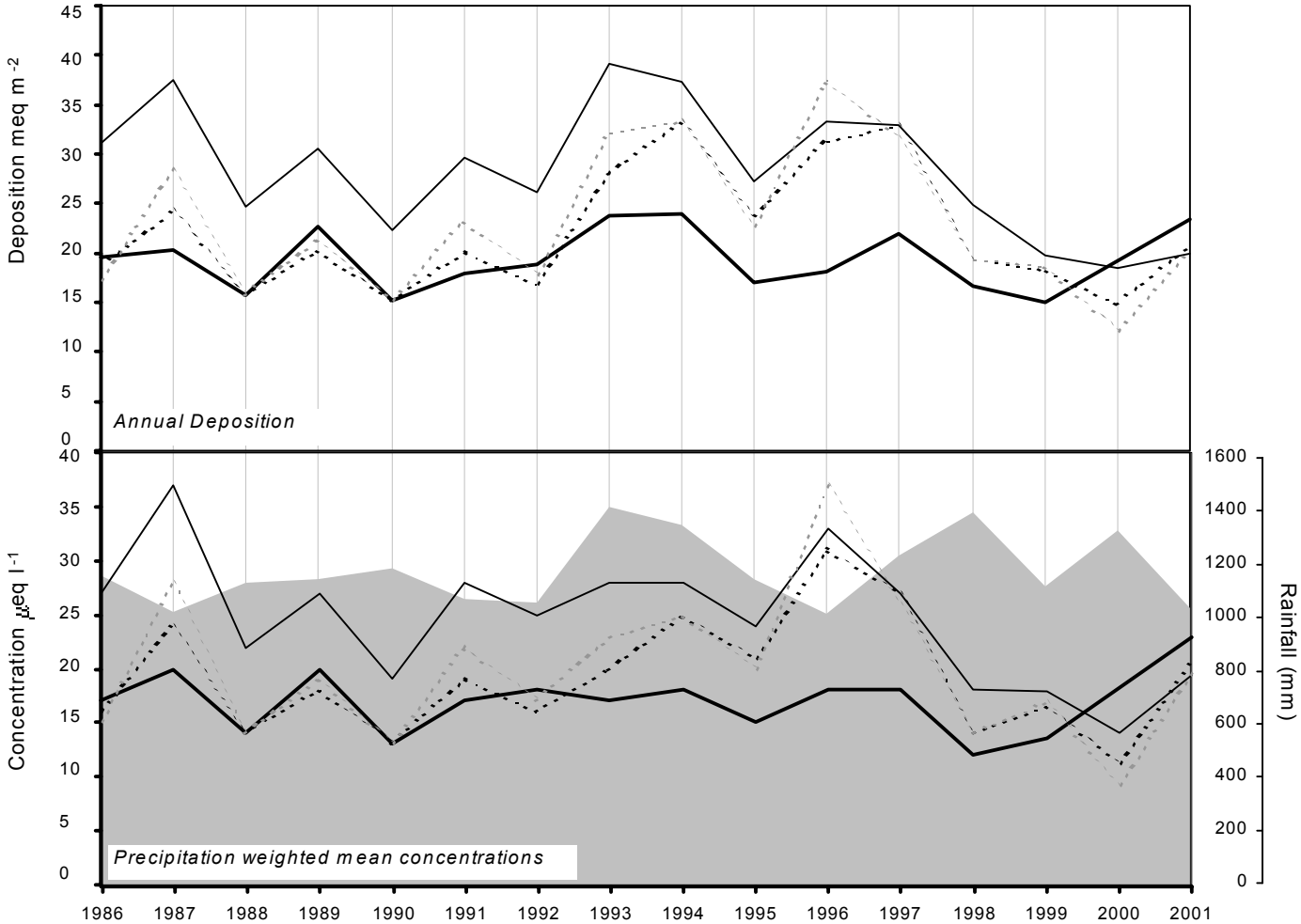
Site Code:	**5008**
Easting:	**2786**
Northing:	**789**
Latitude:	**50 35 48 N**
Longitude:	**03 42 56 W**
Altitude (m):	**119**
Rainfall (mm):	**1377**

[30 year mean 1940 - 1971]

Site Environment:
Open moorland, nature reserve

Other measurements:
DT, Daily SO2, Daily SO4, HNO3 Denuder, ozone, EMEP

Site Operator:
English Nature



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
0.01 ueq/l (0.04 %/year): 15 years' data
\- No significant trend detected

non-marine sulphate
-0.68 ueq/l (-2.28 %/year): 16 years' data
\+ Significant trend detected

nitrate
0.10 ueq/l (0.55 %/year): 16 years' data
\- No significant trend detected

ammonium
-0.02 ueq/l (-0.11 %/year): 16 years' data
\- No significant trend detected

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
03/01/01	10/01/01	5.0	15.8	6.8	4.6	69.5	15.6	6.0	83.8	1.5	< 1.0	7.5	18.0	18.0	22.2
10/01/01	17/01/01	4.5	27.5	47.6	30.4	39.8	9.7	7.5	41.9	1.4	< 1.0	22.7	25.0	25.0	23.1
17/01/01	24/01/01	4.5	35.3	22.6	22.3	147.7	33.1	8.5	172.8	3.6	< 1.0	17.5	37.0	37.0	64.0
24/01/01	30/01/01	5.2	13.1	3.5	5.0	63.5	14.1	4.0	76.3	2.1	< 1.0	5.5	15.0	15.0	28.9
30/01/01	06/02/01	4.6	39.4	10.3	5.9	211.2	47.9	11.1	257.7	4.6	< 1.0	14.0	43.0	43.0	46.3
06/02/01	14/02/01	4.6	29.9	16.0	11.2	67.6	15.4	8.0	80.3	1.5	< 1.0	21.8	22.0	22.0	24.7
14/02/01	21/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21/02/01	28/02/01	4.8	21.9	13.9	21.3	50.5	11.2	8.0	59.8	1.4	< 1.0	15.8	16.0	16.0	11.0
28/02/01	07/03/01	5.1	31.6	43.7	54.9	70.3	14.6	6.2	77.5	2.6	< 1.0	23.1	26.0	26.0	36.0
07/03/01	14/03/01	5.2	37.1	5.2	9.0	248.7	54.2	11.7	311.9	5.2	< 1.0	7.1	47.0	47.0	29.9
14/03/01	21/03/01	4.2	41.2	46.6	31.5	74.7	17.2	6.3	90.1	2.1	< 1.0	32.2	39.0	39.0	59.8
21/03/01	28/03/01	4.2	49.4	38.9	32.7	58.9	14.0	4.2	72.6	1.7	< 1.0	42.3	38.0	38.0	55.6
28/03/01	04/04/01	4.8	23.5	14.5	16.3	52.1	12.2	4.9	63.5	1.4	< 1.0	17.2	18.0	18.0	38.6
04/04/01	11/04/01	5.2	26.5	6.0	7.0	147.3	33.3	8.0	178.1	3.3	< 1.0	8.8	31.0	31.0	17.4
11/04/01	18/04/01	4.5	79.9	66.7	72.8	74.9	20.7	21.0	84.6	2.8	< 1.0	70.9	44.0	44.0	4.6
18/04/01	24/04/01	5.3	24.4	15.6	23.2	33.2	8.3	7.2	38.4	1.1	< 1.0	20.4	13.0	13.0	38.4
24/04/01	01/05/01	5.3	24.4	10.3	12.9	87.1	21.0	10.9	103.9	2.5	< 1.0	13.9	22.0	22.0	21.0
01/05/01	09/05/01	4.7	15.9	9.7	20.8	11.9	2.0	7.5	11.2	6.1	< 1.0	14.5	-	-	2.2
09/05/01	16/05/01	4.8	64.8	86.4	85.5	18.8	8.9	48.5	19.4	3.1	< 1.0	62.5	28.0	28.0	5.4
16/05/01	23/05/01	4.8	17.8	7.3	5.9	45.5	10.6	6.2	53.6	1.5	< 1.0	12.3	16.0	16.0	15.0
23/05/01	29/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29/05/01	06/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06/06/01	13/06/01	5.0	28.0	10.5	9.9	81.7	18.8	16.2	98.8	2.4	< 1.0	18.2	22.0	22.0	5.2
13/06/01	20/06/01	4.8	19.3	10.4	10.6	46.5	10.4	5.0	51.9	1.1	< 1.0	13.7	15.0	15.0	47.5
20/06/01	27/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27/06/01	03/07/01	4.5	67.7	36.7	21.8	89.2	22.6	21.4	89.2	3.7	< 1.0	57.0	33.0	33.0	4.9
03/07/01	11/07/01	4.3	60.4	63.7	50.7	57.4	13.4	14.5	65.6	2.3	< 1.0	53.5	42.0	42.0	28.2
11/07/01	18/07/01	4.7	24.8	8.9	10.4	71.2	15.7	4.0	87.0	2.1	< 1.0	16.2	20.0	20.0	35.0
18/07/01	25/07/01	4.6	30.1	14.4	3.4	43.3	10.7	9.7	50.2	1.6	< 1.0	24.9	21.0	21.0	5.8
25/07/01	01/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01/08/01	08/08/01	5.7	48.1	40.4	35.9	64.5	17.4	38.5	75.6	2.2	< 1.0	40.3	23.0	23.0	2.4
08/08/01	15/08/01	5.7	17.5	7.5	2.7	39.5	8.4	16.2	45.5	2.1	< 1.0	12.7	11.0	11.0	3.6
15/08/01	22/08/01	4.9	26.2	20.0	22.4	32.5	7.4	8.4	36.1	< .5	< 1.0	22.3	17.0	17.0	29.1
22/08/01	28/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3
28/08/01	05/09/01	5.0	60.1	44.0	42.0	115.3	27.5	32.0	125.7	4.2	< 1.0	46.2	35.0	35.0	2.3
05/09/01	12/09/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4
12/09/01	18/09/01	6.1	26.2	5.7	19.7	151.2	30.1	9.5	177.0	2.9	< 1.0	8.0	29.0	29.0	10.0
18/09/01	25/09/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3
25/09/01	03/10/01	4.8	19.4	11.2	8.0	61.1	13.6	5.9	69.4	1.4	< 1.0	12.0	17.0	17.0	65.0
03/10/01	10/10/01	4.9	31.3	5.9	24.5	152.1	32.9	9.0	181.9	7.7	3.2	13.0	33.0	33.0	59.8
10/10/01	17/10/01	4.7	105.5	66.4	68.2	133.7	34.6	56.1	146.7	4.2	5.5	89.4	< 10.0	< 10.0	2.0
17/10/01	24/10/01	4.8	27.7	16.8	18.0	86.6	18.8	6.8	98.6	2.0	< 1.0	17.2	23.0	23.0	50.7
24/10/01	31/10/01	4.7	20.8	10.7	4.2	68.7	14.4	3.4	79.3	1.5	< 1.0	12.6	19.0	19.0	41.8
31/10/01	07/11/01	5.1	63.2	20.2	37.3	227.0	50.6	27.7	270.1	5.5	< 1.0	35.9	49.0	49.0	2.5
07/11/01	21/11/01	5.6	68.8	9.3	18.9	433.1	95.1	23.5	513.6	11.1	< 1.0	16.6	75.0	75.0	5.2
21/11/01	05/12/01	4.9	15.2	10.6	4.2	80.4	15.6	5.7	95.1	1.8	< 1.0	5.5	19.0	19.0	59.0
05/12/01	19/12/01	4.3	90.4	174.1	124.3	219.7	46.6	18.6	232.5	5.8	< 1.0	63.9	75.0	75.0	3.5
19/12/01	02/01/02	5.8	34.3	9.1	26.8	144.8	30.0	8.0	175.5	6.3	16.3	16.9	29.0	29.0	15.7

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5008	30.3	20.4	19.4	91.0	20.3	7.9	107.7	2.6	-	19.4	22.9	26.8	1025.3

Barcombe Mills

2001

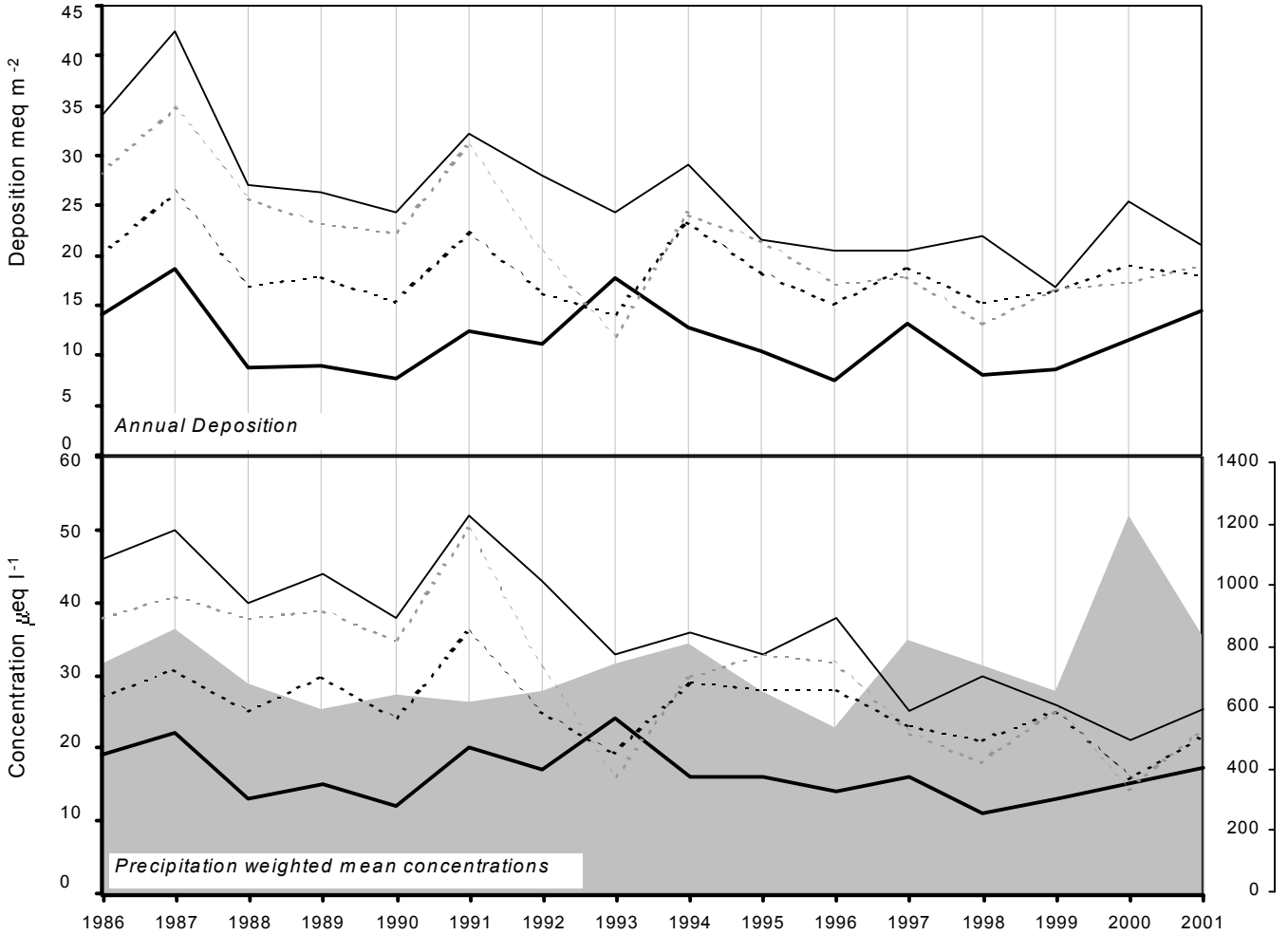
Site Code:	**5007**
Easting:	**5437**
Northing:	**1149**
Latitude:	**50 54 54 N**
Longitude:	**00 02 40 E**
Altitude (m):	**10**
Rainfall (mm):	**876**

[30 year mean 1940 - 1971]

Site Environment:
Water pumping site

Other measurements:
DT, Daily SO2, Daily SO4, HNO3 Denuder, EMEP

Site Operator:
South East Water plc



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration
(+x = increase; -x = decrease)

hydrogen ion
-0.25 ueq/l (-1.37 %/year): 15 years' data
\- No significant trend detected

non-marine sulphate
-1.70 ueq/l (-3.47 %/year): 16 years' data
+++ Strong trend detected

nitrate
-0.57 ueq/l (-1.92 %/year): 16 years' data
\+ Significant trend detected

ammonium
-1.56 ueq/l (-3.71 %/year): 16 years' data
++ Moderately strong trend detected

ACID DEPOSITION DATA REPORT, 2001

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
02/01/01	09/01/01	4.7	20.4	10.0	8.0	80.3	18.1	5.3	96.6	2.5	< 1.0	10.8	21.0	21.0	50.3
09/01/01	16/01/01	4.2	44.7	66.8	42.0	90.4	20.2	12.0	103.6	5.8	< 1.0	33.8	41.0	41.0	3.8
16/01/01	24/01/01	4.8	31.9	20.2	24.1	86.7	19.3	6.9	102.5	2.5	< 1.0	21.5	27.0	27.0	26.5
24/01/01	30/01/01	5.1	25.9	11.1	9.6	129.8	28.9	9.9	159.6	5.2	< 1.0	10.3	29.0	29.0	36.3
30/01/01	06/02/01	4.7	28.8	26.4	15.7	92.3	21.0	7.1	110.2	2.4	< 1.0	17.7	30.0	30.0	31.7
06/02/01	13/02/01	4.6	23.3	14.1	10.8	58.8	14.0	6.9	75.4	1.6	< 1.0	16.2	20.0	20.0	56.6
13/02/01	20/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20/02/01	27/02/01	5.4	82.4	33.0	54.8	329.0	73.4	31.0	411.8	9.4	< 1.0	42.8	71.0	71.0	10.4
27/02/01	06/03/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06/03/01	13/03/01	5.3	21.4	14.0	19.7	71.4	15.8	6.1	97.7	2.5	< 1.0	12.8	19.0	19.0	46.4
13/03/01	20/03/01	4.3	44.0	69.1	62.5	32.8	7.6	13.4	33.9	2.9	< 1.0	40.1	34.0	34.0	21.1
20/03/01	27/03/01	4.5	23.7	25.4	16.1	41.3	9.5	4.7	46.8	1.8	< 1.0	18.7	21.0	21.0	42.4
27/03/01	03/04/01	5.1	36.6	20.4	28.2	99.0	22.9	10.1	118.3	5.6	< 1.0	24.7	27.0	27.0	17.8
03/04/01	10/04/01	5.1	28.4	10.3	19.3	107.0	24.4	8.5	132.8	7.0	< 1.0	15.5	27.0	27.0	35.9
10/04/01	17/04/01	6.4	31.1	28.8	46.4	67.1	6.8	17.6	66.8	9.1	< 1.0	23.0	20.0	20.0	4.5
17/04/01	24/04/01	6.7	73.1	62.7	72.9	144.6	15.0	40.7	139.3	28.8	< 1.0	55.7	42.0	42.0	5.5
24/04/01	02/05/01	4.8	32.4	28.0	27.4	52.9	13.4	13.9	64.6	5.9	< 1.0	26.0	21.0	21.0	23.9
02/05/01	08/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08/05/01	15/05/01	6.5	68.9	89.9	122.0	35.3	13.1	51.5	42.0	14.8	5.0	64.7	35.0	35.0	9.6
15/05/01	22/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5
22/05/01	29/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29/05/01	05/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/06/01	12/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5
12/06/01	19/06/01	6.1	51.9	42.7	75.1	66.3	13.7	20.9	72.1	6.8	< 1.0	43.9	27.0	27.0	6.9
19/06/01	26/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26/06/01	03/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
03/07/01	10/07/01	4.2	66.3	93.8	85.4	7.6	3.8	21.5	8.0	2.7	< 1.0	65.4	42.0	42.0	15.4
10/07/01	17/07/01	4.8	40.3	28.1	23.4	86.8	21.8	18.1	105.6	4.4	< 1.0	29.8	29.0	29.0	22.2
17/07/01	24/07/01	4.8	18.7	10.3	12.4	30.5	6.9	3.6	35.6	1.0	< 1.0	15.0	13.0	13.0	27.3
24/07/01	31/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31/07/01	07/08/01	5.2	35.0	23.5	27.8	41.9	11.0	22.6	49.1	3.0	< 1.0	29.9	19.0	19.0	26.7
07/08/01	14/08/01	4.5	27.4	13.1	13.4	81.8	19.0	8.1	96.6	3.3	< 1.0	17.5	27.0	27.0	20.1
14/08/01	21/08/01	4.8	28.3	19.5	22.6	39.2	9.1	11.0	45.6	1.9	< 1.0	23.6	18.0	18.0	22.7
21/08/01	28/08/01	5.6	59.9	53.6	75.9	5.8	5.0	40.1	6.7	2.5	< 1.0	59.2	21.0	21.0	9.8
28/08/01	11/09/01	5.2	39.0	35.3	42.1	15.7	6.0	25.0	18.8	3.0	< 1.0	37.1	17.0	17.0	11.3
11/09/01	18/09/01	4.7	35.4	19.1	20.1	39.9	11.7	18.1	48.2	5.5	< 1.0	30.6	20.0	20.0	13.9
18/09/01	25/09/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9
25/09/01	02/10/01	4.6	34.9	16.5	20.3	51.2	11.9	9.6	60.3	2.0	< 1.0	28.7	21.0	21.0	90.0
02/10/01	09/10/01	5.6	75.9	5.9	3.6	466.9	109.1	49.2	568.5	14.8	< 1.0	19.6	84.0	84.0	42.6
09/10/01	16/10/01	6.4	138.0	< .7	0.9	182.7	64.1	132.3	289.2	161.4	< 1.0	116.0	72.0	72.0	11.2
16/10/01	23/10/01	4.6	30.4	29.6	24.1	34.4	8.8	11.1	39.2	3.5	< 1.0	26.2	21.0	21.0	28.9
23/10/01	30/10/01	5.0	46.5	18.0	18.6	179.4	40.5	18.8	213.2	6.9	< 1.0	24.9	40.0	40.0	9.0
30/10/01	06/11/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3
06/11/01	13/11/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7
13/11/01	20/11/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5
20/11/01	04/12/01	4.9	9.8	3.5	3.6	48.8	6.9	2.2	44.0	2.6	< 1.0	3.9	10.0	10.0	30.8
04/12/01	11/12/01	6.2	178.3	15.2	13.7	152.9	46.9	153.2	176.0	5.0	< 1.0	159.9	49.0	49.0	5.1
11/12/01	18/12/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18/12/01	02/01/02	5.6	46.5	17.1	36.5	93.1	23.7	17.3	118.2	6.3	< 1.0	35.3	27.0	27.0	11.4

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5007	36.3	21.6	22.9	91.1	21.3	15.8	110.7	6.3	-	25.3	17.4	27.7	834.0

Compton

2001

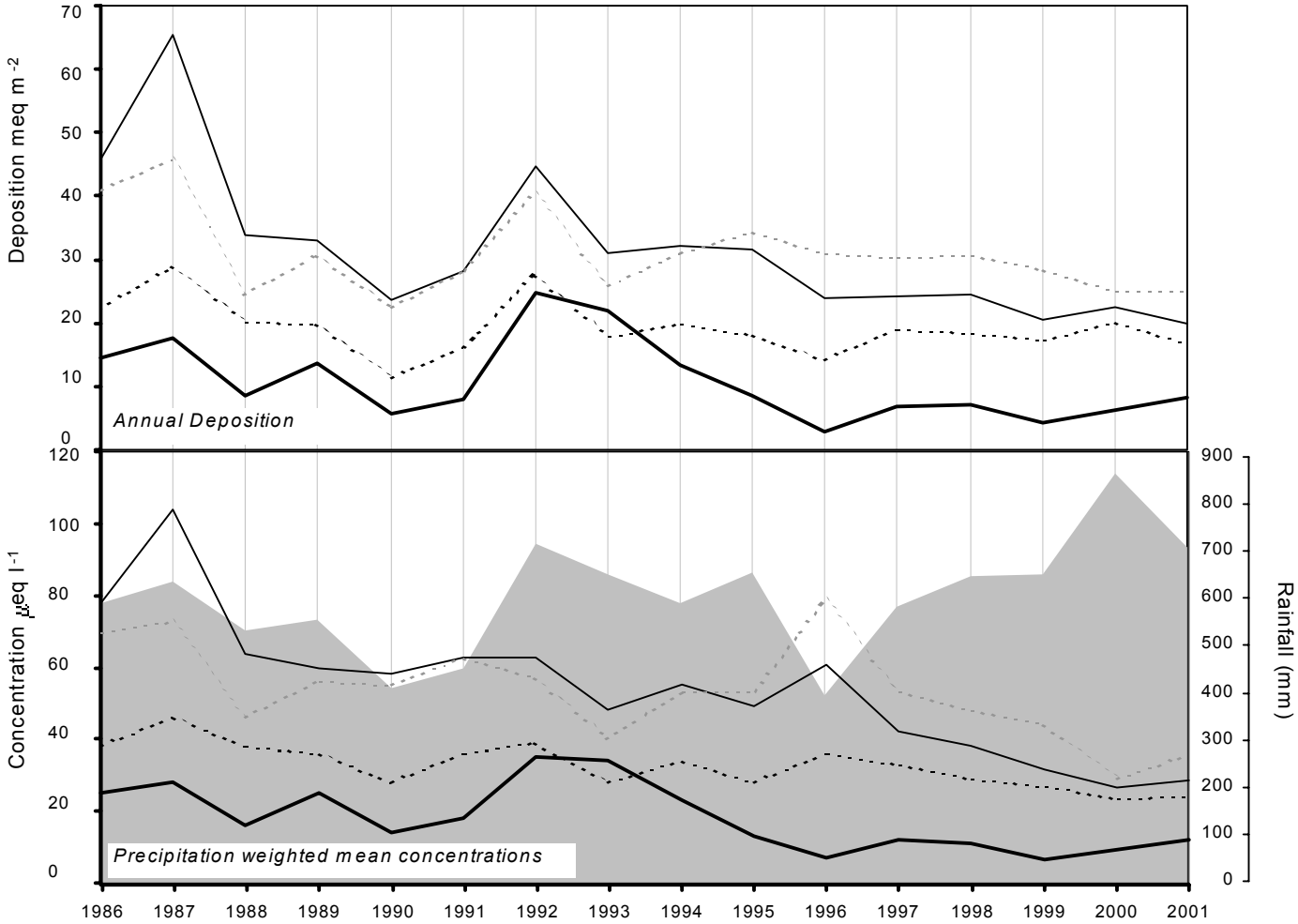
Site Code:	**5129**
Easting:	**4512**
Northing:	**1804**
Latitude:	**51 31 11 N**
Longitude:	**01 15 43 W**
Altitude (m):	**105**
Rainfall (mm):	**707**

[30 year mean 1940 - 1971]

Site Environment:
Rough meadow, near pumping station

Other measurements:
DT

Site Operator:
AEA Technology plc



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-1.17 ueq/l (-4.36 %/year): 15 years' data
\+ Significant trend detected

non-marine sulphate
-3.62 ueq/l (-4.44 %/year): 16 years' data
++++ Very strong trend detected

nitrate
-0.99 ueq/l (-2.47 %/year): 16 years' data
++ Moderately strong trend detected

ammonium
-1.63 ueq/l (-2.48 %/year): 16 years' data
\+ Significant trend detected

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
02/01/01	10/01/01	4.7	19.2	10.2	15.6	40.5	9.0	4.6	49.5	1.2	< 1.0	14.3	14.0	14.0	14.4
10/01/01	15/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15/01/01	06/02/01	5.0	25.9	18.1	25.0	45.8	10.3	9.1	59.4	1.1	< 1.0	20.4	19.0	19.0	78.4
06/02/01	12/02/01	4.5	52.1	40.5	34.1	121.4	28.7	19.7	147.5	3.1	< 1.0	37.4	39.0	39.0	16.3
12/02/01	19/02/01	5.0	33.5	11.1	24.4	13.6	3.1	9.9	20.9	0.9	< 1.0	31.9	14.0	14.0	17.6
19/02/01	26/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26/02/01	05/03/01	4.8	35.7	45.8	58.5	35.6	7.3	10.0	47.4	2.1	< 1.0	31.4	24.0	24.0	10.3
05/03/01	12/03/01	5.6	22.0	20.7	40.8	31.4	5.7	6.4	36.5	1.3	< 1.0	18.2	15.0	15.0	32.8
12/03/01	19/03/01	4.3	50.1	64.3	73.6	27.5	6.4	8.8	34.5	1.1	< 1.0	46.8	33.0	33.0	14.7
19/03/01	26/03/01	4.4	39.3	42.9	38.4	40.7	9.7	16.1	47.5	1.2	< 1.0	34.4	29.0	29.0	26.5
26/03/01	02/04/01	5.3	22.8	19.4	30.9	21.2	5.0	7.7	25.9	0.8	< 1.0	20.2	12.0	12.0	16.5
02/04/01	19/04/01	5.8	30.7	19.6	41.5	41.6	9.2	12.6	50.8	1.5	< 1.0	25.7	17.0	17.0	43.8
19/04/01	23/04/01	5.9	82.2	56.9	101.2	64.7	16.8	46.2	76.7	6.2	< 1.0	74.4	36.0	36.0	7.4
23/04/01	30/04/01	5.0	52.3	29.8	50.2	55.8	14.3	16.2	66.8	3.3	< 1.0	45.6	25.0	25.0	16.3
30/04/01	08/05/01	6.4	68.0	75.6	117.4	10.9	5.0	44.5	15.0	1.5	< 1.0	66.7	26.0	26.0	2.7
08/05/01	14/05/01	6.0	327.5	400.3	456.6	32.5	25.1	270.4	36.6	11.5	< 1.0	323.6	109.0	109.0	1.6
14/05/01	21/05/01	5.0	36.4	29.7	45.8	16.2	4.4	8.0	18.2	1.3	< 1.0	34.4	16.0	16.0	34.5
21/05/01	31/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31/05/01	04/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04/06/01	11/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11/06/01	18/06/01	5.1	26.6	14.3	21.6	23.9	4.7	9.5	23.6	0.8	< 1.0	23.7	13.0	13.0	33.8
18/06/01	25/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25/06/01	02/07/01	7.7	108.6	103.7	77.4	92.2	68.7	807.7	119.0	449.0	56.6	97.5	163.0	163.0	1.2
02/07/01	09/07/01	6.5	93.6	4.9	491.0	13.2	43.3	167.3	18.5	380.3	184.9	92.0	146.0	146.0	22.2
09/07/01	16/07/01	5.9	31.3	18.4	33.9	89.4	18.7	17.1	107.1	2.8	< 1.0	20.5	24.0	24.0	9.6
16/07/01	23/07/01	4.5	36.9	28.1	26.2	19.2	5.3	12.8	21.7	1.4	< 1.0	34.6	19.0	19.0	15.2
23/07/01	29/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29/07/01	06/08/01	5.4	17.1	22.2	24.5	5.5	2.3	16.3	6.2	1.2	< 1.0	16.4	< 10.0	< 10.0	33.6
06/08/01	14/08/01	5.0	15.8	11.3	16.7	13.4	3.0	5.8	14.5	0.8	< 1.0	14.1	< 10.0	< 10.0	42.0
14/08/01	20/08/01	5.6	22.5	21.6	23.8	9.3	3.3	18.9	14.8	1.4	< 1.0	21.4	10.0	10.0	10.2
20/08/01	29/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29/08/01	03/09/01	6.0	55.1	58.7	78.3	16.7	6.6	43.9	17.1	2.6	< 1.0	53.1	24.0	24.0	7.4
03/09/01	10/09/01	6.3	15.8	13.5	39.8	17.4	3.9	14.8	19.4	1.4	< 1.0	13.7	13.0	13.0	9.6
10/09/01	17/09/01	6.0	50.2	29.0	47.8	85.6	18.7	54.4	100.6	3.8	< 1.0	39.9	29.0	29.0	5.2
17/09/01	24/09/01	4.4	106.7	64.4	107.1	25.9	8.6	37.6	33.5	2.7	< 1.0	103.6	40.0	40.0	7.5
24/09/01	02/10/01	4.8	31.5	21.8	35.2	16.6	4.2	8.8	20.4	3.4	< 1.0	29.5	14.0	14.0	32.7
02/10/01	08/10/01	5.2	25.7	5.8	10.1	91.6	20.4	20.5	122.4	18.9	< 1.0	14.7	25.0	25.0	15.4
08/10/01	15/10/01	5.6	45.3	25.9	24.9	64.7	16.7	37.4	78.2	7.0	< 1.0	37.5	23.0	23.0	10.4
15/10/01	22/10/01	4.6	30.8	19.7	27.0	18.1	4.4	6.3	19.4	1.3	< 1.0	28.7	15.0	15.0	21.7
22/10/01	30/10/01	5.0	18.7	11.0	13.3	37.5	7.5	3.4	44.6	1.8	< 1.0	14.2	13.0	13.0	39.5
30/10/01	05/11/01	5.3	61.0	46.9	73.7	103.3	26.5	48.2	130.7	5.9	< 1.0	48.5	36.0	36.0	1.8
05/11/01	19/11/01	5.4	58.1	32.8	56.7	86.4	20.2	25.7	105.3	2.9	< 1.0	47.7	29.0	29.0	10.0
19/11/01	03/12/01	5.3	22.1	13.0	31.0	34.6	4.8	5.1	39.4	1.7	< 1.0	17.9	14.0	14.0	19.6
03/12/01	19/12/01	5.2	58.0	19.0	57.9	59.3	10.6	6.0	70.7	4.2	< 1.0	50.9	24.0	24.0	13.8
19/12/01	02/01/02	5.2	89.7	34.5	96.7	155.9	29.7	22.4	189.6	3.8	< 1.0	70.9	44.0	44.0	4.8

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5129	32.9	24.1	35.7	36.9	8.4	13.1	44.8	2.2	-	28.4	12.0	18.1	701.0

Crai Reservoir

2001

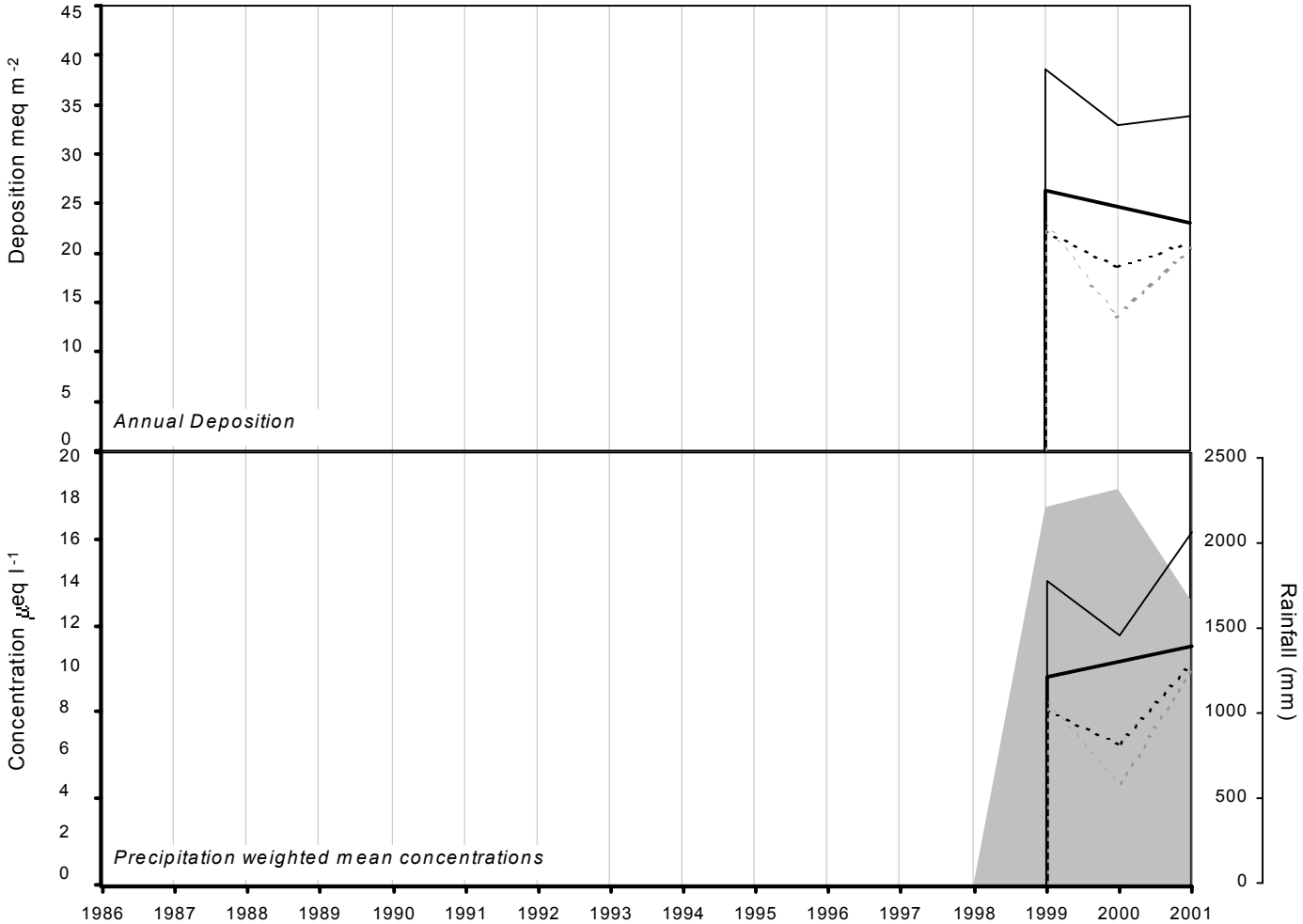
Site Code:	**5154**
Easting:	**2882**
Northing:	**2219**
Latitude:	**51 53 25 N**
Longitude:	**03 37 10 W**
Altitude (m):	**310**
Rainfall (mm):	**-**

[30 year mean 1940 - 1971]

Site Environment:
Bank of Crai Reservoir in valley. Sheep grazing.

Other measurements:
Close to Rural SO2 site (5335)

Site Operator:
Welsh Water plc



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

non-marine sulphate
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

nitrate
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

ammonium
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

ACID DEPOSITION DATA REPORT, 2001

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
12/01/01	02/02/01	5.0	28.8	10.2	9.0	113.1	25.8	8.1	129.1	3.2	< 1.0	15.2	28.0	28.0	89.8
02/02/01	16/02/01	4.9	20.8	6.0	1.3	71.6	16.8	8.3	88.7	1.4	< 1.0	12.2	20.0	20.0	151.1
16/02/01	12/03/01	4.6	28.7	15.0	13.9	90.6	20.8	7.2	109.5	2.5	< 1.0	17.8	26.0	26.0	65.8
12/03/01	26/03/01	4.5	26.0	16.3	7.7	60.8	14.7	4.1	74.8	1.2	< 1.0	18.6	25.0	25.0	73.9
26/03/01	05/04/01	4.7	23.4	13.5	11.7	35.8	8.1	3.7	43.6	1.0	< 1.0	19.1	17.0	17.0	55.8
05/04/01	20/04/01	5.0	26.9	8.2	8.5	109.6	25.2	6.8	133.9	2.2	< 1.0	13.7	26.0	26.0	75.0
20/04/01	27/04/01	4.9	16.9	8.1	8.9	32.1	7.7	4.8	37.6	0.9	< 1.0	13.0	12.0	12.0	48.9
27/04/01	14/05/01	5.4	43.9	37.3	37.6	69.0	15.1	22.2	79.2	8.6	< 1.0	35.6	26.0	26.0	11.4
14/05/01	25/05/01	4.8	21.4	11.8	12.3	30.2	6.6	3.7	37.0	1.2	< 1.0	17.8	14.0	14.0	38.9
25/05/01	08/06/01	4.7	37.3	19.8	23.8	46.8	11.3	13.0	49.5	3.1	< 1.0	31.7	21.0	21.0	13.9
08/06/01	22/06/01	4.8	31.0	20.3	15.6	35.7	10.4	11.1	39.0	6.1	< 1.0	26.7	18.0	18.0	19.5
22/06/01	06/07/01	4.9	47.4	39.8	41.7	42.6	9.4	21.5	43.5	6.8	< 1.0	42.3	24.0	24.0	60.5
06/07/01	20/07/01	4.3	50.8	30.3	31.2	114.0	24.9	9.1	134.0	2.9	< 1.0	37.0	40.0	40.0	52.5
20/07/01	03/08/01	6.6	30.0	16.9	70.5	37.4	6.8	10.8	40.6	5.2	< 1.0	25.5	20.0	20.0	44.3
03/08/01	17/08/01	4.8	20.0	7.1	8.3	25.2	5.6	2.8	29.2	0.5	< 1.0	17.0	13.0	13.0	116.8
17/08/01	14/09/01	5.0	25.6	12.0	16.9	59.7	13.5	7.0	67.4	1.4	< 1.0	18.4	18.0	18.0	76.0
14/09/01	28/09/01	4.6	39.4	28.8	28.5	65.3	15.2	9.0	73.0	1.9	< 1.0	31.5	27.0	27.0	31.7
28/09/01	12/10/01	5.0	27.9	5.7	5.3	128.4	29.2	9.7	153.6	3.2	< 1.0	12.4	28.0	28.0	232.2
12/10/01	26/10/01	4.8	20.3	8.8	7.0	64.2	14.3	5.4	73.8	1.4	< 1.0	12.6	18.0	18.0	119.3
26/10/01	09/11/01	5.2	20.0	5.8	10.8	94.7	20.1	6.9	109.7	1.8	< 1.0	8.6	20.0	20.0	60.9
09/11/01	26/11/01	5.0	14.9	8.1	7.9	37.0	6.2	3.9	41.1	1.0	< 1.0	10.5	12.0	12.0	43.6
26/11/01	07/12/01	6.1	61.8	16.7	< .7	107.5	32.7	117.3	133.8	8.3	< 1.0	48.9	37.0	37.0	143.5
07/12/01	21/12/01	4.7	89.8	92.5	121.7	167.0	38.7	14.8	174.4	4.3	< 1.0	69.6	-	-	3.5
21/12/01	11/01/02	5.1	36.9	15.1	25.4	141.4	28.6	8.3	169.8	4.3	< 1.0	19.9	32.0	32.0	30.1

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5154	29.9	12.7	12.4	79.2	18.6	17.2	94.0	2.9	-	20.4	13.9	23.5	1658.9

Flatford Mill

2001

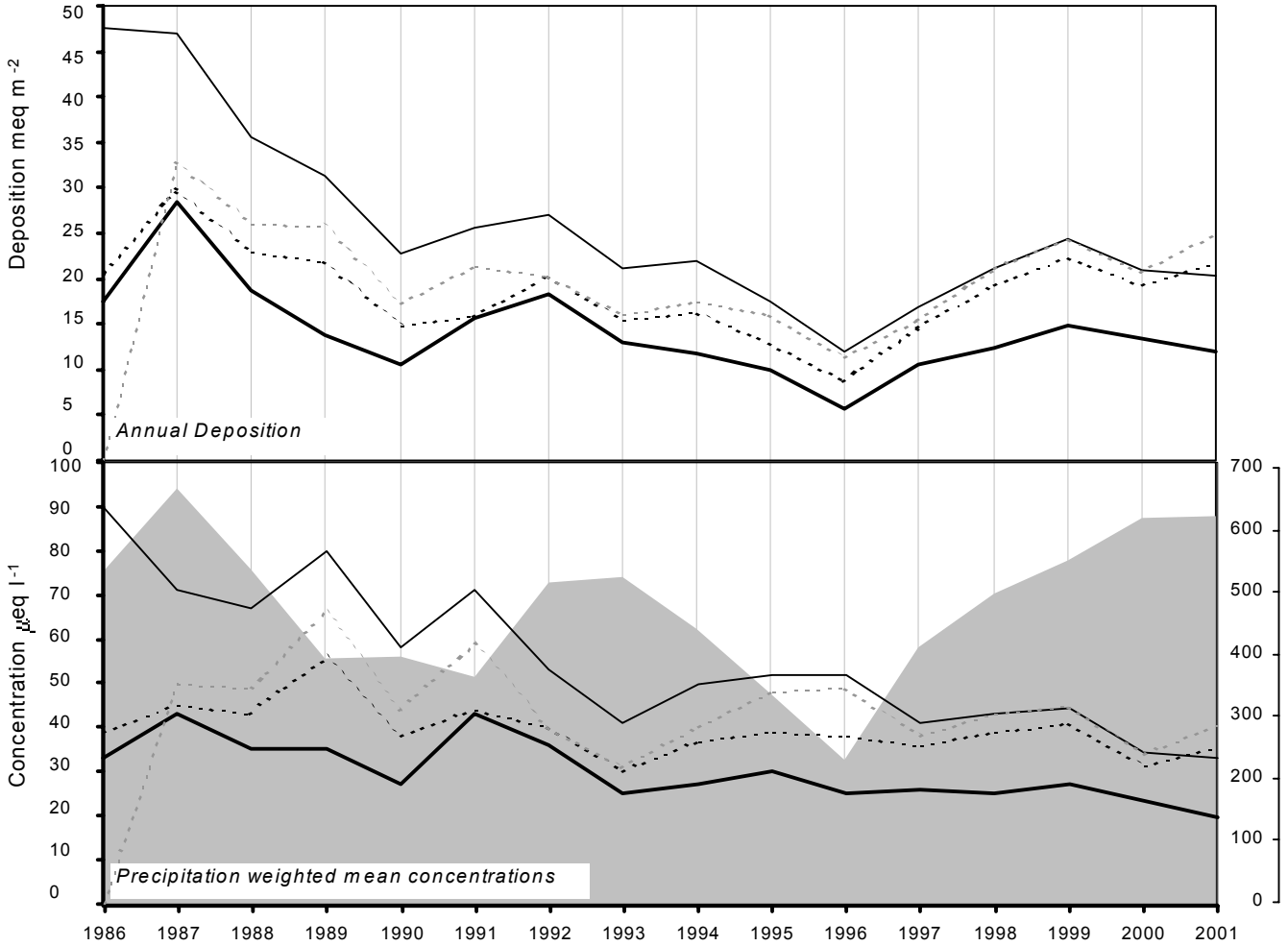
Site Code:	**5024**
Easting:	**6077**
Northing:	**2333**
Latitude:	**51 57 32 N**
Longitude:	**01 01 24 E**
Altitude (m):	**5**
Rainfall (mm):	**599**

[30 year mean 1940 - 1971]

Site Environment:
Open meadow near River Stour

Other measurements:
DT

Site Operator:
Field Studies Council



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-1.11 ueq/l (-2.90 %/year): 15 years' data
++ Moderately strong trend detected

non-marine sulphate
-3.12 ueq/l (-3.98 %/year): 16 years' data
++++ Very strong trend detected

nitrate
-0.65 ueq/l (-1.47 %/year): 16 years' data
+ Significant trend detected

ammonium
-1.05 ueq/l (-1.97 %/year): 15 years' data
+ Significant trend detected

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
03/01/01	10/01/01	4.7	20.9	17.3	9.3	49.2	11.7	5.6	58.7	2.3	< 1.0	15.0	20.0	20.0	16.8
10/01/01	17/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17/01/01	24/01/01	4.4	54.3	58.1	57.2	85.3	19.5	11.2	108.4	3.3	< 1.0	44.0	43.0	43.0	12.2
24/01/01	31/01/01	4.5	26.6	35.8	17.9	48.2	11.3	6.6	59.0	1.6	< 1.0	20.8	27.0	27.0	12.3
31/01/01	07/02/01	4.4	24.6	21.9	13.0	43.1	9.9	5.1	52.5	1.4	< 1.0	19.4	22.0	22.0	30.1
07/02/01	14/02/01	4.6	12.4	10.1	6.5	10.6	2.4	3.4	12.5	< .5	< 1.0	11.1	10.0	10.0	33.5
14/02/01	21/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21/02/01	28/02/01	4.5	58.8	67.1	83.0	83.9	18.4	18.0	107.8	3.0	< 1.0	48.7	40.0	40.0	12.7
28/02/01	07/03/01	4.4	36.0	54.8	44.9	44.0	10.0	7.5	53.1	1.7	< 1.0	30.7	31.0	31.0	15.8
07/03/01	16/03/01	4.5	26.7	39.9	28.5	24.5	6.1	8.0	27.8	1.9	< 1.0	23.7	22.0	22.0	8.7
16/03/01	21/03/01	4.3	56.8	74.6	62.1	141.4	33.2	12.1	168.0	3.7	< 1.0	39.8	54.0	54.0	12.1
21/03/01	28/03/01	4.4	52.6	52.6	43.2	91.7	21.7	12.6	102.4	3.0	< 1.0	41.6	39.0	39.0	10.7
28/03/01	04/04/01	4.7	40.8	33.6	42.2	39.4	10.1	11.5	48.3	2.8	< 1.0	36.0	23.0	23.0	13.0
04/04/01	11/04/01	4.7	47.1	33.3	43.5	60.3	13.5	11.9	71.5	2.8	< 1.0	39.8	29.0	29.0	10.7
11/04/01	18/04/01	6.0	110.7	70.3	163.1	85.0	21.2	26.8	119.9	3.0	< 1.0	100.5	46.0	46.0	4.0
18/04/01	25/04/01	5.5	72.9	57.5	86.5	145.4	34.2	23.7	169.9	4.5	< 1.0	55.4	44.0	44.0	6.1
25/04/01	02/05/01	4.9	43.7	29.9	48.1	34.0	8.9	12.3	39.0	1.5	< 1.0	39.6	21.0	21.0	16.8
02/05/01	09/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	3.9
09/05/01	16/05/01	5.1	55.3	68.6	101.9	10.3	3.9	13.6	9.5	2.0	< 1.0	54.0	24.0	24.0	27.4
16/05/01	23/05/01	5.1	35.7	24.9	41.7	23.6	6.3	10.1	27.1	2.2	< 1.0	32.9	15.0	15.0	4.7
23/05/01	30/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30/05/01	06/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3
06/06/01	13/06/01	5.9	108.9	118.7	136.6	61.7	20.6	80.3	71.6	6.8	< 1.0	101.4	42.0	42.0	2.5
13/06/01	20/06/01	4.8	26.3	23.4	24.0	21.8	5.7	8.6	25.0	2.3	< 1.0	23.7	15.0	15.0	23.3
20/06/01	27/06/01	5.8	101.7	146.3	111.1	29.0	20.3	121.5	27.8	11.7	< 1.0	98.2	44.0	44.0	3.4
27/06/01	04/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5
04/07/01	11/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	11.7
11/07/01	18/07/01	5.0	38.6	37.2	43.8	57.2	14.1	16.7	72.2	2.4	< 1.0	31.7	23.0	23.0	24.5
18/07/01	24/07/01	5.4	25.3	24.7	33.6	24.1	5.9	6.6	25.4	2.1	2.4	22.4	14.0	14.0	9.7
24/07/01	01/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01/08/01	08/08/01	4.9	34.6	31.3	31.9	12.5	4.7	19.8	13.6	1.7	< 1.0	33.1	16.0	16.0	19.2
08/08/01	15/08/01	4.8	19.7	19.5	28.4	7.3	2.3	5.5	8.0	0.7	< 1.0	18.8	11.0	11.0	44.9
15/08/01	21/08/01	4.9	51.4	40.5	48.5	19.8	6.6	24.4	24.8	2.9	9.6	49.0	23.0	23.0	18.8
21/08/01	28/08/01	5.1	47.5	49.3	59.6	7.3	4.2	23.0	8.4	3.0	< 1.0	46.6	19.0	19.0	11.6
28/08/01	04/09/01	4.3	62.8	82.8	53.8	17.8	6.3	24.1	17.7	2.9	< 1.0	60.7	47.0	47.0	5.1
04/09/01	11/09/01	5.4	30.1	19.3	33.0	23.1	6.6	18.6	26.4	2.4	< 1.0	27.3	14.0	14.0	7.3
11/09/01	18/09/01	5.1	33.7	18.3	34.9	50.9	11.1	11.3	56.5	2.1	< 1.0	27.6	18.0	18.0	37.2
18/09/01	25/09/01	4.7	19.2	19.8	20.2	30.7	6.8	3.9	34.1	1.2	< 1.0	15.5	14.0	14.0	17.2
25/09/01	02/10/01	4.7	29.2	19.9	20.0	22.8	4.3	6.6	25.6	2.0	< 1.0	26.5	16.0	16.0	18.4
02/10/01	09/10/01	5.7	68.1	13.5	33.3	228.7	48.7	50.3	274.9	36.9	4.4	40.6	50.0	50.0	9.0
09/10/01	16/10/01	5.6	74.7	59.8	28.5	30.7	15.9	96.5	32.2	5.9	8.1	71.0	24.0	24.0	4.2
16/10/01	23/10/01	4.7	34.5	42.0	47.3	10.5	3.1	9.2	11.5	1.7	< 1.0	33.2	19.0	19.0	27.4
23/10/01	30/10/01	5.2	34.1	20.3	23.5	56.9	12.8	13.3	68.6	4.2	< 1.0	27.2	19.0	19.0	6.3
30/10/01	13/11/01	5.3	45.5	13.9	19.8	228.1	50.3	18.7	281.4	5.1	< 1.0	18.1	44.0	44.0	17.7
13/11/01	27/11/01	4.3	83.3	78.3	84.3	89.2	27.4	19.1	103.4	3.0	< 1.0	72.6	49.0	49.0	8.9
27/11/01	10/12/01	4.8	21.7	18.0	20.4	25.3	4.2	1.6	30.0	1.8	< 1.0	18.7	16.0	16.0	17.8
10/12/01	24/12/01	4.9	106.8	61.3	99.1	277.1	53.6	22.5	305.2	6.8	< 1.0	73.4	68.0	68.0	5.3
24/12/01	15/01/02	4.4	74.4	71.5	75.5	76.8	14.8	11.5	98.4	3.9	< 1.0	65.2	46.0	46.0	11.5

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5024	38.8	35.4	40.6	48.6	11.6	13.2	57.8	2.8	-	32.9	19.6	24.2	615.2

Woburn

2001

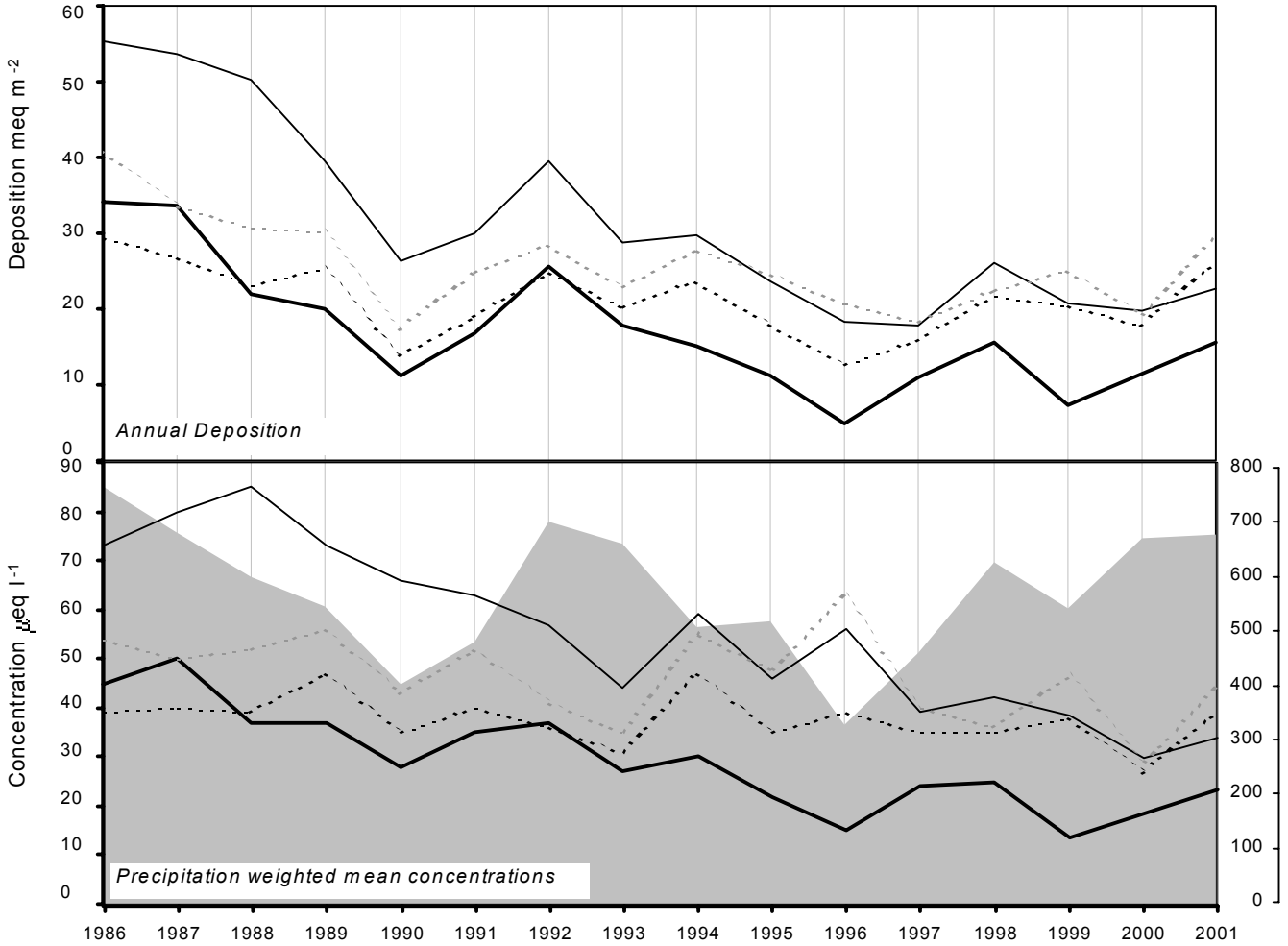
Site Code:	**5127**
Easting:	**4964**
Northing:	**2361**
Latitude:	**52 00 52 N**
Longitude:	**00 35 43 W**
Altitude (m):	**89**
Rainfall (mm):	**646**

[30 year mean 1940 - 1971]

Site Environment:
Pasture

Other measurements:
DT, Weekly SO2, Met

Site Operator:
Rothamsted Experimental Station



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-1.90 ueq/l (-4.39 %/year): 15 years' data
+++ Strong trend detected

non-marine sulphate
-3.34 ueq/l (-4.16 %/year): 16 years' data
++++ Very strong trend detected

nitrate
-0.41 ueq/l (-1.00 %/year): 16 years' data
- No significant trend detected

ammonium
-0.86 ueq/l (-1.63 %/year): 16 years' data
- No significant trend detected

AEA Technology
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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
02/01/01	09/01/01	4.9	14.4	12.8	8.4	31.5	7.5	3.4	38.0	0.9	< 1.0	10.6	13.0	13.0	11.7
09/01/01	16/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16/01/01	23/01/01	4.2	60.8	75.6	60.4	79.0	13.5	17.9	109.7	3.0	< 1.0	51.2	50.0	50.0	8.7
23/01/01	30/01/01	4.6	16.8	13.0	8.1	46.4	9.7	4.3	56.1	1.8	< 1.0	11.2	17.0	17.0	22.5
30/01/01	06/02/01	4.5	21.0	22.9	14.1	28.0	5.9	3.9	35.2	0.6	< 1.0	17.6	20.0	20.0	26.2
06/02/01	13/02/01	4.5	27.3	19.2	14.2	35.6	8.1	6.1	40.8	0.9	< 1.0	23.0	20.0	20.0	30.2
13/02/01	21/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2
21/02/01	27/02/01	5.3	34.8	30.1	37.5	68.1	8.4	19.6	77.0	1.2	< 1.0	26.6	22.0	22.0	6.8
27/02/01	07/03/01	4.7	73.5	85.6	98.3	163.2	20.6	26.8	166.2	2.6	< 1.0	53.9	52.0	52.0	7.5
07/03/01	13/03/01	5.0	43.3	223.3	227.7	40.5	17.4	9.9	63.2	1.5	< 1.0	38.4	49.0	49.0	18.2
13/03/01	27/03/01	4.3	42.6	62.6	46.9	37.2	8.7	7.4	45.5	1.1	< 1.0	38.1	36.0	36.0	49.3
27/03/01	03/04/01	4.8	39.8	37.5	42.9	29.3	7.7	12.1	36.8	1.0	< 1.0	36.3	21.0	21.0	10.2
03/04/01	10/04/01	5.2	22.6	13.4	21.9	38.0	8.9	6.2	53.4	1.2	< 1.0	18.1	15.0	15.0	23.5
10/04/01	17/04/01	6.1	53.8	31.3	74.1	30.9	8.5	18.9	37.3	1.4	< 1.0	50.1	22.0	22.0	6.9
17/04/01	24/04/01	5.0	54.3	38.7	60.6	28.2	7.8	18.2	35.7	0.9	< 1.0	50.9	22.0	22.0	16.9
24/04/01	02/05/01	5.1	38.2	31.2	46.3	28.5	7.0	9.5	33.6	1.3	< 1.0	34.8	19.0	19.0	10.6
02/05/01	08/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
08/05/01	15/05/01	4.8	84.5	91.2	116.1	11.6	8.1	43.9	10.8	2.4	< 1.0	83.1	33.0	33.0	19.2
15/05/01	22/05/01	4.7	33.5	38.0	52.4	10.3	2.6	4.9	11.6	< .5	< 1.0	32.3	17.0	17.0	22.5
22/05/01	29/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29/05/01	05/06/01	6.0	181.2	121.7	118.5	104.2	33.5	157.2	99.6	21.8	< 1.0	168.7	60.0	60.0	1.6
05/06/01	12/06/01	6.6	92.9	56.0	117.9	52.3	14.9	52.9	60.4	3.6	< 1.0	86.6	35.0	35.0	4.0
12/06/01	19/06/01	4.8	29.5	27.8	29.6	10.0	4.0	15.0	12.9	1.8	< 1.0	28.3	15.0	15.0	14.8
19/06/01	26/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26/06/01	03/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
03/07/01	10/07/01	4.6	59.5	62.5	82.2	8.6	5.0	30.1	9.5	2.0	< 1.0	58.5	28.0	28.0	17.8
10/07/01	17/07/01	4.8	44.1	28.3	47.2	28.3	7.8	12.9	33.7	1.4	< 1.0	40.7	19.0	19.0	27.8
17/07/01	25/07/01	4.5	23.6	23.6	21.9	11.4	3.1	5.9	12.3	0.6	< 1.0	22.3	16.0	16.0	29.1
25/07/01	01/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01/08/01	07/08/01	5.8	33.2	42.4	41.7	27.9	6.0	33.5	13.5	2.8	< 1.0	29.9	16.0	16.0	14.2
07/08/01	14/08/01	4.5	30.1	26.6	28.1	12.7	3.7	8.2	14.1	0.9	< 1.0	28.5	17.0	17.0	42.0
14/08/01	21/08/01	5.2	33.8	31.3	47.2	12.8	4.1	14.2	12.5	1.5	< 1.0	32.3	14.0	14.0	14.8
21/08/01	28/08/01	5.3	215.3	436.4	497.1	27.5	18.1	143.8	25.9	13.3	10.3	212.0	100.0	100.0	2.2
28/08/01	04/09/01	4.7	103.8	87.9	111.6	21.0	8.3	44.2	25.2	3.1	< 1.0	101.3	39.0	39.0	9.5
04/09/01	11/09/01	6.0	13.2	9.6	21.9	21.4	5.3	18.1	13.5	1.4	< 1.0	10.7	11.0	11.0	6.5
11/09/01	25/09/01	4.2	78.0	55.5	66.4	48.9	12.8	18.4	58.9	2.4	< 1.0	72.1	39.0	39.0	21.5
25/09/01	05/10/01	4.7	21.8	17.6	19.2	19.1	4.4	5.9	21.3	0.9	< 1.0	19.5	13.0	13.0	30.1
05/10/01	10/10/01	5.3	13.9	7.0	10.4	50.1	10.3	6.0	60.8	1.3	< 1.0	7.9	13.0	13.0	11.0
10/10/01	16/10/01	4.9	42.4	33.1	21.3	17.4	8.0	39.5	19.3	1.4	< 1.0	40.3	16.0	16.0	8.1
16/10/01	23/10/01	4.4	28.8	31.7	22.7	7.0	2.2	4.3	7.6	0.6	< 1.0	28.0	19.0	19.0	44.7
23/10/01	30/10/01	5.0	22.0	10.8	16.8	45.0	9.7	4.7	53.8	1.1	< 1.0	16.6	15.0	15.0	21.2
30/10/01	06/11/01	5.0	139.2	86.1	119.7	311.2	66.9	73.7	346.9	12.2	< 1.0	101.8	-	-	0.9
06/11/01	13/11/01	5.1	25.3	18.2	30.5	37.4	8.4	7.5	45.0	1.3	< 1.0	20.8	15.0	15.0	20.5
13/11/01	21/11/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5
21/11/01	04/12/01	4.9	23.9	13.2	23.4	27.5	6.7	4.9	32.5	0.7	< 1.0	20.6	13.0	13.0	25.4
04/12/01	19/12/01	4.8	61.8	42.9	65.4	86.7	16.7	16.1	101.6	1.9	< 1.0	51.3	34.0	34.0	4.3
19/12/01	02/01/02	4.9	91.2	46.5	91.9	151.0	29.4	18.3	180.9	3.4	< 1.0	73.0	47.0	47.0	5.0

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5127	37.7	39.3	44.1	30.8	7.6	12.5	36.4	1.4	-	34.0	23.3	22.3	669.8

Tycanol Wood

2001

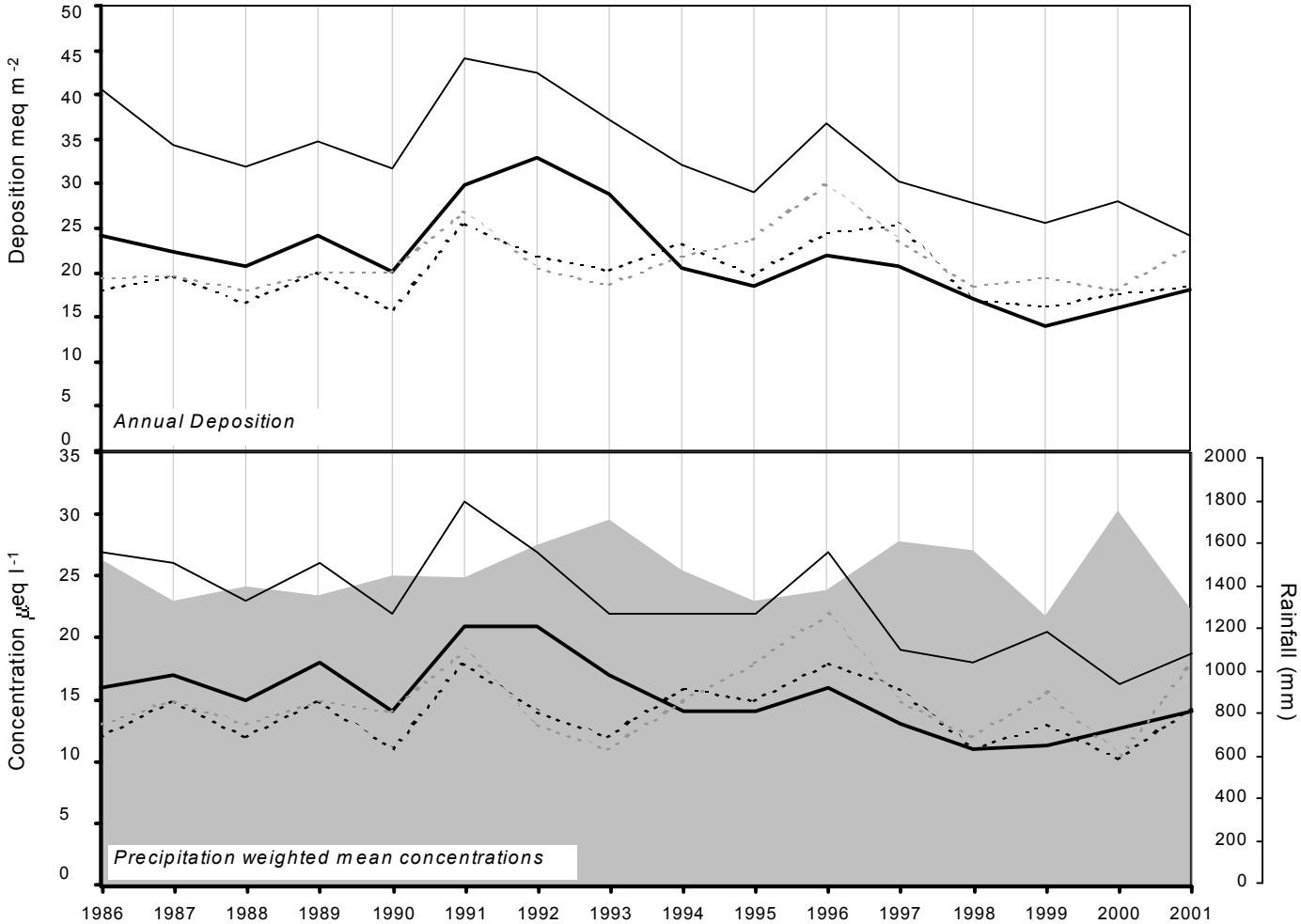
Site Code:	**5123**
Easting:	**2093**
Northing:	**2364**
Latitude:	**51 59 34 N**
Longitude:	**04 46 41 W**
Altitude (m):	**205**
Rainfall (mm):	**1847**

[30 year mean 1940 - 1971]

Site Environment:
Open moorland

Other measurements:
DT

Site Operator:
Countryside Council for Wales



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-0.35 ueq/l (-1.95 %/year): 15 years' data
\+ Significant trend detected

non-marine sulphate
-0.60 ueq/l (-2.18 %/year): 16 years' data
++ Moderately strong trend detected

nitrate
-0.01 ueq/l (-0.10 %/year): 16 years' data
\- No significant trend detected

ammonium
0.08 ueq/l (0.59 %/year): 16 years' data
\- No significant trend detected

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
03/01/01	10/01/01	4.9	34.0	10.4	18.1	127.8	28.3	8.1	155.3	3.0	< 1.0	18.6	30.0	30.0	9.5
10/01/01	17/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17/01/01	24/01/01	4.8	32.9	18.6	20.1	120.6	26.9	7.7	148.4	2.8	< 1.0	18.4	30.0	30.0	66.5
24/01/01	31/01/01	5.2	43.2	5.3	15.2	251.9	55.9	11.9	312.9	5.0	< 1.0	12.9	49.0	49.0	17.4
31/01/01	07/02/01	5.0	22.5	5.8	2.5	109.0	24.4	7.9	126.2	3.4	< 1.0	9.3	25.0	25.0	62.3
07/02/01	14/02/01	4.8	27.2	9.9	8.0	82.0	18.0	7.8	97.2	1.9	< 1.0	17.3	23.0	23.0	56.9
14/02/01	21/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21/02/01	27/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	319.2
Sample collection affected by Foot and Mouth Precautions 21/2/01 to 27/6/01															-
27/06/01	03/07/01	4.6	48.9	9.7	8.0	165.2	35.8	8.6	183.4	3.3	< 1.0	29.0	39.0	39.0	6.3
03/07/01	11/07/01	4.4	70.3	70.5	90.3	38.7	10.2	16.7	45.1	1.7	< 1.0	65.7	37.0	37.0	42.4
11/07/01	18/07/01	5.0	25.1	13.2	15.8	56.3	12.7	10.6	68.4	1.6	< 1.0	18.3	17.0	17.0	18.7
18/07/01	25/07/01	4.9	26.1	10.6	7.3	72.3	16.1	6.3	86.7	1.6	< 1.0	17.4	21.0	21.0	18.8
25/07/01	01/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1
01/08/01	08/08/01	4.8	28.7	13.2	15.5	46.8	11.2	10.1	53.4	1.3	< 1.0	23.1	19.0	19.0	25.9
08/08/01	15/08/01	4.8	21.0	7.0	6.4	33.6	7.3	3.5	39.4	1.3	< 1.0	16.9	14.0	14.0	62.2
15/08/01	22/08/01	4.6	34.1	13.3	14.9	40.1	8.6	5.5	46.1	1.1	< 1.0	29.3	20.0	20.0	35.2
22/08/01	29/08/01	6.6	35.5	17.7	130.3	23.9	2.0	4.2	18.7	18.8	< 1.0	32.6	23.0	23.0	12.9
29/08/01	05/09/01	7.3	80.2	16.5	918.1	53.6	20.9	7.3	63.6	70.5	149.4	73.7	136.0	136.0	16.2
05/09/01	12/09/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0
12/09/01	19/09/01	6.0	30.3	5.5	15.6	179.5	37.8	12.2	207.2	3.4	< 1.0	8.7	33.0	33.0	17.2
19/09/01	26/09/01	5.0	50.4	44.8	57.5	34.9	8.1	25.1	37.5	1.3	< 1.0	46.2	22.0	22.0	12.5
26/09/01	03/10/01	4.8	32.3	18.1	21.6	86.6	18.9	8.4	97.2	3.4	< 1.0	21.8	24.0	24.0	71.5
03/10/01	10/10/01	4.8	25.4	5.6	4.9	109.6	24.6	7.2	129.9	2.2	< 1.0	12.2	25.0	25.0	111.8
10/10/01	17/10/01	5.8	67.1	37.0	28.9	98.9	25.8	61.7	116.7	2.8	< 1.0	55.2	31.0	31.0	19.2
17/10/01	24/10/01	6.0	30.6	15.2	55.4	67.4	12.5	5.1	76.0	5.5	18.1	22.5	22.0	22.0	54.9
24/10/01	31/10/01	5.0	28.6	7.9	5.7	156.3	34.3	10.2	157.8	3.5	< 1.0	9.7	31.0	31.0	42.0
31/10/01	14/11/01	5.1	60.4	13.7	22.0	378.8	84.5	19.8	453.4	7.9	< 1.0	14.8	68.0	68.0	23.0
14/11/01	28/11/01	5.5	23.6	10.2	18.0	126.8	23.6	7.4	148.6	2.6	< 1.0	8.4	25.0	25.0	28.3
28/11/01	12/12/01	5.1	17.5	8.4	8.3	89.8	15.6	2.1	108.9	1.8	< 1.0	6.7	19.0	19.0	125.7
12/12/01	03/01/02	4.8	79.8	34.5	44.4	347.9	75.8	20.2	408.4	7.7	< 1.0	37.9	74.0	74.0	8.9

