

**Ratification of data produced by the
UK Ambient Hydrocarbon Automatic
Air Quality Network, 1 October 2001
to 31 December 2001**

March 2002

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1 Introduction

This report contains information on the quality and statistical parameters associated with ratified data from the UK Ambient Hydrocarbon Automatic Air Quality Network (The UK Hydrocarbon Network). The presented information and data cover the period 1 October 2001 to 31 December 2001. The ratified data have been made available on the World Wide Web at www.aeat.co.uk/netcen/airqual.

This report contains:

- The definition of a Data Quality Code for each reported hydrocarbon.
- The Data Quality Codes assigned to the data presented on the web.
- A list of periods of data loss, reasons for data loss and descriptions of the most significant causes of data loss.
- Statistical information for each measured hydrocarbon for each individual month.

2 Hydrocarbon Data Quality

All hydrocarbon data are assigned a quality value. In general ratified hourly data have an uncertainty (at 95% confidence) of $\pm 10\%$ for values above 0.1 ppb and ± 0.01 ppb for values below 0.1 ppb. These data are termed 'good quality'.

In some cases, because of instrument problems, data cannot be described as 'good' quality, but the data may still be of use to modellers and is therefore included in the archive. This is termed 'acceptable' quality data, and has an uncertainty (at 95% confidence) of $\pm 25\%$ above 0.2ppb and ± 0.05 ppb below 0.2 ppb.

Data that do not meet either the 'good' or 'acceptable' criteria do not appear in the archive.

Each month's data are assigned a Data Quality Code for each species as follows:

- A. all 'good' quality data
- B. most (> 75%) data points 'good', remainder 'acceptable' quality
- C. roughly equal numbers of 'good' and 'acceptable' quality data
- D. some (< 25%) data points 'good' quality; remainder 'acceptable' quality
- E. all points 'acceptable' quality

3 Monthly Data Reports

The following sections give details of issues affecting data on a month by month basis. Data quality codes have been assigned for each monthly set of data.

3.1 CARDIFF

3.1.1 October

3.1.1.1 Data Quality Codes

Data quality code A for all data for all of the month except:
Data quality code E for Ethane, n-Hexane, Isoprene, n-Heptane, Toluene, Ethylbenzene, (m+p)-Xylene and o-Xylene for the whole month.

3.1.1.2 Missing Data – All hydrocarbons

Calibration 11/10/01 hours 09 to 12.
Calibration 25/10/01 hours 08 to 11.

3.1.1.3 Missing Data – Specific hydrocarbons

Ethyne and 2-Methylpropane co-eluted for the whole month.

3.1.2 November

3.1.2.1 Data Quality Codes

Data quality code A for all data for all of the month except:
Data quality code E for Ethane, n-Hexane, Isoprene, n-Heptane, Toluene, Ethylbenzene, (m+p)-Xylene and o-Xylene for the whole month.

3.1.2.2 Missing Data - All hydrocarbons

Calibration 08/11/01 hours 09 to 12.
PC/GC communication problem 18/11/01 hour 03 to 19/11/01 hour 10.
Calibration 22/11/01 hours 10 to 13.

3.1.2.3 Missing Data - Specific hydrocarbons

Ethyne and 2-Methylpropane co-eluted for the whole month.

3.1.3 December

3.1.3.1 Data Quality Codes

Data quality code A for all data for all of the month except:
Data quality code E for Ethane, n-Hexane, Isoprene, n-Heptane, Toluene, Ethylbenzene, (m+p)-Xylene and o-Xylene for the whole month.

3.1.3.2 Missing Data - All hydrocarbons

Calibration 06/12/01 hours 11 to 15.

Calibration 20/12/01 hours 10 to 13.

3.1.3.3 Missing Data - Specific hydrocarbons

Ethyne and 2-Methylpropane co-eluted for the whole month.

3.2 EDINBURGH

3.2.1 October

3.2.1.1 Data Quality Codes

Data quality code A for all data for all of the month except:
Data quality code E for Ethane, Ethene, Ethyne, 2-Methylpropane, n-Hexane, Isoprene, Ethylbenzene, (m+p)-Xylene and o-Xylene for the whole month.

3.2.1.2 Missing Data - All hydrocarbons

Calibration 05/10/01 hours 13 to 17.

Calibration 17/10/01 hours 11 to 14.

3.2.1.3 Missing Data - Specific hydrocarbons

None.

3.2.2 November

3.2.2.1 Data Quality Codes

Data quality code A for all data for all of the month except:
Data quality code E for Ethane, Ethene, Ethyne, 2-Methylpropane, n-Hexane, Isoprene, Ethylbenzene, (m+p)-Xylene and o-Xylene for the whole month.

3.2.2.2 Missing Data - All hydrocarbons

Hydrogen generator failure 07/11/01 hour 16 to 20/11/01 hour 18.

Calibration 21/11/01 hours 12 to 15.

3.2.2.3 Missing Data - Specific hydrocarbons

None.

