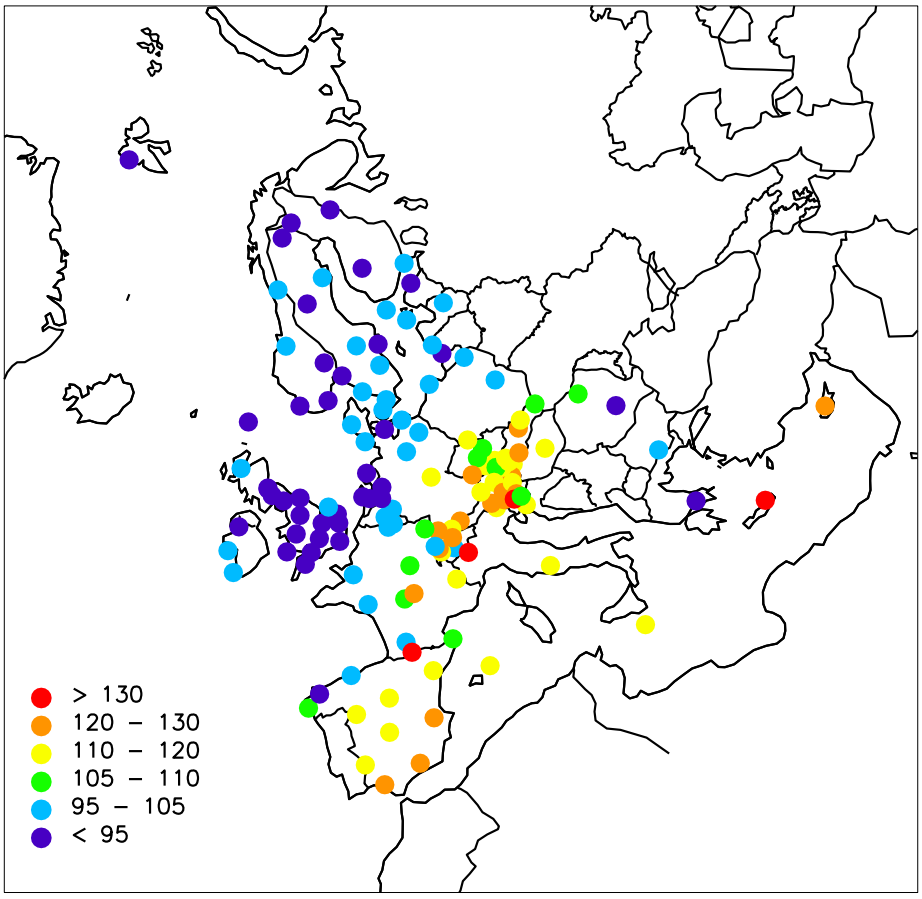
EMEP/CCC-Report 2/2015

EMEP Co-operative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe

Ozone measurements 2013

Anne-Gunn Hjellbrekke and Sverre Solberg



95-percentile
April-September, µg/m^3

Norwegian Institute for Air Research
PO Box 100, NO-2027 Kjeller, Norway
Chemical Co-ordinating Centre of EMEP (CCC)

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1. Introduction

Ozone is a natural constituent of the atmosphere and plays a vital role in many atmospheric processes. However, man-made emissions of volatile organic compounds and nitrogen oxides have increased the photochemical formation of ozone in the troposphere. Until the end of the 1960s the problem was basically believed to be one of the big cities and their immediate surroundings. In the 1970s, however, it was found that the problem of photochemical oxidant formation is much more widespread. The ongoing monitoring of ozone at rural sites throughout Europe shows that episodes of high concentrations of ground-level ozone occur over most parts of the continent every summer. During these episodes the ozone concentrations can reach values above ambient air quality standards over large regions and lead to adverse effects for human health and vegetation. Historical records of ozone measurements in Europe and North America indicate that in the last part of the nineteenth century the values were only about half of the average surface ozone concentrations measured in the same regions during the last 10-15 years (Bojkov, 1986; Volz and Kley, 1988).

The formation of ozone is due to a large number of photochemical reactions taking place in the atmosphere and depends on the temperature, humidity and solar radiation as well as the primary emissions of nitrogen oxides and volatile organic compounds. Together with the non-linear relationships between the primary emissions and the ozone formation, these effects complicates the abatement strategies for ground-level ozone and makes photochemical models crucial in addition to the monitoring data.

The EMEP ozone data from 2013 are presented in this report, which aims to give a short summary of the measurement data. A complete set of data, including raw data, annual statistics and monthly means, can be downloaded from the web at http://ebas.nilu.no and at http://www.nilu.no/projects/ccc

2. Critical levels

Ozone concentrations vary widely from region to region, with the time of year, and with time of day. Typically, high concentrations of ozone are observed in periods with anticyclonic conditions. Such episodes may lead to adverse environmental effects such as impact on human health, agricultural crops, forests and materials. National authorities and international organisations have therefore defined certain threshold levels for ozone. Within WHO these are called “air quality guidelines”, within EU “target value”, “long-term objective” etc. and within UN-ECE “critical levels”. The values of the various threshold levels vary among these organisations and, additionally, the health based indicators are normally based on concentration ($\mu g/m^3$) whereas those related to vegetation are based on mixing ratio (ppb). An overview of various levels relevant for vegetation and human health is given in Table 1 and Table 2, respectively.

Table 1: Limit values for the protection of vegetation.

AOT40 (ppb hours)	Period	Reference	Comment
3000	3 months	CLRTAP (2011)	Critical level for crops and natural vegetation [1)]
5000	1 April - 1 Oct	CLRTAP (2011)	Critical level for forest [1)]
6000	3.5 months	CLRTAP (2011)	Critical level for horticultural crops
9000	1 May – 1 Aug	EU (2008)	EU's target value for vegetation [2,3)]
3000	1 May - 1 Aug	EU (2008)	EU's long-term objective for vegetation [2,3)]

1) ECE's AOT values should be based on the hours with global incoming radiation > 50 W/m^2
2) EU's AOT values should be based on the period 08-20 CET
3) The EU directive uses $\mu g/m^3$ and a factor 2 $\mu g/m^3$ = 1 ppb

Table 2: Limit values for the protection of human health.

Value ($\mu g/m^3$)	Averaging time (hours)	Ref	Description
180	1	EU (2008)	EU's information threshold
240	1	EU (2008)	EU's alert threshold
120	8[1)]	EU (2008)	EU's target value. 8-hour mean value not to be exceeded on more than 25 days per year averaged over 3 years. To be fulfilled by 1.1.2010
120	8[1)]	EU (2008)	EU's long-term objective.
100	8[1)]	WHO (2006)	WHO's air quality guideline (global update 2005)

[1)] The highest 8-hour running mean value for each day calculated such that the 8-hour periods are assigned to the day on which the period ends.

Within UN-ECE scientific evidence has suggested that AOT40-based critical levels for vegetation (Gothenburg Protocol of 1999) should be replaced by stomatal flux-based critical levels. Flux based critical levels have been developed to reflect that the real impacts depend on the amount of the pollutant transported into the leaves, whereas AOT40 are only based on the concentration of ozone in the atmosphere at the top of the plant canopy (Mills et al., 2011). Concentration based critical levels (AOT_x) for estimating the risk of damage to vegetation are, however, still included where climatic data or suitable flux models are not available.

The concentration based critical level is 3000 ppb h (3-months period) for agricultural crops and (semi-)natural vegetation and 5000 ppb h (6-months period) for forest trees. The former critical level for forest was 10 000 ppb h, and the new, lower level is seen as a clear improvement compared to the former level (CLRTAP, 2011). The "Modelling and mapping manual" strongly recommends that the critical levels should be based on the concentrations at the canopy height whereas the measurements normally are taken at 2 m height above ground. When meteorological measurements are not available it is recommended to adjust the measured data to values relevant for the canopy height by applying a given vertical profile depending on the type of vegetation.

Furthermore, the period for calculation of AOT40 should reflect the true growing season and should thus be adapted to the climate of the various regions in Europe, like specified in the Mapping Manual (CLRTAP, 2011). This leads to large

differences in the applied period, from March-May in East Mediterranean to June-August in North Europe, which in turn has major consequences for the calculated AOT values. Since the aim of the present report is to document the general status of the ozone levels and not to provide any effect based calculations, the same 3-months period (May-July) is used for all stations. This also corresponds to the period stated in the EU directive. Moreover, no adjustment of the measured values to take the canopy height into account is done in this report. The measurement data are used directly.

EU has in the ozone directive (2002/3/EC) and the ambient air quality directive (2008/50/EC) defined a number of target values and long-term objectives for the protection of vegetation and human health. The target value, to be met by 1.1.2010, for human health is 120 µg/m^3 (8h mean) which is not to be exceeded on more than 25 days per year averaged over 3 years. For protection of vegetation, AOT40 (May-July) should not exceed 18 000 µg/m^{3}h averaged over five years. In addition information should be given to the population when hourly means exceed 180 µg/m^3 and an alert warning should be issued if hourly means exceed 240 µg/m^3.

EU's long-term objective for the protection of human health defines 120 µg/m^3 as the maximum daily 8-hour mean value to occur within a calendar year. The long-term objective for the protection of vegetation is defined as an AOT40 value of 6000 µg/m^{3}h for the period May-July. Community progress towards attaining the long-term objective using the year 2020 as a benchmark shall be reviewed.

WHO has also defined certain air quality guidelines for the protection of human health and provided a global update of these levels including a new guideline for ground-level ozone in 2005 (WHO, 2006). Additionally, within both WHO, EU and UN-ECE the parameter SOMO35, defined as the sum of maximum 8-hour ozone levels over 35 ppb, is used as an indicator for health effects without any specified threshold level.

New flux-based critical levels for various types of vegetation have been approved for inclusion in LRTAP Convention's modelling and mapping manual (CLRTAP, 2011). The DO_3SE model is used to estimate the stomatal ozone flux as a function of the ozone concentration at the leaf boundary layer, the transfer of ozone across this boundary layer, the stomatal conductance to ozone and the ozone deposition to the leaf cuticle. The accumulated stomatal flux over a specified time interval is estimated by the parameter POD_Y (the Phytotoxic Ozone Dose over a threshold flux of Y nmol m^{-2} PLA s^{-1}|). In this context, Y represents a detoxification threshold, below which it is assumed that any ozone absorbed by the plant will be detoxified. Thus, POD_Y can be described as the "effective dose" or "effective flux". POD_Y is the flux-based analogy to the concentration based AOT_x.

3. Measurement network

Surface ozone measurements have been a part of the EMEP extended (voluntary) measurement activities since the third phase (1 January 1984–31 December 1986). Due to the lack of funds, the systematic collection and checking of data within

EMEP, did not start until 1 January 1987. The measurement of ozone data within the EMEP region was a continuation of the OECD's oxidant data collection programme OXIDATE. Ozone data from the OXIDATE project have been reported in three reports (Grennfelt and Schjoldager, 1984; Grennfelt et al., 1988 and 1989).

This report presents surface ozone data measured at rural background EMEP sites during 2013 with emphasis on statistical summaries and geographical distributions. Earlier reports are listed in Annex 5.

Table 3 and Figure 1 show the location of the monitoring stations reporting data from whole or part of 2013. In total 136 stations from 28 different countries reported data. One of these sites (Ispra), is operated by the Commission of the European communities in Italy.

Table 3: List of EMEP ozone monitoring stations in operation 2013.

Code	Station name	Latitude	Longitude	Altitude
AT0002R	Illmitz	47°46'00"N	16°46'00"E	117
AT0005R	Vorhegg	46°40'40"N	12°58'20"E	1020
AT0030R	Pillersdorf bei Retz	48°43'16"N	15°56'32"E	315
AT0032R	Sulzberg	47°31'45"N	09°55'36"E	1020
AT0034G	Sonnblick	47°03'16"N	12°57'30"E	3106
AT0038R	Gerlitzen	46°41'37"N	13°54'54"E	1895
AT0040R	Masenberg	47°20'53"N	15°52'56"E	1170
AT0041R	Haunsberg	47°58'23"N	13°00'58"E	730
AT0042R	Heidenreichstein	48°52'43"N	15°02'48"E	570
AT0043R	Forsthof	48°06'22"N	15°55'10"E	581
AT0045R	Dunkelsteinerwald	48°22'16"N	15°32'48"E	320
AT0046R	Gänserndorf	48°20'05"N	16°43'50"E	161
AT0047R	Stixneusiedl	48°03'03"N	16°40'36"E	240
AT0048R	Zoebelboden	47°50'19"N	14°26'29"E	899
AT0049R	Grebenzen bei St. Lamprecht	47°02'25"N	14°19'48"E	1648
AT0050R	Graz Lustbuehel	47°04'01"N	15°29'37"E	481
BE0001R	Offagne	49°52'40"N	05°12'13"E	430
BE0032R	Eupen	50°37'46"N	06°00'04"E	295
BE0035R	Vezin	50°30'12"N	04°59'22"E	160
BG0053R	Rojen peak	41°41'45"N	24°44'19"E	1750
CH0001G	Jungfraujoch	46°32'51"N	07°59'06"E	3578
CH0002R	Payerne	46°48'47"N	06°56'41"E	489
CH0003R	Tänikon	47°28'47"N	08°54'17"E	539
CH0004R	Chaumont	47°02'59"N	06°58'46"E	1137
CH0005R	Rigi	47°04'03"N	08°27'50"E	1031
CY0002R	Ayia Marina	35°02'21"N	33°03'29"E	532
CZ0001R	Svratouch	49°44'00"N	16°03'00"E	737
CZ0003R	Košetice	49°35'00"N	15°05'00"E	534
CZ0005R	Churanov	49°04'00"N	13°36'00"E	1118
CZ0007R	Kresin u Pacova	49°34'60"N	15°04'60"E	534
DE0001R	Westerland	54°55'32"N	08°18'35"E	12
DE0002R	Waldhof	52°48'08"N	10°45'34"E	74
DE0003R	Schauinsland	47°54'53"N	07°54'31"E	1205
DE0007R	Neuglobsow	53°10'00"N	13°02'00"E	62
DE0008R	Schmücke	50°39'00"N	10°46'00"E	937
DE0009R	Zingst	54°26'00"N	12°44'00"E	1
DK0005R	Keldsnor	54°44'00"N	10°44'00"E	10
DK0010G	Nord, Greenland	81°36'00"N	16°40'12"W	20
DK0012R	Risoe	55°41'37"N	12°05'09"E	3
DK0031R	Ulborg	56°17'00"N	08°26'00"E	10

Table 3, cont.

Code	Station name	Latitude	Longitude	Altitude
EE0009R	Lahemaa	59°30'00"N	25°54'00"E	32
EE0011R	Vilsandi	58°23'00"N	21°49'00"E	6
ES0001R	San Pablo de los Montes	39°32'52"N	04°20'55"W	917
ES0005R	Noya	42°43'41"N	05°55'25"W	683
ES0006R	Mahón	39°52'00"N	04°19'00"E	78
ES0007R	Víznar	37°14'00"N	03°32'00"W	1265
ES0008R	Niembro	43°26'32"N	04°51'01"W	134
ES0009R	Campisábalos	41°16'52"N	03°08'34"W	1360
ES0010R	Cabo de Creus	42°19'10"N	03°19'01"E	23
ES0011R	Barcarrota	38°28'33"N	06°55'22"W	393
ES0012R	Zarra	39°05'10"N	01°06'07"W	885
ES0013R	Penausende	41°17'00"N	05°52'00"W	985
ES0014R	Els Torms	41°24'00"N	00°43'00"E	470
ES0016R	O Saviñao	43°13'52"N	07°41'59"W	506
ES0017R	Doñana	37°01'50"N	06°19'55"W	5
FI0009R	Utö	59°46'45"N	21°22'38"E	7
FI0017R	Virolahti II	60°31'36"N	27°41'10"E	4
FI0022R	Oulanka	66°19'13"N	29°24'06"E	310
FI0037R	Ähtäri II	62°35'00"N	24°11'00"E	180
FI0096G	Pallas (Sammaltunturi)	68°00'00"N	24°09'00"E	340
FR0008R	Donon	48°30'00"N	07°08'00"E	775
FR0009R	Revin	49°54'00"N	04°38'00"E	390
FR0010R	Morvan	47°16'00"N	04°05'00"E	620
FR0013R	Peyrusse Vieille	43°37'00"N	00°11'00"E	200
FR0014R	Montandon	47°18'00"N	06°50'00"E	836
FR0015R	La Tardière	46°39'00"N	00°45'00"W	133
FR0016R	Le Casset	45°00'00"N	06°28'00"E	1750
FR0017R	Montfranc	45°48'00"N	02°04'00"E	810
FR0018R	La Coulonche	48°38'00"N	00°27'00"W	309
FR0019R	Pic du Midi	42°56'12"N	00°08'31"E	2877
FR0030R	Puy de Dôme	45°46'00"N	02°57'00"E	1465
GB0002R	Eskdalemuir	55°18'47"N	03°12'15"W	243
GB0006R	Lough Navar	54°26'35"N	07°52'12"W	126
GB0013R	Yarner Wood	50°35'47"N	03°42'47"W	119
GB0014R	High Muffles	54°20'04"N	00°48'27"W	267
GB0015R	Strath Vaich Dam	57°44'04"N	04°46'28"W	270
GB0031R	Aston Hill	52°30'14"N	03°01'59"W	370
GB0033R	Bush	55°51'31"N	03°12'18"W	180
GB0035R	Great Dun Fell	54°41'00"N	02°27'00"W	847
GB0036R	Harwell	51°34'23"N	01°19'00"W	137
GB0037R	Ladybower Res.	53°23'56"N	01°45'12"W	420
GB0038R	Lullington Heath	50°47'34"N	00°10'46"E	120
GB0039R	Sibton	52°17'38"N	01°27'47"E	46
GB0043R	Narberth	51°14'00"N	04°42'00"W	160
GB0045R	Wicken Fen	52°17'54"N	00°17'34"W	5
GB0048R	Auchencorth Moss	55°47'32"N	03°14'34"W	260
GB0049R	Weybourne	52°57'02"N	01°07'19"E	16
GB0050R	St. Osyth	51°46'41"N	01°04'56"E	8
GB0052R	Lerwick	60°08'21"N	01°11'07"W	85
GB0053R	Charlton Mackrell	51°03'23"N	02°41'00"W	54
GR0001R	Aliartos	38°22'00"N	23°05'00"E	110
GR0002R	Finokalia	35°19'00"N	25°40'00"E	250
HU0002R	K-puszta	46°58'00"N	19°35'00"E	125
IE0001R	Valentia Observatory	51°56'23"N	10°14'40"W	11
IE0031R	Mace Head	53°10'00"N	09°30'00"W	15
IT0001R	Montelibretti	42°06'00"N	12°38'00"E	48
IT0004R	Ispra	45°48'00"N	08°38'00"E	209
LT0015R	Preila	55°21'00"N	21°04'00"E	5
LV0010R	Rucava	56°09'43"N	21°10'23"E	18
LV0016R	Zoseni	57°08'07"N	25°54'20"E	188
MK0007R	Lazaropole	41°32'10"N	20°41'38"E	1332
MT0001R	Giordan lighthouse	36°04'24"N	14°13'09"E	167
NL0007R	Eibergen	52°05'00"N	06°34'00"E	20
NL0009R	Kollumerwaard	53°20'02"N	06°16'38"E	1
NL0010R	Vredepeel	51°32'28"N	05°51'13"E	28
NL0091R	De Zilk	52°18'00"N	04°30'00"E	4
NL0644R	Cabauw Wielsekade	51°58'28"N	04°55'25"E	1

Table 3, cont.

Code	Station name	Latitude	Longitude	Altitude
NO0002R	Birkenes II	58°23'19"N	08°15'07"E	219
NO0015R	Tustervatn	65°50'00"N	13°55'00"E	439
NO0039R	Kårvatn	62°47'00"N	08°53'00"E	210
NO0042G	Zeppelin mountain (Ny-Ålesund)	78°54'24"N	11°53'18"E	474
NO0043R	Prestebakke	59°00'00"N	11°32'00"E	160
NO0052R	Sandve	59°12'00"N	05°12'00"E	15
NO0056R	Hurdal	60°22'21"N	11°04'41"E	300
PL0002R	Jarczew	51°49'00"N	21°59'00"E	180
PL0003R	Sniezka	50°44'00"N	15°44'00"E	1603
PL0004R	Leba	54°45'00"N	17°32'00"E	2
PL0005R	Diabla Gora	54°09'00"N	22°04'00"E	157
RO0003R	Semenic	45°07'00"N	25°58'29"N	1432
RO0008R	Poiana Stampei	47°19'29"N	25°08'05"E	908
SE0005R	Bredkälen	63°51'00"N	15°20'00"E	404
SE0011R	Vavihill	56°01'00"N	13°09'00"E	175
SE0012R	Aspvreten	58°48'00"N	17°23'00"E	20
SE0013R	Esrange	67°53'00"N	21°04'00"E	475
SE0014R	Råö	57°23'38"N	11°54'50"E	5
SE0032R	Norra-Kvill	57°49'00"N	15°34'00"E	261
SE0035R	Vindeln	64°15'00"N	19°46'00"E	225
SE0039R	Grimsö	59°43'41"N	15°28'19"E	132
SI0008R	Iskrba	45°34'00"N	14°52'00"E	520
SI0031R	Zarodnje	46°25'43"N	15°00'12"E	770
SI0032R	Krvavec	46°17'58"N	14°32'19"E	1740
SI0033R	Kovk	46°07'43"N	15°06'50"E	600
SK0002R	Chopok	48°56'00"N	19°35'00"E	2008
SK0004R	Stará Lesná	49°09'00"N	20°17'00"E	808
SK0006R	Starina	49°03'00"N	22°16'00"E	345
SK0007R	Topolniky	47°57'36"N	17°51'38"E	113

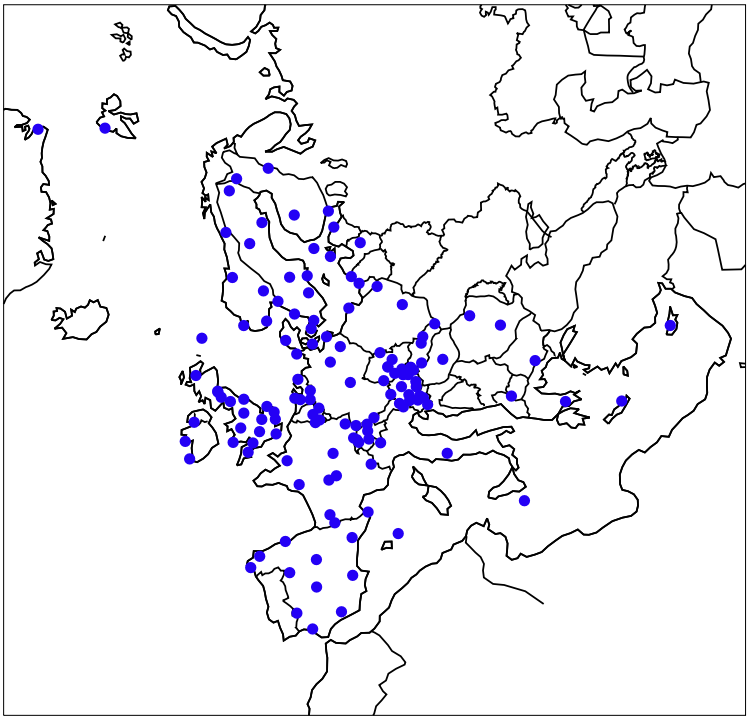

Figure 1: Location of the monitoring stations.

Until 10/09/2008, ozone has been measured at four different heights at Donon. Since 11/09/2008 ozone is measured at one sampling height, 3.5 m, at a new site next to the old deleted tower.

The monitoring stations are selected by the countries. Information about the ozone data quality, calibration and maintenance procedures was in 2000 collected from the participants (Aas et al., 2000). An updated document, "Overview of the routines for calibration and maintenance", is also available under ozone section at http://www.nilu.no/projects/ccc/emepdata.html.

A report on station representativeness has been written for the GEOmon project (Henne et al., 2010). The report can be downloaded at http://geomon.empa.ch/index.php#data.

The UV absorption method is the only measurement method in use in 2013.

All data presented in this report are given in µg/m^3. The conversion factor used to calculate from ppb to µg/m^3 is given in Table 4. Most countries use a conversion factor of 2.0, which corresponds to 20°C and 1013 hPa. Switzerland uses the mean annual conditions at Jungfraujoch (-8°C, 653 mbar). A number of countries report ozone data in ppb, and in this case the data are converted to µg/m^3 by multiplying by 2.0 at the CCC.

Table 4: Conversion factor ppb – µg/m^3.

Country	Conversion factor
Armenia	unknown
Austria	2.0
Belgium	unknown
Bulgaria	unknown
Cyprus	unknown
Czech Republic	2.0
Denmark	2.0
Estonia	2.14
Finland	2.0
France	2.0
Germany	2.0
Greece (Aliartos)	1.96
Greece (Finokalia)	reported in ppb
Hungary	2.0
Ireland (Mace Head)	reported in ppb
Italy (Ispra)	2.0
Italy (Montelibretti)	reported in ppb
Latvia	2.0
Lithuania	2.0
Malta	reported in ppb
Netherlands	2.0
Norway	2.0
Poland	2.0
Romania	unknown
Slovakia	reported in ppb
Slovenia	2.0
Spain	2.0
Sweden	2.0
Switzerland	1.96
United Kingdom	reported in ppb

4. Data completeness

The annual data capture (number of valid measurements in per cent of the total number of measurements) for each station is given in Table 5. The data capture is in general good. 120 stations have a data capture above 90% and 126 above 85%.

Table 5: Data capture in per cent, 2013.

Code	Station	Data capture 2013
AT0002R	Illmitz	90.3
AT0005R	Vorhegg	94.9
AT0030R	Pillersdorf bei Retz	92.7
AT0032R	Sulzberg	94.5
AT0034G	Sonnblick	95.4
AT0038R	Gerlitzen	95.6
AT0040R	Masenberg	95.1
AT0041R	Haunsberg	95.3
AT0042R	Heidenreichstein	95.3
AT0043R	Forsthof	95.1
AT0045R	Dunkelsteinerwald	93.5
AT0046R	Gänserndorf	95.5
AT0047R	Stixneusiedl	95.4
AT0048R	Zoebelboden	94.6
AT0049R	Grebenzen bei St. Lamprecht	89.5
AT0050R	Graz Lustbuehel	92.4
BE0001R	Offagne	94.3
BE0032R	Eupen	94.8
BE0035R	Vezin	94.3
BG0053R	Rojen peak	94.1
CH0001G	Jungfraujoch	96.6
CH0002R	Payerne	99.2
CH0003R	Tänikon	99.0
CH0004R	Chaumont	99.0
CH0005R	Rigi	99.2
CY0002R	Ayia Marina	96.9
CZ0001R	Svratouch	99.8
CZ0003R	Kosetice	95.5
CZ0005R	Churanov	98.2
CZ0007R	Kresin u Pacova	31.0
DE0001R	Westerland	91.8
DE0002R	Waldhof	95.1
DE0003R	Schauinsland	91.2
DE0007R	Neuglobsow	95.7
DE0008R	Schmücke	91.5
DE0009R	Zingst	94.9
DK0005R	Keldsnor	88.5
DK0010G	Nord, Greenland	78.1
DK0012R	Risoe	91.0
DK0031R	Ulborg	83.7
EE0009R	Lahemaa	98.1
EE0011R	Vilsandi	95.1

Table 5, cont.

Code	Station	Data capture 2013
ES0001R	San Pablo de los Montes	98.8
ES0005R	Noya	98.6
ES0006R	Mahón	96.5
ES0007R	Víznar	96.5
ES0008R	Niembro	98.2
ES0009R	Campisabalos	96.8
ES0010R	Cabo de Creus	97.8
ES0011R	Barcarrota	96.9
ES0012R	Zarra	99.0
ES0013R	Penausende	98.6
ES0014R	Els Torms	98.0
ES0016R	O Saviñao	98.7
ES0017R	Doñana	97.4
FI0009R	Utö	98.3
FI0017R	Virolahti II	90.8
FI0022R	Oulanka	92.4
FI0037R	Ähtäri II	99.5
FI0096G	Pallas (Sammaltunturi)	97.6
FR0008R	Donon	99.5
FR0009R	Revin	98.7
FR0010R	Morvan	91.8
FR0013R	Peyrusse Vieille	98.0
FR0014R	Montandon	98.9
FR0015R	La Tardière	96.8
FR0016R	Le Casset	98.8
FR0017R	Montfranc	95.0
FR0018R	La Coulonche	97.8
FR0019R	Pic du Midi	98.4
FR0030R	Puy de Dôme	97.2
GB0002R	Eskdalemuir	98.4
GB0006R	Lough Navar	97.6
GB0013R	Yarner Wood	94.0
GB0014R	High Muffles	98.6
GB0015R	Strath Vaich Dam	89.1
GB0031R	Aston Hill	97.4
GB0033R	Bush	99.3
GB0035R	Great Dun Fell	89.0
GB0036R	Harwell	98.2
GB0037R	Ladybower Res.	99.1
GB0038R	Lullington Heath	98.3
GB0039R	Sibton	94.7
GB0043R	Narberth	98.7
GB0045R	Wicken Fen	99.4
GB0048R	Auchencorth Moss	99.3
GB0049R	Weybourne	94.3
GB0050R	St. Osyth	98.7
GB0052R	Lerwick	65.6
GB0053R	Charlton Mackrell	99.2
GR0001R	Aliartos	97.0
GR0002R	Finokalia	98.3
HU0002R	K-puszta	97.5

Table 5, cont.

Code	Station	Data capture 2013
IE0001R	Valentia Observatory	92.9
IE0031R	Mace Head	99.6
IT0001R	Montelibretti	98.0
IT0004R	Ispra	97.9
LT0015R	Preila	97.0
LV0010R	Rucava	84.5
LV0016R	Zoseni	90.0
MK0007R	Lazaropole	44.1
MT0001R	Giordan lighthouse	87.0
NL0007R	Eibergen	97.9
NL0009R	Kollumerwaard	98.3
NL0010R	Vredepeel	95.5
NL0091R	De Zilk	92.6
NL0644R	Cabauw Wielsekade	98.3
NO0002R	Birkenes II	79.3
NO0015R	Tustervatn	99.1
NO0039R	Kårvatn	98.9
NO0042G	Zeppelin mountain (Ny-Ålesund)	98.7
NO0043R	Prestebakke	99.3
NO0052R	Sandve	95.0
NO0056R	Hurdal	99.6
PL0002R	Jarczew	99.8
PL0003R	Sniezka	97.4
PL0004R	Leba	98.8
PL0005R	Diabla Gora	99.6
RO0003R	Semenic	88.7
RO0008R	Poiana Stampei	63.7
SE0005R	Bredkälen	98.3
SE0011R	Vavihill	93.7
SE0012R	Aspvreten	93.2
SE0013R	Esrange	98.5
SE0014R	Råö	98.4
SE0032R	Norra-Kvill	95.1
SE0035R	Vindeln	99.9
SE0039R	Grimsö	99.1
SI0008R	Iskrba	95.6
SI0031R	Zarodnje	94.7
SI0032R	Krvavec	93.8
SI0033R	Kovk	94.4
SK0002R	Chopok	78.0
SK0004R	Stará Lesná	99.2
SK0006R	Starina	95.0
SK0007R	Topolniky	69.9

Missing data in the measurement series may be critical, especially in summer when the highest ozone concentrations occur. In particular calculations of AOT40 values may be strongly affected by missing data, and a correction is necessary in order to obtain comparable calculations. In the mapping of AOT40, a data capture of 85% is required and an adjustment proportional to the number of missing data

is applied, i.e. exposure index divided by the fraction of data available. This correction gives a good approximation when the missing data are randomly scattered throughout the dataset, but a better correction is needed for larger gaps in the dataset. Calculations of percentiles are less sensitive to missing data, and a data capture of 75% is regarded as sufficient for the mapping.

5. Concentration summaries and episodes

The summer of 2013 was characterised by very low incidence of exceedances prior to mid-June and after August, but also by a period of frequent incidences during July and the beginning of August. The number of exceedances was lower than in many previous years, continuing the long-term downward trend observed over the last 24 years (EEA, 2014). During the past decade, the summers of 2003 and 2006 had very large number of exceedances, principally due to very warm weather (EEA, 2011).

The highest one-hour ozone concentration in 2013 was measured at Ispra in Italy (229 μg/m^3, July 16) (Table 1.1, Annex 1). In total concentrations above 200 μg/m^3 were measured at four sites (Ispra, Italy; Churanov, Czech Republic; Forsthof, Austria; Vredepeel, The Netherlands). The lowest maximum concentrations were measured in Romania (Semenic, 96 μg/m^3) and in Greenland (Nord, 98 μg/m^3).

Exceedances of the information threshold of 180 μg/m^3 were observed at 24 sites mainly in Central Europe (Figure 1.4, Annex 1). The unusual warm summers of 2003 and 2006 had 81 and 69 exceedances respectively.

Table 1.2 in Annex 1 shows the 25-, 50-, 75-, 90-, 95-, 98- and 99-percentiles for the period April-September. Graphical distributions of the 99-percentiles and 95-percentiles for stations with data capture higher than 75% are shown in Figure 1.1 and 1.2 in Annex 1. The lowest values are found in Norway, Finland and United Kingdom, where the 99-percentiles are below 110 μg/m^3. The concentrations are higher in Denmark, Sweden and the Baltics, where the 99-percentiles generally ranges from 110-120 μg/m^3, and at its highest in Switzerland and Austria where the 99-percentile values are above 140 μg/m^3.

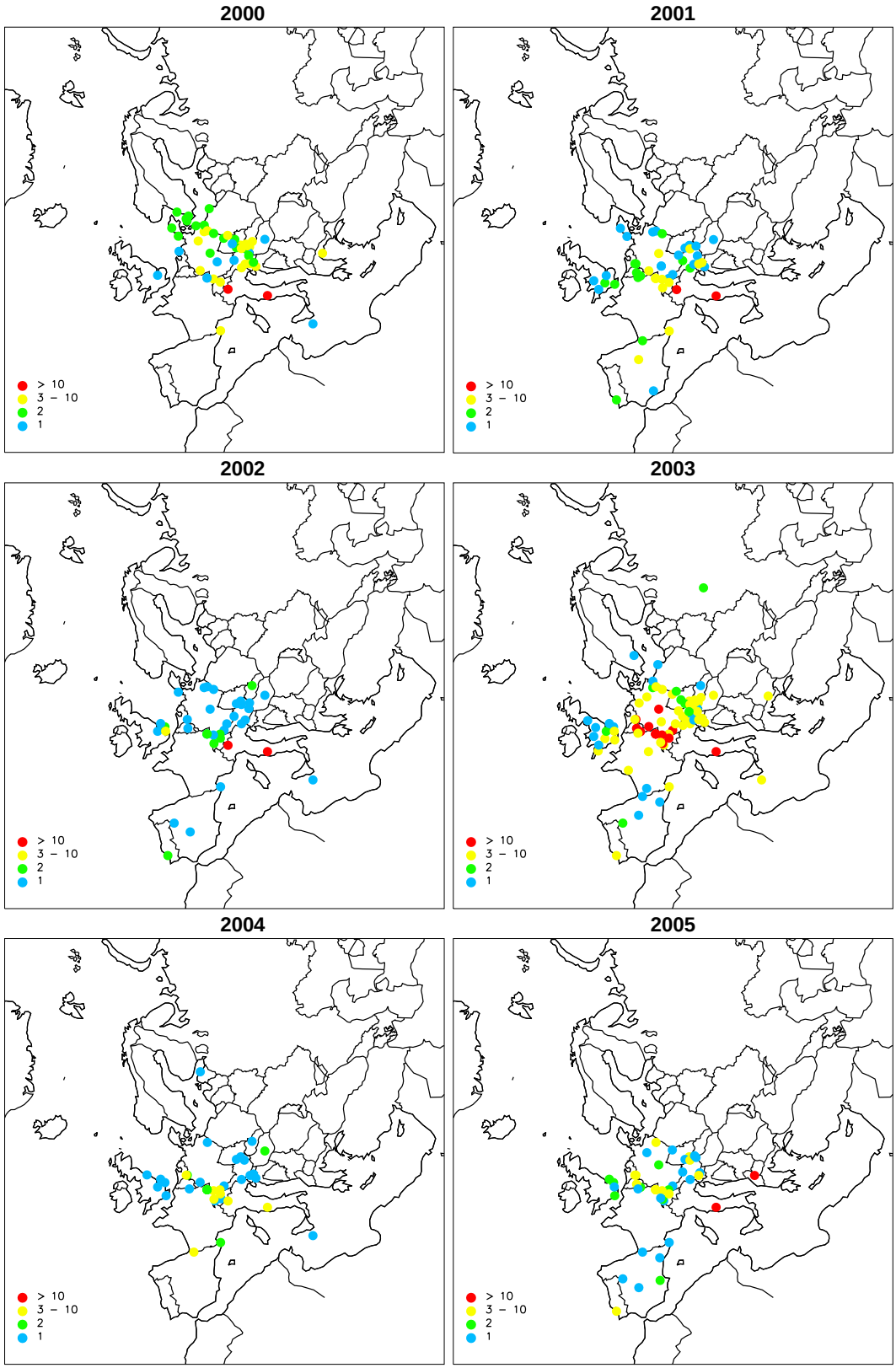

Figure 2: Number of exceedances of the threshold value of 180 µg/m^3 2000-2013. (Unit: number of days.) Stations with zero exceedances are not shown.

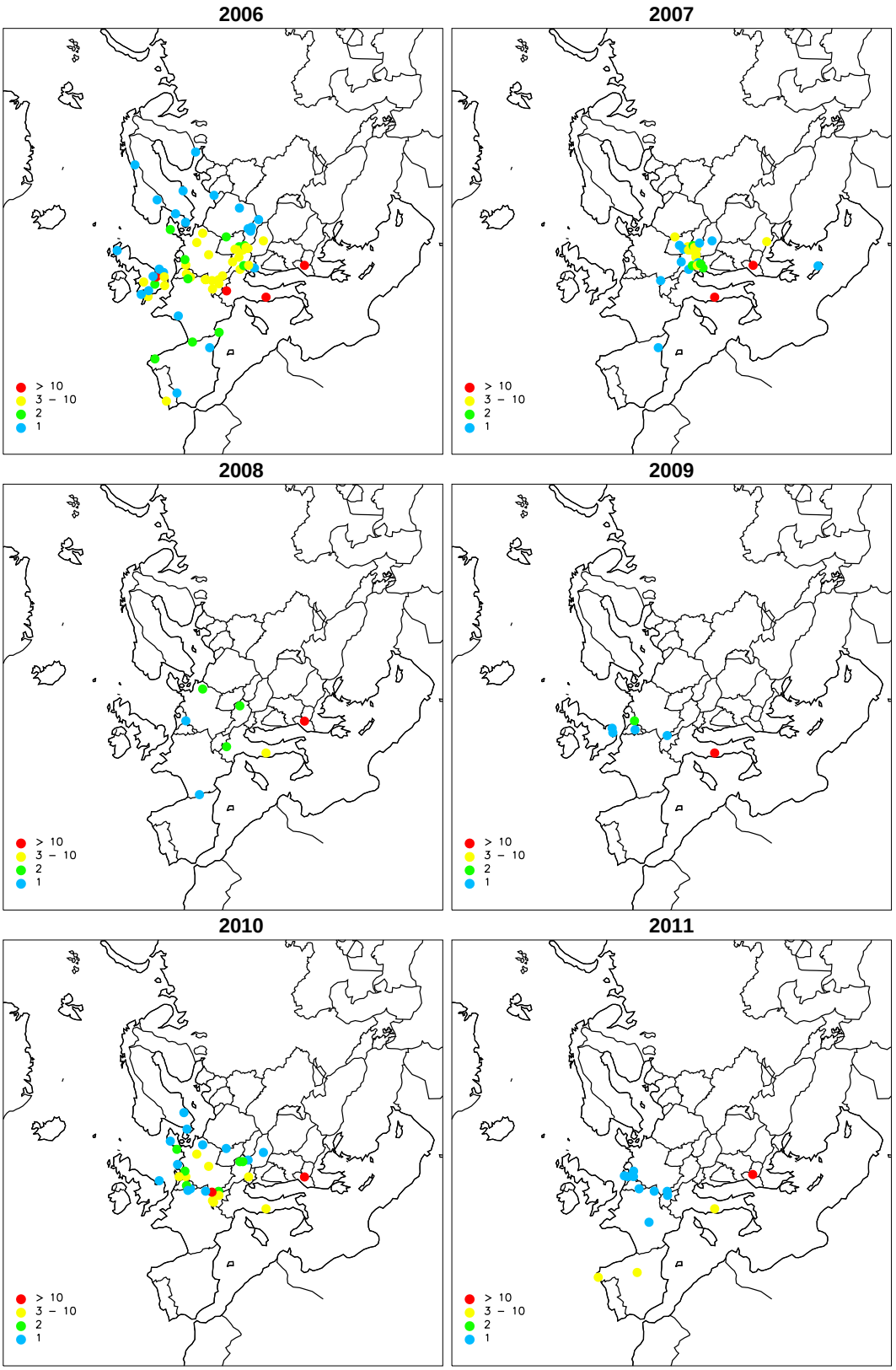

Figure 2, cont.