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5123	31.2	14.4	17.9	103.1	22.2	9.1	120.9	2.8	-	18.8	14.1	26.2	1287.5

Llyn Brianne

2001

Site Code:	**5124**
Easting:	**2807**
Northing:	**2492**
Latitude:	**52 07 32 N**
Longitude:	**03 44 34 W**
Altitude (m):	**372**
Rainfall (mm):	**1774**

[30 year mean 1940 - 1971]

Site Environment:
Open moorland, upland hill farming

Other measurements:
DT, UKAWMN (nearby), Met

Site Operator:
Environment Agency

hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-0.54 ueq/l (-2.65 %/year): 15 years' data
++ Moderately strong trend detected

non-marine sulphate
-0.82 ueq/l (-2.76 %/year): 16 years' data
+++ Strong trend detected

nitrate
-0.05 ueq/l (-0.32 %/year): 16 years' data
- No significant trend detected

ammonium
0.00 ueq/l (-0.02 %/year): 16 years' data
- No significant trend detected

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
04/01/01	12/01/01	4.6	35.8	10.7	14.6	101.7	22.6	6.1	123.2	2.1	< 1.0	23.6	30.0	30.0	20.4
12/01/01	16/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16/01/01	24/01/01	4.8	31.6	18.8	12.5	148.7	34.5	9.0	174.9	3.2	< 1.0	13.7	34.0	34.0	48.2
24/01/01	08/02/01	4.8	26.4	7.3	6.3	120.4	27.2	6.5	147.4	2.5	< 1.0	11.9	28.0	28.0	88.7
08/02/01	15/02/01	5.3	16.3	7.9	5.2	45.1	10.6	9.3	55.5	1.3	< 1.0	10.9	13.0	13.0	69.8
15/02/01	22/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22/02/01	13/12/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample collection affected by Foot and Mouth Precautions 22/2/01 to 13/12/01															-
13/12/01	15/01/02	4.9	50.3	29.2	43.3	188.7	36.7	7.4	219.7	4.5	< 1.0	27.6	45.0	45.0	58.4

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5124	-	-	-	-	-	-	-	-	-	-	-	-	285.5

Pumlumon

2001

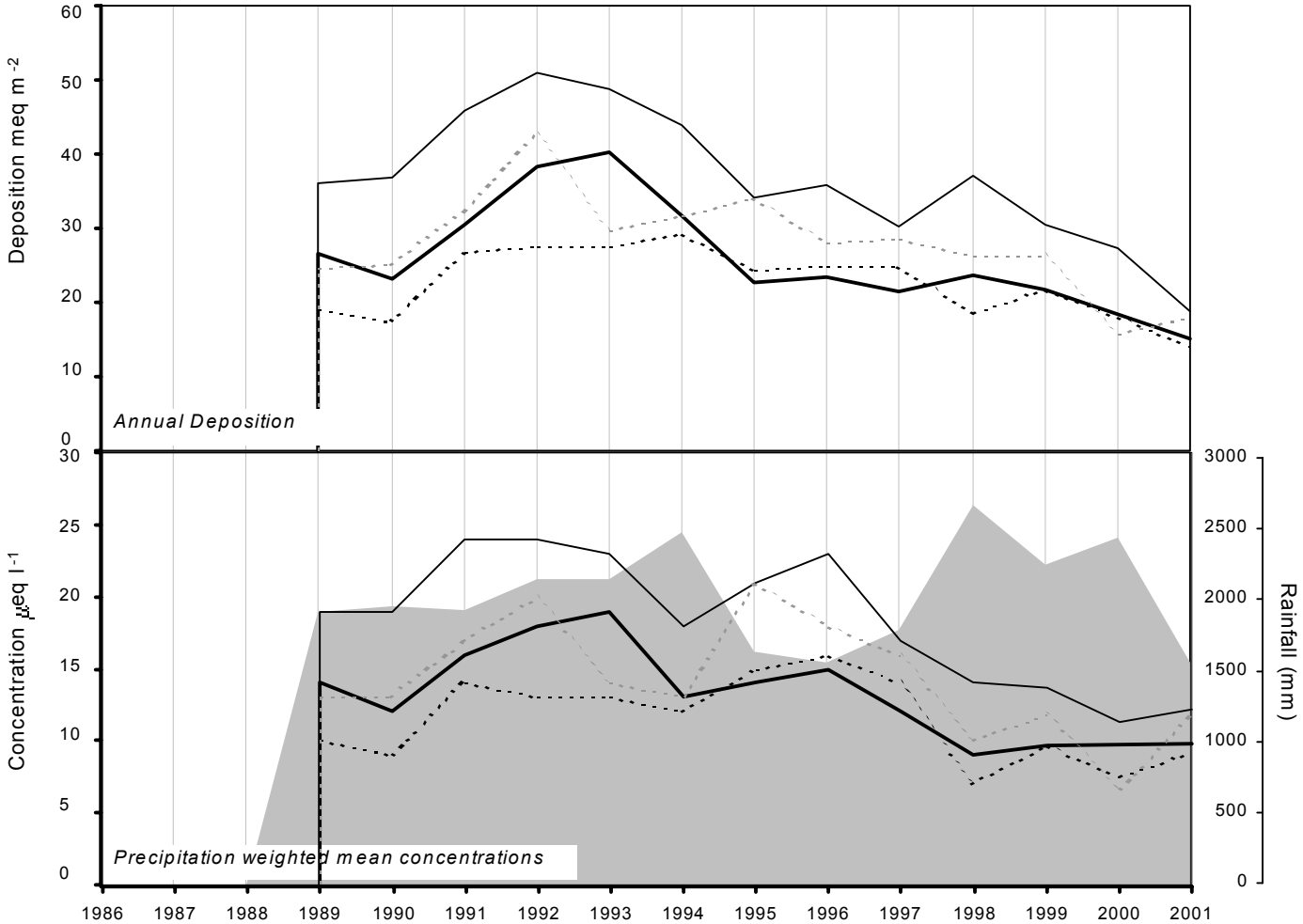
Site Code:	**5150**
Easting:	**2823**
Northing:	**2854**
Latitude:	**52 27 13 N**
Longitude:	**03 43 56 W**
Altitude (m):	**390**
Rainfall (mm):	**2182**

[30 year mean 1940 - 1971]

Site Environment:
Open moorland, upland hill farming

Other measurements:
DT, UKAWMN

Site Operator:
Centre for Ecology and Hydrology (Bangor)



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-0.53 ueq/l (-2.95 %/year): 12 years' data
\+ Significant trend detected

non-marine sulphate
-0.87 ueq/l (-3.31 %/year): 13 years' data
++ Moderately strong trend detected

nitrate
-0.23 ueq/l (-1.68 %/year): 13 years' data
\- No significant trend detected

ammonium
-0.45 ueq/l (-2.45 %/year): 13 years' data
\- No significant trend detected

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
04/01/01	09/01/01	5.0	31.4	10.2	15.5	159.9	35.5	9.4	193.0	3.4	< 1.0	12.1	34.0	34.0	19.3
09/01/01	17/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17/01/01	23/01/01	4.7	31.4	31.3	23.1	81.1	17.8	7.6	101.2	2.0	< 1.0	21.7	27.0	27.0	22.2
23/01/01	30/01/01	5.1	26.0	4.6	5.6	142.9	32.4	8.3	160.7	2.9	< 1.0	8.8	31.0	31.0	46.4
30/01/01	14/02/01	5.0	14.2	5.8	4.5	48.0	10.5	3.6	56.0	1.0	< 1.0	8.4	14.0	14.0	130.7
14/02/01	20/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20/02/01	27/04/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample collection affected by Foot and Mouth Precautions 20/2/01 to 27/4/01															-
27/04/01	04/05/01	5.1	29.0	12.3	19.4	53.7	13.3	9.6	69.3	1.6	< 1.0	22.5	18.0	18.0	23.5
04/05/01	22/05/01	6.5	81.8	48.8	350.9	40.8	17.2	10.5	42.8	40.2	81.1	76.9	66.0	66.0	46.1
22/05/01	29/05/01	5.1	29.0	11.8	32.0	5.5	1.5	4.2	5.9	0.9	< 1.0	28.3	10.0	10.0	25.0
29/05/01	05/06/01	6.1	40.5	19.0	52.7	113.0	24.3	12.4	136.9	2.2	< 1.0	26.9	29.0	29.0	7.9
05/06/01	12/06/01	6.0	29.3	11.2	39.3	50.3	9.7	5.6	54.7	2.0	< 1.0	23.2	16.0	16.0	18.2
12/06/01	19/06/01	5.2	20.8	17.2	19.2	25.7	5.5	5.4	28.4	1.6	< 1.0	17.7	11.0	11.0	13.8
19/06/01	26/06/01	4.8	34.3	20.6	33.6	35.5	8.1	3.7	36.5	1.2	< 1.0	30.0	17.0	17.0	4.5
26/06/01	04/07/01	6.2	54.9	37.9	171.0	23.8	7.2	9.8	23.3	17.0	54.9	52.0	33.0	33.0	59.0
04/07/01	10/07/01	7.7	149.8	42.0	1317.6	55.0	63.0	20.8	65.4	154.2	399.4	143.2	199.0	199.0	17.1
10/07/01	17/07/01	5.8	33.4	8.2	22.6	171.2	34.1	10.1	203.2	3.4	< 1.0	12.7	35.0	35.0	58.4
17/07/01	24/07/01	4.7	17.2	15.7	16.4	8.3	2.6	2.7	9.0	< .5	< 1.0	16.2	11.0	11.0	67.0
24/07/01	31/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31/07/01	06/08/01	5.9	26.6	25.5	31.4	32.3	3.9	16.0	24.4	7.4	< 1.0	22.8	15.0	15.0	26.7
06/08/01	15/08/01	4.9	16.1	5.8	7.3	14.4	3.1	1.4	16.2	< .5	< 1.0	14.4	10.0	10.0	121.7
15/08/01	21/08/01	4.8	20.8	18.2	21.8	19.1	4.4	4.0	21.2	0.6	< 1.0	18.5	14.0	14.0	46.7
21/08/01	28/08/01	4.7	18.8	19.5	11.0	21.4	5.6	8.0	24.9	< .5	< 1.0	16.2	14.0	14.0	11.0
28/08/01	04/09/01	5.2	20.2	12.6	22.6	30.2	8.0	6.5	34.8	1.1	< 1.0	16.6	13.0	13.0	24.9
04/09/01	11/09/01	5.3	19.1	7.8	21.0	40.3	8.4	6.2	43.8	0.8	< 1.0	14.2	12.0	12.0	34.5
11/09/01	18/09/01	5.5	28.8	6.4	15.9	139.3	30.5	8.0	164.0	2.7	< 1.0	12.0	28.0	28.0	23.0
18/09/01	25/09/01	4.3	60.3	54.4	47.5	19.8	6.4	10.2	19.9	0.7	< 1.0	57.9	34.0	34.0	8.7
25/09/01	02/10/01	4.8	20.4	15.2	13.6	54.2	12.1	4.7	64.7	1.0	< 1.0	13.9	18.0	18.0	36.7
02/10/01	09/10/01	5.1	18.5	4.3	4.8	104.4	22.4	4.8	123.6	2.2	< 1.0	5.9	22.0	22.0	145.1
09/10/01	16/10/01	5.5	21.9	9.7	5.8	11.1	3.8	17.9	13.1	0.7	< 1.0	20.5	< 10.0	< 10.0	43.3
16/10/01	23/10/01	4.7	16.8	19.4	14.1	21.0	4.9	3.1	22.5	0.7	< 1.0	14.3	13.0	13.0	38.5
23/10/01	08/11/01	5.0	17.3	5.2	6.6	89.3	19.0	6.4	103.5	1.7	< 1.0	6.5	19.0	19.0	133.2
08/11/01	20/11/01	4.9	20.5	14.0	14.5	58.5	12.3	4.4	67.0	1.2	< 1.0	13.4	17.0	17.0	7.6
20/11/01	04/12/01	5.0	10.2	3.3	< .7	52.5	10.8	2.6	64.8	1.2	< 1.0	3.8	12.0	12.0	215.5
04/12/01	18/12/01	4.9	107.9	31.2	31.9	492.5	100.7	35.3	542.1	16.1	< 1.0	48.5	87.0	87.0	6.1
18/12/01	03/01/02	5.4	37.1	11.6	25.7	173.6	35.1	7.2	196.1	3.6	< 1.0	16.2	36.0	36.0	64.3

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5150	20.4	9.2	11.7	68.5	14.6	5.6	79.9	1.7	-	12.2	9.8	17.9	1546.6

Stoke Ferry

2001

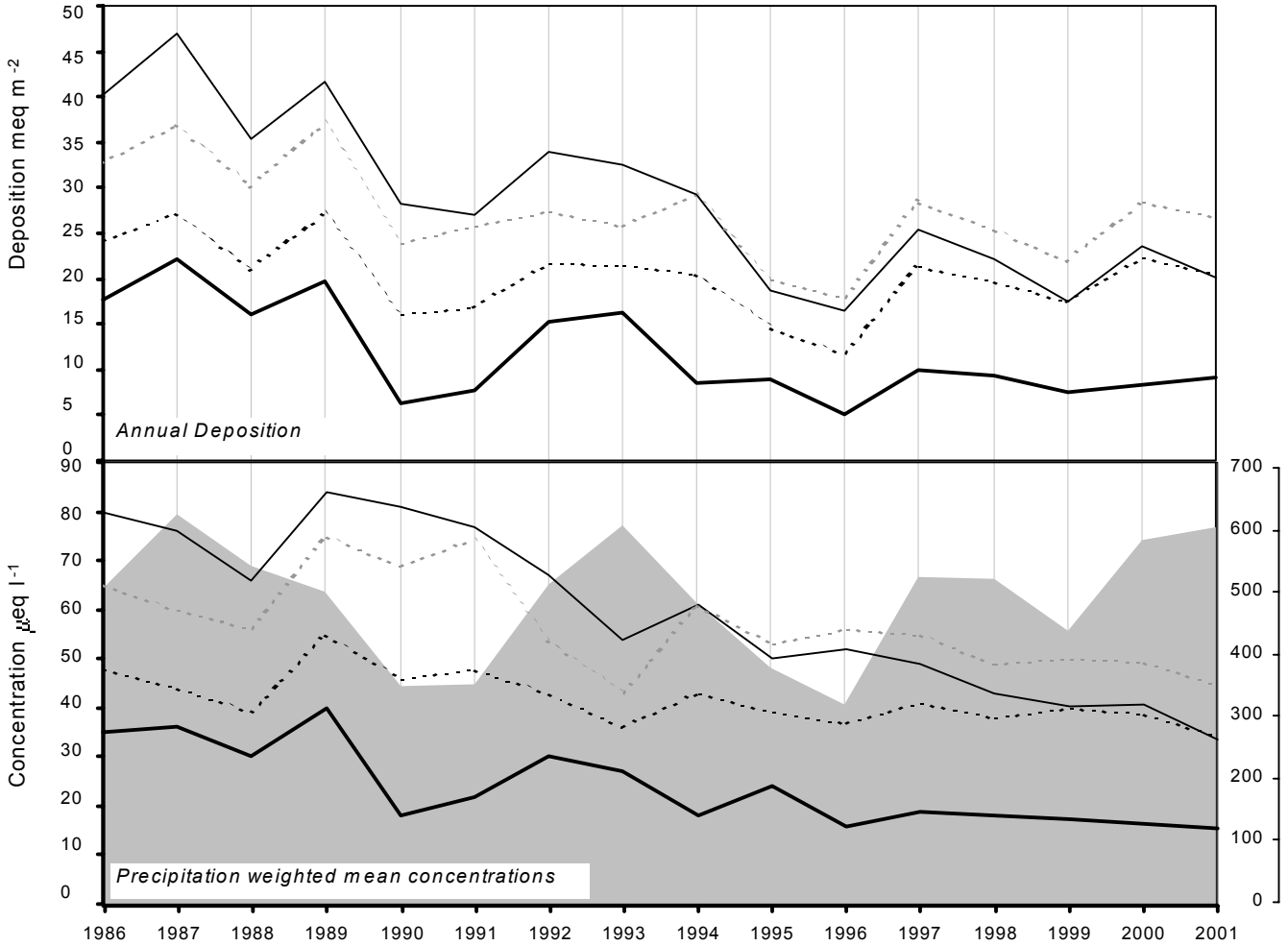
Site Code:	**5004**
Easting:	**5700**
Northing:	**2988**
Latitude:	**52 33 36 N**
Longitude:	**00 30 29 E**
Altitude (m):	**15**
Rainfall (mm):	**629**

[30 year mean 1940 -1971]

Site Environment:
Grassed land at water treatment works

Other measurements:
DT, Daily SO2, Daily SO4, HNO3 Denuder, WF, EMEP

Site Operator:
Kings Lynn and West Norfolk BC



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration
(+x = increase; -x = decrease)

hydrogen ion
-1.41 ueq/l (-4.11 %/year): 15 years' data
++ Moderately strong trend detected

non-marine sulphate
-3.23 ueq/l (-3.85 %/year): 16 years' data
++++ Very strong trend detected

nitrate
-0.75 ueq/l (-1.58 %/year): 16 years' data
++ Moderately strong trend detected

ammonium
-1.34 ueq/l (-1.99 %/year): 16 years' data
++ Moderately strong trend detected

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
02/01/01	09/01/01	4.7	32.4	21.8	38.3	28.1	6.5	5.9	35.1	2.1	< 1.0	29.1	18.0	18.0	12.9
09/01/01	16/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16/01/01	23/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5
23/01/01	30/01/01	4.8	23.7	21.6	22.4	48.6	11.0	6.2	59.4	1.6	< 1.0	17.9	20.0	20.0	18.3
30/01/01	06/02/01	4.7	25.2	29.9	27.4	16.3	4.0	4.1	19.1	0.8	< 1.0	23.2	18.0	18.0	37.6
06/02/01	13/02/01	4.7	41.0	31.1	22.2	80.0	19.2	15.1	97.5	2.0	< 1.0	31.3	30.0	30.0	9.0
13/02/01	20/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4
20/02/01	27/02/01	4.8	53.3	40.0	66.3	51.1	10.8	24.5	71.1	2.3	< 1.0	47.2	28.0	28.0	5.0
27/02/01	06/03/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2
06/03/01	13/03/01	4.8	22.7	18.5	28.4	22.9	5.2	5.3	27.8	1.1	< 1.0	19.9	13.0	13.0	34.3
13/03/01	20/03/01	4.1	64.6	86.1	73.2	111.8	26.9	18.2	134.4	2.8	< 1.0	51.1	54.0	54.0	11.1
20/03/01	27/03/01	4.6	23.4	36.0	31.0	33.5	7.9	5.8	42.7	1.2	< 1.0	19.3	21.0	21.0	14.1
27/03/01	03/04/01	4.6	75.2	59.3	70.5	74.1	18.6	34.0	83.7	2.0	< 1.0	66.2	39.0	39.0	8.0
03/04/01	10/04/01	5.3	39.2	27.9	55.9	36.0	8.4	9.2	48.6	1.1	< 1.0	34.8	19.0	19.0	22.8
10/04/01	17/04/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2
17/04/01	24/04/01	5.4	78.2	48.3	86.7	187.0	44.6	21.8	225.6	4.2	< 1.0	55.6	50.0	50.0	11.3
24/04/01	01/05/01	5.4	45.4	32.7	64.7	30.1	7.3	10.4	36.5	1.8	< 1.0	41.7	19.0	19.0	9.6
01/05/01	08/05/01	5.4	66.7	68.2	93.9	29.4	8.9	34.7	35.4	1.6	< 1.0	63.1	25.0	25.0	2.9
08/05/01	15/05/01	5.5	29.9	40.0	46.5	12.8	2.1	18.9	3.5	0.8	< 1.0	28.4	13.0	13.0	27.2
15/05/01	22/05/01	5.1	40.0	37.5	65.0	16.9	3.9	7.4	19.8	1.8	< 1.0	37.9	17.0	17.0	8.3
22/05/01	29/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29/05/01	05/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/06/01	12/06/01	6.1	127.3	87.3	94.4	141.2	37.3	113.0	157.4	7.0	2.1	110.3	55.0	55.0	3.2
12/06/01	19/06/01	5.6	34.9	37.6	52.7	20.5	6.3	17.9	21.3	1.4	< 1.0	32.5	16.0	16.0	20.1
19/06/01	26/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26/06/01	03/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
03/07/01	10/07/01	6.0	76.3	83.2	99.6	12.0	6.6	82.8	9.7	3.8	< 1.0	74.8	31.0	31.0	16.9
10/07/01	17/07/01	4.8	34.1	35.9	51.4	18.8	4.8	9.4	24.5	0.9	< 1.0	31.8	18.0	18.0	30.9
17/07/01	24/07/01	4.7	20.6	27.4	24.3	28.2	6.3	4.2	32.4	1.0	< 1.0	17.2	16.0	16.0	52.6
24/07/01	31/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31/07/01	07/08/01	5.9	51.0	55.3	70.8	12.7	5.3	39.5	13.4	2.2	< 1.0	49.5	22.0	22.0	13.7
07/08/01	14/08/01	5.1	23.7	21.9	23.0	12.2	3.9	14.3	10.2	1.4	< 1.0	22.2	12.0	12.0	11.7
14/08/01	21/08/01	5.8	53.1	60.7	62.8	16.1	6.8	54.5	18.6	4.6	< 1.0	51.2	21.0	21.0	4.5
21/08/01	28/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28/08/01	04/09/01	5.4	44.2	46.8	62.0	14.8	5.0	26.6	15.5	1.6	3.2	42.5	19.0	19.0	17.9
04/09/01	18/09/01	4.6	48.8	20.7	34.5	96.1	22.2	16.9	111.2	2.5	< 1.0	37.2	30.0	30.0	34.5
18/09/01	25/09/01	4.6	38.7	28.5	27.6	104.9	23.8	11.6	114.2	3.6	< 1.0	26.0	31.0	31.0	17.8
25/09/01	02/10/01	5.4	42.4	32.1	48.6	60.2	13.6	17.3	68.0	2.1	< 1.0	35.1	23.0	23.0	15.2
02/10/01	09/10/01	5.8	35.2	22.7	24.8	95.6	20.9	30.9	114.8	3.7	< 1.0	23.7	25.0	25.0	7.5
09/10/01	16/10/01	5.0	63.1	52.4	41.2	17.3	9.4	59.4	23.5	1.6	< 1.0	61.0	23.0	23.0	5.8
16/10/01	23/10/01	4.4	44.9	58.1	62.9	16.4	4.5	7.1	19.0	1.3	< 1.0	42.9	26.0	26.0	30.1
23/10/01	30/10/01	5.3	27.5	19.5	25.1	40.0	8.1	8.7	46.3	1.4	< 1.0	22.7	15.0	15.0	7.4
30/10/01	07/11/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7
07/11/01	13/11/01	5.0	70.2	10.8	21.8	438.4	100.4	23.2	534.1	9.8	< 1.0	17.4	80.0	80.0	23.0
13/11/01	20/11/01	5.0	100.4	30.4	73.7	359.9	77.3	36.3	420.1	13.1	< 1.0	57.1	-	-	1.4
20/11/01	27/11/01	5.5	57.1	22.6	57.5	60.1	15.2	10.8	70.4	2.8	< 1.0	49.9	22.0	22.0	5.0
27/11/01	04/12/01	5.3	16.2	11.5	21.9	11.4	2.8	1.9	13.9	0.8	< 1.0	14.8	< 10.0	< 10.0	25.5
04/12/01	11/12/01	5.3	170.1	51.5	177.7	127.0	28.9	20.6	151.5	5.1	< 1.0	154.8	53.0	53.0	2.6
11/12/01	02/01/02	4.8	89.3	32.6	77.1	218.4	39.0	13.6	268.9	5.0	< 1.0	63.0	56.0	56.0	14.3

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5004	41.0	34.4	44.9	60.4	14.1	16.0	71.4	2.1	-	33.7	15.3	24.6	597.0

Preston Montford

2001

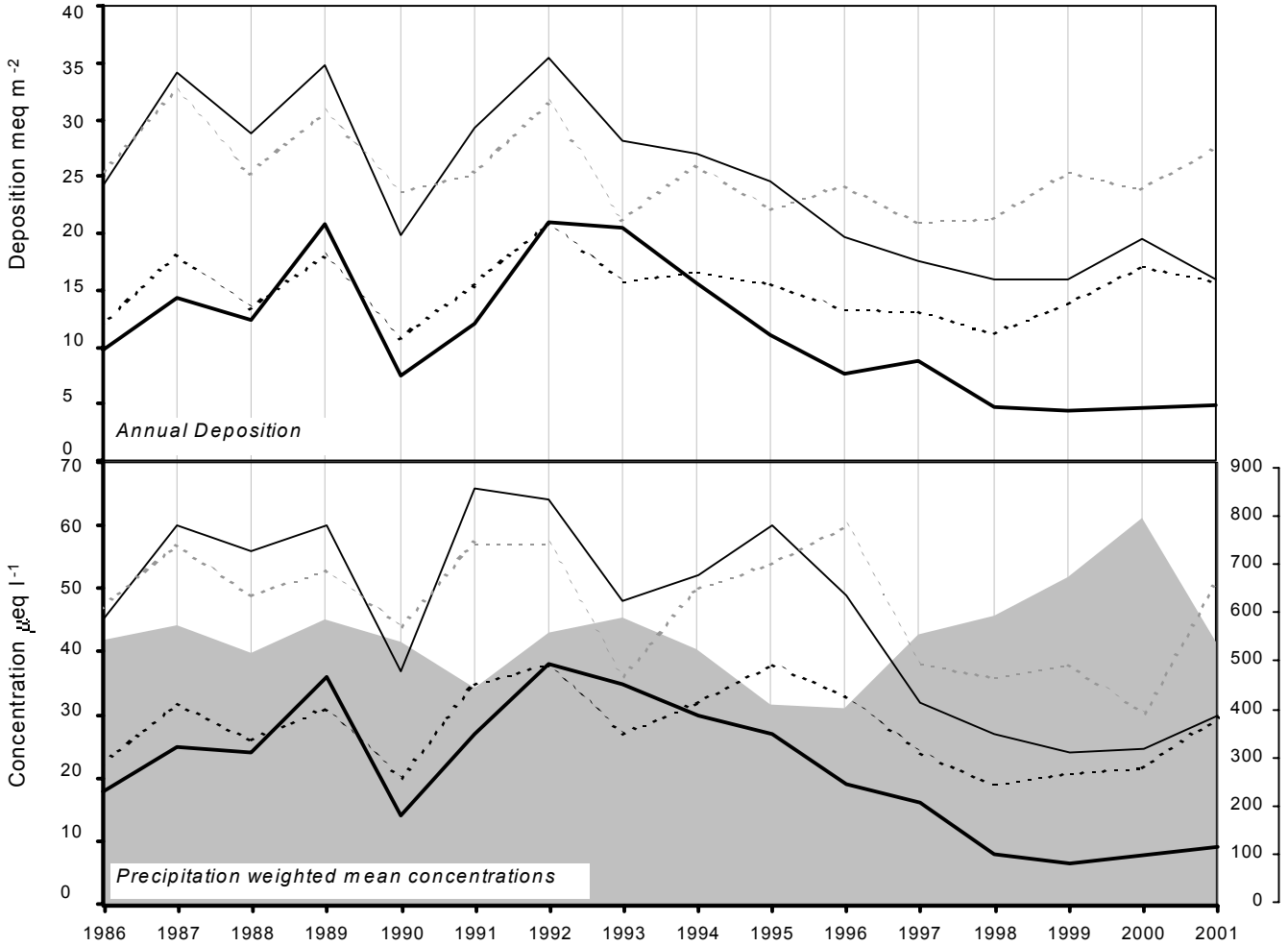
Site Code:	**5023**
Easting:	**3432**
Northing:	**3143**
Latitude:	**52 43 23 N**
Longitude:	**02 50 17 W**
Altitude (m):	**70**
Rainfall (mm):	**695**

[30 year mean 1940 - 1971]

Site Environment:
Field adjacent to Study Centre

Other measurements:
DT, Weekly SO2, Met

Site Operator:
Field Studies Council



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration
(+x = increase; -x = decrease)

hydrogen ion
-1.15 ueq/l (-3.80 %/year): 15 years' data
\+ Significant trend detected

non-marine sulphate
-2.15 ueq/l (-3.47 %/year): 16 years' data
++ Moderately strong trend detected

nitrate
-0.25 ueq/l (-0.82 %/year): 16 years' data
\- No significant trend detected

ammonium
-0.85 ueq/l (-1.58 %/year): 16 years' data
\- No significant trend detected

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National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
03/01/01	10/01/01	5.3	61.1	25.7	123.6	96.7	16.2	7.0	114.8	7.2	< 1.0	49.4	-	-	1.0
10/01/01	17/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17/01/01	24/01/01	4.8	33.2	19.6	42.2	39.1	7.4	6.4	52.2	2.2	< 1.0	28.5	18.0	18.0	22.8
24/01/01	31/01/01	6.1	29.8	10.6	51.0	58.7	12.0	4.8	71.7	1.8	< 1.0	22.7	20.0	20.0	5.9
31/01/01	07/02/01	5.0	26.1	9.9	21.4	59.2	12.6	5.2	74.1	2.2	< 1.0	19.0	18.0	18.0	13.1
07/02/01	14/02/01	5.4	24.4	8.3	15.4	42.0	9.5	11.4	52.1	1.1	< 1.0	19.4	13.0	13.0	23.8
14/02/01	21/02/01	5.0	146.5	94.7	215.0	81.5	9.7	35.4	98.9	14.0	< 1.0	136.7	-	-	1.4
21/02/01	28/02/01	6.1	77.8	33.7	121.9	131.8	25.0	11.6	154.3	3.5	15.1	61.9	43.0	43.0	6.0
28/02/01	07/03/01	6.1	121.0	64.5	132.1	133.9	18.5	49.8	153.7	4.5	< 1.0	104.9	50.0	50.0	2.0
07/03/01	14/03/01	6.6	34.4	14.8	65.1	80.3	12.0	11.6	96.1	7.9	< 1.0	24.8	24.0	24.0	2.3
14/03/01	21/03/01	5.6	41.2	55.6	64.7	77.2	10.7	10.8	85.7	13.1	< 1.0	31.9	26.0	26.0	20.2
21/03/01	28/03/01	4.2	57.2	70.9	66.7	36.3	8.6	9.1	48.3	2.5	< 1.0	52.9	42.0	42.0	19.1
28/03/01	04/04/01	5.5	33.6	26.4	50.7	32.1	7.2	6.2	37.8	2.5	< 1.0	29.8	17.0	17.0	7.6
04/04/01	11/04/01	5.6	12.1	6.1	16.6	29.6	6.2	3.2	34.9	1.7	< 1.0	8.5	10.0	10.0	29.4
11/04/01	18/04/01	5.0	140.8	90.7	165.3	107.7	26.4	45.0	119.7	10.1	< 1.0	127.9	-	-	1.1
18/04/01	25/04/01	5.8	39.2	24.2	58.2	14.9	4.3	12.3	19.7	1.0	< 1.0	37.4	14.0	14.0	10.9
25/04/01	02/05/01	6.1	23.1	12.9	36.6	37.4	8.3	8.5	43.0	3.3	< 1.0	18.5	13.0	13.0	4.7
02/05/01	09/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09/05/01	16/05/01	4.6	78.2	84.4	126.9	5.2	3.8	19.9	11.3	1.6	< 1.0	77.6	32.0	32.0	43.8
16/05/01	23/05/01	5.2	23.4	10.5	23.2	11.2	2.7	4.5	13.4	1.6	< 1.0	22.1	< 10.0	< 10.0	20.1
23/05/01	30/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30/05/01	06/06/01	6.9	68.1	25.9	135.5	93.0	20.5	21.8	98.5	23.7	9.2	56.9	40.0	40.0	2.1
06/06/01	13/06/01	7.0	31.9	12.6	83.5	38.0	6.6	10.3	43.3	5.5	< 1.0	27.3	21.0	21.0	2.2
13/06/01	20/06/01	5.9	28.7	29.4	70.2	18.8	5.5	12.7	19.7	8.6	5.5	26.4	24.0	24.0	15.6
20/06/01	27/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27/06/01	04/07/01	6.0	78.0	115.5	129.5	22.4	13.3	57.0	25.2	19.4	7.1	75.3	36.0	36.0	8.9
04/07/01	11/07/01	5.9	44.9	42.4	89.8	14.3	7.7	19.0	18.2	9.3	9.2	43.1	23.0	23.0	13.1
11/07/01	18/07/01	5.4	28.4	31.7	49.7	14.6	4.8	10.4	18.8	3.3	2.5	26.6	15.0	15.0	29.5
18/07/01	25/07/01	5.0	56.5	34.1	292.1	40.6	7.4	13.8	51.0	14.6	< 1.0	51.6	< 10.0	< 10.0	1.7
25/07/01	01/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01/08/01	08/08/01	6.2	16.6	15.5	28.1	9.5	2.7	8.9	12.0	2.4	< 1.0	15.4	11.0	11.0	23.6
08/08/01	15/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15/08/01	22/08/01	5.7	28.4	27.6	49.0	4.4	2.5	7.2	5.9	2.4	< 1.0	27.9	12.0	12.0	40.8
22/08/01	29/08/01	6.5	28.6	56.6	101.2	11.5	3.0	6.7	15.5	8.9	2.4	27.3	20.0	20.0	4.0
29/08/01	05/09/01	6.2	18.6	15.4	70.1	28.9	5.5	5.9	35.0	9.7	7.3	15.1	18.0	18.0	12.6
05/09/01	12/09/01	6.3	18.8	10.4	30.0	42.9	9.4	10.3	49.8	14.7	< 1.0	13.7	15.0	15.0	2.8
12/09/01	20/09/01	5.8	27.2	9.7	33.0	88.4	17.9	11.7	102.0	9.9	< 1.0	16.6	22.0	22.0	14.0
20/09/01	26/09/01	5.0	97.5	79.7	121.9	26.8	9.2	36.5	30.7	5.0	< 1.0	94.2	-	-	1.3
26/09/01	03/10/01	5.5	26.7	17.4	36.5	59.6	12.2	8.4	71.3	3.5	< 1.0	19.5	19.0	19.0	14.2
03/10/01	10/10/01	6.0	10.9	6.8	14.7	33.8	11.1	17.2	39.9	1.7	< 1.0	6.9	12.0	12.0	21.2
10/10/01	17/10/01	-	-	-	-	-	-	-	-	-	-	-	-	-	3.5
17/10/01	24/10/01	4.6	26.6	25.2	26.6	9.2	2.2	3.9	12.0	0.6	< 1.0	25.5	17.0	17.0	38.0
24/10/01	31/10/01	5.4	5.9	3.7	7.5	9.4	1.5	1.8	10.9	0.7	< 1.0	4.8	< 10.0	< 10.0	15.4
31/10/01	07/11/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5
07/11/01	14/11/01	-	-	-	-	-	-	-	-	-	-	-	-	-	4.6
14/11/01	21/11/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9
21/11/01	05/12/01	5.7	14.6	4.7	25.8	41.5	6.5	2.3	51.6	2.2	< 1.0	9.6	12.0	12.0	20.6
05/12/01	12/12/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2
12/12/01	19/12/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2
19/12/01	02/01/02	5.8	54.9	15.5	55.7	166.7	31.1	10.9	198.8	6.7	< 1.0	34.8	40.0	40.0	8.1

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5023	33.5	29.4	51.4	30.6	7.0	10.4	37.4	3.9	-	29.8	9.1	18.4	535.8

Bottesford

2001

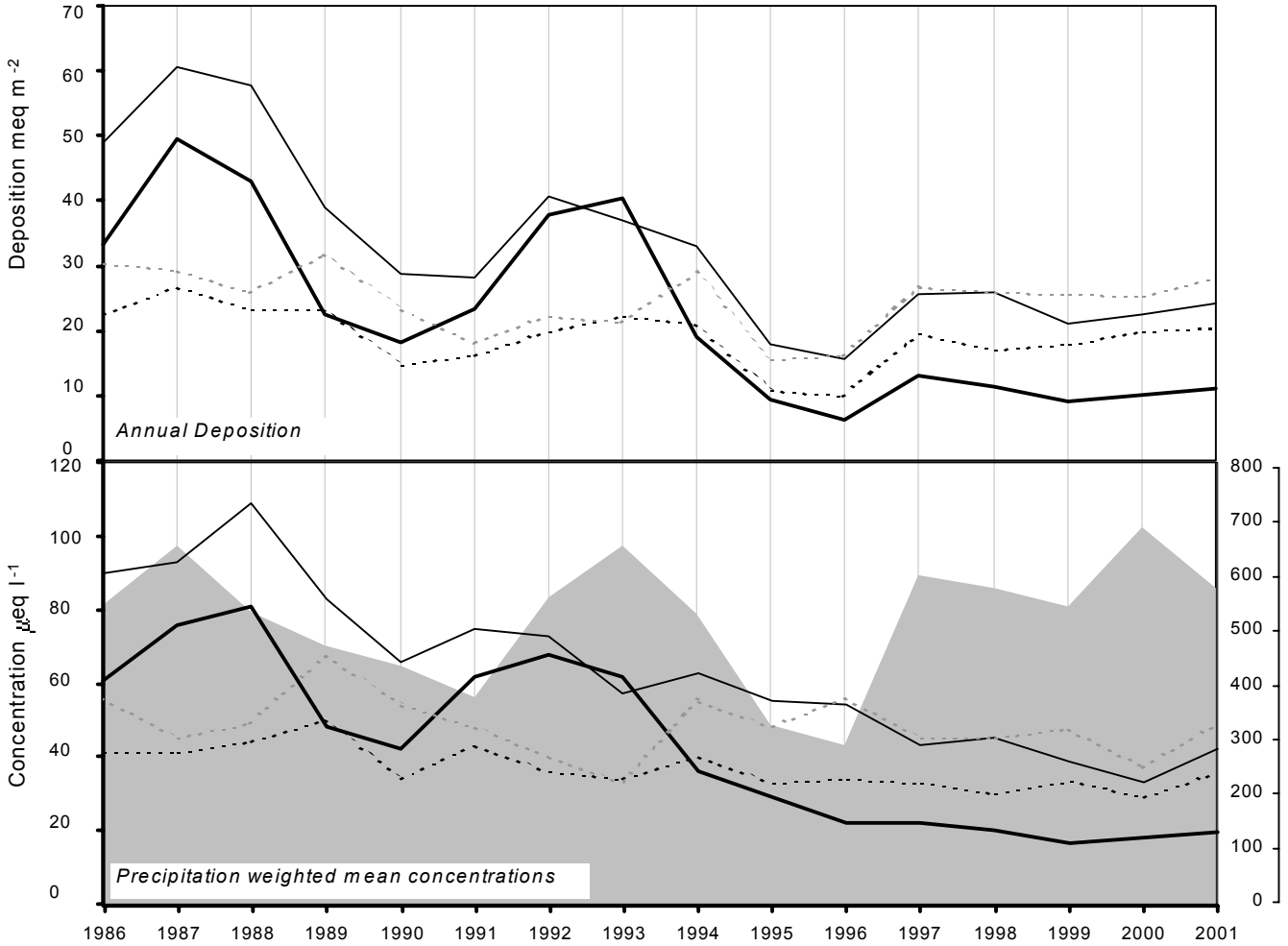
Site Code:	**5121**
Easting:	**4797**
Northing:	**3376**
Latitude:	**52 55 46 N**
Longitude:	**00 48 51 W**
Altitude (m):	**32**
Rainfall (mm):	**561**

[30 year mean 1940 - 1971]

Site Environment:
Rural pasture

Other measurements:
DT, SO2 (PowerGen), ozone (PowerGen)

Site Operator:
PowerGen



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-4.20 ueq/l (-5.67 %/year): 15 years' data
+++ Strong trend detected

non-marine sulphate
-4.30 ueq/l (-4.48 %/year): 16 years' data
++++ Very strong trend detected

nitrate
-0.86 ueq/l (-1.97 %/year): 16 years' data
++ Moderately strong trend detected

ammonium
-0.59 ueq/l (-1.11 %/year): 16 years' data
- No significant trend detected

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
02/01/01	09/01/01	4.8	21.9	12.7	16.3	16.7	4.3	5.7	22.5	0.7	< 1.0	19.9	13.0	13.0	7.2
09/01/01	16/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
16/01/01	23/01/01	4.4	109.1	60.9	120.6	22.4	6.2	15.4	37.4	1.5	< 1.0	106.4	42.0	42.0	4.0
23/01/01	30/01/01	5.1	26.4	9.1	19.9	79.4	17.4	8.5	97.8	2.3	< 1.0	16.8	21.0	21.0	7.6
30/01/01	06/02/01	4.7	23.3	19.5	21.2	27.7	6.5	3.8	35.5	0.8	< 1.0	20.0	17.0	17.0	28.7
06/02/01	13/02/01	4.8	61.7	30.2	38.7	54.3	18.2	30.0	68.6	1.5	< 1.0	55.1	28.0	28.0	10.5
13/02/01	20/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20/02/01	27/02/01	5.1	66.3	41.5	52.4	99.3	17.2	41.9	112.5	2.6	< 1.0	54.3	32.0	32.0	4.0
27/02/01	27/03/01	4.5	55.4	53.9	61.1	73.8	16.4	14.9	90.8	2.1	< 1.0	46.5	37.0	37.0	37.4
Sample collection affected by Foot and Mouth Precautions 27/2/01 to 27/3/01															-
27/03/01	03/04/01	5.0	43.9	38.1	64.1	15.2	4.1	12.4	19.1	1.2	< 1.0	42.1	18.0	18.0	19.4
03/04/01	10/04/01	5.0	18.2	10.0	20.5	13.6	3.3	4.1	18.2	0.7	< 1.0	16.6	10.0	10.0	30.0
10/04/01	17/04/01	5.4	56.5	21.9	59.2	26.1	8.5	21.3	34.5	1.8	< 1.0	53.4	20.0	20.0	11.7
17/04/01	24/04/01	5.1	67.6	39.3	62.5	54.1	17.2	31.9	71.5	2.2	< 1.0	61.0	28.0	28.0	9.1
24/04/01	01/05/01	4.6	38.0	34.6	47.9	9.0	3.2	7.0	12.1	0.7	< 1.0	37.0	20.0	20.0	29.3
01/05/01	08/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08/05/01	15/05/01	5.8	45.7	54.4	85.1	5.7	4.0	21.7	8.7	1.1	< 1.0	45.0	19.0	19.0	18.4
15/05/01	22/05/01	4.6	34.8	44.0	57.1	6.0	2.6	6.1	8.0	0.5	< 1.0	34.1	19.0	19.0	15.2
22/05/01	29/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29/05/01	05/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2
05/06/01	12/06/01	5.3	181.9	74.0	97.2	89.0	38.8	119.7	109.0	18.8	< 1.0	171.2	51.0	51.0	1.5
12/06/01	19/06/01	6.1	19.2	26.1	36.6	16.6	5.8	14.9	19.9	4.6	< 1.0	17.2	12.0	12.0	4.9
19/06/01	26/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26/06/01	03/07/01	6.1	61.4	65.7	54.4	24.9	15.0	59.9	25.8	13.5	< 1.0	58.4	23.0	23.0	2.0
03/07/01	10/07/01	6.2	77.5	69.1	98.1	2.5	3.3	24.3	6.2	1.3	< 1.0	77.2	19.0	19.0	40.3
10/07/01	17/07/01	5.1	97.5	24.0	99.8	69.8	17.4	20.5	97.8	3.0	< 1.0	89.1	33.0	33.0	3.9
17/07/01	24/07/01	4.8	22.6	24.0	26.4	23.7	5.9	5.3	26.6	0.8	< 1.0	19.8	16.0	16.0	67.2
24/07/01	31/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31/07/01	07/08/01	4.9	34.0	22.9	35.4	5.1	2.5	13.3	7.4	1.3	< 1.0	33.4	14.0	14.0	33.1
07/08/01	14/08/01	4.7	62.7	48.7	55.4	17.7	6.5	32.7	21.3	2.1	< 1.0	60.6	27.0	27.0	8.4
14/08/01	21/08/01	5.0	101.9	97.6	95.0	15.3	15.9	74.5	25.2	18.2	7.2	100.1	35.0	35.0	2.7
21/08/01	28/08/01	6.3	81.4	120.0	152.4	14.8	11.8	88.6	15.8	8.8	< 1.0	79.6	36.0	36.0	1.3
28/08/01	04/09/01	4.6	111.6	119.1	136.2	21.6	11.1	58.7	25.3	3.5	< 1.0	109.0	46.0	46.0	7.7
04/09/01	11/09/01	5.5	30.8	9.2	25.5	4.7	3.7	11.3	6.2	0.6	< 1.0	30.2	< 10.0	< 10.0	9.4
11/09/01	18/09/01	4.8	70.3	19.7	66.8	95.5	21.6	21.3	114.8	3.9	< 1.0	58.8	33.0	33.0	12.2
18/09/01	25/09/01	4.0	85.8	76.0	65.6	48.1	12.6	14.8	66.8	2.1	< 1.0	80.0	57.0	57.0	21.1
25/09/01	02/10/01	5.4	27.3	22.9	37.2	38.5	8.7	9.8	45.7	2.0	< 1.0	22.7	16.0	16.0	14.4
02/10/01	09/10/01	5.2	22.6	14.9	14.6	44.8	9.7	12.9	52.0	2.2	< 1.0	17.2	15.0	15.0	6.1
09/10/01	16/10/01	5.1	45.9	44.7	37.3	11.1	7.0	39.5	12.1	1.5	< 1.0	44.6	17.0	17.0	7.5
16/10/01	23/10/01	4.5	36.4	35.2	35.5	3.5	1.2	3.8	7.4	0.6	< 1.0	36.0	23.0	23.0	53.4
23/10/01	30/10/01	5.2	13.2	8.6	12.3	25.6	4.8	3.5	30.5	0.7	< 1.0	10.1	10.0	10.0	9.0
30/10/01	06/11/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
06/11/01	13/11/01	4.7	64.4	12.9	36.9	159.1	36.4	20.7	199.1	3.6	< 1.0	45.2	42.0	42.0	9.3
13/11/01	20/11/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20/11/01	27/11/01	5.6	72.0	19.6	72.3	46.6	6.3	12.4	49.5	3.5	< 1.0	66.4	22.0	22.0	2.4
27/11/01	11/12/01	4.8	54.3	25.1	58.0	46.2	7.3	7.0	56.2	1.9	< 1.0	48.7	23.0	23.0	14.0
11/12/01	18/12/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18/12/01	02/01/02	4.5	85.3	19.1	71.2	79.5	19.2	13.3	113.3	2.3	< 1.0	75.7	37.0	37.0	7.2

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5121	45.6	35.8	49.2	28.8	7.7	14.1	36.5	1.6	-	42.1	19.4	22.5	572.4

Llyn Llagi

2001

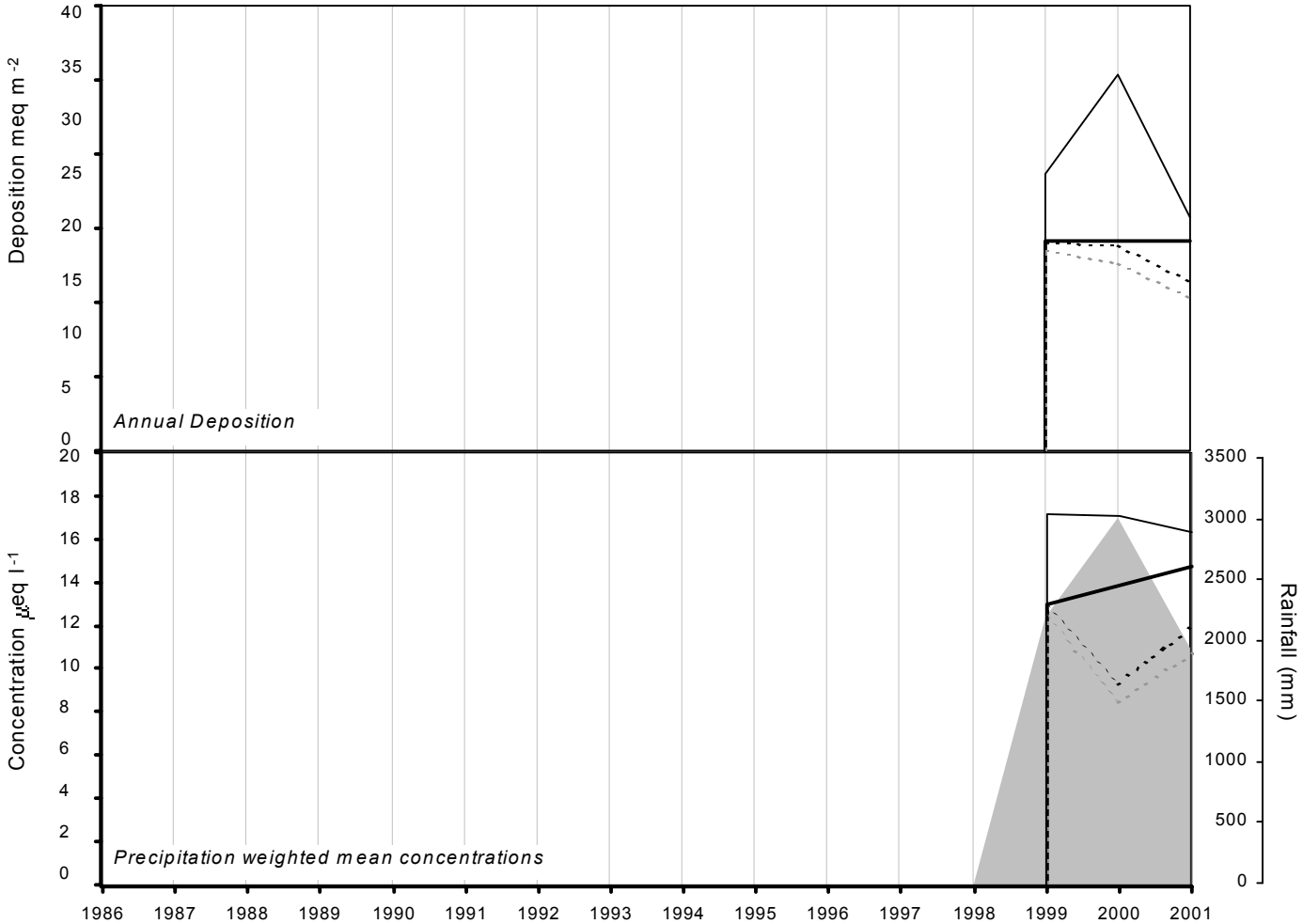
Site Code:	**5160**
Easting:	**2647**
Northing:	**3483**
Latitude:	**53 01 48 N**
Longitude:	**04 01 82 W**
Altitude (m):	**380**
Rainfall (mm):	**-**

[30 year mean 1940 - 1971]

Site Environment:
Grassland and moorland

Other measurements:
UKAWMN. Lakewater chemistry.

Site Operator:
CEH Bangor



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

non-marine sulphate
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

nitrate
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

ammonium
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

ACID DEPOSITION DATA REPORT, 2001

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
09/01/01	23/01/01	4.6	32.0	56.2	15.5	112.3	25.6	11.1	103.8	2.6	< 1.0	18.5	33.0	33.0	18.9
23/01/01	06/02/01	4.8	16.0	10.5	5.9	36.9	7.9	4.6	43.8	1.0	< 1.0	11.6	15.0	15.0	77.5
06/02/01	19/02/01	5.1	16.2	5.5	2.7	78.8	17.6	5.6	99.2	2.3	< 1.0	6.7	19.0	19.0	97.5
19/02/01	26/04/01	4.7	38.7	18.2	24.0	73.3	17.4	6.1	87.3	1.7	< 1.0	29.9	27.0	27.0	127.0
Sample collection affected by Foot and Mouth Precautions 19/2/01 to 26/4/01															-
26/04/01	18/05/01	4.6	38.6	35.4	31.6	36.1	9.9	13.8	42.2	1.2	< 1.0	34.2	23.0	23.0	71.9
18/05/01	29/05/01	4.6	26.5	9.4	10.4	13.6	2.9	2.3	15.1	0.8	< 1.0	24.9	15.0	15.0	84.4
29/05/01	12/06/01	5.0	42.5	18.1	27.8	118.6	27.2	13.7	135.4	2.9	< 1.0	28.2	28.0	28.0	26.6
12/06/01	25/06/01	4.7	23.8	16.6	14.7	23.8	5.4	5.0	25.4	0.7	< 1.0	20.9	15.0	15.0	55.2
25/06/01	09/07/01	7.3	128.3	59.6	1308.7	84.8	31.4	18.4	72.3	126.9	221.5	118.1	199.0	199.0	51.1
09/07/01	23/07/01	4.7	33.3	19.6	21.6	74.3	17.4	8.0	93.6	1.7	< 1.0	24.3	25.0	25.0	63.1
23/07/01	06/08/01	4.6	24.3	17.8	12.4	46.5	10.4	9.1	46.9	1.5	< 1.0	18.7	19.0	19.0	42.0
06/08/01	20/08/01	4.7	29.5	10.7	11.5	37.0	8.2	3.4	42.7	0.7	< 1.0	25.1	19.0	19.0	200.1
20/08/01	31/08/01	4.6	35.0	20.5	16.9	122.2	27.4	10.3	140.0	2.6	< 1.0	20.2	34.0	34.0	29.8
31/08/01	17/09/01	5.0	27.6	8.0	13.5	118.7	25.6	7.8	132.9	2.2	< 1.0	13.3	25.0	25.0	112.1
17/09/01	28/09/01	4.6	26.0	17.8	8.8	66.9	15.5	4.4	75.2	1.6	< 1.0	17.9	22.0	22.0	51.7
28/09/01	15/10/01	5.0	24.0	8.6	7.2	80.9	17.2	7.7	95.4	1.7	< 1.0	14.2	18.0	18.0	245.6
15/10/01	29/10/01	4.8	23.4	10.9	1.3	116.9	24.9	6.3	137.2	2.1	< 1.0	9.3	26.0	26.0	76.9
29/10/01	12/11/01	5.1	31.7	9.1	8.6	139.6	29.6	8.2	166.0	2.8	< 1.0	14.9	29.0	29.0	90.4
12/11/01	26/11/01	4.9	20.1	11.7	10.6	82.4	17.3	4.3	94.5	1.7	< 1.0	10.2	20.0	20.0	69.9
26/11/01	12/12/01	5.0	11.6	4.3	< .7	65.6	12.4	2.6	77.3	1.2	< 1.0	3.7	15.0	15.0	263.5
12/12/01	21/12/01	4.9	78.0	114.4	72.0	239.5	51.6	25.1	226.5	5.6	< 1.0	49.2	58.0	58.0	2.5
21/12/01	02/01/02	5.5	28.0	5.2	14.3	156.4	31.2	6.6	183.1	3.2	< 1.0	9.2	31.0	31.0	67.4

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5160	25.3	11.9	10.7	74.9	16.1	6.0	87.3	1.6	-	16.3	14.7	21.0	1925.1

Llyn Llydaw

2001

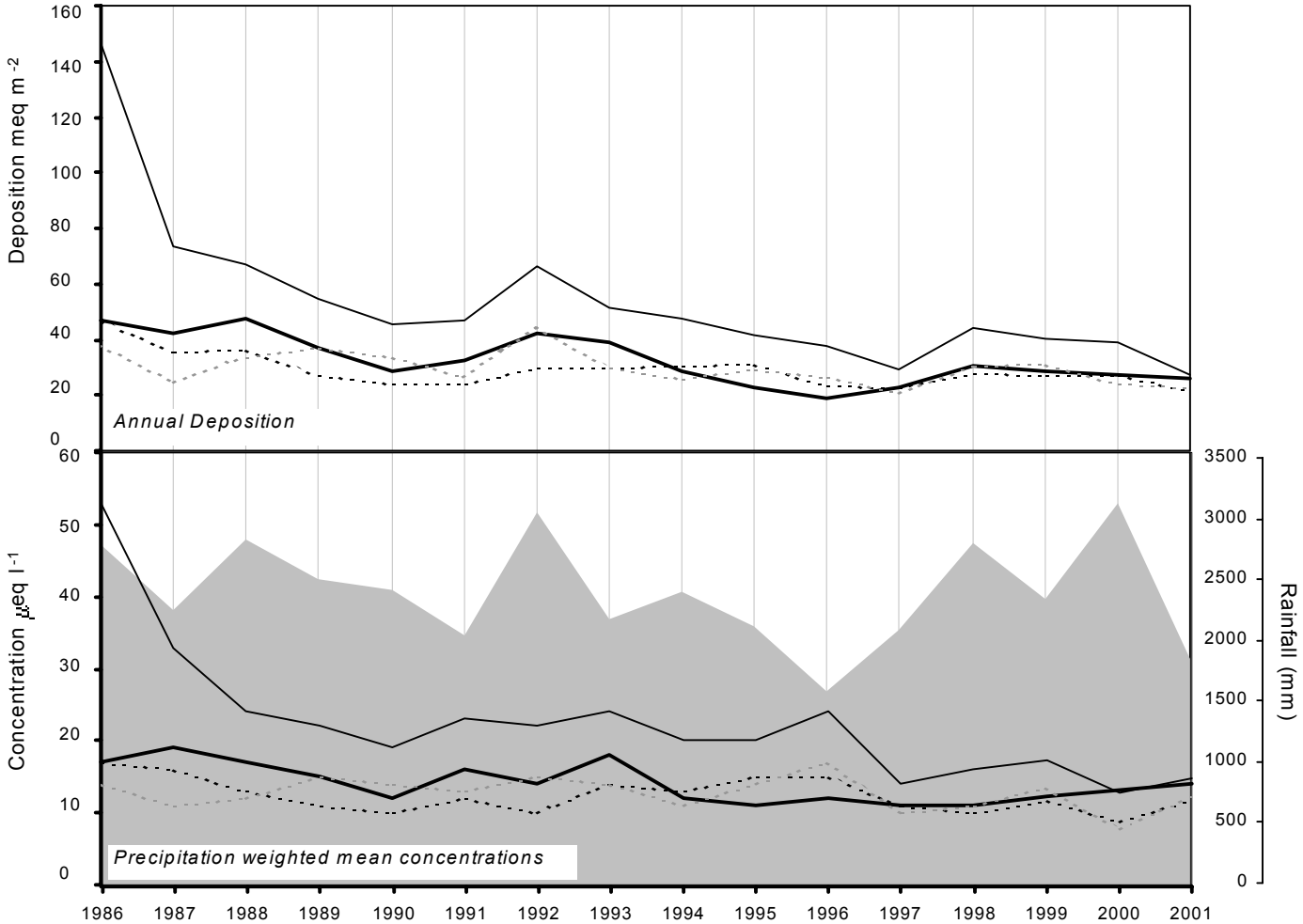
Site Code:	**5153**
Easting:	**2638**
Northing:	**3549**
Latitude:	**53 04 35 N**
Longitude:	**04 01 42 W**
Altitude (m):	**490**
Rainfall (mm):	**2417**

[30 year mean 1940 - 1971]

Site Environment:
Very open moorland in Snowdon Horseshoe

Other measurements:
DT

Site Operator:
Countryside Council for Wales



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-0.40 ueq/l (-2.37 %/year): 15 years' data
++ Moderately strong trend detected

non-marine sulphate
-1.48 ueq/l (-4.41 %/year): 16 years' data
++ Moderately strong trend detected

nitrate
-0.23 ueq/l (-1.65 %/year): 16 years' data
- No significant trend detected

ammonium
-0.15 ueq/l (-1.06 %/year): 16 years' data
- No significant trend detected

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
04/01/01	10/01/01	4.9	38.3	7.6	12.3	158.7	36.1	8.9	195.3	3.4	< 1.0	19.2	36.0	36.0	20.8
10/01/01	17/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17/01/01	24/01/01	4.9	24.8	10.6	5.8	131.4	28.8	6.5	162.8	2.8	< 1.0	8.9	30.0	30.0	41.6
24/01/01	31/01/01	5.1	29.4	5.3	6.6	165.4	36.5	8.6	192.9	3.9	< 1.0	9.5	33.0	33.0	28.9
31/01/01	07/02/01	4.6	17.1	6.2	4.0	74.2	16.5	3.8	90.1	1.5	< 1.0	8.2	19.0	19.0	90.7
07/02/01	14/02/01	4.7	12.0	4.7	2.5	37.9	8.2	2.8	44.5	0.8	< 1.0	7.4	12.0	12.0	61.8
14/02/01	21/02/01	4.7	81.6	72.1	57.0	88.8	22.3	34.1	95.0	2.7	< 1.0	70.9	-	-	2.2
21/02/01	25/04/01	4.8	24.4	14.6	15.3	53.0	12.4	4.7	62.1	1.2	< 1.0	18.0	19.0	19.0	320.1
Sample collection affected by Foot and Mouth Precautions 21/2/01 to 25/4/01															-
25/04/01	02/05/01	5.2	27.2	15.7	16.8	65.7	13.4	11.0	71.0	7.2	< 1.0	19.3	19.0	19.0	21.1
02/05/01	09/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09/05/01	16/05/01	4.4	55.8	54.9	52.4	8.2	3.4	18.1	7.1	1.6	< 1.0	54.8	29.0	29.0	28.1
16/05/01	23/05/01	4.4	47.2	34.4	28.5	24.4	5.8	7.5	29.9	0.4	< 1.0	44.2	28.0	28.0	4.8
23/05/01	30/05/01	4.8	16.2	13.5	8.9	7.5	2.4	6.3	8.0	< .5	< 1.0	15.3	10.0	10.0	20.2
30/05/01	06/06/01	5.3	54.9	28.9	48.0	99.0	23.5	20.9	119.1	1.9	< 1.0	42.9	29.0	29.0	8.3
06/06/01	13/06/01	5.3	37.4	15.9	26.4	120.0	27.4	12.9	139.7	3.5	< 1.0	22.9	28.0	28.0	10.6
13/06/01	20/06/01	4.7	20.1	18.9	18.0	18.0	4.2	3.7	20.1	0.6	< 1.0	17.9	13.0	13.0	32.0
20/06/01	27/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
27/06/01	04/07/01	6.7	49.6	28.6	135.7	26.9	11.6	4.5	29.8	12.5	46.3	46.4	26.0	26.0	5.0
04/07/01	11/07/01	5.2	27.2	12.2	17.0	105.2	25.0	10.9	121.5	2.2	< 1.0	14.6	23.0	23.0	43.5
11/07/01	18/07/01	4.4	61.0	57.1	65.9	71.2	16.0	12.8	86.0	1.9	< 1.0	52.4	38.0	38.0	22.1
18/07/01	25/07/01	5.0	26.8	12.7	11.7	66.1	14.8	8.0	77.0	1.5	< 1.0	18.8	20.0	20.0	16.0
25/07/01	01/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01/08/01	08/08/01	6.4	22.5	11.5	79.7	25.8	5.4	4.3	30.5	7.5	18.5	19.4	22.0	22.0	74.3
08/08/01	15/08/01	4.6	25.8	10.8	10.5	20.1	4.7	3.4	22.3	0.9	< 1.0	23.4	16.0	16.0	34.2
15/08/01	22/08/01	4.7	24.9	13.7	15.9	38.3	8.2	3.8	42.9	0.7	< 1.0	20.3	18.0	18.0	64.3
22/08/01	29/08/01	4.6	26.6	23.6	14.8	10.5	3.0	5.3	11.8	< .5	< 1.0	25.3	17.0	17.0	8.2
29/08/01	05/09/01	5.7	29.7	17.4	18.6	22.4	4.7	3.4	52.1	3.7	< 1.0	27.0	17.0	17.0	15.8
05/09/01	12/09/01	5.3	13.6	5.7	12.6	42.9	8.5	5.1	49.4	0.8	< 1.0	8.4	11.0	11.0	36.2
12/09/01	19/09/01	5.5	25.8	5.0	11.6	142.5	31.0	8.4	165.9	3.1	< 1.0	8.6	27.0	27.0	51.1
19/09/01	26/09/01	4.7	48.2	41.9	31.2	69.0	15.7	12.5	60.3	2.7	< 1.0	39.9	-	-	5.0
26/09/01	03/10/01	4.8	24.5	11.0	12.1	88.2	19.9	6.9	94.7	1.7	< 1.0	13.9	23.0	23.0	129.2
03/10/01	10/10/01	4.8	18.6	6.8	5.5	65.1	14.6	5.0	76.1	1.4	< 1.0	10.7	18.0	18.0	144.2
10/10/01	17/10/01	6.0	27.5	13.9	11.8	37.2	10.1	33.9	42.9	1.1	< 1.0	23.0	14.0	14.0	26.6
17/10/01	24/10/01	4.7	21.0	16.6	10.0	66.2	15.1	5.2	74.2	1.4	< 1.0	13.0	21.0	21.0	41.3
24/10/01	31/10/01	5.0	29.3	9.6	10.6	134.1	29.4	9.0	154.1	2.8	< 1.0	13.2	29.0	29.0	28.4
31/10/01	14/11/01	5.0	20.3	7.5	8.9	82.7	18.9	4.8	95.5	2.0	< 1.0	10.3	20.0	20.0	79.7
14/11/01	28/11/01	5.1	25.2	9.6	14.2	97.2	15.7	2.5	112.9	2.0	< 1.0	13.5	21.0	21.0	52.5
28/11/01	12/12/01	5.0	12.0	5.4	2.2	55.3	9.8	2.2	66.4	1.1	< 1.0	5.3	14.0	14.0	163.3
12/12/01	02/01/02	5.3	25.9	7.7	14.4	128.4	24.3	5.4	155.5	2.5	< 1.0	10.4	26.0	26.0	99.0

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5153	23.4	11.8	12.3	72.0	15.6	6.0	84.2	1.7	-	14.8	14.1	20.2	1831.2

River Etherow

2001

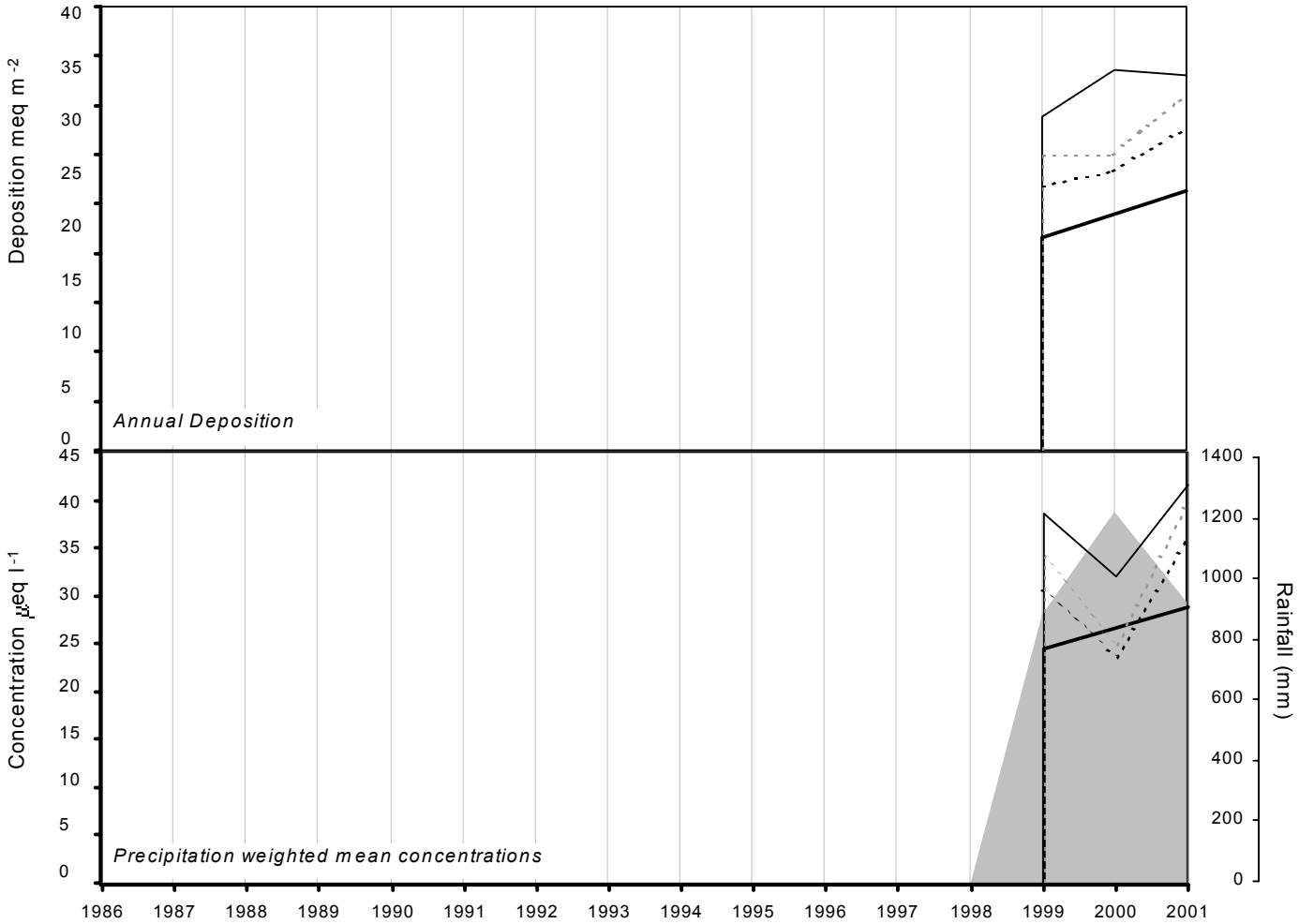
Site Code:	**5158**
Easting:	**4125**
Northing:	**3986**
Latitude:	**53 48 39 N**
Longitude:	**01 81 31 W**
Altitude (m):	**485**
Rainfall (mm):	**-**

[30 year mean 1940 - 1971]

Site Environment:
Moorland

Other measurements:
UKAWMN. Streamwater and soil chemistry

Site Operator:
ENSIS



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

non-marine sulphate
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

nitrate
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

ammonium
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

ACID DEPOSITION DATA REPORT, 2001

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
09/01/01	25/01/01	4.4	44.7	42.5	39.9	70.3	15.8	8.9	84.8	2.3	< 1.0	36.2	34.0	34.0	22.9
25/01/01	06/02/01	4.6	33.8	21.4	16.6	69.3	16.1	7.0	89.4	1.8	< 1.0	25.5	27.0	27.0	47.1
06/02/01	20/02/01	5.3	24.9	14.8	22.9	52.9	10.2	7.1	62.0	2.9	< 1.0	18.5	15.0	15.0	12.1
20/02/01	31/05/01	4.5	59.5	45.2	53.3	37.1	10.1	16.5	45.2	1.3	< 1.0	55.0	32.0	32.0	270.5
Sample collection affected by Foot and Mouth Precautions 20/2/01 to 31/5/01															-
31/05/01	12/06/01	5.2	55.0	29.9	49.7	67.9	16.8	19.1	82.0	2.1	< 1.0	46.8	26.0	26.0	15.8
12/06/01	26/06/01	4.3	84.1	96.9	80.5	24.1	9.4	48.3	22.7	1.4	< 1.0	81.2	42.0	42.0	8.2
26/06/01	10/07/01	4.5	157.1	166.2	140.2	69.5	27.0	99.4	49.8	3.7	< 1.0	148.7	62.0	62.0	7.0
10/07/01	24/07/01	4.5	56.3	51.6	56.0	52.9	13.8	13.9	61.1	1.6	< 1.0	50.0	30.0	30.0	53.8
24/07/01	08/08/01	4.6	31.0	23.5	17.0	8.2	2.6	14.9	8.0	< .5	< 1.0	30.0	17.0	17.0	51.2
08/08/01	21/08/01	4.4	50.4	34.6	39.3	13.6	4.5	14.0	15.8	1.0	< 1.0	48.8	23.0	23.0	43.2
21/08/01	04/09/01	4.9	64.4	67.2	56.4	42.1	11.6	46.4	42.0	2.0	< 1.0	59.3	31.0	31.0	9.9
04/09/01	18/09/01	5.2	27.6	9.7	22.0	71.6	16.0	7.8	80.9	1.6	< 1.0	19.0	18.0	18.0	41.2
18/09/01	02/10/01	4.2	52.9	41.9	34.4	20.9	5.2	7.9	25.9	0.9	< 1.0	50.4	32.0	32.0	55.2
02/10/01	16/10/01	5.0	27.4	20.0	21.5	35.1	8.7	14.7	38.6	1.3	< 1.0	23.2	15.0	15.0	74.0
16/10/01	30/10/01	4.4	32.8	37.0	28.6	20.2	5.0	7.4	24.4	1.6	< 1.0	30.3	22.0	22.0	73.0
30/10/01	15/11/01	4.9	57.2	23.4	45.8	154.7	35.1	14.2	181.5	3.9	< 1.0	38.5	38.0	38.0	26.9
15/11/01	27/11/01	5.1	44.1	21.3	47.5	63.2	14.3	8.6	72.4	1.4	< 1.0	36.5	22.0	22.0	23.2
27/11/01	11/12/01	4.9	25.4	11.6	15.2	75.0	14.6	7.1	87.8	1.6	< 1.0	16.4	20.0	20.0	46.3
11/12/01	28/12/01	4.8	51.9	28.4	48.9	112.0	23.7	9.9	130.2	3.2	< 1.0	38.4	34.0	34.0	31.0
28/12/01	10/01/02	4.7	197.4	261.1	167.8	385.1	94.5	77.8	385.1	11.9	< 1.0	151.0	-	-	1.6

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5158	47.3	35.9	39.7	47.0	11.5	14.0	55.2	1.5	-	41.6	28.8	27.0	914.1