3.2.3 December

3.2.3.1 Data Quality Codes

Data quality code A for all data for all of the month except:

Data quality code E for Ethane, Ethene, Ethyne, 2-Methylpropane, n-Hexane, Isoprene, Ethylbenzene, (m+p)-Xylene and o-Xylene for the whole month.

3.2.3.2 Missing Data - All hydrocarbons

Calibration 04/12/01 hours 15 to 20.

Calibration 20/12/01 hours 11 to 17.

3.2.3.3 Missing Data - Specific hydrocarbons

None.

3.3 HARWELL

3.3.1 October

3.3.1.1 Data Quality Codes

Data quality code A for all data for all of the month except:
Data quality code E for n-Hexane, Isoprene, Ethylbenzene, (m+p)-Xylene and o-Xylene for the whole month.

3.3.1.2 Missing Data - All hydrocarbons

Calibration 11/10/01 hours 08 to 14.
Liquid nitrogen supply problem 18/12/01 hours 05 to 11.
Calibration 26/10/01 hours 10 to 13.

3.3.1.3 Missing Data - Specific hydrocarbons

None.

3.3.2 November

3.3.2.1 Data Quality Codes

Data quality code A for all data for all of the month except:
Data quality code E for n-Hexane, Isoprene, Ethylbenzene, (m+p)-Xylene and o-Xylene for the whole month.

3.3.2.2 Missing Data - All hydrocarbons

Calibration 08/11/01 hours 09 to 12.
PC/GC communication problem 15/11/01 hour 06 to 16/11/01 hour 11.
Calibration 22/11/01 hours 10 to 13.

3.3.2.3 Missing Data - Specific hydrocarbons

None.

3.3.3 December

3.3.3.1 Data Quality Codes

Data quality code A for all data for all of the month except:

Data quality code E for n-Hexane, Isoprene, Ethylbenzene, (m+p)-Xylene and o-Xylene for the whole month.

3.3.3.2 Missing Data - All hydrocarbons

Calibration 07/12/01 hours 11 to 14.

Calibration 20/12/01 hours 11 to 14.

Calibration 27/12/01 hours 10 to 13.

3.3.3.3 Missing Data - Specific hydrocarbons

None.

3.4 MARYLEBONE ROAD

3.4.1 October

3.4.1.1 Data Quality Codes

Data quality code A for all species and periods.

3.4.1.2 Missing Data - All hydrocarbons

Calibration 10/10/01 hours 13 to 18.

Calibration 24/10/01 hours 15 to 17.

3.4.1.3 Missing Data - Specific hydrocarbons

None.

3.4.2 November

3.4.2.1 Data Quality Codes

Data quality code A for all species and periods.

3.4.2.2 Missing Data - All hydrocarbons

Calibration 28/11/01 hour 17 to 20.

3.4.2.3 Missing Data - Specific hydrocarbons

None.

3.4.3 December

3.4.3.1 Data Quality Codes

Data quality code A for all species and periods.

3.4.3.2 Missing Data - All hydrocarbons

Calibration 05/12/01 hours 20 to 23.

Calibration 19/12/01 hours 16 to 19.

3.4.3.3 Missing Data - Specific hydrocarbons

None.

4 Discussion

Tables 1 to 4, Appendix 1 contain statistical information relating to the ratified data, for each measured hydrocarbon, over the period 1 October 2001 to 31 December 2001. The tables list the percentage data capture, maximum concentration, mean concentration and minimum concentration of each hydrocarbon. The data capture is the number of ratified hourly data values expressed as a percentage of the number of hours in the specified period.

The periods when data for benzene and 1,3-butadiene were available, for all the sites, are plotted graphically in Figures 1 to 8, Appendix 2.

For the Cardiff site the data capture values for benzene and 1,3-butadiene were greater than 90%. There were no significant problems for the period covered by this report.

For the Edinburgh site the data capture values for benzene was 84.3% and for 1,3-butadiene was 77%. During November the on site hydrogen generator failed and could not be repaired. There was a period of data loss until it could be replaced with another generator. There were no further problems.

For the Harwell site the data capture values for benzene and 1,3-butadiene were greater than 95%. There were no significant problems over the period covered by this report. The measured concentrations of hydrocarbons at Harwell were low for most of the period covered by this report. The concentrations of both benzene and 1,3-butadiene falling below 0.05 ppb on a number of occasions see figures 5 and 6.

For the Marylebone Road site, the data capture values for benzene and 1,3-butadiene were greater than 95%. There were no significant problems for the period covered by this report.

