

# **Heavy Metal Deposition Mapping: Concentrations and Deposition of Heavy Metals in Rural Areas of the UK: SID4 Interim Report Covering the Period October 2011 – December 2011**

**Interim Report to the Department of Environment, Food  
and Rural Affairs by the Centre for Ecology and Hydrology**

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Defra Project Code  
Defra Project Manager

AQ0716  
Peter Coleman



**Centre for  
Ecology & Hydrology**

NATURAL ENVIRONMENT RESEARCH COUNCIL

January 2012

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**defra**  
Department for Environment  
Food and Rural Affairs

**SID 4**

## Annual/Interim Project Report for Period **October 2011 to December 2011**

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### Project details

1. Defra Project code

AQ0716

2. Project title

Heavy Metal Deposition Mapping

3. Defra Project Manager

Mr Peter Coleman

4. Name and address of contractor

Centre for Ecology and Hydrology  
Bush Estate  
Penicuik  
Midlothian

Postcode EH26 0QB

5. Contractor's Project Manager

Mr Heath Malcolm

6. Project: start date .....

01-April-2006

end date .....

31-March-2012

## Scientific objectives

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7. Please list the scientific objectives as set out in the contract. If necessary these can be expressed in an abbreviated form. Indicate where amendments have been agreed with the Defra Project Manager, giving the date of amendment.

- 1. Links to other heavy metal monitoring work and the 4<sup>th</sup> Daughter Directive**  
Liaise with the operators of the current Urban Heavy Metal Monitoring Network (NPL) to produce, within 4 months, a review on the compatibility of the Rural network data and analytical procedures for submission under the requirements of the 1<sup>st</sup> and 4<sup>th</sup> Air Quality Daughter Directives.
- 2. Production of UK Maps of metal deposition.**  
Production of annual maps for Wet, Dry and Total deposition of heavy metals for the UK.
- 3. Heavy Metals Data Collection**  
Continue to operate the existing Rural Heavy Metals Monitoring network maintaining the high quality of analysis and improving the data capture rate.
- 4. Derivation of relationships between metal deposition and metal concentrations in moss in the UK**  
Establish the relationship between heavy metal concentrations in UK mosses and deposition.
- 5. Monitoring at upland cloud water sites**  
Determine the enrichment factor attributable to cloud water deposition for heavy metals.
- 6. Speciated Mercury Measurements at a single Site**  
Continuously measure the air concentrations for three forms of Mercury (elemental, reactive gaseous and particulate).
- 7. Total gaseous mercury (TGM) and mercury in precipitation at 11 Heavy metal data collection sites.**  
Determine the monthly concentrations of Total Gaseous Mercury and mercury in precipitation at 11 sites across the U.K.

## Summary of Progress

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8. Please summarise, in layperson's terms, scientific progress since the last report/start of the project and how this relates to the objectives. Please provide information on actual results where possible rather than merely a description of activities.

This interim report provides Defra with a copy of the rolling mean concentrations of heavy metals in PM10 and rainwater samples for Quarter 3 of 2011. This refers to samples collected during the period October 2010 to September 2011 (inclusive).

Due to size limitations of the SID4 form, the annual mean concentrations in PM10 and rainwater for each site, along with appropriate sample collection statistics are listed in a separate Annex.

## Amendments to project

9. Are the current scientific objectives appropriate for the remainder of the project? ..... YES  NO   
 If **NO**, explain the reasons for any change giving the financial, staff and time implications.

**Contractors cannot alter scientific objectives without the agreement of the Defra Project Manager.**

## Progress in relation to targets

10. (a) List the agreed milestones for the year/period under report as set out in the contract or any agreed contract variation.

It is the responsibility of the contractor to **check fully that all milestones have been met** and to provide a detailed explanation when they have not been achieved.

| Milestone |   | Target date | Milestones met |         |
|-----------|---|-------------|----------------|---------|
| Number    | Title   |             | In full        | On time |
| 23        | Submission of interim project report on the 2011-Q3 data – <i>Due to a problem with one of the laboratory instrument used in the analysis of the samples, the 2011 Q3 results are submitted 3 weeks late. The problem has now been rectified and the back-log of samples awaiting analysis is currently being cleared. There is no delay expected for submission of the 2011-Q4 data.</i> | 31/12/11    | YES            | NO      |

- (b) Do the remaining milestones look realistic? ..... YES  NO   
 If you have answered **NO**, please provide an explanation.

## **Publications and other outputs**

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11. (a) Please give details of any outputs, e.g. published papers/presentations, meetings attended during this reporting period.

(b) Have opportunities for exploiting Intellectual Property arising out of this work been identified? ..... **YES**  **NO**   
If **YES**, please give details.

(c) Has any other action been taken to initiate Knowledge Transfer?..... **YES**  **NO**   
If **YES**, please give details.

The whole of the Rural Heavy Metals dataset is being prepared for inclusion in the EMEP database. Previously only the data from the Auchencorth site were included in the EMEP database.

The CEH Pollutant Deposition website is currently being transformed to match Defra's agreed web style. The new version of this website will allow users to download the data of interest.

## Future work

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12. Please comment briefly on any new scientific opportunities which may arise from the project.

The project has identified a discrepancy between the calculated annual UK deposition values and those reported as being emitted from the UK in the National Atmospheric Emissions Inventory (NAEI). Following discussions with the Defra Project Manager, it has been agreed to hold a meeting between the relevant scientists with expertise in emission and deposition during 2012.

Work is ongoing between CEH and the British Geological Survey with the aim of separating out the geogenic and anthropogenic signals in the heavy metal concentration data at each site.

## Declaration

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13. I declare that the information I have given is correct to the best of my knowledge and belief.

Name

Heath Malcolm

Date

24/01/12

Position held

Project Supervisor

2011Q3 Data– Auchencorth

| Auchencorth |  | 2011 Q3 Oct.2010 - Sept.2011 |                                    |              | PM10 data             |
|-------------|--|------------------------------|------------------------------------|--------------|-----------------------|
| Data        | 99 %   | metals                       | Filters                            | 53           | metals                |
| Capture     | 82 %   | % Hg                         | Analysed:                          | 21           | Hg                    |
| Metal       | time weighted annual mean (ng/m <sup>3</sup> ) | Std. Dev.                    | Filtered Mean (ng/m <sup>3</sup> ) | No. Outliers | No. Samples Below LoD |
| Li          | 0.035  | 0.026                        | 0.031                              | 2            | 12                    |
| Be          | 0.009  | 0.003                        | 0.009                              | 1            | 52                    |
| Al          | 22.026   | 22.235                       | 18.803                             | 2            | 6                     |
| Sc          | 0.151  | 0.001                        | 0.148                              | 1            | 53                    |
| Ti          | 1.406  | 1.788                        | 1.056                              | 3            | 10                    |
| V           | 0.376  | 0.268                        | 0.323                              | 3            | 6                     |
| Cr          | 0.214  | 0.224                        | 0.164                              | 3            | 40                    |
| Mn          | 1.048  | 0.946                        | 0.819                              | 4            | 0                     |
| Fe          | 41.915   | 40.688                       | 35.751                             | 2            | 3                     |
| Co          | 0.025  | 0.017                        | 0.021                              | 4            | 44                    |
| Ni          | 0.443  | 0.592                        | 0.307                              | 3            | 6                     |
| Cu          | 1.063  | 1.597                        | 0.779                              | 2            | 4                     |
| Zn          | 4.000  | 2.584                        | 3.401                              | 3            | 45                    |
| As          | 0.221  | 0.148                        | 0.184                              | 3            | 2                     |
| Se          | 0.321  | 0.230                        | 0.289                              | 1            | 7                     |
| Rb          | 0.072  | 0.060                        | 0.054                              | 5            | 0                     |
| Sr          | 0.608  | 0.353                        | 0.553                              | 2            | 3                     |
| Mo          | 0.105  | 0.053                        | 0.089                              | 4            | 49                    |
| Cd          | 0.030  | 0.025                        | 0.027                              | 2            | 11                    |
| Sn          | 0.500  | 1.363                        | 0.305                              | 1            | 6                     |
| Sb          | 0.316  | 0.259                        | 0.273                              | 2            | 2                     |
| Cs          | 0.012  | 0.016                        | 0.008                              | 3            | 39                    |
| Ba          | 0.815  | 0.790                        | 0.647                              | 3            | 14                    |
| W           | 0.041  | 0.045                        | 0.031                              | 2            | 49                    |
| Pb          | 1.645  | 1.197                        | 1.370                              | 4            | 3                     |
| U           | 0.006  | 0.000                        | 0.006                              | 1            | 53                    |
| Hg          | 0.801  | 4.643                        | 0.801                              | 0            | 0                     |

| Auchencorth |                                    | 2011 Q3 Oct.2010 - Sept.2011 |                             |              | Rain data             |  |
|-------------|------------------------------------|------------------------------|-----------------------------|--------------|-----------------------|--|
| Rainfall    | 1059 mm                            | metals                       | Samples                     | 42           | metals                |  |
| Collected   | 919 mm                             | Hg                           | Analysed                    | 27           | Hg                    |  |
| Metal       | volume-weighted Annual Mean (µg/l) | Std. Dev.                    | Filtered Annual Mean (ug/l) | No. Outliers | No. Samples Below LoD | Wet Deposition (g ha <sup>-1</sup> y <sup>-1</sup> ) |
| Li          | 0.028                              | 0.029                        | 0.028                       | 3            | 0                     | 0.299  |
| Be          | 0.028                              | 0.003                        | 0.002                       | 0            | 33                    | 0.018  |
| Al          | 0.002                              | 11.029                       | 4.765                       | 6            | 2                     | 50.482   |
| Sc          | 5.191                              | 0.000                        | 0.025                       | 0            | 42                    | 0.265  |
| Ti          | 0.025                              | 0.509                        | 0.116                       | 2            | 8                     | 1.227  |
| V           | 0.176                              | 0.100                        | 0.093                       | 1            | 0                     | 0.984  |
| Cr          | 0.094                              | 0.051                        | 0.035                       | 1            | 23                    | 0.368  |
| Mn          | 0.036                              | 1.888                        | 0.604                       | 4            | 0                     | 6.394  |
| Fe          | 0.693                              | 15.787                       | 5.860                       | 5            | 2                     | 62.082   |
| Co          | 0.111                              | 0.016                        | 0.007                       | 0            | 16                    | 0.070  |
| Ni          | 0.007                              | 0.193                        | 0.111                       | 4            | 1                     | 1.173  |
| Cu          | 0.117                              | 1.309                        | 0.321                       | 1            | 0                     | 3.398  |
| Zn          | 0.489                              | 2.800                        | 1.345                       | 5            | 8                     | 14.247   |
| As          | 1.436                              | 0.051                        | 0.064                       | 0            | 0                     | 0.677  |
| Se          | 0.067                              | 0.071                        | 0.081                       | 4            | 6                     | 0.862  |
| Rb          | 0.080                              | 0.163                        | 0.041                       | 1            | 0                     | 0.436  |
| Sr          | 0.046                              | 1.004                        | 1.025                       | 9            | 0                     | 10.860   |
| Mo          | 1.084                              | 0.024                        | 0.025                       | 0            | 28                    | 0.270  |
| Cd          | 0.026                              | 0.009                        | 0.005                       | 1            | 6                     | 0.054  |
| Sn          | 0.005                              | 0.058                        | 0.023                       | 2            | 12                    | 0.249  |
| Sb          | 0.028                              | 0.045                        | 0.049                       | 6            | 2                     | 0.516  |
| Cs          | 0.049                              | 0.002                        | 0.001                       | 0            | 28                    | 0.013  |
| Ba          | 0.002                              | 1.947                        | 0.343                       | 3            | 0                     | 3.637  |
| W           | 0.458                              | 0.044                        | 0.015                       | 0            | 26                    | 0.158  |
| Pb          | 0.025                              | 0.364                        | 0.182                       | 5            | 5                     | 1.933  |
| U           | 0.208                              | 0.003                        | 0.001                       | 0            | 35                    | 0.011  |
| Hg (ng/l)   | 2.559                              | 1.374                        | 2.336                       | 1            | 0                     | 0.021  |