Wardlow Hay Cop

2001

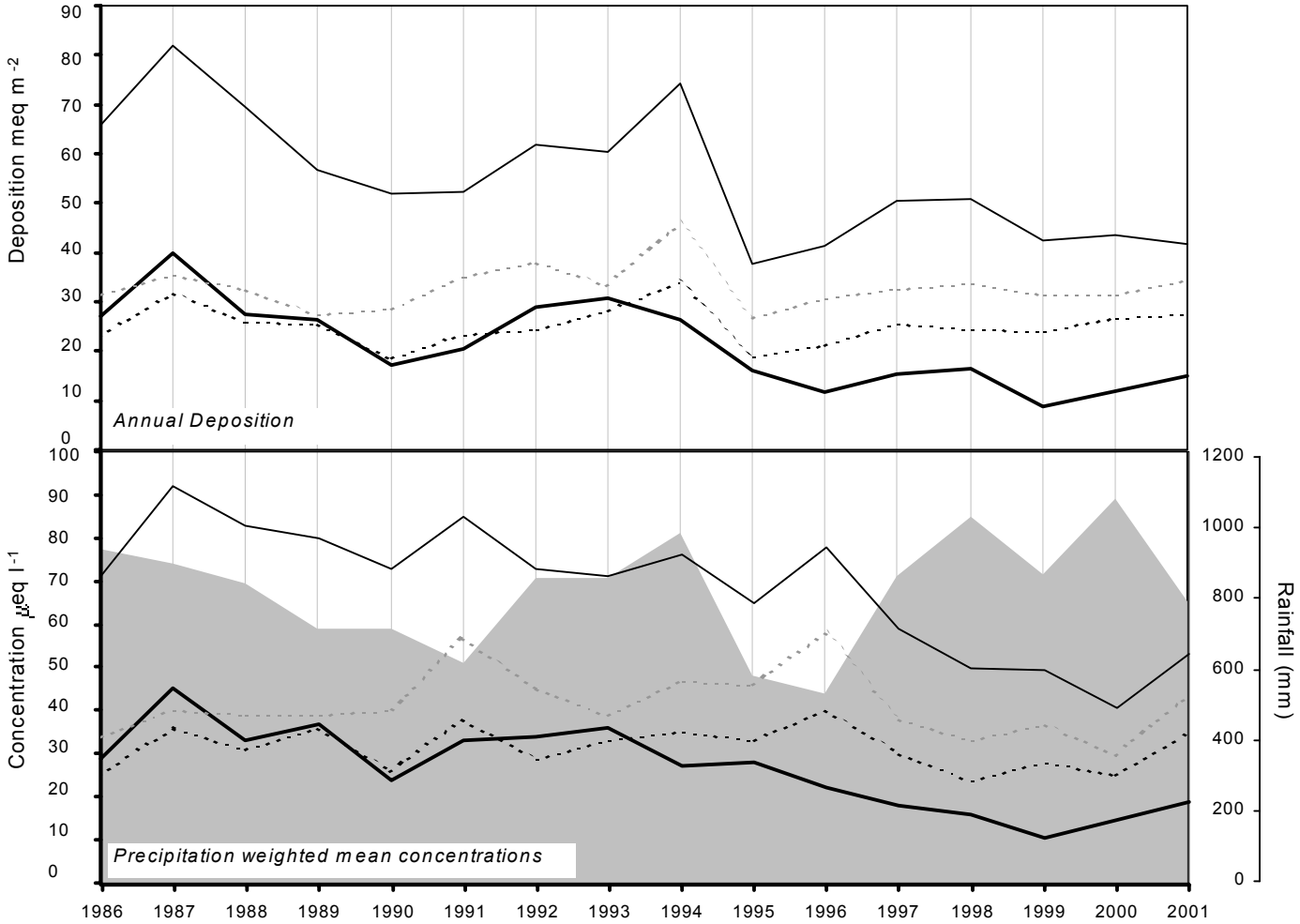
Site Code:	**5120**
Easting:	**4177**
Northing:	**3739**
Latitude:	**53 55 41 N**
Longitude:	**01 44 05 W**
Altitude (m):	**350**
Rainfall (mm):	**1081**

[30 year mean 1940 - 1971]

Site Environment:
Open moorland

Other measurements:
DT

Site Operator:
English Nature



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-1.60 ueq/l (-4.12 %/year): 15 years' data
++ Moderately strong trend detected

non-marine sulphate
-2.54 ueq/l (-2.90 %/year): 16 years' data
+++ Strong trend detected

nitrate
-0.12 ueq/l (-0.38 %/year): 16 years' data
- No significant trend detected

ammonium
-0.09 ueq/l (-0.22 %/year): 16 years' data
- No significant trend detected

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
06/01/01	14/01/01	4.7	81.0	21.5	30.9	111.4	25.7	46.0	138.8	3.4	< 1.0	67.6	38.0	38.0	10.6
14/01/01	21/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7
21/01/01	28/01/01	4.6	63.9	34.4	48.5	78.6	17.3	26.5	111.3	4.0	< 1.0	54.4	34.0	34.0	23.1
28/01/01	04/02/01	5.1	63.5	34.5	46.5	40.7	7.7	42.5	49.2	4.0	< 1.0	58.6	24.0	24.0	16.5
04/02/01	11/02/01	4.5	35.2	12.8	18.5	41.9	9.4	9.8	53.6	0.9	< 1.0	30.1	19.0	19.0	31.4
11/02/01	18/02/01	4.8	40.9	11.5	27.9	18.7	4.5	13.6	20.2	0.7	< 1.0	38.7	14.0	14.0	16.1
18/02/01	25/02/01	6.2	144.8	58.8	130.0	82.0	17.0	111.5	102.2	2.4	< 1.0	134.9	46.0	46.0	4.2
25/02/01	04/03/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04/03/01	20/05/01	4.6	67.2	47.5	56.0	35.8	10.2	35.2	44.7	1.3	< 1.0	62.9	30.0	30.0	185.8
Sample collection affected by Foot and Mouth Precautions 4/3/01 to 20/5/01															-
20/05/01	27/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27/05/01	11/06/01	6.9	83.4	27.1	43.6	67.0	17.4	174.2	77.3	4.7	< 1.0	75.4	42.0	42.0	12.0
11/06/01	17/06/01	6.4	80.6	56.0	72.8	37.4	7.2	77.1	39.7	14.0	< 1.0	76.1	31.0	31.0	9.5
17/06/01	08/07/01	6.7	127.2	100.9	86.6	40.5	18.7	189.4	42.9	11.6	< 1.0	122.3	51.0	51.0	10.4
08/07/01	17/07/01	5.4	48.5	39.4	43.3	29.0	7.9	40.0	34.7	2.4	< 1.0	45.0	20.0	20.0	30.0
17/07/01	22/07/01	5.3	53.9	43.6	45.2	31.9	8.5	37.8	38.6	2.6	< 1.0	50.1	21.0	21.0	31.0
22/07/01	29/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29/07/01	05/08/01	6.8	92.4	89.4	38.8	17.9	10.3	235.8	20.3	6.0	< 1.0	90.2	47.0	47.0	6.6
05/08/01	12/08/01	4.8	39.2	15.5	22.1	10.4	2.7	20.6	12.0	1.2	< 1.0	37.9	16.0	16.0	48.3
12/08/01	19/08/01	4.6	54.9	53.9	66.9	6.8	3.2	26.7	8.7	1.7	< 1.0	54.1	24.0	24.0	29.6
19/08/01	27/08/01	5.1	186.0	155.3	192.4	34.4	13.2	146.9	49.5	4.6	< 1.0	181.9	58.0	58.0	1.9
27/08/01	04/09/01	6.7	160.3	82.7	78.8	117.0	28.3	235.5	139.0	10.3	< 1.0	146.2	64.0	64.0	3.2
04/09/01	16/09/01	6.2	44.9	9.6	33.1	121.4	20.8	60.7	118.8	7.1	< 1.0	30.3	32.0	32.0	32.2
16/09/01	23/09/01	5.5	103.2	48.1	73.3	57.0	15.9	74.6	67.1	2.9	< 1.0	96.3	33.0	33.0	6.0
23/09/01	01/10/01	4.2	48.1	35.3	26.5	18.3	3.7	6.0	25.2	0.8	< 1.0	46.0	31.0	31.0	63.0
01/10/01	07/10/01	5.1	47.9	20.8	28.6	74.7	17.1	30.9	89.7	1.9	22.3	38.9	24.0	24.0	17.3
07/10/01	14/10/01	5.3	7.5	5.0	11.4	29.5	6.6	12.9	13.6	1.0	< 1.0	3.9	11.0	11.0	32.2
14/10/01	21/10/01	4.6	65.0	56.2	69.3	19.4	6.0	25.6	24.8	2.5	< 1.0	62.7	27.0	27.0	32.1
21/10/01	28/10/01	4.5	25.2	20.8	17.7	13.8	2.4	4.5	14.7	0.6	< 1.0	23.6	16.0	16.0	38.9
28/10/01	04/11/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04/11/01	11/11/01	6.0	81.5	17.6	29.2	187.1	40.6	92.1	217.6	5.6	< 1.0	59.0	47.0	47.0	17.6
11/11/01	25/11/01	6.3	98.1	30.0	67.5	65.2	16.6	80.7	74.1	3.6	< 1.0	90.3	34.0	34.0	9.7
25/11/01	09/12/01	5.4	56.6	14.8	34.6	107.5	20.8	27.0	131.7	2.4	< 1.0	43.6	29.0	29.0	34.4
09/12/01	23/12/01	5.3	115.4	48.1	90.7	219.1	49.7	51.8	266.1	5.2	< 1.0	89.0	55.0	55.0	11.1
23/12/01	31/12/01	6.2	91.5	14.3	48.1	189.0	38.7	60.2	228.6	7.3	< 1.0	68.7	45.0	45.0	20.2
31/12/01	13/01/02	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5120	59.0	34.8	43.9	50.0	11.6	39.3	59.1	2.6	-	53.0	19.0	28.1	785.9

Driby

2001

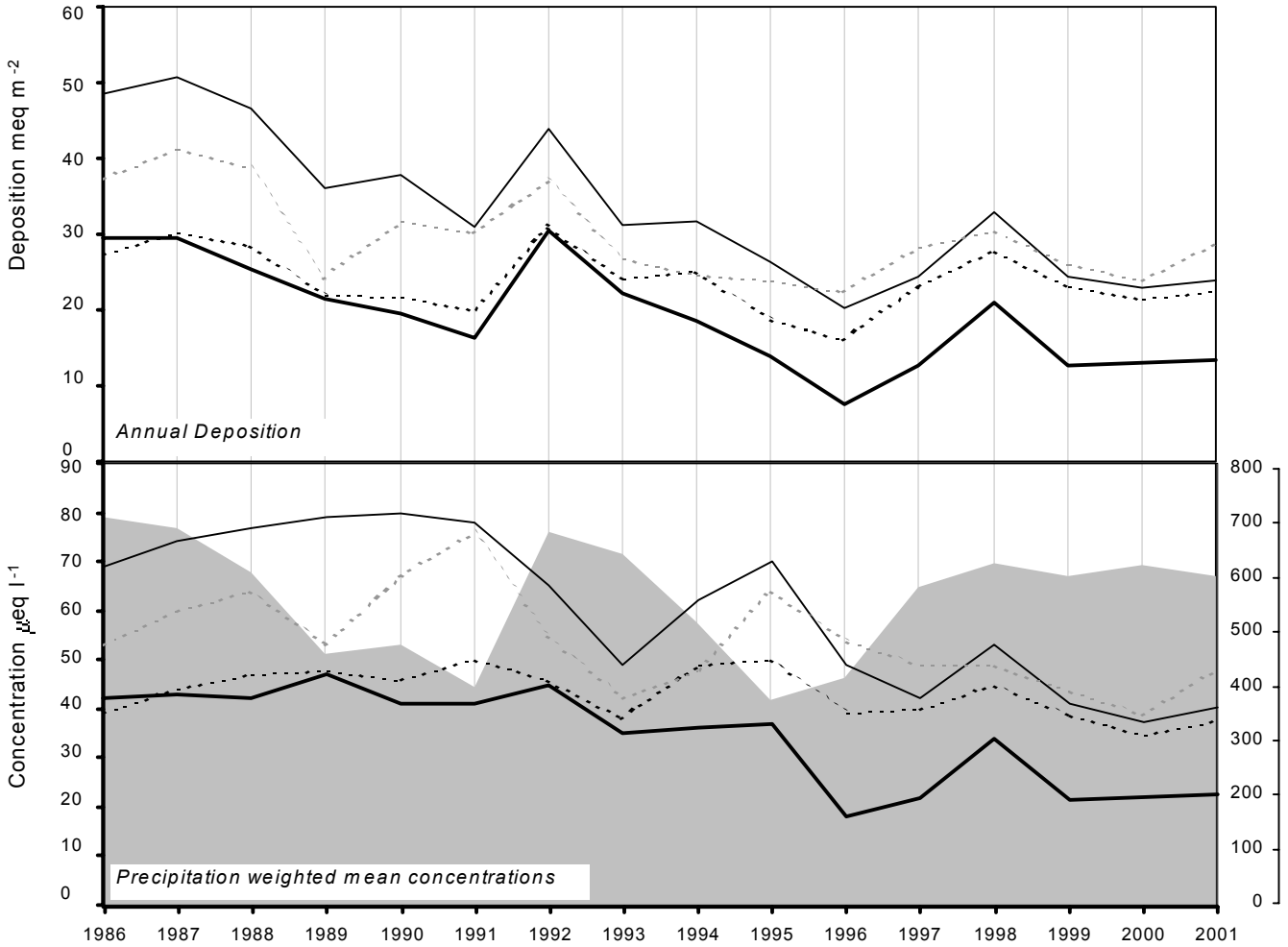
Site Code:	**5136**
Easting:	**5386**
Northing:	**3744**
Latitude:	**53 14 54 N**
Longitude:	**00 04 39 E**
Altitude (m):	**47**
Rainfall (mm):	**737**

[30 year mean 1940 - 1971]

Site Environment:
Sheep pasture

Other measurements:
DT, Met

Site Operator:
Anglian Water Services Ltd



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-1.71 ueq/l (-3.62 %/year): 15 years' data
+++ Strong trend detected

non-marine sulphate
-2.83 ueq/l (-3.47 %/year): 16 years' data
+++ Strong trend detected

nitrate
-0.48 ueq/l (-1.03 %/year): 16 years' data
- No significant trend detected

ammonium
-1.20 ueq/l (-1.90 %/year): 16 years' data
+ Significant trend detected

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
03/01/01	10/01/01	4.6	27.4	17.7	24.8	25.2	6.1	4.3	31.4	0.8	< 1.0	24.3	17.0	17.0	15.7
10/01/01	17/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
17/01/01	24/01/01	4.2	45.0	65.2	48.5	48.1	10.9	6.9	68.2	2.1	< 1.0	39.2	42.0	42.0	12.1
24/01/01	31/01/01	4.3	45.0	44.6	50.0	49.8	12.2	10.6	62.0	1.1	< 1.0	39.0	39.0	39.0	9.6
31/01/01	07/02/01	4.5	23.6	25.6	19.2	29.3	7.0	3.1	36.4	0.9	< 1.0	20.0	20.0	20.0	46.9
07/02/01	14/02/01	4.7	49.8	32.0	29.3	105.2	24.8	21.2	126.3	2.5	< 1.0	37.1	35.0	35.0	6.0
14/02/01	21/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
21/02/01	28/02/01	4.8	100.9	65.2	106.4	132.7	30.6	33.9	161.1	3.5	< 1.0	84.9	51.0	51.0	7.8
28/02/01	07/03/01	4.8	52.4	43.5	45.5	149.3	34.0	14.8	168.1	3.8	< 1.0	34.4	40.0	40.0	11.3
07/03/01	14/03/01	4.8	55.2	35.5	67.5	39.7	9.3	13.7	49.1	2.6	< 1.0	50.4	26.0	26.0	1.4
14/03/01	21/03/01	Sample leaked into polythene bag- no sample analysed													6.0
21/03/01	28/03/01	4.3	70.7	85.7	73.7	93.2	22.6	14.3	105.1	3.1	< 1.0	59.5	52.0	52.0	6.7
28/03/01	04/04/01	4.6	44.6	32.0	47.7	19.8	6.0	10.5	27.3	0.9	< 1.0	42.2	23.0	23.0	15.7
04/04/01	11/04/01	4.8	41.9	27.2	40.5	38.6	8.9	9.4	51.3	1.2	< 1.0	37.2	23.0	23.0	16.0
11/04/01	18/04/01	5.2	87.5	28.2	77.8	142.0	33.7	22.5	177.0	3.4	< 1.0	70.4	44.0	44.0	7.3
18/04/01	25/04/01	4.9	70.9	61.1	104.8	149.4	36.0	18.5	157.2	3.7	< 1.0	52.9	51.0	51.0	13.1
25/04/01	02/05/01	4.8	51.2	36.3	65.3	16.1	5.2	10.2	21.2	< .5	< 1.0	49.3	20.0	20.0	17.6
02/05/01	09/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09/05/01	16/05/01	5.1	69.8	72.7	87.8	58.6	14.2	27.2	58.5	3.8	< 1.0	62.7	30.0	30.0	5.5
16/05/01	23/05/01	5.0	26.8	30.2	48.0	7.1	2.3	5.9	8.8	< .5	< 1.0	25.9	13.0	13.0	13.8
23/05/01	30/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2
30/05/01	13/06/01	6.3	87.2	48.9	96.4	60.2	19.1	46.8	67.6	4.3	< 1.0	80.0	34.0	34.0	13.1
13/06/01	20/06/01	4.5	38.7	46.6	47.9	14.7	4.3	9.6	17.0	1.4	< 1.0	36.9	24.0	24.0	29.5
20/06/01	27/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
27/06/01	04/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04/07/01	11/07/01	4.7	105.6	88.3	93.5	38.8	16.0	60.6	50.0	5.7	< 1.0	100.9	39.0	39.0	7.3
11/07/01	18/07/01	4.7	50.9	47.8	49.1	116.2	26.3	13.7	140.2	3.0	< 1.0	36.9	39.0	39.0	52.8
18/07/01	25/07/01	4.6	23.4	20.0	9.5	48.5	11.7	5.1	59.4	1.4	< 1.0	17.6	20.0	20.0	15.6
25/07/01	01/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01/08/01	08/08/01	4.9	40.2	32.4	45.2	9.5	4.0	16.9	11.9	1.7	< 1.0	39.0	17.0	17.0	26.1
08/08/01	17/08/01	4.3	56.2	40.9	45.4	18.5	5.4	10.0	23.1	1.9	< 1.0	54.0	30.0	30.0	10.6
17/08/01	29/08/01	4.8	71.5	86.2	108.5	8.5	5.1	39.5	12.0	3.4	< 1.0	70.4	30.0	30.0	29.0
29/08/01	05/09/01	4.7	149.3	121.0	136.6	83.4	17.7	71.3	87.4	16.5	< 1.0	139.3	-	-	1.4
05/09/01	12/09/01	4.6	67.5	18.8	31.6	27.0	7.8	16.8	33.9	1.4	< 1.0	64.3	26.0	26.0	4.0
12/09/01	19/09/01	4.7	50.7	19.1	37.2	108.7	24.7	12.8	123.0	3.3	< 1.0	37.6	32.0	32.0	38.2
19/09/01	26/09/01	4.3	46.9	51.8	37.5	115.7	25.7	12.5	109.6	4.0	< 1.0	32.9	50.0	50.0	6.8
26/09/01	03/10/01	4.7	29.5	25.7	37.2	14.5	3.3	5.7	16.3	0.6	< 1.0	27.7	15.0	15.0	26.7
03/10/01	10/10/01	5.0	31.8	22.5	24.5	63.6	14.2	11.1	74.3	2.0	< 1.0	24.1	21.0	21.0	6.7
10/10/01	17/10/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
17/10/01	24/10/01	4.4	43.4	48.4	41.4	31.0	7.1	7.6	34.0	1.0	< 1.0	39.6	29.0	29.0	28.5
24/10/01	31/10/01	5.1	27.9	15.9	25.4	23.2	4.2	4.8	24.3	0.9	< 1.0	25.1	13.0	13.0	13.9
31/10/01	07/11/01	4.7	140.6	50.2	118.6	158.5	40.7	52.4	195.8	6.5	< 1.0	121.5	58.0	58.0	3.0
07/11/01	23/11/01	5.0	75.0	11.7	18.7	438.0	95.9	22.9	517.6	9.4	< 1.0	22.3	78.0	78.0	25.2
23/11/01	05/12/01	4.9	33.0	16.1	35.3	34.8	4.4	1.7	44.3	0.8	< 1.0	28.9	17.0	17.0	31.4
05/12/01	19/12/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9
19/12/01	02/01/02	4.7	83.7	24.8	56.2	259.5	59.6	18.6	306.0	5.7	< 1.0	52.5	59.0	59.0	11.7

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5136	49.1	37.7	48.1	73.8	17.2	14.1	87.2	2.4	-	40.2	22.5	30.6	597.5

Jenny Hurn

2001

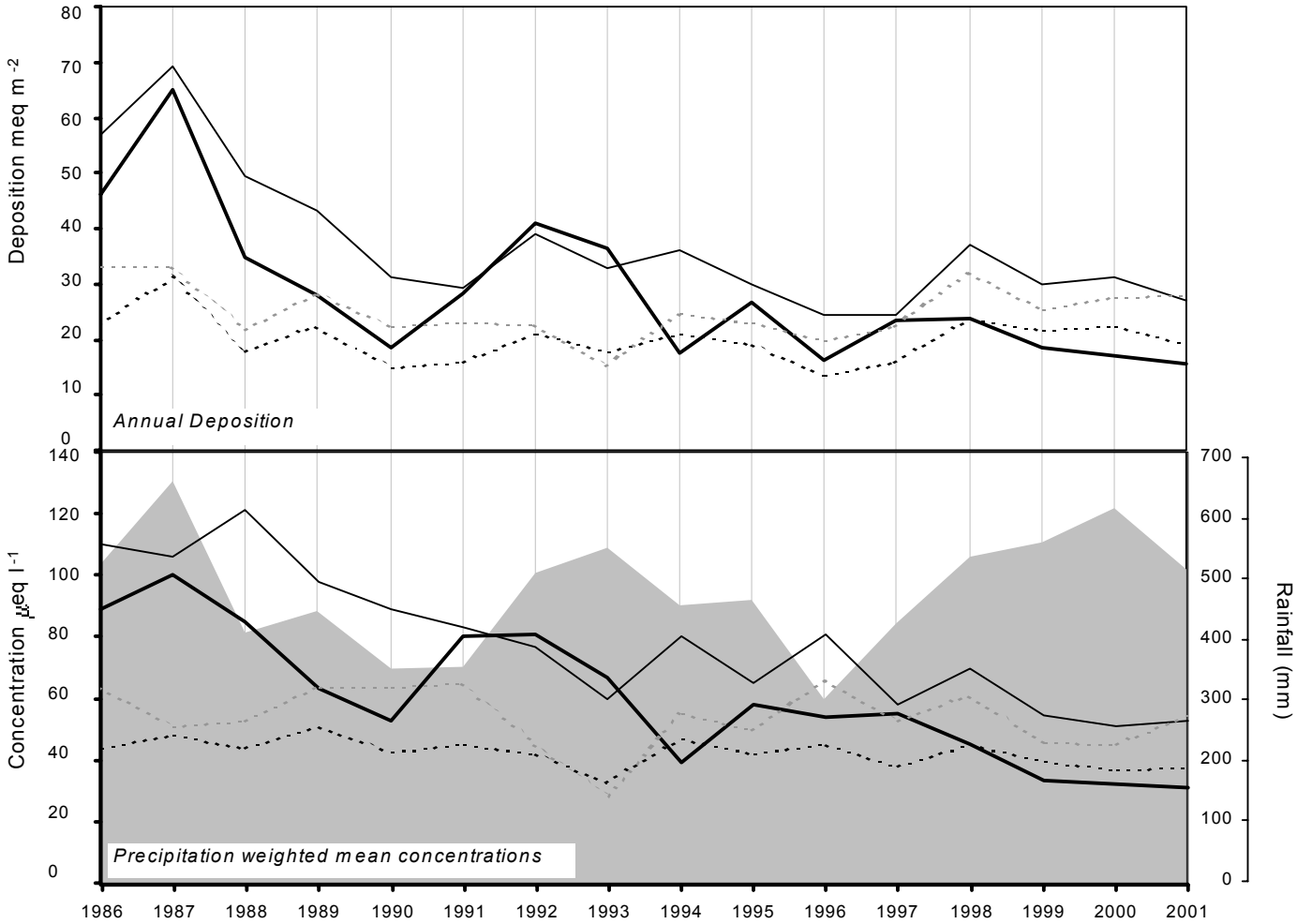
Site Code:	**5118**
Easting:	**4816**
Northing:	**3986**
Latitude:	**53 28 39 N**
Longitude:	**00 46 13 W**
Altitude (m):	**4**
Rainfall (mm):	**563**

[30 year mean 1940 - 1971]

Site Environment:
Open arable land

Other measurements:
DT, SO2 (PowerGen)

Site Operator:
PowerGen



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-3.92 ueq/l (-4.36 %/year): 15 years' data
+++ Strong trend detected

non-marine sulphate
-4.13 ueq/l (-3.77 %/year): 16 years' data
++++ Very strong trend detected

nitrate
-0.54 ueq/l (-1.15 %/year): 16 years' data
\+ Significant trend detected

ammonium
-0.52 ueq/l (-0.91 %/year): 16 years' data
\- No significant trend detected

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
02/01/01	09/01/01	4.3	52.1	24.9	49.8	55.4	14.8	14.3	93.5	1.5	< 1.0	45.4	38.0	38.0	4.5
09/01/01	16/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16/01/01	23/01/01	4.2	70.7	57.9	90.2	17.2	6.1	12.1	36.6	1.2	< 1.0	68.6	39.0	39.0	7.9
23/01/01	30/01/01	4.3	50.8	12.3	33.7	47.2	12.3	9.9	80.8	2.9	< 1.0	45.1	31.0	31.0	11.2
30/01/01	06/02/01	4.3	27.0	29.1	20.0	12.4	3.7	4.4	33.2	0.6	< 1.0	25.5	29.0	29.0	35.7
06/02/01	13/02/01	4.7	56.6	26.7	32.7	47.1	14.8	26.5	58.0	1.5	< 1.0	50.9	26.0	26.0	10.5
13/02/01	20/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20/02/01	27/02/01	5.0	96.3	58.1	107.0	123.2	32.6	52.0	159.1	3.1	< 1.0	81.5	45.0	45.0	5.4
27/02/01	27/03/01	4.4	85.9	65.4	78.8	109.0	30.8	37.4	140.8	3.2	< 1.0	72.8	51.0	51.0	28.3
Sample collection affected by Foot and Mouth Precautions 27/2/01 to 27/3/01															-
27/03/01	03/04/01	4.4	69.5	57.1	93.1	19.6	7.3	16.2	42.3	1.2	< 1.0	67.2	35.0	35.0	14.6
03/04/01	10/04/01	4.4	40.4	17.8	32.8	27.2	7.9	9.1	53.6	0.9	< 1.0	37.1	29.0	29.0	23.8
10/04/01	17/04/01	6.3	43.6	17.6	47.5	29.3	11.7	29.3	35.2	1.8	< 1.0	40.1	18.0	18.0	6.7
17/04/01	24/04/01	5.0	75.5	45.2	79.5	104.7	28.3	26.3	141.4	2.9	< 1.0	62.9	40.0	40.0	11.4
24/04/01	01/05/01	4.3	80.1	52.9	91.7	30.3	10.6	18.1	58.5	1.3	< 1.0	76.4	41.0	41.0	18.4
01/05/01	08/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
08/05/01	15/05/01	6.3	129.4	77.7	143.1	19.0	18.0	81.4	21.2	2.4	< 1.0	127.1	38.0	38.0	15.1
15/05/01	22/05/01	4.4	75.3	42.6	81.0	15.1	4.9	9.1	27.2	0.8	< 1.0	73.5	33.0	33.0	13.5
22/05/01	29/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29/05/01	05/06/01	6.6	54.6	26.3	24.9	26.5	36.8	118.4	33.3	2.9	< 1.0	51.4	27.0	27.0	1.9
05/06/01	12/06/01	6.3	100.2	52.1	76.5	52.1	25.4	74.3	53.6	4.1	< 1.0	93.9	32.0	32.0	1.5
12/06/01	19/06/01	5.0	39.1	31.6	48.6	11.8	5.5	14.5	13.8	1.2	< 1.0	37.7	16.0	16.0	39.8
19/06/01	26/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26/06/01	03/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
03/07/01	10/07/01	6.1	212.4	182.1	137.4	20.4	63.4	208.3	31.0	75.4	< 1.0	210.0	69.0	69.0	2.2
10/07/01	17/07/01	5.9	54.6	16.4	39.2	45.1	15.4	27.3	56.3	2.5	< 1.0	49.2	20.0	20.0	6.4
17/07/01	24/07/01	4.7	55.4	51.2	56.0	93.5	24.5	21.7	112.1	4.1	< 1.0	44.1	38.0	38.0	20.8
24/07/01	31/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31/07/01	07/08/01	4.6	62.2	38.1	52.0	6.9	7.1	24.4	13.8	1.4	< 1.0	61.4	24.0	24.0	17.5
07/08/01	14/08/01	4.4	59.3	36.3	36.7	13.8	5.5	11.0	19.3	1.4	< 1.0	57.7	32.0	32.0	18.2
14/08/01	21/08/01	4.9	47.5	40.5	47.0	6.6	6.0	25.3	8.0	2.9	< 1.0	46.8	21.0	21.0	8.3
21/08/01	28/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28/08/01	04/09/01	5.0	295.2	325.8	324.2	56.8	68.0	241.8	93.3	24.0	< 1.0	288.4	-	-	1.8
04/09/01	11/09/01	6.2	32.5	11.2	37.0	12.4	11.0	26.1	20.7	1.5	< 1.0	31.0	13.0	13.0	8.0
11/09/01	18/09/01	5.4	82.8	28.7	70.8	80.8	23.7	35.2	95.6	3.8	< 1.0	73.0	31.0	31.0	9.4
18/09/01	25/09/01	4.4	53.0	39.1	38.8	47.4	12.2	10.4	138.2	2.0	24.1	47.2	29.0	29.0	38.5
25/09/01	02/10/01	4.2	46.6	30.5	42.2	13.0	3.9	5.3	34.3	0.7	< 1.0	45.1	33.0	33.0	20.4
02/10/01	09/10/01	4.9	37.0	14.1	23.8	43.1	12.2	16.3	58.7	1.4	< 1.0	31.9	19.0	19.0	17.6
09/10/01	16/10/01	-	-	-	-	-	-	-	-	-	-	-	-	-	2.8
16/10/01	23/10/01	4.4	44.9	51.0	55.1	10.1	2.9	6.8	12.2	1.1	< 1.0	43.6	25.0	25.0	32.1
23/10/01	30/10/01	4.3	31.1	9.0	14.0	11.4	3.0	3.4	33.0	< .5	< 1.0	29.8	23.0	23.0	24.7
30/10/01	06/11/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5
06/11/01	13/11/01	5.2	51.6	12.0	28.0	196.3	44.7	18.5	243.0	4.7	< 1.0	28.0	41.0	41.0	15.1
13/11/01	20/11/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20/11/01	27/11/01	5.5	151.7	30.1	113.2	121.1	33.2	48.1	147.3	5.7	< 1.0	137.1	44.0	44.0	2.5
27/11/01	04/12/01	4.6	39.8	17.7	46.6	25.0	7.8	6.2	41.4	0.6	< 1.0	36.8	22.0	22.0	12.9

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5118	57.3	37.6	54.5	39.4	12.6	20.7	56.9	2.2	-	52.6	30.8	30.3	511.6

Thorganby

2001

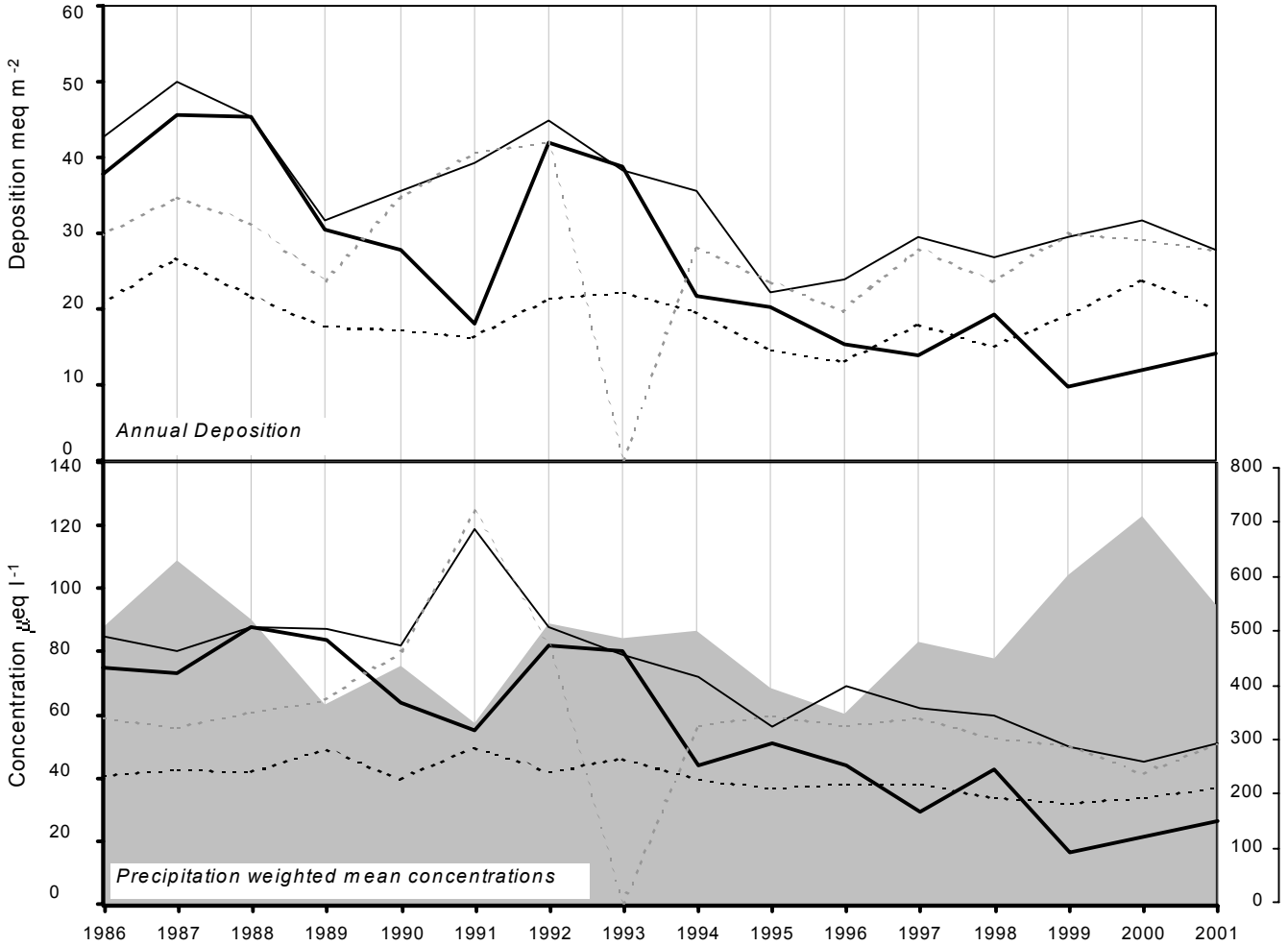
Site Code:	**5117**
Easting:	**4676**
Northing:	**4428**
Latitude:	**53 52 36 N**
Longitude:	**00 58 19 W**
Altitude (m):	**8**
Rainfall (mm):	**565**

[30 year mean 1940 - 1971]

Site Environment:
Open meadow and arable land

Other measurements:
DT

Site Operator:
Selby District Council



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-4.29 ueq/l (-4.91 %/year): 15 years' data
+++ Strong trend detected

non-marine sulphate
-3.12 ueq/l (-3.23 %/year): 16 years' data
++ Moderately strong trend detected

nitrate
-0.75 ueq/l (-1.64 %/year): 16 years' data
++ Moderately strong trend detected

ammonium
-1.65 ueq/l (-2.14 %/year): 15 years' data
- No significant trend detected

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
03/01/01	10/01/01	4.2	63.8	27.4	144.6	153.7	32.6	29.5	123.2	5.8	< 1.0	45.2	75.0	75.0	1.9
10/01/01	17/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4
17/01/01	24/01/01	4.3	66.7	68.6	82.4	30.1	7.4	12.7	40.6	3.1	< 1.0	63.1	35.0	35.0	12.6
24/01/01	31/01/01	4.3	80.3	43.2	86.0	63.2	18.0	22.4	129.2	3.2	< 1.0	72.7	47.0	47.0	4.9
31/01/01	07/02/01	4.3	34.4	27.0	25.8	17.7	4.3	3.8	35.3	1.0	< 1.0	32.2	29.0	29.0	45.0
07/02/01	14/02/01	4.5	45.5	21.4	29.4	19.0	5.7	8.3	26.6	0.7	< 1.0	43.2	24.0	24.0	19.1
14/02/01	21/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
21/02/01	28/02/01	4.4	55.9	51.7	71.8	52.4	13.6	21.8	80.2	1.6	< 1.0	49.6	35.0	35.0	9.6
28/02/01	07/03/01	6.3	53.2	59.9	14.4	46.4	30.7	164.2	51.9	7.6	< 1.0	47.7	36.0	36.0	10.7
07/03/01	14/03/01	5.6	207.7	43.8	186.5	65.9	26.2	88.8	117.4	4.2	< 1.0	199.7	54.0	54.0	2.8
14/03/01	21/03/01	5.0	177.4	100.6	162.3	532.8	111.0	102.8	658.4	15.4	< 1.0	113.3	-	-	1.1
21/03/01	28/03/01	4.2	50.4	63.6	64.2	41.0	11.2	11.4	57.5	1.3	< 1.0	45.4	40.0	40.0	25.3
28/03/01	04/04/01	4.5	67.2	40.5	44.5	24.6	13.6	45.3	56.9	2.0	< 1.0	64.2	36.0	36.0	13.0
04/04/01	11/04/01	5.2	56.6	19.1	28.0	26.2	14.5	52.3	47.5	1.1	< 1.0	53.5	21.0	21.0	23.4
11/04/01	18/04/01	-	-	-	-	-	-	-	-	-	-	-	-	-	5.3
18/04/01	25/04/01	5.1	80.6	60.3	92.0	124.8	32.9	30.9	151.3	3.2	< 1.0	65.5	44.0	44.0	13.2
25/04/01	02/05/01	4.9	78.4	51.8	86.8	25.3	12.2	54.8	52.9	2.3	< 1.0	75.3	33.0	33.0	11.1
02/05/01	09/05/01	5.0	481.6	201.7	971.9	215.2	28.4	115.8	165.1	430.2	1537.5	455.7	-	-	0.8
09/05/01	16/05/01	4.9	88.4	136.0	155.8	49.6	20.8	72.4	86.1	5.3	< 1.0	82.4	50.0	50.0	7.7
16/05/01	23/05/01	7.7	127.9	57.6	215.9	494.2	18.2	108.5	479.6	237.9	< 1.0	68.4	155.0	155.0	2.4
23/05/01	30/05/01	6.5	74.9	38.9	133.2	26.6	17.9	80.7	30.9	9.2	5.7	71.7	38.0	38.0	9.2
30/05/01	06/06/01	6.2	36.4	24.7	43.2	33.9	11.1	33.3	41.5	2.9	< 1.0	32.3	18.0	18.0	4.5
06/06/01	13/06/01	6.4	52.4	20.7	98.5	42.7	16.2	36.5	53.6	5.2	7.3	47.3	28.0	28.0	9.2
13/06/01	20/06/01	4.2	71.3	55.0	59.8	11.5	6.0	19.6	22.6	1.8	< 1.0	69.9	39.0	39.0	24.7
20/06/01	27/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27/06/01	04/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4
04/07/01	11/07/01	5.7	22.3	15.8	7.1	11.5	9.3	33.7	29.9	1.9	< 1.0	20.9	12.0	12.0	19.7
11/07/01	18/07/01	4.6	49.5	41.0	33.8	62.4	19.3	26.9	77.5	3.0	< 1.0	41.9	28.0	28.0	15.2
18/07/01	25/07/01	4.8	75.0	67.2	82.3	127.1	34.1	34.0	152.4	5.8	< 1.0	59.7	44.0	44.0	3.2
25/07/01	01/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
01/08/01	08/08/01	5.2	57.6	33.0	45.5	8.3	8.0	34.1	11.0	1.2	< 1.0	56.6	18.0	18.0	37.6
08/08/01	15/08/01	4.6	66.4	29.7	53.2	11.1	5.6	19.3	22.0	1.4	< 1.0	65.1	27.0	27.0	12.3
15/08/01	22/08/01	4.7	47.6	27.8	35.9	11.1	5.2	16.8	15.5	1.6	< 1.0	46.3	20.0	20.0	27.3
22/08/01	29/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5
29/08/01	05/09/01	5.6	92.4	100.6	63.4	84.1	39.3	146.0	95.6	11.3	< 1.0	82.3	46.0	46.0	1.9
05/09/01	12/09/01	6.4	75.0	34.2	84.3	83.2	20.8	59.4	104.2	12.5	< 1.0	65.0	38.0	38.0	3.0
12/09/01	19/09/01	4.6	54.7	19.1	37.5	64.5	15.0	13.6	72.1	2.6	< 1.0	46.9	29.0	29.0	14.5
19/09/01	26/09/01	4.3	54.2	55.4	55.0	79.7	17.5	8.3	83.7	2.8	< 1.0	44.6	38.0	38.0	12.8
26/09/01	03/10/01	6.6	61.6	16.4	35.3	12.8	34.2	71.5	77.2	102.5	21.6	60.1	33.0	33.0	29.3
03/10/01	10/10/01	5.0	32.7	15.8	29.4	31.2	8.8	12.5	40.6	1.5	< 1.0	29.0	16.0	16.0	17.7
10/10/01	17/10/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8
17/10/01	24/10/01	4.3	42.1	39.9	36.6	10.9	3.1	7.9	14.8	1.2	< 1.0	40.8	25.0	25.0	30.5
24/10/01	31/10/01	4.4	44.7	17.4	23.6	20.4	7.8	16.2	44.6	1.5	< 1.0	42.2	26.0	26.0	15.7
31/10/01	14/11/01	5.5	51.2	11.7	23.3	177.4	40.4	27.1	212.3	4.4	< 1.0	29.8	38.0	38.0	17.6
14/11/01	28/11/01	5.1	218.9	37.7	158.3	197.4	48.8	73.8	224.9	8.8	< 1.0	195.1	68.0	68.0	3.2
28/11/01	12/12/01	4.6	89.2	35.9	78.3	54.2	15.1	37.8	89.1	3.1	< 1.0	82.6	37.0	37.0	9.9
12/12/01	19/12/01	4.7	259.6	104.4	311.0	184.8	36.2	30.1	208.4	4.9	< 1.0	237.3	-	-	1.2
19/12/01	02/01/02	5.7	31.9	11.3	33.7	105.8	15.5	6.3	122.5	2.6	< 1.0	19.2	25.0	25.0	10.3

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5117	56.3	37.2	51.2	43.5	13.0	28.6	59.0	3.6	-	51.1	26.1	30.3	542.7

High Muffles

2001

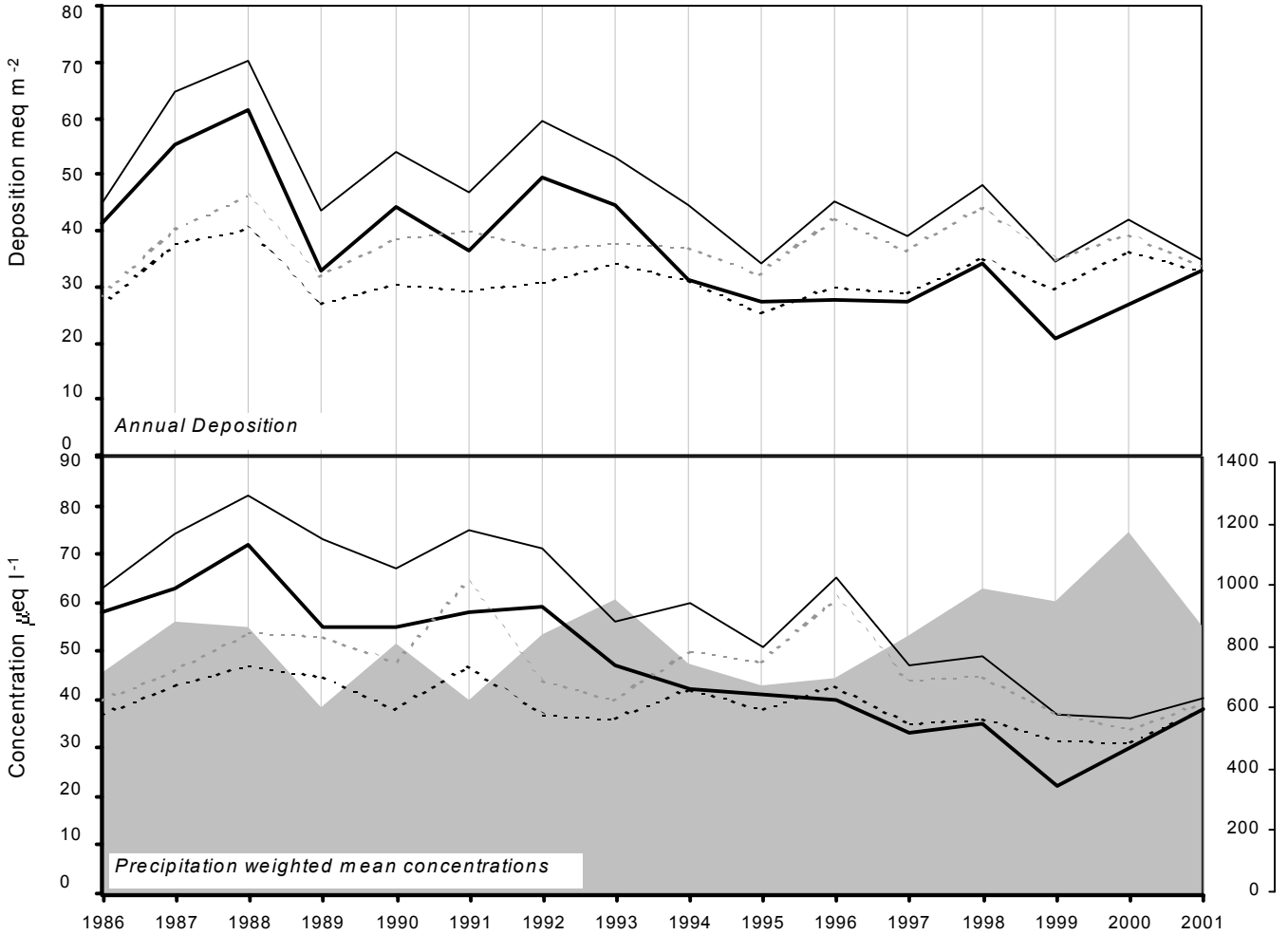
Site Code:	**5009**
Easting:	**4776**
Northing:	**4939**
Latitude:	**54 20 05 N**
Longitude:	**00 48 23 W**
Altitude (m):	**267**
Rainfall (mm):	**897**

[30 year mean 1940 - 1971]

Site Environment:
Forestry plantation

Other measurements:
DT, Daily SO2, Daily SO4, HNO3 Denuder, ozone, EMEP

Site Operator:
Forest Enterprise



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-2.59 ueq/l (-3.92 %/year): 15 years' data
+++ Strong trend detected

non-marine sulphate
-2.63 ueq/l (-3.33 %/year): 16 years' data
+++ Strong trend detected

nitrate
-0.61 ueq/l (-1.40 %/year): 16 years' data
+ Significant trend detected

ammonium
-0.66 ueq/l (-1.28 %/year): 16 years' data
- No significant trend detected

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
03/01/01	10/01/01	4.5	46.3	42.8	50.0	80.8	19.4	13.9	104.8	2.2	< 1.0	36.5	38.0	38.0	5.4
10/01/01	17/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8
17/01/01	24/01/01	4.2	51.4	64.6	47.2	51.3	12.0	4.0	60.9	1.6	< 1.0	45.2	44.0	44.0	36.9
24/01/01	31/01/01	4.0	99.6	79.7	86.4	97.9	24.1	23.5	158.8	< .5	< 1.0	87.8	80.0	80.0	4.6
31/01/01	07/02/01	4.3	45.2	41.5	34.4	56.1	12.8	5.1	75.6	1.4	< 1.0	38.5	39.0	39.0	41.2
07/02/01	14/02/01	4.4	41.6	27.3	28.1	29.1	7.2	5.9	36.8	0.8	< 1.0	38.1	24.0	24.0	20.4
14/02/01	21/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21/02/01	28/02/01	4.6	55.0	33.3	55.0	109.4	24.8	16.0	132.5	2.9	< 1.0	41.8	35.0	35.0	5.8
28/02/01	07/03/01	4.4	45.5	48.0	46.4	94.3	21.1	8.3	115.0	2.3	< 1.0	34.2	38.0	38.0	20.3
07/03/01	14/03/01	4.3	231.1	174.0	256.4	212.9	54.5	69.9	256.0	6.1	< 1.0	205.5	95.0	95.0	1.0
14/03/01	21/03/01	4.5	52.2	23.8	16.0	193.1	43.6	14.7	225.9	4.5	< 1.0	28.9	48.0	48.0	7.6
21/03/01	28/03/01	3.9	92.6	111.7	92.8	123.5	28.9	9.5	141.6	3.2	< 1.0	77.7	80.0	80.0	29.6
28/03/01	04/04/01	6.4	49.9	31.0	95.8	17.6	11.9	9.5	29.8	9.4	18.0	47.8	31.0	31.0	26.4
04/04/01	11/04/01	4.4	46.4	28.2	36.2	44.7	10.8	7.7	55.4	1.3	< 1.0	41.0	30.0	30.0	30.5
11/04/01	18/04/01	5.3	48.6	16.8	31.5	160.2	36.4	16.0	202.9	3.7	< 1.0	29.3	38.0	38.0	11.0
18/04/01	25/04/01	4.5	61.3	64.9	68.2	115.9	27.6	12.1	141.6	2.9	< 1.0	47.3	48.0	48.0	29.8
25/04/01	02/05/01	4.2	83.3	44.9	65.7	35.0	10.3	13.7	52.8	1.4	< 1.0	79.0	45.0	45.0	15.4
02/05/01	09/05/01	4.5	119.6	72.0	81.3	116.4	31.8	49.8	135.9	3.8	< 1.0	105.5	56.0	56.0	5.3
09/05/01	16/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1
16/05/01	23/05/01	4.2	108.4	75.8	102.3	17.1	6.4	20.9	22.6	1.1	< 1.0	106.3	49.0	49.0	4.0
23/05/01	30/05/01	6.6	37.1	24.4	32.3	6.5	5.2	70.4	7.2	1.9	< 1.0	36.3	16.0	16.0	4.5
30/05/01	06/06/01	5.8	17.6	9.9	22.6	34.9	9.1	9.9	43.6	1.4	< 1.0	13.4	12.0	12.0	11.6
06/06/01	13/06/01	5.1	15.8	8.8	15.6	13.4	3.4	3.7	16.1	0.9	< 1.0	14.2	8.0	8.0	51.0
13/06/01	20/06/01	4.2	44.4	51.2	41.6	13.8	4.0	12.5	18.8	1.0	< 1.0	42.7	30.0	30.0	28.2
20/06/01	27/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27/06/01	04/07/01	6.8	32.3	24.0	41.3	14.0	8.7	76.9	17.4	2.9	< 1.0	30.6	18.0	18.0	3.6
04/07/01	11/07/01	6.1	44.6	36.3	50.9	22.2	7.2	70.8	26.8	2.6	< 1.0	41.9	23.0	23.0	19.3
11/07/01	18/07/01	5.0	36.3	37.1	29.2	62.8	15.7	26.9	79.8	3.6	< 1.0	28.8	25.0	25.0	15.8
18/07/01	25/07/01	4.5	40.1	37.0	30.7	101.2	23.1	8.0	118.8	2.6	< 1.0	28.0	37.0	37.0	28.6
25/07/01	01/08/01	6.9	123.0	92.6	95.1	26.1	15.5	170.7	38.6	10.3	< 1.0	119.8	41.0	41.0	1.4
01/08/01	08/08/01	4.7	45.0	32.5	38.2	10.1	3.9	19.8	12.6	0.9	< 1.0	43.7	20.0	20.0	19.7
08/08/01	15/08/01	5.2	28.9	11.4	33.0	17.8	4.3	6.2	19.4	0.8	< 1.0	26.8	11.0	11.0	20.7
15/08/01	22/08/01	4.4	46.9	35.7	37.6	11.5	4.0	16.3	13.3	1.2	< 1.0	45.5	22.0	22.0	21.6
22/08/01	29/08/01	3.6	181.9	181.0	108.3	5.2	4.4	28.3	27.4	2.4	< 1.0	181.3	114.0	114.0	5.4
29/08/01	05/09/01	4.9	76.6	37.8	39.5	132.9	35.5	38.8	145.7	5.2	< 1.0	60.6	40.0	40.0	6.0
05/09/01	12/09/01	6.3	92.5	25.1	46.8	316.9	75.0	55.1	376.1	10.5	< 1.0	54.3	66.0	66.0	2.7
12/09/01	19/09/01	4.7	63.8	22.7	36.8	190.0	43.7	16.8	218.6	6.1	< 1.0	40.9	47.0	47.0	54.5
19/09/01	26/09/01	4.2	44.9	41.4	29.6	84.3	19.0	7.7	91.1	3.0	< 1.0	34.7	38.0	38.0	27.7
26/09/01	03/10/01	4.3	41.6	38.6	31.9	5.1	< .8	1.4	8.0	< .5	< 1.0	41.0	27.0	27.0	69.8
03/10/01	10/10/01	4.8	29.4	20.6	27.8	32.4	8.1	10.1	47.7	1.0	< 1.0	25.5	17.0	17.0	28.5
10/10/01	17/10/01	4.7	82.9	54.5	68.8	13.9	8.3	56.2	28.1	1.5	< 1.0	81.2	29.0	29.0	8.9
17/10/01	24/10/01	4.3	47.5	55.6	47.9	19.0	5.1	6.2	23.9	1.3	< 1.0	45.2	32.0	32.0	29.2
24/10/01	31/10/01	4.5	38.6	19.0	20.3	37.6	9.0	11.2	48.9	1.0	< 1.0	34.1	23.0	23.0	12.3
31/10/01	14/11/01	5.2	55.0	4.8	5.4	356.5	80.9	20.7	436.8	8.8	< 1.0	12.0	62.0	62.0	41.8
14/11/01	28/11/01	5.3	73.3	22.8	66.2	120.3	25.3	17.2	140.2	2.9	< 1.0	58.8	34.0	34.0	10.3
28/11/01	12/12/01	4.4	36.9	30.8	29.0	36.4	10.0	5.3	48.8	1.1	< 1.0	32.5	26.0	26.0	32.3
12/12/01	26/12/01	-	-	-	-	-	-	-	-	-	-	-	-	-	3.4
26/12/01	09/01/02	4.9	50.1	40.9	59.7	128.6	22.3	10.2	155.1	8.2	< 1.0	34.6	35.0	35.0	4.3

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5009	49.6	38.2	39.2	75.7	17.9	13.5	92.3	2.4	-	40.4	38.0	35.1	861.2

Bannisdale

2001

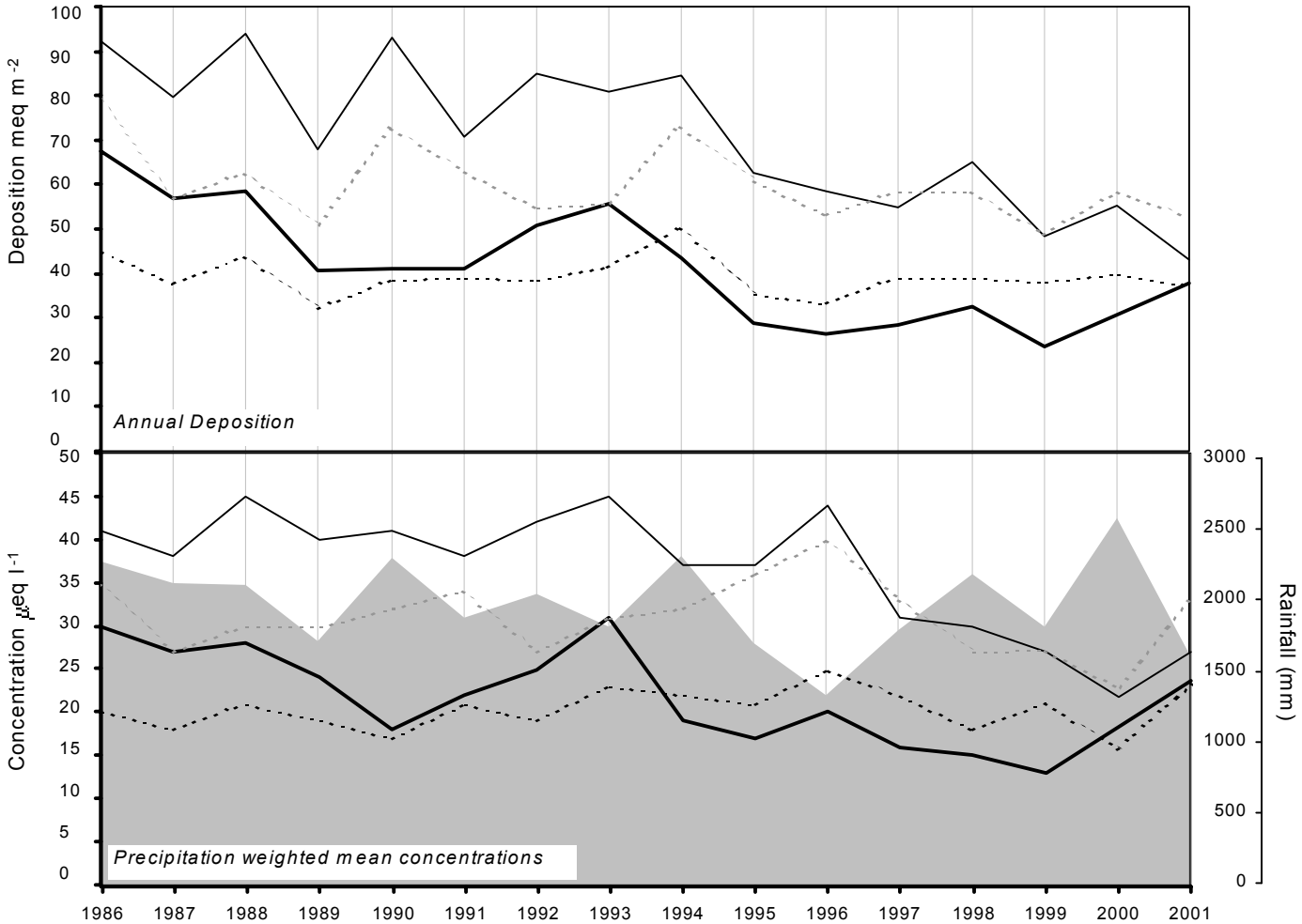
Site Code:	**5111**
Easting:	**3515**
Northing:	**5043**
Latitude:	**54 25 54 N**
Longitude:	**02 44 52 W**
Altitude (m):	**265**
Rainfall (mm):	**1972**

[30 year mean 1940 - 1971]

Site Environment:
Open moorland, sheep grazing

Other measurements:
DT

Site Operator:
CEH Windermere



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-0.80 ueq/l (-2.89 %/year): 15 years' data
++ Moderately strong trend detected

non-marine sulphate
-1.14 ueq/l (-2.53 %/year): 16 years' data
++ Moderately strong trend detected

nitrate
0.11 ueq/l (0.54 %/year): 16 years' data
- No significant trend detected

ammonium
-0.11 ueq/l (-0.35 %/year): 16 years' data
- No significant trend detected

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
05/01/01	12/01/01	4.9	41.1	15.8	28.1	136.4	31.4	10.0	161.4	2.9	< 1.0	24.7	33.0	33.0	16.5
12/01/01	19/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19/01/01	26/01/01	4.6	42.3	21.4	28.3	135.0	29.7	8.8	158.5	3.3	< 1.0	26.0	36.0	36.0	54.5
26/01/01	02/02/01	4.5	51.8	39.6	41.3	118.8	27.6	12.1	143.0	2.6	< 1.0	37.5	43.0	43.0	14.0
02/02/01	09/02/01	4.4	34.0	12.4	8.7	155.3	35.8	8.4	181.7	3.3	< 1.0	15.3	39.0	39.0	75.6
09/02/01	16/02/01	4.7	31.7	16.9	25.8	52.6	11.6	5.2	63.6	1.2	< 1.0	25.4	21.0	21.0	52.1
16/02/01	23/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2
23/02/01	09/03/01	4.5	41.9	35.4	45.8	39.3	9.1	7.1	47.7	1.5	< 1.0	37.1	26.0	26.0	76.7
09/03/01	16/03/01	4.9	38.5	14.6	37.7	59.0	12.2	7.8	70.5	1.4	< 1.0	31.4	20.0	20.0	11.6
16/03/01	27/03/01	4.1	53.9	49.5	31.2	50.1	12.2	12.2	66.6	1.4	< 1.0	47.9	46.0	46.0	21.2
27/03/01	02/04/01	4.4	43.7	35.1	43.7	14.9	3.7	4.1	19.0	0.7	< 1.0	41.9	24.0	24.0	41.2
02/04/01	08/04/01	4.9	20.3	10.1	13.5	47.1	10.7	3.8	59.9	1.1	< 1.0	14.7	17.0	17.0	56.5
08/04/01	25/04/01	4.6	47.8	43.0	60.7	28.2	7.4	10.4	34.0	1.4	< 1.0	44.4	26.0	26.0	71.0
25/04/01	11/05/01	4.3	65.5	60.2	56.5	26.7	9.2	20.3	30.8	1.7	< 1.0	62.3	35.0	35.0	33.4
11/05/01	03/06/01	5.0	40.6	26.1	38.2	26.0	8.5	11.7	30.6	1.6	< 1.0	37.5	17.0	17.0	23.0
03/06/01	25/06/01	6.5	4.9	3.6	129.5	25.5	6.9	7.2	2.3	10.8	3.5	1.8	28.0	28.0	56.7
25/06/01	01/07/01	4.5	91.0	74.9	86.0	86.5	22.9	26.9	94.5	6.2	< 1.0	80.6	48.0	48.0	13.8
01/07/01	20/07/01	4.8	40.9	26.9	38.3	87.3	20.7	12.0	105.2	3.2	< 1.0	30.4	28.0	28.0	51.8
20/07/01	31/07/01	4.9	36.5	27.9	35.3	40.3	10.5	10.5	46.2	3.0	< 1.0	31.6	21.0	21.0	24.3
31/07/01	21/08/01	4.8	35.8	23.2	34.6	20.9	5.0	6.1	21.7	0.9	< 1.0	33.3	18.0	18.0	50.9
21/08/01	31/08/01	4.2	61.6	55.2	58.2	17.1	4.5	8.9	20.2	1.1	< 1.0	59.5	39.0	39.0	34.0
31/08/01	07/09/01	4.8	58.1	29.6	44.1	87.0	19.7	22.4	95.7	0.5	11.4	47.6	32.0	32.0	2.6
07/09/01	05/10/01	4.6	29.6	17.6	19.6	79.4	17.3	7.3	92.7	3.5	< 1.0	20.1	24.0	24.0	221.9
05/10/01	31/10/01	4.9	40.6	25.8	30.0	87.2	19.8	14.1	97.9	2.3	< 1.0	30.1	26.0	26.0	160.2
31/10/01	14/11/01	5.2	26.7	7.7	16.0	98.6	22.4	6.6	119.6	2.2	< 1.0	14.8	23.0	23.0	47.0
14/11/01	28/11/01	4.8	30.0	11.4	20.3	112.5	18.3	4.6	133.7	2.5	< 1.0	16.4	28.0	28.0	148.7
28/11/01	12/12/01	4.6	24.2	22.9	19.7	32.5	7.2	8.8	40.1	0.8	< 1.0	20.3	19.0	19.0	110.6
12/12/01	26/12/01	4.7	37.6	17.4	27.0	99.8	17.1	6.0	115.0	2.1	< 1.0	25.6	28.0	28.0	22.2
26/12/01	16/01/02	4.7	38.0	22.9	28.3	97.6	18.6	5.3	122.2	2.4	< 1.0	26.2	29.0	29.0	113.3

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5111	35.7	23.3	33.0	72.9	15.7	8.4	85.4	2.5	-	26.9	23.6	26.8	1606.5

Hillsborough Forest

2001

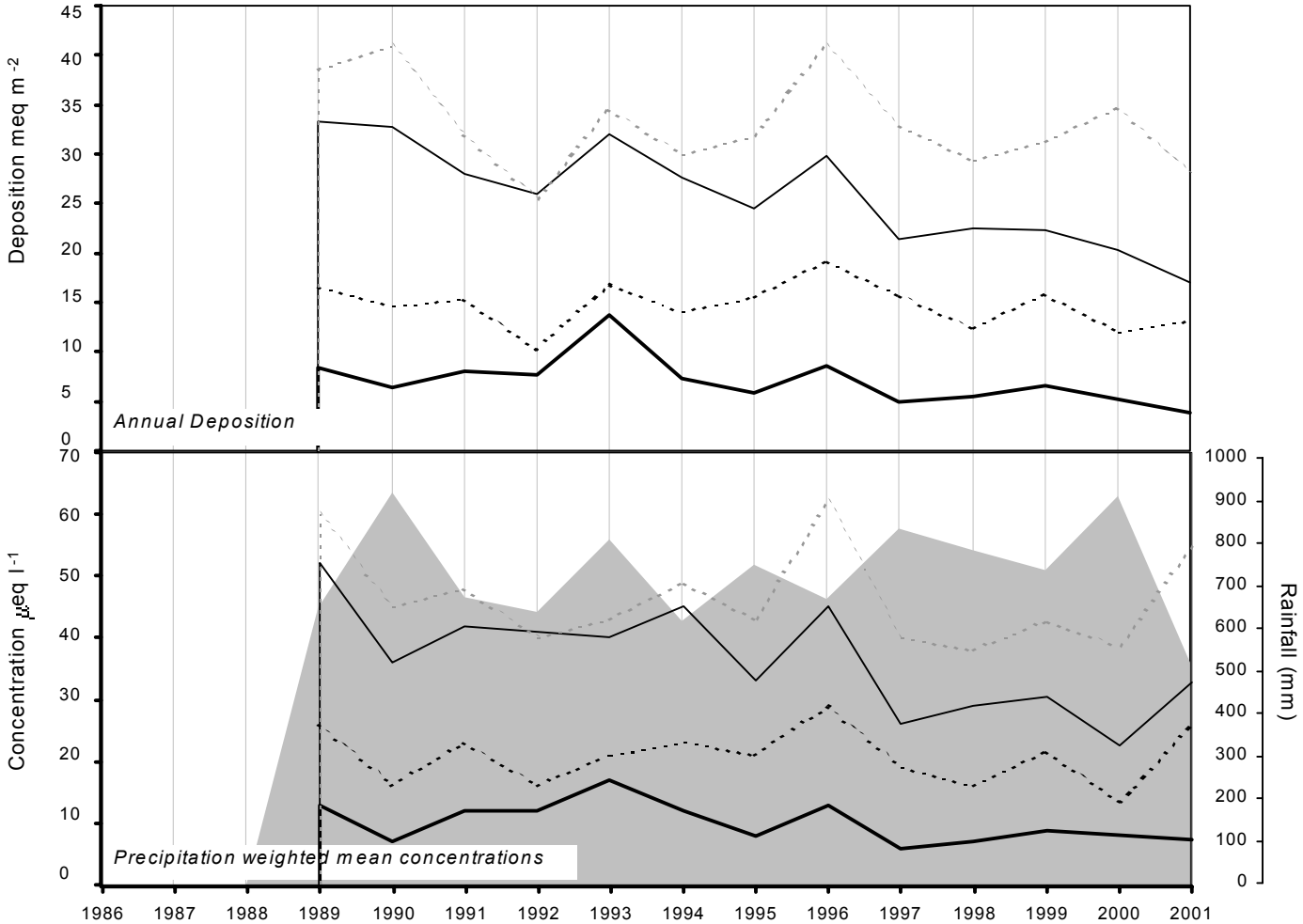
Site Code:	**5149**
Easting:	**1349**
Northing:	**5156**
Latitude:	**54 27 09 N**
Longitude:	**06 05 03 W**
Altitude (m):	**120**
Rainfall (mm):	**863**

[30 year mean 1940 - 1971]

Site Environment:
Open arable, cows graze in summer

Other measurements:
DT

Site Operator:
Department of Agriculture NI



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-0.42 ueq/l (-3.05 %/year): 12 years' data
\- No significant trend detected

non-marine sulphate
-1.60 ueq/l (-3.14 %/year): 13 years' data
++ Moderately strong trend detected

nitrate
-0.11 ueq/l (-0.49 %/year): 13 years' data
\- No significant trend detected

ammonium
-0.46 ueq/l (-0.92 %/year): 13 years' data
\- No significant trend detected

ACID DEPOSITION DATA REPORT, 2001

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
04/01/01	11/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
11/01/01	18/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18/01/01	25/01/01	4.8	52.2	19.7	50.0	93.0	20.5	6.9	121.8	2.5	< 1.0	41.0	29.0	29.0	27.5
25/01/01	01/02/01	6.1	131.1	26.5	152.6	147.7	32.1	15.7	169.2	3.3	< 1.0	113.3	52.0	52.0	4.5
01/02/01	08/02/01	5.0	26.2	14.1	23.9	45.6	9.5	4.8	53.0	1.3	< 1.0	20.7	16.0	16.0	18.7
08/02/01	15/02/01	5.5	37.1	15.0	36.4	84.0	17.4	8.9	103.6	3.4	< 1.0	26.9	21.0	21.0	2.9
15/02/01	22/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
22/02/01	15/03/01	5.7	39.7	13.5	39.7	91.2	19.2	9.3	105.6	2.0	< 1.0	28.7	24.0	24.0	37.1
15/03/01	22/03/01	4.4	125.6	67.7	104.1	309.4	70.6	23.3	385.5	6.5	< 1.0	88.4	86.0	86.0	5.8
22/03/01	29/03/01	4.4	65.1	66.3	93.3	75.8	17.5	7.5	95.3	2.1	< 1.0	56.0	43.0	43.0	16.5
29/03/01	05/04/01	5.9	34.6	16.7	39.7	82.6	17.4	13.3	97.3	2.3	< 1.0	24.7	23.0	23.0	8.6
05/04/01	12/04/01	6.1	18.9	7.0	33.0	41.1	7.7	4.2	50.7	1.3	< 1.0	14.0	14.0	14.0	26.5
12/04/01	19/04/01	5.0	135.9	69.3	200.0	276.4	59.0	34.7	337.7	6.9	< 1.0	102.6	-	-	1.0
19/04/01	26/04/01	6.0	53.9	40.7	72.9	45.8	12.1	19.9	52.8	2.6	< 1.0	48.4	23.0	23.0	6.8
26/04/01	03/05/01	7.2	62.8	30.2	126.1	43.4	9.9	112.7	50.9	6.5	< 1.0	57.5	39.0	39.0	2.1
03/05/01	10/05/01	6.6	56.3	45.9	69.6	28.2	8.6	41.3	27.6	9.6	7.2	52.9	22.0	22.0	10.6
10/05/01	17/05/01	5.4	43.2	42.9	72.2	21.3	5.6	12.3	22.3	1.2	< 1.0	40.6	19.0	19.0	26.6
17/05/01	24/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24/05/01	31/05/01	6.3	35.6	38.5	84.2	21.6	5.3	14.2	26.3	1.9	< 1.0	33.0	20.0	20.0	12.8
31/05/01	07/06/01	6.1	25.9	11.4	40.9	61.8	12.7	10.4	74.8	2.5	< 1.0	18.4	18.0	18.0	10.7
07/06/01	14/06/01	6.6	34.8	10.3	58.8	88.8	16.9	8.9	102.8	2.4	< 1.0	24.1	26.0	26.0	7.6
14/06/01	21/06/01	4.8	55.2	61.7	89.7	26.8	6.6	9.0	29.5	2.5	< 1.0	52.0	27.0	27.0	19.0
21/06/01	28/06/01	5.4	62.3	54.1	85.8	13.5	5.2	21.6	15.2	4.0	< 1.0	60.7	22.0	22.0	10.5
28/06/01	05/07/01	4.6	77.9	69.3	98.7	2.7	3.2	23.2	6.2	1.3	< 1.0	77.6	31.0	31.0	7.6
05/07/01	11/07/01	7.0	135.0	21.4	895.2	68.1	21.6	36.8	61.5	103.4	220.9	126.8	199.0	199.0	20.3
11/07/01	19/07/01	5.9	36.6	19.8	61.0	92.1	17.1	11.0	107.9	5.8	< 1.0	25.5	28.0	28.0	12.7
19/07/01	26/07/01	6.4	29.6	18.5	60.4	34.7	6.4	10.0	39.1	4.6	< 1.0	25.4	16.0	16.0	7.8
26/07/01	01/08/01	5.9	33.0	14.2	40.2	8.3	3.5	16.4	9.2	2.8	< 1.0	31.9	12.0	12.0	6.6
01/08/01	08/08/01	6.0	14.2	12.0	38.8	12.0	1.9	5.5	10.9	0.7	< 1.0	12.8	< 10.0	< 10.0	20.9
08/08/01	15/08/01	5.7	18.5	9.7	24.2	10.4	2.2	5.3	7.5	2.2	< 1.0	17.2	< 10.0	< 10.0	22.7
15/08/01	22/08/01	4.5	45.8	42.2	54.8	20.1	4.9	6.5	23.3	1.1	< 1.0	43.4	25.0	25.0	25.4
22/08/01	30/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
30/08/01	05/09/01	6.1	21.2	5.5	32.3	31.6	5.1	4.6	36.7	1.2	< 1.0	17.4	11.0	11.0	9.5
05/09/01	12/09/01	6.5	31.3	7.6	63.6	76.1	12.5	10.7	88.2	2.8	< 1.0	22.1	22.0	22.0	5.0
12/09/01	19/09/01	6.4	73.2	4.8	51.4	467.4	102.3	26.3	572.7	10.8	< 1.0	16.9	86.0	86.0	7.2
19/09/01	26/09/01	6.3	90.4	50.8	107.8	62.3	16.4	44.9	61.3	4.1	< 1.0	82.9	34.0	34.0	1.7
26/09/01	03/10/01	5.7	19.9	11.2	51.5	77.7	13.6	7.5	91.2	1.8	3.4	10.6	20.0	20.0	17.7
03/10/01	10/10/01	5.8	26.6	13.2	26.2	98.0	19.4	8.0	108.0	3.0	< 1.0	14.8	22.0	22.0	14.8
10/10/01	17/10/01	7.0	63.6	19.5	410.5	79.1	29.0	37.4	99.1	70.1	122.3	54.1	81.0	81.0	9.7
17/10/01	24/10/01	5.1	34.0	27.5	34.3	70.7	14.3	13.2	80.8	3.0	< 1.0	25.5	22.0	22.0	22.7
24/10/01	31/10/01	6.0	29.2	8.7	29.9	81.1	14.7	9.0	95.8	2.0	< 1.0	19.4	20.0	20.0	9.7
31/10/01	14/11/01	4.3	66.1	9.6	280.7	120.1	17.7	30.0	112.1	117.5	233.4	51.6	83.0	83.0	15.0
14/11/01	28/11/01	5.7	18.0	5.6	15.8	71.4	11.9	5.2	85.2	1.7	< 1.0	9.4	17.0	17.0	9.2
28/11/01	12/12/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12/12/01	02/01/02	6.3	101.1	22.6	98.3	335.3	56.6	20.1	377.6	11.4	< 1.0	60.7	70.0	70.0	12.4