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Appendix 1

Summary Statistical Information

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Table 1. Percentage data capture, maximum, mean and minimum values of ratified data from the Cardiff site of the UK Hydrocarbon Network, for the period 1 October 2001 to 31 December 2001

Compound	%data capture	Maximum concentration (ppb)	Mean concentration (ppb)	Minimum concentration (ppb)
Ethane	97.06	58.45	7.37	1.73
Ethene	97.06	46.19	4.30	0.26
Propane	97.06	23.98	3.10	0.42
Propene	97.06	10.77	1.27	0.24
Ethyne	0.00	n/a	n/a	n/a
2-Methylpropane	0.00	n/a	n/a	n/a
n-Butane	97.06	39.57	3.65	0.17
trans-2-Butene	96.97	1.37	0.18	0.02
1-Butene	86.28	2.14	0.23	0.01
cis-2-Butene	85.60	1.30	0.13	0.01
2-Methylbutane	96.92	20.92	2.38	0.09
n-Pentane	97.06	11.03	0.97	0.05
1,3-Butadiene	91.44	1.78	0.17	0.01
trans-2-Pentene	88.36	1.33	0.13	0.01
cis-2-Pentene	80.43	0.68	0.07	0.01
(2+3)-Methylpentane *	94.61	25.73	0.82	0.01
Isoprene	84.24	1.07	0.12	0.01
n-Hexane	96.88	3.10	0.32	0.02
n-Heptane	90.26	3.67	0.13	0.01
Benzene	97.01	6.14	0.65	0.07
Toluene	96.78	22.38	1.92	0.06
Ethylbenzene	89.76	3.51	0.44	0.02
(m+p)-Xylene *	93.98	9.39	0.98	0.02
o-Xylene	32.43	2.89	0.27	0.02

* (2+3)-Methylpentane and (m+p)-Xylene are reported as the sum of the 2 individual components due to the fact that they are not sufficiently well resolved in the chromatogram.

Table 2. Percentage data capture, maximum, mean and minimum values of ratified data from the Edinburgh site of the UK Hydrocarbon Network, for the period 1 October 2001 to 31 December 2001

Compound	%data capture	Maximum concentration (ppb)	Mean concentration (ppb)	Minimum concentration (ppb)
Ethane	83.24	40.02	2.37	0.27
Ethene	78.67	47.47	1.10	0.06
Propane	84.28	189.8	4.32	0.20
Propene	84.24	103	1.10	0.24
Ethyne	83.79	52.91	1.95	0.14
2-Methylpropane	84.24	50.73	1.72	0.05
n-Butane	84.24	118.9	3.29	0.11
trans-2-Butene	84.06	2.64	0.11	0.01
1-Butene	75.05	3.07	0.10	0.01
cis-2-Butene	69.29	1.86	0.09	0.01
2-Methylbutane	84.28	32.02	1.39	0.04
n-Pentane	84.24	34.95	0.88	0.05
1,3-Butadiene	76.99	2.82	0.12	0.01
trans-2-Pentene	75.63	1.39	0.07	0.01
cis-2-Pentene	54.71	0.63	0.04	0.01
(2+3)-Methylpentane *	84.06	12.32	0.54	0.02
Isoprene	79.66	1.11	0.06	0.01
n-Hexane	84.28	8.85	0.39	0.08
n-Heptane	82.88	2.25	0.10	0.00
Benzene	84.28	7.61	0.44	0.10
Toluene	83.79	34.21	1.42	0.06
Ethylbenzene	78.94	4.78	0.25	0.00
(m+p)-Xylene *	80.21	16.12	0.81	0.02
o-Xylene	73.51	5.45	0.30	0.01

* (2+3)-Methylpentane and (m+p)-Xylene are reported as the sum of the 2 individual components due to the fact that they are not sufficiently well resolved in the chromatogram.

Table 3. Percentage data capture, maximum, mean and minimum values of ratified data from the Harwell site of the UK Hydrocarbon Network, for the period; 1 October 2001 to 31 December 2001

Compound	%data capture	Maximum concentration (ppb)	Mean concentration (ppb)	Minimum concentration (ppb)
Ethane	96.11	11.45	2.07	0.62
Ethene	94.84	7.28	0.82	0.04
Propane	96.74	7.71	1.19	0.16
Propene	96.69	5.33	0.30	0.05
Ethyne	96.60	7.39	0.89	0.11
2-Methylpropane	96.69	3.89	0.40	0.02
n-Butane	96.74	6.96	0.80	0.04
trans-2-Butene	96.38	0.49	0.05	0.01
1-Butene	79.98	0.45	0.04	0.00
cis-2-Butene	63.13	0.21	0.03	0.00
2-Methylbutane	96.42	4.06	0.44	0.02
n-Pentane	95.92	1.36	0.18	0.01
1,3-Butadiene	96.33	0.28	0.05	0.01
trans-2-Pentene	35.37	0.13	0.02	0.00
cis-2-Pentene	20.92	0.06	0.02	0.00
(2+3)-Methylpentane *	90.99	1.44	0.14	0.00
Isoprene	72.10	0.35	0.03	0.00
n-Hexane	88.59	0.45	0.05	0.00
n-Heptane	85.64	0.87	0.04	0.00
Benzene	96.29	1.56	0.20	0.03
Toluene	82.79	4.01	0.40	0.02
Ethylbenzene	66.80	0.31	0.06	0.01
(m+p)-Xylene *	71.47	1.05	0.16	0.01
o-Xylene	54.8	0.44	0.07	0.00

* (2+3)-Methylpentane and (m+p)-Xylene are reported as the sum of the 2 individual components due to the fact that they are not sufficiently well resolved in the chromatogram.