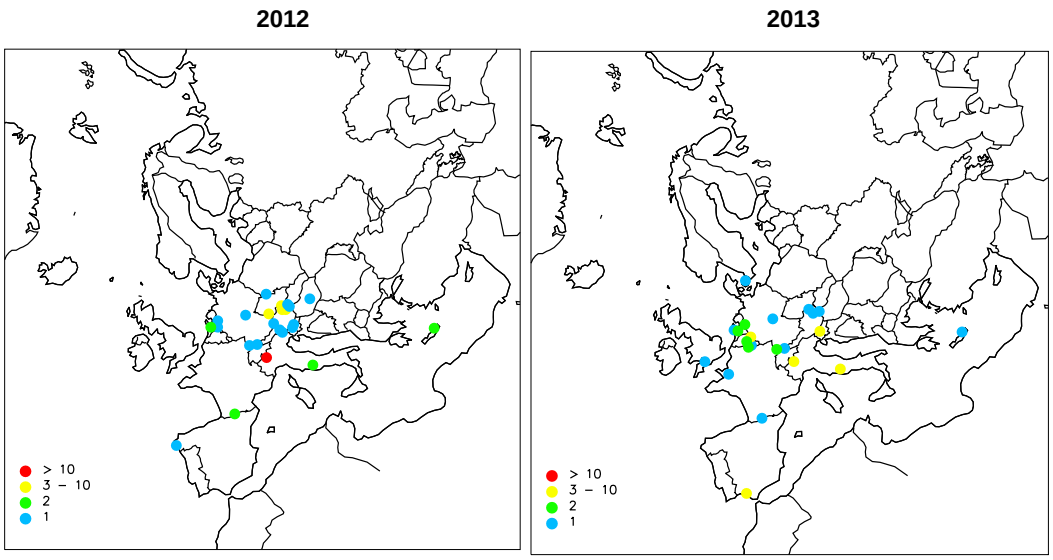

Figure 2, cont.

6. Calculation of AOT40

AOT40 and AOT60 for forest and agricultural crops for 2013 are shown in Table 2.1 and Table 2.2 in Annex 2, and the corresponding geographical distributions of AOT40 and AOT60 are shown in Figure 2.1–2.4. The maps of AOT40 show a general increasing gradient from west to east and from north to south. Low values are found in most parts of Northern Europe, while the highest values are found in Central Europe. Eight sites in Europe (Austria, Spain, Italy, France, Slovenia, Cyprus and Greece) have AOT40 (May-July) values above 15 000 ppbh. The critical level for forest (5 000 ppbh) is exceeded at most sites in Central, Eastern and Southern Europe.

7. Seasonal variation

Monthly mean concentrations and data capture for 2013 are given in Table 3.1 (Annex 3). The concentrations show a clear pattern with maximum values during spring or early summer and minimum in winter. The seasonal variation is the net result of a number of processes such as dry deposition, photochemical loss (titration with NO_x) and formation, and varying influx from the stratosphere as well as varying background ozone concentrations. Plots of the seasonal variations 1990-2013 are given in Figure 3.1 in Annex 3. The seasonal variation of ozone shows characteristics, which seem to be bound by the geographical location of the station (Roemer et al., 1996). In Central and Alpine Europe the variation is characterised by a broad summer maximum with high monthly means from May to August. A springtime maximum in April and May followed by a gradual decline to a minimum in November-December is found for sites in England, the Netherlands and the southern parts of Scandinavia and Finland. A spring maximum followed by a minimum in the summer is generally found in Ireland, Scotland and the northern parts of Scandinavia and Finland.

8. Diurnal variation

In addition to the seasonal variation, ozone concentrations show a variation on a shorter time scale. The average diurnal variation of surface ozone for summer (April-September) 2013 is shown in Annex 4. In general the lowest concentrations are found in early morning and the highest in the afternoon.

The most pronounced diurnal variation is found at the rural sites in Central Europe e.g. sites in Austria, Switzerland, most of the German sites and Ispra in Italy. Typical for those sites is a more marked peak in the diurnal cycle with a characteristic maximum around mid-afternoon. The pronounced diurnal peak during the summer months is due to the diurnal cycle of the mixing height and photochemical generation of ozone during daytime. During the night, more stable atmospheric conditions and nocturnal inversions prevent the vertical mixing and the transport of ozone from the free troposphere into the boundary layer. A weaker diurnal variation is observed at the coastal and island stations and at the remote sites in Norway and Sweden. Mace Head, situated on the west coast of Ireland, has roughly the same average concentrations as the rural sites in Central Europe but almost no diurnal variation due to remoteness from source areas and prevailing westerly winds. Zeppelinfjellet at Spitsbergen shows no diurnal variation. Elevated sites like Chaumont and Krvavec show a weaker diurnal cycle and the average concentration level is also high, due to influence of air from the free troposphere.

9. Update

The data compiled in this report represent the quality assured and quality controlled data at present. If errors are detected in the future, the data will be corrected in the database. It is important that users make certain they have access to the most recent version of the data. For the data presented here, the latest alteration was August 5th, 2015..

All EMEP measurement data can be downloaded online at http://ebas.nilu.no or sent upon request to annehj@nilu.no. Information on EMEP and the measurement network are available at http://www.emep.int and http://www.nilu.no/projects/ccc.

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A large number of co-workers in participating countries have been involved in the many steps of collection of EMEP's measurement data. A list of participating institutes can be seen below. The staff at CCC wishes to express their gratitude and appreciation for continued good co-operation and efforts.

Closer at home the secretarial work, and far beyond, has been performed by Berit Modalen. Ann Mari Fjæraa, Rita Larsen Våler and Mona Waagsbø have been very helpful with data flow and database maintenance.

12. List of participating institutions

Armenia	Environmental Impact Monitoring Centre
Austria	Umweltbundesamt Provincial Government of Tyrol Provincial Government of Carinthia Environment Institute Vorarlberg Provincial Government Styria Provincial Government Salzburg Provincial Government Lower Austria
Belgium	CELINE – IRCEL
Bulgaria	Executive Environment Agency
Commission of the European Communities	Joint Research Center. Ispra Establishment
Cyprus	Ministry of Labour and Social Insurance
Czech Republic	Czech Hydrometeorological Institute
Denmark	Department of Environmental Science, Aarhus University
Estonia	Estonian Environmental Research Laboratory Ltd.
Finland	Finnish Meteorological Institute (FMI)
France	l' Ecole des Mines de Douai
Germany	Umweltbundesamt
Greece	Environmental Chemical Processes Laboratory, University of Crete Ministry of Environmental Physical Planning and Public Works
Hungary	Meteorological Service, Institute for Atmospheric Physics, Dep. for Air Chemistry
Ireland	Environmental Protection Agency (EPA) Ricardo – AEA
Italy	C.N.R. Istituto Inquinamento Atmosferico
Latvia	Latvian Environment, Geology and Meteorology Agency
Lithuania	Center for Physical Sciences and Technology
Macedonia	Ministry of Environment and Physical Planning
Malta	University of Malta
Netherlands	National Institute for Public Health and Environmental Protection (RIVM)
Norway	Norwegian Institute for Air Research (NILU)
Poland	Institute of Meteorology and Water Management Institute of Environmental Protection
Portugal	Instituto de Meteorologica
Romania	National Environmental Protection Agency
Slovakia	Slovak Hydrometeorological Institute
Slovenia	Slovenian Environment Agency
Spain	Dirección General de Calidad y Evaluacíon Ambiental
Sweden	Swedish Environmental Research Institute (IVL)
Switzerland	Swiss Federal Laboratory of Testing Materials and Research (EMPA)
United Kingdom	Ricardo – AEA

Annex 1

Concentration summaries and episodes, tables and figures

Table 1.1: Number of hours (h) and days (d) exceeding 120, 150, 180 and 200 μg/m³ and maximum concentrations in 2013.

Code	Station	Total		>120		>150		>180		>200		Max concentrations	
		hours	days	hours	days	hours	days	hours	days	hours	days	μg/m³	day(s)
AT0002R	Illmitz	7913	350	332	57	53	12	0	0	0	0	180.0	2013-08-04
AT0005R	Vorhegg	8312	365	349	53	35	9	3	1	0	0	193.0	2013-08-06
AT0030R	Pillersdorf bei Retz	8118	361	207	38	33	10	3	3	0	0	196.0	2013-08-06
AT0032R	Sulzberg	8282	365	553	56	32	11	0	0	0	0	163.0	2013-07-20
AT0034G	Sonnblick	8356	365	914	95	23	10	1	1	0	0	183.0	2013-04-25
AT0038R	Gerlitzen	8375	365	848	70	25	7	0	0	0	0	168.0	2013-08-07
AT0040R	Masenberg	8327	365	567	60	37	10	0	0	0	0	167.0	2013-07-28
AT0041R	Haunsberg	8346	365	309	38	32	9	3	1	0	0	188.0	2013-08-03
AT0042R	Heidenreichstein	8349	365	254	37	15	5	0	0	0	0	176.0	2013-08-07
AT0043R	Forsthof	8329	365	387	48	63	15	7	4	1	1	204.0	2013-08-08
AT0045R	Dunkelsteinerwald	8193	361	253	43	61	15	7	3	0	0	192.0	2013-08-08
AT0046R	Gänserndorf	8366	365	266	44	34	9	2	1	0	0	184.0	2013-08-04
AT0047R	Stixneusiedl	8356	365	297	46	35	9	1	1	0	0	183.0	2013-08-04
AT0048R	Zoebelboden	8283	365	290	37	30	7	0	0	0	0	166.0	2013-08-03
AT0049R	Grebenzen bei St. Lamprecht	7837	354	506	59	16	5	0	0	0	0	167.0	2013-07-27
AT0050R	Graz Lustbuehel	8090	360	267	32	11	5	0	0	0	0	157.0	2013-07-28
BE0001R	Offagne	8257	357	155	26	11	4	0	0	0	0	172.5	2013-07-23
BE0032R	Eupen	8308	359	167	30	25	5	0	0	0	0	177.5	2013-07-23
BE0035R	Vezin	8257	357	155	26	11	4	0	0	0	0	172.5	2013-07-23
BG0053R	Rojen peak	8244	365	10	4	0	0	0	0	0	0	132.7	2013-08-09
CH0001G	Jungfraujoch	8462	364	49	8	5	2	0	0	0	0	179.9	2013-11-12
CH0002R	Payerne	8686	365	298	47	20	8	0	0	0	0	157.6	2013-07-16
CH0003R	Tänikon	8673	365	298	55	29	12	1	1	0	0	183.1	2013-07-23
CH0004R	Chaumont	8672	365	620	49	75	18	0	0	0	0	170.5	2013-06-18
CH0005R	Rigi	8691	365	572	62	61	17	0	0	0	0	174.3	2013-06-18
CY0002R	Ayia Marina	8488	364	1256	123	1	1	0	0	0	0	151.0	2013-08-02
CZ0001R	Svratouch	8743	365	147	29	3	1	0	0	0	0	155.0	2013-04-26
CZ0003R	Kosetice	8364	355	183	28	20	5	0	0	0	0	155.8	2013-07-25
CZ0005R	Churanov	8606	363	448	54	93	12	43	4	5	2	214.5	2013-04-25
CZ0007R	Kresin u Pacova	2718	115	0	0	0	0	0	0	0	0	114.3	2013-10-08

Table 1.1, cont.

Code	Station	Total		>120		>150		>180		>200		Max concentrations	
		hours	days	hours	days	hours	days	hours	days	hours	days	µg/m^3	day(s)
DE0001R	Westerland	8042	351	44	13	3	1	0	0	0	0	161.0	2013-08-02
DE0002R	Waldhof	8329	364	126	24	10	4	0	0	0	0	165.9	2013-08-02
DE0003R	Schauinsland	7986	350	608	56	81	14	4	1	0	0	183.8	2013-07-23
DE0007R	Neuglobsow	8383	365	58	16	1	1	0	0	0	0	152.1	2013-08-03
DE0008R	Schmücke	8012	355	333	34	29	7	2	1	0	0	183.4	2013-08-02
DE0009R	Zingst	8317	363	37	11	0	0	0	0	0	0	146.5	2013-08-03
DK0005R	Keldsnor	7756	358	24	7	0	0	0	0	0	0	141.9	2013-08-02
DK0010G	Nord, Greenland	6839	321	0	0	0	0	0	0	0	0	97.7	2013-04-12
DK0012R	Risoe	7972	365	73	15	0	0	0	0	0	0	142.5	2013-05-18
DK0031R	Ulborg	7329	337	37	8	0	0	0	0	0	0	134.8	2013-08-02
EE0009R	Lahemaa	8597	362	19	6	0	0	0	0	0	0	136.0	2013-06-01
EE0011R	Vilsandi	8328	352	20	5	0	0	0	0	0	0	140.0	2013-04-18
ES0001R	San Pablo de los Montes	8655	365	385	52	4	2	0	0	0	0	171.1	2013-08-23
ES0005R	Noya	8639	365	230	31	26	5	2	1	0	0	186.4	2013-09-02
ES0006R	Mahón	8454	362	376	42	21	5	0	0	0	0	168.2	2013-07-09
ES0007R	Víznar	8452	365	640	87	31	11	0	0	0	0	168.6	2013-07-19
ES0008R	Niembro	8601	364	22	9	0	0	0	0	0	0	148.4	2013-07-20
ES0009R	Campisabalos	8477	362	163	32	4	2	0	0	0	0	171.7	2013-07-19
ES0010R	Cabo de Creus	8570	365	203	25	7	3	0	0	0	0	161.3	2013-07-12
ES0011R	Barcarrota	8491	361	381	54	10	5	0	0	0	0	168.2	2013-06-23
ES0012R	Zarra	8670	365	436	66	5	3	0	0	0	0	156.7	2013-07-09
ES0013R	Penausende	8641	365	284	36	5	2	0	0	0	0	161.5	2013-08-22
ES0014R	Els Torms	8588	365	224	40	1	1	0	0	0	0	154.4	2013-07-09
ES0016R	O Saviñao	8642	365	80	19	4	1	0	0	0	0	153.0	2013-09-04
ES0017R	Doñana	8528	365	693	108	48	14	0	0	0	0	167.2	2013-07-22
FI0009R	Utö	8612	365	45	10	0	0	0	0	0	0	138.0	2013-05-16
FI0017R	Virolahti II	7951	336	18	7	0	0	0	0	0	0	134.0	2013-05-31
FI0022R	Oulanka	8098	343	6	1	0	0	0	0	0	0	129.0	2013-04-12
FI0037R	Ähtäri II	8717	365	0	0	0	0	0	0	0	0	116.0	2013-04-11
FI0096G	Pallas (Sammaltunturi)	8552	358	40	4	0	0	0	0	0	0	125.0	2013-04-12

Table 1.1, cont.

Code	Station	Total		>120		>150		>180		>200		Max concentrations	
		hours	days	hours	days	hours	days	hours	days	hours	days	μg/m^3	day(s)
FR0008R	Donon	8713	365	181	30	5	3	0	0	0	0	162.0	2013-06-18
FR0009R	Revin	8642	365	179	22	15	3	0	0	0	0	160.0	2013-06-07
FR0010R	Morvan	8046	353	147	26	4	1	0	0	0	0	153.0	2013-07-17
FR0013R	Peyrusse Vieille	8587	360	118	22	0	0	0	0	0	0	144.0	2013-08-22
FR0014R	Montandon	8668	365	90	20	0	0	0	0	0	0	150.0	2013-06-17
FR0015R	La Tardière	8483	359	202	28	20	5	0	0	0	0	171.0	2013-07-10
FR0016R	Le Casset	8652	363	328	49	0	0	0	0	0	0	149.0	2013-07-11
FR0017R	Montfranc	8320	351	114	17	0	0	0	0	0	0	150.0	2013-07-18
FR0018R	La Coulonche	8569	360	185	26	14	5	0	0	0	0	173.0	2013-06-07
FR0019R	Pic du Midi	8616	364	1216	132	68	13	2	2	0	0	183.0	2013-06-27
FR0030R	Puy de Dôme	8519	365	483	44	22	5	0	0	0	0	170.0	2013-07-18
GB0002R	Eskdalemuir	8616	365	0	0	0	0	0	0	0	0	117.8	2013-04-14
GB0006R	Lough Navar	8548	361	10	2	0	0	0	0	0	0	139.6	2013-07-19
GB0013R	Yarner Wood	8237	353	30	8	5	1	0	0	0	0	158.6	2013-07-18
GB0014R	High Muffles	8639	364	12	4	0	0	0	0	0	0	133.6	2013-07-06
GB0015R	Strath Vaich Dam	7805	327	6	3	0	0	0	0	0	0	130.7	2013-05-29
GB0031R	Aston Hill	8529	361	23	4	0	0	0	0	0	0	149.8	2013-07-18
GB0033R	Bush	8700	365	2	1	0	0	0	0	0	0	121.0	2013-04-14
GB0035R	Great Dun Fell	7798	339	0	0	0	0	0	0	0	0	119.9	2013-08-26
GB0036R	Harwell	8600	362	13	4	2	1	0	0	0	0	153.0	2013-07-17
GB0037R	Ladybower Res.	8684	365	2	1	0	0	0	0	0	0	131.0	2013-07-18
GB0038R	Lullington Heath	8609	363	22	7	0	0	0	0	0	0	140.7	2013-08-23
GB0039R	Sibton	8298	350	17	4	0	0	0	0	0	0	140.5	2013-07-23
GB0043R	Narberth	8646	365	21	5	0	0	0	0	0	0	142.3	2013-07-18
GB0045R	Wicken Fen	8709	365	31	7	10	3	0	0	0	0	170.7	2013-07-22
GB0048R	Auchencorth Moss	8700	364	0	0	0	0	0	0	0	0	109.0	2013-05-28
GB0049R	Weybourne	8259	348	15	9	0	0	0	0	0	0	132.0	2013-09-05
GB0050R	St. Osyth	8643	365	20	7	0	0	0	0	0	0	134.6	2013-08-23
GB0052R	Lerwick	5749	241	0	0	0	0	0	0	0	0	106.4	2013-03-25
GB0053R	Charlton Mackrell	8690	364	64	10	8	1	0	0	0	0	173.5	2013-07-18
GR0001R	Aliartos	8498	358	18	5	0	0	0	0	0	0	128.1	2013-07-26
GR0002R	Finokalia	8612	364	1396	110	66	12	2	2	0	0	180.9	2013-07-31

Table 1.1, cont.

Code	Station	Total		>120		>150		>180		>200		Max concentrations	
		hours	days	hours	days	hours	days	hours	days	hours	days	μg/m^3	day(s)
HU0002R	K-puszta	8543	360	363	60	12	4	1	1	0	0	189.0	2013-07-26
IE0001R	Valentia Observatory	8134	346	17	5	0	0	0	0	0	0	133.3	2013-04-14
IE0031R	Mace Head	8729	365	20	5	0	0	0	0	0	0	137.4	2013-07-20
IT0001R	Montelibretti	8587	364	257	69	24	14	2	2	0	0	198.8	2013-08-06
IT0004R	Ispra	8572	360	601	95	240	45	69	18	25	9	229.0	2013-07-16
LT0015R	Preila	8497	358	3	1	0	0	0	0	0	0	122.9	2013-04-18
LV0010R	Rucava	7403	311	36	10	0	0	0	0	0	0	145.0	2013-04-18
LV0016R	Zoseni	7882	329	34	11	0	0	0	0	0	0	128.0	2013-03-29
MK0007R	Lazaropole	3865	177	2908	173	1043	109	37	9	0	0	196.3	2013-07-26
MT0001R	Giordan lighthouse	7618	326	167	34	2	1	0	0	0	0	160.9	2013-07-07
NL0007R	Eibergen	8573	364	101	20	26	5	4	1	0	0	188.6	2013-07-22
NL0009R	Kollumerwaard	8607	362	18	5	3	1	0	0	0	0	156.0	2013-08-02
NL0010R	Vredepeel	8367	360	80	18	17	3	5	1	1	1	202.5	2013-07-23
NL0091R	De Zilk	8109	354	48	13	0	0	0	0	0	0	148.8	2013-08-23
NL0644R	Cabauw Wielsekade	8609	363	51	11	15	3	3	2	0	0	190.5	2013-07-23
NO0002R	Birkenes II	6947	292	1	1	0	0	0	0	0	0	120.5	2013-07-07
NO0015R	Tustervatn	8684	365	30	3	0	0	0	0	0	0	124.4	2013-04-12
NO0039R	Kårvatn	8666	364	0	0	0	0	0	0	0	0	120.0	2013-04-13
NO0042G	Zeppelin mountain (Ny-Ålesund)	8648	364	0	0	0	0	0	0	0	0	99.7	2013-04-24
NO0043R	Prestebakke	8703	365	0	0	0	0	0	0	0	0	117.8	2013-05-08
NO0052R	Sandve	8324	353	1	1	0	0	0	0	0	0	121.0	2013-08-02
NO0056R	Hurdal	8725	365	0	0	0	0	0	0	0	0	116.3	2013-07-26
PL0002R	Jarczew	8743	365	107	21	11	3	0	0	0	0	175.0	2013-07-28
PL0003R	Sniezka	8534	361	413	54	36	10	1	1	0	0	188.0	2013-08-03
PL0004R	Leba	8658	362	30	8	0	0	0	0	0	0	131.0	2013-05-18
PL0005R	Diabla Gora	8726	365	82	19	0	0	0	0	0	0	140.0	2013-04-18
RO0003R	Semenic	7770	326	0	0	0	0	0	0	0	0	95.8	2013-03-01
RO0008R	Poiana Stampei	5577	243	94	19	0	0	0	0	0	0	143.7	2013-04-20

Table 1.1, cont.

Code	Station	Total		>120		>150		>180		>200		Max concentrations	
		hours	days	hours	days	hours	days	hours	days	hours	days	μg/m^3	day(s)
SE0005R	Bredkälen	8611	363	15	4	0	0	0	0	0	0	127.0	2013-05-18
SE0011R	Vavihill	8207	349	61	15	0	0	0	0	0	0	145.0	2013-08-06
SE0012R	Aspvreten	8161	348	0	0	0	0	0	0	0	0	118.0	2013-05-07
SE0013R	Esrange	8632	363	36	4	0	0	0	0	0	0	128.0	2013-04-12
SE0014R	Råö	8623	361	25	8	0	0	0	0	0	0	144.0	2013-07-28
SE0032R	Norra-Kvill	8329	349	46	11	0	0	0	0	0	0	133.0	2013-05-07
SE0035R	Vindeln	8748	365	49	4	0	0	0	0	0	0	136.0	2013-04-12
SE0039R	Grimsö	8682	364	4	2	0	0	0	0	0	0	124.0	2013-05-20
xsSI0008R	Iskrba	8371	365	259	41	21	8	0	0	0	0	171.0	2013-08-19
SI0031R	Zarodnje	8300	365	448	64	49	10	1	1	0	0	182.0	2013-07-27
SI0032R	Krvavec	8220	365	1653	129	224	27	6	1	0	0	194.0	2013-07-27
SI0033R	Kovk	8272	363	202	30	1	1	0	0	0	0	153.0	2013-08-03
SK0002R	Chopok	6833	296	736	73	23	9	0	0	0	0	168.0	2013-08-03
SK0004R	Stará Lesná	8688	365	239	40	2	1	0	0	0	0	157.0	2013-04-26
SK0006R	Starina	8318	350	162	30	0	0	0	0	0	0	146.0	2013-07-27
SK0007R	Topolniky	6119	259	309	66	14	6	0	0	0	0	162.0	2013-04-25

Table 1.2: Percentiles of hourly ozone values April–September 2013.

Code	Station	25%	50%	75%	90%	95%	98%	99%	Data capture
AT0002R	Illmitz	58.0	76.0	97.0	116.0	127.0	143.0	152.0	94.7
AT0005R	Vorhegg	66.0	83.0	100.0	117.0	127.0	141.8	149.0	94.7
AT0030R	Pillersdorf bei Retz	56.0	73.0	92.0	111.0	121.0	136.0	148.0	90.9
AT0032R	Sulzberg	70.0	87.0	106.0	126.0	136.0	144.0	149.0	94.2
AT0034G	Sonnblick	97.0	109.0	119.0	129.0	134.0	141.0	146.0	94.8
AT0038R	Gerlitzen	91.0	104.0	117.0	128.0	133.0	141.0	145.0	95.7
AT0040R	Masenberg	78.0	94.0	109.0	125.0	136.0	146.0	150.0	94.8
AT0041R	Haunsberg	63.0	78.0	96.0	116.0	128.0	141.0	149.0	95.0
AT0042R	Heidenreichstein	50.0	69.0	91.0	111.0	123.0	134.1	144.0	95.5
AT0043R	Forsthof	64.0	83.0	100.0	118.0	132.0	146.0	156.0	95.2
AT0045R	Dunkelsteinerwald	47.0	64.0	88.0	109.0	124.0	143.0	157.0	95.2
AT0046R	Gänserndorf	50.0	69.0	91.0	111.0	124.2	140.0	149.0	95.5
AT0047R	Stixneusiedl	54.0	72.0	95.0	113.0	126.0	141.1	149.0	95.5
AT0048R	Zoebelboden	68.0	83.0	99.0	116.0	126.6	141.0	147.0	94.4
AT0049R	Grebenzen bei St. Lamprecht	83.0	97.0	111.0	123.0	130.0	138.0	143.0	90.0
AT0050R	Graz Lustbuehel	57.0	79.0	98.0	114.0	124.0	137.4	143.2	92.9
BE0001R	Offagne	47.0	64.0	81.5	101.0	113.9	130.5	140.5	95.7
BE0032R	Eupen	40.8	58.0	77.0	99.5	115.0	127.5	141.4	96.2
BE0035R	Vezin	47.0	64.0	81.5	101.0	113.9	130.5	140.5	95.7
BG0053R	Rojen peak	76.0	86.8	96.4	102.6	106.4	110.2	113.4	93.8
CH0001G	Jungfraujoch	72.6	80.6	89.1	97.5	103.3	110.0	114.2	96.4
CH0002R	Payerne	43.6	64.4	87.1	110.4	126.6	140.6	146.1	99.2
CH0003R	Tänikon	46.6	64.5	86.3	110.6	127.0	141.6	147.5	99.1
CH0004R	Chaumont	74.2	87.8	106.2	127.5	138.9	148.3	153.8	99.4
CH0005R	Rigi	71.8	88.0	105.7	124.7	137.2	147.0	153.0	99.2
CY0002R	Ayia Marina	97.2	110.2	121.3	129.4	134.8	139.4	141.8	97.9
CZ0001R	Svratouch	55.7	72.5	90.2	108.5	117.2	124.3	128.7	100.0
CZ0003R	Kosetice	50.1	68.4	88.4	105.3	117.4	131.5	139.8	94.1
CZ0005R	Churanov	58.7	77.6	100.1	120.5	131.6	152.4	180.4	97.2
CZ0007R	Kresin u Pacova	47.4	56.5	71.7	88.2	94.5	105.0	108.1	13.3
DE0001R	Westerland	64.8	75.6	86.2	96.9	103.1	112.7	121.7	88.1
DE0002R	Waldhof	42.0	61.4	81.8	98.8	111.3	128.9	136.4	94.8
DE0003R	Schauinsland	74.8	91.4	108.4	126.0	137.0	149.9	158.7	94.4
DE0007R	Neuglobsow	39.5	60.8	80.4	97.0	105.7	114.9	122.3	95.6
DE0008R	Schmücke	65.8	82.0	98.9	117.4	128.3	140.6	147.3	88.6
DE0009R	Zingst	54.5	68.1	81.6	95.3	102.8	112.8	119.5	94.4
DK0005R	Keldsnor	54.1	64.6	76.6	87.9	97.6	107.1	113.7	88.5
DK0010G	Nord, Greenland	36.3	47.9	61.4	70.8	75.6	82.9	85.7	71.4
DK0012R	Risoe	60.3	74.2	88.4	101.7	109.4	118.7	126.4	90.6
DK0031R	Ulborg	54.5	66.8	82.0	94.9	101.5	112.5	117.4	90.7
EE0009R	Lahemaa	41.0	60.0	77.0	92.0	101.0	108.0	113.1	97.7
EE0011R	Vilsandi	62.0	75.0	89.0	99.0	106.0	112.0	116.0	91.1
ES0001R	San Pablo de los Montes	81.7	94.1	107.0	118.7	126.0	134.5	137.9	99.3
ES0005R	Noya	50.7	63.7	86.8	108.8	121.0	135.9	145.8	98.1
ES0006R	Mahón	80.7	91.0	103.5	117.4	128.4	139.8	144.9	98.3
ES0007R	Víznar	87.2	98.9	113.2	125.1	131.7	140.9	148.2	97.4
ES0008R	Niembro	61.2	74.9	89.4	99.7	106.0	111.7	116.8	98.7
ES0009R	Campisabalos	69.0	86.0	98.3	110.0	117.7	127.1	133.6	96.9
ES0010R	Cabo de Creus	72.4	82.6	95.2	108.8	119.1	130.6	137.1	98.0
ES0011R	Barcarrota	62.1	82.5	101.9	118.6	127.0	135.4	140.1	98.4
ES0012R	Zarra	83.4	95.9	108.4	120.1	125.6	132.8	139.4	98.9
ES0013R	Penausende	70.5	86.5	99.5	113.8	124.0	131.1	136.7	98.9
ES0014R	Els Torms	72.8	87.0	100.3	113.2	120.6	130.1	136.4	97.4
ES0016R	O Saviñao	44.9	56.3	69.1	85.3	100.7	119.0	129.2	98.7
ES0017R	Doñana	66.2	93.1	112.4	126.7	135.8	144.7	150.8	96.4
FI0009R	Utö	62.0	76.0	89.0	100.0	108.0	114.0	120.0	98.1
FI0017R	Virolahti II	43.0	64.0	81.0	95.0	104.0	111.0	115.0	98.2
FI0022R	Oulanka	46.0	59.0	76.0	88.0	95.0	104.0	111.3	97.2
FI0037R	Ähtäri II	41.0	58.0	76.0	87.0	93.0	100.0	104.0	99.7
FI0096G	Pallas (Sammaltunturi)	55.0	66.0	81.0	92.0	97.0	112.0	119.0	99.7

Table 1.2, cont.

Code	Station	25%	50%	75%	90%	95%	98%	99%	Data capture
FR0008R	Donon	52.0	68.0	87.0	107.0	118.0	130.0	137.0	99.6
FR0009R	Revin	47.0	64.0	82.0	103.0	116.4	134.0	140.7	98.6
FR0010R	Morvan	54.0	70.0	89.0	106.0	117.0	128.0	134.0	91.9
FR0013R	Peyrusse Vieille	60.0	74.0	89.0	103.0	115.0	124.0	129.0	96.7
FR0014R	Montandon	42.0	58.0	76.0	95.0	107.0	121.0	127.0	98.6
FR0015R	La Tardière	52.0	69.0	87.0	104.0	118.4	135.0	144.0	99.0
FR0016R	Le Casset	87.0	97.0	106.0	117.0	124.0	130.0	134.0	99.8
FR0017R	Montfranc	66.0	80.0	94.0	108.0	116.0	123.5	127.0	90.5
FR0018R	La Coulonche	56.0	71.0	87.0	105.0	117.0	133.0	142.0	99.4
FR0019R	Pic du Midi	94.0	110.0	121.0	132.0	139.0	147.0	156.0	97.2
FR0030R	Puy de Dôme	79.0	91.0	106.0	122.0	131.0	140.0	146.0	97.4
GB0002R	Eskdalemuir	44.2	58.4	74.4	87.8	94.2	101.4	105.4	97.2
GB0006R	Lough Navar	34.4	52.0	66.0	80.8	88.6	96.8	101.5	95.9
GB0013R	Yarner Wood	41.9	56.7	75.6	88.6	95.4	105.1	114.7	98.6
GB0014R	High Muffles	49.9	62.7	77.1	89.5	95.5	102.3	107.1	99.4
GB0015R	Strath Vaich Dam	55.4	66.1	82.2	94.3	99.6	105.3	108.9	99.8
GB0031R	Aston Hill	52.9	63.9	77.7	88.8	95.0	104.5	113.1	97.4
GB0033R	Bush	49.6	61.6	75.8	88.6	94.7	99.6	104.0	99.3
GB0035R	Great Dun Fell	55.1	65.3	77.0	87.8	93.7	98.8	101.5	82.1
GB0036R	Harwell	37.0	52.0	70.0	85.0	94.0	103.0	110.0	97.6
GB0037R	Ladybower Res.	38.3	49.5	64.6	78.3	87.0	95.6	99.7	99.2
GB0038R	Lullington Heath	40.0	53.7	68.3	82.1	90.9	105.0	115.0	98.2
GB0039R	Sibton	42.4	58.0	73.3	87.6	96.2	105.9	111.2	99.5
GB0043R	Narberth	51.0	62.7	80.2	90.9	97.5	105.3	113.2	99.2
GB0045R	Wicken Fen	36.2	55.5	73.0	88.7	98.5	110.0	116.6	99.1
GB0048R	Auchencorth Moss	46.0	57.0	70.0	82.0	87.0	94.0	97.2	99.8
GB0049R	Weybourne	52.9	67.8	82.4	94.9	104.0	111.8	114.7	99.5
GB0050R	St. Osyth	41.0	58.1	73.2	87.4	95.8	105.0	111.5	98.5
GB0052R	Lerwick	52.8	63.5	78.2	87.3	92.8	98.3	100.7	81.9
GB0053R	Charlton Mackrell	46.0	63.0	79.0	92.4	101.5	113.4	127.9	99.2
GR0001R	Aliartos	33.6	55.1	70.1	88.1	99.2	109.1	114.1	95.1
GR0002R	Finokalia	101.2	112.0	123.1	132.8	138.2	146.9	154.1	97.9
HU0002R	K-puszta	43.0	69.0	97.0	118.0	129.0	139.0	145.0	95.1
IE0001R	Valentia Observatory	57.1	67.7	85.7	96.6	100.3	105.9	111.0	90.3
IE0031R	Mace Head	62.0	71.8	84.6	97.4	101.7	106.0	110.3	99.3
IT0001R	Montelibretti	26.8	59.0	92.2	111.8	122.4	133.6	143.4	98.2
IT0004R	Ispra	46.5	74.5	99.5	132.8	152.6	175.3	190.5	98.2
LT0015R	Preila	52.6	66.2	77.4	86.4	92.2	100.0	104.1	98.0
LV0010R	Rucava	47.0	68.0	85.0	98.0	106.0	113.0	119.0	99.9
LV0016R	Zoseni	44.0	62.0	80.0	98.0	106.0	113.0	117.0	100.0
MK0007R	Lazaropole	120.1	137.2	151.5	162.2	167.6	174.9	180.3	83.6
MT0001R	Giordan lighthouse	82.7	92.2	102.2	113.1	118.4	124.6	128.9	96.7
NL0007R	Eibergen	31.5	50.5	70.2	92.2	106.3	123.0	138.5	97.9
NL0009R	Kollumerwaard	44.2	60.8	73.9	86.9	93.1	102.3	108.4	97.2
NL0010R	Vredepeel	30.3	49.4	69.3	88.4	104.6	119.7	130.5	94.8
NL0091R	De Zilk	43.9	62.2	76.2	90.0	98.3	110.6	123.9	89.0
NL0644R	Cabauw Wielsekade	33.6	51.0	68.4	84.1	95.3	110.3	122.6	97.6
NO0002R	Birkenes II	52.5	66.3	79.4	90.7	95.1	101.2	103.9	94.3
NO0015R	Tustervatn	51.4	63.6	79.4	93.8	100.2	109.6	117.4	99.2
NO0039R	Kårvatn	31.4	54.4	74.6	95.5	101.9	107.4	111.6	98.6
NO0042G	Zeppelin mountain (Ny-Ålesund)	49.8	60.0	69.6	78.6	84.0	89.1	95.2	99.7
NO0043R	Prestebakke	50.4	64.4	79.7	92.1	97.7	103.5	106.7	99.3
NO0052R	Sandve	58.0	69.1	81.2	91.5	96.3	101.1	104.9	91.0
NO0056R	Hurdal	44.6	58.3	72.2	86.7	93.7	99.5	103.4	99.4
PL0002R	Jarczew	42.0	62.0	84.0	102.0	112.0	122.0	131.1	99.9
PL0003R	Sniezka	74.0	90.0	105.2	119.0	129.0	142.1	149.0	96.7
PL0004R	Leba	57.0	70.0	84.0	98.0	105.0	113.0	118.1	97.8
PL0005R	Diabla Gora	46.0	63.0	84.0	101.0	111.0	119.1	129.0	100.0

Table 1.2, cont.

Code	Station	25%	50%	75%	90%	95%	98%	99%	Data capture
RO0003R	Semenic	25.2	41.0	57.5	67.3	73.7	81.0	83.9	90.2
RO0008R	Poiana Stampei	42.9	69.6	89.5	104.3	114.6	121.2	125.7	78.5
SE0005R	Bredkälen	48.0	62.0	79.0	92.0	99.0	112.0	117.0	97.2
SE0011R	Vavihill	53.0	69.0	86.0	100.0	108.0	117.0	123.0	97.9
SE0012R	Aspvreten	40.0	60.0	75.0	87.0	94.0	104.0	108.7	94.0
SE0013R	Esrange	54.0	65.0	81.0	94.0	99.0	114.0	119.0	97.2
SE0014R	Råö	63.0	74.0	87.0	98.0	105.0	111.0	117.0	99.0
SE0032R	Norra-Kvill	60.0	73.0	88.0	101.0	108.0	115.0	120.0	91.7
SE0035R	Vindeln	47.0	62.0	80.0	95.0	102.0	114.0	121.0	99.9
SE0039R	Grimsö	46.0	63.0	81.0	95.0	102.0	108.6	113.0	98.3
SI0008R	Iskrba	16.0	61.0	95.0	112.0	124.0	136.0	144.0	95.7
SI0031R	Zarodnje	75.0	92.0	108.0	121.0	131.0	143.0	152.0	95.1
SI0032R	Krvavec	92.0	112.0	127.0	141.0	152.0	162.0	167.0	94.6
SI0033R	Kovk	59.0	77.0	96.0	110.0	120.0	130.0	134.4	94.6
SK0002R	Chopok	90.0	103.0	115.0	128.0	135.0	143.0	147.7	91.8
SK0004R	Stará Lesná	55.0	77.0	97.0	112.0	121.0	130.0	135.0	99.2
SK0006R	Starina	50.0	69.0	90.0	106.0	115.0	130.0	136.0	99.9
SK0007R	Topolniky	52.0	72.0	95.8	116.0	125.0	137.0	143.4	97.0

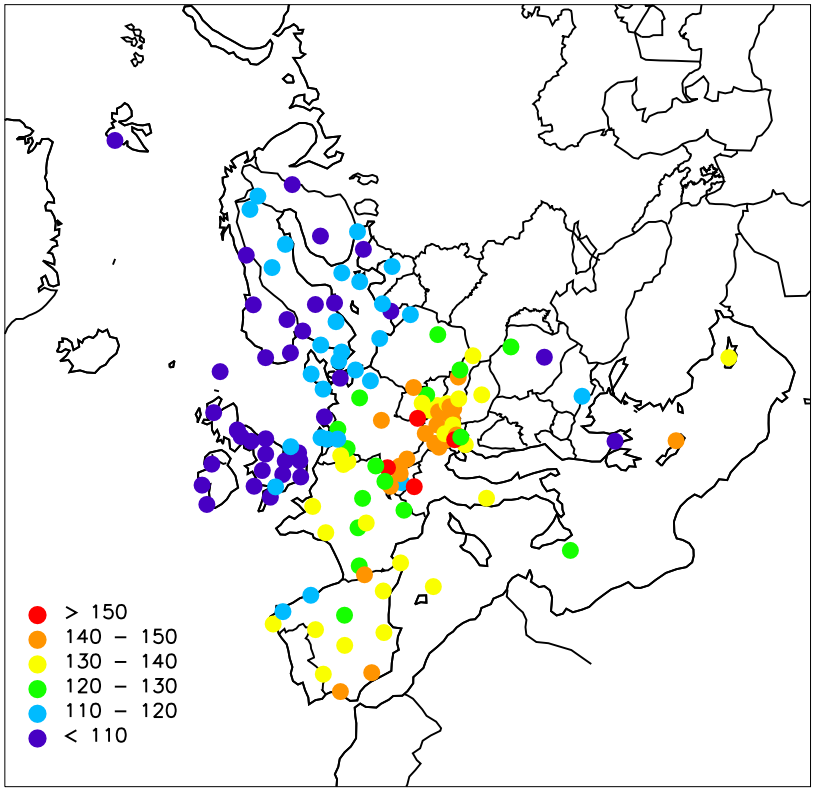


Figure 1.1: Ozone April–September 2013. 99-percentiles ($\mu g/m^3$).

