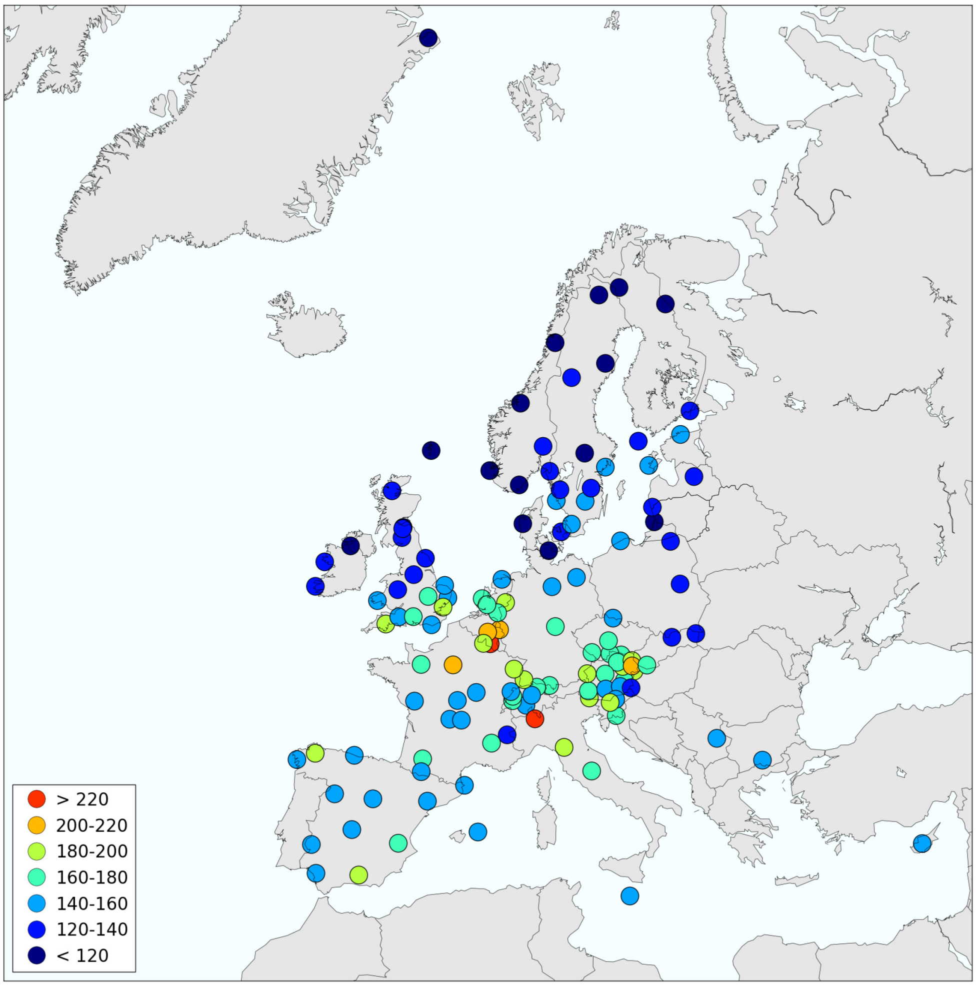
EMEP/CCC-Report 2/2019

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

Ozone measurements 2017

Anne-Gunn Hjellbrekke and Sverre Solberg



Maximum ozone concentration 2017 μg/m³

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Contents

List of tables and figures

Ozone measurements 2017

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 such 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 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 2017 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 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 (µg/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 µg/m^3 and a factor 2 µg/m^3 = 1 ppb

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

Value (µg/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 is 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 ppbh (3-months period) for agricultural crops and (semi-)natural vegetation and 5000 ppbh (6-months period) for forest trees. The former critical level for forest was 10 000 ppbh, and the new, lower level is seen as a clear improvement (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, as 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 for human health, to be met by 1.1.2010 , 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 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.

Flux-based critical levels for various types of vegetation have been approved for inclusion in the LRTAP Convention's modelling and mapping manual (CLRTAP, 2011). The DO^{3}SE-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 2017 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 2017. In total, 139 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 2017.

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	Agia Marina	35°02'21"N	33°03'29"E	532
CZ0003R	Košetice (NOAK)	49°35'00"N	15°05'00"E	534
CZ0005R	Churanov	49°04'00"N	13°36'00"E	1118
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°44'47"N	10°44'10"E	10
DK0010G	Villum Research Station, Station Nord	81°36'00"N	16°40'12"W	20
DK0012R	Risoe	55°41'37"N	12°05'09"E	3
DK0031R	Ulborg	56°17'26"N	08°25'39"E	10
EE0009R	Lahemaa	59°30'00"N	25°54'00"E	32
ES0001R	San Pablo de los Montes	39°32'52"N	04°20'55"W	917
ES0005R	Noia	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

Table 3, cont.

Code	Station name	Latitude	Longitude	Altitude
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
FI0018R	Virolahti III	60°31'48"N	27°40'03"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
FR0020R	SIRTA Atmospheric Research Observatory	48°42'31"N	02°09'32"E	162
FR0023R	Saint-Nazaire-le-Désert	44°34'10"N	05°16'44"E	605
FR0025R	Verneuil	46°48'53"N	02°36'36"E	182
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
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
GB1055R	Chilbolton Observatory	51°08'59"N	01°26'18"W	78
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
HU0003R	Farkasfa	46°54'36"N	16°19'12"E	312
IE0001R	Valentia Observatory	51°56'23"N	10°14'40"W	11
IE0031R	Mace Head	53°10'00"N	09°30'00"W	15
IT0004R	Ispra	45°48'00"N	08°38'00"E	209
IT0009R	Mt Cimone	44°11'00"N	10°42'00"E	2165
IT0018R	Lampedusa	35°31'06"N	12°37'50"E	45
IT0019R	Monte Martano	42°48'20"N	12°33'56"E	1090
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
RS0005R	Kamenici Vis	43°24'00"N	21°57'00"E	813
SE0005R	Bredkälen	63°51'00"N	15°20'00"E	404
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
SE0018R	Asa	57°09'52"N	14°46'57"E	180
SE0019R	Östad	57°57'09"N	12°24'11"E	65
SE0020R	Hallahus	56°02'34"N	13°08'53"N	190
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
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

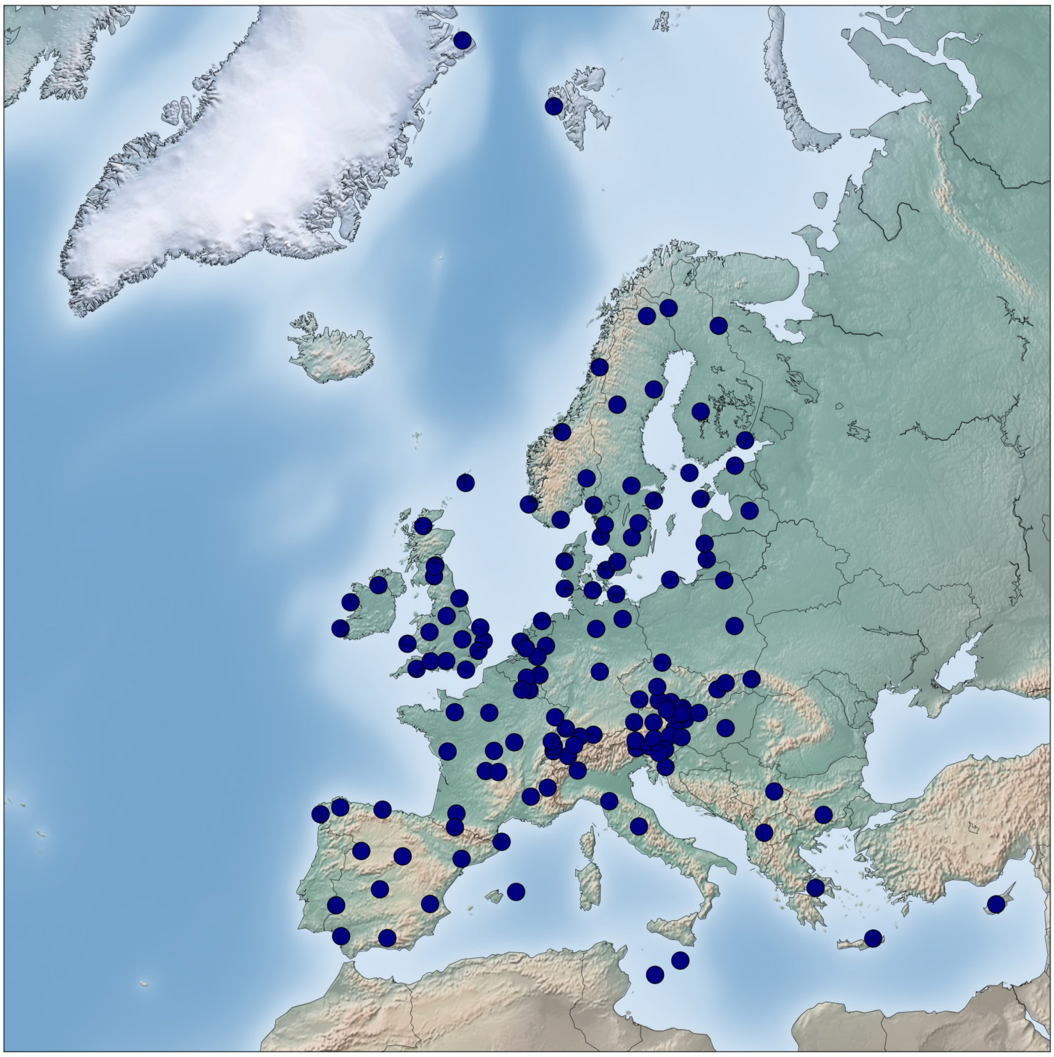

Figure 1: Location of the monitoring stations.

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). A document, "Overview of the routines for calibration and maintenance", is also available under the ozone section at http://www.nilu.no/projects/ccc/emepdata.html.

The UV absorption method is the only measurement method in use in 2017. The monitors measure the mixing ratio (in nmol/mol), whereas all data presented in this report are given in µg/m^3. The conversion factor used to calculate from nmol/mol 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. For the high altitude site Jungfraujoch in Switzerland, the mean annual conditions (-8°C, 653 mbar) are used, giving a conversion factor of 1.42. A number of countries report ozone data in mixing ratio, and in this case the data are converted to μg/m^3 by multiplying by 2.0 at the CCC, corresponding to standard conditions of 20°C and 1 atm.

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

Country	Conversion factor
Austria	2.0
Belgium	2.0
Bulgaria	
Cyprus	2.0
Czech Republic	Reported in mixing ratio
Denmark	2.0
Estonia	2.0
Finland	2.0
France	Reported in mixing ratio
Germany	Reported in mixing ratio
Greece (Aliartos)	1.96
Greece (Finokalia)	Reported in mixing ratio
Hungary	Reported in mixing ratio
Ireland (Mace Head)	Reported in mixing ratio
Italy	Reported in mixing ratio
Latvia	2.0
Lithuania	2.0
Malta	Reported in mixing ratio
Netherlands	2.0
Norway	2.0
Poland (IMWM)	2.0
Poland (Diabla Gora)	Reported in mixing ratio
Slovakia	2.0
Slovenia	Reported in mixing ratio
Spain	2.0
Sweden	2.0
Switzerland	2.0 (1.42 at CH0001R)
United Kingdom	Reported in mixing ratio

4. Data completeness

The annual means and data capture (number of valid measurements in percent of the total number of measurements) for each station is given in Table 5. The data capture is in general good, 121 stations have a data capture above 90%.

Table 5: Annual average and data capture in per cent, 2017.

Code	Station	Annual average	Data capture 2017
AT0002R	Illmitz	65.1	95.3
AT0005R	Vorhegg	74.7	91.6
AT0030R	Pillersdorf bei Retz	65.3	92.7
AT0032R	Sulzberg	81.6	95.2
AT0034G	Sonnblick	97.7	95.5
AT0038R	Gerlitzen	96.6	65.7
AT0040R	Masenberg	80.0	95.4
AT0041R	Haunsberg	67.5	94.6
AT0042R	Heidenreichstein	61.6	95.5
AT0043R	Forsthof	69.7	95.2
AT0045R	Dunkelsteinerwald	57.7	95.5
AT0046R	Gänserndorf	58.2	95.3
AT0047R	Stixneusiedl	61.7	95.5
AT0048R	Zoebelboden	75.4	95.3
AT0049R	Grebenzen bei St. Lamprecht	87.5	95.4
AT0050R	Graz Lustbuehel	59.8	95.5
BE0001R	Offagne	54.8	96.3
BE0032R	Eupen	51.7	94.8
BE0035R	Vezin	44.8	96.0
BG0053R	Rojen peak	91.4	94.8
CH0001G	Jungfraujoch	73.0	96.7
CH0002R	Payerne	55.9	99.3
CH0003R	Tänikon	56.0	99.1
CH0004R	Chaumont	82.3	95.8
CH0005R	Rigi	80.6	98.7
CY0002R	Ayia Marina	96.3	96.4
CZ0003R	Kosetice	66.2	93.5
CZ0003R	Kosetice	71.3	94.5
CZ0005R	Churanov	75.7	97.8
DE0001R	Westerland	66.3	69.0
DE0002R	Waldhof	51.1	95.3
DE0003R	Schauinsland	84.4	95.5
DE0007R	Neuglobsow	47.8	94.1
DE0008R	Schmücke	68.6	95.1
DE0009R	Zingst	62.6	74.6
DK0005R	Keldsnor	57.9	89.1
DK0010G	Villum Research Station, Station Nord	65.5	90.8
DK0012R	Risoe	61.0	91.2
DK0031R	Ulborg	62.3	90.8
EE0009R	Lahemaa	53.0	99.9
EE0011R	Vilsandi	66.0	98.1
ES0001R	San Pablo de los Montes	88.3	97.9
ES0005R	Noya	68.2	92.8
ES0006R	Mahón	87.0	94.8
ES0007R	Víznar	91.8	99.0

Table 5, cont.

Code	Station	Annual average	Data capture 2017
ES0008R	Niembro	70.4	97.3
ES0009R	Campisabalos	64.2	97.2
ES0010R	Cabo de Creus	71.7	98.7
ES0011R	Barcarrota	51.1	97.4
ES0012R	Zarra	92.8	96.3
ES0013R	Penausende	70.5	99.0
ES0014R	Els Torms	76.5	99.0
ES0016R	O Saviñao	60.1	98.3
ES0017R	Doñana	64.0	99.1
FI0009R	Utö	65.6	98.7
FI0018R	Virolahti III	52.6	98.8
FI0022R	Oulanka	57.9	99.6
FI0037R	Ähtäri II	69.3	36.7
FI0096G	Pallas (Sammaltunturi)	66.7	98.8
FR0008R	Donon	61.8	99.3
FR0009R	Revin	59.5	99.4
FR0010R	Morvan	65.4	98.8
FR0013R	Peyrusse Vieille	67.2	98.7
FR0014R	Montandon	58.0	97.6
FR0015R	La Tardière	55.1	99.2
FR0016R	Le Casset	94.6	96.3
FR0017R	Montfranc	76.2	98.7
FR0018R	La Coulonche	65.6	98.0
FR0019R	Pic du Midi	92.7	97.3
FR0020R	SIRTA Atmospheric Research Observatory	54.4	99.2
FR0023R	Saint-Nazaire-le-Désert	64.1	93.8
FR0025R	Verneuil	56.9	98.3
FR0030R	Puy de Dôme	86.4	96.2
GB0002R	Eskdalemuir	57.4	99.3
GB0006R	Lough Navar	48.5	99.5
GB0013R	Yarner Wood	63.9	92.1
GB0014R	High Muffles	57.8	98.0
GB0015R	Strath Vaich Dam	68.0	96.6
GB0031R	Aston Hill	64.2	96.6
GB0033R	Bush	57.5	98.4
GB0037R	Ladybower Res.	55.8	93.1
GB0038R	Lullington Heath	55.4	94.4
GB0039R	Sibton	54.0	96.4
GB0043R	Narberth	60.5	98.1
GB0045R	Wicken Fen	48.6	98.6
GB0048R	Auchencorth Moss	57.7	99.4
GB0049R	Weybourne	60.9	99.6
GB0050R	St. Osyth	51.6	98.7
GB0052R	Lerwick	73.4	96.2
GB0053R	Charlton Mackrell	61.7	99.2
GB1055R	Chilbolton Observatory	51.5	97.6
GR0001R	Aliartos	58.8	56.4
GR0002R	Finokalia	107.4	74.2
HU0002R	K-puszta	56.1	48.7
HU0003R	Farkasfa	54.5	76.0
IE0001R	Valentia Observatory	65.7	100.0

Table 5, cont.

Code	Station	Annual average	Data capture 2017
IE0031R	Mace Head	75.6	99.9
IT0004R	Ispra	52.1	89.9
IT0009R	Mt Cimone	100.2	95.6
IT0018R	Lampedusa	92.0	30.8
IT0019R	Monte Martano	88.2	90.7
LT0015R	Preila	55.4	95.9
LV0010R	Rucava	55.2	86.7
LV0016R	Zoseni	52.0	86.2
MK0007R	Lazaropole	91.9	72.9
MT0001R	Giordan lighthouse	93.0	83.4
NL0007R	Eibergen	40.9	97.9
NL0009R	Kollumerwaard	49.3	96.9
NL0010R	Vredepeel	43.3	96.5
NL0091R	De Zilk	52.3	98.5
NL0644R	Cabauw Wielsekade	43.1	96.7
NO0002R	Birkenes II	61.6	95.3
NO0015R	Tustervatn	67.0	99.3
NO0039R	Kårvatn	54.3	99.2
NO0042G	Zeppelin mountain (Ny-Ålesund)	70.6	46.6
NO0043R	Prestebakke	58.8	99.5
NO0052R	Sandve	63.3	95.5
NO0056R	Hurdal	57.2	99.3
PL0002R	Jarczew	45.6	99.7
PL0003R	Sniezka	75.0	100.0
PL0004R	Leba	61.2	100.0
PL0005R	Diabla Gora	52.2	96.7
RS0005R	Kamenicki vis	78.4	81.0
SE0005R	Bredkälen	62.3	99.8
SE0012R	Aspvreten	54.1	98.2
SE0013R	Esrange	67.4	99.9
SE0014R	Råö	63.0	99.5
SE0018R	Asa	55.8	97.6
SE0019R	Östad	55.8	99.9
SE0020R	Hallahus	59.2	99.8
SE0032R	Norra-Kvill	63.8	98.7
SE0035R	Vindeln	56.0	99.8
SE0039R	Grimsö	54.1	99.9
SI0008R	Iskrba	58.4	92.6
SI0031R	Zarodnje	65.1	94.0
SI0032R	Krvavec	94.9	95.3
SK0002R	Chopok	98.3	46.3
SK0004R	Stará Lesná	62.7	95.3
SK0006R	Starina	60.4	93.1
SK0007R	Topolniky	47.4	94.8

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 number of ozone exceedances in 2017 was higher than in 2016, but still low compared to previous years (Figure 2). During the past decades, 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 concentrations in 2017 were measured at Ispra in Italy (234 $\mu g/m^3$, August 4) and at Offagne in Belgium (228 $\mu g/m^3$, June 20) (Table 1.1, Annex 1). In total concentrations above 200 $\mu g/m^3$ were measured at six sites in Central Europe (Figure 1.5, Annex 1). The lowest maximum concentrations were measured at the remote sites Villum research station, Station Nord in Greenland (99 $\mu g/m^3$) and Oulanka in Finland (101 $\mu g/m^3$).

Exceedances of the information threshold of 180 $\mu g/m^3$ were observed at 21 sites, mostly in Central Europe: Austria, Belgium, the Netherlands, Germany, France and Italy. This compares to 14 sites in 2016, 33 sites in 2015 and just 7 sites in 2014. 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 Figure 1.2 in Annex 1. The lowest values are found in Scandinavia, Ireland and Scotland, where the 99-percentiles are below 110 $\mu g/m^3$. The concentrations are higher in England, Poland and the Baltics, where the 99-percentiles generally ranges from 110-130 $\mu g/m^3$, and at its highest in Italy, Slovenia, Austria and Switzerland, where the 99-percentile values are above 140 $\mu g/m^3$.