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5149	41.4	25.5	54.4	70.4	14.5	11.4	82.8	2.8	-	32.9	7.4	24.3	515.2

Lough Navar

2001

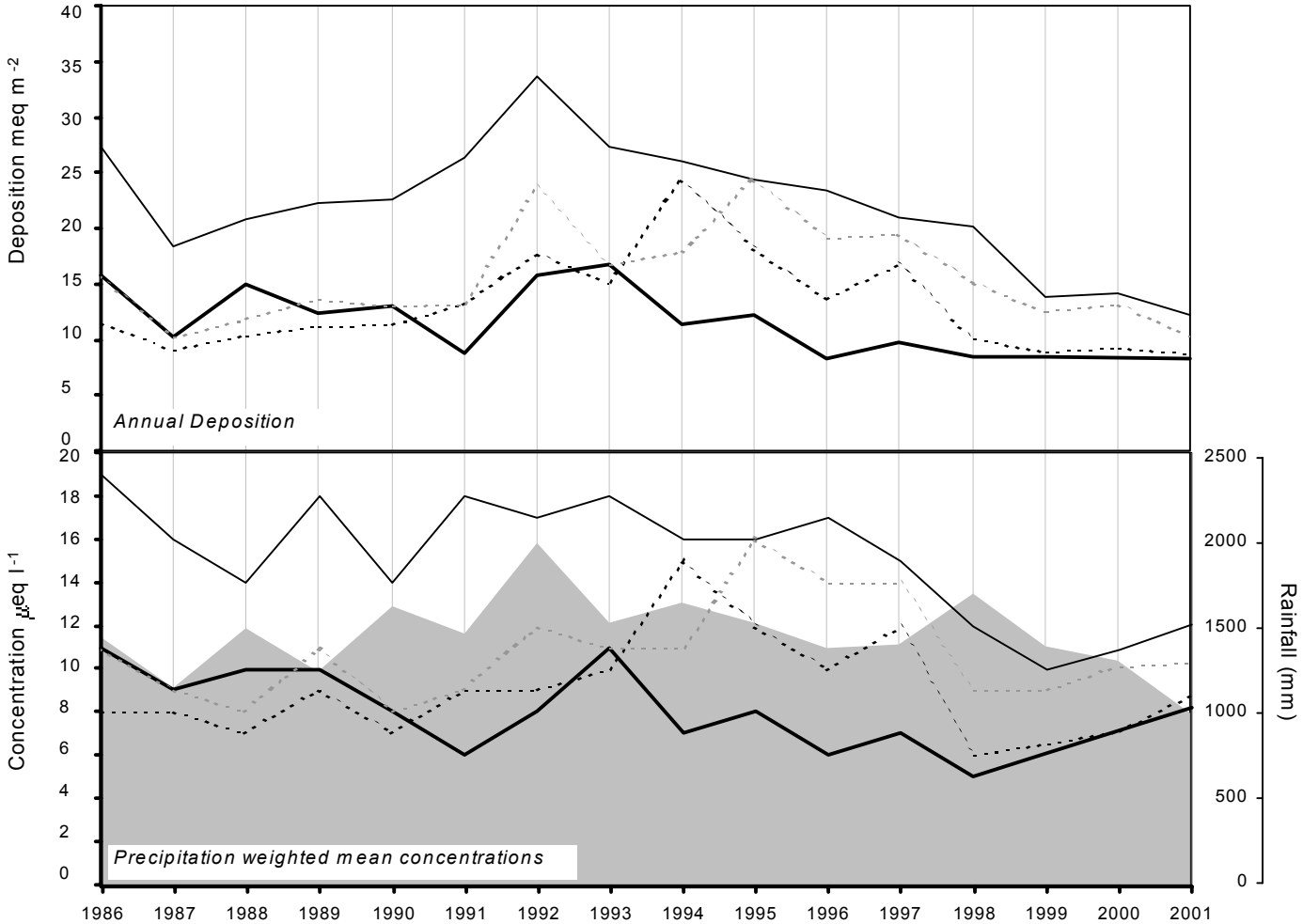
Site Code:	**5006**
Easting:	**192**
Northing:	**5212**
Latitude:	**54 26 20 N**
Longitude:	**07 54 00 W**
Altitude (m):	**130**
Rainfall (mm):	**1412**

[30 year mean 1940 - 1971]

Site Environment:
Clearing near Forestry Offices

Other measurements:
DT, Daily SO2, Daily SO4, HNO3 Denuder, ozone, EMEP

Site Operator:
Forestry Service NI



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-0.26 ueq/l (-2.64 %/year): 15 years' data
\+ Significant trend detected

non-marine sulphate
-0.40 ueq/l (-2.19 %/year): 16 years' data
++ Moderately strong trend detected

nitrate
0.03 ueq/l (0.37 %/year): 16 years' data
\- No significant trend detected

ammonium
0.11 ueq/l (1.12 %/year): 16 years' data
\- No significant trend detected

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
01/01/01	08/01/01	4.9	33.4	2.7	4.1	242.7	52.8	12.7	304.3	7.0	2.9	4.2	46.0	46.0	28.7
08/01/01	15/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
15/01/01	22/01/01	5.9	43.9	25.1	68.6	37.0	7.2	7.5	44.8	2.4	< 1.0	39.4	19.0	19.0	11.8
22/01/01	29/01/01	5.2	23.9	2.4	6.0	148.9	32.9	8.5	190.7	3.6	7.7	6.0	29.0	29.0	42.9
29/01/01	05/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3
05/02/01	12/02/01	5.1	18.0	11.4	12.2	40.7	9.3	5.4	48.1	1.1	< 1.0	13.1	14.0	14.0	24.3
12/02/01	19/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19/02/01	26/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.6
26/02/01	05/03/01	5.1	63.8	19.3	17.4	337.3	74.0	31.5	397.9	8.0	< 1.0	23.2	63.0	63.0	3.6
05/03/01	12/03/01	5.9	26.2	17.5	23.5	88.4	19.5	16.3	118.6	2.9	< 1.0	15.5	22.0	22.0	14.9
12/03/01	19/03/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
19/03/01	26/03/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8
26/03/01	02/04/01	4.7	31.9	20.1	25.5	36.3	8.3	6.0	46.7	1.7	< 1.0	27.6	20.0	20.0	46.4
02/04/01	09/04/01	5.4	14.3	2.8	6.4	68.9	15.4	5.8	82.7	1.8	< 1.0	6.0	16.0	16.0	46.9
09/04/01	16/04/01	5.3	30.2	12.3	20.4	94.3	21.4	11.2	111.1	2.5	< 1.0	18.9	25.0	25.0	30.0
16/04/01	23/04/01	5.2	17.3	4.4	5.1	50.7	11.6	8.2	61.5	1.5	< 1.0	11.2	14.0	14.0	29.5
23/04/01	30/04/01	4.9	23.5	22.1	16.0	49.7	12.5	12.8	59.5	2.6	< 1.0	17.5	19.0	19.0	16.0
30/04/01	07/05/01	5.0	85.0	19.0	19.7	366.5	82.0	102.0	441.1	8.9	< 1.0	40.8	-	-	1.9
07/05/01	14/05/01	6.1	110.4	141.8	165.0	16.8	10.5	94.2	19.3	6.0	< 1.0	108.4	38.0	38.0	5.1
14/05/01	21/05/01	4.8	18.8	13.9	16.5	19.2	5.0	3.9	24.2	0.6	< 1.0	16.5	13.0	13.0	30.6
21/05/01	28/05/01	6.4	56.9	62.6	26.7	19.2	11.6	154.3	25.2	8.1	< 1.0	54.6	27.0	27.0	4.4
28/05/01	04/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04/06/01	11/06/01	5.3	17.3	4.0	1.4	88.5	20.1	12.8	110.3	1.8	< 1.0	6.7	19.0	19.0	24.3
11/06/01	18/06/01	6.7	82.2	60.7	99.8	27.4	9.1	89.3	28.5	2.6	< 1.0	78.9	34.0	34.0	5.8
18/06/01	25/06/01	5.0	20.0	11.6	15.6	15.4	4.1	8.1	19.2	1.1	3.0	18.1	10.0	10.0	15.6
25/06/01	02/07/01	5.1	25.5	14.3	17.3	32.9	7.9	11.2	39.0	1.1	< 1.0	21.5	14.0	14.0	26.6
02/07/01	09/07/01	4.5	45.2	47.0	45.2	30.6	12.1	36.5	36.2	3.3	< 1.0	41.5	29.0	29.0	3.7
09/07/01	16/07/01	5.2	17.5	2.8	< .7	99.1	21.2	7.0	120.1	1.9	< 1.0	5.5	21.0	21.0	42.8
16/07/01	23/07/01	5.8	19.9	10.5	12.3	32.0	9.0	15.3	37.4	1.7	< 1.0	16.0	10.0	10.0	2.5
23/07/01	30/07/01	5.5	12.9	6.1	4.4	17.1	4.0	7.5	19.5	1.3	< 1.0	10.9	< 10.0	< 10.0	6.5
30/07/01	06/08/01	5.6	7.5	2.4	< .7	12.6	3.2	9.5	14.4	1.3	< 1.0	6.0	< 10.0	< 10.0	17.9
06/08/01	13/08/01	4.7	14.1	5.6	3.5	11.8	2.8	4.2	13.5	0.8	< 1.0	12.6	10.0	10.0	42.8
13/08/01	20/08/01	4.7	20.0	17.1	12.3	8.6	2.2	4.5	10.8	< .5	< 1.0	18.9	14.0	14.0	31.7
20/08/01	27/08/01	5.6	9.2	4.1	1.2	40.5	7.7	10.7	45.1	1.8	< 1.0	4.3	16.0	16.0	9.5
27/08/01	03/09/01	4.9	17.6	7.0	2.9	52.1	11.7	7.8	63.9	1.0	< 1.0	11.3	16.0	16.0	22.6
03/09/01	10/09/01	5.1	19.3	2.7	2.0	97.6	21.3	7.6	113.6	2.2	< 1.0	7.5	21.0	21.0	32.0
10/09/01	17/09/01	5.2	48.7	3.1	3.1	352.4	77.9	19.4	404.1	7.5	< 1.0	6.3	62.0	62.0	27.2
17/09/01	24/09/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24/09/01	01/10/01	5.9	20.4	11.5	19.9	27.6	6.5	19.0	31.3	0.9	< 1.0	17.1	12.0	12.0	26.6
01/10/01	08/10/01	5.1	14.7	2.3	2.0	78.1	17.1	6.4	92.7	1.5	< 1.0	5.3	17.0	17.0	44.9
08/10/01	15/10/01	5.4	22.8	8.7	13.6	57.1	13.0	15.4	71.2	1.4	< 1.0	15.9	16.0	16.0	17.3
15/10/01	22/10/01	-	-	-	-	-	-	-	-	-	-	-	-	-	3.4
22/10/01	29/10/01	5.1	15.9	9.7	12.6	30.0	6.1	5.0	34.5	0.8	< 1.0	12.3	11.0	11.0	27.4
29/10/01	12/11/01	5.2	30.6	3.4	1.5	207.5	41.6	13.8	244.4	4.7	< 1.0	5.5	36.0	36.0	45.8
12/11/01	26/11/01	5.0	19.3	3.1	2.9	124.6	26.3	6.7	146.9	2.9	< 1.0	4.3	24.0	24.0	23.8
26/11/01	10/12/01	5.4	20.9	2.5	2.7	152.6	28.7	6.1	183.4	3.1	< 1.0	2.5	27.0	27.0	108.0
10/12/01	31/12/01	5.9	41.3	3.5	< .7	287.8	56.0	20.2	335.4	5.2	< 1.0	6.6	47.0	47.0	30.5
31/12/01	14/01/02	5.2	28.6	13.6	17.1	97.2	19.5	7.9	125.0	2.5	< 1.0	16.9	24.0	24.0	22.0

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5006	24.0	8.8	10.3	98.5	20.9	10.9	118.4	2.5	-	12.1	8.2	22.5	1003.6

Cow Green Reservoir

2001

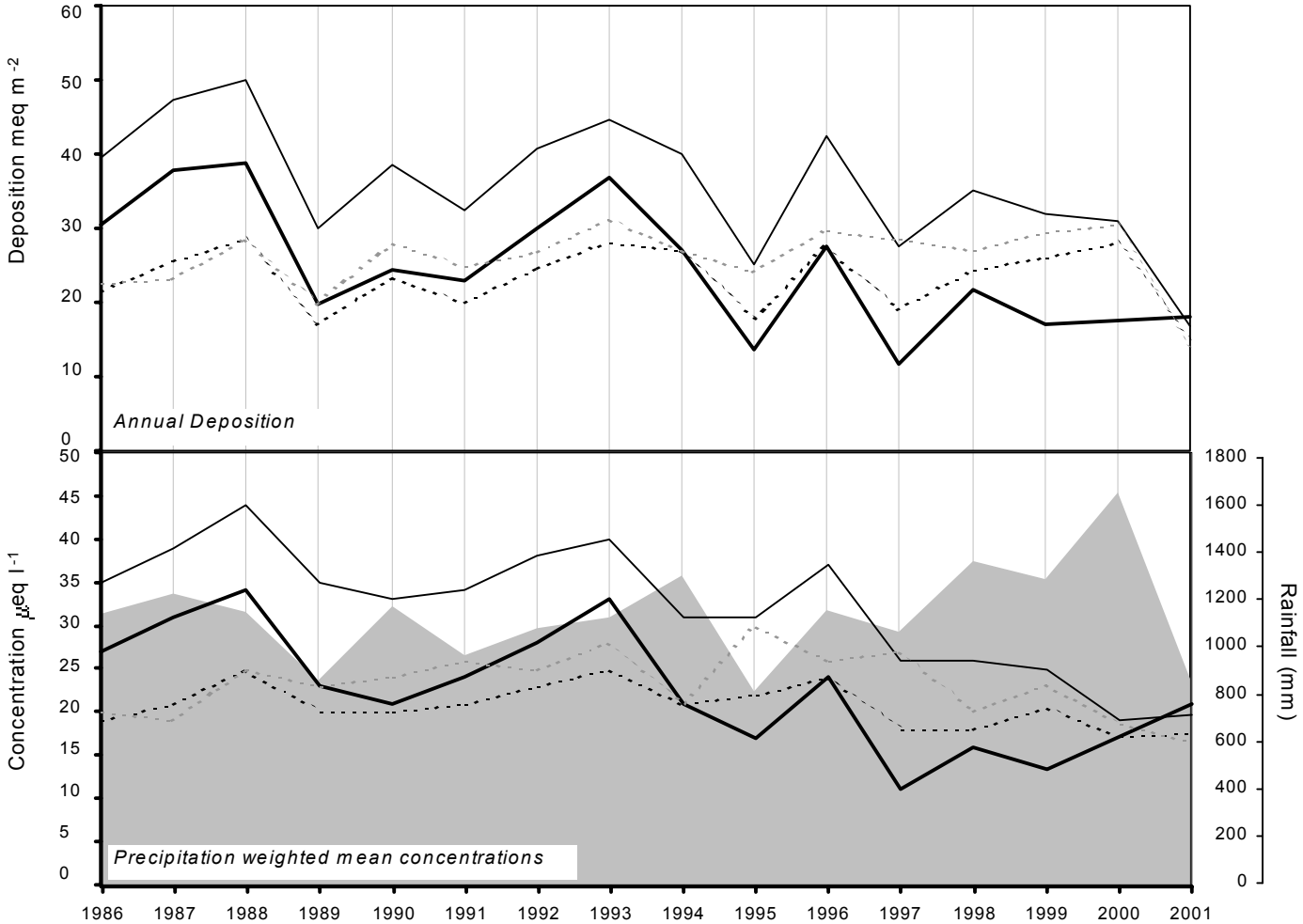
Site Code:	**5113**
Easting:	**3817**
Northing:	**5298**
Latitude:	**54 39 46 N**
Longitude:	**02 17 01 W**
Altitude (m):	**510**
Rainfall (mm):	**2175**

[30 year mean 1940 - 1971]

Site Environment:
Very open moorland

Other measurements:
DT, Met

Site Operator:
English Nature



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-1.02 ueq/l (-3.37 %/year): 15 years' data
++ Moderately strong trend detected

non-marine sulphate
-1.24 ueq/l (-3.01 %/year): 16 years' data
+++ Strong trend detected

nitrate
-0.22 ueq/l (-0.96 %/year): 16 years' data
- No significant trend detected

ammonium
-0.11 ueq/l (-0.46 %/year): 16 years' data
- No significant trend detected

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
03/01/01	10/01/01	4.9	18.6	12.4	13.8	57.7	13.1	6.5	70.6	1.3	< 1.0	11.7	17.0	17.0	28.2
10/01/01	17/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17/01/01	24/01/01	4.5	39.4	28.3	23.9	57.4	13.1	5.3	70.0	1.5	< 1.0	32.5	29.0	29.0	32.7
24/01/01	31/01/01	4.6	47.1	20.5	23.4	210.2	47.6	12.2	263.2	5.2	< 1.0	21.8	47.0	47.0	15.3
31/01/01	14/02/01	4.7	34.4	< .7	< .7	155.1	35.3	11.8	186.6	3.8	< 1.0	15.7	36.0	36.0	40.6
14/02/01	21/02/01	4.9	21.3	16.9	18.8	41.7	9.2	5.2	49.1	1.0	< 1.0	16.2	16.0	16.0	40.1
21/02/01	10/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample collection affected by Foot and Mouth Precautions 21/2/01 to 10/7/01															-
10/07/01	31/07/01	4.8	21.8	14.1	9.0	39.0	9.1	7.4	45.5	0.9	< 1.0	17.1	16.0	16.0	71.6
31/07/01	08/08/01	4.9	18.4	20.2	19.8	9.9	2.5	8.5	9.8	0.5	< 1.0	17.2	11.0	11.0	38.1
08/08/01	22/08/01	4.3	36.3	27.2	24.1	9.9	2.5	4.6	15.2	0.7	< 1.0	35.1	20.0	20.0	60.6
22/08/01	29/08/01	4.7	176.4	213.9	181.5	45.4	16.3	56.6	42.1	1.9	< 1.0	170.9	-	-	1.9
29/08/01	05/09/01	5.1	33.2	37.9	40.0	48.4	10.7	16.6	52.9	1.3	< 1.0	27.3	21.0	21.0	5.8
05/09/01	12/09/01	6.2	27.7	12.5	33.4	107.7	21.5	11.6	125.6	2.0	< 1.0	14.8	25.0	25.0	4.9
12/09/01	20/09/01	5.3	13.7	7.1	10.2	47.5	9.2	5.1	53.4	2.0	< 1.0	8.0	12.0	12.0	41.6
20/09/01	26/09/01	4.6	21.6	20.7	14.4	17.4	4.0	3.6	18.9	0.8	< 1.0	19.5	16.0	16.0	38.1
26/09/01	03/10/01	4.5	37.3	14.3	14.0	127.2	28.9	8.8	151.3	2.7	< 1.0	21.9	33.0	33.0	77.5
03/10/01	10/10/01	4.8	13.8	9.4	8.1	26.1	5.4	3.8	30.9	< .5	< 1.0	10.6	11.0	11.0	67.7
10/10/01	17/10/01	5.4	55.3	56.1	48.8	39.1	12.6	50.0	41.6	1.9	< 1.0	50.6	23.0	23.0	14.8
17/10/01	24/10/01	4.3	36.7	34.6	31.6	12.1	3.2	3.9	17.2	0.7	< 1.0	35.2	25.0	25.0	51.8
24/10/01	31/10/01	4.9	46.6	25.3	24.5	180.1	40.9	14.2	211.1	4.0	< 1.0	24.9	40.0	40.0	21.3
31/10/01	14/11/01	5.3	18.4	7.9	11.6	81.8	16.9	7.6	100.0	1.6	< 1.0	8.6	18.0	18.0	42.5
14/11/01	28/11/01	5.1	17.4	10.1	14.1	57.6	8.1	2.1	63.9	1.1	< 1.0	10.4	15.0	15.0	58.4
28/11/01	12/12/01	4.6	15.3	13.5	8.7	25.2	6.4	2.1	30.2	0.6	< 1.0	12.2	13.0	13.0	71.2
12/12/01	02/01/02	4.7	40.9	22.5	25.1	145.4	31.7	7.9	172.2	3.2	< 1.0	23.3	36.0	36.0	35.3

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5113	-	-	-	-	-	-	-	-	-	-	-	-	860.0

Scoat Tarn

2001

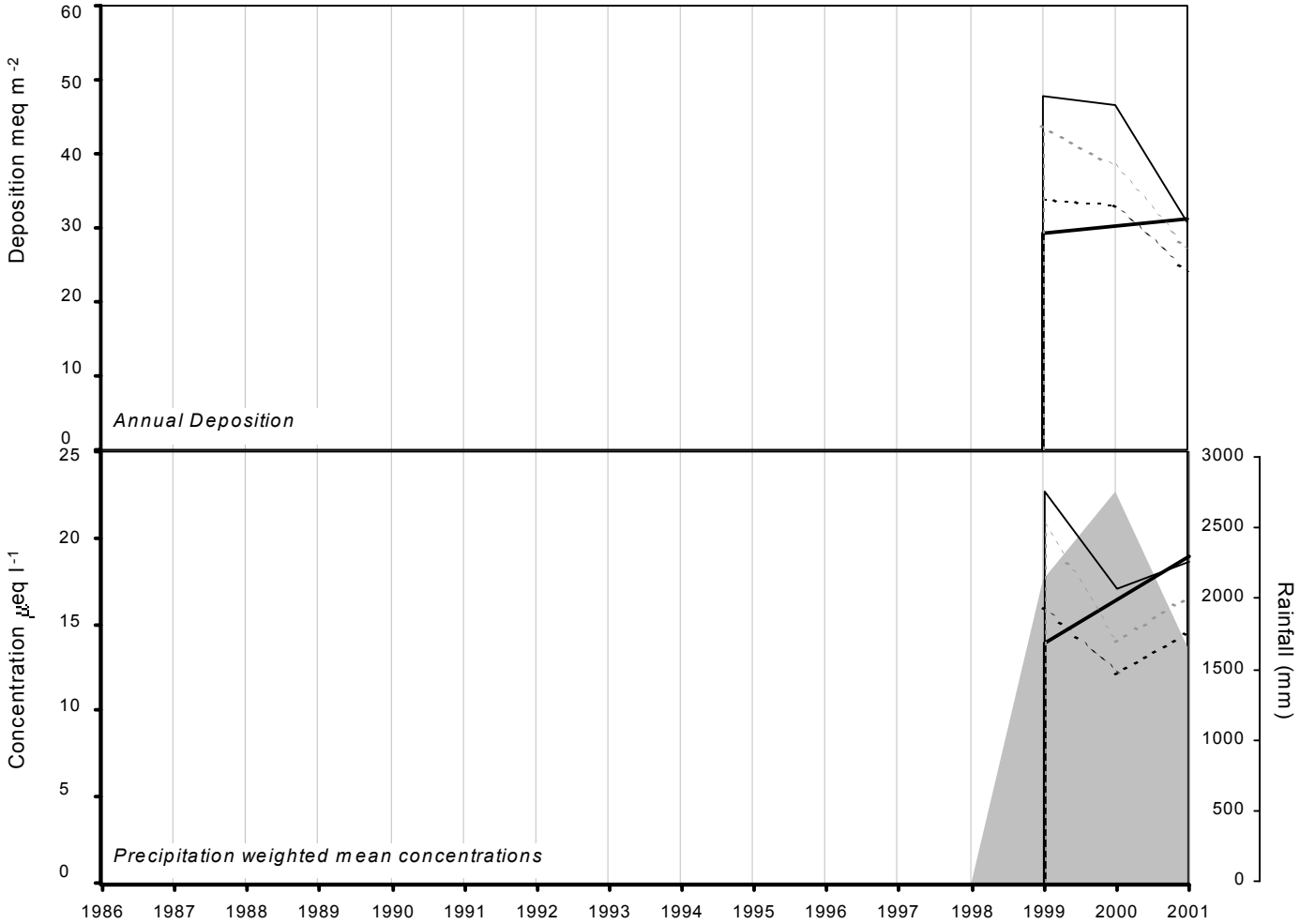
Site Code:	**5159**
Easting:	**3158**
Northing:	**5103**
Latitude:	**54 48 10 N**
Longitude:	**03 30 10 W**
Altitude (m):	**595**
Rainfall (mm):	**-**

[30 year mean 1940 - 1971]

Site Environment:
Grassland

Other measurements:
UKAWMN. Lakewater and soil chemistry

Site Operator:
ENSIS



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

non-marine sulphate
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

nitrate
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

ammonium
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
10/01/01	24/01/01	4.7	31.8	23.7	17.6	82.6	18.7	5.8	94.5	2.2	< 1.0	21.8	26.0	26.0	15.4
24/01/01	07/02/01	4.7	35.1	16.6	10.5	128.4	28.9	7.2	152.0	2.9	< 1.0	19.6	34.0	34.0	53.1
07/02/01	21/02/01	4.5	41.4	29.9	36.9	59.4	13.2	5.8	69.9	1.7	< 1.0	34.2	26.0	26.0	36.5
21/02/01	04/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	321.8
Sample collection affected by Foot and Mouth Precautions 21/2/01 to 4/8/01															-
04/08/01	22/08/01	4.5	23.3	12.7	12.6	19.7	4.2	2.9	24.0	0.5	< 1.0	20.9	15.0	15.0	197.5
22/08/01	05/09/01	4.7	32.3	25.5	27.4	39.1	8.7	6.7	41.4	0.8	< 1.0	27.6	21.0	21.0	34.6
05/09/01	19/09/01	5.2	20.3	4.7	10.7	96.0	20.0	5.3	107.5	1.8	< 1.0	8.8	20.0	20.0	89.3
19/09/01	02/10/01	4.6	22.5	15.9	16.7	32.2	7.2	4.9	35.8	0.9	< 1.0	18.6	15.0	15.0	112.4
02/10/01	15/10/01	4.7	29.1	17.0	19.1	56.2	11.7	6.8	63.4	1.4	< 1.0	22.4	19.0	19.0	232.9
15/10/01	31/10/01	4.6	33.2	21.2	19.2	75.0	15.8	5.7	85.4	1.6	< 1.0	24.2	25.0	25.0	102.2
31/10/01	16/11/01	5.1	25.4	8.5	15.8	102.0	21.6	6.6	117.7	2.2	< 1.0	13.1	22.0	22.0	84.2
16/11/01	28/11/01	5.1	33.1	11.4	22.3	131.8	27.2	7.8	153.5	2.6	< 1.0	17.2	28.0	28.0	85.6
28/11/01	12/12/01	4.8	15.3	10.1	8.2	37.3	7.3	2.1	44.5	0.8	< 1.0	10.8	14.0	14.0	194.2
12/12/01	27/12/01	5.3	27.4	8.2	18.6	125.1	24.9	4.5	146.1	2.7	< 1.0	12.4	26.0	26.0	70.4
27/12/01	09/01/02	4.4	62.7	46.8	51.2	170.4	35.3	9.4	197.5	3.5	< 1.0	42.2	50.0	50.0	21.1

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5159	-	-	-	-	-	-	-	-	-	-	-	-	1651.2

Loch Dee

2001

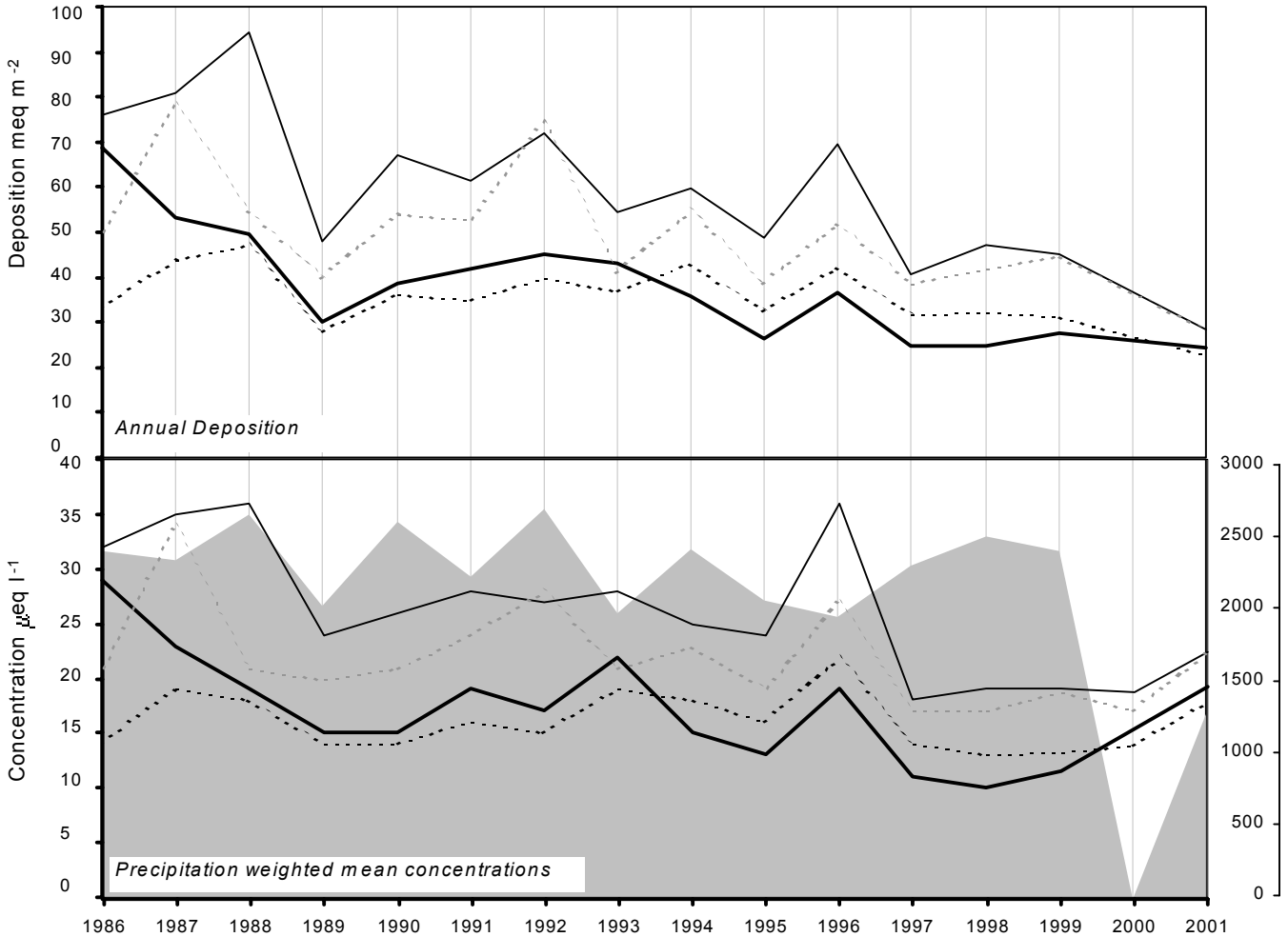
Site Code:	**5107**
Easting:	**2468**
Northing:	**5779**
Latitude:	**55 04 19 N**
Longitude:	**04 23 59 W**
Altitude (m):	**230**
Rainfall (mm):	**1949**

[30 year mean 1940 - 1971]

Site Environment:
Open moorland

Other measurements:
DT

Site Operator:
SEPA; West Region



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-0.67 ueq/l (-3.06 %/year): 15 years' data
\+ Significant trend detected

non-marine sulphate
-0.91 ueq/l (-2.75 %/year): 16 years' data
++ Moderately strong trend detected

nitrate
-0.05 ueq/l (-0.33 %/year): 16 years' data
\- No significant trend detected

ammonium
-0.42 ueq/l (-1.68 %/year): 16 years' data
\- No significant trend detected

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
03/01/01	09/01/01	6.8	90.2	6.2	1581.8	182.2	41.0	24.2	161.1	92.6	330.4	68.2	229.0	229.0	51.2
09/01/01	16/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2
16/01/01	23/01/01	4.4	44.1	29.9	44.0	43.9	9.8	4.3	57.2	1.3	< 1.0	38.8	27.0	27.0	27.5
23/01/01	30/01/01	5.1	37.1	8.6	17.5	176.8	40.8	8.8	200.4	3.8	< 1.0	15.8	38.0	38.0	54.5
30/01/01	06/02/01	4.4	27.1	22.0	16.8	36.0	8.1	2.7	44.6	0.9	< 1.0	22.7	22.0	22.0	50.6
06/02/01	13/02/01	4.7	42.2	18.6	18.2	166.9	37.3	8.9	193.5	3.8	< 1.0	22.1	39.0	39.0	25.1
13/02/01	21/02/01	4.8	42.9	42.0	41.2	83.7	19.3	15.3	94.8	3.1	< 1.0	32.8	26.0	26.0	2.4
21/02/01	27/02/01	4.9	22.5	5.9	9.2	86.0	18.7	6.5	95.4	2.3	< 1.0	12.2	20.0	20.0	10.0
27/02/01	07/03/01	No sample collected 27/2/01 to 7/3/01													-
07/03/01	13/03/01	4.6	26.1	24.7	24.8	50.7	11.6	3.9	56.5	1.3	< 1.0	20.0	21.0	21.0	65.0
13/03/01	21/03/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21/03/01	27/03/01	4.7	83.5	99.0	59.4	121.4	30.1	19.5	138.7	3.8	< 1.0	68.9	-	-	1.9
27/03/01	03/04/01	4.5	42.6	38.4	47.5	36.5	8.3	3.9	46.0	1.7	< 1.0	38.2	27.0	27.0	68.6
03/04/01	10/04/01	4.8	19.5	11.1	11.2	41.5	9.4	3.4	49.9	0.9	< 1.0	14.5	17.0	17.0	39.2
10/04/01	17/04/01	4.5	47.1	38.2	38.2	101.5	22.4	10.3	117.3	3.1	< 1.0	34.9	39.0	39.0	5.3
17/04/01	24/04/01	4.8	16.3	16.1	17.6	12.7	3.4	2.9	15.2	< .5	< 1.0	14.8	12.0	12.0	69.5
24/04/01	04/05/01	6.2	57.1	37.9	156.3	26.8	11.9	36.2	25.2	9.3	42.2	53.9	38.0	38.0	16.9
04/05/01	15/05/01	8.0	2176.8	< .7	43389.9	3842.9	385.6	954.8	1562.2	4341.9	8901.5	1713.9	4930.0	4930.0	3.0
15/05/01	22/05/01	4.9	31.1	15.7	31.9	16.0	4.5	9.6	19.4	0.5	< 1.0	29.2	13.0	13.0	15.8
22/05/01	29/05/01	4.7	46.7	57.8	68.7	20.8	5.9	13.6	24.0	2.4	< 1.0	44.2	26.0	26.0	11.9
29/05/01	06/06/01	4.8	26.2	7.0	11.5	44.4	10.3	4.7	55.7	0.6	< 1.0	20.9	16.0	16.0	29.6
06/06/01	13/06/01	6.6	121.5	5.9	646.8	72.5	36.8	13.2	79.3	66.6	277.0	112.8	106.0	106.0	17.2
13/06/01	20/06/01	4.5	35.6	23.5	22.5	29.4	7.0	6.1	33.1	1.1	< 1.0	32.1	22.0	22.0	44.0
20/06/01	26/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26/06/01	04/07/01	4.6	44.2	31.2	34.4	23.6	6.0	11.0	27.5	1.0	< 1.0	41.4	22.0	22.0	46.3
04/07/01	11/07/01	5.0	23.3	20.2	25.0	29.1	6.2	6.5	34.6	1.4	< 1.0	19.8	14.0	14.0	28.6
11/07/01	17/07/01	4.5	26.0	7.5	5.0	38.5	8.4	3.0	47.8	1.2	< 1.0	21.3	18.0	18.0	19.8
17/07/01	24/07/01	5.8	23.8	11.1	23.5	19.5	6.5	4.9	20.9	8.0	11.4	21.5	12.0	12.0	21.4
24/07/01	31/07/01	5.7	25.4	21.7	30.8	32.9	9.0	12.1	36.3	1.6	< 1.0	21.4	14.0	14.0	10.7
31/07/01	07/08/01	4.9	20.9	8.6	11.7	14.9	3.3	4.7	15.1	1.4	< 1.0	19.1	11.0	11.0	28.9
07/08/01	15/08/01	4.9	43.8	15.3	46.7	12.9	3.3	3.8	14.0	1.8	6.5	42.3	15.0	15.0	39.8
15/08/01	22/08/01	4.8	28.1	18.9	20.6	20.5	4.7	2.7	24.4	0.7	< 1.0	25.6	16.0	16.0	16.1
22/08/01	29/08/01	5.0	35.3	22.3	14.6	126.8	28.1	10.6	147.0	4.1	< 1.0	20.1	32.0	32.0	9.5
29/08/01	04/09/01	5.1	34.6	12.6	31.2	39.1	8.7	6.1	45.2	1.5	< 1.0	29.9	19.0	19.0	14.1
04/09/01	12/09/01	4.9	18.5	5.4	6.4	67.2	14.3	3.9	77.3	1.3	< 1.0	10.4	17.0	17.0	26.4
12/09/01	19/09/01	5.3	25.5	4.1	13.1	143.0	31.7	7.8	161.4	3.0	< 1.0	8.2	28.0	28.0	39.8
19/09/01	25/09/01	5.0	179.7	60.9	420.2	52.5	18.1	17.7	79.1	62.6	293.2	173.3	-	-	1.2
25/09/01	01/10/01	4.6	23.9	19.5	16.8	37.2	8.4	4.8	43.2	1.1	< 1.0	19.4	18.0	18.0	92.9
01/10/01	09/10/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09/10/01	16/10/01	6.7	412.2	0.9	3567.9	361.0	366.0	749.5	623.6	126.7	1025.5	368.7	601.0	601.0	38.5
16/10/01	23/10/01	6.4	63.7	53.9	174.9	27.8	6.9	1.8	32.7	16.0	48.5	60.3	34.0	34.0	62.5
23/10/01	02/11/01	6.3	44.4	12.6	134.9	134.6	27.8	6.2	161.4	15.1	30.0	28.2	47.0	47.0	42.2
02/11/01	08/11/01	5.3	25.5	6.3	18.1	122.5	24.1	7.5	140.6	4.3	< 1.0	10.8	25.0	25.0	28.3
08/11/01	13/11/01	5.0	14.7	5.2	7.6	41.0	9.1	3.9	48.0	1.0	< 1.0	9.8	12.0	12.0	27.5
13/11/01	27/11/01	5.3	19.0	5.9	12.3	79.9	13.2	1.2	92.7	1.6	< 1.0	9.4	18.0	18.0	61.7
27/11/01	02/01/02	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5107	29.1	17.9	22.5	56.0	12.4	5.3	65.0	1.6	-	22.4	19.2	20.9	1265.6

Beaghs Burn

2001

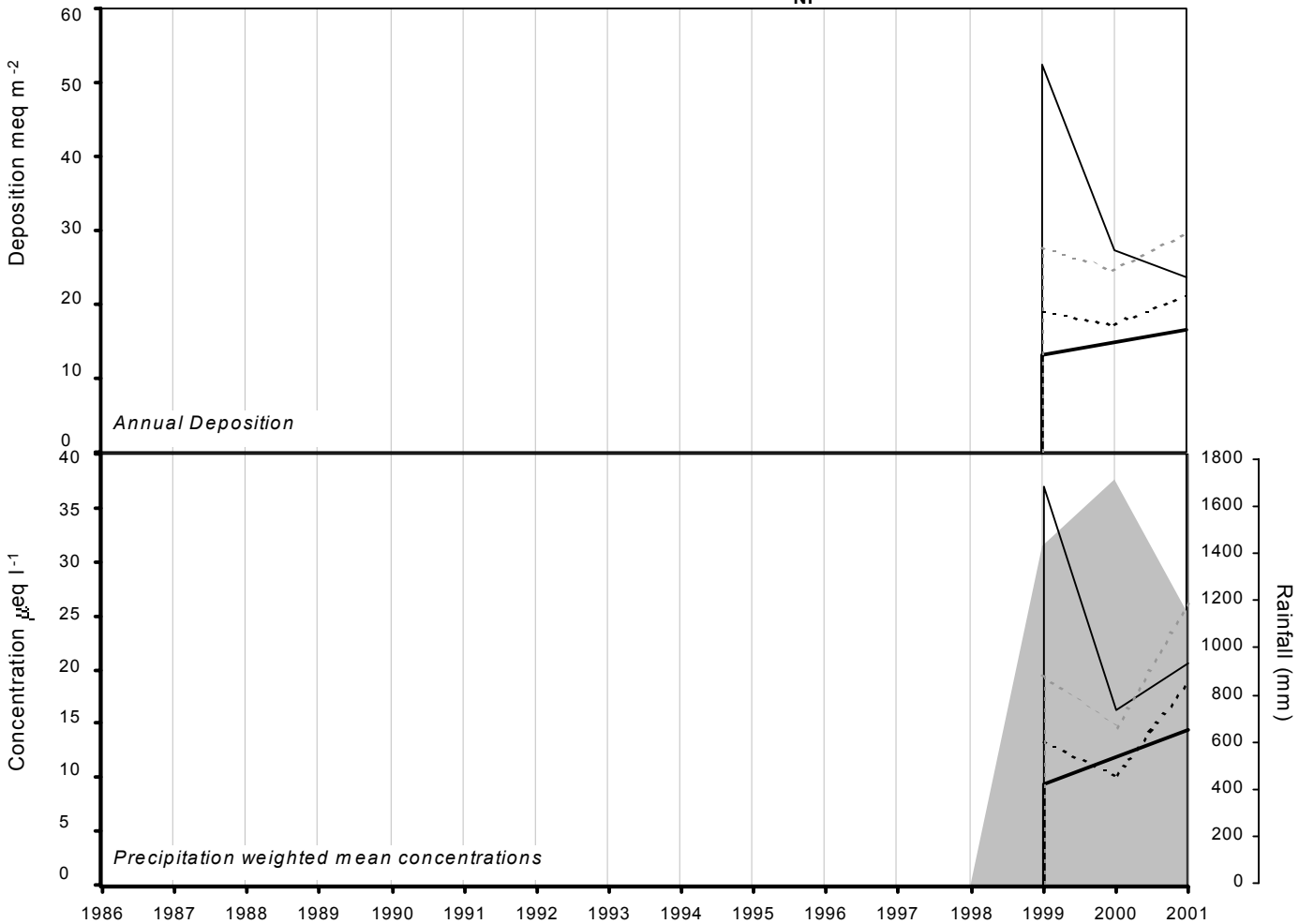
Site Code:	**5155**
Easting:	**1345**
Northing:	**5865**
Latitude:	**55 05 00 N**
Longitude:	**00 06 11 W**
Altitude (m):	**250**
Rainfall (mm):	**-**

[30 year mean 1940 - 1971]

Site Environment:
Turbary, open peat cutting.

Other measurements:
UKAWMN

Site Operator:
Department of Agriculture and Rural Development NI



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

non-marine sulphate
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

nitrate
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

ammonium
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
09/01/01	23/01/01	4.2	62.4	68.2	47.3	164.1	38.3	11.0	181.3	4.0	< 1.0	42.7	55.0	55.0	13.4
23/01/01	06/02/01	4.6	34.8	13.6	11.2	126.8	28.8	6.5	146.9	2.9	< 1.0	19.5	33.0	33.0	93.2
06/02/01	21/02/01	6.0	35.9	12.8	40.4	97.1	19.4	6.9	118.2	2.8	< 1.0	24.2	24.0	24.0	28.2
21/02/01	06/03/01	5.9	47.9	13.8	27.4	256.8	50.4	15.9	300.9	9.8	< 1.0	16.9	50.0	50.0	21.4
06/03/01	20/03/01	5.4	25.5	16.2	24.4	91.0	21.2	8.9	113.3	2.3	< 1.0	14.5	23.0	23.0	20.4
20/03/01	03/04/01	4.1	104.7	96.7	108.5	160.5	37.7	12.0	195.0	4.2	< 1.0	85.4	76.0	76.0	28.3
03/04/01	13/04/01	-	-	-	-	-	-	-	-	-	-	-	-	-	4.1
13/04/01	30/04/01	5.0	38.5	31.8	45.4	62.2	15.2	9.9	74.8	1.8	< 1.0	31.0	24.0	24.0	50.6
30/04/01	15/05/01	4.5	133.3	134.1	155.4	97.5	25.2	47.7	86.3	4.7	< 1.0	121.5	57.0	57.0	7.3
15/05/01	29/05/01	5.2	49.8	48.6	58.4	69.2	17.7	20.0	81.8	2.8	< 1.0	41.5	27.0	27.0	15.9
29/05/01	12/06/01	5.7	19.6	4.2	16.7	80.1	17.1	5.1	91.5	3.4	< 1.0	9.9	18.0	18.0	70.3
12/06/01	26/06/01	4.2	74.4	59.1	69.3	62.3	14.5	8.0	70.1	1.9	< 1.0	66.9	47.0	47.0	50.8
26/06/01	03/07/01	6.1	22.3	13.4	39.7	23.4	4.3	3.2	26.3	1.0	< 1.0	19.5	12.0	12.0	17.3
03/07/01	24/07/01	5.1	34.1	24.4	36.3	38.5	8.8	7.8	44.3	1.6	< 1.0	29.4	17.0	17.0	51.4
24/07/01	07/08/01	5.4	11.8	8.0	16.2	14.9	3.3	4.5	17.8	0.6	< 1.0	10.0	< 10.0	< 10.0	50.1
07/08/01	21/08/01	4.5	25.9	19.3	25.9	9.8	2.6	2.3	11.0	< .5	< 1.0	24.7	14.0	14.0	26.7
21/08/01	04/09/01	5.3	23.8	8.3	21.3	76.7	15.0	9.0	86.3	2.0	< 1.0	14.5	18.0	18.0	20.9
04/09/01	18/09/01	5.8	36.5	3.3	13.7	263.8	57.6	12.1	307.7	5.2	< 1.0	4.8	46.0	46.0	66.8
18/09/01	02/10/01	4.6	49.0	38.9	40.7	139.2	31.3	12.9	156.7	3.6	< 1.0	32.3	37.0	37.0	17.8
02/10/01	16/10/01	5.1	23.8	10.1	13.4	91.0	19.4	5.6	102.8	1.9	< 1.0	12.8	21.0	21.0	125.5
16/10/01	30/10/01	4.4	43.3	37.1	35.8	65.1	14.3	5.7	75.8	1.5	< 1.0	35.5	30.0	30.0	55.0
30/10/01	13/11/01	5.5	34.3	5.3	16.8	214.8	46.6	9.9	265.7	4.1	< 1.0	8.4	40.0	40.0	85.7
13/11/01	27/11/01	6.0	14.9	3.4	13.4	84.3	15.6	4.4	100.5	2.3	< 1.0	4.8	17.0	17.0	35.5
27/11/01	11/12/01	5.3	20.3	4.3	6.0	124.3	23.3	4.3	149.0	2.3	< 1.0	5.3	24.0	24.0	94.9
11/12/01	31/12/01	5.6	52.8	6.1	11.7	366.3	79.2	17.4	444.8	8.1	< 1.0	8.7	65.0	65.0	76.8
31/12/01	15/01/02	5.1	29.5	22.4	22.1	109.1	23.9	9.3	133.3	3.0	< 1.0	16.4	27.0	27.0	19.5

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5155	35.9	18.6	25.9	127.6	27.5	8.4	151.1	3.1	-	20.6	14.4	31.3	1147.8

Redesdale

2001

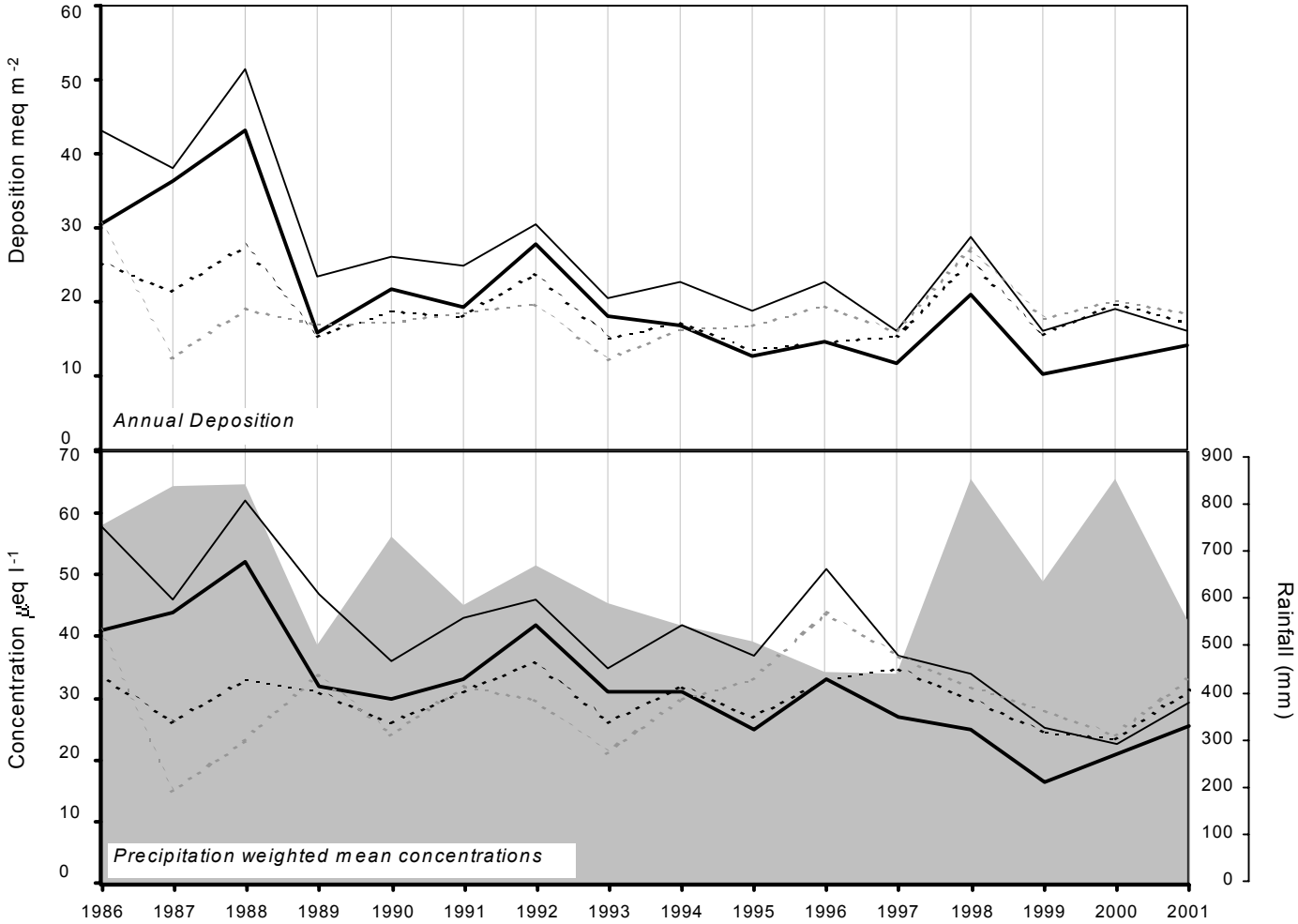
Site Code:	**5109**
Easting:	**3833**
Northing:	**5954**
Latitude:	**55 14 59 N**
Longitude:	**02 15 46 W**
Altitude (m):	**240**
Rainfall (mm):	**875**

[30 year mean 1940 - 1971]

Site Environment:
Open moorland, very open sheep farming land

Other measurements:
DT

Site Operator:
ADAS Redesdale



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-1.54 ueq/l (-3.55 %/year): 15 years' data
++ Moderately strong trend detected

non-marine sulphate
-1.81 ueq/l (-3.33 %/year): 16 years' data
+++ Strong trend detected

nitrate
-0.18 ueq/l (-0.58 %/year): 16 years' data
- No significant trend detected

ammonium
0.31 ueq/l (1.12 %/year): 16 years' data
- No significant trend detected

AEA Technology
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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
02/01/01	09/01/01	5.0	32.3	24.1	35.8	66.1	15.5	6.7	82.0	4.1	< 1.0	24.4	23.0	23.0	8.3
09/01/01	16/01/01	5.0	34.6	18.4	22.3	181.4	37.6	11.3	215.2	4.2	< 1.0	12.7	-	-	1.9
16/01/01	23/01/01	4.0	79.1	111.9	103.7	31.4	7.2	5.4	48.2	1.9	< 1.0	75.3	54.0	54.0	6.7
23/01/01	30/01/01	4.9	24.6	13.7	15.2	69.9	18.6	8.5	86.3	3.2	< 1.0	16.1	22.0	22.0	13.5
30/01/01	06/02/01	4.2	36.8	33.9	25.9	33.9	7.6	4.8	42.0	0.8	< 1.0	32.7	-	-	26.9
06/02/01	13/02/01	4.8	24.9	12.1	17.5	65.1	14.0	5.7	78.1	1.5	< 1.0	17.0	20.0	20.0	19.3
13/02/01	20/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20/02/01	28/02/01	4.3	50.1	58.2	45.8	105.5	23.5	11.1	129.6	3.0	< 1.0	37.4	43.0	43.0	10.6
28/02/01	06/03/01	4.7	25.6	22.9	17.7	78.5	15.8	13.1	91.3	2.4	< 1.0	16.1	24.0	24.0	4.3
06/03/01	13/03/01	4.8	34.5	38.2	44.5	27.2	6.8	7.5	32.3	1.4	< 1.0	31.2	19.0	19.0	6.6
13/03/01	19/03/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.6
19/03/01	27/03/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27/03/01	03/04/01	4.3	55.7	65.2	62.2	31.5	8.6	8.5	37.0	1.4	< 1.0	51.9	38.0	38.0	12.1
03/04/01	10/04/01	4.5	28.9	24.8	24.1	26.1	6.0	3.4	31.8	0.8	< 1.0	25.8	23.0	23.0	23.7
10/04/01	17/04/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4
17/04/01	24/04/01	5.1	49.6	45.2	70.9	66.7	14.9	9.4	75.7	2.5	< 1.0	41.6	27.0	27.0	12.0
24/04/01	01/05/01	4.4	40.5	35.7	29.4	10.4	3.8	5.4	13.5	0.8	< 1.0	39.3	25.0	25.0	17.1
01/05/01	08/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5
08/05/01	15/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15/05/01	22/05/01	4.4	91.9	87.0	123.6	13.8	4.7	11.9	19.3	1.8	< 1.0	90.2	40.0	40.0	6.6
22/05/01	30/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30/05/01	05/06/01	5.6	21.6	14.1	24.4	23.4	5.4	7.7	29.6	2.7	< 1.0	18.8	11.0	11.0	6.0
05/06/01	12/06/01	5.5	9.8	8.4	21.0	5.1	1.9	1.3	8.3	< .5	< 1.0	9.2	< 10.0	< 10.0	23.8
12/06/01	19/06/01	Bottle smashed in transit - most of samples in bag- no sample submitted													5.5
19/06/01	26/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3
26/06/01	03/07/01	4.4	109.9	75.7	98.1	67.5	17.7	26.1	78.8	3.2	< 1.0	101.7	47.0	47.0	7.6
03/07/01	10/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
10/07/01	17/07/01	4.7	21.4	12.2	9.6	14.0	2.9	1.9	13.8	0.7	< 1.0	19.8	13.0	13.0	37.5
17/07/01	24/07/01	4.7	39.9	33.0	21.8	129.5	30.0	10.8	151.9	3.5	< 1.0	24.3	35.0	35.0	7.6
24/07/01	31/07/01	6.0	19.9	25.2	28.0	23.8	7.3	16.3	23.8	2.6	3.2	17.0	11.0	11.0	4.3
31/07/01	07/08/01	4.8	91.6	76.4	90.3	36.3	12.5	38.6	37.9	2.8	< 1.0	87.2	36.0	36.0	3.2
07/08/01	14/08/01	4.9	47.7	27.5	50.6	21.5	5.0	6.1	24.1	2.1	< 1.0	45.1	20.0	20.0	11.5
14/08/01	21/08/01	4.5	35.8	35.0	43.8	8.0	2.7	5.9	10.0	1.4	< 1.0	34.9	20.0	20.0	23.4
21/08/01	28/08/01	4.5	93.2	82.8	105.8	31.2	10.3	21.8	30.6	2.1	6.4	89.4	41.0	41.0	3.5
28/08/01	04/09/01	6.0	16.0	18.1	45.5	7.8	1.4	3.1	8.4	0.7	< 1.0	15.0	< 10.0	< 10.0	6.7
04/09/01	11/09/01	6.0	35.1	22.5	46.1	113.3	20.5	11.4	130.7	9.6	2.4	21.5	27.0	27.0	2.4
11/09/01	18/09/01	6.1	14.0	6.3	15.8	59.4	11.4	5.7	67.8	2.2	< 1.0	6.9	14.0	14.0	8.9
18/09/01	25/09/01	4.4	33.4	48.2	35.4	68.1	16.1	8.0	76.5	2.4	< 1.0	25.1	32.0	32.0	13.4
25/09/01	02/10/01	4.5	25.4	22.4	13.7	26.4	5.0	2.6	30.1	0.9	< 1.0	22.2	19.0	19.0	28.0
02/10/01	08/10/01	4.9	25.1	16.8	16.7	62.7	15.3	9.0	77.0	1.4	< 1.0	17.5	20.0	20.0	18.1
08/10/01	16/10/01	5.2	33.0	30.0	26.0	23.2	7.1	25.4	25.4	1.2	< 1.0	30.2	15.0	15.0	20.8
16/10/01	23/10/01	4.3	47.6	55.4	51.6	16.0	4.0	5.2	20.3	2.0	< 1.0	45.7	31.0	31.0	49.2
23/10/01	30/10/01	5.4	28.0	23.4	27.2	104.1	20.1	14.2	121.9	3.0	< 1.0	15.5	25.0	25.0	2.7
30/10/01	13/11/01	5.4	40.0	13.7	20.8	202.4	45.6	14.1	248.2	4.3	< 1.0	15.6	40.0	40.0	18.7
13/11/01	27/11/01	5.4	25.3	23.1	36.5	62.3	12.9	4.6	73.4	1.7	< 1.0	17.8	19.0	19.0	17.1
27/11/01	18/12/01	4.7	18.9	18.6	14.8	26.7	4.3	< 1.0	31.0	0.9	< 1.0	15.7	15.0	15.0	46.3
18/12/01	31/12/01	5.4	28.1	10.9	19.3	132.1	25.1	6.5	160.7	3.1	< 1.0	12.2	28.0	28.0	9.7
31/12/01	15/01/02	4.8	86.5	111.5	133.0	239.8	54.0	19.3	273.9	6.5	< 1.0	57.6	66.0	66.0	4.2

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5109	34.7	31.3	33.5	45.1	10.2	7.1	53.8	1.7	-	29.3	25.6	23.3	553.1

Eskdalemuir

2001

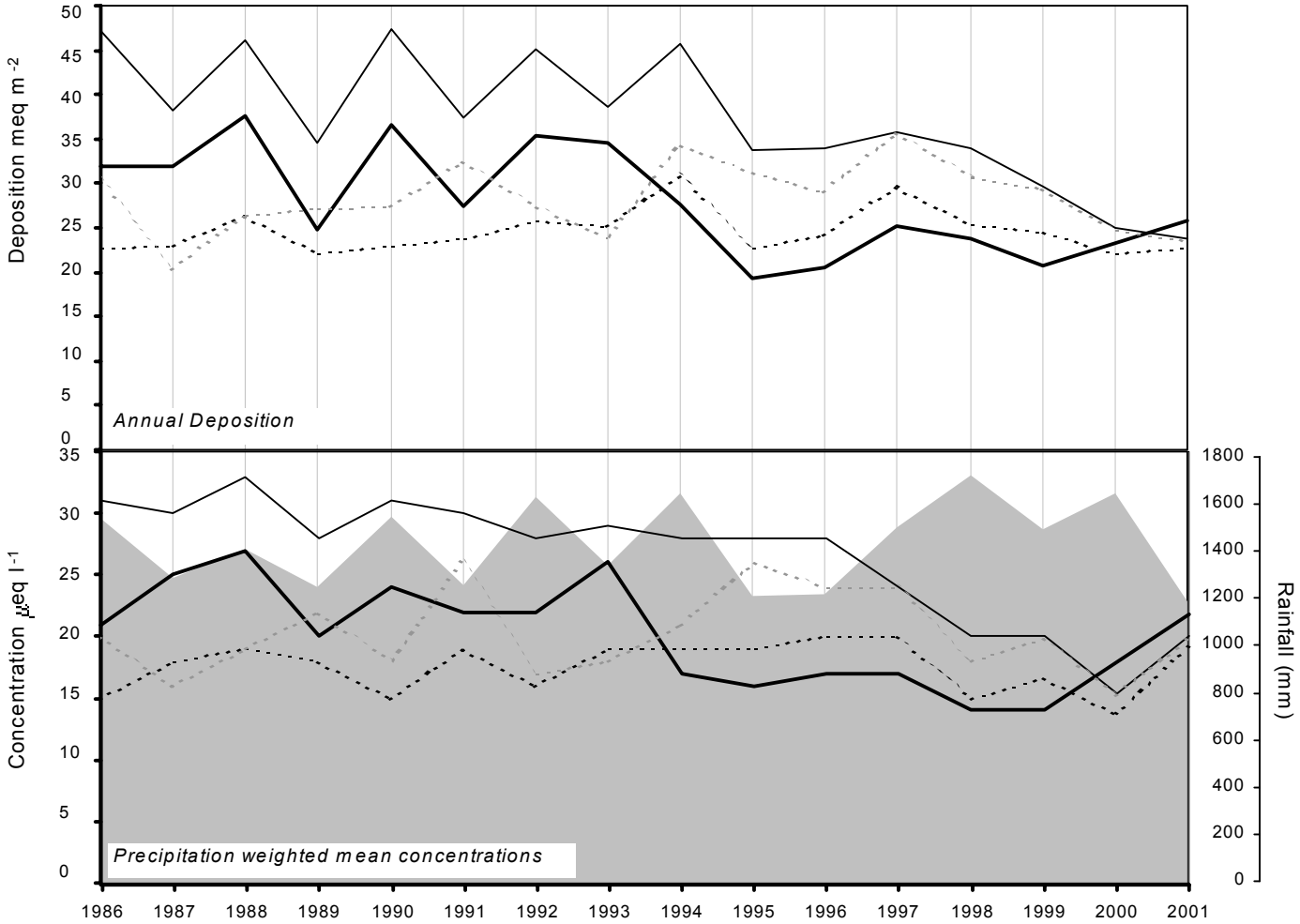
Site Code:	**5002**
Easting:	**3235**
Northing:	**6030**
Latitude:	**55 18 54 N**
Longitude:	**03 12 20 W**
Altitude (m):	**259**
Rainfall (mm):	**1745**

[30 year mean 1940 - 1971]

Site Environment:
Open moorland, Met Office Observatory

Other measurements:
WOC, DT, Daily SO2, Daily SO4, HNO3 Denuder, ozone, Met, EMEP

Site Operator:
Meteorological Office



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-0.59 ueq/l (-2.41 %/year): 15 years' data
\+ Significant trend detected

non-marine sulphate
-0.92 ueq/l (-2.77 %/year): 16 years' data
+++ Strong trend detected

nitrate
0.01 ueq/l (0.04 %/year): 16 years' data
\- No significant trend detected

ammonium
0.04 ueq/l (0.18 %/year): 16 years' data
\- No significant trend detected

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
03/01/01	10/01/01	4.9	18.3	13.9	14.1	61.6	13.4	3.7	70.5	1.5	< 1.0	10.8	18.0	18.0	26.9
10/01/01	17/01/01	6.1	42.6	28.1	31.9	235.4	49.9	17.2	291.7	9.8	< 1.0	14.3	47.0	47.0	1.6
17/01/01	24/01/01	4.6	36.7	21.8	18.4	110.7	24.9	5.9	130.8	2.3	< 1.0	23.4	34.0	34.0	24.0
24/01/01	31/01/01	5.0	34.8	16.6	19.1	159.9	36.1	8.5	189.3	4.0	< 1.0	15.6	36.0	36.0	19.1
31/01/01	07/02/01	4.2	49.6	27.1	15.2	261.3	59.4	12.9	331.2	5.0	< 1.0	18.1	61.0	61.0	40.2
07/02/01	14/02/01	4.9	28.4	12.6	20.8	66.2	14.8	4.2	78.9	1.6	< 1.0	20.4	20.0	20.0	34.2
14/02/01	21/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21/02/01	01/03/01	5.1	51.1	28.1	52.2	95.8	20.3	8.5	126.4	4.2	< 1.0	39.6	30.0	30.0	7.6
01/03/01	07/03/01	4.3	47.1	65.1	47.3	70.0	16.0	9.9	74.3	2.4	< 1.0	38.7	40.0	40.0	9.8
07/03/01	14/03/01	4.8	29.2	19.6	30.1	47.4	10.7	6.5	56.5	1.2	< 1.0	23.5	19.0	19.0	21.6
14/03/01	21/03/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
21/03/01	28/03/01	3.9	58.1	75.5	36.8	55.5	13.0	5.8	62.7	1.8	< 1.0	51.4	55.0	55.0	15.0
28/03/01	04/04/01	4.9	37.2	21.7	40.9	28.6	6.9	4.5	35.2	1.2	< 1.0	33.7	18.0	18.0	28.2
04/04/01	11/04/01	4.6	25.6	21.3	20.9	34.0	7.7	3.6	40.0	1.0	< 1.0	21.5	20.0	20.0	29.0
11/04/01	18/04/01	6.5	38.5	21.4	83.8	49.5	7.8	4.5	59.6	30.3	36.4	32.5	30.0	30.0	9.4
18/04/01	25/04/01	6.3	52.9	39.3	189.8	37.9	10.0	4.7	29.7	23.8	43.3	48.3	35.0	35.0	26.1
25/04/01	02/05/01	4.5	42.7	34.0	36.9	15.7	4.8	5.1	27.8	0.7	< 1.0	40.9	24.0	24.0	17.8
02/05/01	09/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09/05/01	16/05/01	7.5	181.5	73.0	1292.5	65.2	50.8	27.4	63.5	126.3	419.9	173.7	185.0	185.0	10.2
16/05/01	23/05/01	4.7	48.6	30.6	42.7	22.5	5.0	8.3	23.6	3.0	< 9.7	45.9	22.0	22.0	5.9
23/05/01	30/05/01	6.3	41.8	23.8	95.3	37.8	11.8	6.3	39.3	16.4	33.2	37.2	29.0	29.0	15.8
30/05/01	06/06/01	5.2	31.7	14.7	27.0	47.2	11.0	7.3	57.0	2.4	< 1.0	26.0	16.0	16.0	5.9
06/06/01	13/06/01	6.1	12.6	5.3	40.7	11.0	4.9	5.2	12.1	7.0	23.3	11.3	10.0	10.0	24.6
13/06/01	20/06/01	4.3	38.5	34.9	25.6	32.6	7.6	4.9	35.8	1.2	< 1.0	34.6	29.0	29.0	26.7
20/06/01	27/06/01	6.6	171.4	78.9	996.6	42.4	39.6	21.2	44.8	115.6	451.8	166.3	174.0	174.0	14.7
27/06/01	04/07/01	6.0	35.4	16.1	52.1	59.6	11.8	4.0	69.8	2.2	< 1.0	28.2	21.0	21.0	14.0
04/07/01	11/07/01	5.3	25.4	19.4	34.1	25.8	7.9	4.9	29.8	5.3	14.5	22.3	14.0	14.0	45.3
11/07/01	18/07/01	5.9	51.7	13.9	141.8	24.3	7.5	1.2	34.3	21.7	101.2	48.8	32.0	32.0	23.7
18/07/01	25/07/01	5.1	36.3	34.2	37.8	41.0	11.1	11.1	48.8	2.4	< 1.0	31.4	21.0	21.0	10.1
25/07/01	01/08/01	5.3	15.6	20.0	15.9	15.5	4.6	7.3	15.4	1.6	< 1.0	13.7	10.0	10.0	8.3
01/08/01	08/08/01	4.8	15.2	14.5	17.0	10.9	2.6	3.2	11.4	< .5	< 1.0	13.9	10.0	10.0	30.9
08/08/01	15/08/01	4.5	40.4	17.3	28.2	16.3	3.9	3.2	18.5	0.6	< 1.0	38.5	20.0	20.0	35.2
15/08/01	22/08/01	4.6	18.4	19.3	13.5	14.1	3.3	3.6	17.3	0.6	< 1.0	16.7	14.0	14.0	45.2
22/08/01	29/08/01	5.2	9.4	15.9	5.7	26.4	6.7	8.1	27.8	0.9	< 1.0	6.2	10.0	10.0	6.3
29/08/01	05/09/01	5.2	22.0	15.9	30.3	16.3	3.8	3.6	19.1	0.7	< 1.0	20.1	12.0	12.0	15.4
05/09/01	12/09/01	5.3	11.9	5.6	10.0	34.2	6.9	3.6	38.2	0.8	< 1.0	7.8	< 10.0	< 10.0	12.2
12/09/01	19/09/01	5.2	17.2	3.4	8.8	83.3	17.4	4.7	93.8	1.5	< 1.0	7.2	17.0	17.0	15.1
19/09/01	26/09/01	4.3	38.7	44.5	27.6	34.0	8.0	4.2	38.5	1.3	< 1.0	34.6	30.0	30.0	15.3
26/09/01	03/10/01	4.8	29.7	14.3	15.1	109.0	24.2	8.3	126.5	2.3	< 1.0	16.6	28.0	28.0	75.2
03/10/01	10/10/01	4.8	14.9	7.3	7.8	34.6	7.8	3.1	42.1	0.9	< 1.0	10.7	13.0	13.0	105.9
10/10/01	18/10/01	4.9	46.4	44.7	38.8	73.0	18.8	30.5	84.7	2.0	< 1.0	37.6	28.0	28.0	26.8
18/10/01	24/10/01	4.4	24.9	24.6	18.0	17.0	4.1	2.9	21.1	0.6	< 1.0	22.8	19.0	19.0	55.4
24/10/01	31/10/01	5.2	47.5	22.1	33.1	151.9	33.4	14.5	173.0	3.6	< 1.0	29.2	35.0	35.0	25.2
31/10/01	07/11/01	5.3	29.3	10.6	18.8	119.3	24.8	8.3	140.8	3.1	< 1.0	15.0	26.0	26.0	14.0
07/11/01	14/11/01	5.1	7.9	5.2	6.0	27.6	5.5	2.9	33.6	0.5	< 1.0	4.6	< 10.0	< 10.0	16.3
14/11/01	28/11/01	5.3	20.0	9.1	14.6	395.2	15.7	7.6	411.1	2.2	< 1.0	< 27.6	58.0	58.0	60.6
28/11/01	12/12/01	4.7	14.1	16.2	11.7	31.5	3.3	1.6	35.1	0.7	< 1.0	10.3	14.0	14.0	85.8
12/12/01	02/01/02	5.0	42.8	15.1	16.3	255.6	50.0	11.1	308.5	4.9	< 1.0	12.0	48.0	48.0	23.4

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5002	27.9	19.3	19.9	85.2	14.3	6.2	97.8	1.7	-	20.1	21.9	25.0	1180.0

