

Maps of the Precipitation-weighted Concentration of Nitrate (in $\mu\text{eq l}^{-1}$) and of gaseous Nitric Acid (in $\mu\text{g m}^{-3}$) for 2005

Acid Deposition Monitoring Network

Data Summary 2005

Report to

**Department for Environment, Food and Rural
Affairs and the Devolved Administrations**

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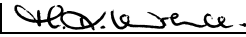
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AEA Energy & Environment
The Gemini Building
Fermi Avenue
Harwell International Business Centre
Didcot
Oxfordshire OX11 0QR

t: 0870 190 6515
f: 0870 190 6933
e-mail: helen.lawrence@aeat.co.uk

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Authors	Name	Garry Hayman, Keith Vincent, Helen Lawrence, Malcolm Smith, Chris Colbeck and Martin Davies (AEA Technology plc) Mark Sutton, Sim Tang, U Dragosits, L Love and David Fowler (Centre for Ecology and Hydrology, Edinburgh) Marion Kendall and Heather Page (Harwell Scientifics Ltd.)
Reviewed by	Name	Keith Vincent Helen Lawrence
Approved by	Name	Garry Hayman
	Signature	
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Executive Summary

This is the first annual data report prepared on the contract *Management and Operation of the UK Acid Deposition Monitoring Network* (RMP 2901), let by the Department for Environment, Food and Rural Affairs (Defra) and the Devolved Administrations (the Scottish Executive, the National Assembly for Wales and the Department of the Environment for Northern Ireland). This data report contains a comprehensive summary of the measurements made in the network for the year 2005.

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 tendering 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 that contract in November 2001. Further changes were made to the sampling programme at the start of the present contract (RMP 2901) in January 2006. The filter-pack measurements of sulphur dioxide were terminated and effectively replaced by measurements made in an expanded denuder network. These changes will be reported with the 2006 dataset.

The 2005 Measurements

The key highlights from the 2005 Measurements are:

- The concentrations of the gaseous and aerosol species were generally higher than those in 2004 but lower than the high values observed in 2003. The measurements are consistent with long-term trends. There were no major episodes of elevated concentrations.
- From the rainwater volumes determined using the bulk rainwater collectors, 2005 was a relatively dry year compared to previous years - all but four sites were drier. On average 20% less rain was measured in 2005 compared to the long-term trend. As a result, the precipitation-weighted concentrations of nitrate and ammonium were higher than those observed in more recent years, although the concentrations of hydrogen and non-seasalt sulphate were similar to those observed in previous years. Deposition at the sites was similar to or lower than that observed in 2004.
- Although the annual mean sulphur dioxide concentrations have decreased substantially at all sites from 1986, the concentrations were generally higher in 2005 than in 2004. For example, the annual mean at High Muffles has decreased by a factor of 10 from an annual mean concentration of $7.3 \mu\text{g SO}_2 \text{ as S m}^{-3}$ in 1987 to $0.73 \mu\text{g SO}_2 \text{ as S m}^{-3}$ in 2005 (no correction has been made for changes to the sampler).
- The decrease in the concentration of particulate sulphate is much less marked than that of sulphur dioxide. Annual mean concentrations were lower in 2004 and 2005 than those observed in the photochemically-active year of 2003 and were more consistent with long-term trends. Over the period from 1978 to 2005 the average concentration at Eskdalemuir declined from around $1.0 \mu\text{g [SO}_4 \text{ as S] m}^{-3}$ to about $0.4 \mu\text{g [SO}_4 \text{ as S] m}^{-3}$ in 2005.
- The 2005 annual mean concentrations of nitrogen dioxide were lower than those measured in 2003 but higher than those determined in 2004. The highest concentrations in 2005 were again observed in the Midlands and southern England with an annual mean concentration of 11.2 ppb determined at Woburn. Nitrogen dioxide concentrations have declined, most noticeably at the relatively high concentration sites such as High Muffles, Stoke Ferry and Barcombe Mills.
- The Nitric Acid Monitoring network continues to provide data on the behaviour of gaseous and aerosol species involved in transboundary and urban air pollution. The measurement data

have been used to derive maps of the spatial distribution of gaseous nitric acid and hydrogen chloride in the UK and of the corresponding aerosol components - nitrate and chloride.

- The 2005 measurements provided further confirmation of the spatial patterns in trends previously observed.

EMEP Laboratory Intercomparison

An important data quality assessment is organised annually by the EMEP Chemical Co-ordinating Centre (CCC) at the Norwegian Institute for Air Research (NILU). Each July samples are sent to around 36 analytical laboratories in Europe and about 25 other internationally recognised analytical laboratories. 2005 was the 23rd time such an intercomparison took place. A comparison of the expected and measured concentrations showed the following for:

- **sulphur dioxide in absorbing solution:** The measured data appears, like previous years, to be slightly over reading. An investigation carried out during the year by Harwell Scientifics Limited showed that the hydrogen peroxide absorbing solution produced a matrix effect within the ion chromatography column.
- **rainwater composition:** Excellent agreement between expected and measured concentrations was observed for sulphate, nitrate, ammonium and pH. For the remaining ions the agreement was poor. This appears anomalous since the agreement between expected and measured concentrations were much better in last year's (22nd) intercomparison for these ions

Given the significant discrepancy between the expected and measured concentrations, Harwell Scientifics Limited, the analytical laboratory for the Acid Deposition Monitoring programme, reviewed its procedures. The review showed that the quality control (QC) standards used were found to be satisfactory and that all the method and run conditions complied with the Group Working Instructions. The QC solutions passed their acceptance criteria and the recorded column efficiency data was within specification. However it was found that there appeared to be an increase in the limit of detection (decrease in sensitivity) for some ions. Further investigations showed that the uncertainty increase occurred for samples analysed during August and September 2005.

A number of improvements have been implemented by HSL to ensure the sensitivity problems would not occur again.

The EMEP intercomparison samples were analysed during August and September 2005. Of primary interest to the sampling programme is the extent to which the decrease in analytical sensitivity will have on the long-term trends in pollutant concentrations. The major ions of interest - nitrate, ammonium and pH - were well predicted. So the maps and trend data presented in this report for 2005 are measured to the same high standards as previous years. Although the sulphate concentration was predicted well, the non-seasalt component requires a measurement of the sodium concentration for its determination. This will result in a degree of uncertainty in the non-seasalt sulphate concentrations measured for samples analysed in August and September. This, in turn, will result in an additional uncertainty in the annual volume weighted mean non-seasalt sulphate concentration. However, the trend analysis presented in elsewhere in this data report shows that the non-sea salt sulphate concentration is similar to previous years.

As regards the other ions, the effect on the respective long-term trend is much more difficult to ascertain. The work carried out by HSL showed that the uncertainty was greatest for samples with concentrations less than the first calibration standard. However, the number of samples failing the ion balance test did not increase noticeably – so the effect on the data quality was probably minimal but an undefined uncertainty will exist for the chloride, magnesium, calcium, sodium, potassium and non-seasalt sulphate concentration.

Use of the Measurement Data

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

The datasets provide information on the current state of the environment with respect to acidification and eutrophication. The individual measurements are used in a number of the projects supported by the Department and the Devolved Administration:

- **Acid Deposition Processes in the UK** (current contractor: CEH Edinburgh): The measurements made in the monitoring programme are core inputs for the UK-scale empirical maps of wet and dry deposition of sulphur, nitrogen and base cations, generated under this contract. The deposition maps are themselves key inputs into critical load assessments and the derivation of the Department's PSA target.
- **Modelling the Concentrations and Depositions of Long range Air Pollution** (current contractor: CEH Edinburgh): The measurements made in the monitoring programme and the derived site-specific deposition rates are the principal datasets used to validate the performance of long range chemical transport model used to assess the effectiveness of emission reduction policies on acidification and eutrophication.
- **Pollution Climate Mapping** (current contractor: AEA Energy & Environment): The measurements of sulphur dioxide, nitrogen dioxide and particulate sulphate made in the network underpin or validate the empirical modelling approaches developed by netcen to meet the reporting requirements under the first air quality daughter directive.
- **Freshwater Critical Load Exceedences** (current contractor: ENSIS). A number of the sites in the Acid Deposition Monitoring programme are located in sensitive catchments and freshwater systems. The measurements made in the sampling programme therefore provide a direct measure of the atmospheric input and can be compared with critical loads of such systems.
- **Dynamic Modelling** (current contractor: CEH Bangor). A number of the sites in the Acid Deposition Monitoring programme are located in sensitive catchments and freshwater systems. The measurements made in the sampling programme therefore provide a direct measure of the atmospheric input and are used in dynamic models used to assess the impact of acid and nitrogen deposition on freshwater and terrestrial habitats.
- **Acid Waters Monitoring Network** (current contractor: ENSIS): The measurements made in the Acid Deposition Monitoring Network were used in the major periodic assessment reports prepared under this contract.

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 (NEGTA).

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1 Introduction

This is the first annual data report prepared on the contract *Management and Operation of the UK Acid Deposition Monitoring Network* (RMP 2901), let by the Department for Environment, Food and Rural Affairs (Defra) and the Devolved Administrations (the Scottish Executive, the National Assembly for Wales and the Northern Ireland Department of the Environment). This data report contains a comprehensive summary of the measurements made in the network for the year 2005.

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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]. 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 (NEG-TAP) 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 in 2001 [NEG-TAP, 2001].

This annual data report is structured as follows:

- Section 2 describes the monitoring networks and the sampling techniques employed, together with the changes made to the network in 2005;
- Section 3 gives an overview of the results from the Acid Deposition Networks for 2005 and presents concentration maps for non-seasalt sulphate, nitrate, ammonium, hydrogen ion and nitrogen dioxide, together with the trends in all acidifying components measured as part of the acid rain monitoring programme;
- Section 4 describes the nitric acid monitoring network and the measurements made.

Summary tables of the bulk precipitation composition data for 2005 at the individual sites are presented in Appendix 1. Time series graphs for data collected since 1986 and seasonal variation plots are presented, together 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. The individual measurements of sulphur dioxide and particulate sulphate are provided in Appendix 3, together with the monthly and annual mean concentrations calculated for each site. Appendix 4 provides a summary of the nitrogen dioxide measurements, together with the annual mean concentrations calculated for each site. Appendix 5 provides a complete set of the measurements made in the HNO₃ Denuder Monitoring Network in 2005. Appendix 6 describes the geostatistical techniques that have been used to calculate the concentration maps in this report.

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 rainwater 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.

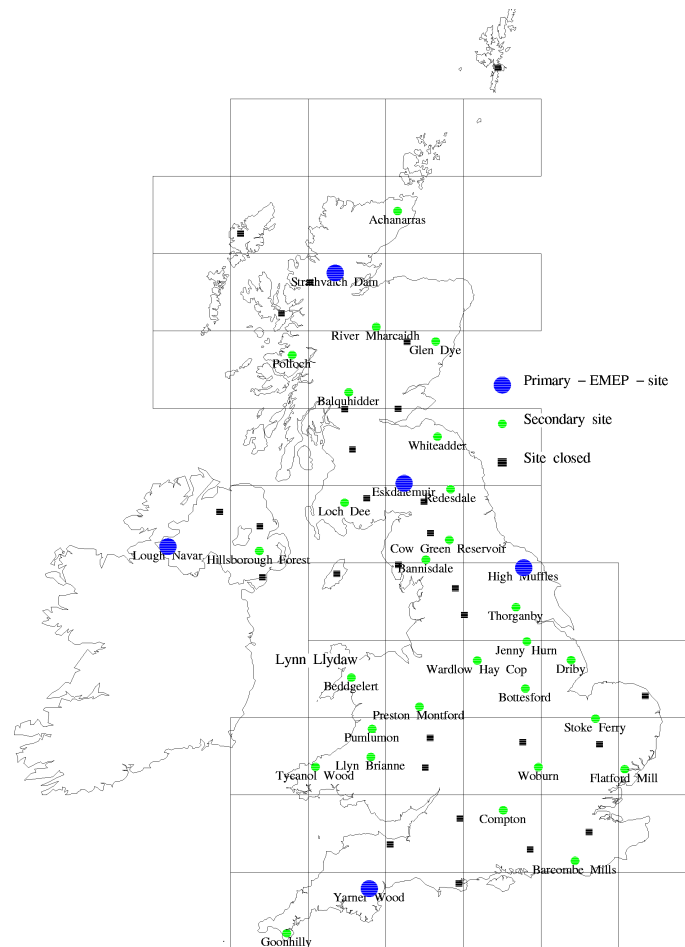


Figure 2-1: Location of the Current Primary and Secondary Sampling Sites (Also presented are the locations of the sites no longer operating. The 100 km squares show how the sampling site coverage meets the original coverage objective.)

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

Following the re-tendering 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. Following the change to the sampling frequency of the sulphur dioxide measurements in the related Rural SO₂ Monitoring programme, the measurements of sulphur dioxide concentrations at the 8 sites in the Acid Deposition Monitoring programme was changed to 4-weekly sampling at the beginning of 2005.

The monitoring programme in 2005 comprised the measurement and determination of

- Precipitation Composition
 - Bulk rainwater sampling on a daily basis at Eskdalemuir
 - Bulk rainwater sampling on a fortnightly basis at 38 sites
- Sulphur Dioxide
 - Sampling on a 4-weekly basis at 8 sites
- Particulate Sulphate
 - Sampling on a daily basis at 5 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

Further changes were made to the sampling programme at the start of the new contract (RMP 2901) in January 2006. The filter-pack measurements of sulphur dioxide were terminated and effectively replaced by measurements made in an expanded denuder network. These changes will be reported with the 2006 dataset.

The sites in operation are listed together with the local operators who perform the sample changeovers in Table 2-1 and Table 2-2. The sampling techniques used to make these measurements are summarised in Section 2.2.

Table 2-1: Network Sites and Measurements Made in 2005.

Measurement:	Precipitation		NO ₂	SO ₂	Part. SO ₄	Denuder HNO ₃ -NO ₃	
	Frequency:	<i>daily bulk</i>	<i>fortnightly bulk</i>	<i>monthly</i>	<i>4-weekly</i>	<i>daily</i>	<i>monthly</i>
SITE:							
Yarner Wood		✓ - 1	✓	✓ - 2	✓	✓	
Lough Navar		✓ - 1	✓	✓ - 2, 4	✓	✓ - 3	
High Muffles		✓ - 1	✓	✓ - 2	✓	✓ - 3	
Eskdalemuir	✓	✓ - 1	✓	✓ - 2	✓	✓ - 3	
Strathvaich Dam		✓ - 1	✓	✓ - 2, 4	✓ - 6	✓ - 3	
Barcombe Mills		✓ - 1	✓	✓ - 2	✓	✓ - 3	
Stoke Ferry		✓ - 1	✓	✓ - 2	✓ - 6	✓ - 3	
Glen Dye		✓ - 1	✓	✓ - 2	✓ - 6		
Goonhilly		✓ - 1	✓				
Compton		✓ - 1	✓				
Flatford Mill		✓ - 1	✓				
Woburn		✓ - 1	✓				
Tycanol Wood		✓ - 1	✓				
Llyn Brianne		✓ - 1	✓				
Pumlumon		✓ - 1	✓				
Preston Montford		✓ - 1	✓				
Bottesford		✓ - 1	✓				
Llyn Llydaw		✓ - 1	✓				
Wardlow Hay Cop		✓ - 1	✓				
Driby		✓ - 1	✓				
Jenny Hurn - 7							
Thornganby		✓ - 1	✓				
Bannisdale		✓ - 1	✓				
Hillsborough Forest		✓ - 1	✓				
Cow Green Reservoir		✓ - 1	✓				
Loch Dee		✓ - 1	✓				
Redesdale		✓ - 1	✓				
Whiteadder		✓ - 1	✓				
Balquhidder		✓ - 1	✓				
Polloch		✓ - 1	✓				
Allt a' Mharcaidh		✓ - 1	✓				
Achanarras		✓ - 1	✓				
Crai Reservoir		✓					
Beaghs Burn		✓					
Loch Chon		✓					
Lochnagar		✓					
River Etherow		✓					
Scoat Tarn		✓					
Llyn Llgi		✓					

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, which has since moved to 4-weekly sampling; (3) A site in the CEH HNO₃ Denuder Monitoring Network (see Section 4); (4) This site, together with those at Bush, Cwmystwyth and Sutton Bonington, was used as an 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 2-2: Network Site Details (those in bold are EMEP Sites with the Daily Measurements - Bulk Sampling 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 and Forestry Commission
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	E.On (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 (now a part of Natural England)
5136	Driby	TF 386744	47	Anglian Water
5118	Jenny Hurn	SK 816986	4	E.On (PowerGen, see note 1)
5117	Thorganby	SE 676428	8	Selby District Council
5009	High Muffles	SE 776939	267	Forest Research (see note 2)
5111	Bannisdale	NY 515043	265	Mr R Newport (see note 3)
5149	Hillsborough Forest	J 243577	120	Department of Agriculture and Rural Development (NI) (now Agri-Food and Biosciences Institute, AFBI)
5006	Lough Navar	H 065545	130	Forestry Service, Northern Ireland
5113	Cow Green Reservoir	NY 817298	510	English Nature (now part of Natural England)
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) (now Agri-Food and Biosciences Institute, AFBI)
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	Fisheries Research Services
5152	Balquhiddel 2	NN 545207	135	Mountain Environments
5151	Polloch	NM 792689	30	Mr J Kirby (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	Fisheries Research Services
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) Ray Newport 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.

2.2 SAMPLING TECHNIQUES

2.2.1 Precipitation Composition

Fortnightly precipitation samples were collected at 38 sites using bulk collectors based on the design of Hall [1986]. Daily measurements of precipitation composition are also made at Eskdalemuir, also a bulk collector. Stone and Tily [1992] provided an assessment of the collection efficiency of the bulk collector. 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.

To assess whether the switch from single week to fortnightly sampling in 2001 had any effect on sampling performance an intercomparison exercise was initiated, which continued until the end of 2005. The results of the intercomparison were presented in the 2004 data report (using available results from the start of sampling to the end of 2004) [Hayman *et al.*, 2005b]. The results from the first three years of the intercomparison indicated that there was good agreement between the parameters collected for the different sampling durations [Hayman *et al.*, 2005b]. The least scatter about the 1:1 line was seen for rainwater volumes and the depositions of non-seasalt sulphate and nitrate observed at Thorganby, followed by those at Eskdalemuir and Lough Navar.

2.2.2 Sulphur Dioxide and Particulate Sulphate

The concentrations of particulate sulphate and sulphur dioxide were previously determined using a single sampler - the eight-port hydrogen peroxide bubbler instrument (AGL, Hitchin). This sampler is still used to determine concentrations of particulate sulphate. Particulate sulphate is collected by drawing air through a Whatman 40 filter and the sulphate concentrations are determined by ion chromatography.

As 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, were at or below the Limit of Detection (LOD) of the bubbler method, a new sampling technique for sulphur dioxide was introduced into the monitoring networks. 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], the 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 during 2001.

The filter pack sampler consists of two filters in series, which are enclosed in an airtight holder. Air is drawn through the filter pack and sulphate aerosol particles are removed on the first filter. Sulphur dioxide is absorbed by the second filter, which has been previously washed with potassium carbonate and then impregnated with a glycerol/potassium hydroxide solution. It is quantitatively converted to solid potassium sulphite by reaction with the potassium hydroxide and oxidising species in the air convert the sulphite to sulphate during sampling. The sulphate on the exposed impregnated filter is extracted using water. The sulphate concentration in the solution is determined using ion chromatography and this is converted into a gas-phase concentration of sulphur dioxide.

Following a change to the sampling frequency of the sulphur dioxide measurements in the related Rural SO₂ Monitoring programme, the measurements of sulphur dioxide concentrations at the 8 sites in the Acid Deposition Monitoring programme was changed from fortnightly to 4-weekly sampling at the beginning of 2004.

2.2.3 Nitrogen Dioxide

Nitrogen dioxide concentrations are measured using passive diffusion tubes. Diffusion tubes work on the principle that the gas species of interest diffuses up the tube and is collected on an efficient absorbent medium at the end. The amount of gas absorbed is then analysed by an appropriate analytical technique. The tube components are manufactured to a 0.1 mm tolerance and this provides a known diffusion path length and hence a constant resistance to uptake. The ambient concentration of the gas can then be calculated from the diffusion path length, amount absorbed (determined analytically), exposure time and diffusion coefficient of the gas.

The diffusion tube consists of a plastic tube, on one end of which is a Low Density Polyethylene cap. Two stainless steel grids impregnated with the absorbent chemical are mounted within this cap. For the NO₂ tubes the absorbent is a solution of triethanolamine & acetone. The absorbent is extracted from the exposed tubes using de-ionised water and the nitrite content analysed using a colourimetric technique on a Bran & Luebbe Segmented Flow Auto Analyser III. The instrument is calibrated at the beginning of each run, and a QC sample of known concentration is analysed several times during any one run in adherence to UKAS guidelines. This particular method has a limit of detection of 0.03 µg nitrite, with any samples greater than 2.0 µg requiring dilution. The exposure time is used to convert the measured nitrate concentration (in µg) into ambient air concentrations of nitrogen dioxide (in µg m⁻³ or ppb).

Diffusion tubes have been used to measure nitrogen dioxide concentrations. Tubes are mounted on the upright of the rain collector stand and are exposed for twelve four or five-week periods throughout each year. This was set to four-week periods in 2005 to coordinate sample changeovers with the fortnightly rain collections.

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.

2.3 ANALYTICAL PROCEDURES

2.3.1 Sample Registration and Preparation

Due to the reduction in sampling frequency the number of samples received and analysed by the laboratory in 2005 was significantly less than previous years. 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 UKAS-accredited methods. All samples with exception of diffusion tubes are analysed using ion chromatography.

The rapid analysis of a large number of rainwater 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.

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

where $\sum c$ = sum of cation concentrations in equivalents (µeq l⁻¹) and $\sum a$ = 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 2-3, are submitted for reanalysis. The reanalysis is usually completed within four months of sampling.

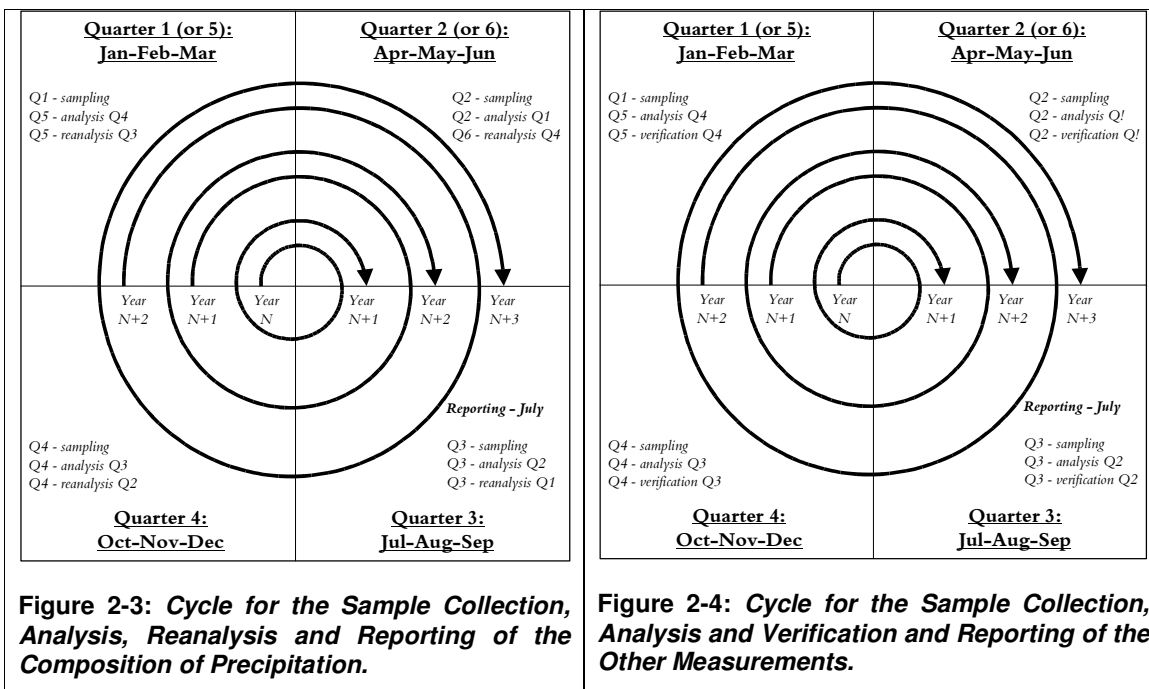
With the introduction of new ion chromatographs [see Hayman *et al.*, 2001d], less than 10% of the samples fail the criteria and would need to be reanalysed.

Table 2-3: Ion Balance Criteria Used to Select Samples for Reanalysis.

Ionic strength concentration range ($\mu\text{eq l}^{-1}$)	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 are continuous processes. 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.



3 2005 Measurements and Trends

3.1 DATA SUMMARY

The complete set of precipitation measurements made in the Acid Deposition Monitoring Network during 2005 is provided in the following appendices:

- Appendix 1 – Precipitation Composition from Weekly Bulk Collectors
- Appendix 2 – Annual Mean Precipitation-weighted Concentrations
- Appendix 3 – SO₂ and Particulate Sulphate Measurements and Statistics
- Appendix 4 – NO₂ Measurements and Statistics
- Appendix 5 – CEH HNO₃ 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 RAIN WATER VOLUMES IN 2005

According to the rainwater volumes determined using the bulk rainwater collectors, 2005 was generally a relatively dry year compared to previous years - all but four sites were drier than previous years. Figure 3-1 shows how the measured rain values compare in 2005 against the average value measured in previous years. On average 20% less rain was measured in 2005 compared to the long-term trend.

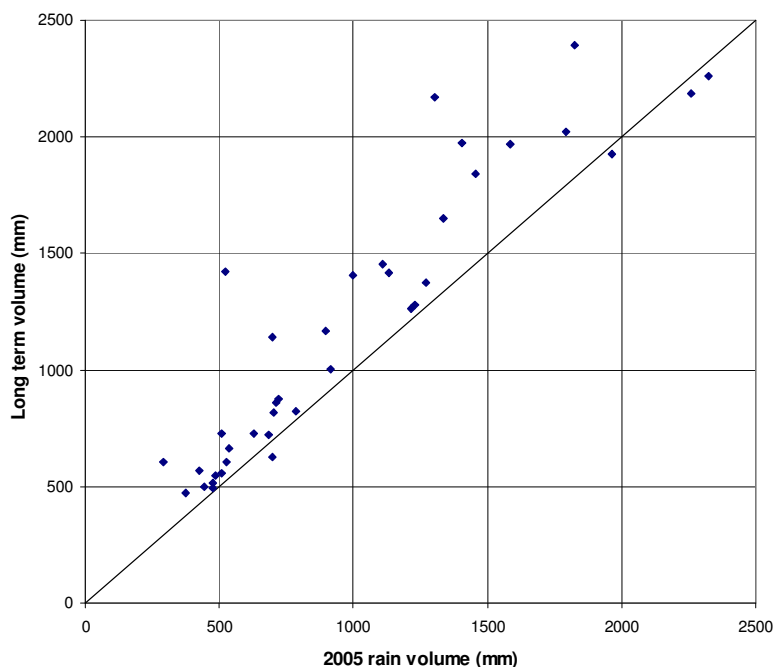


Figure 3-1: A Comparison of Rainwater Volumes in 2005 against the Long-term Mean Determined using the Bulk Rain Collectors.

An alternative assessment of the amount of rain that fell in 2005 can be determined based on information provided by the Meteorological Office¹. Figure 3-2 (blue diamonds) shows that the

¹ <http://www.metoffice.com/climate/uk/2005/annual/averages1.html>

average amount of rainfall in England, Wales, Northern Ireland and Scotland. Scotland was the wettest part of the UK, followed by Wales, Northern Ireland and England. Compared to the long term mean (red squares) rainfall in England and Wales was 90% and 93%, respectively, of the long term average total in 2005. Whereas in Scotland the rainfall was 8% more than the long term total and Northern Ireland was marginally drier at 97%.

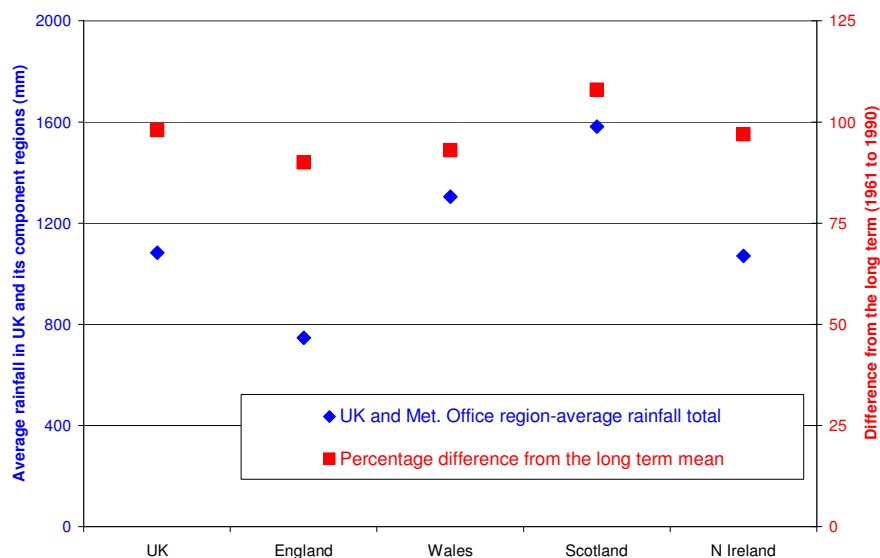


Figure 3-2: A Comparison of Average Rainwater Volumes for 2005 and the Long-term Average (1961 to 1990) for England and Wales, Scotland and Northern Ireland.

3.3 PRECIPITATION CHEMISTRY

3.3.1 The Measurements

The measurements of precipitation composition made using the 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 $>0.01 \text{ mg P l}^{-1}$ (or $>1.0 \text{ } \mu\text{eq l}^{-1}$) 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 concentrations². The mean annual rainfall and the precipitation-weighted mean annual concentrations of all ions for the period from 1986 to 2005 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

² Ion concentrations are conventionally reported as precipitation-weighted annual mean concentrations as rainfall is episodic and a few rainfall events can dominate the annual deposition. The wet deposition is then the precipitation-weighted annual mean concentration multiplied by the annual rainfall.

emissions and of the oxidising capacity of the atmosphere, as demonstrated by the seasonal variation observed in particulate sulphate. 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.

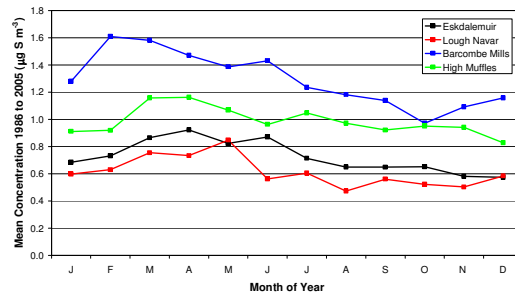


Figure 3.3: Seasonal Variation in the Particulate Sulphate Concentration at 4 of the 5 Sites as Averages for the years 1986-2005.

3.3.2 Concentration Maps for 2005

The spatial patterns of the annual mean precipitation-weighted concentration of acidity, non-seasalt sulphate, nitrate and ammonium are presented in Figure 3-4 to Figure 3-7 for the five most recent years. The parameters used in the interpolation are presented in Appendix 6. As reported previously, there are no hydrogen ion maps for 2000 as the acidity measurements were removed from the 2000 dataset [Hayman *et al.*, 2001d].

The maps show that:

- the hydrogen ion concentration tends to be highest on the eastern sea board where the rainwater volume is smallest. Concentrations appear relatively constant over the three years shown.
- the highest concentrations continue to be measured in the source region.
- the nitrate concentrations are remarkably consistent throughout the five years. The trend, or lack of trend, in nitrate concentrations will be discussed in the next section.
- ammonium concentrations are highest in the areas of the United Kingdom where intensive livestock activity is highest.

3.3.3 Precipitation Chemistry Trends

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 $\mu\text{eq l}^{-1} \text{year}^{-1}$. Associated with the regression analysis is a parameter 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 significant. 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 3-1.

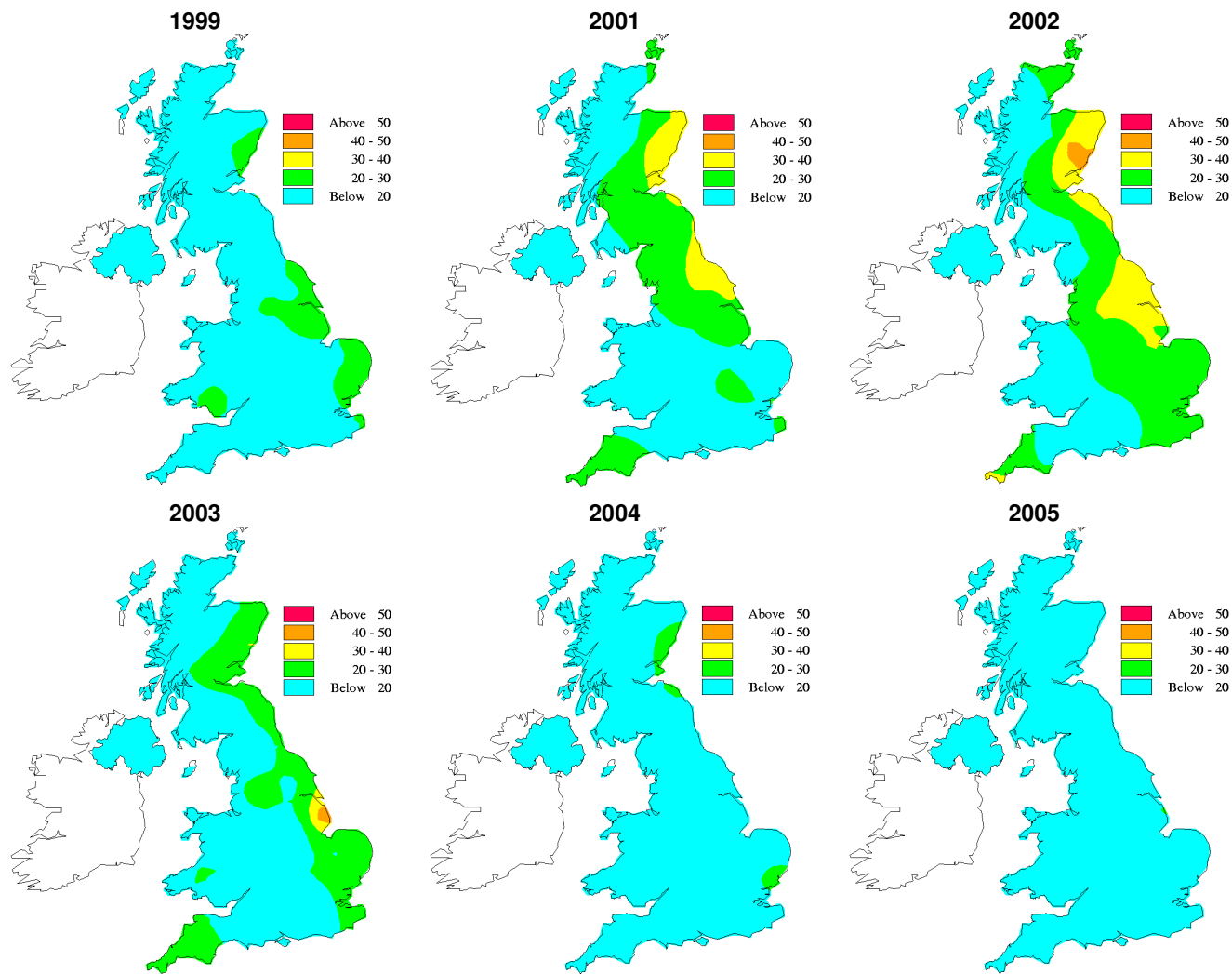


Figure 3-4: *Precipitation-weighted concentration maps of Acidity (in $\mu\text{eq l}^{-1}$) for 1999-2005.*

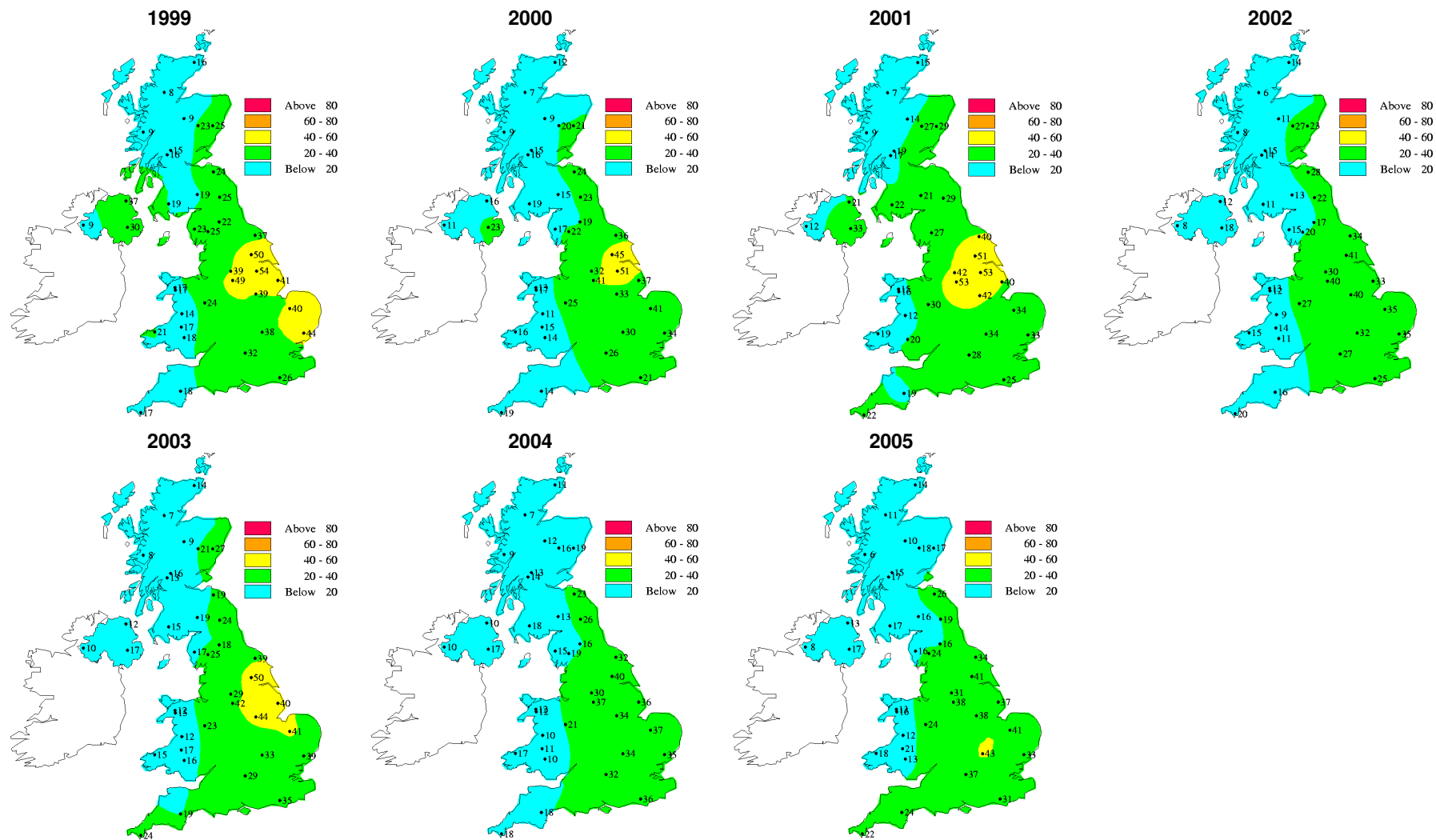


Figure 3-5: Precipitation-weighted Concentration Maps of Non-Seasalt Sulphate (in $\mu\text{eq l}^{-1}$) for 1999-2005.

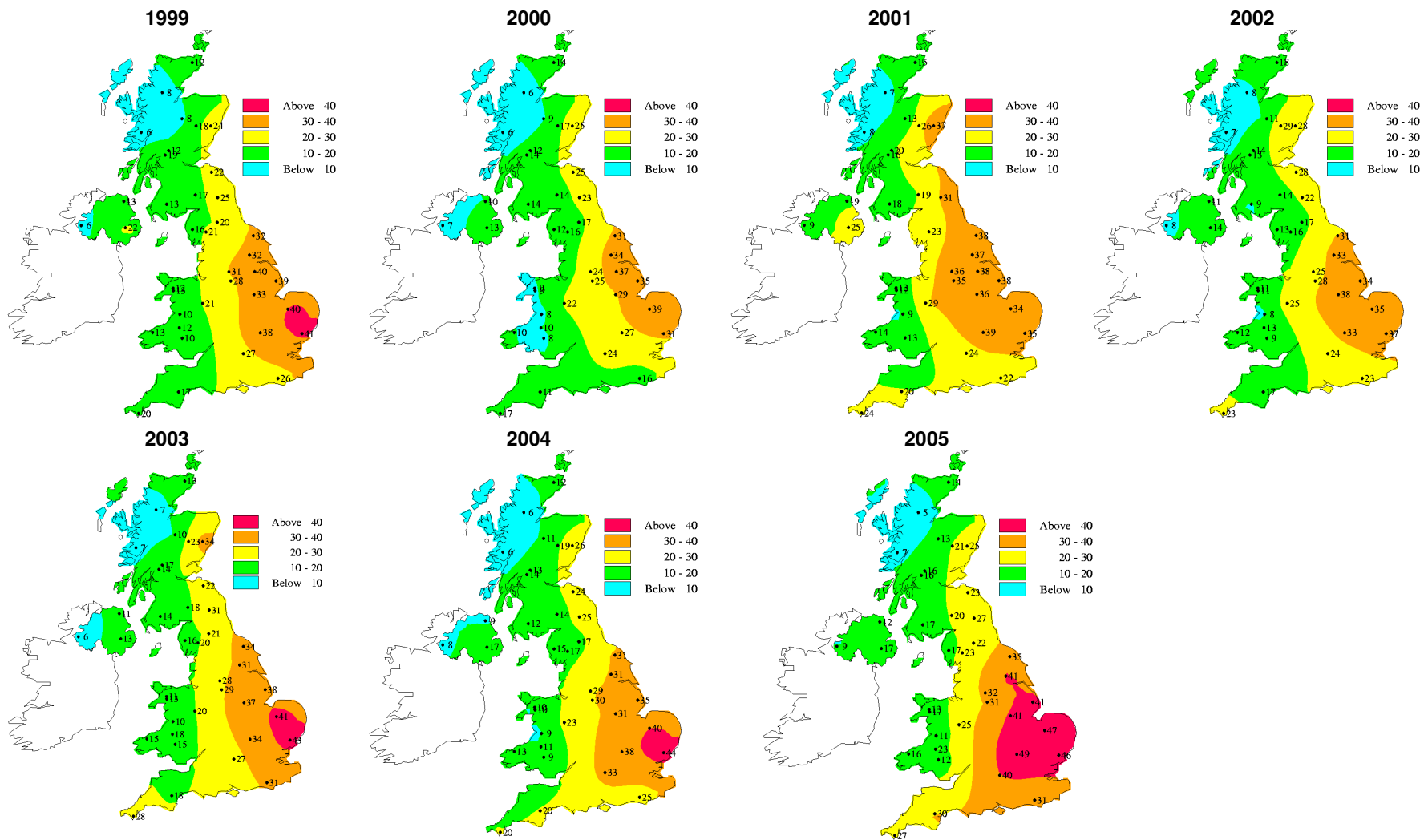


Figure 3-6: *Precipitation-weighted Concentration Maps of Nitrate (in $\mu\text{eq l}^{-1}$) for 1999-2005.*

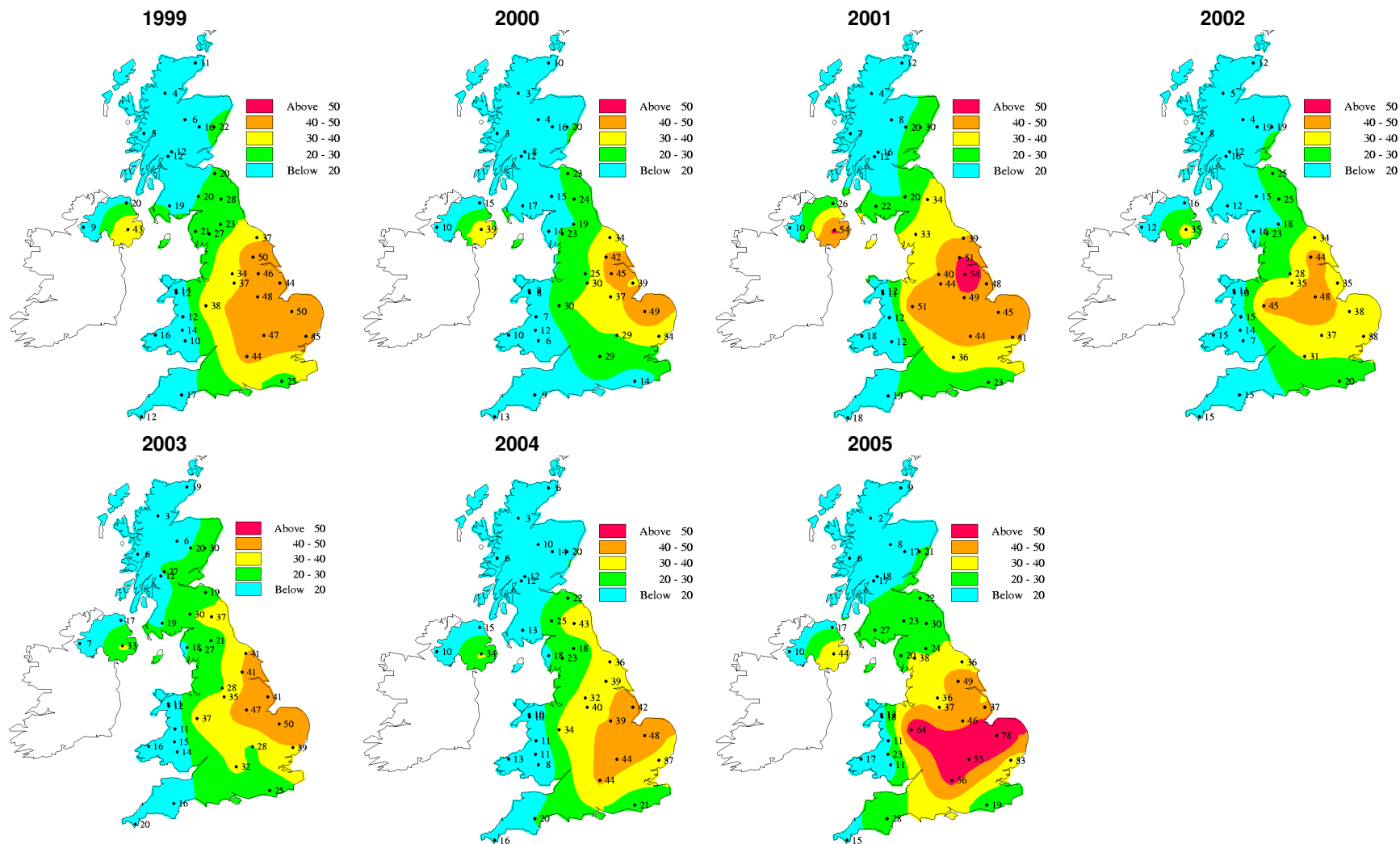


Figure 3-7: Precipitation-weighted Concentration Maps of Ammonium (in $\mu\text{eq l}^{-1}$) for 1999-2005.

Table 3-1: 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 3-2 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 " $F_{\text{calculated}}/F_{\text{critical}}$ " less than one indicate that no statistically significant trend can be detected. This most often occurs for sites located in the more remote parts of the United Kingdom.

Table 3-2: 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		
		$\mu\text{eq l year}^{-1}$	% change year ⁻¹	Trend Status	$\mu\text{eq l year}^{-1}$	% change year ⁻¹	Trend Status
Achanarras	5140	-0.95	-3.23	++++	-0.43	-1.96	++
Allt a' Mharcaidh	5103	-0.66	-3.07	+++	0.06	0.58	-
Balquhidder	5152	-0.80	-2.70	++	-0.01	-0.06	-
Bannisdale	5111	-1.28	-2.80	++++	-0.01	-0.06	-
Barcombe Mills	5007	-1.07	-2.35	++	-0.18	-0.65	-
Bottesford	5121	-3.40	-3.73	+++++	-0.44	-1.08	+
Compton	5129	-2.95	-3.79	++++	-0.55	-1.46	+
Cow Green Reservoir	5113	-1.41	-3.34	++++	-0.18	-0.80	-
Driby	5136	-2.60	-3.24	++++	-0.55	-1.17	++
Eskdalemuir	5002	-1.00	-2.95	+++++	-0.03	-0.19	-
Flatford Mill	5024	-2.54	-3.37	++++	-0.21	-0.51	-
Glen Dye	5011	-1.66	-3.19	+++	-0.25	-0.75	-
Goonhilly	5003	-0.57	-1.90	++	0.12	0.58	-
High Muffles	5009	-2.51	-3.21	++++	-0.62	-1.41	++
Hillsborough Forest	5149	-1.94	-3.64	++++	-0.38	-1.62	-
Jenny Hurn	5118	-4.13	-3.77	++++	-0.54	-1.15	+
Llyn Brianne	5124	-0.82	-2.76	+++	0.08	0.54	-
Llyn Llydaw	5153	-1.24	-3.85	+++	-0.17	-1.24	-
Loch Dee	5107	-0.97	-2.92	+++	-0.15	-0.90	-
Lough Navar	5006	-0.49	-2.64	+++	-0.03	-0.36	-
Polloch	5151	-0.78	-3.69	++++	-0.26	-2.35	++
Preston Montford	5024	-2.17	-3.49	+++	-0.35	-1.16	-
Pumlumon	5150	-0.86	-3.30	+++	-0.23	-1.68	-
Redesdale	5109	-1.80	-3.33	++++	-0.28	-0.87	-
Stoke Ferry	5004	-2.67	-3.30	+++++	-0.41	-0.90	+
Strathvaich Dam	5010	-0.40	-2.69	++	-0.12	-1.34	+
Thorganby	5117	-3.06	-3.18	++++	-0.66	-1.47	++
Tycanol Wood	5123	-0.61	-2.21	+++	0.00	0.02	-
Wardlow Hay Cop	5121	-2.73	-3.08	++++	-0.16	-0.50	-
Whiteadder	5106	-1.83	-3.42	++++	-0.65	-1.86	++
Woburn	5127	-2.63	-3.45	+++++	-0.12	-0.31	-
Yarner Wood	5008	-0.59	-2.04	++	0.19	1.08	-

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).

3.4 SULPHUR DIOXIDE AND PARTICULATE SULPHATE

3.4.1 The 2005 Measurements

A summary of the sulphur dioxide measurements and the daily measurements of particulate sulphate are presented in Appendices 3.1 and 3.2 respectively.

The measurement of sulphur dioxide concentrations is also made in the Rural SO₂ Monitoring Network, which is covered by a separate Defra contract (*Acid Deposition Processes in the UK*, through a 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 2005 by Vincent and Campbell [1996], Hasler and Downing [1998], Hasler *et al.* [2001], and Hayman *et al.* [2001a, b, 2003b, 2006], respectively.

3.4.2 Trends in Sulphur Dioxide

Figure 3-8 shows both the monthly mean concentrations and running annual mean concentrations of sulphur dioxide at Eskdalemuir. There was a large change in concentration occurred between 1980 and 1990, during which time the average concentration decreased by a factor of four from around 4.6 $\mu\text{g S m}^{-3}$ to 1.1 $\mu\text{g S m}^{-3}$. From 1990 to 2005, the concentration has further decreased to 0.22 $\mu\text{g S m}^{-3}$. Figure 3-8 shows that the downward trend in the SO₂ concentrations has followed the reduction in UK SO₂ emissions [Dore *et al.*, 2003], at least in the early years.

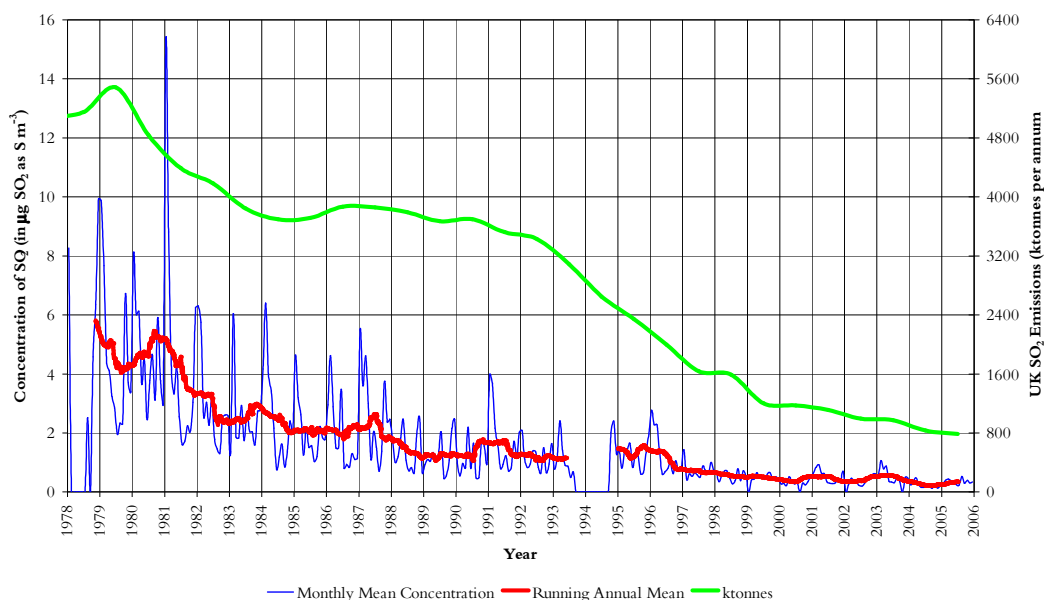


Figure 3-8: Trends in the Concentration of Sulphur Dioxide Observed at Eskdalemuir since 1978.

The monthly and running annual mean concentrations of sulphur dioxide measured at Eskdalemuir and the other primary sites are presented in Figure 3-9. The annual mean sulphur dioxide concentration has decreased substantially at all sites. For example, the annual mean at High Muffles has decreased by a factor of 10 from an annual mean concentration of 7.3 $\mu\text{g SO}_2$ as S m^{-3} in 1987 to 0.73 $\mu\text{g SO}_2$ as S m^{-3} in 2005.

Figure 3-8 also suggests that the large seasonal variations, 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.

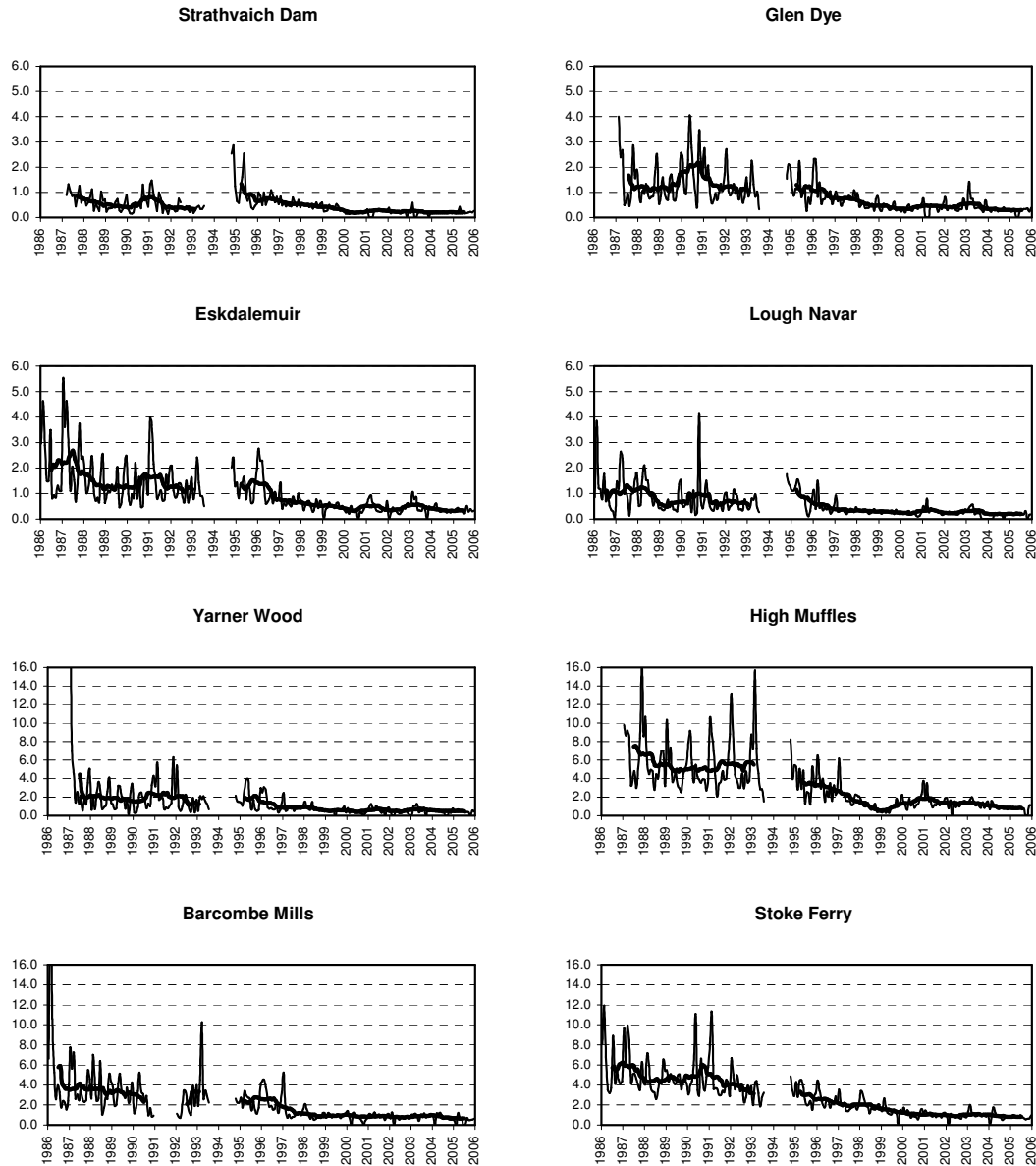


Figure 3-9: Monthly and Running Annual Mean Concentrations of Sulphur Dioxide at the Daily Sites, 1986 to 2005 ($\mu\text{g SO}_2 \text{ as S m}^{-3}$).

3.4.3 Trends in Particulate Sulphate

Figure 3-10 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 from 1992 to 2005. The higher concentrations in 2003 are evident in this figure. Over the period from 1978 to 2005 the average concentration declined from around $1.0 \mu\text{g [SO}_4 \text{ as S] m}^{-3}$ to about $0.4 \mu\text{g [SO}_4 \text{ as S] m}^{-3}$ in 2005.

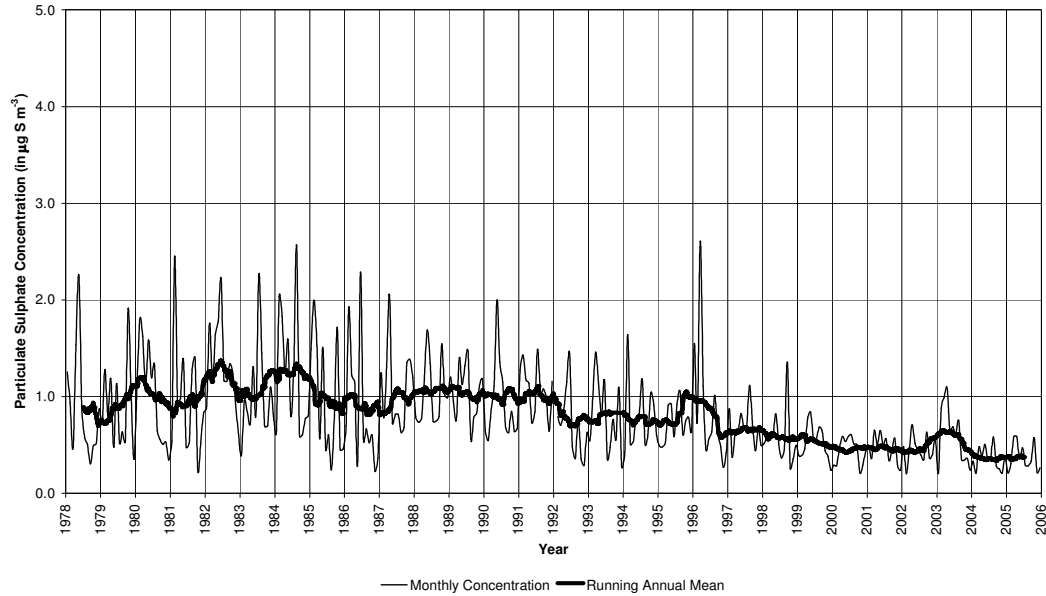


Figure 3-10: Trends in the Particulate Sulphate Concentration Observed at Eskdalemuir since 1978.

Since 2002 daily sulphate concentrations are measured at only five sites; measurements at Strathvaich Dam, Glen Dye and Stoke Ferry were discontinued in 2001. Figure 3-11 shows the annual mean concentration at the operational sites. Concentrations were consistently highest at Barcombe Mills and lowest at Lough Navar, reflecting the proximity of these sites to the European mainland. The relative trends in concentration are somewhat regular. For example, the mean concentrations at each site decreased steadily until about 1992 then remained constant until about 1996 and then decreased rapidly until about 1999, remained more or less constant until 2002. 2003 was a photochemically-active year and there were a number of periods of elevated concentrations, which influenced the annual mean concentrations. Annual mean concentrations were lower in 2004 and 2005 and more consistent with the long-term trends.

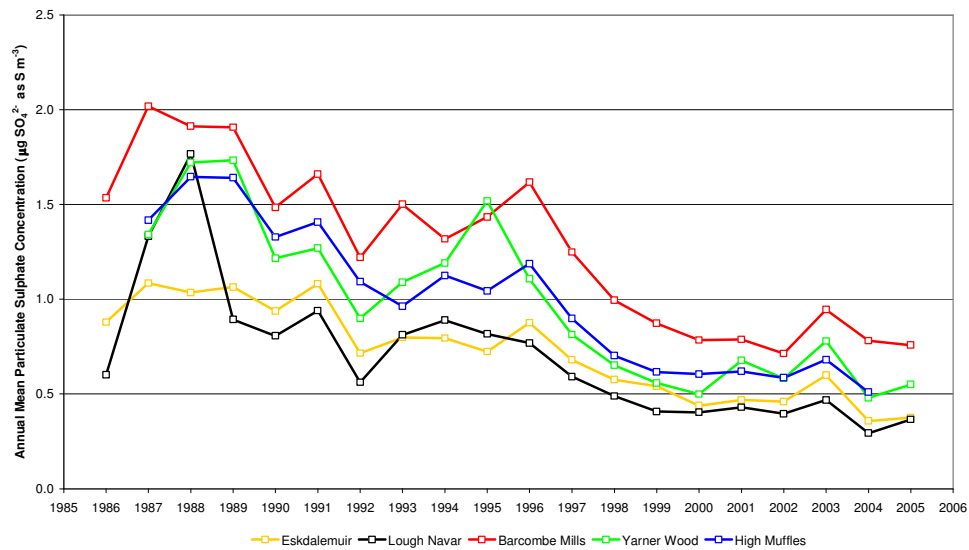


Figure 3-11: Annual Mean Concentrations of Particulate Sulphate at the Daily Sites, 1986 to 2005 ($\mu\text{g S m}^{-3}$).

3.5 NITROGEN DIOXIDE

3.5.1 The 2005 Measurements

The nitrogen dioxide diffusion tube measurements made in 2005 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].

3.5.2 Comparison with Other Measurements

Since 2004, nitrogen dioxide measurements have been made using automatic instruments at a number of rural locations in the UK, primarily in England. Three of these sites are also in the Acid Deposition Monitoring Network (Eskdalemuir, Yarner Wood and High Muffles). A further two Acid Deposition Monitoring Network sites are located close to sites with automatic analysers (Compton - Harwell and Barcombe Mills – Lullington Heath). Table 3-3 compares the monthly and annual mean concentrations determined at these sites from the diffusion tube and automatic measurements.

Table 3-3: Comparison of the 2004 Monthly and Annual Mean Concentrations of Nitrogen Dioxide (in $\mu\text{g NO}_2 \text{ m}^{-3}$) determined at High Muffles and Yarner Wood using Diffusion Tubes and Automatic Analyser.

	Eskdalemuir		High Muffles		Yarner Wood	
	DT ¹	Automatic	DT	Automatic	DT ¹	Automatic
Jan-05	3.8	4.7	9.5	7.0	14.9	
Feb-05	4.3	3.2	9.5	8.1	5.4	
Mar-05	4.9	3.8	9.5	- ²	7.6	
Apr-05	3.6	3.9	8.0	6.0	6.7	
May-05	2.6	3.0	6.0	4.8	5.4	
Jun-05	2.9	2.3	6.0	- ²	4.3	
Jul-05	6.7	2.5	5.3	4.6	4.2	
Aug-05	5.8	3.5	5.0	6.7	4.4	
Sep-05	- ²	4.1	8.9	8.0	4.7	
Oct-05	7.0	4.4	13.7	11.0	7.4	
Nov-05	5.2	4.4	13.4	10.8	6.9	
Dec-05	6.4	5.6	14.5	11.0	6.6	
Annual	4.8	3.8	9.1	7.5	6.5	9.2

	Barcombe Mills/ Lullington Heath		Compton/ Harwell	
	DT ¹	Automatic	DT	Automatic
Jan-05	10.9	7.7	11.1	8.6
Feb-05	16.9	11.6	20.7	14.9
Mar-05	19.6	- ²	- ²	15.0
Apr-05	17.4	- ²	- ²	13.7
May-05	11.8	6.2	9.2	7.3
Jun-05	10.2	- ²	9.3	8.3
Jul-05	8.8	7.3	9.4	7.7
Aug-05	7.8	8.4	10.3	7.6
Sep-05	10.7	7.7	11.5	9.7
Oct-05	16.0	10.3	16.6	14.3
Nov-05	14.6	17.4	20.0	16.4
Dec-05	16.4	15.8	22.3	15.9
Annual	13.4	10.1	13.7	11.6

Notes: (1) DT = Diffusion Tube; (2) The monthly or annual mean concentrations are only determined if the data capture is greater than 75%.

Table 3-3 indicates that the diffusion tube measurements are generally higher than those made by the automatic analyser. This is confirmed in a scatter plot of valid pairs of measurements made at the 5 sites (see Figure 3-12). The over-read is of the order of 20-25%.

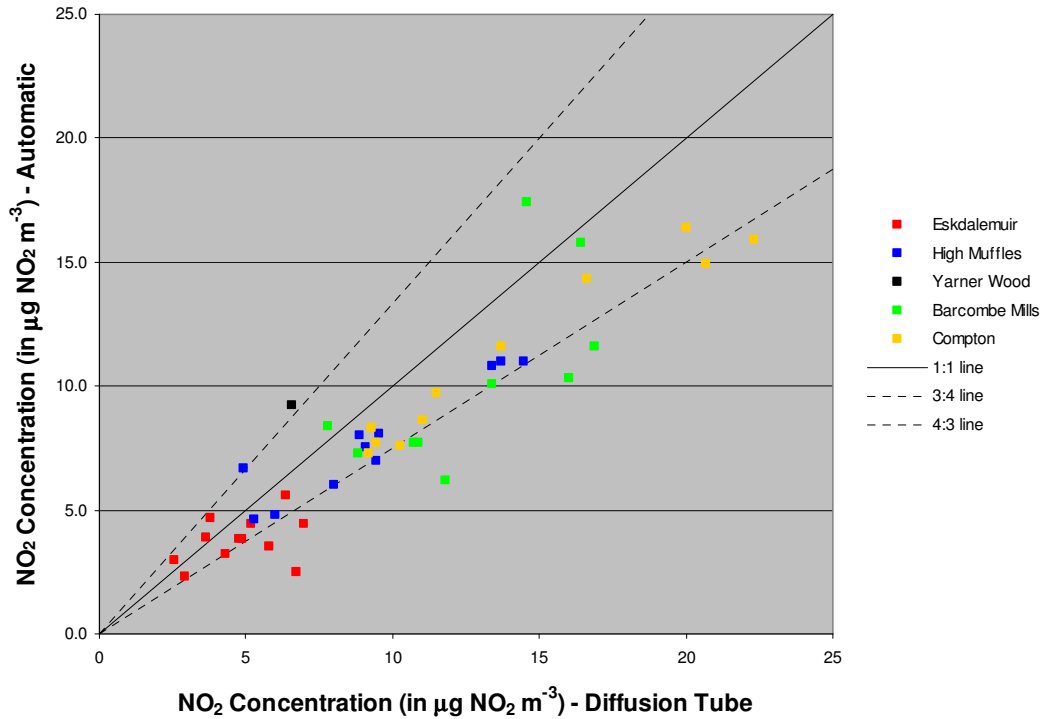


Figure 3-12: Scatter plot of the NO₂ Concentrations determined in 2005 from the Automatic Analyser and Diffusion Tubes for 5 Sites – Eskdalemuir, Barcombe Mills/Lullington Heath, Harwell/Compton, High Muffles and Yarner Wood.

3.5.3 Trends in Nitrogen Dioxide

Figure 3-13 presents the annual average concentrations for nitrogen dioxide determined at 8 of the sites in the monitoring network between 1997 and 2005. As noted elsewhere, 2005 was a higher pollution year than 2004 but less severe than the high pollution year of 2003. In consequence, the annual mean concentrations in 2005 were lower than those measured in 2003 but higher than those determined in 2004.

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 is most clearly observed at the relatively high concentration sites such as High Muffles, Stoke Ferry and Barcombe Mills, although lower concentration sites such as Yarner Wood, Eskdalemuir and Glen Dye also show evidence of a decline.

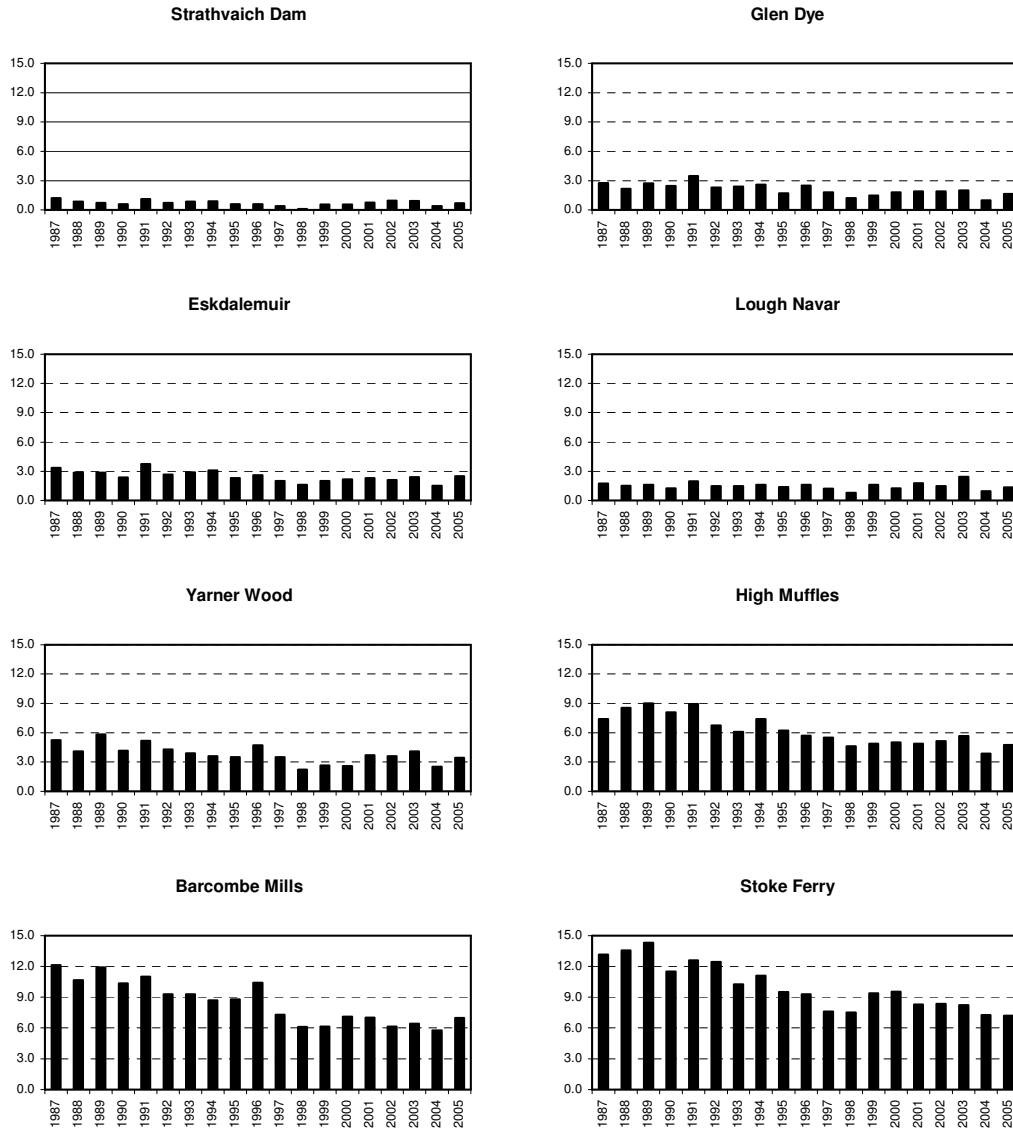


Figure 3-13: Annual average nitrogen dioxide concentration (ppb).

3.5.4 Concentration Map

The diffusion tube measurements have been used to produce a map of the rural nitrogen dioxide concentrations in the UK for 2005, as shown in Figure 3-14 (bottom right-hand panel). The highest concentrations were observed in the Midlands and southern England with an annual mean concentration of 11.2 ppb determined at Woburn in 2005. In the main, this reflects the proximity to the sampling sites of roads and other aspects of urbanisation. The same figure also shows the 1999 to 2004 maps for comparison. The maps show little difference in the spatial patterns between 1999 and 2005 and some evidence of a decrease in nitrogen dioxide concentrations across the UK.

Historically, these UK maps, based on diffusion tube measurements defined the rural nitrogen dioxide concentration field, upon which urban contributions were superimposed. With the introduction of automatic analysers, mainly in England, a hybrid approach is now adopted in the mapping work. The preparation of the Urban-enhanced maps is undertaken under another contract (Pollution Climate Mapping). The measurements were provided to the Pollution Climate Mapping project team.