Table 4. Percentage data capture, maximum, mean and minimum values of ratified data from the Marylebone Road site for the period; 1 October 2001 to 31 December 2001

Compound	%data capture	Maximum concentration (ppb)	Mean concentration (ppb)	Minimum concentration (ppb)
Ethane	98.91	66.03	10.61	2.04
Ethene	98.91	40.49	9.88	0.51
Propane	98.91	298.20	4.88	0.53
Propene	98.82	13.89	3.17	0.17
Ethyne	98.82	21.61	4.72	0.34
2-Methylpropane	98.91	53.80	5.07	0.29
n-Butane	98.91	90.53	10.37	0.53
trans-2-Butene	98.91	4.88	0.51	0.03
1-Butene	98.91	3.60	0.60	0.04
cis-2-Butene	98.91	3.51	0.38	0.02
2-Methylbutane	98.91	46.52	7.35	0.30
n-Pentane	98.91	10.48	1.86	0.16
1,3-Butadiene	98.91	2.44	0.58	0.03
trans-2-Pentene	98.91	2.55	0.45	0.01
cis-2-Pentene	98.91	1.35	0.24	0.01
2-Methylpentane	98.91	27.89	1.86	0.08
3-Methylpentane	98.87	6.25	1.04	0.05
Isoprene	98.91	1.62	0.29	0.01
n-Hexane	98.78	2.92	0.64	0.03
n-Heptane	98.46	2.07	0.32	0.01
Benzene	98.82	7.46	1.47	0.02
Toluene	98.91	28.26	5.20	0.21
Ethylbenzene	98.91	5.79	1.01	0.03
(m+p)-Xylene *	98.91	20.01	3.42	0.06
o-Xylene	98.91	8.47	1.33	0.04
1,3,5-Trimethylbenzene	98.91	2.06	0.34	0.00
1,2,4-Trimethylbenzene	98.91	7.93	1.16	0.04

* (m+p)-Xylene are reported as the sum of the 2 individual components due to the fact that they are not sufficiently well resolved in the chromatogram.

Appendix 2

Time Series Plots of Hydrocarbon Concentrations

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- Figure 1. Time series plot of the ratified Benzene data from the Cardiff site of the UK Hydrocarbon Network, for the period; 1 October 2001 to 31 December 2001
- Figure 2. Time series plot of the ratified 1,3-Butadiene data from the Cardiff site of the UK Hydrocarbon Network, for the period; 1 October 2001 to 31 December 2001
- Figure 3. Time series plots for the ratified Benzene data from the Edinburgh site of the UK Hydrocarbon Network, for the period; 1 October 2001 to 31 December 2001
- Figure 4. Time series plots for the ratified 1,3-Butadiene data from the Edinburgh site of the UK Hydrocarbon Network, for the period; 1 October 2001 to 31 December 2001
- Figure 5. Time series plots for the ratified Benzene data from the Harwell site of the UK Hydrocarbon Network, for the period; 1 October 2001 to 31 December 2001
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- Figure 8. Time series plots for the ratified 1,3-Butadiene data from the Marylebone Road site affiliated to the UK Hydrocarbon Network, for the period; 1 October 2001 to 31 December 2001