Whiteadder

2001

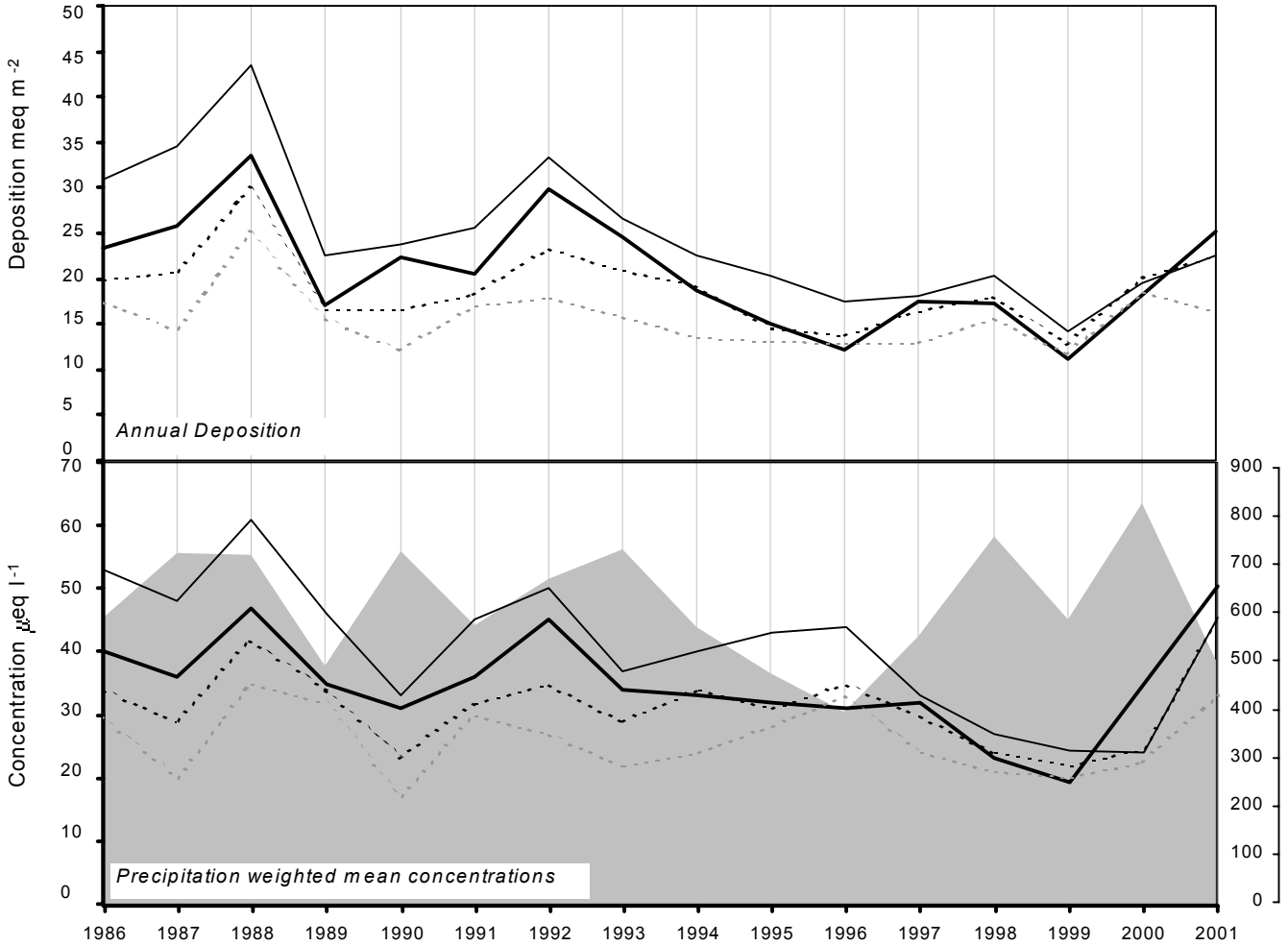
Site Code:	**5106**
Easting:	**3664**
Northing:	**6633**
Latitude:	**55 51 42 N**
Longitude:	**03 32 13 W**
Altitude (m):	**250**
Rainfall (mm):	**1050**

[30 year mean 1940 - 1971]

Site Environment:
Open moorland

Other measurements:
DT

Site Operator:
East of Scotland Water



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-0.56 ueq/l (-1.44 %/year): 15 years' data
\- No significant trend detected

non-marine sulphate
-1.51 ueq/l (-2.89 %/year): 16 years' data
++ Moderately strong trend detected

nitrate
-0.21 ueq/l (-0.63 %/year): 16 years' data
\- No significant trend detected

ammonium
-0.17 ueq/l (-0.61 %/year): 16 years' data
\- No significant trend detected

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
04/01/01	09/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5
09/01/01	15/01/01	4.8	29.0	19.4	12.8	149.8	33.5	10.5	174.5	3.7	< 1.0	11.0	34.0	34.0	5.1
15/01/01	23/01/01	4.1	69.2	81.0	54.8	53.5	12.1	6.4	71.0	3.2	< 1.0	62.7	52.0	52.0	17.8
23/01/01	30/01/01	4.6	46.4	31.9	31.2	131.1	32.3	13.0	153.4	2.7	< 1.0	30.6	42.0	42.0	8.1
30/01/01	06/02/01	4.5	26.2	19.8	7.5	42.7	10.0	4.3	51.3	1.2	< 1.0	21.0	23.0	23.0	22.4
06/02/01	13/02/01	6.1	48.2	17.2	51.2	120.6	28.0	16.6	141.5	8.9	19.8	33.7	32.0	32.0	10.8
13/02/01	20/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20/02/01	13/03/01	4.3	61.2	67.2	58.9	105.2	24.2	12.8	115.5	3.2	< 1.0	48.6	47.0	47.0	20.3
Sample collection affected by Foot and Mouth Precautions 20/2/01 to 13/3/01															-
13/03/01	22/05/01	4.1	87.1	79.8	61.6	98.0	24.5	10.4	111.8	2.8	3.3	75.3	62.0	62.0	79.8
Sample collection affected by Foot and Mouth Precautions 13/3/01 to 22/5/01															-
22/05/01	31/07/01	4.2	55.5	45.1	27.7	32.5	9.0	12.9	37.3	1.9	< 1.0	51.6	35.0	35.0	113.6
Sample collection affected by Foot and Mouth Precautions 22/5/01 to 31/07/01															-
31/07/01	07/08/01	4.3	131.4	130.4	107.8	54.9	13.9	55.1	59.6	5.7	< 1.0	124.8	60.0	60.0	2.8
07/08/01	14/08/01	4.4	35.9	17.8	11.0	36.5	8.1	9.2	39.3	2.1	< 1.0	31.5	23.0	23.0	29.1
14/08/01	21/08/01	4.4	54.9	47.4	42.9	22.9	6.5	10.1	24.6	1.9	< 1.0	52.1	35.0	35.0	19.1
21/08/01	03/09/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3
03/09/01	10/09/01	5.0	47.0	21.0	13.7	131.5	22.6	30.9	139.4	17.0	< 1.0	31.2	-	-	1.9
10/09/01	17/09/01	5.2	63.6	21.8	54.4	140.1	30.9	26.2	142.1	3.9	< 1.0	46.8	37.0	37.0	3.1
17/09/01	24/09/01	4.7	39.6	29.1	23.3	82.9	18.9	14.7	86.0	2.7	< 1.0	29.6	28.0	28.0	20.8
24/09/01	01/10/01	4.5	31.7	26.7	23.5	43.4	9.7	5.2	47.4	1.6	< 1.0	26.5	23.0	23.0	21.2
01/10/01	08/10/01	4.7	19.6	16.1	13.0	45.3	10.3	5.0	52.7	1.1	< 1.0	14.2	16.0	16.0	14.4
08/10/01	15/10/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9
15/10/01	22/10/01	-	-	-	-	-	-	-	-	-	-	-	-	-	36.9
22/10/01	29/10/01	4.0	76.6	59.4	48.8	53.3	11.4	6.6	62.6	2.9	< 1.0	70.2	48.0	48.0	10.1
29/10/01	05/11/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8
05/11/01	12/11/01	4.9	29.5	5.6	3.4	184.6	41.5	11.3	220.6	4.1	< 1.0	7.2	35.0	35.0	23.4
12/11/01	19/11/01	4.7	55.3	17.9	15.2	328.2	71.3	26.5	403.3	10.1	< 1.0	15.8	-	-	5.1
19/11/01	26/11/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1
26/11/01	03/12/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8
03/12/01	10/12/01	4.9	15.3	14.9	8.0	40.7	7.2	3.5	47.6	1.4	< 1.0	10.4	15.0	15.0	5.3
10/12/01	24/12/01	4.4	39.8	45.0	22.2	95.6	24.0	9.7	98.3	2.1	< 1.0	28.3	38.0	38.0	14.0
24/12/01	07/01/02	5.0	29.1	18.1	18.7	88.5	19.5	9.4	102.1	2.4	< 1.0	18.4	25.0	25.0	6.3

Precipitation weighted annual mean for site: samples containing phosphate are excluded.														Total Rainfall
5106		-	-	-	-	-	-	-	-	-	-	-	-	498.8

Loch Chon

2001

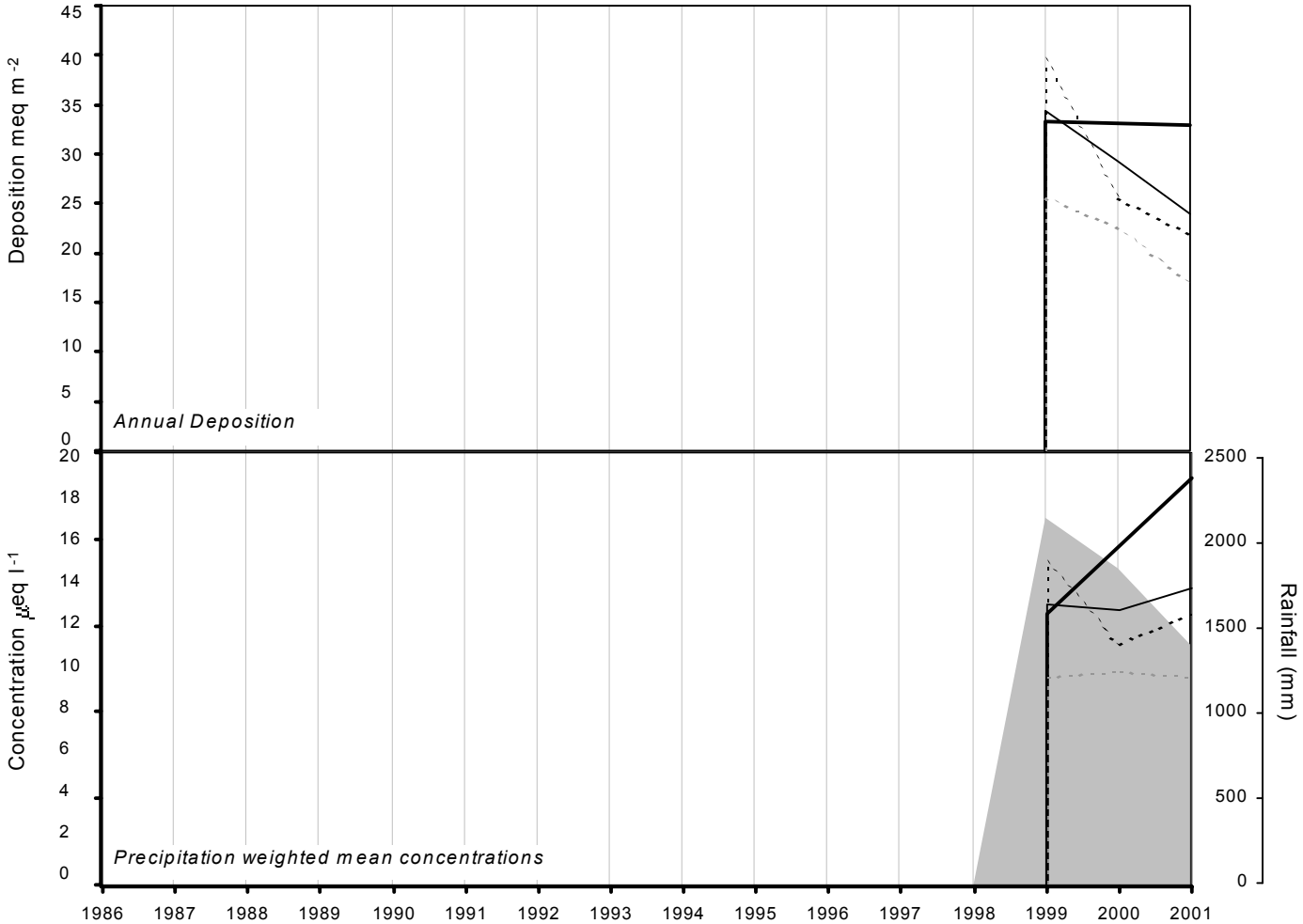
Site Code:	**5156**
Easting:	**2429**
Northing:	**7084**
Latitude:	**56 14 52 N**
Longitude:	**04 32 09 W**
Altitude (m):	**150**
Rainfall (mm):	**-**

[30 year mean 1940 - 1971]

Site Environment:
Moorland overlooking Loch Katrine

Other measurements:
UKAWMN

Site Operator:
Freshwater Fisheries Laboratory



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration
(+x = increase; -x = decrease)

hydrogen ion
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

non-marine sulphate
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

nitrate
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

ammonium
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

ACID DEPOSITION DATA REPORT, 2001

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
04/01/01	17/01/01	5.1	6.8	4.9	0.5	27.7	6.0	2.5	35.0	0.8	< 1.0	3.5	< 10.0	< 10.0	14.9
17/01/01	31/01/01	4.6	30.5	21.9	15.1	78.8	18.6	5.0	94.0	1.9	< 1.0	21.0	29.0	29.0	84.9
31/01/01	14/02/01	4.6	28.1	17.0	11.6	83.4	19.2	5.4	103.5	1.9	< 1.0	18.0	27.0	27.0	25.1
14/02/01	02/05/01	7.7	199.0	26.9	1943.1	123.3	72.0	19.5	107.5	215.8	650.4	184.2	279.0	279.0	175.7
Sample collection affected by Foot and Mouth Precautions 14/2/01 to 2/5/01															-
02/05/01	24/05/01	4.3	40.0	44.0	27.1	27.5	8.9	14.0	28.8	< .5	< 1.0	36.6	30.0	30.0	12.9
24/05/01	05/06/01	4.5	35.0	22.0	13.3	111.4	25.2	10.3	131.3	2.5	< 1.0	21.6	35.0	35.0	25.7
05/06/01	20/06/01	4.6	24.6	16.7	17.0	23.1	5.7	5.5	25.6	< .5	< 1.0	21.8	16.0	16.0	45.3
20/06/01	04/07/01	7.5	245.9	46.5	2631.2	73.6	61.0	23.5	83.0	203.6	643.1	237.1	373.0	373.0	83.1
04/07/01	18/07/01	5.3	23.2	17.2	39.8	10.4	2.0	1.4	15.3	7.2	13.1	21.9	10.0	10.0	47.7
18/07/01	01/08/01	7.1	79.5	14.4	425.7	51.7	14.0	6.5	68.7	46.2	146.8	73.2	82.0	82.0	32.7
01/08/01	14/08/01	4.7	19.2	11.3	13.0	8.6	1.9	2.8	8.5	< .5	< 1.0	18.1	12.0	12.0	62.3
14/08/01	29/08/01	4.4	25.5	20.2	14.0	33.1	7.3	3.9	36.7	0.6	< 1.0	21.5	20.0	20.0	55.9
29/08/01	12/09/01	4.9	12.1	9.2	4.8	24.9	5.4	3.1	26.2	0.6	< 1.0	9.1	11.0	11.0	29.1
12/09/01	26/09/01	4.7	24.6	8.7	2.0	132.5	29.2	6.8	151.0	2.4	< 1.0	8.7	30.0	30.0	30.5
26/09/01	10/10/01	5.9	24.9	9.8	60.3	62.9	9.5	2.0	75.7	11.3	10.0	17.3	22.0	22.0	209.8
10/10/01	24/10/01	4.5	35.4	27.1	20.3	38.4	8.9	10.7	38.9	1.0	< 1.0	30.7	23.0	23.0	132.6
24/10/01	07/11/01	5.5	18.2	4.1	11.2	87.0	16.7	3.4	99.9	3.4	3.7	7.7	18.0	18.0	110.8
07/11/01	21/11/01	6.8	15.5	4.8	98.9	32.7	4.2	< 1.0	43.0	17.8	11.9	11.5	22.0	22.0	39.4
21/11/01	04/12/01	4.8	18.3	8.6	6.1	77.2	16.3	4.0	92.1	1.5	< 1.0	9.0	19.0	19.0	138.8
04/12/01	19/12/01	4.2	30.0	33.5	4.4	42.8	13.6	5.5	44.8	1.3	< 1.0	24.9	28.0	28.0	21.0
19/12/01	03/01/02	5.1	67.6	5.0	< .7	536.6	115.5	23.0	633.5	11.1	< 1.0	3.0	94.0	94.0	20.4

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5156	25.8	15.6	12.0	71.5	15.7	6.1	82.5	1.7	-	17.2	23.5	22.9	1398.6

Balquhidder

2001

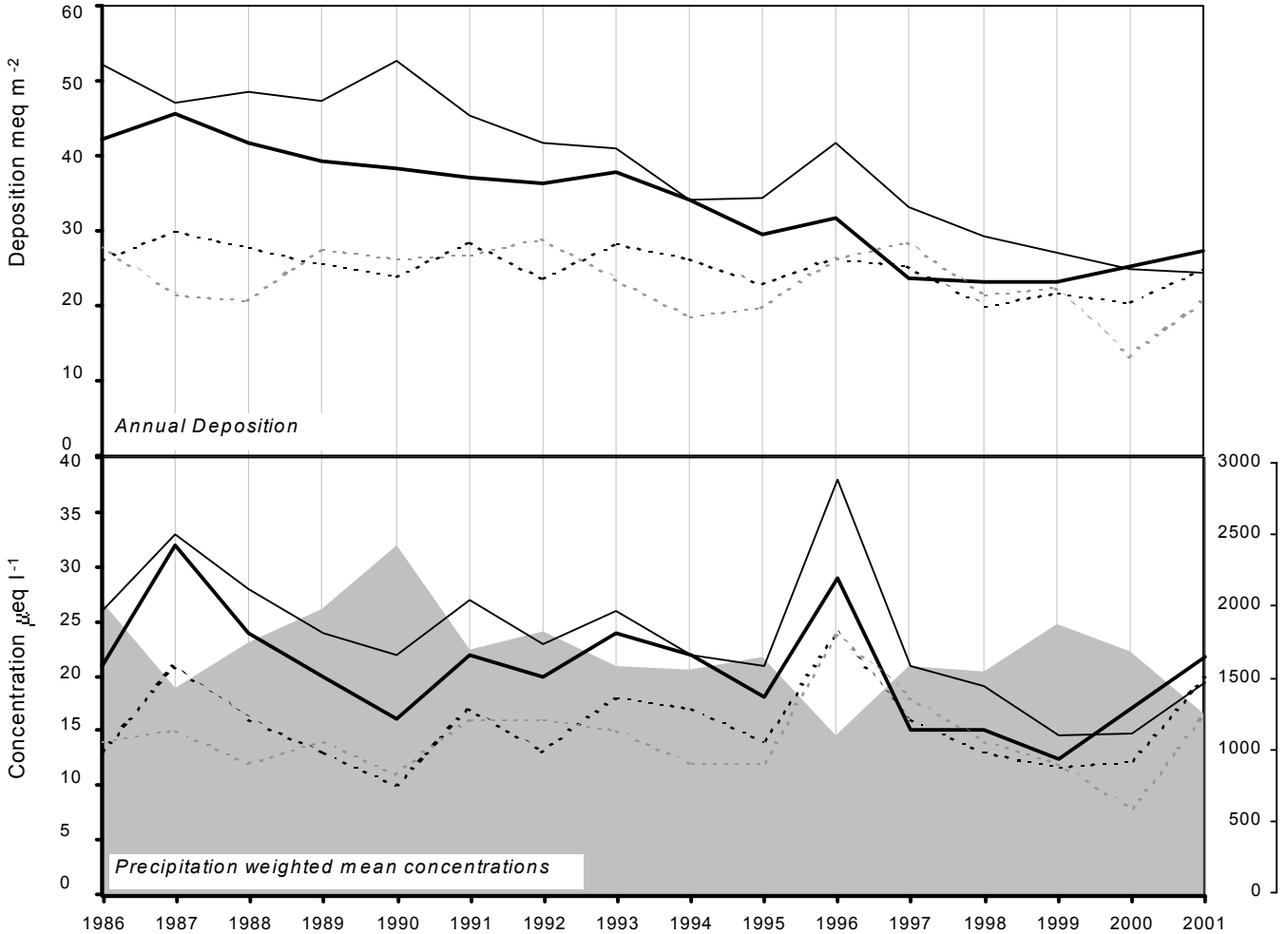
Site Code:	**5152**
Easting:	**2521**
Northing:	**7206**
Latitude:	**56 21 17 N**
Longitude:	**04 23 38 W**
Altitude (m):	**135**
Rainfall (mm):	**2245**

[30 year mean 1940 - 1971]

Site Environment:
Open sheep pasture at loch-side

Other measurements:
DT, Met

Site Operator:
Institute of Hydrology



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration
(+x = increase; -x = decrease)

hydrogen ion
-0.48 ueq/l (-2.00 %/year): 15 years' data
\- No significant trend detected

non-marine sulphate
-0.72 ueq/l (-2.48 %/year): 16 years' data
\+ Significant trend detected

nitrate
0.03 ueq/l (0.20 %/year): 16 years' data
\- No significant trend detected

ammonium
0.03 ueq/l (0.20 %/year): 16 years' data
\- No significant trend detected

AEA Technology
National Environmental Technology Centre

Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
02/01/01	09/01/01	4.7	17.7	9.5	8.2	58.6	13.4	3.5	71.0	1.3	< 1.0	10.6	18.0	18.0	29.7
09/01/01	15/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15/01/01	22/01/01	4.1	55.8	103.4	65.0	29.2	4.0	7.4	33.6	3.9	< 1.0	52.3	53.0	53.0	11.6
22/01/01	30/01/01	4.7	20.8	13.2	8.3	56.0	12.4	2.3	68.7	1.0	< 1.0	14.0	20.0	20.0	82.4
30/01/01	06/02/01	4.7	19.7	22.5	6.8	28.3	4.1	5.6	27.1	2.0	< 1.0	16.3	-	-	2.2
06/02/01	12/02/01	4.8	24.6	9.9	7.7	101.1	22.5	6.2	124.3	2.3	< 1.0	12.4	25.0	25.0	66.1
12/02/01	19/02/01	4.7	66.1	88.6	70.3	118.6	28.5	33.4	135.7	2.9	< 1.0	51.8	-	-	2.0
19/02/01	26/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
26/02/01	01/05/01	4.5	34.5	36.0	27.1	55.6	12.6	5.7	67.0	1.3	< 1.0	27.8	29.0	29.0	165.6
Sample collection affected by Foot and Mouth Precautions 26/2/01 to 1/5/01															-
01/05/01	08/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08/05/01	15/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15/05/01	22/05/01	4.3	50.2	38.5	20.5	13.8	4.3	8.4	19.6	0.8	< 9.7	48.5	30.0	30.0	4.2
22/05/01	30/05/01	4.6	50.2	40.5	41.9	90.8	22.9	11.3	112.3	3.0	< 1.0	39.3	37.0	37.0	10.3
30/05/01	05/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/06/01	11/06/01	5.7	29.3	11.8	17.1	85.7	18.0	13.6	95.9	3.8	< 1.0	19.0	22.0	22.0	2.2
11/06/01	19/06/01	4.5	36.4	33.8	27.4	11.1	3.5	6.2	10.5	1.0	< 1.0	35.0	21.0	21.0	8.0
19/06/01	04/07/01	4.5	40.6	36.0	38.4	12.2	4.1	6.6	14.0	1.1	< 1.0	39.2	23.0	23.0	80.1
04/07/01	09/07/01	4.7	20.2	23.2	17.6	2.6	2.2	7.0	2.9	2.3	< 1.0	19.9	14.0	14.0	16.6
09/07/01	16/07/01	5.2	21.0	12.3	32.7	10.4	2.6	2.1	14.1	4.8	24.3	19.7	11.0	11.0	19.5
16/07/01	23/07/01	4.6	30.1	26.3	16.3	12.1	5.4	8.4	12.1	3.9	< 1.0	28.6	17.0	17.0	9.2
23/07/01	31/07/01	4.7	23.1	21.7	12.7	27.9	6.5	8.6	31.3	5.4	< 1.0	19.7	16.0	16.0	23.1
31/07/01	08/08/01	4.8	31.6	24.5	27.9	19.1	5.4	9.2	22.2	1.3	< 1.0	29.3	19.0	19.0	13.8
08/08/01	15/08/01	6.2	25.2	10.4	74.4	4.1	2.7	1.4	4.3	9.1	22.6	24.7	14.0	14.0	39.1
15/08/01	20/08/01	7.1	70.6	22.7	502.4	17.4	3.9	2.4	18.1	38.2	156.6	68.5	61.0	61.0	21.6
20/08/01	26/08/01	5.0	25.9	15.1	20.6	72.9	15.8	7.3	82.3	2.1	12.7	17.1	20.0	20.0	16.0
26/08/01	01/09/01	5.3	13.2	18.4	18.2	8.4	2.0	5.8	8.2	1.3	< 1.0	12.1	< 10.0	< 10.0	3.6
01/09/01	08/09/01	5.2	13.8	8.5	6.7	35.1	7.4	6.7	38.5	1.3	< 1.0	9.5	11.0	11.0	4.6
08/09/01	16/09/01	5.4	13.3	3.3	3.3	69.2	14.6	4.9	79.8	1.6	< 1.0	5.0	15.0	15.0	16.9
16/09/01	23/09/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0
23/09/01	01/10/01	4.5	27.3	17.7	15.4	35.2	7.8	3.0	41.4	0.9	< 1.0	23.1	19.0	19.0	84.2
01/10/01	06/10/01	5.1	15.0	5.4	6.7	71.1	15.3	3.9	83.8	2.2	< 1.0	6.5	16.0	16.0	85.0
06/10/01	14/10/01	4.9	19.1	8.6	9.2	65.2	13.8	4.2	76.9	1.4	< 1.0	11.2	18.0	18.0	42.1
14/10/01	20/10/01	4.6	29.9	22.9	19.5	15.4	4.4	11.4	17.1	0.8	< 1.0	28.1	16.0	16.0	94.0
20/10/01	28/10/01	4.6	25.2	17.9	13.8	43.2	9.8	3.7	51.9	1.2	< 1.0	20.0	20.0	20.0	45.3
28/10/01	11/11/01	5.2	11.9	3.1	5.7	48.1	9.9	3.5	56.9	1.2	< 1.0	6.1	12.0	12.0	73.0
11/11/01	26/11/01	5.6	14.6	6.9	13.4	74.4	11.6	5.8	85.8	1.8	< 1.0	5.6	16.0	16.0	19.2
26/11/01	09/12/01	4.7	17.2	13.2	8.3	43.8	8.5	1.7	51.1	1.0	< 1.0	11.9	17.0	17.0	120.4
09/12/01	23/12/01	5.1	28.1	24.0	34.0	33.5	5.8	4.7	37.4	1.5	< 1.0	24.1	18.0	18.0	5.5
23/12/01	30/12/01	5.2	67.4	4.0	0.1	532.1	111.5	21.9	613.7	11.3	< 1.0	3.3	94.0	94.0	26.3
30/12/01	13/01/02	4.3	56.0	72.5	56.3	65.7	15.8	7.2	86.3	2.1	< 1.0	48.1	42.0	42.0	8.8

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5152	26.5	19.8	16.5	58.5	12.8	5.6	69.3	1.7	-	19.4	21.8	22.1	1253.8

Polloch

2001

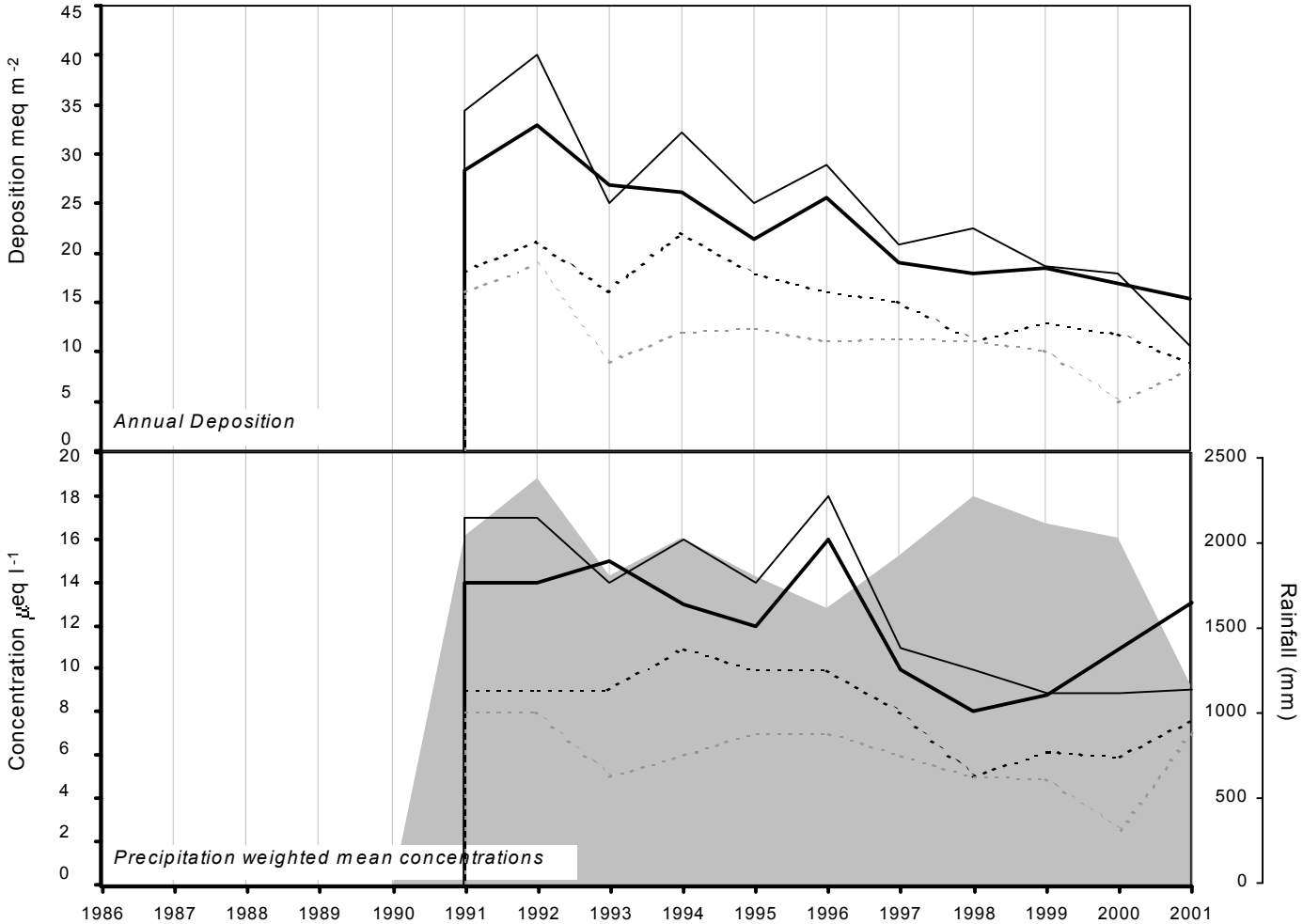
Site Code:	**5151**
Easting:	**1792**
Northing:	**7689**
Latitude:	**56 45 34 N**
Longitude:	**05 36 46 W**
Altitude (m):	**30**
Rainfall (mm):	**2170**

[30 year mean 1940 - 1971]

Site Environment:
Open moorland, in forest area

Other measurements:
DT, UKAWMN

Site Operator:
Forest Enterprise



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-0.45 ueq/l (-2.70 %/year): 10 years' data
\- No significant trend detected

non-marine sulphate
-0.93 ueq/l (-4.16 %/year): 11 years' data
++ Moderately strong trend detected

nitrate
-0.38 ueq/l (-3.15 %/year): 11 years' data
\+ Significant trend detected

ammonium
-0.28 ueq/l (-3.14 %/year): 11 years' data
\- No significant trend detected

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
02/01/01	09/01/01	4.8	14.6	3.9	1.7	107.8	21.8	7.2	127.0	3.4	< 1.0	1.6	23.0	23.0	24.8
09/01/01	16/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8
16/01/01	23/01/01	4.5	35.3	29.6	18.1	89.6	19.3	6.2	107.2	4.6	< 1.0	24.5	33.0	33.0	11.1
23/01/01	30/01/01	5.1	20.0	4.0	1.0	132.5	29.0	6.3	154.5	3.3	< 1.0	4.0	27.0	27.0	110.3
30/01/01	06/02/01	4.7	16.9	13.1	2.4	54.0	12.5	4.0	65.5	1.2	< 1.0	10.4	20.0	20.0	26.8
06/02/01	13/02/01	4.7	22.2	10.4	5.5	100.2	21.1	5.5	119.6	3.6	< 1.0	10.1	24.0	24.0	32.2
13/02/01	20/02/01	4.7	32.6	21.0	13.7	107.4	25.2	11.0	122.8	2.2	< 1.0	19.7	30.0	30.0	10.3
20/02/01	27/02/01	4.9	39.2	4.5	1.1	263.6	58.5	14.4	304.6	5.0	< 1.0	7.5	47.0	47.0	12.5
27/02/01	06/03/01	4.4	52.6	43.5	38.0	171.1	38.6	12.1	204.2	3.7	< 1.0	32.0	49.0	49.0	19.4
06/03/01	13/03/01	4.4	24.9	18.2	10.6	101.2	23.4	6.3	123.0	2.1	< 1.0	12.7	29.0	29.0	21.5
13/03/01	20/03/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20/03/01	27/03/01	5.0	14.0	5.9	5.7	38.0	7.3	9.4	43.8	4.1	< 1.0	9.4	-	-	1.7
27/03/01	03/04/01	4.8	33.0	11.3	11.7	137.6	31.2	7.9	157.2	2.8	< 1.0	16.5	34.0	34.0	32.8
03/04/01	10/04/01	5.0	31.9	4.4	2.2	208.2	46.5	9.8	287.0	4.9	< 1.0	6.8	41.0	41.0	24.3
10/04/01	17/04/01	5.1	25.7	11.2	8.2	63.5	14.1	5.9	74.8	1.4	< 1.0	18.1	19.0	19.0	13.8
17/04/01	24/04/01	4.8	20.9	13.2	5.5	60.7	14.4	8.0	72.0	1.4	< 1.0	13.6	20.0	20.0	23.1
24/04/01	01/05/01	4.7	36.7	18.5	23.4	57.0	11.6	8.1	55.0	2.1	< 1.0	29.9	21.0	21.0	12.5
01/05/01	22/05/01	4.7	31.7	9.9	2.0	50.4	13.2	20.5	62.1	1.2	< 1.0	25.7	-	-	1.9
22/05/01	29/05/01	4.6	43.7	28.4	23.7	88.8	21.6	11.3	108.9	2.1	< 1.0	33.0	31.0	31.0	38.7
29/05/01	05/06/01	4.8	16.2	2.8	1.2	57.9	13.4	3.6	73.0	0.9	< 1.0	9.2	16.0	16.0	51.2
05/06/01	12/06/01	5.0	10.9	3.2	1.4	46.0	9.6	3.0	49.2	0.8	< 1.0	5.3	12.0	12.0	27.2
12/06/01	19/06/01	4.8	24.2	11.3	10.5	53.4	11.8	6.4	60.0	1.0	< 1.0	17.7	18.0	18.0	28.3
19/06/01	26/06/01	4.9	24.8	11.2	12.4	55.9	12.6	7.5	62.1	1.2	< 1.0	18.0	18.0	18.0	22.0
26/06/01	07/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
07/08/01	14/08/01	6.1	20.7	4.9	69.5	10.2	3.2	1.2	12.7	8.9	8.7	19.5	13.0	13.0	49.7
14/08/01	21/08/01	4.8	11.3	3.3	< .7	29.5	6.0	3.2	31.3	0.8	< 1.0	7.8	10.0	10.0	23.7
21/08/01	28/08/01	5.4	20.7	7.7	6.0	90.7	17.9	7.3	99.9	4.1	< 1.0	9.8	20.0	20.0	23.2
28/08/01	04/09/01	5.0	8.1	3.9	1.7	24.9	5.7	2.2	29.6	0.5	< 1.0	5.1	< 10.0	< 10.0	65.7
04/09/01	04/12/01	5.0	20.7	4.3	< .7	141.0	25.4	5.0	166.5	2.7	< 1.0	3.8	27.0	27.0	311.0
Extended sampling period															-
04/12/01	18/12/01	4.8	19.2	9.9	< .7	33.4	7.5	6.2	38.1	0.8	< 1.0	15.2	14.0	14.0	33.0
18/12/01	01/01/02	5.0	59.8	2.7	< .7	485.5	99.4	19.5	557.7	9.7	< 1.0	1.3	80.0	80.0	117.2

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5151	25.8	7.6	7.0	139.1	28.5	7.1	163.1	3.4	-	9.1	13.1	29.1	1170.7

Lochnagar

2001

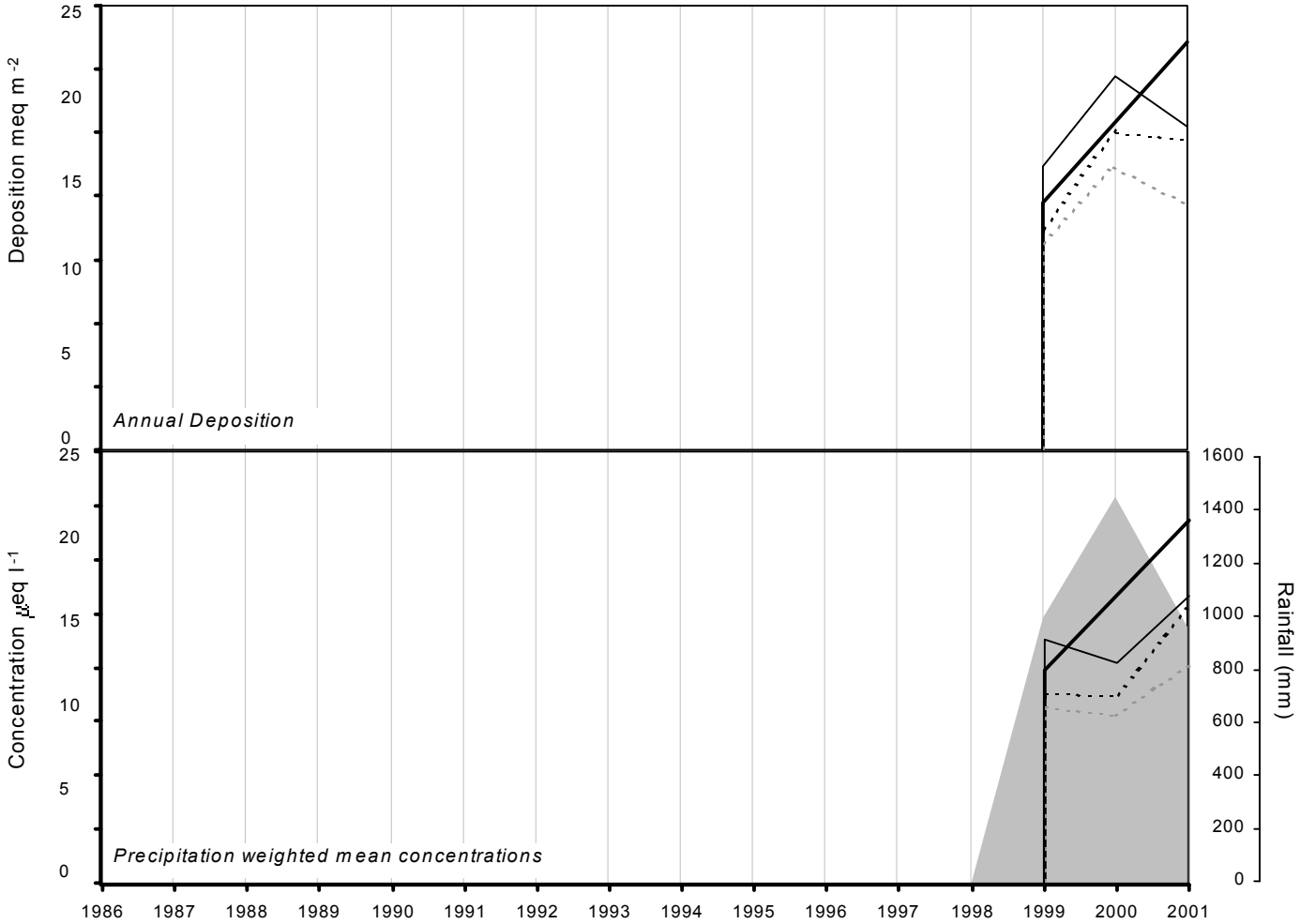
Site Code:	**5157**
Easting:	**3252**
Northing:	**7859**
Latitude:	**56 57 29N**
Longitude:	**03 13 51 W**
Altitude (m):	**785**
Rainfall (mm):	**-**

[30 year mean 1940 - 1971]

Site Environment:
Heathland 60% and bare ground 40%

Other measurements:
UKAWMN. Automatic weather station

Site Operator:
ENSIS



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

non-marine sulphate
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

nitrate
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

ammonium
0.00 ueq/l (0.00 %/year): 2 years' data
n/a Insufficient Data

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
10/01/01	24/01/01	4.4	34.6	30.3	18.2	42.5	9.7	3.2	63.1	1.2	< 1.0	29.5	26.0	26.0	35.2
24/01/01	21/02/01	4.6	34.7	18.3	9.3	165.0	38.4	10.2	201.9	4.2	< 1.0	14.8	39.0	39.0	26.7
21/02/01	20/03/01	4.2	67.3	75.4	70.7	114.5	26.0	7.5	130.7	2.7	< 1.0	53.5	55.0	55.0	22.6
Sample collection affected by Foot and Mouth Precautions 21/2/01 to 20/3/01															-
20/03/01	04/04/01	4.3	49.8	33.0	33.1	28.7	7.2	3.2	35.9	1.0	< 1.0	46.4	33.0	33.0	41.2
04/04/01	20/04/01	4.7	35.4	22.8	20.0	99.6	22.2	8.2	112.1	2.2	< 1.0	23.4	30.0	30.0	13.8
20/04/01	02/05/01	4.3	59.5	72.6	78.0	16.6	5.4	6.9	20.1	0.9	< 1.0	57.5	39.0	39.0	34.1
02/05/01	16/05/01	4.7	35.4	32.3	24.0	24.2	7.8	14.5	28.9	1.1	< 1.0	32.5	20.0	20.0	10.6
16/05/01	30/05/01	4.2	55.5	33.5	24.2	10.4	2.7	4.0	10.3	< .5	< 1.0	54.3	34.0	34.0	24.9
30/05/01	13/06/01	5.0	8.8	6.0	4.7	20.2	5.2	2.7	24.4	0.8	< 1.0	6.3	< 10.0	< 10.0	32.4
13/06/01	27/06/01	4.2	52.2	45.1	31.5	30.4	7.1	5.8	34.7	1.2	< 1.0	48.6	37.0	37.0	41.7
27/06/01	11/07/01	4.5	28.8	28.0	27.3	5.6	1.8	4.3	5.3	< .5	< 1.0	28.1	17.0	17.0	45.3
11/07/01	25/07/01	4.7	20.9	13.3	7.8	30.4	7.0	3.9	33.7	0.9	< 1.0	17.3	16.0	16.0	50.8
25/07/01	08/08/01	4.5	28.5	24.5	12.1	16.8	4.3	6.4	17.7	0.5	< 1.0	26.5	21.0	21.0	20.3
08/08/01	22/08/01	4.6	16.4	9.6	9.8	5.2	1.3	0.8	6.1	< .5	< 1.0	15.8	10.0	10.0	12.5
22/08/01	05/09/01	5.0	9.6	10.1	1.3	21.6	5.6	8.6	22.8	0.6	< 1.0	7.0	11.0	11.0	19.6
05/09/01	19/09/01	5.0	10.0	4.2	3.5	35.5	7.3	3.3	40.8	0.9	< 1.0	5.8	10.0	10.0	14.4
19/09/01	03/10/01	4.6	21.2	13.7	9.8	31.1	5.7	1.8	34.4	0.8	< 1.0	17.5	16.0	16.0	96.3
03/10/01	17/10/01	4.6	27.3	16.4	12.7	31.3	7.9	8.2	37.1	0.7	< 1.0	23.6	17.0	17.0	163.2
17/10/01	01/11/01	4.3	38.5	38.4	31.4	20.8	4.7	2.4	24.6	0.9	< 1.0	36.0	26.0	26.0	139.2
01/11/01	14/11/01	5.1	7.8	2.0	< .7	57.2	11.2	3.7	65.1	1.2	< 1.0	0.9	12.0	12.0	22.9
14/11/01	28/11/01	4.6	14.9	8.8	6.3	47.3	4.9	0.4	56.0	1.0	< 1.0	9.2	15.0	15.0	22.1
28/11/01	12/12/01	4.6	16.9	18.0	9.8	27.0	5.5	< 1.0	30.9	0.7	< 1.0	13.6	16.0	16.0	50.3
12/12/01	08/01/02	4.6	20.5	28.1	10.4	73.7	14.8	5.2	78.3	2.7	< 1.0	11.6	23.0	23.0	16.4

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5157	30.8	25.5	20.3	34.6	7.8	4.6	40.6	1.0	-	26.7	33.7	22.3	956.5

Glen Dye

2001

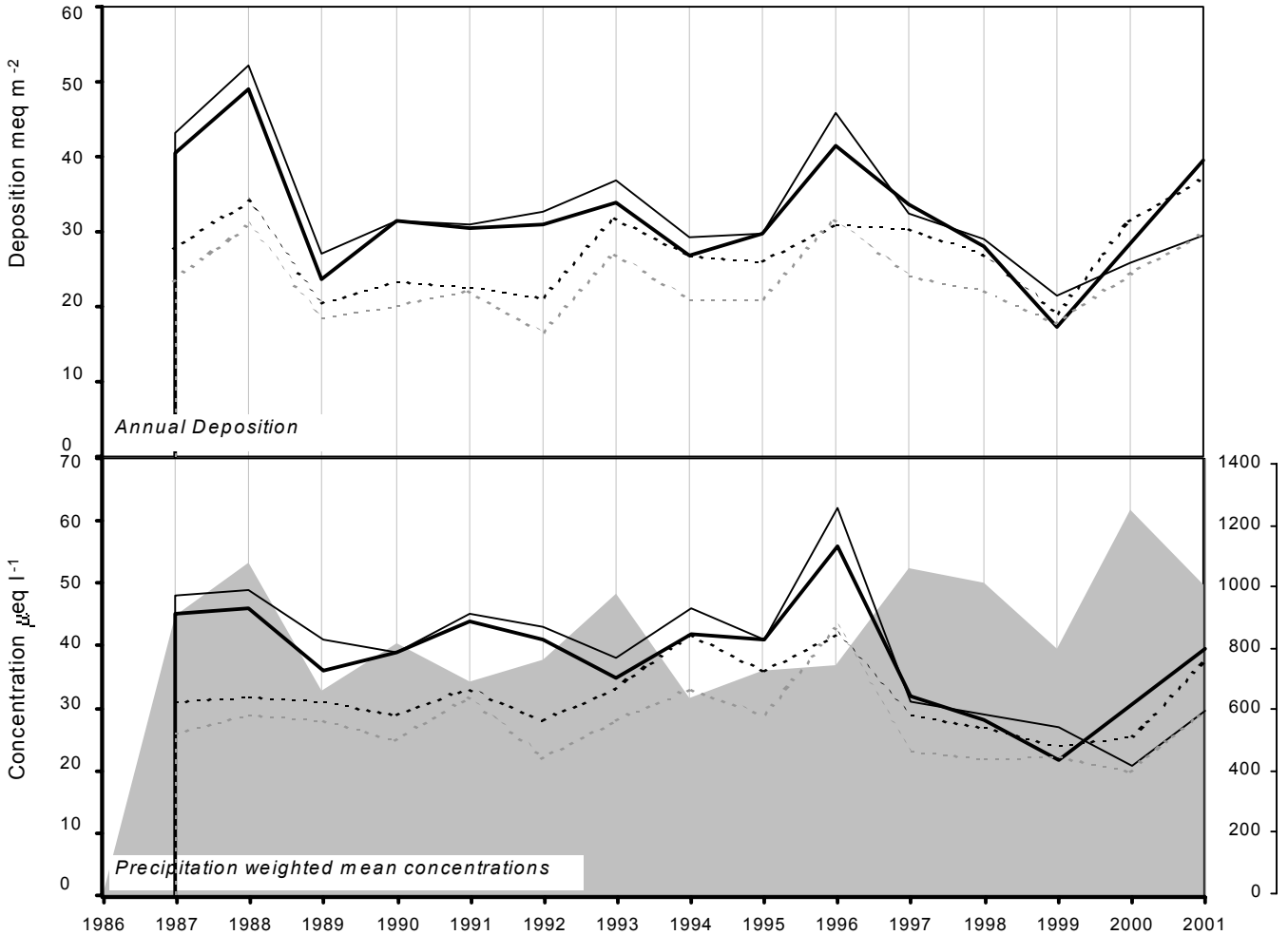
Site Code:	**5011**
Easting:	**3642**
Northing:	**7864**
Latitude:	**56 58 03 N**
Longitude:	**02 35 20 W**
Altitude (m):	**185**
Rainfall (mm):	**1311**

[30 year mean 1940 - 1971]

Site Environment:
Open moorland

Other measurements:
DT, Daily SO2, Daily SO4, EMEP

Site Operator:
SEPA; North Region



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-0.81 ueq/l (-1.79 %/year): 14 years' data
\- No significant trend detected

non-marine sulphate
-1.46 ueq/l (-2.87 %/year): 15 years' data
\+ Significant trend detected

nitrate
-0.07 ueq/l (-0.22 %/year): 15 years' data
\- No significant trend detected

ammonium
-0.19 ueq/l (-0.65 %/year): 15 years' data
\- No significant trend detected

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
02/01/01	09/01/01	4.5	17.9	22.9	11.2	39.2	8.7	4.8	49.5	1.4	< 1.0	13.1	19.0	19.0	6.8
09/01/01	16/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16/01/01	23/01/01	4.2	66.5	63.3	40.9	157.9	36.0	7.7	190.9	3.7	< 1.0	47.5	63.0	63.0	56.8
23/01/01	30/01/01	4.6	30.4	24.1	10.4	119.5	26.7	7.1	138.1	3.1	< 1.0	16.0	35.0	35.0	24.0
30/01/01	07/02/01	4.4	32.2	16.5	4.0	140.8	32.2	6.7	169.4	2.9	< 1.0	15.3	37.0	37.0	132.2
07/02/01	13/02/01	4.8	19.3	12.2	12.9	32.8	7.3	3.1	39.6	0.9	< 1.0	15.3	15.0	15.0	15.6
13/02/01	20/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20/02/01	17/04/01	4.4	41.0	45.2	36.1	77.2	18.2	5.1	105.0	1.9	< 1.0	31.7	38.0	38.0	159.6
Sample collection affected by Foot and Mouth Precautions 20/2/01 to 17/4/01															-
17/04/01	24/04/01	4.3	68.0	87.6	86.1	102.4	25.4	8.9	123.1	2.4	< 1.0	55.7	54.0	54.0	35.6
24/04/01	01/05/01	4.2	71.5	140.1	123.8	29.5	9.6	14.0	31.0	1.5	< 1.0	68.0	55.0	55.0	9.0
01/05/01	08/05/01	5.9	24.4	20.9	29.6	105.9	22.5	10.3	124.8	3.3	< 1.0	11.6	23.0	23.0	4.9
08/05/01	15/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15/05/01	22/05/01	3.9	80.1	58.1	39.9	7.3	2.5	5.0	10.1	< .5	< 1.0	79.2	50.0	50.0	17.6
22/05/01	29/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29/05/01	05/06/01	5.2	12.1	4.8	5.6	41.1	9.5	3.3	49.2	2.7	< 1.0	7.2	12.0	12.0	9.5
05/06/01	12/06/01	5.2	13.0	7.7	10.2	27.4	6.3	4.0	33.9	1.7	< 1.0	9.7	10.0	10.0	8.4
12/06/01	20/06/01	4.1	82.3	74.1	50.5	90.1	21.1	8.4	105.7	2.3	< 1.0	71.5	63.0	63.0	8.2
20/06/01	26/06/01	4.2	70.5	60.1	51.6	18.9	6.9	19.4	18.9	3.7	4.2	68.2	40.0	40.0	2.8
26/06/01	03/07/01	3.9	102.8	103.9	67.5	18.8	6.6	17.2	20.2	1.4	< 1.0	100.6	67.0	67.0	14.8
03/07/01	10/07/01	4.3	71.9	107.5	69.7	15.6	8.7	33.3	13.7	2.8	< 1.0	70.0	44.0	44.0	2.8
10/07/01	17/07/01	5.0	9.2	10.0	7.4	6.2	1.0	< 1.0	6.8	1.6	< 1.0	8.5	< 10.0	< 10.0	26.1
17/07/01	24/07/01	4.7	76.6	54.3	19.4	263.4	61.8	27.5	355.1	12.4	< 1.0	44.8	-	-	2.2
24/07/01	31/07/01	4.0	125.2	135.8	95.9	40.8	13.0	26.6	47.6	4.9	< 1.0	120.3	72.0	72.0	3.4
31/07/01	07/08/01	5.0	10.6	7.2	8.3	7.5	1.7	2.4	8.6	< .5	< 1.0	9.7	< 10.0	< 10.0	33.5
07/08/01	14/08/01	4.5	27.7	21.7	16.3	20.3	5.4	5.7	22.4	0.9	< 1.0	25.3	20.0	20.0	6.2
14/08/01	21/08/01	4.8	21.9	23.1	29.4	10.0	2.2	2.2	10.5	0.5	< 1.0	20.6	14.0	14.0	53.5
21/08/01	28/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28/08/01	04/09/01	4.7	13.5	15.4	6.0	5.4	1.8	4.3	6.5	0.5	< 1.0	12.8	14.0	14.0	9.4
04/09/01	11/09/01	5.3	8.2	2.8	3.4	36.5	7.4	3.0	42.1	0.9	< 1.0	3.8	10.0	10.0	11.2
11/09/01	18/09/01	5.3	14.5	6.6	11.1	41.3	8.6	4.0	46.6	1.4	< 1.0	9.6	12.0	12.0	11.0
18/09/01	25/09/01	4.4	37.7	30.0	26.1	18.8	5.0	6.3	19.7	1.3	< 1.0	35.4	23.0	23.0	15.0
25/09/01	02/10/01	4.5	30.1	23.1	27.9	25.3	5.7	2.9	28.8	0.8	< 1.0	27.1	20.0	20.0	48.7
02/10/01	09/10/01	4.6	17.8	15.6	9.9	42.5	9.7	3.2	49.0	0.9	< 1.0	12.7	17.0	17.0	51.5
09/10/01	16/10/01	4.3	68.5	75.1	52.4	36.6	12.1	46.2	38.8	1.7	< 1.0	64.1	36.0	36.0	4.8
16/10/01	23/10/01	4.1	72.9	88.1	85.7	37.0	13.6	10.4	43.4	3.0	< 1.0	68.4	46.0	46.0	66.6
23/10/01	30/10/01	4.7	24.0	19.3	15.0	40.0	8.6	4.1	47.2	0.9	< 1.0	19.2	19.0	19.0	11.2
30/10/01	13/11/01	5.3	25.0	2.8	3.5	175.6	39.0	8.5	211.3	3.3	< 1.0	3.8	33.0	33.0	25.0
13/11/01	27/11/01	5.1	16.1	8.3	10.8	52.8	11.3	3.7	61.5	1.5	< 1.0	9.8	14.0	14.0	11.8
27/11/01	11/12/01	4.3	34.6	36.4	27.3	111.2	23.7	5.4	133.0	2.3	< 1.0	21.2	36.0	36.0	64.5
11/12/01	24/12/01	4.6	30.6	29.5	14.1	132.6	24.2	5.0	149.4	3.0	< 1.0	14.7	36.0	36.0	19.0
24/12/01	15/01/02	4.7	42.1	24.3	18.6	212.8	43.4	9.5	243.5	4.3	< 1.0	16.5	45.0	45.0	14.9

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5011	38.8	37.2	29.8	77.4	17.9	6.2	93.9	2.1	-	29.5	39.5	33.3	998.1

Allt a' Mharcaidh

2001

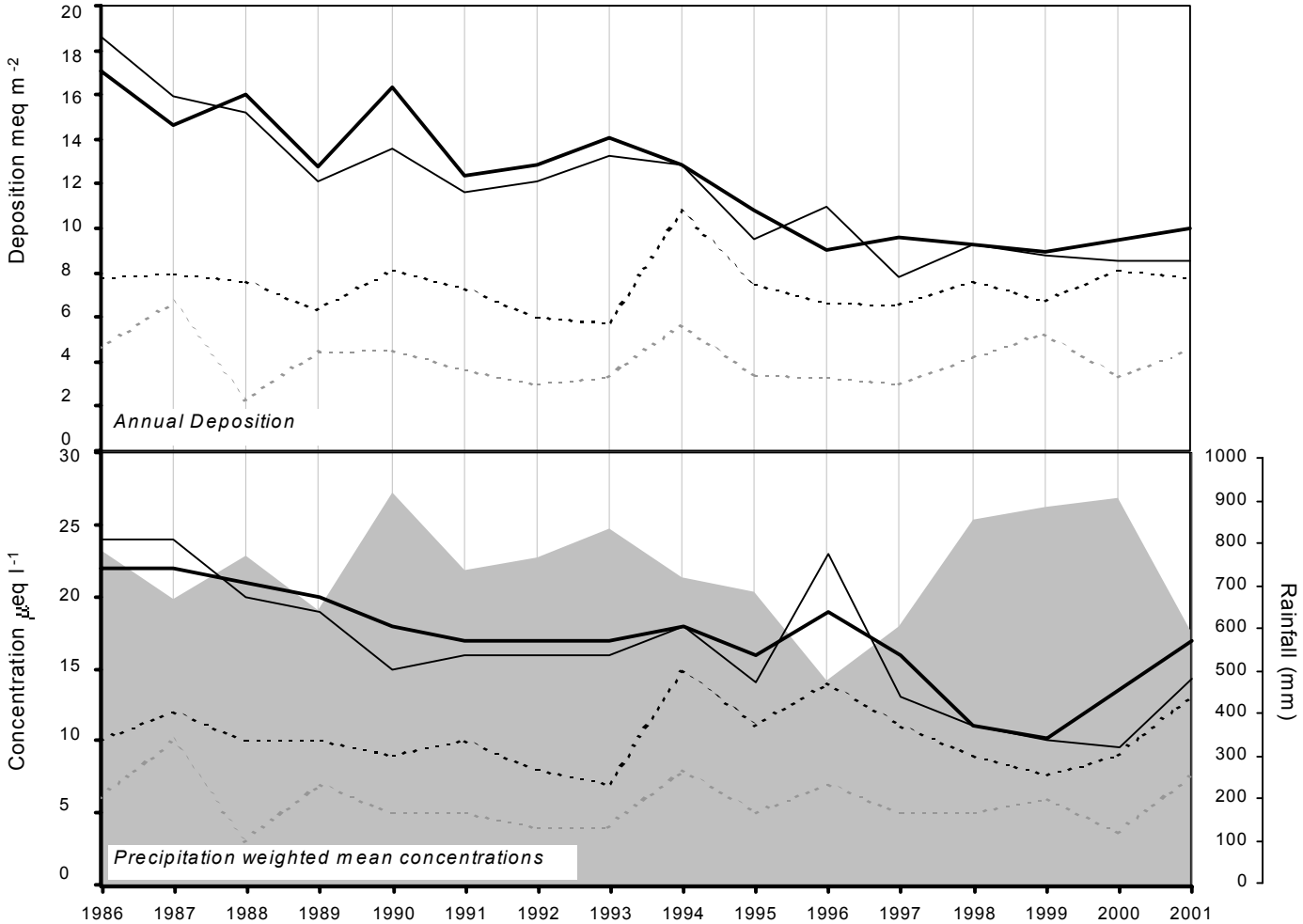
Site Code:	**5103**
Easting:	**2876**
Northing:	**8052**
Latitude:	**57 07 27 N**
Longitude:	**03 51 24 W**
Altitude (m):	**274**
Rainfall (mm):	**1221**

[30 year mean 1940 - 1971]

Site Environment:
Moorland, in forestry SW Cairngorms

Other measurements:
DT, UKAWMN

Site Operator:
Freshwater Fisheries Laboratory



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-0.58 ueq/l (-2.70 %/year): 15 years' data
++ Moderately strong trend detected

non-marine sulphate
-0.73 ueq/l (-3.34 %/year): 16 years' data
++ Moderately strong trend detected

nitrate
0.04 ueq/l (0.38 %/year): 16 years' data
- No significant trend detected

ammonium
-0.04 ueq/l (-0.62 %/year): 16 years' data
- No significant trend detected

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
03/01/01	08/01/01	5.3	5.5	9.3	2.3	8.4	2.4	6.6	8.4	0.9	< 1.0	4.5	< 10.0	< 10.0	5.1
08/01/01	15/01/01	5.0	27.0	14.0	13.8	57.0	14.0	14.9	72.7	3.6	< 1.0	20.1	-	-	1.9
15/01/01	22/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2
22/01/01	29/01/01	4.6	11.8	11.2	2.5	23.3	5.4	2.4	32.2	0.8	< 1.0	9.0	13.0	13.0	20.9
29/01/01	05/02/01	4.7	11.8	15.4	5.3	11.1	2.1	4.0	11.7	4.2	< 1.0	10.4	-	-	6.5
05/02/01	12/02/01	4.9	19.2	6.5	3.6	85.3	18.5	6.5	107.2	1.7	< 1.0	8.9	21.0	21.0	18.7
12/02/01	19/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
19/02/01	26/02/01	4.7	25.5	5.9	7.3	135.4	29.8	11.6	166.0	3.0	< 1.0	9.2	29.0	29.0	3.9
26/02/01	19/03/01	5.0	14.7	10.6	4.8	45.8	10.1	3.2	51.1	1.1	< 1.0	9.2	14.0	14.0	33.9
Sample collection affected by Foot and Mouth Precautions 26/2/01 to 19/3/01															-
19/03/01	26/03/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3
26/03/01	02/04/01	4.4	31.4	42.9	17.2	39.7	9.8	4.7	41.0	1.1	< 1.0	26.7	29.0	29.0	10.0
02/04/01	09/04/01	5.5	31.7	13.9	21.4	118.0	29.2	15.4	135.1	3.1	< 1.0	17.5	26.0	26.0	7.9
09/04/01	16/04/01	5.1	24.2	10.8	7.3	60.4	14.4	7.4	70.1	1.4	< 1.0	16.9	16.0	16.0	8.6
16/04/01	23/04/01	5.0	22.5	7.1	4.6	99.3	22.0	7.1	118.3	2.2	< 1.0	10.5	-	-	8.4
23/04/01	30/04/01	4.6	30.7	42.9	35.0	12.0	4.3	7.8	15.3	0.7	< 1.0	29.3	21.0	21.0	11.4
30/04/01	07/05/01	5.2	20.5	10.6	10.7	34.7	8.9	8.7	37.9	0.6	< 1.0	16.3	12.0	12.0	3.7
07/05/01	14/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14/05/01	21/05/01	4.3	46.6	30.2	14.4	5.5	1.8	4.3	7.8	0.5	< 1.0	46.0	29.0	29.0	13.2
21/05/01	28/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28/05/01	04/06/01	5.8	19.1	< .7	< .7	43.9	10.5	14.7	54.0	8.1	< 1.0	13.8	11.0	11.0	8.0
04/06/01	11/06/01	5.0	17.9	7.1	3.9	34.3	10.0	6.5	41.0	6.2	< 1.0	13.8	13.0	13.0	11.3
11/06/01	18/06/01	4.3	49.0	50.0	27.6	47.6	11.2	8.3	54.4	1.3	< 1.0	43.2	37.0	37.0	9.8
18/06/01	25/06/01	5.3	6.7	6.9	< .7	9.1	1.9	4.7	11.1	2.5	< 1.0	5.6	< 10.0	< 10.0	5.6
25/06/01	02/07/01	4.2	77.7	63.2	60.1	5.3	2.5	10.0	6.8	0.8	< 1.0	77.1	43.0	43.0	17.0
02/07/01	09/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	3.6
09/07/01	16/07/01	4.8	8.6	7.0	< .7	3.0	0.9	< 1.0	3.1	< .5	< 1.0	8.2	< 10.0	< 10.0	46.8
16/07/01	23/07/01	4.4	44.1	19.8	10.8	90.1	21.8	11.2	106.7	1.4	7.4	33.2	32.0	32.0	13.7
23/07/01	30/07/01	4.5	33.0	32.9	18.6	15.7	4.0	6.5	18.3	1.0	< 1.0	31.1	21.0	21.0	8.1
30/07/01	06/08/01	6.3	16.7	10.3	44.1	14.1	3.2	2.3	16.8	9.0	27.0	15.0	12.0	12.0	20.3
06/08/01	13/08/01	4.7	19.1	16.3	8.2	21.8	5.9	3.1	23.3	0.7	< 1.0	16.5	16.0	16.0	8.0
13/08/01	20/08/01	5.0	7.7	6.5	0.8	3.4	1.1	2.3	4.1	< .5	< 1.0	7.2	< 10.0	< 10.0	11.1
20/08/01	21/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21/08/01	27/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27/08/01	03/09/01	5.0	10.8	10.4	1.9	13.4	2.9	4.3	14.7	1.5	< 1.0	9.2	< 10.0	< 10.0	6.1
03/09/01	10/09/01	6.3	19.0	3.4	52.5	33.5	7.9	3.5	39.2	7.3	29.0	14.9	17.0	17.0	12.7
10/09/01	17/09/01	7.4	77.3	10.1	180.3	39.8	8.2	3.7	58.1	23.4	91.9	72.5	51.0	51.0	9.4
17/09/01	24/09/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4
24/09/01	01/10/01	4.8	19.6	10.1	6.7	13.6	3.3	3.7	12.7	0.6	< 1.0	18.0	12.0	12.0	12.4
01/10/01	08/10/01	4.9	14.0	5.3	2.7	45.1	10.0	3.0	52.1	0.9	< 1.0	8.5	14.0	14.0	23.9
08/10/01	15/10/01	5.3	12.7	7.8	5.7	33.9	4.8	9.8	20.8	4.0	< 1.0	8.6	< 10.0	< 10.0	28.6
15/10/01	22/10/01	4.5	26.7	27.3	16.7	7.6	2.7	3.8	7.3	0.7	< 1.0	25.7	18.0	18.0	26.8
22/10/01	29/10/01	4.8	31.1	12.3	9.6	68.4	15.0	9.8	75.7	1.8	< 1.0	22.8	21.0	21.0	5.0
29/10/01	05/11/01	5.3	4.5	< .7	0.9	26.7	5.2	2.2	31.2	0.6	< 1.0	1.3	< 10.0	< 10.0	48.1
05/11/01	19/11/01	5.1	7.8	2.9	< .7	41.0	8.5	3.0	47.8	0.9	< 1.0	2.8	10.0	10.0	28.8
19/11/01	03/12/01	5.1	8.2	3.7	< .7	43.6	8.3	1.5	49.0	0.9	< 1.0	2.9	11.0	11.0	37.6
03/12/01	17/12/01	4.7	15.8	14.2	5.8	15.5	1.5	1.3	19.3	1.0	< 1.0	13.9	13.0	13.0	16.2
17/12/01	31/12/01	6.0	28.1	3.5	< .7	231.8	42.1	13.9	273.6	9.5	< 1.0	0.1	39.0	39.0	17.7

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5103	19.2	13.1	7.7	40.0	8.6	5.0	45.8	1.6	-	14.3	16.9	15.2	593.2

Strathvaich Dam

2001

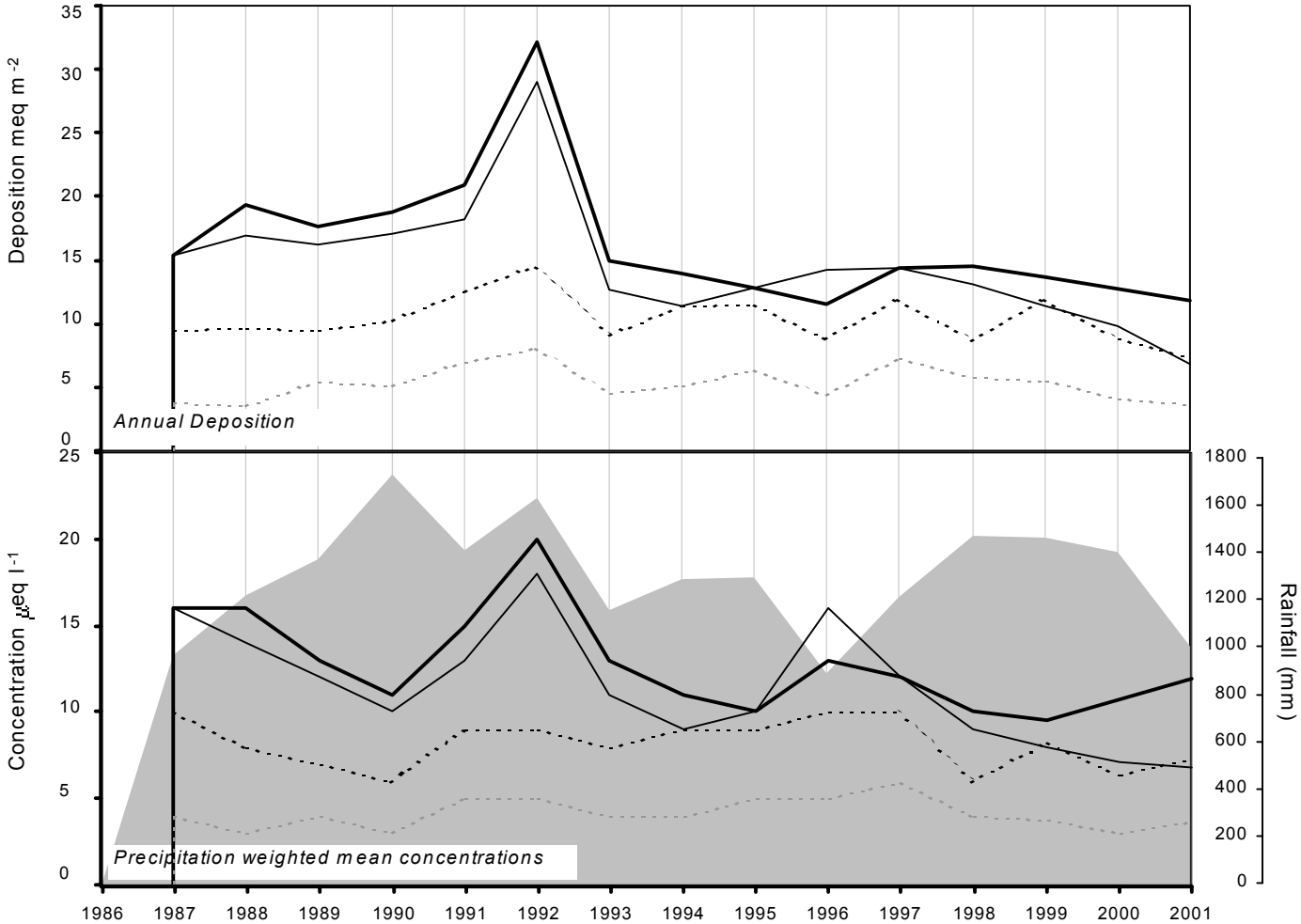
Site Code:	**5010**
Easting:	**2347**
Northing:	**8750**
Latitude:	**57 44 04 N**
Longitude:	**04 46 36 W**
Altitude (m):	**270**
Rainfall (mm):	**1576**

[30 year mean 1940 - 1971]

Site Environment:
Open moorland, deer

Other measurements:
DT, Daily SO2, Daily SO4, HNO3 Denuder, NOx, SO2, ozone, EMEP

Site Operator:
SEPA; North Region



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-0.39 ueq/l (-2.46 %/year): 14 years' data
\+ Significant trend detected

non-marine sulphate
-0.49 ueq/l (-3.21 %/year): 15 years' data
++ Moderately strong trend detected

nitrate
-0.06 ueq/l (-0.64 %/year): 15 years' data
\- No significant trend detected

ammonium
0.02 ueq/l (0.44 %/year): 15 years' data
\- No significant trend detected