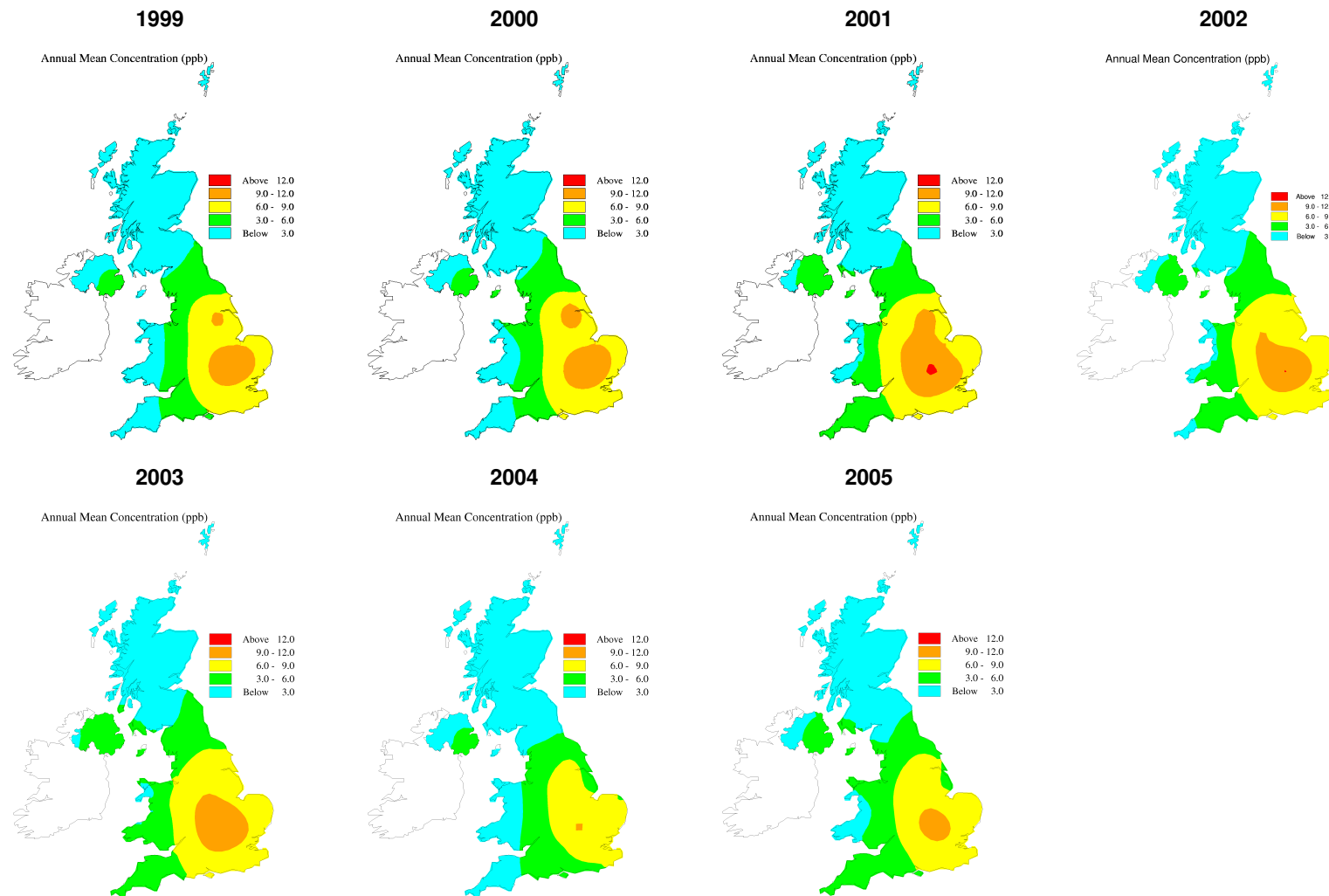


Figure 3-14: Interpolated concentration maps of nitrogen dioxide (in ppb) for 1999-2005.

4 Nitric Acid Monitoring Network

4.1 INTRODUCTION

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, the sampling methods and measurement data for 2005 are summarised and the measurements compared against previous years.

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.

A map of the sites in the monthly HNO_3 monitoring network is shown in Figure 4-1.



Figure 4-1: Map of 12 monitoring sites for HNO_3 , NO_3^- and related acid gas/particle measurements.

4.2 METHOD AND DATA COLLECTION

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:

$$Q = (c_e - c_b) \cdot v \quad (1)$$

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:

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

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 m³ per month.

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 (χ_a (corrected)) is then determined as:

$$\chi_a \text{ (corrected)} = \chi_a \text{ (Denuder 1)} * \frac{1}{[1 - (\chi_a \text{ (Denuder 2)} / \chi_a \text{ (Denuder 1)})]} \quad (3)$$

The absolute amount of the correction is added to the value for the acid gas, and subtracted from the aerosol value. 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:

$$\chi_a = \chi_a \text{ (Denuder 1)} + \chi_a \text{ (Denuder 2)} \quad (4)$$

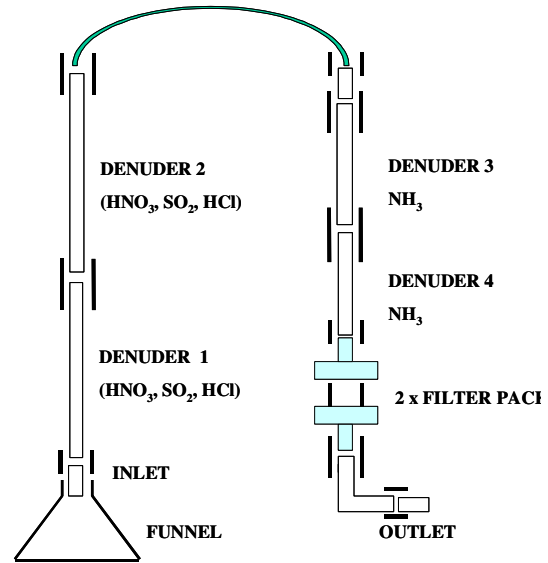


Figure 4-2: Sampling train for monthly air measurements.

4.3 NITRIC ACID NETWORK MEASUREMENTS

4.3.1 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 HNO₃/SO₂/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 are marked as being less certain. The monthly averaged denuder capture efficiencies from the 12 monitoring sites for HNO₃, SO₂ 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 ~ 5 %).

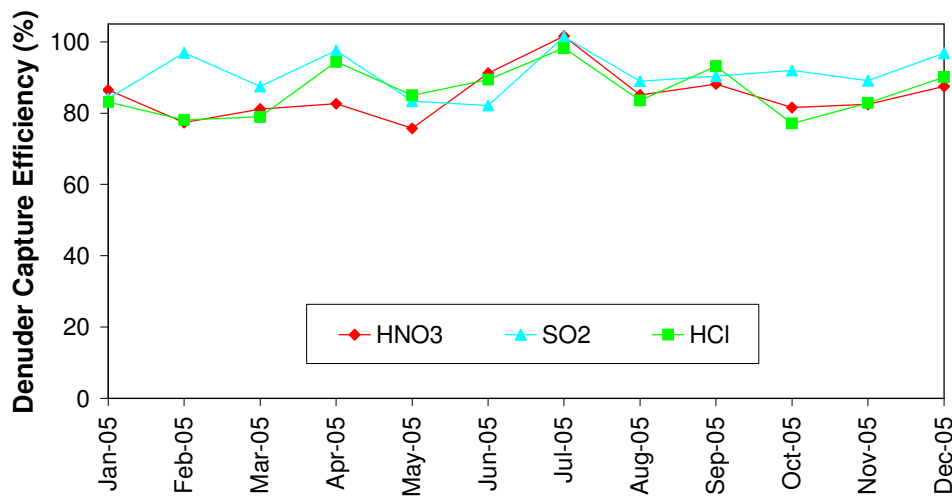


Figure 4-3 Monthly mean denuder capture efficiency for NH₃, HNO₃, SO₂ and HCl from the 12 monitoring sites (= amount in 1st Denuder / (Amounts captured in 1st + 2nd Denuders)*100 %).

4.3.2 The 2005 Measurements

Graphs of the concentrations of HNO_3 and NO_3^- at each site are shown in Figure 4-4. The complete set of the monthly measurements of acidic trace gases, acidic aerosol and base cations made in 2004 can be found in Appendix 5.1.

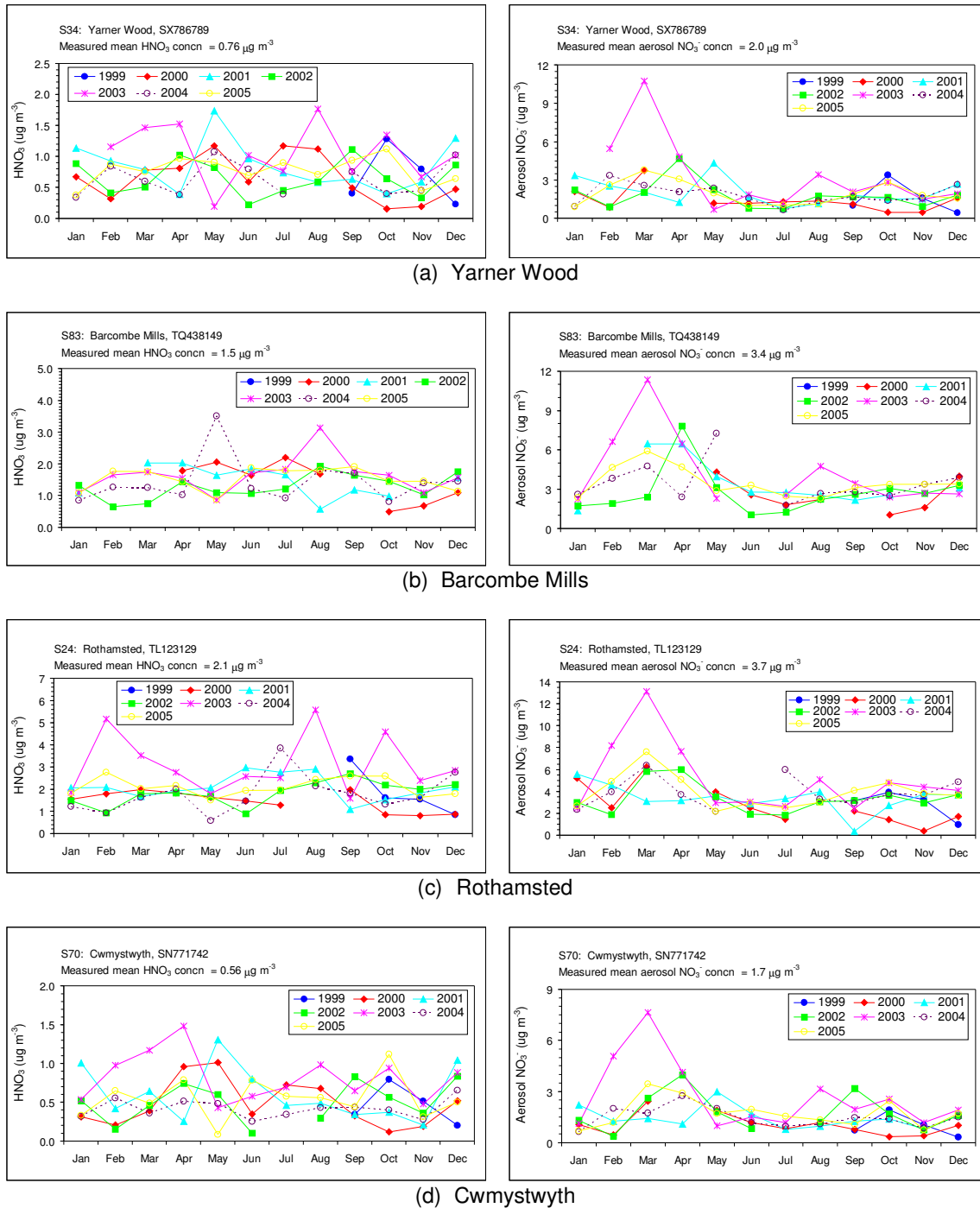
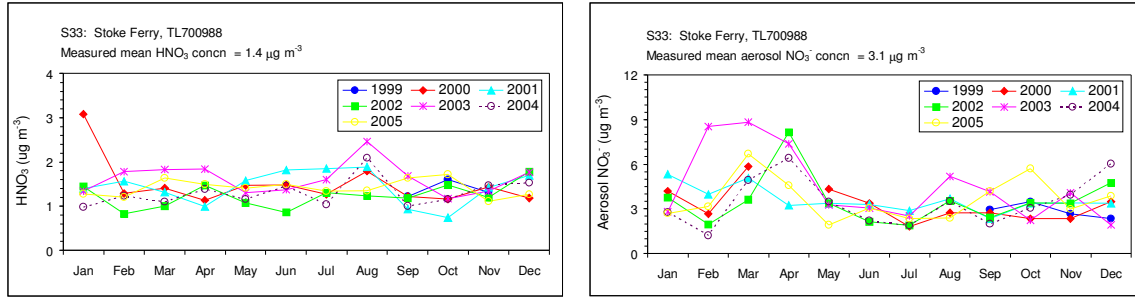
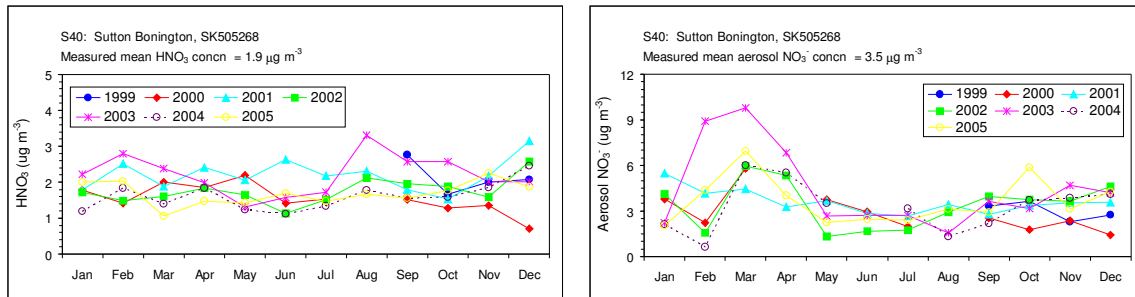


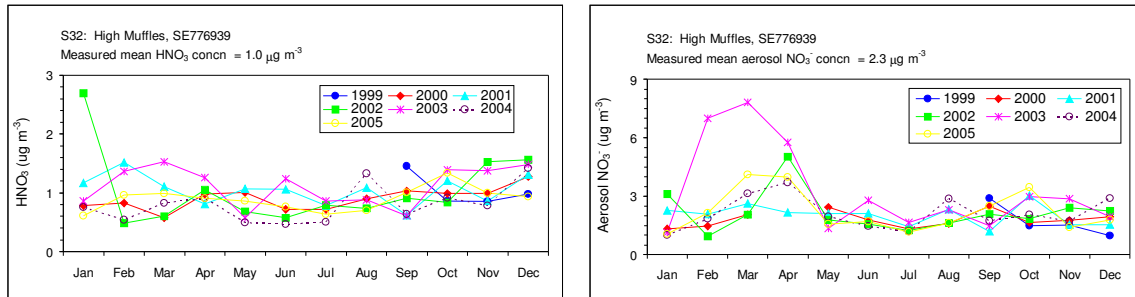
Figure 4-4: Measurements of Gaseous HNO_3 and aerosol NO_3^- made in the Nitric Acid Monitoring Network between September 1999 and December 2005.



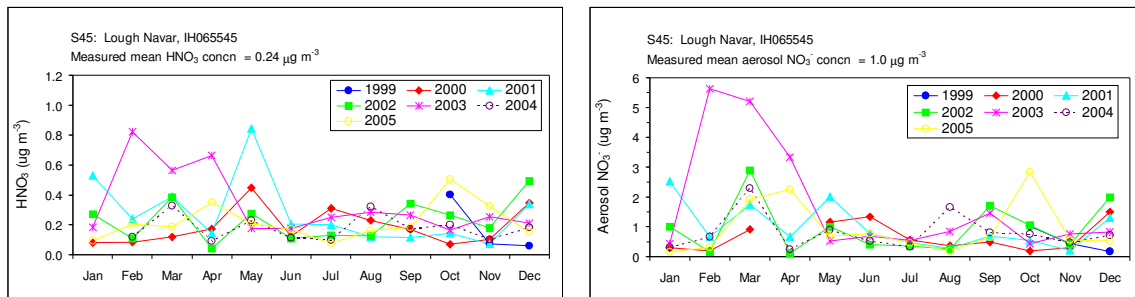
(e) Stoke Ferry



(f) Sutton Bonington



(g) High Muffles



(h) Lough Navar

Figure 4-4: Measurements of Gaseous HNO₃ and aerosol NO₃- made in the Nitric Acid Monitoring Network between September 1999 and December 2005. (continued)

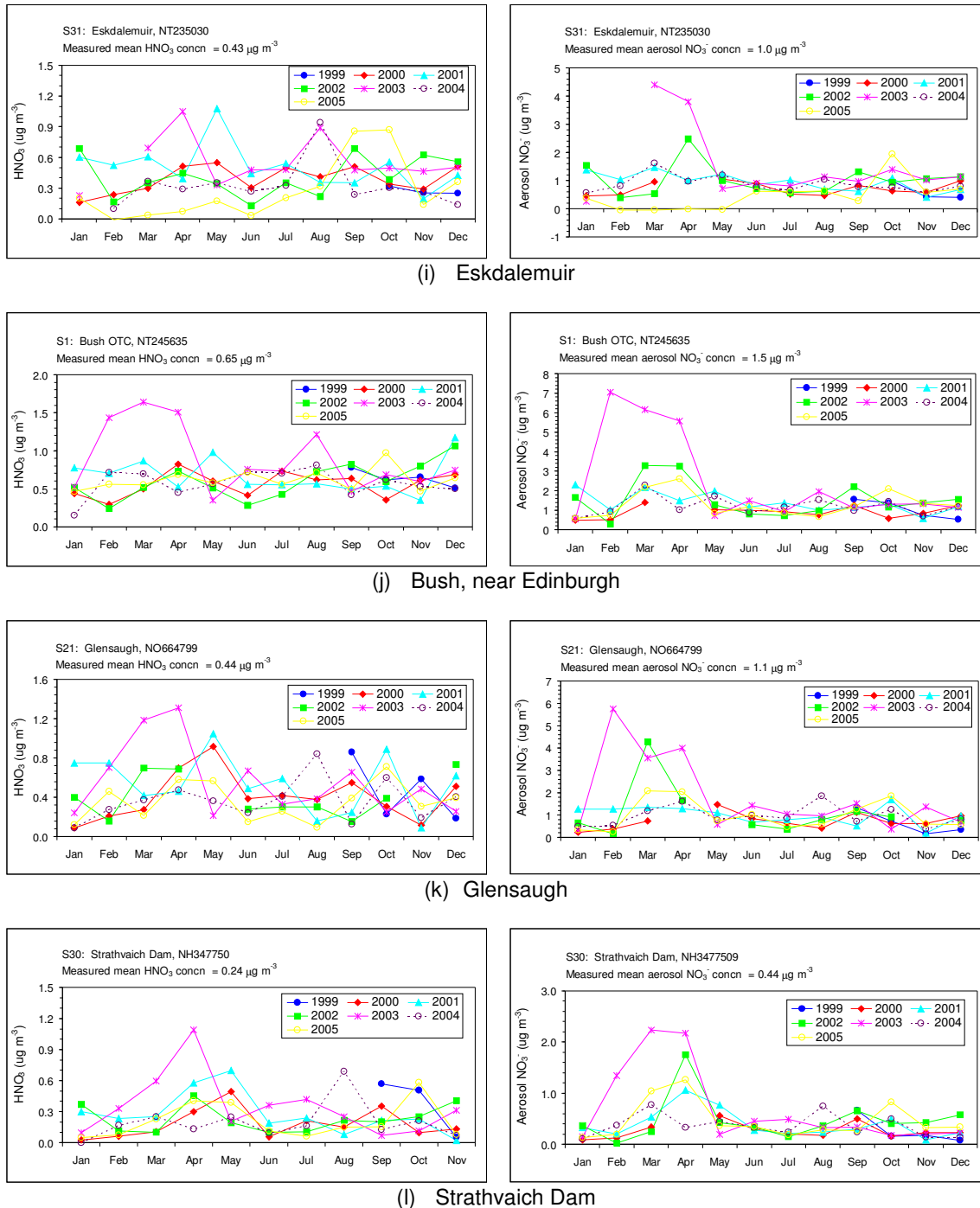


Figure 4-4: Measurements of Gaseous HNO₃ and aerosol NO₃⁻ made in the Nitric Acid Monitoring Network between September 1999 and December 2005. (continued)

The plots in Figure 4-4 show that the concentrations of both species are reasonably stable at a monthly level, and have a weak seasonal variability. The annual cycle for HNO₃/NO₃⁻ has an observed maximum during late spring and early summer, which may be related to increased ozone concentrations during the season and an enhancement of HNO₃ formation. During the winter months, low temperature and high humidity favour the formation of NH₄NO₃ from the gas phase NH₃ and HNO₃. Coupled to changes in boundary layer conditions, this produces the winter minimum in the cycle. The ratio of the concentrations of HNO₃ and NO₃⁻ is similar throughout the year; fluctuations in the ratio are influenced by the loss of HNO₃ due to dry deposition.

Statistical summaries of the measurements made in 2005 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 2005.

No.	Name	Nitric Acid: $\mu\text{g HNO}_3 \text{ m}^{-3}$						Sulphur Dioxide: $\mu\text{g SO}_2 \text{ m}^{-3}$						Hydrochloric acid: $\mu\text{g HCl m}^{-3}$					
		Mean	Min	Max	SD	CV (%)	N	Mean	Min	Max	SD	CV (%)	N	Mean	Min	Max	SD	CV (%)	N
1	Bush OTC	0.62	0.46	0.97	0.14	23.2	12	1.27	0.61	2.12	0.50	39.3	12	0.23	0.14	0.34	0.07	29.2	12
21	Glensaugh	0.35	0.09	0.71	0.20	56.4	12	0.39	0.13	0.89	0.23	59.3	12	0.18	0.03	0.40	0.11	61.3	12
24	Rothamsted	2.10	1.51	2.76	0.41	19.5	12	2.03	1.14	2.93	0.62	30.4	12	0.32	0.19	0.55	0.10	31.8	12
30	Strathvaich Dam	0.21	0.05	0.58	0.17	79.7	12	0.15	-0.05	0.63	0.17	113.3	12	0.26	0.11	1.00	0.25	95.9	12
31	Eskdalemuir	0.27	-0.01	0.87	0.30	110.4	12	0.25	0.00	0.97	0.28	114.7	12	0.10	0.01	0.31	0.10	94.7	12
32	High Muffles	0.89	0.61	1.34	0.20	22.3	12	1.76	0.04	2.87	0.71	40.7	12	0.25	0.17	0.33	0.05	21.3	12
33	Stoke Ferry	1.41	1.12	1.72	0.19	13.3	12	1.55	0.95	2.27	0.41	26.5	12	0.39	0.12	0.83	0.21	54.4	12
34	Yarner Wood	0.77	0.37	1.12	0.22	28.2	12	0.69	0.11	1.09	0.30	43.3	12	0.25	0.09	0.39	0.10	39.8	12
83	Barcombe Mills	1.52	0.86	1.91	0.35	22.8	12	1.68	1.07	2.62	0.50	29.9	12	0.29	0.15	0.43	0.09	30.4	12
40	Sutton Bonington	1.69	1.06	2.25	0.32	19.1	12	2.22	1.14	4.36	0.99	44.8	12	0.31	0.14	0.67	0.16	50.9	12
45	Lough Navar	0.22	0.08	0.50	0.12	54.8	12	0.21	0.00	0.62	0.21	100.4	12	0.10	0.03	0.33	0.08	81.1	12
70	Cwmystwyth	0.55	0.08	1.12	0.27	48.5	12	0.59	0.11	1.12	0.28	48.5	12	0.20	0.00	0.51	0.15	73.2	12

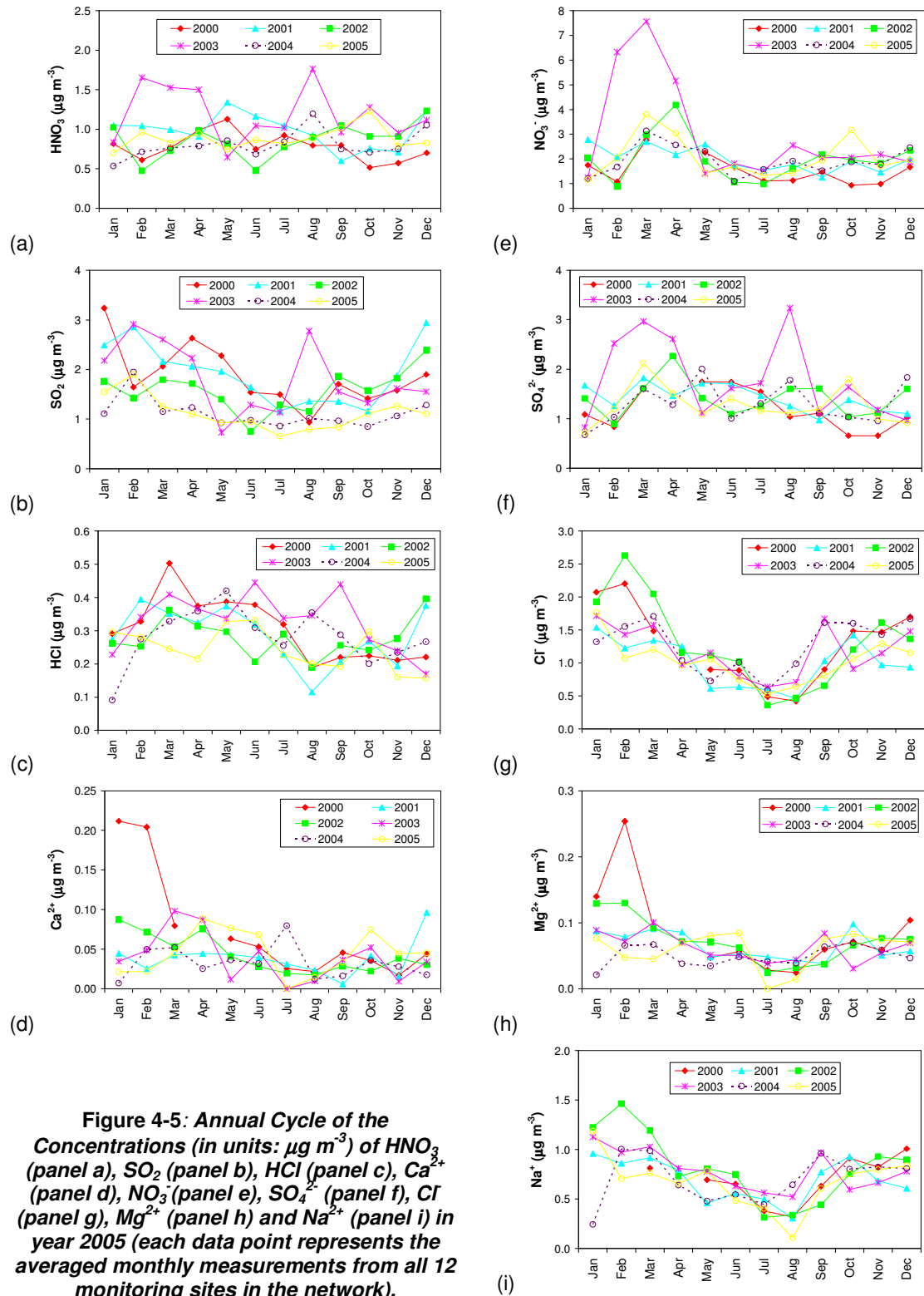
Table 4-2: Summary of Statistics for Monthly Measurements of Acidic Aerosols in 2005.

No.	Name	Nitrate: $\mu\text{g NO}_3^- \text{ m}^{-3}$						Sulphate: $\mu\text{g SO}_4^{2-} \text{ m}^{-3}$						Chloride: $\mu\text{g Cl}^- \text{ m}^{-3}$					
		Mean	Min	Max	SD	CV (%)	N	Mean	Min	Max	SD	CV (%)	N	Mean	Min	Max	SD	CV (%)	N
1	Bush OTC	1.30	0.59	2.61	0.66	50.8	12	0.99	0.37	1.75	0.44	45.1	12	0.95	0.57	1.28	0.26	27.4	12
21	Glensaugh	0.99	0.24	2.09	0.67	68.0	12	0.61	0.13	1.19	0.32	52.7	12	0.78	0.29	1.57	0.34	43.4	12
24	Rothamsted	3.91	2.15	7.59	1.52	38.8	12	2.00	1.41	3.54	0.60	29.8	12	1.10	0.43	2.39	0.54	48.8	12
30	Strathvaich Dam	0.47	0.13	1.27	0.37	79.2	12	0.61	0.34	1.12	0.26	42.9	12	1.04	0.55	1.81	0.34	32.9	12
31	Eskdalemuir	0.47	-0.04	1.95	0.55	118.1	12	0.42	-0.09	1.63	0.46	109.4	12	0.44	-0.06	1.05	0.41	95.3	12
32	High Muffles	2.21	1.06	4.10	1.07	48.5	12	1.33	0.75	2.24	0.44	33.0	12	1.02	0.56	1.77	0.34	33.8	12
33	Stoke Ferry	3.62	1.93	6.70	1.45	40.0	12	1.80	1.12	3.10	0.53	29.5	12	0.99	0.51	1.63	0.36	36.2	12
34	Yarner Wood	1.97	0.91	3.79	0.93	47.2	12	1.26	0.76	2.17	0.44	35.0	12	1.22	0.58	2.22	0.57	46.5	12
83	Barcombe Mills	3.48	2.30	5.91	1.09	31.2	12	2.10	1.32	3.09	0.53	25.2	12	1.37	0.55	2.66	0.58	42.7	12
40	Sutton Bonington	3.65	2.06	6.95	1.52	41.6	12	2.07	1.06	4.61	0.89	43.2	12	1.24	0.61	2.22	0.50	40.3	12
45	Lough Navar	0.95	0.16	2.84	0.88	92.9	12	0.78	0.42	1.42	0.35	44.7	12	1.10	0.54	1.84	0.32	28.8	12
70	Cwmystwyth	1.73	0.70	3.45	0.85	49.0	12	1.21	0.55	2.23	0.53	43.7	12	1.06	0.60	1.72	0.33	30.8	12

Table 4-3: Summary of Statistics for Monthly Measurements of Base Cations in 2005.

No.	Name	Calcium: $\mu\text{g Ca}^{2+} \text{ m}^{-3}$						Magnesium: $\mu\text{g Mg}^{2+} \text{ m}^{-3}$						Sodium: $\mu\text{g Na}^+ \text{ m}^{-3}$					
		Mean	Min	Max	SD	CV (%)	N	Mean	Min	Max	SD	CV (%)	N	Mean	Min	Max	SD	CV (%)	N
1	Bush OTC	0.02	-0.03	0.04	0.02	114.6	12	0.03	0.01	0.06	0.01	47.9	12	0.60	0.09	0.84	0.22	36.6	12
21	Glensaugh	0.02	-0.05	0.07	0.04	172.8	12	0.04	-0.02	0.08	0.03	81.7	12	0.53	0.09	1.09	0.29	54.2	12
24	Rothamsted	0.04	-0.07	0.08	0.04	105.1	12	0.05	-0.02	0.10	0.03	61.0	12	0.76	0.10	1.89	0.44	58.0	12
30	Strathvaich Dam	0.03	-0.03	0.09	0.03	97.5	12	0.05	0.00	0.08	0.02	45.0	12	0.68	0.12	1.11	0.27	39.5	12
31	Eskdalemuir	0.03	-0.06	0.08	0.04	112.0	12	0.05	-0.01	0.10	0.03	61.0	12	0.31	-0.02	0.69	0.28	90.9	12
32	High Muffles	0.03	-0.06	0.08	0.05	157.0	12	0.05	-0.02	0.09	0.04	81.7	12	0.65	0.17	0.96	0.26	39.2	12
33	Stoke Ferry	0.04	-0.06	0.09	0.04	122.8	12	0.05	-0.01	0.09	0.03	61.3	12	0.64	0.10	0.92	0.23	36.5	12
34	Yarner Wood	0.05	-0.04	0.14	0.05	94.6	12	0.08	-0.01	0.15	0.05	56.9	12	0.91	0.11	1.68	0.43	47.4	12
83	Barcombe Mills	0.07	-0.04	0.17	0.05	83.8	12	0.09	0.00	0.18	0.05	59.4	12	0.91	0.11	1.86	0.43	47.7	12
40	Sutton Bonington	0.06	-0.02	0.17	0.05	72.6	12	0.07	0.00	0.10	0.03	47.9	12	0.73	0.10	1.34	0.31	42.5	12
45	Lough Navar	0.04	-0.05	0.11	0.04	93.1	12	0.07	-0.01	0.10	0.03	49.4	12	0.67	0.11	1.15	0.27	40.7	12
70	Cwmystwyth	0.06	-0.08	0.15	0.06	112.0	12	0.09	-0.03	0.19	0.06	68.8	12	0.70	0.12	1.33	0.32	46.2	12

Figure 4-5 shows the annual cycle in the concentrations of the 3 gas-phase and the 6 aerosol components, as monthly network average concentrations, for the years 2000 through to 2005.



Scatter plots of the concentration of gas and aerosol phases of the different components show that there are significant spatial correlations between the concentrations of the different pollutants (Figure 4-6)³.

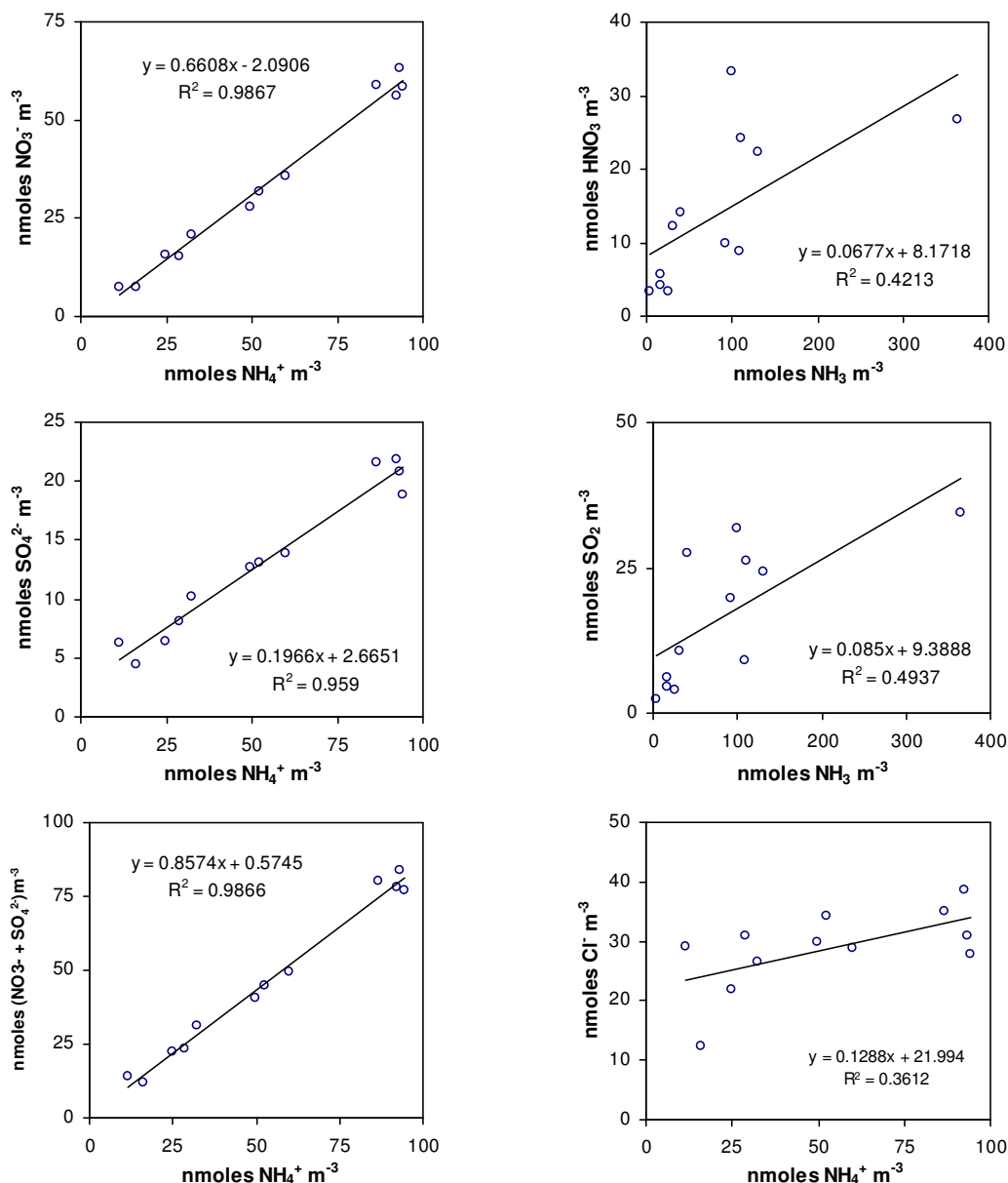


Figure 4-6: Scatter plots of showing the relationships between concentrations of HNO_3 , SO_2 , NH_3 , NO_3^- , SO_4^{2-} and NH_4^+ from the monthly measurements at 12 sites (units: nmol m^{-3}).

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. 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 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

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>.

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^+ .

The high correlations between the aerosol species also indicate the quality of the measurements, since uncertainty in the measurements on a monthly basis would propagate through to scatter in these plots.

4.3.3 The 2005 Maps

Interpolated concentration fields for 2004 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, although detail in the spatial concentration field is necessarily limited by measurements from 12 sites.

Figure 4-7 shows the distribution of annual mean SO_2 concentrations for 2004. The largest annual concentrations of $2.2 \mu\text{g m}^{-3}$ 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. SO_2 concentrations generally decreased towards the West and North of the UK, with the lowest concentrations of $< 0.5 \mu\text{g SO}_2 \text{ m}^{-3}$ in northern Scotland. SO_2 is seen to be more spatially variable than SO_4^{2-} aerosol, reflecting the long atmospheric residence time of the latter.

HCl and Cl^- concentrations are largest in the south east and south west of England (Barcombe Mills, Yarner Wood) (see Figure 4-7). The distribution may reflect the dual contribution to atmospheric Cl^- from anthropogenic and marine sources. The highest HCl concentrations in the south may be derived from emission or reaction of sea salt 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 vary greatly depending on the species. In all cases, however (Ca^{2+} , Mg^{2+} and Na^+), concentrations are the largest at Barcombe Mills (see Figure 4-7). 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.

4.4 DISCUSSION

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.

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 4-7 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 derived predominantly from agricultural sources, and SO_2 and HNO_3 from combustion sources.

It should be noted that the maps of the acid gas and aerosol concentrations shown in Figure 4-7 are constructed using bi-linear interpolation. This is because the number of sites is not sufficient to permit more sophisticated interpolation methods (e.g. krigging) 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

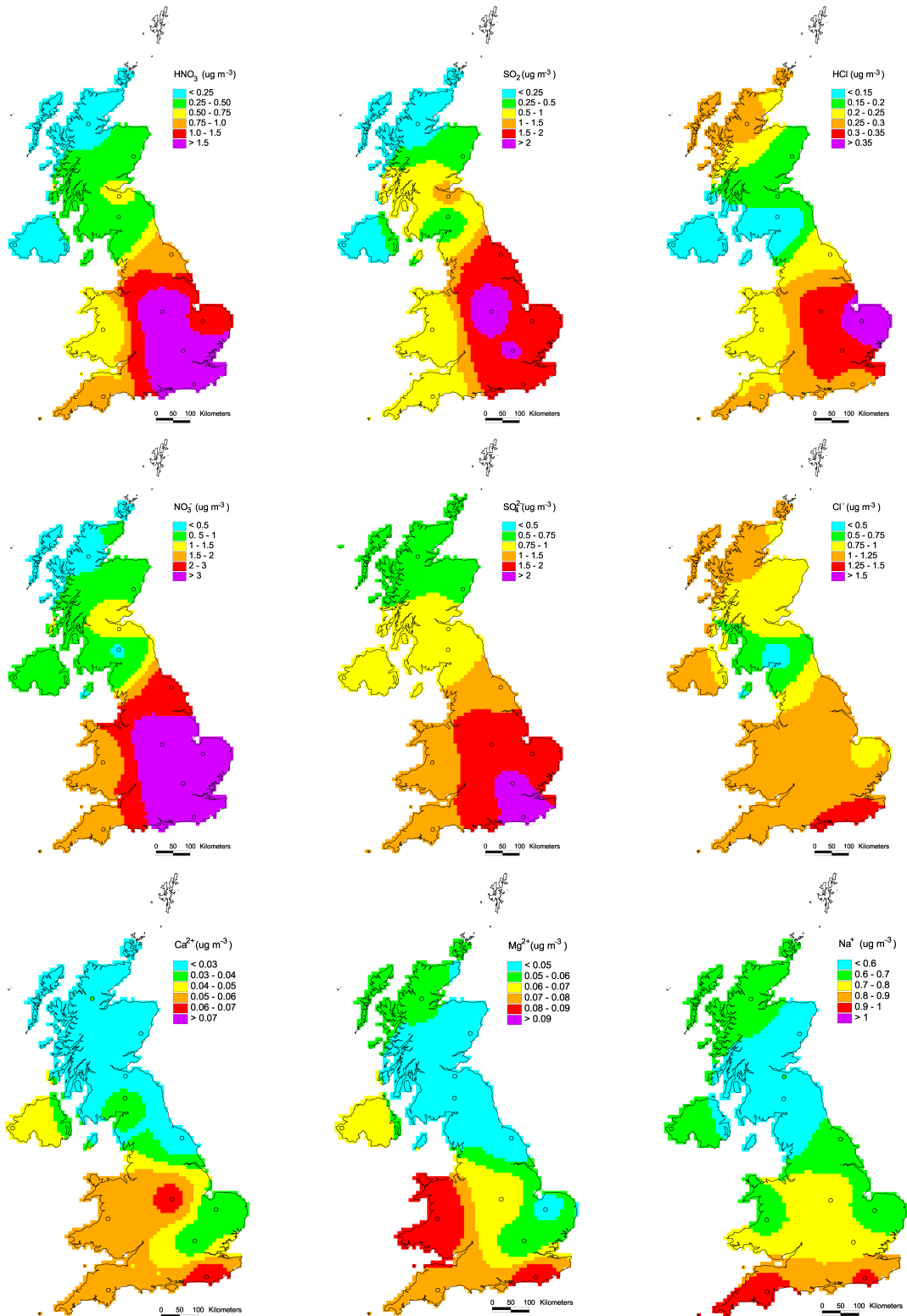


Figure 4-7: Spatial patterns of the concentrations of HNO₃, SO₂, HCl and of aerosol NO₃⁻, SO₄²⁻, Cl⁻, Ca²⁺, Mg²⁺ and Na⁺ concentrations in the UK from the averaged monthly measurements (January-to December-2005).

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.

The UK deposition budgets for HNO₃, using interpolated concentrations from the 12 sites in the monitoring network are shown in Table 4-4. The variation between years is due to the variability in the interpolated concentrations, and demonstrates clearly that large errors can potentially arise due to use of only 12 sites in the present network.

Table 4-4: UK Annual Deposition Budgets for HNO₃ (based on Interpolated Concentrations from the 12 sites in the UK Nitric Acid Monitoring Network)

Year	2000	2001	2002	2003	2004
Annual Deposition Budgets for HNO₃ (kt N)	57	73	62	87	57

The monthly site data provide information on the overall seasonal behaviour of the different pollutants. Figure 4-4 presents the monthly changes at each site, and after five full years of monitoring, the seasonal trends are clearly distinctive and replicated for each site. Figure 4-5 shows the average seasonal changes for 2000 to 2005 from all of the sites, and indicates more clearly the main differences for the pollutants. HNO₃, HCl and NO₃⁻ have a maximum during late spring and early summer, which may reflect the importance of photochemical production processes. Conversely, SO₂, Na⁺ and Cl⁻ have maxima during winter, reflecting the importance of combustion processes for SO₂ and marine sources in winter for seasalt. The reasons for the observed seasonal trends in SO₄²⁻, Mg²⁺ and Ca²⁺ are less clear.

5 Other Activities

5.1 EMEP INTERCOMPARISON

5.1.1 Results of the 23rd Intercomparison

An important data quality assessment is organised annually by the EMEP Chemical Co-ordinating Centre (CCC) at the Norwegian Institute for Air Research (NILU). Each July samples are sent to about 36 analytical laboratories in Europe and about 25 other internationally recognised analytical laboratories. The intercomparison exercise is required as part of the EMEP monitoring programme - such a fundamental check on analytical performance is essential if response to emission reductions can be observed consistently throughout Europe. 2005 was the 23rd time such an intercomparison took place. The samples provided included sulphur dioxide in absorbing solution and synthetic rainwater samples. The results were submitted to the CCC in October 2005 with the expected results provided in November 2005.

Table 5-1 compares the expected and measured concentrations for the sulphur dioxide in absorbing solution samples. The measured data appears, like previous years, to be slightly over reading. An investigation carried out during the year by Harwell Scientifics Limited (HSL) showed that the hydrogen peroxide absorbing solution produced a matrix effect within the ion chromatography column - which resulted in the apparent increase in concentration.

Table 5-1: Comparison of Expected and Measured Concentrations of Sulphur Dioxide in Absorbing Solution.

Sample code	Expected concentration µg SO ₂ -S/ml	Measured concentration µg SO ₂ -S/ml	Absolute Mean difference (%)
A1	0.281	0.302	7.20
A3	0.120	0.133	10.28
A4	0.401	0.423	5.34
A5	0.200	0.215	7.23

As there unfortunately was a fault with the nitrogen dioxide samples distributed by the CCC, no results are included in this report for the nitrogen dioxide intercomparison.

Table 5-2 compares the expected and measured for different components of the rainwater samples. Excellent agreement between expected and measured concentrations were observed for sulphate, nitrate, ammonium and pH. For the remaining ions the agreement is poor. This appears anomalous since the agreement between expected and measured concentrations were much better in last year's (22nd) intercomparison for these ions [Hayman *et al.*, 2005b].

5.1.2 Review of Procedures

Given the significant discrepancy between the expected and measured concentrations, Harwell Scientifics Limited, the analytical laboratory for the Acid Deposition Monitoring programme, reviewed its analytical procedures. The review showed that the quality control (QC) standards used were found to be satisfactory. All the method and run conditions complied with the Group Working Instructions (GWI). The QC solutions passed their acceptance criteria and the recorded column efficiency data was within specification. However it was found that there appeared to be an increase in the limit of detection (decrease in sensitivity) for some ions. Further investigations showed that the uncertainty increase occurred for samples analysed during August and September 2005.

Table 5-2: Comparison of Expected and Measured Concentrations of the Main Component in Rainwater Samples.

Species	Sample code	Expected concentration $\mu\text{eq l}^{-1}$	Measured concentration $\mu\text{eq l}^{-1}$	Absolute Mean difference (%)
Sulphate	G1	97.2	97.9	0.8
	G2	110.6	112.3	1.5
	G3	62.6	62.4	-0.3
	G4	72.7	73.6	1.2
Nitrate	G1	32.3	32.1	-0.4
	G2	25.8	25.7	-0.3
	G3	43.9	43.5	-0.8
	G4	45.9	46.4	1.1
Ammonium	G1	18.3	19.3	4.9
	G2	11.4	12.1	6.1
	G3	27.5	27.8	1.3
	G4	28.6	30.0	4.6
Magnesium	G1	7.7	5.8	-28.2
	G2	7.2	4.9	-36.7
	G3	9.1	6.6	-32.5
	G4	10.2	11.5	12.1
Sodium	G1	10.2	17.8	54.7
	G2	11.8	19.1	47.5
	G3	25.6	29.1	13.0
	G4	28.1	28.7	2.1
Chloride	G1	4.6	1.4	-105.7
	G2	5.2	2.3	-79.2
	G3	14.4	11.0	-26.7
	G4	15.0	11.8	-23.7
Calcium	G1	9.6	9.0	-6.5
	G2	11.5	10.0	-14.0
	G3	13.4	11.0	-19.7
	G4	14.5	14.0	-3.9
Potassium	G1	8.3	6.6	-22.5
	G2	7.8	6.4	-20.1
	G3	5.2	4.3	-18.2
	G4	4.2	4.1	-1.9
		Measured pH, pH Units	Expected pH, pH Units	
pH	G1	4.1	4.0	-2.1
	G2	4.0	4.0	-1.4
	G3	4.4	4.3	-1.8
	G4	4.3	4.3	-1.6

5.1.3 Improvements Measures

A number of improvements were identified by HSL to ensure the sensitivity problems would not occur again. These included:

- The introduction of a limit of quantification solution (LOQ) to ensure that the instrument sensitivity criteria are met.

- The expansion of the range of data recorded in the column efficiency logs to improve the way instrument performance is monitored
- An increase the coefficient of determination (R^2) for the calibration from 0.99 to at least 0.999. The calibration of the ion chromatography instrument uses a parabolic regression analysis. This method of calibration allowed the lowest calibrating standard to have a disproportionately large influence on the calibration- particularly at low concentration levels. The previous R^2 of 0.99 was too lax to ensure a sufficiently rigorous calibration.

Analysis of the components of rainwater is UKAS accredited. The method improvements outlined above will require an update of the UKAS accreditation.

5.1.4 Implication for the 2005 Dataset

The EMEP intercomparison samples were analysed during August and September 2005. Of primary interest to the sampling programme is the extent to which the decrease in analytical sensitivity will have on the long-term trends in pollutant concentrations. Table 5-2 showed that the major ions of interest - nitrate, ammonium and pH - were well predicted. So the maps and trend data presented elsewhere in this report are measured to the same high standards as previous years.

Although the sulphate concentration was predicted well, the non-seasalt component requires a measurement of the sodium concentration for its determination. This will result in a degree of uncertainty in the non-seasalt sulphate concentrations measured for samples analysed in August and September. This, in turn, will result in an additional uncertainty in the annual volume weighted mean non-seasalt sulphate concentration. However, the trend analysis presented in elsewhere in this data report shows that the non-sea salt sulphate concentration is similar to previous years.

As regards the other ions, the effect on the respective long-term trend is much more difficult to ascertain. The work carried out by HSL showed that the uncertainty was greatest for samples with concentrations less than the first calibration standard. However, the number of samples failing the ion balance test did not increase noticeably – so the effect on the data quality was probably minimal but an undefined uncertainty will exist for the chloride, magnesium, calcium, sodium, potassium and non-seasalt sulphate concentration.

5.1.5 Recommendations

To ensure that a similar decrease in sensitivity does not recur, it is recommended that the analytical methods are reviewed as part of HSL's UKAS accreditation.

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Appendices

APPENDIX 1	BULK PRECIPITATION DATA, 2005
APPENDIX 2	TABLES OF MEAN CONCENTRATION AND TOTAL RAINFALL, 1986 TO 2004
APPENDIX 3	CONCENTRATION DATA FOR SULPHUR DIOXIDE AND PARTICULATE SULPHATE, 2004
APPENDIX 4	CONCENTRATION DATA FOR NITROGEN DIOXIDE, 2004
APPENDIX 5	HNO ₃ DENUDEE MEASUREMENTS
APPENDIX 6	GEOSTATISTICS ANNUAL SITE MAINTENANCE AND OTHER SITE VISITS

Appendix 1

BULK PRECIPITATION DATA, 2005

Appendix 1.1

Bulk Precipitation Data, 2005 - Fortnightly Measurements

Notes to Appendix 1.1

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 SO₂ Daily measurements of SO₂ by hydrogen peroxide bubbler and of particulate sulphate on a Whatman 40 filter with ion chromatographic analysis
- Weekly SO₂ Weekly measurements of SO₂ by hydrogen peroxide bubbler with ion chromatographic analysis
- Ozone Hourly measurements surface ozone
- SO₂ Hourly measurements of SO₂
- NO_x Hourly measurements of NO_x
- HNO₃ 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

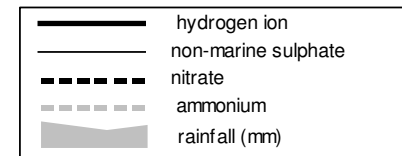
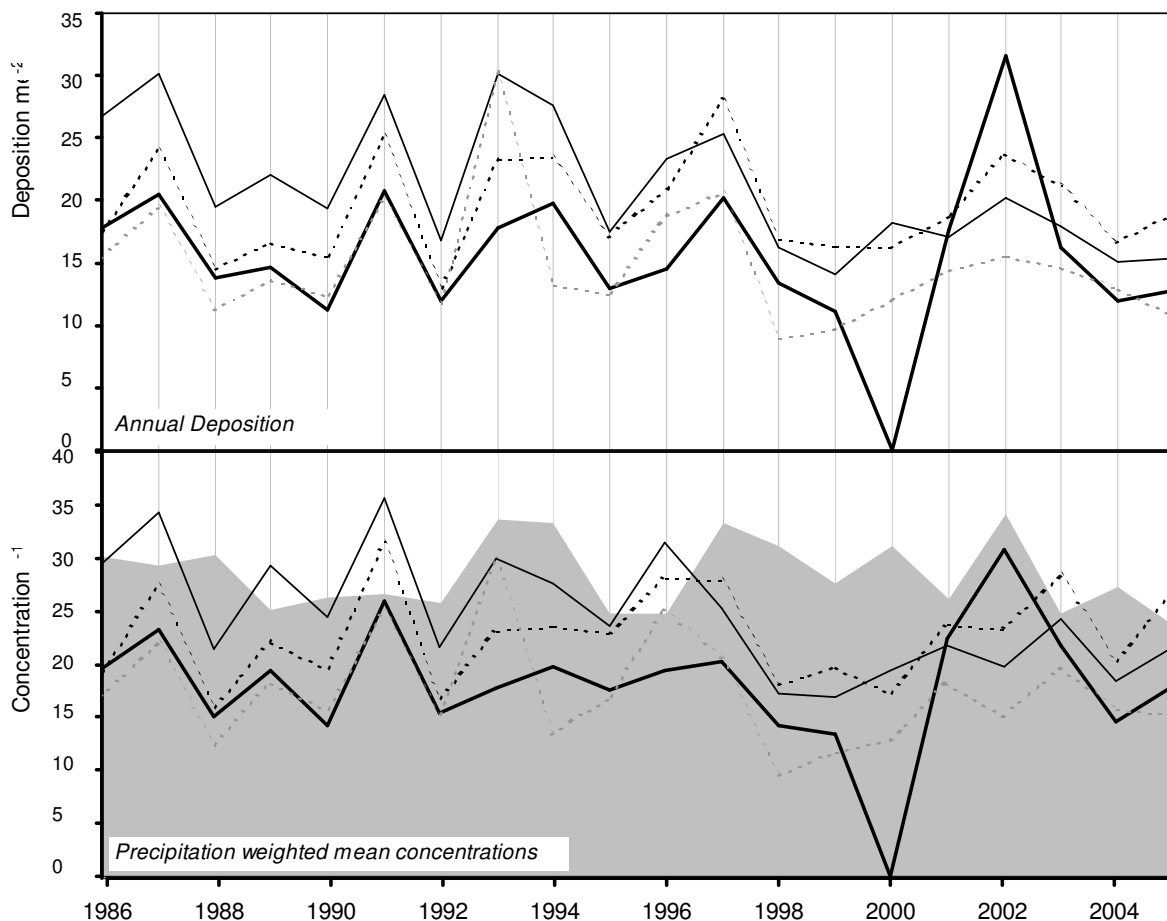
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	0.06 ueq/l (0.32 %/year): 19 years' data - No significant trend detected
<i>non-marine sulphate</i>	-0.57 ueq/l (-1.90 %/year): 20 years' data ++ Moderately strong trend detected
<i>nitrate</i>	0.12 ueq/l (0.58 %/year): 20 years' data - No significant trend detected
<i>ammonium</i>	-0.17 ueq/l (-0.89 %/year): 20 years' data - No significant trend detected

(5003) Goonhilly

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
04/Jan/2005	13/Jan/2005	4.9	125.8	2.2	<0.7	745.1	165.6	36.3	603.6	15.7	<1.0	36.0	12.9	130.0	18.4
13/Jan/2005	28/Jan/2005	5.0	61.9	22.9	15.3	423.8	83.4	20.5	469.3	9.1	<1.0	10.8	10.0	72.0	30.2
28/Jan/2005	09/Feb/2005	4.6	54.4	52.5	44.1	196.4	37.2	24.2	213.9	3.6	<1.0	30.8	26.9	50.0	6.5
09/Feb/2005	23/Feb/2005	5.3	101.1	16.9	17.0	564.1	121.7	25.9	639.4	12.6	<1.0	33.2	5.1	100.0	15.5
23/Feb/2005	09/Mar/2005	5.4	56.9	43.3	24.7	350.4	71.6	20.4	417.3	7.8	<1.0	14.7	3.8	68.0	9.5
09/Mar/2005	23/Mar/2005	4.9	83.9	62.0	57.3	255.0	58.0	40.2	260.1	6.2	<1.0	53.2	12.6	58.0	20.6
23/Mar/2005	06/Apr/2005	4.8	47.4	50.9	53.2	140.0	30.4	12.2	131.2	3.3	<1.0	30.5	15.5	34.9	18.5
06/Apr/2005	21/Apr/2005	5.0	26.1	8.2	9.8	115.1	23.0	5.4	137.6	1.9	<1.0	12.2	9.3	24.5	67.4
21/Apr/2005	10/May/2005	4.5	58.4	49.9	15.6	164.1	30.1	5.8	182.0	14.8	<1.0	38.6	32.4	49.0	27.7
10/May/2005	18/May/2005	4.3	86.5	105.8	70.6	195.6	49.2	23.7	225.7	7.9	<1.0	62.9	50.1	70.0	23.8
18/May/2005	02/Jun/2005	6.6	62.2	13.0	131.2	222.2	38.8	12.4	353.9	69.7	73.0	35.5	0.3	61.0	43.4
02/Jun/2005	15/Jun/2005	4.7	27.7	18.5	<0.7	89.0	29.7	7.4	83.0	2.2	<1.0	17.0	18.6	23.0	22.0
15/Jun/2005	29/Jun/2005	4.4	99.6	89.2	45.8	148.4	31.8	42.9	153.6	7.0	<1.0	81.7	37.2	52.0	16.1
29/Jun/2005	14/Jul/2005	4.3	52.7	23.0	1.1	215.4	45.1	12.4	266.4	4.0	<1.0	26.7	55.0	54.0	18.3
14/Jul/2005	28/Jul/2005	4.7	23.5	23.5	6.9	62.6	18.3	12.5	69.7	2.6	<1.0	15.9	20.9	22.0	55.8
28/Jul/2005	09/Aug/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
09/Aug/2005	24/Aug/2005	5.2	42.5	25.0	11.4	197.6	32.9	11.9	214.6	11.9	<1.0	18.7	5.9	36.0	18.7
24/Aug/2005	08/Sep/2005	4.8	131.4	113.7	43.6	392.4	95.9	50.8	395.9	33.6	29.1	84.1	17.8	121.0	6.6
08/Sep/2005	21/Sep/2005	6.8	62.8	44.2	97.6	110.5	17.8	9.3	115.7	28.2	29.2	49.5	0.2	37.0	13.8
21/Sep/2005	07/Oct/2005	4.9	60.9	22.6	3.1	292.4	66.3	15.5	325.6	6.1	<1.0	25.6	11.5	51.0	22.0
07/Oct/2005	21/Oct/2005	4.5	37.4	29.9	19.4	119.5	23.9	9.9	126.2	2.3	<1.0	23.0	31.6	33.0	92.6
21/Oct/2005	02/Nov/2005	5.1	57.7	9.1	4.3	421.4	88.7	22.3	465.1	8.9	<1.0	7.0	8.9	72.0	34.3
02/Nov/2005	16/Nov/2005	5.4	49.3	6.6	<0.7	354.1	72.5	17.4	381.2	6.9	3.8	6.7	4.2	58.0	50.9
16/Nov/2005	14/Dec/2005	5.3	39.4	10.2	2.9	297.0	61.9	11.1	331.1	6.5	<1.0	3.7	5.6	66.1	71.6
14/Dec/2005	04/Jan/2006	6.5	90.8	28.9	34.6	468.5	108.0	39.5	538.1	39.1	41.8	34.4	0.3	89.5	7.6
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												
5003			50.1	26.7	15.3	236.4	50.2	15.4	254.5	6.0	0.8	21.6	17.9		Total rainfall 711.3

Yarner Wood

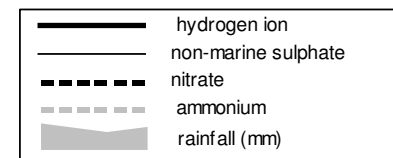
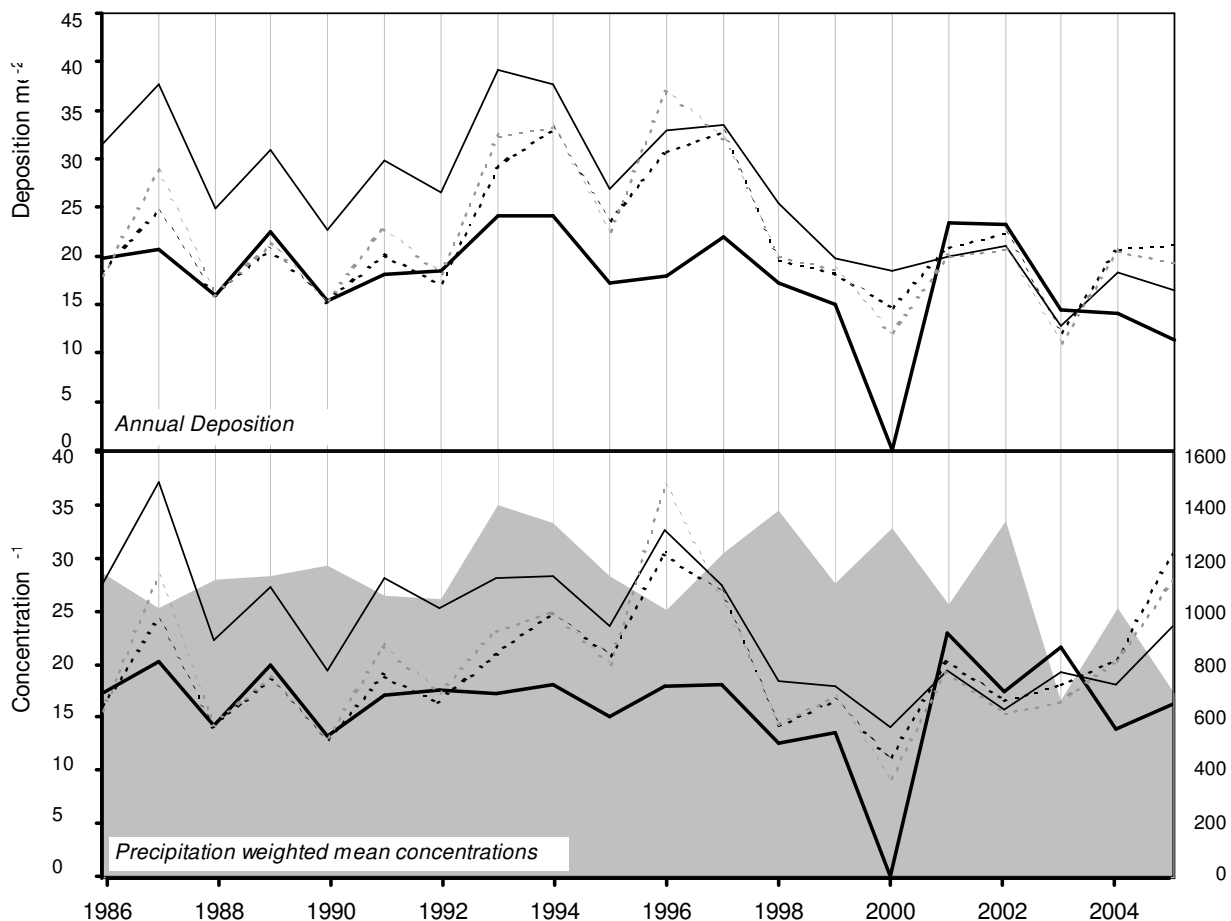
2005

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, SO₂, Daily SO₄, HNO₃ Denuder, ozone, EMEP

Site Operator:
 English Nature



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	0.01 ueq/l (0.08 %/year): 19 years' data - No significant trend detected
<i>non-marine sulphate</i>	-0.59 ueq/l (-2.04 %/year): 20 years' data ++ Moderately strong trend detected
<i>nitrate</i>	0.19 ueq/l (1.08 %/year): 20 years' data - No significant trend detected
<i>ammonium</i>	0.02 ueq/l (0.12 %/year): 20 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5008) Yarner Wood

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
12/Jan/2005	26/Jan/2005	5.1	29.0	23.7	28.7	120.9	26.6	8.9	145.8	<0.5	<1.0	14.4	7.9	27.0	50.4
26/Jan/2005	09/Feb/2005	4.9	43.7	63.4	67.2	40.9	21.9	24.0	47.6	2.0	225.4	38.8	11.5	24.0	8.8
09/Feb/2005	23/Feb/2005	5.9	68.1	10.5	16.5	366.0	76.4	16.7	404.6	8.3	<1.0	24.1	1.3	66.0	16.6
23/Feb/2005	09/Mar/2005	4.9	44.5	40.7	37.1	104.5	21.2	14.9	107.9	3.5	<1.0	31.9	13.2	29.5	6.9
09/Mar/2005	23/Mar/2005	6.1	49.9	56.0	96.5	80.4	15.4	29.8	92.5	3.3	<1.0	40.2	0.8	29.6	25.7
23/Mar/2005	06/Apr/2005	4.9	42.3	61.8	73.1	45.9	9.6	12.8	45.7	1.5	<1.0	36.7	11.5	22.9	26.3
06/Apr/2005	20/Apr/2005	5.0	21.3	13.6	17.8	68.3	13.3	5.6	70.4	3.0	<1.0	13.1	9.1	20.0	11.0
20/Apr/2005	04/May/2005	4.6	41.0	50.0	44.1	41.5	4.2	<0.4	47.6	2.7	<1.0	36.0	27.5	27.0	76.6
04/May/2005	18/May/2005	4.5	70.7	132.0	82.6	46.2	14.4	34.9	47.4	5.9	<1.0	65.1	33.1	38.0	10.2
18/May/2005	01/Jun/2005	4.7	24.7	12.1	2.5	80.2	15.9	7.1	90.1	2.6	<1.0	15.0	19.5	22.0	41.9
01/Jun/2005	15/Jun/2005	4.8	30.6	18.1	11.0	45.5	26.5	9.6	47.7	3.5	<1.0	25.1	17.0	18.0	24.5
15/Jun/2005	29/Jun/2005	6.8	157.2	55.0	811.9	119.6	65.3	279.1	125.6	165.2	59.2	142.8	0.2	206.0	34.9
29/Jun/2005	13/Jul/2005	4.7	40.4	25.6	18.4	53.2	12.0	10.4	68.6	4.2	<1.0	34.0	18.6	21.0	13.5
13/Jul/2005	27/Jul/2005	4.9	19.6	16.9	16.5	20.9	8.0	8.6	24.4	2.6	<1.0	17.1	13.2	14.0	18.1
27/Jul/2005	10/Aug/2005	4.7	21.8	26.4	13.0	19.8	6.9	10.2	18.1	2.1	<1.0	19.4	22.4	14.0	21.6
10/Aug/2005	25/Aug/2005	5.1	24.0	21.6	12.3	41.7	10.0	13.9	37.8	3.2	<1.0	19.0	7.9	13.0	9.8
25/Aug/2005	07/Sep/2005	4.8	72.4	87.0	74.3	85.4	20.1	39.1	78.4	5.4	<1.0	62.1	17.0	36.0	4.8
07/Sep/2005	21/Sep/2005	4.8	24.0	31.9	17.9	13.7	7.5	9.4	15.7	1.2	<1.0	22.4	15.8	12.0	19.5
21/Sep/2005	05/Oct/2005	4.9	23.9	11.4	5.2	105.2	21.7	9.4	116.2	2.9	<1.0	11.3	13.5	22.0	29.4
05/Oct/2005	19/Oct/2005	4.4	44.3	51.7	48.8	34.3	8.1	9.5	34.7	1.5	<1.0	40.2	37.2	26.0	71.1
19/Oct/2005	09/Nov/2005	5.2	24.9	6.6	3.6	134.8	27.5	7.3	144.0	4.0	<1.0	8.6	5.9	22.0	64.0
09/Nov/2005	16/Nov/2005	6.3	53.3	16.9	12.3	301.7	46.3	33.4	289.4	14.0	<1.0	16.9	0.5	49.0	3.4
16/Nov/2005	30/Nov/2005	6.0	56.9	22.8	30.7	307.8	57.0	15.5	393.8	8.6	<1.0	19.8	1.1	53.0	9.0
30/Nov/2005	14/Dec/2005	5.5	26.3	6.6	4.9	187.7	35.7	9.9	205.4	12.8	<1.0	3.7	3.5	31.1	67.4
14/Dec/2005	27/Dec/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
27/Dec/2005	11/Jan/2006	4.6	55.0	40.3	26.7	212.6	47.1	15.6	293.5	5.6	<1.0	29.4	27.5	51.8	31.2
5008			35.6	30.4	27.8	99.4	20.9	10.3	112.8	4.0	0.5	23.6	16.2		Total rainfall 696.6

Barcombe Mills

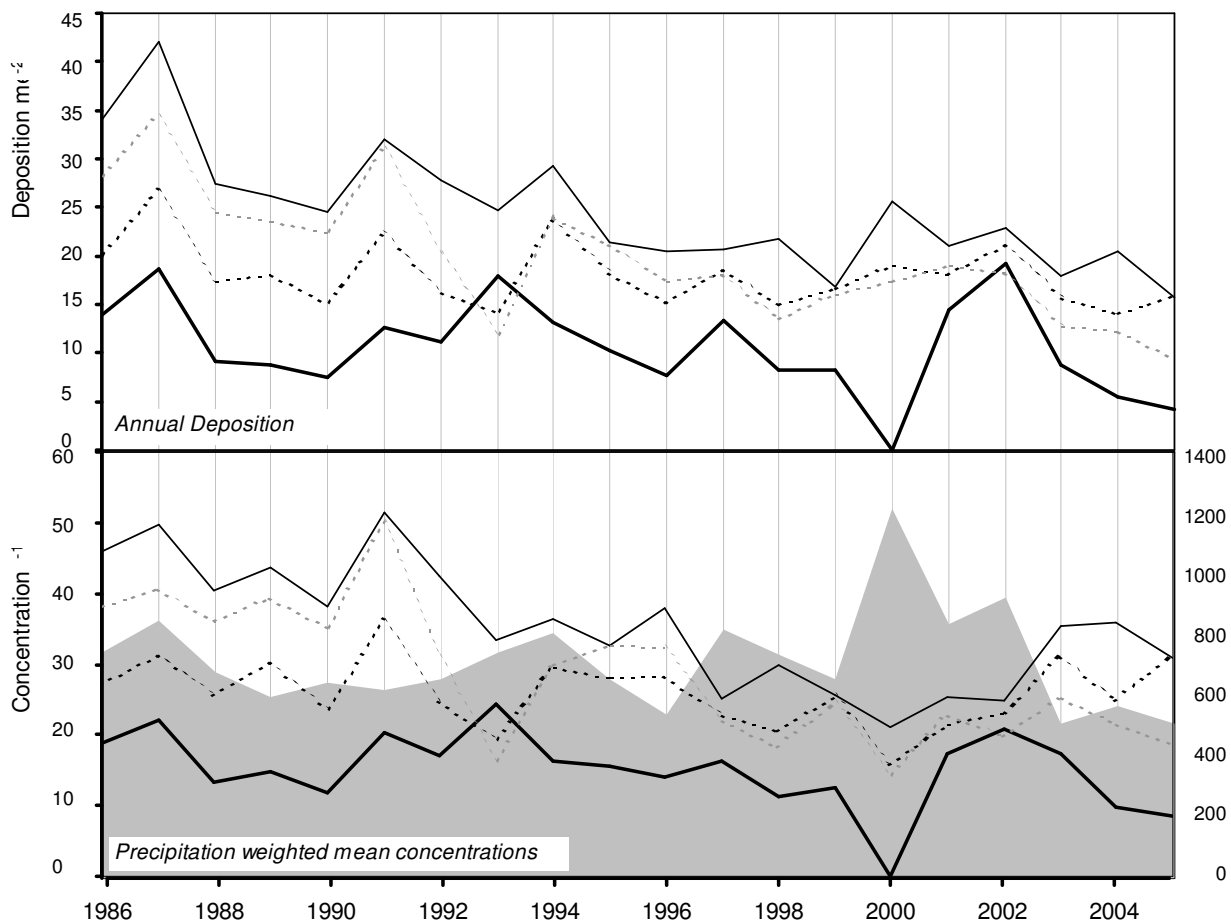
2005

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, SO₂, Daily SO₄, HNO₃ Denuder, EMEP

Site Operator:
 South East Water plc



ACID DEPOSITION DATA REPORT, 2005

(5007) Barcombe Mills

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
05/Jan/2005	19/Jan/2005	5.1	112.0	45.2	34.1	576.6	140.1	57.9	711.7	22.7	<1.0	42.6	7.6	105.0	16.4
19/Jan/2005	02/Feb/2005	4.4	102.0	114.5	51.7	368.5	90.8	55.5	474.8	18.0	<1.0	57.6	44.7	92.0	3.9
02/Feb/2005	16/Feb/2005	6.4	100.2	66.1	43.6	266.9	58.6	87.9	294.9	20.1	<1.0	68.1	0.4	65.0	1.6
16/Feb/2005	02/Mar/2005	4.4	35.5	56.1	22.9	100.1	24.0	26.7	104.9	4.3	<1.0	23.4	43.7	36.1	23.9
02/Mar/2005	23/Mar/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5
23/Mar/2005	06/Apr/2005	6.1	90.6	105.4	128.4	27.0	7.5	41.8	28.7	6.3	<1.0	87.3	0.8	27.2	11.2
06/Apr/2005	20/Apr/2005	6.6	50.6	41.4	32.9	46.4	10.5	66.7	62.8	7.8	<1.0	45.0	0.2	26.0	25.4
20/Apr/2005	04/May/2005	6.6	69.3	59.5	24.1	48.5	9.4	130.7	57.8	5.3	<1.0	63.5	0.3	35.0	22.1
04/May/2005	18/May/2005	7.4	231.2	114.5	84.6	196.2	62.8	175.2	292.4	442.8	109.9	207.6	0.0	12.0	5.8
18/May/2005	01/Jun/2005	6.3	49.3	41.7	34.8	82.2	19.2	54.2	88.9	10.8	<1.0	39.4	0.5	29.0	22.2
01/Jun/2005	15/Jun/2005	7.3	95.2	46.0	70.3	59.0	33.0	215.0	99.0	32.3	28.4	88.1	0.0	66.0	3.0
15/Jun/2005	29/Jun/2005	6.1	57.6	69.7	57.9	13.0	11.4	74.4	16.3	11.4	<1.0	56.0	0.8	26.0	15.4
29/Jun/2005	13/Jul/2005	5.8	56.0	35.4	33.4	31.9	8.9	26.0	47.6	18.4	<1.0	52.1	1.5	18.0	13.9
13/Jul/2005	27/Jul/2005	5.6	18.3	14.2	<0.7	20.7	<0.8	21.2	14.1	17.6	<1.0	15.8	2.5	11.0	46.3
27/Jul/2005	10/Aug/2005	4.6	27.6	29.9	3.8	38.1	9.9	16.6	38.4	5.2	<1.0	23.0	23.4	22.0	12.2
10/Aug/2005	24/Aug/2005	4.7	25.8	31.5	21.0	10.9	6.7	15.9	11.9	3.6	<1.0	24.5	18.6	14.0	40.1
24/Aug/2005	07/Sep/2005	5.0	53.3	38.4	18.3	134.6	31.8	33.8	181.3	8.3	<1.0	37.1	10.2	33.0	23.6
07/Sep/2005	21/Sep/2005	6.2	43.4	55.6	25.7	32.7	11.8	38.7	51.1	13.4	<1.0	39.5	0.7	19.0	4.2
21/Sep/2005	05/Oct/2005	5.3	30.2	12.7	0.1	139.2	28.7	26.7	155.8	8.5	<1.0	13.4	5.1	28.0	26.6
05/Oct/2005	19/Oct/2005	4.9	31.8	31.4	29.9	22.5	6.6	18.2	23.5	3.8	<1.0	29.1	11.5	15.0	24.7
19/Oct/2005	09/Nov/2005	5.5	50.9	9.7	3.3	223.6	50.1	31.6	238.7	13.7	<1.0	24.0	3.2	41.0	116.0
09/Nov/2005	23/Nov/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
23/Nov/2005	07/Dec/2005	5.3	64.7	28.1	10.9	353.4	70.6	29.3	408.4	45.3	<1.0	22.2	5.4	67.6	22.4
07/Dec/2005	21/Dec/2005	4.8	32.4	18.8	7.7	129.4	22.7	15.3	129.3	6.2	<1.0	16.8	17.0	28.6	11.0
21/Dec/2005	04/Jan/2006	4.7	42.8	27.1	12.8	196.5	41.6	17.4	215.2	9.6	<1.0	19.2	20.9	42.2	14.8
5007		Precipitation<weighted annual means for site(samples containing phosphate are excluded)													
			47.0	31.3	18.9	133.2	30.1	36.9	150.3	12.1	0.5	31.0	8.4	Total rainfall 506.8	