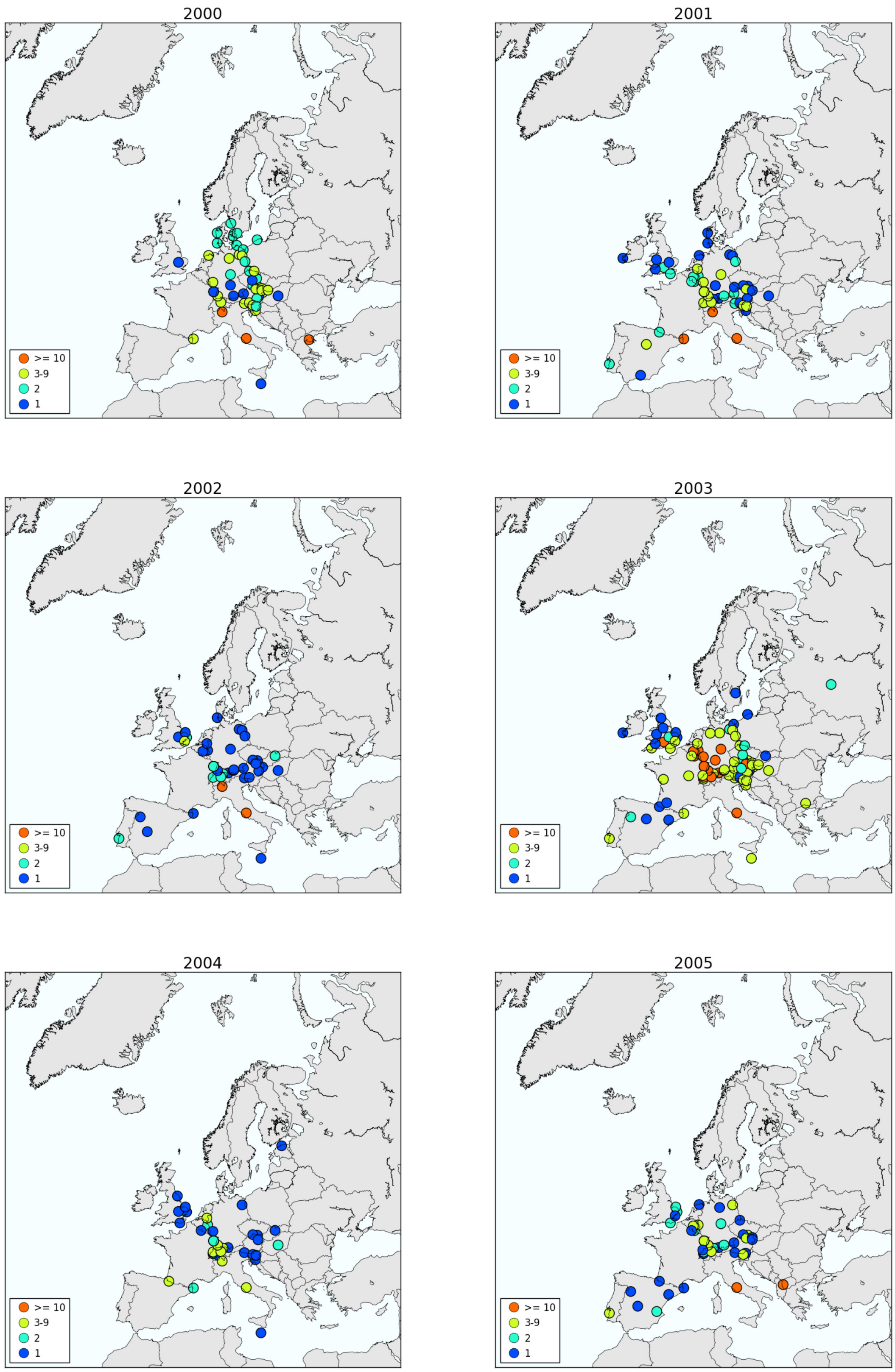

Figure 2: Number of exceedances of the threshold value of 180 µg/m^3 2000-2017. (Unit: number of days.) Stations with zero exceedances are not shown.

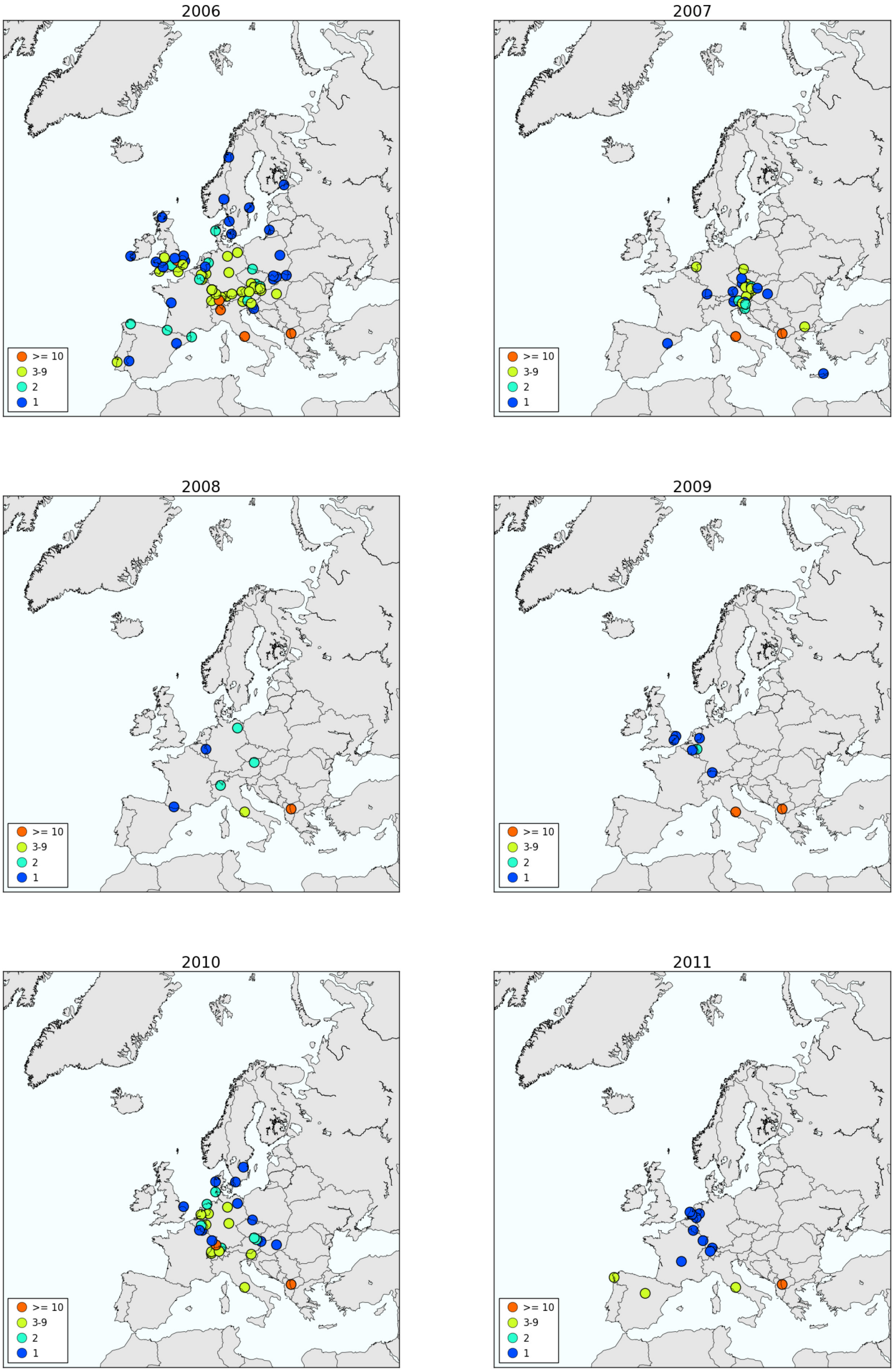

Figure 2, cont.

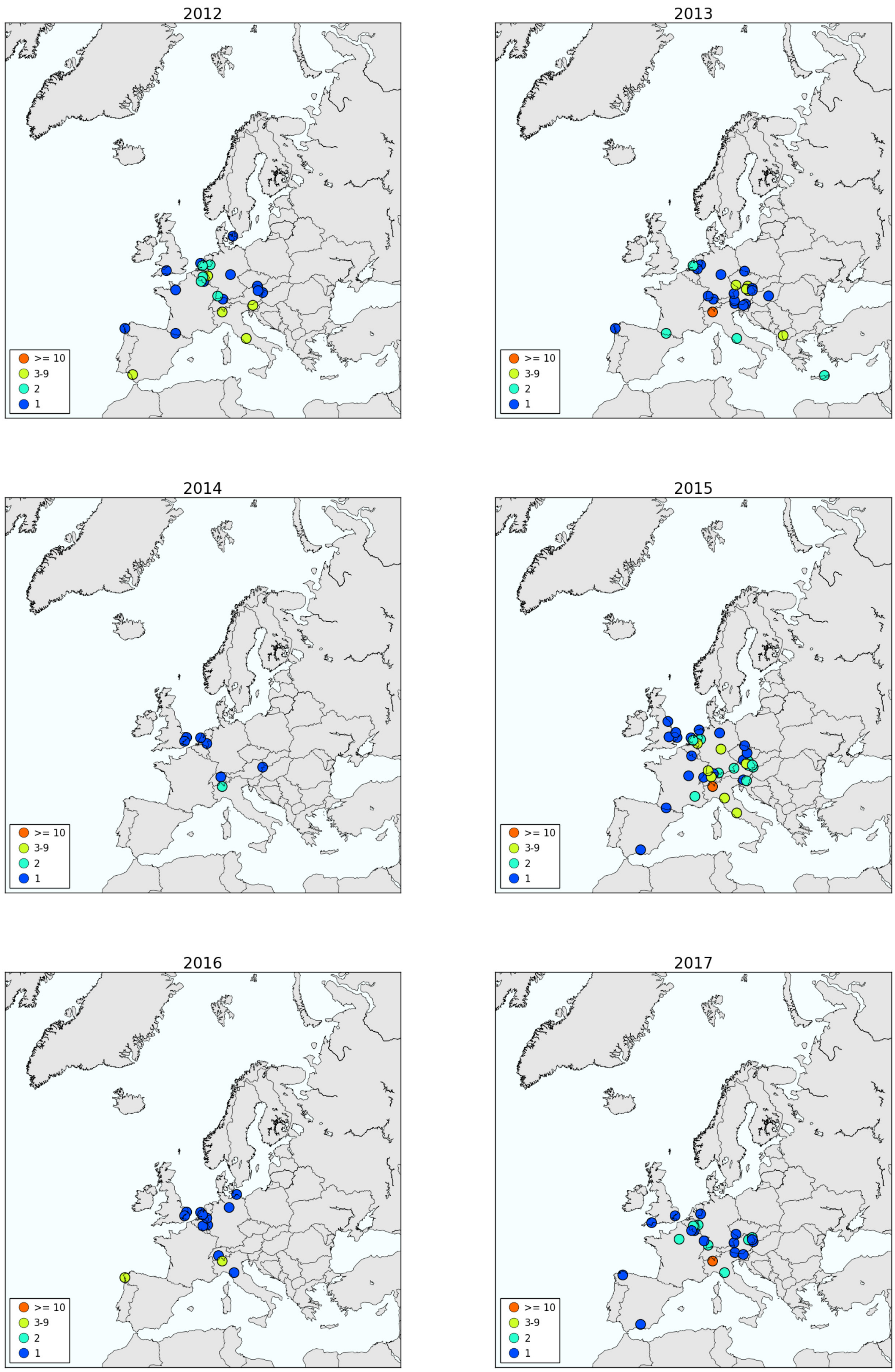

Figure 2, cont.

6. Calculation of AOT40

AOT40 for forest and agricultural crops for 2017 are shown in Table 2.1 in Annex 2, and the corresponding geographical distributions of AOT40 are shown in Figure 2.1–Figure 2.2. AOT values are calculated using daylight hours only, based on an estimated global radiation above 50 W/m^2 assuming clear skies. 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. Five sites in Europe (Spain, Italy and Crete) had 3-months AOT40 (May-July) values above 15 000 ppbh. The critical level for forest (5 000 ppbh) for 6-months AOT40 (April-September) was exceeded at most sites in Central, Eastern and Southern Europe.

7. Seasonal variation

Monthly mean concentrations and data capture for 2017 are given in Table 3.1 in Annex 3. The concentrations show a clear pattern with maximum values during spring or early summer and minimum in autumn or 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 1990-2017 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.

Figure 3 shows geographical distribution of monthly mean concentration for each month in 2017.

These monthly maps reflect the differences in seasonal cycle in different areas of Europe with a May maximum in northern parts and a prolonged summer maximum in the south. In winter all of central Europe acts as an ozone sink through the titration with NO whereas the outskirts (the Arctic and the Mediterranean Ocean) is less affected by the titration and thus show higher mean levels of ozone. In spring, i.e. April-May, higher levels are seen in most of the Europe reflecting the combined effect of higher temperatures, stronger radiation and biogenic and anthropogenic emissions when going from winter to spring. From June, the mean levels are again reduced in northern parts whereas it stays high until September in the south reflecting the longer period of photochemical formation in that area combined with the shorter lifetime (and thus shorter transport distance) due to more efficient dry deposition and uptake in vegetation.

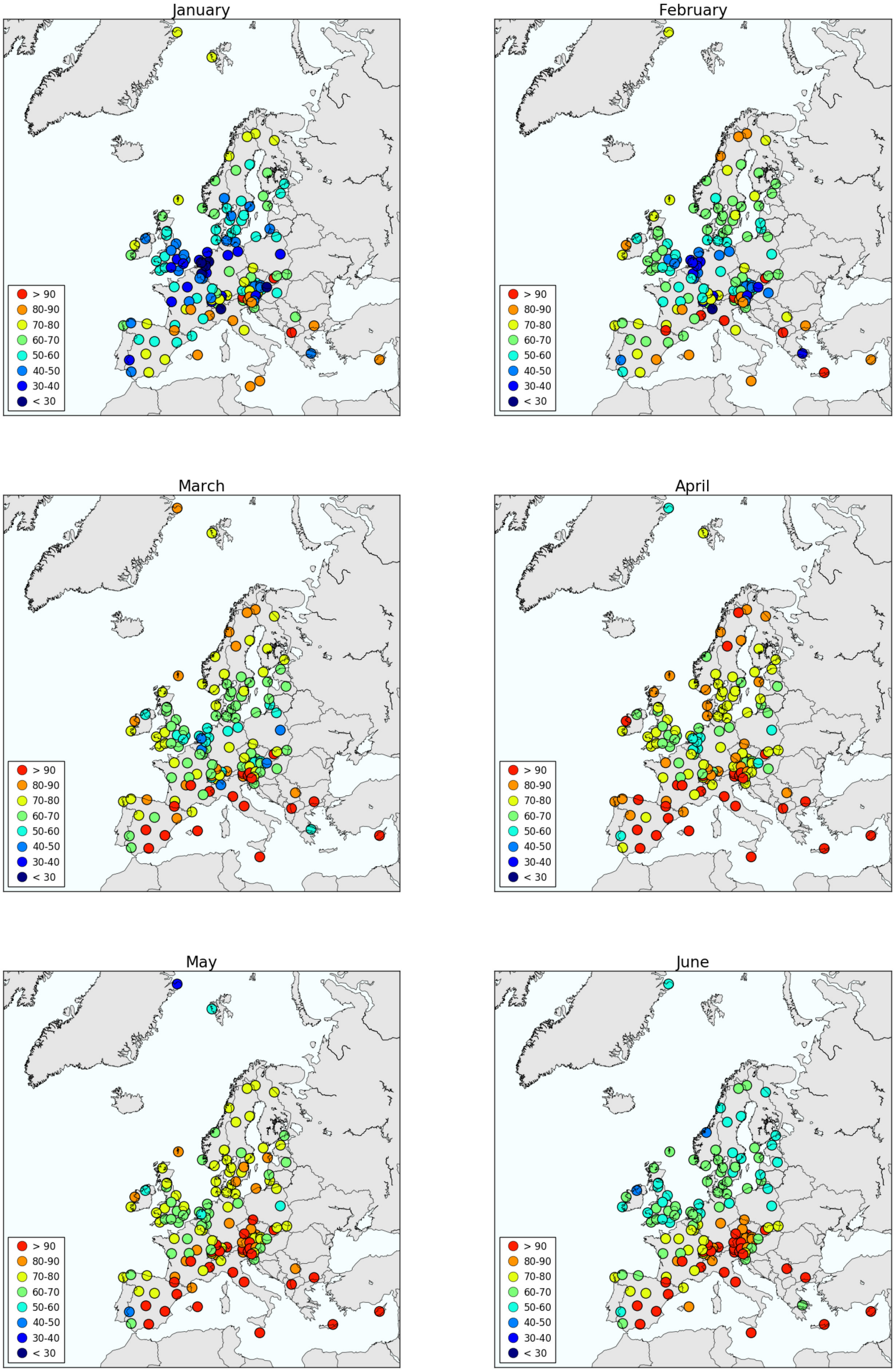

Figure 3: Geographical distribution of monthly mean values 2017. Unit: µg/m³

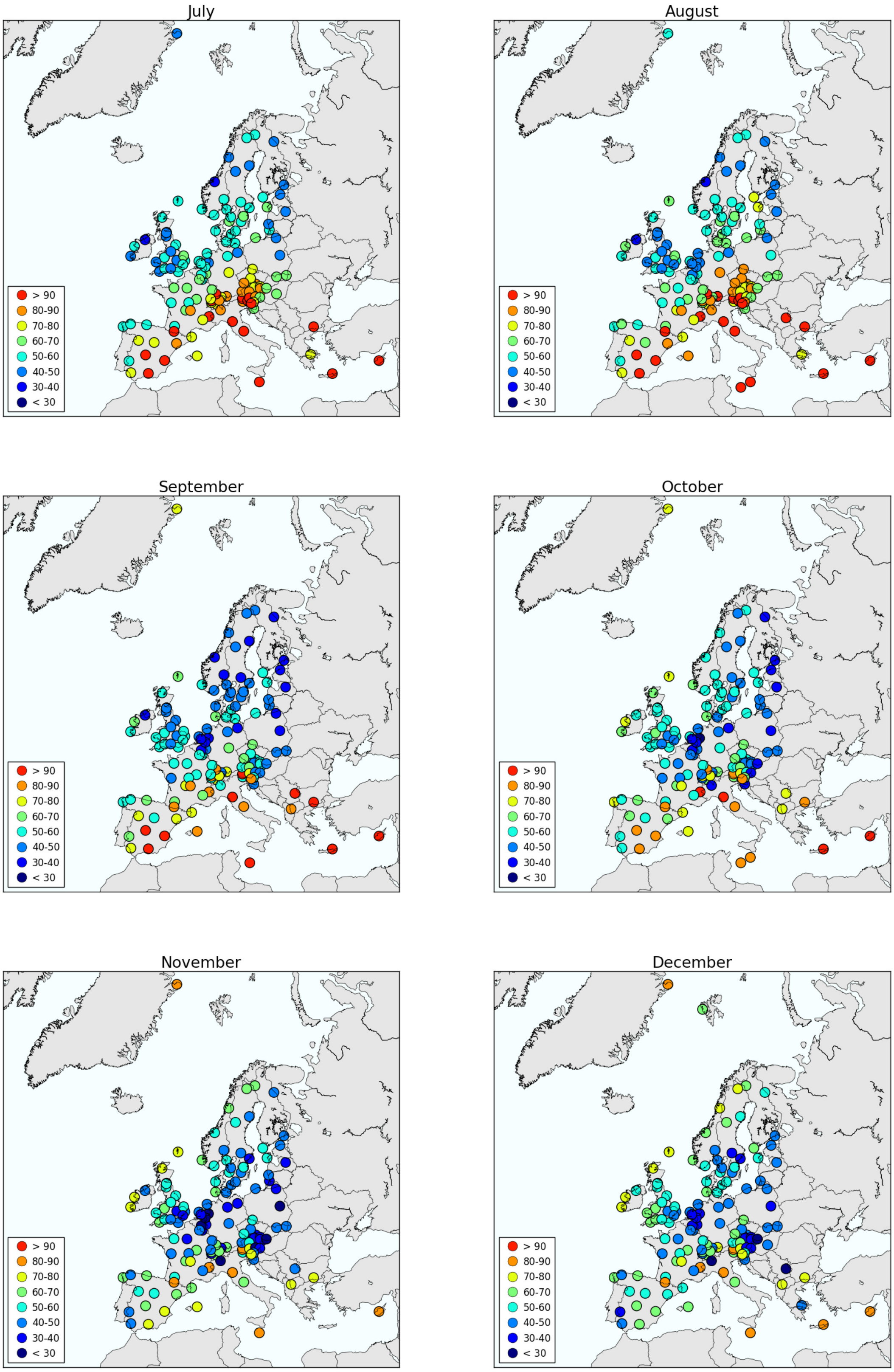

Figure 3, cont.

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) 2017 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. Zeppelin mountain in 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 May 27th, 2019.

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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11. Acknowledgements

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	CNR-ISAC
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 2017.

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	8344	365	343	62	26	8	1	1	0	0	181.6	2017-08-04
AT0005R	Vorhegg	8023	354	254	47	23	5	2	1	0	0	192.2	2017-06-22
AT0030R	Pillersdorf bei Retz	8117	358	264	50	6	4	0	0	0	0	168.8	2017-06-22
AT0032R	Sulzberg	8343	365	450	55	32	8	0	0	0	0	168.0	2017-06-21
AT0034G	Sonnblick	8366	365	756	97	8	3	0	0	0	0	161.3	2017-07-22
AT0038R	Gerlitzen	5751	252	510	58	8	3	0	0	0	0	163.4	2017-06-24
AT0040R	Masenberg	8359	365	335	49	18	2	0	0	0	0	161.8	2017-06-21
AT0041R	Haunsberg	8291	364	190	26	22	4	2	1	0	0	186.0	2017-06-22
AT0042R	Heidenreichstein	8368	365	158	30	8	2	0	0	0	0	163.0	2017-06-22
AT0043R	Forsthof	8342	365	432	56	39	7	4	2	0	0	188.8	2017-06-23
AT0045R	Dunkelsteinerwald	8363	365	237	48	15	4	0	0	0	0	173.8	2017-08-31
AT0046R	Gänserndorf	8350	365	256	55	22	7	3	2	0	0	191.3	2017-06-20
AT0047R	Stixneusiedl	8368	365	267	48	24	7	3	1	1	1	211.3	2017-06-22
AT0048R	Zoebelboden	8345	365	208	29	41	4	0	0	0	0	173.4	2017-06-21
AT0049R	Grebenzen bei St. Lamprecht	8360	365	301	37	0	0	0	0	0	0	147.1	2017-06-21
AT0050R	Graz Lustbuehel	8369	365	195	36	4	1	0	0	0	0	156.2	2017-06-22
BE0001R	Offagne	8433	362	85	15	23	3	5	1	4	1	228.5	2017-06-20
BE0032R	Eupen	8308	359	117	20	21	4	8	2	5	1	218.0	2017-06-20
BE0035R	Vezin	8412	362	131	23	23	4	12	2	2	1	204.0	2017-06-20
BG0053R	Rojen peak	8301	365	507	68	0	0	0	0	0	0	149.9	2017-08-13
CH0001G	Jungfraujoch	8475	365	11	5	1	1	0	0	0	0	155.1	2017-10-30
CH0002R	Payerne	8701	365	155	33	5	2	0	0	0	0	160.0	2017-06-22
CH0003R	Tänikon	8681	365	229	44	20	6	0	0	0	0	177.0	2017-06-22
CH0004R	Chaumont	8390	363	335	47	6	2	0	0	0	0	163.6	2017-06-22
CH0005R	Rigi	8649	365	351	45	23	7	0	0	0	0	159.8	2017-06-22
CY0002R	Ayia Marina	8443	365	475	69	0	0	0	0	0	0	144.7	2017-07-14
CZ0003R	Kosetice	8190	362	194	37	5	2	0	0	0	0	169.0	2017-06-20
CZ0003R	Kosetice	8275	350	272	40	9	4	0	0	0	0	177.9	2017-06-20
CZ0005R	Churanov	8568	365	231	31	27	4	0	0	0	0	175.6	2017-06-20

Table 1.1, cont.