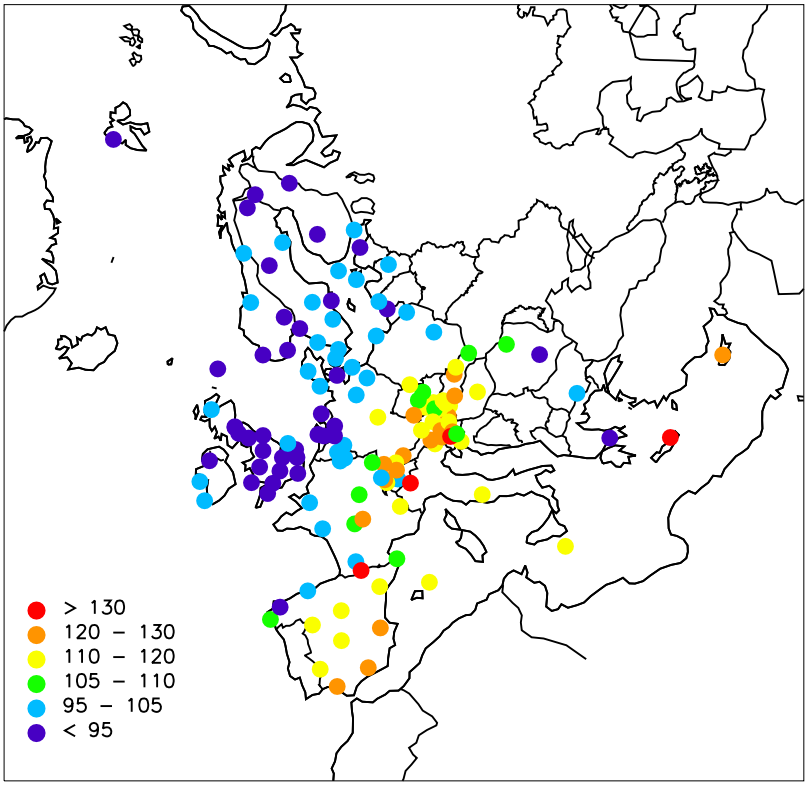


Figure 1.2: Ozone April–September 2013. 95-percentiles (µg/m^3).

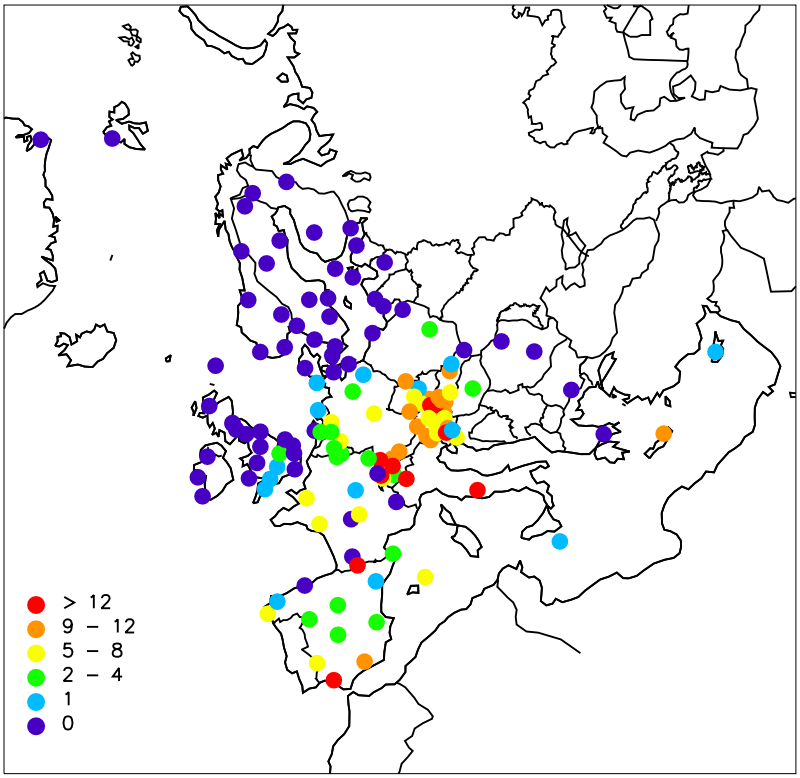


Figure 1.3: Number of exceedances of the threshold value of 150 µg/m^3. (Unit: number of days).

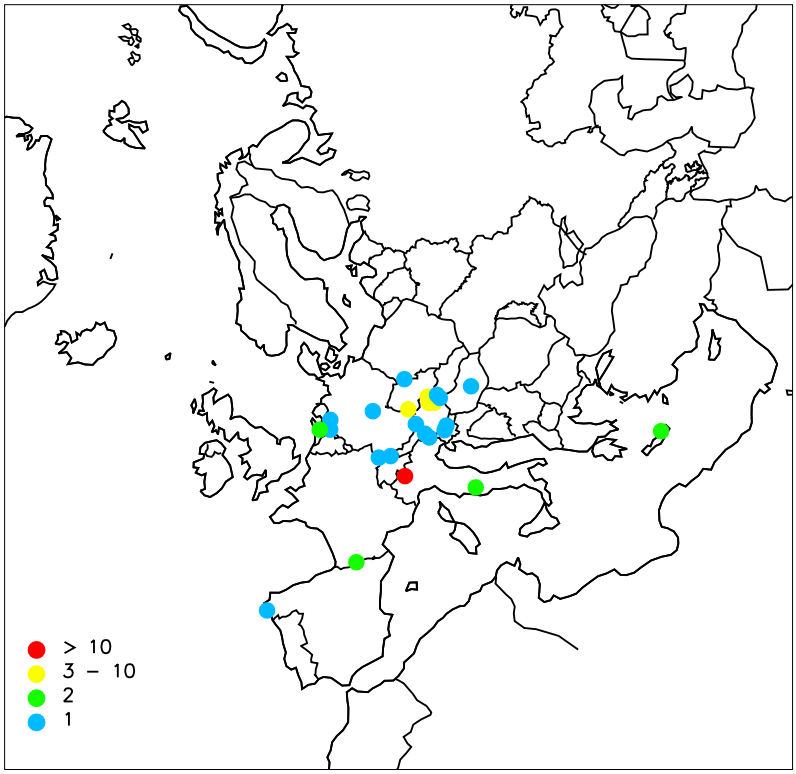


Figure 1.4: Number of exceedances of the threshold value of 180 µg/m^3. (Unit: number of days). Stations with zero exceedances are not shown.

Annex 2

AOT40 and AOT60, figures and tables

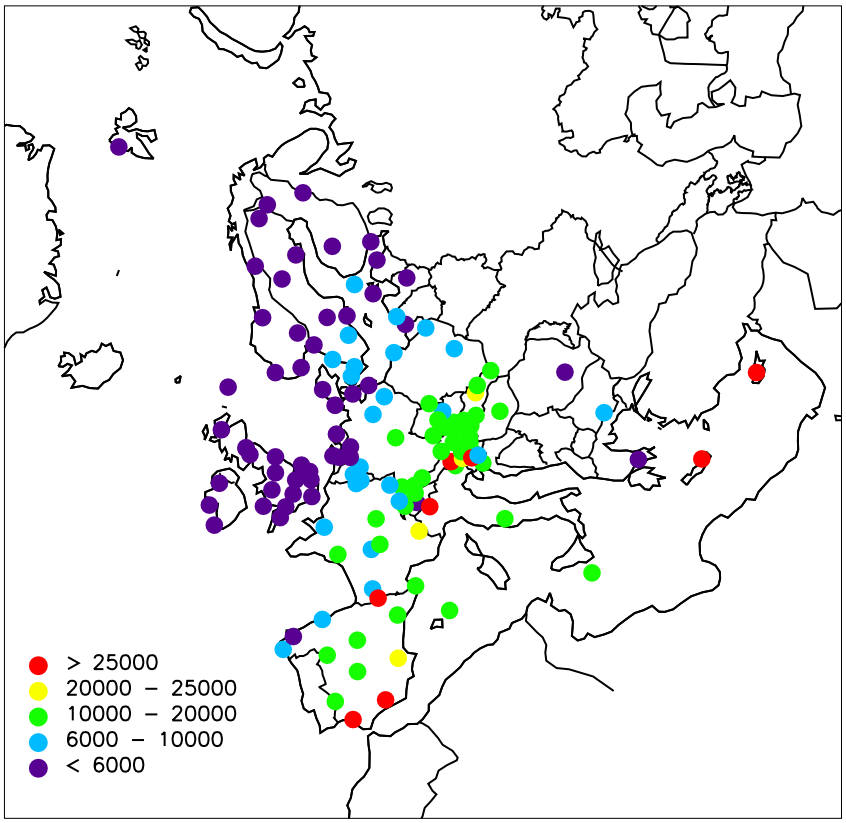


Figure 2.1: AOT40 (ppbh) April–September 2013 (daylight hours).

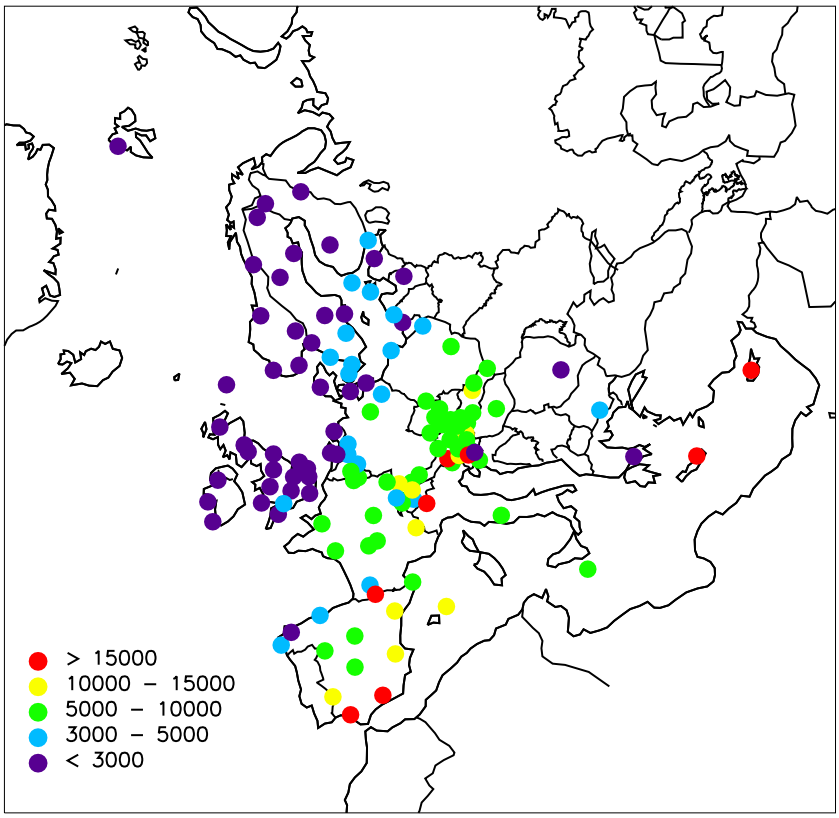


Figure 2.2: AOT40 (ppbh) May, June and July 2013 (daylight hours).

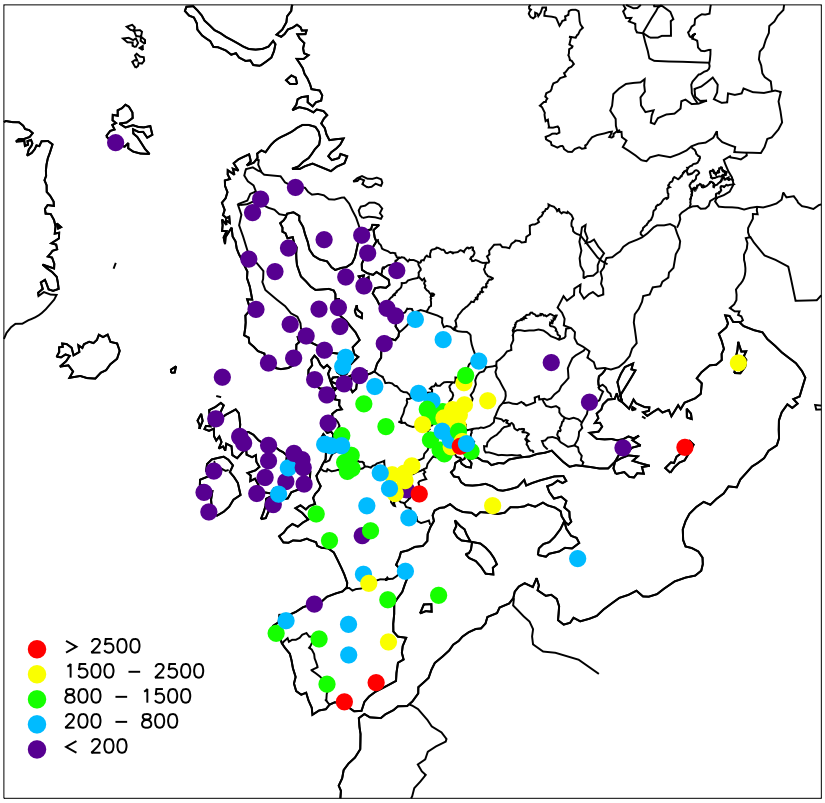


Figure 2.3: AOT60 (ppbh) April-September 2013 (daylight hours).

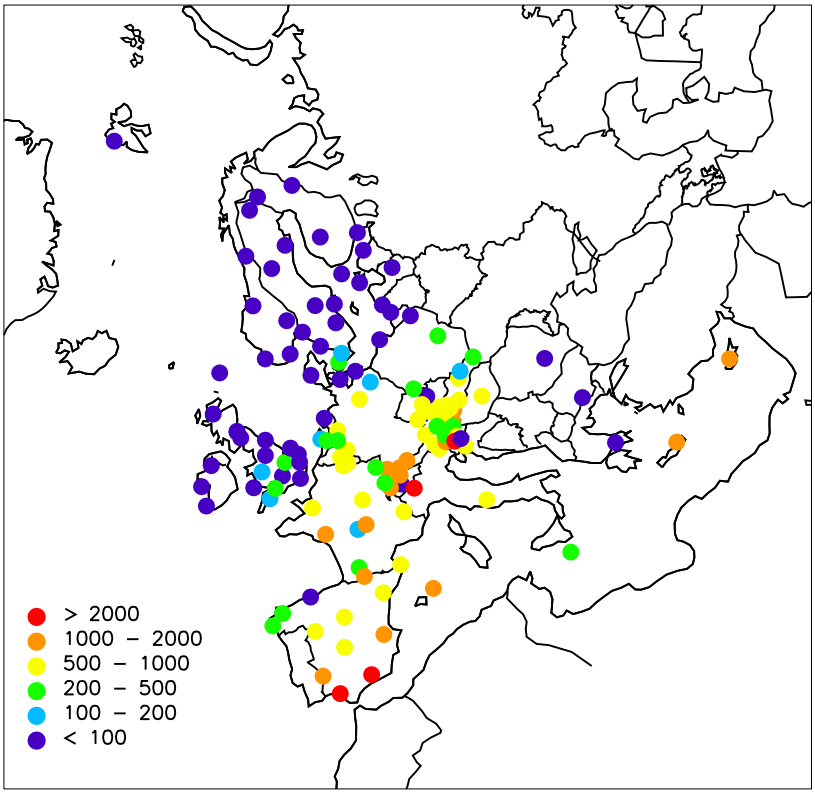


Figure 2.4: AOT60 (ppbh) May, June and July 2013 (daylight hours).

Table 2.1: AOT40 and AOT60 April–September 2013 (daylight hours).

Code	Station	AOT40	AOT40 corrected	AOT60	AOT60 corrected	Data capture
AT0002R	Illmitz	15687.0	16912.0	2125.5	2291.5	92.8
AT0005R	Vorhegg	13816.0	15035.7	1087.0	1183.0	91.9
AT0030R	Pillersdorf bei Retz	11099.5	12237.3	1326.0	1461.9	90.7
AT0032R	Sulzberg	15628.0	15981.9	1910.5	1953.8	97.8
AT0034G	Sonnblick	26373.0	27992.2	1495.5	1587.3	94.2
AT0038R	Gerlitzen	23534.0	24702.3	1662.0	1744.5	95.3
AT0040R	Masenberg	18306.0	19279.8	1904.5	2005.8	94.9
AT0041R	Haunsberg	11570.0	12276.7	1425.5	1512.6	94.2
AT0042R	Heidenreichstein	11878.5	12463.7	1181.5	1239.7	95.3
AT0043R	Forsthof	13556.0	14320.3	1904.0	2011.4	94.7
AT0045R	Dunkelsteinerwald	12384.5	13055.3	2041.5	2152.1	94.9
AT0046R	Gänserndorf	13422.5	14071.8	1745.5	1829.9	95.4
AT0047R	Stixneusiedl	13145.0	13788.2	1770.5	1857.1	95.3
AT0048R	Zoebelboden	10619.5	11435.5	791.0	851.8	92.9
AT0049R	Grebenzen bei St. Lamprecht	16264.5	18224.4	769.5	862.2	89.2
AT0050R	Graz Lustbuehel	11512.0	12391.1	1043.0	1122.6	92.9
BE0001R	Offagne	8545.2	8960.6	936.8	982.3	95.4
BE0032R	Eupen	7643.8	8006.8	964.2	1010.0	95.5
BE0035R	Vezin	8545.2	8960.8	936.8	982.3	95.4
BG0053R	Rojen peak	8449.0	8729.2	2.0	2.1	96.8
CH0001G	Jungfraujoch	5473.9	5680.6	97.6	101.2	96.4
CH0002R	Payerne	12507.9	12720.9	1820.4	1851.4	98.3
CH0003R	Tänikon	12891.2	13143.1	2110.3	2151.6	98.1
CH0004R	Chaumont	15109.9	15320.9	1913.1	1939.9	98.6
CH0005R	Rigi	15984.3	16272.3	2446.3	2490.4	98.2
CY0002R	Ayia Marina	30311.9	31046.3	2192.3	2245.4	97.6
CZ0001R	Svratouch	9279.7	9288.7	346.7	347.0	99.9
CZ0003R	Kosetice	10714.1	11403.4	915.7	974.6	94.0
CZ0005R	Churanov	15075.8	15581.8	2467.5	2550.3	96.8
DE0001R	Westerland	5711.1	6522.8	194.9	222.6	87.6
DE0002R	Waldhof	8768.4	9230.2	873.3	919.3	95.0
DE0003R	Schauinsland	16357.5	17284.2	2159.1	2281.4	94.6
DE0007R	Neuglobsow	7002.1	7356.5	240.6	252.8	95.2
DE0008R	Schmücke	11661.5	13313.4	1205.8	1376.6	87.6
DE0009R	Zingst	5026.4	5345.6	136.4	145.1	94.0
DK0005R	Keldsnor	2709.0	2885.0	89.3	95.1	93.9
DK0010G	Nord, Greenland	44.4	54.4	0	0.0	81.7
DK0012R	Risoe	7487.9	7839.5	279.0	292.1	95.5
DK0031R	Ulborg	5098.4	5281.5	108.1	111.9	96.5
EE0009R	Lahemaa	3492.5	3584.4	36.5	37.5	97.4
EE0011R	Vilsandi	5410.5	5995.3	7.5	8.3	90.2
ES0001R	San Pablo de los Montes	17724.7	17974.2	749.0	759.5	98.6
ES0005R	Noya	8054.5	8286.9	901.2	927.2	97.2
ES0006R	Mahón	17517.3	18089.0	1291.0	1333.2	96.8
ES0007R	Víznar	25359.5	26141.3	2957.4	3048.6	97.0
ES0008R	Niembro	6997.8	7204.1	50.9	52.4	97.1
ES0009R	Campisabalos	16442.2	17237.8	727.5	762.7	95.4
ES0010R	Cabo de Creus	11184.4	11591.6	740.7	767.7	96.5
ES0011R	Barcarrota	18551.5	19031.6	1460.9	1498.7	97.5
ES0012R	Zarra	22734.8	23141.6	1524.9	1552.2	98.2
ES0013R	Penausende	15207.3	15552.9	939.4	960.7	97.8
ES0014R	Els Torms	16465.6	16970.0	850.8	876.8	97.0
ES0016R	O Saviñao	4517.4	4617.3	421.1	430.5	97.8
ES0017R	Doñana	26732.1	27952.2	3287.9	3438.0	95.6
FI0009R	Utö	6477.5	6632.9	85.5	87.6	97.7
FI0017R	Virolahti II	5759.5	5928.5	49.5	51.0	97.1
FI0022R	Oulanka	2455.0	2546.5	15.0	15.6	96.4
FI0037R	Ähtäri II	2473.5	2488.9	0	0.0	99.4
FI0096G	Pallas (Sammaltunturi)	3218.0	3239.7	24.0	24.2	99.3

Table 2.1, cont.

Code	Station	AOT40	AOT40 corrected	AOT60	AOT60 corrected	Data capture
FR0008R	Donon	8244.0	8313.6	543.5	548.1	99.2
FR0009R	Revin	7746.0	7897.7	893.0	910.5	98.1
FR0010R	Morvan	10398.5	11135.0	630.0	674.6	93.4
FR0013R	Peyrusse Vieille	8730.0	9037.2	386.0	399.6	96.6
FR0014R	Montandon	6331.5	6448.9	377.0	384.0	98.2
FR0015R	La Tardière	11126.5	11280.5	1324.5	1342.8	98.6
FR0016R	Le Casset	21490.5	21554.1	778.0	780.3	99.7
FR0017R	Montfranc	9250.0	10222.6	186.0	205.6	90.5
FR0018R	La Coulonche	9791.0	9911.1	1083.5	1096.8	98.8
FR0019R	Pic du Midi	26044.0	26664.4	2225.0	2278.0	97.7
FR0030R	Puy de Dôme	15396.5	15835.1	1149.5	1182.2	97.2
GB0002R	Eskdalemuir	2905.7	2936.9	0	0.0	98.9
GB0006R	Lough Navar	1825.1	1902.0	26.6	27.7	96.0
GB0013R	Yarner Wood	3838.0	3896.9	172.1	174.7	98.5
GB0014R	High Muffles	3239.8	3265.0	30.1	30.3	99.2
GB0015R	Strath Vaich Dam	4249.9	4264.4	14.2	14.2	99.7
GB0031R	Aston Hill	3000.6	3084.0	123.7	127.1	97.3
GB0033R	Bush	2727.9	2753.2	0.6	0.6	99.1
GB0035R	Great Dun Fell	1321.7	1588.2	0	0.0	83.2
GB0036R	Harwell	2927.0	2997.8	88.5	90.6	97.6
GB0037R	Ladybower Res.	1453.9	1470.9	6.0	6.1	98.8
GB0038R	Lullington Heath	2087.6	2135.1	56.8	58.1	97.8
GB0039R	Sibton	3770.7	3794.4	62.8	63.2	99.4
GB0043R	Narberth	3594.2	3637.1	49.9	50.5	98.8
GB0045R	Wicken Fen	4535.4	4592.9	285.8	289.4	98.7
GB0048R	Auchencorth Moss	1362.0	1367.9	0	0.0	99.6
GB0049R	Weybourne	4715.2	4740.3	8.2	8.3	99.5
GB0050R	St. Osyth	3331.6	3402.3	65.8	67.1	97.9
GB0052R	Lerwick	1622.0	1883.7	0	0.0	86.1
GB0053R	Charlton Mackrell	5738.6	5783.4	506.2	510.2	99.2
GR0001R	Aliartos	3631.2	3671.2	31.8	32.2	98.9
GR0002R	Finokalia	30838.6	31563.9	2651.6	2714.0	97.7
HU0002R	K-puszta	16375.5	17180.7	1874.5	1966.7	95.3
IE0001R	Valentia Observatory	4171.6	4602.0	1.4	1.5	90.6
IE0031R	Mace Head	4796.2	4836.1	39.1	39.4	99.2
IT0001R	Montelibretti	15274.6	15576.2	1545.1	1575.6	98.1
IT0004R	Ispra	26521.9	27108.3	8356.3	8541.0	97.8
LT0015R	Preila	1953.4	2009.1	1.5	1.5	97.2
LV0010R	Rucava	6405.5	6405.5	79.0	79.0	100.0
LV0016R	Zoseni	4108.5	4108.5	1.5	1.5	100.0
MK0007R	Lazaropole	49997.3	59837.6	18438.5	22067.5	83.6
MT0001R	Giordan lighthouse	16113.1	16851.7	413.6	432.5	95.6
NL0007R	Eibergen	5744.0	5865.5	826.5	843.9	97.9
NL0009R	Kollumerwaard	2965.0	3062.7	96.8	100.0	96.8
NL0010R	Vredepeel	4953.4	5135.8	644.7	668.5	96.4
NL0091R	De Zilk	3886.5	4356.1	253.1	283.7	89.2
NL0644R	Cabauw Wielsekade	3809.9	3910.9	493.8	506.8	97.4
NO0002R	Birkenes II	3363.0	3581.1	0.2	0.3	93.9
NO0015R	Tustervatn	3700.4	3747.2	18.1	18.3	98.8
NO0039R	Kårvatn	4473.6	4567.0	0	0.0	98.0
NO0042G	Zeppelin mountain (Ny-Ålesund)	407.0	409.0	0	0.0	99.5
NO0043R	Prestebakke	4020.3	4067.4	0	0.0	98.8
NO0052R	Sandve	3450.4	3787.0	0.5	0.5	91.1
NO0056R	Hurdal	2187.2	2205.2	0	0.0	99.2
PL0002R	Jarczew	9590.0	9604.2	666.0	667.0	99.9
PL0003R	Sniezka	13349.5	13823.4	717.5	743.0	96.6
PL0004R	Leba	6611.5	6774.7	70.0	71.7	97.6
PL0005R	Diabla Gora	7846.5	7846.5	289.5	289.5	100.0
RO0003R	Semenic	40.5	45.2	0	0.0	89.6
RO0008R	Poiana Stampei	6019.4	7668.6	121.1	154.2	78.5

Table 2.1, cont.

Code	Station	AOT40	AOT40 corrected	AOT60	AOT60 corrected	Data capture
SE0005R	Bredkälen	3679.0	3768.5	15.5	15.9	97.6
SE0011R	Vavihill	7698.5	7869.1	261.0	266.8	97.8
SE0012R	Aspvreten	2501.5	2657.6	0	0.0	94.1
SE0013R	Esrange	3562.0	3643.9	33.0	33.8	97.8
SE0014R	Råö	6811.5	6877.9	82.5	83.3	99.0
SE0032R	Norra-Kvill	6327.0	6927.3	37.5	41.1	91.3
SE0035R	Vindeln	4798.5	4805.4	89.0	89.1	99.9
SE0039R	Grimsö	5109.5	5176.9	5.0	5.1	98.7
SI0008R	Iskrba	14092.5	14831.5	1253.5	1319.2	95.0
SI0031R	Zarodnje	17279.5	17492.5	1766.5	1788.3	98.8
SI0032R	Krvavec	28986.0	30677.0	4683.5	4956.7	94.5
SI0033R	Kovk	8646.0	9183.3	397.5	422.2	94.1
SK0002R	Chopok	21384.0	23042.9	1577.5	1699.9	92.8
SK0004R	Stará Lesná	15577.5	15577.5	920.5	920.5	100.0
SK0006R	Starina	11528.0	11528.0	735.5	735.5	100.0
SK0007R	Topolniky	16039.0	16530.9	1739.0	1792.3	97.0

Table 2.2: AOT40 and AOT60 May–July 2013 (daylight hours).

Code	Station	AOT40	AOT40 corrected	AOT60	AOT60 corrected	Data capture
AT0002R	Illmitz	9073.0	9778.3	1177.5	1269.0	92.8
AT0005R	Vorhegg	8607.0	9247.1	664.0	713.4	93.1
AT0030R	Pillersdorf bei Retz	5890.5	6668.0	637.5	721.7	88.3
AT0032R	Sulzberg	9832.0	9940.6	1347.5	1362.4	98.9
AT0034G	Sonnblick	15721.5	16609.1	942.0	995.2	94.7
AT0038R	Gerlitzen	14017.5	14663.0	1164.5	1218.1	95.6
AT0040R	Masenberg	10578.5	11082.2	1116.0	1169.1	95.5
AT0041R	Haunsberg	7073.0	7554.5	935.0	998.6	93.6
AT0042R	Heidenreichstein	6282.5	6584.7	643.0	673.9	95.4
AT0043R	Forsthof	6983.5	7335.0	726.0	762.5	95.2
AT0045R	Dunkelsteinerwald	6862.5	7227.4	979.0	1031.1	95.0
AT0046R	Gänserndorf	7176.5	7537.7	724.5	761.0	95.2
AT0047R	Stixneusiedl	7210.5	7545.9	897.5	939.2	95.6
AT0048R	Zoebelboden	6327.5	6779.9	458.5	491.3	93.3
AT0049R	Grebenzen bei St. Lamprecht	9383.5	10205.8	323.5	351.8	91.9
AT0050R	Graz Lustbuehel	6434.5	6990.0	482.0	523.6	92.1
BE0001R	Offagne	5404.2	5612.7	821.8	853.4	96.3
BE0032R	Eupen	4913.0	5215.3	904.0	959.6	94.2
BE0035R	Vezin	5404.2	5612.7	821.8	853.4	96.3
BG0053R	Rojen peak	3979.7	4178.7	0	0.0	95.2
CH0001G	Jungfraujoch	3834.6	3975.0	64.5	66.9	96.5
CH0002R	Payerne	8007.7	8155.4	1445.0	1471.6	98.2
CH0003R	Tänikon	8405.0	8552.6	1613.0	1641.3	98.3
CH0004R	Chaumont	9890.6	10017.6	1585.9	1606.2	98.7
CH0005R	Rigi	10185.4	10383.1	1844.6	1880.4	98.1
CY0002R	Ayia Marina	17008.0	17258.4	1349.8	1369.7	98.5
CZ0001R	Svratouch	5013.4	5013.4	98.5	98.5	100.0
CZ0003R	Kosetice	6404.3	6693.0	629.0	657.4	95.7
CZ0005R	Churanov	8005.9	8345.9	658.2	686.2	95.9
DE0001R	Westerland	2500.4	3122.7	63.7	79.6	80.1
DE0002R	Waldhof	5349.2	5591.8	634.2	663.0	95.7
DE0003R	Schauinsland	10596.8	11110.0	1806.7	1894.2	95.4
DE0007R	Neuglobsow	4131.5	4300.2	152.5	158.7	96.1
DE0008R	Schmücke	6244.7	7654.1	770.0	943.8	81.6
DE0009R	Zingst	2744.9	2941.6	83.1	89.1	93.3
DK0005R	Keldsnor	1454.9	1588.6	41.7	45.5	91.6
DK0010G	Nord, Greenland	35.5	42.1	0	0.0	84.2
DK0012R	Risoe	4253.1	4528.0	261.7	278.7	93.9
DK0031R	Ulborg	2558.3	2664.5	78.1	81.3	96.0

Table 2.2, cont.

Code	Station	AOT40	AOT40 corrected	AOT60	AOT60 corrected	Data capture
EE0009R	Lahemaa	1994.0	2061.4	31.5	32.6	96.7
EE0011R	Vilsandi	3427.0	4018.8	6.5	7.6	85.3
ES0001R	San Pablo de los Montes	9298.3	9419.8	525.5	532.4	98.7
ES0005R	Noya	3862.7	3916.0	346.7	351.5	98.6
ES0006R	Mahón	11195.6	11526.1	1183.2	1218.2	97.1
ES0007R	Víznar	15767.5	16346.9	2438.1	2527.7	96.5
ES0008R	Niembro	3743.8	3871.3	49.5	51.2	96.7
ES0009R	Campisabalos	8890.7	9478.2	566.0	603.4	93.8
ES0010R	Cabo de Creus	7370.1	7610.1	671.1	692.9	96.8
ES0011R	Barcarrota	12663.4	13043.9	1310.5	1349.9	97.1
ES0012R	Zarra	14786.2	15030.7	1366.8	1389.4	98.4
ES0013R	Penausende	8674.7	8877.4	677.6	693.5	97.7
ES0014R	Els Torms	10076.9	10356.3	682.3	701.2	97.3
ES0016R	O Saviñao	2787.7	2865.5	244.7	251.5	97.3
ES0017R	Doñana	16217.7	16947.1	2429.0	2538.3	95.7
FI0009R	Utö	3855.0	3986.3	82.5	85.3	96.7
FI0017R	Virolahti II	3444.0	3610.5	42.5	44.6	95.4
FI0022R	Oulanka	920.0	971.7	0	0.0	94.7
FI0037R	Ähtäri II	1226.5	1235.7	0	0.0	99.3
FI0096G	Pallas (Sammaltunturi)	1626.0	1632.6	0	0.0	99.6
FR0008R	Donon	5458.5	5513.4	484.0	488.9	99.0
FR0009R	Revin	5040.0	5142.3	804.0	820.3	98.0
FR0010R	Morvan	6190.5	6548.7	512.0	541.6	94.5
FR0013R	Peyrusse Vieille	4571.5	4872.1	262.0	279.2	93.8
FR0014R	Montandon	4187.5	4284.5	329.5	337.1	97.7
FR0015R	La Tardière	6605.0	6719.7	1007.0	1024.5	98.3
FR0016R	Le Casset	12727.0	12796.5	695.0	698.8	99.5
FR0017R	Montfranc	5240.5	5612.6	168.0	179.9	93.4
FR0018R	La Coulonche	5754.5	5832.0	839.0	850.3	98.7
FR0019R	Pic du Midi	15964.5	16375.4	1892.5	1941.2	97.5
FR0030R	Puy de Dôme	9542.0	9850.7	1029.5	1062.8	96.9
GB0002R	Eskdalemuir	1240.7	1262.7	0	0.0	98.3
GB0006R	Lough Navar	794.1	794.1	26.6	26.6	100.0
GB0013R	Yarner Wood	2685.5	2757.2	170.3	174.8	97.4
GB0014R	High Muffles	1773.0	1794.7	30.1	30.5	98.8
GB0015R	Strath Vaich Dam	1840.7	1842.3	14.2	14.2	99.9
GB0031R	Aston Hill	1892.6	1924.7	123.7	125.7	98.3
GB0033R	Bush	1080.2	1083.0	0	0.0	99.7
GB0035R	Great Dun Fell	539.5	653.0	0	0.0	82.6
GB0036R	Harwell	1674.0	1716.0	85.5	87.6	97.6
GB0037R	Ladybower Res.	863.9	879.2	6.0	6.2	98.3
GB0038R	Lullington Heath	1277.0	1318.4	23.2	24.0	96.9
GB0039R	Sibton	2021.7	2035.9	56.3	56.7	99.3
GB0043R	Narberth	2172.1	2212.1	39.3	40.1	98.2
GB0045R	Wicken Fen	2347.2	2359.5	239.6	240.8	99.5
GB0048R	Auchencorth Moss	567.5	571.5	0	0.0	99.3
GB0049R	Weybourne	2221.5	2240.9	8.2	8.3	99.1
GB0050R	St. Osyth	1747.8	1788.3	53.0	54.2	97.7
GB0052R	Lerwick	624.6	624.6	0	0.0	100.0
GB0053R	Charlton Mackrell	3875.2	3892.4	455.8	457.8	99.6
GR0001R	Aliartos	794.9	805.4	21.5	21.8	98.7
GR0002R	Finokalia	17542.3	17875.2	1540.2	1569.5	98.1
HU0002R	K-puszta	8929.0	9390.0	875.0	920.2	95.1
IE0001R	Valentia Observatory	2224.7	2299.8	1.4	1.4	96.7
IE0031R	Mace Head	2515.5	2551.3	39.1	39.6	98.6
IT0001R	Montelibretti	9110.7	9291.9	992.0	1011.7	98.1
IT0004R	Ispra	15899.1	16514.0	5329.5	5535.7	96.3
LT0015R	Preila	1102.5	1150.0	0	0.0	95.9
LV0010R	Rucava	3827.0	3827.0	49.0	49.0	100.0
LV0016R	Zoseni	1977.0	1977.0	1.0	1.0	100.0
MK0007R	Lazaropole	24622.4	29900.6	8065.6	9794.6	82.3
MT0001R	Giordan lighthouse	9576.6	10063.9	242.5	254.8	95.2

Table 2.2, cont.

Code	Station	AOT40	AOT40 corrected	AOT60	AOT60 corrected	Data capture
NL0007R	Eibergen	3483.6	3614.6	585.0	607.0	96.4
NL0009R	Kollumerwaard	1281.9	1355.9	13.4	14.2	94.5
NL0010R	Vredepeel	3374.3	3439.7	492.2	501.8	98.1
NL0091R	De Zilk	2212.1	2388.4	155.5	167.9	92.6
NL0644R	Cabauw Wielsekade	2293.4	2345.2	364.2	372.5	97.8
NO0002R	Birkenes II	1931.1	1983.6	0.2	0.3	97.4
NO0015R	Tustervatn	1596.3	1620.3	3.2	3.2	98.5
NO0039R	Kårvatn	1663.0	1693.7	0	0.0	98.2
NO0042G	Zeppelin mountain (Ny-Ålesund)	126.2	126.7	0	0.0	99.6
NO0043R	Prestebakke	2240.3	2263.6	0	0.0	99.0
NO0052R	Sandve	1432.8	1564.8	0	0.0	91.6
NO0056R	Hurdal	849.5	856.8	0	0.0	99.1
PL0002R	Jarczew	5065.5	5074.7	343.5	344.1	99.8
PL0003R	Sniezka	6781.5	7197.1	305.0	323.7	94.2
PL0004R	Leba	3764.5	3933.9	34.0	35.5	95.7
PL0005R	Diabla Gora	4326.5	4326.5	91.0	91.0	100.0
RO0003R	Semenic	3.7	4.3	0	0.0	87.6
RO0008R	Poiana Stampei	3171.6	3887.4	13.1	16.1	81.6
SE0005R	Bredkälen	1716.5	1756.6	4.5	4.6	97.7
SE0011R	Vavihill	4539.5	4607.1	195.5	198.4	98.5
SE0012R	Aspvreten	1720.0	1796.5	0	0.0	95.7
SE0013R	Esrange	1856.0	1860.5	3.0	3.0	99.8
SE0014R	Råö	4199.0	4261.5	57.5	58.4	98.5
SE0032R	Norra-Kvill	3542.5	3816.3	36.5	39.3	92.8
SE0035R	Vindeln	2228.5	2234.0	0	0.0	99.8
SE0039R	Grimsö	2840.5	2847.8	5.0	5.0	99.7
SI0008R	Iskrba	6960.0	7316.9	500.5	526.2	95.1
SI0031R	Zarodnje	9560.5	9717.4	828.5	842.1	98.4
SI0032R	Krvavec	16631.0	17512.9	2450.0	2579.9	95.0
SI0033R	Kovk	2192.0	2343.8	1.5	1.6	93.5
SK0002R	Chopok	10802.5	12209.6	536.0	605.8	88.5
SK0004R	Stará Lesná	6796.0	6796.0	166.0	166.0	100.0
SK0006R	Starina	5320.5	5320.5	242.5	242.5	100.0
SK0007R	Topolniky	8630.5	9128.6	812.0	858.9	94.5

Annex 3

Seasonal variation

Table 3.1: Monthly mean concentrations 2013 ($\mu g/m^3$).