Compton

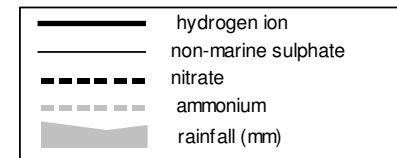
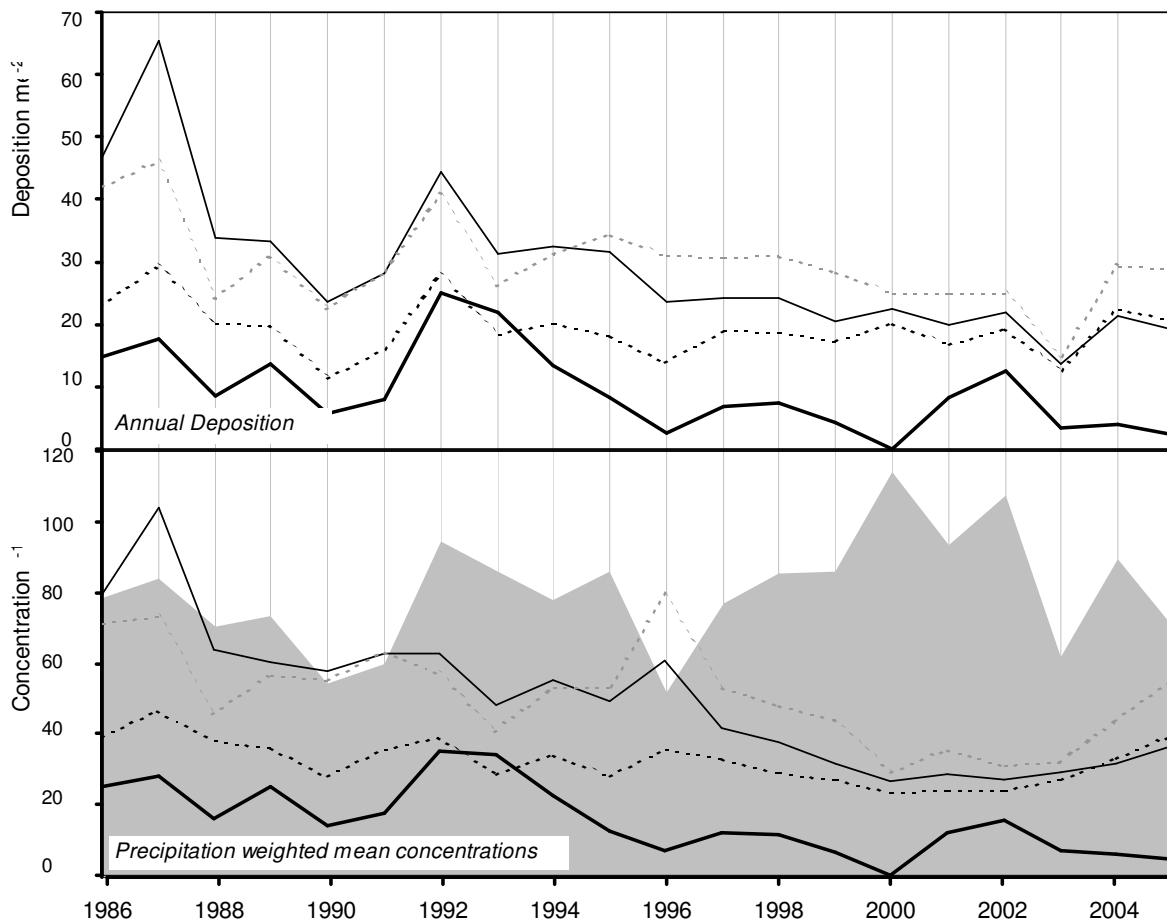
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-1.09 ueq/l (-4.11 %/year): 19 years' data ++ Moderately strong trend detected
<i>non-marine sulphate</i>	-2.95 ueq/l (-3.79 %/year): 20 years' data ++++ Very strong trend detected
<i>nitrate</i>	-0.55 ueq/l (-1.46 %/year): 20 years' data + Significant trend detected
<i>ammonium</i>	-1.39 ueq/l (-2.17 %/year): 20 years' data ++ Moderately strong trend detected

rainfall (mm)

(5129) Compton

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+	Conductivity (S/cm)	Rainfall (mm)
07/Jan/2005	24/Jan/2005	5.8	35.2	32.3	43.1	171.1	34.6	15.2	218.0	4.3	<1.0	14.6	1.5	37.0	25.2
24/Jan/2005	07/Feb/2005	4.9	175.5	111.7	184.8	181.6	37.6	47.9	210.2	5.2	<1.0	153.6	11.5	75.0	3.7
07/Feb/2005	24/Feb/2005	6.1	39.1	39.9	61.3	68.2	12.8	16.2	81.4	2.7	<1.0	30.9	0.9	23.0	9.5
24/Feb/2005	07/Mar/2005	6.0	84.0	55.1	131.4	102.1	17.0	24.2	111.7	4.4	<1.0	71.7	1.1	38.0	12.6
07/Mar/2005	23/Mar/2005	6.4	89.6	41.2	83.4	91.3	13.9	65.7	87.2	5.2	<1.0	78.6	0.4	34.5	6.3
23/Mar/2005	06/Apr/2005	5.7	53.8	77.4	133.7	17.1	4.7	12.3	14.9	1.5	<1.0	51.7	2.2	22.4	41.9
06/Apr/2005	18/Apr/2005	5.5	67.4	49.8	94.8	26.0	8.7	23.9	29.7	1.1	<1.0	64.3	3.0	22.8	27.7
18/Apr/2005	03/May/2005	5.2	47.2	61.7	68.6	15.3	5.1	21.5	21.3	1.5	<1.0	45.4	6.0	21.0	37.1
03/May/2005	17/May/2005	6.9	251.0	159.2	71.1	211.7	58.2	333.4	257.7	54.6	<1.0	225.5	0.1	89.0	1.3
17/May/2005	31/May/2005	6.2	38.1	23.5	36.0	64.6	11.3	15.5	83.1	2.6	<1.0	30.3	0.7	19.0	17.1
31/May/2005	13/Jun/2005	6.0	23.6	29.1	27.3	29.2	8.7	34.7	32.4	6.1	<1.0	20.1	0.9	18.0	3.6
13/Jun/2005	27/Jun/2005	5.0	79.1	89.0	70.7	16.9	11.2	53.4	18.2	7.2	<1.0	77.1	11.2	23.0	13.0
27/Jun/2005	11/Jul/2005	6.3	38.6	37.9	60.6	13.5	5.5	25.3	24.1	2.3	<1.0	37.0	0.5	15.0	28.8
11/Jul/2005	08/Aug/2005	5.6	27.0	29.8	33.5	19.6	5.5	19.1	6.8	3.8	1.0	24.7	2.3	13.0	42.4
08/Aug/2005	05/Sep/2005	5.3	29.0	40.7	26.6	15.4	8.5	36.6	16.8	2.5	<1.0	27.1	5.2	15.0	39.8
05/Sep/2005	19/Sep/2005	5.5	31.3	58.2	49.4	10.3	7.1	23.5	14.5	2.9	<1.0	30.0	3.0	15.0	13.4
19/Sep/2005	03/Oct/2005	5.5	17.4	14.7	12.6	39.7	8.0	14.4	48.5	0.7	<1.0	12.7	3.2	11.0	20.7
03/Oct/2005	18/Oct/2005	4.9	106.7	108.5	143.4	46.0	12.1	49.3	37.7	7.3	<1.0	101.1	12.6	40.0	8.3
18/Oct/2005	01/Nov/2005	5.2	24.4	14.4	26.7	38.6	6.6	8.7	41.8	1.9	<1.0	19.8	6.8	13.0	52.0
01/Nov/2005	15/Nov/2005	5.4	26.0	10.6	19.7	120.2	21.5	9.8	123.3	3.8	<1.0	11.5	4.4	23.0	39.5
15/Nov/2005	28/Nov/2005	6.3	129.6	75.0	142.0	184.3	33.3	55.8	180.1	8.9	<1.0	107.4	0.5	54.0	3.2
28/Nov/2005	12/Dec/2005	5.2	35.5	18.8	27.7	93.0	19.9	13.8	98.0	3.1	<1.0	24.3	6.2	22.2	48.1
12/Dec/2005	09/Jan/2006	4.9	51.4	43.0	61.0	57.5	11.0	14.1	55.4	2.9	<1.0	44.5	13.2	23.5	29.3
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												
5129			42.9	39.8	55.5	53.2	11.8	21.1	58.1	3.0	0.5	36.5	4.6		Total rainfall 524.5

Crai Reservoir

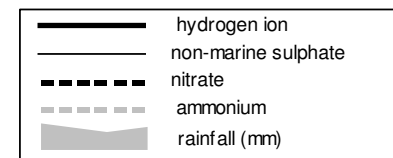
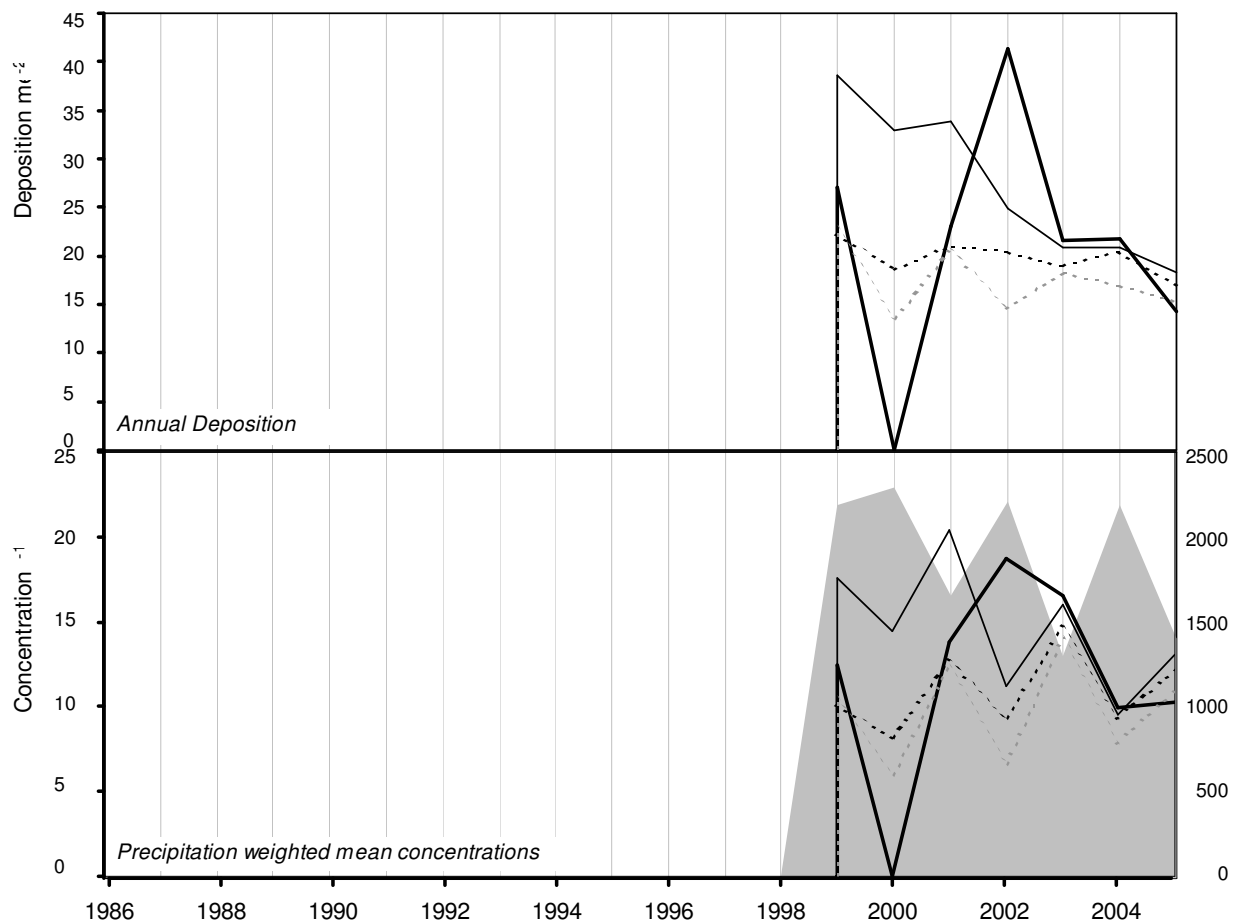
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
hydrogen ion	
non-marine sulphate	
nitrate	
ammonium	

ACID DEPOSITION DATA REPORT, 2005

(5154) Crai Reservoir

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
24/Jan/2005	04/Mar/2005	5.1	18.8	9.3	15.7	116.8	24.0	12.3	132.3	4.7	<1.0	4.8	8.3	24.0	73.1
04/Mar/2005	31/Mar/2005	5.0	27.4	26.7	32.5	77.4	13.4	7.3	65.6	2.2	<1.0	18.0	9.5	19.6	111.0
31/Mar/2005	27/May/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
27/May/2005	24/Jun/2005	6.1	43.8	13.6	21.2	49.4	11.1	18.4	81.4	9.3	30.5	37.8	0.8	15.0	65.4
24/Jun/2005	29/Jul/2005	5.7	22.3	6.2	16.8	30.0	9.2	11.0	31.2	2.2	<1.0	18.7	2.1	11.0	98.0
29/Jul/2005	30/Aug/2005	5.0	14.1	9.0	2.3	26.0	6.8	10.3	27.5	1.4	<1.0	11.0	11.2	<10.0	68.9
30/Aug/2005	30/Sep/2005	4.8	21.8	16.2	8.7	46.2	10.5	9.8	48.5	1.3	<1.0	16.2	16.2	14.0	170.5
30/Sep/2005	31/Oct/2005	5.0	18.6	9.7	4.7	55.3	10.9	5.3	58.7	1.6	<1.0	12.0	11.2	12.0	314.9
31/Oct/2005	02/Dec/2005	5.1	23.9	7.1	8.0	119.3	25.6	7.8	122.0	3.3	<1.0	9.6	7.2	22.1	252.4
02/Dec/2005	31/Dec/2005	5.2	18.7	11.0	8.1	85.4	16.0	7.1	88.7	5.5	<1.0	8.4	6.0	17.6	120.2
31/Dec/2005	30/Jan/2006	4.8	25.9	18.7	17.1	51.6	12.4	6.1	57.5	1.6	<1.0	19.7	17.0	17.0	128.1
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												Total rainfall
5154			21.5	12.1	11.0	70.4	14.8	7.8	72.9	2.5	0.5	13.0	10.2		1402.6

Flatford Mill

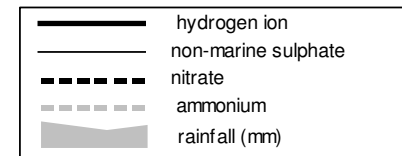
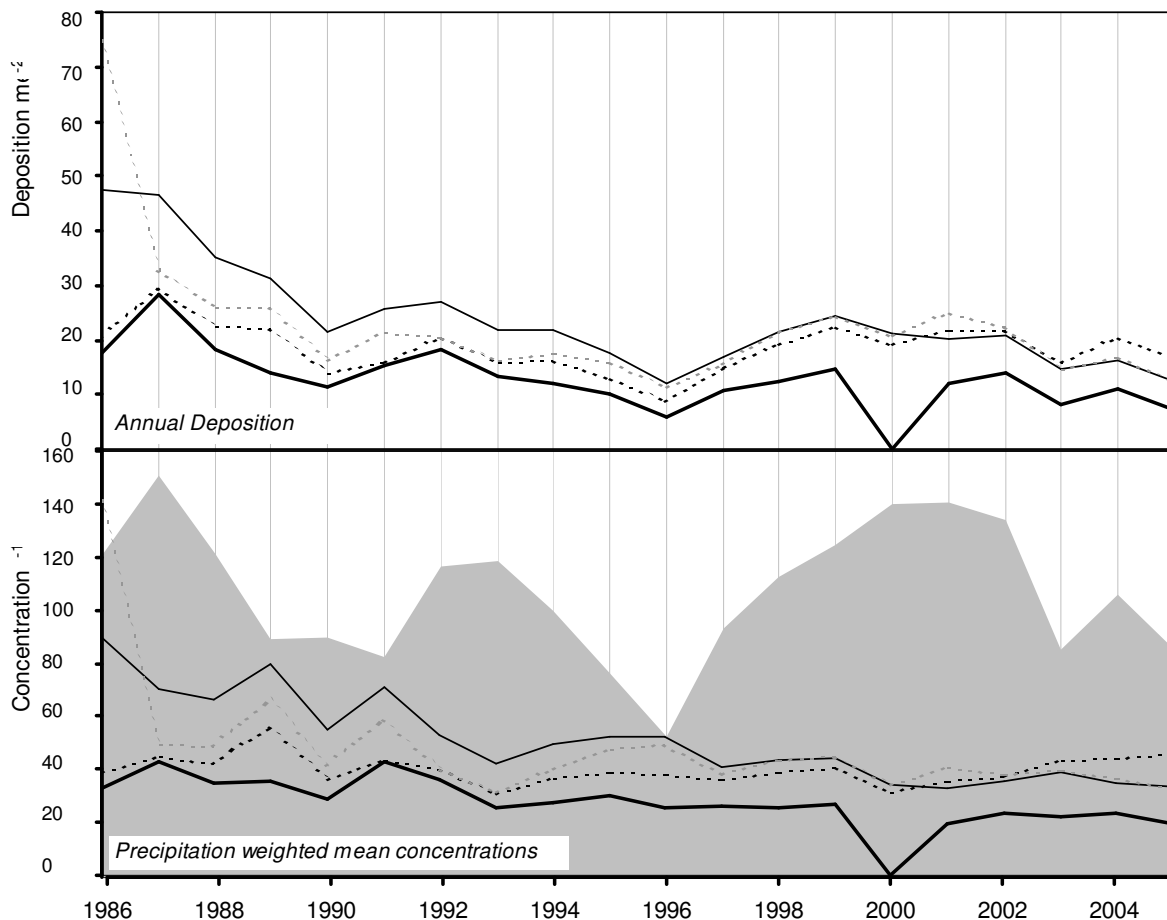
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-0.94 ueq/l (-2.52%/year): 19 years' data +++ Strong trend detected
<i>non-marine sulphate</i>	-2.54 ueq/l (-3.37%/year): 20 years' data ++++ Very strong trend detected
<i>nitrate</i>	-0.21 ueq/l (-0.51%/year): 19 years' data - No significant trend detected
<i>ammonium</i>	-0.97 ueq/l (-1.83%/year): 19 years' data ++ Moderately strong trend detected

ACID DEPOSITION DATA REPORT, 2005

(5024) Flatford Mill

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
11/Jan/2005	25/Jan/2005	5.6	64.3	48.5	47.1	328.8	74.0	34.2	479.9	9.5	<1.0	24.7	2.8	67.0	2.0
25/Jan/2005	09/Feb/2005	4.9	80.3	79.8	81.1	195.2	42.5	29.4	215.9	5.6	<1.0	56.8	12.9	54.1	5.6
09/Feb/2005	22/Feb/2005	4.8	42.3	51.6	39.5	158.8	33.2	9.5	189.3	3.8	<1.0	23.2	16.6	44.0	27.7
22/Feb/2005	08/Mar/2005	4.3	57.0	73.7	43.2	127.2	25.0	11.9	134.4	3.4	<1.0	41.7	51.3	49.1	26.2
08/Mar/2005	22/Mar/2005	6.5	96.3	57.3	114.5	89.7	15.4	55.5	79.7	6.4	<1.0	85.5	0.4	37.3	1.6
22/Mar/2005	05/Apr/2005	6.9	225.0	196.6	329.5	65.8	22.8	59.2	69.8	31.3	<1.0	217.1	0.1	63.1	2.5
05/Apr/2005	19/Apr/2005	4.9	34.2	43.0	42.1	48.5	11.7	11.2	50.3	3.2	<1.0	28.3	13.5	25.0	28.0
19/Apr/2005	03/May/2005	6.2	71.5	68.0	30.1	56.9	9.2	42.8	56.8	25.2	5.0	64.7	0.7	32.0	8.8
03/May/2005	17/May/2005	5.8	48.3	34.5	29.9	107.9	21.1	41.5	125.7	8.0	<1.0	35.3	1.8	30.0	5.4
17/May/2005	31/May/2005	4.5	42.8	47.5	9.7	39.7	14.0	33.7	37.8	4.9	<1.0	38.0	35.5	27.0	9.5
31/May/2005	14/Jun/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3
14/Jun/2005	28/Jun/2005	4.5	71.5	101.5	38.8	11.0	10.8	60.4	15.7	13.9	<1.0	70.2	31.6	33.0	9.4
28/Jun/2005	12/Jul/2005	4.4	26.6	36.4	2.6	17.7	6.2	12.4	11.9	0.9	<1.0	24.4	39.8	26.0	43.7
12/Jul/2005	26/Jul/2005	4.9	54.3	45.6	26.9	34.6	17.4	56.4	43.2	6.6	<1.0	50.1	14.1	25.0	11.3
26/Jul/2005	10/Aug/2005	5.2	36.4	48.1	48.0	14.9	6.3	15.7	14.2	3.4	<1.0	34.6	5.8	17.0	18.0
10/Aug/2005	23/Aug/2005	4.7	28.6	44.7	37.6	5.9	5.4	11.0	5.3	1.6	<1.0	27.9	18.6	15.0	42.9
23/Aug/2005	06/Sep/2005	5.3	33.7	36.4	29.5	30.6	11.6	26.6	36.2	9.8	<1.0	30.0	5.1	18.0	8.3
06/Sep/2005	20/Sep/2005	4.7	32.5	54.7	38.4	14.4	8.0	11.8	10.8	1.7	<1.0	30.8	18.2	18.0	16.4
20/Sep/2005	04/Oct/2005	5.2	29.7	26.4	27.2	39.8	9.7	17.8	41.9	2.6	<1.0	24.9	5.9	16.0	12.2
04/Oct/2005	18/Oct/2005	4.8	85.5	104.3	87.3	42.3	12.3	48.9	33.0	11.6	<1.0	80.4	17.4	33.0	1.5
18/Oct/2005	01/Nov/2005	4.9	24.8	16.9	13.2	27.8	7.3	10.6	29.8	2.7	<1.0	21.5	13.5	<10.0	36.2
01/Nov/2005	15/Nov/2005	5.2	36.9	14.9	9.3	109.3	23.9	16.3	106.5	8.8	<1.0	23.7	6.6	25.0	21.6
15/Nov/2005	29/Nov/2005	4.9	53.9	52.0	45.6	197.8	40.7	21.7	220.3	7.1	<1.0	30.1	13.2	44.0	8.5
29/Nov/2005	15/Dec/2005	4.9	83.4	66.7	56.7	366.6	80.5	33.6	425.3	24.0	<1.0	39.3	11.7	74.7	7.7
15/Dec/2005	05/Jan/2006	4.9	46.8	35.7	37.5	128.8	26.3	15.2	152.2	7.4	<1.0	31.3	11.7	33.2	17.4
			Precipitation <weighted annual means for site (samples containing phosphate are excluded)												
5024			41.5	45.5	32.8	68.6	16.6	18.6	75.2	5.2	0.6	33.2	19.3		Total rainfall 372.5

Woburn

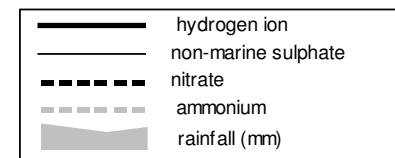
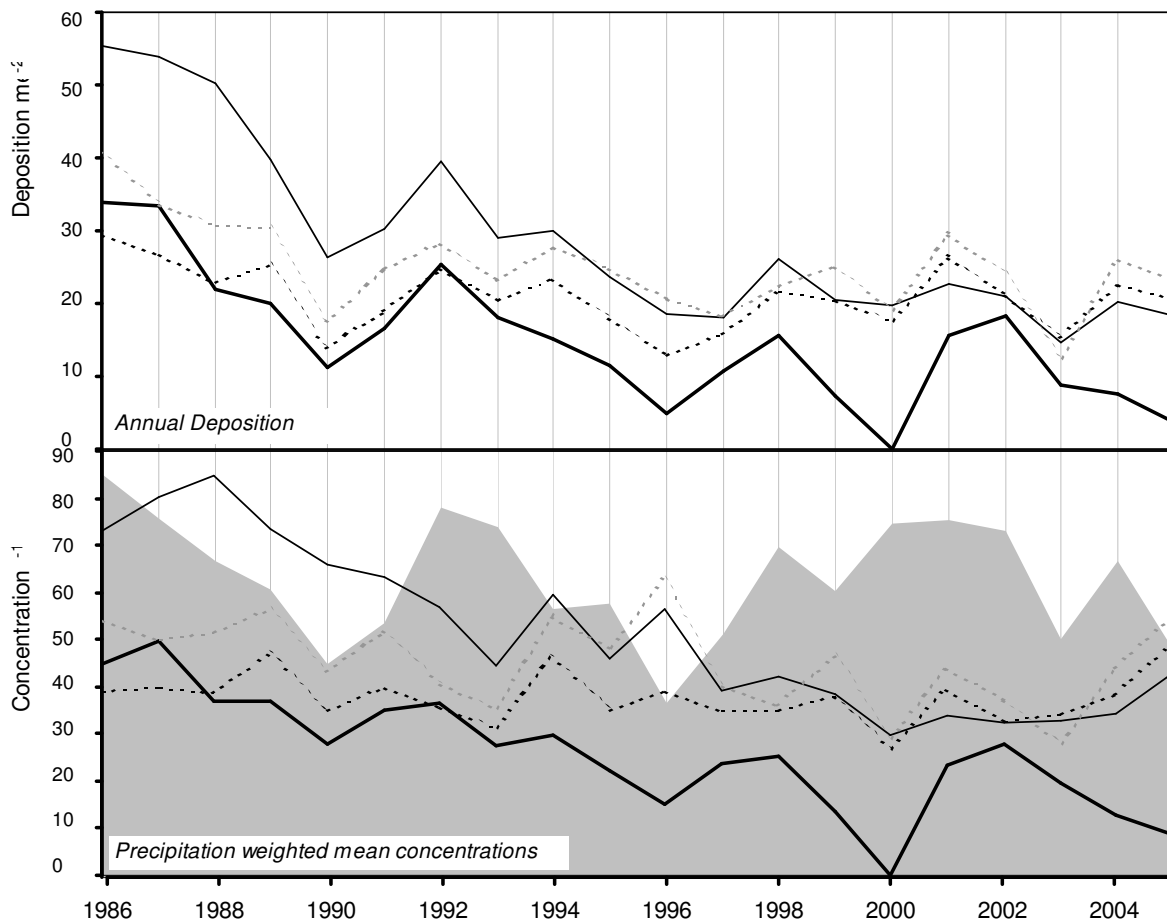
2005

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, SO₂, Met

Site Operator:
Rothamsted Experimental Station



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-1.58 ueq/l (-3.77 %/year): 19 years' data +++ Strong trend detected
<i>non-marine sulphate</i>	-2.63 ueq/l (-3.45 %/year): 20 years' data ++++ Very strong trend detected
<i>nitrate</i>	-0.12 ueq/l (-0.31 %/year): 20 years' data - No significant trend detected
<i>ammonium</i>	-0.65 ueq/l (-1.26 %/year): 20 years' data - No significant trend detected

rfall (mm)

ACID DEPOSITION DATA REPORT, 2005

(5127) Woburn

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
11/Jan/2005	17/Feb/2005	4.8	84.3	55.7	72.0	204.9	43.2	41.1	250.1	5.2	<1.0	59.6	15.8	44.8	24.9
17/Feb/2005	06/Apr/2005	5.3	105.5	97.5	134.0	87.8	17.4	31.6	105.6	2.7	<1.0	94.9	5.1	34.9	51.8
06/Apr/2005	28/Apr/2005	5.7	73.6	68.9	85.1	47.3	5.4	34.3	49.1	3.3	<1.0	67.9	2.0	30.0	19.2
28/Apr/2005	20/May/2005	6.4	107.1	85.9	98.0	94.3	21.7	69.4	94.8	6.4	<1.0	95.8	0.4	46.0	9.0
20/May/2005	21/Jun/2005	4.9	35.8	30.4	8.9	47.2	10.0	18.5	46.3	2.2	<1.0	30.2	13.2	15.0	27.6
21/Jun/2005	20/Jul/2005	4.9	55.1	71.5	59.6	14.6	7.7	29.8	7.2	3.5	<1.0	53.4	14.1	25.0	43.9
20/Jul/2005	02/Aug/2005	4.9	31.8	49.2	50.9	13.6	7.9	12.8	11.9	2.5	<1.0	30.2	13.2	19.0	29.8
02/Aug/2005	23/Aug/2005	5.5	28.8	48.7	36.9	10.2	4.8	23.3	9.3	5.2	<1.0	27.6	3.0	14.0	24.4
23/Aug/2005	06/Sep/2005	5.9	47.8	61.3	61.1	22.1	8.5	28.0	24.7	2.6	<1.0	45.1	1.3	18.0	17.0
06/Sep/2005	04/Oct/2005	4.9	25.0	23.4	26.2	24.6	5.2	11.8	21.7	1.2	<1.0	22.0	12.0	13.0	50.0
04/Oct/2005	19/Oct/2005	5.3	45.9	62.4	67.8	30.8	7.9	25.5	21.0	2.0	<1.0	42.2	5.5	20.0	15.9
19/Oct/2005	04/Nov/2005	5.0	14.1	11.6	10.1	34.9	7.1	5.9	35.1	0.8	<1.0	9.9	9.8	12.0	57.3
04/Nov/2005	15/Nov/2005	5.3	25.9	16.2	16.6	84.8	20.2	10.5	80.6	2.0	<1.0	15.7	5.0	19.0	13.4
15/Nov/2005	06/Dec/2005	6.1	63.4	40.1	80.0	166.9	28.0	21.3	162.1	10.2	<1.0	43.3	0.7	39.2	23.2
06/Dec/2005	19/Dec/2005	5.1	102.6	108.8	107.2	253.8	36.7	46.2	207.0	16.1	<1.0	72.1	8.9	57.3	2.3
19/Dec/2005	05/Jan/2006	5.3	39.4	28.2	42.9	96.1	20.8	14.1	101.7	4.3	<1.0	27.8	5.2	25.0	13.7
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												
5127			50.1	49.2	55.4	59.1	12.9	22.3	62.0	3.2	0.5	43.0	8.5		Total rainfall 423.3

Tycanol Wood

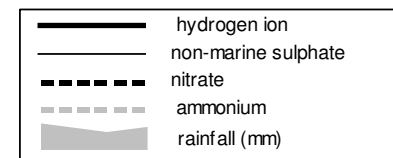
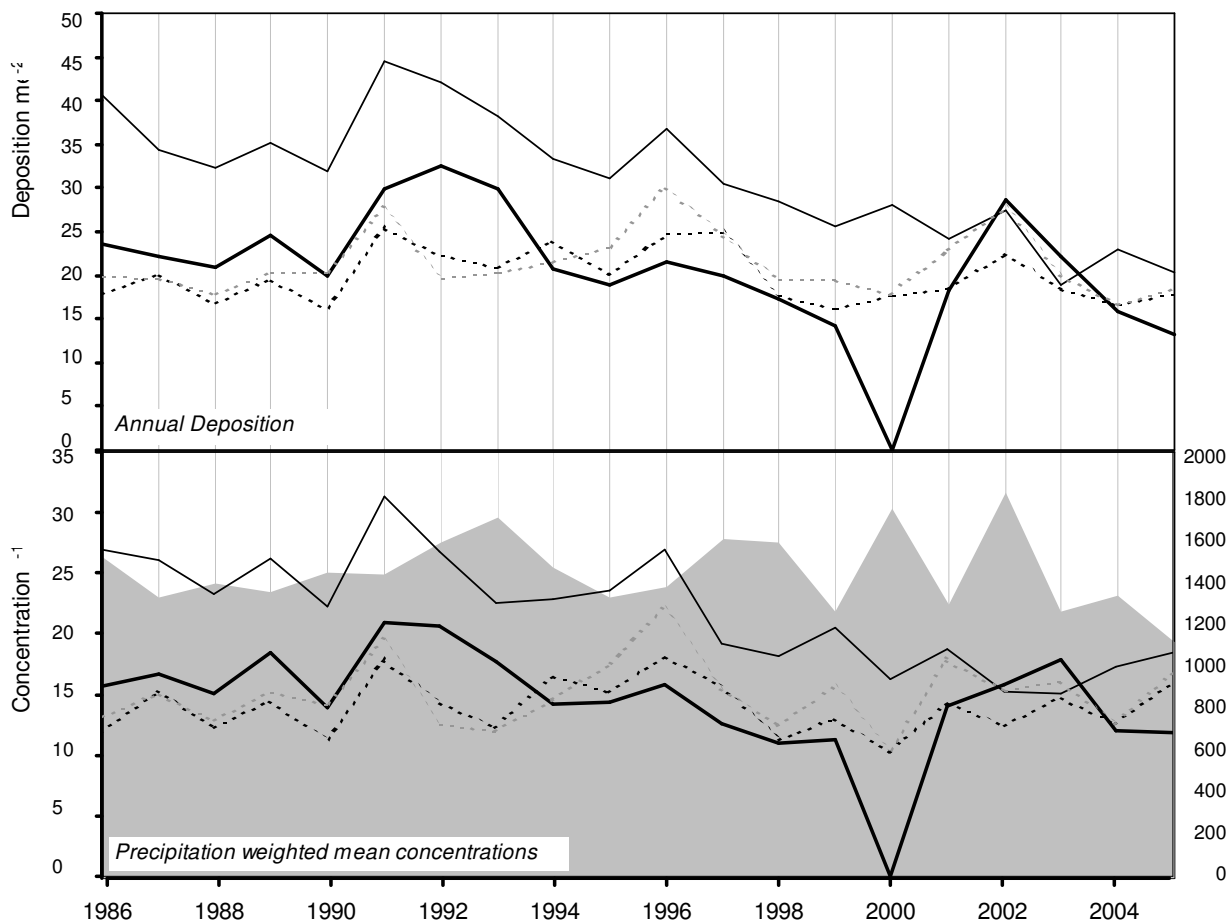
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
hydrogen ion	-0.23 ueq/l (-1.33 %/year): 19 years' data + Significant trend detected
non-marine sulphate	-0.61 ueq/l (-2.21 %/year): 20 years' data +++ Strong trend detected
nitrate	0.00 ueq/l (0.02 %/year): 20 years' data - No significant trend detected
ammonium	0.06 ueq/l (0.39 %/year): 20 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5123) Tycanol Wood

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
12/Jan/2005	26/Jan/2005	5.1	36.8	18.9	25.1	181.8	38.5	8.3	203.6	3.9	<1.0	14.9	8.1	36.2	46.0
26/Jan/2005	09/Feb/2005	5.4	35.2	17.7	25.0	178.1	37.3	10.1	202.3	4.0	<1.0	13.7	4.3	36.0	30.2
09/Feb/2005	28/Feb/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
28/Feb/2005	09/Mar/2005	5.4	71.1	25.2	39.8	370.7	76.0	21.0	403.5	8.6	<1.0	26.4	4.3	68.7	6.9
09/Mar/2005	23/Mar/2005	5.2	53.9	36.9	58.8	128.3	25.6	21.8	134.1	4.0	<1.0	38.5	7.1	30.5	51.1
23/Mar/2005	06/Apr/2005	4.9	45.6	34.0	41.7	187.8	39.2	23.4	183.7	4.3	<1.0	23.0	14.1	37.3	27.6
06/Apr/2005	20/Apr/2005	5.2	16.5	9.6	10.6	70.8	13.6	5.7	78.1	1.5	<1.0	8.0	6.3	18.0	65.7
20/Apr/2005	04/May/2005	4.7	39.2	28.1	16.5	100.5	16.5	5.2	117.7	3.7	<1.0	27.1	20.4	30.0	62.4
04/May/2005	18/May/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
18/May/2005	01/Jun/2005	4.7	32.1	10.3	26.5	119.1	29.2	17.4	117.4	5.4	<1.0	17.7	20.4	29.0	84.5
01/Jun/2005	16/Jun/2005	4.5	57.3	17.4	13.5	79.8	17.9	11.8	111.2	1.8	<1.0	47.7	30.9	28.0	37.2
16/Jun/2005	01/Jul/2005	5.1	70.9	89.1	68.9	76.9	16.6	29.9	100.3	25.4	<1.0	61.6	7.2	33.0	10.5
01/Jul/2005	20/Jul/2005	5.6	194.5	2.6	330.0	140.7	19.1	13.9	181.8	83.3	207.7	177.5	2.6	108.0	16.0
20/Jul/2005	27/Jul/2005	5.9	10.6	5.5	13.7	8.7	<0.8	7.4	13.9	3.0	<1.0	9.5	1.3	<10.0	33.2
27/Jul/2005	10/Aug/2005	5.2	6.8	<0.7	0.3	7.2	<0.8	<1.0	5.1	<0.3	<1.0	5.9	6.2	<10.0	89.9
10/Aug/2005	24/Aug/2005	5.9	39.8	5.7	<0.7	72.0	14.5	13.8	79.3	14.9	17.3	31.1	1.1	21.0	44.0
24/Aug/2005	07/Sep/2005	5.9	87.8	170.8	127.9	67.3	28.7	90.5	60.4	7.2	<1.0	79.7	1.3	44.0	1.9
07/Sep/2005	21/Sep/2005	6.6	36.9	19.6	78.0	47.3	9.0	5.2	55.9	16.1	35.2	31.2	0.3	29.0	30.1
21/Sep/2005	05/Oct/2005	4.7	46.1	25.0	5.6	126.8	29.0	11.0	140.7	2.2	<1.0	30.8	20.0	27.0	49.6
05/Oct/2005	19/Oct/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
19/Oct/2005	02/Nov/2005	4.9	31.1	13.0	10.6	101.5	19.4	11.2	109.5	2.9	<1.0	18.9	13.2	24.0	207.9
02/Nov/2005	16/Nov/2005	5.0	27.5	4.8	3.5	142.6	29.0	8.0	152.7	3.7	<1.0	10.3	9.1	25.0	129.4
16/Nov/2005	30/Nov/2005	5.3	32.8	12.6	12.6	206.6	41.3	11.2	229.1	5.0	<1.0	7.9	4.9	33.0	19.2
30/Nov/2005	15/Dec/2005	4.9	29.7	33.9	18.0	135.9	26.1	8.1	137.5	3.3	<1.0	13.4	13.8	29.4	34.1
15/Dec/2005	06/Jan/2006	5.5	40.6	20.0	34.1	239.0	46.2	10.5	249.2	6.1	<1.0	11.8	3.1	39.2	29.5
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												
5123			32.1	16.1	16.8	113.5	23.0	10.5	122.7	3.4	0.5	18.5	11.9		Total rainfall 1107.0

Llyn Brianne

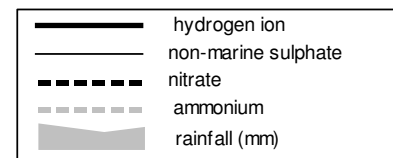
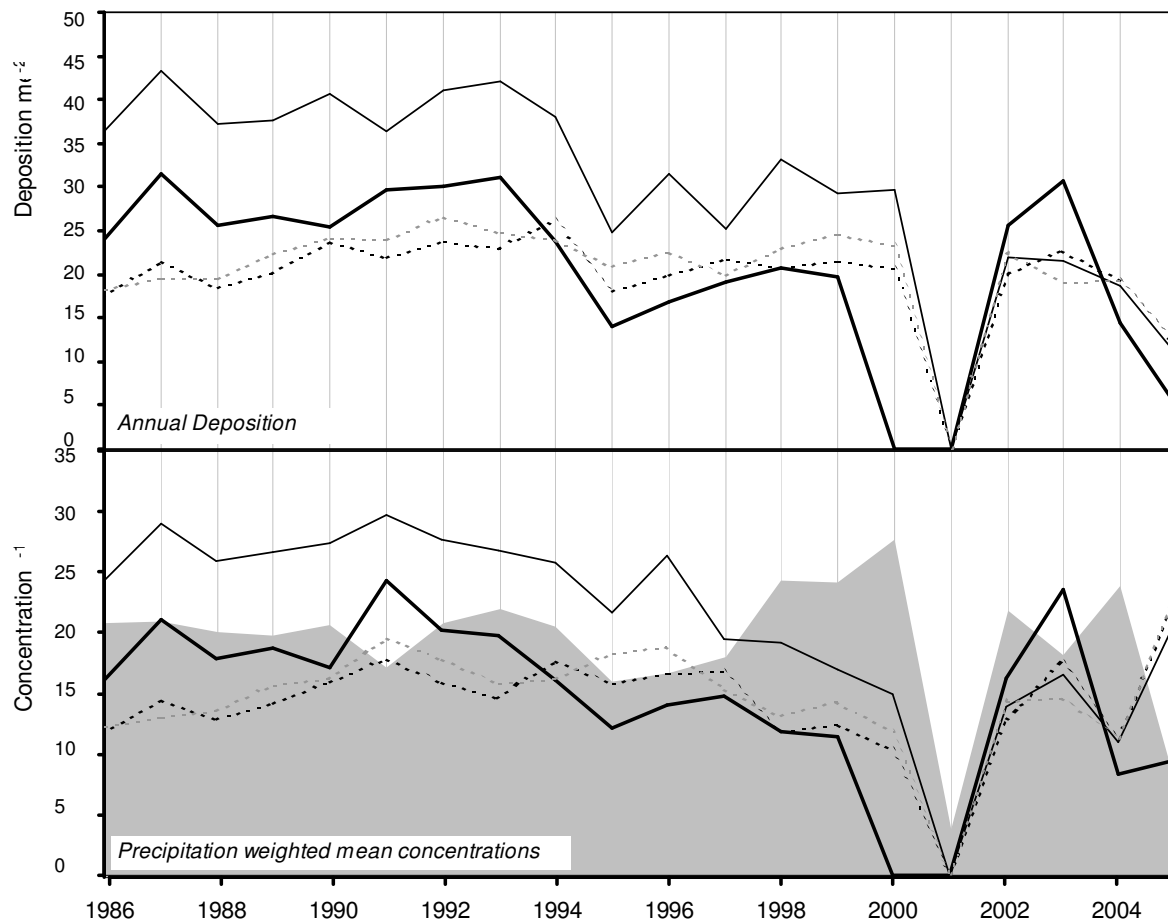
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
hydrogen ion	-0.41 ueq/l (-2.08 %/year): 18 years' data + Significant trend detected
non-marine sulphate	-0.82 ueq/l (-2.76 %/year): 19 years' data +++ Strong trend detected
nitrate	0.08 ueq/l (0.54 %/year): 19 years' data - No significant trend detected
ammonium	0.05 ueq/l (0.33 %/year): 19 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5124) Llyn Brianne

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
13/Jan/2005	26/Jan/2005	4.9	34.7	14.4	12.6	196.3	36.9	21.6	231.0	3.5	<1.0	11.1	14.1	39.0	40.6
26/Jan/2005	09/Feb/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
09/Feb/2005	23/Feb/2005	5.5	27.4	7.1	9.7	141.0	29.1	8.3	168.7	2.6	<1.0	10.4	3.5	26.0	62.7
23/Feb/2005	08/Mar/2005	5.2	50.1	50.7	51.4	160.9	32.8	15.3	164.9	4.6	<1.0	30.7	6.8	37.0	9.1
08/Mar/2005	23/Mar/2005	5.3	30.1	24.9	30.3	89.9	18.1	9.6	91.6	2.3	<1.0	19.3	5.0	22.6	63.1
23/Mar/2005	06/Apr/2005	4.9	24.2	27.9	32.9	38.6	7.1	8.2	38.4	1.8	<1.0	19.5	12.0	15.3	55.6
06/Apr/2005	22/Apr/2005	5.3	27.5	15.2	16.2	90.4	13.1	4.6	111.3	18.8	<1.0	16.6	5.6	21.0	50.8
22/Apr/2005	09/May/2005	4.8	41.2	38.3	35.6	77.3	11.4	7.6	82.1	2.6	<1.0	31.9	14.8	27.0	61.1
09/May/2005	17/May/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
17/May/2005	15/Jun/2005	5.0	29.5	19.3	15.6	75.8	16.3	8.4	88.2	2.6	<1.0	20.4	11.0	23.0	96.1
15/Jun/2005	28/Jun/2005	4.9	38.5	23.5	33.4	36.4	6.8	<0.1	56.6	0.4	<1.0	34.1	13.2	15.0	28.6
28/Jun/2005	12/Jul/2005	5.0	32.1	31.5	26.1	36.1	10.3	11.1	42.1	2.0	<1.0	27.8	9.3	19.0	52.7
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												Total rainfall
5124			31.5	22.9	23.4	87.7	17.0	9.0	100.6	4.0	0.5	20.9	9.5		520.3

Pumlumon

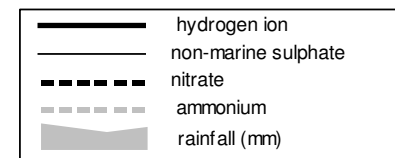
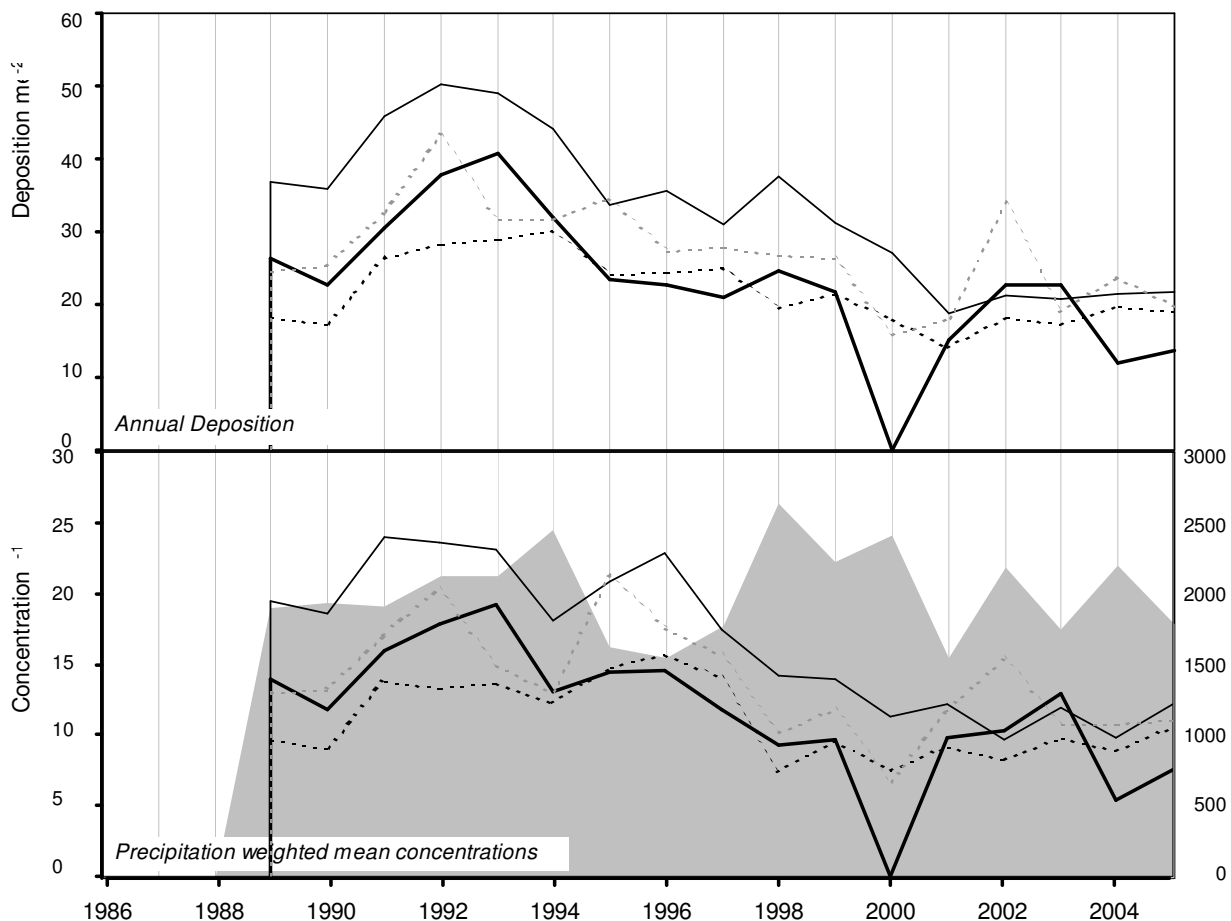
2005

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)



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-0.52 ueq/l (-2.90 %/year): 16 years' data ++ Moderately strong trend detected
<i>non-marine sulphate</i>	-0.86 ueq/l (-3.30 %/year): 17 years' data +++ Strong trend detected
<i>nitrate</i>	-0.23 ueq/l (-1.68 %/year): 17 years' data - No significant trend detected
<i>ammonium</i>	-0.36 ueq/l (-2.02 %/year): 17 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5150) Pumlumon

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
11/Jan/2005	24/Jan/2005	5.6	19.7	7.8	6.8	169.2	37.2	8.6	207.6	3.5	<1.0	0.0	2.8	30.0	82.6
24/Jan/2005	08/Feb/2005	5.4	43.7	32.2	36.0	59.8	24.2	22.2	67.7	<0.5	<1.0	36.5	4.0	18.0	5.6
08/Feb/2005	22/Feb/2005	5.4	11.9	3.7	2.2	84.0	15.8	3.0	111.1	1.1	<1.0	1.7	4.3	16.0	158.2
22/Feb/2005	07/Mar/2005	4.9	30.4	26.5	27.3	71.9	15.6	4.2	80.3	1.8	<1.0	21.8	12.9	23.0	28.1
07/Mar/2005	22/Mar/2005	5.1	34.5	21.0	27.4	91.7	20.3	9.2	96.2	1.6	<1.0	23.4	8.7	24.3	36.1
22/Mar/2005	06/Apr/2005	4.7	31.1	32.2	43.2	41.2	8.2	9.7	37.4	1.5	<1.0	26.2	20.9	18.6	26.5
06/Apr/2005	19/Apr/2005	5.3	18.2	8.2	11.6	69.3	14.7	4.2	83.0	1.3	<1.0	9.9	5.4	15.3	96.3
19/Apr/2005	03/May/2005	5.1	26.4	29.0	33.7	33.0	5.3	7.3	37.3	5.2	<1.0	22.4	8.5	16.0	48.3
03/May/2005	17/May/2005	5.2	64.5	33.2	55.6	96.4	19.0	13.8	108.1	7.0	<1.0	52.9	5.9	30.0	21.5
17/May/2005	31/May/2005	5.7	42.0	12.6	14.2	72.1	13.1	7.0	95.1	2.7	<1.0	33.3	2.1	18.0	45.3
31/May/2005	14/Jun/2005	5.0	17.1	7.1	12.8	25.5	5.5	2.8	31.5	2.7	<1.0	14.0	9.8	12.0	48.1
14/Jun/2005	28/Jun/2005	4.9	31.7	10.2	15.9	20.0	5.7	4.4	21.1	6.6	<1.0	29.3	14.1	13.0	43.4
28/Jun/2005	12/Jul/2005	4.8	26.6	20.7	19.2	33.8	7.8	9.7	38.2	1.4	<1.0	22.5	16.6	16.0	46.3
12/Jul/2005	26/Jul/2005	5.1	19.7	19.3	19.9	18.3	7.3	11.7	21.4	2.7	<1.0	17.5	7.2	12.0	35.4
26/Jul/2005	09/Aug/2005	4.9	8.6	10.3	7.0	2.7	3.2	3.6	3.8	<0.3	<1.0	8.2	12.6	<10.0	56.1
09/Aug/2005	23/Aug/2005	5.0	23.7	10.4	10.4	22.9	6.1	6.3	21.6	0.4	<1.0	20.9	10.0	12.0	29.4
23/Aug/2005	06/Sep/2005	8.4	146.9	18.2	1561.2	122.2	7.4	4.3	109.4	227.2	369.6	132.2	0.0	323.0	42.0
06/Sep/2005	20/Sep/2005	5.6	16.4	11.1	22.9	11.8	6.2	7.1	12.0	1.7	<1.0	15.0	2.7	<10.0	62.4
20/Sep/2005	04/Oct/2005	5.3	14.5	2.9	1.9	74.2	15.3	5.5	84.5	1.1	<1.0	5.6	5.6	15.0	129.0
04/Oct/2005	18/Oct/2005	4.7	20.5	19.8	19.1	15.9	4.2	8.1	14.7	0.2	<1.0	18.6	18.6	13.0	41.1
18/Oct/2005	01/Nov/2005	4.9	14.0	8.8	5.6	46.9	9.0	5.8	48.7	0.9	<1.0	8.3	12.3	14.0	152.5
01/Nov/2005	15/Nov/2005	5.4	13.9	2.4	1.9	61.5	13.0	5.1	77.2	1.9	<1.0	6.5	3.8	15.0	284.0
15/Nov/2005	29/Nov/2005	4.8	64.9	33.7	36.1	339.3	73.2	17.2	460.2	8.6	<1.0	24.1	15.1	65.0	11.8
29/Nov/2005	12/Dec/2005	4.9	18.1	18.4	8.5	75.6	13.9	4.6	79.4	1.9	<1.0	9.0	12.3	18.8	86.0
12/Dec/2005	27/Dec/2005	5.3	27.8	19.9	20.4	115.6	21.5	9.2	129.1	14.5	<1.0	13.9	5.4	23.1	63.0
27/Dec/2005	11/Jan/2006	5.3	16.3	7.1	6.7	75.5	14.2	4.3	82.2	1.5	<1.0	7.2	5.6	14.8	113.8
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												Total rainfall
5150			19.4	10.6	11.0	65.5	13.6	6.0	77.3	2.4	0.5	12.2	7.6		1792.9

Stoke Ferry

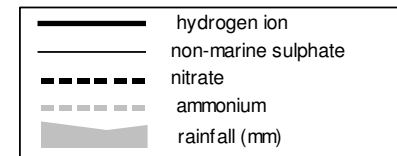
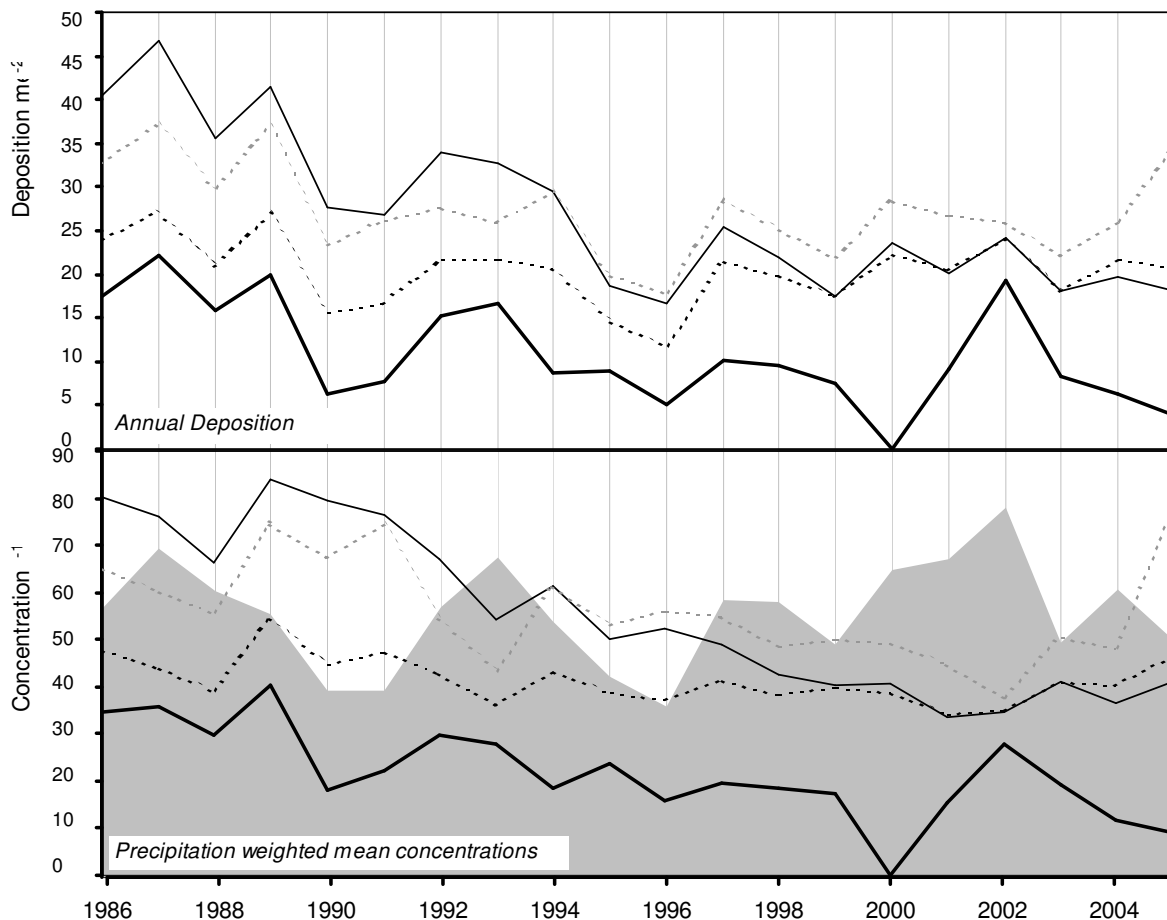
2005

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, SO₂, Daily SO₄, HNO₃ Denuder, WF, EMEP

Site Operator:
 Kings Lynn and West Norfolk BC



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-1.08 ueq/l (-3.29 %/year): 19 years' data ++ Moderately strong trend detected
<i>non-marine sulphate</i>	-2.67 ueq/l (-3.30 %/year): 20 years' data ++++ Very strong trend detected
<i>nitrate</i>	-0.41 ueq/l (-0.90 %/year): 20 years' data + Significant trend detected
<i>ammonium</i>	-0.77 ueq/l (-1.21 %/year): 20 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5004) Stoke Ferry

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
04/Jan/2005	25/Jan/2005	6.4	144.3	50.2	287.9	339.1	62.3	34.8	478.3	96.9	138.8	103.4	0.4	115.0	15.3
25/Jan/2005	08/Feb/2005	5.3	79.5	48.5	43.9	296.7	47.4	30.6	308.0	7.7	<1.0	43.8	4.7	62.0	7.3
08/Feb/2005	22/Feb/2005	5.0	58.3	39.5	43.7	267.5	56.6	18.3	296.2	7.5	<1.0	26.1	10.7	60.0	15.3
22/Feb/2005	08/Mar/2005	4.6	58.2	47.0	61.6	166.6	35.0	15.4	180.0	3.9	<1.0	38.1	27.5	44.0	16.9
08/Mar/2005	18/Mar/2005	6.5	116.1	85.3	170.8	175.7	25.4	75.0	187.9	7.4	<1.0	94.9	0.3	67.0	1.6
18/Mar/2005	01/Apr/2005	6.7	72.6	82.2	131.2	29.2	5.8	44.3	26.0	2.5	<1.0	69.1	0.2	31.4	8.7
01/Apr/2005	12/Apr/2005	5.9	93.7	41.7	100.9	302.2	57.7	56.0	340.2	9.3	<1.0	57.3	1.3	54.6	7.7
12/Apr/2005	19/Apr/2005	5.0	62.3	98.6	104.5	25.4	8.4	23.3	29.1	1.6	<1.0	59.2	9.5	30.0	12.2
19/Apr/2005	04/May/2005	6.4	106.0	113.3	124.5	23.1	10.1	62.0	30.9	3.9	<1.0	103.2	0.4	36.0	16.8
04/May/2005	17/May/2005	6.1	62.9	37.1	125.5	100.0	13.7	20.2	143.3	40.6	58.3	50.8	0.8	44.0	15.3
17/May/2005	31/May/2005	5.3	48.4	62.7	49.3	39.5	12.7	35.9	43.0	4.2	<1.0	43.6	4.6	22.0	9.6
31/May/2005	14/Jun/2005	5.0	47.6	52.8	34.1	39.8	26.6	36.0	35.9	4.2	<1.0	42.8	9.1	23.0	13.0
14/Jun/2005	28/Jun/2005	4.8	75.5	91.5	97.2	16.7	9.3	30.8	13.6	4.8	<1.0	73.5	16.2	28.0	29.8
28/Jun/2005	12/Jul/2005	7.0	72.1	43.3	296.8	40.0	10.0	67.6	59.2	23.1	<1.0	67.3	0.1	61.0	43.9
12/Jul/2005	26/Jul/2005	6.5	29.4	34.8	20.6	31.3	10.3	38.2	35.7	4.1	5.5	25.6	0.4	16.0	15.8
26/Jul/2005	09/Aug/2005	4.3	59.1	101.0	53.7	38.1	10.6	43.5	34.1	5.9	<1.0	54.5	47.9	37.0	4.0
09/Aug/2005	23/Aug/2005	5.4	29.2	33.6	41.9	9.5	5.7	15.5	9.8	2.0	<1.0	28.1	3.7	12.0	45.5
23/Aug/2005	06/Sep/2005	8.0	195.9	51.3	2118.1	62.2	26.7	65.9	22.8	119.2	299.3	188.4	0.0	374.0	19.3
06/Sep/2005	20/Sep/2005	5.2	28.3	44.8	46.0	22.0	8.1	10.6	29.6	1.3	<1.0	25.6	6.2	14.0	38.2
20/Sep/2005	04/Oct/2005	4.8	23.4	24.4	11.6	34.1	8.9	19.6	46.4	0.3	<1.0	19.3	14.8	14.0	21.4
04/Oct/2005	18/Oct/2005	4.6	38.9	48.3	42.4	20.0	5.3	22.8	16.2	1.1	<1.0	36.5	23.4	19.0	10.3
18/Oct/2005	08/Nov/2005	4.9	18.9	15.9	13.8	34.9	7.6	8.1	36.7	0.5	<1.0	14.7	13.5	14.0	62.4
08/Nov/2005	16/Nov/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
16/Nov/2005	30/Nov/2005	5.3	21.7	3.8	1.3	152.5	29.9	9.8	168.0	3.6	<1.0	3.4	4.9	26.0	3.2
30/Nov/2005	14/Dec/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
14/Dec/2005	04/Jan/2006	5.5	49.6	28.3	46.6	100.6	20.6	13.7	111.6	5.6	<1.0	37.5	3.0	25.7	10.9
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												
5004			47.8	46.8	77.8	56.8	14.2	27.8	63.9	5.1	0.7	40.9	8.9		Total rainfall 444.4

Preston Montford

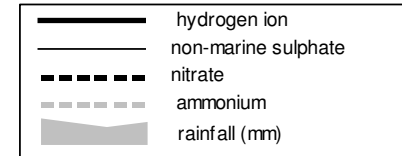
2005

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, SO₂, Met

Site Operator:
 Field Studies Council



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-1.19 ueq/l (-3.88 %/year): 19 years' data ++ Moderately strong trend detected
<i>non-marine sulphate</i>	-2.17 ueq/l (-3.49 %/year): 20 years' data +++ Strong trend detected
<i>nitrate</i>	-0.35 ueq/l (-1.16 %/year): 20 years' data - No significant trend detected
<i>ammonium</i>	-0.51 ueq/l (-0.98 %/year): 20 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5023) Preston Montford

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
11/Jan/2005	24/Jan/2005	5.8	58.4	17.2	30.3	340.6	79.1	23.8	416.3	11.7	<1.0	17.4	1.8	62.0	12.1
24/Jan/2005	06/Feb/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
06/Feb/2005	19/Feb/2005	5.7	62.6	9.1	27.0	348.4	64.0	29.7	408.7	16.2	<1.0	20.7	1.9	58.8	7.8
19/Feb/2005	06/Mar/2005	5.7	149.5	86.6	136.0	276.7	46.5	43.9	288.9	28.2	<1.0	116.1	2.1	66.3	5.9
06/Mar/2005	20/Mar/2005	7.0	84.2	36.2	220.3	259.4	31.9	19.2	320.1	26.9	18.9	53.0	0.1	73.9	1.8
20/Mar/2005	03/Apr/2005	5.1	55.6	64.6	99.9	8.9	5.9	12.9	10.2	1.5	<1.0	54.5	8.7	21.9	40.2
03/Apr/2005	17/Apr/2005	6.0	18.1	16.9	37.1	44.9	7.5	6.9	47.2	3.1	<1.0	12.7	1.0	14.1	19.3
17/Apr/2005	01/May/2005	6.5	36.2	47.5	79.6	33.4	4.4	18.3	30.8	8.5	<1.0	32.2	0.3	28.0	12.7
01/May/2005	15/May/2005	5.2	28.0	23.5	18.8	50.7	11.9	20.8	80.8	7.4	<1.0	21.9	6.3	17.0	11.6
15/May/2005	29/May/2005	6.3	43.4	24.7	83.7	63.8	9.6	14.1	69.4	12.4	8.6	35.7	0.5	29.0	10.9
29/May/2005	12/Jun/2005	6.9	57.0	49.2	221.9	56.4	11.0	15.9	79.2	46.1	22.4	50.2	0.1	56.0	2.5
12/Jun/2005	26/Jun/2005	6.5	63.1	28.5	472.1	15.4	8.8	11.8	16.6	53.8	87.5	61.3	0.3	80.0	39.9
26/Jun/2005	10/Jul/2005	6.5	41.9	20.2	405.2	21.3	6.9	7.7	26.7	34.8	<1.0	39.4	0.3	71.0	24.3
10/Jul/2005	25/Jul/2005	7.3	31.7	3.4	235.3	20.7	9.2	13.2	14.2	26.5	31.0	29.2	0.1	45.0	7.2
25/Jul/2005	08/Aug/2005	5.9	22.9	19.5	44.8	14.9	3.5	4.3	3.0	3.5	1.0	21.1	1.1	11.0	25.1
08/Aug/2005	21/Aug/2005	5.8	21.9	42.6	38.5	14.5	6.2	16.4	24.2	8.6	<1.0	20.2	1.7	13.0	6.2
21/Aug/2005	04/Sep/2005	5.9	16.4	19.0	21.3	13.2	6.1	12.0	16.2	3.8	<1.0	14.8	1.2	<10.0	8.3
04/Sep/2005	18/Sep/2005	5.8	35.9	42.8	72.7	3.8	<0.8	9.2	4.1	1.7	<1.0	35.4	1.5	13.0	37.1
18/Sep/2005	03/Oct/2005	6.2	12.7	7.8	24.5	45.3	6.9	8.1	51.3	3.7	<1.0	7.2	0.6	12.0	19.9
03/Oct/2005	16/Oct/2005	5.5	18.8	21.6	27.4	18.8	5.1	12.5	18.5	0.7	<1.0	16.6	3.1	10.0	22.9
16/Oct/2005	30/Oct/2005	5.4	16.0	11.3	16.9	20.3	4.4	4.0	21.7	1.3	<1.0	13.6	4.4	<10.0	63.2
30/Oct/2005	28/Nov/2005	5.7	20.1	7.5	23.3	76.9	13.1	6.1	75.3	3.1	<1.0	10.8	2.0	16.5	68.2
28/Nov/2005	11/Dec/2005	5.7	21.0	34.5	25.2	49.1	5.6	4.7	39.9	4.7	<1.0	15.1	2.0	11.1	22.1
11/Dec/2005	28/Dec/2005	6.3	63.2	32.8	84.3	135.1	17.0	11.4	133.7	9.1	<1.0	46.9	0.5	34.5	4.7
28/Dec/2005	08/Jan/2006	6.1	38.1	33.8	62.0	73.7	6.2	5.0	53.9	14.6	<1.0	29.2	0.8	18.5	11.3
			Precipitation <weighted annual means for site (samples containing phosphate are excluded)												
5023			30.8	25.4	64.0	53.1	10.3	9.7	56.6	6.1	0.7	24.4	2.7		Total rainfall 485.2

Bottesford

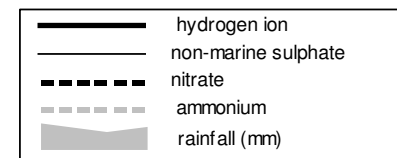
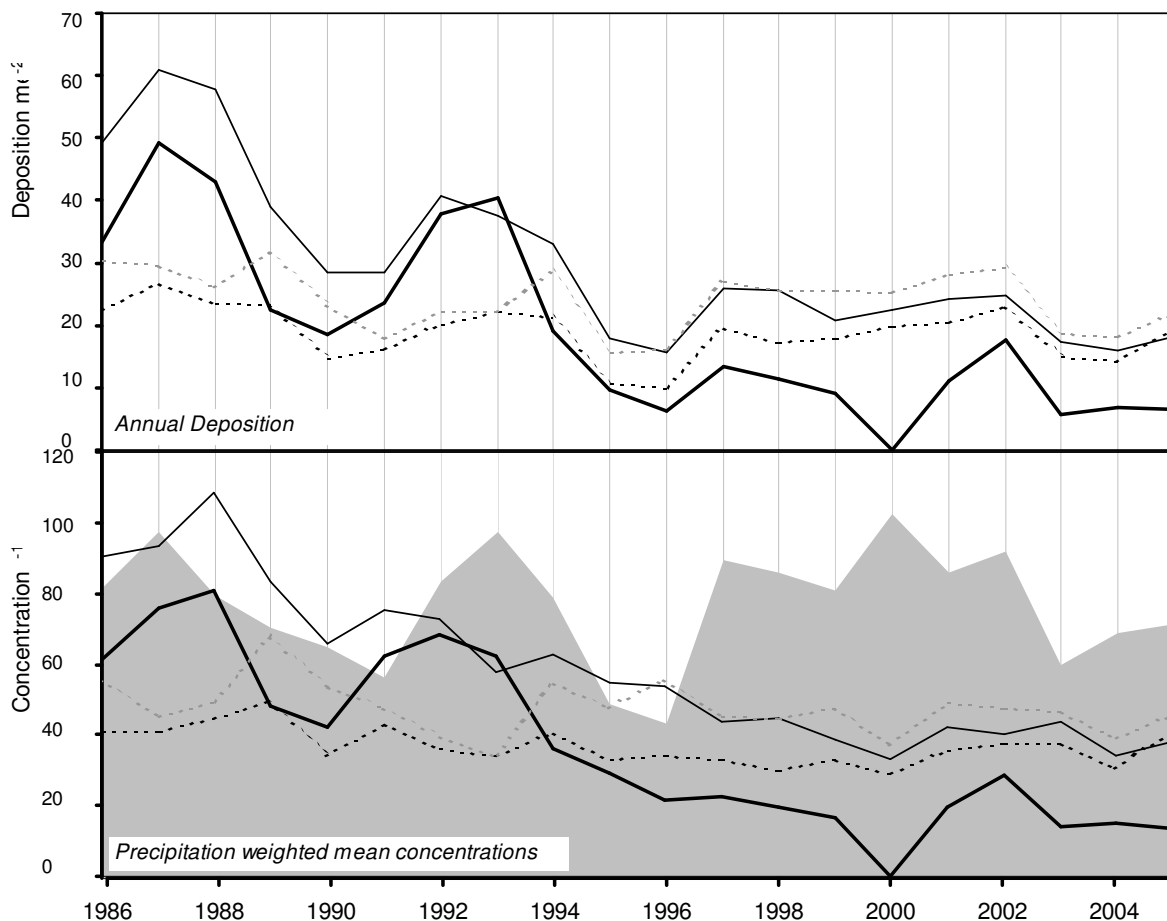
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-3.32 ueq/l (-4.77 %/year): 19 years' data ++++ Very strong trend detected
<i>non-marine sulphate</i>	-3.40 ueq/l (-3.73 %/year): 20 years' data ++++ Very strong trend detected
<i>nitrate</i>	-0.44 ueq/l (-1.08 %/year): 20 years' data + Significant trend detected
<i>ammonium</i>	-0.49 ueq/l (-0.93 %/year): 20 years' data - No significant trend detected

nfall (mm)

ACID DEPOSITION DATA REPORT, 2005

(5121) Bottesford

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
20/Jan/2005	31/Jan/2005	5.1	84.1	41.1	82.8	158.6	33.1	25.7	224.7	3.5	<1.0	65.0	7.4	43.0	11.3
31/Jan/2005	08/Mar/2005	4.5	72.4	47.5	57.2	151.1	29.8	20.6	168.6	4.3	<1.0	54.2	31.6	46.2	43.2
08/Mar/2005	24/Mar/2005	6.6	83.1	48.6	119.5	87.5	16.0	59.4	94.4	4.5	<1.0	72.5	0.3	39.2	5.4
24/Mar/2005	09/May/2005	4.8	55.1	59.9	58.2	68.9	7.3	26.8	72.4	19.5	<1.0	46.8	15.1	26.0	55.4
09/May/2005	24/May/2005	6.0	42.1	31.7	31.3	50.7	11.4	22.7	56.9	3.6	<1.0	36.0	0.9	19.0	16.5
24/May/2005	08/Jun/2005	6.2	55.1	50.1	69.8	16.6	7.2	19.4	31.8	12.0	6.4	53.1	0.6	21.0	11.9
08/Jun/2005	24/Jun/2005	5.6	65.0	50.5	42.5	20.5	12.4	38.7	29.0	10.9	<1.0	62.5	2.3	17.0	9.6
24/Jun/2005	21/Jul/2005	4.7	43.9	52.3	29.2	23.4	10.4	30.8	16.8	2.7	<1.0	41.1	22.4	24.0	29.9
21/Jul/2005	04/Aug/2005	4.9	22.7	28.4	27.3	14.3	6.0	7.7	10.5	1.5	1.0	20.9	12.3	13.0	43.4
04/Aug/2005	23/Aug/2005	4.7	31.8	43.4	35.8	3.5	5.6	20.1	5.5	1.7	<1.0	31.3	18.2	16.0	60.5
23/Aug/2005	07/Sep/2005	5.1	54.7	51.7	58.7	16.1	8.3	36.8	16.5	3.4	<1.0	52.8	8.5	19.0	20.1
07/Sep/2005	27/Sep/2005	5.3	27.2	30.2	39.7	21.6	7.2	13.5	21.5	2.2	<1.0	24.6	5.0	13.0	31.7
27/Sep/2005	12/Oct/2005	5.8	31.0	29.8	58.0	15.5	3.8	7.5	14.0	3.0	<1.0	29.2	1.4	13.0	27.6
12/Oct/2005	08/Nov/2005	5.2	18.1	19.9	20.2	30.4	7.4	7.6	31.0	1.6	<1.0	14.4	6.0	<10.0	58.3
08/Nov/2005	25/Nov/2005	4.8	62.7	39.3	61.2	61.1	13.9	25.2	65.7	2.7	<1.0	55.3	16.2	26.0	9.3
25/Nov/2005	20/Jan/2006	4.7	66.1	50.3	65.8	104.5	18.9	20.5	105.0	4.7	<1.0	53.5	22.4	35.0	43.4
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												
5121			44.2	41.2	45.9	49.6	11.2	19.6	53.6	5.1	0.7	38.2	13.6		Total rainfall 477.6