Code	Station	Total		>120		>150		>180		>200		Max concentrations	
		hours	days	hours	days	hours	days	hours	days	hours	days	μg/m³	day(s)
DE0001R	Westerland	6044	269	6	1	3	1	0	0	0	0	155.1	2017-08-29
DE0002R	Waldhof	8349	365	46	11	0	0	0	0	0	0	144.6	2017-05-23
DE0003R	Schauinsland	8363	365	477	53	62	14	6	2	0	0	195.2	2017-06-21
DE0007R	Neuglobsow	8242	365	30	6	0	0	0	0	0	0	140.8	2017-05-19
DE0008R	Schmücke	8331	365	184	28	16	4	0	0	0	0	165.1	2017-06-22
DE0009R	Zingst	6535	285	17	4	0	0	0	0	0	0	136.2	2017-05-19
DK0005R	Keldsnor	7801	359	0	0	0	0	0	0	0	0	116.5	2017-05-18
DK0010G	Villum Research Station, Station Nord	7958	363	0	0	0	0	0	0	0	0	99.2	2017-11-25
DK0012R	Risoe	7988	365	5	3	0	0	0	0	0	0	125.6	2017-05-23
DK0031R	Ulborg	7951	365	0	0	0	0	0	0	0	0	119.5	2017-05-23
EE0009R	Lahemaa	8751	365	12	2	0	0	0	0	0	0	143.0	2017-05-19
EE0011R	Vilsandi	8597	362	39	6	0	0	0	0	0	0	147.0	2017-05-19
ES0001R	San Pablo de los Montes	8578	363	606	83	2	1	0	0	0	0	158.1	2017-07-27
ES0005R	Noya	8131	353	106	17	1	1	0	0	0	0	150.3	2017-08-21
ES0006R	Mahón	8304	359	453	58	0	0	0	0	0	0	145.1	2017-04-22
ES0007R	Víznar	8670	365	884	129	39	13	1	1	0	0	180.5	2017-08-04
ES0008R	Niembro	8524	363	42	10	2	1	0	0	0	0	151.8	2017-04-08
ES0009R	Campisabalos	8517	363	41	16	2	1	0	0	0	0	152.2	2017-07-17
ES0010R	Cabo de Creus	8649	365	20	9	2	1	0	0	0	0	157.0	2017-05-25
ES0011R	Barcarrota	8530	362	32	7	0	0	0	0	0	0	143.2	2017-06-08
ES0012R	Zarra	8436	357	785	117	14	7	0	0	0	0	164.4	2017-06-15
ES0013R	Penausende	8671	365	44	12	0	0	0	0	0	0	145.1	2017-08-25
ES0014R	Els Torms	8670	365	159	44	0	0	0	0	0	0	144.3	2017-06-19
ES0016R	O Saviñao	8615	365	106	20	3	1	1	1	0	0	181.4	2017-08-21
ES0017R	Doñana	8679	365	87	33	0	0	0	0	0	0	140.8	2017-08-05
FI0009R	Utö	8644	363	3	1	0	0	0	0	0	0	121.7	2017-05-19
FI0018R	Virolahti III	8652	365	6	1	0	0	0	0	0	0	134.4	2017-05-19
FI0022R	Oulanka	8727	365	0	0	0	0	0	0	0	0	101.0	2017-04-05
FI0037R	Ähtäri II	3213	135	0	0	0	0	0	0	0	0	106.9	2017-04-10
FI0096G	Pallas (Sammaltunturi)	8653	364	0	0	0	0	0	0	0	0	105.2	2017-04-04

Table 1.1, cont.

Code	Station	Total		>120		>150		>180		>200		Max concentrations	
		hours	days	hours	days	hours	days	hours	days	hours	days	µg/m³	day(s)
FR0008R	Donon	8702	364	98	14	12	3	1	1	0	0	181.6	2017-06-22
FR0009R	Revin	8711	365	88	11	26	3	4	1	0	0	197.5	2017-06-20
FR0010R	Morvan	8658	365	74	13	0	0	0	0	0	0	143.7	2017-07-18
FR0013R	Peyrusse Vieille	8645	362	79	15	2	1	0	0	0	0	161.6	2017-06-21
FR0014R	Montandon	8550	359	86	19	3	1	0	0	0	0	159.6	2017-06-22
FR0015R	La Tardière	8691	365	33	6	0	0	0	0	0	0	145.7	2017-06-20
FR0016R	Le Casset	8438	353	326	60	0	0	0	0	0	0	139.7	2017-05-29
FR0017R	Montfranc	8648	364	44	8	0	0	0	0	0	0	143.7	2017-06-21
FR0018R	La Coulonche	8587	361	70	8	5	1	0	0	0	0	177.6	2017-06-20
FR0019R	Pic du Midi	8522	360	362	68	4	2	0	0	0	0	157.6	2017-05-09
FR0020R	SIRTA Atmospheric Research Observatory	8692	364	122	20	22	5	11	2	3	1	214.9	2017-06-20
FR0023R	Saint-Nazaire-le-Désert	8218	353	238	55	17	11	0	0	0	0	167.6	2017-06-19
FR0025R	Verneuil	8614	362	36	8	0	0	0	0	0	0	141.7	2017-07-18
FR0030R	Puy de Dôme	8423	357	195	38	1	1	0	0	0	0	150.4	2017-08-29
GB0002R	Eskdalemuir	8698	365	4	2	0	0	0	0	0	0	126.3	2017-05-26
GB0006R	Lough Navar	8712	365	0	0	0	0	0	0	0	0	113.5	2017-05-01
GB0013R	Yarner Wood	8067	342	38	6	10	2	1	1	0	0	183.8	2017-06-20
GB0014R	High Muffles	8588	364	4	2	0	0	0	0	0	0	125.6	2017-05-11
GB0015R	Strath Vaich Dam	8463	356	3	1	0	0	0	0	0	0	122.4	2017-05-27
GB0031R	Aston Hill	8465	361	14	3	0	0	0	0	0	0	138.3	2017-06-20
GB0033R	Bush	8622	363	0	0	0	0	0	0	0	0	119.5	2017-05-26
GB0037R	Ladybower Res.	8158	351	9	4	0	0	0	0	0	0	131.9	2017-05-11
GB0038R	Lullington Heath	8273	351	9	3	1	1	0	0	0	0	150.5	2017-08-27
GB0039R	Sibton	8444	355	13	5	0	0	0	0	0	0	141.0	2017-06-19
GB0043R	Narberth	8593	363	14	3	0	0	0	0	0	0	143.2	2017-06-20
GB0045R	Wicken Fen	8634	365	26	4	4	1	0	0	0	0	162.5	2017-06-21
GB0048R	Auchencorth Moss	8705	365	1	1	0	0	0	0	0	0	120.8	2017-05-26
GB0049R	Weybourne	8721	365	16	5	1	1	0	0	0	0	152.4	2017-06-22
GB0050R	St. Osyth	8649	365	15	5	4	2	1	1	0	0	186.3	2017-06-19
GB0052R	Lerwick	8424	353	0	0	0	0	0	0	0	0	111.7	2017-05-02
GB0053R	Charlton Mackrell	8689	365	11	3	3	1	0	0	0	0	157.2	2017-06-21
GB1055R	Chilbolton Observatory	8550	361	25	5	6	1	0	0	0	0	179.6	2017-06-21

Table 1.1, cont.

Code	Station	Total		>120		>150		>180		>200		Max concentrations	
		hours	days	hours	days	hours	days	hours	days	hours	days	µg/m³	day(s)
GR0001R	Aliartos	4941	209	70	22	0	0	0	0	0	0	148.0	2017-06-06
GR0002R	Finokalia	6497	316	1743	140	148	22	0	0	0	0	169.0	2017-06-25
HU0002R	K-puszta	4269	180	46	12	0	0	0	0	0	0	148.1	2017-07-21
HU0003R	Farkasfa	6658	280	33	7	0	0	0	0	0	0	135.4	2017-04-03
IE0001R	Valentia Observatory	8756	365	1	1	0	0	0	0	0	0	130.7	2017-06-21
IE0031R	Mace Head	8747	365	1	1	0	0	0	0	0	0	124.7	2017-05-09
IT0004R	Ispra	7877	340	511	88	183	40	29	10	13	4	234.8	2017-08-04
IT0009R	Mt Cimone	8376	352	1200	119	84	26	2	2	0	0	182.6	2017-06-22
IT0018R	Lampedusa	2696	127	72	16	4	1	0	0	0	0	162.8	2017-08-18
IT0019R	Monte Martano	7942	356	526	72	19	5	0	0	0	0	168.5	2017-07-21
LT0015R	Preila	8404	358	0	0	0	0	0	0	0	0	119.8	2017-05-18
LV0010R	Rucava	7594	319	8	3	0	0	0	0	0	0	131.3	2017-08-30
LV0016R	Zoseni	7548	320	2	1	0	0	0	0	0	0	128.5	2017-05-20
MK0007R	Lazaropole	6387	271	991	114	38	9	0	0	0	0	169.0	2017-05-20
MT0001R	Giordan lighthouse	7308	314	326	58	2	1	0	0	0	0	155.3	2017-08-08
NL0007R	Eibergen	8577	365	80	15	19	5	1	1	0	0	182.3	2017-05-29
NL0009R	Kollumerwaard	8486	364	21	4	1	1	0	0	0	0	151.7	2017-08-29
NL0010R	Vredepeel	8452	360	118	22	24	6	0	0	0	0	177.5	2017-06-22
NL0091R	De Zilk	8628	365	58	14	7	3	0	0	0	0	168.1	2017-05-27
NL0644R	Cabauw Wielsekade	8475	361	69	15	2	2	0	0	0	0	163.9	2017-06-19
NO0002R	Birkenes II	8352	358	0	0	0	0	0	0	0	0	113.2	2017-06-06
NO0015R	Tustervatn	8698	365	0	0	0	0	0	0	0	0	104.4	2017-04-04
NO0039R	Kårvatn	8688	365	0	0	0	0	0	0	0	0	113.8	2017-05-04
NO0042G	Zeppelin mountain (Ny-Ålesund)	4085	174	0	0	0	0	0	0	0	0	101.8	2017-05-03
NO0043R	Prestebakke	8717	365	8	1	0	0	0	0	0	0	134.6	2017-05-18
NO0052R	Sandve	8364	352	0	0	0	0	0	0	0	0	103.6	2017-05-02
NO0056R	Hurdal	8698	365	2	1	0	0	0	0	0	0	124.1	2017-05-02
PL0002R	Jarczew	8735	365	11	5	0	0	0	0	0	0	131.4	2017-08-11
PL0003R	Sniezka	8758	365	63	17	0	0	0	0	0	0	144.2	2017-05-29
PL0004R	Leba	8757	365	28	4	0	0	0	0	0	0	149.5	2017-05-19
PL0005R	Diabla Gora	8467	359	8	2	0	0	0	0	0	0	130.3	2017-04-02

Table 1.1, cont.

Code	Station	Total		>120		>150		>180		>200		Max concentrations	
		hours	days	hours	days	hours	days	hours	days	hours	days	μg/m³	day(s)
RS0005R	Kamenicki vis	7095	308	298	51	3	3	0	0	0	0	154.0	2017-09-01
SE0005R	Bredkälen	8741	365	1	1	0	0	0	0	0	0	121.2	2017-04-05
SE0012R	Aspvreten	8598	362	19	2	0	0	0	0	0	0	142.9	2017-05-19
SE0013R	Esrange	8752	365	0	0	0	0	0	0	0	0	106.3	2017-04-04
SE0014R	Råö	8719	365	11	2	0	0	0	0	0	0	142.8	2017-05-18
SE0018R	Asa	8549	359	30	3	0	0	0	0	0	0	143.4	2017-05-20
SE0019R	Östad	8752	365	14	3	0	0	0	0	0	0	139.1	2017-05-18
SE0020R	Hallahus	8741	365	23	4	3	1	0	0	0	0	154.7	2017-05-19
SE0032R	Norra-Kvill	8648	362	44	3	0	0	0	0	0	0	136.6	2017-05-19
SE0035R	Vindeln	8743	365	0	0	0	0	0	0	0	0	104.9	2017-03-26
SE0039R	Grimsö	8749	365	0	0	0	0	0	0	0	0	118.3	2017-05-18
SI0008R	Iskrba	8112	357	419	68	22	7	0	0	0	0	169.0	2017-07-20
SI0031R	Zarodnje	8235	365	99	22	5	1	0	0	0	0	159.6	2017-08-04
SI0032R	Krvavec	8350	365	927	86	84	27	1	1	0	0	180.6	2017-08-04
SK0002R	Chopok	4055	183	352	45	10	4	0	0	0	0	175.0	2017-06-23
SK0004R	Stará Lesná	8350	364	48	14	0	0	0	0	0	0	131.0	2017-05-20
SK0006R	Starina	8154	365	47	16	0	0	0	0	0	0	137.0	2017-04-03
SK0007R	Topolniky	8303	363	73	22	2	1	0	0	0	0	162.0	2017-06-22

Table 1.2: Percentiles of hourly ozone values April–September 2017.

Code	Station	25%	50%	75%	90%	95%	98%	99%	Data capture
AT0002R	Illmitz	62.1	77.8	97.2	117.5	127.7	137.9	145.3	95.4
AT0005R	Vorhegg	65.5	82.2	98.4	112.5	122.1	132.3	143.9	88.8
AT0030R	Pillersdorf bei Retz	62.1	77.6	96.4	113.3	123.1	131.5	137.1	95.7
AT0032R	Sulzberg	76.8	89.2	106.3	120.5	130.8	141.5	148.5	95.4
AT0034G	Sonnblick	92.6	103.4	115.1	124.2	131.1	138.3	142.2	95.1
AT0038R	Gerlitzen	89.4	100.8	111.5	122.9	130.3	137.3	142.3	83.9
AT0040R	Masenberg	76.0	90.2	103.8	117.3	124.9	134.9	142.1	95.6
AT0041R	Haunsberg	63.1	76.8	92.6	107.8	119.1	131.6	143.0	93.8
AT0042R	Heidenreichstein	52.7	73.4	93.2	109.0	117.1	126.7	133.3	95.5
AT0043R	Forsthof	68.8	84.4	102.8	120.5	128.3	141.7	149.5	95.2
AT0045R	Dunkelsteinerwald	50.9	69.6	89.8	110.3	122.3	131.9	139.3	95.5
AT0046R	Gänserndorf	52.9	70.1	91.8	113.3	122.1	133.5	141.1	95.6
AT0047R	Stixneusiedl	58.5	74.0	94.4	113.3	124.0	135.9	143.9	95.5
AT0048R	Zoebelboden	68.5	82.2	95.8	109.8	119.9	135.5	148.4	95.3
AT0049R	Grebenzen bei St. Lamprecht	81.8	93.8	104.6	115.7	123.1	129.9	133.3	95.5
AT0050R	Graz Lustbuehel	56.7	79.6	97.2	111.1	119.5	128.1	135.9	95.7
AT0002R	Illmitz	62.1	77.8	97.2	117.5	127.7	137.9	145.3	95.4
BE0001R	Offagne	46.0	61.5	79.0	94.5	104.5	120.2	137.0	97.4
BE0032R	Eupen	42.5	58.0	75.5	95.2	109.5	128.5	137.5	96.7
BE0035R	Vezin	30.5	51.5	73.0	92.0	107.5	127.0	137.6	97.4
BG0053R	Rojen peak	88.0	100.3	111.8	121.6	127.6	131.8	134.6	94.9
CH0001G	Jungfraujoch	70.2	78.1	85.9	93.7	97.9	101.6	103.7	97.4
CH0002R	Payerne	47.5	68.3	88.7	107.4	115.7	127.1	136.7	99.3
CH0003R	Tänikon	47.7	67.2	87.5	108.5	120.7	132.9	142.9	99.1
CH0004R	Chaumont	76.8	91.1	105.4	117.4	126.4	135.0	139.3	94.6
CH0005R	Rigi	76.1	88.2	103.8	116.5	126.6	137.2	146.1	98.5
CY0002R	Ayia Marina	93.5	102.6	111.9	120.4	124.3	128.8	131.8	94.7
CZ0003R	Kosetice	60.0	76.0	94.0	109.9	119.3	128.4	133.7	93.6
CZ0003R	Kosetice	69.2	84.1	99.7	114.8	123.8	132.1	136.8	92.6
CZ0005R	Churanov	69.0	83.4	99.4	111.9	120.9	131.3	140.0	97.8
DE0001R	Westerland	64.6	78.9	88.1	94.2	97.8	101.7	104.3	45.3
DE0002R	Waldhof	40.4	59.9	77.5	91.0	99.4	112.2	120.4	95.3
DE0003R	Schauinsland	79.9	92.5	107.1	122.0	134.1	147.1	156.3	95.7
DE0007R	Neuglobsow	33.1	56.0	74.3	87.3	94.9	104.8	111.3	93.6
DE0008R	Schmücke	63.4	77.8	93.5	109.0	118.0	130.6	140.2	95.4
DE0009R	Zingst	54.7	67.2	79.4	90.0	95.3	102.4	110.1	95.7
DK0005R	Keldsnor	53.4	64.2	76.3	86.0	91.9	97.1	100.8	87.2
DK0010G	Villum Research Station, Station Nord	40.7	51.3	65.1	78.4	86.7	89.6	91.4	91.3
DK0012R	Risoe	54.8	67.8	79.4	89.5	95.2	102.0	107.0	91.4
DK0031R	Ulborg	52.8	65.0	78.4	89.1	94.3	101.2	105.4	90.2
EE0009R	Lahemaa	38.0	55.0	71.0	85.0	90.0	97.0	102.0	99.9
EE0011R	Vilsandi	61.0	73.0	84.0	92.0	97.0	108.0	119.0	99.0
ES0001R	San Pablo de los Montes	86.5	100.6	113.2	122.2	127.6	134.5	139.4	98.8
ES0005R	Noya	53.2	64.5	79.1	95.4	107.1	121.9	129.2	95.1
ES0006R	Mahón	80.4	92.6	104.4	116.9	124.7	131.1	134.0	94.0
ES0007R	Víznar	92.2	104.8	116.6	129.0	136.0	144.9	149.1	99.0
ES0008R	Niembro	54.4	66.7	83.0	96.8	106.0	115.3	119.8	97.0
ES0009R	Campisabalos	54.2	70.4	84.8	96.0	103.7	113.3	119.5	95.4
ES0010R	Cabo de Creus	70.1	78.3	87.8	97.5	103.7	111.5	115.6	98.6
ES0011R	Barcarrota	38.2	53.2	70.4	85.6	94.5	105.7	115.1	96.8
ES0012R	Zarra	90.4	102.7	114.6	125.3	131.2	138.6	142.9	98.9
ES0013R	Penausende	62.4	77.1	93.1	103.8	109.8	114.8	120.1	99.0
ES0014R	Els Torms	74.0	88.5	101.2	112.9	118.3	123.9	126.9	99.1
ES0016R	O Saviñao	45.3	62.1	79.9	96.4	108.3	122.2	128.7	97.8
ES0017R	Doñana	54.2	74.5	92.2	105.3	112.7	119.7	123.9	99.1
FI0009R	Utö	55.8	67.0	77.5	85.0	88.9	94.2	100.1	98.5
FI0018R	Virolahti III	34.8	54.9	70.4	81.3	86.6	91.3	94.7	99.5
FI0022R	Oulanka	39.6	54.7	73.8	84.2	87.7	91.7	94.0	99.8
FI0037R	Ähtäri II	66.8	74.8	81.9	87.4	89.9	91.4	92.8	24.1
FI0096G	Pallas (Sammaltunturi)	50.5	61.5	78.8	88.5	91.2	95.0	97.4	98.0

Table 1.2, cont.