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AT0002R	Illmitz	monthly mean	44.1	54.3	71.3	84.9	75.9	76.4	94.9	80.3	55.6	40.4	34.5	42.6
AT0002R	Illmitz	data capture	86.6	95.5	94.8	95.3	95.2	95.7	91.5	95.7	94.9	95.4	95.3	49.3
AT0005R	Vorhegg	monthly mean	60.3	70.8	82.0	84.8	75.1	90.9	98.5	87.9	63.5	48.1	40.4	66.6
AT0005R	Vorhegg	data capture	95.0	95.4	95.6	94.0	95.3	95.4	94.9	94.9	93.5	94.5	95.0	95.2
AT0030R	Pillersdorf bei Retz	monthly mean	44.1	58.6	70.8	81.0	70.7	71.2	90.3	81.3	57.0	41.1	33.6	31.2
AT0030R	Pillersdorf bei Retz	data capture	94.6	95.1	92.9	94.9	89.7	81.8	93.8	90.1	95.0	94.8	94.7	94.9
AT0032R	Sulzberg	monthly mean	58.3	68.3	80.0	82.3	81.6	90.2	110.1	95.2	71.8	60.1	47.1	75.3
AT0032R	Sulzberg	data capture	95.4	95.8	95.0	87.9	95.4	95.4	95.0	95.8	95.4	94.8	95.8	92.6
AT0034G	Sonnblick	monthly mean	87.1	91.0	104.8	115.4	104.2	112.1	116.6	105.3	92.8	86.1	79.9	90.8
AT0034G	Sonnblick	data capture	96.1	96.1	96.0	96.1	95.2	95.6	96.1	89.9	96.0	96.2	95.6	96.0
AT0038R	Gerlitzen	monthly mean	77.6	81.4	96.9	106.6	97.3	107.3	116.8	109.2	86.5	78.6	71.3	83.2
AT0038R	Gerlitzen	data capture	95.6	95.4	95.0	95.6	95.7	95.7	95.7	95.7	95.8	95.7	95.7	95.7
AT0040R	Masenberg	monthly mean	59.7	68.6	84.6	100.2	84.5	91.8	112.4	106.0	70.8	63.6	54.6	66.8
AT0040R	Masenberg	data capture	95.6	95.2	95.8	91.5	95.4	95.6	95.2	95.6	95.7	94.1	95.6	95.4
AT0041R	Haunsberg	monthly mean	40.3	58.2	66.1	73.2	72.9	79.4	101.2	92.0	62.6	47.1	37.0	51.4
AT0041R	Haunsberg	data capture	95.3	95.8	95.4	95.1	95.8	95.4	92.6	95.7	95.3	95.8	95.3	95.7
AT0042R	Heidenreichstein	monthly mean	42.1	55.0	73.5	78.1	67.9	70.2	80.1	75.9	54.8	44.6	38.2	34.8
AT0042R	Heidenreichstein	data capture	95.0	95.5	95.0	95.6	95.4	95.4	95.6	95.4	95.4	95.7	95.6	94.1
AT0043R	Forsthof	monthly mean	43.4	58.9	78.4	88.7	76.3	80.7	97.2	94.7	64.3	50.0	40.3	39.9
AT0043R	Forsthof	data capture	95.2	94.6	94.2	94.3	95.2	95.7	95.3	95.3	95.1	95.2	95.1	95.7
AT0045R	Dunkelsteinerwald	monthly mean	39.4	51.2	66.8	73.8	64.3	68.6	80.1	75.6	51.5	34.8	30.7	26.3
AT0045R	Dunkelsteinerwald	data capture	94.6	95.4	94.1	95.0	95.3	95.0	95.3	95.4	95.3	80.6	95.3	91.4
AT0046R	Gänserndorf	monthly mean	36.8	51.0	67.1	77.9	72.3	69.9	83.4	76.2	51.2	37.6	29.3	30.7
AT0046R	Gänserndorf	data capture	95.3	95.7	95.6	95.7	95.3	95.6	95.4	95.3	95.7	95.4	95.4	95.7
AT0047R	Stixneusiedl	monthly mean	42.0	51.7	69.6	81.5	70.8	72.5	89.6	80.5	56.2	40.7	32.7	32.6
AT0047R	Stixneusiedl	data capture	95.7	94.9	94.9	95.7	95.7	95.6	95.6	95.7	94.7	95.6	95.1	95.4
AT0048R	Zoebelboden	monthly mean	52.4	68.5	78.7	87.8	78.9	84.3	100.7	88.6	62.3	50.6	46.7	65.9
AT0048R	Zoebelboden	data capture	94.6	95.4	94.4	94.7	94.6	94.0	94.2	95.4	93.3	94.2	95.0	94.8
AT0049R	Grebenzen bei St. Lamprecht	monthly mean	73.5	77.2	92.5	102.4	89.0	97.4	110.0	108.5	78.2	71.6	70.0	83.5
AT0049R	Grebenzen bei St. Lamprecht	data capture	92.3	92.9	90.1	95.6	95.0	91.7	91.1	71.5	95.3	95.0	91.0	73.0
AT0050R	Graz Lustbuehel	monthly mean	25.0	42.4	67.6	80.7	66.5	80.1	95.0	88.8	54.2	37.8	26.0	20.3
AT0050R	Graz Lustbuehel	data capture	92.3	95.7	95.6	87.5	97.6	85.4	95.7	95.4	95.6	76.3	95.7	95.6

Table 3.1, cont.

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
BE0001R	Offagne	monthly mean	35.2	45.5	56.6	71.3	66.4	64.3	76.5	65.8	48.8	44.3	37.9	42.3
BE0001R	Offagne	data capture	97.3	95.8	84.5	97.5	97.6	97.2	95.2	89.0	97.6	84.7	97.8	97.4
BE0032R	Eupen	monthly mean	31.8	40.5	54.4	66.1	60.6	61.5	66.9	62.4	45.0	43.5	31.0	41.5
BE0032R	Eupen	data capture	97.4	84.5	95.6	97.4	97.4	97.1	90.2	97.6	97.6	87.1	97.6	97.8
BE0035R	Vezin	monthly mean	35.2	45.5	56.6	71.3	66.4	64.3	76.5	65.8	48.8	44.3	37.9	42.3
BE0035R	Vezin	data capture	97.3	95.8	84.5	97.5	97.6	97.2	95.2	89.0	97.6	84.7	97.8	97.4
BG0053R	Rojen peak	monthly mean	74.2	76.6	77.6	85.8	87.6	80.5	84.6	95.8	80.3	71.6	61.1	70.3
BG0053R	Rojen peak	data capture	94.8	95.5	95.4	95.3	90.5	92.9	93.8	94.9	95.6	89.7	95.6	95.7
CH0001G	Jungfraujoch	monthly mean	65.8	67.4	78.3	82.9	77.8	80.4	93.4	77.5	74.3	64.6	67.1	67.8
CH0001G	Jungfraujoch	data capture	96.9	97.9	96.2	91.9	97.4	97.2	96.6	97.6	97.6	96.6	95.4	97.6
CH0002R	Payerne	monthly mean	33.6	52.6	49.9	64.1	64.7	69.6	81.8	68.2	51.9	32.3	34.0	26.4
CH0002R	Payerne	data capture	98.5	99.4	99.1	99.3	98.8	99.2	99.3	99.5	99.3	98.9	99.3	99.3
CH0003R	Tänikon	monthly mean	36.3	53.4	54.4	65.2	66.9	71.1	84.6	68.7	51.2	31.5	29.9	26.3
CH0003R	Tänikon	data capture	98.1	99.3	99.2	98.9	99.6	98.6	99.2	99.2	99.2	99.2	98.6	99.1
CH0004R	Chaumont	monthly mean	64.5	70.8	80.8	84.8	82.0	92.4	112.1	97.3	78.1	62.2	54.6	76.0
CH0004R	Chaumont	data capture	95.7	99.1	99.3	99.4	99.5	99.6	99.1	99.3	99.3	99.3	99.2	99.2
CH0005R	Rigi	monthly mean	60.6	70.9	78.0	81.7	82.8	91.2	109.7	95.1	75.5	58.4	49.2	79.2
CH0005R	Rigi	data capture	99.2	99.1	99.3	99.3	98.9	98.6	99.6	99.3	99.3	99.1	99.3	99.5
CY0002R	Ayia Marina	monthly mean	83.8	89.7	99.2	104.3	108.6	109.8	115.3	118.6	95.2	99.8	92.4	78.0
CY0002R	Ayia Marina	data capture	96.6	97.9	89.1	98.3	96.9	98.6	98.9	98.3	96.2	98.7	99.0	94.4
CZ0001R	Svratouch	monthly mean	39.3	47.4	65.0	82.5	62.8	75.3	86.6	78.3	56.7	56.7	38.2	37.1
CZ0001R	Svratouch	data capture	100.0	100.0	98.4	99.9	100.0	100.0	100.0	100.0	99.9	99.9	99.7	100.0
CZ0003R	Kosetice	monthly mean	42.4	55.3	73.5	79.2	66.4	69.0	83.3	69.7	54.4	48.9	36.1	39.8
CZ0003R	Kosetice	data capture	100.0	100.0	100.0	100.0	100.0	93.2	92.7	78.9	99.9	96.5	84.9	100.0
CZ0005R	Churanov	monthly mean	66.3	72.9	81.6	85.1	63.6	81.1	97.6	90.2	64.8	66.4	52.1	72.2
CZ0005R	Churanov	data capture	96.6	99.7	99.6	93.5	90.2	100.0	99.7	100.0	100.0	100.0	99.7	100.0
CZ0007R	Kresin u Pacova	monthly mean	-	-	-	-	-	-	-	-	60.8	59.9	44.3	43.6
CZ0007R	Kresin u Pacova	data capture	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	81.1	99.9	89.9	100.0

Table 3.1, cont.

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DE0001R	Westerland	monthly mean	57.1	63.5	80.1	79.2	79.8	73.7	76.8	79.7	65.0	54.2	63.7	55.3
DE0001R	Westerland	data capture	95.6	96.0	96.0	95.7	50.5	95.4	96.0	96.0	95.7	96.0	93.9	95.8
DE0002R	Waldhof	monthly mean	46.5	51.1	78.2	71.4	64.3	66.1	65.6	62.9	43.4	36.1	32.4	36.9
DE0002R	Waldhof	data capture	96.0	94.9	96.0	95.6	95.7	96.0	95.2	91.1	95.4	96.1	94.4	94.6
DE0003R	Schauinsland	monthly mean	70.2	73.4	86.4	88.1	84.7	91.7	112.8	96.7	80.4	73.1	55.7	76.0
DE0003R	Schauinsland	data capture	96.0	94.5	95.7	96.0	95.7	95.4	95.8	96.0	87.2	54.0	96.0	92.3
DE0007R	Neuglobsow	monthly mean	47.8	53.9	82.1	74.0	66.9	65.5	59.7	56.3	38.0	31.7	35.4	25.4
DE0007R	Neuglobsow	data capture	96.1	96.0	95.4	94.7	96.0	96.1	95.4	95.8	95.7	96.1	95.1	95.8
DE0008R	Schmücke	monthly mean	46.4	57.1	81.1	87.3	78.7	86.9	96.9	95.0	62.6	56.1	49.8	52.0
DE0008R	Schmücke	data capture	95.6	94.8	90.3	94.6	94.9	87.1	64.9	94.8	95.7	95.6	94.2	95.7
DE0009R	Zingst	monthly mean	54.6	60.9	85.2	76.1	76.2	68.7	66.7	68.7	53.6	42.2	42.8	39.2
DE0009R	Zingst	data capture	95.4	96.1	96.0	95.7	96.0	86.5	96.1	96.0	96.0	95.7	94.2	95.6
DK0005R	Keldsnor	monthly mean	54.1	62.7	81.3	65.8	68.6	64.4	66.1	70.7	58.3	48.4	49.8	36.9
DK0005R	Keldsnor	data capture	91.5	91.7	91.3	85.3	81.6	89.7	91.1	91.7	91.7	77.6	91.7	88.2
DK0010G	Nord, Greenland	monthly mean	67.6	74.3	53.3	48.4	32.0	50.0	47.3	43.2	67.2	68.5	66.9	63.9
DK0010G	Nord, Greenland	data capture	91.7	91.7	70.2	91.7	76.1	79.7	87.2	49.6	44.4	90.9	83.8	80.9
DK0012R	Risoe	monthly mean	51.0	60.2	79.5	82.8	83.9	74.5	73.4	71.8	57.9	50.9	46.8	46.0
DK0012R	Risoe	data capture	91.3	90.6	91.8	91.2	91.4	90.1	88.2	90.9	91.5	91.7	91.7	91.7
DK0031R	Ulborg	monthly mean	57.4	62.6	79.9	82.9	80.0	63.1	64.9	65.4	54.6	48.4	59.7	69.1
DK0031R	Ulborg	data capture	88.7	91.5	84.5	91.4	91.7	89.7	91.7	88.2	91.5	91.7	91.5	13.6
EE0009R	Lahemaa	monthly mean	57.9	57.1	78.7	81.9	67.5	59.0	52.0	50.0	41.5	46.7	44.7	52.0
EE0009R	Lahemaa	data capture	100.0	99.6	100.0	96.7	99.9	100.0	90.3	99.5	100.0	94.1	99.7	98.3
EE0011R	Vilsandi	monthly mean	60.1	61.5	83.0	86.9	81.2	79.7	70.4	70.8	57.0	56.1	56.2	56.0
EE0011R	Vilsandi	data capture	99.7	99.4	100.0	99.7	98.1	100.0	57.8	93.0	98.5	97.0	99.4	99.1
ES0001R	San Pablo de los Montes	monthly mean	66.6	71.7	82.0	87.6	84.6	89.9	107.4	101.2	93.3	69.1	59.2	66.6
ES0001R	San Pablo de los Montes	data capture	98.7	98.7	98.9	99.3	99.3	99.0	99.6	99.6	99.0	99.1	95.0	99.3
ES0005R	Noya	monthly mean	71.0	60.6	59.7	45.0	58.5	72.9	81.9	79.7	80.3	74.0	72.4	78.3
ES0005R	Noya	data capture	99.1	99.0	99.1	95.8	99.3	99.4	99.2	95.6	99.3	99.6	98.6	99.5
ES0006R	Mahón	monthly mean	73.2	84.0	85.5	87.4	90.9	94.8	104.1	96.6	80.5	71.3	71.2	71.3
ES0006R	Mahón	data capture	94.0	98.4	98.5	96.2	98.9	99.0	97.6	99.1	98.9	85.3	99.2	93.4
ES0007R	Víznar	monthly mean	71.8	76.5	82.9	90.8	91.6	105.4	116.3	103.5	88.5	73.4	72.1	74.4
ES0007R	Víznar	data capture	94.0	98.2	97.0	98.6	90.5	99.4	99.6	97.2	99.3	98.9	96.8	88.7
ES0008R	Niembro	monthly mean	63.1	66.6	82.8	88.4	81.2	68.6	72.9	73.0	65.0	63.0	61.9	62.7
ES0008R	Niembro	data capture	98.8	91.5	99.1	98.9	98.5	98.1	98.5	99.2	98.9	98.8	98.8	98.7
ES0009R	Campisabalos	monthly mean	68.5	73.2	83.6	85.4	81.3	77.4	95.2	86.2	73.7	60.6	61.9	62.9
ES0009R	Campisabalos	data capture	99.3	99.7	97.8	98.3	99.2	90.3	95.6	98.8	99.0	99.3	85.1	98.5

Table 3.1, cont.

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ES0010R	Cabo de Creus	monthly mean	61.6	68.2	77.7	84.4	79.5	83.3	98.8	85.3	76.1	66.8	46.9	52.9
ES0010R	Cabo de Creus	data capture	98.9	98.5	99.2	96.9	97.2	98.6	97.3	98.7	99.0	92.7	97.9	99.1
ES0011R	Barcarrota	monthly mean	57.2	59.9	79.3	70.4	85.2	100.1	82.8	77.9	74.6	51.6	49.5	59.4
ES0011R	Barcarrota	data capture	98.3	98.4	96.9	99.0	95.3	99.2	98.5	98.9	99.3	96.5	83.3	99.5
ES0012R	Zarra	monthly mean	71.4	78.1	88.9	96.7	92.7	105.3	109.7	89.0	84.1	73.1	64.9	71.8
ES0012R	Zarra	data capture	99.2	99.1	99.2	98.8	98.9	99.3	98.7	98.8	98.9	99.1	98.9	98.9
ES0013R	Penausende	monthly mean	68.5	71.3	83.4	89.5	82.6	79.0	96.5	88.6	76.3	62.3	58.9	61.0
ES0013R	Penausende	data capture	96.0	99.1	99.2	99.2	99.5	98.8	98.4	98.8	99.0	97.6	99.3	99.1
ES0014R	Els Torms	monthly mean	58.9	65.3	76.5	81.9	81.1	89.6	99.4	87.0	82.1	68.7	59.8	47.8
ES0014R	Els Torms	data capture	97.0	99.0	98.7	92.9	98.4	99.2	98.5	98.9	96.7	99.2	99.0	98.9
ES0016R	O Saviñao	monthly mean	32.4	34.6	47.0	56.1	56.7	55.9	67.1	62.2	55.3	46.1	51.5	51.6
ES0016R	O Saviñao	data capture	98.8	98.8	99.2	99.3	99.5	95.8	98.8	99.2	99.4	96.5	99.0	99.5
ES0017R	Doñana	monthly mean	60.0	62.8	86.2	88.1	97.5	90.7	93.1	87.6	70.4	48.1	47.4	45.5
ES0017R	Doñana	data capture	99.5	99.3	99.5	96.1	99.6	96.9	93.8	98.9	92.8	92.9	99.6	99.5
FI0009R	Utö	monthly mean	64.4	60.5	84.9	91.4	85.0	78.4	66.4	72.6	63.0	58.0	60.3	57.3
FI0009R	Utö	data capture	99.6	95.7	100.0	100.0	96.5	100.0	95.8	100.0	96.4	100.0	99.9	95.7
FI0017R	Virolahti II	monthly mean	56.6	52.7	76.9	81.5	70.2	68.5	55.4	55.6	39.5	49.4	45.9	48.1
FI0017R	Virolahti II	data capture	75.3	100.0	100.0	100.0	90.3	100.0	100.0	100.0	99.3	100.0	99.0	27.3
FI0022R	Oulanka	monthly mean	63.6	67.5	79.8	85.5	73.0	57.1	52.5	52.1	46.1	51.9	57.0	64.2
FI0022R	Oulanka	data capture	98.3	99.7	100.0	100.0	99.2	95.0	91.5	99.7	97.5	88.3	99.9	41.7
FI0037R	Ähtäri II	monthly mean	54.9	56.5	75.3	82.3	70.4	58.4	48.3	47.1	39.8	47.6	49.6	53.3
FI0037R	Ähtäri II	data capture	98.5	99.9	99.6	100.0	99.5	99.9	99.3	100.0	99.3	100.0	99.7	98.5
FI0096G	Pallas (Sammaltunturi)	monthly mean	74.3	75.7	84.7	87.4	80.8	66.1	60.8	60.1	55.3	58.3	67.0	64.9
FI0096G	Pallas (Sammaltunturi)	data capture	75.0	100.0	100.0	100.0	100.0	99.3	100.0	100.0	98.8	100.0	99.4	99.5
FR0008R	Donon	monthly mean	45.6	53.5	60.2	74.4	62.9	69.3	86.4	74.8	56.0	50.6	43.6	60.8
FR0008R	Donon	data capture	99.2	99.9	99.3	99.4	99.9	99.2	99.5	99.9	99.9	98.0	99.9	99.7
FR0009R	Revin	monthly mean	38.3	49.8	65.4	76.7	67.1	63.2	76.8	66.6	48.1	42.6	37.8	42.7
FR0009R	Revin	data capture	98.5	95.4	99.9	99.7	100.0	96.0	99.6	96.6	99.6	99.9	100.0	98.4
FR0010R	Morvan	monthly mean	47.5	58.5	68.2	77.6	68.7	69.0	86.0	71.8	54.7	56.4	47.8	57.3
FR0010R	Morvan	data capture	97.7	95.2	79.0	95.0	90.6	96.5	92.9	86.3	90.4	86.3	94.9	98.0
FR0013R	Peyrusse Vieille	monthly mean	57.2	66.9	76.5	80.0	75.0	70.6	83.2	78.1	64.6	56.1	44.8	51.4
FR0013R	Peyrusse Vieille	data capture	99.5	99.7	98.7	99.9	99.6	99.7	81.9	100.0	99.7	98.3	99.9	100.0
FR0014R	Montandon	monthly mean	32.5	47.2	52.7	57.9	54.3	60.1	78.4	61.5	46.9	41.1	34.5	53.5
FR0014R	Montandon	data capture	99.2	99.1	98.5	97.9	99.9	95.6	99.6	99.9	98.8	99.7	99.6	99.6

Table 3.1, cont.

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
FR0015R	La Tardière	monthly mean	53.8	61.2	67.9	76.7	71.2	64.6	83.6	68.6	57.5	42.6	46.3	45.3
FR0015R	La Tardière	data capture	100.0	79.8	99.9	99.4	96.9	98.8	99.9	99.9	99.4	99.3	91.1	96.1
FR0016R	Le Casset	monthly mean	88.2	91.4	98.9	102.7	93.6	96.9	107.6	94.3	87.8	70.9	74.1	87.2
FR0016R	Le Casset	data capture	100.0	94.3	100.0	100.0	100.0	99.2	99.9	100.0	100.0	92.3	99.4	99.7
FR0017R	Montfranc	monthly mean	62.3	70.2	80.0	80.3	76.8	75.3	91.3	91.8	72.2	66.7	57.5	76.1
FR0017R	Montfranc	data capture	99.3	99.6	99.6	99.4	97.8	99.7	81.2	66.0	99.7	99.2	99.3	99.9
FR0018R	La Coulonche	monthly mean	53.2	60.8	72.5	83.2	76.0	65.0	79.7	71.4	63.6	56.0	54.9	57.6
FR0018R	La Coulonche	data capture	99.3	99.6	99.5	99.3	99.5	99.9	98.4	99.5	99.7	81.6	99.4	98.7
FR0019R	Pic du Midi	monthly mean	96.4	100.4	109.9	114.8	109.1	108.8	119.6	104.1	87.9	82.9	79.0	88.8
FR0019R	Pic du Midi	data capture	99.9	99.0	99.2	99.9	97.8	99.7	95.8	99.9	90.0	99.7	99.4	99.9
FR0030R	Puy de Dôme	monthly mean	80.5	81.8	92.9	94.8	87.3	89.5	109.3	94.9	80.7	76.2	66.2	76.4
FR0030R	Puy de Dôme	data capture	95.8	98.5	98.5	98.9	95.2	98.1	96.9	98.4	97.1	94.9	96.8	98.1
GB0002R	Eskdalemuir	monthly mean	50.8	65.0	75.3	81.3	73.5	55.2	53.1	47.9	43.6	58.6	52.1	64.8
GB0002R	Eskdalemuir	data capture	99.1	99.4	100.0	95.6	95.8	95.8	95.8	100.0	99.9	99.6	99.6	99.7
GB0006R	Lough Navar	monthly mean	52.3	55.3	60.3	70.0	64.2	45.1	42.0	41.1	38.8	43.1	46.5	61.1
GB0006R	Lough Navar	data capture	100.0	99.4	100.0	91.1	100.0	100.0	100.0	99.1	84.7	96.4	100.0	100.0
GB0013R	Yarner Wood	monthly mean	52.4	57.7	67.2	74.2	72.8	53.1	61.0	46.6	42.7	47.7	48.6	59.2
GB0013R	Yarner Wood	data capture	92.2	90.5	100.0	98.8	99.7	97.4	95.8	100.0	100.0	73.7	80.1	99.9
GB0014R	High Muffles	monthly mean	53.0	63.1	80.4	79.0	76.5	57.8	62.9	54.8	47.2	47.4	52.3	52.9
GB0014R	High Muffles	data capture	99.2	100.0	96.1	99.9	99.9	100.0	96.6	100.0	99.9	93.0	99.7	99.5
GB0015R	Strath Vaich Dam	monthly mean	65.3	64.2	84.2	91.4	82.8	60.3	58.5	59.0	56.7	65.7	74.0	73.0
GB0015R	Strath Vaich Dam	data capture	86.0	70.2	100.0	99.9	99.9	100.0	100.0	99.3	100.0	99.9	100.0	13.6
GB0031R	Aston Hill	monthly mean	54.3	60.1	63.6	78.3	78.2	58.1	67.4	57.1	50.9	59.3	63.3	67.4
GB0031R	Aston Hill	data capture	100.0	95.4	99.9	99.7	100.0	100.0	95.8	89.2	100.0	99.7	88.3	100.0
GB0033R	Bush	monthly mean	63.0	63.2	76.0	83.1	75.7	56.6	57.9	52.2	48.0	57.2	59.5	67.6
GB0033R	Bush	data capture	99.7	96.4	100.0	99.4	100.0	100.0	99.6	96.8	100.0	99.7	99.9	100.0
GB0035R	Great Dun Fell	monthly mean	59.2	70.7	78.9	79.8	75.9	61.4	64.5	57.9	53.3	59.1	66.0	64.3
GB0035R	Great Dun Fell	data capture	95.3	91.8	92.9	96.8	89.4	96.2	57.9	58.6	94.9	97.8	99.7	98.1
GB0036R	Harwell	monthly mean	46.4	49.7	55.1	72.3	66.8	49.2	51.6	46.6	35.1	40.3	45.3	54.1
GB0036R	Harwell	data capture	93.3	100.0	99.9	99.9	92.6	100.0	100.0	99.5	93.5	99.7	100.0	100.0
GB0037R	Ladybower Res.	monthly mean	49.3	51.2	66.0	65.3	63.6	47.5	51.5	44.8	36.3	42.7	39.2	47.0
GB0037R	Ladybower Res.	data capture	99.7	96.0	100.0	99.9	100.0	99.9	95.7	100.0	99.6	99.3	99.9	99.5
GB0038R	Lullington Heath	monthly mean	36.7	44.7	56.3	64.4	61.3	48.7	60.0	53.6	40.2	45.5	37.8	50.7
GB0038R	Lullington Heath	data capture	93.4	98.4	100.0	99.6	100.0	100.0	91.8	98.9	99.3	98.7	99.4	100.0
GB0039R	Sibton	monthly mean	37.6	54.0	65.6	71.5	70.5	53.6	56.0	53.6	43.4	43.2	40.5	45.8
GB0039R	Sibton	data capture	50.0	99.4	98.7	99.9	100.0	99.0	99.9	99.5	98.6	93.0	99.9	100.0

Table 3.1, cont.

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GB0043R	Narberth	monthly mean	59.3	59.2	66.5	81.5	79.9	59.4	65.7	54.6	46.2	60.0	63.1	70.2
GB0043R	Narberth	data capture	98.0	95.2	96.2	99.4	100.0	100.0	95.7	100.0	100.0	99.9	100.0	99.7
GB0045R	Wicken Fen	monthly mean	32.8	45.1	56.5	67.9	64.5	51.3	55.3	52.6	40.2	42.0	34.3	40.9
GB0045R	Wicken Fen	data capture	100.0	99.1	100.0	99.9	99.9	100.0	99.3	95.8	99.7	99.7	99.6	100.0
GB0048R	Auchencorth Moss	monthly mean	58.6	58.5	73.9	76.3	70.3	53.5	54.2	49.3	45.9	55.6	53.7	64.4
GB0048R	Auchencorth Moss	data capture	100.0	92.6	100.0	99.9	100.0	99.6	99.3	100.0	100.0	99.9	100.0	100.0
GB0049R	Weybourne	monthly mean	48.4	64.2	80.2	83.7	79.8	61.1	65.1	61.5	52.4	48.2	51.1	51.5
GB0049R	Weybourne	data capture	69.6	99.9	99.9	99.9	100.0	100.0	97.2	100.0	100.0	80.5	85.3	100.0
GB0050R	St. Osyth	monthly mean	40.1	50.3	61.7	69.2	70.4	54.2	53.9	55.7	40.7	42.9	38.4	45.9
GB0050R	St. Osyth	data capture	100.0	99.1	95.7	99.4	97.3	99.7	97.7	98.5	98.6	99.5	99.4	99.1
GB0052R	Lerwick	monthly mean	68.7	67.5	84.8	81.3	72.3	58.5	57.9	54.6	-	-	-	-
GB0052R	Lerwick	data capture	100.0	99.6	99.2	99.7	100.0	100.0	99.9	90.5	0.0	0.0	0.0	0.0
GB0053R	Charlton Mackrell	monthly mean	45.8	51.1	63.0	75.2	75.1	59.5	66.8	56.4	45.2	55.7	52.2	64.1
GB0053R	Charlton Mackrell	data capture	99.7	99.3	97.0	99.9	100.0	100.0	98.7	100.0	96.5	99.7	100.0	99.6
GR0001R	Aliartos	monthly mean	34.5	42.3	50.5	47.8	46.5	45.9	57.0	71.5	54.2	33.9	28.5	20.1
GR0001R	Aliartos	data capture	99.9	97.9	98.5	99.4	100.0	99.3	73.0	99.3	100.0	100.0	99.4	97.7
GR0002R	Finokalia	monthly mean	83.5	87.8	99.3	109.1	104.2	115.0	122.5	121.5	100.4	95.2	85.7	81.4
GR0002R	Finokalia	data capture	99.6	96.1	97.8	98.6	97.0	99.6	98.4	98.9	94.7	100.0	99.9	98.8
HU0002R	K-puszta	monthly mean	39.6	48.9	65.0	82.8	69.7	64.3	80.0	72.8	53.0	47.8	33.6	31.5
HU0002R	K-puszta	data capture	100.0	100.0	99.9	87.5	87.2	98.8	97.0	100.0	100.0	100.0	100.0	100.0
IE0001R	Valentia Observatory	monthly mean	73.9	76.3	82.1	88.8	81.6	62.9	58.9	60.0	58.9	68.6	67.1	81.9
IE0001R	Valentia Observatory	data capture	99.2	93.5	99.7	99.7	99.5	94.3	97.7	96.2	53.3	90.6	97.9	91.8
IE0031R	Mace Head	monthly mean	73.4	75.5	75.3	91.3	85.0	68.7	64.5	66.8	60.6	71.7	78.9	84.2
IE0031R	Mace Head	data capture	100.0	100.0	99.7	100.0	100.0	100.0	96.2	100.0	99.9	100.0	100.0	100.0
IT0001R	Montelibretti	monthly mean	28.0	49.8	52.8	58.5	53.6	64.9	72.0	65.8	50.3	25.1	26.9	18.2
IT0001R	Montelibretti	data capture	96.2	98.1	99.7	95.4	99.3	98.6	95.7	100.0	99.9	93.4	100.0	100.0
IT0004R	Ispra	monthly mean	16.0	32.4	44.6	67.6	70.4	86.6	100.5	83.3	53.0	17.0	25.0	14.0
IT0004R	Ispra	data capture	99.7	100.0	100.0	100.0	100.0	100.0	89.7	99.9	99.7	88.4	97.4	99.9
LT0015R	Preila	monthly mean	47.0	52.4	68.7	71.8	72.1	65.5	63.9	64.0	47.4	42.4	37.4	38.5
LT0015R	Preila	data capture	100.0	100.0	78.1	100.0	100.0	98.6	91.5	99.1	99.0	98.9	99.3	100.0

Table 3.1, cont.

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
LV0010R	Rucava	monthly mean	54.9	55.1	80.3	84.0	73.2	67.8	59.2	59.4	48.9	49.1	40.7	53.7
LV0010R	Rucava	data capture	97.2	17.7	58.7	100.0	99.5	100.0	100.0	100.0	100.0	99.7	99.7	37.1
LV0016R	Zoseni	monthly mean	75.1	84.8	90.9	90.4	70.4	59.0	54.5	50.9	46.1	51.9	47.9	53.2
LV0016R	Zoseni	data capture	100.0	17.7	56.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7	100.0
MK0007R	Lazaropole	monthly mean	-	-	131.1	145.1	129.2	127.6	135.7	141.0	128.2	-	-	-
MK0007R	Lazaropole	data capture	0.0	0.0	25.9	95.3	78.6	86.2	83.2	95.8	62.2	0.0	0.0	0.0
MT0001R	Giordan lighthouse	monthly mean	74.3	77.8	83.5	97.7	96.5	97.2	93.0	91.2	80.7	74.9	74.0	80.4
MT0001R	Giordan lighthouse	data capture	99.9	53.0	14.5	95.0	95.6	99.7	94.9	95.4	99.7	99.6	97.9	96.5
NL0007R	Eibergen	monthly mean	32.8	41.0	58.0	61.4	57.4	58.0	55.9	51.1	32.7	27.4	23.7	30.2
NL0007R	Eibergen	data capture	92.9	99.1	97.0	99.7	100.0	90.7	97.6	99.7	99.4	99.7	99.9	98.7
NL0009R	Kollumerwaard	monthly mean	43.5	52.6	66.1	66.3	69.8	61.3	55.8	54.9	47.5	39.9	44.2	40.7
NL0009R	Kollumerwaard	data capture	100.0	98.8	99.2	99.9	99.7	99.4	85.2	100.0	99.4	98.7	100.0	98.9
NL0010R	Vredepeel	monthly mean	26.6	35.9	48.5	56.5	56.8	55.0	55.2	48.7	31.1	28.6	24.5	31.7
NL0010R	Vredepeel	data capture	99.7	80.5	99.7	100.0	99.1	97.5	94.5	95.3	82.1	96.8	99.4	100.0
NL0091R	De Zilk	monthly mean	32.8	47.8	56.6	64.9	70.0	60.8	55.3	55.0	49.4	37.9	43.7	39.6
NL0091R	De Zilk	data capture	98.9	99.6	100.0	99.4	97.4	86.1	94.0	92.2	64.3	81.3	98.2	99.3
NL0644R	Cabauw Wielsekade	monthly mean	27.5	37.5	50.5	57.8	60.2	53.5	54.1	48.1	37.5	29.1	26.8	31.6
NL0644R	Cabauw Wielsekade	data capture	95.7	100.0	99.1	92.2	94.9	99.3	99.9	99.5	99.6	99.5	99.9	100.0
NO0002R	Birkenes II	monthly mean	-	-	82.3	84.0	77.4	64.7	62.4	57.4	50.0	51.4	57.3	60.8
NO0002R	Birkenes II	data capture	0.0	0.0	82.0	72.5	94.4	99.2	99.7	99.9	99.7	99.7	99.9	98.8
NO0015R	Tustervatn	monthly mean	73.2	75.1	86.3	90.6	81.0	60.3	53.6	52.7	53.2	62.2	69.7	73.4
NO0015R	Tustervatn	data capture	99.5	99.7	99.9	99.9	98.9	99.0	98.8	99.1	99.6	99.9	96.3	99.2
NO0039R	Kårvatn	monthly mean	54.8	64.2	87.8	88.7	70.6	49.7	43.3	37.0	33.7	35.2	47.1	63.5
NO0039R	Kårvatn	data capture	99.5	99.4	100.0	99.3	99.2	99.7	97.3	96.4	99.9	99.9	98.2	98.5
NO0042G	Zeppelin mountain (Ny-Ålesund)	monthly mean	76.4	77.1	74.6	64.4	64.8	53.2	53.8	55.0	62.8	67.3	65.2	66.6
NO0042G	Zeppelin mountain (Ny-Ålesund)	data capture	99.9	99.3	99.1	99.6	99.7	99.6	99.9	99.7	99.7	99.6	95.8	92.9
NO0043R	Prestebakke	monthly mean	53.8	52.5	79.5	82.8	79.2	62.4	57.4	55.8	47.2	47.5	52.3	58.2
NO0043R	Prestebakke	data capture	99.3	99.4	99.3	99.6	99.5	98.7	99.5	99.3	99.4	99.7	99.2	99.2
NO0052R	Sandve	monthly mean	58.5	57.0	77.5	81.6	80.1	64.6	62.6	62.6	61.7	54.1	65.9	69.2
NO0052R	Sandve	data capture	98.9	99.3	98.9	99.0	76.2	99.4	99.7	99.9	71.7	98.0	99.7	99.6
NO0056R	Hurdal	monthly mean	49.0	51.9	79.9	80.9	68.9	58.3	57.1	43.8	42.0	37.5	41.9	48.8
NO0056R	Hurdal	data capture	100.0	99.9	100.0	99.9	98.8	99.2	99.9	99.7	99.0	99.9	99.9	99.2

Table 3.1, cont.

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PL0002R	Jarczew	monthly mean	46.0	54.6	81.7	79.5	71.1	61.4	61.6	64.6	42.4	36.9	31.7	35.0
PL0002R	Jarczew	data capture	99.2	100.0	100.0	99.7	99.7	99.9	100.0	100.0	100.0	100.0	100.0	99.2
PL0003R	Sniezka	monthly mean	65.0	67.7	96.9	106.0	87.4	90.6	95.1	94.1	68.2	75.9	63.9	72.1
PL0003R	Sniezka	data capture	97.2	93.5	99.3	99.2	83.6	99.4	99.3	99.5	99.3	99.2	99.7	99.7
PL0004R	Leba	monthly mean	58.4	62.8	85.7	82.6	80.3	72.0	66.1	64.6	53.6	46.0	45.8	44.8
PL0004R	Leba	data capture	100.0	100.0	100.0	100.0	86.8	100.0	100.0	100.0	100.0	99.5	100.0	100.0
PL0005R	Diabla Gora	monthly mean	54.8	65.2	90.1	83.1	73.4	62.6	66.5	55.3	41.0	45.2	47.5	48.9
PL0005R	Diabla Gora	data capture	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.4
RO0003R	Semenic	monthly mean	61.2	53.0	62.7	54.7	56.9	27.5	29.8	46.9	42.2	27.6	21.0	19.9
RO0003R	Semenic	data capture	100.0	95.8	34.7	86.0	70.2	100.0	93.5	95.8	96.1	99.7	94.9	99.1
RO0008R	Poiana Stampei	monthly mean	55.5	70.8	74.3	77.2	69.5	58.1	68.1	69.8	51.2	56.6	-	-
RO0008R	Poiana Stampei	data capture	96.6	97.5	91.1	97.9	63.2	84.2	97.7	61.6	66.7	10.6	0.0	0.0
SE0005R	Bredkälen	monthly mean	66.2	70.5	84.9	89.9	74.8	62.0	56.1	49.1	46.8	49.2	52.8	62.5
SE0005R	Bredkälen	data capture	99.7	100.0	99.3	100.0	99.3	100.0	94.1	99.7	90.3	99.6	98.1	99.5
SE0011R	Vavihill	monthly mean	54.4	65.8	86.0	86.2	84.7	67.1	63.5	61.5	52.9	47.8	45.0	46.0
SE0011R	Vavihill	data capture	99.5	100.0	100.0	100.0	99.3	98.9	98.9	100.0	90.0	89.1	51.7	96.4
SE0012R	Aspvreten	monthly mean	52.5	52.8	73.9	75.0	69.4	59.6	51.3	48.3	40.2	42.2	37.7	46.4
SE0012R	Aspvreten	data capture	67.9	90.0	98.7	78.1	100.0	99.7	87.8	99.6	98.6	97.4	100.0	100.0
SE0013R	Esrange	monthly mean	71.4	76.1	85.1	89.5	80.4	63.1	59.7	57.9	53.4	59.6	69.0	68.3
SE0013R	Esrange	data capture	99.7	100.0	100.0	100.0	99.6	100.0	100.0	93.3	90.3	99.6	100.0	100.0
SE0014R	Råö	monthly mean	53.2	58.1	80.3	83.5	83.9	75.7	67.9	72.1	59.5	56.5	61.3	54.9
SE0014R	Råö	data capture	99.2	99.4	100.0	100.0	99.5	100.0	95.7	99.3	99.6	100.0	99.7	89.1
SE0032R	Norra-Kvill	monthly mean	61.2	65.6	91.6	93.4	86.3	71.8	63.9	64.2	60.0	58.3	55.9	58.9
SE0032R	Norra-Kvill	data capture	99.7	100.0	100.0	100.0	99.6	99.7	79.3	72.6	100.0	100.0	90.8	100.0
SE0035R	Vindeln	monthly mean	66.7	67.6	87.1	92.3	79.0	60.1	54.5	45.4	45.1	46.5	48.5	54.8
SE0035R	Vindeln	data capture	99.3	100.0	100.0	100.0	99.6	100.0	99.9	100.0	100.0	99.7	99.9	100.0
SE0039R	Grimsö	monthly mean	58.3	57.0	83.1	84.3	79.6	60.4	57.0	50.4	40.9	45.4	48.6	56.5
SE0039R	Grimsö	data capture	99.6	100.0	100.0	100.0	99.6	100.0	100.0	100.0	90.3	99.7	100.0	100.0

Table 3.1, cont.