Llyn Llgi

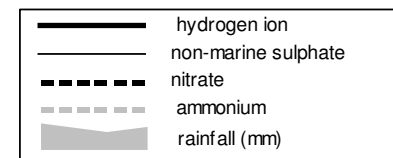
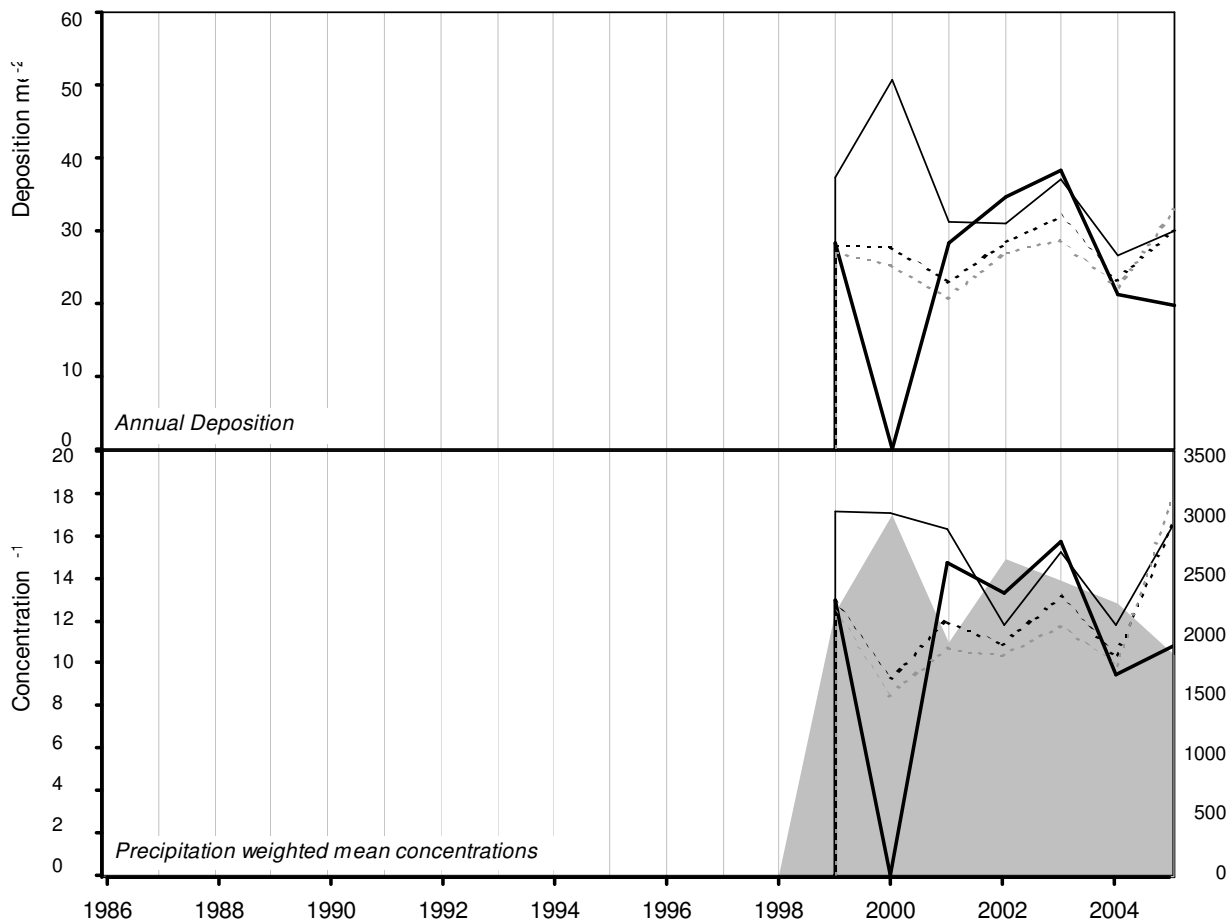
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
hydrogen ion	
non-marine sulphate	
nitrate	
ammonium	

ACID DEPOSITION DATA REPORT, 2005

(5160) Llyn Llagi

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
10/Jan/2005	25/Jan/2005	6.4	25.2	6.5	39.7	203.3	37.9	10.0	233.5	5.2	<1.0	0.8	0.4	41.0	98.6
25/Jan/2005	07/Feb/2005	5.3	27.8	18.7	20.0	66.3	23.7	19.6	75.2	<0.5	<1.0	19.8	4.9	18.0	19.7
07/Feb/2005	21/Feb/2005	5.5	30.5	7.9	11.3	140.0	28.0	7.5	170.2	2.6	<1.0	13.6	3.1	28.0	113.1
21/Feb/2005	22/Mar/2005	5.0	46.3	26.1	34.7	122.9	26.3	10.8	135.6	2.8	<1.0	31.5	11.0	32.0	119.2
22/Mar/2005	04/Apr/2005	4.7	42.8	44.8	48.6	58.4	12.2	7.5	68.2	1.8	<1.0	35.7	21.9	28.0	46.4
04/Apr/2005	20/Apr/2005	5.2	17.1	7.8	11.3	61.9	11.0	3.4	74.2	1.1	<1.0	9.7	6.3	14.6	153.7
20/Apr/2005	04/May/2005	4.8	38.0	42.1	36.3	71.3	12.2	12.0	75.4	4.9	<1.0	29.4	16.2	25.0	64.8
04/May/2005	16/May/2005	5.9	21.7	11.1	20.2	76.7	14.2	10.4	84.2	3.1	<1.0	12.5	1.3	19.0	18.2
16/May/2005	01/Jun/2005	4.9	26.1	10.4	11.4	81.6	15.3	4.7	98.0	2.3	<1.0	16.3	12.6	20.0	153.4
01/Jun/2005	13/Jun/2005	4.9	32.9	10.8	11.3	47.6	10.3	4.7	42.7	1.6	<1.0	27.1	12.9	15.0	76.1
13/Jun/2005	27/Jul/2005	4.6	46.2	13.6	10.9	77.1	15.0	6.6	94.2	2.5	<1.0	36.9	26.3	26.0	43.5
27/Jul/2005	11/Jul/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
11/Jul/2005	22/Aug/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
22/Aug/2005	05/Sep/2005	5.0	22.3	17.5	15.7	60.4	11.8	11.0	63.8	2.0	<1.0	15.1	9.3	16.0	124.9
05/Sep/2005	19/Sep/2005	4.9	20.3	14.7	9.8	48.1	12.4	8.3	69.5	1.3	<1.0	14.5	11.5	15.0	56.2
19/Sep/2005	03/Oct/2005	5.0	24.5	8.0	9.6	107.7	23.4	7.9	118.8	2.5	<1.0	11.5	10.7	22.0	176.8
03/Oct/2005	17/Oct/2005	4.7	33.5	25.3	30.9	15.9	4.8	5.7	16.6	1.1	<1.0	31.6	19.5	13.0	89.1
17/Oct/2005	31/Oct/2005	5.0	13.7	7.1	5.1	55.3	9.7	5.7	57.1	1.0	<1.0	7.0	10.0	14.0	214.5
31/Oct/2005	14/Nov/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
14/Nov/2005	28/Nov/2005	5.6	51.3	23.5	26.2	299.5	61.4	15.3	403.8	6.8	<1.0	15.2	2.8	54.0	27.2
28/Nov/2005	14/Dec/2005	4.6	31.2	54.1	26.4	105.7	17.4	7.3	102.1	1.3	<1.0	18.5	24.0	30.9	99.5
14/Dec/2005	27/Dec/2005	5.2	32.5	19.3	20.1	139.1	25.9	11.6	142.6	21.8	<1.0	15.7	6.2	26.3	62.0
27/Dec/2005	09/Jan/2006	5.3	17.0	8.9	7.9	72.4	15.8	1.7	79.2	1.6	<1.0	8.3	5.5	14.5	70.4
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												
5160			27.3	16.6	17.9	90.0	17.8	7.5	101.5	2.8	0.5	16.5	10.8		Total rainfall 1827.3

Llyn Llydaw

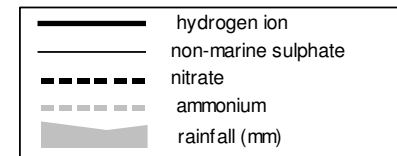
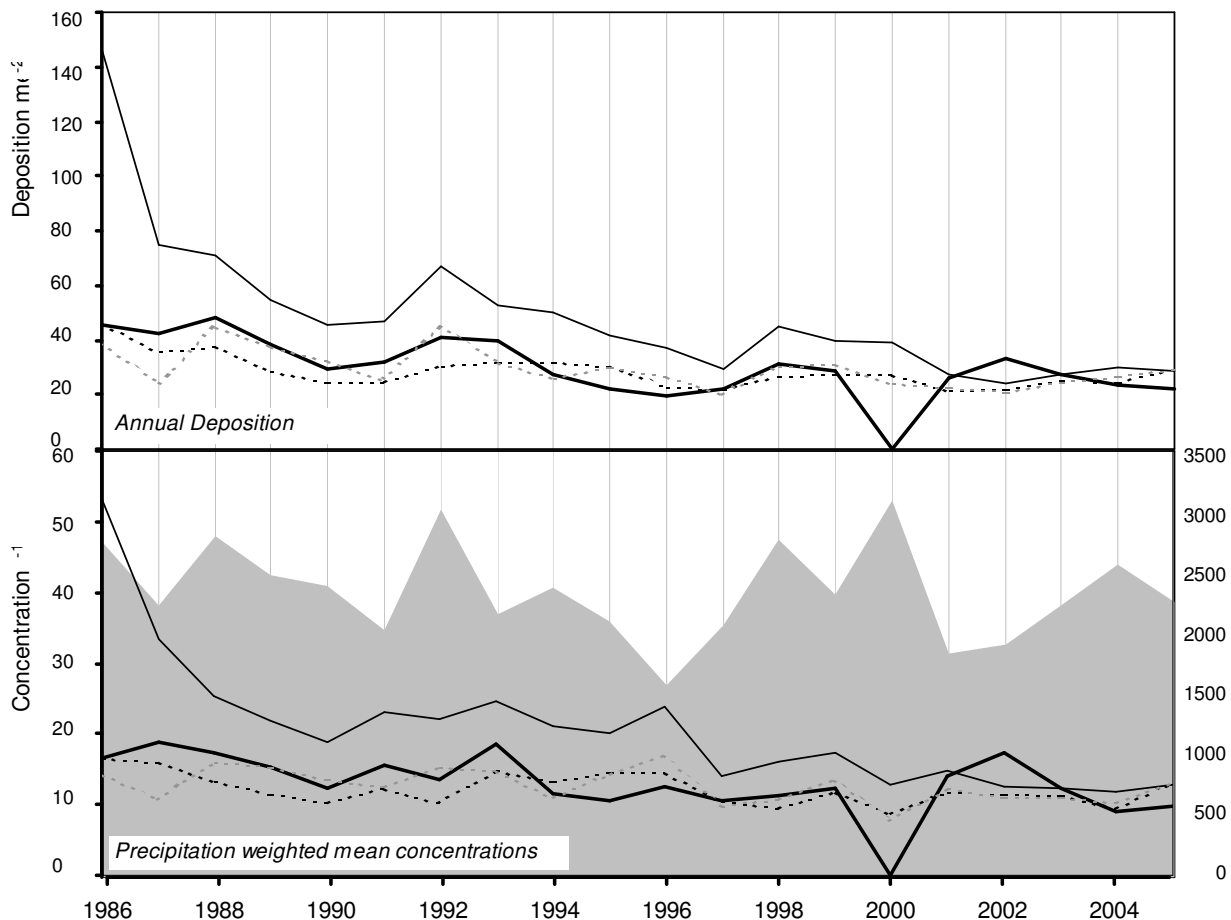
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-0.31 ueq/l (-1.85 %/year): 19 years' data ++ Moderately strong trend detected
<i>non-marine sulphate</i>	-1.24 ueq/l (-3.85 %/year): 20 years' data +++ Strong trend detected
<i>nitrate</i>	-0.17 ueq/l (-1.24 %/year): 20 years' data - No significant trend detected
<i>ammonium</i>	-0.14 ueq/l (-1.02 %/year): 20 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5153) Llyn Llydaw

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
12/Jan/2005	26/Jan/2005	5.4	12.8	9.3	8.9	125.8	26.1	7.1	148.0	2.5	<1.0	0.0	4.1	23.0	77.0
26/Jan/2005	09/Feb/2005	4.5	28.3	22.3	9.3	86.6	17.9	5.8	86.0	2.2	<1.0	17.9	34.7	26.6	31.0
09/Feb/2005	23/Feb/2005	5.7	14.2	5.3	7.6	89.5	14.6	2.9	117.3	3.3	<1.0	3.4	1.9	17.0	110.8
23/Feb/2005	09/Mar/2005	4.6	66.5	54.7	50.2	166.6	34.7	14.3	192.0	3.8	<1.0	46.4	25.7	46.0	8.0
09/Mar/2005	23/Mar/2005	4.9	30.7	18.3	22.1	70.4	15.1	6.3	88.0	1.6	<1.0	22.3	13.2	21.0	83.6
23/Mar/2005	06/Apr/2005	4.8	25.0	26.6	29.0	47.8	9.4	4.8	61.4	1.1	<1.0	19.2	16.6	17.6	66.7
06/Apr/2005	20/Apr/2005	5.1	15.3	9.7	11.4	68.2	14.3	3.8	79.0	1.0	<1.0	7.1	8.3	16.4	174.8
20/Apr/2005	04/May/2005	5.0	45.3	42.2	61.6	49.5	17.0	14.0	61.1	3.4	<1.0	39.4	10.5	23.0	70.8
04/May/2005	18/May/2005	6.4	66.4	40.2	54.3	108.5	36.8	33.6	132.4	8.2	5.7	53.4	0.4	35.0	11.6
18/May/2005	01/Jun/2005	5.0	26.6	10.1	10.3	61.3	10.8	4.7	83.7	1.7	<1.0	19.2	10.0	15.0	122.4
01/Jun/2005	15/Jun/2005	5.3	20.9	14.8	20.0	23.4	8.2	14.4	30.7	1.2	<1.0	18.1	4.6	11.0	80.6
15/Jun/2005	29/Jun/2005	6.5	75.5	46.0	121.7	22.3	13.1	<5.4	27.3	10.5	38.5	72.9	0.3	25.0	29.9
29/Jun/2005	13/Jul/2005	4.9	17.9	14.4	15.5	27.0	5.7	6.1	30.6	2.1	<1.0	14.7	11.5	12.0	39.2
13/Jul/2005	27/Jul/2005	7.3	80.6	28.5	1014.4	50.5	<0.8	<1.0	36.1	109.0	193.9	74.5	0.1	188.0	19.5
27/Jul/2005	10/Aug/2005	4.7	16.2	21.8	12.4	2.4	4.1	11.2	5.0	0.9	3.4	15.9	21.9	13.0	49.5
10/Aug/2005	24/Aug/2005	5.2	10.9	5.2	3.9	25.9	6.0	<1.0	25.9	0.4	<1.0	7.7	6.0	<10.0	82.4
24/Aug/2005	07/Sep/2005	5.0	24.8	26.8	28.0	41.6	10.9	16.6	48.1	1.2	<1.0	19.8	10.7	16.0	45.9
07/Sep/2005	21/Sep/2005	4.9	18.4	18.4	8.8	31.5	7.6	10.2	31.4	1.8	<1.0	14.6	12.0	12.0	55.4
21/Sep/2005	05/Oct/2005	5.2	20.3	7.6	9.2	93.5	19.8	6.3	102.7	1.8	<1.0	9.0	6.8	18.0	97.9
05/Oct/2005	19/Oct/2005	4.7	26.8	20.3	28.5	12.4	3.9	6.3	13.2	2.2	<1.0	25.3	19.1	13.0	161.3
19/Oct/2005	02/Nov/2005	5.1	11.1	4.8	4.2	49.8	8.2	4.7	50.7	1.0	<1.0	5.1	8.7	12.0	238.1
02/Nov/2005	16/Nov/2005	5.4	15.1	3.6	2.0	91.6	16.5	7.3	93.0	4.0	<1.0	4.1	4.2	16.0	321.4
16/Nov/2005	30/Nov/2005	4.6	45.1	21.4	7.6	267.7	61.6	15.2	324.2	6.9	<1.0	12.9	24.5	53.0	40.9
30/Nov/2005	14/Dec/2005	4.7	21.7	39.6	12.5	63.6	9.1	4.8	47.9	1.2	<1.0	14.1	21.4	17.7	61.4
14/Dec/2005	11/Jan/2006	5.1	16.9	9.4	8.2	59.9	14.0	9.4	66.6	2.3	<1.0	9.7	7.2	14.1	177.8
5153			20.1	13.1	13.1	65.1	13.4	7.1	73.4	2.2	0.6	12.8	9.8		Total rainfall 2258.2

River Etherow

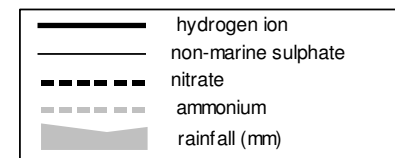
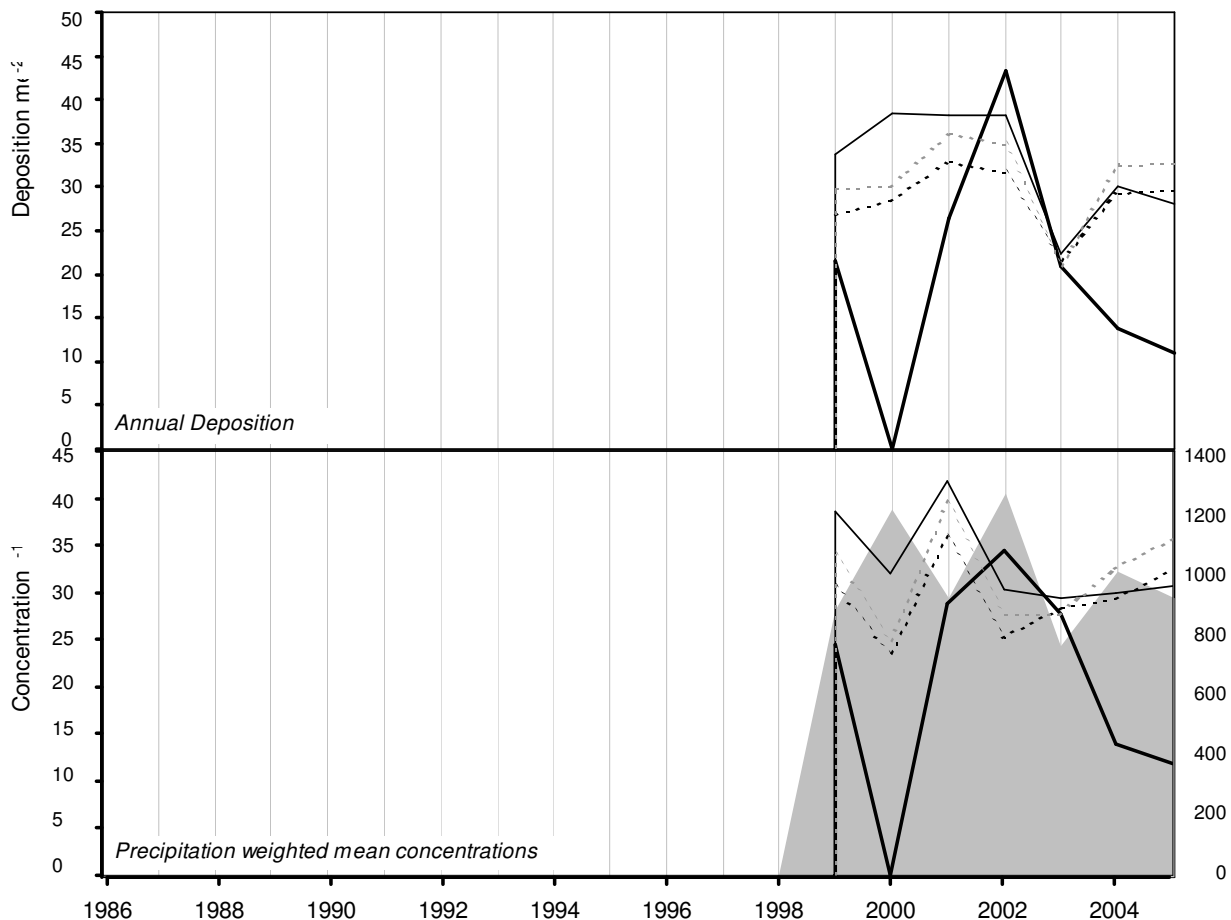
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
hydrogen ion	
non-marine sulphate	
nitrate	
ammonium	

ACID DEPOSITION DATA REPORT, 2005

(5158) River Etherow

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
09/Jan/2005	24/Jan/2005	5.1	55.5	17.4	22.7	323.9	69.8	21.5	343.4	6.5	<1.0	16.5	7.9	55.7	25.5
24/Jan/2005	07/Feb/2005	5.3	75.9	69.7	83.5	123.0	28.7	28.1	141.7	10.4	<1.0	61.1	4.6	41.0	7.7
07/Feb/2005	22/Feb/2005	5.2	25.7	14.6	19.3	90.8	16.6	6.7	123.2	1.8	<1.0	14.8	6.6	20.0	42.2
22/Feb/2005	08/Mar/2005	5.7	98.3	64.3	90.3	189.4	32.7	23.4	199.8	28.5	<1.0	75.5	1.8	50.0	6.6
08/Mar/2005	25/Mar/2005	6.7	101.2	88.1	123.5	145.4	27.1	33.7	147.2	13.7	<1.0	83.7	0.2	45.3	15.8
25/Mar/2005	05/Apr/2005	4.7	138.1	120.6	194.3	36.0	9.4	20.3	40.5	2.8	<1.0	133.8	19.1	40.3	19.5
05/Apr/2005	19/Apr/2005	5.1	36.9	29.8	33.9	38.4	8.2	10.4	43.9	0.6	<1.0	32.3	8.9	17.3	45.3
19/Apr/2005	04/May/2005	4.8	56.0	57.0	54.1	43.2	6.2	15.3	48.0	12.6	<1.0	50.8	16.6	26.0	46.7
04/May/2005	18/May/2005	5.6	53.8	32.6	34.4	115.9	29.7	25.4	135.4	4.6	<1.0	39.8	2.6	29.0	11.6
18/May/2005	01/Jun/2005	5.2	26.0	22.4	24.6	38.7	10.9	18.4	33.5	4.1	<1.0	21.4	7.1	15.0	68.1
01/Jun/2005	14/Jun/2005	5.8	42.9	31.1	47.7	59.1	11.7	18.6	63.6	4.6	<1.0	35.8	1.5	22.0	33.5
14/Jun/2005	29/Jun/2005	5.5	48.2	43.7	53.6	20.6	5.9	8.9	13.6	0.8	<1.0	45.7	3.0	13.0	38.6
29/Jun/2005	12/Jul/2005	4.7	32.9	19.9	11.3	32.6	7.4	20.0	43.7	1.1	230.5	28.9	21.4	16.0	23.3
12/Jul/2005	27/Jul/2005	5.1	110.1	77.6	70.9	206.6	46.6	86.6	229.7	10.3	<1.0	85.2	7.8	55.0	9.1
27/Jul/2005	10/Aug/2005	4.7	30.4	28.1	20.7	26.9	6.5	12.5	27.6	1.9	<1.0	27.1	20.9	14.0	36.5
10/Aug/2005	23/Aug/2005	5.7	15.7	25.3	22.4	12.6	4.6	11.5	7.8	1.1	<1.0	14.2	2.1	<10.0	23.6
23/Aug/2005	07/Sep/2005	6.5	90.4	41.2	142.2	75.3	13.7	15.8	79.6	39.6	159.0	81.3	0.3	44.0	30.7
07/Sep/2005	20/Sep/2005	4.5	39.7	35.4	25.9	9.9	6.6	10.6	13.9	0.8	<1.0	38.5	29.5	16.0	62.7
20/Sep/2005	03/Oct/2005	5.6	16.8	10.4	11.2	70.7	14.0	11.8	77.2	2.6	<1.0	8.3	2.8	15.0	43.7
03/Oct/2005	17/Oct/2005	4.6	53.2	62.0	53.6	40.0	11.3	26.7	32.6	2.1	<1.0	48.4	25.7	25.0	20.4
17/Oct/2005	01/Nov/2005	5.1	21.8	10.7	12.7	81.5	15.8	6.5	86.8	1.8	<1.0	12.0	7.9	19.0	115.9
01/Nov/2005	14/Nov/2005	5.2	20.3	9.8	17.9	71.4	8.9	15.3	67.6	4.5	<1.0	11.7	5.8	15.0	74.8
14/Nov/2005	28/Nov/2005	4.7	78.8	78.0	73.8	193.4	35.0	26.7	210.4	8.3	<1.0	55.5	21.9	51.0	9.9
28/Nov/2005	12/Dec/2005	4.6	26.0	39.3	26.1	30.9	5.7	5.9	28.7	1.4	<1.0	22.3	24.5	19.6	76.7
12/Dec/2005	29/Dec/2005	5.9	77.4	52.6	79.1	205.6	36.9	18.8	213.3	16.0	<1.0	52.6	1.3	43.3	11.8
29/Dec/2005	09/Jan/2006	4.4	68.6	55.6	66.7	117.2	20.2	10.4	117.6	6.8	<1.0	54.5	42.7	42.9	15.2
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												
5158			39.0	32.4	35.7	68.2	13.9	14.0	72.1	3.9	0.5	30.7	11.9		Total rainfall 915.2

Wardlow Hay Cop

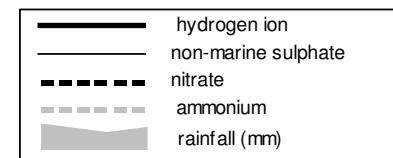
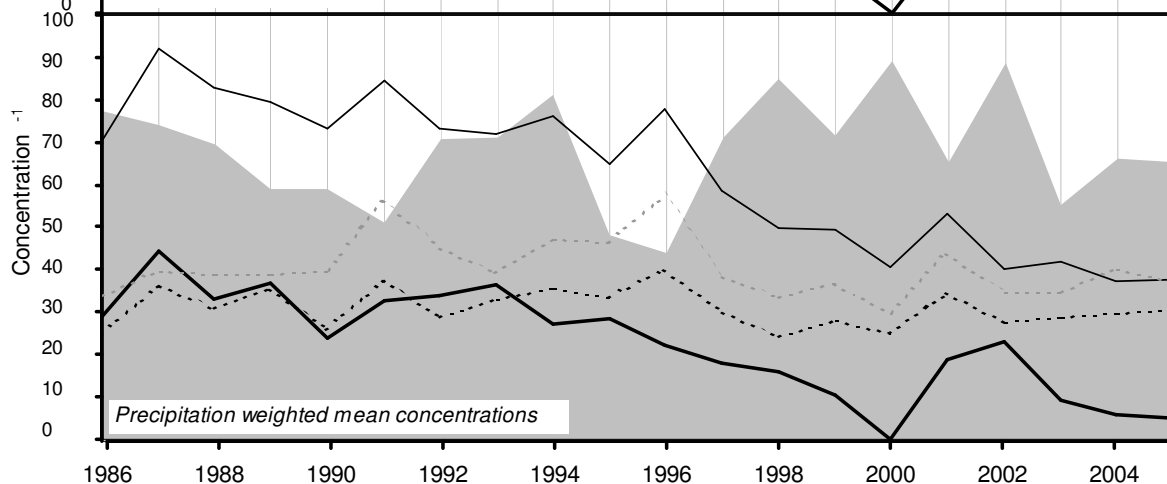
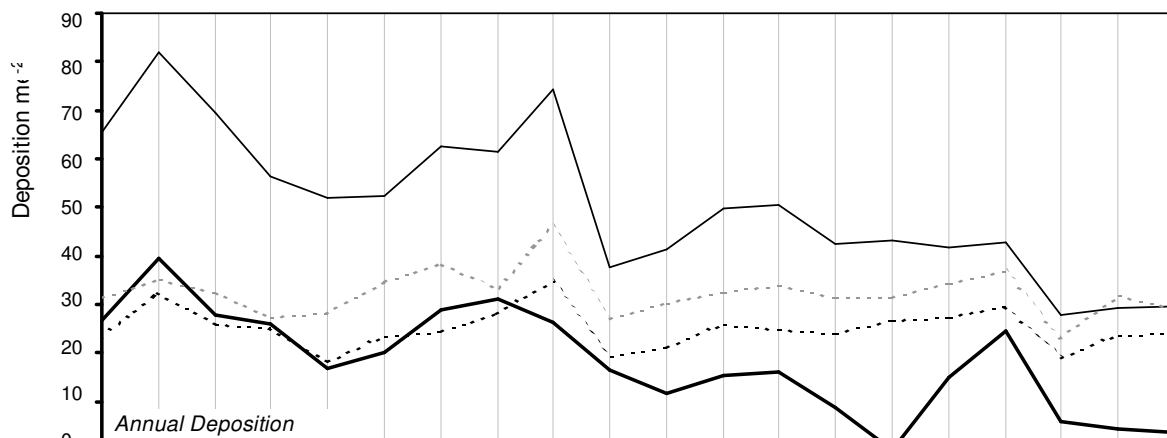
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-1.64 ueq/l (-4.19 %/year): 19 years' data ++++ Very strong trend detected
<i>non-marine sulphate</i>	-2.73 ueq/l (-3.08 %/year): 20 years' data ++++ Very strong trend detected
<i>nitrate</i>	-0.16 ueq/l (-0.50 %/year): 20 years' data - No significant trend detected
<i>ammonium</i>	-0.27 ueq/l (-0.63 %/year): 20 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5120) Wardlow Hay Cop

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
09/Jan/2005	30/Jan/2005	6.2	63.6	22.8	41.2	177.6	37.8	42.3	224.8	4.0	<1.0	42.2	0.6	41.0	37.4
30/Jan/2005	06/Feb/2005	5.3	83.1	74.4	88.7	70.9	25.6	43.0	82.3	3.1	<1.0	74.5	4.6	37.0	5.7
06/Feb/2005	20/Feb/2005	6.1	36.2	18.7	34.4	137.0	25.7	22.5	159.7	3.3	<1.0	19.7	0.8	30.0	35.2
20/Feb/2005	06/Mar/2005	4.6	84.2	47.6	63.6	145.0	30.2	37.8	162.8	3.8	<1.0	66.7	26.9	45.0	17.2
06/Mar/2005	20/Mar/2005	6.6	88.5	35.2	61.6	128.8	19.8	76.8	125.2	3.9	<1.0	73.0	0.3	43.3	8.9
20/Mar/2005	03/Apr/2005	4.9	110.1	133.6	151.9	38.2	10.1	43.1	33.5	3.5	<1.0	105.5	12.3	38.2	22.4
03/Apr/2005	24/Apr/2005	5.3	49.9	33.3	44.0	39.0	8.2	25.2	47.3	2.3	<1.0	45.1	5.2	19.0	45.1
24/Apr/2005	01/May/2005	6.2	48.3	59.7	70.2	19.1	5.7	29.6	21.6	2.7	<1.0	46.0	0.7	21.0	34.2
01/May/2005	15/May/2005	6.0	49.0	23.2	30.7	63.6	13.1	22.4	98.8	2.4	<1.0	41.4	0.9	19.0	26.9
15/May/2005	29/May/2005	6.5	58.4	19.5	28.2	35.9	9.9	66.9	37.3	3.5	<1.0	54.1	0.3	23.0	19.4
29/May/2005	19/Jun/2005	6.1	85.6	37.2	48.7	80.4	15.1	53.3	97.2	2.5	<1.0	75.9	0.9	28.0	24.9
19/Jun/2005	26/Jun/2005	5.7	49.1	42.4	42.4	1.6	3.9	44.5	6.7	1.8	<1.0	48.9	2.0	13.0	22.2
26/Jun/2005	10/Jul/2005	6.0	40.1	29.2	22.4	28.0	9.3	38.5	40.6	3.4	<1.0	36.8	1.0	14.0	27.6
10/Jul/2005	25/Jul/2005	6.4	85.9	66.3	47.3	76.4	34.7	132.1	95.3	8.7	<1.0	76.7	0.4	40.0	13.8
25/Jul/2005	07/Aug/2005	5.1	33.6	25.9	24.7	15.0	4.6	23.0	10.9	0.9	<1.0	31.8	8.5	13.0	34.1
07/Aug/2005	04/Sep/2005	5.6	24.0	15.2	12.2	31.0	8.7	25.2	33.2	1.1	<1.0	20.3	2.3	12.0	62.4
04/Sep/2005	18/Sep/2005	5.1	46.8	40.4	50.0	6.6	4.6	37.0	10.3	1.2	<1.0	46.0	8.5	14.0	42.4
18/Sep/2005	02/Oct/2005	6.0	20.8	9.2	16.1	48.3	9.9	16.9	55.3	1.1	<1.0	15.0	1.0	12.0	43.2
02/Oct/2005	16/Oct/2005	4.7	53.0	50.2	50.9	22.3	9.7	31.1	24.2	1.1	<1.0	50.3	21.4	24.0	24.2
16/Oct/2005	30/Oct/2005	5.4	17.1	14.3	16.4	24.2	4.6	10.7	22.7	0.4	<1.0	14.2	4.5	<10.0	101.3
30/Oct/2005	13/Nov/2005	5.7	21.6	10.4	16.1	34.1	8.9	12.1	37.8	1.3	<1.0	17.5	1.9	11.0	61.6
13/Nov/2005	27/Nov/2005	6.6	169.1	52.6	70.9	213.7	45.2	148.0	241.1	6.5	<1.0	143.4	0.3	62.0	6.6
27/Nov/2005	11/Dec/2005	4.8	27.0	33.8	29.3	33.9	7.7	13.8	27.6	1.9	<1.0	22.9	15.1	16.9	44.5
11/Dec/2005	01/Jan/2006	6.1	65.7	30.3	64.1	115.2	20.1	28.5	128.4	2.7	<1.0	51.8	0.8	31.8	25.4
			Precipitation <weighted annual means for site (samples containing phosphate are excluded)												
5120			43.9	30.6	37.1	51.9	12.0	30.2	59.7	2.1	0.5	37.7	4.9		Total rainfall 786.3

Driby

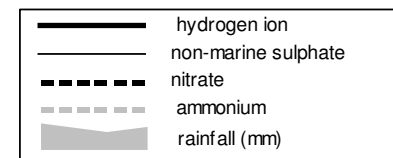
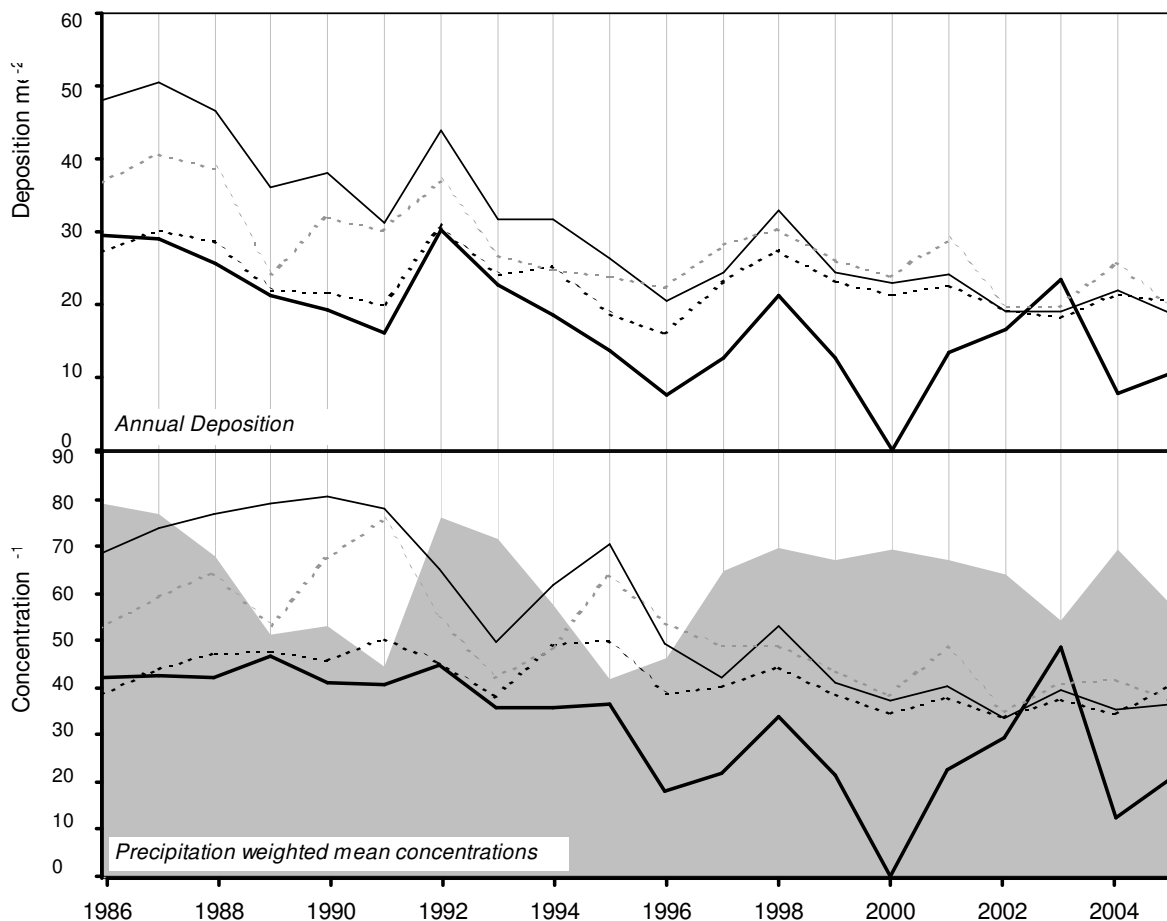
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-1.20 ueq/l (-2.69%/year): 19 years' data ++ Moderately strong trend detected
<i>non-marine sulphate</i>	-2.60 ueq/l (-3.24%/year): 20 years' data ++++ Very strong trend detected
<i>nitrate</i>	-0.55 ueq/l (-1.17%/year): 20 years' data ++ Moderately strong trend detected
<i>ammonium</i>	-1.34 ueq/l (-2.10%/year): 20 years' data ++ Moderately strong trend detected

nfall (mm)

(5136) Driby

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
12/Jan/2005	26/Jan/2005	4.8	102.6	32.0	34.2	546.4	72.2	37.9	535.2	11.0	<1.0	36.7	14.5	99.0	5.6
26/Jan/2005	09/Feb/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0
09/Feb/2005	23/Feb/2005	4.7	56.1	25.6	19.9	213.2	46.9	15.4	228.0	4.6	<1.0	30.4	20.0	47.0	40.1
23/Feb/2005	09/Mar/2005	4.2	73.8	50.8	26.8	162.6	37.8	22.5	189.8	6.3	<1.0	54.2	58.9	54.4	8.1
09/Mar/2005	23/Mar/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
23/Mar/2005	20/Apr/2005	4.9	59.0	52.3	63.4	71.1	17.6	17.9	76.4	2.2	<1.0	50.5	11.7	32.0	36.7
20/Apr/2005	04/May/2005	5.9	41.7	45.3	58.3	33.7	15.4	19.1	39.7	2.1	<1.0	37.6	1.3	19.0	24.7
04/May/2005	19/May/2005	5.1	50.6	17.7	28.2	81.1	16.6	18.8	103.9	3.6	<1.0	40.9	7.2	23.0	14.9
19/May/2005	01/Jun/2005	4.9	54.6	43.1	57.0	71.2	3.5	1.4	53.9	7.8	<1.0	46.1	12.0	23.0	15.4
01/Jun/2005	15/Jun/2005	4.6	46.3	29.5	19.8	32.4	9.4	17.9	40.6	3.0	<1.0	42.4	24.0	23.0	13.4
15/Jun/2005	29/Jul/2005	4.1	77.8	76.5	8.6	14.7	12.1	26.3	27.4	12.3	<1.0	76.1	72.4	40.0	13.9
29/Jul/2005	13/Jul/2005	4.5	31.4	41.7	31.0	18.4	6.2	9.6	22.5	3.8	<1.0	29.2	34.7	22.0	44.2
13/Jul/2005	27/Jul/2005	4.8	51.8	69.5	60.5	41.8	13.2	37.1	54.1	6.6	<1.0	46.7	15.5	30.0	18.7
27/Jul/2005	10/Aug/2005	4.8	42.3	42.2	32.7	35.8	10.4	17.6	45.9	1.7	<1.0	38.0	17.8	22.0	25.8
10/Aug/2005	24/Aug/2005	5.0	33.5	28.7	35.4	10.5	5.5	14.8	11.4	3.3	<1.0	32.3	9.5	13.0	39.4
24/Aug/2005	07/Sep/2005	5.6	35.7	44.1	51.7	14.0	7.3	27.8	14.2	4.3	<1.0	34.0	2.4	16.0	20.4
07/Sep/2005	21/Sep/2005	4.5	30.7	38.3	22.3	67.3	15.5	13.6	67.9	1.8	<1.0	22.6	28.8	25.0	40.2
21/Sep/2005	05/Oct/2005	4.7	26.9	31.6	4.4	45.4	11.6	26.7	46.6	1.7	<1.0	21.4	18.6	18.0	13.7
05/Oct/2005	19/Oct/2005	4.4	39.9	58.3	33.8	58.4	14.6	20.0	62.1	1.9	<1.0	32.8	36.3	30.0	14.0
19/Oct/2005	02/Nov/2005	5.8	14.2	12.9	28.6	29.6	4.7	5.4	28.4	1.6	<1.0	10.7	1.4	11.0	34.5
02/Nov/2005	16/Nov/2005	5.6	46.9	24.7	35.6	129.6	26.3	19.0	132.1	6.1	<1.0	31.3	2.3	26.0	11.5
16/Nov/2005	30/Nov/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
30/Nov/2005	14/Dec/2005	4.7	71.9	35.4	30.5	315.9	53.4	19.9	303.8	10.6	<1.0	33.9	19.5	54.7	28.9
14/Dec/2005	11/Jan/2006	4.3	77.7	63.7	65.6	150.8	31.5	13.2	159.0	4.9	<1.0	59.5	45.7	19.9	42.0
5136			47.3	40.5	37.4	88.3	19.1	16.8	92.7	4.2	0.5	36.7	21.0		Total rainfall 506.9

Jenny Hurn

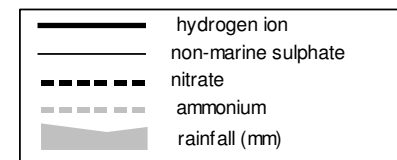
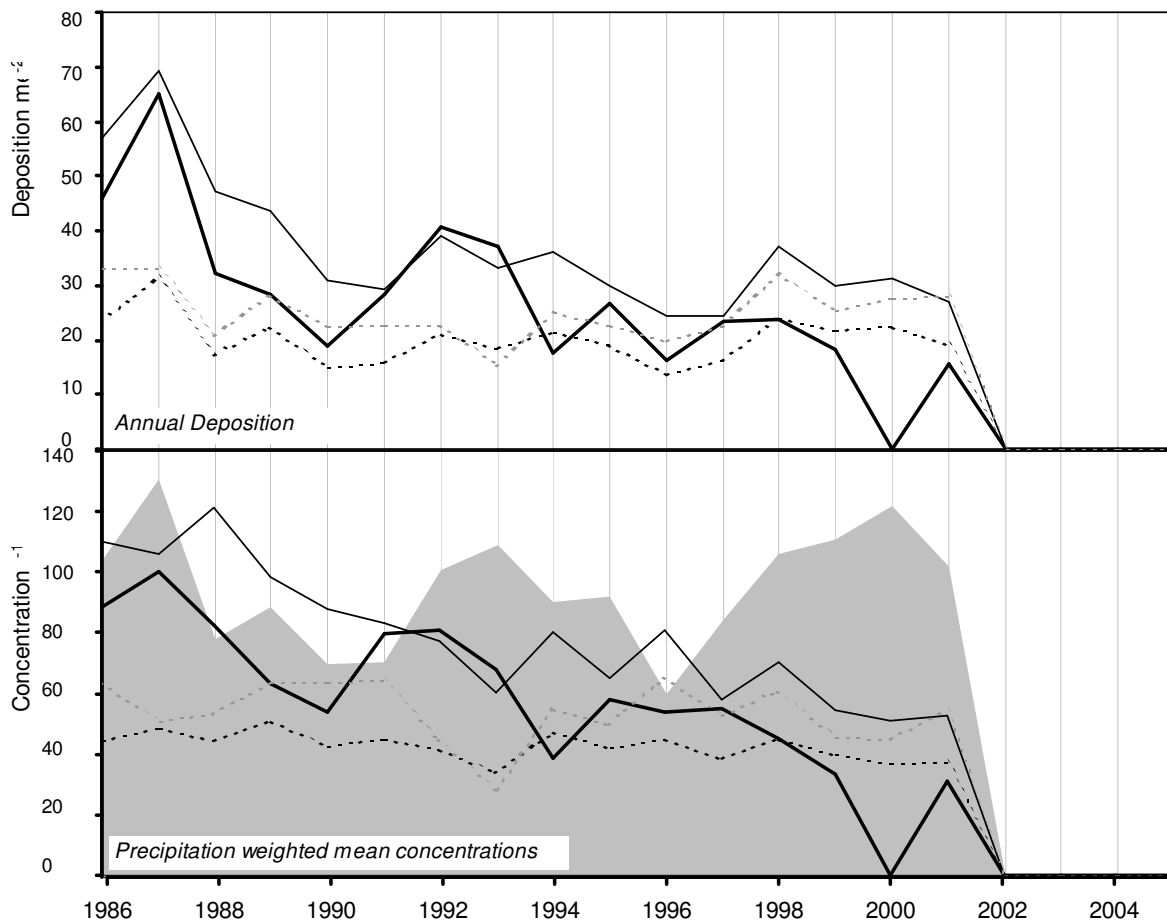
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-3.92 ueq/l (-4.36 %/year): 15 years' data +++ Strong trend detected
<i>non-marine sulphate</i>	-4.13 ueq/l (-3.77 %/year): 16 years' data ++++ Very strong trend detected
<i>nitrate</i>	-0.54 ueq/l (-1.15 %/year): 16 years' data + Significant trend detected
<i>ammonium</i>	-0.52 ueq/l (-0.91 %/year): 16 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5118) Jenny Hurn

5118	Precipitation<weighted annual means for site(samples containing phosphate are excluded)	Total rainfall
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Thorganby

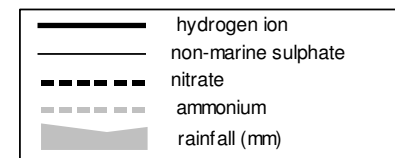
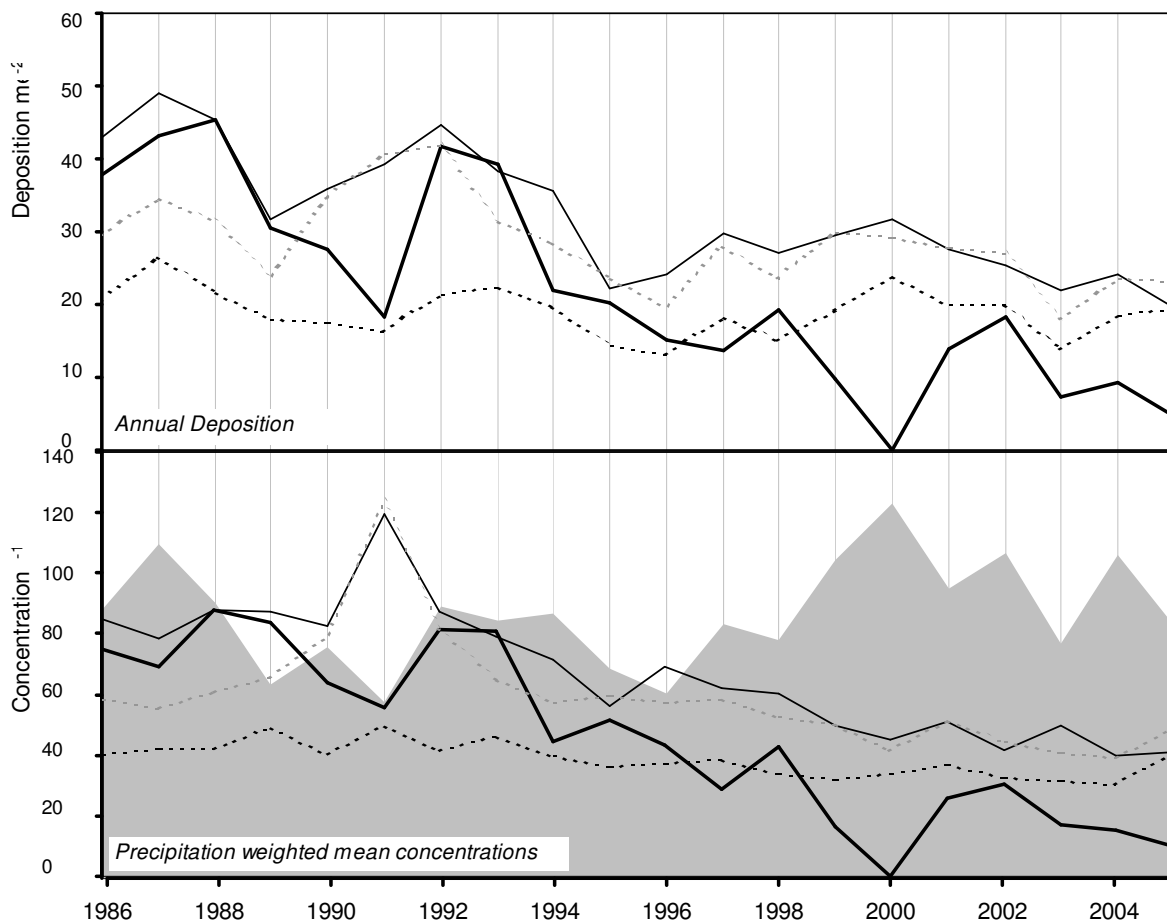
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-4.01 ueq/l (-4.67 %/year): 19 years' data ++++ Very strong trend detected
<i>non-marine sulphate</i>	-3.06 ueq/l (-3.18 %/year): 20 years' data ++++ Very strong trend detected
<i>nitrate</i>	-0.66 ueq/l (-1.47 %/year): 20 years' data ++ Moderately strong trend detected
<i>ammonium</i>	-1.87 ueq/l (-2.46 %/year): 19 years' data + Significant trend detected

rainfall (mm)

ACID DEPOSITION DATA REPORT, 2005

(5117) Thorganby

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
09/Feb/2005	23/Feb/2005	4.9	45.7	30.6	39.9	148.4	32.5	13.3	182.1	4.6	<1.0	27.9	12.9	42.0	24.2
23/Feb/2005	09/Mar/2005	4.6	70.1	32.3	47.0	144.0	30.0	16.0	168.1	3.8	<1.0	52.7	25.1	42.9	11.2
09/Mar/2005	23/Mar/2005	7.0	168.3	88.8	206.6	118.7	28.2	107.7	136.1	17.8	18.6	154.0	0.1	66.4	3.7
23/Mar/2005	06/Apr/2005	7.6	488.8	86.3	1893.5	309.1	28.7	27.0	204.0	497.8	529.3	451.6	0.0	329.0	14.4
06/Apr/2005	20/Apr/2005	5.4	55.4	46.9	59.8	33.9	9.2	18.5	39.8	1.1	<1.0	51.3	4.3	21.0	42.1
20/Apr/2005	04/May/2005	5.6	108.0	93.7	118.4	35.8	9.8	53.1	45.9	5.0	<1.0	103.7	2.4	38.0	16.9
04/May/2005	18/May/2005	7.1	137.6	20.0	603.1	73.4	16.3	56.3	139.6	64.4	140.0	128.8	0.1	113.0	14.8
18/May/2005	01/Jun/2005	6.2	73.4	35.5	40.8	30.7	18.0	64.0	29.6	12.7	<1.0	69.7	0.6	25.0	8.3
01/Jun/2005	15/Jun/2005	8.1	806.4	12.4	4609.4	445.5	590.9	984.3	353.9	640.7	914.5	752.8	0.0	714.0	8.3
15/Jun/2005	29/Jun/2005	5.6	60.9	64.2	84.1	11.9	8.2	17.6	16.0	7.2	<1.0	59.5	2.6	20.0	22.1
29/Jun/2005	13/Jul/2005	4.7	38.5	36.8	42.7	20.0	8.4	13.1	25.3	3.1	<1.0	36.1	21.4	24.0	34.4
13/Jul/2005	27/Jul/2005	8.0	539.0	61.5	1412.3	280.7	35.9	72.2	175.7	442.2	1037.9	505.2	0.0	313.0	6.3
27/Jul/2005	10/Aug/2005	4.9	25.6	38.6	26.2	23.8	7.8	17.5	21.4	3.5	<1.0	22.8	12.6	17.0	26.3
10/Aug/2005	24/Aug/2005	5.5	33.2	40.0	39.8	9.6	7.1	16.6	10.8	2.6	<1.0	32.0	3.2	13.0	53.4
24/Aug/2005	07/Sep/2005	6.7	2.8	124.6	137.6	45.8	26.3	111.2	44.4	11.8	<1.0	0.0	0.2	51.0	7.2
07/Sep/2005	21/Sep/2005	5.1	51.6	52.9	63.6	25.8	11.6	29.3	27.7	3.1	<1.0	48.5	8.7	19.0	22.8
21/Sep/2005	05/Oct/2005	5.5	47.7	24.0	30.1	70.7	22.3	42.7	78.5	4.6	<1.0	39.2	3.3	25.0	14.5
05/Oct/2005	19/Oct/2005	5.0	79.1	77.3	80.8	63.9	18.3	40.7	70.6	6.1	<1.0	71.4	9.1	33.0	10.6
19/Oct/2005	16/Nov/2005	4.8	26.8	17.1	15.2	27.8	6.9	10.5	41.6	1.1	<1.0	23.5	15.8	15.0	93.2
16/Nov/2005	30/Nov/2005	7.0	249.7	23.5	980.9	194.6	22.1	12.2	229.8	229.0	624.4	226.2	0.1	190.0	11.7
30/Nov/2005	14/Dec/2005	6.2	41.2	45.3	89.3	58.2	7.8	6.6	56.6	4.6	<1.0	34.2	0.6	21.9	12.6
14/Dec/2005	29/Dec/2005	6.4	70.6	28.6	90.3	176.3	28.3	18.9	199.8	9.6	<1.0	49.4	0.4	41.4	8.1
29/Dec/2005	11/Jan/2006	4.9	100.8	82.3	106.2	88.4	19.0	13.1	92.4	8.8	<1.0	90.2	13.2	38.0	7.4
		Precipitation<weighted annual means for site(samples containing phosphate are excluded)													Total rainfall
5117			45.4	41.1	48.8	42.4	11.9	21.0	50.7	3.6	0.5	41.0	9.7		474.5

High Muffles

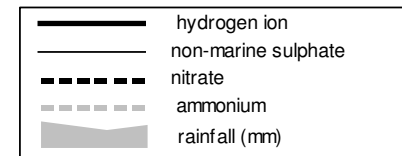
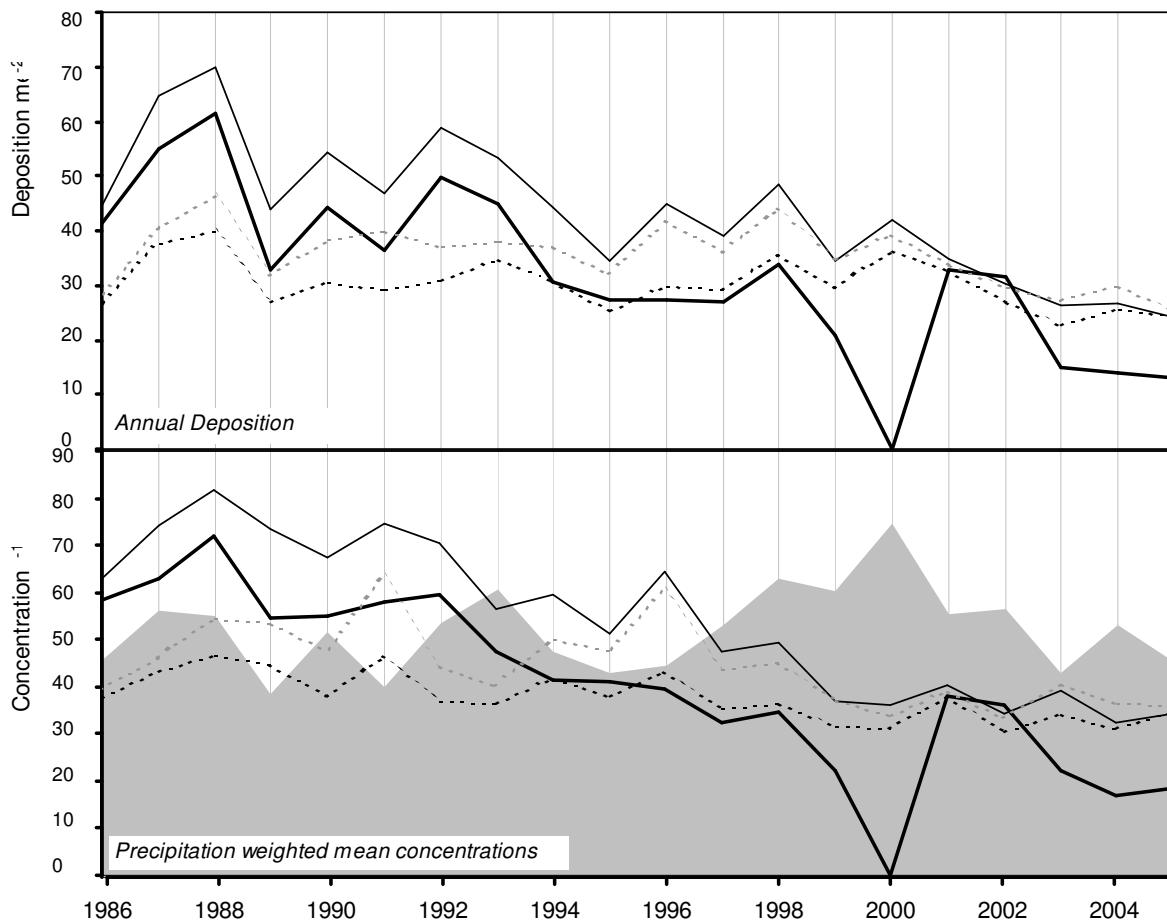
2005

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, SO₂, Daily SO₄, HNO₃ Denuder, ozone, EMEP

Site Operator:
Forest Research



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-2.48 ueq/l (-3.78 %/year): 19 years' data ++++ Very strong trend detected
<i>non-marine sulphate</i>	-2.51 ueq/l (-3.21 %/year): 20 years' data ++++ Very strong trend detected
<i>nitrate</i>	-0.62 ueq/l (-1.41 %/year): 20 years' data ++ Moderately strong trend detected
<i>ammonium</i>	-0.82 ueq/l (-1.56 %/year): 20 years' data + Significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5009) High Muffles

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
12/Jan/2005	26/Jan/2005	5.3	71.3	21.6	27.4	314.0	70.4	17.7	398.7	7.4	<1.0	33.5	5.5	60.0	19.4
26/Jan/2005	09/Feb/2005	4.8	49.0	26.6	22.3	234.1	40.6	23.9	280.3	5.1	<1.0	20.8	17.8	51.0	15.3
09/Feb/2005	23/Feb/2005	4.9	68.1	23.5	15.8	341.2	75.2	18.0	350.3	7.2	<1.0	27.0	12.3	64.0	34.5
23/Feb/2005	09/Mar/2005	4.5	37.6	14.5	17.9	158.5	34.7	10.2	185.2	3.3	<1.0	18.5	28.8	38.0	43.3
09/Mar/2005	23/Mar/2005	5.7	93.2	66.1	122.9	58.4	13.6	38.1	58.5	6.1	<1.0	86.2	1.9	33.4	12.6
23/Mar/2005	06/Apr/2005	5.5	57.4	66.2	93.6	33.4	8.1	29.4	33.3	2.2	<1.0	53.4	3.5	21.6	19.4
06/Apr/2005	20/Apr/2005	4.7	44.7	52.2	45.1	94.5	20.2	10.0	118.2	2.3	<1.0	33.3	22.4	33.4	36.1
20/Apr/2005	03/May/2005	4.8	65.9	57.1	60.9	58.4	14.2	25.0	63.0	5.0	<1.0	58.8	15.5	33.0	28.6
03/May/2005	18/May/2005	5.9	56.7	17.3	29.9	141.6	29.0	20.9	185.9	7.9	<1.0	39.7	1.2	33.0	10.6
18/May/2005	01/Jun/2005	4.9	63.4	45.0	54.9	24.5	9.3	30.3	25.1	2.9	<1.0	60.4	11.5	23.0	21.9
01/Jun/2005	15/Jun/2005	5.2	35.1	28.4	33.5	21.3	24.9	11.9	22.1	4.0	<1.0	32.6	6.3	15.0	24.1
15/Jun/2005	29/Jun/2005	4.7	68.6	50.9	47.2	14.6	6.7	21.4	20.0	16.8	<1.0	66.9	19.5	23.0	20.1
29/Jun/2005	13/Jul/2005	4.6	43.0	38.6	34.4	33.1	7.9	10.6	33.2	4.0	<1.0	39.0	26.3	21.0	32.1
13/Jul/2005	27/Jul/2005	6.9	67.6	42.2	60.6	173.4	41.7	68.8	211.4	18.7	6.1	46.7	0.1	50.0	2.9
27/Jul/2005	10/Aug/2005	4.5	23.6	20.0	9.2	40.3	8.9	8.4	43.2	1.4	<1.0	18.8	29.5	16.0	38.7
10/Aug/2005	24/Aug/2005	4.7	34.0	42.7	39.9	15.5	7.4	13.8	15.6	2.1	<1.0	32.1	19.1	17.0	45.9
24/Aug/2005	07/Sep/2005	5.8	48.8	67.1	84.6	25.7	12.0	23.3	28.2	6.1	<1.0	45.8	1.8	26.0	14.6
07/Sep/2005	21/Sep/2005	4.8	28.0	24.9	16.3	76.2	17.2	16.8	77.9	2.7	<1.0	18.8	15.8	20.0	25.8
21/Sep/2005	05/Oct/2005	5.4	42.5	28.5	48.9	35.3	9.4	18.6	34.8	3.3	<1.0	38.2	3.7	14.0	17.5
05/Oct/2005	19/Oct/2005	4.5	68.3	63.4	68.6	44.4	10.5	17.2	45.0	2.5	<1.0	63.0	29.5	31.0	19.8
19/Oct/2005	02/Nov/2005	4.7	25.5	22.1	20.7	38.5	7.4	8.2	37.8	1.7	<1.0	20.9	21.4	18.0	75.9
02/Nov/2005	16/Nov/2005	5.1	31.0	17.5	25.7	52.2	11.8	7.3	58.3	4.1	<1.0	24.7	8.9	15.0	55.5
16/Nov/2005	30/Nov/2005	4.6	43.3	14.5	6.8	181.4	39.9	12.0	203.3	6.4	<1.0	21.5	24.5	38.0	27.4
30/Nov/2005	14/Dec/2005	4.6	35.6	46.3	36.5	72.2	15.9	7.7	73.4	3.0	<1.0	26.9	24.0	26.4	22.9
14/Dec/2005	28/Dec/2005	5.9	63.0	26.4	34.7	227.5	47.8	24.2	253.8	6.8	<1.0	35.6	1.3	43.8	9.6
28/Dec/2005	11/Jan/2006	4.3	59.9	57.2	48.1	106.0	19.7	9.7	110.9	4.4	<1.0	47.1	51.3	43.2	29.9
5009			45.1	34.5	36.0	89.6	20.7	14.9	99.6	4.2	0.5	34.3	18.5		Total rainfall 704.4

Bannisdale

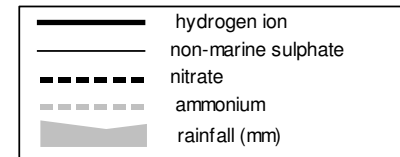
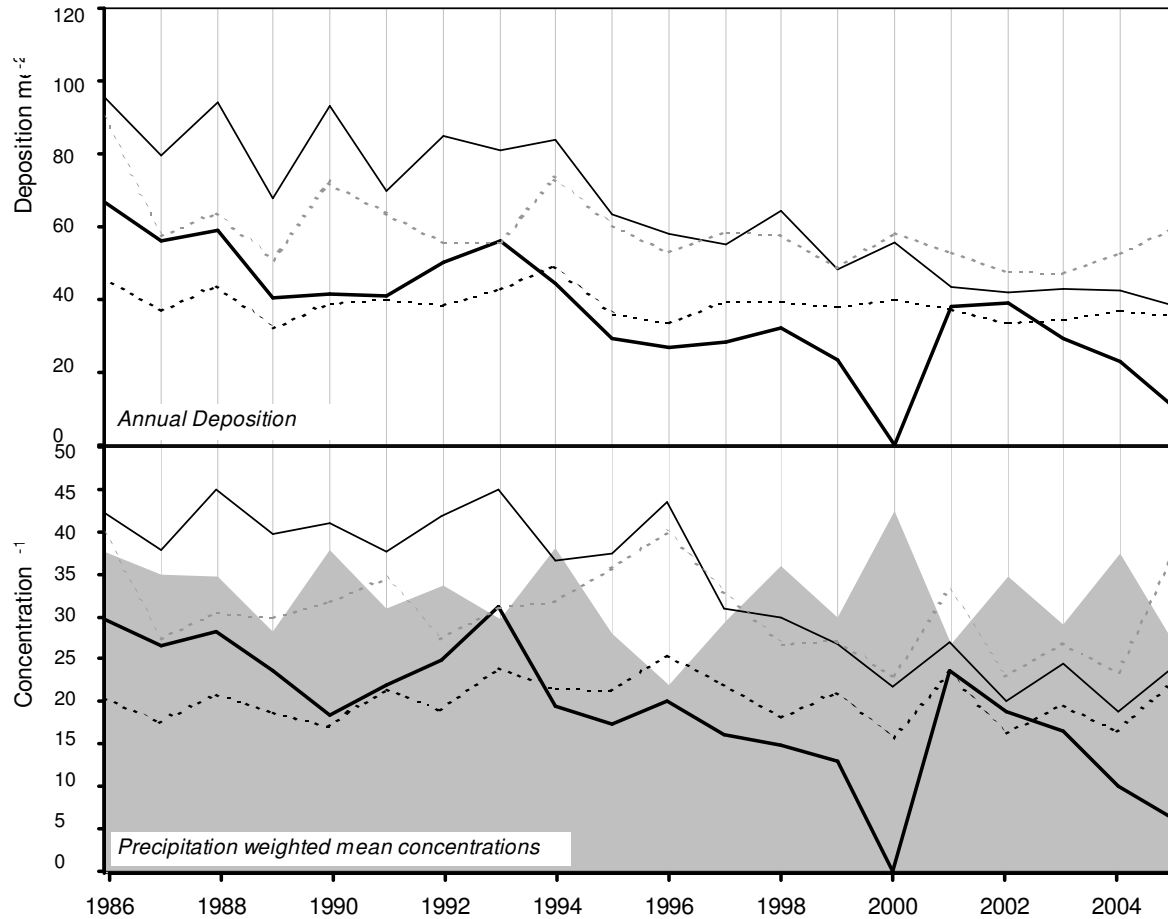
2005

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:
 Mr. R Newport



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-0.86 ueq/l (-3.07 %/year): 19 years' data +++ Strong trend detected
<i>non-marine sulphate</i>	-1.28 ueq/l (-2.80 %/year): 20 years' data ++++ Very strong trend detected
<i>nitrate</i>	-0.01 ueq/l (-0.06 %/year): 20 years' data - No significant trend detected
<i>ammonium</i>	-0.19 ueq/l (-0.58 %/year): 20 years' data - No significant trend detected

(5111) Bannisdale

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
12/Jan/2005	26/Jan/2005	5.6	48.2	20.1	31.3	291.3	64.1	16.1	355.7	6.9	<1.0	13.1	2.5	55.0	52.2
26/Jan/2005	08/Feb/2005	5.5	47.1	38.3	61.5	73.2	14.3	7.6	75.3	5.1	<1.0	38.3	3.3	24.4	22.9
08/Feb/2005	23/Feb/2005	5.6	28.8	16.1	25.3	119.4	23.0	7.8	144.2	3.7	<1.0	14.4	2.7	25.0	43.2
23/Feb/2005	09/Mar/2005	5.9	45.3	27.1	53.5	93.5	16.3	9.2	106.4	3.0	<1.0	34.1	1.3	28.0	17.1
09/Mar/2005	23/Mar/2005	5.6	45.5	28.7	49.6	81.7	13.2	8.7	87.1	3.6	<1.0	35.6	2.8	21.0	110.2
23/Mar/2005	06/Apr/2005	5.7	46.1	53.6	89.1	56.7	10.4	13.0	65.3	2.1	<1.0	39.3	1.8	21.7	61.6
06/Apr/2005	20/Apr/2005	5.0	25.4	24.3	28.2	40.8	7.8	3.8	48.9	0.9	<1.0	20.5	10.2	16.1	74.6
20/Apr/2005	04/May/2005	6.0	39.5	37.2	48.1	51.6	10.2	9.7	59.0	2.7	<1.0	33.3	1.1	20.0	31.2
04/May/2005	18/May/2005	6.4	71.9	40.1	55.6	128.1	25.6	30.0	194.7	4.7	<1.0	56.5	0.4	34.0	3.8
18/May/2005	01/Jun/2005	5.2	42.0	22.0	35.6	71.7	10.9	12.2	98.4	5.1	<1.0	33.4	6.3	19.0	85.8
01/Jun/2005	15/Jun/2005	5.3	21.5	12.3	22.4	21.1	5.5	4.3	27.8	1.7	<1.0	18.9	5.6	12.0	64.3
15/Jun/2005	29/Jun/2005	5.6	54.9	28.8	61.7	26.4	5.9	7.7	32.2	2.3	<1.0	51.8	2.6	17.0	32.5
29/Jun/2005	13/Jul/2005	7.0	70.4	39.1	326.5	31.8	4.6	3.4	54.3	27.1	<1.0	66.5	0.1	56.0	24.3
13/Jul/2005	27/Jul/2005	6.1	65.2	40.0	76.3	125.4	25.3	23.4	150.0	6.5	<1.0	50.1	0.8	36.0	4.2
27/Jul/2005	10/Aug/2005	5.2	25.8	20.2	23.7	17.5	5.4	7.5	25.9	1.9	1.0	23.7	6.8	12.0	33.5
10/Aug/2005	24/Aug/2005	5.5	9.3	6.3	9.7	31.4	5.2	3.5	32.4	1.0	<1.0	5.6	3.5	<10.0	78.1
24/Aug/2005	07/Sep/2005	7.6	2525.0	<0.7	10552.8	778.2	46.5	54.3	385.7	610.1	2444.6	2431.2	0.0	1491.0	27.9
07/Sep/2005	21/Sep/2005	6.1	24.5	15.8	29.0	63.1	12.9	8.9	92.2	2.5	<1.0	16.9	0.9	17.0	80.6
21/Sep/2005	05/Oct/2005	6.0	26.5	13.5	36.2	91.1	16.5	7.6	103.5	2.7	<1.0	15.5	0.9	21.0	100.9
05/Oct/2005	19/Oct/2005	4.6	74.8	74.9	101.9	23.6	7.6	17.9	25.4	2.3	<1.0	72.0	25.1	31.0	67.4
19/Oct/2005	02/Nov/2005	5.1	18.7	11.1	10.7	48.0	8.9	10.7	50.9	1.2	<1.0	12.9	7.2	13.0	162.9
02/Nov/2005	16/Nov/2005	5.3	24.1	7.0	13.8	97.0	20.6	8.1	95.4	2.2	<1.0	12.4	4.9	20.0	201.9
16/Nov/2005	30/Nov/2005	5.0	66.7	85.9	74.0	222.1	43.9	23.5	228.8	11.0	<1.0	40.0	10.0	50.0	5.7
30/Nov/2005	14/Dec/2005	4.8	38.0	48.8	40.1	45.3	11.9	24.7	42.7	3.2	3.0	32.6	15.5	21.5	42.4
14/Dec/2005	28/Dec/2005	5.8	43.0	29.5	10.9	121.5	24.9	27.2	128.1	8.5	<1.0	28.4	1.7	27.6	27.1
28/Dec/2005	11/Jan/2006	4.9	26.6	17.3	22.2	83.4	15.8	7.0	80.9	2.3	<1.0	16.6	13.5	19.8	126.4
5111			33.0	22.5	37.8	73.5	14.5	9.7	82.8	3.1	0.6	24.2	6.1		Total rainfall 1583.2

Hillsborough Forest

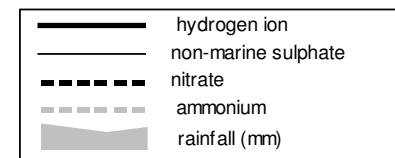
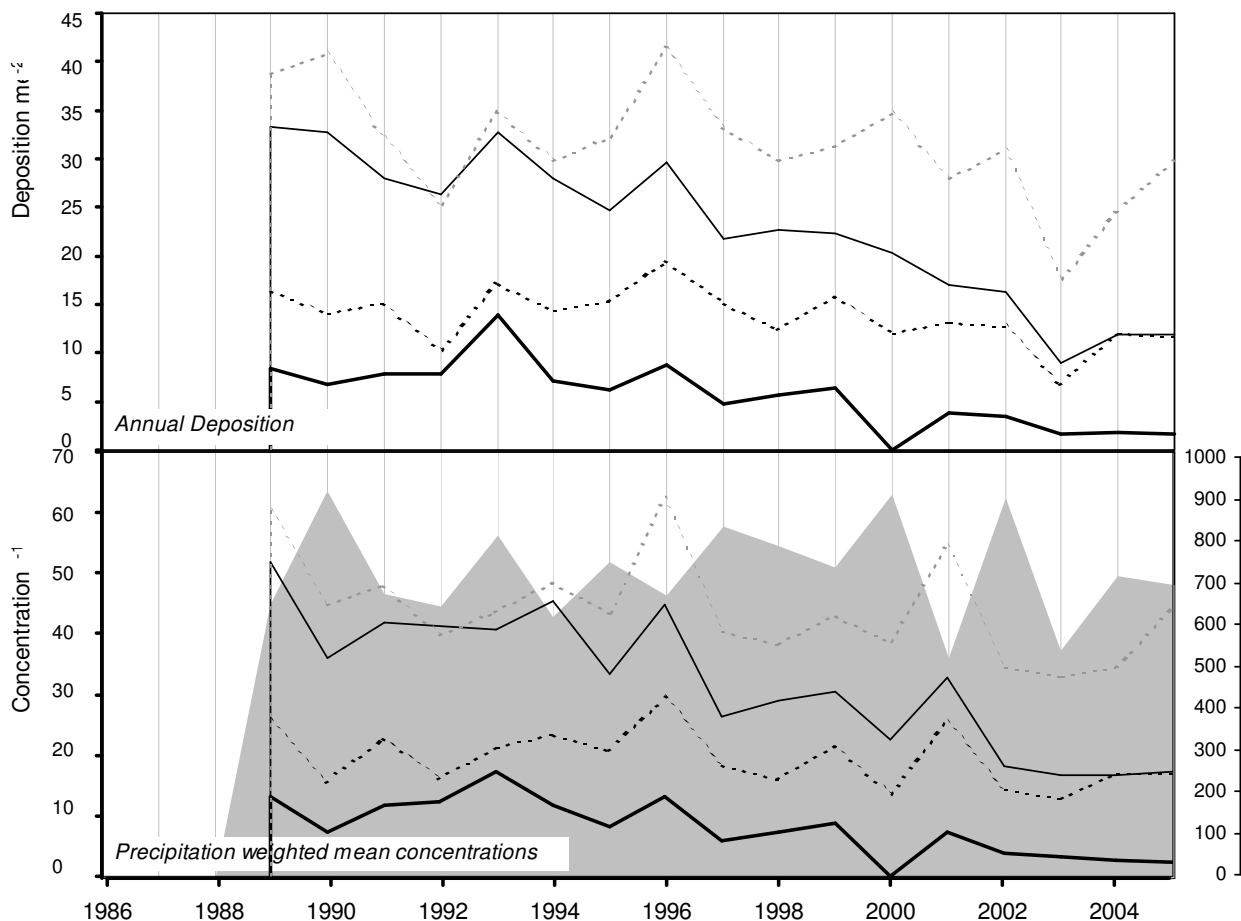
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
hydrogen ion	-0.66 ueq/l (-4.23 %/year): 16 years' data ++ Moderately strong trend detected
non-marine sulphate	-1.94 ueq/l (-3.64 %/year): 17 years' data ++++ Very strong trend detected
nitrate	-0.38 ueq/l (-1.62 %/year): 17 years' data - No significant trend detected
ammonium	-0.81 ueq/l (-1.52 %/year): 17 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5149) Hillsborough Forest