Code	Station	25%	50%	75%	90%	95%	98%	99%	Data capture
FR0008R	Donon	53.9	65.8	81.8	99.8	111.7	121.7	130.0	99.8
FR0009R	Revin	51.9	65.8	81.8	95.0	107.7	121.7	135.7	99.6
FR0010R	Morvan	53.9	69.8	85.8	99.8	109.7	119.7	125.7	98.6
FR0013R	Peyrusse Vieille	55.9	71.8	85.8	101.8	109.7	119.7	129.7	97.9
FR0014R	Montandon	49.9	65.8	83.8	99.8	107.7	121.7	127.7	96.3
FR0015R	La Tardière	43.9	61.9	77.8	91.8	97.8	109.7	117.7	99.1
FR0016R	Le Casset	89.8	99.8	111.7	119.7	121.7	127.7	129.7	93.4
FR0017R	Montfranc	65.8	79.8	91.8	105.8	113.7	117.7	121.7	97.5
FR0018R	La Coulonche	55.9	67.8	81.8	95.8	103.8	116.1	132.9	96.5
FR0019R	Pic du Midi	87.8	97.8	109.7	117.7	123.7	131.7	138.0	95.3
FR0020R	SIRTA Atmospheric Research Observatory	46.5	60.4	76.8	92.8	108.0	127.6	141.4	99.6
FR0023R	Saint-Nazaire-le-Désert	51.9	77.8	93.8	111.7	123.7	135.7	143.7	89.5
FR0025R	Verneuil	43.9	63.9	81.8	95.8	103.8	113.7	119.7	99.8
FR0030R	Puy de Dôme	77.2	90.8	102.8	112.9	118.9	123.9	128.6	97.0
GB0002R	Eskdalemuir	46.6	57.5	69.0	80.1	85.0	93.3	99.6	99.3
GB0006R	Lough Navar	32.1	46.7	59.3	76.1	83.3	93.0	98.8	99.2
GB0013R	Yarner Wood	48.8	63.1	76.3	88.2	95.4	104.8	120.4	86.0
GB0014R	High Muffles	45.9	58.7	70.9	84.1	89.7	98.3	102.5	98.0
GB0015R	Strath Vaich Dam	52.3	62.5	76.7	89.2	93.0	98.3	103.2	93.9
GB0031R	Aston Hill	52.4	61.1	72.3	83.7	88.8	100.0	108.3	95.7
GB0033R	Bush	44.9	54.9	67.6	79.5	84.2	89.9	96.0	99.3
GB0037R	Ladybower Res.	43.4	53.4	66.0	80.0	87.2	97.2	105.1	92.7
GB0038R	Lullington Heath	43.4	57.4	70.4	80.2	87.2	99.0	105.4	93.4
GB0039R	Sibton	46.0	59.4	72.2	83.4	89.9	97.7	107.8	99.4
GB0043R	Narberth	45.0	55.6	69.6	82.2	89.8	98.2	106.9	96.8
GB0045R	Wicken Fen	37.7	53.3	68.5	82.2	89.5	100.6	110.5	99.1
GB0048R	Auchencorth Moss	46.0	55.3	67.6	80.0	85.6	92.4	97.1	99.3
GB0049R	Weybourne	54.4	66.6	79.7	91.7	96.5	104.2	111.4	99.2
GB0050R	St. Osyth	45.0	58.6	73.3	85.3	92.1	100.7	106.7	98.4
GB0052R	Lerwick	60.2	68.7	81.6	91.1	95.4	99.5	102.7	99.2
GB0053R	Charlton Mackrell	46.7	59.2	71.5	84.9	92.4	100.3	107.4	99.2
GB1055R	Chilbolton Observatory	39.5	54.5	69.3	84.2	92.4	106.6	116.0	96.7
GR0001R	Aliartos	47.0	76.0	100.0	111.0	117.0	122.0	127.0	53.4
GR0002R	Finokalia	107.6	117.6	127.0	138.1	147.3	155.4	160.7	91.6
HU0002R	K-puszta	42.4	70.2	90.2	107.7	116.7	124.4	130.5	31.6
HU0003R	Farkasfa	44.5	64.9	81.1	93.7	101.3	110.6	118.4	89.0
IE0001R	Valentia Observatory	49.9	60.5	70.6	82.8	88.0	93.7	97.3	99.9
IE0031R	Mace Head	61.3	70.2	81.6	94.3	98.7	102.1	104.8	99.9
IT0004R	Ispra	49.0	71.5	98.0	127.1	148.3	168.1	177.5	89.5
IT0009R	Mt Cimone	100.6	110.5	121.3	130.9	139.7	150.3	157.2	93.7
IT0018R	Lampedusa	84.8	98.8	107.5	114.9	119.7	128.5	137.7	35.4
IT0019R	Monte Martano	88.7	101.5	112.2	122.6	129.4	137.3	142.5	89.6
LT0015R	Preila	51.4	65.0	74.3	81.7	87.3	93.8	97.0	96.3
LV0010R	Rucava	39.0	61.6	76.0	86.4	92.9	102.9	111.1	99.8
LV0016R	Zoseni	41.4	55.6	67.8	76.8	81.7	87.1	91.1	96.0
MK0007R	Lazaropole	77.0	98.0	116.0	130.0	138.0	146.0	152.0	55.2
MT0001R	Giordan lighthouse	90.6	99.8	109.6	118.1	123.8	130.3	134.2	78.0
NL0007R	Eibergen	28.5	45.9	67.5	84.9	97.3	119.3	133.3	98.0
NL0009R	Kollumerwaard	39.6	54.5	68.9	79.7	84.5	94.9	108.6	97.3
NL0010R	Vredepeel	30.2	49.8	69.3	88.5	103.9	126.6	139.9	96.4
NL0091R	De Zilk	44.7	61.7	76.9	89.0	95.1	110.3	124.0	98.5
NL0644R	Cabauw Wielsekade	33.3	51.3	69.1	82.3	93.0	113.7	130.5	95.9
NO0002R	Birkenes II	50.7	62.8	75.2	87.5	93.5	98.2	100.7	91.9
NO0015R	Tustervatn	49.0	59.6	79.2	89.7	93.0	96.2	98.2	99.4
NO0039R	Kårvatn	30.5	48.8	66.2	81.1	86.8	92.8	97.9	99.1
NO0042G	Zeppelin mountain (Ny-Ålesund)	53.6	72.8	80.9	86.9	89.6	96.0	98.1	37.0
NO0043R	Prestebakke	50.5	63.5	73.7	84.3	89.6	95.0	98.3	99.6
NO0052R	Sandve	54.1	63.2	73.0	82.6	87.1	92.6	95.2	99.4
NO0056R	Hurdal	46.8	60.2	74.0	87.2	94.0	99.4	103.5	99.4
PL0002R	Jarczew	32.4	50.1	67.3	82.4	93.3	104.4	112.0	99.6
PL0003R	Sniezka	69.7	81.8	93.3	104.2	112.0	118.5	122.6	100.0
PL0004R	Leba	55.0	69.1	81.7	91.5	96.4	105.5	111.5	99.9
PL0005R	Diabla Gora	37.7	58.3	73.6	86.2	93.8	101.2	106.2	98.2
RS0005R	Kamenicki vis	79.7	95.3	109.0	119.0	126.0	135.0	141.0	77.6

Table 1.2, cont.

Code	Station	25%	50%	75%	90%	95%	98%	99%	Data capture
SE0005R	Bredkälen	41.7	55.2	73.5	93.9	98.4	103.3	105.7	99.6
SE0012R	Aspvreten	43.7	60.3	73.4	84.0	89.5	95.6	102.3	98.1
SE0013R	Esrange	49.4	61.9	79.8	90.3	93.6	96.4	98.1	99.9
SE0014R	Råö	57.8	68.0	79.3	88.1	93.8	101.7	107.0	99.2
SE0018R	Asa	45.2	60.6	74.6	86.5	92.1	99.7	107.3	99.9
SE0019R	Östad	43.4	62.6	76.3	87.6	93.5	100.4	105.1	99.9
SE0020R	Hallahus	48.2	63.3	77.5	89.0	96.1	105.4	112.3	99.8
SE0032R	Norra-Kvill	54.7	67.1	79.2	89.8	95.4	102.0	122.5	97.8
SE0035R	Vindeln	38.1	55.4	73.0	84.8	88.9	92.2	95.1	99.8
SE0039R	Grimsö	43.7	57.4	71.3	81.4	87.1	92.9	96.4	99.9
SI0008R	Iskrba	21.8	66.2	99.4	118.3	128.2	137.4	144.8	93.6
SI0031R	Zarodnje	60.7	75.0	89.4	103.4	111.9	122.5	130.6	94.8
SI0032R	Krvavec	90.2	103.0	116.7	130.9	139.9	149.9	154.6	95.0
SK0002R	Chopok	95.0	104.0	116.0	125.0	130.0	136.0	143.0	44.0
SK0004R	Stará Lesná	48.0	70.0	89.0	101.0	109.0	117.0	121.0	94.6
SK0006R	Starina	46.0	66.0	87.0	100.0	108.0	116.0	121.0	92.9
SK0007R	Topolniky	43.0	58.0	76.0	96.0	107.8	119.0	128.0	95.2

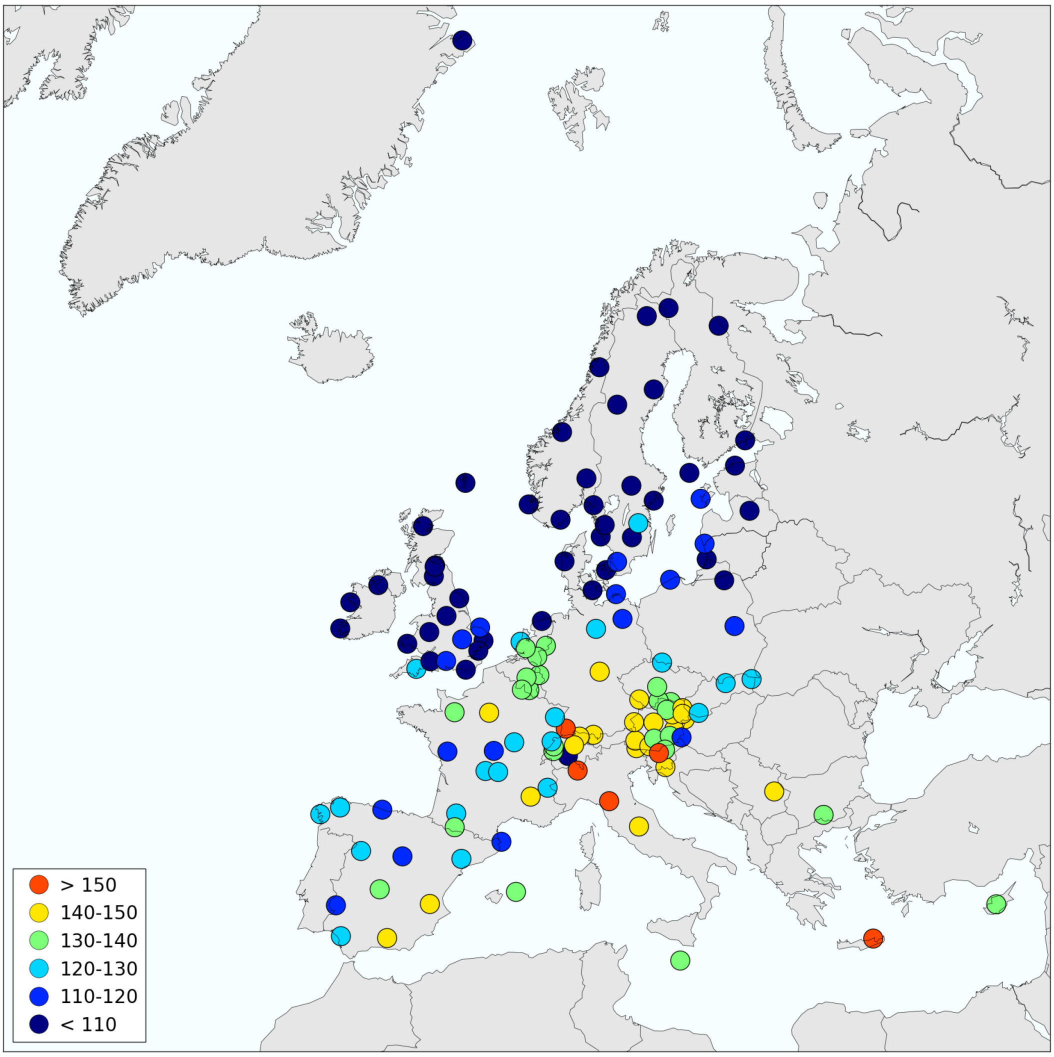


Figure 1.1: Ozone April–September 2017. 99-percentiles (µg/m³).

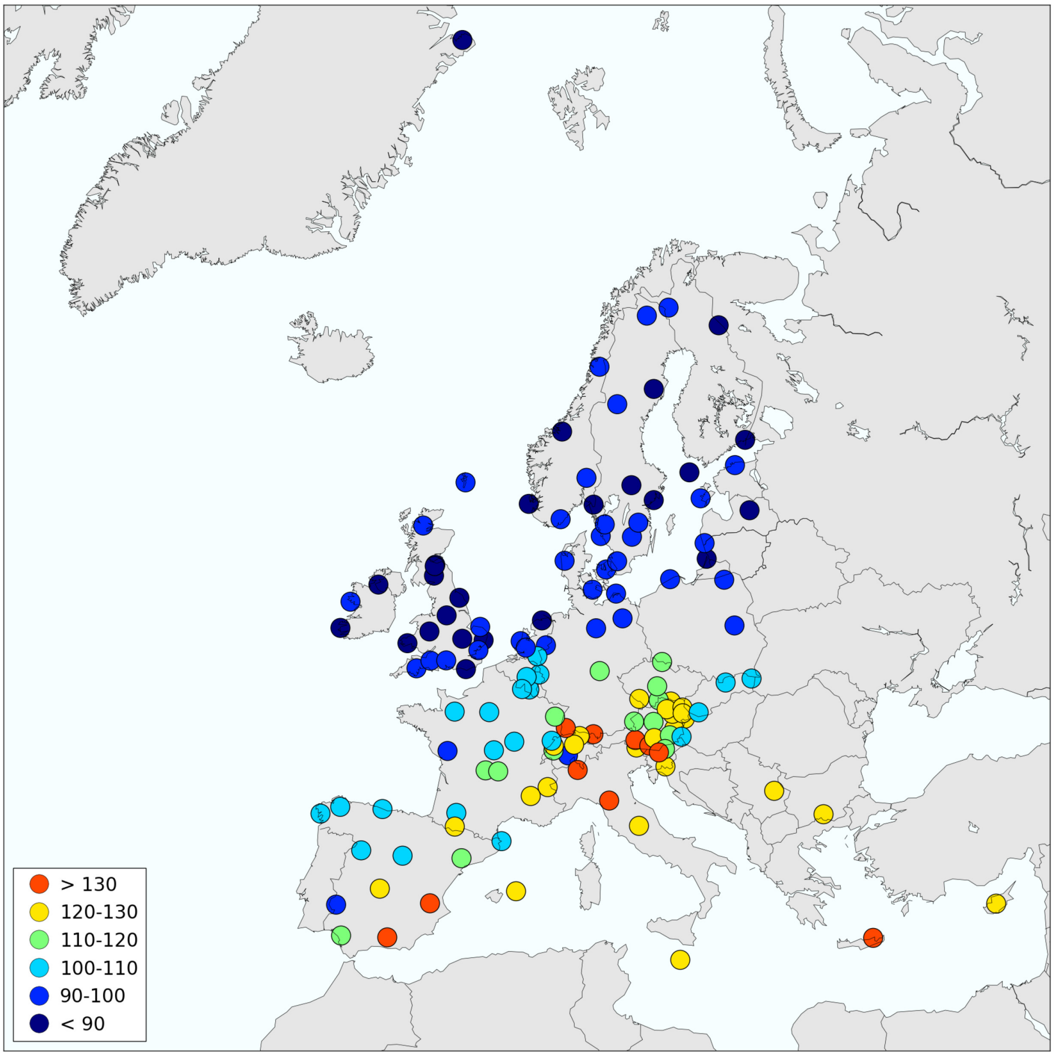


Figure 1.2: Ozone April–September 2017. 95-percentiles (μg/m^3).

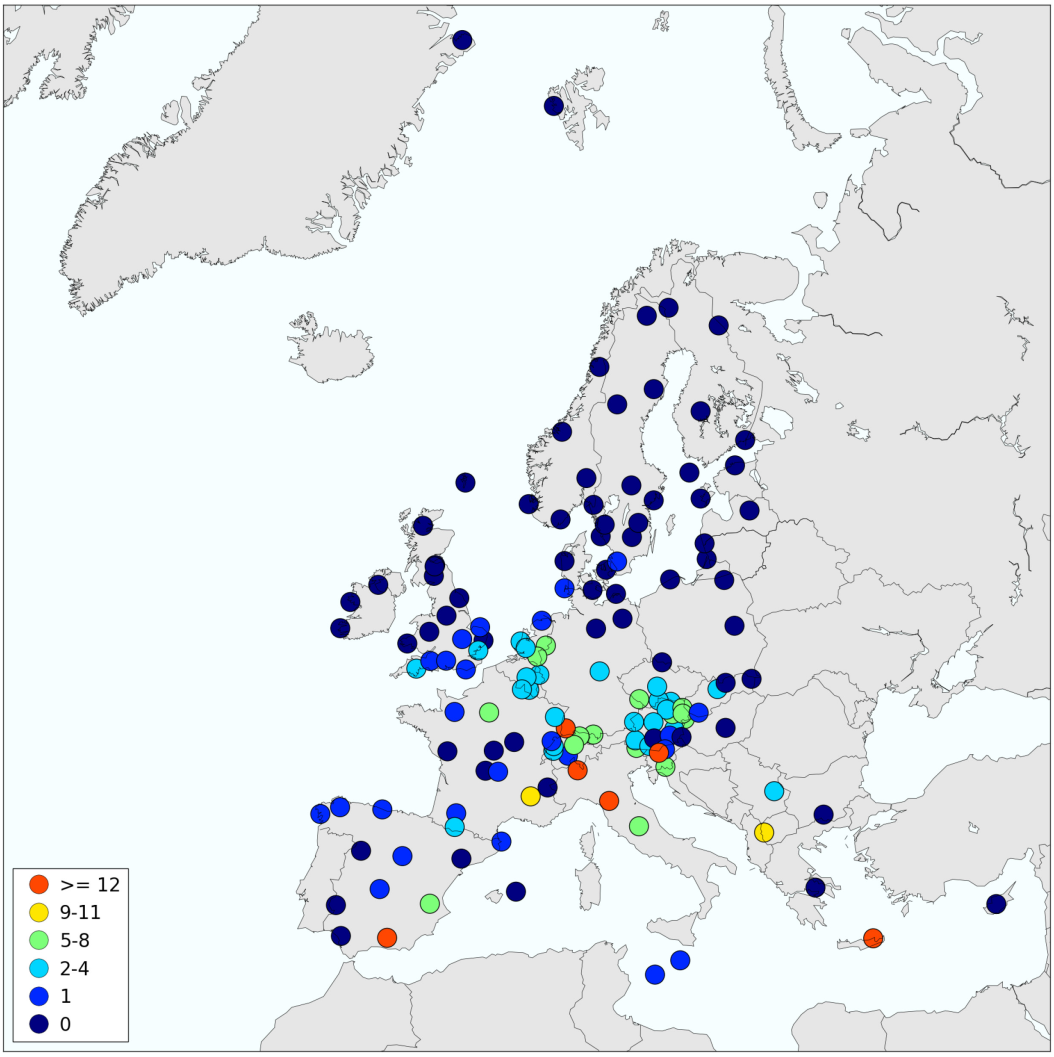


Figure 1.3: Number of days with ozone concentration above 150 µg/m³.

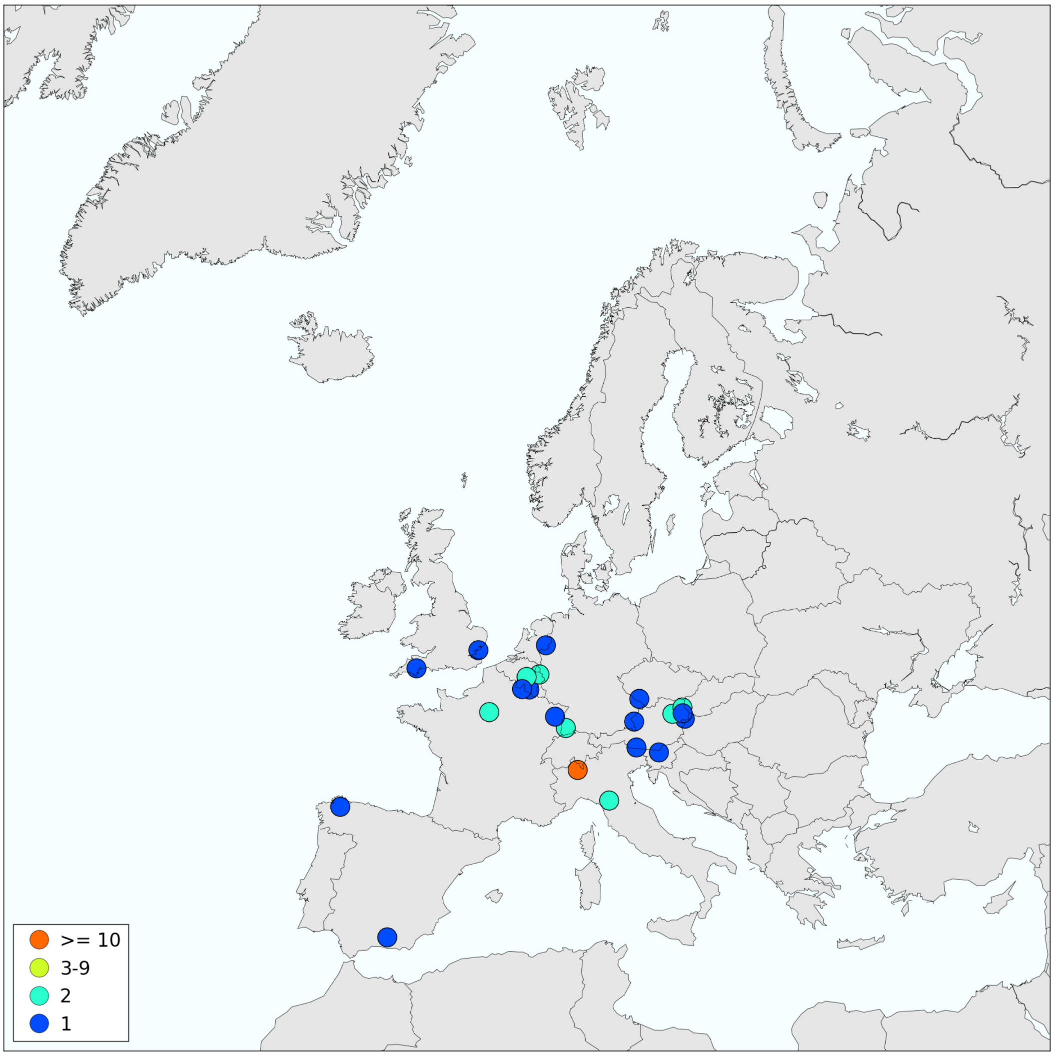


Figure 1.4: Number of exceedances of the threshold value of 180 μg/m³. (Unit: number of days). Stations with zero exceedances are not shown.