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SI0008R	Iskrba	monthly mean	34.2	54.7	61.9	72.1	57.9	50.9	63.2	65.2	43.0	41.8	38.7	40.0
SI0008R	Iskrba	data capture	94.5	95.7	96.0	95.6	95.3	95.7	95.8	95.8	96.0	95.3	95.3	95.8
SI0031R	Zarodnje	monthly mean	47.2	66.5	85.2	97.2	86.4	89.0	105.7	101.9	67.1	55.9	42.3	49.4
SI0031R	Zarodnje	data capture	95.0	94.9	95.4	95.6	94.1	95.0	95.2	95.7	95.1	94.9	90.3	95.7
SI0032R	Krvavec	monthly mean	87.4	95.3	112.5	128.9	109.6	110.3	123.8	109.6	81.2	78.9	72.9	85.3
SI0032R	Krvavec	data capture	92.3	92.6	89.0	94.4	95.0	94.0	95.0	95.2	94.2	94.6	94.4	95.2
SI0033R	Kovk	monthly mean	50.8	69.4	85.2	100.1	80.8	54.5	69.5	85.2	71.4	52.2	39.2	40.1
SI0033R	Kovk	data capture	95.6	96.0	96.0	95.4	91.7	95.3	93.8	96.0	95.4	86.8	95.6	96.0
SK0002R	Chopok	monthly mean	77.9	84.0	99.0	115.5	101.0	100.3	109.7	107.9	81.7	82.4	-	88.5
SK0002R	Chopok	data capture	99.1	98.8	99.2	95.4	98.3	92.4	70.6	95.7	99.2	21.0	0.0	67.7
SK0004R	Stará Lesná	monthly mean	56.1	73.6	86.4	99.6	72.8	69.6	77.5	80.6	59.3	66.3	55.3	61.2
SK0004R	Stará Lesná	data capture	99.2	99.6	99.5	98.9	99.1	99.6	99.1	99.3	99.6	98.9	98.8	98.8
SK0006R	Starina	monthly mean	49.1	59.4	77.3	83.9	69.0	62.4	72.0	80.8	54.4	56.2	44.2	52.7
SK0006R	Starina	data capture	57.9	99.1	99.7	99.7	99.9	99.9	99.9	100.0	100.0	99.9	100.0	84.5
SK0007R	Topolniky	monthly mean	-	-	94.9	85.2	75.8	72.6	83.8	75.2	54.0	37.1	35.1	35.3
SK0007R	Topolniky	data capture	0.0	0.0	14.7	99.9	84.3	100.0	98.5	99.6	100.0	42.3	96.2	99.7

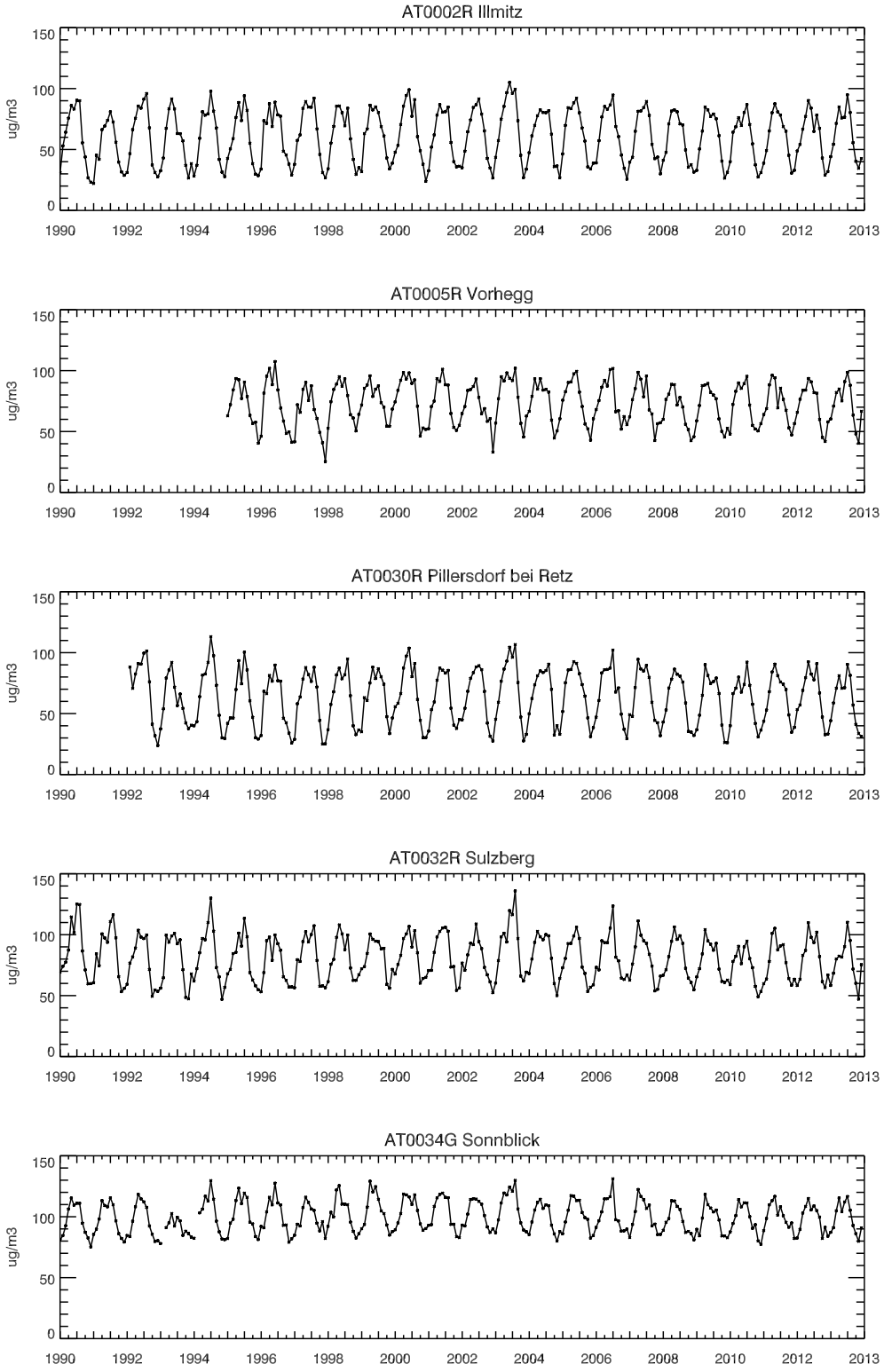


Figure 3.1: Seasonal variation, 1990–2013.

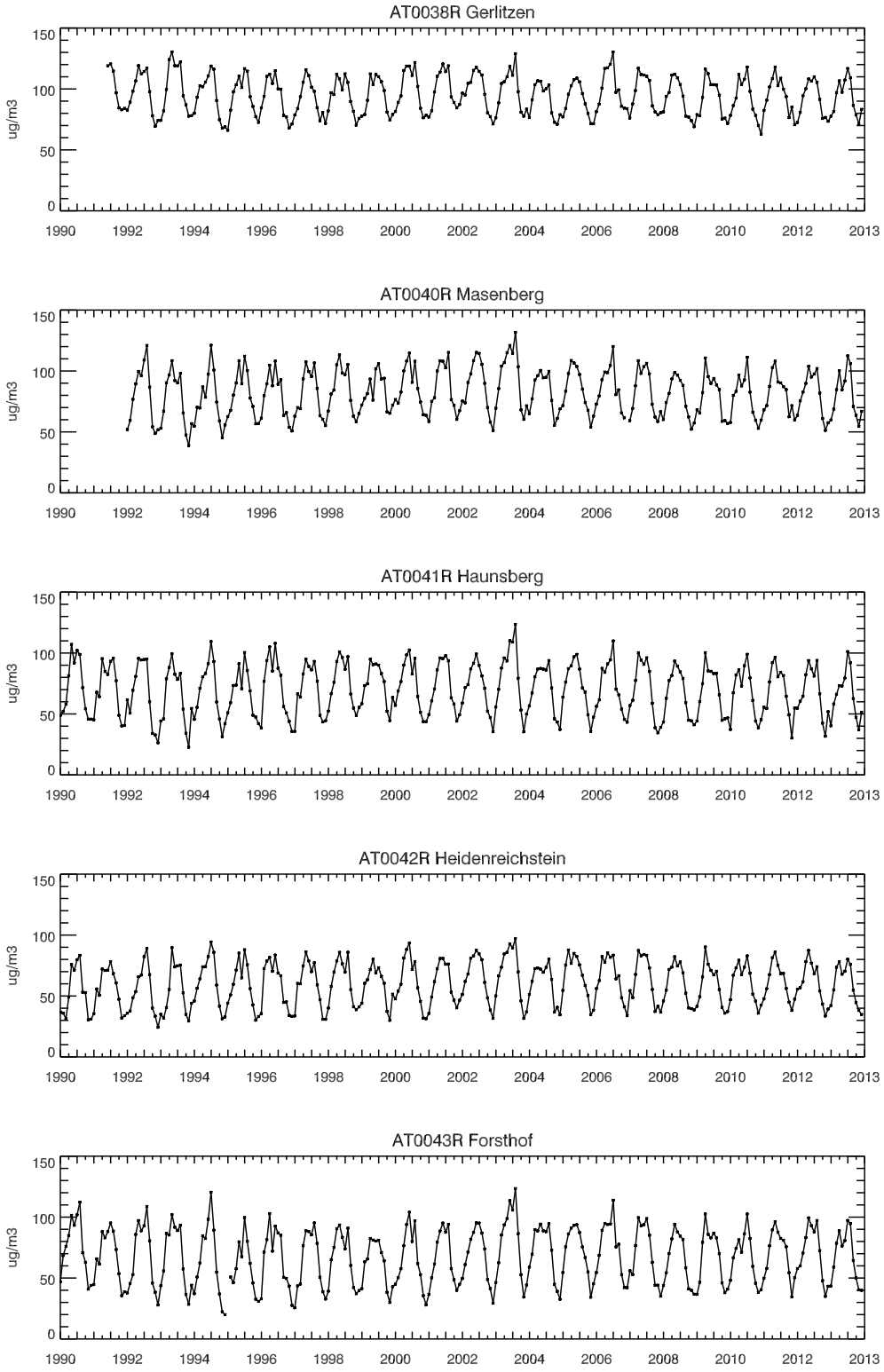
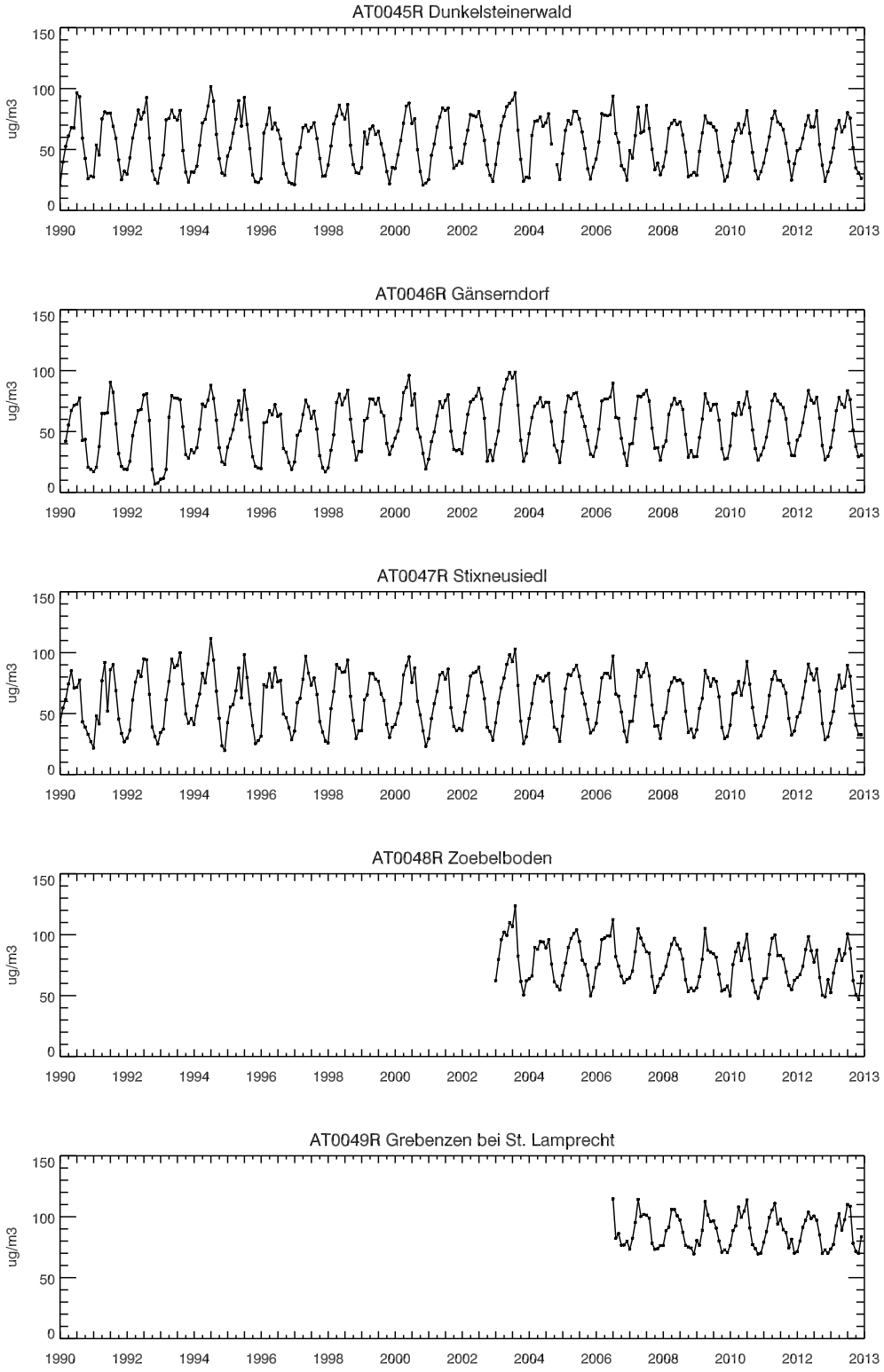


Figure 3.1, cont.



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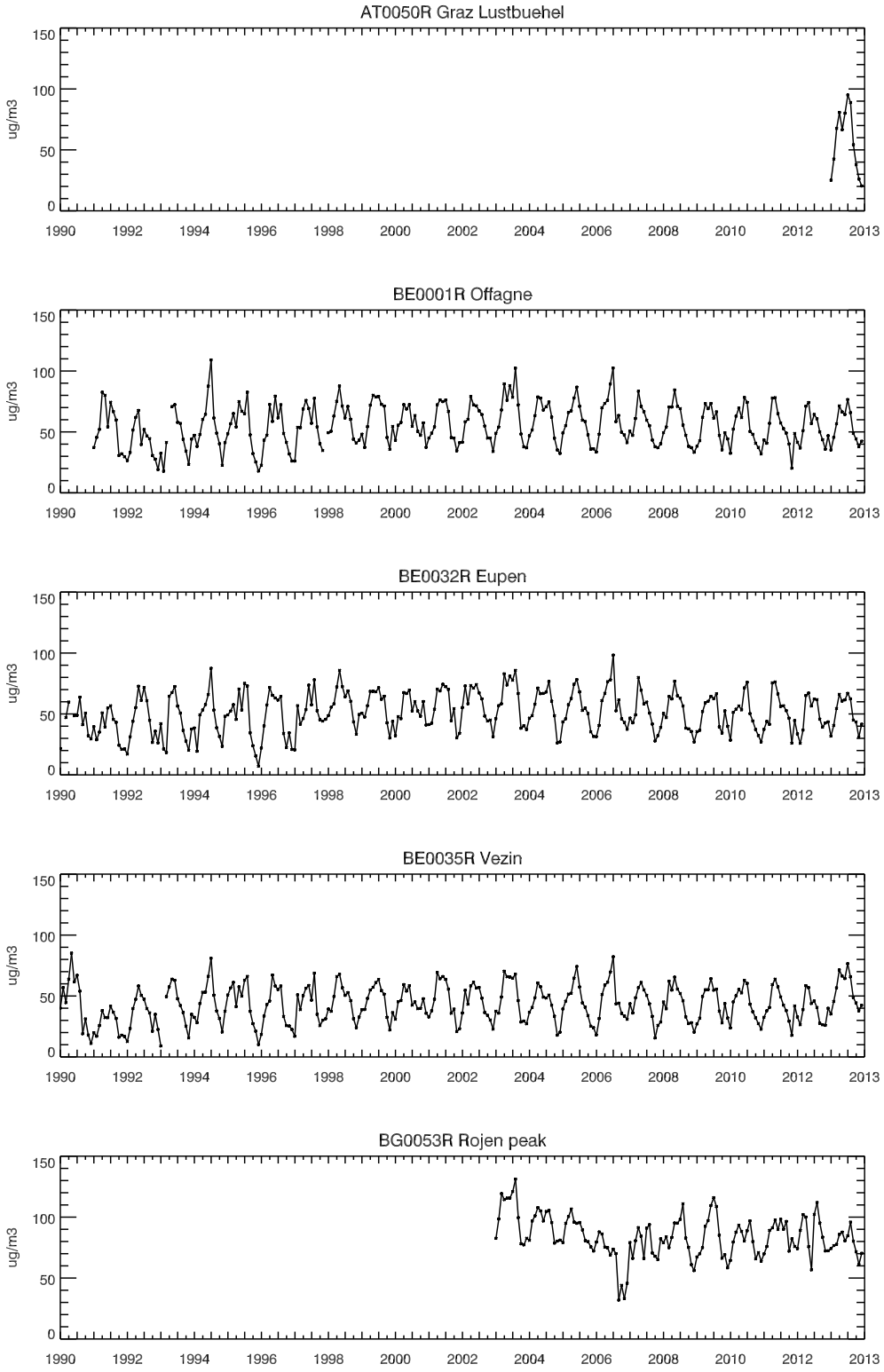


Figure 3.1, cont.

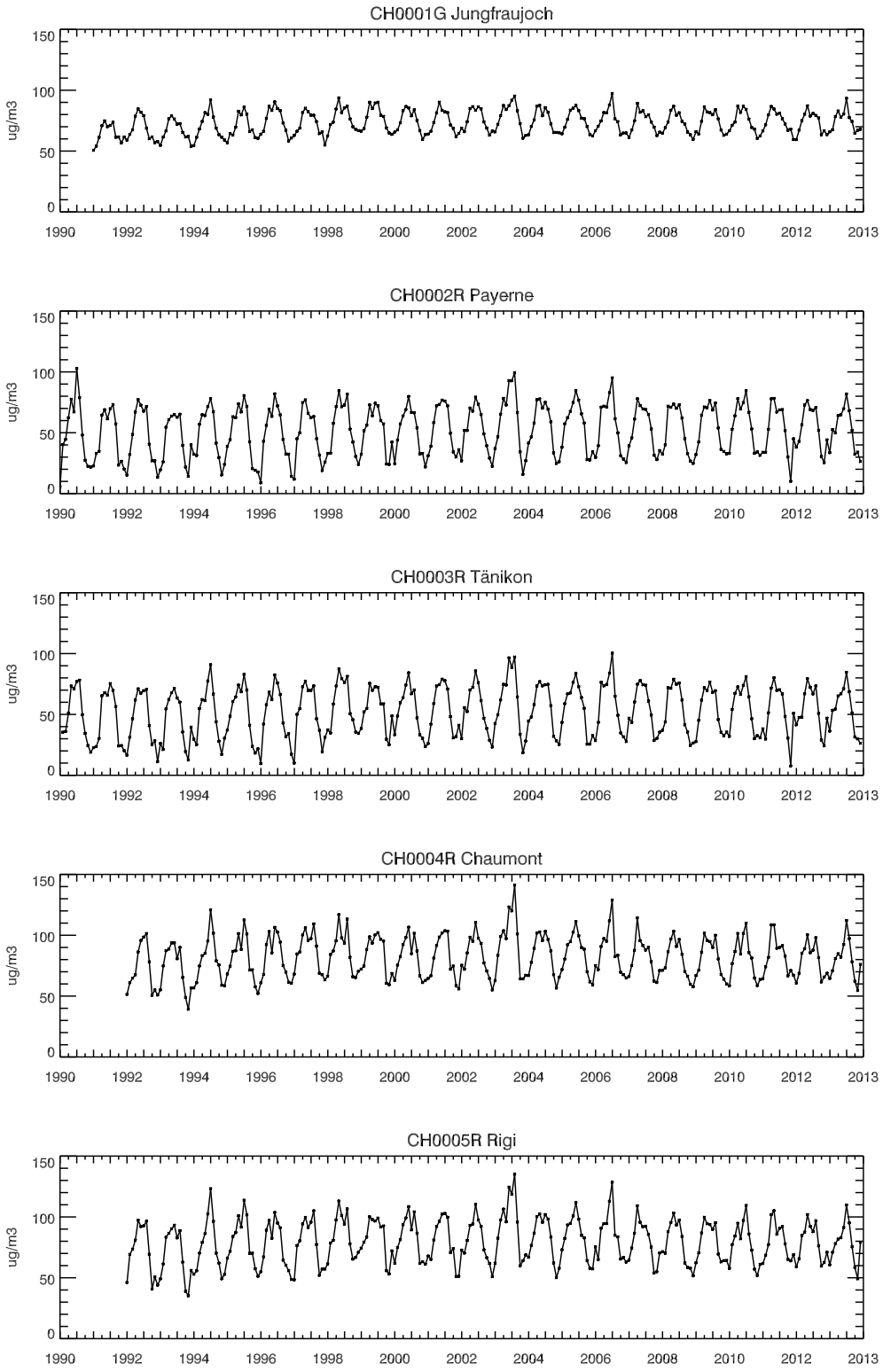


Figure 3.1, cont.

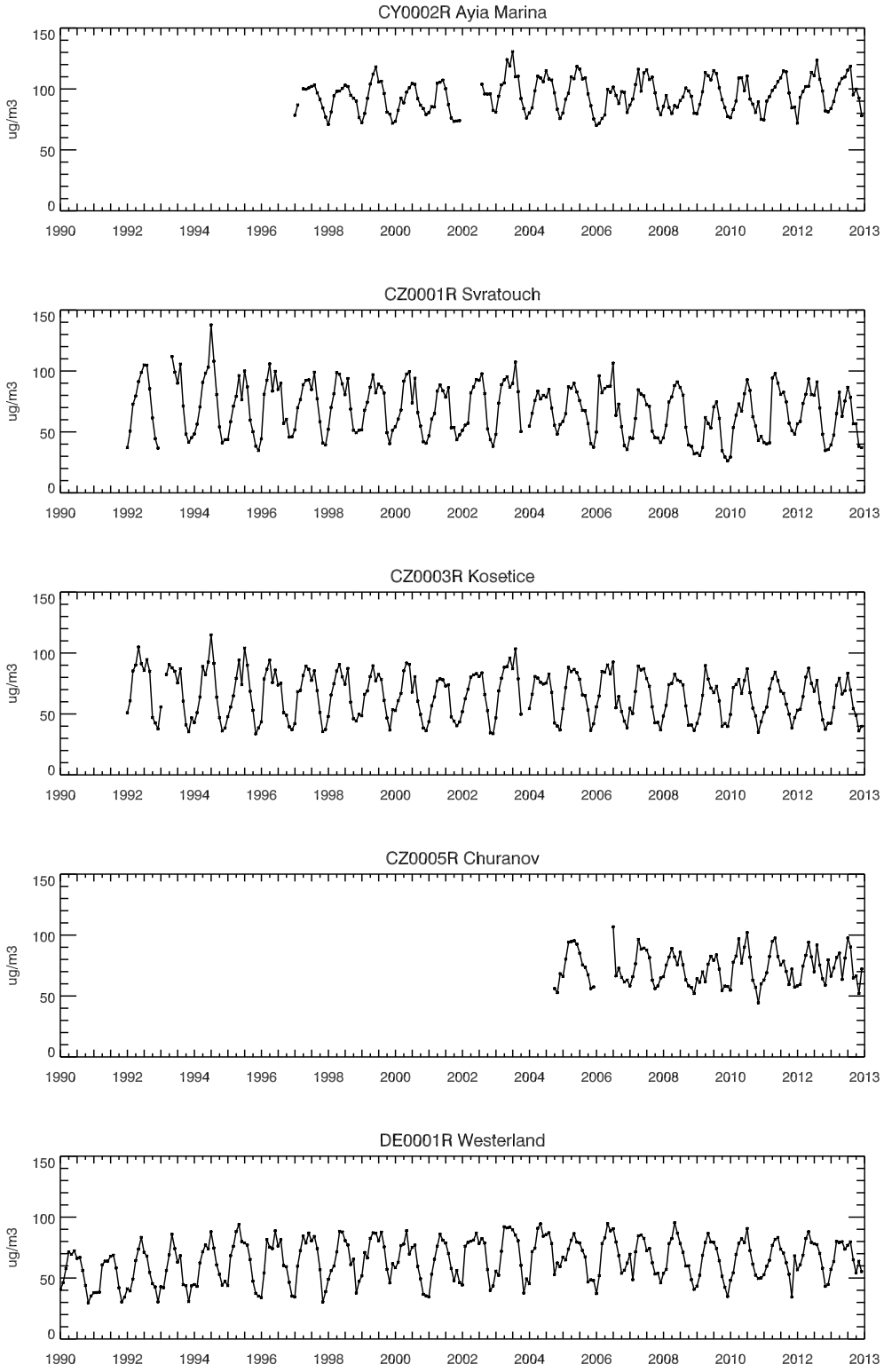
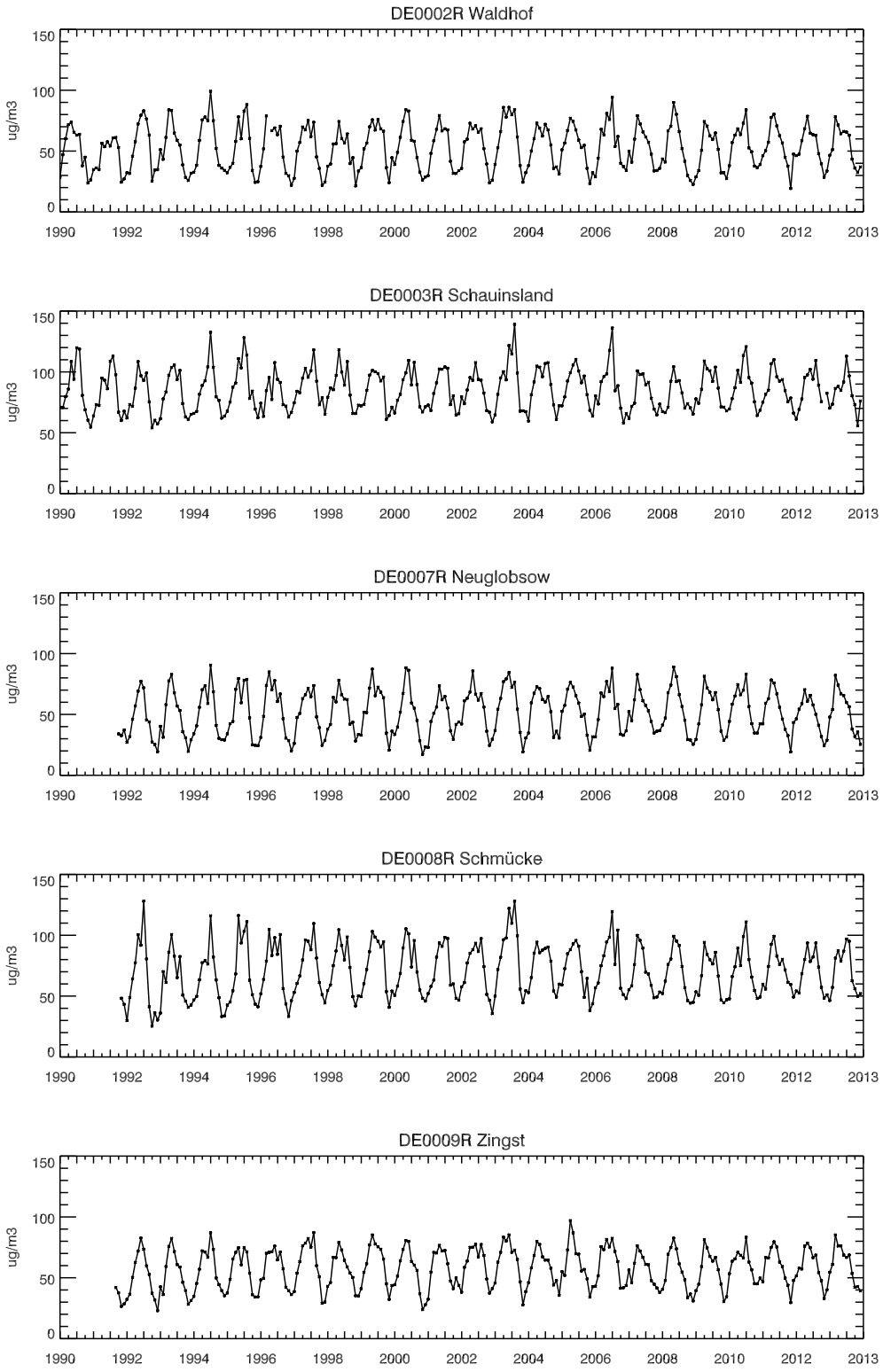


Figure 3.1, cont.



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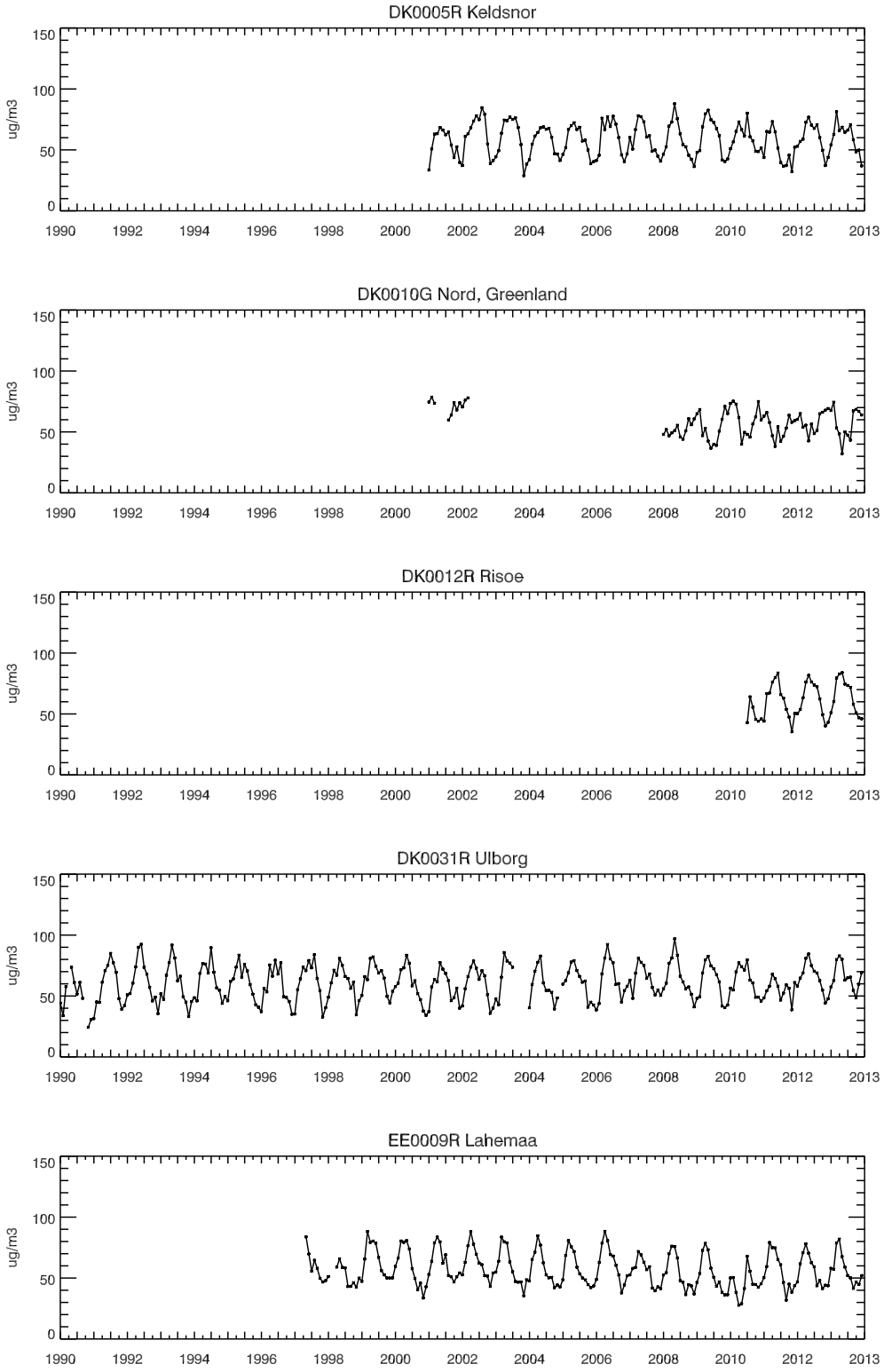
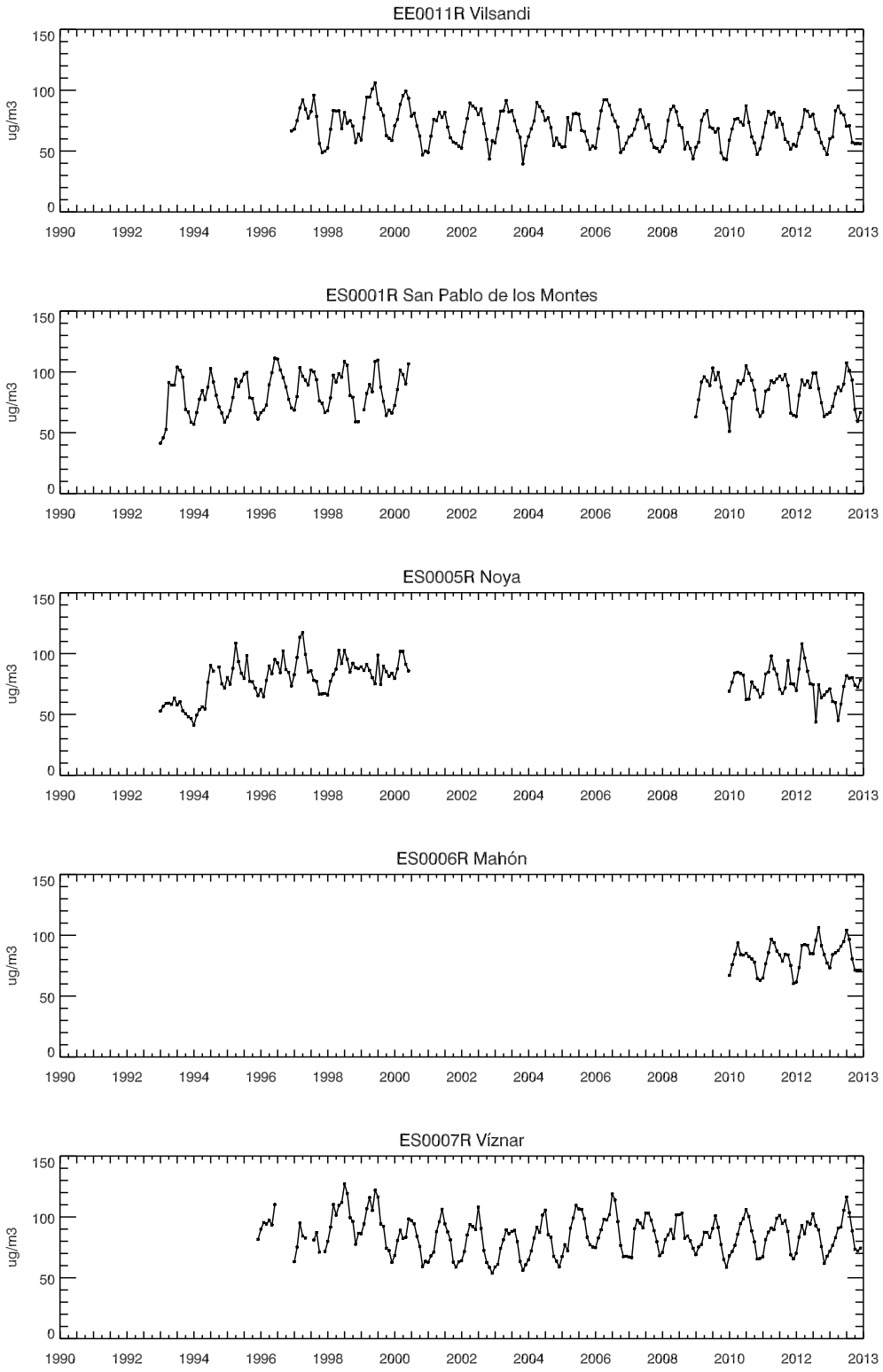


Figure 3.1, cont.