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+	Conductivity (S/cm)	Rainfall (mm)
05/Jan/2005	12/Jan/2005	5.7	21.8	2.4	10.5	157.0	33.4	10.4	179.6	4.1	<1.0	2.9	2.0	30.0	49.0
12/Jan/2005	26/Jan/2005	6.1	95.8	16.7	51.5	713.0	147.0	30.6	826.5	15.7	<1.0	9.9	0.7	123.0	13.9
26/Jan/2005	09/Feb/2005	6.1	38.2	40.5	59.3	65.0	23.1	22.2	80.3	1.8	<1.0	30.4	0.9	23.0	9.6
09/Feb/2005	23/Feb/2005	6.2	4.8	<0.7	24.7	254.1	49.5	11.8	13.0	5.0	<1.0	0.0	0.6	48.0	21.4
23/Feb/2005	02/Mar/2005	6.6	74.4	25.9	148.4	205.0	18.9	13.9	238.9	4.9	<1.0	49.7	0.3	53.0	1.1
02/Mar/2005	09/Mar/2005	6.3	47.9	11.7	83.9	286.8	38.8	14.7	321.5	5.8	<1.0	13.4	0.5	52.3	1.1
09/Mar/2005	24/Mar/2005	7.1	88.9	37.5	456.5	157.6	14.8	12.5	122.8	37.2	86.4	69.9	0.1	99.9	32.4
24/Mar/2005	06/Apr/2005	6.7	34.5	31.8	62.9	69.0	9.4	17.2	70.2	14.2	<1.0	26.2	0.2	23.5	6.5
06/Apr/2005	20/Apr/2005	5.6	25.0	14.2	22.9	77.5	17.1	5.8	88.8	1.5	<1.0	15.7	2.8	19.5	39.7
20/Apr/2005	04/May/2005	6.6	43.3	56.5	80.9	65.6	2.3	6.4	73.6	14.3	<1.0	35.4	0.3	26.0	7.7
04/May/2005	18/May/2005	6.4	26.7	13.9	40.1	66.8	14.9	9.5	80.4	2.6	<1.0	18.7	0.4	20.0	11.2
18/May/2005	01/Jun/2005	5.9	18.3	26.5	24.8	49.4	1.5	1.2	34.2	6.4	<1.0	12.3	1.3	16.0	42.7
01/Jun/2005	15/Jun/2005	6.5	19.1	16.9	48.8	24.5	10.1	20.5	35.2	1.6	<1.0	16.1	0.3	16.0	18.9
15/Jun/2005	29/Jun/2005	6.0	38.1	40.3	71.9	20.4	4.6	3.5	27.7	3.0	<1.0	35.6	1.0	15.0	17.8
29/Jun/2005	14/Jul/2005	6.0	18.6	9.5	30.9	39.3	6.8	6.5	44.5	3.9	<1.0	13.9	1.0	13.0	17.4
14/Jul/2005	27/Jul/2005	6.6	38.4	14.0	62.1	69.1	11.2	11.5	94.5	4.3	<1.0	30.1	0.2	23.0	5.6
27/Jul/2005	10/Aug/2005	4.7	31.7	24.6	23.9	32.9	9.0	9.9	34.6	1.4	<1.0	27.8	20.4	17.0	34.8
10/Aug/2005	24/Aug/2005	6.2	11.7	7.3	34.8	18.9	2.3	2.4	21.8	1.3	<1.0	9.4	0.6	<10.0	29.7
24/Aug/2005	08/Sep/2005	6.7	162.3	46.1	2535.9	63.1	22.5	11.4	102.3	331.2	358.6	154.7	0.2	348.0	17.3
08/Sep/2005	21/Sep/2005	7.3	236.3	35.0	180.1	4.1	<0.8	<1.0	56.8	46.7	753.2	235.8	0.1	368.0	23.6
21/Sep/2005	05/Oct/2005	6.1	16.2	6.0	20.3	86.1	15.0	6.7	99.0	3.5	<1.0	5.8	0.8	18.0	30.1
05/Oct/2005	19/Oct/2005	5.3	28.2	31.4	46.8	42.4	8.5	8.9	43.2	1.5	<1.0	23.0	4.8	17.0	40.8
19/Oct/2005	04/Nov/2005	5.8	14.8	7.2	16.5	73.0	10.8	5.5	76.3	2.9	<1.0	6.0	1.7	15.0	76.0
04/Nov/2005	18/Nov/2005	6.1	29.3	4.8	23.2	187.1	28.5	7.9	208.0	5.1	<1.0	6.7	0.9	30.0	20.3
18/Nov/2005	30/Nov/2005	6.1	106.5	22.5	88.4	529.4	104.7	23.8	839.1	11.7	2.2	42.7	0.8	98.0	8.6
30/Nov/2005	16/Dec/2005	6.6	43.5	20.7	130.5	85.6	7.3	7.5	67.2	21.1	<1.0	33.2	0.2	29.6	69.4
16/Dec/2005	29/Dec/2005	6.5	67.0	26.3	82.9	275.4	43.1	16.5	280.9	16.8	<1.0	33.8	0.3	52.1	8.6
29/Dec/2005	11/Jan/2006	5.8	25.8	28.8	35.4	79.3	12.1	5.7	80.0	3.0	<1.0	16.3	1.8	18.7	30.1
			Precipitation <weighted annual means for site (samples containing phosphate are excluded)												
5149			28.3	17.1	43.8	104.0	18.3	8.5	105.7	6.0	0.5	17.3	2.5		Total rainfall 685.5

Lough Navar

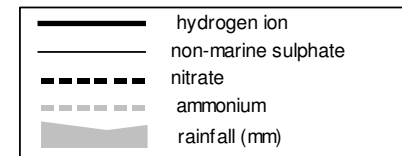
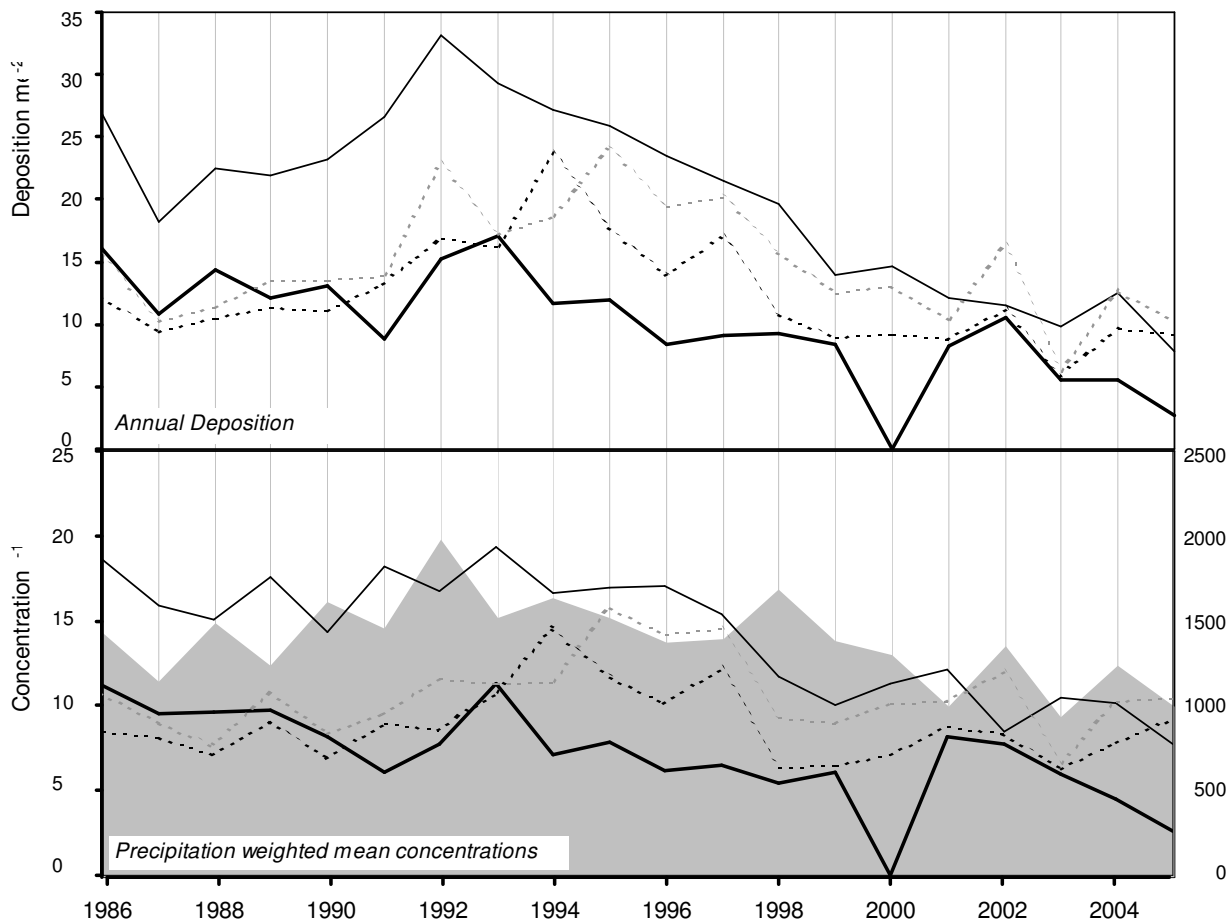
2005

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, SO₂, Daily SO₄, HNO₃ Denuder, ozone, EMEP

Site Operator:
 Forestry Service NI



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-0.28 ueq/l (-2.76%/year): 19 years' data ++ Moderately strong trend detected
<i>non-marine sulphate</i>	-0.49 ueq/l (-2.64%/year): 20 years' data +++ Strong trend detected
<i>nitrate</i>	-0.03 ueq/l (-0.36%/year): 20 years' data - No significant trend detected
<i>ammonium</i>	0.01 ueq/l (0.10%/year): 20 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5006) Lough Navar

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+	Conductivity (S/cm)	Rainfall (mm)
07/Feb/2005	21/Feb/2005	5.9	33.6	3.5	<0.7	268.0	56.9	14.0	280.6	9.3	<1.0	1.3	1.4	46.0	65.7
21/Feb/2005	21/Mar/2005	5.8	20.1	6.8	16.1	147.8	28.3	12.5	176.0	4.5	<1.0	2.3	1.7	25.5	65.3
21/Mar/2005	04/Apr/2005	5.2	40.2	53.5	67.6	27.0	6.0	6.5	37.7	2.9	<1.0	37.0	5.8	19.0	21.6
04/Apr/2005	18/Apr/2005	5.5	17.8	1.6	4.7	116.5	21.4	6.4	130.6	2.5	<1.0	3.7	3.1	20.3	93.9
18/Apr/2005	02/May/2005	6.2	25.1	38.1	39.3	32.9	6.4	22.4	39.5	3.9	<1.0	21.1	0.6	17.0	21.2
02/May/2005	16/May/2005	5.1	22.2	5.7	1.4	127.2	25.7	14.2	144.3	3.7	<1.0	6.9	8.7	28.0	19.7
16/May/2005	30/May/2005	5.4	21.4	13.0	13.2	32.6	6.0	11.7	42.1	2.3	<1.0	17.5	3.6	12.0	83.9
30/May/2005	13/Jun/2005	5.3	7.9	5.8	4.6	6.7	3.9	9.5	12.7	1.1	<1.0	7.1	4.6	<10.0	35.1
13/Jun/2005	27/Jun/2005	5.6	15.9	9.1	11.1	26.5	7.5	9.0	32.9	3.6	<1.0	12.7	2.5	<10.0	28.4
27/Jun/2005	11/Jul/2005	6.3	11.1	5.4	26.0	42.2	7.3	6.1	47.3	1.9	<1.0	6.0	0.5	14.0	40.7
11/Jul/2005	25/Jul/2005	6.0	37.1	4.0	10.1	177.0	35.1	20.7	221.6	6.3	<1.0	15.8	1.0	34.0	16.7
25/Jul/2005	08/Aug/2005	6.1	26.7	10.0	15.8	110.4	20.4	19.4	135.2	2.9	1.0	13.4	0.8	25.0	27.0
08/Aug/2005	22/Aug/2005	5.6	18.2	5.7	5.4	35.2	6.5	8.8	44.0	1.8	<1.0	14.0	2.8	<10.0	25.3
22/Aug/2005	05/Sep/2005	5.5	15.5	8.5	3.6	99.3	19.7	9.2	115.2	2.6	<1.0	3.6	3.2	19.0	74.7
05/Sep/2005	19/Sep/2005	5.8	14.8	15.1	13.6	42.4	10.1	11.4	64.2	1.6	<1.0	9.7	1.6	11.0	27.9
19/Sep/2005	03/Oct/2005	5.6	29.0	14.4	4.7	165.7	32.9	11.6	206.3	3.6	<1.0	9.0	2.5	27.0	76.2
03/Oct/2005	17/Oct/2005	6.1	18.0	12.2	21.6	53.4	9.2	17.4	52.4	2.1	<1.0	11.6	0.9	14.0	19.9
17/Oct/2005	07/Nov/2005	5.5	13.1	7.2	8.5	57.8	11.3	4.9	61.2	1.5	<1.0	6.1	3.4	<10.0	117.5
07/Nov/2005	21/Nov/2005	5.8	39.8	2.6	3.4	315.7	59.4	14.8	375.7	7.7	<1.0	1.8	1.7	47.0	48.8
21/Nov/2005	05/Dec/2005	5.6	43.5	8.2	7.4	340.1	71.5	15.4	385.2	7.8	<1.0	2.5	2.4	52.4	51.3
05/Dec/2005	19/Dec/2005	5.7	16.2	7.4	5.7	113.8	18.2	10.0	106.3	4.9	<1.0	2.5	2.0	18.3	37.8
19/Dec/2005	09/Jan/2006	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												
5006			22.3	9.2	10.4	120.7	23.9	10.9	138.7	3.7	0.5	7.8	2.6		Total rainfall 998.6

Cow Green Reservoir

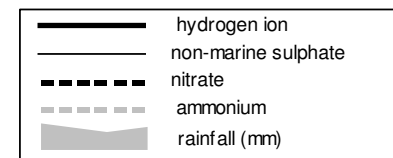
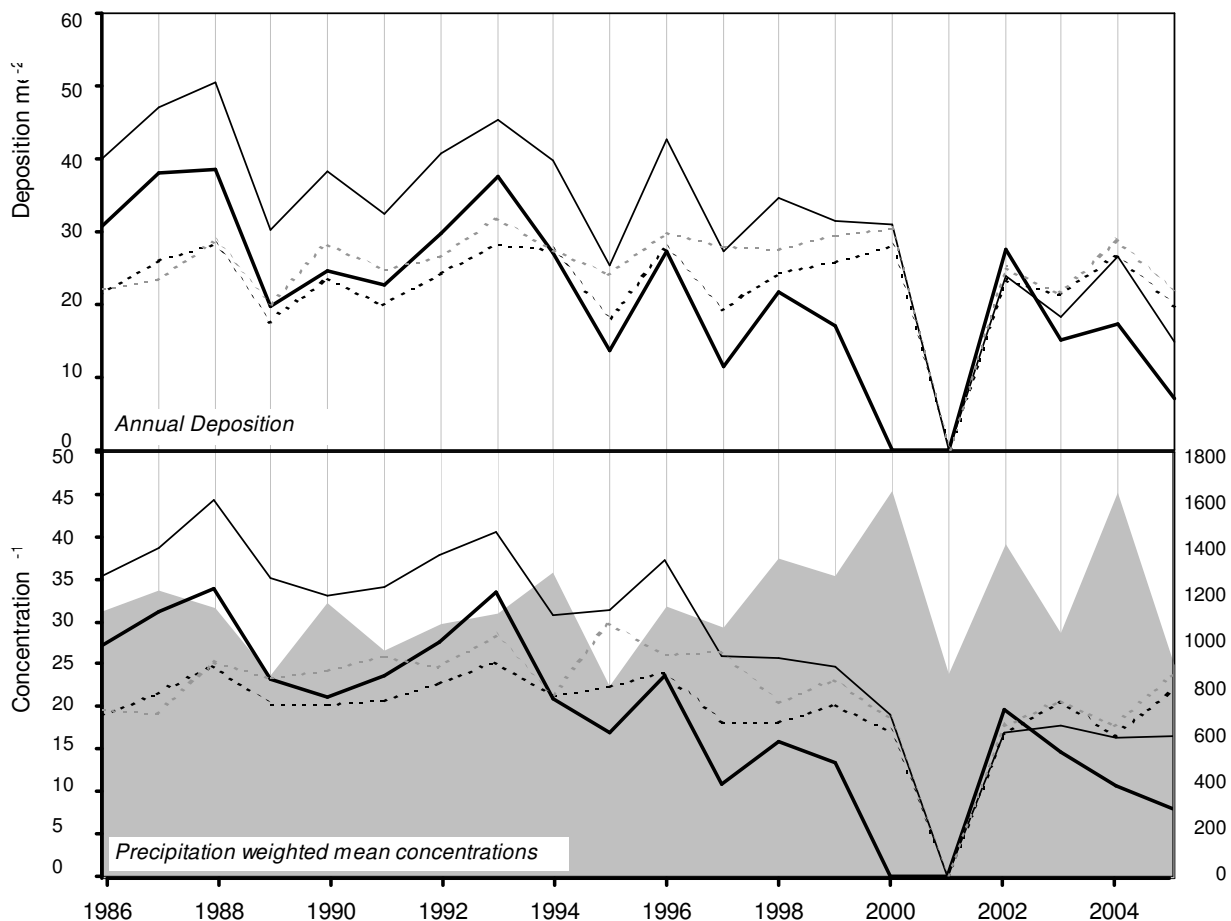
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-1.12 ueq/l (-3.66 %/year): 18 years' data +++ Strong trend detected
<i>non-marine sulphate</i>	-1.41 ueq/l (-3.34 %/year): 19 years' data ++++ Very strong trend detected
<i>nitrate</i>	-0.18 ueq/l (-0.80 %/year): 19 years' data - No significant trend detected
<i>ammonium</i>	-0.15 ueq/l (-0.62 %/year): 19 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5113) Cow Green Reservoir

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
10/Jan/2005	24/Jan/2005	5.5	46.9	22.6	19.6	314.8	70.6	17.6	359.9	6.4	<1.0	9.0	3.5	57.0	41.4
24/Jan/2005	07/Feb/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
07/Feb/2005	01/Mar/2005	5.5	17.3	14.1	17.9	74.1	13.7	5.4	81.7	1.6	<1.0	8.3	3.1	15.0	45.4
01/Mar/2005	08/Mar/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
08/Mar/2005	21/Mar/2005	5.7	31.9	17.6	45.8	100.6	15.1	9.6	104.1	5.6	<1.0	19.8	2.2	22.4	20.9
21/Mar/2005	11/Apr/2005	5.4	27.4	28.3	38.6	45.8	8.6	7.5	60.6	1.4	<1.0	21.9	4.1	16.0	84.9
11/Apr/2005	18/Apr/2005	4.8	27.0	22.8	20.6	16.3	3.9	5.1	16.0	0.5	<1.0	25.0	17.8	15.0	19.6
18/Apr/2005	03/May/2005	4.8	56.7	66.3	50.4	72.9	17.0	24.7	80.2	4.8	<1.0	47.9	17.4	34.0	27.9
03/May/2005	16/May/2005	5.8	23.3	14.2	21.8	76.0	14.7	8.9	84.7	3.0	<1.0	14.2	1.7	20.0	14.2
16/May/2005	01/Jun/2005	5.3	29.0	19.3	42.3	104.0	2.6	0.9	103.5	5.0	<1.0	16.5	4.7	23.0	58.2
01/Jun/2005	15/Jun/2005	5.3	18.5	16.5	21.3	14.6	9.4	4.8	25.8	1.7	<1.0	16.8	4.6	<10.0	41.1
15/Jun/2005	27/Jun/2005	6.6	64.9	57.9	96.5	47.5	12.0	16.6	59.7	14.6	<1.0	59.2	0.3	23.0	5.2
27/Jun/2005	11/Jul/2005	4.5	27.0	19.5	13.5	52.3	15.0	18.8	37.5	0.5	60.1	20.7	33.9	25.0	18.9
11/Jul/2005	25/Jul/2005	7.0	41.3	39.7	87.3	80.3	17.2	18.1	89.6	6.1	<1.0	31.7	0.1	31.0	7.3
25/Jul/2005	09/Aug/2005	5.0	21.1	19.9	19.9	37.1	9.2	6.7	39.9	1.5	1.0	16.6	9.8	15.0	29.8
09/Aug/2005	23/Aug/2005	5.5	13.3	13.1	13.5	6.7	<0.8	3.7	8.4	1.7	<1.0	12.5	2.9	<10.0	52.1
23/Aug/2005	06/Sep/2005	5.3	22.0	18.1	18.0	73.6	14.8	14.1	83.7	1.7	<1.0	13.1	4.9	18.0	52.0
06/Sep/2005	27/Sep/2005	5.2	17.6	18.5	14.2	49.7	12.3	10.6	55.1	1.7	<1.0	11.7	6.2	13.0	63.1
27/Sep/2005	04/Oct/2005	5.5	12.6	3.9	5.6	71.1	14.4	6.1	80.2	1.2	<1.0	4.1	3.4	13.0	46.5
04/Oct/2005	25/Oct/2005	4.7	27.6	33.0	26.9	25.5	6.5	7.4	24.5	1.4	<1.0	24.6	19.1	14.0	101.7
25/Oct/2005	01/Nov/2005	5.3	9.3	8.3	5.0	37.4	6.5	4.4	35.7	0.7	<1.0	4.8	4.9	<10.0	40.8
01/Nov/2005	16/Nov/2005	5.2	18.1	8.2	10.4	74.4	13.5	4.9	75.9	1.6	<1.0	9.2	6.8	13.0	91.9
16/Nov/2005	29/Nov/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
29/Nov/2005	14/Dec/2005	4.5	35.2	66.6	33.1	47.4	10.2	9.5	40.5	2.5	<1.0	29.5	32.4	24.8	28.2
14/Dec/2005	22/Dec/2005	5.8	29.1	24.5	33.8	110.7	21.4	9.9	118.8	3.7	<1.0	15.8	1.4	24.2	7.6
5113			24.4	21.9	23.8	66.1	12.7	8.0	72.6	2.3	0.5	16.5	7.9		Total rainfall 898.6

Scoat Tarn

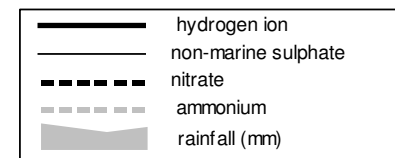
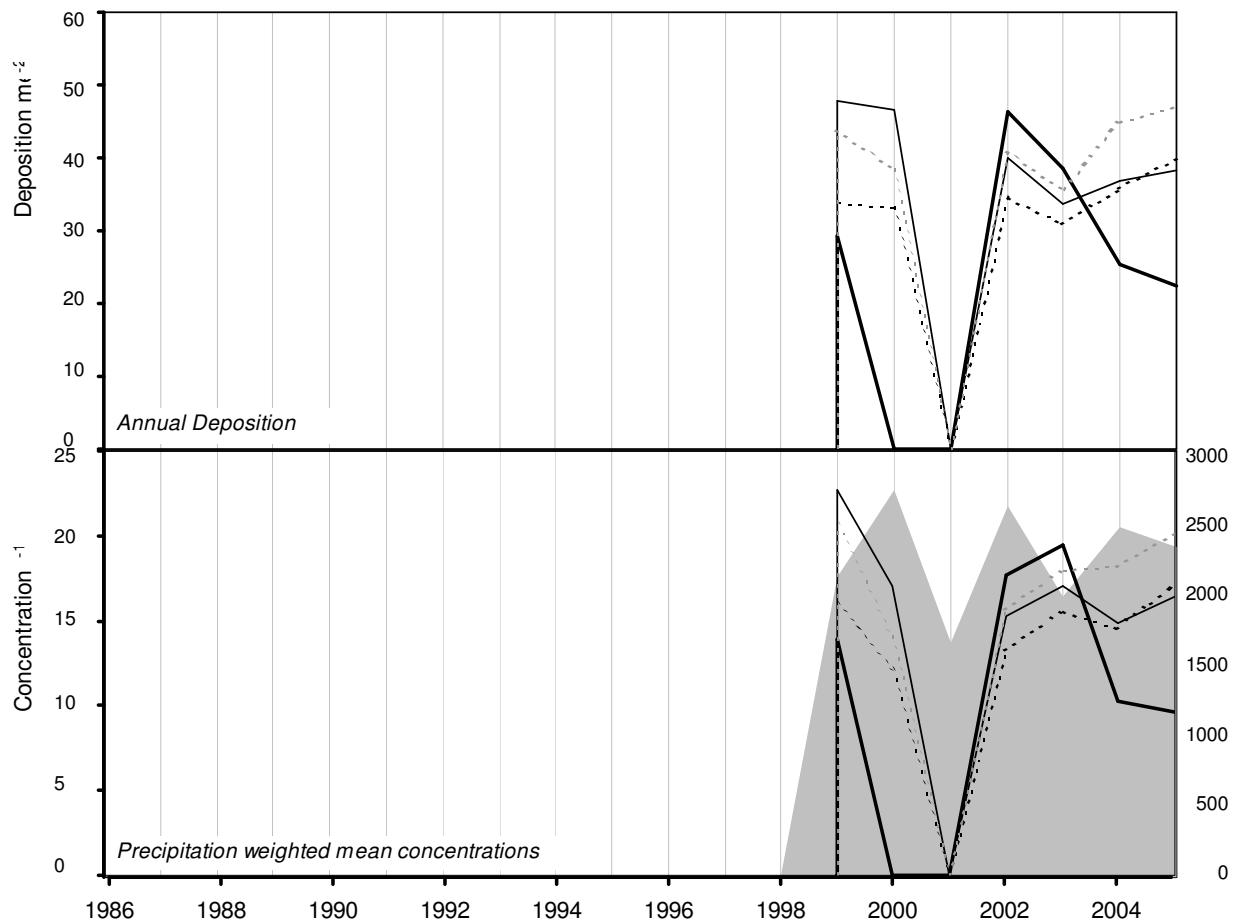
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
hydrogen ion	
non-marine sulphate	
nitrate	
ammonium	

ACID DEPOSITION DATA REPORT, 2005

(5159) Scoat Tarn

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
25/Jan/2005	07/Feb/2005	5.5	16.8	13.9	21.6	51.0	22.8	20.0	58.5	0.8	<1.0	10.7	3.1	13.0	35.1
07/Feb/2005	23/Feb/2005	5.2	36.4	34.7	30.9	148.8	28.2	4.3	168.4	3.3	<1.0	18.5	6.2	37.0	102.6
23/Feb/2005	09/Mar/2005	5.4	34.6	27.4	54.9	130.0	22.8	8.2	133.9	3.2	<1.0	18.9	4.4	28.3	10.6
09/Mar/2005	24/Mar/2005	5.0	38.1	20.8	29.1	80.8	15.6	5.7	105.1	2.7	<1.0	28.4	10.0	23.0	118.2
24/Mar/2005	06/Apr/2005	5.0	34.2	49.9	65.1	54.1	10.8	13.8	62.2	1.5	<1.0	27.7	10.7	21.2	72.2
06/Apr/2005	18/Apr/2005	5.0	24.9	16.1	18.0	59.3	11.2	5.7	69.0	0.9	<1.0	17.7	11.0	17.2	65.7
18/Apr/2005	04/May/2005	5.1	37.8	35.2	42.6	51.6	11.1	10.7	51.7	2.1	<1.0	31.5	8.7	23.0	50.4
04/May/2005	18/May/2005	5.6	31.0	14.8	22.3	82.7	17.0	9.5	101.0	2.1	<1.0	21.1	2.3	20.0	22.0
18/May/2005	02/Jun/2005	5.1	23.8	13.1	16.2	38.0	8.5	3.0	45.6	0.5	<1.0	19.2	8.7	13.0	202.4
02/Jun/2005	14/Jun/2005	5.4	25.3	15.2	16.1	51.0	26.0	9.8	62.2	2.7	<1.0	19.2	4.3	13.0	66.8
14/Jun/2005	30/Jun/2005	5.0	41.6	24.4	36.3	42.8	7.6	<1.7	44.6	0.2	<1.0	36.5	10.2	14.0	76.5
30/Jun/2005	12/Jul/2005	5.0	24.0	10.4	12.9	38.9	9.2	5.3	54.1	1.2	<1.0	19.3	11.0	15.0	52.7
12/Jul/2005	25/Jul/2005	6.0	34.5	29.3	60.7	59.0	9.2	10.4	60.4	6.0	<1.0	27.4	1.1	20.0	34.8
25/Jul/2005	09/Aug/2005	5.1	14.6	11.7	9.7	38.5	9.6	6.4	40.5	1.2	1.0	9.9	7.4	13.0	64.3
09/Aug/2005	24/Aug/2005	5.1	12.6	10.6	6.3	38.9	8.2	7.1	41.0	1.1	<1.0	7.9	7.9	11.0	149.0
24/Aug/2005	08/Sep/2005	4.9	30.9	29.9	26.6	110.9	22.9	15.7	126.3	2.3	<1.0	17.6	13.5	28.0	38.7
08/Sep/2005	21/Sep/2005	5.0	25.0	17.9	14.6	86.0	17.2	7.8	103.9	2.5	<1.0	14.7	10.7	20.0	68.7
21/Sep/2005	04/Oct/2005	5.1	24.6	9.8	15.1	111.9	22.5	6.6	125.2	2.4	<1.0	11.1	7.4	22.0	151.9
04/Oct/2005	18/Oct/2005	4.6	43.2	39.4	52.4	14.6	4.6	5.9	17.5	1.3	<1.0	41.4	26.3	19.0	20.7
18/Oct/2005	02/Nov/2005	4.9	18.1	10.9	13.5	68.7	12.5	6.4	69.6	1.3	<1.0	9.8	12.0	16.0	197.9
02/Nov/2005	15/Nov/2005	5.4	15.8	4.9	5.2	84.3	15.7	4.2	89.1	2.1	<1.0	5.6	3.9	13.0	266.6
15/Nov/2005	29/Nov/2005	5.2	53.6	63.5	41.1	228.2	38.6	11.8	221.8	12.1	<1.0	26.2	6.3	45.0	7.8
29/Nov/2005	13/Dec/2005	4.6	27.3	36.2	23.4	41.8	7.7	4.7	38.6	1.7	<1.0	22.3	25.7	21.7	76.9
13/Dec/2005	28/Dec/2005	5.0	36.0	18.7	27.5	105.4	25.7	11.9	111.9	4.3	<1.0	23.3	10.0	25.1	58.4
28/Dec/2005	23/Jan/2006	4.9	22.8	14.3	18.6	69.7	12.7	4.8	70.8	2.0	<1.0	14.4	13.8	17.0	313.6
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												
5159			24.9	17.2	20.2	70.4	14.4	6.4	77.4	1.9	0.5	16.5	9.6		Total rainfall 2324.7

Loch Dee

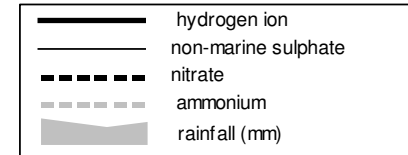
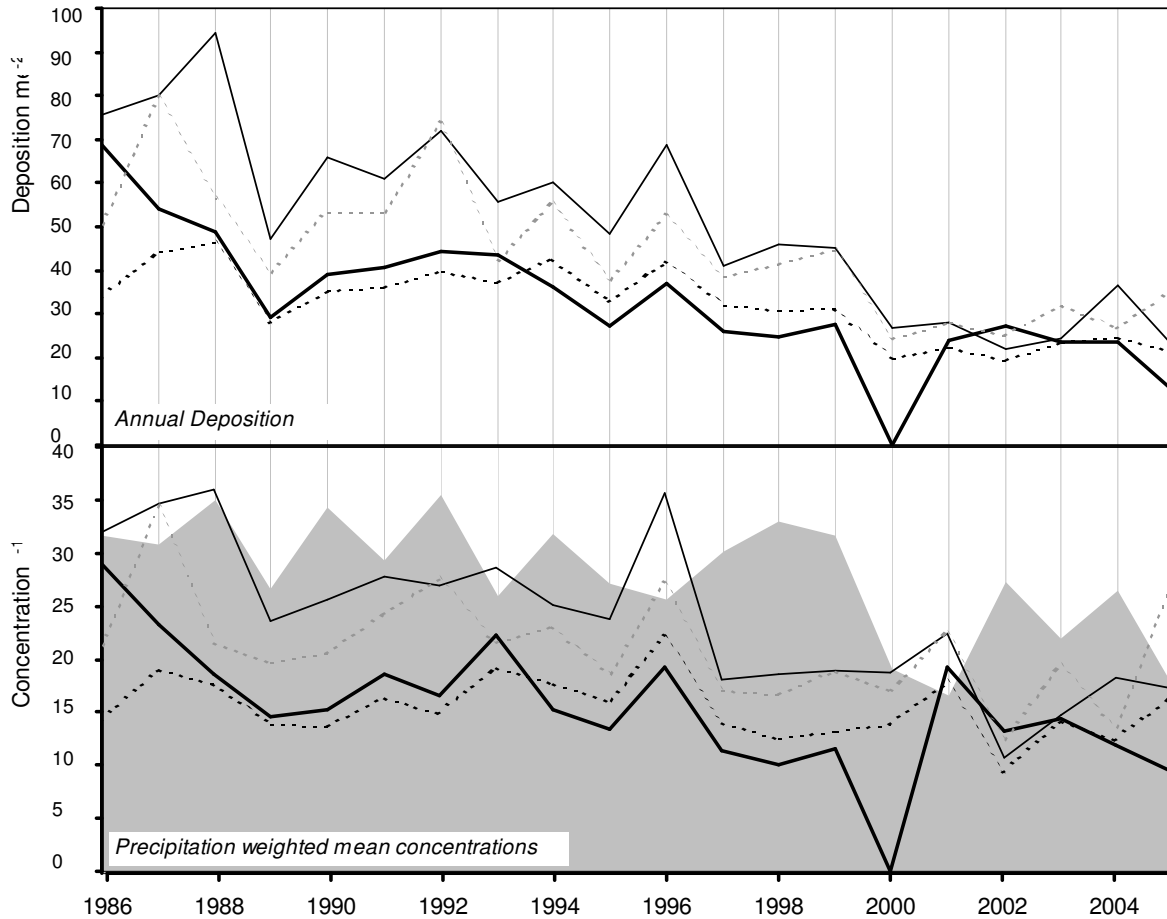
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-0.57 ueq/l (-2.67%/year): 19 years' data ++ Moderately strong trend detected
<i>non-marine sulphate</i>	-0.97 ueq/l (-2.92%/year): 20 years' data +++ Strong trend detected
<i>nitrate</i>	-0.15 ueq/l (-0.90%/year): 20 years' data - No significant trend detected
<i>ammonium</i>	-0.37 ueq/l (-1.49%/year): 20 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5107) Loch Dee

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+	Conductivity (S/cm)	Rainfall (mm)
12/Jan/2005	25/Jan/2005	4.9	55.5	19.6	18.2	312.3	70.1	14.9	405.3	6.7	<1.0	17.9	14.1	61.0	79.4
25/Jan/2005	09/Feb/2005	6.8	86.0	13.5	387.5	104.7	20.2	17.0	125.6	101.0	<1.0	73.4	0.1	83.0	14.0
09/Feb/2005	23/Feb/2005	6.5	34.7	8.9	49.8	180.9	27.2	4.3	228.2	3.7	<1.0	12.9	0.3	39.0	23.4
23/Feb/2005	07/Mar/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
07/Mar/2005	22/Mar/2005	5.7	25.4	36.5	62.7	67.1	10.2	10.3	60.1	3.1	<1.0	17.3	2.1	19.1	26.2
22/Mar/2005	05/Apr/2005	4.4	65.6	115.0	84.6	100.6	21.7	15.9	124.3	1.9	<1.0	53.5	40.7	48.2	2.6
05/Apr/2005	21/Apr/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
21/Apr/2005	10/May/2005	6.2	27.3	21.2	47.8	72.2	3.8	7.1	68.8	19.0	22.1	18.6	0.6	21.0	88.5
10/May/2005	24/May/2005	5.6	25.7	15.2	31.2	51.6	8.6	7.1	63.7	3.1	<1.0	19.5	2.3	15.0	96.2
24/May/2005	07/Jun/2005	5.6	28.6	17.8	33.3	43.9	5.2	3.4	43.5	4.4	8.9	23.3	2.3	<10.0	138.8
07/Jun/2005	21/Jun/2005	7.3	946.2	<0.7	5370.7	173.9	64.6	19.5	312.3	559.0	723.7	925.2	0.1	881.0	35.3
21/Jun/2005	04/Jul/2005	7.7	3775.2	<0.7	14199.2	681.8	317.3	136.5	1050.9	2267.8	7060.7	3693.1	0.0	2240.0	12.9
04/Jul/2005	20/Jul/2005	7.6	1410.5	<0.7	2489.7	84.8	60.6	24.0	514.4	255.4	3036.4	1400.3	0.0	1995.0	32.7
20/Jul/2005	01/Aug/2005	6.8	15.2	28.6	72.3	18.7	4.6	2.5	19.5	5.6	9.2	12.9	0.2	16.0	4.5
01/Aug/2005	17/Aug/2005	7.0	28.3	6.7	185.9	36.7	3.6	<1.0	34.0	14.0	46.6	23.9	0.1	341.0	52.1
17/Aug/2005	31/Aug/2005	6.2	26.2	9.0	10.7	68.4	14.3	6.9	84.8	3.7	6.8	18.0	0.6	16.0	43.5
31/Aug/2005	13/Sep/2005	6.3	27.6	28.5	52.0	25.8	7.1	11.3	29.8	6.3	12.5	24.5	0.6	18.0	40.1
13/Sep/2005	27/Sep/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8
27/Sep/2005	05/Oct/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
05/Oct/2005	19/Oct/2005	4.7	35.0	22.6	34.9	59.9	11.9	6.8	65.1	2.9	<1.0	27.8	18.2	22.0	183.2
19/Oct/2005	02/Nov/2005	5.0	18.6	9.9	7.8	88.2	16.0	6.6	91.9	1.7	<1.0	8.0	10.7	17.0	162.3
02/Nov/2005	15/Nov/2005	5.4	18.1	4.4	2.6	122.7	24.4	6.1	128.0	3.5	<1.0	3.3	3.6	18.0	182.8
15/Nov/2005	28/Nov/2005	5.2	31.3	18.6	10.1	216.3	44.0	13.1	238.0	5.8	<1.0	5.2	5.8	39.0	12.2
28/Nov/2005	14/Dec/2005	4.5	27.4	39.9	27.3	46.2	8.3	4.7	43.2	2.4	<1.0	21.9	28.8	23.1	71.9
14/Dec/2005	29/Dec/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
29/Dec/2005	12/Jan/2006	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												
5107			28.8	16.6	27.4	96.3	18.6	7.0	108.9	4.7	1.9	17.2	9.4		Total rainfall 1303.5

Beaghs Burn

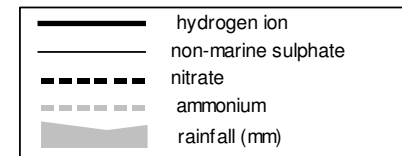
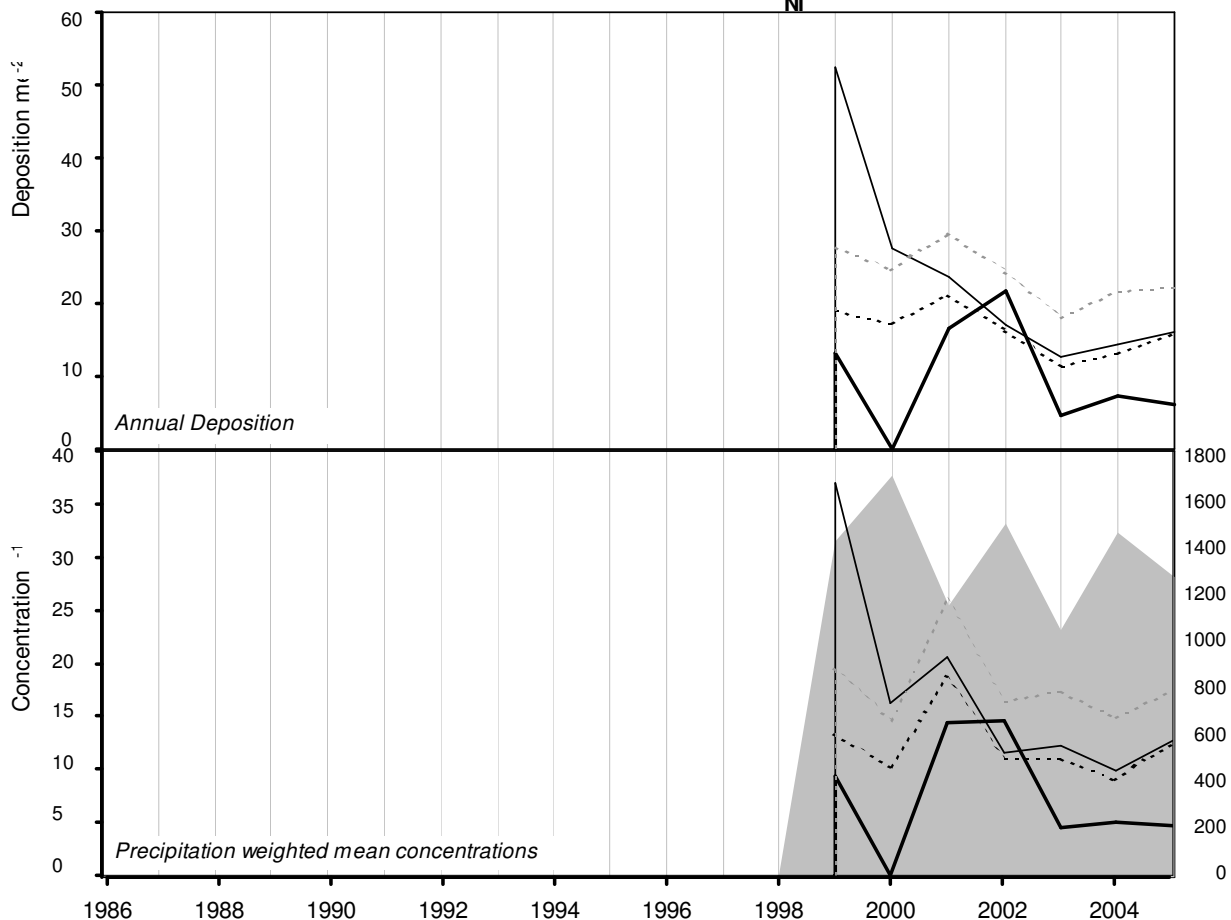
2005

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:
 Turbarry, open peat cutting.

Other measurements:
 UKAWMN

Site Operator:
 Department of Agriculture and Rural Development
 NI



long-term trends in concentration (+x = increase; -x = decrease)	
hydrogen ion	-x
non-marine sulphate	-x
nitrate	+x
ammonium	-x

ACID DEPOSITION DATA REPORT, 2005

(5155) Beaghs Burn

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
04/Jan/2005	11/Jan/2005	5.9	18.5	2.7	8.6	148.5	30.6	7.7	171.7	3.4	<1.0	0.7	1.2	27.0	54.6
11/Jan/2005	25/Jan/2005	5.2	102.9	2.6	4.6	682.2	86.0	31.7	712.2	14.2	<1.0	20.7	6.9	117.0	77.9
25/Jan/2005	08/Feb/2005	6.1	21.3	5.4	23.4	138.7	27.8	19.2	159.6	3.6	<1.0	4.6	0.8	26.0	35.4
08/Feb/2005	22/Feb/2005	5.8	56.3	3.9	4.4	383.2	82.6	14.8	406.8	7.3	<1.0	10.2	1.5	65.0	71.5
22/Feb/2005	08/Mar/2005	5.5	31.2	6.3	20.4	177.9	31.8	11.1	180.4	5.3	<1.0	9.7	3.2	28.3	20.0
08/Mar/2005	22/Mar/2005	6.1	48.2	26.4	49.0	213.3	38.0	19.2	213.7	13.3	<1.0	22.5	0.8	38.8	53.4
22/Mar/2005	05/Apr/2005	5.4	26.4	27.5	31.4	67.4	11.0	7.6	66.3	2.2	<1.0	18.3	4.4	19.0	19.4
05/Apr/2005	19/Apr/2005	5.2	21.4	6.9	13.2	75.9	13.9	5.3	92.3	1.3	<1.0	12.2	6.3	19.7	70.4
19/Apr/2005	03/May/2005	4.9	43.9	48.7	41.9	66.4	9.8	9.8	66.9	2.3	<1.0	35.9	13.8	27.0	15.8
03/May/2005	17/May/2005	6.8	58.7	4.6	148.8	182.0	17.7	<0.1	236.7	104.1	111.9	36.8	0.1	64.0	32.8
17/May/2005	30/May/2005	6.1	24.7	19.2	37.6	60.2	2.3	0.7	49.4	3.6	12.5	17.4	0.8	17.0	56.0
30/May/2005	14/Jun/2005	6.4	17.4	5.5	88.2	61.7	3.7	1.5	63.0	14.5	12.5	9.9	0.4	21.0	48.0
14/Jun/2005	28/Jun/2005	7.6	75.4	23.6	19.6	184.4	408.0	855.0	97.7	9.1	<1.0	53.2	0.0	157.0	45.4
28/Jun/2005	11/Jul/2005	5.8	20.2	12.8	35.6	32.4	6.2	4.0	29.6	1.7	<1.0	16.3	1.4	12.0	25.3
11/Jul/2005	29/Jul/2005	5.1	22.9	14.4	24.4	79.1	16.0	9.4	88.8	3.3	<1.0	13.4	7.4	22.0	27.9
29/Jul/2005	09/Aug/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
09/Aug/2005	23/Aug/2005	5.7	9.2	5.9	16.1	25.4	<0.8	2.7	27.6	0.9	<1.0	6.1	1.9	<10.0	48.9
23/Aug/2005	06/Sep/2005	5.8	19.2	21.5	37.2	53.8	10.6	9.1	64.5	2.0	<1.0	12.7	1.7	15.0	49.7
06/Sep/2005	20/Sep/2005	5.6	18.6	10.0	17.8	67.4	12.5	9.2	69.0	1.7	<1.0	10.4	2.6	12.0	45.4
20/Sep/2005	04/Oct/2005	5.9	27.2	4.8	14.6	184.6	35.2	9.4	220.3	4.0	<1.0	5.0	1.2	34.0	72.3
04/Oct/2005	18/Oct/2005	5.4	15.4	16.9	18.9	33.7	6.1	5.8	31.3	0.8	<1.0	11.3	3.6	10.0	44.2
18/Oct/2005	25/Oct/2005	4.8	21.8	19.9	20.9	58.7	11.0	5.5	59.4	2.0	<1.0	14.7	17.0	18.0	66.6
25/Oct/2005	01/Nov/2005	5.3	22.5	13.4	15.3	106.2	19.0	8.7	108.5	2.1	<1.0	9.7	4.7	20.0	30.2
01/Nov/2005	15/Nov/2005	5.9	28.1	5.2	10.9	208.3	39.5	11.5	189.6	4.7	<1.0	3.0	1.4	33.0	58.7
15/Nov/2005	29/Nov/2005	5.8	113.4	8.1	9.8	950.0	191.9	37.4	1158.4	20.2	<1.0	0.0	1.7	144.0	24.0
29/Nov/2005	13/Dec/2005	4.9	19.0	20.3	10.0	84.6	15.7	4.1	90.4	2.2	<1.0	8.8	12.9	21.3	113.3
13/Dec/2005	03/Jan/2006	5.7	38.5	12.5	14.8	254.2	48.7	12.1	284.0	7.1	<1.0	7.9	1.9	42.1	62.8
5155			35.5	12.5	17.5	191.6	48.9	45.1	203.2	5.0	0.5	12.7	4.7		Total rainfall 1269.7

Redesdale

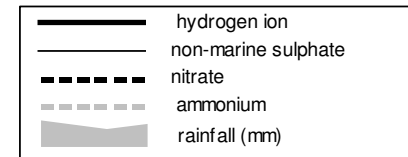
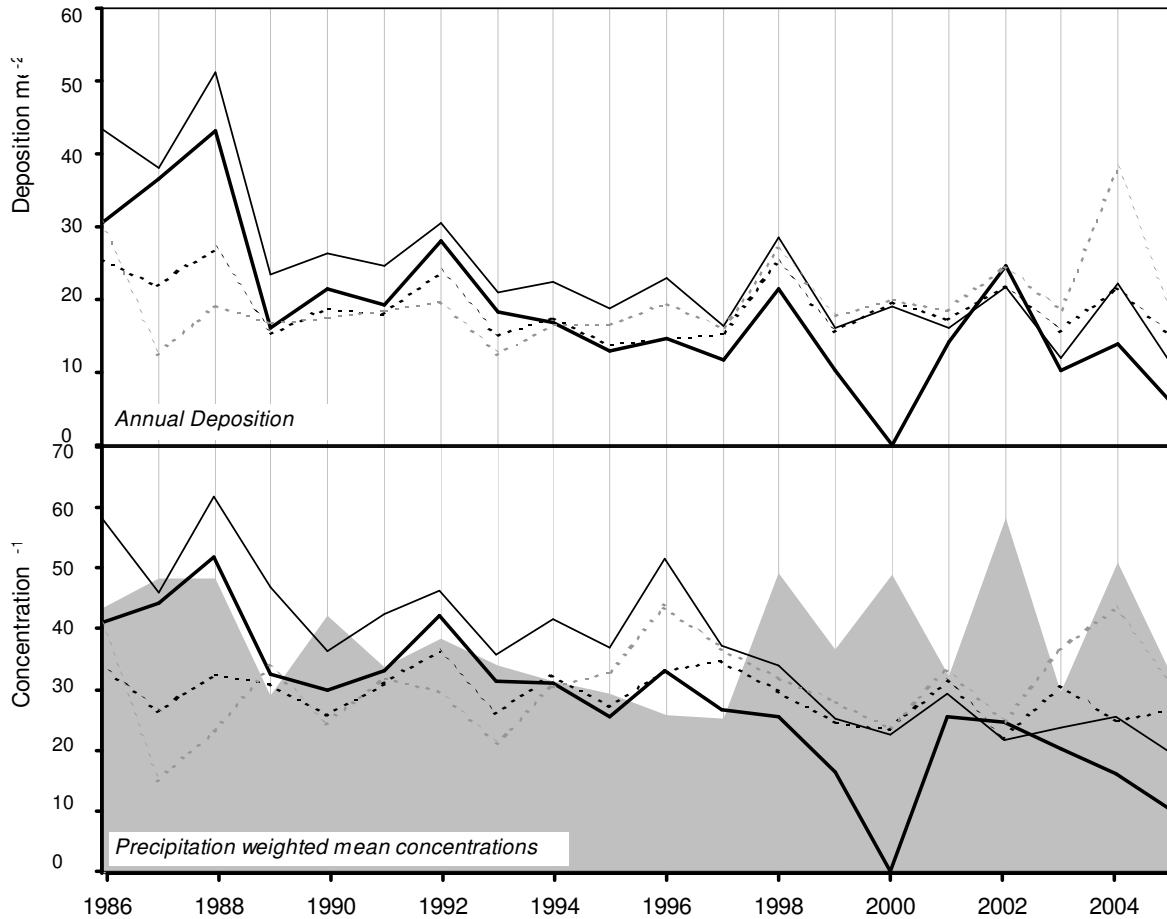
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-1.50 ueq/l (-3.47 %/year): 19 years' data ++++ Very strong trend detected
<i>non-marine sulphate</i>	-1.80 ueq/l (-3.33 %/year): 20 years' data ++++ Very strong trend detected
<i>nitrate</i>	-0.28 ueq/l (-0.87 %/year): 20 years' data - No significant trend detected
<i>ammonium</i>	0.35 ueq/l (1.29 %/year): 20 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5109) Redesdale

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
24/Jan/2005	08/Feb/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8
08/Feb/2005	22/Feb/2005	5.1	31.6	35.3	33.4	147.1	32.2	9.8	170.1	3.6	<1.0	13.8	7.9	34.0	19.5
22/Feb/2005	08/Mar/2005	4.7	49.0	18.9	27.6	216.3	49.2	14.9	267.7	5.4	<1.0	23.0	18.6	46.0	17.9
08/Mar/2005	22/Mar/2005	5.8	30.7	25.5	45.5	71.6	12.9	9.2	67.3	2.2	<1.0	22.1	1.5	19.0	21.7
22/Mar/2005	05/Apr/2005	5.0	47.5	69.4	101.1	43.8	8.9	12.5	45.9	3.3	<1.0	42.2	9.5	23.9	22.6
05/Apr/2005	19/Apr/2005	4.8	20.3	21.2	17.8	24.3	5.2	3.3	27.1	0.5	<1.0	17.4	14.5	13.3	70.7
19/Apr/2005	03/May/2005	4.6	70.0	88.2	80.3	30.4	9.2	18.0	35.3	2.0	<1.0	66.3	28.2	35.0	23.9
03/May/2005	17/May/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4
17/May/2005	31/May/2005	5.2	26.3	24.0	32.8	48.5	9.0	8.6	48.0	6.7	<1.0	20.5	6.2	16.0	27.7
31/May/2005	14/Jun/2005	5.2	16.0	15.7	23.7	13.4	3.9	4.9	16.1	1.5	<1.0	14.4	5.8	10.0	29.4
14/Jun/2005	28/Jun/2005	5.0	58.9	62.3	61.6	44.7	14.7	26.3	58.5	5.5	<1.0	53.5	9.1	21.0	7.0
28/Jun/2005	13/Jul/2005	7.4	279.7	49.1	1054.2	73.5	40.5	13.3	81.7	133.7	415.3	270.8	0.0	180.0	15.9
13/Jul/2005	26/Jul/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
26/Jul/2005	09/Aug/2005	5.3	19.4	26.8	27.3	24.3	7.4	5.3	26.8	1.5	1.0	16.5	5.5	12.0	25.9
09/Aug/2005	23/Aug/2005	6.7	78.7	20.2	164.2	9.9	<0.8	<1.0	8.8	16.0	77.0	77.5	0.2	26.0	28.0
23/Aug/2005	06/Sep/2005	6.3	18.3	22.9	60.7	41.5	7.5	7.9	50.0	3.2	<1.0	13.3	0.5	17.0	20.2
06/Sep/2005	20/Sep/2005	5.1	13.0	17.2	9.7	29.4	8.4	7.6	45.6	0.9	<1.0	9.5	8.7	10.0	33.3
20/Sep/2005	04/Oct/2005	5.8	25.7	13.9	23.5	139.4	25.8	10.6	158.3	2.7	<1.0	8.9	1.4	26.0	16.5
04/Oct/2005	18/Oct/2005	4.8	26.9	27.6	26.7	9.6	4.3	6.0	9.3	1.3	<1.0	25.7	17.8	11.0	15.7
18/Oct/2005	01/Nov/2005	4.9	15.0	13.3	10.2	41.0	7.1	6.9	42.8	1.6	<1.0	10.0	11.5	13.0	78.8
01/Nov/2005	15/Nov/2005	5.3	16.0	6.8	5.3	72.1	14.5	7.1	71.5	1.4	<1.0	7.3	4.9	15.0	25.9
15/Nov/2005	29/Nov/2005	5.2	31.6	30.3	21.4	144.1	31.2	11.1	143.5	4.4	<1.0	14.2	5.9	26.0	5.4
29/Nov/2005	13/Dec/2005	6.9	68.0	52.3	244.6	128.4	15.2	6.8	142.8	41.6	59.1	52.5	0.1	55.5	22.5
13/Dec/2005	27/Dec/2005	6.1	71.6	54.6	86.1	390.8	65.5	19.9	324.6	14.8	<1.0	24.5	0.9	58.1	5.9
27/Dec/2005	10/Jan/2006	4.7	48.0	37.5	34.2	108.0	19.5	9.9	106.8	3.7	<1.0	34.9	20.0	-	1.5
5109			26.3	26.6	30.5	57.6	12.1	8.3	63.2	2.4	0.5	19.4	10.0		Total rainfall 538.2

Eskdalemuir

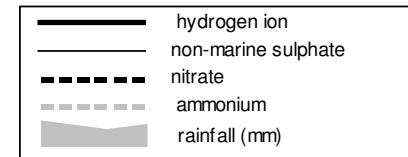
2005

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:
 Daily Bulk, DT, SO₂, Daily SO₄, HNO₃ Denuder, ozone, Met, EMEP

Site Operator:
 Meteorological Office



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-0.70 ueq/l (-2.79%/year): 19 years' data +++ Strong trend detected
<i>non-marine sulphate</i>	-1.00 ueq/l (-2.95%/year): 20 years' data ++++ Very strong trend detected
<i>nitrate</i>	-0.03 ueq/l (-0.19%/year): 20 years' data - No significant trend detected
<i>ammonium</i>	0.19 ueq/l (0.98%/year): 20 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5002) Eskdalemuir

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
12/Jan/2005	26/Jan/2005	5.1	33.9	34.2	34.3	157.0	34.5	13.9	192.9	6.1	<1.0	15.0	7.2	28.0	45.8
26/Jan/2005	09/Feb/2005	5.5	30.7	22.3	31.8	57.6	22.4	19.5	73.5	1.5	<1.0	23.8	3.4	15.0	47.8
09/Feb/2005	23/Feb/2005	5.4	22.9	13.7	16.7	111.6	21.5	5.0	128.4	2.1	<1.0	9.5	4.3	23.0	42.0
23/Feb/2005	09/Mar/2005	4.6	38.9	15.7	26.1	125.8	25.3	9.0	144.7	4.4	<1.0	23.7	25.7	33.2	21.2
09/Mar/2005	23/Mar/2005	5.6	16.7	15.9	31.6	56.7	8.8	9.3	58.4	1.5	<1.0	9.9	2.3	14.0	60.5
23/Mar/2005	06/Apr/2005	5.1	25.7	42.3	48.1	21.7	4.8	3.3	30.2	0.9	<1.0	23.1	8.9	15.0	49.3
06/Apr/2005	20/Apr/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
20/Apr/2005	04/May/2005	4.8	38.2	38.4	34.0	26.5	6.7	8.7	31.7	2.3	<1.0	35.0	16.6	17.0	53.2
04/May/2005	18/May/2005	5.0	52.9	30.0	21.0	142.9	29.6	17.0	175.8	4.1	<1.0	35.6	10.0	34.0	4.6
18/May/2005	01/Jun/2005	4.9	17.9	12.4	17.1	43.3	7.9	4.0	45.8	2.0	<1.0	12.7	12.3	13.0	130.7
01/Jun/2005	15/Jun/2005	5.3	15.3	17.1	21.2	26.5	3.8	2.4	19.1	0.9	<1.0	12.1	5.0	<10.0	52.5
15/Jun/2005	29/Jun/2005	5.2	27.6	26.6	34.3	19.5	8.7	<1.8	23.4	<0.4	<1.0	25.2	6.2	<10.0	26.9
29/Jun/2005	13/Jul/2005	4.6	25.5	17.8	2.7	69.8	15.4	8.2	82.7	2.8	<1.0	17.1	26.3	28.0	28.3
13/Jul/2005	27/Jul/2005	4.7	24.6	18.0	7.6	50.4	12.5	10.8	57.6	4.6	<1.0	18.5	18.2	19.0	15.4
27/Jul/2005	10/Aug/2005	4.8	14.3	11.9	<0.7	18.1	6.5	6.5	26.3	2.3	<1.0	12.1	15.8	13.0	28.2
10/Aug/2005	24/Aug/2005	5.0	9.4	9.9	<0.7	19.0	6.0	<1.0	21.1	1.0	<1.0	7.1	10.2	<10.0	73.2
24/Aug/2005	07/Sep/2005	6.2	44.6	29.8	59.1	167.5	28.4	12.4	193.3	4.0	<1.0	24.4	0.7	37.0	27.0
07/Sep/2005	21/Sep/2005	5.4	11.7	16.6	16.7	45.2	9.7	4.9	49.7	1.1	<1.0	6.2	3.7	11.0	45.6
21/Sep/2005	05/Oct/2005	6.4	39.7	27.6	34.5	86.4	12.9	11.7	96.5	8.7	<1.0	29.3	0.4	24.0	11.3
05/Oct/2005	19/Oct/2005	4.7	31.2	23.0	29.6	47.2	10.3	8.2	52.0	1.5	<1.0	25.5	21.4	20.0	129.4
19/Oct/2005	02/Nov/2005	4.9	26.8	34.1	22.1	81.5	15.6	7.6	81.7	2.6	<1.0	17.0	11.7	21.9	16.5
02/Nov/2005	16/Nov/2005	5.4	18.8	6.3	5.4	110.6	21.4	10.2	119.4	2.9	<1.0	5.5	3.7	20.0	95.0
16/Nov/2005	30/Nov/2005	-	-	-	-	-	-	-	-	-	-	0.0	-	-	16.5
30/Nov/2005	14/Dec/2005	4.6	21.7	38.4	30.4	58.3	7.8	7.4	33.2	2.3	<1.0	14.7	24.0	19.1	37.5
14/Dec/2005	28/Dec/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
28/Dec/2005	11/Jan/2006	5.3	23.3	21.3	30.4	72.2	14.9	2.9	82.9	7.6	<1.0	14.6	5.5	15.8	73.2
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												
5002			23.7	20.5	23.2	62.0	12.9	7.0	68.8	2.5	0.5	16.2	10.6		Total rainfall 1131.5

Whiteadder

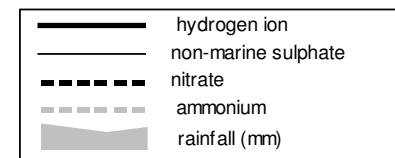
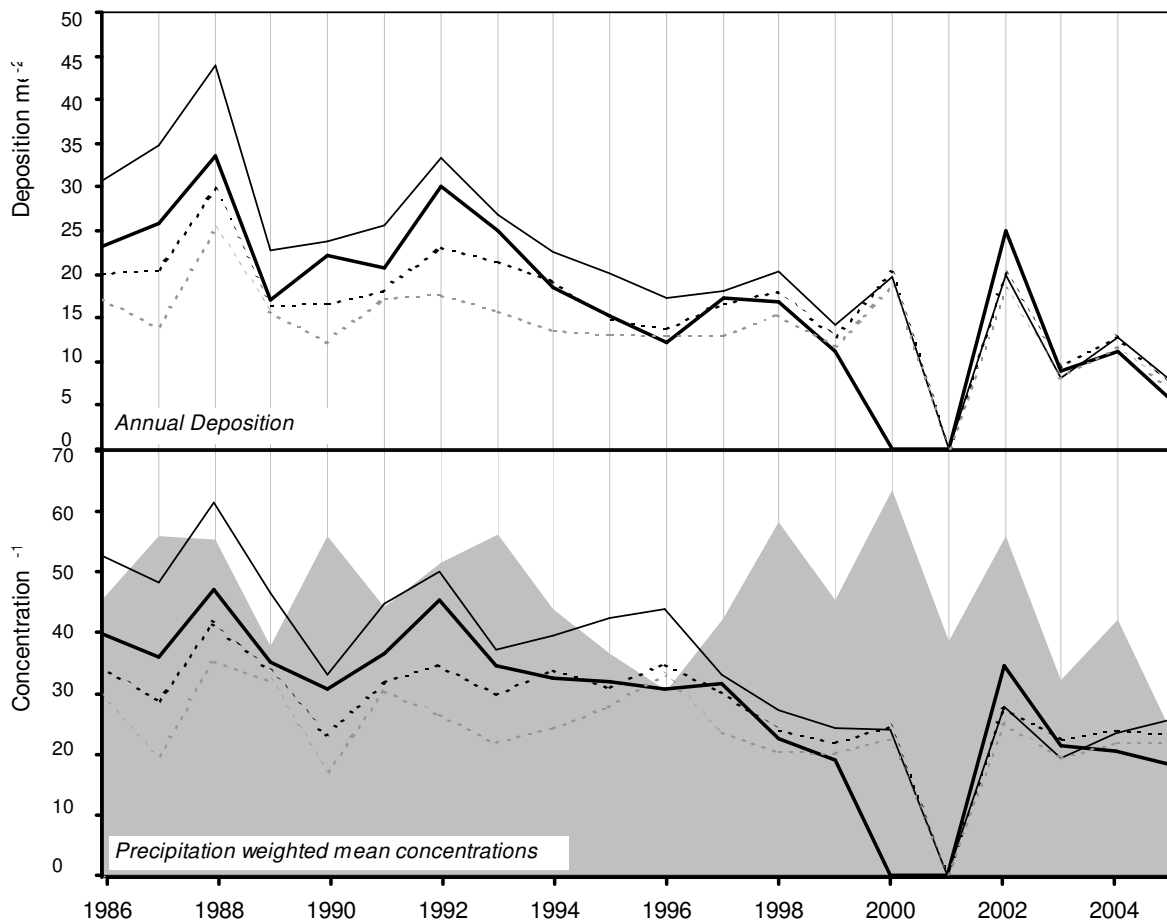
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-1.18 ueq/l (-2.81 %/year): 18 years' data +++ Strong trend detected
<i>non-marine sulphate</i>	-1.83 ueq/l (-3.42 %/year): 19 years' data ++++ Very strong trend detected
<i>nitrate</i>	-0.65 ueq/l (-1.86 %/year): 19 years' data ++ Moderately strong trend detected
<i>ammonium</i>	-0.39 ueq/l (-1.37 %/year): 19 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5106) Whiteadder

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
10/Jan/2005	25/Jan/2005	4.4	159.6	51.8	58.4	660.9	84.3	40.2	692.9	16.2	<1.0	80.0	39.8	-	3.1
25/Jan/2005	07/Feb/2005	5.5	26.6	25.9	31.6	55.8	23.4	23.1	59.7	2.3	<1.0	19.8	3.5	18.0	6.0
07/Feb/2005	21/Feb/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
21/Feb/2005	07/Mar/2005	4.4	52.6	20.0	13.5	244.3	56.2	16.3	266.1	5.0	<1.0	23.2	38.0	54.0	35.6
07/Mar/2005	04/Apr/2005	4.8	35.5	42.6	46.2	29.9	6.3	8.9	28.6	1.8	<1.0	31.9	15.1	19.7	54.8
04/Apr/2005	18/Apr/2005	4.7	45.1	20.6	12.6	156.5	32.7	9.6	189.0	3.2	<1.0	26.2	22.4	38.0	56.6
18/Apr/2005	16/May/2005	4.7	49.7	52.6	41.0	45.7	10.6	11.7	51.1	3.6	<1.0	44.2	22.4	22.0	6.2
16/May/2005	29/May/2005	4.7	34.0	34.6	35.3	56.1	11.0	17.0	62.0	7.6	<1.0	27.2	19.5	22.0	25.3
29/May/2005	13/Jun/2005	5.1	15.3	11.1	12.0	14.1	4.2	7.7	15.3	2.7	<1.0	13.6	7.8	10.0	28.8
13/Jun/2005	27/Jun/2005	4.9	19.8	19.2	18.7	12.2	2.7	<3.5	15.6	0.7	<1.0	18.3	13.5	<10.0	19.6
27/Jun/2005	08/Aug/2005	5.0	35.2	<0.7	5.9	45.3	8.8	8.2	60.6	2.3	<1.0	29.7	9.3	14.0	36.7
08/Aug/2005	05/Sep/2005	4.9	23.5	16.3	11.4	80.0	16.1	11.3	84.1	2.8	<1.0	13.8	12.3	20.0	18.3
05/Sep/2005	18/Sep/2005	[4.6]	[37.7]	[27.3]	[24.7]	[36.9]	[9.4]	[14.9]	[37.9]	[2.3]	[<1.0]	[33.3]	[26.9]	19.0	[.0]
18/Sep/2005	03/Oct/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5
03/Oct/2005	22/Jan/2006	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												
5106			36.9	23.1	21.9	93.0	19.7	10.8	105.3	3.3	0.5	25.7	18.2	Total rainfall 292.4	

Loch Chon

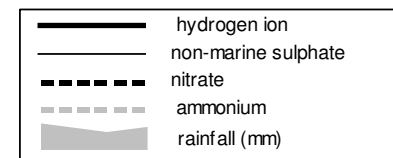
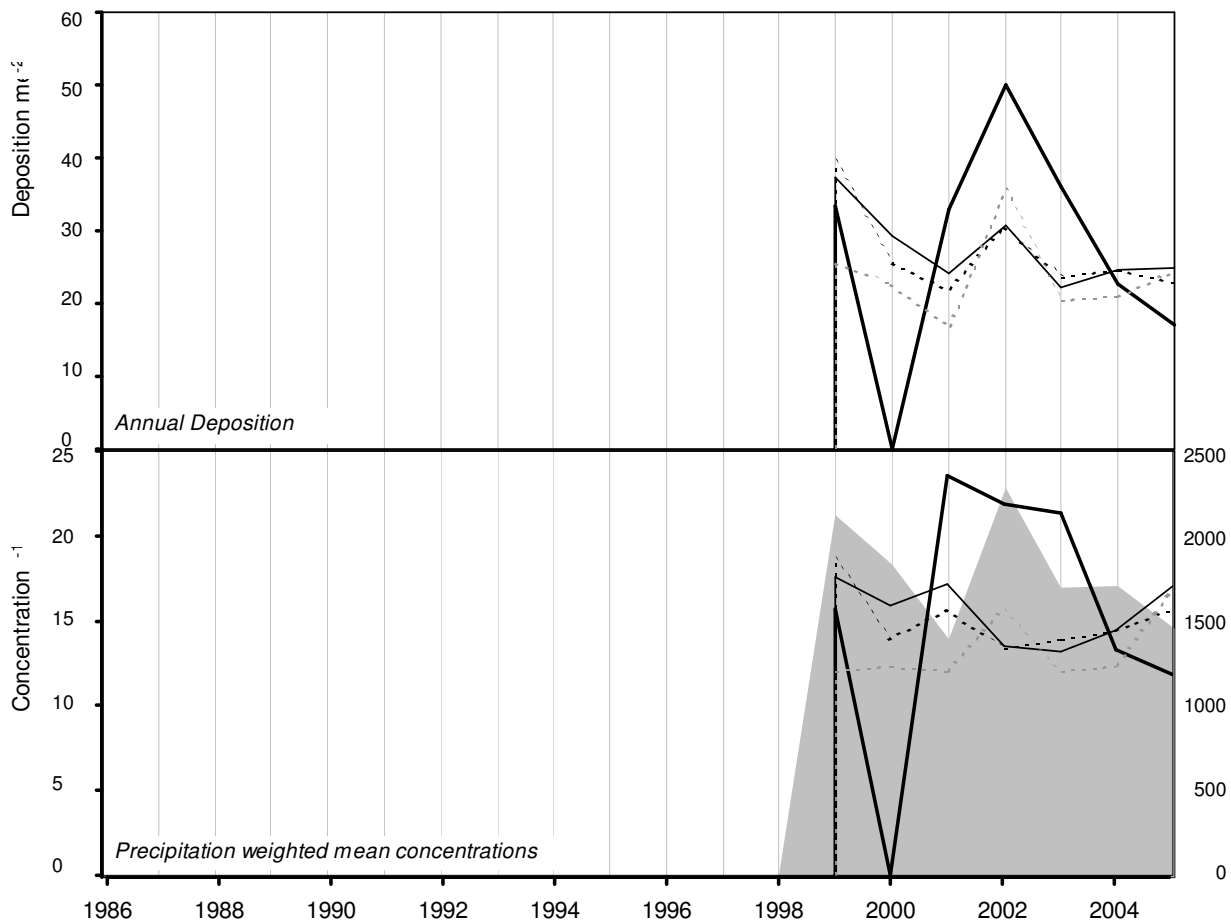
2005

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:
Fisheries Research Services



long-term trends in concentration (+x = increase; -x = decrease)	
hydrogen ion	
non-marine sulphate	
nitrate	
ammonium	