## 2011Q3 Data– Banchory

| Banchory |  | 2011 Q3 Oct.2010 - Sept.2011 |                                    |              | PM10 data             |
|----------|--|------------------------------|------------------------------------|--------------|-----------------------|
| Data     | 101  | % metals                     | Filters                            | 52           | metals                |
| Capture  | 75   | % Hg                         | Analysed:                          | 23           | Hg                    |
| Metal    | time weighted annual mean (ng/m <sup>3</sup> ) | Std. Dev.                    | Filtered Mean (ng/m <sup>3</sup> ) | No. Outliers | No. Samples Below LoD |
| Li       | 0.025  | 0.026                        | 0.019                              | 4            | 24                    |
| Be       | 0.009  | 0.002                        | 0.009                              | 1            | 51                    |
| Al       | 16.170   | 25.005                       | 10.149                             | 4            | 13                    |
| Sc       | 0.150  | 0.037                        | 0.151                              | 1            | 51                    |
| Ti       | 1.280  | 1.980                        | 0.954                              | 3            | 13                    |
| V        | 0.300  | 0.282                        | 0.244                              | 4            | 10                    |
| Cr       | 0.342  | 0.465                        | 0.241                              | 4            | 37                    |
| Mn       | 0.801  | 0.664                        | 0.687                              | 3            | 0                     |
| Fe       | 23.716   | 27.522                       | 18.782                             | 3            | 12                    |
| Co       | 0.021  | 0.012                        | 0.019                              | 5            | 46                    |
| Ni       | 0.235  | 0.259                        | 0.192                              | 3            | 10                    |
| Cu       | 0.547  | 0.583                        | 0.472                              | 2            | 9                     |
| Zn       | 3.481  | 1.619                        | 3.161                              | 5            | 45                    |
| As       | 0.228  | 0.164                        | 0.202                              | 3            | 2                     |
| Se       | 0.215  | 0.150                        | 0.203                              | 2            | 23                    |
| Rb       | 0.111  | 0.065                        | 0.096                              | 5            | 0                     |
| Sr       | 0.497  | 0.266                        | 0.476                              | 2            | 3                     |
| Mo       | 0.099  | 0.041                        | 0.091                              | 5            | 47                    |
| Cd       | 0.037  | 0.046                        | 0.030                              | 2            | 11                    |
| Sn       | 0.298  | 1.190                        | 0.138                              | 1            | 14                    |
| Sb       | 0.257  | 0.447                        | 0.203                              | 1            | 3                     |
| Cs       | 0.010  | 0.020                        | 0.008                              | 1            | 43                    |
| Ba       | 0.511  | 0.457                        | 0.430                              | 3            | 20                    |
| W        | 0.032  | 0.014                        | 0.030                              | 3            | 49                    |
| Pb       | 1.658  | 3.216                        | 1.259                              | 1            | 4                     |
| U        | 0.007  | 0.006                        | 0.006                              | 1            | 50                    |
| Hg       | 1.270  | 5.191                        | 1.270                              | 0            | 0                     |

| Banchory  |                                    | 2011 Q3 Oct.2010 - Sept.2011 |                             |              | Rain data             |  |
|-----------|------------------------------------|------------------------------|-----------------------------|--------------|-----------------------|--|
| Rainfall  | 768                                | mm                           | Samples                     | 35           | metals                |  |
| Collected | 728                                | mm Hg                        | Analysed                    | 26           | Hg                    |  |
| Metal     | volume-weighted Annual Mean (µg/l) | Std. Dev.                    | Filtered Annual Mean (ug/l) | No. Outliers | No. Samples Below LoD | Wet Deposition (g ha <sup>-1</sup> y <sup>-1</sup> ) |
| Li        | 0.036                              | 0.049                        | 0.028                       | 1            | 0                     | 0.218  |
| Be        | 0.003                              | 0.004                        | 0.002                       | 1            | 27                    | 0.016  |
| Al        | 7.017                              | 30.557                       | 7.052                       | 3            | 0                     | 54.208   |
| Sc        | 0.024                              | 0.022                        | 0.026                       | 1            | 33                    | 0.201  |
| Ti        | 0.257                              | 1.491                        | 0.245                       | 2            | 4                     | 1.886  |
| V         | 0.163                              | 0.132                        | 0.181                       | 4            | 0                     | 1.390  |
| Cr        | 0.036                              | 0.068                        | 0.039                       | 3            | 16                    | 0.299  |
| Mn        | 3.637                              | 5.949                        | 2.876                       | 3            | 0                     | 22.107   |
| Fe        | 8.024                              | 33.007                       | 8.023                       | 3            | 2                     | 61.665   |
| Co        | 0.011                              | 0.019                        | 0.011                       | 4            | 6                     | 0.083  |
| Ni        | 0.156                              | 0.303                        | 0.171                       | 2            | 0                     | 1.314  |
| Cu        | 0.491                              | 0.566                        | 0.436                       | 4            | 0                     | 3.351  |
| Zn        | 2.631                              | 7.043                        | 2.866                       | 1            | 4                     | 22.030   |
| As        | 0.107                              | 0.121                        | 0.114                       | 3            | 0                     | 0.879  |
| Se        | 0.110                              | 0.082                        | 0.101                       | 2            | 4                     | 0.779  |
| Rb        | 0.324                              | 0.577                        | 0.323                       | 3            | 0                     | 2.483  |
| Sr        | 1.400                              | 1.862                        | 1.092                       | 1            | 0                     | 8.393  |
| Mo        | 0.035                              | 0.028                        | 0.030                       | 3            | 19                    | 0.233  |
| Cd        | 0.012                              | 0.012                        | 0.009                       | 2            | 4                     | 0.072  |
| Sn        | 0.030                              | 0.083                        | 0.032                       | 3            | 9                     | 0.242  |
| Sb        | 0.054                              | 0.124                        | 0.054                       | 1            | 1                     | 0.418  |
| Cs        | 0.003                              | 0.008                        | 0.003                       | 1            | 11                    | 0.027  |
| Ba        | 0.593                              | 0.747                        | 0.545                       | 2            | 0                     | 4.190  |
| W         | 0.042                              | 0.076                        | 0.031                       | 2            | 16                    | 0.240  |
| Pb        | 0.441                              | 0.574                        | 0.390                       | 2            | 3                     | 2.998  |
| U         | 0.002                              | 0.005                        | 0.002                       | 2            | 23                    | 0.015  |
| Hg (ng/l) | 5.199                              | 3.131                        | 4.681                       | 1            | 0                     | 0.034  |



2011Q3 Data– Beacon Hill

| Beacon Hill  |  | 2011 Q3 Oct.2010 - Sept.2011 |                                    |              | PM10 data             |
|--------------|--|------------------------------|------------------------------------|--------------|-----------------------|
| Data Capture | 65 %<br>87 % Hg                                | metals                       | Filters Analysed:                  | 42<br>21     | metals<br>Hg          |
| Metal        | time weighted annual mean (ng/m <sup>3</sup> ) | Std. Dev.                    | Filtered Mean (ng/m <sup>3</sup> ) | No. Outliers | No. Samples Below LoD |
| Li           | 0.113  | 0.070                        | 0.108                              | 2            | 0                     |
| Be           | 0.011  | 0.033                        | 0.010                              | 1            | 35                    |
| Al           | 63.572   | 61.666                       | 60.199                             | 4            | 0                     |
| Sc           | 0.185  | 0.547                        | 0.174                              | 1            | 35                    |
| Ti           | 3.229  | 4.947                        | 2.697                              | 1            | 0                     |
| V            | 1.029  | 1.282                        | 0.965                              | 2            | 0                     |
| Cr           | 0.953  | 1.637                        | 0.869                              | 1            | 12                    |
| Mn           | 4.239  | 3.368                        | 3.778                              | 3            | 0                     |
| Fe           | 147.643  | 110.333                      | 140.240                            | 3            | 0                     |
| Co           | 0.076  | 0.073                        | 0.072                              | 2            | 3                     |
| Ni           | 0.920  | 0.970                        | 0.869                              | 2            | 0                     |
| Cu           | 4.327  | 2.266                        | 3.884                              | 2            | 0                     |
| Zn           | 14.497   | 12.225                       | 12.916                             | 2            | 4                     |
| As           | 0.876  | 0.508                        | 0.778                              | 1            | 0                     |
| Se           | 0.770  | 0.457                        | 0.733                              | 2            | 0                     |
| Rb           | 0.218  | 0.172                        | 0.206                              | 2            | 0                     |
| Sr           | 1.369  | 1.112                        | 1.133                              | 1            | 0                     |
| Mo           | 0.380  | 0.357                        | 0.363                              | 1            | 9                     |
| Cd           | 0.154  | 0.109                        | 0.135                              | 1            | 0                     |
| Sn           | 1.434  | 0.838                        | 1.237                              | 2            | 0                     |
| Sb           | 1.694  | 0.984                        | 1.494                              | 1            | 0                     |
| Cs           | 0.052  | 0.093                        | 0.035                              | 1            | 7                     |
| Ba           | 3.641  | 3.045                        | 3.004                              | 1            | 0                     |
| W            | 0.042  | 0.109                        | 0.040                              | 1            | 32                    |
| Pb           | 8.719  | 6.448                        | 7.045                              | 2            | 0                     |
| U            | 0.007  | 0.022                        | 0.007                              | 1            | 35                    |
| Hg           | 1.648  | 0.596                        | 1.572                              | 1            | 0                     |