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
02/01/01	09/01/01	4.8	7.4	7.2	1.4	34.2	7.2	3.9	38.9	1.1	< 1.0	3.3	11.0	11.0	16.5
09/01/01	16/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16/01/01	23/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
23/01/01	30/01/01	5.1	5.6	3.0	0.9	31.3	6.6	2.8	37.8	1.3	< 1.0	1.8	< 10.0	< 10.0	27.2
30/01/01	13/02/01	4.7	31.1	7.8	1.7	202.7	44.9	9.4	233.9	4.5	< 1.0	6.7	40.0	40.0	20.9
13/02/01	20/02/01	5.0	35.6	16.6	8.1	193.8	43.5	13.8	226.3	3.9	< 1.0	12.2	39.0	39.0	6.0
20/02/01	27/02/01	4.7	66.1	2.6	2.2	460.2	107.8	21.2	571.5	9.8	< 1.0	10.7	-	-	9.6
27/02/01	17/04/01	5.0	22.8	8.5	4.3	126.6	29.2	6.7	169.2	2.7	< 1.0	7.5	29.0	29.0	110.6
Sample collection affected by Foot and Mouth Precautions 27/2/01 to 17/4/01															-
17/04/01	24/04/01	5.0	36.9	10.9	6.0	150.2	34.9	17.6	181.6	3.2	< 1.0	18.8	32.0	32.0	5.4
24/04/01	01/05/01	4.4	62.8	63.8	51.8	63.8	18.9	26.2	71.9	1.9	< 1.0	55.1	41.0	41.0	2.4
01/05/01	08/05/01	5.1	29.1	5.8	3.0	153.6	34.9	13.5	183.7	3.3	< 1.0	10.6	30.0	30.0	4.9
08/05/01	15/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15/05/01	22/05/01	5.7	40.5	10.5	70.6	34.8	8.6	2.4	41.1	11.9	92.8	36.3	20.0	20.0	18.7
22/05/01	29/05/01	5.0	11.3	6.2	2.0	26.9	6.0	3.8	25.7	1.6	2.9	8.1	< 10.0	< 10.0	12.6
29/05/01	05/06/01	4.9	11.4	3.2	1.4	41.1	9.4	3.3	51.4	0.6	< 1.0	6.4	12.0	12.0	28.9
05/06/01	12/06/01	5.1	14.4	3.2	1.5	75.8	17.2	5.2	87.0	1.8	< 1.0	5.3	17.0	17.0	16.6
12/06/01	19/06/01	4.1	54.1	53.9	24.9	85.0	20.7	11.2	93.3	2.4	< 1.0	43.8	46.0	46.0	5.2
19/06/01	26/06/01	4.8	15.9	9.4	5.7	23.7	5.3	2.8	27.3	< .5	< 1.0	13.0	12.0	12.0	34.9
26/06/01	03/07/01	4.8	21.4	20.6	16.1	19.4	4.6	5.6	22.4	0.7	< 1.0	19.1	15.0	15.0	12.7
03/07/01	10/07/01	5.4	32.2	32.4	53.2	2.9	2.5	8.5	3.7	1.1	< 1.0	31.9	13.0	13.0	15.4
10/07/01	17/07/01	4.6	14.7	11.4	3.9	7.0	1.6	< 1.0	7.5	< .5	< 1.0	13.8	12.0	12.0	31.4
17/07/01	24/07/01	4.8	17.7	13.6	3.5	42.1	9.6	4.4	44.4	0.8	< 1.0	12.7	15.0	15.0	9.4
24/07/01	31/07/01	4.3	26.5	32.6	14.6	21.9	5.0	3.5	26.9	0.5	< 1.0	23.9	24.0	24.0	12.4
31/07/01	07/08/01	5.2	7.9	4.2	< .7	15.2	3.5	3.9	16.2	< .5	< 1.0	6.0	< 10.0	< 10.0	17.0
07/08/01	14/08/01	5.8	15.2	5.6	17.8	34.1	6.1	2.2	36.4	< .5	< 1.0	11.1	10.0	10.0	7.8
14/08/01	21/08/01	4.9	7.4	6.9	1.1	10.1	2.2	2.1	11.6	< .5	< 1.0	6.2	< 10.0	< 10.0	21.7
21/08/01	28/08/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28/08/01	04/09/01	5.1	5.7	3.6	< .7	14.0	3.0	2.7	16.3	0.9	< 1.0	4.0	< 10.0	< 10.0	20.9
04/09/01	11/09/01	5.3	12.8	1.5	< .7	90.0	20.1	5.0	106.4	1.7	< 1.0	2.0	18.0	18.0	45.4
11/09/01	18/09/01	5.0	15.7	2.3	< .7	106.2	22.3	5.6	122.6	1.9	< 1.0	2.9	21.0	21.0	36.0
18/09/01	25/09/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25/09/01	02/10/01	4.7	14.3	8.2	3.3	53.6	11.7	5.8	61.8	1.1	< 1.0	7.8	16.0	16.0	29.6
02/10/01	09/10/01	4.9	8.9	5.8	0.2	47.2	10.0	3.5	52.4	1.1	< 1.0	3.2	12.0	12.0	42.6
09/10/01	16/10/01	5.2	17.7	6.9	4.2	77.8	16.7	10.8	90.5	1.4	< 1.0	8.3	17.0	17.0	13.3
16/10/01	23/10/01	4.3	30.7	41.8	14.9	11.5	2.3	4.7	7.0	1.4	< 1.0	29.3	25.0	25.0	27.9
23/10/01	30/10/01	5.2	5.6	1.9	0.7	34.7	6.5	2.2	40.6	0.6	< 1.0	1.4	< 10.0	< 10.0	75.0
30/10/01	06/11/01	5.2	24.5	1.6	1.2	184.1	39.3	7.9	218.0	3.4	< 1.0	2.3	33.0	33.0	52.6
06/11/01	13/11/01	5.4	16.1	2.1	0.9	124.7	25.6	5.8	151.8	2.0	< 1.0	1.0	23.0	23.0	22.6
13/11/01	21/11/01	5.0	10.8	4.3	1.5	60.5	11.9	5.0	67.7	2.2	< 1.0	3.6	14.0	14.0	9.0
21/11/01	27/11/01	5.3	28.1	< .7	< .7	231.2	47.8	10.5	264.2	4.3	< 1.0	0.2	39.0	39.0	34.6
27/11/01	04/12/01	5.2	29.1	2.4	< .7	237.6	48.2	10.5	269.8	4.8	< 1.0	0.5	41.0	41.0	40.9
04/12/01	18/12/01	4.8	13.9	10.0	2.2	43.8	6.8	1.9	50.8	1.1	< 1.0	8.7	14.0	14.0	20.8
18/12/01	01/01/02	5.2	20.8	2.2	< .7	164.1	30.1	4.7	208.7	3.3	< 1.0	1.0	31.0	31.0	76.3

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5010	18.3	7.4	3.7	95.1	20.2	5.6	114.4	2.0	-	6.8	11.9	20.5	996.3

Achanarras

2001

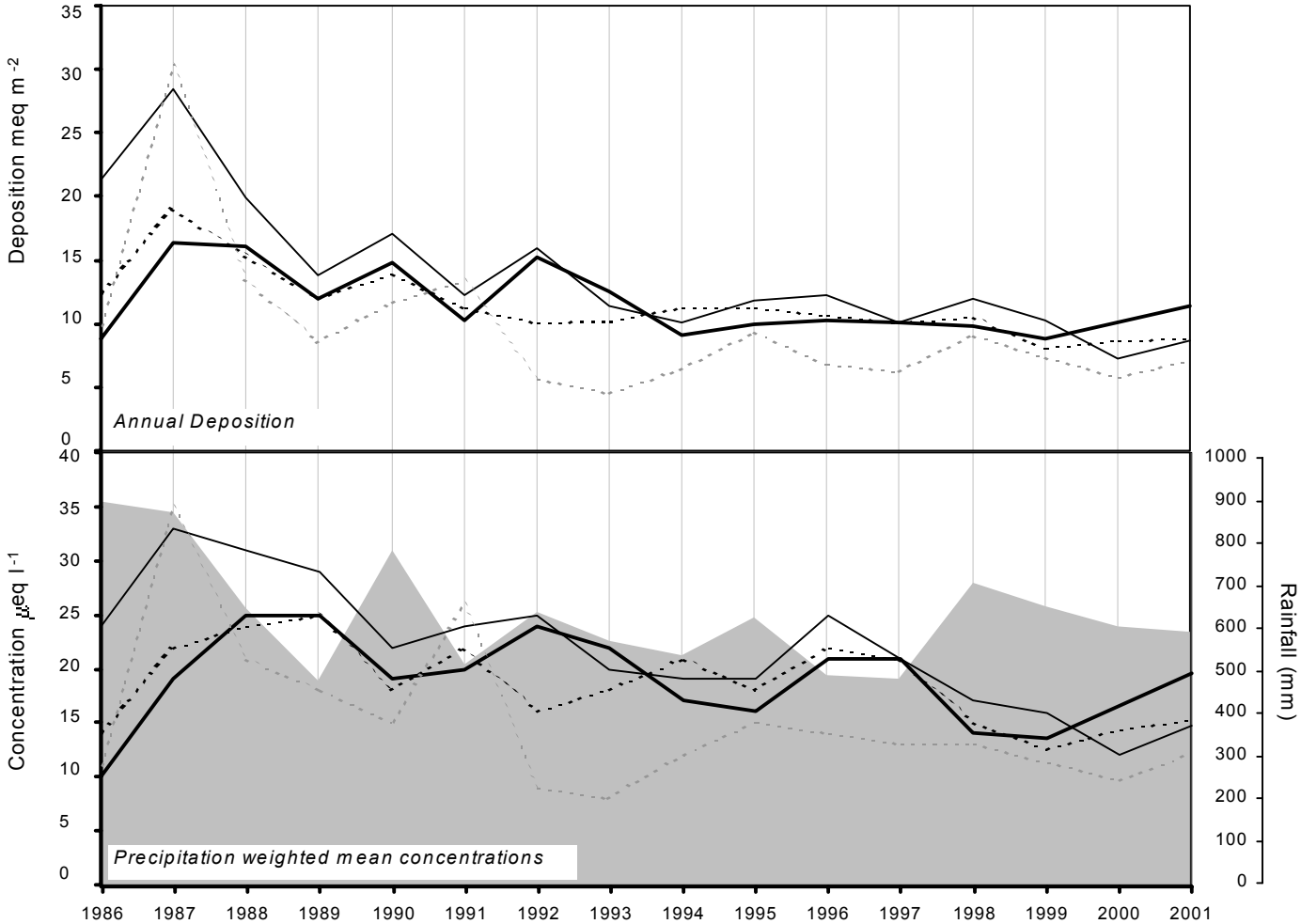
Site Code:	**5140**
Easting:	**3151**
Northing:	**9550**
Latitude:	**58 28 31 N**
Longitude:	**03 27 21 W**
Altitude (m):	**98**
Rainfall (mm):	**973**

[30 year mean 1940 - 1971]

Site Environment:
Open moorland, farm pastures

Other measurements:
DT

Site Operator:
Mrs. J Erridge



hydrogen ion
non-marine sulphate
nitrate
ammonium
rainfall (mm)

long-term trends in concentration (+x = increase; -x = decrease)

hydrogen ion
-0.15 ueq/l (-0.76 %/year): 15 years' data
- No significant trend detected

non-marine sulphate
-1.04 ueq/l (-3.48 %/year): 16 years' data
+++ Strong trend detected

nitrate
-0.39 ueq/l (-1.83 %/year): 16 years' data
- No significant trend detected

ammonium
-0.76 ueq/l (-3.62 %/year): 16 years' data
+ Significant trend detected

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Sampling Start Date	End Date	pH	SO_4 (μ eq l^{-1})	NO_3 (μ eq l^{-1})	NH_4 (μ eq l^{-1})	Na (μ eq l^{-1})	Mg (μ eq l^{-1})	Ca (μ eq l^{-1})	Cl (μ eq l^{-1})	K (μ eq l^{-1})	PO_4 (μ eq l^{-1})	nss-SO_4 (μ eq l^{-1})	H (μ eq l^{-1})	conductivity (μ S cm^{-1})	rainfall mm
03/01/01	10/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4
10/01/01	17/01/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2
17/01/01	24/01/01	4.0	126.1	125.1	63.4	584.4	131.9	28.7	703.1	12.4	< 1.0	55.7	151.0	151.0	8.8
24/01/01	31/01/01	5.0	28.8	9.9	17.1	179.7	38.7	11.1	218.0	4.0	< 1.0	7.2	-	-	2.1
31/01/01	07/02/01	4.8	31.1	12.9	4.1	146.9	33.4	7.8	177.9	3.4	< 1.0	13.4	35.0	35.0	12.6
07/02/01	14/02/01	4.7	34.6	14.9	14.2	169.3	37.6	9.5	204.3	4.2	< 1.0	14.2	35.0	35.0	3.9
14/02/01	21/02/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
21/02/01	28/02/01	5.1	99.1	1.7	4.2	736.8	167.8	36.0	889.9	14.8	< 1.0	10.3	127.0	127.0	9.8
28/02/01	07/03/01	4.3	104.6	79.7	50.2	515.5	123.2	31.9	635.1	12.3	< 1.0	42.5	106.0	106.0	2.5
07/03/01	14/03/01	5.2	33.2	10.2	13.0	208.6	46.3	9.2	253.2	3.9	< 1.0	8.1	42.0	42.0	14.4
14/03/01	21/03/01	5.1	29.5	12.1	15.4	121.6	26.3	7.7	141.5	3.4	< 1.0	14.8	27.0	27.0	3.7
21/03/01	28/03/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28/03/01	04/04/01	4.5	43.1	49.3	36.6	123.0	26.7	7.9	142.9	2.8	< 1.0	28.3	41.0	41.0	3.5
04/04/01	11/04/01	4.9	51.0	14.8	15.8	263.7	58.4	14.4	326.6	5.5	< 1.0	19.3	55.0	55.0	8.9
11/04/01	18/04/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0
18/04/01	25/04/01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8
25/04/01	02/05/01	5.2	23.1	24.1	15.4	77.0	18.0	8.8	84.9	2.2	< 1.0	13.9	18.0	18.0	7.5
02/05/01	09/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09/05/01	16/05/01	4.5	61.2	44.6	37.1	45.5	13.4	16.1	48.1	1.8	< 1.0	55.7	30.0	30.0	5.3
16/05/01	23/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23/05/01	30/05/01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30/05/01	06/06/01	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2
06/06/01	13/06/01	5.2	17.5	3.9	1.6	83.5	18.7	5.5	93.1	1.7	< 1.0	7.4	18.0	18.0	10.4
13/06/01	20/06/01	5.1	31.7	18.3	10.0	138.6	30.1	15.0	154.2	4.5	< 1.0	15.0	29.0	29.0	7.0
20/06/01	27/06/01	4.0	89.2	99.8	81.2	71.1	18.2	20.5	79.1	2.3	< 1.0	80.6	63.0	63.0	13.7
27/06/01	04/07/01	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2
04/07/01	11/07/01	4.3	34.7	25.3	13.1	49.0	11.8	5.0	61.1	0.8	< 1.0	28.8	29.0	29.0	33.0
11/07/01	18/07/01	4.8	32.1	2.4	8.9	44.4	10.9	7.1	54.7	1.3	< 1.0	26.8	16.0	16.0	2.4
18/07/01	25/07/01	5.1	17.5	3.6	10.3	69.5	15.6	6.6	81.0	1.6	< 1.0	9.1	17.0	17.0	12.3
25/07/01	01/08/01	4.3	18.6	8.6	< .7	29.3	7.2	4.9	34.0	0.6	< 1.0	15.1	17.0	17.0	17.1
01/08/01	08/08/01	4.8	11.5	1.2	< .7	25.7	5.7	3.0	30.7	< .5	< 1.0	8.4	10.0	10.0	21.8
08/08/01	15/08/01	5.3	13.0	< .7	2.0	29.6	6.2	2.9	34.9	0.6	< 1.0	9.4	< 10.0	< 10.0	17.6
15/08/01	22/08/01	4.8	11.0	9.2	8.5	11.5	2.6	2.8	12.0	< .5	39.3	9.6	< 10.0	< 10.0	45.6
22/08/01	29/08/01	7.7	160.4	11.9	714.2	108.5	25.8	10.2	126.4	53.7	403.5	147.3	115.0	115.0	3.6
29/08/01	05/09/01	4.9	10.8	1.4	< .7	56.8	13.1	4.6	65.2	0.9	< 1.0	4.0	13.0	13.0	23.8
05/09/01	12/09/01	5.2	31.1	< .7	0.1	239.4	53.8	12.3	274.5	4.2	< 1.0	2.3	42.0	42.0	38.5
12/09/01	19/09/01	5.4	30.1	3.0	3.9	199.7	43.1	10.1	234.4	3.7	< 1.0	6.0	37.0	37.0	9.2
19/09/01	26/09/01	4.3	39.3	26.5	13.0	43.6	10.6	7.2	45.9	2.1	< 1.0	34.0	28.0	28.0	16.1
26/09/01	02/10/01	4.7	18.7	13.0	7.1	26.2	8.0	12.5	31.9	1.7	< 1.0	15.6	13.0	13.0	12.9
02/10/01	24/10/01	4.6	37.2	31.5	36.6	94.1	20.6	10.7	107.4	6.3	4.1	25.9	31.0	31.0	62.2
24/10/01	31/10/01	5.3	17.7	1.3	2.6	134.0	28.0	5.9	160.8	2.4	< 1.0	1.5	25.0	25.0	38.5
31/10/01	07/11/01	5.4	39.6	0.9	2.3	312.3	66.4	14.2	361.1	6.1	< 1.0	1.9	52.0	52.0	8.4
07/11/01	14/11/01	5.4	100.7	0.7	2.0	782.5	171.5	36.2	929.4	16.1	< 1.0	6.5	129.0	129.0	12.7
14/11/01	21/11/01	5.7	28.5	1.3	2.0	235.4	45.1	11.9	266.7	4.8	< 1.0	0.1	39.0	39.0	6.8
21/11/01	28/11/01	5.5	54.6	1.3	< .7	437.9	95.7	20.4	520.2	9.3	< 1.0	1.8	76.0	76.0	17.0
28/11/01	05/12/01	5.5	16.6	2.0	< .7	113.0	21.1	10.6	136.5	2.2	< 1.0	3.0	21.0	21.0	4.0
05/12/01	19/12/01	4.9	35.7	8.9	6.3	241.0	44.8	9.0	283.7	5.8	< 1.0	6.7	44.0	44.0	20.6
19/12/01	02/01/02	5.2	51.0	1.1	< .7	406.3	85.3	15.8	487.9	8.4	< 1.0	2.1	68.0	68.0	40.7

Precipitation weighted annual mean for site: samples containing phosphate are excluded.													Total Rainfall
5140	37.2	15.2	12.2	186.1	40.6	11.2	220.2	4.4	-	14.8	19.5	40.3	586.3

Appendix 2
Tables of Annual Mean Concentrations and Total Rainfall, 1986 to 2001

Notes to Tables A.2.1 to A.2.10:

(1) The monitoring programme in 2001 was severely affected by the outbreak of Foot and Mouth disease which prevented access to the sampling sites. The evaluation of the rainfall volumes, presented in Section 3.2.2, indicates that the rainfall collected at the high rainfall sites is likely to be understated.

(2) Annual mean precipitation-weighted concentrations for 2001 have not been included for the Cow Green Reservoir (5113), Llyn Brianne (5124), Scoat Tarn (5159) and Whiteadder (5106) sites as sampling was suspended for more than 5 months of 2001.

Table A.2.1 - Precipitation-weighted Annual Mean Acidity, 1986 to 2001 (μeq l^{-1})

Site	Precipitation-weighted Annual Mean Acidity (μeq l^{-1})															
Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Goonhilly	20	23	15	19	14	26	15	17	20	18	19	20	14	13	-	22
Yarner Wood	17	20	14	20	13	17	18	17	18	15	18	18	12	14	-	23
Barcombe Mills	19	22	13	15	12	20	17	24	16	16	14	16	11	13	-	17
Compton	25	28	16	25	14	18	35	34	23	13	7	12	11	7	-	12
Crai Reservoir														12	-	14
Flatford Mill	33	43	35	35	27	43	36	25	27	30	25	26	25	27	-	20
Woburn	45	50	37	37	28	35	37	27	30	22	15	24	25	14	-	23
Tycanol Wood	16	17	15	18	14	21	21	17	14	14	16	13	11	11	-	14
Llyn Brianne	16	21	18	19	17	24	20	19	16	12	14	15	12	11	-	-
Pumlumon	-	-	-	14	12	16	18	19	13	14	15	12	9	10	-	10
Stoke Ferry	35	36	30	40	18	22	30	27	18	24	16	19	18	17	-	15
Preston Montford	18	25	24	36	14	27	38	35	30	27	19	16	8	7	-	9
Bottesford	61	76	81	48	42	62	68	62	36	29	22	22	20	17	-	19
Llyn Llagi														13	-	15
Beddgelert	17	19	17	15	12	16	14	18	12	11	12					
Llyn Llydaw												11	11	12	-	14
Wardlow Hay Cop	29	45	33	37	24	33	34	36	27	28	22	18	16	10	-	19
Driby	42	43	42	47	41	41	45	35	36	37	18	22	34	21	-	23
Jenny Hurn	89	100	85	63	53	80	81	67	39	58	54	55	45	33	-	31
River Etherow														25	-	29
Thorganby	75	73	88	84	64	55	82	80	44	51	44	29	43	16	-	26
High Muffles	58	63	72	55	55	58	59	47	42	41	40	33	35	22	-	38
Bannisdale	30	27	28	24	18	22	25	31	19	17	20	16	15	13	-	24
Scoat Tarn														14	-	-
Hillsborough Forest	-	-	-	13	7	12	12	17	12	8	13	6	7	9	-	7
Lough Navar	11	9	10	10	8	6	8	11	7	8	6	7	5	6	-	8
Cow Green Reservoir	27	31	34	23	21	24	28	33	21	17	24	11	16	13	-	-
Loch Dee	29	23	19	15	15	19	17	22	15	13	19	11	10	12	-	19
Beaghs Burn														9	-	14
Redesdale	41	44	52	32	30	33	42	31	31	25	33	27	25	16	-	26
Eskdalemuir	21	25	27	20	24	22	22	26	17	16	17	17	14	14	-	22
Whiteadder	40	36	47	35	31	36	45	34	33	32	31	32	23	19	-	-
Loch Chon														16	-	24
Balquhidder	21	32	24	20	16	22	20	24	22	18	29	15	15	12	-	22
Polloch	-	-	-	-	-	14	14	15	13	12	16	10	8	9	-	13
Loch Nagar														20	-	34
Glen Dye	-	45	46	36	39	44	41	35	42	41	56	32	28	22	-	40
Allt a'Mharcaidh	22	22	21	20	18	17	17	17	18	16	19	16	11	10	-	17
Strathvaich Dam	-	16	16	13	11	15	20	13	11	10	13	12	10	10	-	12
Achanarras	10	19	25	25	19	20	24	22	17	16	21	21	14	14	-	20

Table A.2.2 - Precipitation-weighted Annual Mean Non-marine Sulphate, 1986 to 2001 (μeq l^{-1})

Site	Precipitation-weighted Annual Mean Non-marine Sulphate (μeq l^{-1})															
Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Goonhilly	30	34	21	29	24	36	22	29	26	24	31	25	17	17	20	22
Yarner Wood	27	37	22	27	19	28	25	28	28	24	33	27	18	18	14	19
Barcombe Mills	46	50	40	44	38	52	43	33	36	33	38	25	30	26	21	25
Compton	78	104	64	60	58	63	63	48	55	49	61	42	38	32	26	28
Crai Reservoir														18	14	20
Flatford Mill	90	71	67	80	58	71	53	41	50	52	52	41	43	45	34	33
Woburn	73	80	85	73	66	63	57	44	59	46	56	39	42	38	30	34
Tycanol Wood	27	26	23	26	22	31	27	22	22	22	27	19	18	21	16	19
Llyn Brianne	24	29	26	27	27	30	28	26	26	22	26	20	19	17	15	-
Pumlumon	-	-	-	19	19	24	24	23	18	21	23	17	14	14	11	12
Stoke Ferry	80	76	66	84	81	77	67	54	61	50	52	49	43	40	41	34
Preston Montford	45	60	56	60	37	66	64	48	52	60	49	32	27	24	25	30
Bottesford	90	93	109	83	66	75	73	57	63	55	54	43	45	39	33	42
Llyn Llagi														17	17	16
Beddgelert	53	33	24	22	19	23	22	24	20	20	24					
Llyn Llydaw												14	16	17	13	15
Wardlow Hay Cop	71	92	83	80	73	85	73	71	76	65	78	59	50	49	41	53
Driby	69	74	77	79	80	78	65	49	62	70	49	42	53	41	37	40
Jenny Hurn	110	106	121	98	89	83	77	60	80	65	81	58	70	54	51	53
River Etherow														39	32	42
Thorganby	85	80	88	87	82	119	88	79	72	56	69	62	60	50	45	51
High Muffles	63	74	82	73	67	75	71	56	60	51	65	47	49	37	36	40
Bannisdale	41	38	45	40	41	38	42	45	37	37	44	31	30	27	22	27
Scoat Tarn														23	17	-
Hillsborough Forest	-	-	-	52	36	42	41	40	45	33	45	26	29	31	23	33
Lough Navar	19	16	14	18	14	18	17	18	16	16	17	15	12	10	11	12
Cow Green Reservoir	35	39	44	35	33	34	38	40	31	31	37	26	26	25	19	-
Loch Dee	32	35	36	24	26	28	27	28	25	24	36	18	19	19	19	22
Beaghs Burn														37	16	21
Redesdale	58	46	62	47	36	43	46	35	42	37	51	37	34	25	23	29
Eskdalemuir	31	30	33	28	31	30	28	29	28	28	28	24	20	20	15	20
Whiteadder	53	48	61	46	33	45	50	37	40	43	44	33	27	24	24	-
Loch Chon														16	16	17
Balquhidder	26	33	28	24	22	27	23	26	22	21	38	21	19	15	15	19
Polloch	-	-	-	-	-	17	17	14	16	14	18	11	10	9	9	9
Loch Nagar														23	20	27
Glen Dye	-	48	49	41	39	45	43	38	46	41	62	31	29	27	21	29
Allt a'Mharcaidh	24	24	20	19	15	16	16	16	18	14	23	13	11	10	10	14
Strathvaich Dam	-	16	14	12	10	13	18	11	9	10	16	12	9	8	7	7
Achanarras	24	33	31	29	22	24	25	20	19	19	25	21	17	16	12	15

Table A.2.3 - Precipitation-weighted Annual Mean Nitrate, 1986 to 2001 (μeq l^{-1})

Site	Precipitation-weighted Annual Mean Nitrate (μeq l^{-1})															
Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Goonhilly	19	27	16	22	20	31	17	23	24	23	28	28	18	20	17	24
Yarner Wood	16	24	14	18	13	19	16	20	25	21	31	27	14	17	11	20
Barcombe Mills	27	31	25	30	24	36	25	19	29	28	28	23	21	25	16	22
Compton	38	46	38	36	28	36	39	28	34	28	36	33	29	27	24	24
Crai Reservoir														10	8	13
Flatford Mill	39	45	43	56	38	44	40	30	37	39	38	36	39	41	32	35
Woburn	39	40	39	47	35	40	36	31	47	35	39	35	35	38	27	39
Tycanol Wood	12	15	12	15	11	18	14	12	16	15	18	16	11	13	10	14
Llyn Brianne	12	14	13	14	16	18	16	14	18	16	17	17	12	13	10	-
Pumlumon	-	-	-	10	9	14	13	13	12	15	16	14	7	10	8	9
Stoke Ferry	48	44	39	55	46	48	43	36	43	39	37	41	38	40	39	34
Preston Montford	22	32	26	31	20	35	38	27	32	38	33	24	19	21	22	29
Bottesford	41	41	44	50	34	43	36	34	40	33	34	33	30	33	29	36
Llyn Llagi														13	9	12
Beddgelert	17	16	13	11	10	12	10	14	13	15	15					
Llyn Llydaw												11	10	12	9	12
Wardlow Hay Cop	25	36	31	36	26	38	29	33	35	33	40	30	24	28	25	35
Driby	39	44	47	48	46	50	46	38	49	50	39	40	45	39	35	38
Jenny Hurn	44	48	44	51	43	45	42	33	47	42	45	38	45	40	37	38
River Etherow														31	24	36
Thorganby	41	43	42	49	40	50	42	46	40	37	38	38	34	32	34	37
High Muffles	37	43	47	45	38	47	37	36	42	38	43	35	36	32	31	38
Bannisdale	20	18	21	19	17	21	19	23	22	21	25	22	18	21	16	23
Scoat Tarn														16	12	-
Hillsborough Forest	-	-	-	26	16	23	16	21	23	21	29	19	16	22	13	25
Lough Navar	8	8	7	9	7	9	9	10	15	12	10	12	6	7	7	9
Cow Green Reservoir	19	21	25	20	20	21	23	25	21	22	24	18	18	20	17	-
Loch Dee	14	19	18	14	14	16	15	19	18	16	22	14	13	13	14	18
Beaghs Burn														13	10	19
Redesdale	34	26	33	31	26	31	36	26	32	27	33	35	30	25	23	31
Eskdalemuir	15	18	19	18	15	19	16	19	19	19	20	20	15	17	14	19
Whiteadder	34	29	42	34	23	32	35	29	34	31	35	30	24	22	25	-
Loch Chon														19	14	16
Balquhidder	13	21	16	13	10	17	13	18	17	14	24	16	13	12	12	20
Polloch	-	-	-	-	-	9	9	9	11	10	10	8	5	6	6	8
Loch Nagar														18	17	26
Glen Dye	-	31	32	31	29	33	28	33	42	36	42	29	27	24	26	37
Allt a'Mharcaidh	10	12	10	10	9	10	8	7	15	11	14	11	9	8	9	13
Strathvaich Dam	-	10	8	7	6	9	9	8	9	9	10	10	6	8	6	7
Achanarras	14	22	24	25	18	22	16	18	21	18	22	21	15	13	14	15

Table A.2.4 - Precipitation-weighted Annual Mean Ammonium, 1986 to 2001 (μeq l^{-1})

Site	Precipitation-weighted Annual Mean Ammonium (μeq l^{-1})															
Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Goonhilly	17	22	12	18	16	24	15	30	13	17	25	21	10	12	13	18
Yarner Wood	15	28	14	19	13	22	17	23	25	20	37	26	14	17	9	19
Barcombe Mills	38	41	38	39	35	50	31	16	30	33	32	22	18	25	14	23
Compton	70	73	46	56	55	63	57	40	53	53	79	53	48	44	29	36
Crai Reservoir														10	6	12
Flatford Mill	-	50	49	66	44	59	40	31	40	48	49	38	43	45	34	41
Woburn	54	50	52	56	43	52	41	35	55	48	63	40	36	47	29	44
Tycanol Wood	13	15	13	15	14	19	13	11	15	18	22	15	12	16	10	18
Llyn Brianne	12	13	14	16	16	20	18	15	16	18	19	15	13	14	12	-
Pumlumon	-	-	-	13	13	17	20	14	13	21	18	16	10	12	7	12
Stoke Ferry	65	60	56	75	69	74	54	43	61	53	56	55	49	50	49	45
Preston Montford	47	57	49	53	44	57	57	36	50	54	60	38	36	38	30	51
Bottesford	56	45	49	68	54	48	40	33	55	48	56	45	45	48	37	49
Llyn Llagi														12	8	11
Beddgelert	14	11	12	15	14	13	15	14	11	14	17					
Llyn Llydaw												10	11	14	8	12
Wardlow Hay Cop	34	40	39	39	40	57	45	39	47	46	58	38	33	37	30	44
Driby	53	60	64	53	67	76	55	42	48	64	54	49	49	44	39	48
Jenny Hurn	64	51	53	64	64	65	45	28	55	50	66	53	61	46	45	55
River Etherow														34	25	40
Thorganby	59	56	61	65	80	124	82	-	57	60	57	59	53	50	42	51
High Muffles	40	46	54	53	48	64	44	40	50	48	61	44	45	37	34	39
Bannisdale	35	27	30	30	32	34	27	31	32	36	40	33	27	27	23	33
Scoat Tarn														21	14	-
Hillsborough Forest	-	-	-	60	45	48	40	43	49	43	62	40	38	43	39	54
Lough Navar	11	9	8	11	8	9	12	11	11	16	14	14	9	9	10	10
Cow Green Reservoir	20	19	25	23	24	26	25	28	21	30	26	27	20	23	19	-
Loch Dee	21	34	21	20	21	24	28	21	23	19	27	17	17	19	17	22
Beaghs Burn														20	15	26
Redesdale	41	15	23	34	24	32	30	21	30	33	44	37	32	28	24	34
Eskdalemuir	20	16	19	22	18	26	17	18	21	26	24	24	18	20	15	20
Whiteadder	30	20	35	32	17	30	27	22	24	28	33	24	21	20	23	-
Loch Chon														12	12	12
Balquhidder	14	15	12	14	11	16	16	15	12	12	24	18	14	12	8	16
Polloch	-	-	-	-	-	8	8	5	6	7	7	6	5	5	3	7
Loch Nagar														16	16	20
Glen Dye	-	26	29	28	25	32	22	28	33	29	43	23	22	22	20	30
Allt a'Mharcaidh	6	10	3	7	5	5	4	4	8	5	7	5	5	6	4	8
Strathvaich Dam	-	4	3	4	3	5	5	4	4	5	5	6	4	4	3	4
Achanarras	11	35	21	18	15	26	9	8	12	15	14	13	13	11	10	12

Table A.2.5 - Precipitation-weighted Annual Mean Sodium, 1986 to 2001 (μeq l^{-1})

Site	Precipitation-weighted Annual Mean Sodium (μeq l^{-1})															
Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Goonhilly	264	206	212	276	506	327	238	227	265	270	313	284	292	292	299	225
Yarner Wood	98	125	150	166	245	140	104	101	123	128	127	118	127	88	104	91
Barcombe Mills	186	255	153	204	359	137	128	98	147	176	195	164	154	173	199	91
Compton	54	67	70	84	129	71	40	55	64	64	76	77	58	55	45	37
Crai Reservoir														96	103	79
Flatford Mill	99	60	54	79	79	70	57	54	73	79	76	60	59	49	63	49
Woburn	71	65	50	60	87	54	28	41	56	51	61	58	36	46	34	31
Tycanol Wood	116	90	104	232	232	163	120	119	164	157	146	159	145	151	144	103
Llyn Brianne	94	68	83	112	152	111	72	97	90	84	94	96	90	103	90	-
Pumlumon	-	-	-	104	141	102	72	69	73	79	81	113	95	85	93	69
Stoke Ferry	74	49	50	58	84	75	57	53	54	46	71	55	56	55	44	60
Preston Montford	86	38	86	39	100	164	38	66	58	64	35	80	40	54	33	31
Bottesford	82	35	59	47	62	54	35	35	39	49	58	27	33	39	25	29
Llyn Llagi														110	90	75
Beddgelert	126	75	122	134	193	162	95	111	98	129	97					
Llyn Llydaw												107	88	104	70	72
Wardlow Hay Cop	71	52	90	57	140	131	57	95	94	66	82	60	65	70	40	50
Driby	95	53	64	98	91	103	67	70	83	100	121	58	77	65	62	74
Jenny Hurn	97	47	80	68	104	55	37	47	53	54	73	36	61	51	30	39
River Etherow														60	46	47
Thorganby	74	50	52	69	90	96	50	51	52	51	59	45	67	53	33	43
High Muffles	61	63	67	95	83	103	78	111	88	113	153	82	106	76	61	76
Bannisdale	122	62	133	116	161	182	91	106	95	129	95	156	101	131	76	73
Scoat Tarn														85	71	-
Hillsborough Forest	-	-	-	89	140	107	72	87	125	108	107	78	97	90	90	70
Lough Navar	248	102	317	139	261	192	133	187	174	125	116	131	136	171	152	98
Cow Green Reservoir	74	40	69	76	90	84	74	72	77	93	91	99	89	100	55	-
Loch Dee	116	54	136	132	147	123	86	79	92	106	91	109	91	124	101	56
Beaghs Burn														171	150	128
Redesdale	114	44	66	91	67	80	59	73	76	75	93	55	65	65	50	45
Eskdalemuir	86	37	62	81	86	2	53	63	77	88	63	66	76	102	61	85
Whiteadder	112	53	83	92	78	59	79	103	120	100	121	93	80	86	93	-
Loch Chon														112	69	71
Balquhidder	122	45	59	110	100	89	61	145	120	71	122	87	81	123	83	59
Polloch	-	-	-	-	-	213	118	204	155	168	148	127	161	195	150	139
Loch Nagar														39	33	35
Glen Dye	-	52	73	83	81	78	65	86	108	98	121	112	91	83	71	77
Allt a'Mharcaidh	90	37	45	88	62	46	57	143	92	57	66	70	65	83	63	40
Strathvaich Dam	-	83	109	126	174	147	121	212	154	102	130	116	122	180	153	95
Achanarras	231	145	217	277	212	235	186	224	217	169	219	167	202	249	251	186

Table A.2.6 - Precipitation-weighted Annual Mean Magnesium, 1986 to 2001 (μeq l^{-1})

Site / Year	Precipitation-weighted Annual Mean Magnesium (μeq l^{-1})															
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Goonhilly	61	48	49	63	19	77	57	54	64	73	86	82	87	93	73	50
Yarner Wood	23	30	35	38	58	32	26	28	33	38	37	35	41	37	24	20
Barcombe Mills	44	62	35	49	85	34	33	28	40	48	58	48	48	57	47	21
Compton	13	19	21	21	31	18	11	15	18	20	25	26	26	27	11	8
Crai Reservoir														40	24	19
Flatford Mill	32	17	16	23	22	19	15	15	18	20	21	17	20	18	16	12
Woburn	9	11	13	18	24	14	9	12	15	15	18	18	13	19	8	8
Tycanol Wood	27	21	24	53	54	39	29	31	43	45	43	45	48	54	32	22
Llyn Brianne	21	16	20	27	36	27	19	26	25	24	29	27	32	41	20	-
Pumlumon	-	-	-	24	32	23	19	20	23	25	25	33	35	37	21	15
Stoke Ferry	20	12	13	16	23	18	16	15	16	12	21	16	19	22	11	14
Preston Montford	21	11	22	11	24	43	11	18	20	42	15	25	25	27	9	7
Bottesford	26	11	18	16	18	16	11	10	12	14	16	10	14	17	6	8
Llyn Llagi														40	21	16
Beddgelert	29	18	26	31	44	37	24	29	28	37	31					
Llyn Llydaw												32	33	41	16	16
Wardlow Hay Cop	18	15	25	17	35	32	15	25	27	18	24	18	23	27	9	12
Driby	24	14	18	27	27	26	18	22	22	26	34	18	23	24	15	17
Jenny Hurn	36	16	30	25	35	21	14	16	22	19	24	13	22	20	10	13
River Etherow														21	11	11
Thorganby	22	16	17	23	27	31	16	15	19	15	19	16	23	27	10	13
High Muffles	15	17	19	23	29	27	19	30	23	29	39	21	30	26	15	18
Bannisdale	29	15	33	27	38	43	23	27	27	35	27	41	32	48	18	16
Scoat Tarn														32	16	-
Hillsborough Forest	-	-	-	21	31	24	20	25	36	34	29	27	42	38	21	15
Lough Navar	57	24	80	32	60	47	34	48	48	38	37	40	53	63	43	21
Cow Green Reservoir	17	10	17	18	22	20	19	19	22	25	25	29	29	41	13	-
Loch Dee	29	12	31	31	35	29	22	22	25	31	28	34	35	48	27	12
Beaghs Burn														64	46	28
Redesdale	26	12	19	23	18	19	15	20	21	21	27	17	21	27	13	10
Eskdalemuir	20	9	15	20	21	25	14	17	22	26	20	20	30	41	16	14
Whiteadder	26	13	22	23	20	15	19	26	33	26	31	26	25	33	22	-
Loch Chon														40	16	16
Balquhidder	29	11	14	26	24	21	16	37	31	22	33	24	28	52	18	13
Polloch	-	-	-	-	-	48	30	52	40	46	41	37	54	68	35	29
Loch Nagar														17	8	8
Glen Dye	-	12	18	21	21	19	16	22	26	25	30	28	26	29	16	18
Allt a'Mharcaidh	21	8	12	20	15	11	14	35	24	16	20	19	23	36	17	9
Strathvaich Dam	-	20	25	28	39	32	31	51	42	31	40	33	42	69	40	20
Achanarras	55	37	46	64	49	54	46	56	58	45	59	43	61	83	57	41

Table A.2.7 - Precipitation-weighted Annual Mean Calcium, 1986 to 2001 (μeq l^{-1})

Site	Precipitation-weighted Annual Mean Calcium (μeq l^{-1})															
Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Goonhilly	16	15	14	18	31	22	18	18	19	24	23	21	27	31	20	14
Yarner Wood	11	15	12	13	17	15	12	13	18	18	16	16	20	22	10	8
Barcombe Mills	20	29	22	30	33	32	22	20	28	29	37	25	49	43	20	16
Compton	23	51	33	22	32	30	23	20	34	41	55	34	61	36	15	13
Crai Reservoir														18	8	17
Flatford Mill	33	21	27	37	29	24	18	21	25	21	22	18	26	26	16	13
Woburn	23	30	38	28	32	24	19	18	24	21	34	23	28	33	11	12
Tycanol Wood	12	9	9	31	17	13	11	10	14	17	16	15	19	26	10	9
Llyn Brianne	7	8	9	10	15	10	10	10	12	12	12	11	17	19	7	-
Pumlumon	-	-	-	7	11	11	9	7	9	12	10	12	14	17	7	6
Stoke Ferry	31	22	24	28	45	33	32	25	30	22	35	34	33	39	16	16
Preston Montford	14	19	19	14	14	37	18	17	24	76	28	18	34	28	9	10
Bottesford	36	33	50	33	23	29	19	17	23	29	25	21	31	31	10	14
Llyn Llagi														16	9	6
Beddgelert	9	10	13	9	12	11	11	11	14	18	13					
Llyn Llydaw												11	14	16	6	6
Wardlow Hay Cop	47	59	56	55	75	57	55	52	64	55	69	64	89	92	28	39
Driby	18	19	27	34	33	27	18	19	28	35	30	21	26	26	12	14
Jenny Hurn	56	45	73	48	50	39	27	26	60	31	35	23	44	38	19	21
River Etherow														22	10	14
Thorganby	25	25	30	37	35	67	27	24	67	29	32	33	53	57	18	29
High Muffles	13	21	23	27	20	23	21	19	25	26	23	21	20	28	10	14
Bannisdale	13	12	14	13	15	16	15	14	16	17	16	17	20	28	8	8
Scoat Tarn														16	7	-
Hillsborough Forest	-	-	-	13	14	17	16	15	24	25	24	21	36	34	11	11
Lough Navar	17	10	21	12	18	25	19	24	27	26	25	23	29	33	15	11
Cow Green Reservoir	7	8	12	12	13	11	13	12	13	16	14	13	16	23	7	-
Loch Dee	10	9	11	9	11	10	11	9	11	14	10	12	23	19	10	5
Beaghs Burn														61	37	8
Redesdale	12	10	20	18	11	14	13	10	18	13	16	13	13	19	8	7
Eskdalemuir	7	5	8	21	8	10	8	9	14	13	8	10	17	17	6	6
Whiteadder	14	14	20	16	11	13	12	12	18	19	15	13	14	19	9	-
Loch Chon														13	5	6
Balquhidder	8	5	6	9	8	11	8	11	10	9	10	9	16	19	7	6
Polloch	-	-	-	-	-	16	13	13	14	13	12	11	20	24	9	7
Loch Nagar														10	4	5
Glen Dye	-	7	10	11	9	9	10	10	12	10	10	10	10	15	6	6
Allt a'Mharcaidh	10	8	7	8	7	6	9	11	12	7	11	9	13	17	6	5
Strathvaich Dam	-	7	7	8	13	9	10	13	14	11	15	11	16	20	11	6
Achanarras	16	15	20	20	21	17	17	18	18	17	18	15	20	28	14	11

Table A.2.8 - Precipitation-weighted Annual Mean Chloride, 1986 to 2001 (μeq l^{-1})

Site	Precipitation-weighted Annual Mean Chloride (μeq l^{-1})															
Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Goonhilly	311	242	253	322	595	373	265	255	296	313	368	320	324	325	353	266
Yarner Wood	118	152	180	190	291	160	122	116	139	147	149	133	143	98	124	108
Barcombe Mills	226	310	186	252	427	161	156	115	166	202	230	187	180	195	237	111
Compton	54	92	94	110	159	89	54	73	74	81	91	89	68	64	55	45
Crai Reservoir														116	125	94
Flatford Mill	109	80	70	99	95	88	71	67	79	95	90	68	69	57	76	58
Woburn	82	82	61	75	109	69	38	50	64	61	66	64	41	52	40	36
Tycanol Wood	141	109	123	266	268	190	135	135	178	184	171	178	162	170	173	121
Llyn Brianne	107	83	99	131	178	129	81	109	100	95	107	106	101	117	106	-
Pumlumon	-	-	-	124	165	118	83	76	83	91	95	127	108	97	110	80
Stoke Ferry	95	65	66	73	101	90	72	63	62	57	86	62	63	62	52	71
Preston Montford	109	56	114	59	123	203	50	83	72	84	46	94	47	63	42	37
Bottesford	115	58	100	78	97	85	62	63	55	67	74	37	42	43	32	37
Llyn Llagi														124	106	87
Beddgelert	154	83	137	156	225	185	107	128	105	149	112					
Llyn Llydaw												120	99	120	85	84
Wardlow Hay Cop	99	85	131	84	183	163	78	121	113	87	104	74	78	80	50	59
Driby	128	76	90	126	135	123	88	84	98	125	144	69	90	78	75	87
Jenny Hurn	169	99	151	123	170	124	86	84	83	99	111	72	89	68	47	57
River Etherow														69	57	55
Thorganby	140	102	121	139	166	180	123	106	96	96	90	64	107	73	49	59
High Muffles	89	96	106	131	146	140	110	139	108	146	187	98	126	88	73	92
Bannisdale	148	75	168	141	193	213	107	124	109	151	113	178	114	149	88	85
Scoat Tarn														95	83	-
Hillsborough Forest	-	-	-	106	165	123	84	102	140	130	123	89	110	102	106	83
Lough Navar	293	125	409	166	298	222	153	215	191	144	135	150	155	188	179	118
Cow Green Reservoir	91	52	85	91	107	98	86	84	89	108	105	117	100	113	66	-
Loch Dee	152	66	159	159	173	144	96	89	106	121	106	123	102	138	120	65
Beaghs Burn														194	178	151
Redesdale	133	54	84	112	83	97	72	92	86	89	108	62	74	73	60	54
Eskdalemuir	105	47	76	97	103	118	65	71	85	101	74	74	87	113	73	98
Whiteadder	129	64	100	110	93	69	93	117	132	115	139	104	91	97	112	-
Loch Chon														129	82	82
Balquhidder	146	58	70	131	125	104	70	166	135	83	146	100	92	140	98	69
Polloch	-	-	-	-	-	249	135	226	169	191	176	143	183	226	180	163
Loch Nagar														43	39	41
Glen Dye	-	64	86	98	98	91	78	102	124	115	146	124	103	93	83	94
Allt a'Mharcaidh	104	39	52	104	72	53	65	158	99	66	76	82	75	93	73	46
Strathvaich Dam	-	101	129	148	207	168	138	227	169	116	149	131	138	202	179	114
Achanarras	280	174	253	317	251	272	209	255	245	195	246	189	225	280	302	220

Table A.2.9 - Precipitation-weighted Annual Mean Sulphate, 1986 to 2001 (μeq l^{-1})

Site	Precipitation-weighted Annual Mean Sulphate (μeq l^{-1})															
Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Goonhilly	61	59	47	63	85	75	50	57	58	56	69	59	53	51	56	49
Yarner Wood	39	52	40	47	49	44	38	40	43	39	48	41	34	28	27	30
Barcombe Mills	68	80	58	68	82	68	58	45	54	54	61	45	48	47	45	36
Compton	84	112	72	70	73	71	67	55	63	57	70	51	45	38	32	33
Crai Reservoir														29	27	30
Flatford Mill	102	78	73	89	67	79	59	48	58	62	61	48	50	50	42	39
Woburn	82	86	91	81	76	70	60	49	66	52	63	46	46	44	34	38
Tycanol Wood	41	37	36	54	50	51	41	37	42	40	45	38	36	39	34	31
Llyn Brianne	36	37	36	40	46	43	36	38	37	32	38	31	30	29	26	-
Pumlumon	-	-	-	32	35	34	32	31	27	30	33	31	26	23	22	20
Stoke Ferry	89	82	72	91	91	86	74	60	68	56	61	55	49	47	46	41
Preston Montford	56	65	66	65	49	85	69	56	59	68	53	42	31	31	29	33
Bottesford	100	98	116	89	73	82	77	62	67	61	61	47	49	43	36	46
Llyn Llagi														30	28	25
Beddgelert	61	39	39	38	42	43	34	38	32	35	35					
Llyn Llydaw												27	27	30	21	23
Wardlow Hay Cop	80	98	94	86	90	100	80	83	87	73	88	66	58	58	45	59
Driby	80	80	85	91	91	90	73	58	72	82	64	49	62	49	45	49
Jenny Hurn	121	112	130	107	101	90	81	66	86	72	90	62	78	60	55	57
River Etherow														46	38	47
Thorganby	94	86	94	96	93	126	94	85	78	62	76	68	69	56	49	56
High Muffles	70	82	90	85	77	87	80	69	70	65	83	57	62	46	44	50
Bannisdale	56	45	61	54	60	60	53	57	48	53	55	50	42	39	31	36
Scoat Tarn														33	26	-
Hillsborough Forest	-	-	-	62	53	55	50	51	60	46	58	36	41	41	34	41
Lough Navar	48	28	34	34	46	41	33	40	37	31	31	31	28	30	29	24
Cow Green Reservoir	44	43	53	44	44	44	47	49	40	43	48	38	36	34	26	-
Loch Dee	47	41	52	39	43	42	37	38	36	37	47	31	29	34	31	29
Beaghs Burn														58	34	36
Redesdale	72	51	70	58	44	52	53	44	51	46	63	44	42	33	28	35
Eskdalemuir	41	35	41	38	42	43	34	37	38	38	36	32	30	31	23	28
Whiteadder	66	55	72	58	42	52	59	49	54	55	58	44	37	35	35	-
Loch Chon														26	24	26
Balquhidder	41	39	35	37	34	38	31	43	38	30	52	31	29	29	25	26
Polloch	-	-	-	-	-	42	31	39	34	33	36	26	30	32	27	26
Loch Nagar														27	24	31
Glen Dye	-	54	58	51	49	54	51	48	60	53	76	44	40	35	30	39
Allt a'Mharcaidh	35	29	26	29	23	22	23	32	29	21	31	22	19	19	17	19
Strathvaich Dam	-	26	27	27	31	30	33	35	28	22	32	26	24	26	26	18
Achanarras	52	50	57	63	48	52	47	47	45	40	51	41	41	46	42	37

Table A.2.10 - Annual volume of Rain Samples collected in the Acid Deposition Monitoring Network*, 1986 to 2001 (mm)

Site	Rainfall (mm)															
Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001†
Goonhilly	907	879	910	753	790	800	776	1008	999	744	743	1000	936	831	935	*787*
Yarner Wood	1150	1015	1123	1131	1174	1058	1049	1398	1333	1135	1007	1218	1383	1106	1315	*1025*
Barcombe Mills	740	849	678	597	639	620	653	738	806	652	539	818	733	655	1215	*834*
Compton	586	629	530	550	407	449	709	644	586	647	392	576	642	644	856	*701*
Crai Reservoir														2190	2292	*1659*
Flatford Mill	528	660	532	392	393	362	510	518	438	335	231	409	493	546	613	*615*
Woburn	758	672	592	540	400	478	694	655	505	515	328	456	620	537	663	*670*
Tycanol Wood	1508	1318	1385	1340	1437	1422	1572	1692	1460	1320	1366	1589	1547	1246	1735	*1288*
Llyn Brianne	1491	1497	1434	1417	1483	1224	1488	1573	1474	1143	1195	1296	1737	1725	1984	-
Pumlumon	–	–	–	1896	1936	1908	2129	2123	2445	1622	1554	1780	2641	2230	2411	*1547*
Stoke Ferry	503	617	537	495	348	350	508	601	479	375	318	519	517	435	577	*597*
Preston Montford	539	570	514	580	538	443	554	585	520	409	403	550	590	666	789	*536*
Bottesford	545	651	531	469	434	377	557	651	526	327	289	596	573	540	682	*572*
Llyn Llagi														2177	2979	*1925*
Beddgelert	2758	2231	2794	2480	2394	2028	3013	2152	2375	2097	747					
Llyn Llydaw											827	2068	2777	2313	3086	*1831*
Wardlow Hay Cop	928	889	837	708	711	617	849	852	977	581	530	853	1018	860	1068	*786*
Driby	702	685	605	457	473	398	676	636	513	375	415	578	620	598	616	*598*
Jenny Hurn	518	652	409	443	351	354	505	546	452	460	301	423	530	554	610	*512*
River Etherow														876	1205	*914*
Thorganby	503	625	516	364	434	329	511	485	496	395	348	477	448	597	703	*543*
High Muffles	711	875	855	599	806	626	836	947	740	670	693	827	980	936	1160	*861*
Bannisdale	2249	2101	2091	1699	2270	1857	2027	1794	2290	1690	1328	1771	2167	1798	2552	*1607*
Scoat Tarn														2110	2727	-
Hillsborough Forest	–	–	–	642	909	668	635	802	614	742	662	824	777	730	900	*515*
Lough Navar	1439	1144	1492	1242	1617	1459	1977	1517	1631	1521	1373	1395	1686	1383	1297	*1004*
Cow Green Reservoir	1129	1216	1138	858	1165	957	1073	1118	1293	807	1149	1058	1353	1275	1633	-
Loch Dee	2373	2311	2619	2001	2574	2196	2659	1950	2393	2036	1928	2269	2473	2373		*1266*
Beaghs Burn														1417	1695	*1148*
Redesdale	745	828	832	499	724	581	662	585	541	507	444	437	843	632	842	*553*
Eskdalemuir	1523	1275	1396	1236	1528	1248	1609	1330	1631	1202	1211	1487	1700	1479	1628	*1180*
Whiteadder	584	718	712	489	721	569	665	722	566	473	395	546	750	583	817	-
Loch Chon														2123	1838	*1399*
Balquhidder	2008	1428	1736	1967	2398	1683	1814	1575	1547	1637	1096	1579	1540	1863	1674	*1254*
Polloch	–	–	–	–	–	2021	2355	1790	2012	1788	1606	1904	2250	2099	2011	*1171*
Loch Nagar														987	1436	*957*
Glen Dye	–	898	1067	659	809	691	758	969	637	724	740	1049	1005	792	1238	*998*
Allt a'Mharcaidh	777	664	761	638	907	729	757	826	714	678	477	601	846	874	895	*593*
Strathvaich Dam	–	959	1205	1357	1713	1396	1609	1147	1272	1282	885	1200	1458	1444	1384	*996*
Achanarras	889	864	642	476	776	512	635	567	535	622	488	478	700	646	598	*586*

* All samples including those with phosphate contamination; † The sampling programme at many of the sites in 2001 was interrupted by the outbreak of Foot and Mouth disease.

Appendix 3
Sulphur Data, 2001

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Appendix 3.1
Sulphur Dioxide Data, 2001

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National Environmental Technology Centre

Monthly and Annual Mean Concentrations of Sulphur Dioxide in 2001
Concentration in Air (μg SO_2 [as S] m^{-3})

Site	Jan	Feb	Mar	Apr -*1*	May -*1*	Jun -*1*	Jul -*1*	Aug -*1*	Sep -*1*	Oct -*1*	Nov -*1*	Dec -*1*	Annual Mean -*1*
Eskdalemuir -*2*	0.64	0.84	0.92	0.64	0.59	0.21	0.16	0.14	0.16	0.27	0.20	0.57	0.44
Stoke Ferry -*2*	1.45	1.22	1.00	0.97	0.83	0.94	0.67	0.95	0.94	0.65	1.02	1.08	0.97
Lough Navar -*2*	0.51	0.32	0.80	0.27	0.42	0.21	0.21	0.17	0.15	0.16	0.03	0.04	0.28
Barcombe Mills -*2*	1.12	1.04	0.89	1.26	0.89	0.82	0.62	0.76	0.67	0.37	0.91	0.98	0.86
Yarner Wood -*2*	0.89	1.25	0.88	0.56	1.08	0.54	0.41	0.18	0.36	-	0.48	0.75	0.64
High Muffles -*2*	2.00	3.52	1.56	1.55	0.88	1.04	0.97	1.49	0.98	1.39	1.21	1.72	1.52
Strathvaich Dam -*2*	0.32	-	-	-	0.31	0.16	0.14	0.13	0.15	0.18	0.11	0.16	0.20
Glen Dye -*2*	0.75	-	-	-	0.51	0.30	0.33	0.31	0.09	0.26	0.19	0.48	0.48

Notes: - indicates that no average was determined as the data capture was less than 75%; (1) The monthly and annual mean concentrations have been calculated as time-weighted averages of either the daily H_2O_2 bubbler or fortnightly filter-pack measurements. No correction has been made to the filter-pack measurements although an on-going measurement overlap programme suggests that the filter-pack sampler has an offset of about -0.13 μg SO_2 [as S] m^{-3}; (2) The filter-pack samplers were installed on the following dates:

Site	Installation Date	Site	Installation Date	Site	Installation Date	Installation Date	Date
– Eskdalemuir	24th May 2001	– Stoke Ferry	10th May 2001	– Lough Navar	24th April 2001	– Barcombe Mills	10th May 2001
– Yarner Wood	16th July 2001	– High Muffles	21st May 2001	– Strathvaich Dam	19th June 2001	– Glen Dye	20th June 2001

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 2001 to December 2001

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	<0.23	2.14	2.77	0.30	0.33							
2 - 3	<0.22	0.30	0.82	0.36	1.67							
3 - 4	0.53	0.50	2.25	0.26	0.63							
4 - 5	0.30	0.93	4.25	0.23	0.71							
5 - 6	0.36	0.97	1.35	0.48	0.45							
6 - 7	<0.24	0.52	2.34	0.70	0.30							
7 - 8	0.27	2.04	0.33	0.51	1.50							
8 - 9	0.29	1.56	0.62	0.37	0.28							
9 - 10	0.39	0.99	0.35	0.43	0.34							
10 - 11	<0.26	0.39	0.34	0.61	0.44							
11 - 12	0.24	<0.23	0.78	0.50	1.21							
12 - 13	0.27	<0.24	0.44	0.56	1.75							
13 - 14	1.34	0.38	0.28	1.74	0.92							
14 - 15	0.86	4.46	0.34	<0.26	0.26							
15 - 16	0.60	0.39	0.44	0.99	0.29							
16 - 17	0.89	0.25	<0.28	0.52	0.38							
17 - 18	0.84	0.40	<0.26	0.78	1.04							
18 - 19	0.41	0.51	0.28	2.52	0.26							
19 - 20	0.47	0.43	0.68	1.16	0.34							
20 - 21	1.63	0.56	1.96	0.49	0.34							
21 - 22	4.12	0.36	0.81	0.48	0.29							
22 - 23	1.65	0.56	0.41	0.96	0.50							
23 - 24	0.37	0.71	0.28	0.58	2.31							
24 - 25	0.27	1.56	0.53	1.14								
25 - 26	<0.24	0.49	0.53	0.27								
26 - 27	0.33	0.77	0.54	0.41								
27 - 28	<0.24	0.31	0.90	0.31								
28 - 29	0.26	N	0.68	0.41								
29 - 30	0.37		2.60	0.26								
30 - 31	0.62		0.31	0.64								
31 - 1	1.55		<0.24									
Arithmetric Mean (3)	0.64	0.84	0.92	0.64	0.72							
Standard Deviation (3)	0.79	0.90	0.98	0.49	0.59							
Sample Size	31	27	31	30	23	0	0	0	0	0	0	0

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: 5002 Eskdalemuir - Sulphur Dioxide as S (SO2 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Fortnightly measurements, collection-day - non standard
Summary for January 2001 to December 2001

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
											06/06 - 20/06	0.14
											20/06 - 04/07	0.31
									24/05 - 06/06	0.21		
Arithmetric Mean	-		-		-		-		-		-	
Standard Deviation	-		-		-		-		-		-	
Valid Samples	0		0		0		0		1		2	

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	04/07 - 18/07	0.12	01/08 - 14/08	0.11	29/08 - 12/09	0.18	26/09 - 10/10	0.17	08/11 - 21/11	0.32	05/12 - 19/12	0.47
	18/07 - 01/08	0.17	14/08 - 29/08	0.17	12/09 - 26/09	0.15	10/10 - 24/10	0.42	21/11 - 05/12	0.11	19/12 - 02/01	0.81
							24/10 - 08/11	0.10				
Arithmetric Mean	-		-		-		-		-		-	
Standard Deviation	-		-		-		-		-		-	
Valid Samples	2		2		2		3		2		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%.

The daily H_2O_2 bubbler measurement programme was replaced by fortnightly filter-pack measurements starting from 24th May 2001.

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

Daily measurements - Summary for January 2001 to December 2001

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.63	1.27	0.66	0.59	0.60							
2 - 3	0.72	1.11	0.62	1.17	0.36							
3 - 4	1.49	1.24	0.50	0.96	1.19							
4 - 5	0.53	0.91	1.19	1.06	0.26							
5 - 6	3.44	1.11	1.90	0.76	0.43							
6 - 7	0.91	0.59	1.80	1.03	0.26							
7 - 8	0.83	0.45	0.91	0.94	0.33							
8 - 9	2.20	1.00	0.56	1.43	0.64							
9 - 10	0.74	1.12	0.65	1.18								
10 - 11	0.42	1.12	0.66	1.03								
11 - 12	0.57	0.51	0.39	0.61								
12 - 13	0.39	0.77	0.73	1.23								
13 - 14	0.93	1.78	3.73	0.40								
14 - 15	0.38	1.23	1.44	0.92								
15 - 16	1.05	0.66	2.11	0.92								
16 - 17	1.88	0.67	0.94	0.46								
17 - 18	0.86	<0.28	0.31	2.02								
18 - 19	0.86	<0.30	0.42	0.95								
19 - 20	5.64	1.44	0.34	1.20								
20 - 21	6.40	2.81	1.00	0.31								
21 - 22	1.43	1.03	0.70	0.44								
22 - 23	0.55	1.77	0.44	1.35								
23 - 24	0.74	1.53	0.61	0.96								
24 - 25	0.92	2.30	0.85	0.48								
25 - 26	0.56	4.80	0.60	0.68								
26 - 27	0.89	1.26	0.70	0.36								
27 - 28	1.45	0.56	1.32	1.42								
28 - 29	1.31	0.95	0.80	0.41								
29 - 30	3.77		3.04	0.44								
30 - 31	1.10		0.58	3.27								
31 - 1	1.32		0.63									
Arithmetric Mean (3)	1.45	1.22	1.00	0.97	0.51							
Standard Deviation (3)	1.46	0.91	0.78	0.59	0.31							
Sample Size	31	28	31	30	8	0	0	0	0	0	0	0

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 ($\mu g\ S\ m^{-3}$)

Fortnightly measurements, collection-day - non standard
Summary for January 2001 to December 2001

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
											29/05 - 12/06	1.04
									10/05 - 29/05	0.94	12/06 - 26/06	1.06
Arithmetric Mean	-		-		-		-		-		-	
Standard Deviation	-		-		-		-		-		-	
Valid Samples	0		0		0		0		1		2	

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
	26/06 - 10/07	0.39	07/08 - 21/08	1.04	04/09 - 18/09	1.54	02/10 - 16/10	0.69	30/10 - 13/11	0.91	27/11 - 11/12	0.71
	10/07 - 24/07	0.75	21/08 - 04/09	0.88	18/09 - 02/10	0.30	16/10 - 30/10	0.59	13/11 - 27/11	1.20	11/12 - 02/01	1.26
	24/07 - 07/08	0.84										
Arithmetric Mean	-		-		-		-		-		-	
Standard Deviation	-		-		-		-		-		-	
Valid Samples	3		2		2		2		2		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%.

The daily H_2O_2 bubbler measurement programme was replaced by fortnightly filter-pack measurements starting from 10th May 2001.

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 2001 to December 2001

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.19	0.17	0.29	0.62	0.21	N	0.14	0.21	0.15	0.16	<0.12	N
2 - 3	0.19	0.24	1.16	0.29	0.19	N	0.43	0.33	0.13	0.22	<0.12	N
3 - 4	0.26	0.19	1.99	0.32	0.17	N	0.16	0.12	0.24	0.28	<0.12	N
4 - 5	0.22	0.50	2.77	0.35	0.18	0.18	0.19	0.15	<0.12	<0.14	0.13	N
5 - 6	0.14	0.42	1.10	0.25	0.25	0.14	0.12	0.19	0.13	<0.14	N	N
6 - 7	0.16	0.15	0.86	0.24	0.19	0.13	0.16	0.19	0.13	0.19	N	N
7 - 8	0.17	0.18	0.42	0.25	0.37	0.15	0.12	<0.12	0.14	<0.15	N	N
8 - 9	0.21	0.34	0.20	0.37	0.23	0.11	0.13	0.12	0.14	0.15	N	N
9 - 10	<0.13	0.42	0.23	0.16	1.45	0.13	0.16	0.13	0.13	0.15	N	N
10 - 11	0.60	<0.16	0.34	0.20	1.09	0.14	0.11	0.12	<0.12	0.14	N	N
11 - 12	0.66	0.20	0.25	0.26	1.53	0.20	0.14	<0.13	0.17	0.25	N	N
12 - 13	1.90	0.20	0.32	0.34	1.12	0.30	0.13	<0.14	0.14	<0.13	N	N
13 - 14	0.28	1.30	0.32	0.26	1.53	0.28	0.13	0.20	0.20	<0.13	N	N
14 - 15	0.58	0.54	0.28	0.20	0.62	0.44	0.14	<0.13	0.16	<0.16	N	N
15 - 16	0.61	0.22	0.38	0.37	0.24	0.30	0.13	0.17	0.14	0.20	N	N
16 - 17	0.97	0.24	1.30	0.20	0.18	0.18	0.31	0.17	0.14	0.15	N	N
17 - 18	1.84	0.35	1.03	0.17	0.15	0.14	0.93	0.14	0.17	0.46	N	N
18 - 19	1.29	0.41	0.66	0.19	0.20	0.24	0.31	0.25	0.18	0.26	N	N
19 - 20	2.08	0.33	0.95	0.20	0.24	0.25	0.16	0.16	0.20	0.38	N	N
20 - 21	0.59	0.25	2.26	0.22	0.34	0.15	0.26	0.33	0.14	0.13	N	N
21 - 22	0.20	0.23	1.98	0.17	N	0.17	0.16	0.12	0.15	<0.15	N	N
22 - 23	0.19	0.30	0.62	<0.16	N	0.32	0.14	0.31	<0.14	0.18	N	N
23 - 24	0.20	0.22	0.54	0.21	N	0.33	0.14	0.26	<0.14	0.15	N	N
24 - 25	0.56	0.30	0.58	0.46	N	0.16	0.19	0.21	0.25	0.16	N	N
25 - 26	0.45	0.20	0.77	0.52	N	0.26	0.20	0.14	0.19	0.20	N	N
26 - 27	0.27	0.23	1.38	0.37	N	0.68	0.20	0.19	0.30	0.21	N	N
27 - 28	0.20	0.48	0.29	0.21	N	0.12	0.14	0.15	<0.14	<0.13	N	N
28 - 29	<0.16	0.30	0.38	0.18	N	0.17	0.51	0.18	0.31	<0.15	N	N
29 - 30	0.23		0.35	0.19	N	0.23	0.15	0.13	<0.12	0.15	N	N
30 - 31	0.19		0.34	0.21	N	0.14	0.13	0.14	0.22	0.11	N	N
31 - 1	0.23		0.30		N		0.15	0.13		0.11		N
Arithmetic Mean (3)	0.51	0.32	0.80	0.27	-	0.22	0.21	0.17	0.15	0.16	-	-
Standard Deviation (3)	0.55	0.22	0.67	0.12	-	0.12	0.16	0.07	0.07	0.09	-	-
Sample Size	31	28	31	30	20	27	31	31	30	31	4	0

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 ($\mu g\ S\ m^{-3}$)

Fortnightly measurements, collection-day - non standard
Summary for January 2001 to December 2001

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start End		Start End		Start End		Start End		Start End		Start End	
									07/05 - 24/05	0.59	04/06 - 18/06	0.12
									24/05 - 04/06	0.11	18/06 - 02/07	0.13
							24/04 - 07/05	0.10				
Arithmetric Mean	-		-		-		-		-		-	
Standard Deviation	-		-		-		-		-		-	
Valid Samples	0		0		0		1		2		2	

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start End		Start End		Start End		Start End		Start End		Start End	
	02/07 - 16/07	0.04	30/07 - 13/08	0.03	27/08 - 10/09	0.03	24/09 - 08/10	0.09	05/11 - 19/11	0.03	19/11 - 17/12	0.02
	16/07 - 30/07	0.15	13/08 - 27/08	0.07	10/09 - 24/09	0.04	08/10 - 22/10	0.09			17/12 - 31/12	0.07
							22/10 - 05/11	0.05				
Arithmetric Mean	-		-		-		-		-		-	
Standard Deviation	-		-		-		-		-		-	
Valid Samples	2		2		2		3		1		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%.

A programme of fortnightly filter-pack measurements was operated in parallel with the daily H_2O_2 bubbler measurements from 24th April 2001.

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 2001 to December 2001

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.45	1.03	0.75	0.74	0.69							
2 - 3	0.47	2.28	2.91	1.02	1.81							
3 - 4	0.44	0.86	1.73	0.65	1.69							
4 - 5	0.27	0.38	1.64	0.56	1.26							
5 - 6	0.51	0.42	1.22	0.33	2.12							
6 - 7	0.55	0.62	0.78	0.43	1.49							
7 - 8	0.63	0.55	0.64	0.93	0.81							
8 - 9	0.75	1.03	0.31	0.49	0.76							
9 - 10	0.84	1.78	0.36	0.52	0.83							
10 - 11	1.06	0.99	0.37	1.90								
11 - 12	1.01	0.50	0.35	0.69								
12 - 13	1.22	0.48	0.41	2.46								
13 - 14	1.97	0.86	1.70	0.50								
14 - 15	0.88	1.07	0.64	0.67								
15 - 16	1.78	0.82	0.34	6.23								
16 - 17	1.60	0.95	0.99	1.01								
17 - 18	1.94	0.97	0.32	1.21								
18 - 19	2.59	0.43	0.77	1.63								
19 - 20	1.56	3.03	1.46	1.43								
20 - 21	2.05	0.67	0.62	1.06								
21 - 22	0.64	1.00	0.58	1.04								
22 - 23	0.75	1.11	0.60	1.83								
23 - 24	0.40	1.49	0.50	0.69								
24 - 25	0.37	1.93	1.36	0.59								
25 - 26	0.30	1.40	1.55	0.67								
26 - 27	0.36	0.50	1.29	0.78								
27 - 28	0.55	0.73	0.64	0.68								
28 - 29	2.40	1.32	0.48	0.54								
29 - 30	4.59		0.99	0.39								
30 - 31	0.84		0.82	6.17								
31 - 1	0.87		0.44									
Arithmetic Mean (3)	1.12	1.04	0.89	1.26	1.27							
Standard Deviation (3)	0.92	0.61	0.59	1.43	0.53							
Sample Size	31	28	31	30	9	0	0	0	0	0	0	0

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 ($\mu g\ S\ m^{-3}$)

Fortnightly measurements, collection-day - non standard
Summary for January 2001 to December 2001

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
											05/06 - 19/06	0.73
									10/05 - 24/05	0.83	19/06 - 03/07	1.01
									24/05 - 05/06	0.57		
Arithmetric Mean	-		-		-		-		-		-	
Standard Deviation	-		-		-		-		-		-	
Valid Samples	0		0		0		0		2		2	

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
	03/07 - 17/07	0.44	31/07 - 14/08	0.47	28/08 - 11/09	0.64	25/09 - 09/10	0.30	06/11 - 20/11	1.34	04/12 - 18/12	0.96
	17/07 - 31/07	0.76	14/08 - 28/08	1.06	11/09 - 25/09	0.84	09/10 - 23/10	0.40	20/11 - 04/12	0.59	18/12 - 02/01	1.09
							23/10 - 06/11	0.40				
Arithmetric Mean	-		-		-		-		-		-	
Standard Deviation	-		-		-		-		-		-	
Valid Samples	2		2		2		3		2		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%.

The daily H_2O_2 bubbler measurement programme was replaced by fortnightly filter-pack measurements starting from 10th May 2001.

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

Daily measurements - Summary for January 2001 to December 2001

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.22	0.88	3.70	0.57	1.80	0.28	0.29					
2 - 3	0.13	0.16	4.67	0.37	1.39	0.38	0.70					
3 - 4	0.16	0.20	1.96	0.41	3.70	0.54	2.27					
4 - 5	0.17	0.17	2.12	0.27	1.32	0.78	0.45					
5 - 6	N	0.25	1.65	0.22	2.37	0.61	0.41					
6 - 7	0.18	0.22	1.08	0.17	0.54	0.28	0.21					
7 - 8	0.19	0.41	0.37	0.45	0.93	0.25	0.14					
8 - 9	0.20	3.62	0.42	0.21	0.75	0.33	0.15					
9 - 10	1.01	2.74	0.27	0.28	1.10	0.35	<0.18					
10 - 11	1.56	0.26	0.26	0.35	1.41	0.34	0.19					
11 - 12	1.08	0.32	0.40	0.95	2.64	0.27	0.36					
12 - 13	1.95	0.70	0.27	0.60	3.43	0.43	0.40					
13 - 14	1.72	2.18	0.27	0.49	1.03	0.26	0.39					
14 - 15	1.60	1.31	0.30	0.55	0.25	0.35	0.40					
15 - 16	2.07	4.24	0.26	0.52	0.38	0.28	0.31					
16 - 17	1.71	2.01	0.96	0.42	0.32	0.47						
17 - 18	1.90	3.38	0.52	0.52	0.43	0.21						
18 - 19	1.45	1.30	1.20	0.56	0.32	0.32						
19 - 20	0.82	0.58	1.27	0.60	0.44	0.64						
20 - 21	1.91	0.35	0.46	0.81	0.75	0.25						
21 - 22	0.43	0.30	0.32	1.26	1.67	0.59						
22 - 23	0.33	0.21	0.20	0.25	1.25	1.97						
23 - 24	0.20	0.43	0.26	0.48	1.82	1.37						
24 - 25	0.21	0.62	1.03	0.23	1.20	N						
25 - 26	0.18	0.47	0.83	0.25	0.64	2.39						
26 - 27	0.23	0.22	0.67	0.29	0.26	0.84						
27 - 28	0.21	2.45	0.21	0.63	0.26	0.29						
28 - 29	1.97	5.03	0.25	0.25	0.26	0.26						
29 - 30	0.34		0.38	0.39	0.27	0.19						
30 - 31	0.32		0.44	3.35	0.29	0.22						
31 - 1	2.20		0.20		0.44							
Arithmetic Mean (3)	0.89	1.25	0.88	0.56	1.08	0.54	0.45					
Standard Deviation (3)	0.77	1.40	1.03	0.58	0.93	0.52	0.53					
Sample Size	30	28	31	30	31	29	15	0	0	0	0	0

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 ($\mu g\ S\ m^{-3}$)

Fortnightly measurements, collection-day - non standard
Summary for January 2001 to December 2001

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
Arithmetric Mean	-		-		-		-		-		-	
Standard Deviation	-		-		-		-		-		-	
Valid Samples	0		0		0		0		0		0	

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
			01/08 - 15/08	0.10	28/08 - 12/09	0.17	25/09 - 10/10	0.23	07/11 - 21/11	0.95	05/12 - 19/12	1.20
	16/07 - 01/08	0.38	15/08 - 28/08	0.28	12/09 - 25/09	0.59	10/10 - 24/10	N	21/11 - 05/12	0.06	19/12 - 02/01	0.48
							24/10 - 07/11	0.09				
Arithmetric Mean	-		-		-		-		-		-	
Standard Deviation	-		-		-		-		-		-	
Valid Samples	1		2		2		2		2		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%.

The daily H_2O_2 bubbler measurement programme was replaced by fortnightly filter-pack measurements starting from 16th July 2001.