ACID DEPOSITION DATA REPORT, 2005

(5156) Loch Chon

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
12/Jan/2005	26/Jan/2005	4.9	56.3	15.3	15.3	259.6	44.3	23.9	335.9	5.0	<1.0	25.1	11.7	50.0	90.7
26/Jan/2005	09/Feb/2005	5.7	9.9	9.6	18.2	43.1	8.1	2.7	40.9	0.7	<1.0	4.7	2.0	10.6	39.7
09/Feb/2005	23/Feb/2005	5.0	21.4	8.2	1.4	160.1	32.5	4.3	194.4	3.4	<1.0	2.1	10.2	34.0	24.8
23/Feb/2005	09/Mar/2005	5.9	23.6	11.0	6.9	106.2	20.3	15.9	117.5	3.5	<1.0	10.8	1.4	21.2	2.2
09/Mar/2005	23/Mar/2005	4.8	15.0	14.0	10.6	32.9	7.8	4.1	44.5	1.5	<1.0	11.0	15.1	15.0	100.9
23/Mar/2005	06/Apr/2005	5.0	22.5	24.8	31.3	44.7	9.0	9.3	49.0	1.8	<1.0	17.1	11.2	16.0	42.9
06/Apr/2005	20/Apr/2005	4.6	27.5	15.3	11.1	55.9	11.9	4.3	65.5	1.2	<1.0	20.8	24.0	21.0	63.6
20/Apr/2005	04/May/2005	5.2	29.3	17.4	33.9	28.2	5.4	4.1	26.3	4.0	4.3	25.9	6.0	15.0	71.7
04/May/2005	18/May/2005	5.2	20.0	6.1	4.8	103.3	18.4	10.0	117.4	9.7	<1.0	7.6	6.5	24.0	6.4
18/May/2005	01/Jun/2005	4.9	10.1	9.9	8.5	11.7	3.3	1.8	11.9	1.8	<1.0	8.7	11.7	<10.0	137.5
01/Jun/2005	15/Jun/2005	4.9	14.1	10.9	8.2	10.7	3.0	2.5	12.0	0.5	<1.0	12.9	11.7	<10.0	53.7
15/Jun/2005	29/Jun/2005	5.4	21.9	18.6	28.4	8.6	3.1	3.3	13.9	1.9	<1.0	20.9	4.0	<10.0	50.8
29/Jun/2005	13/Jul/2005	7.4	197.9	62.6	415.5	121.7	11.8	7.1	148.7	75.5	82.6	183.2	0.0	96.0	3.0
13/Jul/2005	27/Jul/2005	5.0	17.3	15.9	15.7	46.0	11.9	8.6	61.4	3.2	<1.0	11.8	9.3	16.0	21.6
27/Jul/2005	10/Aug/2005	4.5	32.1	19.4	5.1	125.1	25.3	10.9	136.5	2.7	<1.0	17.0	30.2	33.0	12.4
10/Aug/2005	24/Aug/2005	5.2	17.1	7.8	3.2	23.6	5.9	6.1	18.9	0.8	<1.0	14.3	6.6	<10.0	6.0
24/Aug/2005	07/Sep/2005	4.7	29.8	27.5	18.4	50.9	13.9	11.7	65.8	1.5	<1.0	23.7	19.5	18.0	42.6
07/Sep/2005	21/Sep/2005	5.7	8.4	10.6	8.3	24.3	8.5	5.0	25.0	0.7	<1.0	5.4	1.9	<10.0	38.1
21/Sep/2005	05/Oct/2005	5.0	19.4	8.7	12.7	70.2	14.6	6.6	81.2	1.3	<1.0	10.9	9.3	16.0	114.3
05/Oct/2005	19/Oct/2005	4.8	25.0	15.4	18.2	56.3	12.7	7.1	62.6	1.4	<1.0	18.3	16.2	18.0	100.8
19/Oct/2005	02/Nov/2005	4.7	16.4	11.3	8.2	44.1	7.8	5.7	47.7	1.1	<1.0	11.1	18.6	14.0	122.3
02/Nov/2005	16/Nov/2005	5.6	57.8	22.1	33.7	196.4	41.3	22.7	221.6	14.8	<1.0	34.1	2.3	41.0	157.2
16/Nov/2005	30/Nov/2005	5.3	75.0	42.1	54.4	268.5	54.9	29.6	297.0	12.2	<1.0	42.7	5.6	55.0	14.1
30/Nov/2005	14/Dec/2005	4.5	34.0	49.4	29.3	51.7	8.5	6.2	45.8	3.1	<1.0	27.8	35.5	29.4	34.1
14/Dec/2005	28/Dec/2005	5.4	16.0	8.6	6.0	70.2	16.0	8.7	73.2	3.0	<1.0	7.6	4.3	14.2	31.6
28/Dec/2005	11/Jan/2006	4.9	19.2	14.9	7.1	64.2	15.9	8.9	75.1	1.8	<1.0	11.5	13.8	17.1	71.1
5156			26.3	15.7	16.8	76.9	15.9	8.8	89.6	3.5	0.7	17.0	11.8		Total rainfall 1454.0

Balquhiddier

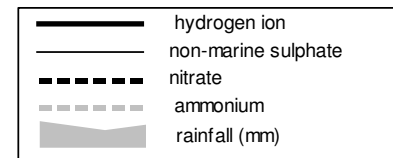
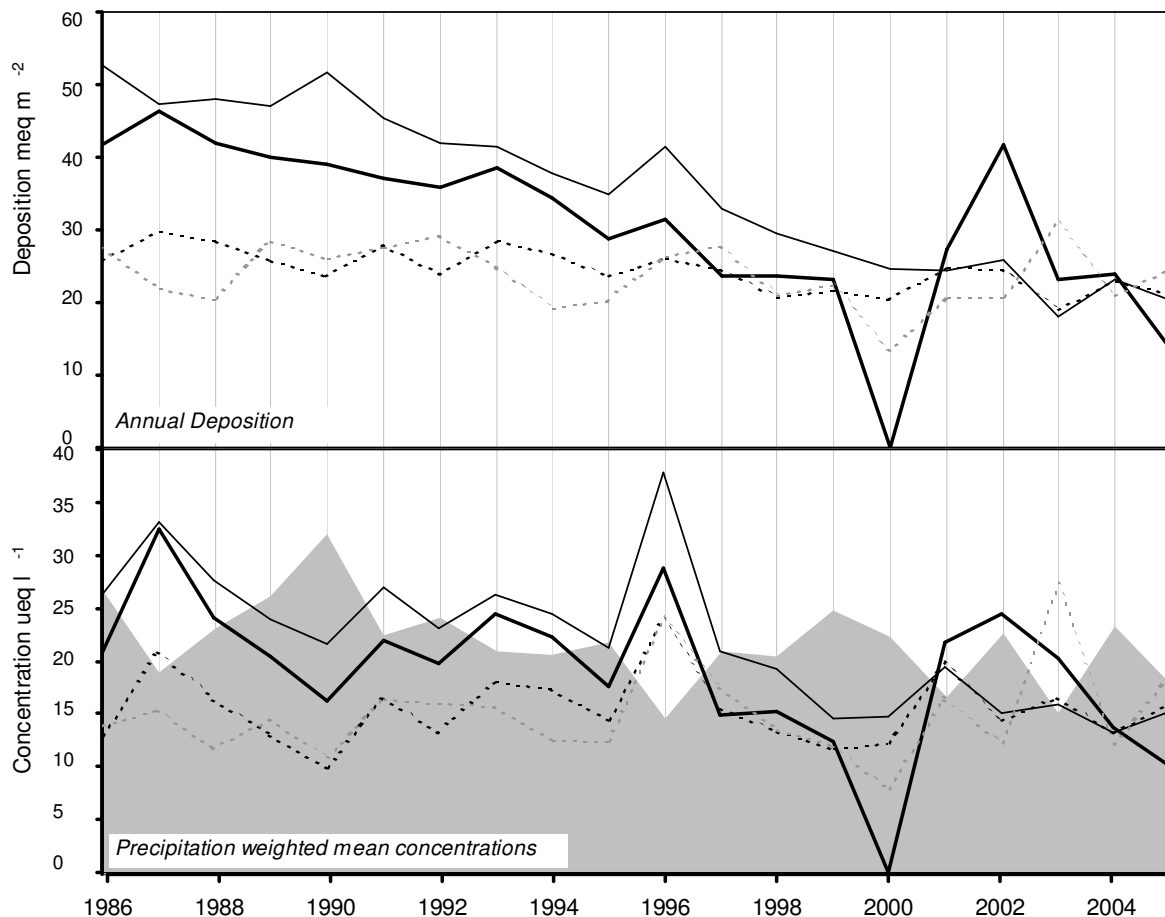
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-0.45 ueq/l (-1.86 %/year): 19 years' data + Significant trend detected
<i>non-marine sulphate</i>	-0.80 ueq/l (-2.70 %/year): 20 years' data ++ Moderately strong trend detected
<i>nitrate</i>	-0.01 ueq/l (-0.06 %/year): 20 years' data - No significant trend detected
<i>ammonium</i>	0.17 ueq/l (1.26 %/year): 20 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5152)Balquhiddar

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)							
10/Jan/2005	28/Jan/2005	5.0	62.7	15.3	9.3	497.8	99.4	20.6	601.3	9.4	<1.0	2.7	11.2	82.0	125.9							
28/Jan/2005	13/Feb/2005	5.5	20.0	11.3	13.0	82.3	16.7	5.3	95.6	1.0	<1.0	10.1	3.4	17.0	44.8							
13/Feb/2005	21/Feb/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0							
21/Feb/2005	15/Mar/2005	5.1	24.5	16.5	12.2	76.6	27.9	4.0	71.5	2.0	<1.0	15.3	8.5	18.0	26.1							
15/Mar/2005	03/Apr/2005	4.5	58.3	79.4	97.1	32.3	9.8	15.3	31.6	2.2	<1.0	54.4	30.9	34.2	36.6							
03/Apr/2005	17/Apr/2005	5.0	24.2	18.2	11.1	53.2	12.0	5.4	83.4	1.2	<1.0	17.8	10.5	16.0	78.5							
17/Apr/2005	06/May/2005	4.7	22.7	21.0	17.6	28.4	1.8	<1.4	38.8	3.3	<1.0	19.2	18.6	15.0	63.5							
06/May/2005	16/May/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0							
16/May/2005	01/Jun/2005	4.7	23.3	14.9	6.8	7.7	4.8	2.6	12.6	0.7	<1.0	22.3	22.4	13.0	131.8							
01/Jun/2005	13/Jun/2005	4.9	14.8	16.5	5.3	6.6	4.0	3.0	9.6	0.2	<1.0	14.0	14.1	<10.0	25.2							
13/Jun/2005	04/Jul/2005	5.1	24.4	21.4	24.7	12.4	4.2	7.9	19.5	0.8	<1.0	22.9	7.4	<10.0	25.8							
04/Jul/2005	22/Jul/2005	5.1	23.8	15.5	18.1	47.6	13.2	11.2	53.0	7.7	<1.0	18.1	8.9	16.0	12.4							
22/Jul/2005	08/Aug/2005	4.4	49.9	44.7	32.5	89.0	20.6	14.5	95.9	4.7	<1.0	39.2	38.0	35.0	8.1							
08/Aug/2005	06/Sep/2005	6.3	18.5	14.8	83.2	30.5	5.1	<1.0	30.4	9.3	<1.0	14.8	0.5	27.0	100.8							
06/Sep/2005	03/Oct/2005	5.3	16.1	9.1	12.5	58.1	12.7	6.8	65.0	1.5	<1.0	9.1	5.6	14.0	167.2							
03/Oct/2005	17/Oct/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0							
17/Oct/2005	04/Nov/2005	5.2	24.3	13.9	7.3	51.0	12.2	9.6	50.4	2.9	6.3	18.1	6.6	14.0	267.3							
04/Nov/2005	18/Nov/2005	5.6	20.6	4.0	5.8	138.8	24.3	6.3	148.4	3.3	<1.0	3.9	2.8	20.0	106.3							
18/Nov/2005	28/Nov/2005	5.4	40.4	3.1	<0.7	344.1	71.1	17.1	399.3	7.2	<1.0	0.0	3.6	55.0	30.8							
28/Nov/2005	22/Dec/2005	4.6	21.1	28.5	23.7	53.1	10.7	7.8	44.7	2.2	<1.0	14.7	22.9	19.0	47.2							
22/Dec/2005	09/Jan/2006	6.0	17.6	20.2	<1.4	43.5	7.8	6.2	35.6	4.8	14.9	12.3	0.9	13.6	36.0							
			Precipitation <weighted annual means for site (samples containing phosphate are excluded)																			Total rainfall
5152			27.1	15.9	18.4	102.2	21.4	7.8	118.2	3.5	1.7	15.2	10.1									1335.1

Polloch

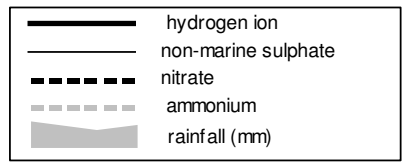
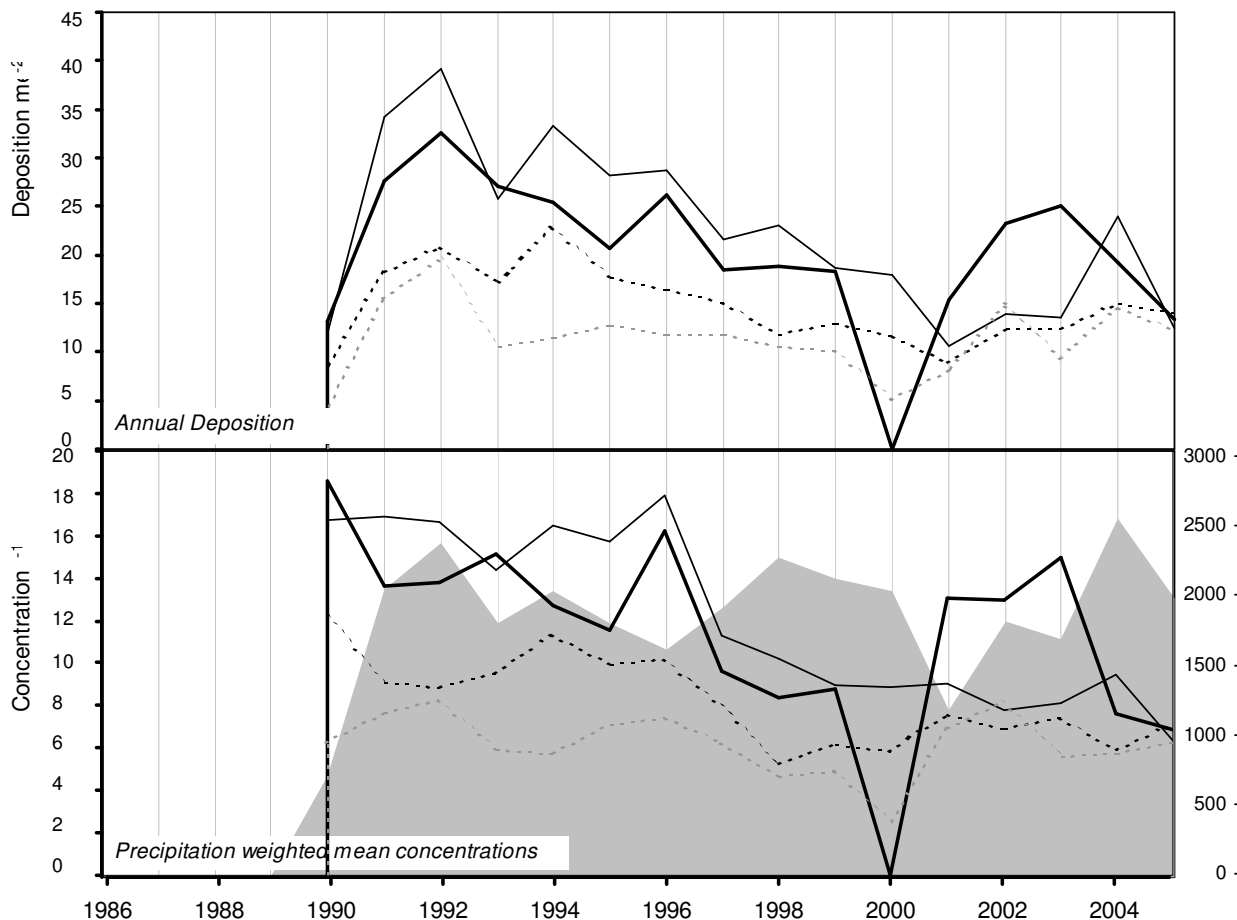
2005

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:
 Mr. J Kirby



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

<i>hydrogen ion</i>	-0.34 ueq/l (-2.16 %/year): 14 years' data	- No significant trend detected
<i>non-marine sulphate</i>	-0.78 ueq/l (-3.69 %/year): 15 years' data	++++ Very strong trend detected
<i>nitrate</i>	-0.26 ueq/l (-2.35 %/year): 15 years' data	++ Moderately strong trend detected
<i>ammonium</i>	-0.09 ueq/l (-1.19 %/year): 15 years' data	- No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5151) Polloch

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
11/Jan/2005	25/Jan/2005	5.5	145.9	9.8	4.1	1207.0	259.3	50.5	1303.6	24.4	<1.0	0.5	3.0	187.0	78.8
25/Jan/2005	08/Feb/2005	5.1	12.1	5.8	3.3	110.3	21.6	5.1	118.1	2.2	<1.0	0.0	8.1	20.5	47.1
08/Feb/2005	22/Feb/2005	5.3	48.4	4.2	<0.7	395.8	86.0	19.0	418.8	9.9	<1.0	0.7	4.8	68.0	79.1
22/Feb/2005	08/Mar/2005	5.1	9.7	1.5	<0.7	142.4	26.4	8.8	154.8	3.4	<1.0	0.0	8.3	23.0	16.4
08/Mar/2005	22/Mar/2005	5.4	16.7	11.4	14.7	94.2	16.7	8.8	102.5	9.2	<1.0	5.4	4.3	18.3	146.0
22/Mar/2005	07/Apr/2005	5.2	32.8	29.5	34.8	151.8	30.7	14.0	161.7	4.7	<1.0	14.5	6.8	31.3	6.2
07/Apr/2005	19/Apr/2005	4.8	39.2	14.9	10.2	188.1	40.6	13.9	222.6	4.0	<1.0	16.6	17.8	40.3	80.8
19/Apr/2005	03/May/2005	5.0	15.5	11.8	7.7	80.9	14.3	8.9	96.3	4.5	<1.0	5.7	9.3	19.0	22.3
03/May/2005	17/May/2005	5.2	32.4	5.8	4.4	166.8	32.9	9.2	174.0	7.5	<1.0	12.3	6.8	31.0	30.0
17/May/2005	30/May/2005	4.9	8.3	6.8	3.9	25.4	5.0	4.6	29.0	1.5	<1.0	5.3	11.5	<10.0	78.1
30/May/2005	14/Jun/2005	5.0	4.4	4.7	2.8	1.5	1.6	1.0	4.9	1.4	<1.0	4.2	9.1	<10.0	68.6
14/Jun/2005	28/Jun/2005	5.4	9.7	10.5	10.5	14.3	6.5	9.4	16.1	4.2	<1.0	8.0	3.7	<10.0	57.2
28/Jun/2005	12/Jul/2005	5.1	33.0	17.1	11.5	100.4	20.2	12.2	119.9	4.1	<1.0	20.9	8.5	23.0	16.0
12/Jul/2005	27/Jul/2005	5.0	12.7	5.1	<3.3	46.9	11.5	8.4	62.5	1.6	<1.0	7.0	11.2	14.0	56.1
27/Jul/2005	09/Aug/2005	6.2	21.6	3.6	29.2	94.8	14.1	3.7	110.5	8.3	1.0	10.2	0.7	21.0	34.4
09/Aug/2005	23/Aug/2005	5.2	12.5	3.6	<0.7	14.2	3.3	3.4	12.6	1.0	<1.0	10.8	6.9	<10.0	100.6
23/Aug/2005	06/Sep/2005	5.1	14.0	6.9	<0.2	79.0	16.0	10.9	89.2	1.7	<1.0	4.5	7.2	16.0	90.5
06/Sep/2005	21/Sep/2005	5.2	11.4	4.0	2.5	47.5	10.1	6.1	48.6	1.2	<1.0	5.7	6.0	<10.0	106.1
21/Sep/2005	04/Oct/2005	5.3	25.5	4.7	7.1	174.7	37.3	9.7	197.6	3.8	<1.0	4.5	5.4	30.0	141.8
04/Oct/2005	18/Oct/2005	5.6	25.8	10.7	27.2	86.4	15.9	6.3	93.4	1.8	<1.0	15.4	2.8	20.0	126.2
18/Oct/2005	01/Nov/2005	4.9	14.1	7.4	3.4	68.6	11.7	5.7	70.9	1.0	<1.0	5.8	12.9	16.0	124.7
01/Nov/2005	15/Nov/2005	5.5	60.2	1.8	<0.7	493.4	103.3	24.5	557.1	10.5	<1.0	0.8	3.5	80.0	208.0
15/Nov/2005	29/Nov/2005	5.2	78.0	16.5	2.2	556.9	124.3	23.0	637.4	12.3	<1.0	10.9	6.3	92.1	25.2
29/Nov/2005	13/Dec/2005	4.9	12.8	15.1	3.3	49.1	9.0	4.1	47.2	1.6	<1.0	6.9	11.7	13.7	32.7
13/Dec/2005	27/Dec/2005	5.4	17.1	3.8	0.5	111.8	21.5	8.3	124.2	2.4	<1.0	3.6	4.1	20.3	125.3
27/Dec/2005	10/Jan/2006	4.9	15.8	13.9	6.2	68.8	12.0	4.7	72.4	1.8	<1.0	7.5	11.7	17.7	64.5
5151			29.1	7.1	6.3	191.4	39.9	11.5	211.4	5.1	0.5	6.3	6.8		Total rainfall 1962.6

Lochnagar

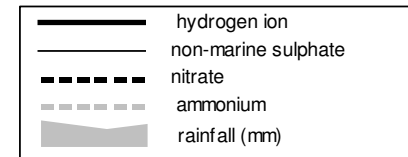
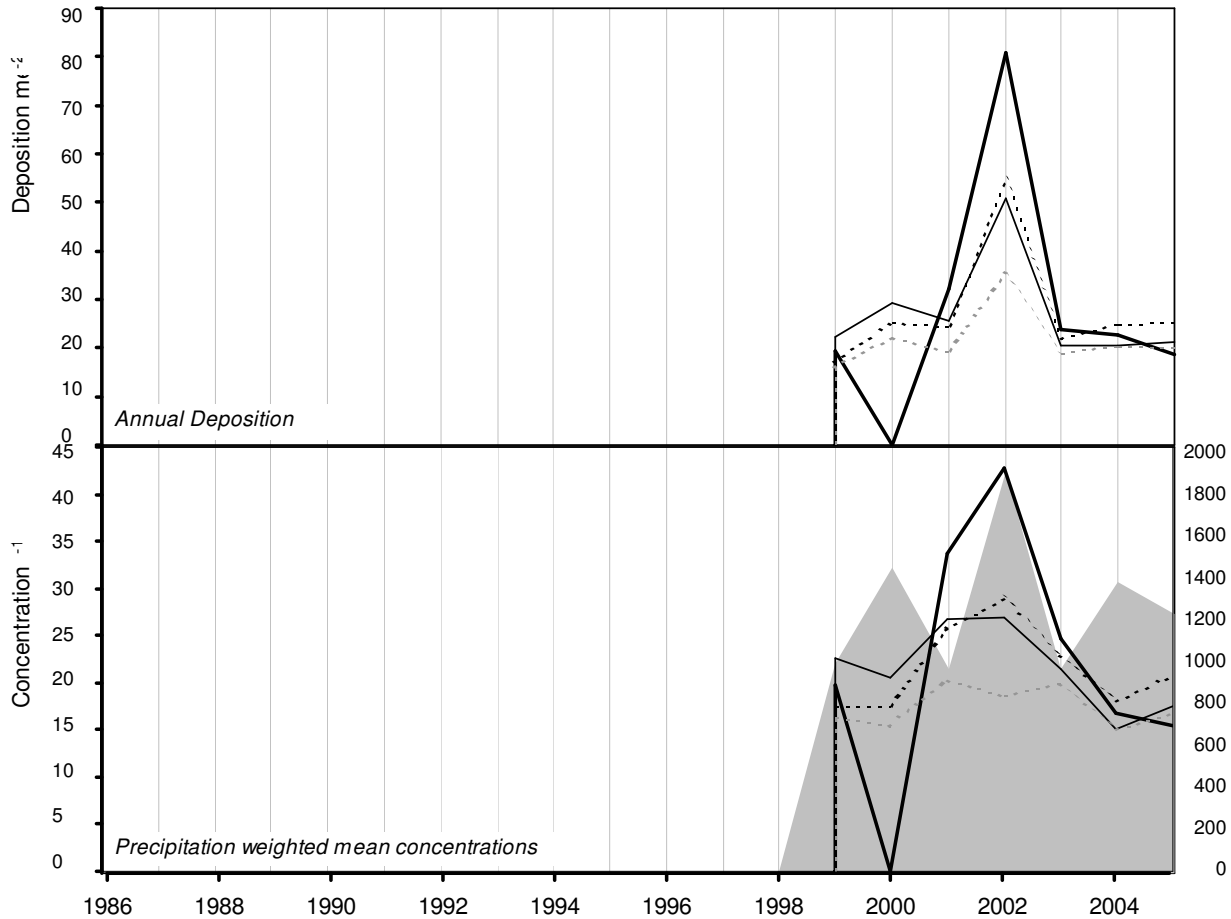
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
hydrogen ion	-x
non-marine sulphate	-x
nitrate	-x
ammonium	-x

ACID DEPOSITION DATA REPORT, 2005

(5157) Lochnagar

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
13/Jan/2005	26/Jan/2005	4.6	22.4	32.8	18.1	76.1	20.9	7.3	81.6	1.6	<1.0	13.3	23.4	26.0	40.1
26/Jan/2005	09/Feb/2005	5.1	3.3	7.3	<0.7	16.4	2.9	1.4	12.9	0.6	<1.0	1.3	7.9	<10.0	29.4
09/Feb/2005	09/Mar/2005	5.5	22.2	6.6	4.7	126.1	25.6	9.4	141.1	3.2	<1.0	7.0	3.3	32.2	8.3
09/Mar/2005	23/Mar/2005	4.9	29.2	36.9	37.7	27.5	7.2	8.6	37.3	1.5	<1.0	25.9	11.5	17.0	37.2
23/Mar/2005	06/Apr/2005	4.5	61.5	73.8	76.1	36.4	8.2	11.1	40.8	2.1	<1.0	57.1	28.8	29.1	62.3
06/Apr/2005	20/Apr/2005	4.7	25.7	23.7	21.1	32.7	6.9	5.5	39.3	1.1	<1.0	21.8	20.4	18.0	48.1
20/Apr/2005	04/May/2005	4.9	20.5	22.1	19.3	12.8	<0.8	2.1	22.0	0.9	<1.0	18.9	11.5	12.0	68.7
04/May/2005	18/May/2005	5.3	36.4	6.5	5.6	64.9	19.4	14.4	88.5	2.2	41.0	28.5	5.5	15.0	3.7
18/May/2005	01/Jun/2005	4.7	18.5	14.7	13.4	13.0	3.6	2.8	16.7	2.4	<1.0	17.0	18.2	11.0	117.8
01/Jun/2005	15/Jun/2005	4.8	14.8	13.8	7.8	19.3	5.8	10.9	24.1	3.1	<1.0	12.5	14.5	11.0	61.8
15/Jun/2005	29/Jun/2005	5.1	33.7	29.2	39.4	6.6	5.7	7.5	9.7	<0.5	<1.0	32.9	7.6	<10.0	35.9
29/Jun/2005	13/Jul/2005	4.8	33.9	17.1	18.3	26.0	6.0	7.2	37.3	1.1	<1.0	30.8	17.8	14.0	23.9
13/Jul/2005	27/Jul/2005	4.4	19.9	13.9	28.4	22.2	7.8	11.4	20.9	2.5	<1.0	17.2	39.8	<10.0	13.2
27/Jul/2005	10/Aug/2005	5.1	10.5	5.8	4.1	23.5	6.1	5.1	30.8	1.9	<1.0	7.7	7.6	10.0	31.7
10/Aug/2005	23/Aug/2005	4.8	10.4	12.6	2.5	6.4	<0.8	9.5	7.4	1.2	<1.0	9.6	15.8	<10.0	5.1
23/Aug/2005	07/Sep/2005	4.9	11.8	14.9	2.3	23.4	6.6	11.0	24.7	1.1	<1.0	8.9	12.6	<10.0	45.0
07/Sep/2005	19/Sep/2005	5.3	13.1	16.2	11.0	38.1	10.6	8.7	53.9	1.0	<1.0	8.5	5.2	11.0	23.9
19/Sep/2005	05/Oct/2005	4.9	23.3	10.0	13.2	44.3	10.7	5.4	50.1	1.1	<1.0	18.0	13.8	15.0	89.5
05/Oct/2005	20/Oct/2005	4.8	22.0	20.1	19.7	31.2	6.9	4.5	33.7	1.4	<1.0	18.2	15.5	12.0	144.5
20/Oct/2005	02/Nov/2005	4.9	17.0	12.7	9.6	47.0	9.0	5.6	47.4	0.9	<1.0	11.3	12.0	15.0	104.2
02/Nov/2005	17/Nov/2005	5.0	14.1	4.1	<0.7	67.8	14.9	5.2	75.2	4.5	<1.0	5.9	9.3	14.9	122.0
17/Nov/2005	01/Dec/2005	5.1	32.4	33.1	15.1	150.1	24.8	8.3	127.4	5.9	<1.0	14.3	7.4	27.3	3.3
01/Dec/2005	15/Dec/2005	4.5	25.4	48.5	14.2	48.6	11.5	6.9	48.3	0.1	<1.0	19.6	30.9	22.9	56.8
15/Dec/2005	26/Dec/2005	5.9	13.3	11.2	<0.2	125.9	13.8	7.8	103.8	5.6	<1.0	0.0	1.3	19.3	10.1
26/Dec/2005	12/Jan/2006	4.7	27.2	25.5	8.9	83.8	17.2	11.2	84.4	3.0	<1.0	17.1	21.4	21.7	27.8
			Precipitation <weighted annual means for site (samples containing phosphate are excluded)												
5157			21.9	20.7	16.7	37.5	8.5	6.2	41.8	1.8	0.5	17.6	15.5		Total rainfall 1214.5

Glen Dye

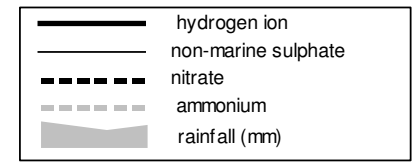
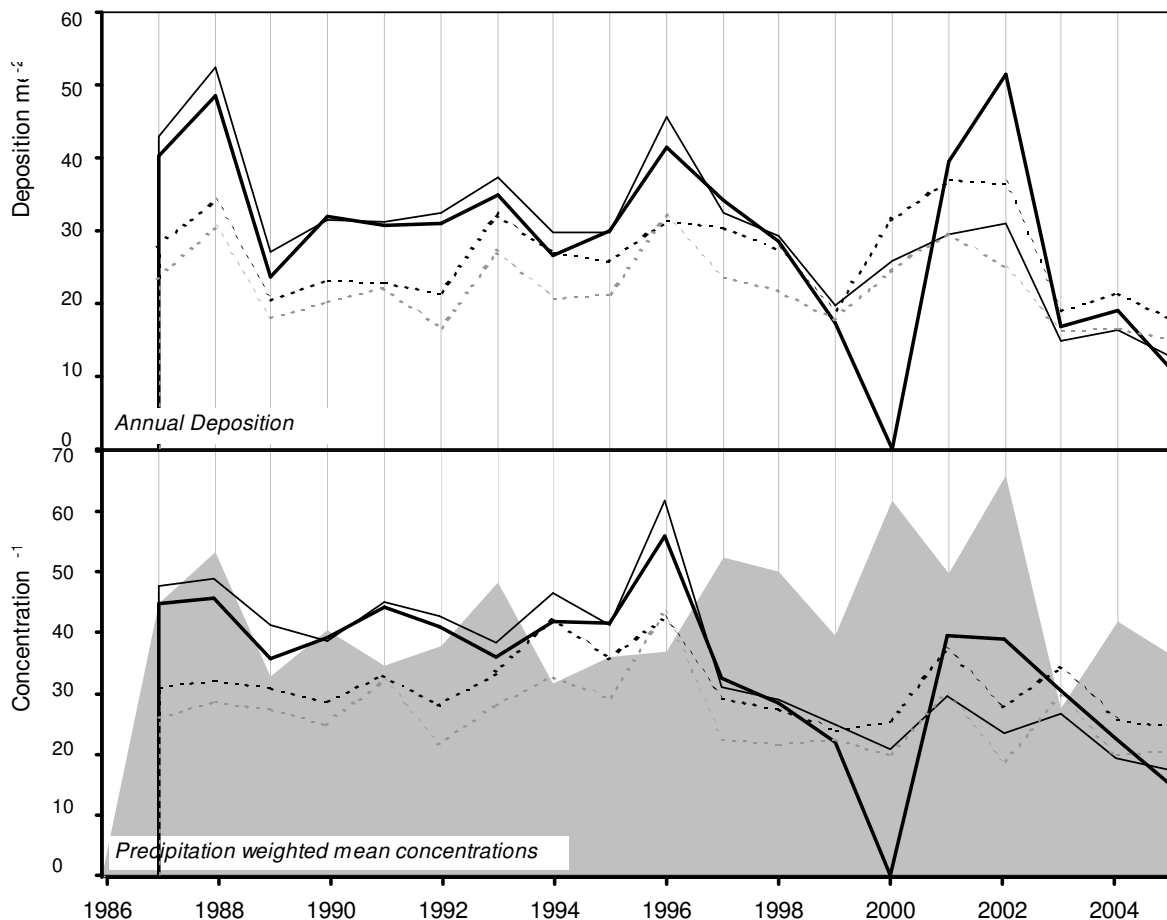
2005

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, SO₂, Daily SO₄, EMEP

Site Operator:
 SEPA; North Region



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-1.12 ueq/l (-2.37 %/year): 18 years' data ++ Moderately strong trend detected
<i>non-marine sulphate</i>	-1.66 ueq/l (-3.19 %/year): 19 years' data +++ Strong trend detected
<i>nitrate</i>	-0.25 ueq/l (-0.75 %/year): 19 years' data - No significant trend detected
<i>ammonium</i>	-0.37 ueq/l (-1.22 %/year): 19 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5011) Glen Dye

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
11/Jan/2005	25/Jan/2005	5.4	55.2	25.9	22.9	354.3	77.1	22.6	451.8	8.1	<1.0	12.5	4.3	63.0	11.9
25/Jan/2005	08/Feb/2005	5.3	16.8	25.0	32.7	31.1	6.4	3.6	28.7	1.0	<1.0	13.0	4.7	12.9	10.3
08/Feb/2005	22/Feb/2005	5.3	27.0	16.5	10.6	214.5	43.0	11.2	224.6	10.7	<1.0	1.2	5.1	38.0	31.8
22/Feb/2005	08/Mar/2005	4.8	28.3	7.0	7.6	219.4	47.0	11.9	260.6	4.7	<1.0	1.9	14.5	40.0	23.0
08/Mar/2005	22/Mar/2005	4.8	38.2	41.4	46.4	60.3	13.8	16.5	63.3	1.6	<1.0	30.9	14.5	25.5	17.8
22/Mar/2005	05/Apr/2005	4.5	101.2	115.2	124.2	106.2	23.3	13.5	136.8	3.6	<1.0	88.4	35.5	49.0	19.0
05/Apr/2005	19/Apr/2005	5.0	19.0	17.4	18.2	39.1	7.9	2.6	43.6	0.7	<1.0	14.3	11.0	15.1	77.4
19/Apr/2005	03/May/2005	4.6	27.5	36.3	25.5	24.3	5.4	8.1	28.4	2.7	<1.0	24.6	22.9	20.0	26.0
03/May/2005	16/May/2005	5.5	12.9	8.1	11.8	48.2	10.3	4.6	50.8	2.8	<1.0	7.1	3.2	14.0	24.5
16/May/2005	30/May/2005	4.5	48.1	53.4	45.9	34.2	10.6	10.5	40.8	2.5	<1.0	44.0	34.7	29.0	41.3
30/May/2005	14/Jun/2005	4.8	17.7	15.5	8.4	34.5	9.3	12.0	44.2	1.9	<1.0	13.5	15.8	16.0	27.6
14/Jun/2005	28/Jun/2005	4.9	46.7	45.4	50.9	24.6	6.4	8.4	24.2	3.0	<1.0	43.8	14.1	19.0	12.7
28/Jun/2005	12/Jul/2005	4.6	37.6	29.9	12.2	16.9	5.7	12.4	19.6	1.4	<1.0	35.5	26.3	15.0	14.4
12/Jul/2005	27/Jul/2005	5.7	43.9	19.5	0.2	45.5	19.6	33.5	53.1	11.8	<1.0	38.4	1.9	18.0	3.1
27/Jul/2005	09/Aug/2005	5.1	29.3	16.6	12.3	84.1	17.8	8.0	95.0	5.2	1.0	19.2	8.9	22.0	19.3
09/Aug/2005	23/Aug/2005	5.5	9.0	10.5	12.3	8.4	2.9	3.0	8.4	2.3	<1.0	8.0	3.5	<10.0	32.1
23/Aug/2005	06/Sep/2005	5.1	19.2	20.4	11.7	13.5	6.6	13.1	15.3	1.3	<1.0	17.5	8.5	<10.0	18.2
06/Sep/2005	20/Sep/2005	5.3	32.1	29.6	27.0	88.0	18.3	19.6	86.0	6.4	<1.0	21.5	4.6	20.0	7.8
20/Sep/2005	04/Oct/2005	5.0	34.9	22.4	28.9	77.8	16.9	16.2	86.9	4.0	<1.0	25.5	9.3	22.0	12.8
04/Oct/2005	05/Oct/2005	5.0	12.4	10.9	11.9	14.4	3.5	5.5	14.4	0.5	<1.0	10.7	9.8	<10.0	12.5
05/Oct/2005	18/Oct/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
18/Oct/2005	01/Nov/2005	5.6	18.0	8.6	16.1	83.2	14.1	7.5	82.3	2.1	<1.0	7.9	2.3	16.0	93.3
01/Nov/2005	15/Nov/2005	4.9	24.1	15.6	8.7	106.2	20.2	7.5	114.1	3.0	<1.0	11.3	11.7	20.0	37.0
15/Nov/2005	29/Nov/2005	5.3	19.7	6.6	1.7	162.9	30.8	8.5	173.4	3.9	<1.0	0.1	5.4	25.0	49.5
29/Nov/2005	13/Dec/2005	4.4	33.9	47.4	23.2	121.0	27.0	9.0	122.1	3.2	<1.0	19.3	40.7	36.8	71.4
13/Dec/2005	28/Dec/2005	4.7	35.4	24.3	13.2	148.8	31.6	9.7	167.9	3.7	<1.0	17.5	18.6	33.8	27.6
			Precipitation<weighted annual means for site(samples containing phosphate are excluded)												
5011			28.0	24.7	20.9	88.5	18.5	8.9	96.5	3.1	0.5	17.3	14.6		Total rainfall 722.4

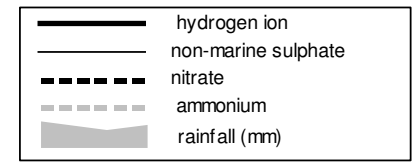
Allt a' Mharcaidh

2005 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:
Fisheries Research Services



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-0.46 ueq/l (-2.20 %/year): 19 years' data +++ Strong trend detected
<i>non-marine sulphate</i>	-0.66 ueq/l (-3.07 %/year): 20 years' data +++ Strong trend detected
<i>nitrate</i>	0.06 ueq/l (0.58 %/year): 20 years' data - No significant trend detected
<i>ammonium</i>	0.06 ueq/l (1.18 %/year): 20 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5103) Allt a' Mharcaidh

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+	Conductivity (S/cm)	Rainfall (mm)
11/Jan/2005	25/Jan/2005	5.4	81.4	5.7	1.0	720.0	155.9	31.0	841.7	14.4	<1.0	0.0	4.0	117.0	18.1
25/Jan/2005	07/Feb/2005	5.4	1.7	2.6	<0.7	12.4	4.2	0.6	10.6	0.1	<1.0	0.2	4.5	<10.0	30.4
07/Feb/2005	21/Feb/2005	5.2	23.0	11.2	5.2	176.6	38.0	10.0	186.4	3.6	<1.0	1.7	6.9	31.0	34.9
21/Feb/2005	08/Mar/2005	4.8	27.5	7.2	7.3	253.2	55.6	13.7	292.3	4.6	<1.0	0.0	15.5	45.7	22.2
08/Mar/2005	22/Mar/2005	5.1	4.1	7.6	0.8	42.9	6.5	7.2	48.1	1.1	<1.0	0.0	7.6	<10.0	18.2
22/Mar/2005	05/Apr/2005	7.0	56.4	31.7	137.5	65.3	23.9	8.7	65.7	47.0	79.1	48.5	0.1	63.4	10.9
05/Apr/2005	19/Apr/2005	6.8	112.6	27.9	439.1	93.0	11.1	1.7	125.6	84.6	175.8	101.4	0.2	86.2	31.1
19/Apr/2005	03/May/2005	7.8	502.5	16.7	3480.8	231.5	106.4	69.4	160.0	143.3	683.5	474.6	0.0	708.0	21.7
03/May/2005	17/May/2005	8.0	2026.3	<0.7	8421.9	917.9	514.0	217.9	615.0	1463.4	3871.9	1915.7	0.0	20000.0	10.2
17/May/2005	31/May/2005	7.9	726.7	9.7	3989.8	205.8	124.9	93.0	75.7	353.1	2612.0	701.9	0.0	824.0	53.8
31/May/2005	14/Jun/2005	7.7	784.3	<1.4	7515.7	370.7	135.3	39.0	276.1	874.1	1532.4	739.7	0.0	1105.0	31.1
14/Jun/2005	28/Jun/2005	8.4	1298.0	<0.7	8338.4	286.8	106.4	<21.5	399.8	816.4	2580.5	1263.5	0.0	1094.0	24.2
28/Jun/2005	12/Jul/2005	7.0	221.3	29.2	973.3	48.5	14.1	6.3	65.7	84.8	78.4	215.5	0.1	158.0	11.0
12/Jul/2005	26/Jul/2005	7.3	52.0	8.6	215.9	48.1	12.5	7.1	54.1	29.2	158.0	46.2	0.1	48.0	6.6
26/Jul/2005	09/Aug/2005	6.7	43.2	13.3	101.3	52.3	6.0	3.4	82.2	29.7	86.9	36.9	0.2	30.0	3.4
09/Aug/2005	24/Aug/2005	5.3	3.4	3.4	0.5	5.8	<0.8	<1.0	1.6	0.2	<1.0	2.7	5.5	<10.0	45.2
24/Aug/2005	05/Sep/2005	4.5	38.2	32.3	30.9	10.4	4.9	6.2	8.8	0.5	<1.0	37.0	30.2	16.0	60.5
05/Sep/2005	22/Sep/2005	7.2	52.4	11.3	328.2	23.6	7.4	<1.0	30.6	49.4	149.4	49.5	0.1	55.0	15.7
22/Sep/2005	04/Oct/2005	6.5	50.8	20.9	83.4	105.5	11.8	4.9	113.7	26.6	77.6	38.1	0.3	29.0	5.4
04/Oct/2005	17/Oct/2005	5.1	3.0	4.1	<0.2	5.8	<0.8	<1.0	4.3	0.1	<1.0	2.3	8.1	<10.0	43.4
17/Oct/2005	31/Oct/2005	4.7	25.1	20.6	16.4	98.4	20.2	7.2	103.9	3.0	<1.0	13.2	21.4	25.0	40.1
31/Oct/2005	14/Nov/2005	5.7	11.0	2.5	1.2	82.4	15.0	5.1	90.9	6.2	<1.0	1.1	2.2	12.0	61.1
14/Nov/2005	28/Nov/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
28/Nov/2005	12/Dec/2005	4.6	22.8	46.6	7.4	75.1	7.8	6.6	41.3	3.6	<1.0	13.8	26.9	18.5	20.6
12/Dec/2005	28/Dec/2005	6.1	17.9	5.2	26.2	121.6	19.5	11.6	137.2	8.3	<1.0	3.3	0.8	23.6	8.6
28/Dec/2005	09/Jan/2006	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
5103			19.6	12.8	8.4	95.9	19.9	6.5	104.1	3.0	0.5	10.0	12.2		Total rainfall 628.3

Strathvaich Dam

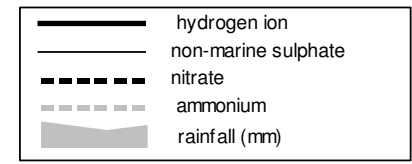
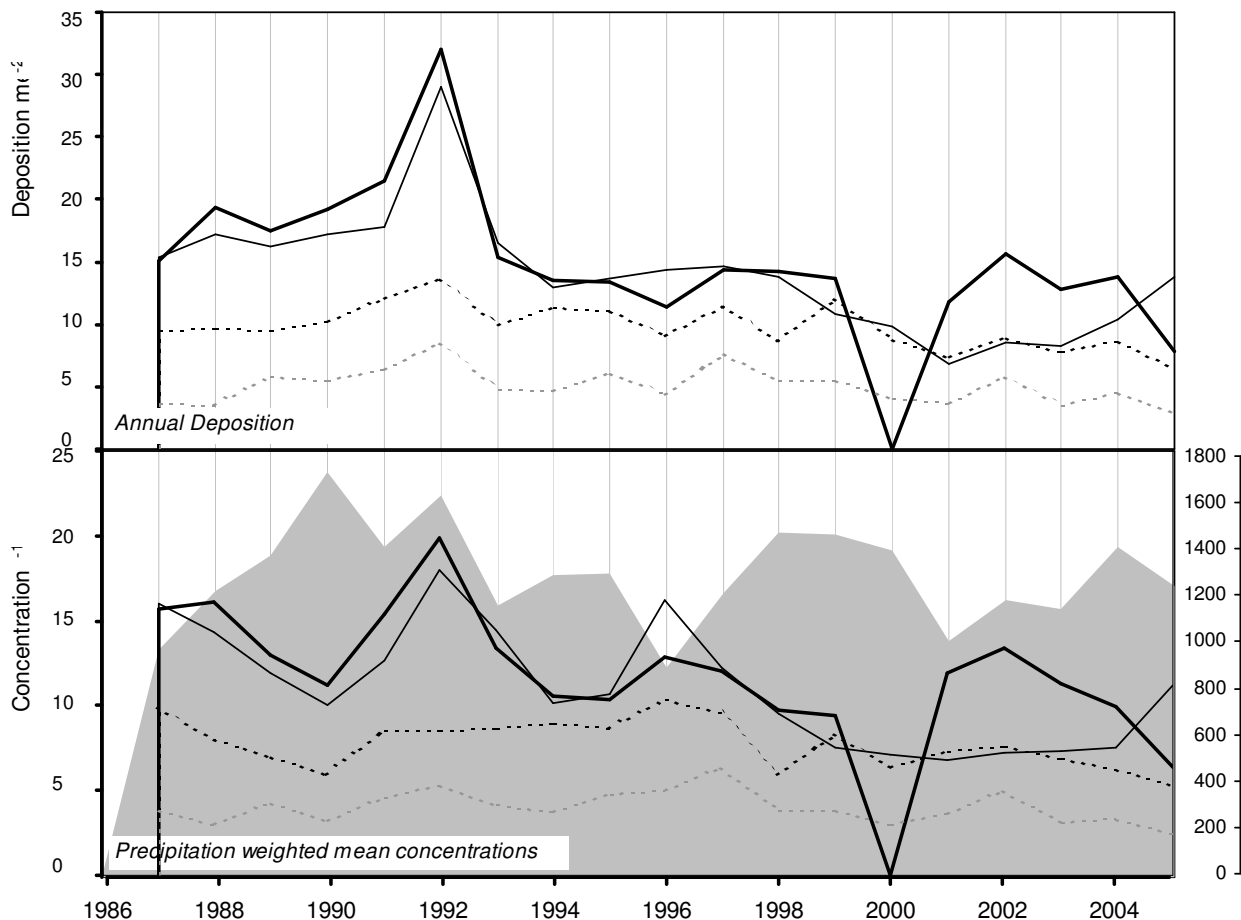
2005

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, SO₂, Daily SO₄, HNO₃ Denuder, NO_x, SO₂,
 ozone, EMEP

Site Operator:
 CLOVA



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-0.34 ueq/l (-2.18 %/year): 18 years' data ++ Moderately strong trend detected
<i>non-marine sulphate</i>	-0.40 ueq/l (-2.69 %/year): 19 years' data ++ Moderately strong trend detected
<i>nitrate</i>	-0.12 ueq/l (-1.34 %/year): 19 years' data + Significant trend detected
<i>ammonium</i>	-0.03 ueq/l (-0.78 %/year): 19 years' data - No significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5010) Strathvaich Dam

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
05/Jan/2005	16/Jan/2005	5.6	51.5	<0.7	<1.4	107.3	24.7	5.9	393.7	3.6	<1.0	38.6	2.5	72.0	158.3
16/Jan/2005	27/Jan/2005	5.5	103.2	3.9	<0.7	908.2	192.5	41.5	1334.4	18.2	<1.0	0.0	3.5	146.0	33.5
27/Jan/2005	06/Feb/2005	5.5	2.5	1.3	<0.7	36.0	6.6	1.6	34.3	0.6	<1.0	0.0	3.4	<10.0	38.8
06/Feb/2005	28/Feb/2005	5.2	68.1	5.6	<0.8	479.0	105.8	22.2	547.8	10.1	<1.0	10.4	5.9	86.0	57.9
28/Feb/2005	09/Mar/2005	5.2	56.1	1.7	<0.7	414.2	91.5	18.8	550.4	9.0	<1.0	6.2	6.9	74.9	18.0
09/Mar/2005	21/Mar/2005	5.1	6.9	3.5	3.2	84.9	15.7	8.4	89.6	1.7	<1.0	0.0	7.2	14.7	72.8
21/Mar/2005	03/Apr/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
03/Apr/2005	14/Apr/2005	5.0	18.5	8.7	7.0	105.1	20.9	6.8	115.2	2.2	<1.0	5.8	9.5	22.3	79.9
14/Apr/2005	01/May/2005	5.8	20.3	23.3	14.0	70.9	13.2	14.9	78.1	6.6	<1.0	11.8	1.6	19.0	23.7
01/May/2005	15/May/2005	5.2	10.9	2.1	1.9	81.8	16.3	4.9	92.6	2.1	<1.0	1.0	6.2	18.0	83.3
15/May/2005	29/May/2005	4.7	17.2	13.8	8.4	37.3	7.8	7.2	43.6	2.8	<1.0	12.7	18.2	14.0	57.4
29/May/2005	12/Jun/2005	5.0	5.8	6.4	<0.7	7.9	4.0	1.0	12.2	0.1	<1.0	4.9	10.5	<10.0	42.8
12/Jun/2005	25/Jun/2005	4.9	9.8	8.6	<1.4	21.4	6.7	7.4	25.4	3.6	<1.0	7.2	13.2	<10.0	30.9
25/Jun/2005	10/Jul/2005	4.7	44.5	33.4	19.2	77.3	17.0	18.7	91.3	2.9	<1.0	35.2	19.1	26.0	5.3
10/Jul/2005	24/Jul/2005	5.1	10.9	1.2	<0.6	19.0	4.6	3.5	22.7	0.5	<1.0	8.7	8.7	<10.0	24.2
24/Jul/2005	07/Aug/2005	4.9	21.8	<0.7	<0.7	81.0	16.2	7.2	88.8	1.2	<1.0	12.0	11.5	19.0	23.1
07/Aug/2005	21/Aug/2005	5.2	3.4	2.8	<0.7	2.9	<0.8	<1.0	4.3	0.2	<1.0	3.0	6.9	<10.0	39.0
21/Aug/2005	04/Sep/2005	5.3	12.4	7.0	<0.7	83.4	16.4	9.7	94.3	3.0	<1.0	2.4	5.5	16.0	32.6
04/Sep/2005	18/Sep/2005	5.1	7.5	<0.7	<0.7	30.2	8.5	7.8	43.5	1.0	<1.0	3.8	7.9	<10.0	7.6
18/Sep/2005	02/Oct/2005	5.2	14.9	2.5	0.1	112.6	21.3	6.2	125.1	2.3	<1.0	1.4	7.1	20.0	82.6
02/Oct/2005	16/Oct/2005	5.3	4.6	5.1	0.2	14.9	3.2	<1.0	14.8	0.2	<1.0	2.8	4.9	<10.0	43.3
16/Oct/2005	30/Oct/2005	5.8	12.4	13.7	19.7	24.9	4.3	9.0	23.9	0.7	<1.0	9.4	1.7	<10.0	35.9
30/Oct/2005	13/Nov/2005	5.5	24.7	2.0	<2.1	229.3	42.4	13.4	234.9	4.4	<1.0	0.0	3.0	33.0	88.0
13/Nov/2005	29/Nov/2005	5.7	88.4	2.3	<0.7	792.2	176.3	30.2	824.2	18.3	<1.0	0.0	2.1	114.3	48.3
29/Nov/2005	14/Dec/2005	4.7	30.4	43.9	3.2	145.5	25.1	10.4	155.6	4.5	<1.0	12.8	21.9	31.3	18.1
14/Dec/2005	02/Jan/2006	5.5	22.9	4.3	<1.1	177.4	40.3	13.7	197.6	6.0	<1.0	1.5	3.5	29.2	84.3
5010			27.6	5.3	2.5	165.0	35.0	9.9	225.7	4.2	0.5	11.2	6.4		Total rainfall 1229.7

Achanarras

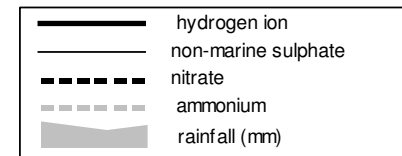
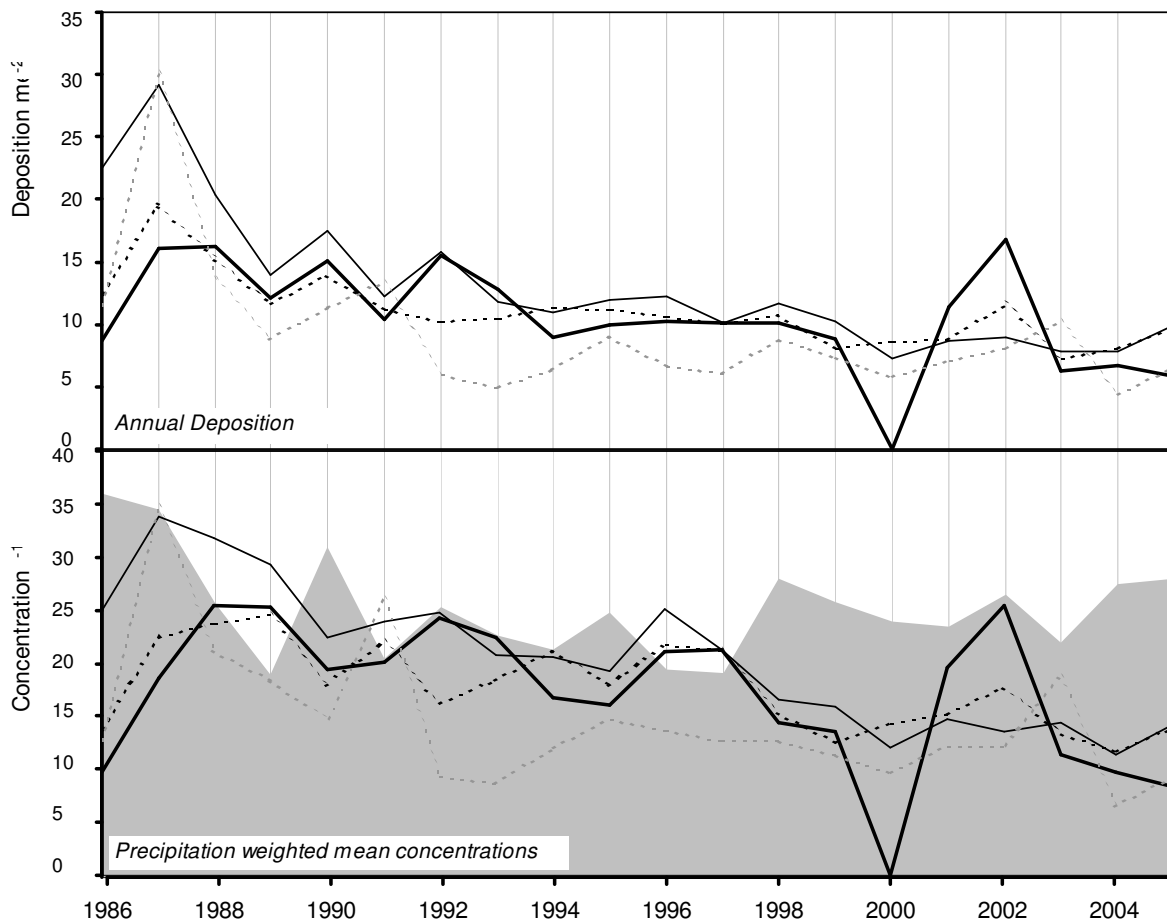
2005

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



long-term trends in concentration (+x = increase; -x = decrease)	
<i>hydrogen ion</i>	-0.39 ueq/l (-1.79 %/year): 19 years' data - No significant trend detected
<i>non-marine sulphate</i>	-0.95 ueq/l (-3.23 %/year): 20 years' data ++++ Very strong trend detected
<i>nitrate</i>	-0.43 ueq/l (-1.96 %/year): 20 years' data ++ Moderately strong trend detected
<i>ammonium</i>	-0.57 ueq/l (-2.86 %/year): 20 years' data + Significant trend detected

ACID DEPOSITION DATA REPORT, 2005

(5140) Achanarras

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+	Conductivity (S/cm)	Rainfall (mm)
05/Jan/2005	12/Jan/2005	5.8	50.8	<0.7	<0.7	431.0	100.0	21.0	534.3	10.3	<1.0	0.0	1.8	73.0	21.6
12/Jan/2005	26/Jan/2005	5.6	130.4	6.8	<0.7	641.9	233.4	48.1	301.3	22.5	<1.0	53.1	2.5	176.0	35.1
26/Jan/2005	09/Feb/2005	5.5	44.1	5.7	4.6	301.1	63.8	13.5	323.6	5.5	<1.0	7.8	3.3	54.0	41.7
09/Feb/2005	23/Feb/2005	5.1	183.9	1.8	6.2	1528.3	320.8	61.4	1590.2	29.3	<1.0	0.0	8.3	229.0	20.9
23/Feb/2005	09/Mar/2005	5.5	95.0	7.1	7.0	707.0	150.5	30.9	812.2	14.2	<1.0	9.8	3.0	120.3	34.2
09/Mar/2005	22/Mar/2005	5.3	20.5	11.6	7.4	70.8	13.8	5.7	72.0	1.8	<1.0	11.9	5.4	15.0	27.5
22/Mar/2005	06/Apr/2005	7.8	352.0	35.1	914.7	1295.3	242.3	52.9	363.3	156.1	217.0	196.0	0.0	362.0	16.1
06/Apr/2005	20/Apr/2005	5.4	106.7	158.3	175.0	228.2	75.8	48.2	265.2	7.6	<1.0	79.3	3.9	78.0	5.3
20/Apr/2005	04/May/2005	5.1	55.4	55.9	46.0	165.0	33.2	15.1	187.6	7.8	<1.0	35.6	8.1	45.0	10.7
04/May/2005	18/May/2005	5.6	85.3	6.7	9.9	475.7	100.9	27.6	565.0	15.7	<1.0	28.0	2.8	83.0	28.7
18/May/2005	01/Jun/2005	4.8	19.5	16.2	8.1	83.2	16.0	5.0	90.3	2.1	<1.0	9.5	17.4	23.0	70.2
01/Jun/2005	15/Jun/2005	4.7	32.5	7.1	<0.7	143.0	29.7	18.8	166.1	3.8	<1.0	15.2	20.0	32.0	37.1
15/Jun/2005	29/Jun/2005	4.9	27.2	37.8	19.6	47.8	13.8	10.7	46.3	5.0	<1.0	21.5	13.8	20.0	9.2
29/Jun/2005	13/Jul/2005	7.2	54.9	21.1	294.7	63.5	9.2	6.6	76.0	28.3	115.6	47.2	0.1	57.0	9.9
13/Jul/2005	27/Jul/2005	5.3	15.1	6.5	10.8	53.3	10.2	3.5	57.4	1.7	1.0	8.7	4.9	13.0	41.2
27/Jul/2005	10/Aug/2005	5.0	23.0	1.5	5.9	92.4	18.0	8.3	114.0	3.7	<1.0	11.8	10.5	22.0	8.3
10/Aug/2005	24/Aug/2005	5.8	6.3	6.8	10.7	15.6	3.9	<1.0	14.1	2.5	<1.0	4.4	1.7	<10.0	21.9
24/Aug/2005	07/Sep/2005	4.7	28.0	45.2	34.6	58.5	11.7	6.9	64.7	1.9	<1.0	20.9	18.6	22.0	27.6
07/Sep/2005	21/Sep/2005	5.1	17.8	1.4	<0.7	117.1	23.2	9.6	121.9	2.1	<1.0	3.6	8.3	19.0	22.5
21/Sep/2005	05/Oct/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
05/Oct/2005	19/Oct/2005	5.5	11.9	8.5	7.3	52.7	8.1	6.0	55.1	1.3	<1.0	5.5	3.5	11.0	30.8
19/Oct/2005	02/Nov/2005	4.9	26.1	25.6	9.2	178.5	35.5	10.5	196.6	4.4	<1.0	4.6	12.3	36.0	31.8
02/Nov/2005	16/Nov/2005	5.8	20.1	15.9	3.2	129.7	24.4	9.9	126.1	4.0	<1.0	4.5	1.7	25.0	36.1
16/Nov/2005	30/Nov/2005	5.6	101.5	4.4	3.5	940.2	202.9	31.6	968.0	21.4	<1.0	0.0	2.3	128.4	55.8
30/Nov/2005	21/Dec/2005	4.8	67.9	23.1	10.6	473.9	95.8	17.8	577.6	9.8	<1.0	10.8	17.8	81.9	52.9
21/Dec/2005	28/Dec/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1
		Precipitation<weighted annual means for site(samples containing phosphate are excluded)													Total rainfall
5140			52.0	13.8	9.4	339.2	76.5	17.5	352.1	8.3	0.5	14.2	8.4		698.0

Appendix 1.2

Bulk Precipitation Data, 2005 - Weekly Measurements

Weekly measurements were continued at the following 3 sites:

- 5006 Lough Navar (designated as site 5161 for differentiation from the fortnightly measurements)
- 5002 Eskdalemuir (designated as site 5162 for differentiation from the fortnightly measurements)
- 5117 Thorganby (designated as site 5163 for differentiation from the fortnightly measurements)

(5161)LoughNavar(Weekly)

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
03/Jan/2005	10/Jan/2005	5.4	26.0	1.4	<0.7	236.0	50.7	11.5	280.2	5.3	<1.0	0.0	4.4	42.0	87.4
10/Jan/2005	17/Jan/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
17/Jan/2005	24/Jan/2005	5.7	22.2	2.5	3.0	228.0	48.6	12.0	263.5	5.4	<1.0	0.0	2.0	40.0	58.2
24/Jan/2005	31/Jan/2005	6.2	39.2	8.7	13.3	261.4	45.0	24.3	328.8	17.5	<1.0	7.7	0.6	46.0	2.7
31/Jan/2005	07/Feb/2005	5.6	9.6	2.8	3.3	43.1	21.9	20.5	49.2	1.4	<1.0	4.4	2.8	<10.0	19.6
07/Feb/2005	14/Feb/2005	5.5	48.1	3.4	<0.7	260.2	55.6	13.5	286.6	6.1	<1.0	16.7	3.0	46.0	46.9
14/Feb/2005	21/Feb/2005	5.8	25.0	7.4	6.5	168.8	35.5	12.0	189.7	4.8	<1.0	4.7	1.8	31.0	10.9
21/Feb/2005	28/Feb/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
28/Feb/2005	07/Mar/2005	5.6	19.0	<0.7	7.0	210.1	42.5	12.7	245.9	4.0	<1.0	0.0	2.5	35.0	15.2
07/Mar/2005	14/Mar/2005	6.1	27.0	3.3	9.9	187.8	38.6	18.5	208.2	3.8	<1.0	4.4	0.8	31.8	17.3
14/Mar/2005	21/Mar/2005	5.2	14.6	16.7	27.0	51.6	9.5	6.8	50.5	3.3	<1.0	8.4	6.9	12.7	30.0
21/Mar/2005	28/Mar/2005	6.0	32.0	41.4	64.4	159.7	10.8	35.5	46.8	64.0	<1.0	12.8	1.0	16.7	19.0
28/Mar/2005	04/Apr/2005	5.2	29.4	59.5	65.8	9.1	2.7	13.8	5.1	0.9	<1.0	28.3	6.5	16.6	1.6
04/Apr/2005	11/Apr/2005	5.5	22.8	7.9	0.7	193.1	39.5	21.3	211.0	5.2	<1.0	0.0	3.0	29.2	50.8
11/Apr/2005	18/Apr/2005	5.8	8.0	2.5	7.8	23.7	4.2	2.9	22.9	1.2	<1.0	5.1	1.7	<10.0	36.5
18/Apr/2005	25/Apr/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
25/Apr/2005	02/May/2005	6.0	21.3	30.6	34.2	28.0	5.5	16.8	33.3	3.1	<1.0	17.9	0.9	14.0	32.0
02/May/2005	09/May/2005	5.1	24.8	5.7	7.3	151.6	22.7	7.4	158.1	12.6	<1.0	6.6	7.2	25.0	19.0
09/May/2005	16/May/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
16/May/2005	23/May/2005	6.1	8.4	7.4	6.4	37.3	6.7	12.1	43.4	0.4	<1.0	3.9	0.8	11.0	32.5
23/May/2005	30/May/2005	4.9	20.4	15.8	13.5	26.1	8.2	6.9	34.8	1.3	<1.0	17.3	11.7	12.0	53.7
30/May/2005	06/Jun/2005	5.2	10.6	6.1	3.7	10.7	4.5	2.1	16.0	1.5	<1.0	9.3	5.9	<10.0	42.3
06/Jun/2005	13/Jun/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
13/Jun/2005	20/Jun/2005	5.1	11.3	7.2	1.8	19.5	4.8	4.7	25.8	0.8	<1.0	9.0	8.9	<10.0	27.8
20/Jun/2005	27/Jun/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7
27/Jun/2005	04/Jul/2005	5.9	13.8	10.6	9.0	41.8	7.3	2.1	47.3	0.5	<1.0	8.8	1.4	<10.0	24.0
04/Jul/2005	11/Jul/2005	5.2	14.1	6.8	6.4	44.4	9.0	6.8	48.6	1.4	<1.0	8.7	6.5	11.0	17.5
11/Jul/2005	18/Jul/2005	5.7	17.6	9.4	7.2	51.5	10.2	16.1	58.9	2.7	<1.0	11.4	2.0	13.0	8.4
18/Jul/2005	25/Jul/2005	5.2	46.4	2.1	<0.1	254.3	53.9	20.2	309.8	8.9	<1.0	15.8	6.0	48.0	8.2
25/Jul/2005	01/Aug/2005	6.6	21.0	27.4	26.0	35.7	10.8	35.4	32.8	2.5	<1.0	16.7	0.2	17.0	8.8
01/Aug/2005	08/Aug/2005	5.3	25.7	2.3	<0.7	143.4	27.7	10.6	163.5	3.9	1.0	8.5	5.6	28.0	18.6
08/Aug/2005	15/Aug/2005	6.4	11.9	4.0	4.7	34.8	10.1	18.9	30.0	3.9	<1.0	7.7	0.4	11.0	9.1
15/Aug/2005	22/Aug/2005	6.0	11.8	9.8	15.5	28.7	6.2	7.5	31.4	1.1	<1.0	8.3	1.0	<10.0	36.2
22/Aug/2005	29/Aug/2005	5.3	14.2	3.1	1.3	108.3	19.7	7.9	124.0	2.3	<1.0	1.2	4.7	20.0	63.5
29/Aug/2005	05/Sep/2005	5.2	37.4	41.1	50.4	23.1	7.0	16.5	34.6	3.0	<1.0	34.6	6.0	16.0	9.3
05/Sep/2005	12/Sep/2005	5.6	23.3	24.7	26.3	29.5	6.7	6.5	39.6	2.0	<1.0	19.8	2.6	11.0	13.4
12/Sep/2005	19/Sep/2005	6.0	13.2	8.1	<0.5	55.5	12.1	11.7	76.2	2.1	<1.0	6.5	1.0	11.0	21.5
19/Sep/2005	26/Sep/2005	5.7	13.8	4.2	7.6	47.5	9.0	7.6	46.3	2.5	<1.0	8.1	2.2	<10.0	24.2
26/Sep/2005	03/Oct/2005	5.5	29.7	1.3	0.3	245.6	52.1	13.2	273.4	5.3	<1.0	0.1	3.2	41.0	43.8
03/Oct/2005	24/Oct/2005	5.1	14.0	10.6	0.1	38.2	8.3	8.6	35.8	1.5	<1.0	9.4	7.2	<10.0	67.9
24/Oct/2005	31/Oct/2005	5.1	15.2	14.0	13.6	36.0	7.1	7.4	37.0	0.7	<1.0	10.8	8.9	12.0	23.4
31/Oct/2005	07/Nov/2005	5.7	13.0	3.0	7.0	88.5	15.1	7.0	92.7	1.9	<1.0	2.3	1.9	16.0	39.4
07/Nov/2005	14/Nov/2005	5.6	45.7	2.4	5.6	360.3	69.3	34.6	383.6	10.1	<1.0	2.3	2.6	55.0	38.9
14/Nov/2005	21/Nov/2005	6.1	12.4	4.9	<1.2	94.3	11.2	9.2	74.3	5.7	<1.0	1.1	0.8	13.0	5.2
21/Nov/2005	28/Nov/2005	6.1	146.1	11.6	11.1	1207.2	241.8	48.9	1440.4	28.6	<1.0	0.7	0.7	181.0	7.8
28/Nov/2005	05/Dec/2005	5.6	13.1	8.5	3.7	75.9	14.1	6.3	80.2	2.3	<1.0	4.0	2.3	14.5	34.5
05/Dec/2005	12/Dec/2005	5.6	8.5	4.3	2.1	51.6	7.3	4.3	48.4	2.8	<1.0	2.3	2.3	<10.0	23.8
12/Dec/2005	19/Dec/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	2.6
19/Dec/2005	26/Dec/2005	6.4	30.8	18.4	24.9	124.4	14.5	8.6	143.4	7.7	7.1	15.8	0.4	23.3	6.1
26/Dec/2005	02/Jan/2006	5.7	18.7	4.7	5.1	142.6	24.9	7.9	153.0	10.2	<1.0	1.5	2.0	23.1	48.9
		Precipitation <weighted annual means for site(samples containing phosphate are excluded)													Total rainfall
5161			21.0	8.0	7.7	124.6	25.1	11.6	137.9	4.8	0.5	7.9	3.8		1210.4

(5162) Eskdalemuir (Weekly)

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
05/Jan/2005	12/Jan/2005	5.7	25.3	4.8	9.8	145.6	30.5	7.1	204.8	3.0	<1.0	7.7	1.9	27.0	141.9
12/Jan/2005	19/Jan/2005	5.0	39.1	37.6	40.4	112.0	25.1	8.1	147.1	3.0	<1.0	25.6	11.0	27.0	27.5
19/Jan/2005	27/Jan/2005	5.2	23.2	11.0	<0.7	0.9	<0.8	40.0	222.2	215.6	<1.0	23.1	6.3	34.0	6.9
27/Jan/2005	02/Feb/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
02/Feb/2005	09/Feb/2005	5.5	18.7	18.9	27.1	61.6	11.3	2.8	65.2	1.3	<1.0	11.3	2.9	16.0	41.2
09/Feb/2005	16/Feb/2005	5.2	16.4	16.3	15.8	94.4	17.9	5.1	103.4	2.0	<1.0	5.0	5.9	20.0	33.4
16/Feb/2005	23/Feb/2005	5.5	39.6	23.0	33.3	129.6	26.0	9.2	161.5	5.6	<1.0	24.0	3.5	29.0	7.4
23/Feb/2005	02/Mar/2005	4.5	50.1	22.8	23.5	83.6	17.9	7.8	105.4	2.2	<1.0	40.0	30.9	32.0	9.6
02/Mar/2005	09/Mar/2005	5.6	35.3	12.7	22.7	169.2	32.5	10.8	196.7	3.5	<1.0	14.9	2.3	33.0	3.6
09/Mar/2005	16/Mar/2005	5.3	17.7	13.0	21.3	35.3	6.4	1.8	45.3	1.0	<1.0	13.5	4.8	12.0	37.3
16/Mar/2005	23/Mar/2005	5.8	22.3	24.8	48.2	78.4	12.2	9.5	75.9	6.9	<1.0	12.8	1.5	18.0	26.8
23/Mar/2005	30/Mar/2005	4.9	31.9	47.3	56.0	31.9	7.2	3.8	44.4	1.4	<1.0	28.1	11.5	19.0	11.3
30/Mar/2005	06/Apr/2005	5.2	24.5	40.5	46.0	18.4	4.4	3.4	25.7	0.9	<1.0	22.3	6.6	14.0	38.7
06/Apr/2005	13/Apr/2005	5.3	26.4	18.2	16.7	73.3	12.6	5.0	87.0	1.4	<1.0	17.5	4.9	17.0	13.8
13/Apr/2005	20/Apr/2005	4.7	20.1	23.7	17.4	39.6	8.7	2.9	47.1	0.5	<1.0	15.4	18.2	17.4	41.8
20/Apr/2005	27/Apr/2005	4.5	79.6	114.7	87.1	31.5	25.5	29.7	25.7	1.8	<1.0	75.8	32.4	39.0	6.2
27/Apr/2005	04/May/2005	5.3	23.6	23.6	25.5	33.8	6.4	8.8	30.5	6.2	<1.0	19.5	4.7	15.0	45.3
04/May/2005	11/May/2005	5.6	39.0	13.9	21.2	125.6	21.4	13.5	170.0	10.3	<1.0	23.8	2.6	25.0	4.7
11/May/2005	18/May/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
18/May/2005	23/May/2005	5.2	18.0	11.2	14.8	52.3	7.4	3.2	51.3	1.7	<1.0	11.7	6.5	12.0	85.0
23/May/2005	01/Jun/2005	4.7	28.0	22.5	20.7	42.3	8.3	9.8	43.7	3.7	<1.0	22.9	19.5	19.0	29.0
01/Jun/2005	08/Jun/2005	5.1	11.6	8.1	6.5	7.6	2.8	1.8	15.8	1.1	<1.0	10.6	8.3	<10.0	22.0
08/Jun/2005	15/Jun/2005	5.9	26.7	25.1	45.9	42.6	7.0	4.0	36.9	2.1	<1.0	21.6	1.4	14.0	18.8
15/Jun/2005	22/Jun/2005	5.4	25.8	26.0	40.1	22.3	5.1	5.9	29.8	1.2	<1.0	23.1	3.8	<10.0	11.6
22/Jun/2005	29/Jun/2005	4.6	24.1	37.6	7.7	23.2	6.5	18.9	30.5	2.0	<1.0	21.3	26.3	19.0	7.9
29/Jun/2005	06/Jul/2005	4.6	34.3	22.3	10.6	69.1	16.1	8.3	87.4	0.8	<1.0	26.0	23.4	23.0	27.6
06/Jul/2005	13/Jul/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
13/Jul/2005	20/Jul/2005	5.7	30.4	15.9	30.7	46.8	14.8	9.4	52.7	5.7	<1.0	24.7	2.0	16.0	15.3
20/Jul/2005	27/Jul/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
27/Jul/2005	03/Aug/2005	4.7	15.4	19.5	8.2	16.6	5.9	7.3	19.8	0.8	<1.0	13.4	18.6	12.0	21.4
03/Aug/2005	10/Aug/2005	5.2	13.3	11.9	13.2	22.0	6.4	6.5	32.5	1.2	<1.0	10.7	6.6	11.0	11.8
10/Aug/2005	17/Aug/2005	5.3	6.0	5.8	4.0	1.4	<0.8	2.9	3.6	1.0	<1.0	5.8	5.1	<10.0	24.9
17/Aug/2005	24/Aug/2005	5.1	9.3	10.5	3.3	27.5	6.8	9.7	29.7	1.3	<1.0	6.0	8.3	<10.0	41.2
24/Aug/2005	31/Aug/2005	6.1	30.7	14.5	40.2	146.6	26.3	9.4	164.7	3.2	<1.0	13.0	0.8	29.0	22.8
31/Aug/2005	07/Sep/2005	5.3	60.0	93.2	72.0	66.7	19.2	40.7	63.0	4.9	<1.0	52.0	5.1	31.0	3.0
07/Sep/2005	14/Sep/2005	5.7	25.4	19.8	32.2	74.7	9.1	6.3	75.5	1.9	<1.0	16.4	1.8	17.0	28.0
14/Sep/2005	21/Sep/2005	5.3	5.8	11.0	8.2	29.3	7.4	<1.0	31.7	0.5	<1.0	2.3	4.7	<10.0	18.2
21/Sep/2005	28/Sep/2005	5.4	24.6	13.4	22.3	92.3	16.9	10.0	108.8	2.3	<1.0	13.4	4.3	20.0	46.6
28/Sep/2005	05/Oct/2005	5.4	23.9	11.7	21.6	88.6	17.9	7.6	90.4	3.2	<1.0	13.2	4.5	16.0	48.8
05/Oct/2005	12/Oct/2005	4.6	29.3	20.1	26.0	38.8	8.6	6.4	42.2	2.4	<1.0	24.6	22.9	19.0	123.1
12/Oct/2005	19/Oct/2005	4.7	42.2	74.5	46.7	72.0	15.0	18.8	60.4	5.2	<1.0	33.6	22.4	30.0	6.1
19/Oct/2005	26/Oct/2005	5.0	9.1	8.9	4.3	26.2	4.7	4.1	25.7	0.5	<1.0	5.9	10.2	<10.0	76.5
26/Oct/2005	02/Nov/2005	5.3	12.6	8.4	9.7	56.2	9.3	5.2	57.8	1.6	<1.0	5.8	4.6	13.0	54.6
02/Nov/2005	09/Nov/2005	5.4	19.6	4.7	2.2	95.6	14.1	9.1	92.9	3.7	<1.0	8.1	3.8	17.0	67.1
09/Nov/2005	16/Nov/2005	5.8	24.4	8.0	11.9	150.9	28.0	9.1	136.3	4.1	<1.0	6.3	1.4	26.0	17.8
16/Nov/2005	23/Nov/2005	6.4	46.3	69.8	80.9	111.0	10.8	11.3	54.1	8.2	<1.0	32.9	0.4	24.0	1.7
23/Nov/2005	30/Nov/2005	5.0	24.2	29.3	16.6	85.3	15.6	7.0	86.3	2.4	<1.0	13.9	11.0	21.1	14.9
30/Nov/2005	07/Dec/2005	4.8	20.3	33.1	25.7	38.5	12.9	14.0	37.1	2.8	<1.0	15.7	16.2	16.6	22.2
07/Dec/2005	14/Dec/2005	4.7	26.9	73.5	32.8	48.1	5.5	5.1	26.0	1.3	<1.0	21.1	21.4	19.4	9.2
14/Dec/2005	21/Dec/2005	5.9	29.1	27.8	28.7	112.3	15.8	6.4	107.5	4.2	<1.0	15.6	1.3	21.0	10.6
21/Dec/2005	28/Dec/2005	6.2	58.1	47.6	80.2	158.9	28.7	10.3	157.3	5.3	<1.0	39.0	0.6	36.0	7.3
		Precipitation <weighted annual means for site (samples containing phosphate are excluded)													Total rainfall
5162			22.6	17.5	20.0	66.1	12.9	6.8	77.0	3.5	0.5	14.6	8.6		1392.4