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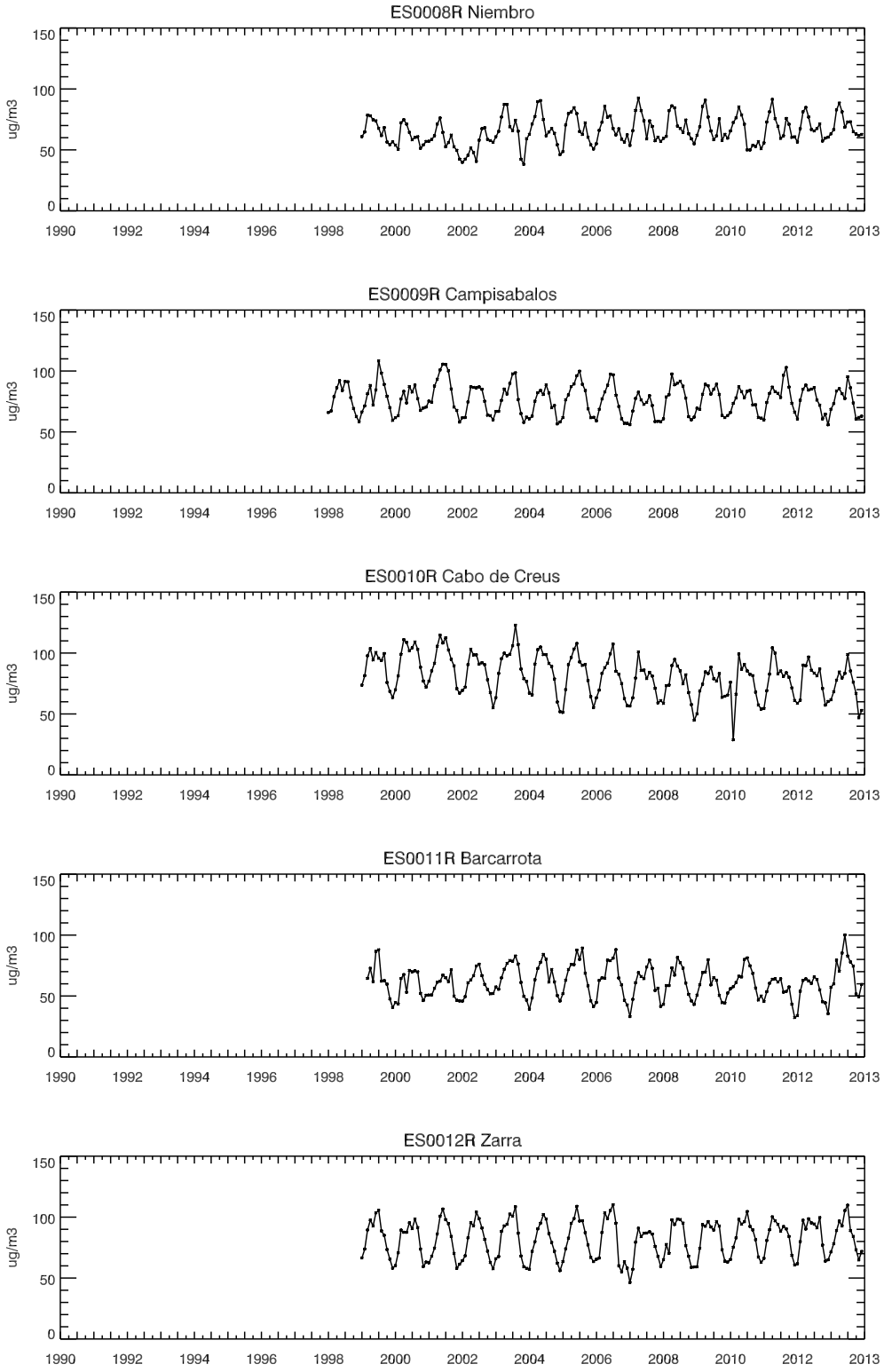
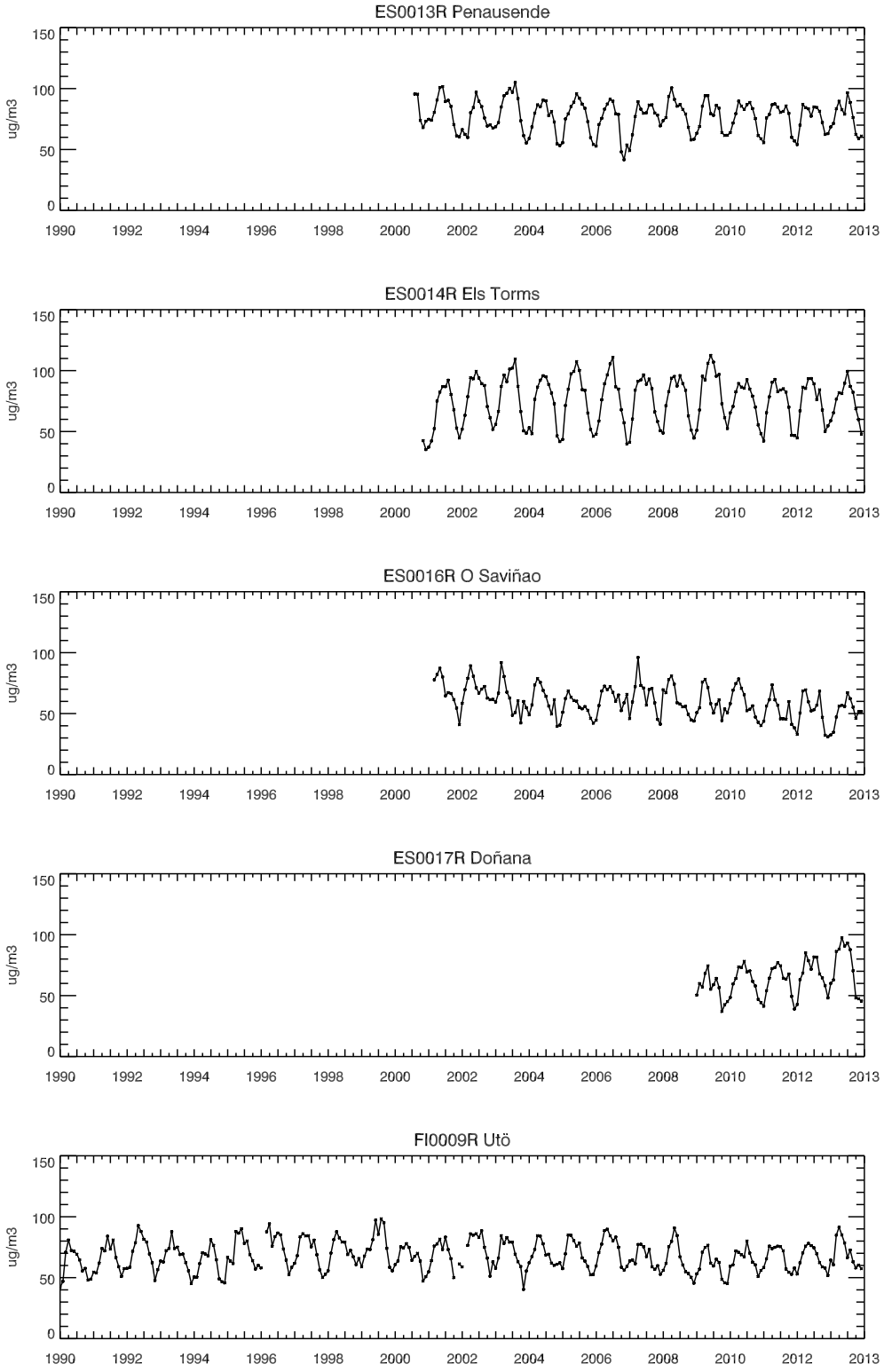


Figure 3.1, cont.



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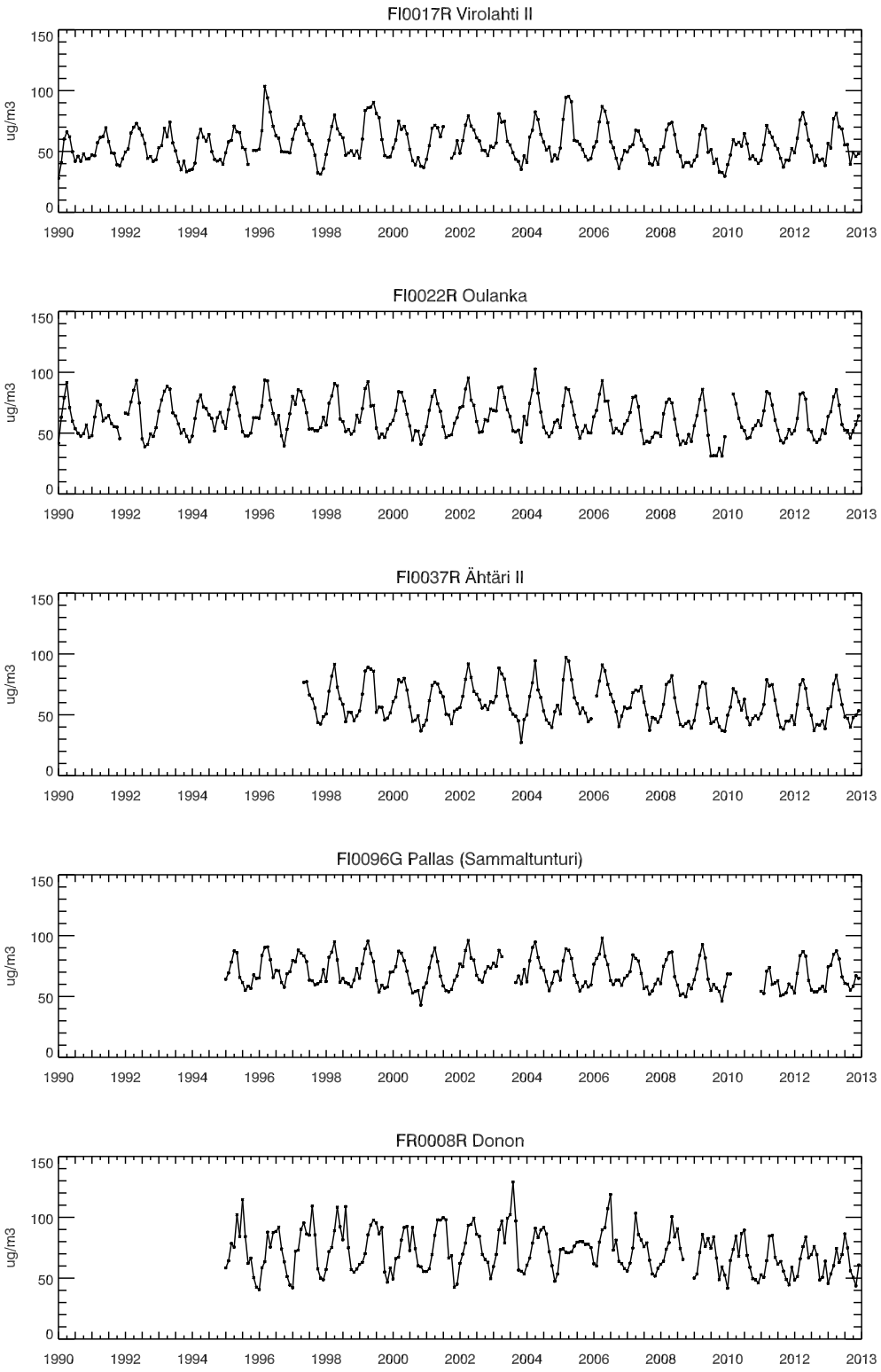

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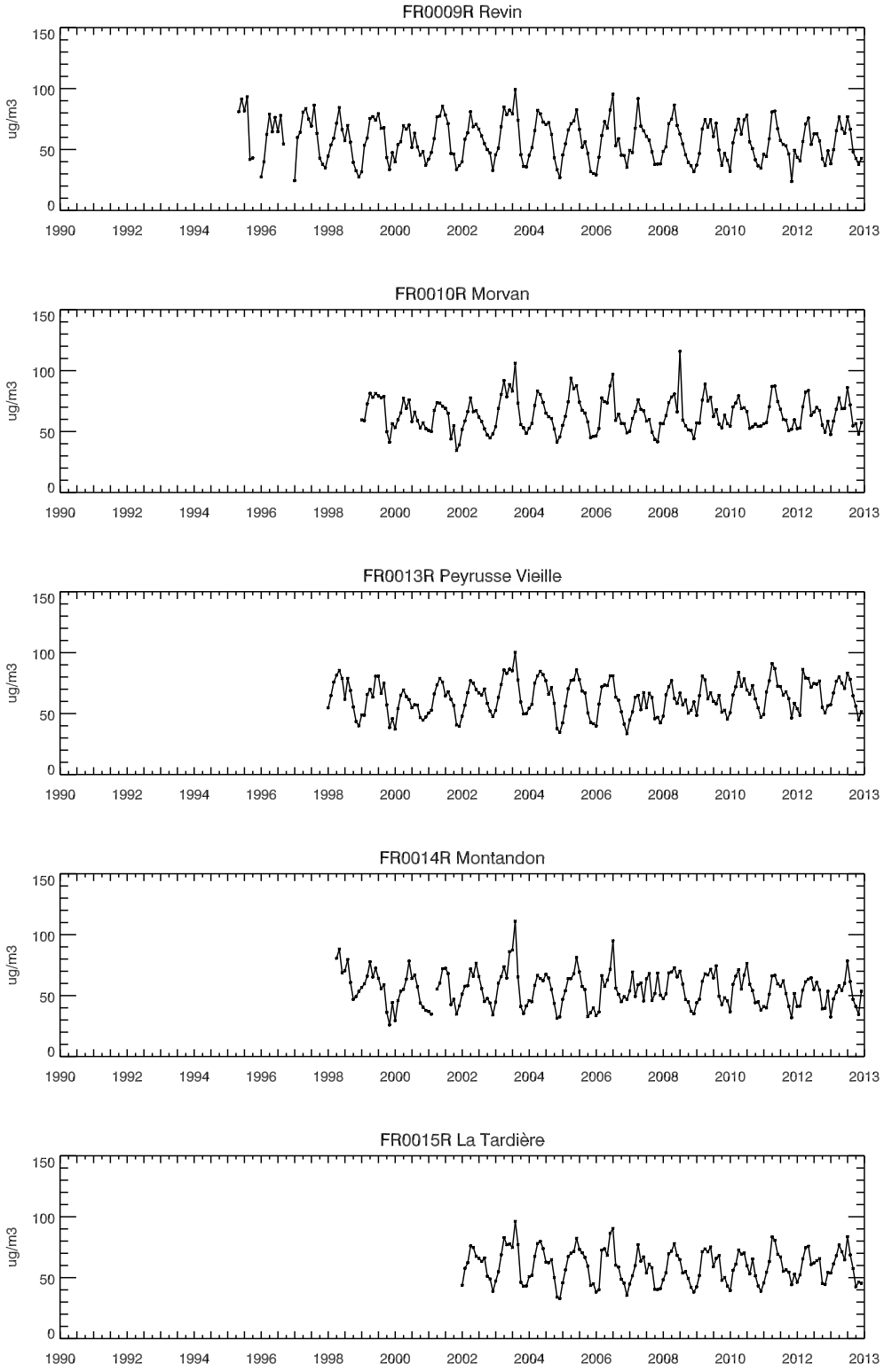
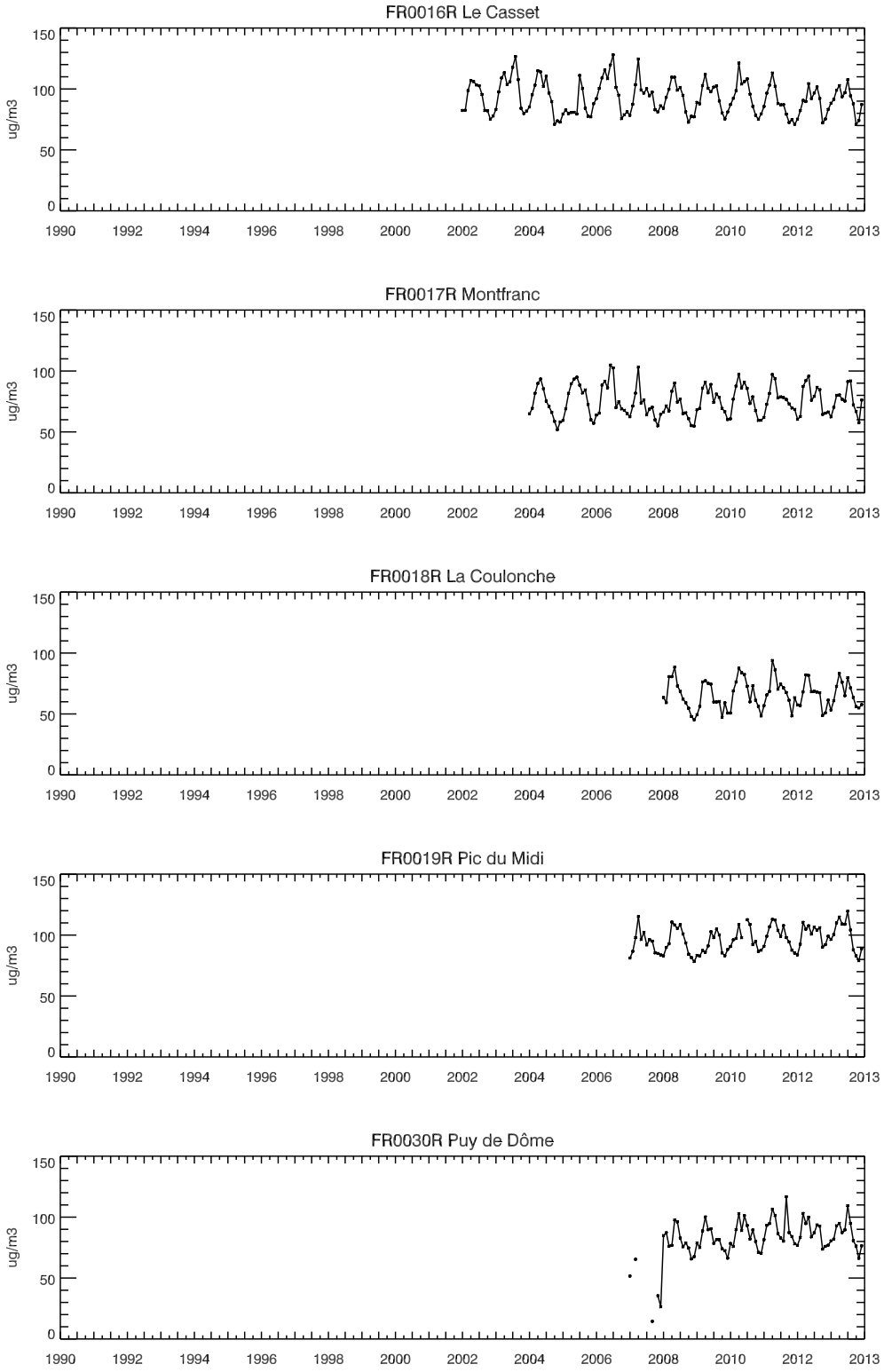


Figure 3.1, cont.



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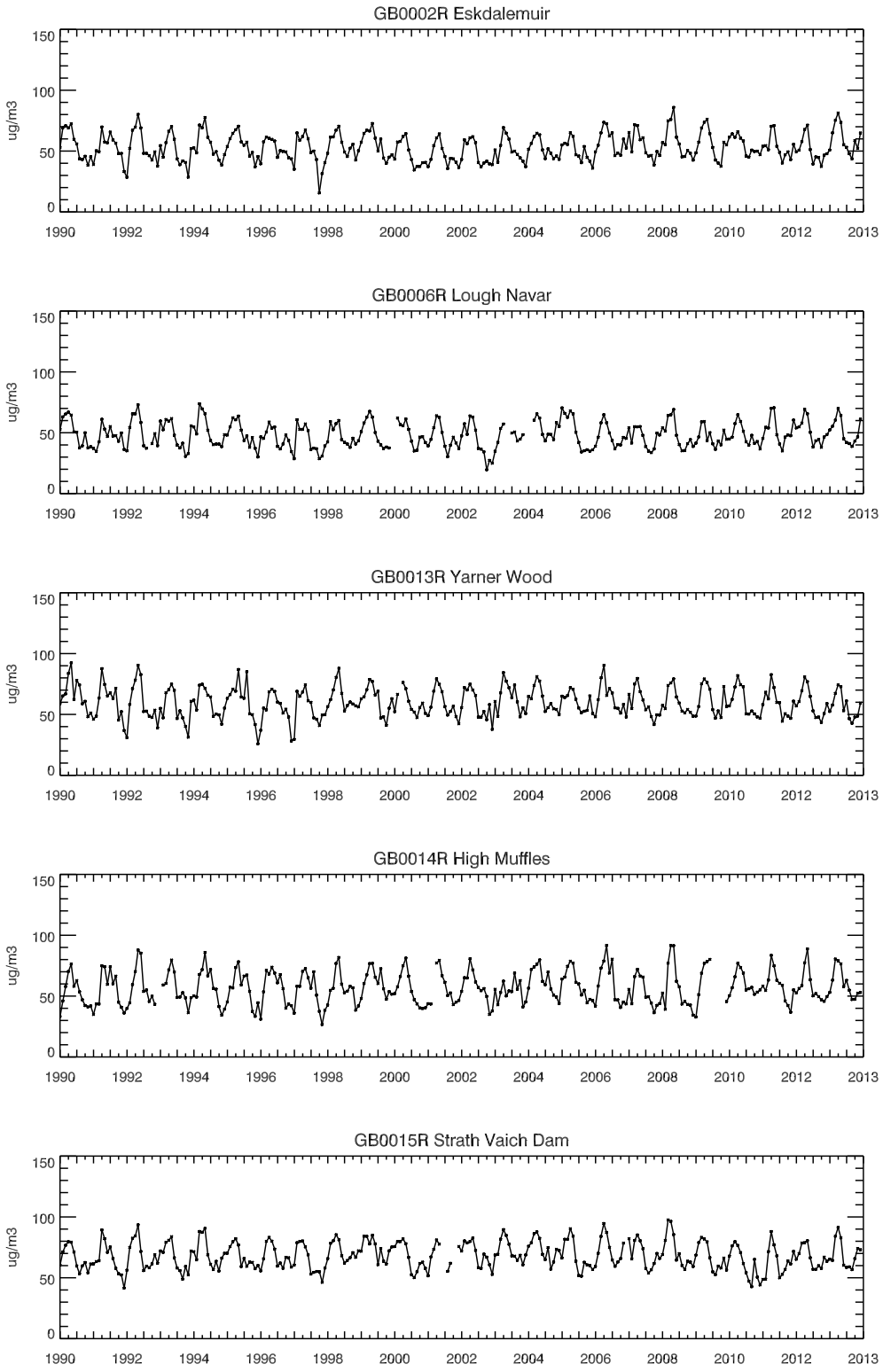

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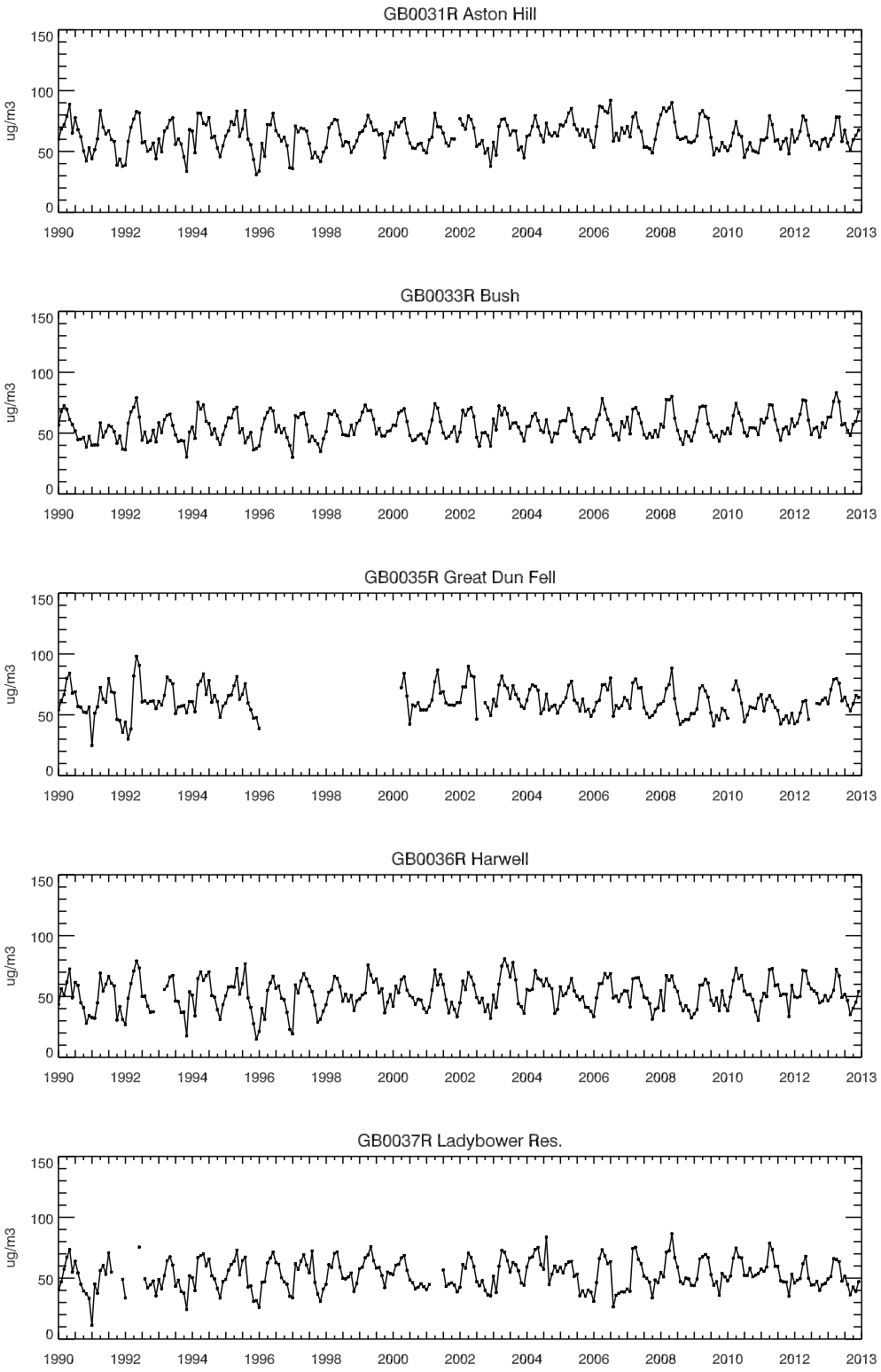


Figure 3.1, cont.

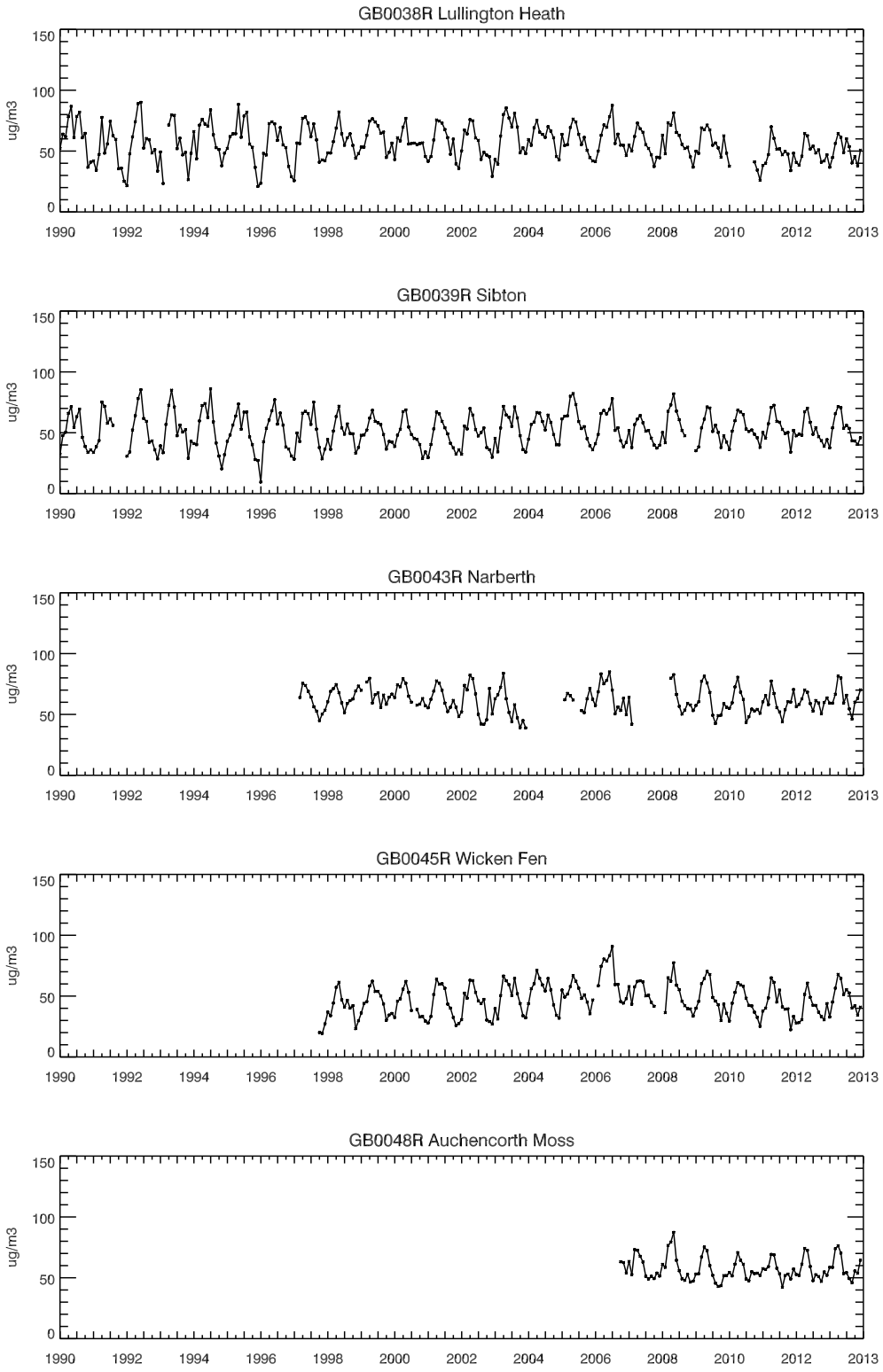


Figure 3.1, cont.

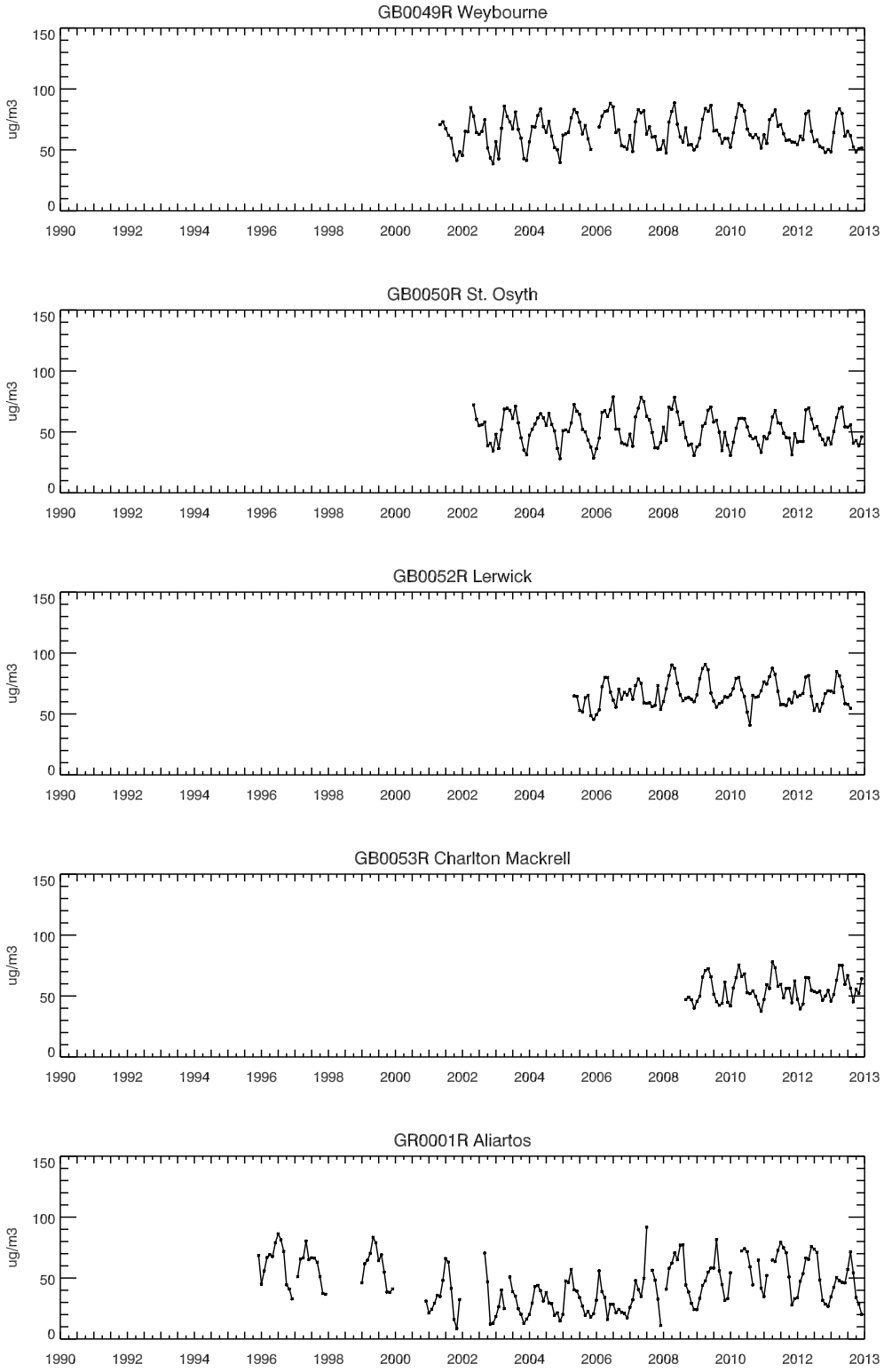
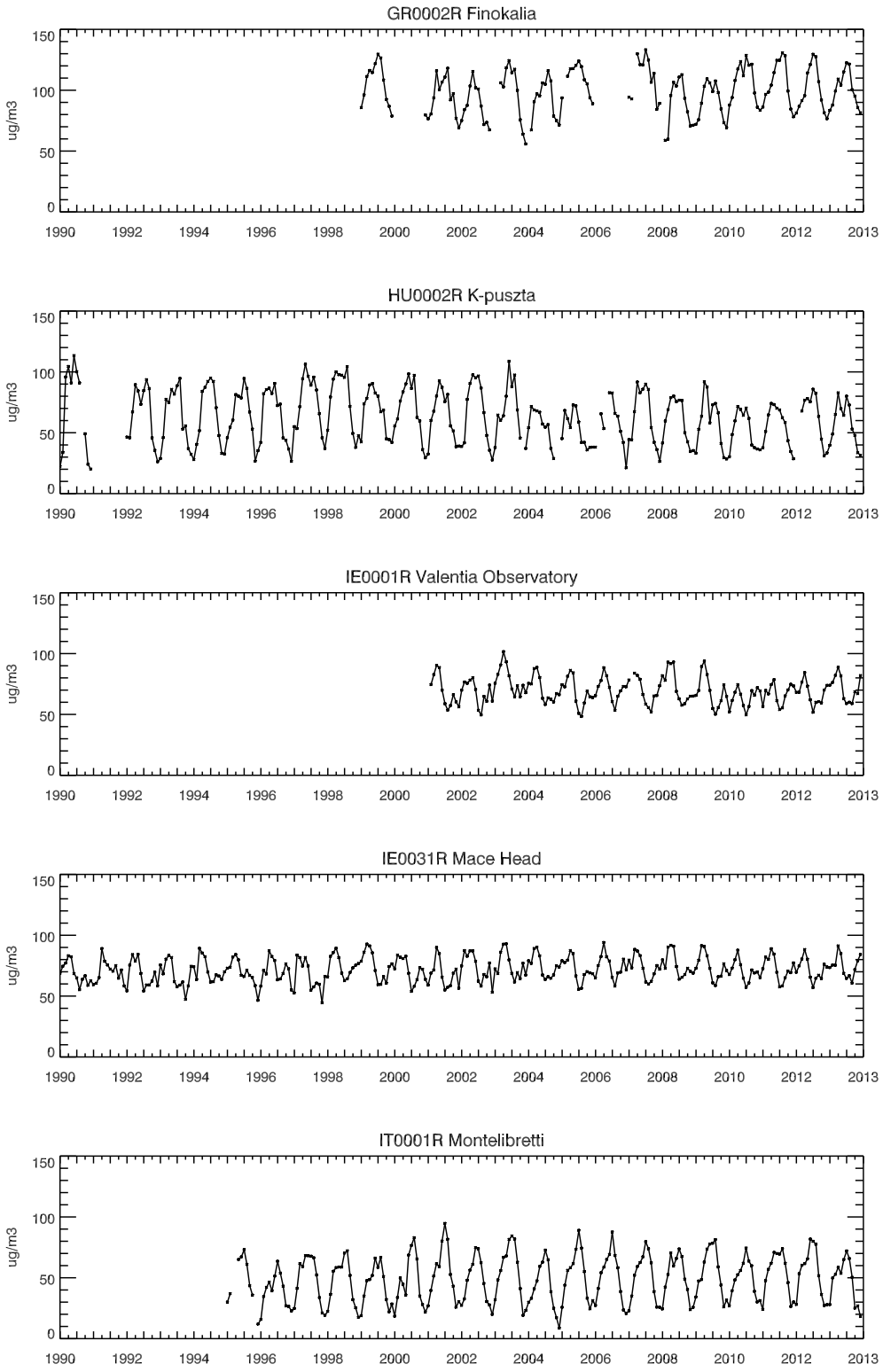


Figure 3.1, cont.