| Beacon Hill        |                                    | 2011 Q3 Oct.2010 - Sept.2011 |                             |              | Rain data             |  |
|--------------------|------------------------------------|------------------------------|-----------------------------|--------------|-----------------------|--|
| Rainfall Collected | 408 mm<br>360 mm Hg                | metals                       | Samples Analysed            | 12<br>25     | metals<br>Hg          |  |
| Metal              | volume-weighted Annual Mean (µg/l) | Std. Dev.                    | Filtered Annual Mean (ug/l) | No. Outliers | No. Samples Below LoD | Wet Deposition (g ha <sup>-1</sup> y <sup>-1</sup> ) |
| Li                 | 0.052                              | 0.044                        | 0.046                       | 1            | 0                     | 0.187  |
| Be                 | 0.005                              | 0.005                        | 0.004                       | 1            | 6                     | 0.014  |
| Al                 | 22.634                             | 26.105                       | 19.400                      | 1            | 0                     | 79.166   |
| Sc                 | 0.036                              | 0.022                        | 0.025                       | 1            | 11                    | 0.102  |
| Ti                 | 0.771                              | 1.161                        | 0.516                       | 1            | 0                     | 2.105  |
| V                  | 0.309                              | 0.173                        | 0.283                       | 1            | 0                     | 1.155  |
| Cr                 | 0.122                              | 0.107                        | 0.118                       | 0            | 3                     | 0.481  |
| Mn                 | 6.305                              | 5.141                        | 5.219                       | 1            | 0                     | 21.297   |
| Fe                 | 30.397                             | 34.230                       | 25.974                      | 1            | 0                     | 105.993  |
| Co                 | 0.037                              | 0.036                        | 0.032                       | 1            | 0                     | 0.133  |
| Ni                 | 0.214                              | 0.081                        | 0.199                       | 1            | 0                     | 0.813  |
| Cu                 | 1.671                              | 1.077                        | 1.517                       | 1            | 0                     | 6.192  |
| Zn                 | 8.103                              | 5.216                        | 7.394                       | 1            | 0                     | 30.172   |
| As                 | 0.242                              | 0.111                        | 0.233                       | 0            | 0                     | 0.949  |
| Se                 | 0.125                              | 0.082                        | 0.120                       | 0            | 1                     | 0.491  |
| Rb                 | 0.240                              | 0.245                        | 0.189                       | 1            | 0                     | 0.770  |
| Sr                 | 1.415                              | 1.094                        | 1.362                       | 1            | 0                     | 5.559  |
| Mo                 | 0.062                              | 0.038                        | 0.060                       | 0            | 2                     | 0.244  |
| Cd                 | 0.026                              | 0.017                        | 0.024                       | 1            | 0                     | 0.097  |
| Sn                 | 0.033                              | 0.021                        | 0.032                       | 0            | 1                     | 0.130  |
| Sb                 | 0.153                              | 0.101                        | 0.137                       | 1            | 0                     | 0.559  |
| Cs                 | 0.008                              | 0.005                        | 0.008                       | 0            | 1                     | 0.031  |
| Ba                 | 2.457                              | 1.932                        | 2.212                       | 1            | 0                     | 9.026  |
| W                  | 0.062                              | 0.121                        | 0.021                       | 1            | 7                     | 0.085  |
| Pb                 | 1.569                              | 1.312                        | 1.399                       | 1            | 0                     | 5.709  |
| U                  | 0.004                              | 0.003                        | 0.003                       | 1            | 5                     | 0.014  |
| Hg (ng/l)          | 8.848                              | 12.461                       | 6.862                       | 1            | 0                     | 0.025  |

## 2011Q3 Data– Cockley Beck

| Cockley Beck |  | 2011 Q3 Oct.2010 - Sept.2011 |                                    |              | PM10 data             |
|--------------|--|------------------------------|------------------------------------|--------------|-----------------------|
| Data         | 82 %   | metals                       | Filters                            | 51           | metals                |
| Capture      | 91 %   | % Hg                         | Analysed:                          | 21           | Hg                    |
| Metal        | time weighted annual mean (ng/m <sup>3</sup> ) | Std. Dev.                    | Filtered Mean (ng/m <sup>3</sup> ) | No. Outliers | No. Samples Below LoD |
| Li           | 0.041  | 0.030                        | 0.031                              | 3            | 10                    |
| Be           | 0.011  | 0.005                        | 0.009                              | 3            | 48                    |
| Al           | 28.317   | 36.673                       | 17.608                             | 3            | 6                     |
| Sc           | 0.177  | 0.078                        | 0.153                              | 3            | 48                    |
| Ti           | 1.476  | 2.909                        | 0.924                              | 1            | 13                    |
| V            | 0.527  | 0.283                        | 0.422                              | 3            | 2                     |
| Cr           | 0.631  | 1.391                        | 0.458                              | 3            | 33                    |
| Mn           | 1.188  | 1.190                        | 0.879                              | 2            | 0                     |
| Fe           | 39.339   | 39.969                       | 27.160                             | 3            | 7                     |
| Co           | 0.031  | 0.020                        | 0.022                              | 4            | 37                    |
| Ni           | 0.322  | 0.270                        | 0.256                              | 3            | 8                     |
| Cu           | 1.126  | 0.997                        | 0.831                              | 3            | 9                     |
| Zn           | 4.626  | 2.934                        | 3.646                              | 3            | 41                    |
| As           | 0.384  | 0.429                        | 0.269                              | 2            | 0                     |
| Se           | 0.422  | 0.215                        | 0.358                              | 2            | 4                     |
| Rb           | 0.087  | 0.071                        | 0.065                              | 3            | 0                     |
| Sr           | 0.961  | 0.678                        | 0.842                              | 1            | 1                     |
| Mo           | 0.129  | 0.079                        | 0.103                              | 3            | 43                    |
| Cd           | 0.037  | 0.033                        | 0.029                              | 3            | 12                    |
| Sn           | 0.389  | 0.313                        | 0.304                              | 3            | 1                     |
| Sb           | 0.345  | 0.220                        | 0.291                              | 2            | 1                     |
| Cs           | 0.016  | 0.023                        | 0.010                              | 2            | 36                    |
| Ba           | 1.575  | 18.232                       | 0.745                              | 1            | 17                    |
| W            | 0.042  | 0.039                        | 0.032                              | 2            | 46                    |
| Pb           | 2.126  | 2.299                        | 1.804                              | 1            | 2                     |
| U            | 0.007  | 0.004                        | 0.006                              | 3            | 47                    |
| Hg           | 1.577  | 0.758                        | 1.49                               | 1            | 0                     |

| Cockley Beck |                                    | 2011 Q3 Oct.2010 - Sept.2011 |                             |              | Rain data             |  |
|--------------|------------------------------------|------------------------------|-----------------------------|--------------|-----------------------|--|
| Rainfall     | 2542 mm                            | metals                       | Samples                     | 44           | metals                |  |
| Collected    | 2385 mm                            | Hg                           | Analysed                    | 27           | Hg                    |  |
| Metal        | volume-weighted Annual Mean (µg/l) | Std. Dev.                    | Filtered Annual Mean (ug/l) | No. Outliers | No. Samples Below LoD | Wet Deposition (g ha <sup>-1</sup> y <sup>-1</sup> ) |
| Li           | 0.033                              | 0.037                        | 0.032                       | 2            | 0                     | 0.819  |
| Be           | 0.002                              | 0.003                        | 0.002                       | 3            | 35                    | 0.049  |
| Al           | 4.727                              | 34.332                       | 4.522                       | 1            | 1                     | 114.980  |
| Sc           | 0.025                              | 0.000                        | 0.025                       | 0            | 44                    | 0.636  |
| Ti           | 0.172                              | 1.004                        | 0.068                       | 2            | 20                    | 1.724  |
| V            | 0.214                              | 0.256                        | 0.210                       | 2            | 0                     | 5.330  |
| Cr           | 0.030                              | 0.137                        | 0.029                       | 1            | 30                    | 0.728  |
| Mn           | 0.597                              | 6.730                        | 0.561                       | 1            | 0                     | 14.278   |
| Fe           | 5.030                              | 37.762                       | 4.804                       | 1            | 6                     | 122.174  |
| Co           | 0.009                              | 0.050                        | 0.009                       | 1            | 16                    | 0.217  |
| Ni           | 0.624                              | 1.490                        | 0.308                       | 2            | 0                     | 7.843  |
| Cu           | 0.439                              | 1.474                        | 0.426                       | 1            | 0                     | 10.845   |
| Zn           | 1.621                              | 5.638                        | 1.573                       | 1            | 13                    | 39.990   |
| As           | 0.086                              | 0.085                        | 0.084                       | 1            | 0                     | 2.131  |
| Se           | 0.143                              | 0.077                        | 0.139                       | 2            | 0                     | 3.531  |
| Rb           | 0.043                              | 0.179                        | 0.041                       | 2            | 0                     | 1.038  |
| Sr           | 1.315                              | 1.491                        | 1.288                       | 1            | 0                     | 32.741   |
| Mo           | 0.027                              | 0.050                        | 0.021                       | 3            | 31                    | 0.539  |
| Cd           | 0.011                              | 0.019                        | 0.011                       | 2            | 1                     | 0.275  |
| Sn           | 0.044                              | 0.103                        | 0.036                       | 2            | 9                     | 0.917  |
| Sb           | 0.066                              | 0.078                        | 0.054                       | 2            | 0                     | 1.374  |
| Cs           | 0.002                              | 0.005                        | 0.002                       | 1            | 26                    | 0.048  |
| Ba           | 0.335                              | 2.389                        | 0.320                       | 1            | 0                     | 8.135  |
| W            | 0.020                              | 0.052                        | 0.015                       | 1            | 33                    | 0.394  |
| Pb           | 0.484                              | 1.154                        | 0.472                       | 1            | 2                     | 12.004   |
| U            | 0.001                              | 0.005                        | 0.001                       | 1            | 36                    | 0.035  |
| Hg (ng/l)    | 3.367                              | 1.894                        | 3.223                       | 1            | 0                     | 0.077  |