(5163)Thorganby(Weekly)

Start Date	End Date	pH	SO4 (µeq/l)	NO3 (µeq/l)	NH4 (µeq/l)	Na (µeq/l)	Mg (µeq/l)	Ca (µeq/l)	Cl (µeq/l)	K (µeq/l)	PO4 (µeq/l)	nss (µeq/l)	H+ (µeq/l)	Conductivity (S/cm)	Rainfall (mm)
07/Jan/2005	12/Jan/2005	5.3	115.8	20.6	63.5	174.4	48.8	53.8	302.6	14.1	<1.0	94.8	4.8	55.0	1.3
12/Jan/2005	19/Jan/2005	5.1	102.8	69.5	98.4	146.5	33.9	33.1	177.1	4.8	<1.0	85.1	7.4	42.0	5.2
19/Jan/2005	26/Jan/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
26/Jan/2005	02/Feb/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
02/Feb/2005	09/Feb/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3
09/Feb/2005	16/Feb/2005	4.6	78.8	40.4	64.2	157.8	38.5	23.0	195.7	3.2	<1.0	59.7	26.3	47.0	14.3
16/Feb/2005	23/Feb/2005	4.9	37.4	29.4	31.2	142.9	29.4	6.9	173.0	3.3	<1.0	20.2	11.5	37.0	14.1
23/Feb/2005	02/Mar/2005	4.6	62.5	35.4	41.9	118.7	26.9	13.8	144.0	3.3	<1.0	48.2	28.2	39.0	10.2
02/Mar/2005	09/Mar/2005	5.8	55.3	16.7	39.7	189.7	33.1	22.7	216.1	4.4	<1.0	32.4	1.6	38.3	2.4
09/Mar/2005	16/Mar/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7
16/Mar/2005	23/Mar/2005	7.0	135.7	76.5	153.7	59.5	16.3	86.9	65.3	11.9	14.0	128.6	0.1	46.5	3.6
23/Mar/2005	30/Mar/2005	6.2	78.3	84.1	131.3	20.9	5.1	17.0	29.8	1.4	<1.0	75.8	0.7	23.2	12.1
30/Mar/2005	06/Apr/2005	6.7	123.9	68.3	100.0	79.3	22.1	73.5	84.1	9.2	<1.0	114.3	0.2	37.1	1.7
06/Apr/2005	13/Apr/2005	6.3	106.2	50.4	104.2	137.5	33.9	49.4	167.8	4.0	<1.0	89.6	0.5	45.6	6.7
13/Apr/2005	20/Apr/2005	4.9	45.3	50.0	55.2	12.4	4.4	10.3	13.2	0.5	<1.0	43.8	11.7	18.3	33.4
20/Apr/2005	27/Apr/2005	4.9	121.1	127.0	156.9	53.5	15.1	44.4	65.3	7.4	<1.0	114.6	12.3	51.0	7.6
27/Apr/2005	04/May/2005	7.1	97.8	66.9	70.4	26.3	10.7	87.6	35.4	12.7	<1.0	94.6	0.1	42.0	9.0
04/May/2005	11/May/2005	6.2	14.3	10.9	16.5	44.7	4.1	10.4	40.9	4.0	<1.0	8.9	0.7	14.0	15.2
11/May/2005	18/May/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
18/May/2005	25/May/2005	5.9	61.5	26.1	41.3	21.4	12.5	35.1	22.0	2.4	<1.0	58.9	1.3	19.0	4.8
25/May/2005	01/Jun/2005	6.3	326.1	45.1	672.8	61.1	29.7	116.6	50.3	477.5	809.5	318.7	0.5	203.0	5.9
01/Jun/2005	08/Jun/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
08/Jun/2005	15/Jun/2005	6.3	74.0	48.0	75.8	46.2	13.6	28.2	70.3	5.8	<1.0	68.4	0.6	25.0	6.0
15/Jun/2005	22/Jun/2005	4.8	61.5	65.5	70.3	3.4	6.1	18.0	6.6	4.2	<1.0	61.1	14.5	19.0	9.2
22/Jun/2005	29/Jun/2005	6.9	61.5	78.5	66.5	20.4	15.2	42.0	22.7	7.1	<1.0	59.0	0.1	21.0	9.3
29/Jun/2005	05/Jul/2005	4.5	120.5	103.1	91.9	54.0	15.4	16.8	90.0	4.3	<1.0	114.0	28.8	38.0	8.6
05/Jul/2005	13/Jul/2005	6.6	31.7	12.7	111.3	9.7	<0.8	<1.0	11.7	7.4	14.0	30.5	0.3	20.0	25.7
13/Jul/2005	20/Jul/2005	6.4	114.7	49.7	104.1	40.8	21.6	87.9	48.0	12.4	9.7	109.7	0.4	41.0	3.3
20/Jul/2005	27/Jul/2005	8.1	674.0	55.4	3296.1	599.7	111.9	125.4	380.0	463.9	2030.5	601.7	0.0	669.0	2.5
27/Jul/2005	03/Aug/2005	7.7	173.5	30.8	1344.0	48.5	11.4	6.7	98.7	148.6	487.6	167.6	0.0	213.0	22.2
03/Aug/2005	10/Aug/2005	7.1	89.3	51.5	154.3	69.9	18.9	68.0	101.1	11.8	<1.0	80.9	0.1	48.0	3.1
10/Aug/2005	17/Aug/2005	6.0	41.1	16.3	49.9	5.3	3.1	8.9	6.8	4.4	<1.0	40.4	1.1	12.0	12.4
17/Aug/2005	24/Aug/2005	6.0	27.2	41.7	40.8	9.1	6.8	23.3	6.2	2.4	<1.0	26.1	1.0	13.0	41.8
24/Aug/2005	31/Aug/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
31/Aug/2005	07/Sep/2005	6.0	132.6	138.9	128.1	18.1	20.6	115.3	21.5	9.9	<1.0	130.4	0.9	45.0	5.8
07/Sep/2005	14/Sep/2005	4.9	74.5	92.9	91.4	32.2	15.2	51.1	35.5	7.6	<1.0	70.6	13.8	33.0	9.9
14/Sep/2005	21/Sep/2005	5.0	30.6	24.9	28.1	20.6	8.0	9.8	30.6	2.3	<1.0	28.1	9.1	12.0	45.4
21/Sep/2005	28/Sep/2005	5.8	45.4	33.0	23.3	68.7	18.7	32.8	77.0	8.1	<1.0	37.2	1.6	20.0	4.8
28/Sep/2005	05/Oct/2005	5.7	26.8	7.1	11.0	30.8	9.4	18.1	31.7	2.6	<1.0	23.1	1.9	<10.0	7.2
05/Oct/2005	19/Oct/2005	6.6	92.5	78.3	261.7	122.2	17.0	20.4	155.7	65.0	187.3	77.8	0.2	64.0	12.5
19/Oct/2005	26/Oct/2005	4.8	23.1	13.1	16.3	19.1	4.9	5.3	22.0	1.0	<1.0	20.8	14.5	<10.0	43.1
26/Oct/2005	02/Nov/2005	5.7	30.9	21.6	34.4	41.5	6.8	11.4	37.9	5.0	<1.0	25.9	2.2	16.0	13.9
02/Nov/2005	09/Nov/2005	4.9	26.5	13.4	18.3	24.3	8.3	10.3	30.9	0.8	<1.0	23.5	12.6	14.0	36.5
09/Nov/2005	16/Nov/2005	6.2	97.3	37.9	71.2	160.5	34.3	69.6	127.8	15.1	<1.0	77.9	0.6	43.0	1.5
16/Nov/2005	23/Nov/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
23/Nov/2005	30/Nov/2005	5.6	12.7	4.1	4.1	85.5	15.3	7.1	91.5	2.3	<1.0	2.4	2.5	15.0	10.5
30/Nov/2005	07/Dec/2005	7.0	216.1	39.8	919.6	201.9	59.3	73.2	202.0	108.4	271.9	191.7	0.1	157.2	9.4
07/Dec/2005	14/Dec/2005	6.4	211.3	113.5	275.7	231.5	23.6	38.9	135.1	25.8	<1.0	183.4	0.4	66.2	0.9
14/Dec/2005	21/Dec/2005	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
21/Dec/2005	29/Dec/2005	7.8	1164.7	8.1	5233.2	448.3	29.1	21.1	241.0	1007.8	2973.8	1110.7	0.0	692.0	8.6
		Precipitation <weighted annual means for site(samples containing phosphate are excluded)													Total rainfall
5163			48.4	39.4	48.8	42.3	11.8	21.1	50.5	3.4	0.6	43.3	8.6		503.1

Appendix 2

TABLES OF ANNUAL MEAN CONCENTRATIONS AND TOTAL RAINFALL, 1986 TO 2005

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 indicates that the rainfall collected at the high rainfall sites is likely to be understated [see Hayman *et al.* (2003a)].
- (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 II.1. Precipitation-weighted Annual Mean Acidity, 1986 to 2005 ($\mu\text{eq/l}$)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Goonhilly	19.7	23.3	15.1	19.4	14.3	25.9	15.4	17.7	19.8	17.5	19.5	20.3	14.2	13.3	-	22.5	30.8	21.8	14.6	17.9
Yarner Wood	17.2	20.3	14.2	20.0	13.1	17.1	17.6	17.2	18.1	15.1	17.9	18.0	12.5	13.6	-	22.9	17.3	21.7	13.9	16.2
Barcombe Mills	18.9	22.1	13.4	14.7	11.9	20.3	17.1	24.3	16.4	15.6	14.2	16.3	11.3	12.5	-	17.4	20.8	17.3	9.8	8.4
Compton	25.3	28.0	16.2	25.0	14.2	17.6	35.3	34.2	22.7	12.5	6.8	12.0	11.4	6.6	-	12.0	15.5	7.2	6.0	4.6
Crai Reservoir													12.4		-	13.9	18.7	16.5	10.0	10.2
Flatford Mill	33.0	43.0	34.5	35.4	29.1	42.5	35.9	25.6	27.2	30.4	25.1	26.1	25.3	27.0	-	19.6	23.6	22.0	23.6	19.3
Woburn	44.8	49.6	37.0	37.0	27.8	34.8	36.7	27.6	29.9	22.2	15.1	23.6	25.1	13.5	-	23.3	28.0	19.6	12.7	8.5
Tycanol Wood	15.7	16.8	15.1	18.4	13.8	21.0	20.7	17.7	14.2	14.4	15.8	12.6	11.0	11.3	-	14.1	15.8	17.8	12.0	11.9
Llyn Brianne	16.1	21.1	17.8	18.8	17.2	24.3	20.2	19.8	16.2	12.2	14.0	14.7	11.9	11.4	-	0.0	16.3	23.5	8.4	9.5
Pumlumon				13.9	11.8	16.0	17.8	19.2	13.1	14.5	14.5	11.9	9.3	9.7	-	9.8	10.3	12.9	5.4	7.6
Stoke Ferry	34.6	35.8	29.7	40.4	18.2	22.3	29.8	27.7	18.4	23.7	15.7	19.5	18.4	17.4	-	15.3	27.7	19.2	11.8	8.9
Preston Montford	17.6	24.7	24.5	36.3	13.5	26.5	37.8	35.9	29.8	26.9	18.8	16.4	7.9	6.5	-	9.1	16.0	13.1	7.5	2.7
Bottesford	61.1	75.8	81.0	48.2	42.3	62.4	68.1	62.2	36.0	29.2	21.5	22.5	19.8	16.7	-	19.4	28.6	14.1	14.9	13.6
Llyn Llagi														13.0	-	14.7	13.3	15.8	9.5	10.8
Llyn Llydaw	16.6	18.8	17.2	15.4	12.3	15.6	13.7	18.5	11.6	10.5	12.4	10.5	11.2	12.3	-	14.1	17.2	12.3	9.1	9.8
River Etherow														24.6	-	28.8	34.4	27.7	13.8	11.9
Wardlow Hay Cop	28.8	44.5	33.2	36.8	23.7	32.6	33.9	36.5	27.0	28.3	22.1	18.1	16.0	10.3	-	19.0	22.8	9.0	5.7	4.9
Driby	42.1	42.5	42.4	46.6	41.0	40.6	44.9	35.6	35.9	36.6	18.2	21.8	34.1	21.4	-	22.5	29.2	48.7	12.6	21.0
Jenny Hurn	88.7	99.9	82.3	63.5	53.7	79.9	80.6	67.9	38.6	58.2	53.8	55.2	45.0	33.2	-	30.8				
Thorganby	75.1	69.0	88.0	83.5	63.7	55.4	81.5	80.9	44.4	51.3	43.5	28.8	43.0	16.2	-	25.8	30.2	16.8	15.5	9.7
High Muffles	58.2	62.9	71.9	54.7	55.0	58.1	59.4	47.5	41.5	40.9	39.6	32.5	34.6	22.1	-	38.0	36.0	22.4	16.9	18.5
Bannisdale	29.7	26.6	28.2	23.7	18.3	22.0	24.8	31.2	19.4	17.3	20.1	16.1	15.0	13.0	-	23.6	18.8	16.6	10.1	6.1
Hillsborough Forest				13.2	7.4	11.9	12.4	17.3	11.7	8.3	13.3	5.8	7.2	8.9	-	7.4	3.9	3.1	2.5	2.5
Lough Navar	11.2	9.5	9.6	9.7	8.1	6.0	7.7	11.2	7.1	7.8	6.1	6.5	5.5	6.1	-	8.2	7.8	6.0	4.5	2.6
Cow Green Res.	27.1	31.3	33.9	23.1	21.2	23.6	27.6	33.5	20.9	17.0	23.7	11.0	16.0	13.4	-	0.0	19.6	14.6	10.6	7.9
Scoat Tarn														13.9	-	0.0	17.7	19.4	10.3	9.6
Loch Dee	28.9	23.3	18.6	14.6	15.2	18.5	16.6	22.3	15.2	13.4	19.3	11.4	10.0	11.6	-	19.2	13.2	14.4	11.8	9.4
Beaghs Burn														9.3	-	14.4	14.6	4.6	5.0	4.7
Redesdale	40.9	44.2	51.9	32.5	29.8	33.1	42.2	31.2	30.9	25.4	33.1	26.8	25.4	16.3	-	25.5	24.5	20.2	16.0	10.0
Eskdalemuir	19.6	25.0	27.3	19.6	23.9	21.5	21.9	26.2	16.9	15.8	17.4	16.7	13.8	14.0	-	21.9	16.7	14.0	7.7	10.6
Whiteadder	39.7	36.0	47.1	35.0	30.7	36.5	45.3	34.6	32.5	32.0	30.7	31.6	22.6	19.1	-	0.0	34.5	21.4	20.5	18.2
Loch Chon														15.7	-	23.5	21.9	21.4	13.3	11.8
Balquhiddy	20.7	32.4	24.1	20.4	16.2	22.0	19.8	24.5	22.3	17.6	28.8	15.0	15.3	12.4	-	21.8	24.4	20.3	13.7	10.1
Polloch					18.6	13.7	13.8	15.1	12.7	11.5	16.3	9.7	8.4	8.8	-	13.1	13.0	15.0	7.6	6.8
Lochnagar														19.8	-	33.6	42.8	24.7	16.7	15.5
Glen Dye		44.7	45.6	35.8	39.4	44.4	40.9	36.0	41.8	41.5	56.0	32.4	28.5	21.8	-	39.5	39.0	30.4	22.6	14.6
Allt a' Mharcaidh	21.6	21.7	20.9	19.6	17.9	17.2	16.7	17.2	18.2	16.2	18.8	16.0	11.4	10.2	-	16.9	18.8	13.9	10.8	12.2
Strathvaich Dam		15.7	16.1	12.9	11.2	15.4	19.9	13.4	10.6	10.4	12.9	12.0	9.7	9.5	-	11.9	13.4	11.3	9.9	6.4
Achanarras	9.7	18.6	25.4	25.3	19.5	20.1	24.3	22.5	16.8	16.1	21.1	21.3	14.4	13.6	-	19.5	25.4	11.4	9.7	8.4

Table II.2. Precipitation-weighted Annual Mean Non-marine Sulphate, 1986 to 2005 (µeq/l)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Goonhilly	30	34	21	29	25	36	22	30	28	24	31	25	17	17	19	22	20	24	18	22
Yarner Wood	27	37	22	27	19	28	25	28	28	24	33	27	18	18	14	19	16	19	18	24
Barcombe Mills	46	50	40	44	38	52	43	33	36	33	38	25	30	26	21	25	25	35	36	31
Compton	79	104	64	60	58	63	63	48	55	49	61	42	38	32	26	28	27	29	32	37
Crai Reservoir														18	14	20	11	16	10	13
Flatford Mill	90	71	66	80	55	71	53	42	50	52	52	41	43	44	34	33	35	39	35	33
Woburn	73	80	85	73	66	63	57	44	59	46	56	39	42	38	30	34	32	33	34	43
Tycanol Wood	27	26	23	26	22	31	27	23	23	24	27	19	18	21	16	19	15	15	17	18
Llyn Brianne	24	29	26	27	27	30	28	27	26	22	26	20	19	17	15	0	14	17	11	21
Pumlumon				19	19	24	24	23	18	21	23	17	14	14	11	12	10	12	10	12
Stoke Ferry	80	76	66	84	79	77	67	54	61	50	52	49	42	40	41	34	35	41	37	41
Preston Montford	45	60	56	60	37	66	64	48	52	60	49	32	27	24	25	30	32	23	21	24
Bottesford	90	93	109	83	66	75	73	58	63	55	54	43	45	39	33	42	40	44	34	38
Llyn Llagi														17	17	16	12	15	12	16
Llyn Llydaw	53	33	25	22	19	23	22	25	21	20	24	14	16	17	13	15	13	12	12	13
River Etherow														39	32	42	30	29	30	31
Wardlow Hay Cop	70	92	83	80	73	85	73	72	76	65	78	59	50	49	41	53	40	42	37	38
Driby	69	74	77	79	80	78	65	50	62	70	49	42	53	41	37	40	33	40	36	37
Jenny Hurn	110	106	121	98	88	83	77	61	80	65	81	58	70	54	51	53				
Thorganby	85	79	88	87	82	119	87	79	72	56	69	62	60	50	45	51	41	50	40	41
High Muffles	63	74	82	73	67	75	71	56	60	51	65	47	49	37	36	40	34	39	32	34
Bannisdale	42	38	45	40	41	38	42	45	37	37	44	31	30	27	22	27	20	25	19	24
Hillsborough Forest				52	36	42	41	41	45	33	45	26	29	30	23	33	18	17	17	17
Lough Navar	19	16	15	18	14	18	17	19	17	17	17	15	12	10	11	12	8	10	10	8
Cow Green Res.	35	39	44	35	33	34	38	41	31	31	37	26	26	25	19	0	17	18	16	16
Scoat Tarn														23	17	0	15	17	15	16
Loch Dee	32	35	36	24	26	28	27	29	25	24	36	18	19	19	19	22	11	15	18	17
Beaghs Burn														37	16	21	11	12	10	13
Redesdale	58	46	62	47	36	43	46	36	42	37	51	37	34	25	23	29	22	24	26	19
Eskdalemuir	30	30	33	28	32	30	28	30	28	28	28	24	20	20	15	21	13	19	14	16
Whiteadder	53	48	61	47	33	45	50	37	40	43	44	33	27	24	24	0	28	19	23	26
Loch Chon														18	16	17	14	13	14	17
Balquhidder	26	33	28	24	22	27	23	26	24	21	38	21	19	15	15	19	15	16	13	15
Polloch					17	17	17	14	17	16	18	11	10	9	9	9	8	8	9	6
Lochnagar														23	20	27	27	21	15	18
Glen Dye		48	49	41	39	45	43	39	47	41	62	31	29	25	21	29	23	27	19	17
Allt a' Mharcaidh	24	24	20	19	15	16	16	18	18	14	23	13	11	9	9	14	11	9	12	10
Strathvaich Dam		16	14	12	10	13	18	14	10	11	16	12	9	7	7	7	7	7	7	11
Achanarras	25	34	32	29	23	24	25	21	21	19	25	21	17	16	12	15	14	14	11	14

Table II.3. Precipitation-weighted Annual Mean Nitrate, 1986 to 2005 ($\mu\text{eq/l}$)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Goonhilly	19	27	16	22	20	32	17	23	24	23	28	28	18	20	17	24	23	28	20	27
Yarner Wood	16	24	14	19	13	19	16	21	25	21	31	27	14	17	11	20	17	18	20	30
Barcombe Mills	27	31	26	30	24	36	25	19	29	28	28	23	21	25	16	22	23	31	25	31
Compton	39	46	38	36	28	36	39	29	34	28	36	33	29	27	24	24	24	27	33	40
Crai Reservoir														10	8	13	9	15	9	12
Flatford Mill	39	45	42	56	36	44	40	31	37	39	38	36	39	41	31	35	37	43	44	46
Woburn	39	40	39	47	35	40	36	31	47	35	39	35	35	38	27	39	33	34	38	49
Tycanol Wood	12	15	12	15	11	18	14	12	16	15	18	16	11	13	10	14	12	15	13	16
Llyn Brianne	12	14	13	14	16	18	16	15	18	16	17	17	12	12	10	0	13	18	11	23
Pumlumon				10	9	14	13	14	12	15	16	14	7	10	8	9	8	10	9	11
Stoke Ferry	48	44	39	55	45	48	43	36	43	39	37	41	38	40	39	34	35	41	40	47
Preston Montford	22	32	26	31	20	35	38	28	32	38	33	24	19	21	22	29	23	20	23	25
Bottesford	41	41	45	50	34	43	36	34	40	33	34	33	30	33	29	36	38	37	31	41
Llyn Llgi														13	9	12	11	13	10	17
Llyn Llydaw	17	16	13	11	10	12	10	15	13	15	15	11	10	12	9	12	11	11	10	13
River Etherow														31	24	36	25	28	29	32
Wardlow Hay Cop	25	36	31	36	26	38	29	33	35	33	40	30	24	28	25	35	28	29	30	31
Driby	39	44	48	48	46	50	46	38	49	50	39	40	45	39	35	38	34	38	35	41
Jenny Hurn	44	48	44	51	43	45	42	34	47	42	45	38	45	40	37	38				
Thorganby	41	42	42	49	40	50	42	46	40	37	38	38	34	32	34	37	33	31	31	41
High Muffles	38	43	47	45	38	47	37	37	42	38	43	35	36	32	31	38	31	34	31	35
Bannisdale	20	18	21	19	17	22	19	24	22	21	25	22	18	21	16	23	16	20	17	23
Hillsborough Forest				26	16	23	16	21	23	21	29	19	16	22	13	25	14	13	17	17
Lough Navar	8	8	7	9	7	9	9	11	15	12	10	12	6	6	7	9	8	6	8	9
Cow Green Res.	19	22	25	20	20	21	23	25	21	22	24	18	18	20	17	0	17	21	17	22
Scoat Tarn														16	12	0	13	16	15	17
Loch Dee	14	19	18	14	14	16	15	19	18	16	22	14	13	13	14	18	9	14	12	17
Beaghs Burn														13	10	19	11	11	9	12
Redesdale	34	26	33	31	26	31	36	26	33	27	33	35	30	25	23	31	22	31	25	27
Eskdalemuir	14	18	19	18	15	19	16	19	19	19	20	20	15	17	14	19	14	18	14	20
Whiteadder	34	29	42	34	23	32	35	30	34	31	35	30	24	22	25	0	28	22	24	23
Loch Chon														19	14	16	13	14	14	16
Balquhiddy	13	21	16	13	10	17	13	18	17	14	24	16	13	12	12	20	14	17	13	16
Polloch					12	9	9	10	11	10	10	8	5	6	6	8	7	7	6	7
Lochnagar														18	17	26	29	23	18	21
Glen Dye		31	32	31	29	33	28	33	42	36	42	29	27	24	25	37	28	34	26	25
Allt a' Mharcaidh	10	12	11	10	9	10	8	7	15	11	14	11	9	8	9	13	11	10	11	13
Strathvaich Dam		10	8	7	6	9	9	9	9	9	10	10	6	8	6	7	8	7	6	5
Achanarras	14	22	24	25	18	22	16	18	21	18	22	21	15	12	14	15	18	13	12	14

Table II.4. Precipitation-weighted Annual Mean Ammonium, 1986 to 2005 (µeq/l)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Goonhilly	17	22	12	18	16	25	15	30	13	17	25	21	10	12	13	18	15	20	16	15
Yarner Wood	16	28	14	19	13	22	17	23	25	20	37	26	14	17	9	19	15	16	20	28
Barcombe Mills	38	41	36	39	35	50	31	16	30	33	32	22	18	25	14	23	20	25	21	19
Compton	71	73	46	57	55	63	57	41	53	53	79	53	48	44	29	36	31	32	44	56
Crai Reservoir														10	6	12	7	14	8	11
Flatford Mill	141	50	49	66	41	59	40	32	40	48	49	38	43	45	34	41	38	39	37	33
Woburn	54	50	52	56	43	52	41	35	55	48	63	40	36	47	29	44	37	28	44	55
Tycanol Wood	13	15	13	15	14	19	13	12	15	18	22	15	12	16	10	18	15	16	13	17
Llyn Brianne	12	13	14	16	16	20	18	16	16	18	19	15	13	14	12	0	14	15	11	23
Pumlumon				13	13	17	20	15	13	21	18	16	10	12	7	12	15	11	11	11
Stoke Ferry	65	60	56	75	67	75	54	43	61	53	56	55	49	50	49	45	38	50	48	78
Preston Montford	47	57	49	53	44	57	57	37	50	54	60	38	36	38	30	51	76	37	34	64
Bottesford	56	45	49	68	54	48	40	34	55	48	56	45	45	48	37	49	48	47	39	46
Llyn Llagi														12	8	11	10	12	10	18
Llyn Llydaw	14	11	16	15	14	13	15	15	11	14	17	10	11	14	8	12	11	11	10	13
River Etherow														34	25	40	28	28	32	36
Wardlow Hay Cop	34	40	39	39	40	57	45	39	47	46	58	38	33	37	30	44	35	35	40	37
Driby	53	60	64	53	67	76	55	42	48	64	54	49	49	44	39	49	35	41	42	37
Jenny Hurn	64	51	53	64	64	65	45	28	55	50	66	53	61	46	45	54				
Thorganby	59	55	61	65	80	124	82	65	57	60	57	59	53	50	42	51	44	41	39	49
High Muffles	40	46	54	53	48	64	44	40	50	48	61	44	45	37	34	39	34	41	36	36
Bannisdale	40	27	31	30	32	34	27	31	32	36	40	33	27	27	23	33	23	27	23	38
Hillsborough Forest				60	45	48	40	44	49	43	63	40	38	43	39	54	35	33	34	44
Lough Navar	11	9	8	11	8	10	12	11	11	16	14	14	9	9	10	10	12	7	10	10
Cow Green Res.	20	19	25	23	24	26	25	29	21	30	26	27	20	23	19	0	18	21	18	24
Scoat Tarn														21	14	0	16	18	18	20
Loch Dee	21	34	22	20	21	24	28	22	23	19	27	17	17	19	17	22	12	19	13	27
Beaghs Burn														20	15	26	16	17	15	17
Redesdale	41	15	23	34	24	32	30	21	30	33	44	37	32	28	24	34	25	37	43	30
Eskdalemuir	19	16	20	22	18	26	17	18	21	26	24	24	18	20	15	20	15	30	25	23
Whiteadder	30	20	35	32	17	30	27	22	24	28	33	24	21	20	23	0	25	19	22	22
Loch Chon														12	12	12	16	12	12	17
Balquhidder	14	15	12	14	11	16	16	16	12	12	24	18	14	12	8	16	12	27	12	18
Polloch					6	8	8	6	6	7	7	6	5	5	3	7	8	6	6	6
Lochnagar														16	16	20	19	20	15	17
Glen Dye		26	29	28	25	32	22	28	33	29	43	23	22	22	20	30	19	30	20	21
Allt a' Mharcaidh	6	10	4	7	5	5	4	4	8	5	7	5	5	6	4	8	4	6	10	8
Strathvaich Dam		4	3	4	3	5	5	4	4	5	5	6	4	4	3	4	5	3	3	2
Achanarras	13	35	21	18	15	26	9	9	12	15	14	13	13	11	10	12	12	19	6	9

Table II.5. Precipitation-weighted Annual Mean Sodium, 1986 to 2005 ($\mu\text{eq/l}$)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Goonhilly	264	206	212	276	506	327	238	228	265	270	313	284	292	292	299	226	283	223	298	236
Yarner Wood	98	125	150	166	245	141	104	101	123	128	127	118	127	88	104	91	204	111	131	99
Barcombe Mills	186	255	156	204	357	137	128	99	147	176	195	164	154	177	199	91	203	131	153	133
Compton	55	67	70	84	129	71	40	55	64	64	76	77	58	55	45	37	62	43	45	53
Crai Reservoir														96	103	79	122	101	106	70
Flatford Mill	99	60	54	79	85	70	57	55	73	79	76	60	59	49	63	49	67	60	51	69
Woburn	71	65	50	60	87	54	28	41	56	51	61	58	36	46	34	31	41	48	43	59
Tycanol Wood	116	90	104	232	232	163	120	120	164	157	146	159	145	151	144	103	166	146	146	113
Llyn Brianne	94	68	83	112	152	111	72	97	90	84	94	96	90	103	90	0	116	111	106	88
Pumlumon				104	141	102	72	70	73	79	81	113	95	85	92	69	136	96	82	66
Stoke Ferry	74	49	50	58	86	75	57	53	54	46	71	55	56	55	44	60	37	53	49	57
Preston Montford	86	38	86	39	100	164	38	66	58	64	35	80	40	54	33	31	58	44	48	53
Bottesford	82	35	59	47	62	54	35	36	39	49	58	27	33	39	25	29	41	39	40	50
Llyn Llgi														110	90	75	116	99	133	90
Llyn Llydaw	126	78	122	135	194	162	95	112	98	129	97	107	88	104	70	72	82	67	90	65
River Etherow														60	46	47	65	64	102	68
Wardlow Hay Cop	70	52	90	57	140	131	57	95	94	66	82	60	65	70	40	50	58	67	91	52
Driby	95	53	64	98	94	103	67	71	83	100	121	58	77	65	62	74	79	68	60	88
Jenny Hurn	97	47	74	68	104	55	37	47	53	54	73	36	61	51	30	39				
Thorganby	74	51	52	69	90	96	50	52	52	51	59	45	67	53	33	44	35	40	30	42
High Muffles	61	63	67	95	92	103	78	111	88	113	153	82	106	76	61	76	57	98	55	90
Bannisdale	122	62	133	116	161	182	91	107	95	129	95	156	101	131	76	73	88	78	127	73
Hillsborough Forest				89	140	107	72	87	125	108	107	78	97	90	90	70	65	74	99	104
Lough Navar	248	102	317	139	261	192	133	188	174	125	116	131	136	171	152	98	151	173	125	121
Cow Green Res.	74	40	69	76	90	84	74	72	77	93	91	99	89	100	55	0	73	71	70	66
Scoat Tarn														85	71	0	76	71	80	70
Loch Dee	116	54	136	132	147	123	86	79	92	106	91	109	91	124	101	56	103	92	94	96
Beaghs Burn														171	150	128	139	172	161	192
Redesdale	114	44	66	91	67	80	59	73	76	75	93	55	65	65	49	45	59	62	73	58
Eskdalemuir	86	37	62	81	86	102	53	63	77	88	63	66	76	102	61	85	63	66	73	62
Whiteadder	112	53	83	92	78	59	79	104	120	100	121	93	80	86	93	0	81	119	49	93
Loch Chon														112	69	71	128	88	63	77
Balquhidder	122	45	59	110	102	89	61	146	120	71	122	87	81	122	83	59	84	95	67	102
Polloch					173	213	118	205	155	168	148	127	161	194	150	139	234	159	154	191
Lochnagar														39	33	35	76	45	40	38
Glen Dye		52	73	83	81	78	65	89	108	98	121	112	91	83	71	77	89	72	52	88
Allt a' Mharcaidh	90	37	45	88	62	46	57	143	92	57	66	70	65	83	63	40	44	75	57	96
Strathvaich Dam		83	109	126	175	147	121	212	154	102	130	116	122	180	153	95	105	235	125	165
Achanarras	231	145	217	277	215	235	186	225	217	169	219	167	202	249	251	186	216	340	196	339

Table II.6. Precipitation-weighted Annual Mean Magnesium, 1986 to 2005 (µeq/l)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Goonhilly	61	48	49	63	119	77	57	55	64	73	86	82	87	93	73	50	63	48	57	50
Yarner Wood	23	30	35	38	58	32	26	29	33	38	37	35	41	37	24	20	45	24	28	21
Barcombe Mills	44	62	36	49	84	34	33	29	40	48	58	48	48	58	47	21	46	30	38	30
Compton	14	19	21	21	31	18	11	15	18	20	25	26	26	27	10	8	14	10	11	12
Crai Reservoir														40	24	19	27	23	21	15
Flatford Mill	32	17	16	23	23	19	15	16	18	20	21	17	20	18	16	12	16	14	12	17
Woburn	9	12	13	18	24	14	9	13	15	15	18	18	13	19	8	8	10	11	10	13
Tycanol Wood	27	21	24	53	54	39	29	31	43	45	43	45	48	54	32	22	36	30	31	23
Llyn Brianne	21	16	20	27	36	27	19	27	25	24	29	27	32	41	20	0	25	24	21	17
Pumlumon				24	32	23	19	20	23	25	25	33	35	37	21	15	29	20	17	14
Stoke Ferry	20	12	13	16	23	18	16	16	16	12	21	16	19	22	11	14	9	13	11	14
Preston Montford	21	11	22	11	24	43	11	18	20	42	15	25	25	27	9	7	12	9	9	10
Bottesford	26	11	18	16	18	16	11	10	12	14	16	10	14	17	6	8	11	11	11	11
Llyn Llagi														40	21	16	25	21	28	18
Llyn Llydaw	29	18	26	31	44	37	24	30	28	37	31	32	33	41	16	16	18	14	18	13
River Etherow														21	11	11	15	14	23	14
Wardlow Hay Cop	17	15	25	17	35	32	15	25	27	18	24	18	23	27	9	12	14	15	20	12
Driby	24	14	19	27	27	26	18	23	22	26	34	18	23	23	15	17	19	17	14	19
Jenny Hurn	36	16	29	25	34	21	14	16	22	19	24	13	22	20	10	13				
Thorganby	22	16	17	23	27	31	16	15	19	15	19	16	23	27	10	13	12	14	9	12
High Muffles	15	17	19	23	29	27	19	30	23	29	39	21	30	26	15	18	13	23	13	21
Bannisdale	29	15	33	27	38	44	23	28	27	35	27	41	32	48	17	16	18	18	27	15
Hillsborough Forest				21	31	24	20	25	36	34	29	27	42	38	21	15	14	14	20	18
Lough Navar	57	24	80	32	60	47	34	49	48	38	37	40	53	63	43	21	32	37	25	24
Cow Green Res.	17	10	17	18	22	20	19	20	22	25	25	29	29	41	13	0	16	16	15	13
Scoat Tarn														32	16	0	16	15	16	14
Loch Dee	29	12	31	31	35	29	22	23	25	31	28	34	35	48	27	12	22	19	20	19
Beaghs Burn														64	46	28	30	35	33	49
Redesdale	26	12	19	23	18	19	15	20	21	21	27	17	21	26	13	10	13	13	16	12
Eskdalemuir	20	9	15	20	21	25	14	18	22	26	20	20	30	41	16	14	13	14	15	13
Whiteadder	26	13	22	23	20	15	19	27	33	26	31	26	25	33	22	0	18	25	11	20
Loch Chon														40	16	16	28	19	14	16
Balquhidder	29	11	14	26	25	21	16	38	31	22	33	24	28	52	18	13	18	19	14	21
Polloch					40	48	30	53	40	46	41	37	54	68	35	29	50	34	32	40
Lochnagar														17	8	8	17	10	9	9
Glen Dye		12	18	22	21	19	16	23	26	25	30	28	26	28	16	18	20	16	13	19
Allt a' Mharcaidh	21	8	12	20	15	11	14	35	24	16	20	19	23	35	16	9	10	16	12	20
Strathvaich Dam		20	25	28	39	32	31	52	42	31	40	33	42	68	40	20	22	44	26	35
Achanarras	55	37	46	64	49	54	46	56	58	45	59	43	61	83	57	41	47	71	41	77

Table II.7. Precipitation-weighted Annual Mean Calcium, 1986 to 2005 ($\mu\text{eq/l}$)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Goonhilly	16	15	14	18	31	22	18	19	19	24	23	21	27	30	20	14	15	19	17	15
Yarner Wood	11	15	12	13	17	15	12	13	18	18	16	16	20	22	10	8	13	9	12	10
Barcombe Mills	20	29	22	30	33	32	22	20	28	29	37	25	49	43	20	16	23	21	39	37
Compton	26	51	33	22	32	30	23	21	34	41	55	34	61	36	15	13	14	26	20	21
Crai Reservoir														18	8	17	8	10	8	8
Flatford Mill	33	21	27	37	24	24	18	21	25	21	22	18	25	25	15	13	17	23	17	19
Woburn	23	30	38	28	32	24	19	19	24	21	34	23	28	33	11	12	13	21	16	22
Tycanol Wood	12	9	9	31	17	13	11	11	14	17	16	15	19	26	10	9	9	10	10	11
Llyn Brianne	7	8	9	10	15	10	10	11	12	12	12	11	17	19	7	0	8	11	8	9
Pumlumon				7	11	11	9	8	9	12	10	12	14	17	7	6	7	7	6	6
Stoke Ferry	31	22	24	28	43	33	32	26	30	22	35	34	33	39	16	16	16	27	19	28
Preston Montford	14	19	19	14	14	37	18	17	24	76	28	18	34	28	9	10	10	11	10	10
Bottesford	36	33	50	33	23	29	19	18	23	29	25	21	31	31	10	14	14	28	18	20
Llyn Llgi														16	9	6	7	7	11	7
Llyn Llydaw	9	10	13	9	12	11	11	11	14	18	13	11	14	16	6	6	6	6	6	7
River Etherow														22	10	14	9	12	14	14
Wardlow Hay Cop	45	59	56	55	75	57	55	52	64	55	69	64	89	92	28	39	27	40	31	30
Driby	18	19	27	34	33	27	18	19	28	35	30	21	26	26	12	14	17	23	15	17
Jenny Hurn	56	45	75	48	49	39	27	26	60	31	35	23	44	38	19	21				
Thorganby	25	25	30	37	35	67	27	24	67	29	32	33	53	57	18	29	18	37	22	21
High Muffles	13	21	23	27	20	23	21	20	25	26	23	21	20	28	10	14	12	19	13	15
Bannisdale	13	12	14	13	15	16	15	14	16	17	16	17	20	28	8	8	8	11	11	10
Hillsborough Forest				13	14	17	16	15	24	25	24	21	36	34	11	11	8	8	9	9
Lough Navar	17	11	21	12	18	25	19	24	27	26	25	23	29	33	15	11	10	13	9	11
Cow Green Res.	7	8	12	12	13	11	13	12	13	16	14	13	16	23	7	0	7	11	7	8
Scoat Tarn														16	7	0	5	6	6	6
Loch Dee	10	9	11	9	11	10	11	10	11	14	10	12	23	19	10	5	5	6	7	7
Beaghs Burn														61	37	8	7	17	8	45
Redesdale	12	10	20	18	11	14	13	11	18	13	16	13	13	19	8	7	6	9	16	8
Eskdalemuir	7	5	8	21	8	10	8	10	14	13	8	10	17	17	6	6	4	6	7	7
Whiteadder	14	14	20	16	11	13	12	12	18	19	15	13	14	19	9	0	8	9	7	11
Loch Chon														13	5	6	7	7	5	9
Balquhiddy	8	5	6	9	8	11	8	12	10	9	10	9	16	19	7	6	6	7	6	8
Polloch					9	16	13	13	14	13	12	11	20	24	9	7	10	9	9	12
Lochnagar														10	4	5	5	6	5	6
Glen Dye		7	10	11	10	9	10	11	12	10	10	10	10	15	6	6	6	11	6	9
Allt a' Mharcaidh	10	8	7	8	7	6	9	12	12	7	11	9	13	17	6	5	4	6	6	6
Strathvaich Dam		7	7	8	13	9	10	14	14	11	15	11	16	20	11	6	5	10	8	10
Achanarras	16	15	20	20	21	17	17	19	18	17	18	15	20	28	14	11	12	18	14	18

Table II.8. Precipitation-weighted Annual Mean Chloride, 1986 to 2005 (µeq/l)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Goonhilly	311	242	253	322	595	373	265	256	296	313	368	320	324	325	353	266	320	222	332	255
Yarner Wood	118	152	180	190	291	161	122	117	139	147	149	133	143	98	124	108	230	123	142	113
Barcombe Mills	226	310	190	252	425	161	156	116	166	202	230	187	180	200	237	111	235	157	184	150
Compton	55	92	94	110	159	89	54	73	74	81	91	89	68	64	55	45	75	51	52	58
Crai Reservoir														116	125	94	139	115	115	73
Flatford Mill	109	80	70	99	101	88	71	68	79	95	90	68	69	57	75	58	77	68	59	75
Woburn	82	82	61	75	109	69	38	51	64	61	66	64	41	52	40	36	48	51	49	62
Tycanol Wood	141	109	123	266	268	190	135	135	178	184	171	178	162	169	173	121	187	167	167	123
Llyn Brianne	107	83	99	131	178	129	81	110	100	95	107	106	101	117	105	0	131	125	119	101
Pumlumon				124	165	118	83	77	83	91	95	127	108	97	110	80	152	108	92	77
Stoke Ferry	95	65	66	73	103	89	72	64	62	57	86	62	63	62	51	71	44	58	54	64
Preston Montford	109	56	114	59	123	203	50	84	72	84	46	94	47	63	42	37	66	53	58	57
Bottesford	115	58	100	78	97	85	62	63	55	67	74	37	42	43	32	37	51	47	47	54
Llyn Llagi														124	106	87	132	113	149	101
Llyn Llydaw	154	83	137	156	225	185	107	128	105	149	112	120	99	120	85	84	95	74	94	73
River Etherow														69	57	56	76	73	76	72
Wardlow Hay Cop	97	85	131	84	183	163	78	122	113	87	104	74	78	80	50	59	69	72	104	60
Driby	128	76	90	126	135	123	88	85	98	125	144	69	90	78	75	88	91	80	68	93
Jenny Hurn	169	99	146	123	170	124	86	84	83	99	111	72	89	68	47	57				
Thorganby	140	100	121	139	166	180	123	107	96	96	90	64	107	73	49	59	49	51	41	51
High Muffles	89	96	106	131	146	140	110	139	108	146	187	98	126	88	73	92	68	110	63	100
Bannisdale	148	75	168	141	193	213	107	125	109	151	113	178	114	149	88	85	100	90	145	83
Hillsborough Forest				106	165	123	84	102	140	130	123	89	110	102	106	83	78	85	105	106
Lough Navar	293	125	409	166	298	222	153	215	191	144	135	150	155	188	179	118	172	197	139	139
Cow Green Res.	91	52	85	91	107	98	86	85	89	108	105	117	100	113	66	0	83	76	82	73
Scoat Tarn														95	83	0	87	80	88	77
Loch Dee	152	67	159	159	173	144	96	90	106	121	106	123	102	138	120	65	121	104	102	109
Beaghs Burn														194	178	151	158	207	163	203
Redesdale	133	54	84	112	83	97	72	92	86	89	108	62	74	73	60	54	69	64	83	63
Eskdalemuir	105	47	76	97	103	118	65	72	85	101	74	74	87	113	73	98	73	76	85	69
Whiteadder	129	64	100	110	93	69	93	118	132	115	139	104	91	97	112	0	93	128	54	105
Loch Chon														129	82	82	146	100	73	90
Balquhidder	146	58	70	131	125	104	70	167	135	83	146	100	92	140	98	69	97	105	78	118
Polloch					205	249	135	227	169	191	176	143	183	226	180	163	275	174	175	211
Lochnagar														43	39	41	85	50	45	42
Glen Dye		64	86	98	98	91	78	103	124	115	146	124	103	93	83	94	102	77	59	97
Allt a' Mharcaidh	104	39	52	104	72	53	65	158	99	66	76	82	75	93	73	46	51	87	67	104
Strathvaich Dam		101	129	148	207	168	138	228	169	116	149	131	138	201	179	114	118	265	141	226
Achanarras	279	174	253	317	251	272	209	255	245	195	246	189	225	280	302	220	244	381	228	352

Table II.9. Precipitation-weighted Annual Mean Sulphate, 1986 to 2005 ($\mu\text{eq/l}$)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Goonhilly	61	59	47	63	85	75	50	57	58	56	69	59	52	51	55	49	54	47	51	50
Yarner Wood	39	52	40	47	49	44	38	40	43	39	48	41	34	28	27	30	40	33	32	36
Barcombe Mills	68	80	59	68	81	68	58	45	54	54	61	45	48	47	45	36	49	51	54	47
Compton	85	112	72	70	73	71	67	55	63	57	70	51	45	38	32	33	35	34	37	43
Crai Reservoir														29	27	30	26	28	22	22
Flatford Mill	102	78	73	89	65	79	60	49	58	62	61	48	50	50	42	39	43	46	41	42
Woburn	82	86	91	81	76	70	60	49	66	52	63	46	46	44	34	38	37	39	39	50
Tycanol Wood	41	37	36	54	50	51	41	37	42	40	45	38	36	39	34	31	35	33	35	32
Llyn Brianne	36	37	36	40	46	43	36	39	37	32	38	31	30	29	26	0	28	30	24	31
Pumlumon				32	36	35	32	31	27	30	33	31	26	23	22	20	25	23	19	19
Stoke Ferry	89	82	72	91	90	86	74	61	68	56	61	55	49	47	46	41	39	47	43	48
Preston Montford	56	65	66	65	49	85	69	56	59	68	53	42	31	30	29	33	39	28	27	31
Bottesford	100	98	116	89	73	82	77	62	67	61	61	47	49	43	36	46	45	48	39	44
Llyn Llagi														30	28	25	26	27	26	27
Llyn Llydaw	61	39	41	38	42	43	34	38	32	35	35	27	27	30	21	23	23	20	21	20
River Etherow														46	38	48	38	37	36	39
Wardlow Hay Cop	79	98	94	87	90	100	80	83	87	73	88	66	58	58	45	59	47	50	48	44
Driby	80	80	85	91	91	91	73	58	72	82	64	49	62	49	45	49	43	48	43	47
Jenny Hurn	121	112	130	107	100	90	81	66	86	72	90	62	78	60	55	57				
Thorganby	94	85	94	96	93	126	94	85	78	62	76	68	69	56	49	56	46	54	44	45
High Muffles	70	82	90	85	78	87	80	70	70	65	83	57	62	46	44	50	41	51	39	45
Bannisdale	57	45	61	54	60	60	53	58	48	53	55	50	42	38	31	36	31	34	34	33
Hillsborough Forest				63	53	55	50	51	60	46	58	36	41	41	33	41	26	26	29	28
Lough Navar	49	28	34	34	46	41	33	41	37	31	31	31	28	30	29	24	26	30	24	22
Cow Green Res.	44	43	53	44	44	44	47	49	40	43	48	38	36	34	26	0	26	26	24	24
Scoat Tarn														33	26	0	24	26	25	25
Loch Dee	47	41	52	39	43	43	37	38	36	37	47	31	29	34	31	29	23	26	26	29
Beaghs Burn														58	34	36	28	33	26	36
Redesdale	72	51	70	58	44	52	53	44	51	46	63	44	42	33	28	35	29	31	34	26
Eskdalemuir	40	35	41	38	42	43	34	37	38	38	36	32	30	31	23	28	21	27	22	24
Whiteadder	66	55	72	58	42	52	59	50	54	55	58	44	37	35	35	0	38	34	29	37
Loch Chon														26	24	26	29	24	22	26
Balquhidder	41	39	35	37	34	38	31	44	38	30	52	31	29	29	25	26	25	27	21	27
Polloch					36	42	31	39	34	33	36	26	30	32	27	26	36	26	23	29
Lochnagar														27	24	31	36	27	20	22
Glen Dye		54	58	51	49	54	51	49	60	53	76	44	40	35	30	39	34	35	26	28
Allt a' Mharcaidh	35	29	26	29	23	22	23	33	29	21	31	22	19	19	17	19	16	17	17	20
Strathvaich Dam		26	27	27	31	30	33	35	28	22	32	26	24	25	26	18	19	30	21	28
Achanarras	52	50	57	63	48	52	47	48	45	40	51	41	41	46	42	37	40	52	34	52

Table II.10. Annual Volume of Rain Samples collected in the Secondary Network collector*, 1986 to 2005 (mm)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Goonhilly	907	879	910	753	790	800	776	1008	999	744	743	1000	936	831	934	787	1025	743	819	711
Yarner Wood	1150	1016	1123	1131	1174	1058	1049	1398	1333	1135	1007	1218	1383	1106	1315	1026	1342	668	1012	697
Barcombe Mills	740	849	678	597	639	620	654	739	806	652	539	818	733	655	1215	834	923	506	568	507
Compton	589	629	530	550	407	449	709	644	585	647	392	576	642	644	855	701	805	466	671	525
Crai Reservoir														2190	2292	1659	2207	1305	2187	1403
Flatford Mill	528	660	532	392	393	362	510	518	438	335	231	409	493	546	613	615	586	372	465	373
Woburn	758	672	592	540	400	478	694	656	505	515	328	456	620	537	662	670	651	448	595	423
Tycanol Wood	1508	1318	1385	1340	1437	1422	1572	1692	1460	1320	1366	1589	1576	1246	1734	1287	1808	1246	1324	1107
Llyn Brianne	1491	1497	1434	1417	1483	1224	1488	1573	1474	1143	1195	1296	1737	1725	1983	286	1567	1303	1709	520
Pumlumon				1896	1936	1908	2129	2124	2445	1622	1554	1780	2641	2230	2410	1547	2193	1752	2204	1793
Stoke Ferry	503	617	537	495	348	350	508	601	479	375	318	519	517	435	577	597	694	440	539	444
Preston Montford	539	570	514	580	538	443	555	585	520	409	403	550	590	666	789	535	554	534	560	485
Bottesford	545	651	531	469	434	377	557	651	526	327	289	596	573	540	682	572	614	400	461	478
Llyn Llagi														2177	2979	1925	2608	2431	2239	1827
Llyn Llydaw	2758	2231	2794	2480	2394	2028	3014	2152	2375	2097	1574	2068	2777	2313	3086	1831	1916	2238	2573	2258
River Etherow														876	1205	914	1261	758	1002	915
Wardlow Hay Cop	928	889	837	708	711	617	850	853	977	581	530	853	1018	860	1068	786	1066	665	793	786
Driby	702	685	605	457	473	398	676	636	514	375	415	578	620	598	616	597	568	483	617	507
Jenny Hurn	518	652	390	443	351	354	505	546	451	460	301	423	530	554	610	511				
Thorganby	503	625	516	364	434	329	511	485	496	395	348	477	448	597	703	542	609	441	605	475
High Muffles	711	875	855	599	806	626	836	947	740	670	693	827	980	936	1160	861	879	670	826	704
Bannisdale	2259	2101	2091	1699	2270	1857	2027	1794	2289	1690	1328	1771	2167	1798	2552	1606	2082	1756	2247	1583
Hillsborough Forest				642	909	668	635	802	614	742	662	824	777	730	900	515	893	532	709	685
Lough Navar	1439	1144	1492	1242	1617	1459	1978	1517	1631	1521	1373	1395	1686	1383	1297	1004	1358	941	1237	999
Cow Green Res.	1129	1216	1138	858	1165	957	1073	1118	1293	807	1149	1058	1353	1275	1633	860	1411	1033	1627	899
Scoat Tarn														2110	2727	1651	2618	1980	2467	2325
Loch Dee	2373	2311	2619	2001	2574	2196	2659	1950	2393	2036	1928	2269	2473	2373	1438	1249	2055	1646	1990	1303
Beaghs Burn														1417	1695	1148	1494	1044	1458	1270
Redesdale	745	828	832	499	724	581	662	585	541	507	444	437	843	632	842	553	1002	509	874	538
Eskdalemuir	1523	1276	1396	1236	1528	1248	1609	1330	1630	1202	1211	1487	1700	1479	1628	1180	1780	1070	1381	1132
Whiteadder	585	718	712	489	721	569	665	722	566	473	395	546	750	583	817	499	722	416	544	292
Loch Chon														2123	1838	1399	2278	1696	1706	1454
Balquhidder	2008	1428	1736	1967	2398	1683	1815	1575	1547	1637	1096	1579	1540	1863	1674	1254	1704	1138	1746	1335
Polloch					707	2021	2355	1790	2012	1788	1606	1904	2250	2098	2011	1171	1800	1675	2520	1963
Lochnagar														987	1436	956	1885	959	1367	1215
Glen Dye		898	1067	659	809	691	759	968	637	724	740	1049	1005	792	1238	998	1320	554	840	722
Allt a' Mharcaidh	778	664	761	638	907	729	757	826	714	678	477	601	846	874	895	593	786	496	781	628
Strathvaich Dam		959	1205	1357	1713	1396	1609	1148	1273	1282	885	1200	1458	1444	1383	997	1173	1129	1395	1230
Achanarras	901	864	642	476	776	512	635	567	535	622	488	478	700	646	598	586	663	548	686	698

* 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

2005 SULPHUR MEASUREMENTS

Appendix 3.1

2005 SULPHUR DIOXIDE MEASUREMENTS

Monthly and Annual Mean Concentrations of Sulphur Dioxide in 2005
Concentration in Air ($\mu\text{g SO}_2$ [as S] m^{-3})

Site	Jan -1	Feb -1	Mar -1	Apr -1	May -1	Jun -1	Jul -1	Aug -1	Sep -1	Oct -1	Nov -1	Dec -1	Annual Mean -1
Eskdalemuir -2	0.15	0.26	0.30	0.25	0.22	0.10	0.09	0.39	0.16	0.26	0.17	0.20	0.21
Stoke Ferry -2	0.75	0.88	0.79	0.80	0.59	0.84	0.70	0.56	0.46	0.49	0.53	0.84	0.68
Lough Navar -2	0.07	0.07	0.10	0.12	0.12	0.03	0.03	0.05	0.18	-	0.03	0.05	0.08
Barcombe Mills -2	0.23	-	1.07	0.59	0.59	-	-	0.56	0.36	0.37	0.43	0.49	0.55
Yarner Wood -2	0.23	0.42	0.53	0.43	0.41	0.31	0.20	0.26	0.23	-	0.41	0.29	0.33
High Muffles -2	0.67	0.80	0.71	0.72	0.64	0.68	0.51	0.64	-	-	0.98	0.98	0.73
Strathvaich Dam -2	0.06	0.03	0.06	0.29	0.05	0.04	0.03	0.03	0.06	0.09	0.06	0.12	0.08
Glen Dye - 2	0.10	0.11	0.18	-	-	0.13	0.13	0.19	0.19	0.22	0.09	0.25	0.17

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 the monthly filter-pack measurements. No correction has been made to the filter-pack measurements although the measurement overlap programme suggests that the filter-pack sampler has an offset of about $-0.13 \mu\text{g SO}_2$ [as S] m^{-3} ; compared to the H_2O_2 bubbler; (2) The filter-pack samplers were installed on the following dates:

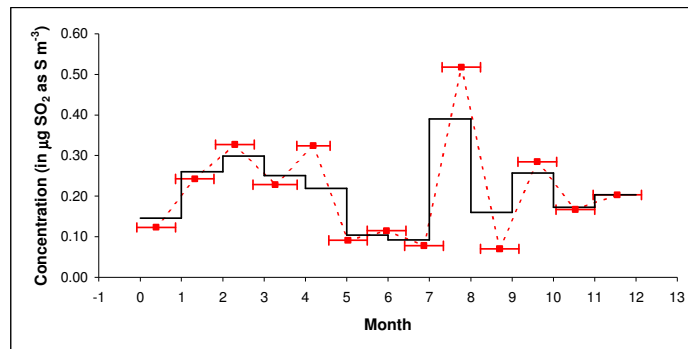
Site	Installation Date	Site	Installation Date	Site	Installation Date	Installation Date	Date
- Eskdalemuir	24 th May 2001	- Stoke Ferry	10 th May 2001	- Lough Navar	24 th April 2001	- Barcombe Mills	10 th May 2001
- Yarner Wood	16 th July 2001	- High Muffles	21 st May 2001	- Strathvaich Dam	19 th June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

National Environmental Technology Centre
 Sulphur Dioxide Concentration in Air ($\mu\text{g SO}_2$ as S m^{-3})

Site: 5002 Eskdalemuir

Fortnightly measurements, collection-day - non standard
 Summary for January 2005 to December 2005

Start Date	End Date	Duration	Concentration
29-Dec-2004	- 26-Jan-2005	28	0.12
26-Jan-2005	- 23-Feb-2005	28	0.24
23-Feb-2005	- 23-Mar-2005	28	0.33
23-Mar-2005	- 24-Apr-2005	32	0.23
24-Apr-2005	- 18-May-2005	24	0.32
18-May-2005	- 15-Jun-2005	28	0.09
15-Jun-2005	- 13-Jul-2005	28	0.11
13-Jul-2005	- 10-Aug-2005	28	0.08
10-Aug-2005	- 07-Sep-2005	28	0.52
07-Sep-2005	- 05-Oct-2005	28	0.07
05-Oct-2005	- 02-Nov-2005	28	0.28
02-Nov-2005	- 30-Nov-2005	28	0.17
30-Nov-2005	- 04-Jan-2006	35	0.20



Annual Mean Concentration	=	0.21
Data Capture	=	100.0%

Notes:

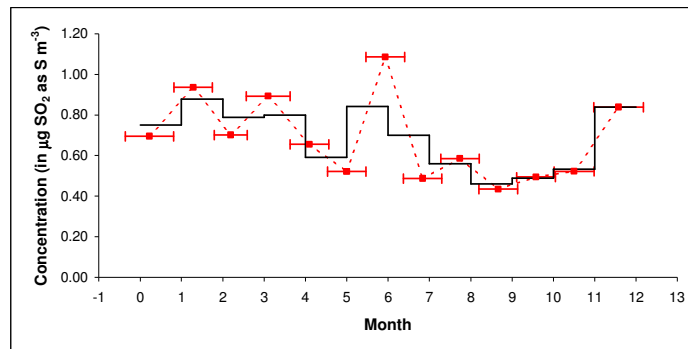
- (1) N = no or non valid measurement;
- (2) Measurements preceded by < are below the Limit of Detection.
 included in the calculation of the statistical parameters at 50% of its value
- (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
 Sulphur Dioxide Concentration in Air ($\mu\text{g SO}_2$ as S m^{-3})

Site: 5004 Stoke Ferry

Fortnightly measurements, collection-day - non standard
 Summary for January 2005 to December 2005

Start Date	End Date	Duration	Concentration
21-Dec-2004	- 25-Jan-2005	35	0.69
25-Jan-2005	- 22-Feb-2005	28	0.94
22-Feb-2005	- 18-Mar-2005	24	0.70
18-Mar-2005	- 19-Apr-2005	32	0.89
19-Apr-2005	- 17-May-2005	28	0.66
17-May-2005	- 14-Jun-2005	28	0.52
14-Jun-2005	- 12-Jul-2005	28	1.09
12-Jul-2005	- 09-Aug-2005	28	0.49
09-Aug-2005	- 06-Sep-2005	28	0.59
06-Sep-2005	- 04-Oct-2005	28	0.43
04-Oct-2005	- 01-Nov-2005	28	0.49
01-Nov-2005	- 30-Nov-2005	29	0.52
30-Nov-2005	- 05-Jan-2006	36	0.84



Annual Mean Concentration	=	0.68
Data Capture	=	100.0%

Notes:

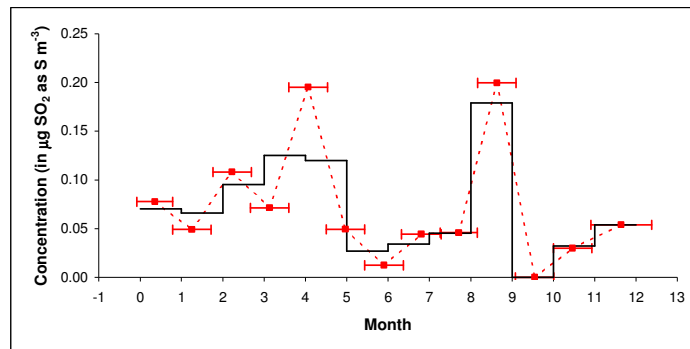
- (1) N = no or non valid measurement;
- (2) Measurements preceded by < are below the Limit of Detection.
 included in the calculation of the statistical parameters at 50% of its value
- (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
 Sulphur Dioxide Concentration in Air ($\mu\text{g SO}_2$ as S m^{-3})

Site: 5006 Lough Navar

Fortnightly measurements, collection-day - non standard
 Summary for January 2005 to December 2005

Start Date	End Date	Duration	Concentration
29-Dec-2004	- 24-Jan-2005	26	0.08
24-Jan-2005	- 21-Feb-2005	28	0.05
21-Feb-2005	- 21-Mar-2005	28	0.11
21-Mar-2005	- 18-Apr-2005	28	0.07
18-Apr-2005	- 16-May-2005	28	0.20
16-May-2005	- 13-Jun-2005	28	0.05
13-Jun-2005	- 11-Jul-2005	28	0.01
11-Jul-2005	- 09-Aug-2005	29	0.04
09-Aug-2005	- 05-Sep-2005	27	0.05
05-Sep-2005	- 03-Oct-2005	28	0.20
03-Oct-2005	- 31-Oct-2005	28	N
31-Oct-2005	- 28-Nov-2005	28	0.03
28-Nov-2005	- 11-Jan-2006	44	0.05



Annual Mean Concentration	=	0.08
Data Capture	=	92.3%

Notes:

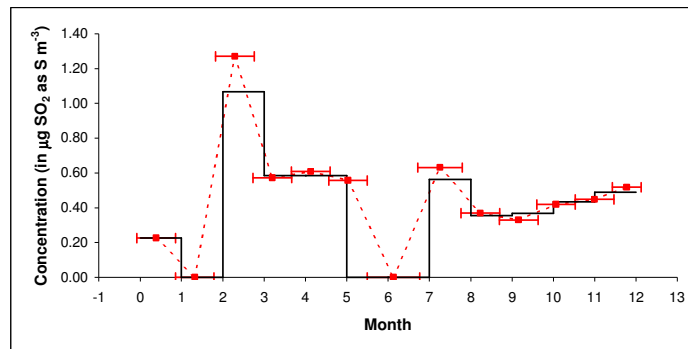
- (1) N = no or non valid measurement;
- (2) Measurements preceded by < are below the Limit of Detection.
 included in the calculation of the statistical parameters at 50% of its value
- (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
 Sulphur Dioxide Concentration in Air ($\mu\text{g SO}_2$ as S m^{-3})

Site: 5007 Barcombe Mills

Fortnightly measurements, collection-day - non standard
 Summary for January 2005 to December 2005

Start Date	End Date	Duration	Concentration
29-Dec-2004	- 26-Jan-2005	28	0.23
26-Jan-2005	- 23-Feb-2005	28	N
23-Feb-2005	- 23-Mar-2005	28	1.27
23-Mar-2005	- 20-Apr-2005	28	0.57
20-Apr-2005	- 18-May-2005	28	0.61
18-May-2005	- 15-Jun-2005	28	0.56
15-Jun-2005	- 23-Jul-2005	38	N
23-Jul-2005	- 24-Aug-2005	32	0.63
24-Aug-2005	- 21-Sep-2005	28	0.37
21-Sep-2005	- 19-Oct-2005	28	0.33
19-Oct-2005	- 16-Nov-2005	28	0.42
16-Nov-2005	- 14-Dec-2005	28	0.45
14-Dec-2005	- 04-Jan-2006	21	0.52



Annual Mean Concentration	=	0.55
Data Capture	=	81.9%

Notes:

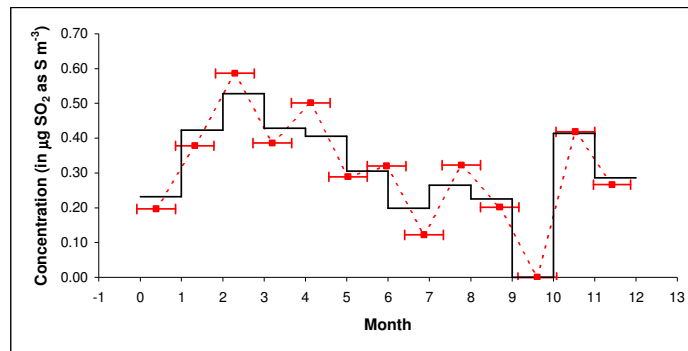
- (1) N = no or non valid measurement;
- (2) Measurements preceded by < are below the Limit of Detection.
 included in the calculation of the statistical parameters at 50% of its value
- (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
 Sulphur Dioxide Concentration in Air ($\mu\text{g SO}_2$ as S m^{-3})

Site: 5008 Yarner Wood

Fortnightly measurements, collection-day - non standard
 Summary for January 2005 to December 2005

Start Date	End Date	Duration	Concentration
29-Dec-2004	- 26-Jan-2005	28	0.20
26-Jan-2005	- 23-Feb-2005	28	0.38
23-Feb-2005	- 23-Mar-2005	28	0.59
23-Mar-2005	- 20-Apr-2005	28	0.39
20-Apr-2005	- 18-May-2005	28	0.50
18-May-2005	- 15-Jun-2005	28	0.29
15-Jun-2005	- 13-Jul-2005	28	0.32
13-Jul-2005	- 10-Aug-2005	28	0.12
10-Aug-2005	- 07-Sep-2005	28	0.32
07-Sep-2005	- 05-Oct-2005	28	0.20
05-Oct-2005	- 02-Nov-2005	28	N
02-Nov-2005	- 30-Nov-2005	28	0.42
30-Nov-2005	- 27-Dec-2005	27	0.27
27-Dec-2005	- 24-Jan-2006	28	0.39



Annual Mean Concentration	=	0.33
Data Capture	=	92.3%

Notes:

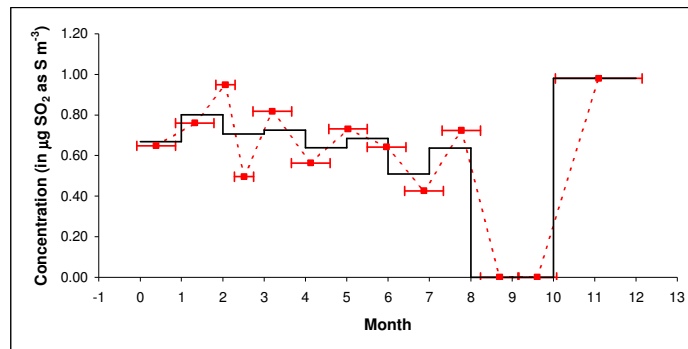
- (1) N = no or non valid measurement;
- (2) Measurements preceded by < are below the Limit of Detection.
 included in the calculation of the statistical parameters at 50% of its value
- (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
 Sulphur Dioxide Concentration in Air ($\mu\text{g SO}_2$ as S m^{-3})

Site: 5009 High Muffles

Fortnightly measurements, collection-day - non standard
 Summary for January 2005 to December 2005

Start Date	End Date	Duration	Concentration
29-Dec-2004	- 26-Jan-2005	28	0.65
26-Jan-2005	- 23-Feb-2005	28	0.76
23-Feb-2005	- 09-Mar-2005	14	0.95
09-Mar-2005	- 23-Mar-2005	14	0.50
23-Mar-2005	- 20-Apr-2005	28	0.82
20-Apr-2005	- 18-May-2005	28	0.56
18-May-2005	- 15-Jun-2005	28	0.73
15-Jun-2005	- 13-Jul-2005	28	0.64
13-Jul-2005	- 10-Aug-2005	28	0.43
10-Aug-2005	- 07-Sep-2005	28	0.72
07-Sep-2005	- 05-Oct-2005	28	N
05-Oct-2005	- 02-Nov-2005	28	N
02-Nov-2005	- 04-Jan-2006	63	0.98



Annual Mean Concentration	=	0.73
Data Capture	=	84.7%

Notes:

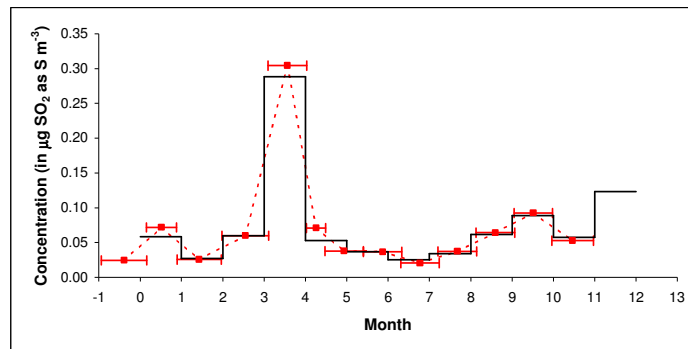
- (1) N = no or non valid measurement;
- (2) Measurements preceded by < are below the Limit of Detection.
 included in the calculation of the statistical parameters at 50% of its value
- (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
 Sulphur Dioxide Concentration in Air ($\mu\text{g SO}_2$ as S m^{-3})

Site: 5010 Strathvaich Dam

Fortnightly measurements, collection-day - non standard
 Summary for January 2005 to December 2005

Start Date	End Date	Duration	Concentration
03-Dec-2004	- 05-Jan-2005	33	0.02
05-Jan-2005	- 27-Jan-2005	22	0.07
27-Jan-2005	- 28-Feb-2005	32	0.03
28-Feb-2005	- 03-Apr-2005	34	0.06
03-Apr-2005	- 01-May-2005	28	0.30
01-May-2005	- 15-May-2005	14	0.07
15-May-2005	- 12-Jun-2005	28	0.04
12-Jun-2005	- 10-Jul-2005	28	0.04
10-Jul-2005	- 07-Aug-2005	28	0.02
07-Aug-2005	- 04-Sep-2005	28	0.04
04-Sep-2005	- 02-Oct-2005	28	0.06
02-Oct-2005	- 30-Oct-2005	28	0.09
30-Oct-2005	- 29-Nov-2005	30	0.05
29-Nov-2005	- 02-Jan-2006	03	0.12



Annual Mean Concentration	=	0.08
Data Capture	=	100.0%

Notes:

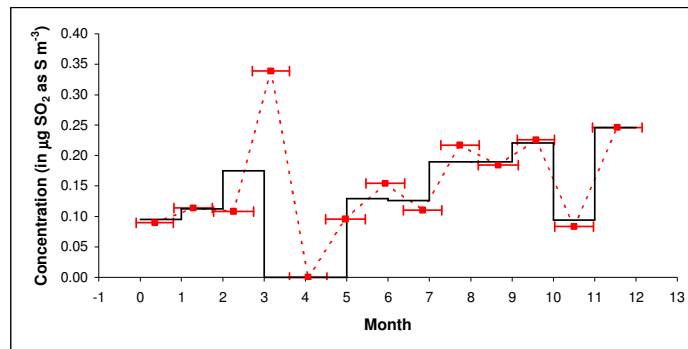
- (1) N = no or non valid measurement;
- (2) Measurements preceded by < are below the Limit of Detection.
 included in the calculation of the statistical parameters at 50% of its value
- (3) Statistical parameters calculated only if data capture is greater than 75%.

National Environmental Technology Centre
 Sulphur Dioxide Concentration in Air ($\mu\text{g SO}_2$ as S m^{-3})

Site: 5011 Glen Dye

Fortnightly measurements, collection-day - non standard
 Summary for January 2005 to December 2005

Start Date	End Date	Duration	Concentration
29-Dec-2004	- 25-Jan-2005	27	0.09
25-Jan-2005	- 22-Feb-2005	28	0.11
22-Feb-2005	- 23-Mar-2005	29	0.11
23-Mar-2005	- 19-Apr-2005	27	0.34
19-Apr-2005	- 16-May-2005	27	N
16-May-2005	- 14-Jun-2005	29	0.10
14-Jun-2005	- 12-Jul-2005	28	0.15
12-Jul-2005	- 09-Aug-2005	28	0.11
09-Aug-2005	- 06-Sep-2005	28	0.22
06-Sep-2005	- 05-Oct-2005	29	0.18
05-Oct-2005	- 01-Nov-2005	27	0.23
01-Nov-2005	- 29-Nov-2005	28	0.08
29-Nov-2005	- 04-Jan-2006	36	0.25



Annual Mean Concentration	=	0.17
Data Capture	=	92.6%

Notes:

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

Appendix 3.2

2005 PARTICULATE SULPHATE MEASUREMENTS

Monthly and Annual Mean Concentrations of Particulate Sulphate in 2005
Concentration in Air ($\mu\text{g SO}_4$ [as S] m^{-3})

Site	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean
Eskdalemuir	0.21	0.31	0.59	0.58	0.36	0.47	0.29	0.29	0.33	0.57	0.22	0.26	0.38
Lough Navar	0.16	0.29	0.56	0.53	0.33	0.40	0.40	-	0.32	0.51	0.29	0.29	0.37
Barcombe Mills	0.44	0.76	1.01	0.84	0.75	0.96	0.79	-	0.90	0.92	-	0.50	0.76
Yarner Wood	0.27	0.57	0.79	0.59	0.48	0.59	0.50	-	0.42	-	-	-	0.55
High Muffles	0.30	0.53	0.77	0.67	0.44	0.58	-	-	-	-	-	0.42	-

Note: - indicates that no average was determined as the data capture was less than 75%.