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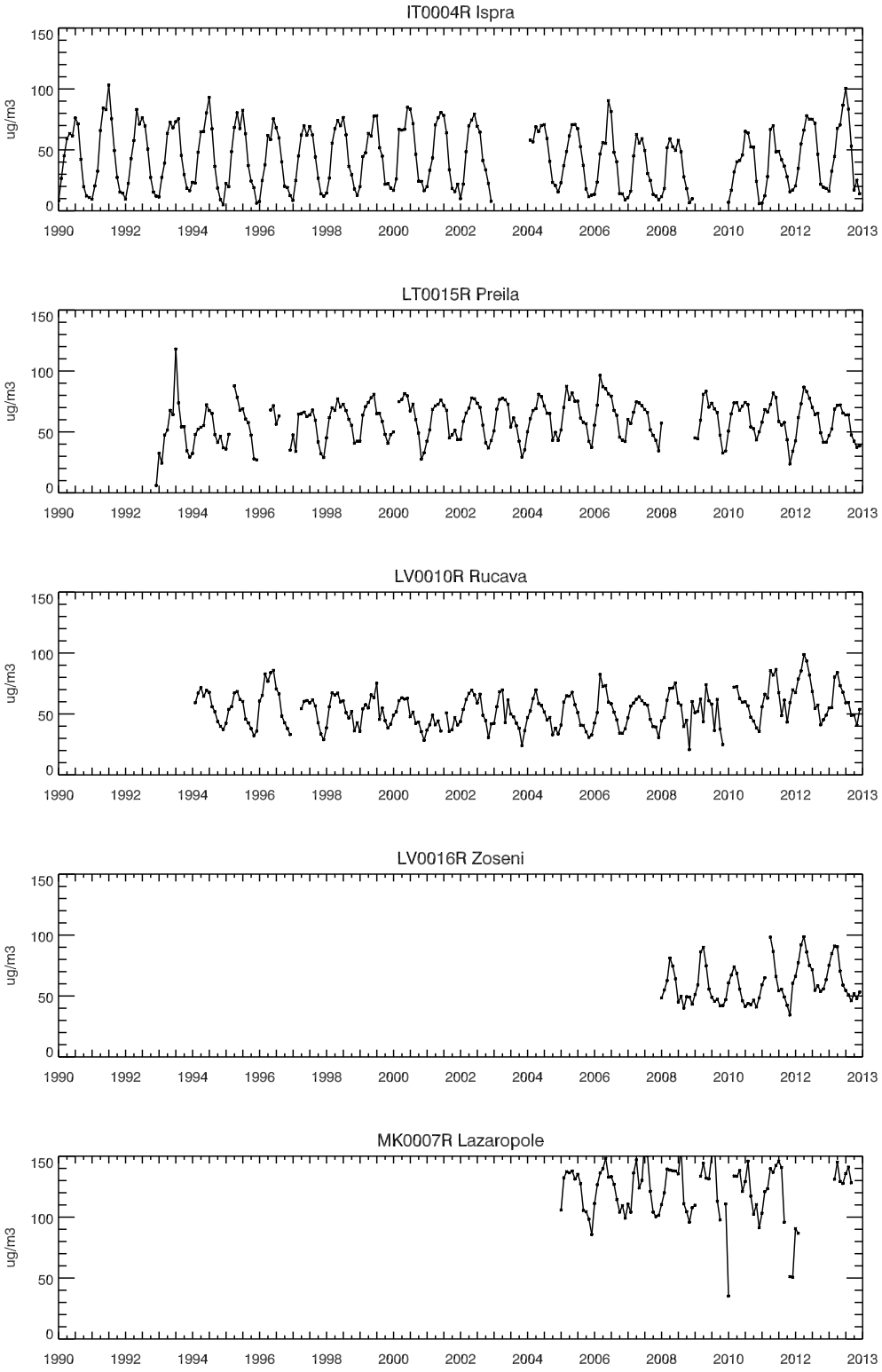

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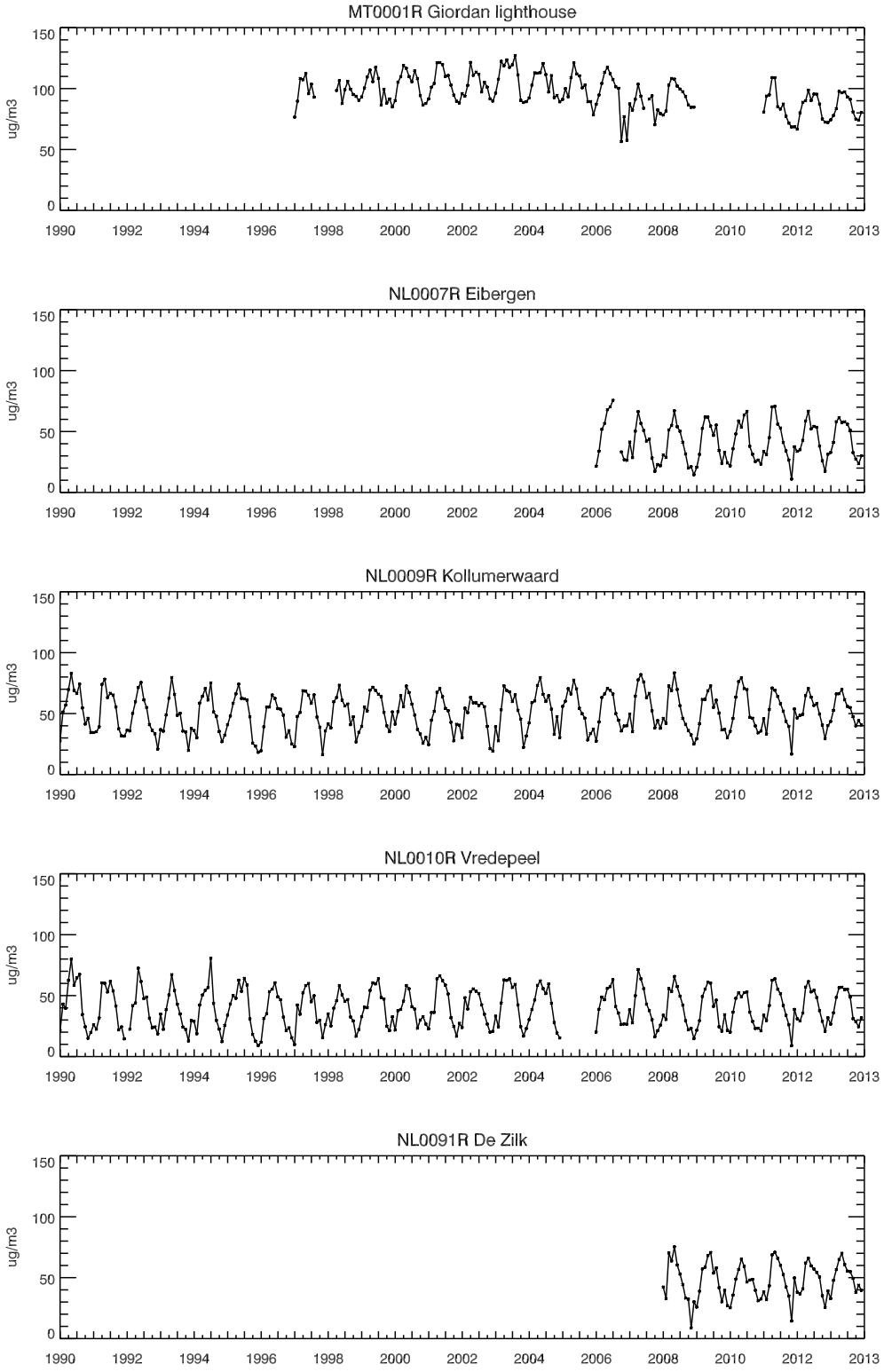

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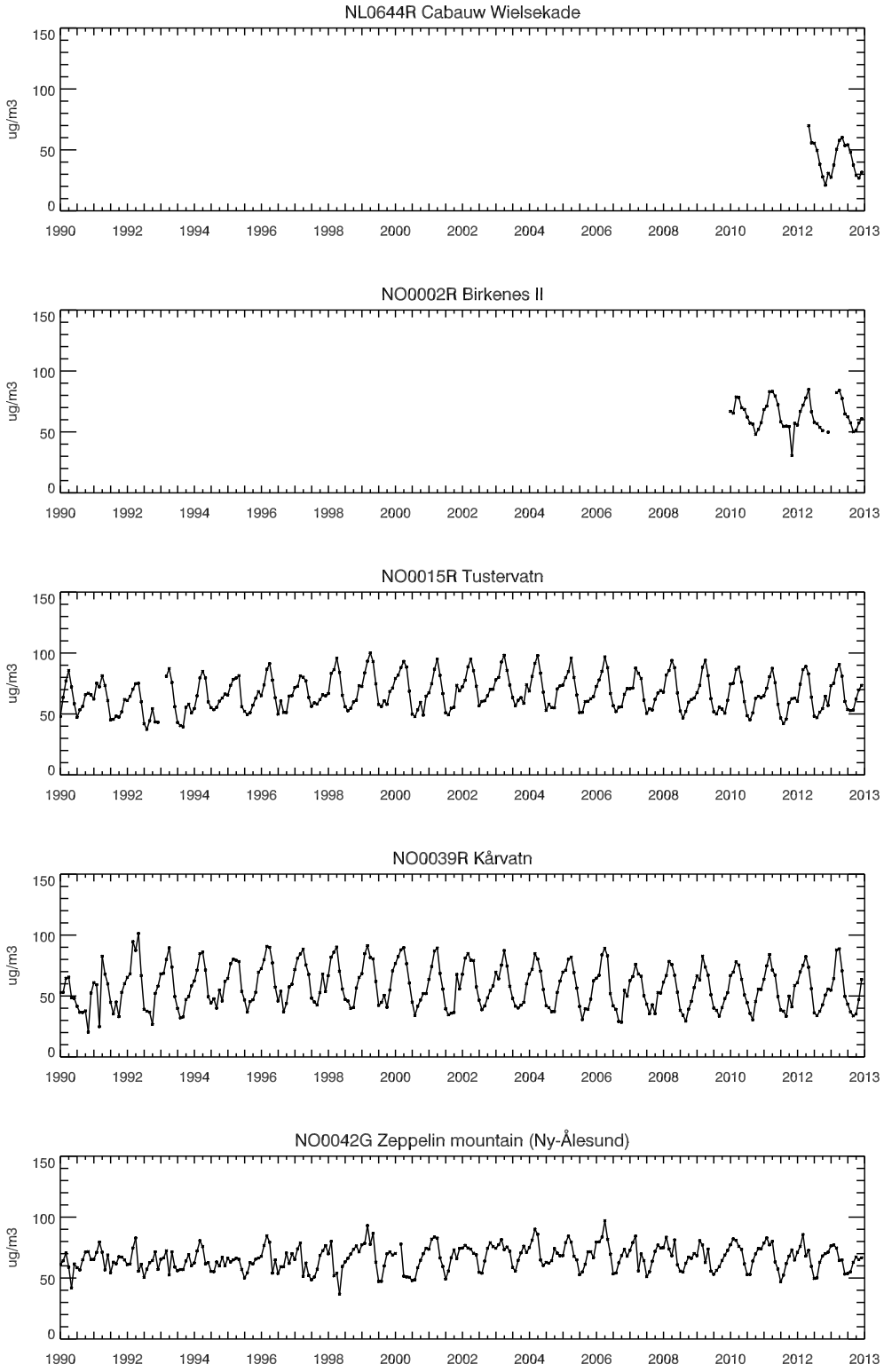

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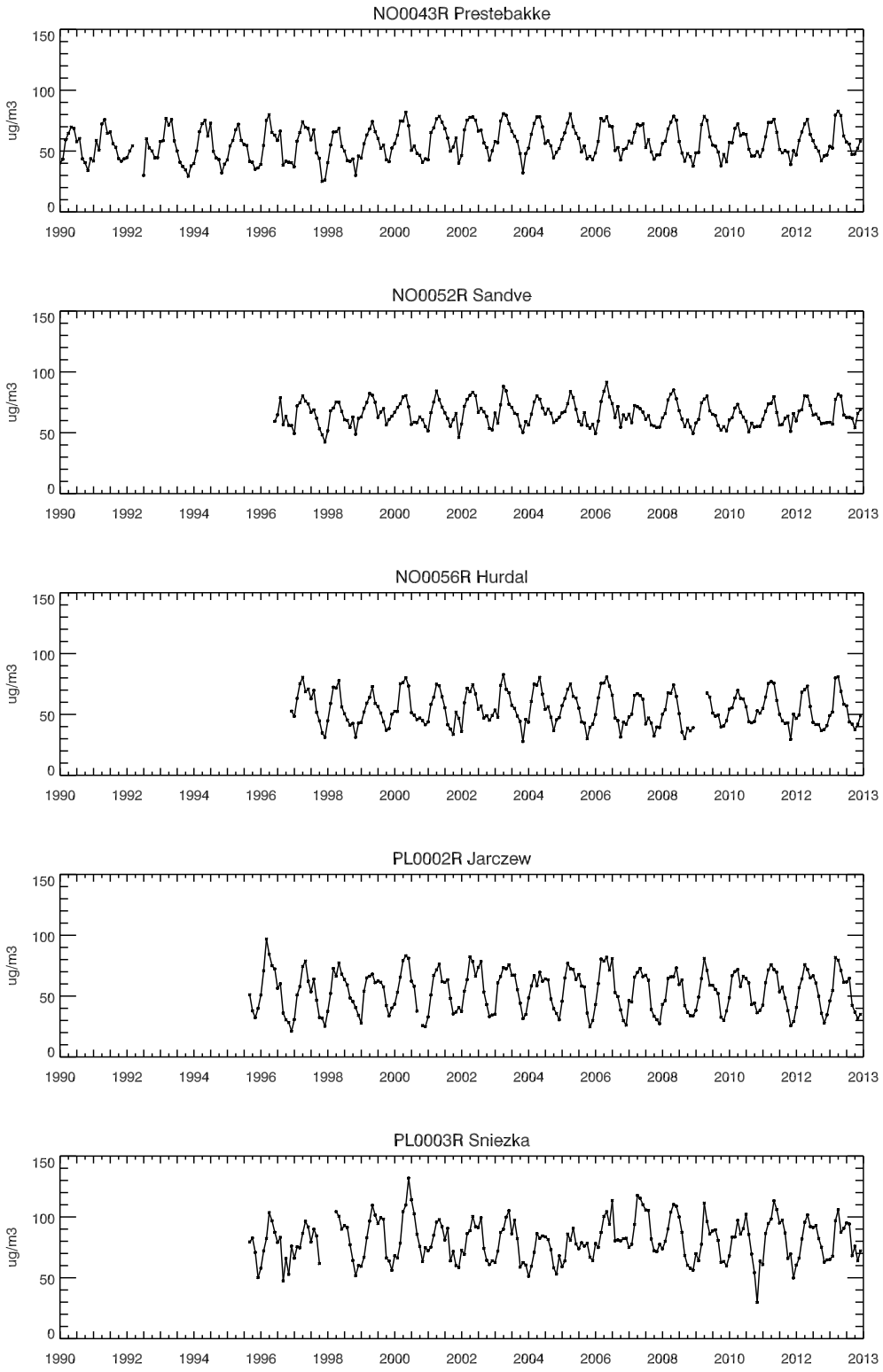
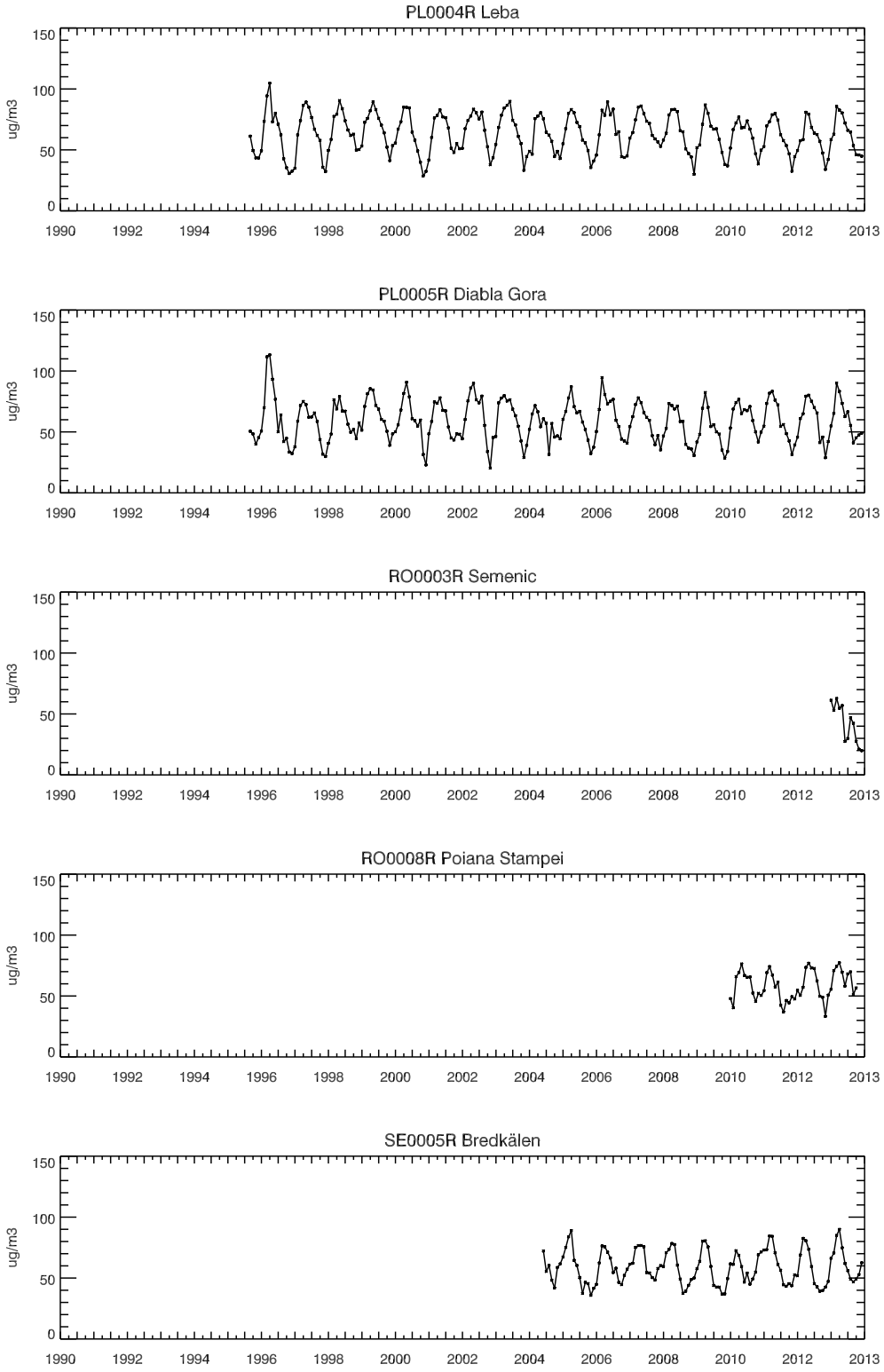


Figure 3.1, cont.



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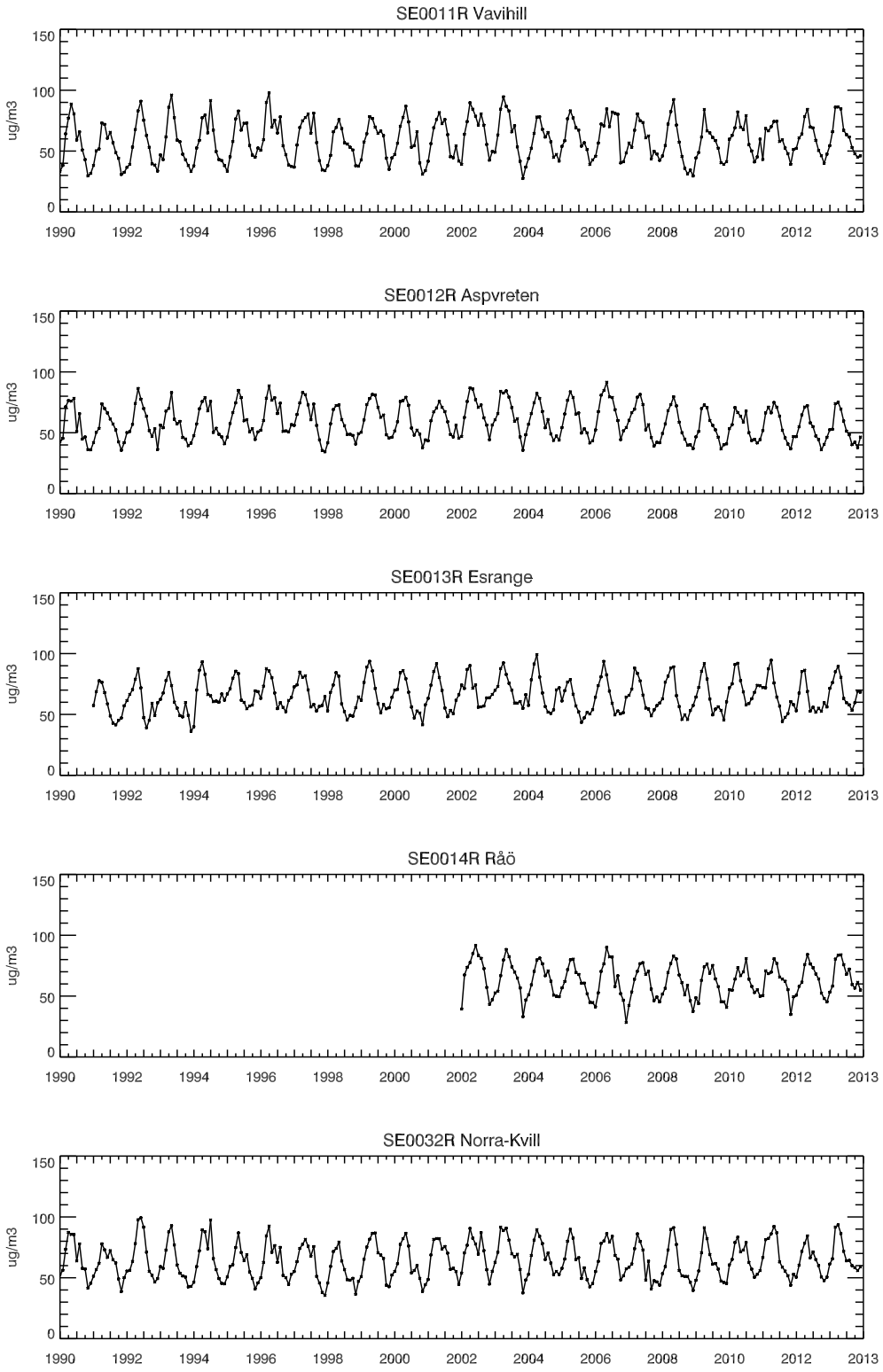
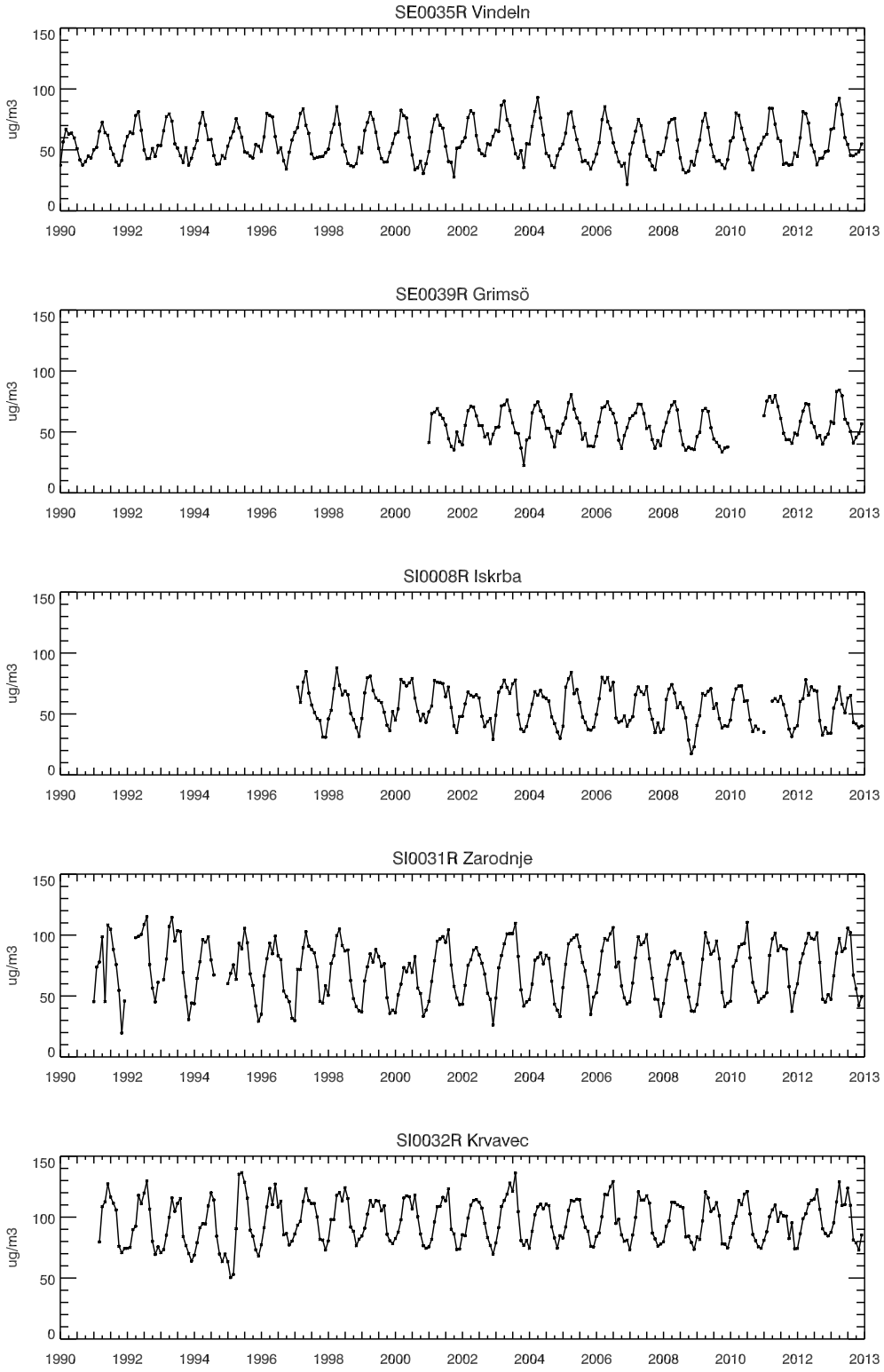


Figure 3.1, cont.



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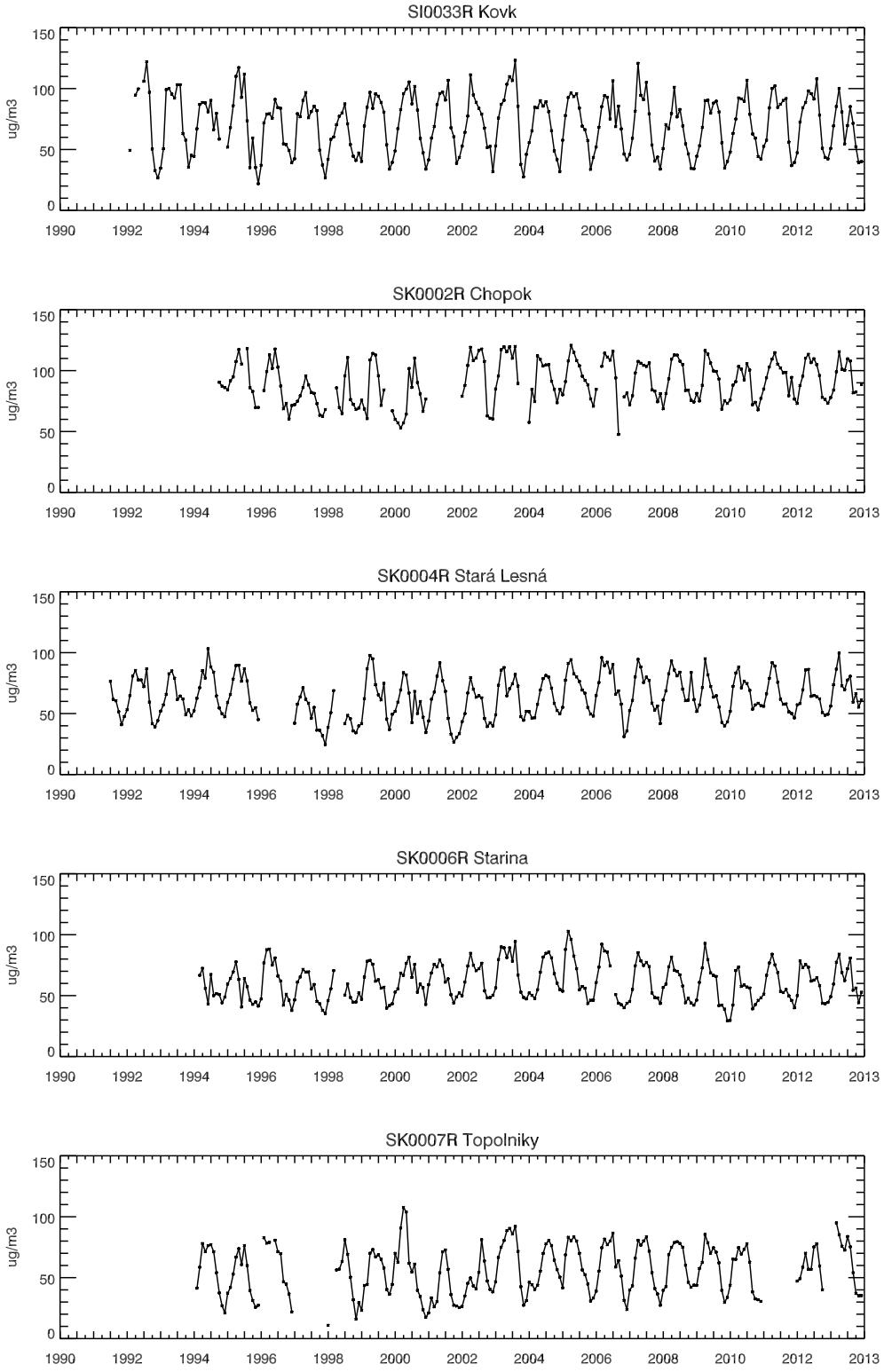


Figure 3.1, cont.

Annex 4

Diurnal variation, April–September 2013

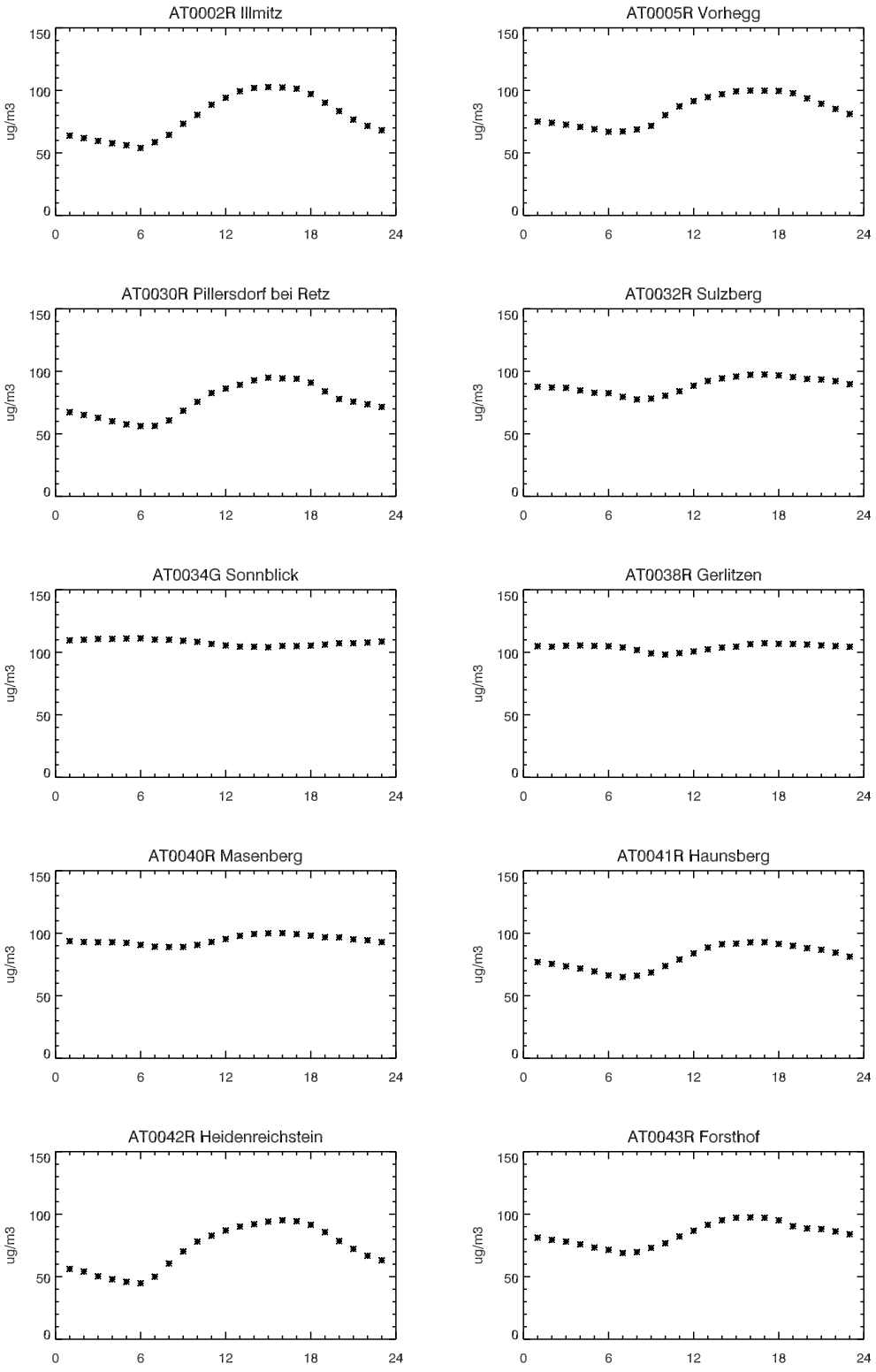


Figure 4.1: Diurnal variation, April–September 2013.

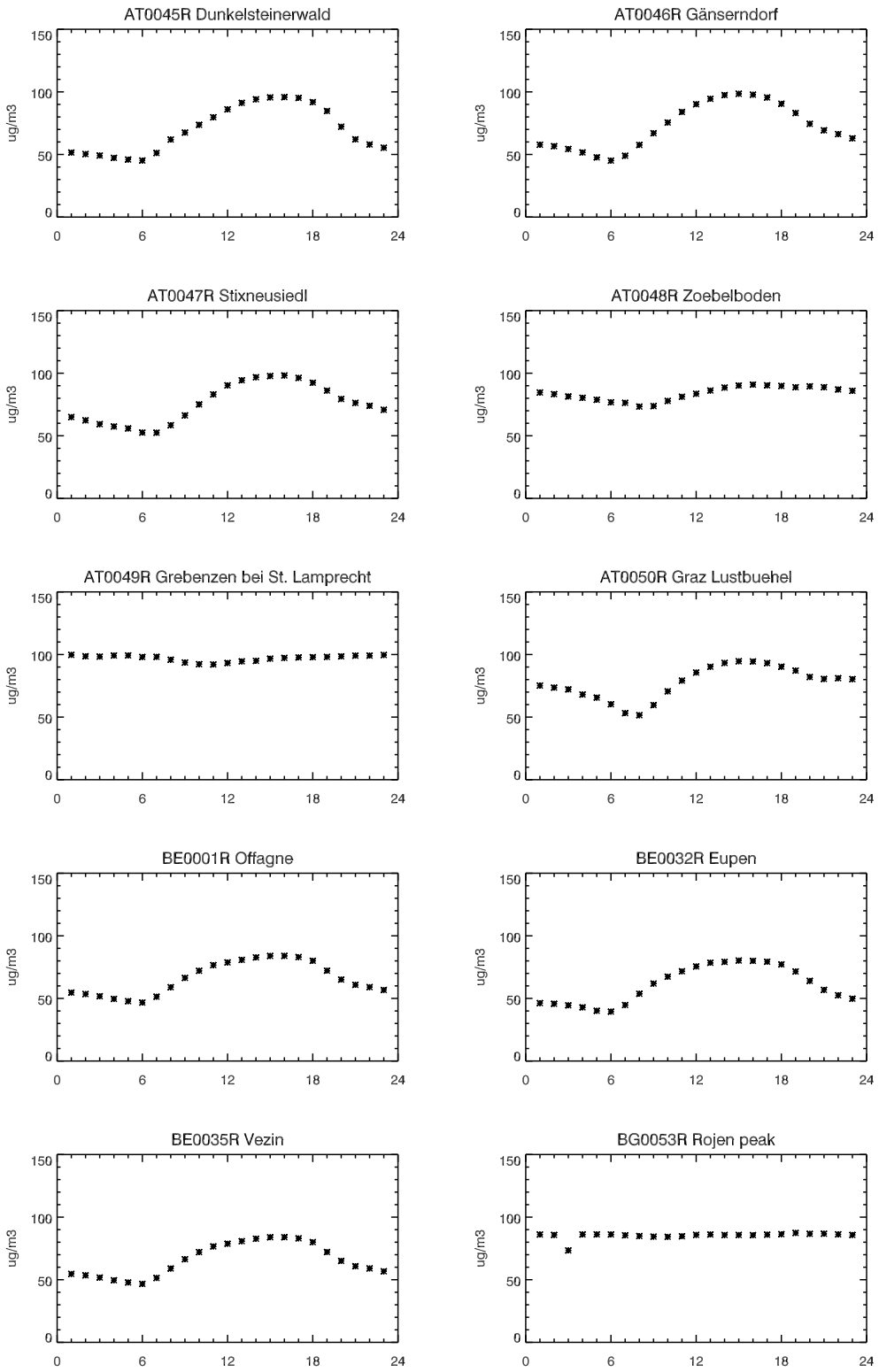
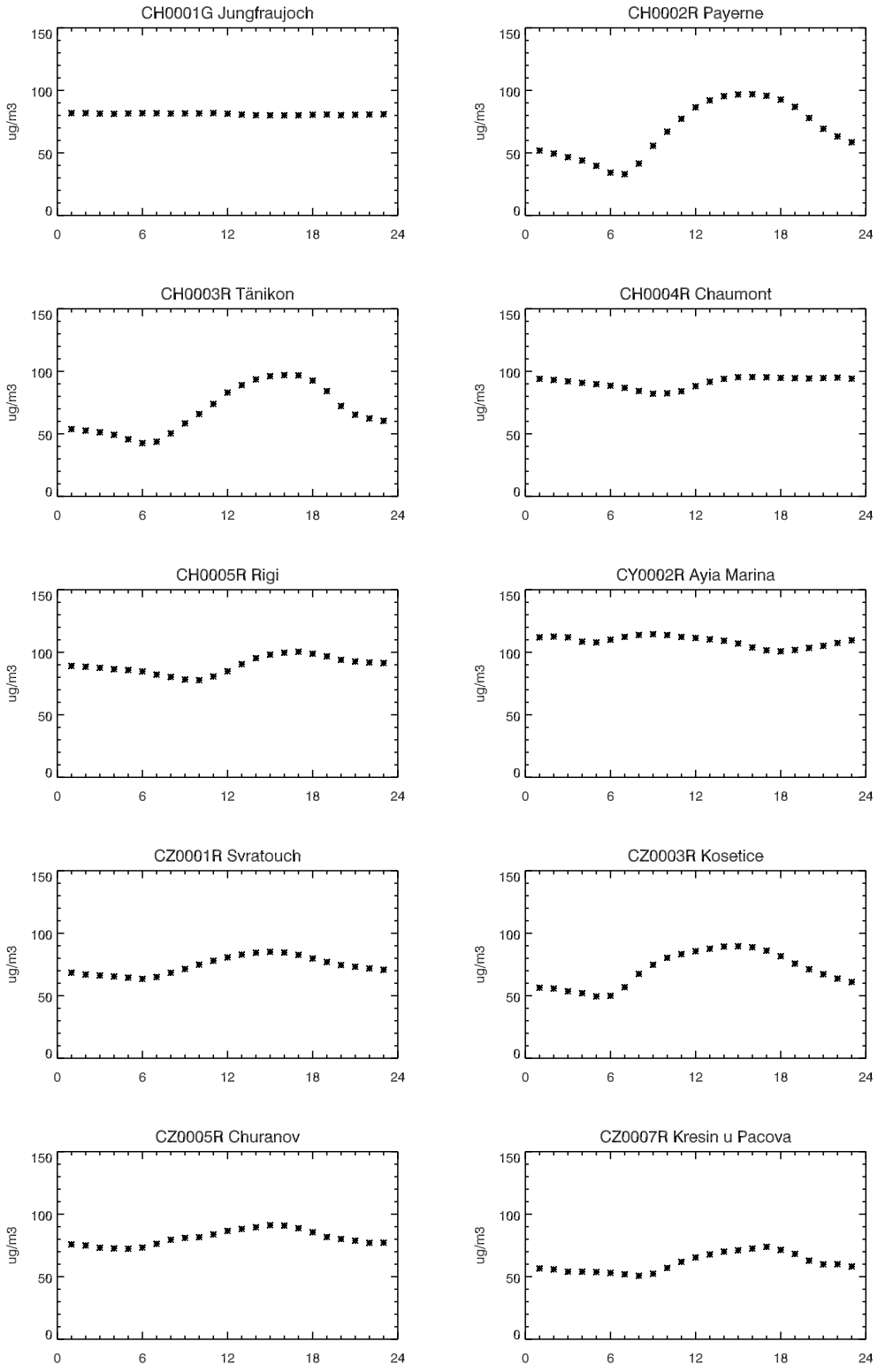


Figure 4.1, cont.