## 2011Q3 Data- Cwymstwyth

| Cwymstwyth |  |           |                                    | 2011 Q3 Oct.2010 - Sept.2011 |                       | PM10 data |
|------------|--|-----------|------------------------------------|------------------------------|-----------------------|-----------|
| Data       | 89   | % metals  | Filters                            | 47                           | metals                |           |
| Capture    | 84   | % Hg      | Analysed:                          | 19                           | Hg                    |           |
| Metal      | time weighted annual mean (ng/m <sup>3</sup> ) | Std. Dev. | Filtered Mean (ng/m <sup>3</sup> ) | No. Outliers                 | No. Samples Below LoD |           |
| Li         | 0.052  | 0.054     | 0.043                              | 2                            | 5                     |           |
| Be         | 0.009  | 0.001     | 0.009                              | 3                            | 47                    |           |
| Al         | 38.377   | 56.964    | 28.992                             | 2                            | 5                     |           |
| Sc         | 0.152  | 0.018     | 0.150                              | 3                            | 47                    |           |
| Ti         | 1.430  | 2.418     | 0.981                              | 2                            | 8                     |           |
| V          | 0.611  | 0.369     | 0.537                              | 4                            | 1                     |           |
| Cr         | 0.547  | 0.686     | 0.511                              | 1                            | 32                    |           |
| Mn         | 1.520  | 1.930     | 1.107                              | 3                            | 0                     |           |
| Fe         | 47.646   | 58.849    | 35.771                             | 3                            | 5                     |           |
| Co         | 0.036  | 0.033     | 0.029                              | 3                            | 32                    |           |
| Ni         | 0.404  | 0.335     | 0.373                              | 2                            | 2                     |           |
| Cu         | 2.163  | 5.658     | 1.140                              | 2                            | 6                     |           |
| Zn         | 5.275  | 4.693     | 4.693                              | 2                            | 35                    |           |
| As         | 0.276  | 0.206     | 0.245                              | 3                            | 0                     |           |
| Se         | 0.383  | 0.254     | 0.355                              | 2                            | 7                     |           |
| Rb         | 0.115  | 0.125     | 0.094                              | 2                            | 0                     |           |
| Sr         | 0.929  | 0.709     | 0.851                              | 1                            | 0                     |           |
| Mo         | 0.120  | 0.091     | 0.104                              | 3                            | 41                    |           |
| Cd         | 0.046  | 0.045     | 0.042                              | 3                            | 6                     |           |
| Sn         | 0.333  | 0.320     | 0.264                              | 4                            | 3                     |           |
| Sb         | 0.361  | 0.331     | 0.291                              | 4                            | 4                     |           |
| Cs         | 0.024  | 0.051     | 0.020                              | 1                            | 26                    |           |
| Ba         | 0.877  | 1.250     | 0.741                              | 1                            | 21                    |           |
| W          | 0.044  | 0.052     | 0.031                              | 3                            | 44                    |           |
| Pb         | 2.483  | 2.313     | 2.126                              | 3                            | 4                     |           |
| U          | 0.006  | 0.002     | 0.006                              | 1                            | 46                    |           |
| Hg         | 2.083  | 4.314     | 2.083                              | 0                            | 0                     |           |

| Cwymstwyth |                                    |           | 2011 Q3 Oct.2010 - Sept.2011 |              | Rain data             |  |
|------------|------------------------------------|-----------|------------------------------|--------------|-----------------------|--|
| Rainfall   | 1551                               | mm        | Samples                      | 10           | metals                |  |
| Collected  | 1336                               | mm Hg     | Analysed                     | 25           | Hg                    |  |
| Metal      | volume-weighted Annual Mean (µg/l) | Std. Dev. | Filtered Annual Mean (ug/l)  | No. Outliers | No. Samples Below LoD | Wet Deposition (g ha <sup>-1</sup> y <sup>-1</sup> ) |
| Li         | 0.031                              | 0.014     | 0.035                        | 1            | 0                     | 0.546  |
| Be         | 0.002                              | 0.001     | 0.002                        | 1            | 9                     | 0.023  |
| Al         | 3.346                              | 8.754     | 3.772                        | 2            | 0                     | 58.521   |
| Sc         | 0.025                              | 0.011     | 0.025                        | 1            | 9                     | 0.388  |
| Ti         | 0.052                              | 0.135     | 0.048                        | 1            | 7                     | 0.752  |
| V          | 0.158                              | 0.084     | 0.169                        | 1            | 0                     | 2.616  |
| Cr         | 0.029                              | 0.046     | 0.028                        | 1            | 7                     | 0.439  |
| Mn         | 0.726                              | 1.700     | 0.682                        | 1            | 0                     | 10.582   |
| Fe         | 2.996                              | 11.418    | 2.470                        | 1            | 4                     | 38.320   |
| Co         | 0.009                              | 0.054     | 0.005                        | 1            | 7                     | 0.083  |
| Ni         | 0.196                              | 0.372     | 0.118                        | 1            | 0                     | 1.838  |
| Cu         | 0.186                              | 0.339     | 0.180                        | 1            | 0                     | 2.793  |
| Zn         | 1.136                              | 5.655     | 0.740                        | 1            | 7                     | 11.487   |
| As         | 0.093                              | 0.040     | 0.103                        | 1            | 0                     | 1.591  |
| Se         | 0.118                              | 0.082     | 0.126                        | 1            | 0                     | 1.959  |
| Rb         | 0.041                              | 0.097     | 0.037                        | 1            | 0                     | 0.573  |
| Sr         | 1.245                              | 0.499     | 1.404                        | 0            | 0                     | 21.779   |
| Mo         | 0.015                              | 0.023     | 0.015                        | 1            | 7                     | 0.233  |
| Cd         | 0.013                              | 0.113     | 0.004                        | 1            | 1                     | 0.068  |
| Sn         | 0.011                              | 0.011     | 0.007                        | 1            | 5                     | 0.107  |
| Sb         | 0.021                              | 0.026     | 0.020                        | 1            | 1                     | 0.312  |
| Cs         | 0.003                              | 0.003     | 0.003                        | 0            | 5                     | 0.044  |
| Ba         | 0.162                              | 0.256     | 0.147                        | 1            | 0                     | 2.287  |
| W          | 0.061                              | 0.076     | 0.031                        | 1            | 6                     | 0.474  |
| Pb         | 0.199                              | 0.517     | 0.177                        | 1            | 0                     | 2.740  |
| U          | 0.003                              | 0.005     | 0.004                        | 1            | 7                     | 0.061  |
| Hg (ng/l)  | 3.918                              | 1.378     | 3.764                        | 1            | 0                     | 0.05   |

2011Q3 Data– Detling

| Detling |  | 2011 Q3 Oct.2010 - Sept.2011 |                                    |              | PM10 data             |
|---------|--|------------------------------|------------------------------------|--------------|-----------------------|
| Data    | 96   | % metals                     | Filters                            | 50           | metals                |
| Capture | 81   | % Hg                         | Analysed:                          | 20           | Hg                    |
| Metal   | time weighted annual mean (ng/m <sup>3</sup> ) | Std. Dev.                    | Filtered Mean (ng/m <sup>3</sup> ) | No. Outliers | No. Samples Below LoD |
| Li      | 0.087  | 0.107                        | 0.074                              | 1            | 0                     |
| Be      | 0.011  | 0.011                        | 0.009                              | 1            | 49                    |
| Al      | 54.256   | 65.326                       | 41.222                             | 3            | 0                     |
| Sc      | 0.175  | 0.189                        | 0.148                              | 1            | 49                    |
| Ti      | 2.547  | 3.405                        | 2.144                              | 1            | 0                     |
| V       | 2.345  | 1.827                        | 2.057                              | 2            | 0                     |
| Cr      | 0.682  | 0.975                        | 0.513                              | 3            | 27                    |
| Mn      | 4.619  | 7.342                        | 3.647                              | 1            | 0                     |
| Fe      | 157.702  | 237.014                      | 125.579                            | 1            | 0                     |
| Co      | 0.098  | 0.126                        | 0.081                              | 1            | 1                     |
| Ni      | 1.678  | 1.508                        | 1.435                              | 2            | 0                     |
| Cu      | 5.762  | 8.365                        | 4.649                              | 1            | 0                     |
| Zn      | 17.647   | 24.721                       | 14.414                             | 1            | 7                     |
| As      | 0.987  | 1.861                        | 0.730                              | 1            | 0                     |
| Se      | 0.781  | 1.424                        | 0.583                              | 1            | 0                     |
| Rb      | 0.239  | 0.328                        | 0.196                              | 1            | 0                     |
| Sr      | 1.556  | 2.232                        | 1.128                              | 2            | 0                     |
| Mo      | 0.381  | 0.673                        | 0.288                              | 1            | 7                     |
| Cd      | 0.422  | 1.570                        | 0.203                              | 1            | 0                     |
| Sn      | 1.643  | 3.175                        | 1.199                              | 1            | 0                     |
| Sb      | 2.273  | 4.009                        | 1.298                              | 3            | 0                     |
| Cs      | 0.039  | 0.072                        | 0.026                              | 2            | 12                    |
| Ba      | 4.223  | 7.612                        | 2.700                              | 2            | 0                     |
| W       | 0.044  | 0.054                        | 0.034                              | 2            | 44                    |
| Pb      | 12.182   | 25.662                       | 8.658                              | 1            | 0                     |
| U       | 0.007  | 0.008                        | 0.006                              | 1            | 46                    |
| Hg      | 0.747  | 4.41                         | 0.747                              | 0            | 0                     |

| Detling   |                                    | 2011 Q3 Oct.2010 - Sept.2011 |                             |              | Rain data             |  |
|-----------|------------------------------------|------------------------------|-----------------------------|--------------|-----------------------|--|
| Rainfall  | 523                                | mm                           | Samples                     | 12           | metals                |  |
| Collected | 525                                | mm Hg                        | Analysed                    | 24           | Hg                    |  |
| Metal     | volume-weighted Annual Mean (µg/l) | Std. Dev.                    | Filtered Annual Mean (ug/l) | No. Outliers | No. Samples Below LoD | Wet Deposition (g ha <sup>-1</sup> y <sup>-1</sup> ) |
| Li        | 0.047                              | 0.040                        | 0.041                       | 1            | 0                     | 0.212  |
| Be        | 0.004                              | 0.003                        | 0.003                       | 1            | 6                     | 0.014  |
| Al        | 22.564                             | 44.197                       | 17.934                      | 1            | 0                     | 93.767   |
| Sc        | 0.029                              | 0.023                        | 0.025                       | 1            | 11                    | 0.131  |
| Ti        | 0.552                              | 0.957                        | 0.448                       | 1            | 0                     | 2.343  |
| V         | 0.485                              | 0.343                        | 0.439                       | 1            | 0                     | 2.297  |
| Cr        | 0.159                              | 0.499                        | 0.111                       | 1            | 3                     | 0.580  |
| Mn        | 4.488                              | 8.331                        | 3.566                       | 1            | 0                     | 18.643   |
| Fe        | 21.461                             | 35.324                       | 17.422                      | 1            | 0                     | 91.087   |
| Co        | 0.035                              | 0.050                        | 0.029                       | 1            | 0                     | 0.153  |
| Ni        | 0.526                              | 0.415                        | 0.266                       | 1            | 0                     | 1.389  |
| Cu        | 4.842                              | 33.380                       | 1.702                       | 1            | 0                     | 8.899  |
| Zn        | 7.754                              | 8.043                        | 7.026                       | 2            | 0                     | 36.732   |
| As        | 0.175                              | 0.183                        | 0.146                       | 1            | 0                     | 0.763  |
| Se        | 0.124                              | 0.073                        | 0.113                       | 0            | 0                     | 0.589  |
| Rb        | 0.110                              | 0.125                        | 0.092                       | 1            | 0                     | 0.481  |
| Sr        | 1.873                              | 1.824                        | 1.594                       | 1            | 0                     | 8.335  |
| Mo        | 0.069                              | 0.058                        | 0.062                       | 0            | 3                     | 0.325  |
| Cd        | 0.126                              | 0.386                        | 0.033                       | 1            | 0                     | 0.171  |
| Sn        | 0.073                              | 0.098                        | 0.033                       | 1            | 2                     | 0.170  |
| Sb        | 0.186                              | 0.162                        | 0.160                       | 1            | 0                     | 0.835  |
| Cs        | 0.008                              | 0.030                        | 0.004                       | 1            | 2                     | 0.022  |
| Ba        | 1.765                              | 2.101                        | 1.477                       | 1            | 0                     | 7.722  |
| W         | 0.021                              | 0.033                        | 0.016                       | 1            | 6                     | 0.085  |
| Pb        | 1.478                              | 1.397                        | 1.339                       | 1            | 0                     | 7.002  |
| U         | 0.002                              | 0.005                        | 0.002                       | 2            | 6                     | 0.009  |
| Hg (ng/l) | 5.107                              | 4.292                        | 4.650                       | 4            | 0                     | 0.024  |