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 2001 to December 2001

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	4.59	9.86	0.56	3.86	N							
2 - 3	0.44	0.59	1.25	4.74	3.80							
3 - 4	5.46	1.44	0.94	2.82	0.37							
4 - 5	1.38	1.28	5.13	0.59	0.44							
5 - 6	0.50	1.91	11.74	2.03	0.34							
6 - 7	0.27	3.63	1.89	1.63	0.30							
7 - 8	0.71	0.83	N	1.90	0.47							
8 - 9	0.29	7.47	N	0.96	0.33							
9 - 10	1.75	7.27	1.78	2.35	0.71							
10 - 11	0.28	3.01	1.51	0.56	1.22							
11 - 12	0.27	0.28	0.77	0.61	0.69							
12 - 13	0.19	4.72	1.85	0.57	0.45							
13 - 14	1.39	0.72	0.57	0.96	0.48							
14 - 15	0.37	12.85	N	0.45	0.26							
15 - 16	0.54	5.24	N	0.46	0.42							
16 - 17	1.45	5.84	0.24	0.58	1.99							
17 - 18	1.22	6.07	0.24	0.49	3.02							
18 - 19	2.42	1.95	0.22	1.60	0.41							
19 - 20	1.46	0.91	1.52	0.40	0.32							
20 - 21	2.21	0.52	0.24	0.26	0.95							
21 - 22	2.75	0.51	0.41	3.58								
22 - 23	1.86	1.82	0.72	2.32								
23 - 24	3.86	0.79	0.82	3.28								
24 - 25	2.58	4.23	0.40	1.85								
25 - 26	5.39	8.42	0.31	N								
26 - 27	1.58	4.86	0.52	1.42								
27 - 28	1.40	1.11	1.33	2.01								
28 - 29	9.80	0.50	3.32	0.38								
29 - 30	1.71		1.09	N								
30 - 31	3.08		1.53	0.84								
31 - 1	0.76		1.15									
Arithmetric Mean (3)	2.00	3.52	1.56	1.55	0.89							
Standard Deviation (3)	2.06	3.32	2.29	1.22	0.99							
Sample Size	31	28	27	28	19	0	0	0	0	0	0	0

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 ($\mu g\ S\ m^{-3}$)

Fortnightly measurements, collection-day - non standard
Summary for January 2001 to December 2001

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
											06/06 - 20/06	0.73
									21/05 - 06/06	0.86	20/06 - 04/07	1.51
Arithmetric Mean	-		-		-		-		-		-	
Standard Deviation	-		-		-		-		-		-	
Valid Samples	0		0		0		0		1		2	

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
	04/07 - 18/07	0.43	01/08 - 15/08	0.99	29/08 - 12/09	1.57	26/09 - 10/10	1.67	07/11 - 21/11	1.61	05/12 - 19/12	1.92
	18/07 - 01/08	1.41	15/08 - 29/08	1.98	12/09 - 26/09	0.27	10/10 - 24/10	1.62	21/11 - 05/12	0.94	19/12 - 02/01	1.75
							24/10 - 07/11	0.69				
Arithmetric Mean	-		-		-		-		-		-	
Standard Deviation	-		-		-		-		-		-	
Valid Samples	2		2		2		3		2		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%.

The daily H_2O_2 bubbler measurement programme was replaced by fortnightly filter-pack measurements starting from 21st May 2001.

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

Daily measurements - Summary for January 2001 to December 2001

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.36	N	0.17	N	0.30	0.14	0.12	0.17	0.11	<0.12	0.16	0.20
2 - 3	0.28	N	0.54	N	0.31	0.16	0.18	<0.14	<0.13	<0.11	0.12	0.18
3 - 4	0.15	N	1.18	N	0.24	0.14	0.13	<0.12	0.11	0.11	0.09	0.25
4 - 5	0.18	N	0.48	N	0.21	0.14	<0.13	0.12	0.15	0.12	0.11	0.19
5 - 6	<0.12	N	0.24	N	0.25	0.17	0.12	<0.11	<0.11	0.23	0.26	0.26
6 - 7	0.16	0.61	N	N	0.21	0.15	0.12	0.12	0.10	0.13	N	0.40
7 - 8	<0.14	N	N	N	0.49	0.15	<0.12	0.22	0.13	0.18	N	0.30
8 - 9	0.17	N	N	N	0.24	0.13	0.13	0.13	0.10	<0.13	N	0.28
9 - 10	0.12	N	N	N	0.29	0.16	0.14	0.11	<0.10	0.14	N	0.28
10 - 11	0.13	N	N	N	0.28	0.20	0.22	0.12	0.22	0.13	N	0.27
11 - 12	0.16	N	N	N	0.40	0.17	0.14	<0.12	0.13	0.12	N	0.40
12 - 13	0.11	N	N	N	0.73	0.16	0.13	0.19	0.14	0.16	N	0.12
13 - 14	0.23	N	N	N	0.29	0.12	0.12	N	0.13	0.12	0.12	0.15
14 - 15	0.33	0.68	N	N	0.19	0.19	0.13	0.15	0.14	0.13	0.14	0.15
15 - 16	0.59	0.58	N	N	0.19	0.14	0.12	<0.11	0.12	0.16	0.18	0.12
16 - 17	0.50	0.35	N	N	0.20	0.15	0.16	0.14	0.16	0.20	0.16	0.11
17 - 18	0.20	0.46	N	0.23	0.31	0.14	0.25	<0.12	0.18	0.71	0.11	0.12
18 - 19	0.19	0.39	N	0.19	0.20	0.26	0.12	0.44	0.15	0.24	<0.10	0.13
19 - 20	0.33	0.16	N	0.22	0.21	0.12	0.11	<0.13	<0.11	0.45	0.11	<0.10
20 - 21	0.72	0.16	N	0.19	0.21	0.11	0.23	0.15	<0.11	0.21	0.11	<0.10
21 - 22	2.21	0.36	N	0.20	0.36	0.10	0.15	0.18	<0.11	0.20	0.11	0.10
22 - 23	0.62	0.20	N	0.19	0.54	0.12	0.12	0.15	<0.12	0.28	0.11	0.13
23 - 24	0.59	0.19	N	0.38	0.41	0.41	<0.13	0.21	<0.11	0.22	<0.12	0.11
24 - 25	0.15	0.15	N	0.84	0.39	0.21	0.15	0.20	<0.11	0.14	0.14	0.11
25 - 26	0.18	0.20	N	0.52	1.48	0.17	0.12	0.14	0.14	0.15	<0.10	0.11
26 - 27	<0.13	0.19	N	0.27	0.17	0.25	0.13	0.15	0.12	0.11	0.11	<0.11
27 - 28	<0.14	0.26	N	0.17	0.15	0.15	0.11	0.14	0.48	0.10	0.14	0.10
28 - 29	0.13	0.19	N	0.13	0.15	0.13	0.13	0.14	0.49	<0.13	0.27	0.10
29 - 30	0.15		N	0.13	<0.14	0.12	0.12	<0.13	0.63	0.11	0.29	0.09
30 - 31	N		N	0.14	0.13	0.12	0.16	<0.11	0.14	0.17	0.27	0.13
31 - 1	N		N		0.13		0.14	0.10		0.14		<0.10
Arithmetric Mean (3)	0.32	-	-	-	0.31	0.16	0.14	0.13	0.15	0.18	0.14	0.16
Standard Deviation (3)	0.41	-	-	-	0.26	0.06	0.04	0.08	0.14	0.13	0.07	0.10
Sample Size	29	16	5	14	31	30	31	30	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 ($\mu g\ S\ m^{-3}$)

Fortnightly measurements, collection-day - non standard
Summary for January 2001 to December 2001

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
											19/06 - 03/07	0.06
Arithmetric Mean		-		-		-		-		-		-
Standard Deviation		-		-		-		-		-		-
Valid Samples		0		0		0		0		0		1

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
	03/07 - 17/07	0.03	31/07 - 14/08	0.03	28/08 - 11/09	0.01	25/09 - 09/10	0.14	06/11 - 21/11	0.01	04/12 - 18/12	0.02
	17/07 - 31/07	0.04	14/08 - 28/08	0.05	11/09 - 25/09	0.05	09/10 - 23/10	0.10	21/11 - 04/12	0.02	18/12 - 01/01	0.01
							23/10 - 06/11	0.02				
Arithmetric Mean		-		-		-		-		-		-
Standard Deviation		-		-		-		-		-		-
Valid Samples		2		2		2		3		2		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%.

A programme of fortnightly filter-pack measurements was operated in parallel with the daily H_2O_2 bubbler measurements from 19th June 2001.

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

Daily measurements - Summary for January 2001 to December 2001

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.79	5.33	N	N	0.73	0.34						
2 - 3	0.34	0.18	N	N	0.41	0.22						
3 - 4	0.71	N	N	N	0.33	0.21						
4 - 5	N	N	N	N	0.26	0.20						
5 - 6	<0.23	N	N	N	0.33	0.28						
6 - 7	<0.22	0.31	N	N	0.26	0.19						
7 - 8	0.21	0.33	N	N	0.27	<0.18						
8 - 9	<0.22	0.27	N	N	0.39	<0.18						
9 - 10	<0.22	0.83	N	N	0.27	0.21						
10 - 11	<0.22	2.10	N	N	0.41	0.25						
11 - 12	<0.21	<0.19	N	N	0.53	0.20						
12 - 13	0.21	0.18	N	N	1.24	0.66						
13 - 14	3.62	0.39	N	N	0.29	0.30						
14 - 15	2.03	0.78	N	N	0.36	0.25						
15 - 16	0.61	0.26	N	N	0.47	<0.22						
16 - 17	1.02	0.24	N	N	0.90	0.23						
17 - 18	0.27	0.26	N	2.23	0.29	0.21						
18 - 19	<0.21	0.26	N	1.46	0.20	0.67						
19 - 20	<0.21	0.30	N	6.02	0.23	1.45						
20 - 21	2.34	N	N	7.95	0.40							
21 - 22	2.92	N	N	6.23	0.42							
22 - 23	0.62	N	N	2.30	1.65							
23 - 24	0.72	N	N	5.01	0.62							
24 - 25	1.02	N	N	3.55	0.44							
25 - 26	0.72	N	N	0.42	2.01							
26 - 27	0.74	N	N	0.43	0.24							
27 - 28	0.25	N	N	0.64	0.29							
28 - 29	<0.26	N	N	0.41	0.83							
29 - 30	<0.25		N	0.34	0.31							
30 - 31	0.73		N	0.27	0.21							
31 - 1	1.53		N		0.19							
Arithmetic Mean (3)	0.75	-	-	-	0.51	0.32						
Standard Deviation (3)	0.89	-	-	-	0.43	0.31						
Sample Size	30	16	0	14	31	19	0	0	0	0	0	0

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 ($\mu g\ S\ m^{-3}$)

Fortnightly measurements, collection-day - non standard
Summary for January 2001 to December 2001

MONTH	JAN		FEB		MAR		APR		MAY		JUN	
	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
											20/06 - 03/07	0.25
Arithmetric Mean	-		-		-		-		-		-	
Standard Deviation	-		-		-		-		-		-	
Valid Samples	0		0		0		0		0		1	

MONTH	JUL		AUG		SEP		OCT		NOV		DEC	
	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
	03/07 - 17/07	0.22	31/07 - 14/08	0.15	28/08 - 11/09	0.06	25/09 - 09/10	0.30	23/10 - 13/11	0.06	27/11 - 11/12	1.01
	17/07 - 31/07	0.48	14/08 - 28/08	0.52	11/09 - 25/09	0.03	09/10 - 23/10	0.36	13/11 - 27/11	0.07	11/12 - 24/12	0.06
Arithmetric Mean	-		-		-		-		-		-	
Standard Deviation	-		-		-		-		-		-	
Valid Samples	2		2		2		2		2		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%.

The daily H_2O_2 bubbler measurement programme was replaced by fortnightly filter-pack measurements starting from 20th June 2001.

Appendix 3.2
Particulate Sulphate Data, 2001

AEA Technology
National Environmental Technology Centre

Monthly and Annual Mean Concentrations of Particulate Sulphate in 2001
Concentration in Air (μg SO_4 [as S] m^{-3})

Site	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean
Eskdalemuir	0.50	0.36	0.65	0.50	0.65	0.50	0.56	0.34	0.43	0.57	0.28	0.24	0.47
Stoke Ferry -*1*	0.86	0.73	0.87	0.63	-	0.83	0.96	0.82	-	0.47	0.42	-	0.72
Lough Navar	0.55	0.33	0.86	0.45	0.69	0.43	0.33	0.22	0.40	0.32	0.19	0.29	0.43
Barcombe Mills	0.73	0.71	0.89	0.62	-	-	1.10	0.91	-	0.53	-	0.73	0.79
Yarner Wood	0.60	0.62	0.76	0.53	0.97	0.86	0.73	0.66	0.69	0.67	0.47	0.54	0.68
High Muffles	0.59	0.55	0.90	0.63	0.63	0.72	0.79	0.75	0.38	0.63	0.52	0.33	0.62
Strathvaich Dam -*1*	0.27	-	-	-	0.53	0.32	0.26	0.19	0.32	0.32	-	0.36	0.32
Glen Dye -*1*	0.49	-	-	-	0.64	0.49	0.52	0.34	0.29	0.42	-	-	-

Notes: - indicates that no average was determined as the data capture was less than 75%; (1) The programme of particulate sulphate measurements was discontinued with effect from 4th December 2001 at Stoke Ferry, 31st December 2001 at Strathvaich Dam and 13th November 2001 at Glen Dye..

National Environmental Technology Centre
Site: 5002 Eskdalemuir - Sulphate as S (SO4 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Daily measurements - Summary for January 2001 to December 2001

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.72	N	0.33	0.62	0.30	0.13	0.68	0.36	0.46	N	0.32	0.30
2 - 3	0.32	0.48	0.45	0.92	0.63	0.14	1.03	1.13	0.07	0.36	0.43	0.28
3 - 4	0.28	0.26	1.08	0.29	0.34	0.24	1.51	0.14	0.09	0.47	0.38	0.49
4 - 5	0.28	0.63	1.37	0.25	0.32	0.36	1.56	0.19	0.12	0.36	0.23	0.15
5 - 6	0.31	0.47	1.37	0.45	0.36	0.85	1.11	0.20	0.14	0.67	0.21	0.17
6 - 7	0.30	0.29	1.98	0.21	0.13	0.16	1.04	0.28	0.16	0.39	0.10	0.18
7 - 8	0.17	0.31	0.44	0.22	0.27	0.10	1.37	0.23	0.11	0.57	0.09	0.48
8 - 9	0.09	0.27	0.88	0.43	0.31	0.14	0.58	0.20	0.06	0.28	0.15	0.49
9 - 10	0.16	0.41	0.39	0.46	0.56	0.19	0.33	<0.04	0.12	0.30	0.23	0.19
10 - 11	0.07	0.36	0.29	0.38	0.92	0.31	0.22	0.21	0.15	0.26	0.29	0.18
11 - 12	0.11	0.45	0.24	0.47	0.76	0.12	0.27	0.24	0.53	0.39	0.21	0.17
12 - 13	0.18	0.24	0.33	0.40	1.07	0.60	0.20	0.22	0.27	0.99	0.16	0.21
13 - 14	0.23	0.47	0.18	1.11	0.69	0.62	0.15	0.53	0.28	0.48	0.12	0.52
14 - 15	0.12	0.80	0.13	0.23	0.98	0.99	0.17	0.58	0.25	1.00	0.28	0.48
15 - 16	1.14	0.48	0.34	0.34	0.39	0.47	0.20	0.40	0.22	0.31	0.21	0.37
16 - 17	1.23	0.13	0.21	0.50	0.43	0.29	0.44	0.23	0.17	0.63	0.34	0.20
17 - 18	1.38	0.21	0.20	0.20	0.57	0.17	0.36	0.44	0.22	0.96	1.71	0.29
18 - 19	1.27	0.97	0.28	0.19	0.23	0.35	0.33	0.65	0.56	0.31	0.41	0.24
19 - 20	1.40	0.25	0.47	0.19	0.29	0.42	0.39	0.45	0.66	1.00	0.33	0.18
20 - 21	0.95	0.36	0.27	0.23	0.23	0.19	0.30	0.20	0.62	0.52	0.45	0.24
21 - 22	0.99	0.27	0.56	0.42	0.30	0.41	0.32	0.33	0.24	0.75	0.14	0.15
22 - 23	0.55	0.17	0.57	1.02	1.17	0.36	0.30	0.14	0.44	2.19	0.10	0.19
23 - 24	0.44	0.12	0.73	0.82	2.49	1.41	0.29	0.39	0.91	0.35	0.12	0.19
24 - 25	0.27	0.13	1.27	0.99	1.73	0.70	0.19	0.46	0.84	0.38	0.35	0.09
25 - 26	0.23	0.46	0.90	0.67	2.17	0.82	0.42	0.37	0.35	0.36	0.19	0.17
26 - 27	0.32	0.51	0.79	0.68	0.60	2.01	1.55	0.15	2.08	0.29	0.16	0.08
27 - 28	0.14	0.13	1.73	1.14	0.60	1.32	0.49	0.14	0.58	0.21	0.08	0.15
28 - 29	0.12	0.15	0.96	0.26	0.36	0.38	0.64	0.27	1.22	0.21	0.24	0.11
29 - 30	0.28		0.54	0.53	0.36	0.52	0.40	0.89	0.68	1.33	0.30	0.09
30 - 31	0.47		0.55	0.48	0.38	0.31	0.28	0.22	0.41	0.63	0.21	0.25
31 - 1	0.85		0.40		0.17		0.28	0.28		0.14		0.20
Arithmetic Mean (3)	0.50	0.36	0.65	0.50	0.65	0.50	0.56	0.34	0.43	0.57	0.28	0.24
Standard Deviation (3)	0.43	0.21	0.48	0.29	0.57	0.44	0.44	0.23	0.42	0.42	0.29	0.13
Sample Size	31	27	31	30	31	30	31	31	30	30	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: 5004 Stoke Ferry - Sulphate as S (SO4 - S)
Concentration in air (μg S m^{-3})

Daily measurements - Summary for January 2001 to December 2001

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.34	1.04	0.78	0.70	0.83	0.31	0.76	3.15	0.42	0.13	0.22	0.19
2 - 3	0.28	0.91	0.85	0.61	0.62	0.60	1.37	1.05	2.44	0.16	0.35	0.27
3 - 4	0.76	0.52	1.21	0.43	0.53	0.42	1.53	0.85	0.24	0.19	0.45	0.54
4 - 5	0.33	0.39	1.80	0.28	0.31	1.04	1.08	0.25	N	0.21	0.38	
5 - 6	0.90	0.52	3.15	0.65	0.31	0.95	1.22	0.30	N	0.43	0.34	
6 - 7	0.45	0.29	1.52	0.52	0.46	0.67	1.61	0.66	N	0.16	N	
7 - 8	0.31	0.55	0.45	0.35	0.35	0.36	1.75	0.51	N	0.13	0.16	
8 - 9	0.39	0.36	0.72	0.56	0.42	0.62	1.64	0.36	N	0.11	0.15	
9 - 10	0.62	0.46	0.50	0.70	N	0.08	0.56	0.42	N	0.26	0.26	
10 - 11	0.45	0.72	0.46	1.14	N	0.49	0.41	0.42	N	0.31	0.35	
11 - 12	0.26	0.70	0.36	0.96	N	0.67	0.40	0.43	N	0.41	0.79	
12 - 13	0.30	0.44	0.24	0.70	N	0.84	0.36	0.57	N	0.48	0.03	
13 - 14	0.26	0.45	0.70	0.31	N	1.04	N	1.99	N	0.72	0.19	
14 - 15	0.59	0.70	0.58	0.90	N	1.56	0.51	1.36	N	0.91	0.24	
15 - 16	1.31	2.28	0.83	0.36	N	0.56	0.48	1.10	N	0.51	0.03	
16 - 17	1.18	0.47	0.41	0.44	N	0.69	0.87	0.44	N	0.31	0.59	
17 - 18	1.65	0.12	0.35	0.70	N	0.55	1.14	0.39	N	0.92	0.47	
18 - 19	3.08	N	0.36	0.45	N	0.68	0.49	1.16	0.49	0.37	1.35	
19 - 20	3.16	1.35	0.40	0.36	N	1.38	0.54	0.50	0.47	1.23	1.35	
20 - 21	2.39	1.52	0.48	0.39	N	0.81	0.64	0.66	0.37	0.72	1.16	
21 - 22	1.56	0.96	0.73	0.64	N	0.77	0.39	0.61	0.49	0.62	0.58	
22 - 23	0.77	0.63	0.46	1.06	N	0.41	0.44	0.84	0.39	0.81	0.28	
23 - 24	0.35	0.31	1.07	0.94	N	0.69	0.53	2.85	0.47	0.28	0.47	
24 - 25	0.24	0.39	1.47	0.88	N	1.63	0.62	0.71	0.40	0.27	0.86	
25 - 26	0.18	0.55	1.92	0.41	0.47	1.71	1.23	0.88	0.55	0.67	0.26	
26 - 27	0.26	0.64	1.64	0.43	1.44	1.88	1.59	0.72	0.65	0.64	0.03	
27 - 28	0.47	1.36	1.66	1.40	1.52	1.61	1.55	0.22	0.45	0.22	0.25	
28 - 29	0.77	0.97	0.27	0.40	0.69	0.39	2.37	0.33	0.91	0.24	0.24	
29 - 30	1.11		0.76	0.37	0.70	0.95	1.69	0.60	0.37	1.57	0.26	
30 - 31	0.87		0.06	0.79	0.51	0.47	0.55	0.55	0.45	N	0.22	
31 - 1	1.14		0.73		0.65		0.45	0.61		0.22		
Arithmetic Mean (3)	0.86	0.73	0.87	0.63	-	0.83	0.96	0.82	-	0.47	0.42	0.33
Standard Deviation (3)	0.79	0.46	0.66	0.28	-	0.47	0.55	0.69	-	0.35	0.36	0.19
Sample Size	31	27	31	30	15	30	30	31	16	30	29	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: 5006 Lough Navar - Sulphate as S (SO4 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Daily measurements - Summary for January 2001 to December 2001

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.25	0.22	0.36	0.75	0.16	0.24	0.34	0.23	0.16	0.23	0.18	0.14
2 - 3	0.10	0.22	0.75	0.36	0.21	0.19	0.93	0.16	0.15	0.14	0.14	0.19
3 - 4	0.20	0.13	1.05	0.14	0.18	0.17	0.61	0.12	0.13	0.12	0.11	0.14
4 - 5	0.13	0.42	0.95	0.16	0.28	0.27	0.32	0.13	0.18	0.22	0.19	0.14
5 - 6	0.19	0.69	1.55	0.26	0.23	0.21	0.24	0.16	0.09	0.24	N	0.14
6 - 7	0.10	0.12	1.52	0.28	0.35	0.16	0.49	0.15	0.16	0.23	N	0.38
7 - 8	0.10	0.29	0.39	0.44	0.84	0.14	0.46	0.12	0.21	0.18	N	0.61
8 - 9	0.27	0.32	0.32	0.39	0.23	0.15	0.32	0.19	0.12	0.40	N	0.59
9 - 10	0.53	0.51	0.27	0.25	0.94	0.16	0.39	0.13	0.14	0.33	N	0.46
10 - 11	0.36	0.36	0.26	0.19	0.86	0.20	0.12	0.37	0.15	0.21	N	0.04
11 - 12	0.25	0.33	0.18	0.32	1.59	0.34	0.22	0.20	0.17	0.59	N	0.50
12 - 13	0.68	0.22	0.32	0.70	2.49	0.42	0.11	0.28	0.18	0.09	0.09	0.24
13 - 14	0.64	0.56	0.45	0.65	0.96	0.72	0.09	0.37	0.18	0.14	0.10	0.79
14 - 15	0.35	0.74	0.22	0.20	1.37	1.26	0.10	0.11	0.16	0.79	0.14	1.03
15 - 16	1.08	0.25	0.28	0.16	0.49	1.47	0.13	0.17	0.35	0.14	0.10	0.49
16 - 17	1.95	0.25	0.57	0.50	0.11	0.45	0.32	0.15	0.15	0.23	0.26	0.40
17 - 18	1.78	0.87	0.44	0.25	0.32	0.19	1.02	0.32	0.18	0.81	0.58	0.30
18 - 19	1.68	0.99	0.58	0.51	0.16	0.40	0.33	0.65	0.43	0.31	0.52	0.51
19 - 20	2.44	0.26	0.68	0.25	0.69	0.49	0.17	0.58	0.34	0.61	0.18	0.36
20 - 21	1.26	0.15	0.76	0.19	0.64	0.29	0.24	0.18	0.73	0.17	0.22	0.21
21 - 22	0.50	0.08	1.30	0.32	0.71	0.25	0.18	0.13	0.59	0.21	0.15	0.18
22 - 23	0.30	0.30	2.28	0.22	1.74	0.75	0.18	0.29	0.72	0.55	0.13	0.14
23 - 24	0.18	0.17	3.29	0.45	0.97	0.72	0.20	0.20	0.98	0.32	0.32	0.16
24 - 25	0.20	0.21	1.91	0.71	1.82	0.45	0.19	0.22	1.01	0.33	0.14	0.13
25 - 26	0.18	0.16	2.14	1.57	1.00	0.47	0.40	0.18	0.86	0.38	0.11	0.06
26 - 27	0.15	0.15	1.83	2.20	0.82	1.32	0.46	0.13	1.62	0.17	0.13	0.12
27 - 28	0.14	0.24	0.41	0.51	0.53	0.16	0.09	0.18	0.39	0.07	0.17	0.15
28 - 29	0.13	0.16	0.49	0.09	0.25	0.42	1.14	0.39	0.91	0.08	0.16	0.11
29 - 30	0.20		0.34	0.12	0.21	0.30	0.25	0.16	0.33	1.31	0.18	0.06
30 - 31	0.11		0.45	0.44	0.15	0.27	0.12	0.18	0.21	0.29	0.07	0.11
31 - 1	0.61		0.38		0.15		0.18	0.11		0.15		0.20
Arithmetic Mean (3)	0.55	0.33	0.86	0.45	0.69	0.43	0.33	0.22	0.40	0.32	0.19	0.29
Standard Deviation (3)	0.63	0.24	0.76	0.44	0.59	0.36	0.27	0.13	0.37	0.27	0.13	0.23
Sample Size	31	28	31	30	31	30	31	31	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: 5007 Barcombe Mills - Sulphate as S (SO4 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Daily measurements - Summary for January 2001 to December 2001

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.29	0.80	1.06	0.92	0.92	N	N	0.58	N	0.70	0.44	N
2 - 3	0.31	0.77	1.43	0.51	0.81	N	N	1.25	N	0.32	0.47	N
3 - 4	0.28	0.41	2.27	0.27	0.75	N	1.88	1.13	N	0.25	0.96	N
4 - 5	0.19	0.37	2.06	0.33	0.42	N	2.20	0.34	N	0.24	0.95	0.82
5 - 6	0.54	0.40	2.43	0.34	0.46	N	1.84	0.41	N	0.45	0.49	0.36
6 - 7	0.21	0.26	0.83	0.30	0.53	N	1.54	0.62	N	0.43	0.56	0.45
7 - 8	0.28	0.39	0.41	0.36	0.39	N	1.83	0.82	N	0.27	0.39	0.52
8 - 9	0.36	0.31	0.39	0.42	0.45	N	0.82	0.41	N	0.19	0.55	2.30
9 - 10	0.98	0.46	0.40	0.42	0.87	N	0.85	0.28	N	0.35	0.62	1.48
10 - 11	0.85	0.56	0.49	1.11	N	N	0.10	0.39	N	0.29	0.26	1.36
11 - 12	0.72	0.53	0.35	1.11	N	N	0.56	0.14	1.01	0.53	1.14	1.07
12 - 13	0.44	0.37	0.16	1.13	N	0.81	0.53	0.64	0.35	0.48	0.65	0.94
13 - 14	0.54	0.33	0.60	0.39	N	1.00	0.46	1.27	0.52	0.88	0.54	0.91
14 - 15	0.77	0.69	0.30	0.89	N	0.98	0.40	1.33	0.41	0.86	0.52	0.88
15 - 16	1.30	1.67	0.48	0.32	N	0.48	0.49	1.05	0.41	0.95	0.86	0.77
16 - 17	1.28	0.92	1.76	0.69	N	1.12	0.49	0.69	0.62	0.18	0.95	0.86
17 - 18	1.51	0.78	0.88	0.89	N	1.50	0.87	0.30	0.84	0.61	0.92	0.69
18 - 19	1.82	1.04	0.57	0.81	N	1.05	0.40	0.67	0.05	0.22	0.90	0.68
19 - 20	1.88	1.81	0.72	0.57	N	1.92	0.97	0.64	1.36	0.50	1.75	0.90
20 - 21	2.28	0.97	0.63	0.61	N	0.84	0.80	0.65	1.14	0.83	N	0.40
21 - 22	0.47	1.43	0.59	0.74	N	1.25	0.53	0.59	0.08	0.07	N	0.51
22 - 23	0.52	0.56	0.62	1.26	N	0.86	0.78	1.09	1.35	0.41	N	0.42
23 - 24	0.29	0.46	0.37	0.69	N	2.11	0.51	1.87	1.18	0.39	N	0.56
24 - 25	0.19	0.42	1.16	0.45	N	2.25	0.41	2.62	0.14	0.27	N	0.58
25 - 26	0.20	0.37	2.25	0.30	N	2.11	0.81	1.25	0.86	0.75	N	0.30
26 - 27	0.25	0.53	1.87	0.40	N	N	1.77	1.93	0.64	1.21	N	0.30
27 - 28	0.31	1.32	0.58	0.82	N	N	1.91	1.56	0.80	0.19	N	0.38
28 - 29	0.81	0.90	0.23	0.36	N	N	2.27	N	0.97	0.27	N	0.33
29 - 30	1.21		0.53	0.28	N	N	2.33	N	1.13	0.75	N	0.51
30 - 31	0.60		0.33	0.79	N	N	2.58	N	0.64	1.94	N	0.52
31 - 1	1.09		0.69		N		0.88	N		0.54		0.73
Arithmetic Mean (3)	0.73	0.71	0.89	0.62	-	-	1.10	0.91	-	0.53	-	0.73
Standard Deviation (3)	0.56	0.42	0.67	0.30	-	-	0.72	0.59	-	0.38	-	0.43
Sample Size	31	28	31	30	9	14	29	27	20	31	19	28

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 - Sulphate as S (SO4 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Daily measurements - Summary for January 2001 to December 2001

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.40	0.73	0.93	1.53	1.08	0.70	0.65	1.42	0.37	0.32	0.28	0.10
2 - 3	0.18	0.24	1.34	0.52	0.70	0.45	1.49	1.35	0.37	0.21	0.45	0.15
3 - 4	0.19	0.29	1.65	0.21	0.84	0.55	2.65	0.16	0.39	0.23	0.46	0.21
4 - 5	0.10	0.28	1.81	0.24	0.61	0.50	1.92	0.17	0.33	0.49	0.40	0.16
5 - 6	0.07	0.38	2.48	0.40	1.06	1.00	1.71	0.27	1.12	0.55	0.42	0.25
6 - 7	0.49	0.35	1.00	0.26	0.53	0.28	1.35	0.32	0.37	0.25	0.28	0.44
7 - 8	0.36	0.37	0.66	0.41	0.77	0.29	1.04	0.42	0.45	0.17	0.49	0.63
8 - 9	0.24	0.97	0.29	0.15	0.46	0.29	0.54	0.21	0.19	0.15	0.17	1.10
9 - 10	0.54	0.45	0.22	0.36	1.07	0.51	0.25	0.28	0.25	0.24	0.24	1.55
10 - 11	0.83	0.25	0.31	0.41	2.85	0.35	0.38	0.22	0.32	0.28	0.41	1.13
11 - 12	0.57	0.67	0.27	0.99	2.14	0.73	0.37	0.46	0.42	0.59	0.50	0.98
12 - 13	0.47	0.28	0.17	0.78	1.22	0.64	N	0.39	0.32	0.63	0.42	0.89
13 - 14	0.48	0.41	0.36	1.06	0.60	0.71	0.21	1.07	0.21	1.04	0.31	1.04
14 - 15	0.62	0.76	0.22	1.12	0.49	0.76	0.28	1.22	0.18	0.99	0.30	0.86
15 - 16	1.51	0.84	0.47	0.32	0.61	0.50	0.22	0.47	0.32	0.25	0.84	0.75
16 - 17	1.32	0.63	0.76	0.65	0.35	0.95	0.44	0.16	0.31	0.49	N	0.78
17 - 18	1.82	0.96	0.53	0.78	0.34	0.61	0.31	0.37	0.29	0.59	N	0.84
18 - 19	1.64	1.26	0.83	0.39	0.38	0.71	0.69	0.62	1.30	0.47	1.43	1.15
19 - 20	1.18	1.30	0.77	0.29	0.70	1.16	0.35	0.46	1.09	0.21	2.52	1.51
20 - 21	1.14	1.05	0.31	0.46	1.38	0.58	0.29	0.19	0.66	0.24	1.04	0.27
21 - 22	0.41	0.67	0.50	0.67	0.92	0.84	0.31	0.41	1.16	0.32	0.63	0.23
22 - 23	0.41	0.54	0.44	0.39	0.55	1.83	0.27	1.09	1.61	0.39	0.27	0.16
23 - 24	0.37	0.30	0.25	0.50	1.02	1.40	0.17	1.00	2.16	0.28	0.43	0.17
24 - 25	0.21	0.38	1.09	0.23	1.22	N	0.26	1.94	1.15	0.60	0.08	0.15
25 - 26	0.16	0.41	1.96	0.23	3.68	2.73	0.43	1.52	1.42	1.18	0.14	0.16
26 - 27	0.18	0.16	1.96	0.25	0.84	3.19	0.58	1.12	0.37	0.52	0.18	0.15
27 - 28	0.21	0.91	0.20	0.92	0.78	0.39	1.05	0.40	1.33	0.47	0.22	0.13
28 - 29	0.43	1.42	0.15	0.21	1.23	0.62	1.51	N	1.44	2.01	0.21	0.19
29 - 30	0.37		0.49	0.44	0.51	1.19	1.66	1.38	0.42	2.10	0.03	0.16
30 - 31	0.73		0.44	0.82	0.60	0.43	0.30	0.47	0.33	3.23	0.04	0.18
31 - 1	1.03		0.78		0.47		0.23	0.32		1.37		0.37
Arithmetric Mean (3)	0.60	0.62	0.76	0.53	0.97	0.86	0.73	0.66	0.69	0.67	0.47	0.54
Standard Deviation (3)	0.48	0.35	0.62	0.33	0.73	0.68	0.64	0.50	0.53	0.69	0.50	0.45
Sample Size	31	28	31	30	31	29	30	30	30	31	28	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 - Sulphate as S (SO4 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Daily measurements - Summary for January 2001 to December 2001

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.49	0.71	0.60	0.88	0.43	0.17	0.46	1.16	0.43	0.20	0.25	0.16
2 - 3	0.14	0.40	0.65	1.08	0.65	0.24	1.79	0.89	0.22	0.26	0.41	0.44
3 - 4	0.44	0.58	0.91	0.51	0.34	0.29	1.82	0.32	0.12	0.29	0.25	0.62
4 - 5	0.53	0.48	2.15	0.29	0.27	0.38	1.19	0.29	0.10	0.46	0.14	0.24
5 - 6	0.35	0.64	2.78	0.44	0.25	0.70	1.08	0.21	0.26	0.75	0.19	0.40
6 - 7	0.31	0.36	1.87	0.49	0.46	0.40	1.11	0.23	0.13	0.35	0.07	0.37
7 - 8	0.34	0.38	1.34	0.33	0.32	0.14	1.31	0.64	0.19	0.26	0.10	0.81
8 - 9	0.19	0.52	1.15	0.37	0.49	0.38	1.01	0.35	0.18	0.30	0.22	0.79
9 - 10	0.32	0.58	0.97	0.81	0.50	0.17	0.64	0.36	0.11	0.25	0.33	0.73
10 - 11	0.14	0.61	1.03	0.81	0.75	0.24	0.49	0.36	0.22	0.28	0.31	0.50
11 - 12	0.13	0.15	0.47	0.57	0.38	0.28	0.32	0.51	0.25	0.40	0.28	0.24
12 - 13	0.14	0.44	0.48	0.27	0.25	0.57	0.25	0.25	0.28	0.89	0.15	0.43
13 - 14	0.25	0.44	0.21	0.32	0.48	1.32	0.48	1.82	0.25	1.29	0.27	0.25
14 - 15	0.19	1.08	N	0.43	0.75	1.43	0.61	1.32	0.17	1.24	0.36	0.44
15 - 16	1.23	0.81	N	0.13	0.88	1.19	0.30	1.14	0.09	0.72	0.61	0.31
16 - 17	1.17	0.52	0.22	0.45	0.92	0.48	0.67	0.39	0.10	0.36	0.95	0.16
17 - 18	1.60	0.56	0.26	0.24	1.15	0.38	0.53	0.65	0.10	1.13	3.25	0.17
18 - 19	1.49	0.92	0.35	0.31	0.30	0.47	0.47	1.02	0.25	0.58	2.07	0.20
19 - 20	1.25	0.64	0.46	0.31	0.45	0.97	0.42	0.84	0.42	0.99	1.04	0.21
20 - 21	0.83	0.38	0.29	0.32	0.27	0.37	0.50	0.27	0.57	N	0.98	0.29
21 - 22	1.30	0.39	0.67	0.79	0.88	0.30	0.52	0.67	0.49	1.09	0.28	0.22
22 - 23	0.56	0.38	0.66	1.16	1.42	0.29	0.35	1.03	0.36	1.96	0.19	0.45
23 - 24	0.38	0.19	0.67	1.05	1.91	1.42	0.56	1.21	0.68	0.55	0.26	0.21
24 - 25	0.46	0.36	1.16	0.83	N	1.45	0.37	1.26	0.65	0.56	0.42	0.15
25 - 26	0.46	0.71	1.25	1.09	N	1.72	1.27	1.48	0.27	0.77	0.24	0.18
26 - 27	0.60	0.95	0.95	1.75	N	1.89	1.45	0.48	1.52	0.41	0.46	0.28
27 - 28	0.42	0.66	1.83	1.20	N	2.21	2.17	0.37	0.60	0.32	0.23	0.14
28 - 29	0.72	0.66	0.82	0.30	N	0.66	0.82	0.63	1.44	0.20	0.48	0.17
29 - 30	0.45		0.85	0.54	N	0.53	1.02	1.53	0.56	1.16	0.21	0.17
30 - 31	0.60		0.50	0.96	N	0.59	0.25	1.19	0.51	0.68	0.56	0.43
31 - 1	0.83		0.48		N		0.29	0.40		0.19		0.18
Arithmetic Mean (3)	0.59	0.55	0.90	0.63	-	0.72	0.79	0.75	0.38	0.63	0.52	0.33
Standard Deviation (3)	0.42	0.22	0.62	0.38	-	0.58	0.51	0.46	0.35	0.43	0.65	0.19
Sample Size	31	28	29	30	23	30	31	31	30	30	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: 5010 Strathvaich Dam - Sulphate as S (SO4 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Daily measurements - Summary for January 2001 to December 2001

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	1.17	N	0.07	N	0.19	0.06	0.08	0.11	0.08	0.12	0.17	0.06
2 - 3	0.17	N	0.16	N	0.15	0.18	0.38	0.11	0.09	0.11	0.09	0.12
3 - 4	0.07	N	0.62	N	0.14	0.21	0.62	0.14	0.13	0.08	0.12	0.15
4 - 5	0.05	N	0.52	N	0.16	0.18	0.33	0.16	0.19	0.12	0.09	0.10
5 - 6	0.02	N	0.53	N	0.28	0.13	0.62	0.18	0.12	0.29	0.09	0.08
6 - 7	0.02	0.16	N	N	0.20	0.10	0.60	0.20	0.10	0.19	N	0.11
7 - 8	0.07	N	N	N	0.67	0.08	0.36	0.40	0.07	0.32	N	0.31
8 - 9	0.11	N	N	N	0.53	0.07	0.20	0.14	0.09	0.25	N	0.22
9 - 10	0.05	N	N	N	0.51	0.11	0.36	0.16	0.11	0.16	N	0.14
10 - 11	0.06	N	N	N	0.69	0.10	0.33	0.13	0.16	0.13	N	0.09
11 - 12	0.06	N	N	N	0.53	0.28	0.11	0.08	0.19	0.33	N	0.11
12 - 13	0.09	N	N	N	0.94	0.19	0.10	0.09	0.09	0.10	N	0.23
13 - 14	0.23	N	N	N	0.81	0.12	0.10	0.25	0.13	0.10	N	0.41
14 - 15	0.12	0.41	N	N	0.99	0.13	0.14	0.16	0.22	0.36	N	0.27
15 - 16	0.16	0.11	N	N	0.55	0.18	0.08	0.16	0.16	0.18	N	0.15
16 - 17	0.23	0.09	N	N	0.15	0.14	0.18	0.18	0.10	0.17	N	0.17
17 - 18	0.48	0.33	N	0.12	0.44	0.11	0.47	0.14	0.12	1.15	N	0.21
18 - 19	0.98	0.97	N	0.17	0.20	0.22	0.15	0.60	0.16	0.38	N	0.18
19 - 20	1.28	0.19	N	0.18	0.17	0.11	0.12	0.33	0.62	0.62	N	0.19
20 - 21	0.83	0.21	N	0.16	0.16	0.12	0.28	0.19	0.34	0.45	N	0.20
21 - 22	0.68	0.28	N	0.13	0.73	0.13	0.17	0.19	0.26	1.33	0.11	0.20
22 - 23	0.23	0.15	N	0.16	1.07	0.22	0.23	0.20	0.32	1.57	0.11	1.28
23 - 24	0.24	0.08	N	1.19	1.49	1.10	0.10	0.31	0.34	0.49	0.09	0.32
24 - 25	0.14	0.18	N	1.36	1.71	0.90	0.22	0.28	0.87	0.22	0.06	0.28
25 - 26	0.11	0.32	N	1.89	1.83	0.35	0.11	0.16	0.47	0.29	0.10	1.03
26 - 27	<0.02	0.19	N	1.29	0.26	1.44	0.20	0.12	0.34	0.13	0.07	0.83
27 - 28	0.08	0.12	N	0.75	0.14	1.96	0.33	0.15	1.57	0.08	0.09	0.79
28 - 29	0.06	0.07	N	0.08	0.26	0.23	0.21	0.22	0.85	0.08	0.13	0.94
29 - 30	0.04		N	0.15	0.17	0.21	0.26	0.15	1.04	0.07	0.11	0.78
30 - 31	N		N	0.37	0.13	0.17	0.22	0.14	0.18	0.09	0.12	0.26
31 - 1	N		N		0.10		0.31	0.15		0.10		0.85
Arithmetic Mean (3)	0.27	-	-	-	0.53	0.32	0.26	0.19	0.32	0.32	-	0.36
Standard Deviation (3)	0.36	-	-	-	0.48	0.44	0.16	0.10	0.35	0.37	-	0.33
Sample Size	29	16	5	14	31	30	31	31	30	31	15	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 - Sulphate as S (SO4 - S)
Concentration in air ($\mu g\ S\ m^{-3}$)

Daily measurements - Summary for January 2001 to December 2001

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DATE												
1 - 2	0.78	0.81	N	N	0.30	0.08	0.15	0.36	0.10	0.33	N	
2 - 3	0.56	0.08	N	N	0.26	0.15	0.57	0.86	0.05	0.15	N	
3 - 4	0.41	N	N	N	0.18	0.22	1.63	0.11	0.07	0.07	N	
4 - 5	N	N	N	N	0.16	0.24	1.13	0.07	0.10	0.20	N	
5 - 6	0.10	N	N	N	0.21	0.15	1.25	0.12	0.10	0.74	0.13	
6 - 7	0.08	0.19	N	N	0.20	0.15	0.65	0.15	0.08	0.42	0.08	
7 - 8	0.14	0.19	N	N	0.15	0.09	0.48	0.26	0.04	0.44	N	
8 - 9	0.17	0.31	N	N	0.25	0.10	0.22	0.18	0.09	0.15	N	
9 - 10	0.11	0.40	N	N	0.49	0.12	0.39	0.11	0.07	0.18	N	
10 - 11	0.14	0.57	N	N	0.44	0.17	0.33	0.09	0.11	0.16	N	
11 - 12	0.12	0.20	N	N	0.43	0.17	0.19	0.28	0.21	0.42	N	
12 - 13	0.12	0.24	N	N	0.73	0.62	0.17	0.11	0.26	0.13	N	
13 - 14	0.33	0.27	N	N	1.01	0.32	0.13	0.12	0.17	0.13		
14 - 15	0.08	0.52	N	N	0.97	0.22	0.19	1.02	0.08	0.97		
15 - 16	0.68	0.21	N	N	0.54	0.25	0.30	0.45	0.10	0.49		
16 - 17	1.45	0.10	N	N	1.43	0.28	0.47	0.17	0.07	0.51		
17 - 18	0.86	0.13	N	0.19	0.79	1.37	0.35	0.13	0.08	0.98		
18 - 19	1.19	0.79	N	0.24	0.18	0.38	0.36	0.68	0.20	0.54		
19 - 20	1.41	0.20	N	0.27	0.16	N	0.24	0.29	0.49	0.52		
20 - 21	0.95	N	N	0.21	0.22	0.09	0.32	0.16	0.31	0.91		
21 - 22	1.10	N	N	0.49	0.66	0.18	0.66	0.43	0.17	0.04		
22 - 23	0.82	N	N	1.20	1.28	0.22	0.15	0.32	0.41	1.67		
23 - 24	0.63	N	N	1.33	1.51	1.29	0.53	0.71	0.47	0.56		
24 - 25	0.27	N	N	1.61	1.79	1.40	0.22	0.81	0.80	0.52		
25 - 26	0.29	N	N	1.27	3.93	0.88	0.55	0.53	0.29	0.51		
26 - 27	0.28	N	N	1.40	0.48	1.75	1.01	0.12	0.21	0.30		
27 - 28	0.13	N	N	1.15	0.57	1.97	1.85	0.16	1.24	0.05		
28 - 29	0.12	N	N	0.11	0.31	0.52	0.80	0.36	0.91	0.07		
29 - 30	0.05		N	0.34	0.16	0.69	0.34	0.85	0.98	0.08		
30 - 31	0.44		N	0.39	0.13	0.22	0.22	0.48	0.61	N		
31 - 1	0.75		N		0.09		0.28	0.16		N		
Arithmetric Mean (3)	0.49	-	-	-	0.64	0.49	0.52	0.34	0.29	0.42	-	
Standard Deviation (3)	0.42	-	-	-	0.76	0.54	0.43	0.27	0.31	0.37	-	
Sample Size	30	16	0	14	31	29	31	31	30	29	2	0

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 4
Nitrogen Dioxide Data

AEA Technology
National Environmental Technology Centre

Nitrogen Dioxide
Concentration in air (ppb)

Monthly measurements, collection-day - non standard
Summary for January 2001 to December 2001

Site	Sampling Period	Start Date/Time	End Date/Time		Concentration (in ppb)
Goonhilly	1	03-Jan-01 14:30	02-Feb-01 10:50		6.41
	2	02-Feb-01 10:50	01-Mar-01 09:10		4.15
	3	01-Mar-01 09:10	05-Apr-01 11:34		3.80
	4	05-Apr-01 11:34	03-May-01 15:00		1.82
	5	03-May-01 15:00	31-May-01 10:46		3.05
	6	31-May-01 10:46	11-Jul-01 13:30	*	2.20
	7	11-Jul-01 13:30	01-Aug-01 10:00		2.62
	8	01-Aug-01 10:00	05-Sep-01 10:30		2.33
	9	05-Sep-01 10:30	03-Oct-01 13:20		2.27
	10	03-Oct-01 13:20	31-Oct-01 09:00		3.64
	11	31-Oct-01 09:00	28-Nov-01 12:06		4.29
	12	28-Nov-01 12:06	02-Jan-02 09:45		6.56
		Annual Mean Concentration =			3.61
Compton	1	02-Jan-01 10:57	12-Feb-01 08:05	*	13.78
	2	12-Feb-01 08:05	26-Feb-01 08:06		20.65
	3	26-Feb-01 08:06	02-Apr-01 08:07		10.51
	4	02-Apr-01 08:07	30-Apr-01 13:10		7.12
	5	30-Apr-01 13:10	31-May-01 12:00		6.80
	6	31-May-01 12:00	02-Jul-01 08:01		5.70
	7	02-Jul-01 08:01	29-Jul-01 14:20		5.27
	8	29-Jul-01 14:20	03-Sep-01 07:53		7.44
	9	03-Sep-01 07:53	02-Oct-01 14:02		9.79
	10	02-Oct-01 14:02	30-Oct-01 13:20		10.26
	11	30-Oct-01 13:20	03-Dec-01 08:03		12.27
	12	03-Dec-01 08:03	02-Jan-02 08:31		15.39
		Annual Mean Concentration =			10.06
Yarner Wood	1	04-Jan-01 09:45	31-Jan-01 09:17		8.59
	2	31-Jan-01 09:17	28-Feb-01 09:10		4.74
	3	28-Feb-01 09:10	04-Apr-01 09:00		4.40
	4	04-Apr-01 09:00	01-May-01 16:00		1.72
	5	01-May-01 16:00	29-May-01 16:00		3.04
	6	29-May-01 16:00	05-Jul-01 16:00		2.33
	7	05-Jul-01 16:00	01-Aug-01 10:30		1.73
	8	01-Aug-01 10:30	05-Sep-01 19:40		1.51
	9	05-Sep-01 19:40	03-Oct-01 09:15		1.34
	10	03-Oct-01 09:15	07-Nov-01 10:05		2.53
	11	07-Nov-01 10:05	05-Dec-01 09:45		4.56
	12	05-Dec-01 09:45	02-Jan-02 09:30		8.86
		Annual Mean Concentration =			3.69
Flatford Mill	1	03-Jan-01 11:18	30-Jan-01 14:26		13.80
	2	30-Jan-01 14:26	27-Feb-01 09:15		14.45
	3	27-Feb-01 09:15	03-Apr-01 10:00		10.65
	4	03-Apr-01 10:00	01-May-01 12:00		6.71
	5	01-May-01 12:00	29-May-01 12:00		5.12
	6	29-May-01 12:00	04-Jul-01 16:00		5.48
	7	04-Jul-01 16:00	06-Aug-01 16:00		5.02
	8	06-Aug-01 16:00	04-Sep-01 17:50		3.36
	9	04-Sep-01 17:50	02-Oct-01 14:30		6.12
	10	02-Oct-01 14:30	30-Oct-01 15:10		10.16
	11	30-Oct-01 15:10	27-Nov-01 12:35		13.45
	12	27-Nov-01 12:35	02-Jan-02 10:40		11.44
		Annual Mean Concentration =			8.75
Barcombe Mills	1	28-Dec-00 12:00	30-Jan-01 12:00		11.63
	2	30-Jan-01 12:00	27-Feb-01 12:00		10.59
	3	27-Feb-01 12:00	03-Apr-01 15:00		8.67
	4	03-Apr-01 15:00	01-May-01 15:30		6.84
	5	01-May-01 15:30	29-May-01 16:00		3.94
	6	29-May-01 16:00	10-Jul-01 16:30	*	3.78
	7	10-Jul-01 16:30	14-Aug-01 16:00		3.19
	8	14-Aug-01 16:00	11-Sep-01 16:00		4.45
	9	11-Sep-01 16:00	09-Oct-01 16:00		4.82
	10	09-Oct-01 16:00	30-Oct-01 16:00		6.38
	11	30-Oct-01 16:00	03-Dec-01 16:00		9.18
	12	03-Dec-01 16:00	02-Jan-02 09:50		11.06
		Annual Mean Concentration =			7.01
Woburn	1	02-Jan-01 12:15	01-Feb-01 11:30		17.84
	2	01-Feb-01 11:30	27-Feb-01 11:20		21.87
	3	27-Feb-01 11:20	10-Apr-01 15:00	*	13.22
	4	10-Apr-01 15:00	02-May-01 09:50		12.04
	5	02-May-01 09:50	29-May-01 15:55		9.26
	6	29-May-01 15:55	03-Jul-01 10:55		7.94
	7	03-Jul-01 10:55	02-Aug-01 09:20		8.25
	8	02-Aug-01 09:20	04-Sep-01 15:40		7.98
	9	04-Sep-01 15:40	05-Oct-01 08:40		10.04
	10	05-Oct-01 08:40	30-Oct-01 10:30		13.54
	11	30-Oct-01 10:30	04-Dec-01 08:55		15.21
	12	04-Dec-01 08:55	02-Jan-02 11:10		18.66
		Annual Mean Concentration =			12.84

Notes: * denotes extended sampling period (greater than the expected 4 or 5 week period). N denotes missing sample. Annual mean concentration only given if the data capture is greater than 75%.

National Environmental Technology Centre

Nitrogen Dioxide
Concentration in air (ppb)

Monthly measurements, collection-day - non standard
Summary for January 2001 to December 2001

Site	Sampling Period	Start Date/Time	End Date/Time		Concentration (in ppb)
Tycanol Wood	1	03-Jan-01 10:30	31-Jan-01 10:15		7.00
	2	31-Jan-01 10:15	03-Jul-01 10:30	*	1.04
	3	03-Jul-01 10:30	01-Aug-01 10:15		1.32
	4	01-Aug-01 10:15	05-Sep-01 12:00		1.35
	5	05-Sep-01 12:00	03-Oct-01 10:15		1.77
	6	03-Oct-01 10:15	31-Oct-01 10:30		2.88
	7	31-Oct-01 10:30	28-Nov-01 10:15		2.10
	8	28-Nov-01 10:15	03-Jan-02 14:30		7.15
	9				
	10				
	11				
	12				
		Annual Mean Concentration =			
Llyn Brianne	1	02-Jan-01 11:45	31-Jan-01 14:00		8.90
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				
		Annual Mean Concentration =			
Pumlumon	1	04-Jan-01 13:40	30-Jan-01 13:30		7.66
	2	30-Jan-01 13:30	27-Apr-01 10:45	*	2.24
	3	27-Apr-01 10:45	29-May-01 13:46		2.48
	4	10-Jul-01 14:07	31-Jul-01 13:10		1.47
	5	31-Jul-01 13:10	04-Sep-01 14:15		0.85
	6	04-Sep-01 14:15	02-Oct-01 13:43		1.58
	7	02-Oct-01 13:43	30-Oct-01 15:10		2.25
	8	30-Oct-01 15:10	04-Dec-01 14:37		2.17
	9	04-Dec-01 14:37	03-Jan-02 14:12		6.38
	10				
	11				
	12				
		Annual Mean Concentration =			2.82

Site	Sampling Period	Start Date/Time	End Date/Time		Concentration (in ppb)
Stoke Ferry	1	02-Jan-01 14:40	30-Jan-01 15:00		14.28
	2	30-Jan-01 15:00	27-Feb-01 12:30		12.79
	3	27-Feb-01 12:30	03-Apr-01 15:25		7.93
	4	03-Apr-01 15:25	01-May-01 14:45		6.25
	5	01-May-01 14:45	29-May-01 13:00		3.78
	6	29-May-01 13:00	03-Jul-01 12:35		3.87
	7	03-Jul-01 12:35	31-Jul-01 14:45		3.82
	8	31-Jul-01 14:45	04-Sep-01 11:20		5.41
	9	04-Sep-01 11:20	02-Oct-01 15:05		6.21
	10	02-Oct-01 15:05	30-Oct-01 14:41		11.03
	11	30-Oct-01 14:41	04-Dec-01 13:58		12.36
	12	04-Dec-01 13:58	02-Jan-02 15:30		12.47
		Annual Mean Concentration =			8.29
Preston Montford	1	02-Jan-01 12:00	30-Jan-01 09:30		10.14
	2	30-Jan-01 09:30	27-Feb-01 10:55		10.11
	3	27-Feb-01 10:55	03-Apr-01 15:35		8.89
	4	03-Apr-01 15:35	01-May-01 10:20		4.03
	5	01-May-01 10:20	29-May-01 11:00		5.88
	6	29-May-01 11:00	31-Jul-01 11:55	*	2.95
	7	31-Jul-01 11:55	04-Sep-01 10:30		4.53
	8	04-Sep-01 10:30	02-Oct-01 10:00		5.48
	9	02-Oct-01 10:00	04-Dec-01 12:00	*	N
	10	04-Dec-01 12:00	02-Jan-02 12:00		23.43
	11				
	12				
		Annual Mean Concentration =			7.73
Bottesford	1	02-Jan-01 14:30	30-Jan-01 13:00		15.32
	2	30-Jan-01 13:00	27-Feb-01 11:30		16.31
	3	27-Feb-01 11:30	03-Apr-01 10:50		9.36
	4	03-Apr-01 10:50	01-May-01 11:05		7.55
	5	01-May-01 11:05	29-May-01 10:50		4.96
	6	29-May-01 10:50	03-Jul-01 11:45		3.81
	7	03-Jul-01 11:45	31-Jul-01 15:15		4.76
	8	31-Jul-01 15:15	04-Sep-01 11:45		4.69
	9	04-Sep-01 11:45	02-Oct-01 14:30		7.02
	10	02-Oct-01 14:30	30-Oct-01 11:15		8.89
	11	30-Oct-01 11:15	04-Dec-01 11:35		14.74
	12	04-Dec-01 11:35	02-Jan-02 10:15		15.30
		Annual Mean Concentration =			9.31

Notes: * denotes extended sampling period (greater than the expected 4 or 5 week period). N denotes missing sample. Annual mean concentration only given if the data capture is greater than 75%.

National Environmental Technology Centre

Nitrogen Dioxide
Concentration in air (ppb)

Monthly measurements, collection-day - non standard
Summary for January 2001 to December 2001

Site	Sampling Period	Start Date/Time	End Date/Time		Concentration (in ppb)
Llyn Llydaw	1	03-Jan-01 12:40	31-Jan-01 15:06		4.02
	2	31-Jan-01 15:06	25-Apr-01 12:35	*	2.44
	3	25-Apr-01 12:35	02-May-01 13:00		2.44
	4	02-May-01 13:00	01-Jun-01 10:30		2.29
	5	01-Jun-01 10:30	04-Jul-01 12:25		1.32
	6	04-Jul-01 12:25	01-Aug-01 13:01		1.39
	7	01-Aug-01 13:01	05-Sep-01 13:30		1.03
	8	05-Sep-01 13:30	19-Sep-01 12:04		1.62
	9	19-Sep-01 12:04	03-Oct-01 12:47		1.89
	10	03-Oct-01 12:47	05-Dec-01 11:50	*	1.86
	11	05-Dec-01 11:50	02-Jan-02 13:53		3.18
	12				
		Annual Mean Concentration =			2.14
Wardlow Hay Cop	1	31-Dec-00 11:10	28-Jan-01 15:10		14.86
	2	28-Jan-01 15:10	25-Feb-01 12:30		16.95
	3	25-Feb-01 12:30	27-May-01 18:45	*	4.66
	4	27-May-01 18:45	01-Jul-01 19:00		4.39
	5	01-Jul-01 19:00	29-Jul-01 19:00		4.62
	6	29-Jul-01 19:00	04-Sep-01 11:05		5.36
	7	04-Sep-01 11:05	01-Oct-01 09:35		8.32
	8	01-Oct-01 09:35	28-Oct-01 12:30		8.80
	9	28-Oct-01 12:30	09-Dec-01 13:45	*	12.40
	10	09-Dec-01 13:45	31-Dec-01 16:02		12.27
	11				
	12				
		Annual Mean Concentration =			8.36
Driby	1	29-Nov-00 10:50	31-Jan-01 16:07	*	11.24
	2	31-Jan-01 16:07	28-Feb-01 14:30		13.11
	3	28-Feb-01 14:30	04-Apr-01 14:00		7.39
	4	04-Apr-01 14:00	02-May-01 13:45		4.60
	5	02-May-01 13:45	30-May-01 10:15		2.47
	6	30-May-01 10:15	04-Jul-01 15:55		3.33
	7	04-Jul-01 15:55	01-Aug-01 10:55		3.02
	8	01-Aug-01 10:55	05-Sep-01 15:00		2.32
	9	05-Sep-01 15:00	03-Oct-01 11:40		4.40
	10	03-Oct-01 11:40	31-Oct-01 13:30		9.80
	11	31-Oct-01 13:30	05-Dec-01 15:00		13.10
	12	05-Dec-01 15:00	04-Jan-02 10:45		11.44
		Annual Mean Concentration =			7.52

Site	Sampling Period	Start Date/Time	End Date/Time		Concentration (in ppb)
Jenny Hurn	1	02-Jan-01 12:05	30-Jan-01 14:35		16.79
	2	30-Jan-01 14:35	27-Feb-01 13:20		20.26
	3	27-Feb-01 13:20	03-Apr-01 12:50		9.56
	4	03-Apr-01 12:50	01-May-01 12:55		6.81
	5	01-May-01 12:55	29-May-01 13:15		6.42
	6	29-May-01 13:15	03-Jul-01 13:20		4.74
	7	03-Jul-01 13:20	31-Jul-01 13:10		5.27
	8	31-Jul-01 13:10	04-Sep-01 13:00		6.90
	9	04-Sep-01 13:00	02-Oct-01 12:05		8.22
	10	02-Oct-01 12:05	30-Oct-01 13:55		13.67
	11	30-Oct-01 13:55	04-Dec-01 13:15		16.15
	12				
		Annual Mean Concentration =			10.35
Thorganby	1	03-Jan-01 13:30	31-Jan-01 13:30		11.27
	2	31-Jan-01 13:30	28-Feb-01 14:00		17.73
	3	28-Feb-01 14:00	04-Apr-01 13:30		8.80
	4	04-Apr-01 13:30	30-May-01 13:00	*	N
	5	30-May-01 13:00	04-Jul-01 13:30		0.42
	6	04-Jul-01 13:30	01-Aug-01 12:30		5.31
	7	01-Aug-01 12:30	05-Sep-01 14:45		6.19
	8	05-Sep-01 14:45	03-Oct-01 12:00		6.90
	9	03-Oct-01 12:00	31-Oct-01 14:05		4.87
	10	31-Oct-01 14:05	05-Dec-01 14:40		12.75
	11	05-Dec-01 14:40	02-Jan-02 15:50		13.04
	12				
		Annual Mean Concentration =			8.57
High Muffles	1	03-Jan-01 10:01	31-Jan-01 10:00		7.99
	2	31-Jan-01 10:00	28-Feb-01 12:00		7.27
	3	28-Feb-01 12:00	04-Apr-01 09:32		5.29
	4	04-Apr-01 09:32	02-May-01 08:16		2.86
	5	02-May-01 08:16	30-May-01 07:40		2.17
	6	30-May-01 07:40	04-Jul-01 08:05		2.35
	7	04-Jul-01 08:05	01-Aug-01 09:11		1.75
	8	01-Aug-01 09:11	05-Sep-01 08:05		2.59
	9	05-Sep-01 08:05	03-Oct-01 08:07		2.95
	10	03-Oct-01 08:07	31-Oct-01 08:55		7.83
	11	31-Oct-01 08:55	05-Dec-01 10:25		5.79
	12	05-Dec-01 10:25	02-Jan-02 10:45		10.47
		Annual Mean Concentration =			4.87

Notes: * denotes extended sampling period (greater than the expected 4 or 5 week period). N denotes missing sample. Annual mean concentration only given if the data capture is greater than 75%.

Nitrogen Dioxide
Concentration in air (ppb)

Monthly measurements, collection-day - non standard
Summary for January 2001 to December 2001

Site	Sampling Period	Start Date/Time	End Date/Time		Concentration (in ppb)
Bannisdale	1	05-Jan-01 09:15	02-Feb-01 09:30		11.58
	2	02-Feb-01 09:30	09-Mar-01 17:00		6.49
	3	09-Mar-01 17:00	08-Apr-01 17:00		3.66
	4	08-Apr-01 17:00	05-May-01 17:30		3.20
	5	05-May-01 17:30	04-Jun-01 18:00		2.53
	6	04-Jun-01 18:00	01-Jul-01 16:00		2.94
	7	01-Jul-01 16:00	31-Jul-01 07:30		2.08
	8	31-Jul-01 07:30	04-Sep-01 08:00		2.33
	9	04-Sep-01 08:00	06-Oct-01 17:00		2.65
	10	06-Oct-01 17:00	30-Oct-01 15:30		5.24
	11	30-Oct-01 15:30	04-Dec-01 17:00		4.65
	12	04-Dec-01 17:00	06-Jan-02 19:00		8.09
		Annual Mean Concentration =			4.61
Hillsborough Forest	1	04-Jan-01 11:00	01-Feb-01 11:05		10.20
	2	01-Feb-01 11:05	15-Mar-01 12:00	*	7.33
	3	15-Mar-01 12:00	09-Apr-01 14:30		6.47
	4	09-Apr-01 14:30	03-May-01 11:00		3.99
	5	03-May-01 11:00	31-May-01 12:10		3.23
	6	31-May-01 12:10	05-Jul-01 11:15		3.52
	7	05-Jul-01 11:15	01-Aug-01 12:20		2.58
	8	01-Aug-01 12:20	05-Sep-01 11:15		2.55
	9	05-Sep-01 11:15	03-Oct-01 12:00		4.05
	10	03-Oct-01 12:00	31-Oct-01 11:00		4.73
	11	31-Oct-01 11:00	12-Dec-01 11:00	*	7.42
	12	12-Dec-01 11:00	16-Jan-02 11:00		8.16
		Annual Mean Concentration =			5.48
Lough Navar	1	01-Jan-01 13:47	02-Feb-01 16:49		4.41
	2	02-Feb-01 16:49	04-Mar-01 18:00		1.88
	3	04-Mar-01 18:00	02-Apr-01 08:05		2.94
	4	02-Apr-01 08:05	30-Apr-01 08:09		1.24
	5	30-Apr-01 08:09	28-May-01 10:30		1.46
	6	28-May-01 10:30	02-Jul-01 08:30		1.06
	7	02-Jul-01 08:30	21-Jul-01 11:00		1.23
	8	21-Jul-01 11:00	03-Sep-01 08:29	*	0.56
	9	03-Sep-01 08:29	01-Oct-01 08:15		1.23
	10	01-Oct-01 08:15	29-Oct-01 08:28		1.68
	11	29-Oct-01 08:28	03-Dec-01 08:30		1.09
	12	03-Dec-01 08:30	31-Dec-01 08:30		3.05
		Annual Mean Concentration =			1.78
Cow Green Reservoir	1	03-Jan-01 09:55	31-Jan-01 10:45		9.64
	2	31-Jan-01 10:45	10-Jul-01 11:00	*	1.78
	3	10-Jul-01 11:00	31-Jul-01 08:40		1.77
	4	31-Jul-01 08:40	05-Sep-01 11:55		1.67
	5	05-Sep-01 11:55	03-Oct-01 08:55		2.45
	6	03-Oct-01 08:55	31-Oct-01 08:35		5.49
	7	31-Oct-01 08:35	05-Dec-01 08:55		3.33
	8	05-Dec-01 08:55	07-Jan-02 09:20		5.75
	9				
	10				
	11				
	12				
		Annual Mean Concentration =			
Loch Dee	1	03-Jan-01 11:22	01-Feb-01 11:13		4.86
	2	01-Feb-01 11:13	03-May-01 10:37	*	2.20
	3	03-May-01 10:37	01-Jun-01 08:24		1.52
	4	01-Jun-01 08:24	02-Jul-01 09:05		1.24
	5	02-Jul-01 09:05	03-Sep-01 10:00	*	0.85
	6	03-Sep-01 10:00	03-Oct-01 11:00		1.98
	7	03-Oct-01 11:00	03-Dec-01 13:00	*	2.28
	8	03-Dec-01 13:00	07-Jan-02 09:58		4.24
	9				
	10				
	11				
	12				
		Annual Mean Concentration =			2.23
Redesdale	1	09-Jan-01 09:00	30-Jan-01 09:00		6.54
	2	30-Jan-01 09:00	03-Mar-01 09:00		3.81
	3	03-Mar-01 09:00	03-Apr-01 09:00		4.55
	4	03-Apr-01 09:00	01-May-01 11:05		2.62
	5	01-May-01 11:05	29-May-01 10:00		2.06
	6	29-May-01 10:00	03-Jul-01 10:00		1.19
	7	03-Jul-01 10:00	04-Sep-01 09:00	*	1.42
	8	04-Sep-01 09:00	02-Oct-01 09:45		1.94
	9	02-Oct-01 09:45	30-Oct-01 09:00		5.02
	10	30-Oct-01 09:00	04-Dec-01 09:00		3.59
	11	04-Dec-01 09:00	31-Dec-01 09:00		3.97
	12				
		Annual Mean Concentration =			3.06

Notes: * denotes extended sampling period (greater than the expected 4 or 5 week period). N denotes missing sample. Annual mean concentration only given if the data capture is greater than 75%.

Nitrogen Dioxide
Concentration in air (ppb)

Monthly measurements, collection-day - non standard
Summary for January 2001 to December 2001

Site	Sampling Period	Start Date/Time	End Date/Time		Concentration (in ppb)
Eskdalemuir	1	02-Jan-01 14:35	01-Feb-01 15:13		4.29
	2	01-Feb-01 15:13	01-Mar-01 10:36		3.61
	3	01-Mar-01 10:36	03-Apr-01 14:10		3.00
	4	03-Apr-01 14:10	01-May-01 14:32		1.94
	5	01-May-01 14:32	29-May-01 14:20		1.20
	6	29-May-01 14:20	03-Jul-01 14:10		1.07
	7	03-Jul-01 14:10	31-Jul-01 14:28		1.16
	8	31-Jul-01 14:28	04-Sep-01 14:12		1.00
	9	04-Sep-01 14:12	02-Oct-01 14:10		1.49
	10	02-Oct-01 14:10	30-Oct-01 15:37		3.43
	11	30-Oct-01 15:37	05-Dec-01 14:30		2.62
	12	05-Dec-01 14:30	01-Jan-02 11:11		3.42
		Annual Mean Concentration =			2.32
Polloch	1	02-Jan-01 08:00	30-Jan-01 08:00		1.73
	2	30-Jan-01 08:00	27-Feb-01 16:45		1.25
	3	27-Feb-01 16:45	03-Apr-01 07:15		1.01
	4	03-Apr-01 07:15	01-May-01 07:30		0.56
	5	01-May-01 07:30	01-Jun-01 07:40		0.71
	6	01-Jun-01 07:40	31-Jul-01 13:45	*	0.35
	7	31-Jul-01 13:45	04-Sep-01 07:45		0.61
	8	04-Sep-01 07:45	04-Dec-01 10:19	*	0.23
	9	04-Dec-01 10:19	01-Jan-02 11:00		0.98
	10				
	11				
	12				
		Annual Mean Concentration =			0.68
Whiteadder	1	04-Jan-01 11:00	06-Feb-01 12:00		4.50
	2	06-Feb-01 12:00	13-Mar-01 10:45		5.55
	3	13-Mar-01 10:45	22-May-01 09:30	*	1.37
	4	22-May-01 09:30	31-Jul-01 10:00	*	1.25
	5	31-Jul-01 10:00	03-Sep-01 09:08		1.77
	6	03-Sep-01 09:08	01-Oct-01 09:00		2.90
	7	01-Oct-01 09:00	29-Oct-01 09:00		3.52
	8	29-Oct-01 09:00	03-Dec-01 09:00		3.05
	9	03-Dec-01 09:00	31-Dec-01 09:00		5.13
	10				
	11				
	12				
		Annual Mean Concentration =			2.82
Glen Dye	1	02-Jan-01 13:20	30-Jan-01 11:00		3.35
	2	30-Jan-01 11:00	17-Apr-01 10:15	*	1.78
	3	17-Apr-01 10:15	01-May-01 10:00		1.72
	4	01-May-01 10:00	29-May-01 10:00		1.26
	5	29-May-01 10:00	03-Jul-01 10:00		0.99
	6	03-Jul-01 10:00	31-Jul-01 09:30		1.05
	7	31-Jul-01 09:30	04-Sep-01 10:00		1.19
	8	04-Sep-01 10:00	02-Oct-01 10:15		1.14
	9	02-Oct-01 10:15	30-Oct-01 10:00		3.33
	10	30-Oct-01 10:00	11-Dec-01 13:05	*	2.25
	11	11-Dec-01 13:05	15-Jan-02 10:00		3.00
	12				
		Annual Mean Concentration =			1.91
Balquhidder 2	1	27-Dec-00 11:00	30-Jan-01 10:00		3.78
	2	30-Jan-01 10:00	08-May-01 10:00	*	1.13
	3	08-May-01 10:00	20-May-01 11:00		2.15
	4	20-May-01 11:00	04-Jul-01 10:00	*	0.91
	5	04-Jul-01 10:00	31-Jul-01 11:00		1.39
	6	31-Jul-01 11:00	01-Sep-01 12:00		0.96
	7	01-Sep-01 12:00	01-Oct-01 16:00		1.25
	8	01-Oct-01 16:00	28-Oct-01 12:30		2.78
	9	28-Oct-01 12:30	09-Dec-01 11:00	*	2.05
	10	09-Dec-01 11:00	30-Dec-01 12:00		2.07
	11				
	12				
		Annual Mean Concentration =			1.67
Allt a' Mharcaidh	1	03-Jan-01 13:15	29-Jan-01 12:23		2.62
	2	29-Jan-01 12:23	26-Feb-01 12:24		1.48
	3	26-Feb-01 12:24	02-Apr-01 11:27		1.47
	4	02-Apr-01 11:27	30-Apr-01 11:38		0.77
	5	30-Apr-01 11:38	28-May-01 12:01		0.99
	6	28-May-01 12:01	02-Jul-01 10:44		0.52
	7	02-Jul-01 10:44	30-Jul-01 11:40		0.57
	8	30-Jul-01 11:40	03-Sep-01 11:31		0.48
	9	03-Sep-01 11:31	01-Oct-01 11:28		0.67
	10	01-Oct-01 11:28	29-Oct-01 11:24		1.58
	11	29-Oct-01 11:24	31-Dec-01 13:30	*	1.05
	12				
		Annual Mean Concentration =			1.08

Notes: * denotes extended sampling period (greater than the expected 4 or 5 week period). N denotes missing sample. Annual mean concentration only given if the data capture is greater than 75%.