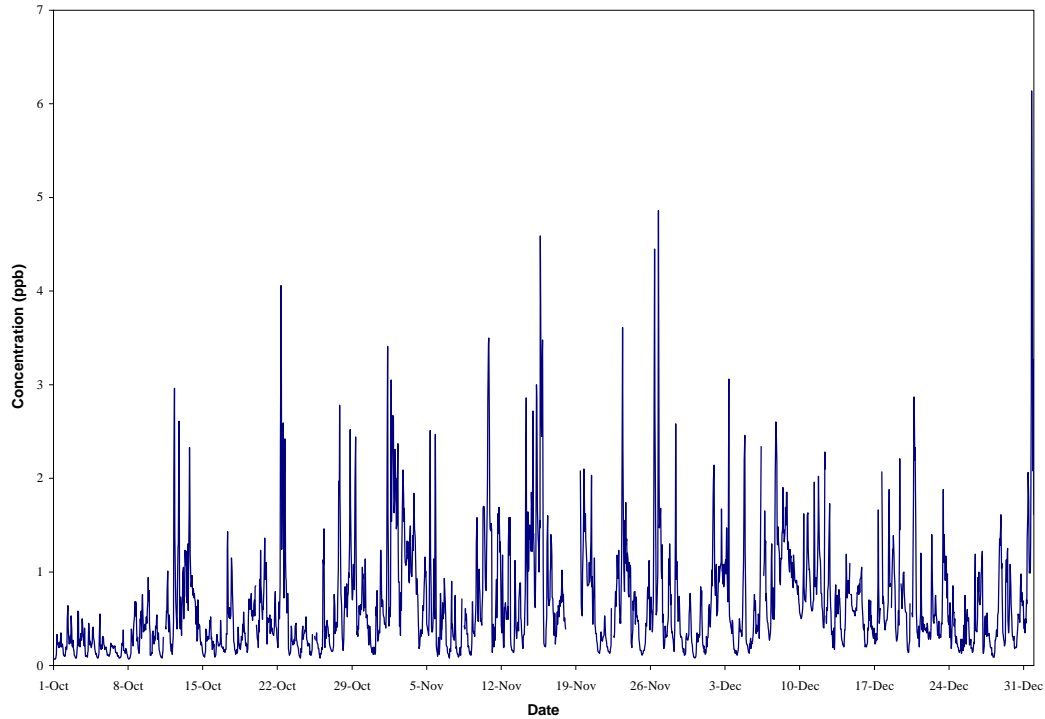


Figure 1. Time series plot of the ratified Benzene data from the Cardiff site of the UK Hydrocarbon Network, for the period; 1 October 2001 to 31 December 2001

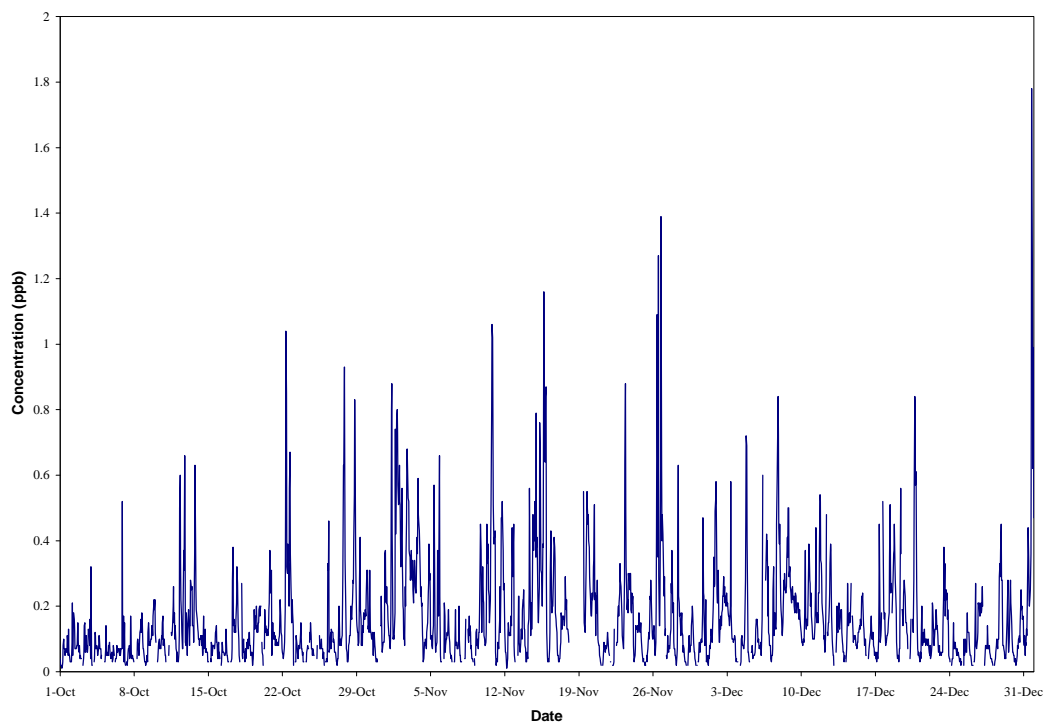


Figure 2. Time series plot of the ratified 1,3-Butadiene data from the Cardiff site of the UK Hydrocarbon Network, for the period; 1 October 2001 to 31 December 2001