2011Q3 Data– Harwell

| Harwell |  | 2011 Q3 Oct.2010 - Sept.2011 |                                    |              | PM10 data             |
|---------|--|------------------------------|------------------------------------|--------------|-----------------------|
| Data    | 97   | % metals                     | Filters                            | 53           | metals                |
| Capture | 77   | % Hg                         | Analysed:                          | 22           | Hg                    |
| Metal   | time weighted annual mean (ng/m <sup>3</sup> ) | Std. Dev.                    | Filtered Mean (ng/m <sup>3</sup> ) | No. Outliers | No. Samples Below LoD |
| Li      | 0.070  | 0.056                        | 0.059                              | 3            | 0                     |
| Be      | 0.009  | 0.009                        | 0.009                              | 2            | 51                    |
| Al      | 53.693   | 83.779                       | 43.467                             | 2            | 0                     |
| Sc      | 0.156  | 0.152                        | 0.152                              | 2            | 51                    |
| Ti      | 2.006  | 2.248                        | 1.537                              | 3            | 2                     |
| V       | 1.112  | 0.797                        | 0.995                              | 3            | 0                     |
| Cr      | 0.369  | 0.430                        | 0.326                              | 3            | 24                    |
| Mn      | 2.662  | 2.172                        | 2.285                              | 3            | 0                     |
| Fe      | 102.565  | 81.985                       | 84.041                             | 4            | 0                     |
| Co      | 0.055  | 0.044                        | 0.047                              | 4            | 20                    |
| Ni      | 0.950  | 1.012                        | 0.792                              | 3            | 0                     |
| Cu      | 3.079  | 2.324                        | 2.685                              | 3            | 0                     |
| Zn      | 9.335  | 7.404                        | 8.309                              | 4            | 16                    |
| As      | 0.561  | 0.392                        | 0.545                              | 2            | 0                     |
| Se      | 0.503  | 0.293                        | 0.442                              | 4            | 1                     |
| Rb      | 0.170  | 0.134                        | 0.148                              | 3            | 0                     |
| Sr      | 1.478  | 0.840                        | 1.303                              | 4            | 0                     |
| Mo      | 0.202  | 0.204                        | 0.148                              | 6            | 31                    |
| Cd      | 0.091  | 0.072                        | 0.080                              | 3            | 0                     |
| Sn      | 0.798  | 2.537                        | 0.706                              | 1            | 0                     |
| Sb      | 0.909  | 0.635                        | 0.816                              | 3            | 0                     |
| Cs      | 0.028  | 0.028                        | 0.023                              | 2            | 12                    |
| Ba      | 17.199   | 22.049                       | 12.239                             | 4            | 0                     |
| W       | 0.040  | 0.056                        | 0.033                              | 2            | 48                    |
| Pb      | 5.713  | 3.781                        | 5.372                              | 3            | 0                     |
| U       | 0.007  | 0.006                        | 0.007                              | 2            | 48                    |
| Hg      | 1.565  | 0.618                        | 1.493                              | 1            | 0                     |

| Harwell   |                                    | 2011 Q3 Oct.2010 - Sept.2011 |                             |              | Rain data             |  |
|-----------|------------------------------------|------------------------------|-----------------------------|--------------|-----------------------|--|
| Rainfall  | 523                                | mm                           | Samples                     | 13           | metals                |  |
| Collected | 477                                | mm Hg                        | Analysed                    | 26           | Hg                    |  |
| Metal     | volume-weighted Annual Mean (µg/l) | Std. Dev.                    | Filtered Annual Mean (ug/l) | No. Outliers | No. Samples Below LoD | Wet Deposition (g ha <sup>-1</sup> y <sup>-1</sup> ) |
| Li        | 0.048                              | 0.042                        | 0.040                       | 1            | 0                     | 0.207  |
| Be        | 0.006                              | 0.006                        | 0.005                       | 1            | 5                     | 0.025  |
| Al        | 24.468                             | 29.020                       | 19.849                      | 1            | 0                     | 103.829  |
| Sc        | 0.030                              | 0.017                        | 0.026                       | 1            | 11                    | 0.134  |
| Ti        | 0.712                              | 1.006                        | 0.565                       | 1            | 1                     | 2.957  |
| V         | 0.345                              | 0.177                        | 0.303                       | 0            | 0                     | 1.584  |
| Cr        | 0.073                              | 0.091                        | 0.060                       | 1            | 6                     | 0.313  |
| Mn        | 3.272                              | 4.604                        | 2.605                       | 1            | 0                     | 13.625   |
| Fe        | 22.845                             | 30.977                       | 18.256                      | 1            | 0                     | 95.496   |
| Co        | 0.028                              | 0.039                        | 0.022                       | 1            | 0                     | 0.115  |
| Ni        | 0.194                              | 0.154                        | 0.157                       | 1            | 0                     | 0.821  |
| Cu        | 0.899                              | 0.805                        | 0.744                       | 2            | 0                     | 3.891  |
| Zn        | 5.294                              | 4.021                        | 4.443                       | 1            | 0                     | 23.240   |
| As        | 0.129                              | 0.105                        | 0.104                       | 1            | 0                     | 0.541  |
| Se        | 0.122                              | 0.090                        | 0.098                       | 1            | 0                     | 0.515  |
| Rb        | 0.075                              | 0.055                        | 0.063                       | 2            | 0                     | 0.328  |
| Sr        | 3.161                              | 3.000                        | 2.614                       | 1            | 0                     | 13.674   |
| Mo        | 0.033                              | 0.042                        | 0.027                       | 2            | 7                     | 0.139  |
| Cd        | 0.022                              | 0.017                        | 0.018                       | 1            | 0                     | 0.097  |
| Sn        | 0.034                              | 0.038                        | 0.019                       | 1            | 2                     | 0.099  |
| Sb        | 0.132                              | 0.077                        | 0.097                       | 0            | 0                     | 0.507  |
| Cs        | 0.004                              | 0.003                        | 0.003                       | 1            | 3                     | 0.016  |
| Ba        | 41.431                             | 65.080                       | 32.580                      | 1            | 0                     | 170.426  |
| W         | 0.024                              | 0.040                        | 0.018                       | 1            | 7                     | 0.092  |
| Pb        | 2.988                              | 4.326                        | 2.359                       | 1            | 0                     | 12.341   |
| U         | 0.004                              | 0.006                        | 0.004                       | 1            | 6                     | 0.019  |
| Hg (ng/l) | 5.569                              | 3.180                        | 5.569                       | 0            | 0                     | 0.027  |

## 2011Q3 Data– Heigham Holmes

| Heigham Holmes |  |           |                                    | 2011 Q3 Oct.2010 - Sept.2011 |                       | PM10 data |
|----------------|--|-----------|------------------------------------|------------------------------|-----------------------|-----------|
| Data           | 89   | % metals  | Filters                            | 53                           | metals                |           |
| Capture        | 77   | % Hg      | Analysed:                          | 22                           | Hg                    |           |
| Metal          | time weighted annual mean (ng/m <sup>3</sup> ) | Std. Dev. | Filtered Mean (ng/m <sup>3</sup> ) | No. Outliers                 | No. Samples Below LoD |           |
| Li             | 0.529  | 2.896     | 0.070                              | 2                            | 1                     |           |
| Be             | 0.073  | 0.401     | 0.009                              | 1                            | 50                    |           |
| Al             | 328.736  | 1836.022  | 38.261                             | 4                            | 1                     |           |
| Sc             | 0.358  | 1.211     | 0.156                              | 1                            | 50                    |           |
| Ti             | 14.226   | 75.926    | 2.162                              | 1                            | 0                     |           |
| V              | 25.324   | 149.029   | 1.861                              | 2                            | 0                     |           |
| Cr             | 5.118  | 27.489    | 0.767                              | 1                            | 28                    |           |
| Mn             | 28.546   | 164.475   | 2.598                              | 3                            | 0                     |           |
| Fe             | 859.968  | 4915.853  | 83.893                             | 3                            | 0                     |           |
| Co             | 1.109  | 6.572     | 0.075                              | 2                            | 11                    |           |
| Ni             | 23.293   | 138.882   | 1.454                              | 2                            | 0                     |           |
| Cu             | 17.910   | 100.163   | 2.063                              | 2                            | 1                     |           |
| Zn             | 111.408  | 641.955   | 10.125                             | 2                            | 13                    |           |
| As             | 3.814  | 20.385    | 0.574                              | 1                            | 0                     |           |
| Se             | 6.129  | 34.759    | 0.636                              | 2                            | 1                     |           |
| Rb             | 1.418  | 7.765     | 0.187                              | 2                            | 0                     |           |
| Sr             | 5.230  | 25.547    | 1.130                              | 1                            | 0                     |           |
| Mo             | 3.299  | 19.577    | 0.219                              | 1                            | 24                    |           |
| Cd             | 0.835  | 4.545     | 0.114                              | 1                            | 0                     |           |
| Sn             | 6.727  | 37.766    | 0.754                              | 2                            | 0                     |           |
| Sb             | 4.768  | 25.308    | 0.742                              | 1                            | 0                     |           |
| Cs             | 0.209  | 1.162     | 0.025                              | 1                            | 15                    |           |
| Ba             | 15.724   | 89.250    | 1.622                              | 1                            | 1                     |           |
| W              | 0.444  | 2.551     | 0.041                              | 1                            | 42                    |           |
| Pb             | 34.453   | 179.768   | 5.816                              | 2                            | 0                     |           |
| U              | 0.039  | 0.207     | 0.006                              | 1                            | 49                    |           |
| Hg             | 1.380  | 4.756     | 1.380                              | 0                            | 0                     |           |