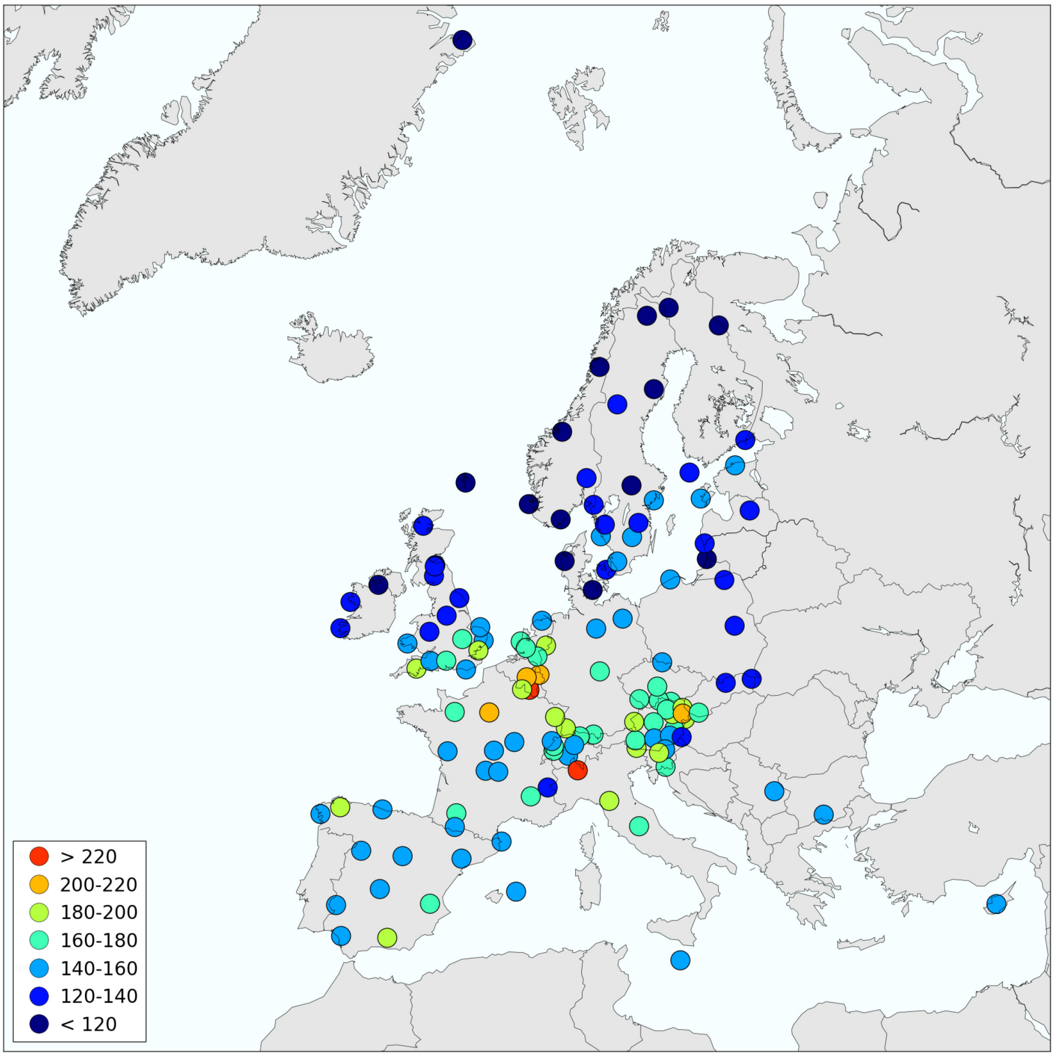


Figure 1.5: Maximum ozone concentrations 2017 (µg/m³).

Annex 2

AOT40, figures and tables

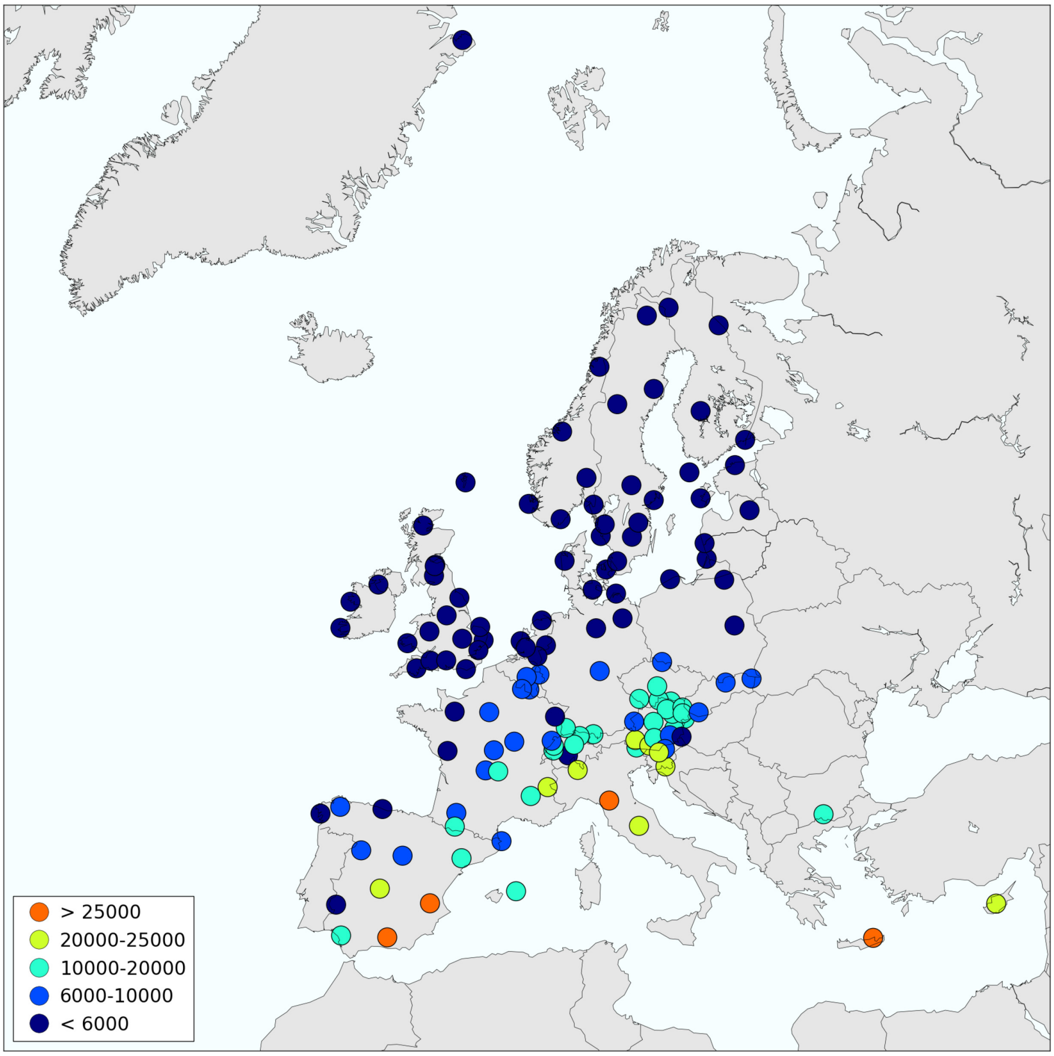


Figure 2.1: AOT40 (ppbh) April–September 2017 (daylight hours).

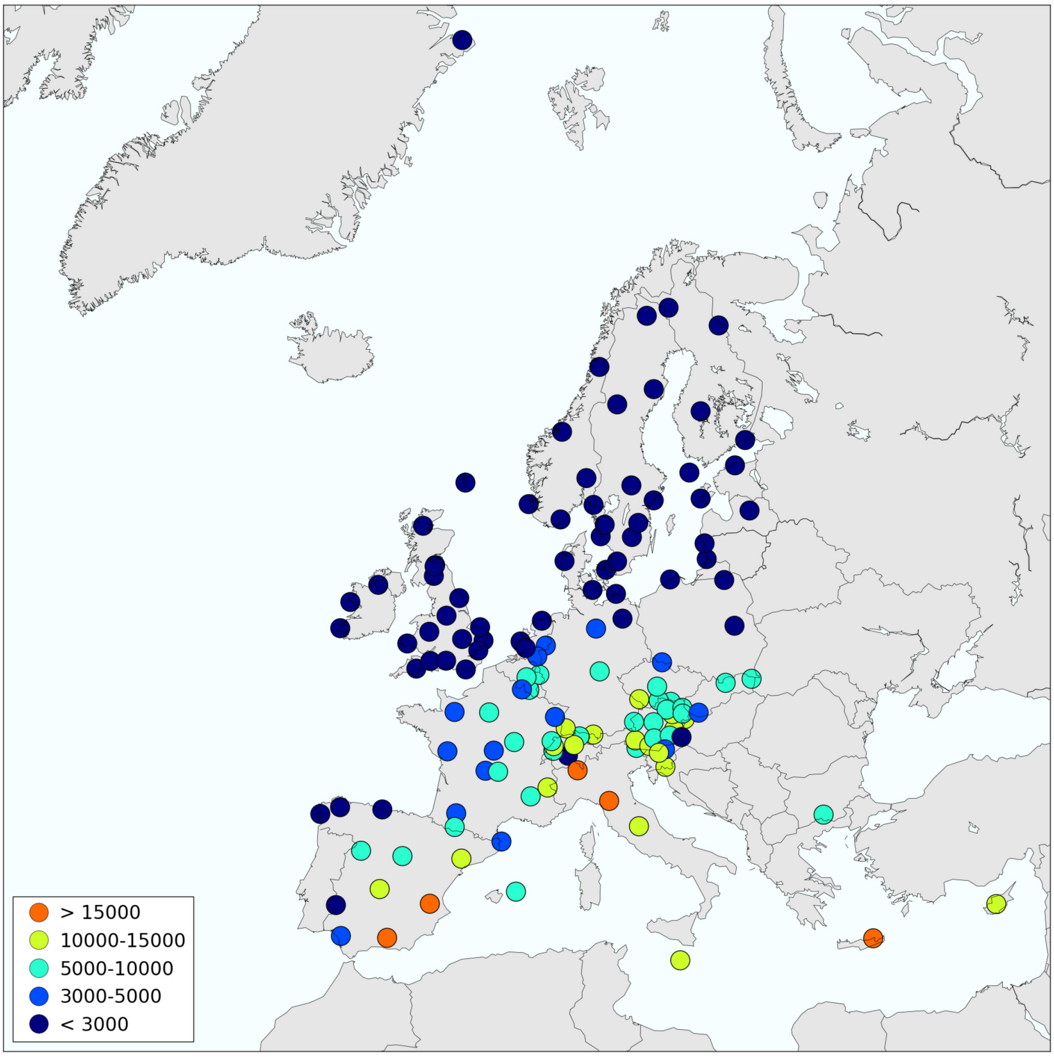


Figure 2.2: AOT40 (ppbh) May, June and July 2017 (daylight hours).

Table 2.1: AOT40 May-July and April–September 2017 (daylight hours).

Code	Station	May - July			April - September		
		AOT40	AOT40 corrected	Data capture	AOT40	AOT40 corrected	Data capture
AT0002R	Illmitz	9686.6	10409.6	93.1	14410.0	15527.2	92.8
AT0005R	Vorhegg	6767.3	7430.5	91.1	9945.4	11102.6	89.6
AT0030R	Pillersdorf bei Retz	8586.1	9204.6	93.3	11908.0	12715.0	93.7
AT0032R	Sulzberg	10208.6	10274.1	99.4	14971.8	15075.6	99.3
AT0034G	Sonnblick	13539.5	14262.9	94.9	22018.4	23604.3	93.3
AT0038R	Gerlitzen	11829.7	12492.5	94.7	17442.4	20481.0	85.2
AT0040R	Masenberg	9556.9	10040.1	95.2	13451.4	14080.6	95.5
AT0041R	Haunsberg	6490.2	6938.6	93.5	8327.9	8952.4	93.0
AT0042R	Heidenreichstein	7208.2	7583.0	95.1	10011.7	10499.3	95.4
AT0043R	Forsthof	9671.1	10176.7	95.0	13112.3	13823.3	94.9
AT0045R	Dunkelsteinerwald	7600.5	7967.5	95.4	10301.9	10810.2	95.3
AT0046R	Gänserndorf	8290.1	8675.0	95.6	11799.6	12338.9	95.6
AT0047R	Stixneusiedl	7630.8	7985.7	95.6	11149.0	11712.4	95.2
AT0048R	Zoebelboden	7287.5	7749.4	94.0	9403.9	10110.7	93.0
AT0049R	Grebenzen bei St. Lamprecht	9179.8	9619.0	95.4	13950.5	14589.8	95.6
AT0050R	Graz Lustbuehel	6407.4	6688.1	95.8	9529.3	9980.3	95.5
BE0001R	Offagne	4983.8	5132.5	97.1	6839.2	7058.5	96.9
BE0032R	Eupen	5356.2	5589.1	95.8	6735.0	7025.9	95.9
BE0035R	Vezin	5303.8	5457.0	97.2	6947.5	7170.4	96.9
BG0053R	Rojen peak	9075.1	9357.6	97.0	18937.3	19260.7	98.3
CH0001G	Jungfraujoch	2560.9	2642.3	96.9	3647.7	3770.0	96.8
CH0002R	Payerne	8408.3	8531.9	98.6	12772.7	12957.7	98.6
CH0003R	Tänikon	9647.9	9808.3	98.4	13512.6	13783.6	98.0
CH0004R	Chaumont	9692.9	10319.2	93.9	14827.0	15724.2	94.3
CH0005R	Rigi	10274.4	10621.1	96.7	15312.8	15730.5	97.3
CY0002R	Ayia Marina	12424.7	13190.1	94.2	23243.8	24724.6	94.0
CZ0003R	Kosetice	9037.8	9199.8	98.2	13453.6	13931.9	96.6
CZ0003R	Kosetice	9774.8	10833.3	90.2	14772.8	15944.8	92.6
CZ0005R	Churanov	10174.1	10201.2	99.7	14231.8	14266.4	99.8
DE0001R	Westerland	725.0	3705.8	19.6	2285.9	5484.5	41.7
DE0002R	Waldhof	3680.8	3865.7	95.2	5640.5	5937.5	95.0
DE0003R	Schauinsland	10926.3	11433.8	95.6	16263.5	17052.8	95.4
DE0007R	Neuglobsow	2489.0	2648.3	94.0	3854.9	4198.7	91.8
DE0008R	Schmücke	6930.4	7331.4	94.5	9424.0	9948.1	94.7
DE0009R	Zingst	2139.8	2245.2	95.3	3571.6	3739.2	95.5
DK0005R	Keldsnor	921.0	1039.5	88.6	1712.2	1843.4	92.9
DK0010G	Villum Research Station, Station Nord	135.9	142.9	95.1	183.2	190.9	95.9
DK0012R	Risoe	1652.6	1736.9	95.1	3021.3	3125.2	96.7
DK0031R	Ulborg	1618.8	1690.7	95.7	2994.3	3109.7	96.3
EE0009R	Lahemaa	1096.0	1097.9	99.8	1667.5	1670.7	99.8
EE0011R	Vilsandi	1749.0	1755.0	99.7	3712.0	3739.0	99.3
ES0001R	San Pablo de los Montes	11574.3	11813.8	98.0	22257.9	22719.7	98.0
ES0005R	Noya	2104.0	2214.5	95.0	3608.7	3841.2	93.9
ES0006R	Mahón	8457.9	9061.5	93.3	17190.7	18216.7	94.4
ES0007R	Víznar	16652.4	17017.5	97.9	30229.2	30797.3	98.2
ES0008R	Niembro	1862.2	1995.5	93.3	4895.3	5149.3	95.1
ES0009R	Campisabalos	4632.0	5146.1	90.0	7169.8	7668.4	93.5
ES0010R	Cabo de Creus	2971.9	3062.8	97.0	6000.7	6174.9	97.2
ES0011R	Barcarrota	855.5	910.2	94.0	3335.4	3478.2	95.9
ES0012R	Zarra	16050.4	16347.6	98.2	27836.2	28290.9	98.4
ES0013R	Penausende	5004.2	5073.7	98.6	9692.1	9867.5	98.2
ES0014R	Els Torms	9980.1	10206.2	97.8	16734.2	17078.4	98.0
ES0016R	O Saviñao	2463.4	2525.2	97.6	6033.1	6194.6	97.4
ES0017R	Doñana	4771.5	4842.4	98.5	11658.1	11882.1	98.1
FI0009R	Utö	570.1	585.4	97.4	1494.7	1523.1	98.1
FI0018R	Virolahti III	776.8	776.8	100.0	1311.5	1325.6	98.9
FI0022R	Oulanka	361.1	362.3	99.7	1178.4	1182.9	99.6
FI0037R	Ähtäri II	258.7	268.2	96.5	661.3	669.8	98.7
FI0096G	Pallas (Sammaltunturi)	532.5	556.7	95.7	1762.3	1813.4	97.2

Table 2.1, cont.

Code	Station	May - July			April - September		
		AOT40	AOT40 corrected	Data capture	AOT40	AOT40 corrected	Data capture
FR0008R	Donon	3958.5	3972.9	99.6	5455.9	5472.1	99.7
FR0009R	Revin	4482.9	4515.6	99.3	6273.2	6326.2	99.2
FR0010R	Morvan	5332.9	5406.8	98.6	8205.0	8311.7	98.7
FR0013R	Peyrusse Vieille	4535.7	4569.4	99.3	7545.8	7689.8	98.1
FR0014R	Montandon	5340.0	5734.8	93.1	7515.1	7859.5	95.6
FR0015R	La Tardière	3284.4	3341.4	98.3	5231.1	5303.6	98.6
FR0016R	Le Casset	12370.7	12704.5	97.4	21352.1	22895.8	93.3
FR0017R	Montfranc	4695.5	4791.1	98.0	8577.3	8762.0	97.9
FR0018R	La Coulonche	3283.7	3527.4	93.1	5414.7	5650.3	95.8
FR0019R	Pic du Midi	8359.9	9350.6	89.4	15352.4	16347.3	93.9
FR0020R	SIRTA Atmospheric Research Observatory	5673.4	5719.1	99.2	7532.8	7599.2	99.1
FR0023R	Saint-Nazaire-le-Désert	9006.8	9190.3	98.0	14233.2	15541.8	91.6
FR0025R	Verneuil	3592.7	3605.7	99.6	6670.8	6703.6	99.5
FR0030R	Puy de Dôme	7082.5	7290.8	97.1	12410.3	12790.1	97.0
GB0002R	Eskdalemuir	956.0	972.0	98.3	1266.2	1277.9	99.1
GB0006R	Lough Navar	967.8	975.7	99.2	1192.9	1206.6	98.9
GB0013R	Yarner Wood	2081.7	2137.3	97.4	3468.4	4044.5	85.8
GB0014R	High Muffles	1266.6	1294.5	97.8	1930.1	1984.5	97.3
GB0015R	Strath Vaich Dam	1410.4	1415.3	99.7	2683.2	2838.4	94.5
GB0031R	Aston Hill	1581.9	1657.8	95.4	2088.4	2168.0	96.3
GB0033R	Bush	551.6	557.9	98.9	906.7	914.6	99.1
GB0037R	Ladybower Res.	1339.9	1368.5	97.9	1583.6	1706.9	92.8
GB0038R	Lullington Heath	852.6	984.3	86.6	1865.3	2020.4	92.3
GB0039R	Sibton	1428.5	1437.2	99.4	2441.9	2463.3	99.1
GB0043R	Narberth	1473.5	1537.3	95.8	2168.3	2243.1	96.7
GB0045R	Wicken Fen	1881.4	1892.9	99.4	2683.7	2719.1	98.7
GB0048R	Auchencorth Moss	780.6	782.0	99.8	1173.3	1184.2	99.1
GB0049R	Weybourne	2370.7	2401.9	98.7	3719.9	3759.7	98.9
GB0050R	St. Osyth	2004.3	2021.9	99.1	3025.7	3097.5	97.7
GB0052R	Lerwick	1386.6	1403.3	98.8	2973.3	3003.7	99.0
GB0053R	Charlton Mackrell	1439.6	1443.5	99.7	2607.0	2627.3	99.2
GB1055R	Chilbolton Observatory	2380.8	2506.1	95.0	3387.0	3521.3	96.2
GR0001R	Aliartos	6167.0	9154.5	67.4	10620.5	19173.8	55.4
GR0002R	Finokalia	21440.2	21951.2	97.7	35302.8	39483.9	89.4
HU0002R	K-puszta	2669.6	8818.4	30.3	3664.2	11520.8	31.8
HU0003R	Farkasfa	2394.2	2394.2	100.0	4428.1	4951.4	89.4
IE0001R	Valentia Observatory	519.4	519.4	100.0	1115.1	1116.7	99.9
IE0031R	Mace Head	1729.0	1729.0	100.0	3531.1	3536.2	99.9
IT0004R	Ispra	15872.2	16501.7	96.2	22498.9	24696.6	91.1
IT0009R	Mt Cimone	16379.4	17959.7	91.2	29754.8	31578.4	94.2
IT0018R	Lampedusa	907.4	7010.9	12.9	6471.4	19512.5	33.2
IT0019R	Monte Martano	13701.0	13881.1	98.7	22311.0	23963.2	93.1
LT0015R	Preila	530.4	540.8	98.1	742.5	766.3	96.9
LV0010R	Rucava	1040.1	1040.1	100.0	1780.8	1783.4	99.9
LV0016R	Zoseni	218.3	233.5	93.5	278.7	290.9	95.8
MK0007R	Lazaropole	5802.0	15327.9	37.9	14919.0	28108.1	53.1
MT0001R	Giordan lighthouse	10868.1	10965.7	99.1	18068.4	22709.9	79.6
NL0007R	Eibergen	3256.8	3280.6	99.3	4250.2	4299.0	98.9
NL0009R	Kollumerwaard	1279.1	1286.0	99.5	1787.6	1819.7	98.2
NL0010R	Vredepeel	4519.3	4680.4	96.6	5588.2	5761.6	97.0
NL0091R	De Zilk	2800.3	2817.6	99.4	4301.1	4334.8	99.2
NL0644R	Cabauw Wielsekade	2659.3	2834.7	93.8	3568.7	3702.2	96.4
NO0002R	Birkenes II	1090.1	1159.3	94.0	2014.1	2166.8	93.0
NO0015R	Tustervatn	759.7	767.2	99.0	2206.3	2233.0	98.8
NO0039R	Kårvatn	820.0	827.5	99.1	1410.7	1430.4	98.6
NO0042G	Zeppelin mountain (Ny-Ålesund)	390.1	943.8	41.3	595.0	1505.4	39.5
NO0043R	Prestebakke	1066.3	1075.5	99.1	1764.7	1781.0	99.1
NO0052R	Sandve	582.0	588.6	98.9	1107.6	1120.5	98.8
NO0056R	Hurdal	1232.4	1245.1	99.0	2139.2	2166.3	98.7

Table 2.1, cont.