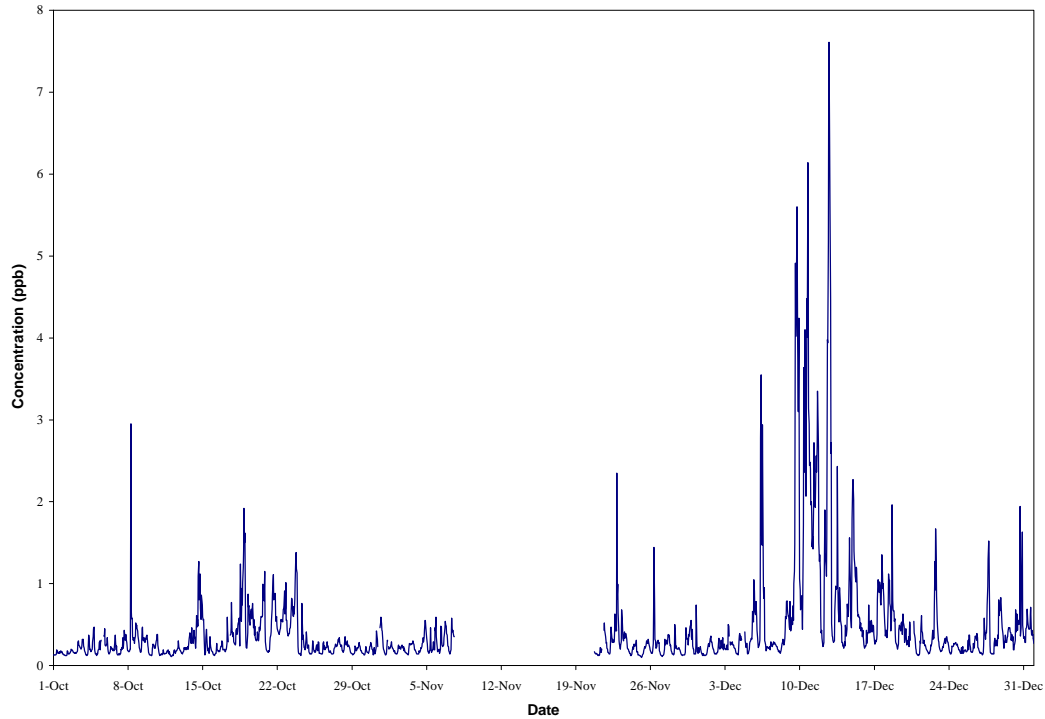


Figure 3. Time series plots for the ratified Benzene data from the Edinburgh site of the UK Hydrocarbon Network, for the period; 1 October 2001 to 31 December 2001

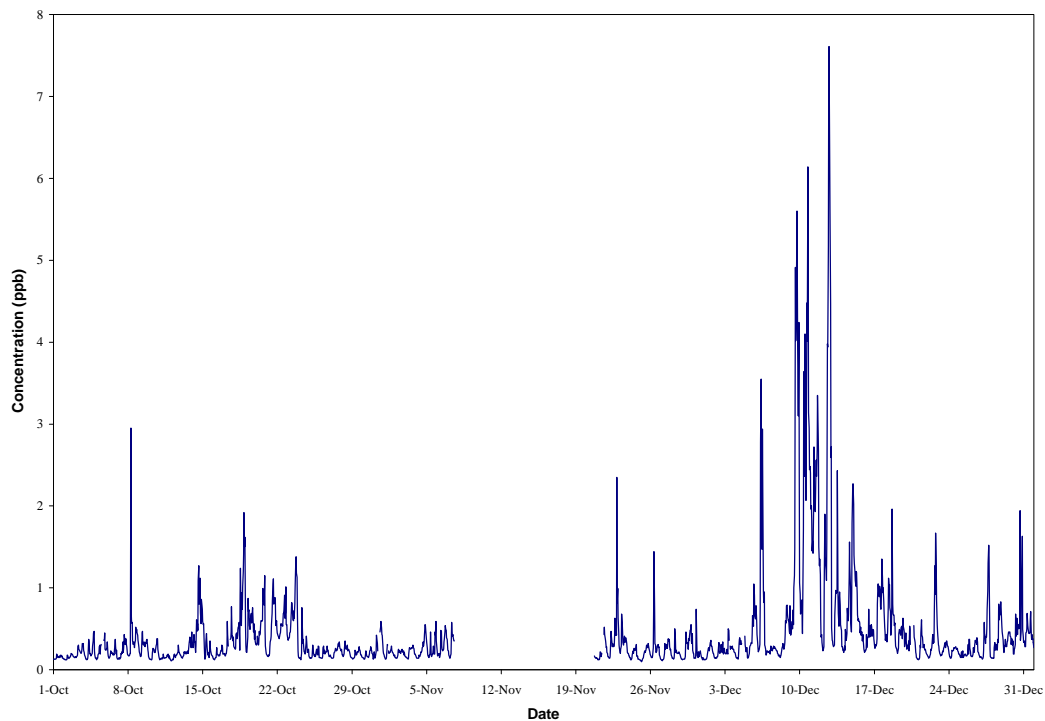


Figure 4. Time series plots for the ratified 1,3-Butadiene data from the Edinburgh site of the UK Hydrocarbon Network, for the period; 1 October 2001 to 31 December 2001