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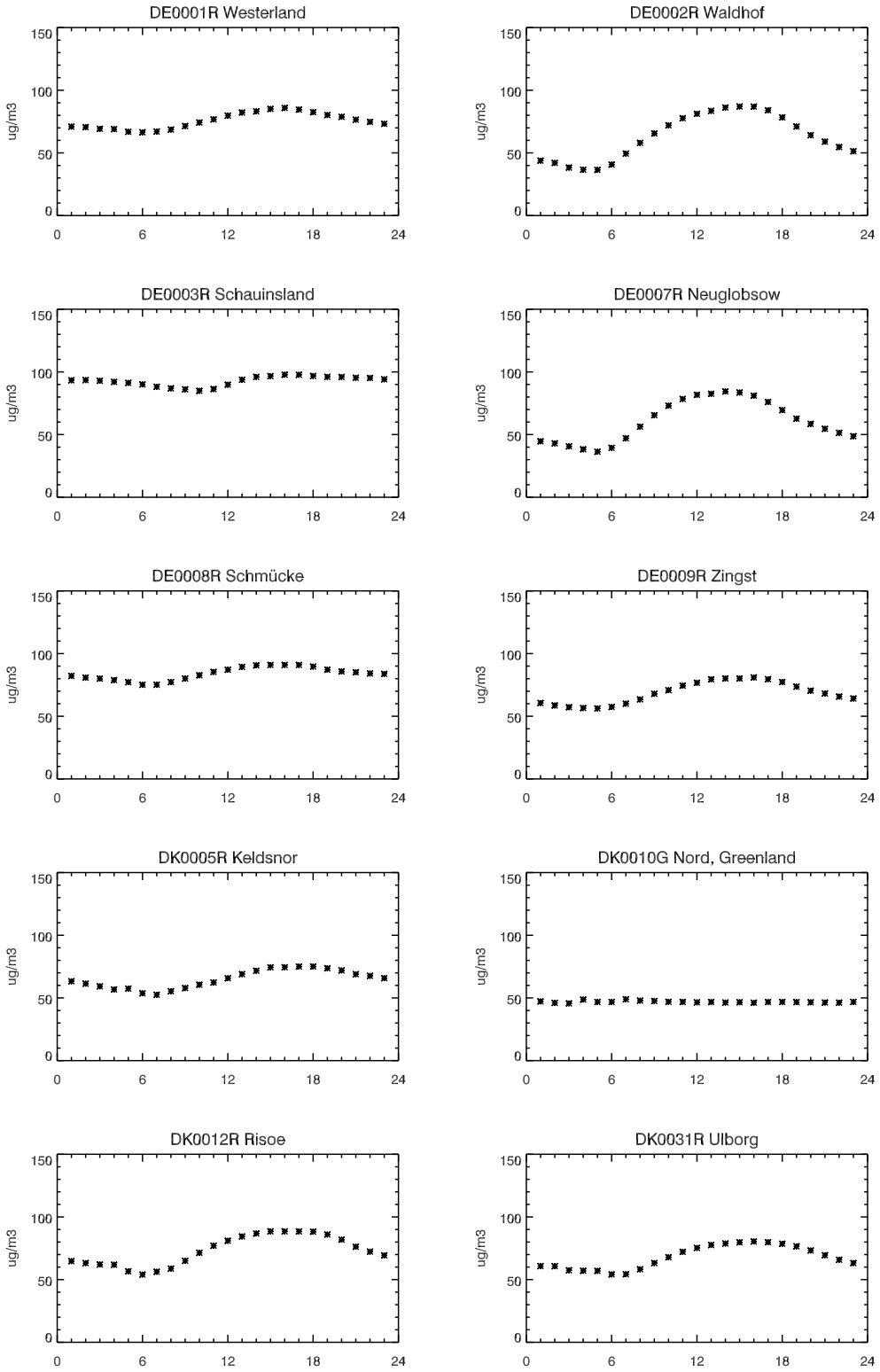

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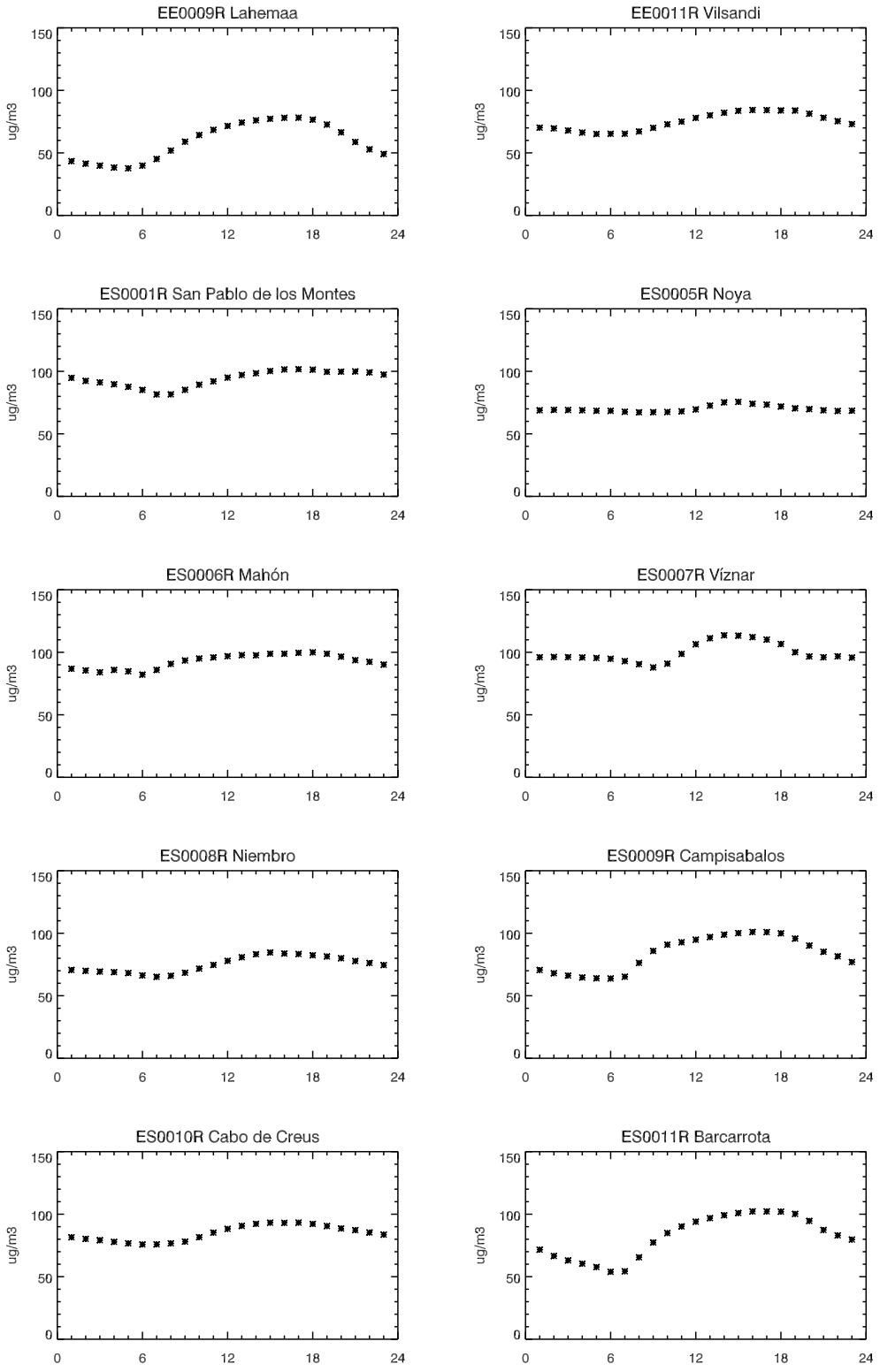

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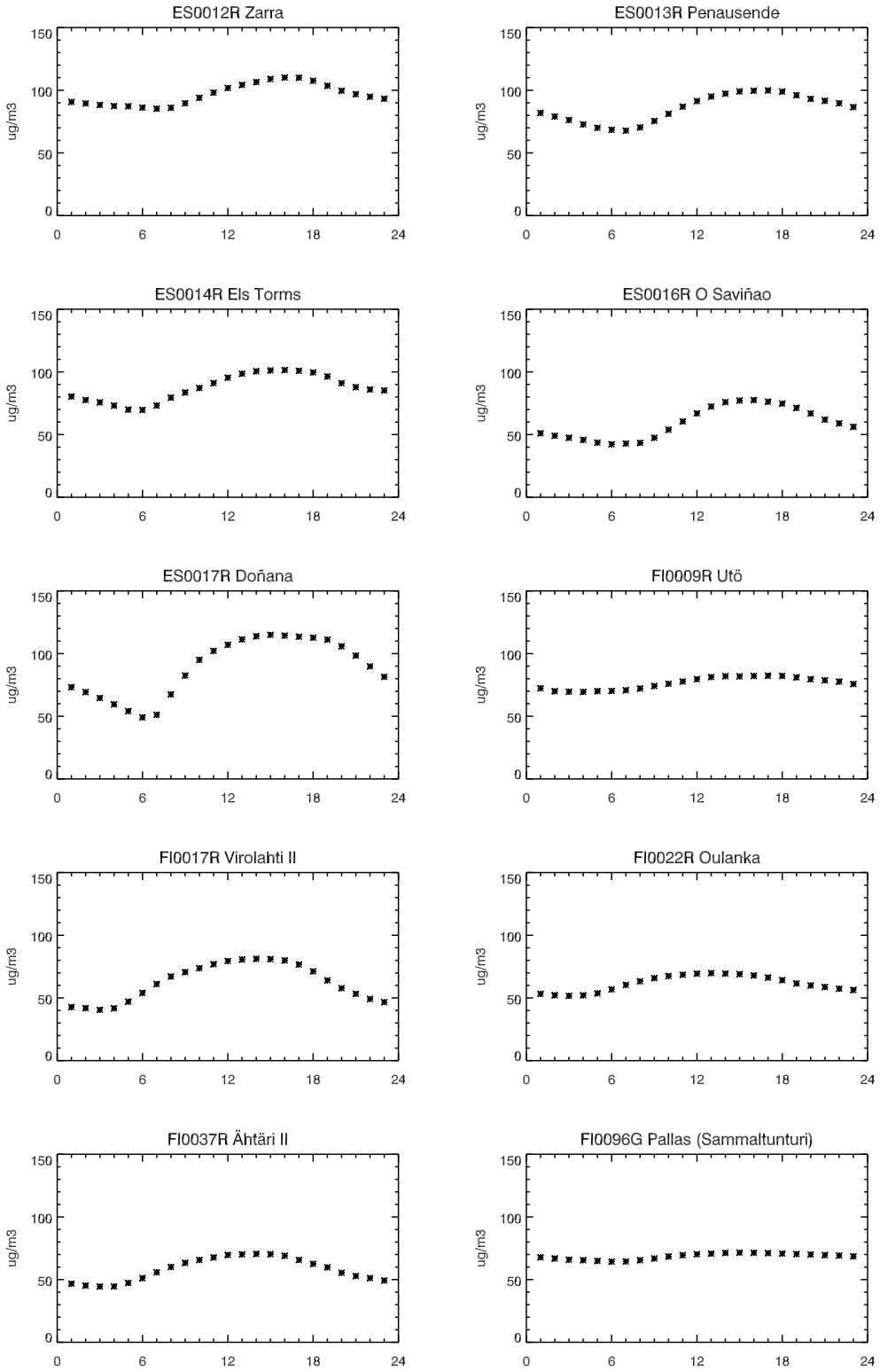
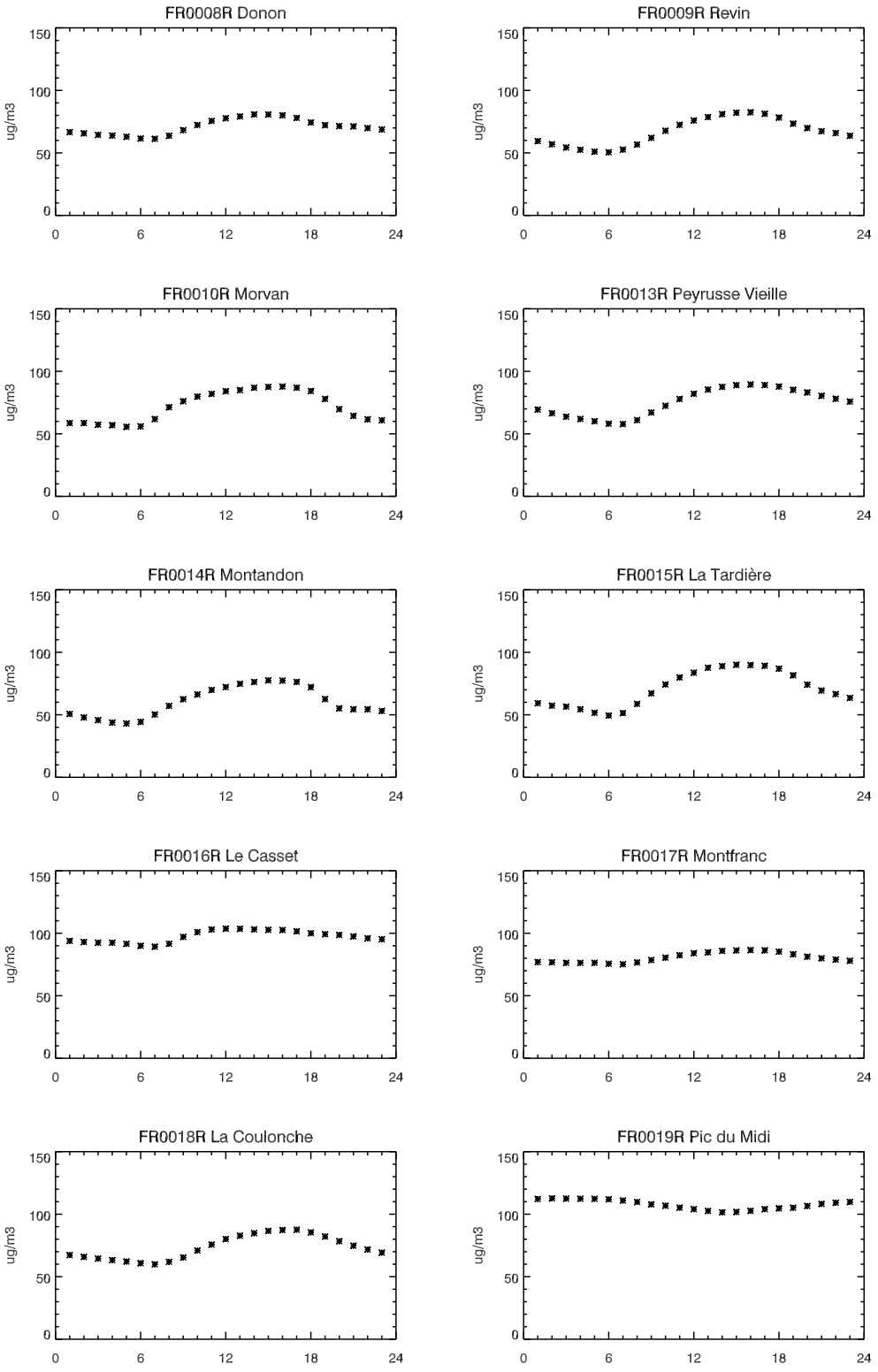


Figure 4.1, cont.



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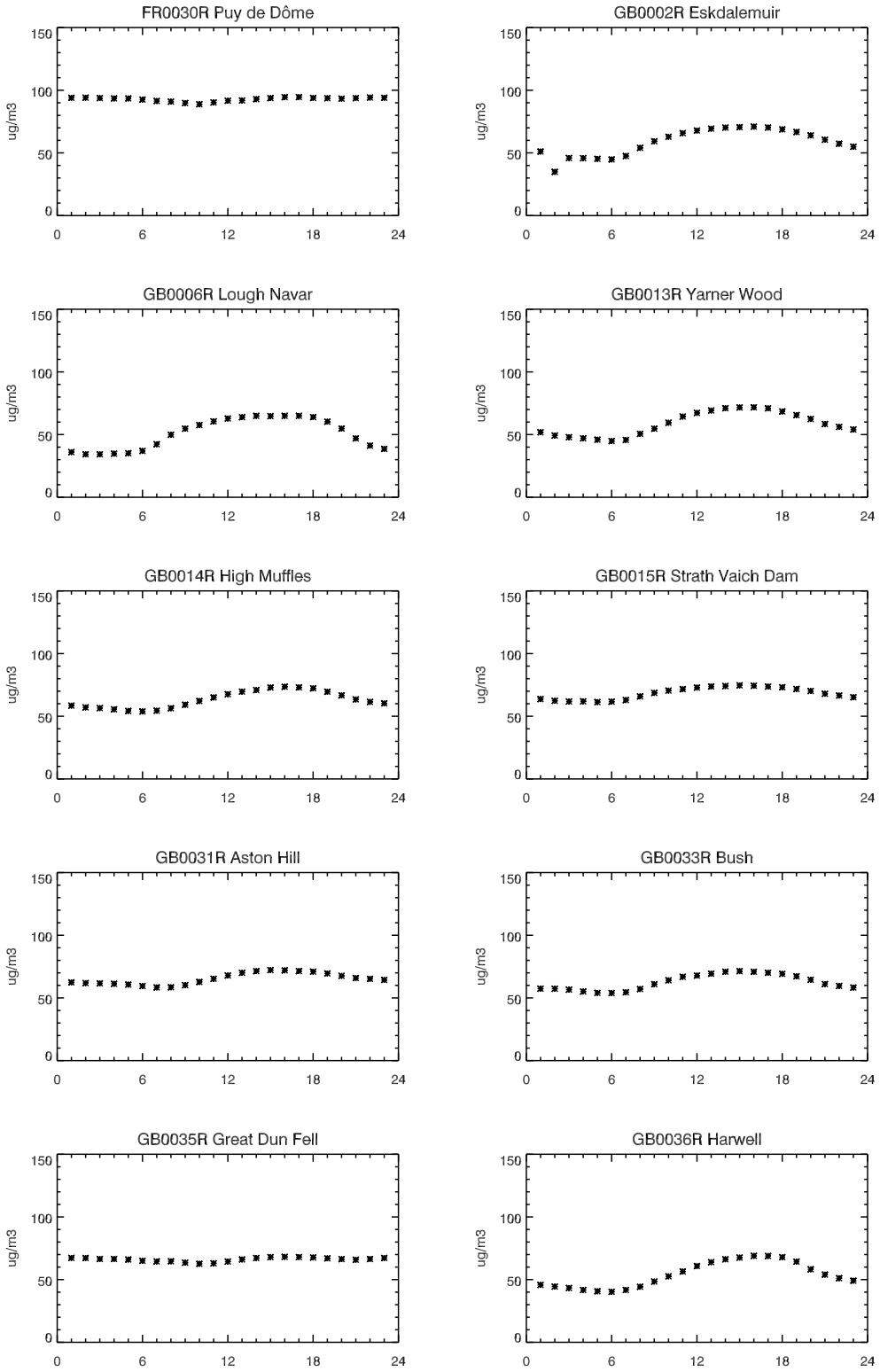

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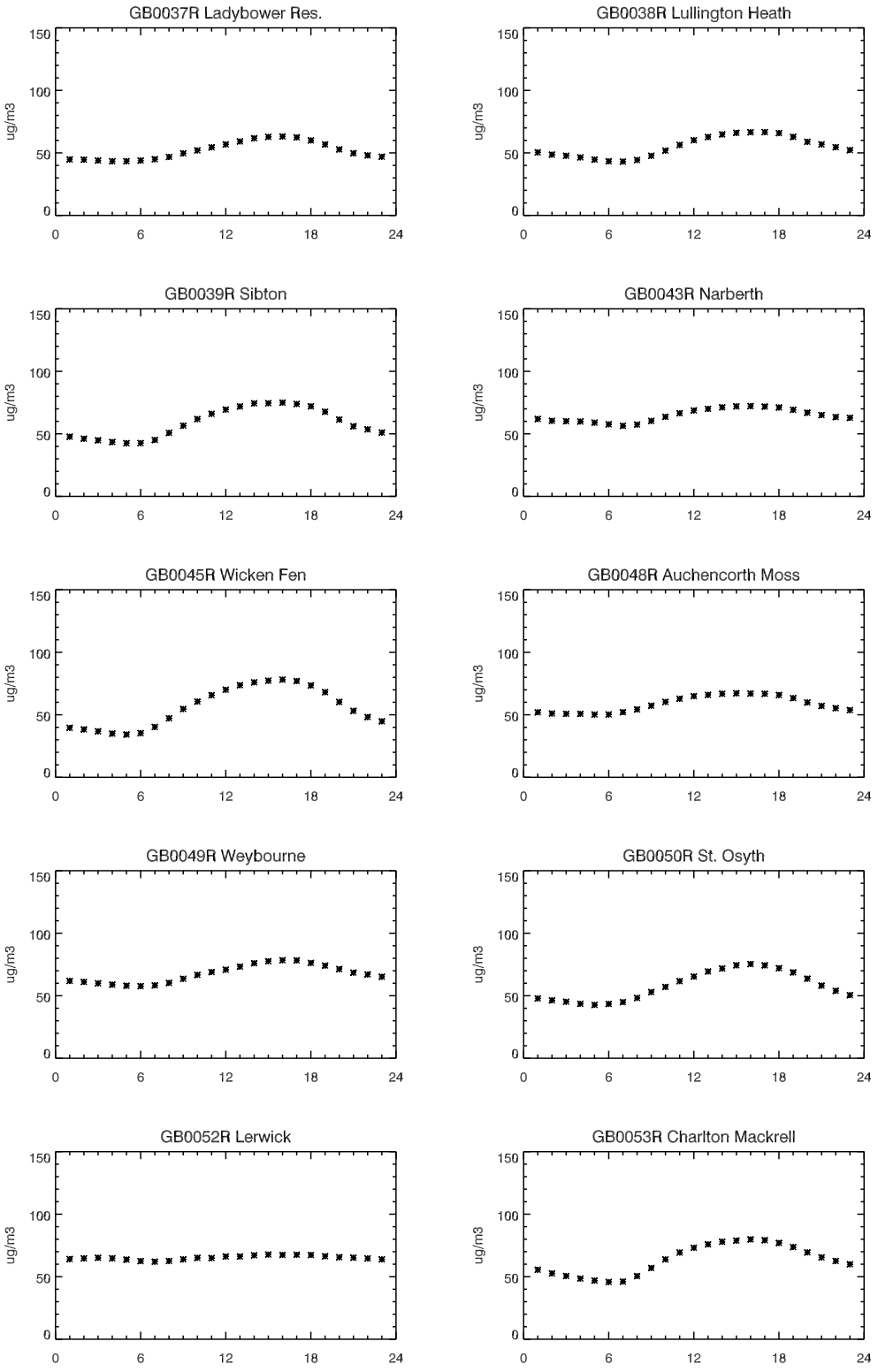

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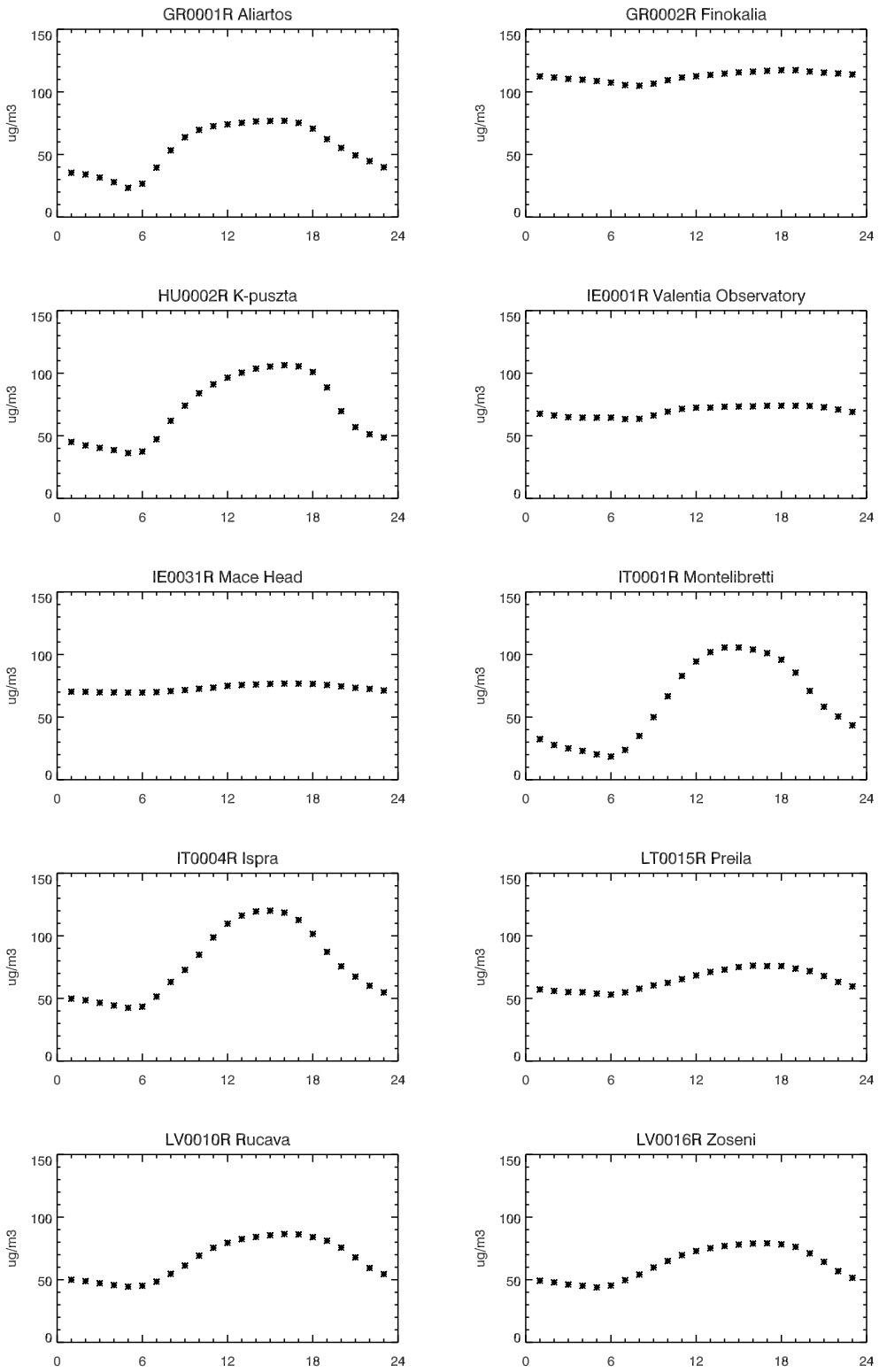

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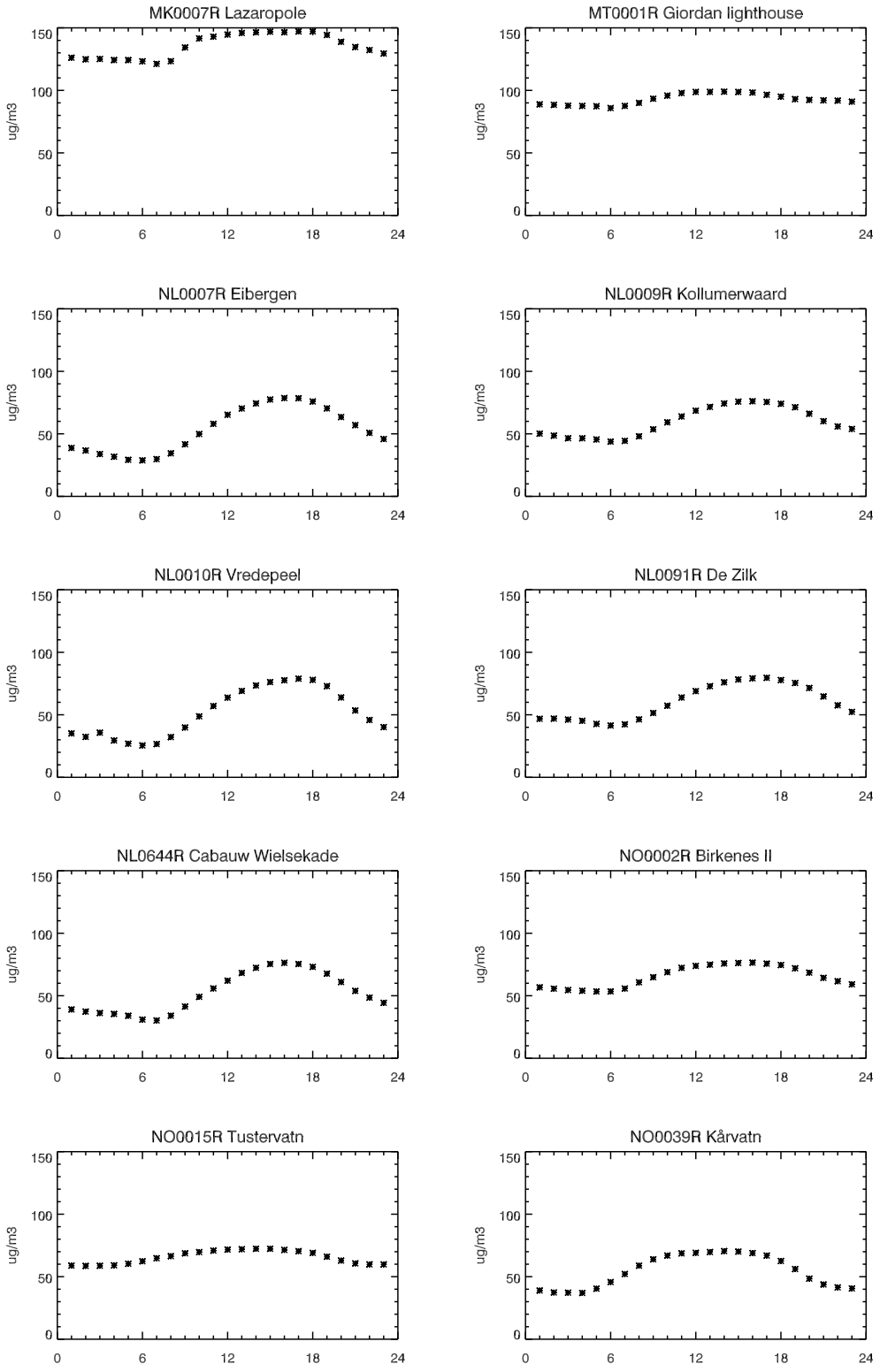

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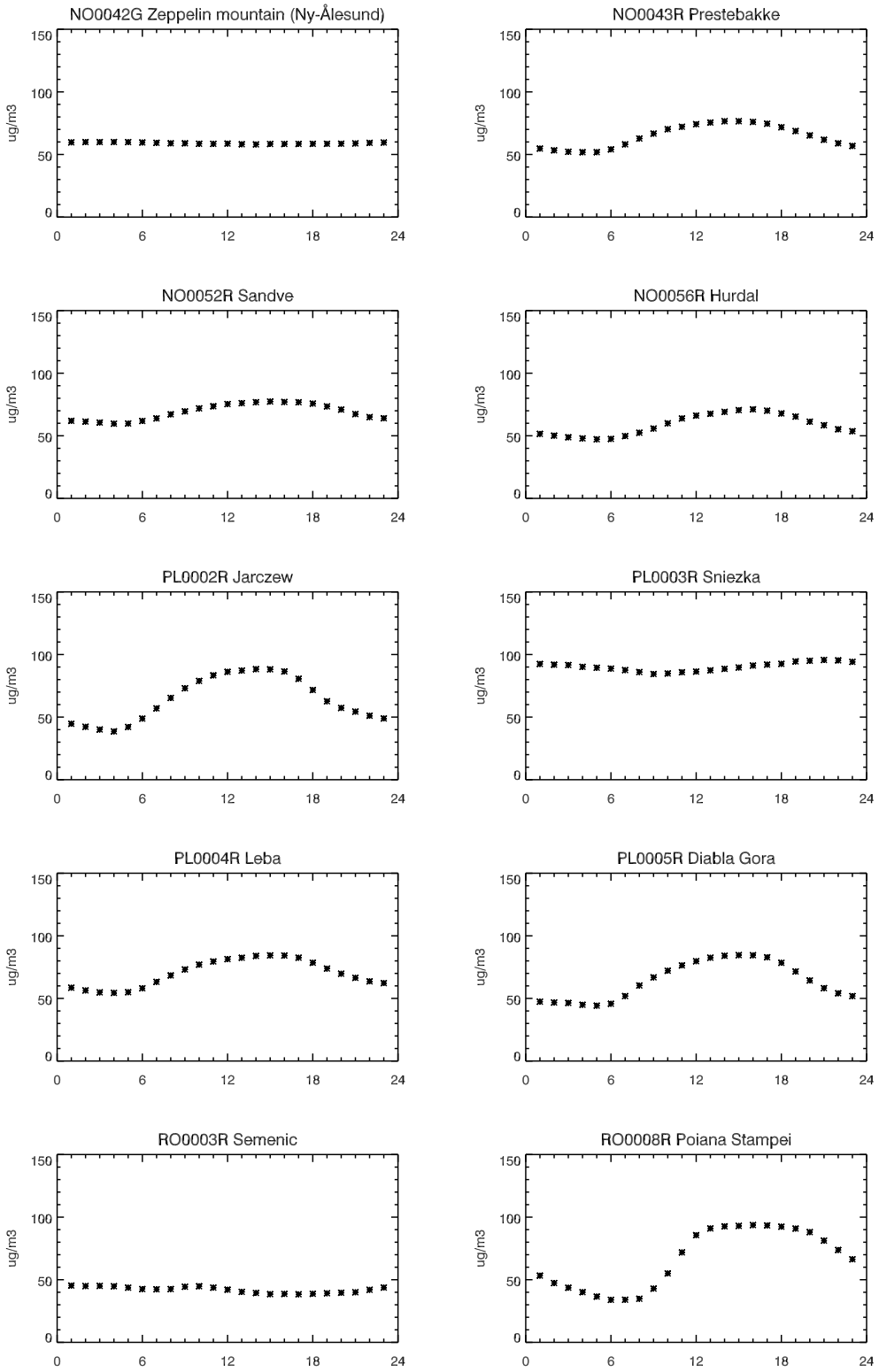

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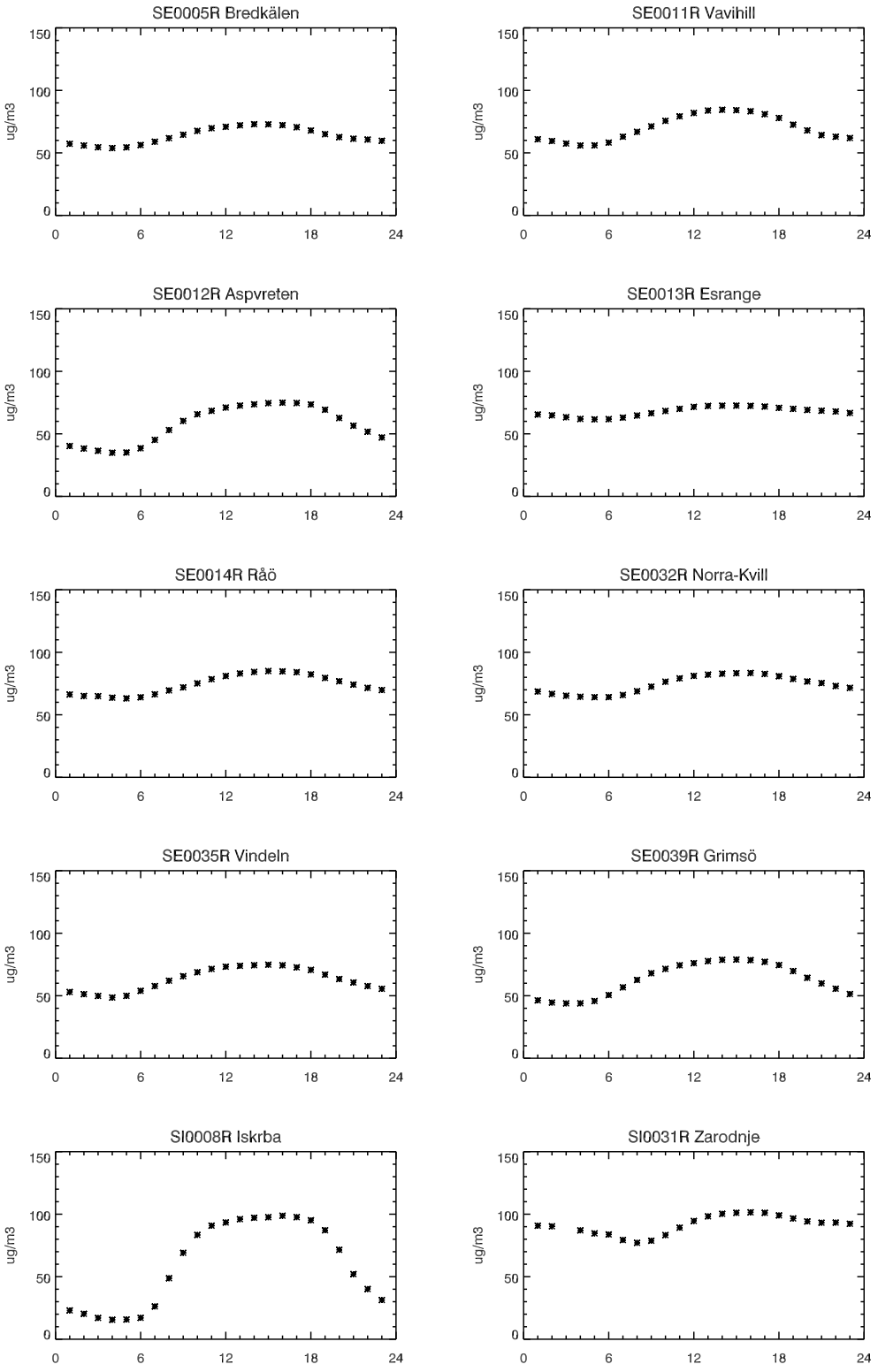

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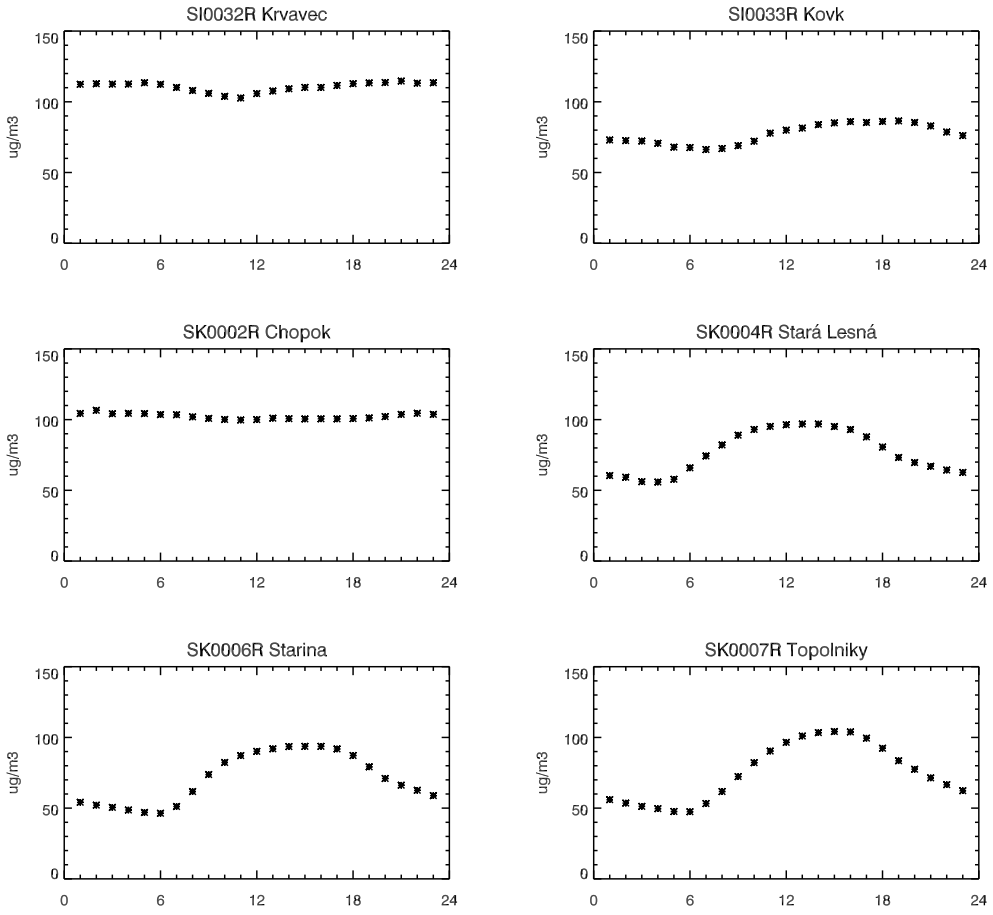

Figure 4.1, cont.

Annex 5

List of data reports

Ozone measurements in the ECE region January 1985–December 1985. Report no. 1.
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