Code	Station	May - July			April - September		
		AOT40	AOT40 corrected	Data capture	AOT40	AOT40 corrected	Data capture
PL0002R	Jarczew	1468.7	1480.8	99.2	2455.2	2474.8	99.2
PL0003R	Sniezka	4692.0	4692.0	100.0	6809.4	6809.4	100.0
PL0004R	Leba	2138.9	2140.7	99.9	3491.6	3496.7	99.9
PL0005R	Diabla Gora	1813.6	1843.7	98.4	2828.1	2895.3	97.7
RS0005R	Kamenicki vis	6448.2	8434.7	76.4	13506.3	17332.4	77.9
SE0005R	Bredkälen	884.4	886.7	99.7	3237.9	3263.2	99.2
SE0012R	Aspvreten	1476.9	1485.8	99.4	2405.9	2443.5	98.5
SE0013R	Esrange	826.8	828.2	99.8	2361.8	2366.3	99.8
SE0014R	Råö	1678.7	1705.1	98.4	2940.4	2973.4	98.9
SE0018R	Asa	2266.4	2274.2	99.7	3223.3	3229.5	99.8
SE0019R	Östad	1899.4	1904.3	99.7	3105.8	3110.3	99.9
SE0020R	Hallahus	2518.9	2527.7	99.7	3832.6	3845.6	99.7
SE0032R	Norra-Kvill	2086.0	2182.9	95.6	3458.2	3547.1	97.5
SE0035R	Vindeln	692.2	694.5	99.7	1606.9	1613.9	99.6
SE0039R	Grimsö	829.7	832.5	99.7	1464.3	1467.1	99.8
SI0008R	Iskrba	11146.2	12037.9	92.6	18747.0	20018.4	93.6
SI0031R	Zarodnje	4152.6	4201.5	98.8	7821.5	7910.1	98.9
SI0032R	Krvavec	13947.2	14715.4	94.8	22564.8	24068.4	93.8
SK0002R	Chopok	8684.0	14791.0	58.7	11579.5	24771.3	46.7
SK0004R	Stará Lesná	5252.5	5409.3	97.1	8535.0	8693.7	98.2
SK0006R	Starina	4830.0	5068.7	95.3	7905.0	8250.3	95.8
SK0007R	Topolniky	3957.0	4003.6	98.8	6333.0	6404.9	98.9

Annex 3

Seasonal variation

Table 3.1: Monthly mean concentrations 2017 (µg/m³).

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AT0002R	Illmitz	monthly mean	57.2	50.4	66.4	77.0	85.6	93.1	83.5	84.1	58.1	48.3	35.2	41.1
AT0002R	Illmitz	data capture	94.8	95.2	95.0	95.4	94.9	95.7	94.4	96.4	95.6	95.0	95.1	95.6
AT0005R	Vorhegg	monthly mean	69.1	60.5	84.0	90.2	88.6	93.1	80.6	76.4	57.9	67.8	56.3	66.2
AT0005R	Vorhegg	data capture	95.3	95.4	95.0	95.6	95.6	87.4	95.0	95.2	63.2	90.7	94.6	95.7
AT0030R	Pillersdorf bei Retz	monthly mean	52.2	53.6	67.2	74.6	85.6	94.9	83.1	83.4	56.9	51.1	35.1	40.1
AT0030R	Pillersdorf bei Retz	data capture	80.2	75.9	95.6	95.8	95.2	95.4	95.8	96.1	95.6	94.5	95.3	95.3
AT0032R	Sulzberg	monthly mean	71.3	74.6	80.9	89.8	101.6	102.2	89.8	93.6	74.4	68.3	60.4	70.6
AT0032R	Sulzberg	data capture	95.4	95.8	95.8	95.1	95.3	95.8	95.2	95.8	95.3	95.0	95.0	93.3
AT0034G	Sonnblick	monthly mean	92.1	94.4	102.9	107.8	111.8	112.1	97.7	99.3	93.8	89.4	87.2	84.0
AT0034G	Sonnblick	data capture	96.1	95.2	96.1	96.4	96.4	95.6	95.2	90.7	96.2	95.8	96.2	96.1
AT0038R	Gerlitzen	monthly mean	85.1	85.0	96.7	102.7	106.0	108.8	97.7	95.8	75.5	-	-	-
AT0038R	Gerlitzen	data capture	95.7	95.8	95.4	95.7	95.8	95.1	94.9	95.2	25.6	0.0	0.0	0.0
AT0040R	Masenberg	monthly mean	77.5	69.2	82.0	88.5	100.0	100.9	91.4	93.0	67.1	68.3	55.7	64.9
AT0040R	Masenberg	data capture	95.7	95.1	94.1	95.7	95.8	95.4	95.3	95.6	95.7	95.3	95.7	95.7
AT0041R	Haunsberg	monthly mean	56.8	56.5	68.1	74.8	86.4	93.0	81.8	80.0	57.0	55.3	47.1	53.5
AT0041R	Haunsberg	data capture	95.6	95.1	95.8	94.4	94.8	95.1	94.8	88.4	95.6	95.4	95.1	95.7
AT0042R	Heidenreichstein	monthly mean	55.3	55.7	61.9	72.8	79.4	85.4	76.1	71.6	51.1	49.3	36.5	43.8
AT0042R	Heidenreichstein	data capture	95.4	95.7	95.4	95.7	94.8	95.7	95.7	95.6	95.7	95.7	95.4	95.6
AT0043R	Forsthof	monthly mean	55.2	52.5	67.0	77.1	90.8	101.2	95.4	92.7	60.6	54.8	40.4	47.0
AT0043R	Forsthof	data capture	95.4	94.8	95.3	95.0	95.2	95.0	95.7	95.2	95.1	95.0	95.7	95.3
AT0045R	Dunkelsteinerwald	monthly mean	47.4	45.0	59.3	69.7	74.3	86.9	75.9	73.5	48.2	41.8	31.8	38.0
AT0045R	Dunkelsteinerwald	data capture	95.6	95.7	95.4	95.3	95.4	95.7	95.3	95.4	95.7	95.2	95.6	95.4
AT0046R	Gänserndorf	monthly mean	44.5	48.1	57.2	66.5	76.7	85.2	78.4	78.3	52.5	43.5	31.0	34.4
AT0046R	Gänserndorf	data capture	95.2	95.2	95.4	95.7	95.4	95.7	95.7	95.6	95.4	95.0	93.8	95.7
AT0047R	Stixneusiedl	monthly mean	49.9	45.9	63.4	71.5	78.1	89.5	83.7	85.1	54.6	46.8	33.7	37.4
AT0047R	Stixneusiedl	data capture	95.6	95.7	95.4	95.1	95.6	95.7	95.6	95.3	95.6	95.6	95.7	95.6
AT0048R	Zoebelboden	monthly mean	71.9	67.4	77.8	84.0	93.6	97.4	85.3	77.3	61.6	63.0	57.3	67.0
AT0048R	Zoebelboden	data capture	95.2	95.5	94.8	95.7	94.9	94.7	96.0	96.2	94.2	95.4	95.0	95.6
AT0049R	Grebenzen bei St. Lamprecht	monthly mean	86.1	84.7	93.4	94.9	101.0	101.0	92.4	93.9	78.8	76.5	71.8	74.9
AT0049R	Grebenzen bei St. Lamprecht	data capture	95.4	95.4	95.6	95.7	95.4	94.9	95.6	95.6	95.7	94.5	95.8	95.7
AT0050R	Graz Lustbuehel	monthly mean	35.8	38.4	73.0	80.5	85.1	84.4	80.8	78.6	49.3	50.2	25.9	32.7
AT0050R	Graz Lustbuehel	data capture	95.7	94.8	95.3	95.8	95.7	95.7	95.8	95.7	95.3	95.6	95.7	95.3
BE0001R	Offagne	monthly mean	42.2	44.5	62.4	69.8	71.2	74.9	59.6	56.2	50.1	43.4	39.2	44.0
BE0001R	Offagne	data capture	97.3	97.3	85.3	97.1	97.2	97.8	97.8	97.0	97.8	97.7	95.4	97.6
BE0032R	Eupen	monthly mean	33.9	42.8	61.8	57.2	68.5	73.3	60.2	56.7	47.4	45.8	35.7	37.5
BE0032R	Eupen	data capture	97.3	82.9	84.4	96.2	94.1	97.6	97.2	97.2	97.8	97.3	97.5	97.7
BE0035R	Vezin	monthly mean	27.7	37.0	49.7	51.8	61.3	65.7	54.1	47.7	39.9	38.9	29.7	33.6

Table 3.1, cont.

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
BE0035R	Vezin	data capture	97.7	97.8	83.2	96.5	97.8	97.8	96.9	97.7	97.6	96.5	95.3	97.7
BG0053R	Rojen peak	monthly mean	81.3	88.1	96.4	96.0	98.1	95.6	101.3	110.4	98.5	81.3	73.0	76.6
BG0053R	Rojen peak	data capture	95.7	95.8	90.5	95.8	91.8	94.4	95.7	95.7	95.8	95.7	95.4	94.9
CH0001G	Jungfraujoch	monthly mean	68.0	68.8	74.0	80.8	84.6	81.6	74.9	76.4	70.0	68.9	64.2	62.5
CH0001G	Jungfraujoch	data capture	94.4	95.1	97.4	97.8	97.6	97.4	97.6	97.7	96.4	97.3	94.7	97.4
CH0002R	Payerne	monthly mean	36.9	37.7	58.7	72.0	74.0	78.5	70.5	63.1	53.6	45.0	37.8	42.2
CH0002R	Payerne	data capture	99.5	99.4	98.9	99.4	99.3	99.4	99.1	99.5	99.3	99.3	99.3	99.5
CH0003R	Tänikon	monthly mean	38.1	39.4	55.4	69.7	77.7	83.0	70.3	63.3	49.8	40.9	38.9	45.0
CH0003R	Tänikon	data capture	99.5	99.3	98.4	99.6	99.2	98.8	99.6	98.7	98.6	99.1	99.3	99.3
CH0004R	Chaumont	monthly mean	74.5	73.2	82.7	94.2	97.8	98.2	90.9	89.8	80.0	74.8	62.6	68.2
CH0004R	Chaumont	data capture	99.5	99.3	99.2	99.3	99.3	96.9	86.7	95.4	90.1	95.3	95.0	93.5
CH0005R	Rigi	monthly mean	70.2	73.7	79.9	89.9	99.8	99.6	87.4	89.0	76.3	70.6	60.5	70.0
CH0005R	Rigi	data capture	99.1	99.0	99.3	99.0	99.2	99.4	94.8	99.3	99.0	98.8	98.9	99.1
CY0002R	Ayia Marina	monthly mean	85.7	87.7	99.4	104.1	98.4	102.6	108.6	102.5	98.6	95.5	88.7	84.3
CY0002R	Ayia Marina	data capture	96.6	97.5	98.7	99.3	98.1	94.0	94.0	87.5	95.4	98.9	98.9	97.8
CZ0003R	Kosetice	monthly mean	60.4	62.4	69.0	76.6	82.2	85.7	76.4	82.6	58.7	53.0	40.9	46.7
CZ0003R	Kosetice	monthly mean	60.6	62.0	74.0	79.9	92.8	97.4	86.0	90.9	63.7	58.3	44.0	49.0
CZ0003R	Kosetice	data capture	82.5	95.8	95.8	84.2	95.3	95.1	95.8	95.0	96.1	95.3	95.6	95.4
CZ0003R	Kosetice	data capture	97.6	92.7	100.0	100.0	98.8	72.1	100.0	98.8	85.0	87.9	99.9	100.0
CZ0005R	Churanov	monthly mean	73.6	69.5	76.6	82.6	92.2	100.1	82.7	86.2	64.3	64.1	55.5	60.6
CZ0005R	Churanov	data capture	97.8	97.8	98.0	97.6	97.4	97.9	98.0	97.8	97.9	98.0	97.5	98.0
DE0001R	Westerland	monthly mean	56.4	57.2	68.0	84.8	77.6	-	-	72.5	63.3	66.3	61.4	62.8
DE0001R	Westerland	data capture	94.8	94.5	95.8	95.8	58.7	0.0	0.0	23.1	96.1	95.8	82.2	93.4
DE0002R	Waldhof	monthly mean	34.5	46.4	58.6	67.6	71.0	61.2	54.3	56.0	41.8	43.5	35.6	42.6
DE0002R	Waldhof	data capture	95.6	95.2	96.0	95.1	96.0	94.9	94.5	95.7	95.4	95.2	94.6	95.6
DE0003R	Schauinsland	monthly mean	68.9	76.3	80.8	89.1	100.9	105.2	92.5	97.6	85.3	80.2	65.9	68.7
DE0003R	Schauinsland	data capture	96.1	95.8	95.7	96.0	95.4	96.0	94.9	96.0	96.0	95.7	92.2	95.8
DE0007R	Neuglobsow	monthly mean	36.2	47.8	54.4	69.1	68.4	56.6	46.8	47.4	35.6	36.6	33.8	40.1
DE0007R	Neuglobsow	data capture	95.7	96.0	95.6	96.0	94.8	94.9	95.3	87.4	93.7	94.2	95.7	90.2
DE0008R	Schmücke	monthly mean	60.4	57.3	74.8	79.0	87.9	88.9	77.4	81.9	63.6	55.5	47.8	47.4
DE0008R	Schmücke	data capture	95.2	95.1	94.8	95.3	95.4	95.3	95.4	95.3	95.8	94.1	94.4	95.2
DE0009R	Zingst	monthly mean	46.1	55.9	63.3	77.7	78.6	67.2	58.7	65.2	52.9	54.9	-	-
DE0009R	Zingst	data capture	96.0	95.2	95.7	96.1	95.8	94.6	96.1	96.0	95.8	35.5	0.0	0.0

Table 3.1, cont.

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DK0005R	Keldsnor	monthly mean	46.0	54.7	60.8	77.4	73.0	64.7	55.9	62.2	53.5	48.7	49.3	50.8
DK0005R	Keldsnor	data capture	90.9	90.9	90.5	90.6	91.3	69.3	89.8	91.0	91.2	90.7	90.7	91.5
DK0010G	Villum Research Station, Station Nord	monthly mean	78.5	79.8	81.4	52.1	32.0	55.9	46.1	51.0	70.7	79.6	80.3	81.0
DK0010G	Villum Research Station, Station Nord	data capture	91.3	91.7	91.1	91.5	91.7	91.7	91.0	90.5	91.5	91.5	91.2	85.6
DK0012R	Risoe	monthly mean	50.6	60.7	66.8	78.8	78.3	67.1	58.6	65.5	53.5	54.5	46.5	51.2
DK0012R	Risoe	data capture	91.4	90.9	90.7	91.7	91.1	91.0	91.5	91.8	91.5	91.1	90.1	91.3
DK0031R	Ulborg	monthly mean	56.4	61.8	72.8	82.3	76.7	66.3	59.6	59.2	48.9	54.0	54.5	55.9
DK0031R	Ulborg	data capture	91.4	91.7	91.5	87.6	90.2	91.7	91.0	91.0	89.4	90.7	91.2	91.7
EE0009R	Lahemaa	monthly mean	56.0	62.0	67.8	71.2	71.3	54.6	43.5	50.0	35.1	35.8	41.2	48.4
EE0009R	Lahemaa	data capture	100.0	100.0	99.7	100.0	100.0	99.7	100.0	100.0	99.7	100.0	100.0	99.6
EE0011R	Vilsandi	monthly mean	61.2	60.2	69.2	81.3	81.0	69.3	64.2	79.8	53.1	57.1	54.8	58.0
EE0011R	Vilsandi	data capture	96.8	100.0	99.9	100.0	100.0	99.3	99.6	99.6	95.7	99.7	99.6	87.8
ES0001R	San Pablo de los Montes	monthly mean	71.7	78.9	90.3	98.7	95.7	98.7	103.8	101.4	99.3	84.1	66.3	68.2
ES0001R	San Pablo de los Montes	data capture	98.4	99.6	99.2	98.9	99.2	98.6	98.9	99.1	98.1	98.4	89.7	97.0
ES0005R	Noya	monthly mean	64.8	75.5	74.2	87.0	75.5	70.8	55.4	58.4	57.8	71.1	67.9	64.4
ES0005R	Noya	data capture	94.5	85.1	88.8	87.5	98.9	91.8	98.0	96.4	97.5	94.2	80.6	99.3
ES0006R	Mahón	monthly mean	82.2	86.0	103.8	108.0	101.8	89.5	76.2	89.8	82.4	76.0	77.6	69.6
ES0006R	Mahón	data capture	81.9	98.7	99.2	92.2	94.2	99.0	82.7	97.0	99.0	96.4	98.9	99.1
ES0007R	Víznar	monthly mean	76.4	75.8	92.6	107.2	99.0	105.0	109.7	101.7	103.0	87.1	75.8	67.1
ES0007R	Víznar	data capture	99.2	99.3	99.1	99.2	98.9	98.6	99.1	99.3	99.2	98.8	98.5	98.7
ES0008R	Niembro	monthly mean	70.7	75.8	82.5	95.2	78.2	63.6	55.5	59.5	64.2	65.8	66.3	67.8
ES0008R	Niembro	data capture	92.1	98.8	98.9	99.0	91.0	98.8	96.0	98.4	98.9	98.9	98.5	98.8
ES0009R	Campisabalos	monthly mean	59.0	61.1	65.4	73.5	71.6	76.0	75.3	67.2	55.7	51.1	57.7	59.0
ES0009R	Campisabalos	data capture	98.9	99.4	99.3	98.8	99.2	80.1	96.6	98.3	99.2	98.4	99.2	99.2
ES0010R	Cabo de Creus	monthly mean	52.1	63.3	76.6	86.0	82.9	76.0	74.5	77.8	78.1	71.3	62.3	58.9
ES0010R	Cabo de Creus	data capture	98.9	98.7	99.2	98.8	98.1	98.9	98.7	98.0	99.2	98.9	98.9	98.7
ES0011R	Barcarrota	monthly mean	39.6	47.6	63.6	54.6	44.4	54.0	55.0	58.4	61.9	54.9	43.3	35.8
ES0011R	Barcarrota	data capture	98.9	97.0	98.4	98.9	98.3	95.6	91.0	99.3	97.8	99.5	95.6	98.3
ES0012R	Zarra	monthly mean	72.5	87.7	98.3	104.9	103.3	108.3	105.0	97.5	97.1	86.5	79.2	69.2
ES0012R	Zarra	data capture	82.0	83.3	98.9	99.0	99.1	98.8	98.8	98.8	98.9	99.2	99.0	98.9
ES0013R	Penausende	monthly mean	59.9	67.1	76.0	86.1	76.3	78.0	73.4	77.2	72.6	68.9	57.3	53.8
ES0013R	Penausende	data capture	98.4	99.1	98.8	98.6	99.5	99.0	99.3	99.2	98.6	98.9	99.4	98.9
ES0014R	Els Torms	monthly mean	56.8	67.0	82.3	93.1	93.2	91.7	87.5	86.1	75.7	69.9	62.1	52.7
ES0014R	Els Torms	data capture	99.3	99.1	97.6	99.2	99.3	98.5	99.1	99.2	99.2	98.9	99.2	99.2
ES0016R	O Saviñao	monthly mean	47.4	66.5	74.4	83.0	61.9	61.5	58.2	61.0	56.2	55.7	49.4	47.3
ES0016R	O Saviñao	data capture	98.9	98.7	99.3	98.9	96.2	98.8	98.9	94.9	99.0	99.5	99.4	97.7

Table 3.1, cont.