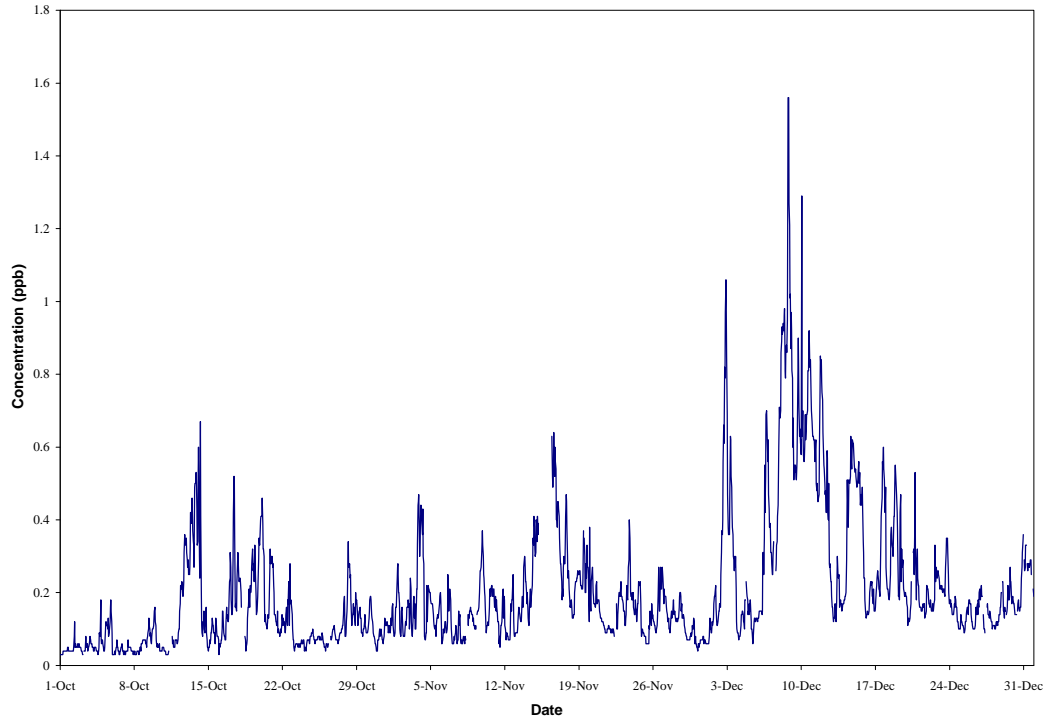


Figure 5. Time series plots for the ratified Benzene data from the Harwell site of the UK Hydrocarbon Network, for the period; 1 October 2001 to 31 December 2001

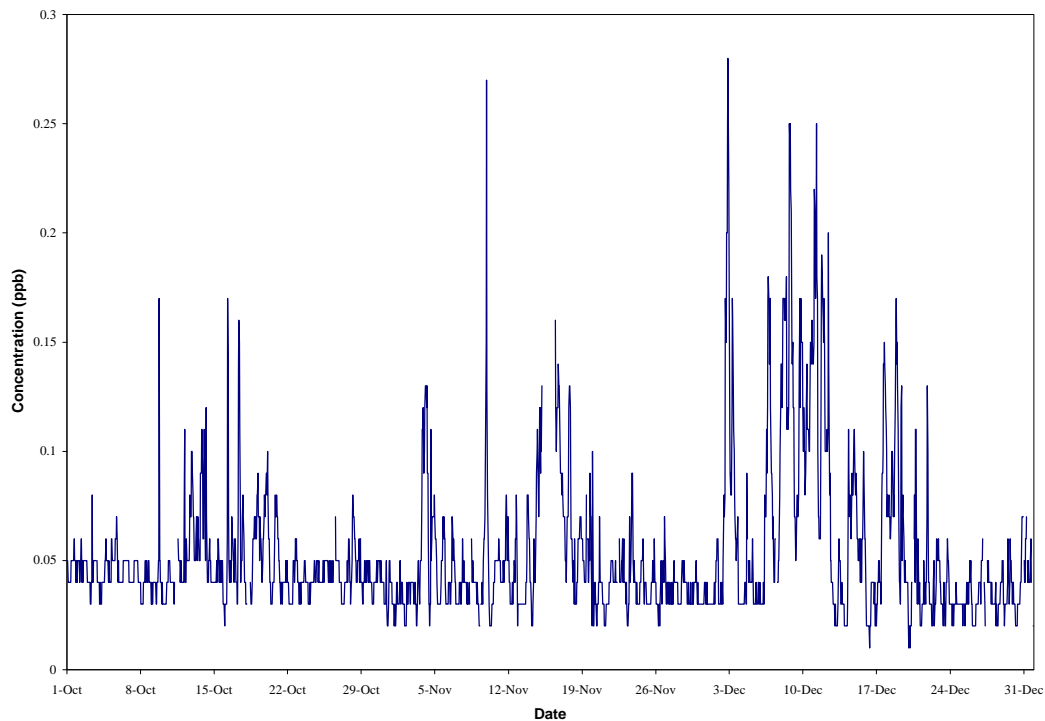


Figure 6. Time series plots for the ratified 1,3-Butadiene data from the Harwell site of the UK Hydrocarbon Network, for the period; 1 October 2001 to 31 December 2001