| Heigham Holmes |                                    |           | 2011 Q3 Oct.2010 - Sept.2011 |              | Rain data             |  |
|----------------|------------------------------------|-----------|------------------------------|--------------|-----------------------|--|
| Rainfall       | 467                                | mm        | Samples                      | 14           | metals                |  |
| Collected      | 402                                | mm Hg     | Analysed                     | 27           | Hg                    |  |
| Metal          | volume-weighted Annual Mean (µg/l) | Std. Dev. | Filtered Annual Mean (ug/l)  | No. Outliers | No. Samples Below LoD | Wet Deposition (g ha <sup>-1</sup> y <sup>-1</sup> ) |
| Li             | 0.088                              | 0.056     | 0.077                        | 1            | 0                     | 0.362  |
| Be             | 0.005                              | 0.006     | 0.002                        | 1            | 9                     | 0.007  |
| Al             | 16.792                             | 43.236    | 12.144                       | 2            | 0                     | 56.738   |
| Sc             | 0.031                              | 0.008     | 0.025                        | 1            | 13                    | 0.117  |
| Ti             | 0.402                              | 0.963     | 0.287                        | 1            | 1                     | 1.339  |
| V              | 0.360                              | 0.242     | 0.304                        | 1            | 0                     | 1.419  |
| Cr             | 0.074                              | 0.121     | 0.058                        | 2            | 4                     | 0.270  |
| Mn             | 4.813                              | 10.196    | 3.528                        | 1            | 0                     | 16.484   |
| Fe             | 27.708                             | 57.178    | 20.479                       | 1            | 0                     | 95.680   |
| Co             | 0.035                              | 0.066     | 0.027                        | 1            | 0                     | 0.125  |
| Ni             | 0.686                              | 1.566     | 0.396                        | 2            | 0                     | 1.851  |
| Cu             | 1.083                              | 5.182     | 0.897                        | 1            | 0                     | 4.192  |
| Zn             | 7.763                              | 9.307     | 6.770                        | 1            | 0                     | 31.631   |
| As             | 0.158                              | 0.101     | 0.133                        | 1            | 0                     | 0.622  |
| Se             | 0.171                              | 0.056     | 0.148                        | 0            | 0                     | 0.693  |
| Rb             | 0.189                              | 0.159     | 0.159                        | 1            | 0                     | 0.742  |
| Sr             | 3.494                              | 1.743     | 2.488                        | 1            | 0                     | 11.625   |
| Mo             | 0.074                              | 0.414     | 0.061                        | 1            | 1                     | 0.285  |
| Cd             | 0.025                              | 0.021     | 0.022                        | 1            | 0                     | 0.102  |
| Sn             | 0.031                              | 0.025     | 0.027                        | 0            | 1                     | 0.126  |
| Sb             | 0.111                              | 0.087     | 0.098                        | 1            | 0                     | 0.457  |
| Cs             | 0.006                              | 0.004     | 0.005                        | 0            | 0                     | 0.024  |
| Ba             | 1.387                              | 1.811     | 1.101                        | 1            | 0                     | 5.145  |
| W              | 0.031                              | 0.033     | 0.022                        | 0            | 7                     | 0.101  |
| Pb             | 1.067                              | 1.290     | 0.859                        | 1            | 0                     | 4.012  |
| U              | 0.003                              | 0.007     | 0.002                        | 1            | 7                     | 0.011  |
| Hg (ng/l)      | 7.065                              | 4.930     | 6.795                        | 2            | 0                     | 0.027  |

2011Q3 Data–Monks Wood

| Monks Wood |  | 2011 Q3 Oct.2010 - Sept.2011 |                                    |              | PM10 data             |
|------------|--|------------------------------|------------------------------------|--------------|-----------------------|
| Data       | 97 %   | metals                       | Filters                            | 53           | metals                |
| Capture    | 87 %   | % Hg                         | Analysed:                          | 23           | Hg                    |
| Metal      | time weighted annual mean (ng/m <sup>3</sup> ) | Std. Dev.                    | Filtered Mean (ng/m <sup>3</sup> ) | No. Outliers | No. Samples Below LoD |
| Li         | 0.085  | 0.047                        | 0.073                              | 4            | 0                     |
| Be         | 0.010  | 0.012                        | 0.010                              | 1            | 50                    |
| Al         | 65.904   | 64.596                       | 52.505                             | 3            | 0                     |
| Sc         | 0.158  | 0.198                        | 0.152                              | 1            | 51                    |
| Ti         | 2.506  | 2.340                        | 2.196                              | 1            | 0                     |
| V          | 1.169  | 0.740                        | 1.029                              | 3            | 0                     |
| Cr         | 0.537  | 0.444                        | 0.472                              | 2            | 18                    |
| Mn         | 3.273  | 1.827                        | 2.858                              | 4            | 0                     |
| Fe         | 134.737  | 72.273                       | 119.791                            | 3            | 0                     |
| Co         | 0.063  | 0.040                        | 0.056                              | 4            | 9                     |
| Ni         | 0.821  | 0.535                        | 0.720                              | 3            | 0                     |
| Cu         | 3.866  | 1.789                        | 3.598                              | 2            | 0                     |
| Zn         | 11.566   | 7.846                        | 10.726                             | 2            | 9                     |
| As         | 0.669  | 0.388                        | 0.628                              | 1            | 0                     |
| Se         | 0.699  | 0.296                        | 0.636                              | 3            | 0                     |
| Rb         | 0.202  | 0.119                        | 0.171                              | 4            | 0                     |
| Sr         | 1.099  | 0.523                        | 1.003                              | 2            | 0                     |
| Mo         | 0.263  | 0.199                        | 0.235                              | 3            | 19                    |
| Cd         | 0.110  | 0.063                        | 0.102                              | 1            | 0                     |
| Sn         | 0.964  | 0.536                        | 0.860                              | 3            | 0                     |
| Sb         | 1.182  | 0.614                        | 1.058                              | 3            | 0                     |
| Cs         | 0.030  | 0.030                        | 0.024                              | 2            | 9                     |
| Ba         | 2.737  | 1.467                        | 2.468                              | 2            | 0                     |
| W          | 0.039  | 0.044                        | 0.038                              | 1            | 45                    |
| Pb         | 5.981  | 3.456                        | 5.304                              | 2            | 0                     |
| U          | 0.006  | 0.008                        | 0.006                              | 1            | 50                    |
| Hg         | 1.012  | 0.444                        | 1.012                              | 0            | 0                     |

| Monks Wood |                                    | 2011 Q3 Oct.2010 - Sept.2011 |                             |              | Rain data             |  |
|------------|------------------------------------|------------------------------|-----------------------------|--------------|-----------------------|--|
| Rainfall   | 304 mm                             | metals                       | Samples                     | 31           | metals                |  |
| Collected  | 289 mm                             | Hg                           | Analysed                    | 24           | Hg                    |  |
| Metal      | volume-weighted Annual Mean (µg/l) | Std. Dev.                    | Filtered Annual Mean (ug/l) | No. Outliers | No. Samples Below LoD | Wet Deposition (g ha <sup>-1</sup> y <sup>-1</sup> ) |
| Li         | 0.039                              | 0.038                        | 0.037                       | 3            | 0                     | 0.112  |
| Be         | 0.003                              | 0.003                        | 0.002                       | 3            | 21                    | 0.006  |
| Al         | 18.948                             | 24.190                       | 13.169                      | 2            | 0                     | 40.085   |
| Sc         | 0.027                              | 0.023                        | 0.025                       | 2            | 29                    | 0.076  |
| Ti         | 0.371                              | 0.417                        | 0.296                       | 2            | 1                     | 0.901  |
| V          | 0.246                              | 0.253                        | 0.219                       | 2            | 0                     | 0.665  |
| Cr         | 0.079                              | 0.070                        | 0.074                       | 3            | 6                     | 0.224  |
| Mn         | 2.487                              | 3.192                        | 1.869                       | 2            | 0                     | 5.690  |
| Fe         | 18.132                             | 18.760                       | 16.412                      | 3            | 0                     | 49.956   |
| Co         | 0.026                              | 0.029                        | 0.019                       | 2            | 0                     | 0.059  |
| Ni         | 0.331                              | 0.669                        | 0.297                       | 1            | 0                     | 0.904  |
| Cu         | 1.059                              | 0.746                        | 0.966                       | 3            | 0                     | 2.940  |
| Zn         | 4.832                              | 3.188                        | 4.394                       | 2            | 0                     | 13.375   |
| As         | 0.130                              | 0.081                        | 0.116                       | 2            | 0                     | 0.352  |
| Se         | 0.103                              | 0.083                        | 0.097                       | 2            | 4                     | 0.296  |
| Rb         | 0.099                              | 0.083                        | 0.092                       | 2            | 0                     | 0.279  |
| Sr         | 1.265                              | 1.294                        | 0.968                       | 4            | 0                     | 2.947  |
| Mo         | 0.054                              | 0.059                        | 0.039                       | 1            | 16                    | 0.120  |
| Cd         | 0.019                              | 0.017                        | 0.016                       | 2            | 0                     | 0.047  |
| Sn         | 0.044                              | 0.041                        | 0.042                       | 1            | 4                     | 0.128  |
| Sb         | 0.116                              | 0.073                        | 0.105                       | 1            | 0                     | 0.318  |
| Cs         | 0.004                              | 0.006                        | 0.003                       | 2            | 11                    | 0.009  |
| Ba         | 1.185                              | 1.128                        | 0.918                       | 2            | 0                     | 2.794  |
| W          | 0.018                              | 0.035                        | 0.016                       | 1            | 16                    | 0.049  |
| Pb         | 0.810                              | 0.631                        | 0.751                       | 3            | 0                     | 2.287  |
| U          | 0.002                              | 0.003                        | 0.002                       | 2            | 18                    | 0.006  |
| Hg (ng/l)  | 7.360                              | 5.201                        | 6.797                       | 2            | 0                     | 0.020  |

## 2011Q3 Data– Wytham Wood

| Wytham Wood |  | 2011 Q3 Oct.2010 - Sept.2011 |                                    | PM10 data    |                       |
|-------------|--|------------------------------|------------------------------------|--------------|-----------------------|
| Data        | 95 %   | Filters                      | 54                                 | metals       |                       |
| Capture     | 79 % Hg  | Analysed:                    | 23                                 | Hg           |                       |
| Metal       | time weighted annual mean (ng/m <sup>3</sup> ) | Std. Dev.                    | Filtered Mean (ng/m <sup>3</sup> ) | No. Outliers | No. Samples Below LoD |
| Li          | 0.071  | 0.053                        | 0.059                              | 4            | 1                     |
| Be          | 0.010  | 0.035                        | 0.009                              | 1            | 52                    |
| Al          | 48.252   | 40.118                       | 38.573                             | 3            | 0                     |
| Sc          | 0.163  | 0.576                        | 0.152                              | 1            | 53                    |
| Ti          | 2.126  | 2.437                        | 1.754                              | 1            | 2                     |
| V           | 1.161  | 0.704                        | 0.992                              | 2            | 0                     |
| Cr          | 0.378  | 0.536                        | 0.330                              | 2            | 24                    |
| Mn          | 2.636  | 1.762                        | 2.193                              | 3            | 0                     |
| Fe          | 113.048  | 76.100                       | 93.836                             | 3            | 0                     |
| Co          | 0.055  | 0.075                        | 0.052                              | 1            | 22                    |
| Ni          | 0.758  | 0.507                        | 0.611                              | 4            | 0                     |
| Cu          | 3.793  | 3.126                        | 3.281                              | 1            | 0                     |
| Zn          | 11.133   | 12.461                       | 10.537                             | 1            | 13                    |
| As          | 0.700  | 0.390                        | 0.648                              | 1            | 0                     |
| Se          | 0.600  | 0.406                        | 0.553                              | 2            | 0                     |
| Rb          | 0.184  | 0.112                        | 0.155                              | 3            | 0                     |
| Sr          | 1.193  | 0.750                        | 1.022                              | 2            | 0                     |
| Mo          | 0.232  | 0.375                        | 0.219                              | 1            | 28                    |
| Cd          | 0.106  | 0.063                        | 0.086                              | 4            | 0                     |
| Sn          | 0.845  | 0.699                        | 0.771                              | 2            | 0                     |
| Sb          | 1.063  | 0.591                        | 0.954                              | 2            | 0                     |
| Cs          | 0.033  | 0.041                        | 0.025                              | 4            | 9                     |
| Ba          | 2.536  | 1.881                        | 2.145                              | 2            | 0                     |
| W           | 0.040  | 0.117                        | 0.038                              | 1            | 47                    |
| Pb          | 6.084  | 3.513                        | 5.450                              | 2            | 0                     |
| U           | 0.007  | 0.023                        | 0.006                              | 1            | 51                    |
| Hg          | 1.091  | 0.320                        | 1.091                              | 0            | 0                     |