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ES0017R	Doñana	monthly mean	49.9	59.5	69.7	76.5	69.7	68.8	71.0	73.6	74.4	59.6	47.7	48.0
ES0017R	Doñana	data capture	98.9	99.3	99.1	98.9	99.3	99.0	99.5	98.5	99.2	98.8	99.2	99.3
FI0009R	Utö	monthly mean	63.7	71.1	75.8	78.1	72.6	65.3	60.0	71.9	50.6	58.9	59.5	60.4
FI0009R	Utö	data capture	100.0	100.0	100.0	98.9	92.1	100.0	100.0	100.0	100.0	99.9	93.3	100.0
FI0018R	Virolahti III	monthly mean	55.5	64.8	70.5	70.4	69.3	51.9	42.8	48.2	30.8	37.5	41.0	49.4
FI0018R	Virolahti III	data capture	98.3	92.7	99.3	99.9	100.0	100.0	100.0	97.3	99.6	98.5	99.3	99.9
FI0022R	Oulanka	monthly mean	70.3	72.9	77.4	83.0	72.0	54.9	49.1	43.6	33.9	37.5	46.0	55.0
FI0022R	Oulanka	data capture	98.8	99.1	99.9	100.0	99.5	100.0	100.0	100.0	99.4	99.7	100.0	99.1
FI0037R	Ähtäri II	monthly mean	60.4	66.8	74.3	74.1	72.6	-	-	-	-	-	-	-
FI0037R	Ähtäri II	data capture	99.6	100.0	99.9	100.0	45.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FI0096G	Pallas (Sammaltunturi)	monthly mean	75.1	81.8	84.2	88.3	74.6	62.2	58.0	53.9	45.5	50.7	60.0	67.4
FI0096G	Pallas (Sammaltunturi)	data capture	99.6	98.8	99.9	100.0	93.7	95.1	99.7	99.9	99.3	99.9	99.9	99.6
FR0008R	Donon	monthly mean	52.8	53.1	65.2	72.5	76.9	78.9	67.6	65.2	55.6	53.0	48.2	51.2
FR0008R	Donon	data capture	99.7	100.0	99.7	99.7	100.0	100.0	99.5	100.0	99.9	94.1	99.9	99.7
FR0009R	Revin	monthly mean	43.9	50.6	70.0	76.8	75.3	77.3	62.1	59.3	54.2	49.6	44.5	49.4
FR0009R	Revin	data capture	98.9	99.3	100.0	100.0	99.5	99.4	100.0	100.0	98.5	98.9	99.0	99.7
FR0010R	Morvan	monthly mean	58.6	61.4	71.7	74.9	81.6	71.5	62.2	62.1	58.0	57.7	61.3	63.2
FR0010R	Morvan	data capture	99.7	99.7	99.7	98.9	99.6	97.9	98.5	98.3	98.3	98.5	98.2	98.7
FR0013R	Peyrusse Vieille	monthly mean	55.0	73.5	78.2	86.7	82.0	76.6	59.8	65.0	64.3	58.5	53.5	56.4
FR0013R	Peyrusse Vieille	data capture	99.9	98.7	98.7	88.6	99.9	98.9	99.9	100.0	99.9	99.9	100.0	99.9
FR0014R	Montandon	monthly mean	48.0	52.5	60.2	64.9	69.5	77.2	71.3	64.8	51.8	45.9	44.5	46.9
FR0014R	Montandon	data capture	99.5	99.4	99.6	98.5	99.7	99.6	80.8	99.9	99.6	99.9	99.4	95.8
FR0015R	La Tardière	monthly mean	39.4	55.1	65.2	76.4	68.5	64.4	54.9	55.0	49.1	47.2	42.6	44.1
FR0015R	La Tardière	data capture	99.9	100.0	99.1	99.7	99.5	99.9	96.5	99.6	99.4	99.7	98.2	99.2
FR0016R	Le Casset	monthly mean	88.8	90.9	100.2	111.9	106.1	100.1	96.7	97.2	86.5	92.1	83.4	81.8
FR0016R	Le Casset	data capture	99.7	100.0	99.7	100.0	99.2	99.7	92.5	69.5	100.0	100.0	99.6	96.8
FR0017R	Montfranc	monthly mean	71.0	77.3	85.5	92.7	88.7	82.0	68.8	73.9	73.4	69.3	67.6	65.1
FR0017R	Montfranc	data capture	99.9	100.0	100.0	98.5	95.6	97.2	100.0	97.7	96.1	100.0	100.0	99.7
FR0018R	La Coulonche	monthly mean	55.4	65.4	75.2	83.9	74.7	75.6	61.9	64.2	59.0	57.8	55.3	58.5
FR0018R	La Coulonche	data capture	99.6	100.0	99.9	99.3	100.0	95.3	85.1	99.9	99.6	98.9	99.4	99.6
FR0019R	Pic du Midi	monthly mean	84.9	90.0	96.9	105.3	102.0	99.6	96.2	94.6	90.0	87.2	83.8	82.9
FR0019R	Pic du Midi	data capture	99.6	99.9	99.7	99.9	99.9	88.5	85.1	99.2	99.3	98.0	99.6	99.1
FR0020R	SIRTA Atmospheric Research Observatory	monthly mean	32.7	51.2	61.4	64.3	67.8	72.8	62.0	58.2	53.0	43.1	39.4	46.3
FR0020R	SIRTA Atmospheric Research Observatory	data capture	100.0	100.0	99.3	98.8	98.8	100.0	100.0	100.0	100.0	100.0	93.8	100.0

Table 3.1, cont.

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
FR0023R	Saint-Nazaire-le-Désert	monthly mean	50.5	62.2	64.5	77.4	74.1	74.8	73.3	76.1	67.7	59.6	49.3	45.9
FR0023R	Saint-Nazaire-le-Désert	data capture	97.8	98.5	98.3	59.3	95.7	95.6	98.3	96.1	91.5	98.4	97.2	98.5
FR0025R	Verneuil	monthly mean	45.2	57.4	68.3	69.9	67.6	64.5	58.7	59.2	51.9	43.8	42.5	52.2
FR0025R	Verneuil	data capture	99.5	99.7	96.6	99.9	99.9	99.7	99.9	99.6	99.7	86.7	100.0	99.2
FR0030R	Puy de Dôme	monthly mean	83.7	86.5	91.7	99.1	98.9	92.4	80.2	89.1	80.7	79.8	76.0	78.3
FR0030R	Puy de Dôme	data capture	99.6	100.0	97.0	96.8	94.2	99.3	98.5	96.8	96.7	98.4	100.0	77.2
GB0002R	Eskdalemuir	monthly mean	52.7	60.2	63.2	69.6	68.6	58.7	49.2	47.8	49.3	55.6	55.8	57.9
GB0002R	Eskdalemuir	data capture	96.1	100.0	100.0	100.0	99.9	100.0	96.0	100.0	100.0	99.7	100.0	100.0
GB0006R	Lough Navar	monthly mean	47.9	55.8	58.5	63.6	55.3	44.4	38.0	33.8	38.3	50.3	45.7	50.3
GB0006R	Lough Navar	data capture	99.6	99.1	99.7	99.7	99.2	99.9	99.3	98.5	98.8	99.6	100.0	100.0
GB0013R	Yarner Wood	monthly mean	56.8	68.1	73.6	78.3	71.6	63.7	47.6	50.8	57.4	58.8	64.0	66.9
GB0013R	Yarner Wood	data capture	99.9	95.8	98.5	99.9	99.5	100.0	93.1	33.7	91.1	94.6	100.0	100.0
GB0014R	High Muffles	monthly mean	45.9	59.2	65.8	74.7	71.9	59.6	50.0	49.5	48.9	52.7	55.8	59.3
GB0014R	High Muffles	data capture	99.7	96.0	100.0	99.7	100.0	100.0	96.5	96.1	95.8	100.0	99.2	93.3
GB0015R	Strath Vaich Dam	monthly mean	69.6	72.8	78.4	84.6	75.8	62.8	51.0	52.5	55.8	66.1	70.7	71.3
GB0015R	Strath Vaich Dam	data capture	96.6	100.0	99.6	100.0	99.9	100.0	99.6	76.5	87.8	99.7	100.0	100.0
GB0031R	Aston Hill	monthly mean	55.4	66.0	72.8	77.4	72.8	62.5	54.7	53.0	55.8	64.0	65.7	69.2
GB0031R	Aston Hill	data capture	93.5	97.6	100.0	99.9	97.3	92.8	93.5	97.3	93.3	96.5	97.9	99.9
GB0033R	Bush	monthly mean	57.4	63.3	65.3	74.1	68.6	53.5	44.3	46.7	48.4	56.4	56.2	55.9
GB0033R	Bush	data capture	100.0	96.1	100.0	99.9	100.0	100.0	97.6	98.5	100.0	99.7	89.4	99.5
GB0037R	Ladybower Res.	monthly mean	46.8	60.7	68.3	69.5	67.6	58.0	46.8	46.6	48.0	53.6	53.6	54.3
GB0037R	Ladybower Res.	data capture	98.7	95.2	99.6	69.0	99.7	95.3	98.4	99.2	94.2	99.1	99.7	69.2
GB0038R	Lullington Heath	monthly mean	41.2	55.0	64.2	67.4	61.9	56.5	51.1	54.4	51.8	56.2	48.9	52.6
GB0038R	Lullington Heath	data capture	79.6	94.2	99.7	100.0	99.9	73.9	89.0	97.6	99.9	100.0	99.4	100.0
GB0039R	Sibton	monthly mean	42.3	48.6	55.1	67.4	64.5	58.9	52.4	57.9	56.0	50.3	44.9	45.4
GB0039R	Sibton	data capture	70.8	91.7	99.3	100.0	99.7	99.7	99.6	97.6	100.0	99.7	98.8	99.7
GB0043R	Narberth	monthly mean	55.9	67.7	75.2	75.8	71.0	57.6	45.5	45.6	52.2	56.4	59.3	64.4
GB0043R	Narberth	data capture	96.9	100.0	100.0	99.6	89.1	99.6	99.3	97.4	96.1	99.3	100.0	100.0
GB0045R	Wicken Fen	monthly mean	33.8	49.9	57.3	62.4	63.6	60.2	47.3	47.3	41.7	42.2	35.6	41.3
GB0045R	Wicken Fen	data capture	100.0	95.4	100.0	99.6	99.3	99.9	99.9	96.2	99.6	97.8	96.9	97.8
GB0048R	Auchencorth Moss	monthly mean	54.8	64.3	66.2	73.0	70.0	56.0	47.1	47.4	49.6	53.9	55.3	54.9
GB0048R	Auchencorth Moss	data capture	100.0	99.4	97.7	99.6	100.0	100.0	99.7	96.4	100.0	99.7	100.0	100.0
GB0049R	Weybourne	monthly mean	46.9	57.4	65.5	76.6	77.4	69.6	60.0	62.5	57.5	53.2	52.0	52.2
GB0049R	Weybourne	data capture	99.7	100.0	100.0	99.9	99.6	96.8	100.0	99.6	99.3	99.7	100.0	100.0
GB0050R	St. Osyth	monthly mean	33.8	46.6	58.0	69.1	66.6	64.3	54.5	49.5	50.1	46.1	39.0	41.4
GB0050R	St. Osyth	data capture	99.2	99.7	96.2	99.6	99.5	99.6	99.3	94.9	97.4	99.7	100.0	99.9
GB0052R	Lerwick	monthly mean	75.0	76.5	84.7	87.3	81.5	67.4	60.0	65.4	62.9	73.0	71.9	75.9
GB0052R	Lerwick	data capture	99.5	99.1	100.0	100.0	96.6	100.0	99.9	99.1	99.9	99.7	99.7	61.3

Table 3.1, cont.

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GB0053R	Charlton Mackrell	monthly mean	55.2	69.6	75.3	74.9	66.9	60.1	52.4	50.2	55.0	59.0	58.4	63.9
GB0053R	Charlton Mackrell	data capture	99.6	99.6	96.0	100.0	100.0	100.0	99.2	99.6	96.7	99.7	100.0	100.0
GB1055R	Chilbolton Observatory	monthly mean	34.1	53.2	62.2	66.7	66.0	58.2	50.0	44.7	45.6	46.5	42.3	50.5
GB1055R	Chilbolton Observatory	data capture	99.5	96.3	96.1	99.7	86.4	98.6	100.0	97.6	97.8	99.6	99.7	100.0
GR0001R	Aliartos	monthly mean	46.6	39.0	52.5	76.3	71.7	68.1	74.7	77.0	68.2	-	-	43.6
GR0001R	Aliartos	data capture	99.1	99.9	99.3	6.0	2.0	99.7	100.0	99.9	11.2	0.0	0.0	60.5
GR0002R	Finokalia	monthly mean	85.8	90.5	101.3	113.9	114.7	118.3	125.7	125.5	106.0	95.9	88.4	83.0
GR0002R	Finokalia	data capture	39.4	54.2	36.8	56.9	93.0	99.0	100.0	100.0	99.7	100.0	21.2	87.1
HU0002R	K-puszta	monthly mean	50.7	49.4	60.7	68.4	-	-	65.4	-	-	-	-	42.0
HU0002R	K-puszta	data capture	100.0	100.0	100.0	100.0	0.0	0.0	90.1	0.0	0.0	0.0	0.0	96.6
HU0003R	Farkasfa	monthly mean	-	-	69.9	72.8	67.4	66.6	60.6	62.1	45.2	38.7	32.3	36.6
HU0003R	Farkasfa	data capture	0.0	0.0	72.4	99.9	100.0	100.0	100.0	50.0	85.0	100.0	100.0	100.0
IE0001R	Valentia Observatory	monthly mean	65.8	72.4	76.6	73.2	71.1	58.3	47.7	53.2	58.7	66.4	70.7	74.2
IE0001R	Valentia Observatory	data capture	100.0	100.0	100.0	99.9	100.0	100.0	100.0	100.0	99.6	100.0	100.0	100.0
IE0031R	Mace Head	monthly mean	75.8	82.2	86.9	90.4	81.8	67.5	58.6	63.3	68.1	75.2	79.3	78.8
IE0031R	Mace Head	data capture	99.9	99.4	99.7	100.0	100.0	100.0	100.0	99.7	99.7	99.7	100.0	100.0
IT0004R	Ispra	monthly mean	21.6	22.5	49.9	74.2	77.9	88.8	84.8	84.2	50.1	31.7	20.5	20.2
IT0004R	Ispra	data capture	78.6	60.6	100.0	100.0	100.0	100.0	87.9	50.4	100.0	100.0	100.0	100.0
IT0009R	Mt Cimone	monthly mean	84.4	91.8	102.5	113.4	111.6	117.1	113.1	117.7	95.9	92.8	82.5	80.3
IT0009R	Mt Cimone	data capture	96.8	100.0	99.5	100.0	78.2	96.7	97.4	98.0	92.4	99.9	100.0	89.2
IT0018R	Lampedusa	monthly mean	83.1	-	-	-	-	-	87.2	99.8	97.1	88.9	-	-
IT0018R	Lampedusa	data capture	73.3	0.0	0.0	0.0	0.0	0.0	40.1	87.0	84.9	80.0	0.0	0.0
IT0019R	Monte Martano	monthly mean	72.8	75.5	90.4	101.8	98.6	106.1	105.9	109.0	88.1	80.4	67.9	64.4
IT0019R	Monte Martano	data capture	95.7	87.4	93.7	91.5	95.7	95.7	92.7	67.6	94.9	92.3	91.0	89.8
LT0015R	Preila	monthly mean	42.8	55.1	57.7	66.5	71.5	64.7	57.2	62.2	45.9	49.4	39.9	49.7
LT0015R	Preila	data capture	100.0	100.0	99.5	94.7	100.0	97.6	94.6	100.0	90.6	89.8	97.6	87.1
LV0010R	Rucava	monthly mean	55.6	58.8	64.2	71.3	69.8	58.9	47.7	55.8	41.2	46.0	40.7	44.7
LV0010R	Rucava	data capture	29.0	100.0	98.5	99.7	100.0	100.0	100.0	99.3	100.0	99.3	99.9	17.5
LV0016R	Zoseni	monthly mean	62.8	68.8	63.4	65.7	65.4	57.0	45.9	48.2	39.8	39.9	39.6	47.1
LV0016R	Zoseni	data capture	33.7	26.6	99.9	100.0	99.9	80.6	100.0	95.2	100.0	93.5	100.0	100.0
MK0007R	Lazaropole	monthly mean	106.3	97.4	106.0	104.9	97.1	90.6	-	102.8	85.1	76.8	71.5	78.4
MK0007R	Lazaropole	data capture	100.0	57.6	100.0	99.9	100.0	12.2	0.0	24.1	96.2	97.7	86.1	99.7
MT0001R	Giordan lighthouse	monthly mean	86.3	84.1	98.0	104.8	100.1	98.0	95.7	101.1	-	88.3	83.5	80.3
MT0001R	Giordan lighthouse	data capture	84.1	61.3	98.1	94.0	98.8	99.7	99.2	75.0	0.0	89.0	99.2	99.2

Table 3.1, cont.

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
NL0007R	Eibergen	monthly mean	25.8	36.1	50.7	57.0	61.0	57.0	45.8	44.1	30.3	29.7	22.3	30.5
NL0007R	Eibergen	data capture	96.9	96.9	96.9	97.4	98.0	98.1	98.9	97.8	97.6	98.9	99.0	98.4
NL0009R	Kollumerwaard	monthly mean	32.8	41.6	54.7	67.0	61.7	57.1	50.2	49.6	41.5	45.6	42.9	47.4
NL0009R	Kollumerwaard	data capture	91.8	98.4	94.4	90.3	98.5	98.6	98.9	98.4	99.0	98.9	97.4	98.0
NL0010R	Vredepeel	monthly mean	25.7	34.4	51.3	51.6	62.5	62.3	52.3	45.5	36.0	37.6	28.8	34.4
NL0010R	Vredepeel	data capture	98.9	98.5	85.6	93.2	98.4	91.5	98.4	98.0	99.0	98.9	98.5	98.9
NL0091R	De Zilk	monthly mean	33.3	37.1	50.9	71.5	64.4	65.2	57.4	56.1	45.5	51.6	47.6	45.9
NL0091R	De Zilk	data capture	98.9	98.8	98.5	98.5	98.9	98.1	98.7	98.9	98.2	98.9	97.8	97.7
NL0644R	Cabauw Wielsekade	monthly mean	24.7	31.7	46.5	58.6	58.9	60.9	50.6	47.2	35.8	38.2	30.6	34.3
NL0644R	Cabauw Wielsekade	data capture	98.9	98.4	99.1	98.9	95.4	85.4	98.4	98.9	98.5	97.8	92.4	98.7
NO0002R	Birkenes II	monthly mean	61.7	68.7	71.6	81.8	71.6	65.8	59.3	54.1	46.0	58.0	55.3	51.6
NO0002R	Birkenes II	data capture	98.9	98.8	97.8	78.2	90.9	83.9	98.8	99.6	99.4	98.8	99.2	99.5
NO0015R	Tustervatn	monthly mean	76.0	80.8	84.8	88.8	78.1	59.5	47.0	48.8	49.5	55.6	65.4	71.2
NO0015R	Tustervatn	data capture	99.5	98.8	99.3	99.7	99.5	99.2	99.6	98.9	99.4	99.3	98.8	99.5
NO0039R	Kårvatn	monthly mean	60.6	65.2	75.1	69.3	63.2	45.8	37.8	32.9	39.8	50.8	50.1	61.3
NO0039R	Kårvatn	data capture	98.4	99.3	99.5	98.2	99.5	98.2	99.7	99.6	99.4	99.6	99.3	99.5
NO0042G	Zeppelin mountain (Ny-Ålesund)	monthly mean	77.6	84.5	71.1	76.4	55.3	77.6	-	-	-	-	74.8	67.0
NO0042G	Zeppelin mountain (Ny-Ålesund)	data capture	99.5	29.2	98.7	90.8	99.7	31.5	0.0	0.0	0.0	0.0	8.1	98.7
NO0043R	Prestebakke	monthly mean	54.4	60.1	69.6	75.7	72.1	62.0	59.5	57.1	42.8	52.2	51.5	48.5
NO0043R	Prestebakke	data capture	99.5	99.3	99.2	99.7	99.3	99.6	99.7	99.6	99.4	99.3	99.7	99.7
NO0052R	Sandve	monthly mean	64.6	65.6	73.8	77.5	68.5	61.7	54.3	58.3	54.3	60.7	63.2	62.3
NO0052R	Sandve	data capture	99.3	99.3	54.2	99.6	99.5	99.4	99.3	99.5	99.2	99.6	98.2	99.6
NO0056R	Hurdal	monthly mean	49.4	53.9	74.1	78.4	72.3	61.1	57.3	51.7	39.9	50.7	49.3	47.4
NO0056R	Hurdal	data capture	98.9	98.8	99.6	99.0	99.5	99.7	99.2	99.2	99.7	99.2	99.3	99.3
PL0002R	Jarczew	monthly mean	38.4	54.5	48.0	56.9	59.3	55.1	48.1	51.1	36.9	37.5	29.7	32.8
PL0002R	Jarczew	data capture	100.0	100.0	100.0	99.3	99.5	99.3	100.0	99.7	100.0	99.3	99.4	100.0
PL0003R	Sniezka	monthly mean	72.9	74.9	77.4	83.2	93.0	85.0	79.0	84.0	68.8	63.9	57.4	60.6
PL0003R	Sniezka	data capture	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7	100.0	100.0
PL0004R	Leba	monthly mean	55.8	61.6	64.1	77.4	83.9	69.0	60.0	65.2	52.7	50.7	45.5	48.7
PL0004R	Leba	data capture	100.0	100.0	100.0	100.0	99.9	100.0	100.0	100.0	99.7	100.0	100.0	100.0
PL0005R	Diabla Gora	monthly mean	50.1	62.0	58.0	68.2	71.7	59.8	44.9	49.6	38.8	42.5	35.6	43.6
RS0005R	Kamenicki vis	monthly mean	69.1	77.9	85.2	86.2	83.3	101.1	98.0	101.3	93.3	73.7	41.3	17.2
RS0005R	Kamenicki vis	data capture	92.7	100.0	85.3	65.0	100.0	99.9	30.5	99.5	71.1	88.2	91.2	50.4
SE0005R	Bredkälen	monthly mean	68.3	75.1	88.1	91.2	73.4	55.2	46.9	44.2	40.5	47.3	53.6	64.5
SE0005R	Bredkälen	data capture	99.7	100.0	100.0	99.3	99.6	100.0	100.0	99.2	99.6	100.0	100.0	100.0

Table 3.1, cont.