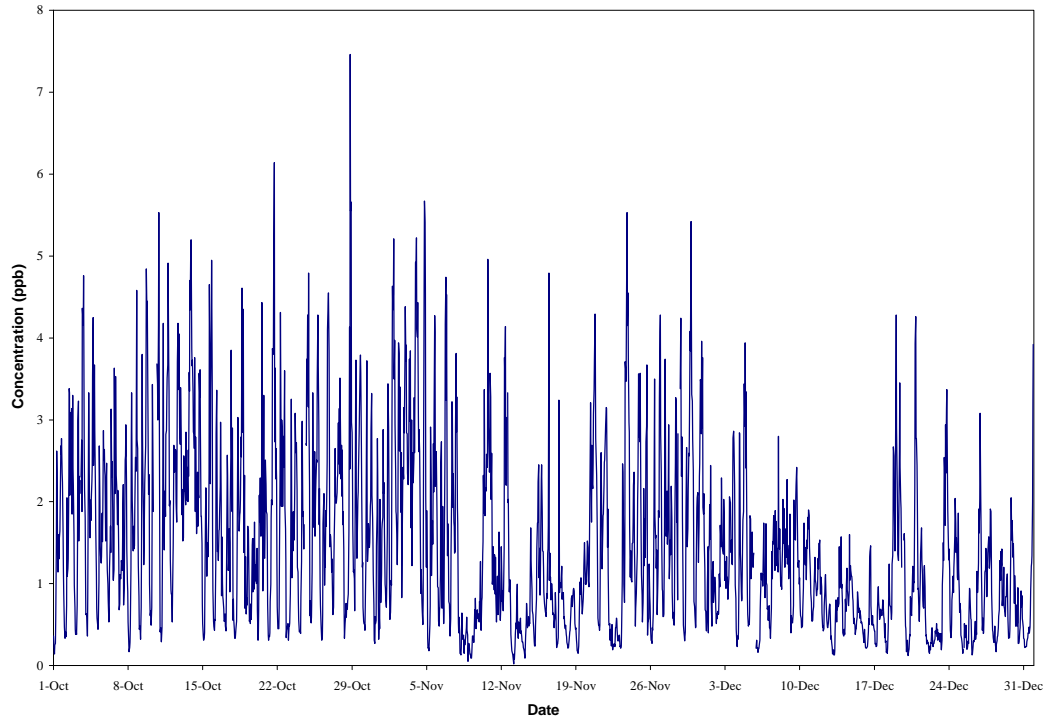


Figure 7. Time series plots for the ratified Benzene data from the Marylebone Road site affiliated to the UK Hydrocarbon Network, for the period; 1 October 2001 to 31 December 2001

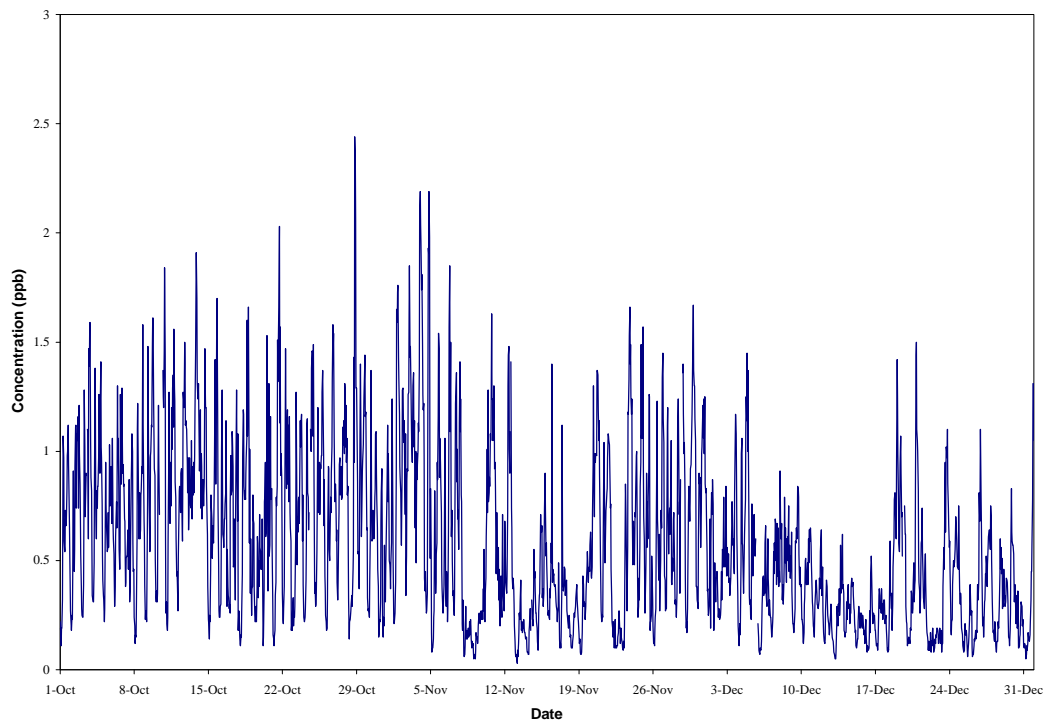


Figure 8. Time series plots for the ratified 1,3-Butadiene data from the Marylebone Road site affiliated to the UK Hydrocarbon Network, for the period; 1 October 2001 to 31 December 2001