| Wytham Wood |                                    | 2011 Q3 Oct.2010 - Sept.2011 |                             | Rain data    |                       |  |
|-------------|------------------------------------|------------------------------|-----------------------------|--------------|-----------------------|--|
| Rainfall    | 413 mm                             | Samples                      | 12                          | metals       |                       |  |
| Collected   | 387 mm Hg                          | Analysed                     | 25                          | Hg           |                       |  |
| Metal       | volume-weighted Annual Mean (µg/l) | Std. Dev.                    | Filtered Annual Mean (ug/l) | No. Outliers | No. Samples Below LoD | Wet Deposition (g ha <sup>-1</sup> y <sup>-1</sup> ) |
| Li          | 0.040                              | 0.031                        | 0.040                       | 0            | 0                     | 0.164  |
| Be          | 0.005                              | 0.006                        | 0.002                       | 1            | 8                     | 0.009  |
| Al          | 12.671                             | 16.875                       | 11.713                      | 2            | 0                     | 48.347   |
| Sc          | 0.027                              | 0.019                        | 0.025                       | 1            | 11                    | 0.103  |
| Ti          | 0.316                              | 0.492                        | 0.280                       | 1            | 1                     | 1.155  |
| V           | 0.263                              | 0.154                        | 0.263                       | 0            | 0                     | 1.085  |
| Cr          | 0.080                              | 0.078                        | 0.080                       | 0            | 4                     | 0.328  |
| Mn          | 2.289                              | 3.233                        | 2.289                       | 2            | 0                     | 9.447  |
| Fe          | 15.141                             | 22.168                       | 13.566                      | 2            | 0                     | 55.996   |
| Co          | 0.022                              | 0.030                        | 0.022                       | 2            | 1                     | 0.089  |
| Ni          | 0.199                              | 0.133                        | 0.199                       | 1            | 0                     | 0.820  |
| Cu          | 1.095                              | 0.951                        | 1.095                       | 1            | 0                     | 4.521  |
| Zn          | 4.516                              | 3.812                        | 4.516                       | 2            | 0                     | 18.641   |
| As          | 0.250                              | 0.131                        | 0.250                       | 1            | 0                     | 1.033  |
| Se          | 0.109                              | 0.091                        | 0.097                       | 1            | 1                     | 0.400  |
| Rb          | 0.080                              | 0.051                        | 0.080                       | 1            | 0                     | 0.330  |
| Sr          | 1.615                              | 1.264                        | 1.615                       | 1            | 0                     | 6.668  |
| Mo          | 0.052                              | 0.089                        | 0.046                       | 1            | 4                     | 0.189  |
| Cd          | 0.022                              | 0.013                        | 0.022                       | 1            | 0                     | 0.089  |
| Sn          | 1.331                              | 2.470                        | 0.059                       | 1            | 1                     | 0.245  |
| Sb          | 0.125                              | 0.087                        | 0.125                       | 1            | 0                     | 0.515  |
| Cs          | 0.004                              | 0.004                        | 0.004                       | 0            | 4                     | 0.015  |
| Ba          | 1.268                              | 1.117                        | 1.188                       | 2            | 0                     | 4.902  |
| W           | 0.030                              | 0.043                        | 0.027                       | 1            | 6                     | 0.110  |
| Pb          | 3.031                              | 3.975                        | 0.982                       | 1            | 0                     | 4.051  |
| U           | 0.002                              | 0.003                        | 0.002                       | 1            | 7                     | 0.006  |
| Hg (ng/l)   | 4.944                              | 2.597                        | 4.886                       | 1            | 0                     | 0.019  |



2011Q3 Data– Yarner Wood

| Yarner Wood |  | 2011 Q3 Oct.2010 - Sept.2011 |                                    |              | PM10 data             |
|-------------|--|------------------------------|------------------------------------|--------------|-----------------------|
| Data        | 95 %   | metals                       | Filters                            | 54           | metals                |
| Capture     | 74 %   | % Hg                         | Analysed:                          | 19           | Hg                    |
| Metal       | time weighted annual mean (ng/m <sup>3</sup> ) | Std. Dev.                    | Filtered Mean (ng/m <sup>3</sup> ) | No. Outliers | No. Samples Below LoD |
| Li          | 0.063  | 0.047                        | 0.054                              | 3            | 0                     |
| Be          | 0.009  | 0.001                        | 0.009                              | 1            | 53                    |
| Al          | 30.933   | 33.206                       | 26.400                             | 2            | 2                     |
| Sc          | 0.150  | 0.017                        | 0.150                              | 1            | 53                    |
| Ti          | 1.224  | 1.470                        | 0.879                              | 4            | 7                     |
| V           | 1.367  | 1.348                        | 1.196                              | 2            | 0                     |
| Cr          | 0.341  | 0.323                        | 0.294                              | 3            | 30                    |
| Mn          | 1.649  | 1.627                        | 1.349                              | 3            | 0                     |
| Fe          | 53.849   | 57.360                       | 43.189                             | 3            | 2                     |
| Co          | 0.042  | 0.041                        | 0.034                              | 3            | 33                    |
| Ni          | 0.818  | 0.893                        | 0.697                              | 2            | 0                     |
| Cu          | 1.535  | 1.581                        | 1.201                              | 4            | 1                     |
| Zn          | 5.572  | 4.916                        | 4.309                              | 5            | 38                    |
| As          | 0.492  | 0.346                        | 0.456                              | 2            | 0                     |
| Se          | 0.457  | 0.267                        | 0.405                              | 4            | 2                     |
| Rb          | 0.171  | 0.115                        | 0.148                              | 4            | 0                     |
| Sr          | 0.997  | 0.481                        | 0.952                              | 2            | 0                     |
| Mo          | 0.146  | 0.134                        | 0.119                              | 4            | 42                    |
| Cd          | 0.060  | 0.053                        | 0.050                              | 4            | 7                     |
| Sn          | 0.410  | 0.400                        | 0.331                              | 4            | 7                     |
| Sb          | 0.468  | 0.365                        | 0.434                              | 2            | 1                     |
| Cs          | 0.029  | 0.042                        | 0.022                              | 2            | 22                    |
| Ba          | 0.995  | 0.881                        | 0.850                              | 3            | 10                    |
| W           | 0.031  | 0.006                        | 0.030                              | 2            | 52                    |
| Pb          | 2.697  | 2.118                        | 2.533                              | 3            | 4                     |
| U           | 0.006  | 0.001                        | 0.006                              | 2            | 52                    |
| Hg          | 1.757  | 0.678                        | 1.757                              | 0            | 0                     |

| Yarner Wood |                                    | 2011 Q3 Oct.2010 - Sept.2011 |                             |              | Rain data             |  |
|-------------|------------------------------------|------------------------------|-----------------------------|--------------|-----------------------|--|
| Rainfall    | 846 mm                             | metals                       | Samples                     | 38           | metals                |  |
| Collected   | 762 mm                             | Hg                           | Analysed                    | 26           | Hg                    |  |
| Metal       | volume-weighted Annual Mean (µg/l) | Std. Dev.                    | Filtered Annual Mean (ug/l) | No. Outliers | No. Samples Below LoD | Wet Deposition (g ha <sup>-1</sup> y <sup>-1</sup> ) |
| Li          | 0.034                              | 0.065                        | 0.033                       | 3            | 0                     | 0.276  |
| Be          | 0.002                              | 0.004                        | 0.002                       | 3            | 29                    | 0.018  |
| Al          | 6.888                              | 29.620                       | 6.656                       | 2            | 2                     | 56.303   |
| Sc          | 0.035                              | 0.030                        | 0.025                       | 2            | 35                    | 0.214  |
| Ti          | 0.141                              | 0.603                        | 0.128                       | 3            | 11                    | 1.086  |
| V           | 0.374                              | 0.329                        | 0.376                       | 1            | 0                     | 3.179  |
| Cr          | 0.043                              | 0.148                        | 0.042                       | 2            | 17                    | 0.352  |
| Mn          | 1.450                              | 8.051                        | 1.423                       | 1            | 0                     | 12.034   |
| Fe          | 6.508                              | 32.360                       | 6.216                       | 2            | 4                     | 52.583   |
| Co          | 0.010                              | 0.047                        | 0.010                       | 2            | 10                    | 0.085  |
| Ni          | 0.242                              | 0.372                        | 0.236                       | 2            | 0                     | 1.996  |
| Cu          | 0.577                              | 1.660                        | 0.567                       | 2            | 0                     | 4.801  |
| Zn          | 2.104                              | 5.987                        | 2.077                       | 2            | 3                     | 17.567   |
| As          | 0.091                              | 0.197                        | 0.087                       | 2            | 0                     | 0.736  |
| Se          | 0.107                              | 0.158                        | 0.105                       | 2            | 5                     | 0.889  |
| Rb          | 0.123                              | 0.679                        | 0.118                       | 2            | 0                     | 1.000  |
| Sr          | 1.311                              | 2.264                        | 1.269                       | 2            | 0                     | 10.739   |
| Mo          | 0.046                              | 0.045                        | 0.046                       | 1            | 20                    | 0.391  |
| Cd          | 0.008                              | 0.034                        | 0.008                       | 2            | 3                     | 0.068  |
| Sn          | 0.056                              | 0.055                        | 0.046                       | 3            | 8                     | 0.385  |
| Sb          | 0.044                              | 0.102                        | 0.044                       | 2            | 2                     | 0.369  |
| Cs          | 0.003                              | 0.017                        | 0.003                       | 2            | 8                     | 0.025  |
| Ba          | 0.336                              | 1.626                        | 0.323                       | 2            | 1                     | 2.734  |
| W           | 0.035                              | 0.033                        | 0.025                       | 2            | 23                    | 0.211  |
| Pb          | 0.330                              | 1.202                        | 0.321                       | 2            | 1                     | 2.716  |
| U           | 0.002                              | 0.004                        | 0.002                       | 2            | 28                    | 0.014  |
| Hg (ng/l)   | 2.067                              | 5.109                        | 1.793                       | 4            | 0                     | 0.014  |