Nitrogen Dioxide
Concentration in air (ppb)

Monthly measurements, collection-day - non standard
Summary for January 2001 to December 2001

Site	Sampling Period	Start Date/Time	End Date/Time		Concentration (in ppb)
Strathvaich Dam	1	02-Jan-01 11:30	30-Jan-01 10:15		1.41
	2	30-Jan-01 10:15	27-Feb-01 12:40		0.86
	3	27-Feb-01 12:40	17-Apr-01 16:58	*	0.68
	4	17-Apr-01 16:58	01-May-01 07:40		0.85
	5	01-May-01 07:40	29-May-01 08:30		0.71
	6	29-May-01 08:30	03-Jul-01 08:30		0.38
	7	03-Jul-01 08:30	31-Jul-01 07:45		0.38
	8	31-Jul-01 07:45	04-Sep-01 09:30		0.26
	9	04-Sep-01 09:30	02-Oct-01 08:35		0.50
	10	02-Oct-01 08:35	30-Oct-01 09:15		1.21
	11	30-Oct-01 09:15	04-Dec-01 17:10		1.30
	12	04-Dec-01 17:10	01-Jan-02 15:30		0.79
		Annual Mean Concentration =			0.76
Achanarras	1	03-Jan-01 16:00	31-Jan-01 16:30		2.84
	2	31-Jan-01 16:30	28-Feb-01 14:00		1.93
	3	28-Feb-01 14:00	04-Apr-01 14:00		1.86
	4	04-Apr-01 14:00	02-May-01 14:00		0.98
	5	02-May-01 14:00	30-May-01 09:30		1.31
	6	30-May-01 09:30	04-Jul-01 16:00		0.86
	7	04-Jul-01 16:00	01-Aug-01 21:00		0.90
	8	01-Aug-01 21:00	05-Sep-01 19:30		0.44
	9	05-Sep-01 19:30	02-Oct-01 09:00		1.05
	10	02-Oct-01 09:00	31-Oct-01 14:00		2.23
	11	31-Oct-01 14:00	05-Dec-01 16:30		0.48
	12	05-Dec-01 16:30	02-Jan-02 16:15		1.55
		Annual Mean Concentration =			1.34
Forsinard	1	08-Jan-01 11:00	05-Feb-01 10:50		3.04
	2	05-Feb-01 10:50	05-Mar-01 10:00		1.04
	3	05-Mar-01 10:00	02-Apr-01 09:45		1.71
	4	02-Apr-01 09:45	01-May-01 09:45		0.76
	5	01-May-01 09:45	05-Jun-01 10:00		0.66
	6	05-Jun-01 10:00	03-Jul-01 09:30		0.68
	7	03-Jul-01 09:30	06-Aug-01 09:30		0.81
	8	06-Aug-01 09:30	03-Sep-01 08:39		0.71
	9	03-Sep-01 08:39	02-Oct-01 09:15		0.86
	10	02-Oct-01 09:15	30-Oct-01 09:45		2.11
	11	30-Oct-01 09:45	04-Dec-01 10:50		1.06
	12	04-Dec-01 10:50	30-Dec-01 09:30		2.14
		Annual Mean Concentration =			1.27

Notes: * denotes extended sampling period (greater than the expected 4 or 5 week period). N denotes missing sample. Annual mean concentration only given if the data capture is greater than 75%.

Appendix 5
Denuder Measurements

AEA Technology
National Environmental Technology Centre

Appendix 5.1
Monthly Denuder Measurements

Table A5.1.1 provides a listing of the measurements and the the summary statistics of the monthly concentrations of HNO_3, SO_2 and HCl in the gas phase and of NO_3^-, SO_4^{2-}, Cl^-, Na^+, Mg^{2+} and Ca^{2+} in the aerosol phase.

The 12 sites which comprise the network are listed below:

Site Number	Site Name	Grid Ref
1	Bush OTC	NT245635
21	Glensaugh	NO664799
24	Rothamstead	TL123129
30	Strathvaich Dam	NH347750
31	Eskdalemuir	NT235030
32	High Muffles	SE776939
33	Stoke Ferry	TL700988
34	Yarner Wood	SX786789
83	Barcombe Mills	TQ438149
40	Sutton Bonnington	SK505268
45	Lough Navar	IH065545
70	Cwmystwyth	SN771742

Table A5.1.1a *Monthly Concentrations of HNO_3 and of Aerosol NO_3^- Measured at the 12 Monitoring Sites in the Nitric Acid Monitoring Network in 2001.*

Nitric Acid: μg HNO_3 m^{-3}

Month	Site 1	Site 21	Site 24	Site 30	Site 31	Site 32	Site 33	Site 34	Site 83	Site 40	Site 45	Site 70
Jan-01	0.78	*0.75* [3]	2.06	0.30	0.60	1.17	1.40	1.13	1.07	1.78	0.53	1.01
Feb-01	0.70	*0.75* [3]	2.07	0.23	0.52	1.52	1.57	0.93	ND [4]	2.52	0.24	0.42
Mar-01	0.86	0.42	1.66	0.25	0.61	1.10	1.31	0.78	*2.03* [3]	1.88	0.39	0.64
Apr-01	0.52	0.46	1.91	0.58	0.39	0.80	0.99	0.39	*2.03* [3]	2.41	0.15	0.25
May-01	0.98	1.05	2.06	0.70	1.08	1.07	1.57	1.74	1.64	2.06	0.84	1.30
Jun-01	0.56	0.49	2.97	0.19	0.44	1.06	1.82	0.97	1.84	2.63	0.20	0.80
Jul-01	0.56	0.59	2.77	0.24	0.54	0.79	1.85	0.74	1.65	2.18	0.20	0.46
Aug-01	0.57	0.16	2.89	0.08	0.36	1.09	1.89	0.58	0.57	2.31	0.12	0.49
Sep-01	0.50	0.25	0.27	0.22	0.35	0.62	0.93	0.63	1.17	1.80	0.11	0.34
Oct-01	0.54	0.89	1.51	0.23	0.55	1.20	0.75	0.40	0.97	1.53	0.15	0.37
Nov-01	0.35	0.09	1.82	0.02	0.20	0.86	1.42	0.59	ND [6]	2.17	0.07	0.21
Dec-01	1.17	0.62	2.11	0.08	0.42	1.31	1.69	1.29	1.57	3.15	0.34	1.04
Mean	0.67	0.54	2.01	0.26	0.51	1.05	1.43	0.85	1.46	2.20	0.28	0.61
Min	0.35	0.09	0.27	0.02	0.20	0.62	0.75	0.39	0.57	1.53	0.07	0.21
Max	1.17	1.05	2.97	0.70	1.08	1.52	1.89	1.74	1.84	3.15	0.84	1.30
SD	0.23	0.29	0.72	0.20	0.22	0.25	0.38	0.39	0.49	0.44	0.22	0.35
CV (%)	34.8	53.7	35.9	75.6	42.6	23.6	26.4	46.5	33.5	20.1	79.5	57.4
N	12	12	12	12	12	12	12	12	10	12	12	12

Aerosol Nitrate: μg NO_3^- m^{-3}

Month	Site 1	Site 21	Site 24	Site 30	Site 31	Site 32	Site 33	Site 34	Site 83	Site 40	Site 45	Site 70
Jan-01	2.30	*1.27* [3]	5.56	0.33	1.39	2.27	5.30	3.33	1.35	5.50	2.53	2.23
Feb-01	1.02	*1.27* [3]	4.57	0.20	1.05	2.09	3.96	2.53	ND [4]	4.17	0.67	1.26
Mar-01	2.17	1.34	3.09	0.54	1.48	2.63	5.05	2.05	*6.44* [3]	4.45	1.74	1.41
Apr-01	1.49	1.29	3.18	1.06	1.01	2.15	3.22	1.25	*6.44* [3]	3.25	0.66	0.92
May-01	1.98	1.10	3.58	0.77	1.23	2.12	3.37	4.30	3.95	3.67	2.00	2.99
Jun-01	1.16	0.67	2.87	0.28	0.84	2.11	3.29	1.72	2.77	2.85	0.78	1.68
Jul-01	1.38	0.80	3.31	0.21	1.01	1.42	2.88	0.76	2.74	2.68	0.47	0.77
Aug-01	1.01	0.90	3.95	0.24	0.70	2.33	3.70	1.15	2.53	3.44	0.28	0.97
Sep-01	1.14	0.51	0.32	0.30	0.62	1.19	2.33	1.83	2.14	2.79	0.69	1.26
Oct-01	1.30	1.22	2.71	0.49	1.08	3.03	3.36	1.51	2.56	3.36	0.54	1.39
Nov-01	0.59	0.19	3.73	0.09	0.41	1.53	3.39	1.52	ND [6]	3.54	0.22	0.81
Dec-01	1.18	0.95	3.67	0.23	0.69	1.53	3.35	2.69	3.10	3.57	1.31	1.60
Mean	1.39	0.96	3.38	0.39	0.96	2.03	3.60	2.05	3.40	3.61	0.99	1.44
Min	0.59	0.19	0.32	0.09	0.41	1.19	2.33	0.76	1.35	2.68	0.22	0.77
Max	2.30	1.34	5.56	1.06	1.48	3.03	5.30	4.30	3.95	5.50	2.53	2.99
SD	0.51	0.36	1.24	0.28	0.32	0.53	0.84	1.01	1.73	0.79	0.74	0.64
CV (%)	36.8	37.7	36.7	70.4	33.3	26.2	23.3	49.2	50.9	22.0	74.2	44.4
N	12	12	12	12	12	12	12	12	10	12	12	12

Note:
ND [1]: Power off during sampling period
Data [2] = Flow < 0.2 l /min (pump not working properly, or intermittent power cuts)
Data [3] = Samples exposed for more than one month
ND [4] = Samples lost
ND [5] = Problems with Aerosol Sampling
ND [6] = Water in sampling train
Data [7] = Treat negative numbers as zero

Table A5.1.1b *Monthly Concentrations of SO_2 and of Aerosol SO_4^{2-} Measured at the 12 Monitoring Sites in the Nitric Acid Monitoring Network in 2001.*

Sulphur Dioxide: µg SO_2 m^{-3}

Month	Site 1	Site 21	Site 24	Site 30	Site 31	Site 32	Site 33	Site 34	Site 83	Site 40	Site 45	Site 70
Jan-01	1.80	*1.89* [3]	5.03	0.35	1.45	4.08	3.80	1.73	1.89	4.69	0.82	2.35
Feb-01	2.16	*1.89* [3]	3.42	0.60	1.86	6.92	3.39	2.27	ND [4]	6.48	0.37	2.05
Mar-01	2.93	1.08	2.27	0.29	1.51	3.88	2.30	1.56	*3.28* [3]	4.66	1.14	1.07
Apr-01	1.19	0.75	3.75	0.23	1.28	2.95	2.41	0.93	*3.28* [3]	7.30	0.25	0.43
May-01	3.66	0.73	2.02	0.32	1.06	1.82	1.87	1.94	2.66	3.90	0.98	2.55
Jun-01	1.35	0.49	3.58	0.10	0.43	2.31	2.15	0.82	1.78	5.65	0.27	0.81
Jul-01	1.54	0.59	2.15	0.07	0.41	1.72	1.90	0.51	1.35	3.16	0.19	0.35
Aug-01	1.22	0.30	3.37	0.11	0.37	3.21	2.19	0.45	0.33	3.99	0.18	0.59
Sep-01	1.87	0.18	0.48	0.20	0.56	2.14	2.24	1.05	1.27	5.32	0.17	0.79
Oct-01	0.91	0.83	1.62	0.22	0.74	4.13	0.52	0.49	1.24	2.39	0.22	0.62
Nov-01	1.19	0.11	4.07	0.04	0.53	2.78	3.35	1.30	ND [6]	6.74	0.11	0.46
Dec-01	2.19	2.27	5.54	0.05	1.43	4.17	3.79	2.07	3.01	7.59	0.46	2.78
Mean	1.83	0.93	3.11	0.22	0.97	3.34	2.49	1.26	2.01	5.16	0.43	1.24
Min	0.91	0.11	0.48	0.04	0.37	1.72	0.52	0.45	0.33	2.39	0.11	0.35
Max	3.66	2.27	5.54	0.60	1.86	6.92	3.80	2.27	3.01	7.59	1.14	2.78
SD	0.81	0.72	1.45	0.16	0.52	1.44	0.95	0.65	1.01	1.65	0.35	0.92
CV (%)	44.0	77.7	46.8	74.8	54.0	43.1	38.0	51.4	50.1	32.1	81.4	74.0
N	12	12	12	12	12	12	12	12	10	12	12	12

Aerosol Sulphate: µg SO_4^{2-} m^{-3}

Month	Site 1	Site 21	Site 24	Site 30	Site 31	Site 32	Site 33	Site 34	Site 83	Site 40	Site 45	Site 70
Jan-01	1.45	*0.89* [3]	2.65	0.49	1.16	1.49	2.87	1.46	1.36	3.38	1.36	1.50
Feb-01	0.73	*0.89* [3]	2.26	0.43	0.62	1.16	2.30	1.35	ND [4]	2.55	0.76	0.83
Mar-01	1.71	0.95	1.79	0.71	1.23	1.84	2.56	1.50	*4.02* [3]	2.67	1.53	1.39
Apr-01	1.17	0.88	1.69	0.97	0.96	1.37	1.42	1.10	*4.02* [3]	1.82	1.05	1.06
May-01	1.95	1.09	2.16	1.27	1.26	1.56	1.74	2.27	1.76	2.20	1.56	1.80
Jun-01	1.24	0.69	2.99	0.58	1.08	1.83	2.35	1.93	2.27	2.59	0.99	1.94
Jul-01	1.38	0.69	2.40	0.49	1.30	1.55	2.27	1.15	2.65	2.02	0.61	1.08
Aug-01	0.84	0.67	2.42	0.37	0.68	1.51	2.12	1.23	2.00	1.65	0.54	1.01
Sep-01	0.79	0.31	0.14	0.57	0.72	0.83	1.33	1.69	1.47	1.80	0.91	1.10
Oct-01	1.42	0.72	1.54	0.80	1.13	1.84	1.88	1.26	1.85	1.87	0.81	1.43
Nov-01	0.59	0.17	2.08	0.32	0.58	1.50	1.80	1.14	ND [6]	2.20	0.42	0.72
Dec-01	0.71	0.51	1.89	0.29	0.43	0.80	1.46	1.61	1.80	1.77	0.91	1.01
Mean	1.16	0.71	2.00	0.61	0.93	1.44	2.01	1.47	2.32	2.21	0.95	1.24
Min	0.59	0.17	0.14	0.29	0.43	0.80	1.33	1.10	1.36	1.65	0.42	0.72
Max	1.95	1.09	2.99	1.27	1.30	1.84	2.87	2.27	2.65	3.38	1.56	1.94
SD	0.43	0.27	0.72	0.29	0.31	0.35	0.48	0.35	0.97	0.51	0.37	0.37
CV (%)	37.4	38.0	35.9	47.4	33.0	24.6	24.0	24.0	41.8	22.9	38.8	30.3
N	12	12	12	12	12	12	12	12	10	12	12	12

Note:
ND [1]: Power off during sampling period
Data [2] = Flow < 0.2 l /min (pump not working properly, or intermittent power cuts)
Data [3] = Samples exposed for more than one month
ND [4] = Samples lost
ND [5] = Problems with Aerosol Sampling
ND [6] = Water in sampling train
Data [7] = Treat negative numbers as zero

Table A5.1.1c *Monthly Concentrations of HCl and of Aerosol Cl⁻ Measured at the 12 Monitoring Sites in the Nitric Acid Monitoring Network in 2001.*

Hydrochloric Acid: µg HCl m^{-3}

Month	Site 1	Site 21	Site 24	Site 30	Site 31	Site 32	Site 33	Site 34	Site 83	Site 40	Site 45	Site 70
Jan-01	0.17	*0.33* [3]	0.27	0.21	0.22	0.36	0.30	0.41	0.42	0.25	0.13	0.20
Feb-01	0.35	*0.33* [3]	0.46	0.45	0.21	0.37	0.36	0.46	ND [4]	0.40	0.12	0.84
Mar-01	0.33	0.26	0.41	0.24	0.24	0.33	0.43	0.39	*0.69* [3]	0.47	0.16	0.29
Apr-01	0.33	0.26	0.49	0.22	0.28	0.29	0.38	0.24	*0.69* [3]	0.48	0.15	0.08
May-01	0.31	0.29	0.36	0.23	0.19	0.86	0.53	0.38	0.56	0.36	0.17	0.28
Jun-01	0.21	0.31	0.50	0.20	0.20	0.31	0.52	0.33	0.49	0.48	0.12	0.17
Jul-01	0.13	0.22	0.30	0.10	0.22	0.21	0.39	0.24	0.40	0.28	0.09	0.16
Aug-01	0.07	0.09	0.17	0.07	0.07	0.12	0.26	0.12	0.07	0.23	0.02	0.10
Sep-01	0.15	0.29	0.09	0.16	0.14	0.26	0.23	0.19	0.32	0.25	0.07	0.33
Oct-01	0.18	0.59	0.32	0.19	0.23	0.27	0.14	0.30	0.32	0.29	0.11	0.27
Nov-01	0.15	0.36	0.28	0.17	0.10	0.23	0.29	0.16	ND [6]	0.20	0.08	0.11
Dec-01	0.18	0.33	0.32	0.09	0.19	0.23	0.20	2.00	0.23	0.31	0.12	0.30
Mean	0.21	0.31	0.33	0.19	0.19	0.32	0.34	0.44	0.42	0.33	0.11	0.26
Min	0.07	0.09	0.09	0.07	0.07	0.12	0.14	0.12	0.07	0.20	0.02	0.08
Max	0.35	0.59	0.50	0.45	0.28	0.86	0.53	2.00	0.56	0.48	0.17	0.84
SD	0.09	0.11	0.12	0.10	0.06	0.18	0.12	0.50	0.20	0.10	0.04	0.20
CV (%)	43.3	37.7	37.5	50.1	30.4	57.3	36.2	115.8	47.1	30.3	36.2	77.3
N	12	12	12	12	12	12	12	12	10	12	12	12

Aerosol Chloride: µg Cl^- m^{-3}

Month	Site 1	Site 21	Site 24	Site 30	Site 31	Site 32	Site 33	Site 34	Site 83	Site 40	Site 45	Site 70
Jan-01	1.02	*0.98* [3]	1.62	0.43	0.83	1.11	1.92	2.23	3.63	2.09	1.25	1.35
Feb-01	1.10	*0.98* [3]	1.30	0.43	0.81	1.20	1.54	1.74	ND [4]	1.79	1.36	1.22
Mar-01	1.08	0.87	0.88	1.09	0.69	1.00	1.22	2.21	*3.38* [3]	1.25	0.94	1.50
Apr-01	0.86	0.77	1.19	0.44	0.71	1.34	1.37	1.43	*3.38* [3]	1.40	1.39	0.72
May-01	0.64	0.28	0.50	0.58	0.34	0.60	0.76	0.56	1.19	0.63	0.61	0.67
Jun-01	0.66	0.31	0.44	0.56	0.57	0.62	0.60	0.91	0.61	0.62	1.08	0.69
Jul-01	0.81	0.22	0.60	0.46	0.41	0.57	0.48	0.82	1.00	0.48	0.60	0.74
Aug-01	0.46	0.28	0.33	0.57	0.32	0.31	0.32	0.70	0.78	0.36	0.57	0.48
Sep-01	0.91	0.40	0.21	0.63	0.83	0.96	1.18	1.68	2.27	1.06	1.29	0.97
Oct-01	0.93	0.68	1.32	0.80	0.81	0.89	1.24	2.53	1.76	1.26	1.94	2.93
Nov-01	0.86	0.49	1.13	1.20	0.71	1.02	1.12	0.96	ND [6]	1.48	0.92	0.78
Dec-01	0.64	0.50	1.10	0.57	0.40	0.76	1.10	1.22	0.80	1.35	0.89	1.03
Mean	0.83	0.56	0.89	0.65	0.62	0.87	1.07	1.42	1.88	1.15	1.07	1.09
Min	0.46	0.22	0.21	0.43	0.32	0.31	0.32	0.56	0.61	0.36	0.57	0.48
Max	1.10	0.87	1.62	1.20	0.83	1.34	1.92	2.53	3.63	2.09	1.94	2.93
SD	0.20	0.28	0.46	0.26	0.20	0.30	0.46	0.66	1.20	0.54	0.40	0.66
CV (%)	23.6	50.5	51.4	39.5	32.5	34.5	43.0	46.6	63.8	46.6	37.6	60.1
N	12	12	12	12	12	12	12	12	10	12	12	12

Note:
ND [1]: Power off during sampling period
Data [2] = Flow < 0.2 l /min (pump not working properly, or intermittent power cuts)
Data [3] = Samples exposed for more than one month
ND [4] = Samples lost
ND [5] = Problems with Aerosol Sampling
ND [6] = Water in sampling train
Data [7] = Treat negative numbers as zero

Table A5.1.1d *Monthly Concentrations of Aerosol Ca^{2+} and Mg^{2+} Measured at the 12 Monitoring Sites in the Nitric Acid Monitoring Network in 2001.*

Calcium: μg Ca^{2+} m^{-3}

Month	Site 1	Site 21	Site 24	Site 30	Site 31	Site 32	Site 33	Site 34	Site 83	Site 40	Site 45	Site 70
Jan-01	0.04	*0.03* [3]	0.04	0.01	0.02	0.03	0.06	0.06	0.11	0.06	0.04	0.04
Feb-01	0.00	*0.03* [3]	0.02	*-0.04* [7]	0.00	0.03	0.06	0.05	ND [4]	0.05	0.02	0.01
Mar-01	0.02	0.00	0.02	0.04	0.01	0.03	0.07	0.05	*0.12* [3]	0.05	0.04	0.05
Apr-01	0.01	0.02	0.07	0.01	0.01	0.04	0.04	0.05	*0.12* [3]	0.06	0.07	0.03
May-01	0.02	0.00	0.04	0.03	0.02	0.03	0.07	0.06	0.07	0.07	0.03	0.07
Jun-01	0.03	*-0.08* [7]	0.04	0.02	0.02	0.04	0.08	0.04	0.05	0.06	0.03	0.05
Jul-01	0.00	*-0.02* [7]	0.06	0.03	0.01	0.02	0.05	0.04	0.04	0.05	0.04	0.02
Aug-01	0.02	*-0.03* [7]	0.03	0.01	0.01	0.03	0.05	0.03	0.03	0.04	0.01	0.01
Sep-01	*-0.03* [7]	*-0.10* [7]	*-0.03* [7]	*-0.03* [7]	*-0.01* [7]	*-0.02* [7]	0.03	0.01	0.02	0.01	*-0.01* [7]	*-0.06* [7]
Oct-01	*-0.01* [7]	0.00	0.04	0.02	0.03	0.03	0.09	0.07	0.10	0.07	0.06	*-0.02* [7]
Nov-01	0.00	*-0.07* [7]	*-0.03* [7]	*-0.01* [7]	*-0.02* [7]	*-0.02* [7]	0.04	0.01	ND [6]	0.05	0.02	0.02
Dec-01	0.05	0.09	0.07	0.06	0.05	0.07	0.08	0.08	0.49	0.11	0.00	0.01
Mean	0.02	0.01	0.04	0.02	0.02	0.03	0.06	0.05	0.12	0.06	0.03	0.03
Min	0.00	0.00	0.02	0.01	0.00	0.02	0.03	0.01	0.02	0.01	0.00	0.01
Max	0.05	0.09	0.07	0.06	0.05	0.07	0.09	0.08	0.49	0.11	0.07	0.07
SD	0.02	0.03	0.02	0.02	0.01	0.02	0.02	0.02	0.14	0.02	0.02	0.02
CV (%)	98.9	178.9	66.4	102.3	96.7	61.0	30.4	44.4	117.5	39.8	66.3	86.1
N	12	12	12	12	12	12	12	12	10	12	12	12

Magnesium: μg Mg^{2+} m^{-3}

Month	Site 1	Site 21	Site 24	Site 30	Site 31	Site 32	Site 33	Site 34	Site 83	Site 40	Site 45	Site 70
Jan-01	0.05	*0.09* [3]	0.07	0.03	0.05	0.07	0.10	0.13	0.23	0.08	0.07	0.09
Feb-01	0.07	*0.09* [3]	0.07	0.04	0.05	0.07	0.10	0.13	ND [4]	0.09	0.09	0.08
Mar-01	0.07	0.08	0.07	0.08	0.05	0.07	0.10	0.13	*0.21* [3]	0.08	0.06	0.08
Apr-01	0.05	0.06	0.09	0.03	0.05	0.09	0.10	0.10	*0.21* [3]	0.09	0.10	0.06
May-01	0.04	0.04	0.04	0.04	0.03	0.05	0.06	0.05	0.09	0.05	0.04	0.05
Jun-01	0.05	0.01	0.05	0.04	0.05	0.05	0.06	0.08	0.06	0.05	0.07	0.05
Jul-01	0.04	0.02	0.05	0.03	0.04	0.04	0.04	0.06	0.08	0.05	0.06	0.06
Aug-01	0.04	0.03	0.04	0.04	0.03	0.04	0.04	0.06	0.07	0.05	0.04	0.04
Sep-01	0.01	*-0.02* [7]	*-0.02* [7]	0.00	0.02	0.04	0.06	0.08	0.12	0.05	0.06	0.01
Oct-01	0.05	0.09	0.10	0.07	0.07	0.06	0.11	0.15	0.17	0.11	0.11	0.05
Nov-01	0.02	0.02	0.03	0.06	0.03	0.06	0.07	0.07	ND [6]	0.08	0.06	0.06
Dec-01	0.03	0.03	0.05	0.04	0.03	0.06	0.07	0.09	0.13	0.07	0.03	0.05
Mean	0.04	0.05	0.05	0.04	0.04	0.06	0.07	0.09	0.14	0.07	0.07	0.06
Min	0.01	0.01	0.03	0.00	0.02	0.04	0.04	0.05	0.06	0.05	0.03	0.01
Max	0.07	0.09	0.10	0.08	0.07	0.09	0.11	0.15	0.23	0.11	0.11	0.09
SD	0.02	0.03	0.03	0.02	0.01	0.02	0.02	0.03	0.06	0.02	0.02	0.02
CV (%)	45.4	69.6	49.5	46.6	30.2	26.4	32.2	36.6	46.9	30.2	35.2	34.6
N	12	12	12	12	12	12	12	12	10	12	12	12

Note:
ND [1]: Power off during sampling period
Data [2] = Flow < 0.2 l /min (pump not working properly, or intermittent power cuts)
Data [3] = Samples exposed for more than one month
ND [4] = Samples lost
ND [5] = Problems with Aerosol Sampling
ND [6] = Water in sampling train
Data [7] = Treat negative numbers as zero

Table A5.1.1e *Monthly Concentrations of Aerosol Na^+ Measured at the 12 Monitoring Sites in the Nitric Acid Monitoring Network in 2001.*

Sodium: μg Na^+ m^{-3}

Month	Site 1	Site 21	Site 24	Site 30	Site 31	Site 32	Site 33	Site 34	Site 83	Site 40	Site 45	Site 70
Jan-01	0.63	***0.94*** [3]	0.83	0.32	0.56	0.75	1.02	1.35	2.64	0.91	0.73	0.85
Feb-01	0.83	***0.94*** [3]	0.78	0.47	0.55	0.79	1.07	1.40	**ND** [4]	0.92	0.89	0.84
Mar-01	0.80	0.70	0.70	0.79	0.54	0.72	0.96	1.34	***2.14*** [3]	0.79	0.61	0.92
Apr-01	0.53	0.51	0.83	0.19	0.46	0.88	0.94	0.89	***2.14*** [3]	0.84	1.01	0.27
May-01	0.46	0.24	0.42	0.45	0.24	0.48	0.58	0.48	0.90	0.44	0.40	0.42
Jun-01	0.56	0.29	0.50	0.41	0.54	0.55	0.58	0.84	0.58	0.50	0.79	0.55
Jul-01	0.49	0.18	0.56	0.34	0.44	0.49	0.42	0.65	0.90	0.38	0.47	0.65
Aug-01	0.30	0.13	0.24	0.38	0.24	0.17	0.25	0.49	0.64	0.12	0.37	0.33
Sep-01	0.61	0.33	0.14	0.49	0.63	0.69	1.03	1.26	1.69	0.78	0.89	0.72
Oct-01	0.70	0.69	0.97	0.68	0.61	0.65	1.01	1.49	1.44	0.92	1.07	0.57
Nov-01	0.66	0.59	0.73	0.90	0.52	0.73	0.74	0.73	**ND** [6]	0.74	0.71	0.60
Dec-01	0.47	0.40	0.70	0.44	0.35	0.57	0.67	0.88	0.63	0.65	0.68	0.85
Mean	0.59	0.50	0.62	0.49	0.47	0.62	0.77	0.98	1.37	0.67	0.72	0.63
Min	0.30	0.13	0.14	0.19	0.24	0.17	0.25	0.48	0.58	0.12	0.37	0.27
Max	0.83	0.70	0.97	0.90	0.63	0.88	1.07	1.49	2.64	0.92	1.07	0.92
SD	0.15	0.28	0.25	0.20	0.13	0.19	0.27	0.37	0.75	0.25	0.23	0.21
CV (%)	25.7	56.4	40.7	41.8	28.3	29.8	35.3	37.2	54.8	38.2	31.8	33.8
N	12	12	12	12	12	12	12	12	10	12	12	12

Note:
ND [1]: Power off during sampling period
Data [2] = Flow < 0.2 l /min (pump not working properly, or intermittent power cuts)
Data [3] = Samples exposed for more than one month
ND [4] = Samples lost
ND [5] = Problems with Aerosol Sampling
ND [6] = Water in sampling train
Data [7] = Treat negative numbers as zero

Appendix 5.2
Daily Denuder Measurements

AEA Technology
National Environmental Technology Centre

Table A5.2.1 ***Daily Concentrations of HNO_3, HNO_2, SO_2, and HCl Measured at Barcombe Mills between April 2000 and July 2001.***

Date	HNO_3 (µg m^{-3})	HNO_2 (µg m^{-3})	SO_2 (µg m^{-3})	HCl (µg m^{-3})
	No sampling between 01-Jan-2001 and 10-Apr-2001			
11/04/01	2.00	1.31	3.33	0.59
12/04/01	3.23	0.57	4.01	0.88
13/04/01	0.77	0.66	1.19	0.79
14/04/01	0.56	0.62	0.75	0.35
15/04/01	FAILED			
16/04/01	FAILED			
17/04/01	1.52	0.68	2.20	0.59
18/04/01	Delayed sample			
19/04/01	Changeover			
20/04/01	0.90	0.28	1.81	0.72
21/04/01	1.57	0.44	4.32	0.26
22/04/01	FAILED			
23/04/01	0.63	0.59	2.15	0.13
24/04/01	0.26	0.28	1.34	0.33
25/04/01	0.44	0.27	2.02	0.29
26/04/01	0.40	0.44	1.03	0.10
27/04/01	0.62	0.20	1.92	0.39
28/04/01	0.41	0.15	1.03	0.38
29/04/01	0.62	0.33	4.03	0.23
30/04/01	1.46	0.32	9.75	0.29
01/05/01	1.03	0.26	2.32	0.70
02/05/01	FAILED			
03/05/01	0.83	0.29	2.73	0.28
04/05/01	0.50	0.22	3.90	0.41
05/05/01	0.64	0.29	4.12	0.44
06/05/01	0.69	0.27	3.75	0.60
07/05/01	0.89	0.21	1.25	0.34
08/05/01	0.97	0.26	1.33	0.38
09/05/01	2.19	0.51	2.22	0.40
10/05/01	2.97	1.01	4.68	0.45
11/05/01	2.93	0.37	2.91	0.39
12/05/01	2.59	0.37	2.63	0.34
13/05/01	1.27	0.36	2.34	0.34
14/05/01	1.06	0.40	1.91	0.35
15/05/01	0.90	0.19	2.57	0.33
16/05/01	FAILED			
17/05/01	0.41	0.18	2.07	0.31
18/05/01	FAILED			
19/05/01	2.44	1.34	5.88	1.27
20/05/01	1.56	0.22	1.99	0.32
21/05/01	1.34	0.19	1.88	0.35
22/05/01	2.97	0.19	2.96	0.45
23/05/01	FAILED			
24/05/01	2.51	0.17	1.33	0.56
25/05/01	FAILED			
26/05/01	1.39	0.20	0.91	0.31
27/05/01	1.33	0.31	1.18	0.27
28/05/01	0.86	0.26	0.79	0.29
29/05/01	1.43	0.35	1.65	0.38
30/05/01	1.01	0.29	2.17	0.38
31/05/01	0.62	0.31	1.29	0.22
01/06/01	0.55	0.21	0.96	0.19
02/06/01	0.62	0.27	2.17	0.35
03/06/01	Power			
04/06/01	Failure			
05/06/01	0.54	0.21	0.96	0.22
06/06/01	0.69	0.23	1.99	0.36
07/06/01	Power Failure			
08/06/01	0.96	0.27	1.68	0.30
09/06/01	0.75	0.29	0.98	0.26
10/06/01	1.04	0.34	2.09	0.52
11/06/01	1.28	0.16	1.31	0.33
12/06/01	1.72	0.31	1.79	0.37
13/06/01	1.71	0.26	1.50	0.31
14/06/01	1.14	0.39	3.25	0.42
15/06/01	0.35	0.13	1.04	0.41
16/06/01	1.05	0.31	1.03	0.20
17/06/01	1.23	0.44	3.47	0.36
18/06/01	2.55	0.35	2.48	0.45
19/06/01	4.18	0.40	4.33	0.70
20/06/01	1.68	0.57	3.40	0.45
21/06/01	Engineer servicing equipment			
22/06/01	1.93	0.30	3.18	0.35
23/06/01	3.30	0.42	3.08	0.40
24/06/01	4.41	0.38	3.66	0.43
25/06/01	5.88	0.33	4.51	0.43
26/06/01	2.57	0.26	2.03	0.51
27/06/01	0.87	0.24	1.72	0.88
28/06/01	0.55	0.28	1.73	0.59
29/06/01	1.01	0.26	2.43	0.43
30/06/01	0.57	0.23	1.26	0.43
01/07/01	1.21	0.47	1.50	0.26
02/07/01	2.73	0.46	1.95	0.34
03/07/01	3.87	0.62	2.92	0.53
04/07/01	2.08	0.81	2.54	0.35
05/07/01	1.52	0.52	2.50	0.30
06/07/01	Site			
07/07/01	Operator			
08/07/01	Did			
09/07/01	Not			
10/07/01	Start			
11/07/01	Program			
12/07/01				
13/07/01	0.39	0.27	0.86	0.36
14/07/01	0.63	0.28	0.96	0.26
15/07/01	0.75	0.30	0.90	0.19
16/07/01	1.12	0.29	1.39	0.40
17/07/01	0.31	0.12	0.71	0.65
18/07/01	0.76	0.27	1.53	0.29
19/07/01	1.01	0.47	3.13	0.40
20/07/01	0.51	0.12	1.12	0.55
21/07/01	0.55	0.17	1.08	0.32
22/07/01	1.03	0.28	0.99	0.33
23/07/01	1.17	0.34	1.14	0.36
24/07/01	2.78	0.43	2.83	0.29
25/07/01	3.59	0.41	3.56	0.45
26/07/01	3.29	0.44	2.11	0.36
27/07/01	3.25	0.36	1.84	0.30
28/07/01	2.96	0.51	2.83	0.27
29/07/01	3.17	0.46	3.35	0.24
30/07/01	1.26	0.48	1.42	0.32
31/07/01	1.45	0.34	2.64	0.72
01/08/01	1.22	0.74	3.16	0.79
02/08/01	1.52	0.59	1.20	0.30
03/08/01	0.42	0.17	1.58	0.38
04/08/01	0.42	0.13	1.24	0.45
05/08/01	0.47	0.15	1.02	0.37

Table A5.2.1 ***Daily Concentrations of HNO_3, HNO_2, SO_2, and HCl Measured at Barcombe Mills between April 2000 and July 2001.***

Date	HNO_3 (µg m^{-3})	HNO_2 (µg m^{-3})	SO_2 (µg m^{-3})	HCl (µg m^{-3})
06/08/01	0.22	0.09	0.86	0.54
07/08/01	0.35	0.18	1.08	1.06
08/08/01	0.27	0.17	0.98	0.39
09/08/01	0.47	0.22	0.72	0.32
10/08/01	0.68	0.18	1.65	0.35
11/08/01	0.61	0.14	1.79	0.67
12/08/01	0.44	0.11	0.68	0.50
13/08/01	1.05	0.16	0.71	0.45
14/08/01	1.56	0.48	1.99	0.32
15/08/01	0.89	0.39	1.73	0.50
16/08/01	0.36	0.18	0.92	0.51
17/08/01	1.41	0.32	1.88	0.26
18/08/01	0.30	0.12	1.15	0.52
19/08/01	0.52	0.15	1.71	0.61
20/08/01	0.98	0.21	2.30	0.32
21/08/01	1.42	0.34	1.80	0.39
22/08/01	3.21	0.70	4.55	0.52
23/08/01	4.64	0.89	5.40	0.44
24/08/01	2.09	0.47	2.33	0.21
25/08/01	1.78	0.82	2.16	0.32
26/08/01	0.92	0.34	1.84	0.23
27/08/01	1.26	0.27	2.07	0.31
28/08/01	1.80	0.33	1.98	0.25
29/08/01	1.35	0.77	2.18	0.27
30/08/01	0.78	0.32	2.17	0.21
31/08/01	0.89	0.46	1.93	0.21
01/09/01	0.58	0.20	1.37	0.23
02/09/01	0.57	0.27	1.45	0.24
03/09/01	0.54	0.23	1.56	0.17
04/09/01	0.67	0.33	1.70	0.23
05/09/01	0.59	0.30	1.86	0.25
06/09/01	0.65	0.41	1.82	0.34
07/09/01				
08/09/01				
09/09/01				
10/09/01	Site			
11/09/01	Operator			
12/09/01	Off			
13/09/01	Sick			
14/09/01				
15/09/01				
16/09/01				
17/09/01	0.50	0.44	5.15	0.27
18/09/01	0.44	0.25	2.33	0.14
19/09/01	0.97	0.48	3.60	0.26
20/09/01	1.12	0.46	1.53	0.29
21/09/01	1.30	0.54	3.70	0.21
22/09/01	0.94	0.39	2.07	0.28
23/09/01	0.59	0.28	1.50	0.28
24/09/01	1.30	0.40	1.35	0.18
25/09/01	1.03	0.33	0.90	0.17
26/09/01	0.39	0.16	0.56	0.30
27/09/01	0.92	0.25	1.54	0.27
28/09/01	1.78	0.35	1.91	0.39
29/09/01	0.48	0.18	0.84	0.58
30/09/01	0.25	0.14	0.85	1.00
01/10/01	0.36	0.14	0.70	0.73
02/10/01	0.47	0.18	0.67	0.53
03/10/01	0.24	0.10	0.70	0.51
04/10/01	0.74	0.21	1.90	0.89

Date	HNO_3 (µg m^{-3})	HNO_2 (µg m^{-3})	SO_2 (µg m^{-3})	HCl (µg m^{-3})
05/10/01	0.82	0.15	2.13	0.83
06/10/01	0.13	0.08	0.58	0.61
07/10/01	0.07	0.06	0.54	1.45
08/10/01	Delayed sample			
09/10/01	Changeover			
10/10/01	0.39	0.15	1.02	0.62
11/10/01	0.77	0.30	1.39	0.31
12/10/01	0.81	0.91	3.19	0.27
13/10/01	0.55	0.66	1.49	0.33
14/10/01	0.47	0.18	2.69	0.54
15/10/01	0.17	0.18	0.76	0.50
16/10/01	0.76	0.49	2.04	0.48
17/10/01	1.27	0.43	1.84	0.60
18/10/01	0.47	0.30	0.93	0.38
19/10/01	0.73	0.41	1.70	0.31
20/10/01	0.30	0.51	1.84	0.16
21/10/01	0.64	0.31	1.39	0.35
22/10/01	0.58	0.20	1.60	0.68
23/10/01	0.25	0.12	0.69	0.85
24/10/01	0.27	0.13	1.35	0.77
25/10/01	0.45	0.12	1.51	0.52
26/10/01	0.22	0.12	0.67	0.47
27/10/01	0.33	0.36	1.29	0.22
28/10/01	0.30	0.35	0.97	0.11
29/10/01	1.04	0.21	1.92	0.44
30/10/01	0.32	0.10	1.09	0.58
31/10/01	-0.03	0.03	0.11	0.04
01/11/01	0.26	0.45	1.26	0.15
02/11/01	-0.03	0.05	0.15	0.01
03/11/01	0.26	0.64	1.25	0.12
04/11/01	-0.01	0.04	0.16	0.02
05/11/01	0.36	0.32	1.34	0.24
06/11/01	0.28	0.22	1.13	0.16
	Sampling Programme discontinued			

Mean	1.14	0.34	1.95	0.40
SD	1.00	0.21	1.22	0.21
CV (%)	87.3	61.5	62.4	52.4
N	177	177	177	177

Table A5.2.2 *Daily Concentrations of Aerosol NO_3^-, SO_4^{2-} and Cl^- Measured at Barcombe Mills between April 2000 and July 2001.*

Date	NO_3 (µg m^{-3})			SO_4 (µg m^{-3})			Cl (µg m^{-3})		
	Teflon	Nylon	Sum	Teflon	Nylon	Sum	Teflon	Nylon	Sum
	No sampling between 01-Jan-2001 and 10-Apr-2001								
11-Apr-01	1.84	2.69	4.53	3.64	-0.01	3.63	-0.02	0.50	0.47
12-Apr-01	0.44	1.25	1.69	2.71	-0.01	2.70	0.25	0.27	0.51
13-Apr-01	0.74	0.39	1.13	1.32	0.06	1.38	0.25	0.46	0.71
14-Apr-01	0.32	0.48	0.80	2.91	-0.01	2.90	0.00	0.42	0.42
15-Apr-01	FAILED								
16-Apr-01	FAILED								
17-Apr-01	0.56	0.34	0.90	2.41	-0.01	2.40	0.09	0.40	0.49
18-Apr-01	Delayed sample								
19-Apr-01	Changeover								
20-Apr-01	0.70	0.60	1.31	1.43	0.32	1.75	0.09	0.31	0.40
21-Apr-01	0.72	2.62	3.34	1.32	0.92	2.23	0.00	0.39	0.39
22-Apr-01	FAILED								
23-Apr-01	0.54	1.78	2.32	1.00	0.78	1.79	0.00	0.30	0.30
24-Apr-01	0.80	0.04	0.84	0.85	0.03	0.87	1.03	0.10	1.13
25-Apr-01	FAILED								
26-Apr-01	0.61	0.12	0.73	0.60	0.07	0.67	0.05	0.18	0.24
27-Apr-01	0.54	0.38	0.92	1.87	0.17	2.05	0.55	0.26	0.82
28-Apr-01	0.22	0.03	0.25	0.39	0.18	0.57	0.58	0.11	0.70
29-Apr-01	0.17	1.84	2.01	0.96	0.02	0.98	-0.02	0.10	0.08
30-Apr-01	0.34	0.90	1.25	1.45	0.52	1.96	0.01	0.12	0.14
01-May-01	1.72	0.36	2.08	3.93	0.04	3.97	0.17	0.75	0.92
02-May-01	FAILED								
03-May-01	0.73	0.13	0.86	0.77	0.21	0.98	0.57	0.24	0.81
04-May-01	0.81	0.09	0.90	1.37	0.01	1.38	0.23	0.24	0.47
05-May-01	0.49	0.11	0.59	1.32	0.02	1.34	0.22	0.23	0.46
06-May-01	0.69	0.10	0.79	1.61	0.01	1.62	0.17	0.21	0.38
07-May-01	0.35	0.18	0.53	0.65	0.02	0.67	0.00	0.11	0.11
08-May-01	0.77	0.62	1.40	1.49	0.02	1.51	0.00	0.18	0.18
09-May-01	3.83	2.25	6.07	2.99	0.03	3.02	0.02	0.21	0.23
10-May-01	7.61	1.86	9.47	5.74	0.03	5.77	0.02	0.20	0.22
11-May-01	0.15	3.69	3.83	4.06	-0.01	4.05	-0.04	-0.05	-0.09
12-May-01	0.70	3.38	4.08	2.00	0.48	2.48	-0.01	-0.02	-0.03
13-May-01	0.99	0.88	1.87	2.09	0.01	2.10	0.07	0.42	0.49
14-May-01	0.73	1.48	2.22	3.43	0.00	3.43	0.03	0.48	0.51
15-May-01	0.50	0.99	1.49	2.81	0.00	2.80	0.29	0.25	0.53
16-May-01	FAILED								
17-May-01	0.64	0.07	0.71	1.70	-0.01	1.69	0.14	0.04	0.18
18-May-01	FAILED								
19-May-01	0.58	0.39	0.98	0.64	2.13	2.77	0.00	0.91	0.91
20-May-01	0.15	1.20	1.36	3.02	0.08	3.10	0.00	0.13	0.13
21-May-01	0.35	0.39	0.75	0.93	0.10	1.03	0.02	0.15	0.17
22-May-01	0.44	1.09	1.53	1.62	0.14	1.77	0.00	0.16	0.16
23-May-01	FAILED								
24-May-01	0.21	0.64	0.84	5.00	0.63	5.63	0.00	0.24	0.24
25-May-01	FAILED								
26-May-01	0.05	0.65	0.70	2.49	0.91	3.39	0.03	0.09	0.11
27-May-01	0.04	0.87	0.91	5.98	0.03	6.01	0.00	0.17	0.17
28-May-01	0.09	0.83	0.92	4.38	0.04	4.42	0.00	0.23	0.23
29-May-01	0.16	0.33	0.49	0.71	0.45	1.16	0.00	0.24	0.24
30-May-01	0.17	0.31	0.48	1.67	-0.05	1.62	0.00	0.15	0.15
31-May-01	0.11	0.35	0.46	1.32	0.06	1.37	0.00	0.11	0.11
01-Jun-01	0.14	0.36	0.50	1.60	0.01	1.61	0.01	0.15	0.16
02-Jun-01	0.20	0.30	0.50	1.71	0.12	1.83	0.02	0.14	0.16
03-Jun-01	Power								
04-Jun-01	Failure								
05-Jun-01	0.25	0.22	0.47	1.57	0.02	1.59	0.04	0.13	0.16
06-Jun-01	0.15	0.05	0.20	1.15	0.03	1.18	0.01	0.04	0.05
07-Jun-01	Power Failure								
08-Jun-01	0.08	0.13	0.21	1.03	0.05	1.07	0.00	0.04	0.04
09-Jun-01	0.09	0.68	0.76	1.42	0.27	1.69	0.01	0.13	0.14
10-Jun-01	0.18	0.69	0.87	2.22	0.09	2.32	0.00	0.22	0.22
11-Jun-01	0.05	0.51	0.55	0.91	1.15	2.06	0.00	0.11	0.11
12-Jun-01	0.14	1.33	1.47	2.66	0.02	2.68	0.00	0.13	0.13
13-Jun-01	0.22	1.01	1.24	2.49	0.57	3.06	0.03	0.14	0.17
14-Jun-01	0.66	1.17	1.83	2.89	0.05	2.95	0.07	0.34	0.41
15-Jun-01	0.17	0.04	0.22	0.60	0.01	0.61	0.10	0.07	0.17
16-Jun-01	0.06	0.74	0.80	0.74	1.54	2.28	0.00	0.17	0.17
17-Jun-01	0.10	0.43	0.53	3.53	0.08	3.61	0.00	0.30	0.30
18-Jun-01	0.07	0.93	1.00	2.09	0.70	2.79	0.02	0.48	0.49
19-Jun-01	0.02	1.58	1.60	0.00	1.24	1.24	0.02	0.28	0.30
20-Jun-01	0.07	0.66	0.73	3.16	0.17	3.33	0.00	0.28	0.28
21-Jun-01	Engineer servicing equipment								
22-Jun-01	0.10	0.40	0.50	2.36	-0.09	2.27	0.01	0.09	0.10
23-Jun-01	0.07	2.12	2.19	3.55	0.38	3.94	-0.01	0.13	0.12
24-Jun-01	0.10	3.16	3.27	4.44	1.19	5.63	0.01	0.09	0.09
25-Jun-01	0.10	1.50	1.59	5.71	0.00	5.72	0.01	0.02	0.03
26-Jun-01	0.13	1.14	1.27	6.83	-0.07	6.76	-0.01	0.36	0.35
27-Jun-01	0.26	0.06	0.32	1.93	-0.09	1.84	0.04	0.22	0.26
28-Jun-01	0.47	0.11	0.58	3.05	-0.06	3.00	0.04	0.21	0.25
29-Jun-01	0.09	0.54	0.63	3.34	0.19	3.52	0.01	0.33	0.34
30-Jun-01	0.42	0.08	0.50	1.07	0.06	1.13	0.30	0.21	0.51
01-Jul-01	0.12	0.29	0.40	1.78	-0.07	1.71	0.01	0.16	0.17
02-Jul-01	0.11	1.06	1.17	3.93	-0.07	3.86	0.00	0.06	0.06
03-Jul-01	0.07	1.26	1.33	5.11	0.10	5.21	-0.02	0.13	0.11
04-Jul-01	0.24	1.12	1.36	6.73	-0.02	6.71	0.01	0.06	0.07
05-Jul-01	1.37	0.77	2.14	5.02	-0.07	4.94	0.00	0.08	0.08
06-Jul-01	Site								
07-Jul-01	Operator								
08-Jul-01	Did								
09-Jul-01	Not								
10-Jul-01	Start								
11-Jul-01	Program								
12-Jul-01									
13-Jul-01	0.13	0.03	0.16	0.89	-0.16	0.74	0.03	0.01	0.04
14-Jul-01	0.05	0.31	0.36	1.32	-0.15	1.17	0.02	0.02	0.04
15-Jul-01	0.04	0.30	0.34	1.36	-0.03	1.34	0.01	0.08	0.09
16-Jul-01	0.06	0.58	0.65	2.10	-0.17	1.94	0.01	0.03	0.05
17-Jul-01	0.22	0.03	0.24	0.76	-0.02	0.74	0.33	0.10	0.43
18-Jul-01	0.09	0.42	0.51	2.40	-0.12	2.28	-0.02	0.15	0.13
19-Jul-01	0.12	0.44	0.55	2.19	-0.11	2.07	0.00	0.20	0.20
20-Jul-01	0.20	0.06	0.26	1.25	-0.01	1.24	0.08	0.08	0.16
21-Jul-01	0.20	0.10	0.30	1.88	0.15	2.02	0.02	0.13	0.15
22-Jul-01	0.08	0.13	0.21	1.23	-0.06	1.17	0.01	0.06	0.07
23-Jul-01	0.04	0.20	0.24	1.23	-0.03	1.20	0.01	0.06	0.06
24-Jul-01	0.03	0.36	0.39	1.94	-0.08	1.86	-0.01	0.05	0.04
25-Jul-01	0.03	1.10	1.13	5.07	0.09	5.16	-0.01	0.12	0.11
26-Jul-01	0.03	1.22	1.26	6.58	0.01	6.59	-0.01	0.07	0.07
27-Jul-01	0.03	0.82	0.85	6.32	0.24	6.56	0.01	0.17	0.18
28-Jul-01	0.03	1.20	1.23	6.62	0.06	6.68	0.00	0.12	0.12
29-Jul-01	0.06	3.47	3.54	8.69	0.88	9.57	0.00	0.51	0.51
30-Jul-01	0.04	0.32	0.36	2.79	0.00	2.79	0.02	0.10	0.11
31-Jul-01	0.20	0.15	0.36	1.81	0.02	1.83	0.02	0.20	0.22
01-Aug-01	0.31	1.85	2.16	3.42	0.14	3.56	0.01	0.40	0.41
02-Aug-01	0.48	3.57	4.05	3.41	0.10	3.51	0.02	0.20	0.21
03-Aug-01	0.21	0.03	0.24	0.69	0.00	0.69	0.08	0.04	0.11
04-Aug-01	0.19	0.05	0.25	0.93	0.01	0.94	0.21	0.05	0.26
05-Aug-01	0.16	0.06	0.22	1.60	0.01	1.60	0.02	0.04	0.06

Table A5.2.2 *Daily Concentrations of Aerosol NO_3^-, SO_4^{2-} and Cl^- Measured at Barcombe Mills between April 2000 and July 2001.*

	NO_3 (µg m^{-3})			SO_4 (µg m^{-3})			Cl (µg m^{-3})		
Date	Teflon	Nylon	Sum	Teflon	Nylon	Sum	Teflon	Nylon	Sum
06-Aug-01	0.15	0.06	0.21	1.58	0.02	1.60	0.31	0.10	0.41
07-Aug-01	0.18	0.02	0.20	0.85	0.02	0.86	0.36	0.05	0.41
08-Aug-01	0.19	0.04	0.23	0.73	0.04	0.77	0.14	0.07	0.21
09-Aug-01	0.12	0.18	0.30	1.13	0.01	1.14	0.02	0.04	0.06
10-Aug-01	0.13	0.19	0.32	1.09	-0.02	1.07	0.01	0.12	0.13
11-Aug-01	0.23	0.08	0.31	1.39	-0.03	1.36	0.05	0.13	0.17
12-Aug-01	0.20	0.02	0.23	2.70	-0.03	2.68	0.08	0.03	0.11
13-Aug-01	0.03	0.10	0.14	3.76	0.06	3.82	0.00	0.07	0.07
14-Aug-01	0.07	0.60	0.67	2.65	0.00	2.65	0.01	0.06	0.07
15-Aug-01	0.10	0.07	0.17	2.17	-0.01	2.16	0.01	0.27	0.28
16-Aug-01	0.19	0.23	0.42	0.77	0.21	0.98	0.05	0.20	0.26
17-Aug-01	0.04	0.57	0.61	2.17	0.02	2.19	0.00	0.12	0.12
18-Aug-01	0.20	0.14	0.34	1.55	0.02	1.57	0.19	0.17	0.36
19-Aug-01	0.23	0.09	0.32	1.72	0.02	1.75	0.11	0.18	0.28
20-Aug-01	0.14	0.09	0.23	1.28	0.04	1.32	0.00	0.09	0.09
21-Aug-01	0.04	2.00	2.04	3.06	0.03	3.08	0.00	0.18	0.18
22-Aug-01	1.89	1.64	3.53	5.06	0.02	5.08	0.00	0.14	0.14
23-Aug-01	2.68	5.87	8.55	8.98	0.06	9.04	0.00	0.17	0.17
24-Aug-01	0.04	0.33	0.36	4.10	0.21	4.31	0.00	0.08	0.08
25-Aug-01	0.19	0.52	0.72	5.61	0.05	5.66	0.00	0.05	0.05
26-Aug-01	0.04	2.15	2.19	4.91	0.03	4.94	0.03	0.19	0.21
27-Aug-01	0.05	0.26	0.31	1.90	0.03	1.94	0.00	0.13	0.13
28-Aug-01	0.11	0.86	0.97	2.03	0.05	2.08	0.00	0.16	0.16
29-Aug-01	0.99	3.76	4.75	3.38	0.04	3.42	0.00	0.31	0.31
30-Aug-01	0.04	1.09	1.14	2.41	0.05	2.46	0.00	0.18	0.18
31-Aug-01	0.05	0.58	0.63	1.51	0.02	1.53	0.00	0.17	0.17
01-Sep-01	0.06	0.11	0.17	2.11	0.02	2.13	0.00	0.14	0.14
02-Sep-01	0.12	0.09	0.21	1.31	0.02	1.33	0.04	0.13	0.17
03-Sep-01	0.07	0.08	0.15	0.72	0.02	0.74	0.01	0.05	0.07
04-Sep-01	0.05	0.38	0.43	1.82	0.04	1.86	0.03	0.11	0.14
05-Sep-01	0.08	0.17	0.25	2.71	0.02	2.73	0.01	0.09	0.10
06-Sep-01	0.13	0.13	0.26	1.99	0.02	2.01	0.02	0.13	0.15
07-Sep-01									
08-Sep-01									
09-Sep-01									
10-Sep-01	Site								
11-Sep-01	Operator								
12-Sep-01	Off								
13-Sep-01	Sick								
14-Sep-01									
15-Sep-01									
16-Sep-01									
17-Sep-01	0.07	0.15	0.21	1.98	0.01	2.00	-0.02	0.14	0.13
18-Sep-01	0.07	0.23	0.29	2.75	0.02	2.77	-0.01	0.18	0.17
19-Sep-01	0.06	1.26	1.31	3.56	0.02	3.58	-0.01	0.33	0.31
20-Sep-01	0.07	1.93	2.00	2.61	0.04	2.65	-0.03	0.42	0.40
21-Sep-01	0.06	1.03	1.09	3.18	0.02	3.21	-0.03	0.29	0.26
22-Sep-01	0.11	0.86	0.97	3.32	0.02	3.34	-0.03	0.22	0.19
23-Sep-01	0.07	0.58	0.65	2.26	0.02	2.28	-0.01	0.33	0.32
24-Sep-01	0.04	1.51	1.55	2.22	0.01	2.23	0.01	0.35	0.36
25-Sep-01	0.03	0.51	0.54	2.01	0.01	2.02	0.00	0.12	0.11
26-Sep-01	0.19	0.12	0.32	1.64	0.01	1.64	0.26	0.18	0.44
27-Sep-01	0.07	0.34	0.41	2.50	0.01	2.51	0.00	0.21	0.21
28-Sep-01	0.06	0.77	0.83	3.83	0.01	3.84	0.01	0.22	0.23
29-Sep-01	0.19	0.05	0.23	1.35	0.01	1.36	0.05	0.16	0.21
30-Sep-01	0.21	0.03	0.23	1.44	0.01	1.45	0.48	0.14	0.61
01-Oct-01	0.22	0.01	0.23	0.52	0.03	0.55	0.83	0.02	0.85
02-Oct-01	0.22	0.03	0.25	0.44	0.03	0.47	0.46	0.03	0.49
03-Oct-01	0.23	0.03	0.26	0.59	0.03	0.63	0.63	0.04	0.67
04-Oct-01	0.23	0.10	0.32	1.17	0.03	1.20	0.07	0.25	0.32
05-Oct-01	0.28	0.12	0.40	1.28	0.03	1.30	0.32	0.17	0.49
06-Oct-01	0.22	0.02	0.24	0.59	0.04	0.63	0.59	0.02	0.62
07-Oct-01	0.11	0.01	0.12	0.37	0.03	0.40	0.57	0.00	0.58
08-Oct-01									
09-Oct-01									
10-Oct-01	0.34	0.03	0.38	1.21	0.04	1.25	0.40	0.13	0.53
11-Oct-01	0.07	0.24	0.31	1.43	0.04	1.47	0.00	0.15	0.15
12-Oct-01	0.06	0.98	1.04	2.91	0.04	2.95	0.00	0.12	0.12
13-Oct-01	0.05	0.44	0.49	3.39	0.04	3.43	0.01	0.19	0.20
14-Oct-01	0.19	0.06	0.24	2.93	0.04	2.97	0.04	0.23	0.27
15-Oct-01	0.26	0.01	0.27	0.47	-0.01	0.46	0.12	0.05	0.17
16-Oct-01	0.24	0.28	0.52	1.87	0.04	1.91	0.02	0.31	0.33
17-Oct-01	0.14	0.86	1.00	2.26	0.03	2.28	0.15	0.38	0.53
18-Oct-01	0.18	0.29	0.48	1.42	0.03	1.45	0.00	0.32	0.32
19-Oct-01	0.09	0.74	0.84	3.93	0.03	3.95	0.02	0.29	0.31
20-Oct-01	0.06	1.53	1.58	1.72	0.03	1.75	0.01	0.22	0.23
21-Oct-01	0.09	0.23	0.33	1.37	0.13	1.50	0.02	0.25	0.27
22-Oct-01	0.23	0.16	0.39	1.18	0.28	1.46	0.16	0.34	0.51
23-Oct-01	0.34	0.01	0.35	0.86	0.03	0.89	0.64	0.08	0.72
24-Oct-01	0.19	0.05	0.24	1.53	0.07	1.60	0.64	0.29	0.93
25-Oct-01	0.30	0.08	0.37	3.46	0.03	3.49	0.11	0.41	0.52
26-Oct-01	0.18	0.02	0.21	0.66	0.03	0.70	0.34	0.09	0.43
27-Oct-01	0.28	0.14	0.42	0.76	0.03	0.79	0.03	0.29	0.33
28-Oct-01	0.04	0.35	0.39	1.70	0.03	1.73	0.00	0.35	0.35
29-Oct-01	0.06	0.48	0.55	5.92	0.03	5.94	0.00	0.38	0.38
30-Oct-01	-0.02	0.02	0.00	0.07	0.03	0.10	0.01	0.15	0.16
31-Oct-01	-0.02	-0.01	-0.03	-0.01	-0.05	-0.07	0.01	-0.01	0.00
01-Nov-01	-0.02	0.00	-0.02	0.04	-0.05	-0.01	0.02	0.00	0.02
02-Nov-01	0.11	0.25	0.36	0.73	0.00	0.73	0.04	0.37	0.40
03-Nov-01	0.83	0.57	1.40	2.85	0.02	2.87	0.11	1.09	1.21
04-Nov-01	0.02	-0.01	0.02	0.04	-0.05	-0.01	0.01	-0.01	0.01
05-Nov-01	0.37	0.04	0.41	1.14	0.00	1.15	0.21	0.31	0.52
06-Nov-01	0.12	0.18	0.29	0.96	0.00	0.96	0.02	0.12	0.15
	Sampling Programme discontinued								
Mean	0.33	0.67	1.00	2.29	0.11	2.40	0.09	0.19	0.27
SD	0.71	0.88	1.30	1.66	0.29	1.68	0.17	0.15	0.22
CV (%)	218.2	131.4	130.3	72.6	272.2	70.1	203.2	81.6	81.0
N	176	176	176	176	176	176	176	176	176

Table A5.2.3 *Daily Concentrations of Aerosol Ca^{2+}, Mg^{2+} and Na^{+} Measured at Barcombe Mills between April 2000 and July 2001.*

	Ca (μg m^{-3})			Mg (μg m^{-3})			Na (μg m^{-3})		
Date	Teflon	Nylon	Sum	Teflon	Nylon	Sum	Teflon	Nylon	Sum
	No sampling between 01-Jan-2001 and 10-Apr-2001								
11-Apr-01	0.05			0.02			0.16		
12-Apr-01	0.04			0.04			0.41		
13-Apr-01	0.01			0.05			0.46		
14-Apr-01	0.01			0.03			0.21		
15-Apr-01	FAILED								
16-Apr-01	FAILED								
17-Apr-01	0.04			0.04			0.33		
18-Apr-01	Delayed sample								
19-Apr-01	Changeover								
20-Apr-01	0.61			0.04			0.31		
21-Apr-01	0.12			0.02			0.09		
22-Apr-01	FAILED								
23-Apr-01	0.21			0.02			0.09		
24-Apr-01	0.07			0.10			0.86		
25-Apr-01	FAILED								
26-Apr-01	0.04			0.03			0.20		
27-Apr-01	-0.02			0.07			0.62		
28-Apr-01	0.02			0.05			0.44		
29-Apr-01	-0.04			0.01			0.05		
30-Apr-01	0.01			0.02			0.14		
01-May-01	0.05			0.11			0.92		
02-May-01	FAILED								
03-May-01	0.03			0.07			0.58		
04-May-01	-0.13			0.05			0.44		
05-May-01	-0.10			0.04			0.34		
06-May-01	0.26			0.05			0.34		
07-May-01	-0.09			0.02			0.14		
08-May-01	0.04			0.03			0.14		
09-May-01	0.08			0.02			0.09		
10-May-01	0.04			0.02			0.05		
11-May-01	0.02			0.01			0.07		
12-May-01	0.22			0.01			0.06		
13-May-01	0.15			0.05			0.43		
14-May-01	0.09			0.04			0.33		
15-May-01	0.00			0.06			0.54		
16-May-01	FAILED								
17-May-01	0.10			0.04			0.34		
18-May-01	FAILED								
19-May-01	-0.03			-0.05			0.14		
20-May-01	0.03			0.02			0.09		
21-May-01	0.09			0.02			0.13		
22-May-01	0.15			0.02			0.08		
23-May-01	FAILED								
24-May-01	0.23			0.02			0.16		
25-May-01	FAILED								
26-May-01	0.07			0.01			0.04		
27-May-01	-0.04			0.01			0.09		
28-May-01	-0.05			0.02			0.13		
29-May-01	-0.06			0.01			0.09		
30-May-01	-0.05			0.01			0.12		
31-May-01	-0.02			0.01			0.05		
01-Jun-01	-0.10			0.01			0.10		
02-Jun-01	-0.07			0.02			0.12		
03-Jun-01	Power								
04-Jun-01	Failure								
05-Jun-01	-0.04			0.02			0.15		
06-Jun-01	-0.07			0.01			0.08		

	Ca (μg m^{-3})			Mg (μg m^{-3})			Na (μg m^{-3})		
Date	Teflon	Nylon	Sum	Teflon	Nylon	Sum	Teflon	Nylon	Sum
07-Jun-01	Power Failure								
08-Jun-01	0.05			0.01			0.04		
09-Jun-01	0.09			0.01			0.04		
10-Jun-01	0.18			0.01			0.06		
11-Jun-01	0.00			0.00			0.02		
12-Jun-01	0.01			0.01			0.06		
13-Jun-01	0.06			0.01			0.05		
14-Jun-01	0.23			0.03			0.28		
15-Jun-01	0.03			0.02			0.15		
16-Jun-01	-0.02			0.00			0.02		
17-Jun-01	-0.03			0.01			0.11		
18-Jun-01	-0.03			0.01			0.04		
19-Jun-01	0.00			0.00			0.00		
20-Jun-01	-0.03			0.02			0.12		
21-Jun-01	Engineer servicing equipment								
22-Jun-01	-0.24			0.01			0.06		
23-Jun-01	-0.25			0.01			0.05		
24-Jun-01	-0.15			0.01			0.05		
25-Jun-01	-0.19			0.01			0.05		
26-Jun-01	-0.11			0.03			0.21		
27-Jun-01	-0.22			0.03			0.29		
28-Jun-01	-0.26			0.04			0.33		
29-Jun-01	0.12			0.02			0.14		
30-Jun-01	0.15			0.05			0.41		
01-Jul-01	0.07			0.02			0.12		
02-Jul-01	0.11			0.02			0.07		
03-Jul-01	0.11			0.01			0.04		
04-Jul-01	0.20			0.03			0.12		
05-Jul-01	0.24			0.01			0.02		
06-Jul-01	Site								
07-Jul-01	Operator								
08-Jul-01	Did								
09-Jul-01	Not								
10-Jul-01	Start								
11-Jul-01	Program								
12-Jul-01									
13-Jul-01	0.03			0.02			0.12		
14-Jul-01	0.21			0.01			0.04		
15-Jul-01	0.07			0.01			0.02		
16-Jul-01	0.13			0.01			0.05		
17-Jul-01	0.04			0.04			0.37		
18-Jul-01	0.16			0.01			0.10		
19-Jul-01	0.03			0.01			0.12		
20-Jul-01	0.02			0.02			0.19		
21-Jul-01	0.00			0.02			0.16		
22-Jul-01	0.01			0.01			0.08		
23-Jul-01	0.01			0.01			0.05		
24-Jul-01	0.02			0.01			0.04		
25-Jul-01	0.03			0.01			0.04		
26-Jul-01	0.01			0.00			0.03		
27-Jul-01	0.09			0.00			0.02		
28-Jul-01	0.08			0.00			0.03		
29-Jul-01	0.08			0.00			0.03		
30-Jul-01	0.01			0.01			0.07		
31-Jul-01	0.02			0.02			0.16		
01-Aug-01	0.01			0.01			0.09		
02-Aug-01	0.02			0.01			0.04		
03-Aug-01	0.05			0.01			0.15		
04-Aug-01	0.02			0.03			0.26		
05-Aug-01	0.13			0.02			0.16		

Table A5.2.3 *Daily Concentrations of Aerosol Ca^{2+}, Mg^{2+} and Na^{+} Measured at Barcombe Mills between April 2000 and July 2001.*

	Ca (μg m^{-3})			Mg (μg m^{-3})			Na (μg m^{-3})		
Date	Teflon	Nylon	Sum	Teflon	Nylon	Sum	Teflon	Nylon	Sum
06-Aug-01	0.03			0.04			0.35		
07-Aug-01	0.02			0.03			0.33		
08-Aug-01	0.01			0.02			0.17		
09-Aug-01	0.03			0.01			0.06		
10-Aug-01	0.02			0.01			0.07		
11-Aug-01	0.01			0.02			0.16		
12-Aug-01	0.03			0.03			0.33		
13-Aug-01	0.02			0.01			0.08		
14-Aug-01	0.03			0.00			0.03		
15-Aug-01	0.02			0.01			0.10		
16-Aug-01	0.00			0.01			0.12		
17-Aug-01	0.02			0.01			0.05		
18-Aug-01	0.02			0.03			0.29		
19-Aug-01	0.01			0.03			0.25		
20-Aug-01	0.01			0.01			0.09		
21-Aug-01	0.02			0.01			0.04		
22-Aug-01	0.02			0.00			0.04		
23-Aug-01	0.04			0.01			0.05		
24-Aug-01	0.03			0.00			0.03		
25-Aug-01	0.03			0.01			0.04		
26-Aug-01	0.01			0.01			0.05		
27-Aug-01	0.01			0.01			0.05		
28-Aug-01	0.01			0.00			0.03		
29-Aug-01	0.02			0.00			0.04		
30-Aug-01	0.03			0.00			0.03		
31-Aug-01	-0.03			0.01			0.04		
01-Sep-01	-0.04			0.01			0.07		
02-Sep-01	-0.04			0.02			0.11		
03-Sep-01	-0.05			0.01			0.03		
04-Sep-01	-0.04			0.01			0.03		
05-Sep-01	-0.04			0.02			0.09		
06-Sep-01	0.06			0.02			0.12		
07-Sep-01									
08-Sep-01									
09-Sep-01									
10-Sep-01									
11-Sep-01	Site								
12-Sep-01	Operator								
13-Sep-01	Off								
14-Sep-01	Sick								
15-Sep-01									
16-Sep-01									
17-Sep-01	-0.06			0.01			0.05		
18-Sep-01	0.45			0.02			0.09		
19-Sep-01	0.00			0.01			0.07		
20-Sep-01	-0.04			0.01			0.05		
21-Sep-01	0.07			0.01			0.03		
22-Sep-01	0.90			0.01			0.07		
23-Sep-01	0.06			0.01			0.06		
24-Sep-01	0.04			0.00			0.03		
25-Sep-01	0.02			0.00			0.03		
26-Sep-01	0.03			0.04			0.32		
27-Sep-01	0.38			0.01			0.07		
28-Sep-01	0.04			0.01			0.09		
29-Sep-01	0.03			0.02			0.15		
30-Sep-01	0.03			0.06			0.52		
01-Oct-01	0.02			0.07			0.60		
02-Oct-01	0.00			0.04			0.37		
03-Oct-01	0.01			0.06			0.52		
04-Oct-01	0.01			0.03			0.18		
05-Oct-01	0.05			0.04			0.40		
06-Oct-01	0.02			0.06			0.50		
07-Oct-01	0.01			0.05			0.43		
08-Oct-01									
09-Oct-01									
10-Oct-01	0.02			0.06			0.43		
11-Oct-01	0.00			0.02			0.04		
12-Oct-01	0.01			0.01			0.02		
13-Oct-01	0.02			0.02			0.06		
14-Oct-01	0.00			0.03			0.19		
15-Oct-01	-0.01			0.02			0.17		
16-Oct-01	0.00			0.02			0.12		
17-Oct-01	0.04			0.03			0.27		
18-Oct-01	0.02			0.02			0.10		
19-Oct-01	0.03			0.02			0.07		
20-Oct-01	0.02			0.00			0.00		
21-Oct-01	0.02			0.00			0.02		
22-Oct-01	0.02			0.03			0.23		
23-Oct-01	0.03			0.06			0.54		
24-Oct-01	0.14			0.06			0.62		
25-Oct-01	0.03			0.05			0.44		
26-Oct-01	0.00			0.03			0.32		
27-Oct-01	0.00			0.03			0.14		
28-Oct-01	0.01			0.02			0.02		
29-Oct-01	0.06			0.03			0.13		
30-Oct-01	0.00			0.03			0.25		
31-Oct-01	-0.02			0.00			0.00		
01-Nov-01	0.19			0.00			0.00		
02-Nov-01	0.34			0.02			0.06		
03-Nov-01	0.19			0.07			0.05		
04-Nov-01	0.07			0.00			0.00		
05-Nov-01	0.17			0.05			0.21		
06-Nov-01	0.11			0.02			0.06		
	Sampling Programme discontinued								

Mean	0.04			0.02			0.16		
SD	0.12			0.02			0.17		
CV (%)	298.2			97.0			103.9		
N	176			176			176		

Appendix 6
Geostatistics

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National Environmental Technology Centre

GEOSTATISTICS

The use of geostatistics in the analysis of United Kingdom precipitation composition was described by Webster *et al.* (1991). A brief discussion is reproduced here. In a geostatistical treatment of spatial variability the concentration of an ion in precipitation, 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 x 20 km grid square the variance would probably be smaller than within a 200 km x 200 km square. The dependence of the variance on separation (usually termed the lag) is described by a quantity known as the semi-variance:

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

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

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

Spherical

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

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 ω is called the factor and θ 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.

The models fitted to the experimental points in the variogram for $\log_e$ [acidity], non-marine sulphate, nitrate and ammonium are listed in Table A.6.1.

Table A.6.1 - Variogram Models fitted to 2001 Annual Mean Concentrations of the Major Ions

Ion	Model	Sill $(\mu eq\ l^{-1})^2$	Range (km)
acidity ($\log_e$ transformed)	exponential	0.45	260
non-marine sulphate	exponential	400	300
nitrate	exponential	200	260
ammonium	exponential	400	260