National Environmental Technology Centre
 Site: 5002 Eskdalemuir - Sulphate as S (SO₄ - S)
 Concentration in air (µg S m⁻³)

Daily measurements - Summary for January 2005 to December 2005

MONTH DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1 - 2	0.16	0.10	0.23	0.63	0.93	0.32	0.31	0.19	0.12	0.10	0.19	0.44
2 - 3	0.18	0.17	0.16	0.90	0.42	0.87	0.38	0.29	0.41	0.16	0.31	0.46
3 - 4	0.30	0.25	0.21	0.68	0.22	0.42	0.21	0.20	1.21	0.15	0.20	0.22
4 - 5	0.20	0.24	0.16	0.23	0.20	0.24	0.17	0.20	2.24	0.87	0.13	0.31
5 - 6	0.20	0.14	0.25	0.21	0.15	0.26	0.31	0.31	1.71	1.56	0.17	0.19
6 - 7	0.20	0.24	0.33	0.25	0.14	0.24	0.34	0.15	0.69	2.35	0.18	0.19
7 - 8	0.09	1.08	0.18	0.13	0.14	0.74	0.31	0.21	0.17	1.28	0.19	0.36
8 - 9	0.13	0.35	0.16	0.22	0.15	0.95	0.33	0.22	0.33	0.19	0.14	0.36
9 - 10	0.27	0.33	0.16	0.21	0.18	0.37	0.31	0.20	0.05	0.20	0.15	0.29
10 - 11	0.22	0.19	0.22	0.19	0.30	0.34	0.19	N	0.10	1.14	0.32	0.49
11 - 12	0.29	0.19	0.15	0.23	0.08	0.31	0.28	N	0.11	0.05	0.24	0.12
12 - 13	0.12	0.15	0.09	0.18	N	0.14	0.11	N	0.20	0.08	0.09	0.14
13 - 14	0.16	0.15	0.20	0.44	0.19	0.18	0.19	N	0.17	0.10	0.17	N
14 - 15	0.52	0.14	0.46	0.59	0.28	0.37	0.59	N	N	0.39	0.25	0.30
15 - 16	0.88	0.22	0.11	0.18	0.40	0.57	0.34	N	0.05	1.10	0.11	0.19
16 - 17	0.29	0.49	0.22	0.61	0.29	0.48	0.29	N	0.10	1.21	0.25	0.22
17 - 18	0.20	0.18	0.44	0.41	0.21	0.47	0.60	0.65	0.03	1.64	0.09	0.10
18 - 19	0.12	0.22	0.32	0.30	0.66	0.72	0.19	0.29	0.11	0.95	0.11	0.11
19 - 20	0.28	0.23	0.58	0.54	0.88	1.08	0.15	0.19	0.11	0.37	0.30	0.15
20 - 21	0.18	0.11	2.69	0.82	2.51	0.46	0.34	0.21	0.10	0.21	0.28	0.37
21 - 22	0.19	0.21	1.45	1.17	0.27	0.32	0.29	0.26	0.21	0.24	0.46	0.18
22 - 23	0.11	0.30	0.50	0.98	0.17	0.65	0.38	0.14	0.50	0.14	0.28	0.56
23 - 24	0.15	0.71	0.03	1.02	0.27	0.49	0.28	0.22	0.09	0.29	0.66	0.25
24 - 25	0.25	0.84	1.75	1.81	0.32	0.28	0.18	0.10	0.09	0.15	0.08	0.15
25 - 26	0.22	0.84	0.78	1.69	0.02	0.22	0.14	0.10	0.09	0.19	0.10	0.12
26 - 27	0.21	0.28	N	1.20	0.26	0.34	0.33	0.24	0.10	0.48	0.10	0.12
27 - 28	0.13	0.19	0.18	0.30	0.26	0.25	0.67	0.25	0.07	0.91	N	0.23
28 - 29	0.08	0.18	0.34	0.29	0.23	0.46	0.20	0.23	0.13	0.28	0.09	0.35
29 - 30	0.10		0.89	0.35	0.19	0.61	0.10	0.13	0.11	0.51	0.10	0.47
30 - 31	0.06		1.92	0.74	0.11	0.99	0.27	0.35	0.17	0.27	0.51	0.23
31 - 1	0.06		2.40		0.25		0.21	1.56		0.25		0.21
Arithmetic Mean (3)	0.21	0.31	0.59	0.58	0.36	0.47	0.29	0.29	0.33	0.57	0.22	0.26
Standard Deviation (3)	0.15	0.25	0.71	0.45	0.46	0.25	0.13	0.29	0.52	0.58	0.14	0.13
Sample Size	31	28	30	30	30	30	31	24	29	31	29	30

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

National Environmental Technology Centre
 Site: 5006 Lough Navar - Sulphate as S (SO₄ - S)
 Concentration in air (µg S m⁻³)

Daily measurements - Summary for January 2005 to December 2005

MONTH DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1 - 2	0.15	0.12	0.15	0.42	0.58	0.22	0.30	0.27	0.13	0.23	0.13	0.18
2 - 3	0.20	0.32	0.16	1.08	0.23	0.30	0.32	0.35	0.27	0.30	0.21	0.32
3 - 4	0.23	0.13	0.24	0.41	0.25	0.25	0.13	0.23	0.85	0.23	0.12	0.30
4 - 5	0.16	0.11	0.32	0.15	0.37	0.17	0.19	0.16	2.00	0.49	0.16	0.10
5 - 6	0.19	0.13	0.24	0.28	0.30	0.24	0.22	0.20	0.19	0.96	0.22	0.17
6 - 7	0.11	0.19	0.22	0.16	0.29	0.54	0.20	0.22	0.35	1.35	0.16	0.24
7 - 8	0.08	0.27	0.10	0.13	0.28	1.29	0.15	0.22	0.14	0.93	0.16	0.29
8 - 9	0.11	0.18	0.13	0.36	0.15	0.76	0.24	N	0.23	0.10	0.11	0.11
9 - 10	0.16	0.26	0.18	0.32	0.35	0.46	0.15	N	0.23	0.20	0.13	0.17
10 - 11	0.19	0.18	0.21	0.22	0.48	0.44	0.19	N	0.35	0.17	0.32	0.40
11 - 12	0.15	0.10	0.25	0.24	0.50	0.42	0.38	N	0.28	0.20	1.28	0.20
12 - 13	0.18	0.21	0.13	0.23	0.67	0.24	0.59	N	0.57	0.11	1.01	0.13
13 - 14	0.24	0.23	0.22	0.16	0.46	0.34	0.30	N	0.29	0.09	0.67	0.19
14 - 15	0.22	0.19	0.46	0.50	0.36	0.24	0.41	N	0.19	0.68	0.15	0.30
15 - 16	0.41	0.27	0.42	0.20	0.45	0.31	0.29	N	0.12	1.65	0.20	0.36
16 - 17	0.15	0.24	0.37	0.27	0.35	0.23	0.36	N	0.18	1.79	0.10	0.28
17 - 18	0.14	0.36	0.40	0.16	0.26	0.27	0.27	N	0.19	1.43	0.20	0.16
18 - 19	0.22	0.36	0.88	0.17	0.36	0.67	0.18	N	0.31	1.24	0.30	0.14
19 - 20	0.22	0.24	2.44	0.25	0.30	0.29	0.25	N	0.24	0.40	0.32	0.21
20 - 21	<0.02	0.16	1.92	0.81	0.21	0.67	0.22	N	0.18	0.14	0.30	0.80
21 - 22	0.17	0.30	0.52	1.80	0.24	0.09	0.31	N	0.53	0.29	0.49	0.26
22 - 23	0.20	0.37	0.31	1.44	N	0.21	2.36	0.23	0.24	0.16	0.47	0.54
23 - 24	0.10	0.60	0.56	1.49	0.20	0.25	0.48	0.19	0.18	0.26	0.41	0.15
24 - 25	0.12	0.92	0.27	1.43	0.29	0.35	0.78	0.19	0.24	0.14	0.17	1.04
25 - 26	0.25	0.90	0.29	1.45	0.22	0.27	1.24	0.15	0.15	0.15	0.27	0.40
26 - 27	0.15	0.21	0.72	0.52	0.25	0.34	0.28	0.19	0.30	0.69	0.15	0.33
27 - 28	0.10	0.32	0.53	0.20	0.43	0.33	0.31	0.20	0.17	0.70	0.10	0.31
28 - 29	0.09	0.28	0.88	0.16	0.23	0.81	0.67	0.23	0.19	0.20	0.14	0.44
29 - 30	0.06		1.52	0.23	0.15	0.90	0.24	0.19	0.14	0.29	0.08	0.18
30 - 31	0.11		0.78	0.50	0.24	0.26	0.20	0.29	0.19	0.16	0.17	0.20
31 - 1	0.17		1.57		0.44		0.20	0.28		0.16		0.17
Arithmetic Mean (3)	0.16	0.29	0.56	0.53	0.33	0.40	0.40	-	0.32	0.51	0.29	0.29
Standard Deviation (3)	0.07	0.20	0.57	0.50	0.13	0.26	0.43	-	0.35	0.50	0.27	0.20
Sample Size	31	28	31	30	30	30	31	17	30	31	30	31

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

National Environmental Technology Centre
 Site: 5007 Barcombe Mills - Sulphate as S (SO₄ - S)
 Concentration in air (µg S m⁻³)

Daily measurements - Summary for January 2005 to December 2005

MONTH DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1 - 2	0.30	0.64	0.11	1.63	1.05	0.86	0.66	0.72	1.35	0.34	N	0.52
2 - 3	0.19	0.93	1.09	1.30	1.22	0.36	1.10	1.14	0.54	0.27	N	0.27
3 - 4	0.20	1.62	0.69	1.17	1.10	0.88	1.11	0.45	1.96	0.48	N	0.16
4 - 5	0.32	1.16	0.52	1.38	0.83	0.61	0.31	0.41	1.87	0.51	N	0.23
5 - 6	0.21	0.90	0.83	0.32	0.53	0.57	0.32	0.40	1.10	1.49	N	0.30
6 - 7	0.75	1.09	0.66	0.50	0.77	0.78	0.37	0.42	0.75	4.10	N	0.47
7 - 8	0.56	1.13	0.58	0.28	0.50	0.50	0.67	0.53	1.24	3.29	N	1.58
8 - 9	0.75	0.96	1.58	0.59	0.37	0.55	0.70	0.66	1.26	1.68	N	0.54
9 - 10	0.25	1.50	1.12	0.77	0.48	0.81	1.18	0.54	1.46	0.26	0.15	1.34
10 - 11	0.92	0.32	1.34	0.84	0.42	1.14	0.01	N	1.26	1.21	0.47	0.72
11 - 12	0.72	0.32	0.88	0.55	0.63	0.46	0.70	N	0.87	1.56	0.44	0.05
12 - 13	0.38	0.29	0.51	0.76	0.75	0.77	1.42	N	1.13	1.62	0.29	0.44
13 - 14	0.25	0.27	0.38	0.78	1.04	0.39	1.18	N	0.88	0.05	0.52	0.38
14 - 15	0.49	0.26	0.41	0.45	0.93	0.64	1.20	N	1.31	0.69	0.28	0.78
15 - 16	0.68	0.59	1.24	0.49	0.78	0.89	1.71	N	0.54	1.73	0.85	0.50
16 - 17	0.70	1.44	1.89	0.49	0.84	1.47	1.09	N	0.20	0.04	0.30	0.23
17 - 18	0.25	0.52	0.82	0.68	0.48	1.70	0.93	N	0.33	1.18	0.30	0.37
18 - 19	0.15	1.07	1.28	0.47	0.81	1.16	0.96	N	0.30	0.07	0.41	0.39
19 - 20	0.31	0.51	0.91	0.44	0.81	0.93	0.29	N	0.82	0.15	0.50	0.58
20 - 21	0.32	0.50	0.53	0.84	1.13	1.30	0.30	N	0.90	0.21	0.52	0.17
21 - 22	0.23	0.69	0.22	1.01	0.66	0.62	0.65	N	1.21	0.40	1.01	0.45
22 - 23	0.24	1.40	0.07	1.03	0.48	0.66	1.62	N	1.67	0.21	1.07	0.65
23 - 24	0.18	1.01	0.38	0.91	0.38	1.84	1.34	N	1.18	0.30	0.92	0.68
24 - 25	0.32	1.00	1.19	1.28	0.58	1.88	0.86	0.32	0.49	0.67	1.39	0.88
25 - 26	0.38	N	0.90	1.57	1.64	1.70	0.46	0.22	0.47	0.54	0.21	0.28
26 - 27	0.52	0.10	1.23	1.07	1.52	0.83	0.60	0.25	0.33	N	0.59	0.34
27 - 28	0.43	0.17	2.79	0.51	0.76	1.05	0.57	0.28	0.39	N	0.80	0.07
28 - 29	0.31	0.12	0.60	0.63	0.55	0.83	0.64	0.42	0.25	N	0.50	0.41
29 - 30	0.24		3.51	1.11	0.39	1.40	0.46	0.49	0.46	N	0.58	0.85
30 - 31	1.16		1.38	1.34	0.48	1.14	0.47	0.89	0.56	N	0.38	0.48
31 - 1	0.80		1.57		0.36		0.74	1.24		N		0.40
Arithmetic Mean (3)	0.44	0.76	1.01	0.84	0.75	0.96	0.79	-	0.90	0.92	-	0.50
Standard Deviation (3)	0.26	0.46	0.74	0.38	0.33	0.43	0.42	-	0.50	1.01	-	0.33
Sample Size	31	27	31	30	31	30	31	17	30	25	22	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: 5008 Yarner Wood - Sulphate as S (SO₄ - S)
 Concentration in air (µg S m⁻³)

Daily measurements - Summary for January 2005 to December 2005

MONTH DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1 - 2	0.17	0.34	0.28	1.46	1.59	0.37	0.18	0.40	0.19	0.15	N	N
2 - 3	0.19	0.49	0.42	1.42	0.71	0.39	0.41	0.32	0.27	0.24	N	N
3 - 4	0.19	0.65	0.21	1.06	0.61	0.25	0.23	0.33	1.68	0.35	N	N
4 - 5	0.17	0.48	0.23	0.17	0.45	0.33	0.21	0.26	1.64	0.68	N	N
5 - 6	0.23	0.22	0.48	0.34	0.44	0.14	0.25	0.28	0.41	1.36	N	N
6 - 7	0.27	0.03	1.05	0.21	0.31	0.70	0.32	0.33	0.37	1.36	N	N
7 - 8	0.39	0.70	0.37	0.21	0.38	0.54	0.28	0.31	0.43	1.36	N	N
8 - 9	0.22	0.71	0.36	0.23	0.23	0.58	0.43	0.41	0.66	1.36	N	N
9 - 10	0.54	0.30	0.50	0.36	0.25	0.68	0.88	0.24	0.69	1.36	N	N
10 - 11	0.27	0.14	0.51	0.43	0.05	0.77	0.02	0.51	0.39	1.36	N	N
11 - 12	0.23	0.05	0.43	0.18	0.56	0.78	0.96	N	0.75	1.36	N	N
12 - 13	0.19	0.20	0.20	0.22	0.72	0.47	1.05	N	0.37	0.30	N	N
13 - 14	0.19	0.26	0.26	0.31	0.74	0.30	1.07	N	1.20	0.92	N	N
14 - 15	0.46	0.20	0.59	0.29	0.60	0.70	1.08	N	0.06	1.95	N	N
15 - 16	0.47	0.45	1.35	0.42	0.52	0.35	0.56	N	0.15	1.21	N	N
16 - 17	0.18	0.69	0.49	0.37	0.49	0.59	0.69	N	0.33	1.14	N	N
17 - 18	0.09	0.31	0.25	0.28	0.66	0.58	0.78	N	0.15	0.85	N	N
18 - 19	0.22	0.33	0.58	0.25	0.56	0.98	0.26	N	0.33	0.11	N	N
19 - 20	0.13	0.25	1.35	0.38	0.40	1.02	0.26	N	0.56	N	N	N
20 - 21	0.15	0.27	3.78	0.90	0.28	0.30	0.55	N	0.33	N	N	N
21 - 22	0.22	0.68	0.79	1.70	0.18	0.24	0.48	N	0.28	N	N	N
22 - 23	0.17	0.75	0.54	0.75	0.16	0.32	0.62	N	0.53	N	N	N
23 - 24	0.20	N	1.44	0.83	0.27	0.49	0.50	N	0.09	N	N	N
24 - 25	0.33	0.38	N	0.80	0.38	0.69	0.21	N	0.12	N	N	N
25 - 26	0.41	0.58	0.62	1.17	0.93	1.78	0.83	0.20	0.06	N	N	N
26 - 27	0.43	2.40	1.00	0.31	0.48	0.67	0.46	0.18	0.10	N	N	N
27 - 28	0.52	2.78	1.22	0.33	0.80	0.48	0.47	0.35	0.08	N	N	N
28 - 29	0.39	0.88	1.88	0.47	0.22	1.06	0.24	0.42	0.18	N	N	N
29 - 30	0.20		0.53	0.59	0.24	0.98	0.21	0.31	0.14	N	N	N
30 - 31	0.18		0.95	1.21	0.29	0.30	N	1.01	0.15	N	N	N
31 - 1	0.23		1.15		0.49		0.50	1.89		N		N
Arithmetic Mean (3)	0.27	0.57	0.79	0.59	0.48	0.59	0.50	-	0.42	-	-	-
Standard Deviation (3)	0.12	0.63	0.71	0.44	0.29	0.34	0.30	-	0.42	-	-	-
Sample Size	31	27	30	30	31	30	30	17	30	18	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 - Sulphate as S (SO4 - S)
 Concentration in air ($\mu\text{g S m}^{-3}$)

Daily measurements - Summary for January 2005 to December 2005

MONTH DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1 - 2	0.34	0.39	N	1.60	1.18	0.60	0.57	N	N	N	N	0.67
2 - 3	0.17	0.20	N	1.27	0.66	0.44	0.90	N	N	N	N	0.45
3 - 4	0.23	0.43	N	1.56	0.46	0.55	0.04	N	N	N	N	0.44
4 - 5	0.27	0.62	N	0.27	0.37	0.27	0.07	N	N	N	N	0.42
5 - 6	0.45	0.98	N	0.39	0.20	0.28	0.03	N	N	N	N	0.46
6 - 7	0.42	1.14	N	0.20	0.23	0.17	0.55	N	N	N	N	0.38
7 - 8	0.33	1.87	N	0.27	0.18	0.35	0.56	N	N	N	N	0.31
8 - 9	0.27	1.38	N	0.27	0.18	0.76	0.57	N	N	N	N	0.22
9 - 10	N	0.50	0.25	0.25	0.20	0.51	0.97	N	N	N	N	0.44
10 - 11	N	0.31	0.32	0.30	0.30	0.26	0.64	N	N	N	N	0.42
11 - 12	0.54	0.35	0.22	0.30	0.54	0.37	0.18	N	N	N	N	0.44
12 - 13	0.23	0.19	0.15	0.33	0.47	0.24	1.85	N	N	N	N	0.22
13 - 14	0.22	0.26	0.34	0.81	0.33	0.15	N	N	N	N	N	0.23
14 - 15	0.53	0.21	0.72	0.62	0.40	0.40	N	N	N	N	N	0.35
15 - 16	0.71	0.35	0.99	0.25	0.52	2.07	N	N	N	N	N	0.31
16 - 17	0.57	0.70	0.62	0.88	0.23	1.62	N	N	N	N	0.17	0.88
17 - 18	0.20	0.31	0.54	1.12	0.39	1.54	N	N	N	N	0.18	0.26
18 - 19	0.17	0.25	0.37	0.49	0.78	0.48	N	N	N	N	0.17	0.27
19 - 20	0.28	0.24	1.33	0.45	0.84	N	N	N	N	N	1.10	0.03
20 - 21	0.18	0.21	1.30	0.59	0.40	N	N	N	N	N	0.78	0.02
21 - 22	0.34	0.34	1.11	0.65	0.45	N	N	N	N	N	1.13	0.57
22 - 23	0.27	0.49	0.79	0.65	0.43	0.98	N	N	N	N	1.91	0.59
23 - 24	0.28	N	1.22	0.96	0.31	0.38	N	N	N	N	0.04	0.41
24 - 25	0.27	N	1.44	1.35	0.37	0.78	N	N	N	N	0.27	0.40
25 - 26	0.11	N	0.74	1.13	0.71	0.20	N	N	N	N	0.26	0.17
26 - 27	0.38	N	0.24	1.46	0.47	0.32	N	N	N	N	0.71	0.17
27 - 28	0.15	N	0.31	0.35	0.67	0.38	N	N	N	N	0.50	0.29
28 - 29	0.29	N	0.93	0.50	0.29	0.36	N	N	N	N	0.40	1.98
29 - 30	0.24		0.91	0.35	0.23	0.48	N	N	N	N	0.18	1.18
30 - 31	0.12		1.46	0.55	0.45	0.86	N	N	N	N	N	0.05
31 - 1	0.20		1.42		0.28		N	N		N		0.02
Arithmetic Mean (3)	0.30	0.53	-	0.67	0.44	0.58	-	-	-	-	-	0.42
Standard Deviation (3)	0.14	0.44	-	0.44	0.23	0.47	-	-	-	-	-	0.38
Sample Size	29	22	23	30	31	27	12	0	0	0	14	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%.

Appendix 4

2005 NITROGEN DIOXIDE MEASUREMENTS

National Environmental Technology Centre

Nitrogen Dioxide
Concentration in air (ppb)

Monthly measurements, collection-day - non standard
Summary for January 2005 to December 2005

Site	Sampling Period	Start Date	End Date	Concentration (in ppb)	Site	Sampling Period	Start Date/Time	End Date/Time	Concentration (in ppb)
Goonhilly	1	06-Dec-2004	13-Jan-2005	2.18	Compton	1	21-Dec-2004	24-Jan-2005	4.29
	2	13-Jan-2005	09-Mar-2005	* 1.92		2	24-Jan-2005	21-Feb-2005	10.75
	3	09-Mar-2005	24-Mar-2005	4.75		3	21-Feb-2005	07-Mar-2005	N
	4	24-Mar-2005	21-Apr-2005	3.51		4	07-Mar-2005	24-Mar-2005	N
	5	21-Apr-2005	09-Aug-2005	* N		5	24-Mar-2005	24-Apr-2005	N
	6	09-Aug-2005	08-Sep-2005	3.21		6	24-Apr-2005	17-May-2005	4.60
	7	08-Sep-2005	07-Oct-2005	3.23		7	17-May-2005	13-Jun-2005	4.99
	8	07-Oct-2005	02-Nov-2005	4.88		8	13-Jun-2005	11-Jul-2005	4.70
	9	02-Nov-2005	07-Dec-2005	4.35		9	11-Jul-2005	08-Aug-2005	5.01
	10	07-Dec-2005	04-Jan-2006	< 0.33		10	08-Aug-2005	05-Sep-2005	5.47
	11					11	05-Sep-2005	03-Oct-2005	6.08
	12					12	03-Oct-2005	01-Nov-2005	8.92
	13					13	01-Nov-2005	28-Nov-2005	10.38
	14					14	28-Nov-2005	09-Jan-2006	* 11.61
Annual Mean Concentration =					Annual Mean Concentration =				7.13
Yarner Wood	1	29-Dec-2004	26-Jan-2005	8.72	Flatford Mill	1	22-Feb-2005	22-Mar-2005	10.51
	2	26-Jan-2005	23-Feb-2005	2.54		2	22-Mar-2005	19-Apr-2005	N
	3	23-Feb-2005	23-Mar-2005	4.08		3	19-Apr-2005	17-May-2005	N
	4	23-Mar-2005	20-Apr-2005	3.54		4	17-May-2005	14-Jun-2005	5.02
	5	20-Apr-2005	18-May-2005	3.33		5	14-Jun-2005	10-Jul-2005	N
	6	18-May-2005	15-Jun-2005	2.13		6	10-Jul-2005	09-Aug-2005	2.38
	7	15-Jun-2005	13-Jul-2005	2.31		7	09-Aug-2005	06-Sep-2005	5.24
	8	13-Jul-2005	10-Aug-2005	2.09		8	06-Sep-2005	04-Oct-2005	6.82
	9	10-Aug-2005	07-Sep-2005	2.37		9	04-Oct-2005	01-Nov-2005	7.55
	10	07-Sep-2005	05-Oct-2005	2.48		10	01-Nov-2005	29-Nov-2005	10.61
	11	05-Oct-2005	02-Nov-2005	4.09		11	29-Nov-2005	05-Jan-2006	10.76
	12	02-Nov-2005	30-Nov-2005	3.53		12			
	13	30-Nov-2005	27-Dec-2005	3.08		13			
	14	27-Dec-2005	24-Jan-2006	5.76		14			
Annual Mean Concentration =				3.40	Annual Mean Concentration =				1000.00
Barcombe Mills	1	30-Dec-2004	26-Jan-2005	5.11	Woburn	1	08-Dec-2004	11-Jan-2005	12.18
	2	26-Jan-2005	23-Feb-2005	8.45		2	11-Jan-2005	17-Feb-2005	15.43
	3	23-Feb-2005	23-Mar-2005	10.25		3	17-Feb-2005	06-Apr-2005	* 14.03
	4	23-Mar-2005	20-Apr-2005	10.02		4	06-Apr-2005	28-Apr-2005	10.49
	5	20-Apr-2005	18-May-2005	7.05		5	28-Apr-2005	20-May-2005	8.12
	6	18-May-2005	15-Jun-2005	4.90		6	20-May-2005	21-Jun-2005	6.37
	7	15-Jun-2005	13-Jul-2005	5.73		7	21-Jun-2005	20-Jul-2005	7.34
	8	13-Jul-2005	10-Aug-2005	3.76		8	20-Jul-2005	23-Aug-2005	9.62
	9	10-Aug-2005	07-Sep-2005	4.20		9	23-Aug-2005	06-Sep-2005	9.32
	10	07-Sep-2005	05-Oct-2005	6.00		10	06-Sep-2005	04-Oct-2005	10.53
	11	05-Oct-2005	26-Oct-2005	9.07		11	04-Oct-2005	04-Nov-2005	12.02
	12	26-Oct-2005	30-Nov-2005	7.58		12	04-Nov-2005	19-Dec-2005	* 13.42
	13	30-Nov-2005	04-Jan-2006	8.53		13	19-Dec-2005	10-Jan-2006	14.22
	14					14			
Annual Mean Concentration =				6.97	Annual Mean Concentration =				11.24

Notes: * denotes extended sampling period (greater than the expected 4 or 5 week period). N denotes missing or excluded 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 2005 to December 2005

Site	Sampling Period	Start Date	End Date	Concentration (in ppb)	Site	Sampling Period	Start Date/Time	End Date/Time	Concentration (in ppb)	
Tycanol Wood	1	29-Dec-2004	26-Jan-2005	1.68	Stoke Ferry	1	21-Dec-2004	25-Jan-2005	9.13	
	2	26-Jan-2005	23-Feb-2005	2.89		2	25-Jan-2005	22-Feb-2005	9.70	
	3	23-Feb-2005	23-Mar-2005	2.87		3	22-Feb-2005	18-Mar-2005	6.54	
	4	23-Mar-2005	20-Apr-2005	2.48		4	18-Mar-2005	19-Apr-2005	9.08	
	5	20-Apr-2005	18-May-2005	2.29		5	19-Apr-2005	17-May-2005	5.33	
	6	18-May-2005	16-Jun-2005	2.62		6	17-May-2005	14-Jun-2005	1.82	
	7	16-Jun-2005	13-Jul-2005	2.22		7	14-Jun-2005	12-Jul-2005	4.91	
	8	13-Jul-2005	10-Aug-2005	1.55		8	12-Jul-2005	09-Aug-2005	3.40	
	9	10-Aug-2005	07-Sep-2005	1.78		9	09-Aug-2005	06-Sep-2005	4.79	
	10	07-Sep-2005	05-Oct-2005	1.72		10	06-Sep-2005	04-Oct-2005	6.84	
	11	05-Oct-2005	02-Nov-2005	0.84		11	04-Oct-2005	01-Nov-2005	8.36	
	12	02-Nov-2005	30-Nov-2005	3.24		12	01-Nov-2005	30-Nov-2005	11.96	
	13	30-Nov-2005	06-Jan-2006	3.61		13	30-Nov-2005	04-Jan-2006	11.16	
	14					14				
		Annual Mean Concentration =		2.31			Annual Mean Concentration =		7.21	
Llyn Brianne	1	29-Dec-2004	26-Jan-2005	2.76	Preston Montford	1	01-Jan-2005	06-Feb-2005	N	
	2	26-Jan-2005	23-Feb-2005	1.82		2	06-Feb-2005	21-Feb-2005	5.63	
	3	23-Feb-2005	23-Mar-2005	3.35		3	21-Feb-2005	20-Mar-2005	2.48	
	4	23-Mar-2005	22-Apr-2005	3.54		4	20-Mar-2005	17-Apr-2005	4.72	
	5	22-Apr-2005	17-May-2005	2.84		5	17-Apr-2005	15-May-2005	5.98	
	6	17-May-2005	15-Jun-2005	N		6	15-May-2005	12-Jun-2005	2.37	
	7	15-Jun-2005	13-Jul-2005	N		7	12-Jun-2005	10-Jul-2005	4.03	
	8	13-Jul-2005	01-Jan-2006	*		8	10-Jul-2005	08-Aug-2005	4.23	
	9					9	08-Aug-2005	04-Sep-2005	3.81	
	10					10	04-Sep-2005	03-Oct-2005	5.56	
	11					11	03-Oct-2005	31-Oct-2005	7.17	
	12					12	31-Oct-2005	28-Nov-2005	6.06	
	13					13	28-Nov-2005	01-Jan-2006	6.39	
	14					14	29-Dec-2004	25-Jan-2005	9.21	
		Annual Mean Concentration =				Annual Mean Concentration =		5.13		
Pwllumon	1	28-Dec-2004	25-Jan-2005	1.49	Bottesford	1	09-Dec-2004	20-Jan-2005	*	10.20
	2	25-Jan-2005	22-Feb-2005	1.51		2	20-Jan-2005	31-Jan-2005		10.43
	3	22-Feb-2005	22-Mar-2005	3.02		3	31-Jan-2005	08-Mar-2005		11.81
	4	22-Mar-2005	19-Apr-2005	2.67		4	08-Mar-2005	24-Mar-2005		11.15
	5	19-Apr-2005	17-May-2005	2.63		5	24-Mar-2005	09-May-2005	*	6.15
	6	17-May-2005	14-Jun-2005	1.69		6	09-May-2005	24-May-2005		4.53
	7	14-Jun-2005	12-Jul-2005	2.16		7	24-May-2005	24-Jun-2005		5.02
	8	12-Jul-2005	09-Aug-2005	1.51		8	24-Jun-2005	21-Jul-2005		4.99
	9	09-Aug-2005	06-Sep-2005	1.04		9	21-Jul-2005	04-Aug-2005		7.17
	10	06-Sep-2005	04-Oct-2005	1.85		10	04-Aug-2005	07-Sep-2005		5.40
	11	04-Oct-2005	01-Nov-2005	3.95		11	07-Sep-2005	12-Oct-2005		7.06
	12	01-Nov-2005	29-Nov-2005	2.00		12	12-Oct-2005	08-Nov-2005		7.71
	13	29-Nov-2005	27-Dec-2005	2.18		13	08-Nov-2005	20-Jan-2006	*	12.75
	14	27-Dec-2005	24-Jan-2006	4.70		14				
		Annual Mean Concentration =		2.16			Annual Mean Concentration =		8.13	

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

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Monthly measurements, collection-day - non standard
Summary for January 2005 to December 2005

Site	Sampling Period	Start Date	End Date	Concentration (in ppb)	Site	Sampling Period	Start Date/Time	End Date/Time	Concentration (in ppb)	
Llyn Llydaw	1	01-Dec-2004	12-Jan-2005	*	Jenny Hurn	1				
	2	12-Jan-2005	26-Jan-2005	1.11		2				
	3	26-Jan-2005	23-Feb-2005	1.74		3				
	4	23-Feb-2005	23-Mar-2005	1.49		4				
	5	23-Mar-2005	20-Apr-2005	N		5				
	6	20-Apr-2005	18-May-2005	N		6				
	7	18-May-2005	15-Jun-2005	2.22		7				
	8	15-Jun-2005	13-Jul-2005	1.21		8				
	9	13-Jul-2005	10-Aug-2005	N		9				
	10	10-Aug-2005	07-Sep-2005	1.96		10				
	11	07-Sep-2005	05-Oct-2005	0.97		11				
	12	05-Oct-2005	02-Nov-2005	1.62		12				
	13	02-Nov-2005	30-Nov-2005	3.00		13				
	14	30-Nov-2005	01-Jan-2006	1.44		14				
Annual Mean Concentration =					Annual Mean Concentration =				7.72	
Wardlow Hay Cop	1	31-Dec-2004	30-Jan-2005	6.31	Thorganby	1	29-Dec-2004	26-Jan-2005	5.82	
	2	30-Jan-2005	20-Feb-2005	9.83		2	26-Jan-2005	23-Feb-2005	8.77	
	3	20-Feb-2005	20-Mar-2005	6.33		3	23-Feb-2005	23-Mar-2005	8.70	
	4	20-Mar-2005	24-Apr-2005	9.03		4	23-Mar-2005	20-Apr-2005	7.68	
	5	24-Apr-2005	15-May-2005	6.46		5	20-Apr-2005	18-May-2005	4.40	
	6	15-May-2005	19-Jun-2005	5.32		6	18-May-2005	15-Jun-2005	3.50	
	7	19-Jun-2005	10-Jul-2005	7.00		7	15-Jun-2005	13-Jul-2005	4.76	
	8	10-Jul-2005	07-Aug-2005	5.92		8	13-Jul-2005	10-Aug-2005	4.36	
	9	07-Aug-2005	04-Sep-2005	3.79		9	10-Aug-2005	31-Aug-2005	6.07	
	10	04-Sep-2005	02-Oct-2005	6.04		10	31-Aug-2005	28-Sep-2005	8.09	
	11	02-Oct-2005	30-Oct-2005	10.35		11	28-Sep-2005	16-Nov-2005	*	
	12	30-Oct-2005	27-Nov-2005	10.22		12	16-Nov-2005	30-Nov-2005	12.27	
	13	27-Nov-2005	08-Jan-2006	6.99		13	30-Nov-2005	29-Dec-2005	11.66	
	14					14	29-Dec-2005	25-Jan-2006	16.04	
Annual Mean Concentration =				7.16	Annual Mean Concentration =				7.72	
Driby	1	01-Dec-2004	04-Jan-2005	3.06	High Muffles	1	29-Dec-2004	26-Jan-2005	4.92	
	2	04-Jan-2005	26-Jan-2005	7.29		2	26-Jan-2005	23-Feb-2005	4.94	
	3	26-Jan-2005	23-Feb-2005	7.92		3	23-Feb-2005	23-Mar-2005	5.02	
	4	23-Feb-2005	23-Mar-2005	6.22		4	23-Mar-2005	20-Apr-2005	4.71	
	5	23-Mar-2005	20-Apr-2005	6.92		5	20-Apr-2005	18-May-2005	3.04	
	6	20-Apr-2005	19-May-2005	3.27		6	18-May-2005	15-Jun-2005	3.24	
	7	19-May-2005	15-Jun-2005	3.86		7	15-Jun-2005	13-Jul-2005	3.05	
	8	15-Jun-2005	24-Aug-2005	1.06		8	13-Jul-2005	10-Aug-2005	2.52	
	9	24-Aug-2005	07-Sep-2005	4.47		9	10-Aug-2005	07-Sep-2005	2.60	
	10	07-Sep-2005	05-Oct-2005	4.95		10	07-Sep-2005	05-Oct-2005	5.23	
	11	05-Oct-2005	02-Nov-2005	6.69		11	05-Oct-2005	02-Nov-2005	7.49	
	12	02-Nov-2005	14-Dec-2005	6.97		12	02-Nov-2005	30-Nov-2005	6.93	
	13	14-Dec-2005	11-Jan-2006	11.49		13	30-Nov-2005	04-Jan-2006	7.53	
	14					14				
Annual Mean Concentration =				5.24	Annual Mean Concentration =				4.73	

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

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Nitrogen Dioxide
Concentration in air (ppb)

Monthly measurements, collection-day - non standard
Summary for January 2005 to December 2005

Site	Sampling Period	Start Date	End Date	Concentration (in ppb)	Site	Sampling Period	Start Date/Time	End Date/Time	Concentration (in ppb)
Bannisdale	1	31-Dec-2004	24-Jan-2005	N	Cow Green Reservoir	1	23-Dec-2004	24-Jan-2005	1.63
	2	24-Jan-2005	21-Feb-2005	2.17		2	24-Jan-2005	01-Mar-2005	2.54
	3	21-Feb-2005	21-Mar-2005	2.38		3	01-Mar-2005	21-Mar-2005	3.49
	4	21-Mar-2005	18-Apr-2005	3.45		4	21-Mar-2005	18-Apr-2005	5.88
	5	18-Apr-2005	20-May-2005	2.12		5	18-Apr-2005	16-May-2005	N
	6	20-May-2005	12-Jun-2005	2.04		6	16-May-2005	15-Jun-2005	N
	7	12-Jun-2005	10-Jul-2005	2.67		7	15-Jun-2005	11-Jul-2005	2.96
	8	10-Jul-2005	07-Aug-2005	1.95		8	11-Jul-2005	09-Aug-2005	1.87
	9	07-Aug-2005	04-Sep-2005	1.66		9	09-Aug-2005	06-Sep-2005	1.95
	10	04-Sep-2005	02-Oct-2005	N		10	06-Sep-2005	04-Oct-2005	2.17
	11	02-Oct-2005	31-Oct-2005	5.91		11	04-Oct-2005	01-Nov-2005	5.31
	12	31-Oct-2005	28-Nov-2005	3.33		12	01-Nov-2005	29-Nov-2005	2.56
	13	28-Nov-2005	28-Dec-2005	3.99		13	29-Nov-2005	22-Dec-2005	5.36
	14	28-Dec-2005	25-Jan-2006	6.83		14	22-Dec-2005	01-Feb-2006	* 3.82
Annual Mean Concentration =				2.94	Annual Mean Concentration =				3.22
Hillsborough Forest	1	01-Dec-2004	05-Jan-2005	4.77	Loch Dee	1	01-Dec-2004	05-Jan-2005	2.62
	2	05-Jan-2005	26-Jan-2005	5.14		2	05-Jan-2005	01-Feb-2005	1.42
	3	26-Jan-2005	02-Mar-2005	3.77		3	01-Feb-2005	24-Feb-2005	1.10
	4	02-Mar-2005	24-Mar-2005	4.87		4	24-Feb-2005	21-Mar-2005	2.58
	5	24-Mar-2005	20-Apr-2005	4.30		5	21-Mar-2005	21-Apr-2005	3.15
	6	20-Apr-2005	18-May-2005	4.73		6	21-Apr-2005	07-Jun-2005	* N
	7	18-May-2005	15-Jun-2005	N		7	07-Jun-2005	01-Jul-2005	1.49
	8	15-Jun-2005	14-Jul-2005	3.44		8	01-Jul-2005	12-Jul-2005	1.00
	9	14-Jul-2005	10-Aug-2005	4.16		9	12-Jul-2005	16-Aug-2005	0.73
	10	10-Aug-2005	08-Sep-2005	3.73		10	16-Aug-2005	05-Sep-2005	N
	11	08-Sep-2005	05-Oct-2005	3.41		11	05-Sep-2005	03-Oct-2005	N
	12	05-Oct-2005	04-Nov-2005	4.97		12	03-Oct-2005	01-Dec-2005	* 2.19
	13	04-Nov-2005	16-Dec-2005	* 7.17		13	01-Dec-2005	09-Jan-2006	2.73
	14	16-Dec-2005	11-Jan-2006	5.28		14			
Annual Mean Concentration =				4.63	Annual Mean Concentration =				1000.00
Lough Navar	1	27-Dec-2004	24-Jan-2005	0.72	Redesdale	1	27-Dec-2004	24-Jan-2005	1.25
	2	24-Jan-2005	28-Feb-2005	0.66		2	24-Jan-2005	22-Feb-2005	2.78
	3	28-Feb-2005	21-Mar-2005	1.19		3	22-Feb-2005	22-Mar-2005	3.36
	4	21-Mar-2005	18-Apr-2005	1.41		4	22-Mar-2005	19-Apr-2005	N
	5	18-Apr-2005	16-May-2005	1.62		5	19-Apr-2005	17-May-2005	1.72
	6	16-May-2005	13-Jun-2005	1.07		6	17-May-2005	14-Jun-2005	1.97
	7	13-Jun-2005	11-Jul-2005	1.14		7	14-Jun-2005	13-Jul-2005	N
	8	11-Jul-2005	08-Aug-2005	1.39		8	13-Jul-2005	09-Aug-2005	N
	9	08-Aug-2005	05-Sep-2005	1.40		9	09-Aug-2005	07-Sep-2005	2.45
	10	05-Sep-2005	03-Oct-2005	1.12		10	07-Sep-2005	04-Oct-2005	1.89
	11	03-Oct-2005	31-Oct-2005	2.34		11	04-Oct-2005	02-Nov-2005	4.87
	12	31-Oct-2005	28-Nov-2005	1.87		12	02-Nov-2005	29-Nov-2005	3.58
	13	28-Nov-2005	02-Jan-2006	1.74		13	29-Nov-2005	04-Jan-2006	4.23
	14					14			
Annual Mean Concentration =				1.36	Annual Mean Concentration =				2.86

Notes: * denotes extended sampling period (greater than the expected 4 or 5 week period). N denotes missing or excluded 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 2005 to December 2005

Site	Sampling Period	Start Date	End Date	Concentration (in ppb)	Site	Sampling Period	Start Date/Time	End Date/Time	Concentration (in ppb)
Eskdalemuir	1	29-Dec-2004	24-Jan-2005	1.91	Polloch	1	28-Dec-2004	25-Jan-2005	0.44
	2	24-Jan-2005	23-Feb-2005	2.16		2	25-Jan-2005	22-Feb-2005	0.12
	3	23-Feb-2005	23-Mar-2005	2.67		3	22-Feb-2005	22-Mar-2005	2.16
	4	23-Mar-2005	20-Apr-2005	2.14		4	22-Mar-2005	19-Apr-2005	1.82
	5	20-Apr-2005	18-May-2005	1.38		5	19-Apr-2005	17-May-2005	0.29
	6	18-May-2005	15-Jun-2005	1.27		6	17-May-2005	14-Jun-2005	0.67
	7	15-Jun-2005	13-Jul-2005	1.78		7	14-Jun-2005	12-Jul-2005	0.77
	8	13-Jul-2005	10-Aug-2005	4.75		8	12-Jul-2005	09-Aug-2005	0.64
	9	10-Aug-2005	07-Sep-2005	2.18		9	09-Aug-2005	06-Sep-2005	0.60
	10	07-Sep-2005	05-Oct-2005	N		10	06-Sep-2005	04-Oct-2005	< 0.33
	11	05-Oct-2005	02-Nov-2005	3.62		11	04-Oct-2005	01-Nov-2005	1.67
	12	02-Nov-2005	30-Nov-2005	2.62		12	01-Nov-2005	29-Nov-2005	0.71
	13	30-Nov-2005	04-Jan-2006	3.32		13	29-Nov-2005	27-Dec-2005	< 0.33
	14					14	27-Dec-2005	22-Jan-2006	1.44
	Annual Mean Concentration =			2.50		Annual Mean Concentration =			0.80
Whiteadder	1	31-Dec-2004	25-Jan-2005	5.52	Glen Dye	1	29-Dec-2004	25-Jan-2005	1.17
	2	25-Jan-2005	21-Feb-2005	3.18		2	25-Jan-2005	22-Feb-2005	0.97
	3	21-Feb-2005	18-Apr-2005	*		3	22-Feb-2005	23-Mar-2005	1.93
	4	18-Apr-2005	16-May-2005	1.81		4	23-Mar-2005	19-Apr-2005	1.90
	5	16-May-2005	13-Jun-2005	1.37		5	19-Apr-2005	16-May-2005	1.11
	6	13-Jun-2005	08-Aug-2005	*		6	16-May-2005	14-Jun-2005	1.31
	7	08-Aug-2005	05-Sep-2005	1.92		7	14-Jun-2005	12-Jul-2005	1.35
	8	05-Sep-2005	03-Oct-2005	1.87		8	12-Jul-2005	09-Aug-2005	0.98
	9	03-Oct-2005	01-Jan-2006	*		9	09-Aug-2005	06-Sep-2005	1.55
	10			N		10	06-Sep-2005	05-Oct-2005	2.12
	11					11	05-Oct-2005	01-Nov-2005	3.52
	12					12	01-Nov-2005	29-Nov-2005	1.31
	13					13	29-Nov-2005	04-Jan-2006	2.86
	14					14			
	Annual Mean Concentration =			2.33		Annual Mean Concentration =			1.64
Balquhider 2	1	29-Dec-2004	28-Jan-2005	0.89	Allt a' Mharcaidh	1	28-Dec-2004	25-Jan-2005	0.53
	2	28-Jan-2005	21-Feb-2005	0.58		2	25-Jan-2005	08-Mar-2005	*
	3	21-Feb-2005	21-Mar-2005	N		3	08-Mar-2005	22-Mar-2005	1.72
	4	21-Mar-2005	19-Apr-2005	2.07		4	22-Mar-2005	19-Apr-2005	1.71
	5	19-Apr-2005	16-May-2005	1.40		5	19-Apr-2005	17-May-2005	0.65
	6	16-May-2005	13-Jun-2005	1.35		6	17-May-2005	14-Jun-2005	1.06
	7	13-Jun-2005	22-Jul-2005	0.93		7	14-Jun-2005	12-Jul-2005	0.99
	8	22-Jul-2005	08-Aug-2005	2.14		8	12-Jul-2005	09-Aug-2005	0.84
	9	08-Aug-2005	06-Sep-2005	1.39		9	09-Aug-2005	22-Sep-2005	*
	10	06-Sep-2005	03-Oct-2005	1.25		10	22-Sep-2005	04-Oct-2005	1.19
	11	03-Oct-2005	04-Nov-2005	2.51		11	04-Oct-2005	31-Oct-2005	3.20
	12	04-Nov-2005	28-Nov-2005	1.14		12	31-Oct-2005	28-Nov-2005	0.99
	13	28-Nov-2005	09-Jan-2006	*		13	28-Nov-2005	09-Jan-2006	*
	14					14			
	Annual Mean Concentration =			1.59		Annual Mean Concentration =			1.16

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

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Nitrogen Dioxide
Concentration in air (ppb)

Monthly measurements, collection-day - non standard
Summary for January 2005 to December 2005

Site	Sampling Period	Start Date	End Date	Concentration (in ppb)	Site	Sampling Period	Start Date/Time	End Date/Time	Concentration (in ppb)	
Strathvaich Dam	1	03-Dec-2004	05-Jan-2005	< 0.28		1				
	2	05-Jan-2005	27-Jan-2005	0.23		2				
	3	27-Jan-2005	28-Feb-2005	< 0.29		3				
	4	28-Feb-2005	21-Mar-2005	0.75		4				
	5	21-Mar-2005	01-May-2005	*		5				
	6	01-May-2005	15-May-2005	1.25		6				
	7	15-May-2005	12-Jun-2005	0.71		7				
	8	12-Jun-2005	10-Jul-2005	1.07		8				
	9	10-Jul-2005	07-Aug-2005	0.54		9				
	10	07-Aug-2005	04-Sep-2005	0.47		10				
	11	04-Sep-2005	02-Oct-2005	0.91		11				
	12	02-Oct-2005	30-Oct-2005	0.91		12				
	13	30-Oct-2005	29-Nov-2005	0.59		13				
	14	29-Nov-2005	02-Jan-2006	0.69		14				
Annual Mean Concentration =				0.68	Annual Mean Concentration =					
Achanarras	1	01-Dec-2004	05-Jan-2005	0.79		1				
	2	05-Jan-2005	26-Jan-2005	0.52		2				
	3	26-Jan-2005	23-Feb-2005	0.82		3				
	4	23-Feb-2005	23-Mar-2005	3.09		4				
	5	23-Mar-2005	20-Apr-2005	1.74		5				
	6	20-Apr-2005	18-May-2005	0.79		6				
	7	18-May-2005	15-Jun-2005	1.69		7				
	8	15-Jun-2005	13-Jul-2005	1.73		8				
	9	13-Jul-2005	10-Aug-2005	0.84		9				
	10	10-Aug-2005	07-Sep-2005	0.93		10				
	11	07-Sep-2005	05-Oct-2005	0.52		11				
	12	05-Oct-2005	02-Nov-2005	N		12				
	13	02-Nov-2005	30-Nov-2005	1.05		13				
	14	30-Nov-2005	28-Dec-2005	2.28		14				
Annual Mean Concentration =				1.34	Annual Mean Concentration =					
Forsinard	1	27-Dec-2004	24-Jan-2005	0.45		1				
	2	24-Jan-2005	20-Feb-2005	0.32		2				
	3	20-Feb-2005	26-Mar-2005	0.50		3				
	4	26-Mar-2005	18-Apr-2005	2.69		4				
	5	18-Apr-2005	17-May-2005	1.22		5				
	6	17-May-2005	12-Jun-2005	0.81		6				
	7	12-Jun-2005	10-Jul-2005	1.10		7				
	8	10-Jul-2005	07-Aug-2005	N		8				
	9	07-Aug-2005	05-Sep-2005	0.69		9				
	10	05-Sep-2005	03-Oct-2005	1.11		10				
	11	03-Oct-2005	01-Nov-2005	2.32		11				
	12	01-Nov-2005	28-Nov-2005	< 0.34		12				
	13	28-Nov-2005	02-Jan-2006	1.10		13				
	14					14				
Annual Mean Concentration =				1.02	Annual Mean Concentration =					

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

Appendix 5

2005 DENUDER MEASUREMENTS

Table A5.1 provides a listing of the measurements and the summary statistics of the monthly concentrations of HNO₃, SO₂ and HCl in the gas phase and of NO₃⁻, SO₄²⁻, Cl⁻, Na⁺, Mg²⁺ and Ca²⁺ in the aerosol phase.

The 12 sites comprising 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 Bonington	SK505268
45	Lough Navar	IH065545
70	Cwmystwyth	SN771742

Table A5.1a Monthly Concentrations of HNO₃ and of Aerosol NO₃⁻ Measured at the 12 Monitoring Sites in the Nitric Acid Monitoring Network in 2005.

HNO₃ (µg 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-05	0.46	0.12 ²	1.80	0.05	0.20 ²	0.61	1.28	0.37	1.08	2.00	0.10	0.33 ²
Feb-05	0.56	0.46	2.76	0.07	-0.01	0.96	1.21	0.88	1.77	2.03	0.21	0.65 ²
Mar-05	0.55	0.21	2.02	0.23	0.03	0.99	1.64	0.75	1.76	1.06	0.19	0.49
Apr-05	0.69	0.58	2.17	0.40	0.07	0.91	1.49	0.96 ²	1.44	1.47	0.35	0.79
May-05	0.58	0.57	1.51	0.39	0.17	0.86	1.41	0.91	0.86	1.42	0.21	0.08 ²
Jun-05	0.71	0.15	1.94	0.11	0.03	0.76	1.49	0.69 ²	1.86	1.69	0.17	0.78 ²
Jul-05	0.56	0.26	1.95	0.06	0.21	0.63	1.33	0.90	1.78	1.46	0.08	0.57
Aug-05	0.71	0.09	2.43	0.15	0.32	0.70	1.35	0.71	1.79	1.66	0.16	0.56
Sep-05	0.49	0.39	2.60	0.15	0.86	1.00	1.64	0.93	1.91	1.56	0.18	0.44
Oct-05	0.97	0.71	2.59	0.58	0.87	1.34	1.72	1.12	1.45 ³	1.76	0.50	1.12
Nov-05	0.47	0.31	1.64	0.08	0.14	0.99	1.12	0.44	1.45 ³	2.25	0.33	0.31
Dec-05	0.65	0.39	1.80	0.24	0.36	0.93	1.27	0.64	1.13	1.87	0.15	0.50 ²
Mean	0.62	0.35	2.10	0.21	0.27	0.89	1.41	0.77	1.52	1.69	0.22	0.55
Min	0.46	0.09	1.51	0.05	-0.01	0.61	1.12	0.37	0.86	1.06	0.08	0.31
Max	0.97	0.71	2.76	0.58	0.87	1.34	1.72	1.12	1.91	2.25	0.50	1.12
SD	0.14	0.20	0.41	0.17	0.30	0.20	0.19	0.22	0.35	0.32	0.12	0.27
CV (%)	23.2	56.2	19.5	79.7	110.4	22.3	13.3	28.2	22.8	19.1	54.8	48.5
N	12	12	12	12	12	12	12	12	12	12	12	12

NO₃⁻ (µg 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-05	0.59	0.34 ²	2.66	0.13	0.38 ²	1.06	2.68	0.91	2.35	2.06	0.16	0.70 ²
Feb-05	0.74	0.24	4.90	0.19	-0.04	2.14	3.15	2.61	4.64	4.37	0.32	1.19 ²
Mar-05	2.17	2.09	7.59	1.04	-0.04	4.10	6.70	3.79	5.91	6.95	1.92	3.45
Apr-05	2.61	2.04	5.08	1.27	-0.02	3.97	4.58	3.07 ²	4.68	4.04	2.26	2.92
May-05	0.84	0.73	2.15	0.37	-0.03	1.56	1.93	1.97	2.88	2.26	0.69	1.71 ²
Jun-05	1.18	1.02	2.91	0.35	0.62	1.71	3.04	1.01 ²	3.29	2.47	0.77	1.95 ²
Jul-05	0.87	0.48	2.48	0.19	0.60	1.16	2.33	1.05	2.46	2.41	0.46	1.54
Aug-05	0.67	0.60	2.98	0.28	0.64	1.62	2.36	1.11	2.30	3.12	0.20	1.32
Sep-05	1.19	1.27	4.08	0.27	0.28	2.47	4.17	1.88	3.13	2.90	0.66	1.07
Oct-05	2.09	1.86	4.77	0.83	1.95	3.47	5.71	2.81	3.36 ³	5.87	2.84	2.46
Nov-05	1.35	0.60	3.78	0.33	0.58	1.41	2.97	1.79	3.36 ³	3.12	0.57	0.74
Dec-05	1.24	0.57	3.60	0.34	0.70	1.79	3.85	1.58	3.39	4.25	0.54	1.71 ²
Mean	1.30	0.99	3.91	0.47	0.47	2.21	3.62	1.97	3.48	3.65	0.95	1.73
Min	0.59	0.24	2.15	0.13	-0.04	1.06	1.93	0.91	2.30	2.06	0.16	0.70
Max	2.61	2.09	7.59	1.27	1.95	4.10	6.70	3.79	5.91	6.95	2.84	3.45
SD	0.66	0.67	1.52	0.37	0.55	1.07	1.45	0.93	1.09	1.52	0.88	0.85
CV (%)	50.8	68.0	38.8	79.2	118.1	48.5	40.0	47.2	31.2	41.6	92.9	49.0
N	12	12	12	12	12	12	12	12	12	12	12	12

Notes:

ND¹ = Power off during sampling period.

Data² = Flow < 0.2 l/min (pump not working properly, or intermittent power cuts).

Data³ = Samples exposed for more than one month.

ND⁴ = Samples lost.

ND⁵ = Problems with Aerosol Sampling.

ND⁶ = Water in sampling train.

ND⁷ = Possible contamination because sampling train returned separated.

0.0⁸ = < limit of detection: same as blanks

Numbers in bold: Capture = < 75% in the first of the 2 glass denuders.

Table A5.1b Monthly Concentrations of SO₂ and of Aerosol SO₄²⁻ Measured at the 12 Monitoring Sites in the Nitric Acid Monitoring Network in 2005.

SO₂ (µg 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-05	0.94	0.60²	2.34	0.63	0.97²	1.70	2.13	1.09	2.12	4.36	0.57	1.12²
Feb-05	1.98	0.27	2.84	-0.01	0.0⁸	2.13	1.63	1.09	2.53	3.90	0.0⁸	0.71²
Mar-05	1.61	0.17	2.93	0.15	0.09	1.72	2.27	0.98	2.62	1.14	0.62	0.76
Apr-05	1.61	0.34	2.22	0.07	0.0⁸	1.65	1.40	0.70²	1.42	2.08	0.11	0.53
May-05	0.61	0.48	1.41	0.19	0.07	2.36	1.47	0.87	1.26	1.93	0.30	0.20²
Jun-05	2.12	0.19	1.14	0.14	0.17	1.14	1.23	0.44²	1.67	2.18	0.10	0.83²
Jul-05	0.80	0.14	1.23	-0.05	0.08	0.04	0.95	0.11	1.18	1.91	0.0⁸	0.11
Aug-05	1.48	0.13	1.87	0.09	0.15	1.43	1.01	0.38	1.07	1.45	0.08	0.37
Sep-05	0.66	0.51	1.54	0.10	0.25	1.62	1.36	0.60	1.39	1.56	0.11	0.39
Oct-05	0.94	0.89	1.98	0.19	0.61	2.28	1.74	0.60	1.69³	1.36	0.33	0.69
Nov-05	1.27	0.36	2.74	0.13	0.28	2.87	1.93	0.81	1.69³	2.14	0.20	0.74
Dec-05	1.23	0.55	2.12	0.16	0.29	2.14	1.53	0.56	1.55	2.48	0.07	0.60²
Mean	1.27	0.39	2.03	0.15	0.25	1.76	1.55	0.69	1.68	2.22	0.21	0.59
Min	0.61	0.13	1.14	-0.05	0.00	0.04	0.95	0.11	1.07	1.14	0.00	0.11
Max	2.12	0.89	2.93	0.63	0.61	2.87	2.27	1.09	2.62	4.36	0.62	1.12
SD	0.50	0.23	0.62	0.16	0.28	0.71	0.41	0.30	0.50	0.98	0.21	0.28
CV (%)	39.3	59.3	30.4	113.3	114.7	40.7	26.5	43.4	29.9	44.5	100.4	48.5
N	12	12	12	12	12	12	12	12	12	12	12	12

SO₄²⁻ (µg 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-05	0.37	0.13²	1.41	0.37	0.28²	0.75	1.12	0.76	1.32	1.06	0.42	0.56²
Feb-05	0.70	0.35	2.23	0.34	-0.09	1.30	1.83	1.61	2.36	2.09	0.66	0.90²
Mar-05	1.47	0.78	3.54	0.88	-0.03	2.24	3.10	2.17	3.09	4.61	1.35	2.23
Apr-05	1.73	0.93	2.23	1.12	0.07	1.93	1.85	1.32²	2.33	2.03	1.06	1.50
May-05	0.86	0.50	1.53	0.79	0.03	1.12	1.28	1.47	1.81	1.65	0.77	1.32²
Jun-05	0.64	0.89	2.15	0.62	0.71	1.30	1.96	0.77²	2.94	1.94	1.01	1.87²
Jul-05	0.97	0.40	1.82	0.37	0.51	1.39	1.58	1.14	2.05	1.65	0.55	1.45
Aug-05	0.90	0.54	1.64	0.49	0.66	1.13	1.51	1.04	1.66	2.17	0.53	1.05
Sep-05	1.04	0.90	2.06	0.46	0.46	1.24	1.95	1.18	2.01	1.44	0.64	0.83
Oct-05	1.75	1.19	2.42	0.95	1.63	1.69	2.40	1.79	2.07³	2.65	1.42	1.56
Nov-05	0.78	0.46	1.52	0.49	0.51	1.03	1.43	0.96	2.07³	1.62	0.52	0.55
Dec-05	0.61	0.25	1.45	0.42	0.35	0.81	1.65	0.84	1.50	1.93	0.42	0.74²
Mean	0.99	0.57	2.00	0.61	0.42	1.33	1.80	1.26	2.10	2.07	0.78	1.21
Min	0.37	0.13	1.41	0.34	-0.09	0.75	1.12	0.76	1.32	1.06	0.42	0.55
Max	1.75	1.19	3.54	1.12	1.63	2.24	3.10	2.17	3.09	4.61	1.42	2.23
SD	0.44	0.33	0.60	0.26	0.46	0.44	0.53	0.44	0.53	0.89	0.35	0.53
CV (%)	45.1	58.4	29.8	42.9	109.4	33.0	29.5	35.0	25.2	43.2	44.7	43.7
N	12	12	12	12	12	12	12	12	12	12	12	12

Notes:

ND¹: Power off during sampling period.

Data² = Flow < 0.2 l/min (pump not working properly, or intermittent power cuts).

Data³ = Samples exposed for more than one month.

ND⁴ = Samples lost.

ND⁵ = Problems with Aerosol Sampling.

ND⁶ = Water in sampling train.

ND⁷ = Possible contamination because sampling train returned separated.

0.0⁸ = < limit of detection: same as blanks

Numbers in bold: Capture = < 75% in the first of the 2 glass denuders.

Table A5.1c Monthly Concentrations of HCl and of Aerosol Cl⁻ Measured at the 12 Monitoring Sites in the Nitric Acid Monitoring Network in 2005.

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

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-05	0.20	0.12²	0.29	1.00	0.25²	0.17	0.27	0.19	0.29	0.34	0.14	0.28²
Feb-05	0.25	0.27	0.31	0.19	0.01	0.28	0.32	0.39	0.38	0.31	0.12	0.51²
Mar-05	0.34	0.08	0.28	0.19	0.07	0.30	0.49	0.39	0.42	0.16	0.08	0.14
Apr-05	0.20	0.20	0.46	0.29	0.09	0.28	0.32	0.23²	0.15	0.22	0.03	0.12
May-05	0.24	0.28	0.55	0.34	0.03	0.33	0.64	0.38	0.22	0.56	0.04	0.0⁸
Jun-05	0.28	0.03	0.37	0.11	0.0⁸	0.27	0.83	0.25²	0.43	0.67	0.05	0.37²
Jul-05	0.28	0.10	0.27	0.11	0.03	0.18	0.61	0.09	0.34	0.34	0.33	0.05
Aug-05	0.20	0.05	0.28	0.14	0.15	0.20	0.41	0.18	0.22	0.29	0.08	0.20
Sep-05	0.14	0.16	0.29	0.16	0.15	0.20	0.32	0.22	0.26	0.25	0.06	0.10
Oct-05	0.30	0.40	0.34	0.26	0.31	0.30	0.24	0.33	0.30³	0.25	0.17	0.36
Nov-05	0.14	0.21	0.19	0.14	0.02	0.20	0.12	0.21	0.30³	0.14	0.08	0.16
Dec-05	0.14	0.20	0.20	0.15	0.09	0.24	0.14	0.15	0.20	0.18	0.04	0.15²
Mean	0.23	0.18	0.32	0.26	0.10	0.25	0.39	0.25	0.29	0.31	0.10	0.20
Min	0.14	0.03	0.19	0.11	0.01	0.17	0.12	0.09	0.15	0.14	0.03	0.05
Max	0.34	0.40	0.55	1.00	0.31	0.33	0.83	0.39	0.43	0.67	0.33	0.36
SD	0.07	0.11	0.10	0.25	0.10	0.05	0.21	0.10	0.09	0.16	0.08	0.15
CV (%)	29.2	61.3	31.8	95.9	98.6	21.3	54.4	39.7	30.4	50.9	81.1	73.0
N	12	12	12	12	12	12	12	12	12	12	12	12

Cl⁻ ($\mu\text{g m}^{-3}$)

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-05	1.19	0.82²	2.39	1.81	1.05²	1.77	1.63	2.07	2.66	2.22	1.84	1.72²
Feb-05	1.25	0.69	1.10	1.16	-0.06	1.38	1.36	1.37	1.13	1.38	1.29	0.79²
Mar-05	1.28	1.17	1.37	1.02	-0.03	1.00	0.95	1.78	1.41	2.00	1.35	1.16
Apr-05	1.12	0.95	0.84	1.01	0.01	1.21	0.85	1.09²	1.03	1.14	1.08	1.24
May-05	0.76	0.52	1.41	0.96	-0.04	1.13	1.19	1.49	1.54	1.17	1.11	1.47²
Jun-05	0.63	0.50	0.88	0.87	0.27	0.69	0.73	0.58²	1.34	0.83	0.87	0.76²
Jul-05	0.60	0.29	0.43	0.55	0.31	0.63	0.51	0.66	0.63	0.61	0.54	0.60
Aug-05	0.57	0.56	0.49	0.74	0.56	0.73	0.56	0.71	0.55	0.64	0.89	0.70
Sep-05	0.98	0.71	0.67	0.97	0.51	0.56	0.66	0.67	0.97	0.95	0.93	1.11
Oct-05	0.83	1.57	0.87	0.69	0.90	1.04	0.85	1.06	1.87³	1.07	0.99	1.00
Nov-05	1.13	0.77	1.49	1.36	0.87	1.02	1.31	2.22	1.87³	1.25	1.21	1.03
Dec-05	1.00	0.75	1.28	1.33	0.86	1.10	1.28	0.93	1.42	1.60	1.12	1.20²
Mean	0.95	0.78	1.10	1.04	0.44	1.02	0.99	1.22	1.37	1.24	1.10	1.06
Min	0.57	0.29	0.43	0.55	-0.06	0.56	0.51	0.58	0.55	0.61	0.54	0.60
Max	1.28	1.57	2.39	1.81	1.05	1.77	1.63	2.22	2.66	2.22	1.84	1.72
SD	0.26	0.34	0.54	0.34	0.41	0.34	0.36	0.57	0.58	0.50	0.32	0.33
CV (%)	27.4	43.4	48.8	32.9	95.3	33.8	36.2	46.5	42.7	40.3	28.8	30.8
N	12	12	12	12	12	12	12	12	12	12	12	12

Notes:

ND¹: Power off during sampling period.

Data² = Flow < 0.2 l/min (pump not working properly, or intermittent power cuts).

Data³ = Samples exposed for more than one month.

ND⁴ = Samples lost.

ND⁵ = Problems with Aerosol Sampling.

ND⁶ = Water in sampling train.

ND⁷ = Possible contamination because sampling train returned separated.

0.0⁸ = < limit of detection: same as blanks

Numbers in bold: Capture = < 75% in the first of the 2 glass denuders.

**Table A5.1d Monthly Concentrations of Aerosol Ca²⁺ and Mg²⁺
Measured at the 12 Monitoring Sites in the Nitric Acid Monitoring Network in 2005.**

Ca²⁺ (µg 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-05	-0.03	-0.05²	0.04	0.01	0.00²	-0.04	0.01	0.06	0.07	0.06	0.04	0.09²
Feb-05	0.03	0.04	0.05	0.04	0.04	-0.01	0.00	0.01	0.01	0.04	0.02	-0.01²
Mar-05	-0.01	0.07	0.04	0.02	0.06	0.01	0.03	0.03	0.06	0.17	0.02	0.04
Apr-05	0.03	0.06	0.07	0.09	0.07	0.08	0.07	0.14²	0.12	0.12	0.11	0.11
May-05	0.03	0.05	0.06	0.05	0.06	0.05	0.09	0.09	0.17	0.07	0.07	0.13²
Jun-05	0.04	0.04	0.05	0.05	0.08	0.06	0.08	0.10²	0.09	0.06	0.07	0.09²
Jul-05	0.02	-0.05	-0.07	-0.03	-0.06	-0.06	-0.06	-0.04	-0.04	-0.02	-0.05	-0.08
Aug-05	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.02	0.01	0.02
Sep-05	0.01	0.01	0.04	0.02	0.03	0.06	0.03	0.02	0.06	0.06	0.03	0.04
Oct-05	0.03	0.04	0.08	0.05	0.06	0.08	0.09	0.10	0.09³	0.07	0.06	0.15
Nov-05	0.02	0.02	0.05	0.03	0.04	0.04	0.03	0.06	0.09³	0.06	0.05	0.06
Dec-05	0.02	0.04	0.03	0.03	0.05	0.06	0.04	0.05	0.05	0.07	0.05	0.06²
Mean	0.02	0.02	0.04	0.03	0.03	0.03	0.04	0.05	0.07	0.06	0.04	0.06
Min	-0.03	-0.05	-0.07	-0.03	-0.06	-0.06	-0.06	-0.04	-0.04	-0.02	-0.05	-0.08
Max	0.04	0.07	0.08	0.09	0.08	0.08	0.09	0.14	0.17	0.17	0.11	0.15
SD	0.02	0.04	0.04	0.03	0.04	0.05	0.04	0.05	0.05	0.05	0.04	0.06
CV (%)	114.6	172.8	105.1	97.5	112.0	157.0	122.8	94.6	83.8	72.6	93.1	112.0
N	12	12	12	12	12	12	12	12	12	12	12	12

Mg²⁺ (µg 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-05	0.01	-0.02²	0.10	0.06	0.04²	-0.02	0.04	0.15	0.15	0.10	0.10	0.19²
Feb-05	0.04	0.04	0.05	0.06	0.04	0.03	0.04	0.06	0.04	0.06	0.08	0.04²
Mar-05	0.02	0.04	0.04	0.04	0.03	0.02	0.03	0.07	0.06	0.10	0.05	0.06
Apr-05	0.03	0.08	0.06	0.08	0.05	0.07	0.06	0.10²	0.06	0.07	0.08	0.09
May-05	0.03	0.05	0.07	0.06	0.05	0.06	0.09	0.11	0.18	0.07	0.08	0.13²
Jun-05	0.06	0.05	0.07	0.07	0.10	0.08	0.09	0.11²	0.10	0.07	0.09	0.12²
Jul-05	0.02	-0.02	-0.02	0.00	-0.01	-0.01	-0.01	-0.01	0.00	0.00	-0.01	-0.03
Aug-05	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02
Sep-05	0.05	0.05	0.08	0.07	0.08	0.09	0.06	0.06	0.09	0.10	0.07	0.11
Oct-05	0.03	0.07	0.09	0.06	0.08	0.09	0.08	0.10	0.12³	0.07	0.07	0.14
Nov-05	0.03	0.04	0.07	0.06	0.07	0.07	0.06	0.12	0.12³	0.08	0.08	0.09
Dec-05	0.03	0.05	0.06	0.07	0.07	0.09	0.06	0.07	0.08	0.09	0.08	0.10²
Mean	0.03	0.04	0.05	0.05	0.05	0.05	0.05	0.08	0.09	0.07	0.07	0.09
Min	0.01	-0.02	-0.02	0.00	-0.01	-0.02	-0.01	-0.01	0.00	0.00	-0.01	-0.03
Max	0.06	0.08	0.10	0.08	0.10	0.09	0.09	0.15	0.18	0.10	0.10	0.19
SD	0.01	0.03	0.03	0.02	0.03	0.04	0.03	0.05	0.05	0.03	0.03	0.06
CV (%)	47.9	81.7	61.0	45.0	61.0	81.7	61.3	56.9	59.4	47.9	49.4	68.8
N	12	12	12	12	12	12	12	12	12	12	12	12

Notes:

ND¹: Power off during sampling period.

Data² = Flow < 0.2 l/min (pump not working properly, or intermittent power cuts).

Data³ = Samples exposed for more than one month.

ND⁴ = Samples lost.

ND⁵ = Problems with Aerosol Sampling.

ND⁶ = Water in sampling train.

ND⁷ = Possible contamination because sampling train returned separated.

0.0⁸ = < limit of detection: same as blanks

Numbers in bold: Capture = < 75% in the first of the 2 glass denuders.

**Table A5.1e Monthly Concentrations of Aerosol Na⁺
Measured at the 12 Monitoring Sites in the Nitric Acid Monitoring Network in 2005.**

Na⁺ (µg 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-05	0.84	0.50 ²	1.89	1.11	0.67 ²	0.95	0.92	1.68	1.86	1.34	1.15	1.33 ²
Feb-05	0.79	0.36	0.63	0.78	-0.02	0.96	0.89	1.02	0.75	0.86	0.97	0.50 ²
Mar-05	0.79	1.09	0.90	0.71	0.02	0.48	0.65	1.25	0.85	0.93	0.81	0.65
Apr-05	0.73	0.69	0.57	0.73	0.05	0.83	0.56	0.75 ²	0.64	0.78	0.73	0.81
May-05	0.54	0.42	1.04	0.68	0.03	0.79	0.87	1.19	1.34	0.77	0.74	1.03 ²
Jun-05	0.37	0.36	0.57	0.49	0.23	0.38	0.51	0.62 ²	0.84	0.47	0.48	0.50 ²
Jul-05	0.39	0.21	0.42	0.42	0.29	0.44	0.45	0.52	0.57	0.50	0.36	0.30
Aug-05	0.09	0.09	0.10	0.12	0.09	0.17	0.10	0.11	0.11	0.10	0.11	0.12
Sep-05	0.67	0.54	0.54	0.61	0.46	0.50	0.56	0.61	0.73	0.71	0.61	0.73
Oct-05	0.59	0.96	0.68	0.57	0.69	0.77	0.65	0.92	1.13 ³	0.67	0.63	0.78
Nov-05	0.69	0.55	0.96	0.89	0.58	0.66	0.69	1.43	1.13 ³	0.59	0.70	0.69
Dec-05	0.72	0.56	0.81	1.02	0.66	0.92	0.87	0.84	0.96	1.00	0.76	0.92 ²
Mean	0.60	0.53	0.76	0.68	0.31	0.65	0.64	0.91	0.91	0.73	0.67	0.70
Min	0.09	0.09	0.10	0.12	-0.02	0.17	0.10	0.11	0.11	0.10	0.11	0.12
Max	0.84	1.09	1.89	1.11	0.69	0.96	0.92	1.68	1.86	1.34	1.15	1.33
SD	0.22	0.29	0.44	0.27	0.28	0.26	0.23	0.43	0.43	0.31	0.27	0.32
CV (%)	36.6	54.2	58.0	39.5	90.9	39.2	36.5	47.4	47.7	42.5	40.7	46.2
N	12	12	12	12	12	12	12	12	12	12	12	12

Note:

ND¹: Power off during sampling period.

Data² = Flow < 0.2 l/min (pump not working properly, or intermittent power cuts).

Data³ = Samples exposed for more than one month.

ND⁴ = Samples lost.

ND⁵ = Problems with Aerosol Sampling.

ND⁶ = Water in sampling train.

ND⁷ = Possible contamination because sampling train returned separated.

0.0⁸ = < limit of detection: same as blanks

Numbers in bold: Capture = < 75% in the first of the 2 glass denuders.

Appendix 6

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:

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

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

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

Spherical

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

Linear

$$\gamma(h) = c_0 + \omega h^\theta \quad 4$$

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 variogram 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 $I_1 z_1 + I_2 z_2 + \dots$. Using the variogram model the variance of the interpolated estimate can be expressed in terms of the I_i and this variance is then minimised subject to the constraint that the I_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 2005 Annual Mean Concentrations of the Major Ions

Ion	Model	Sill ($\mu\text{eq l}^{-1}$) ²	Range (km)
acidity (log _e transformed)	exponential	0.5	200
non-marine sulphate	exponential	240	200
nitrate	exponential	160	150
ammonium	exponential	600	250