2011Q3 – Rainfall Only Sites – Inverpollly and Lough Navar

| Inverpollly        |                                    | 2011 Q3 Oct.2010 - Sept.2011 |                             |              |                       | Rain data  |
|--------------------|------------------------------------|------------------------------|-----------------------------|--------------|-----------------------|--|
| Rainfall Collected | 1813                               | mm<br>metals<br>- mm Hg      | Samples Analysed            | 11           | metals<br>Hg          |  |
| Metal              | volume-weighted Annual Mean (µg/l) | Std. Dev.                    | Filtered Annual Mean (ug/l) | No. Outliers | No. Samples Below LoD | Wet Deposition (g ha <sup>-1</sup> y <sup>-1</sup> ) |
| Li                 | 0.046                              | 0.041                        | 0.034                       | 1            | 0                     | 0.622  |
| Be                 | 0.003                              | 0.003                        | 0.002                       | 1            | 8                     | 0.033  |
| Al                 | 2.564                              | 1.591                        | 1.815                       | 0            | 0                     | 32.919   |
| Sc                 | 0.027                              | 0.000                        | 0.025                       | 0            | 11                    | 0.453  |
| Ti                 | 0.201                              | 0.156                        | 0.121                       | 1            | 2                     | 2.197  |
| V                  | 0.093                              | 0.049                        | 0.085                       | 0            | 0                     | 1.545  |
| Cr                 | 0.024                              | 0.014                        | 0.020                       | 1            | 10                    | 0.363  |
| Mn                 | 0.861                              | 0.527                        | 0.786                       | 0            | 0                     | 14.261   |
| Fe                 | 2.570                              | 1.562                        | 2.348                       | 0            | 2                     | 42.583   |
| Co                 | 0.003                              | 0.000                        | 0.003                       | 0            | 11                    | 0.054  |
| Ni                 | 0.073                              | 0.049                        | 0.051                       | 1            | 0                     | 0.920  |
| Cu                 | 0.193                              | 0.091                        | 0.176                       | 0            | 0                     | 3.189  |
| Zn                 | 1.205                              | 0.931                        | 0.738                       | 1            | 7                     | 13.379   |
| As                 | 0.049                              | 0.032                        | 0.037                       | 1            | 0                     | 0.667  |
| Se                 | 0.102                              | 0.057                        | 0.084                       | 1            | 0                     | 1.523  |
| Rb                 | 0.070                              | 0.031                        | 0.064                       | 0            | 0                     | 1.163  |
| Sr                 | 1.956                              | 1.623                        | 1.473                       | 1            | 0                     | 26.706   |
| Mo                 | 0.020                              | 0.008                        | 0.015                       | 1            | 10                    | 0.272  |
| Cd                 | 0.005                              | 0.005                        | 0.003                       | 1            | 1                     | 0.050  |
| Sn                 | 0.007                              | 0.008                        | 0.003                       | 1            | 10                    | 0.054  |
| Sb                 | 0.012                              | 0.007                        | 0.011                       | 0            | 4                     | 0.197  |
| Cs                 | 0.002                              | 0.001                        | 0.001                       | 1            | 10                    | 0.018  |
| Ba                 | 0.126                              | 0.059                        | 0.115                       | 0            | 1                     | 2.088  |
| W                  | 0.069                              | 0.097                        | 0.026                       | 1            | 7                     | 0.473  |
| Pb                 | 0.128                              | 0.103                        | 0.107                       | 1            | 3                     | 1.946  |
| U                  | 0.003                              | 0.003                        | 0.002                       | 1            | 9                     | 0.034  |
| Hg (ng/l)          | -                                  | -                            | -                           | -            | -                     | -  |

| Lough Navar        |                                    | 2011 Q3 Oct.2010 - Sept.2011 |                             |              |                       | Rain data  |
|--------------------|------------------------------------|------------------------------|-----------------------------|--------------|-----------------------|--|
| Rainfall Collected | 991                                | mm<br>metals<br>- mm Hg      | Samples Analysed            | 10           | metals<br>Hg          |  |
| Metal              | volume-weighted Annual Mean (µg/l) | Std. Dev.                    | Filtered Annual Mean (ug/l) | No. Outliers | No. Samples Below LoD | Wet Deposition (g ha <sup>-1</sup> y <sup>-1</sup> ) |
| Li                 | 0.053                              | 0.041                        | 0.030                       | 1            | 0                     | 0.295  |
| Be                 | 0.002                              | 0.000                        | 0.002                       | 1            | 9                     | 0.015  |
| Al                 | 3.453                              | 6.608                        | 3.091                       | 2            | 0                     | 30.626   |
| Sc                 | 0.032                              | 0.009                        | 0.025                       | 1            | 9                     | 0.248  |
| Ti                 | 0.252                              | 0.261                        | 0.225                       | 0            | 0                     | 2.233  |
| V                  | 0.100                              | 0.082                        | 0.085                       | 1            | 0                     | 0.840  |
| Cr                 | 0.054                              | 0.038                        | 0.049                       | 0            | 5                     | 0.482  |
| Mn                 | 1.988                              | 2.005                        | 1.780                       | 1            | 0                     | 17.637   |
| Fe                 | 4.547                              | 10.025                       | 4.071                       | 1            | 1                     | 40.339   |
| Co                 | 0.006                              | 0.009                        | 0.005                       | 1            | 5                     | 0.047  |
| Ni                 | 0.170                              | 0.189                        | 0.095                       | 1            | 0                     | 0.943  |
| Cu                 | 0.212                              | 0.150                        | 0.190                       | 0            | 0                     | 1.883  |
| Zn                 | 0.856                              | 0.759                        | 0.766                       | 0            | 6                     | 7.594  |
| As                 | 0.255                              | 0.138                        | 0.228                       | 0            | 0                     | 2.258  |
| Se                 | 0.129                              | 0.048                        | 0.097                       | 1            | 0                     | 0.966  |
| Rb                 | 0.080                              | 0.187                        | 0.052                       | 1            | 0                     | 0.515  |
| Sr                 | 2.406                              | 1.715                        | 1.406                       | 1            | 0                     | 13.928   |
| Mo                 | 0.027                              | 0.082                        | 0.019                       | 1            | 8                     | 0.185  |
| Cd                 | 0.005                              | 0.006                        | 0.005                       | 1            | 3                     | 0.045  |
| Sn                 | 0.204                              | 0.299                        | 0.014                       | 1            | 5                     | 0.138  |
| Sb                 | 0.022                              | 0.024                        | 0.018                       | 1            | 2                     | 0.182  |
| Cs                 | 0.002                              | 0.002                        | 0.001                       | 1            | 6                     | 0.012  |
| Ba                 | 0.162                              | 0.201                        | 0.145                       | 1            | 1                     | 1.437  |
| W                  | 0.061                              | 0.088                        | 0.005                       | 1            | 9                     | 0.050  |
| Pb                 | 0.151                              | 0.151                        | 0.135                       | 1            | 2                     | 1.339  |
| U                  | 0.001                              | 0.000                        | 0.001                       | 1            | 9                     | 0.010  |
| Hg (ng/l)          | -                                  | -                            | -                           | -            | -                     | -  |

## 2011Q3 – Rainfall Only Sites – Penallt

| Penallt            |                                    | 2011 Q3 Oct.2010 - Sept.2011 |                             |              | Rain data             |  |
|--------------------|------------------------------------|------------------------------|-----------------------------|--------------|-----------------------|--|
| Rainfall Collected | 682 mm metals<br>- mm Hg           | Samples Analysed             | 2 metals<br>- Hg            |              |                       |  |
| Metal              | volume-weighted Annual Mean (µg/l) | Std. Dev.                    | Filtered Annual Mean (ug/l) | No. Outliers | No. Samples Below LoD | Wet Deposition (g ha <sup>-1</sup> y <sup>-1</sup> ) |
| Li                 | 0.014                              | 0.025                        | 0.042                       | 1            | 0                     | 0.286  |
| Be                 | 0.001                              | 0.002                        | 0.002                       | 0            | 1                     | 0.010  |
| Al                 | 1.075                              | 1.697                        | 19.600                      | 1            | 0                     | 133.697  |
| Sc                 | 0.007                              | 0.000                        | 0.025                       | 2            | 2                     | 0.171  |
| Ti                 | 0.036                              | 0.002                        | 0.578                       | 2            | 0                     | 3.943  |
| V                  | 0.102                              | 0.138                        | 0.293                       | 1            | 0                     | 1.999  |
| Cr                 | 0.018                              | 0.071                        | 0.061                       | 0            | 1                     | 0.416  |
| Mn                 | 1.111                              | 0.375                        | 4.790                       | 2            | 0                     | 32.674   |
| Fe                 | 1.271                              | 1.796                        | 28.700                      | 1            | 0                     | 195.771  |
| Co                 | 0.003                              | 0.001                        | 0.035                       | 2            | 0                     | 0.239  |
| Ni                 | 0.072                              | 0.057                        | 0.204                       | 2            | 0                     | 1.392  |
| Cu                 | 0.183                              | 0.439                        | 0.876                       | 0            | 0                     | 5.975  |
| Zn                 | 0.721                              | 0.757                        | 6.320                       | 1            | 0                     | 43.110   |
| As                 | 0.133                              | 0.275                        | 0.213                       | 1            | 0                     | 1.453  |
| Se                 | 0.031                              | 0.069                        | 0.110                       | 0            | 0                     | 0.750  |
| Rb                 | 0.060                              | 0.055                        | 0.118                       | 2            | 0                     | 0.805  |
| Sr                 | 0.475                              | 0.693                        | 1.380                       | 1            | 0                     | 9.413  |
| Mo                 | 0.006                              | 0.013                        | 0.015                       | 1            | 1                     | 0.102  |
| Cd                 | 0.004                              | 0.004                        | 0.044                       | 2            | 0                     | 0.300  |
| Sn                 | 0.002                              | 0.006                        | 0.024                       | 0            | 1                     | 0.164  |
| Sb                 | 0.021                              | 0.013                        | 0.116                       | 2            | 0                     | 0.791  |
| Cs                 | 0.001                              | 0.001                        | 0.009                       | 1            | 0                     | 0.061  |
| Ba                 | 0.183                              | 0.177                        | 1.900                       | 2            | 0                     | 12.960   |
| W                  | 0.001                              | 0.000                        | 0.035                       | 2            | 2                     | 0.239  |
| Pb                 | 0.193                              | 0.169                        | 1.480                       | 2            | 0                     | 10.095   |
| U                  | 0.000                              | 0.000                        | 0.004                       | 2            | 2                     | 0.027  |
| Hg (ng/l)          | -                                  | -                            | -                           | -            | -                     | -  |