Code	Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SE0012R	Aspvreten	monthly mean	48.2	62.9	66.4	68.3	70.7	58.2	52.9	52.5	44.0	44.6	39.3	39.5
SE0012R	Aspvreten	data capture	99.9	100.0	100.0	100.0	98.0	100.0	100.0	96.8	93.8	100.0	89.4	99.9
SE0013R	Esrange	monthly mean	76.5	81.7	86.3	90.1	76.2	64.4	56.2	51.5	42.8	49.8	63.6	70.5
SE0013R	Esrange	data capture	99.6	100.0	100.0	100.0	99.7	100.0	100.0	100.0	99.6	100.0	100.0	100.0
SE0014R	Råö	monthly mean	54.4	62.2	67.6	77.7	77.3	67.9	64.0	67.4	49.2	58.7	54.8	55.3
SE0014R	Råö	data capture	99.7	100.0	100.0	100.0	99.6	100.0	96.4	99.3	99.7	100.0	100.0	99.7
SE0018R	Asa	monthly mean	50.7	64.9	63.6	70.6	76.2	59.3	52.5	50.7	40.4	48.7	42.8	47.0
SE0018R	Asa	data capture	96.4	100.0	100.0	100.0	99.2	100.0	100.0	100.0	100.0	94.6	81.7	99.2
SE0019R	Östad	monthly mean	49.0	60.4	63.2	73.4	71.3	62.3	55.3	52.9	40.6	50.2	42.4	48.6
SE0019R	Östad	data capture	100.0	99.6	100.0	100.0	100.0	99.6	100.0	100.0	100.0	99.7	100.0	100.0
SE0020R	Hallahus	monthly mean	50.4	66.3	67.1	76.7	81.2	63.2	52.8	57.1	46.3	51.7	47.0	51.2
SE0020R	Hallahus	data capture	99.2	100.0	100.0	100.0	99.5	99.9	100.0	99.6	100.0	99.3	100.0	100.0
SE0032R	Norra-Kvill	monthly mean	59.7	71.4	74.2	79.8	83.3	66.0	62.5	65.0	47.4	54.6	51.5	50.7
SE0032R	Norra-Kvill	data capture	99.7	100.0	100.0	100.0	99.6	87.1	100.0	100.0	100.0	99.6	99.0	99.5
SE0035R	Vindeln	monthly mean	59.7	68.1	75.7	80.1	71.2	56.1	45.7	40.7	32.9	40.1	44.1	58.4
SE0035R	Vindeln	data capture	99.6	99.9	99.6	100.0	99.6	99.9	100.0	99.9	99.3	100.0	100.0	100.0
SE0039R	Grimsö	monthly mean	52.5	63.0	68.6	71.6	69.3	55.1	53.9	50.3	39.3	45.0	44.2	37.4
SE0039R	Grimsö	data capture	99.6	100.0	100.0	100.0	99.5	100.0	100.0	100.0	100.0	99.7	99.7	100.0
SI0008R	Iskrba	monthly mean	60.6	62.9	69.6	73.2	61.6	68.1	69.0	63.5	45.3	38.5	43.9	41.0
SI0008R	Iskrba	data capture	95.7	94.9	95.7	95.7	85.1	95.1	95.3	95.7	94.9	94.2	95.8	73.7
SI0031R	Zarodnje	monthly mean	49.9	47.1	72.3	73.0	77.8	75.7	77.1	88.2	58.8	62.9	44.8	50.0
SI0031R	Zarodnje	data capture	95.0	95.2	94.8	95.7	95.8	95.0	94.5	92.7	95.0	92.6	90.6	91.3
SI0032R	Krvavec	monthly mean	87.6	87.9	101.2	104.8	108.5	112.7	106.2	108.5	86.1	83.6	75.7	75.3
SI0032R	Krvavec	data capture	94.9	95.7	95.8	95.8	95.8	95.6	95.4	95.8	91.7	95.7	95.8	95.7
SK0002R	Chopok	monthly mean	95.3	93.2	95.7	100.0	106.6	109.1	-	-	-	-	-	74.5
SK0002R	Chopok	data capture	70.4	95.7	94.2	96.0	95.2	73.9	0.0	0.0	0.0	0.0	0.0	34.4
SK0004R	Stará Lesná	monthly mean	65.7	69.0	72.0	78.4	75.4	78.2	61.8	66.7	49.2	46.8	41.6	48.8
SK0004R	Stará Lesná	data capture	96.8	96.3	96.0	96.2	88.7	95.8	95.7	95.6	95.8	95.8	95.4	95.8
SK0006R	Starina	monthly mean	65.6	61.4	67.8	77.0	70.7	73.6	63.6	65.6	47.9	44.0	42.3	44.8
SK0006R	Starina	data capture	93.8	93.5	94.4	92.8	93.4	92.1	91.8	93.1	94.0	94.6	94.9	88.7
SK0007R	Topolniky	monthly mean	27.4	33.2	47.2	52.2	61.2	66.7	67.9	69.0	46.2	38.1	27.7	29.2
SK0007R	Topolniky	data capture	92.1	95.8	95.7	96.1	95.7	94.9	94.8	95.7	94.3	92.2	95.3	95.0

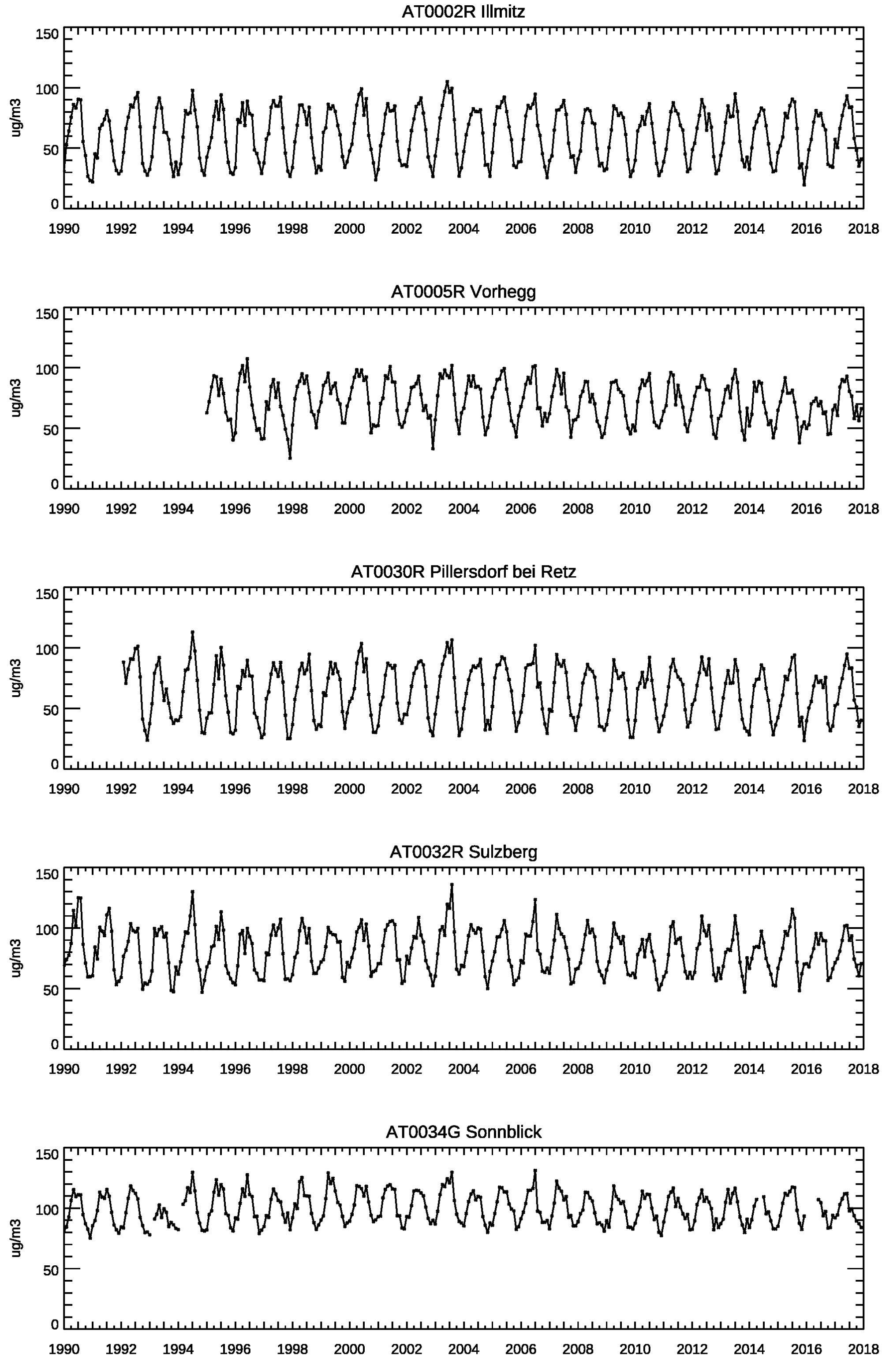
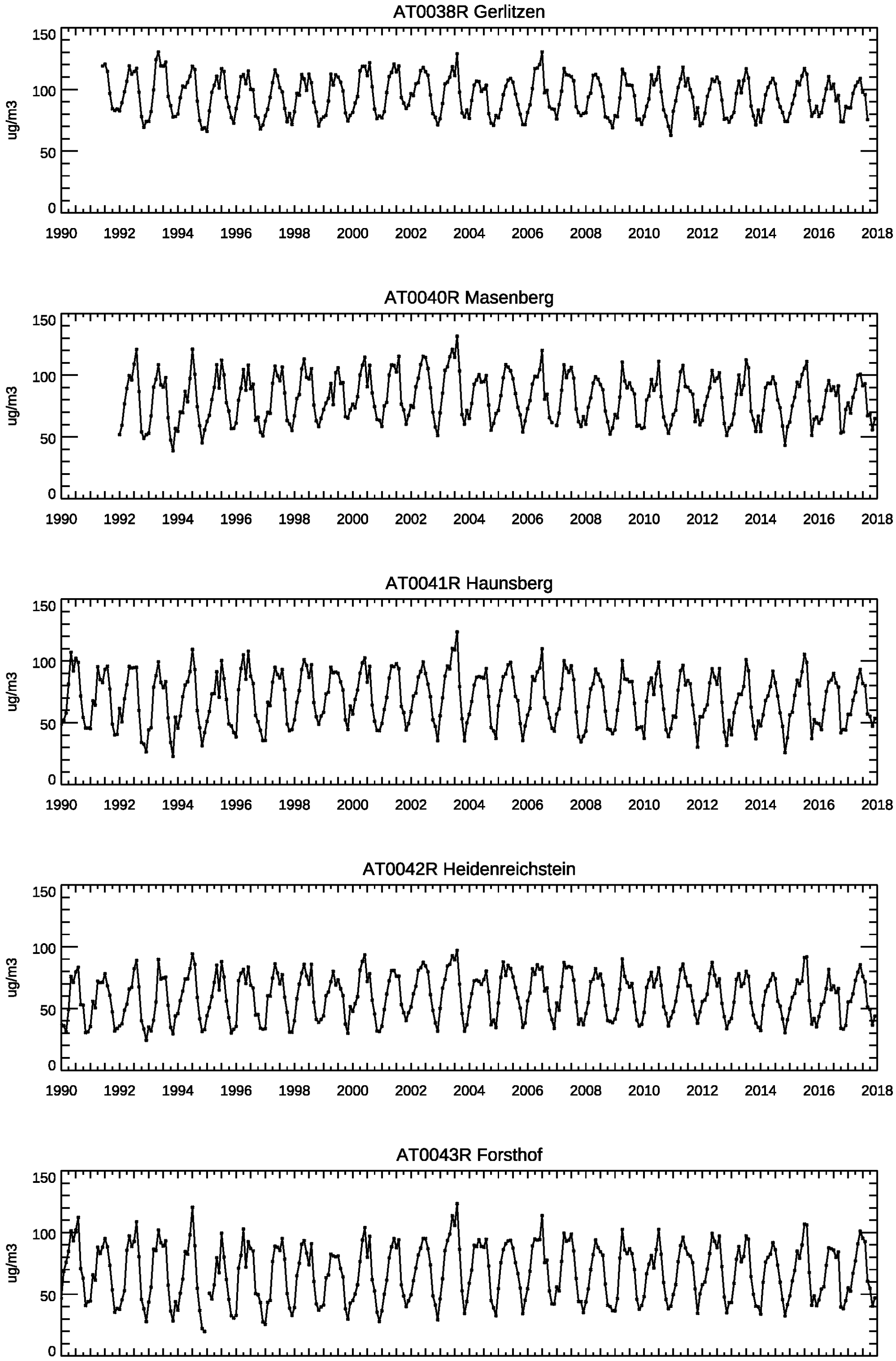


Figure 3.1: Seasonal variation, 1990–2017.



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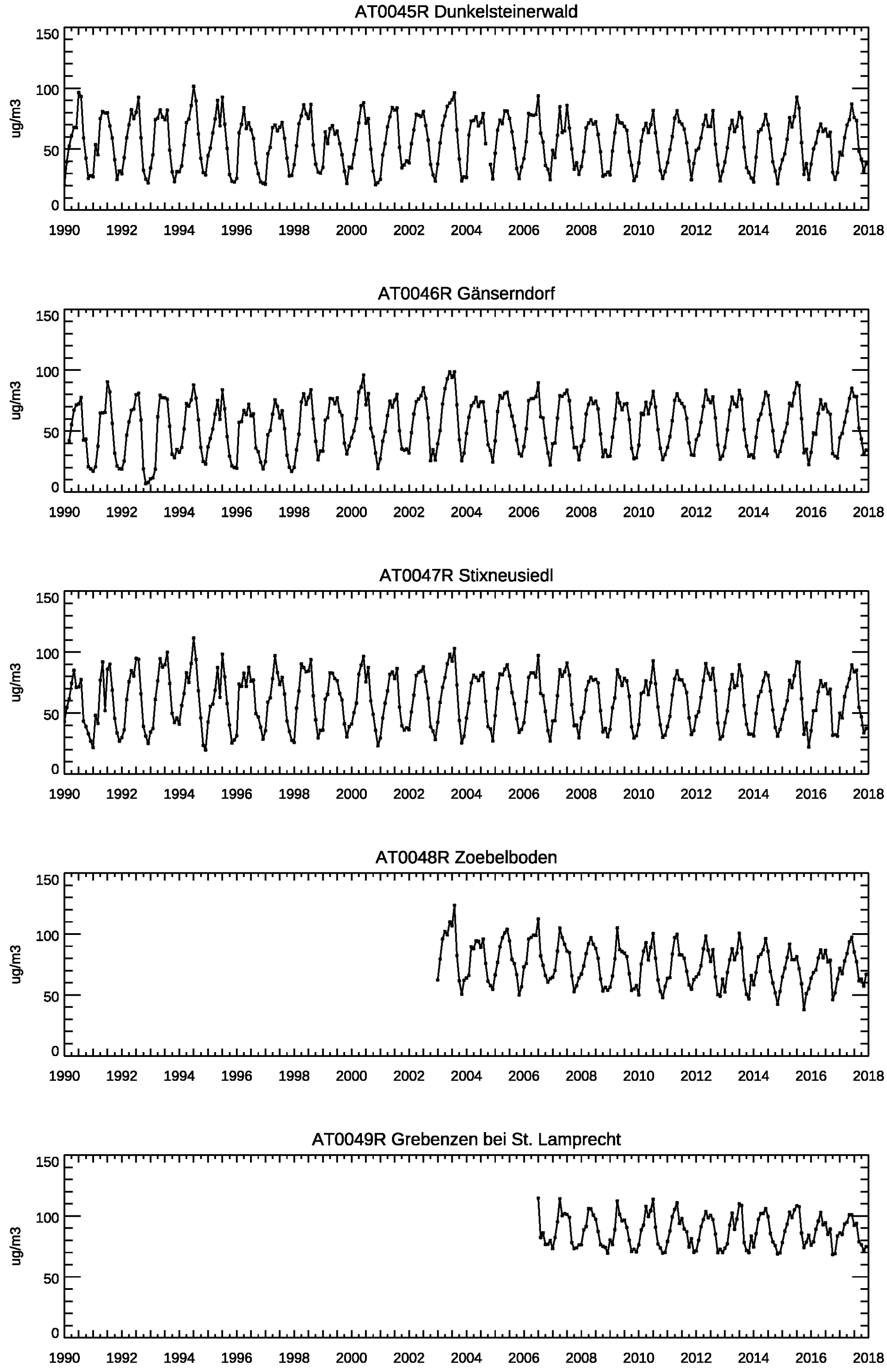

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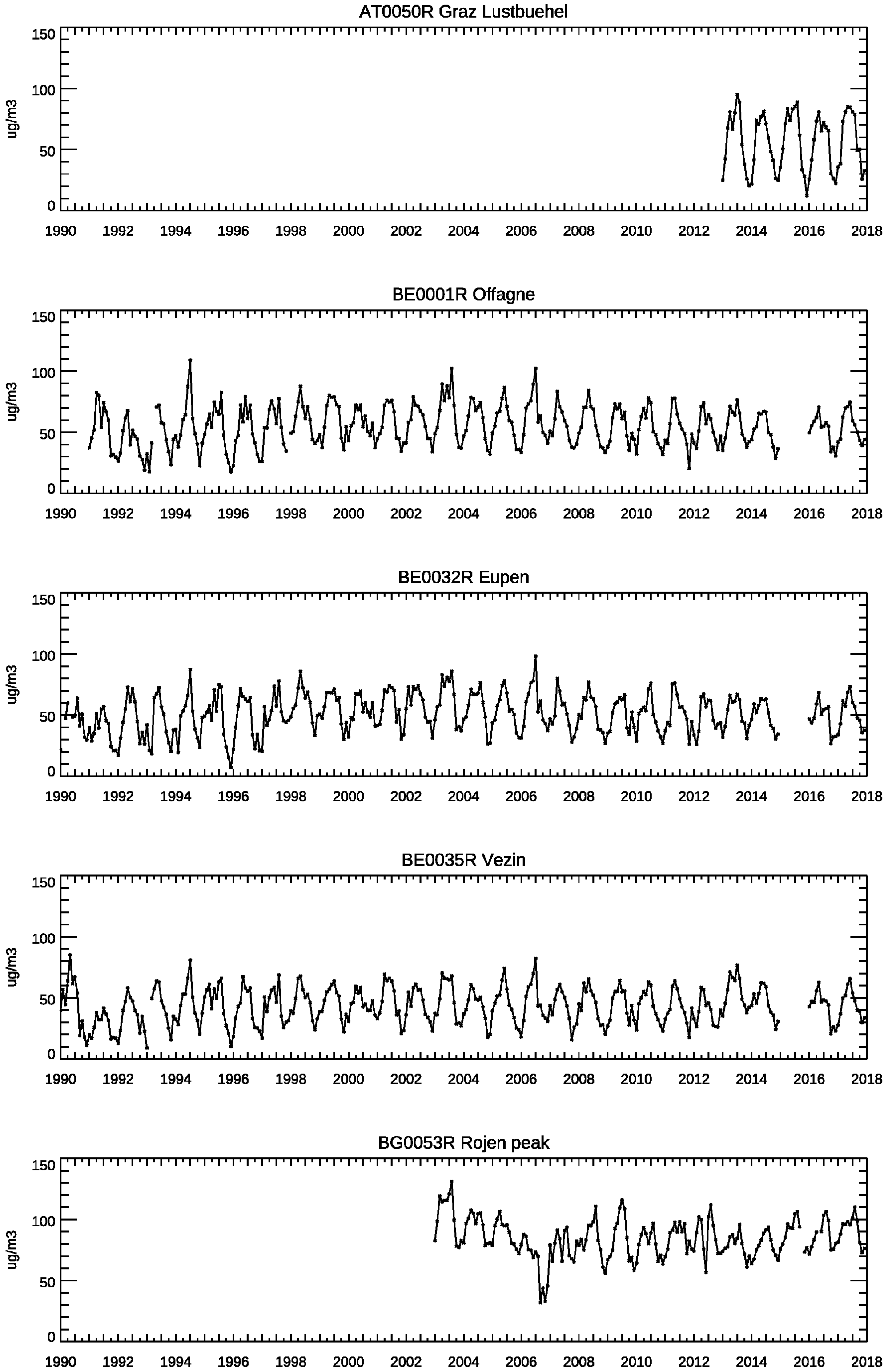

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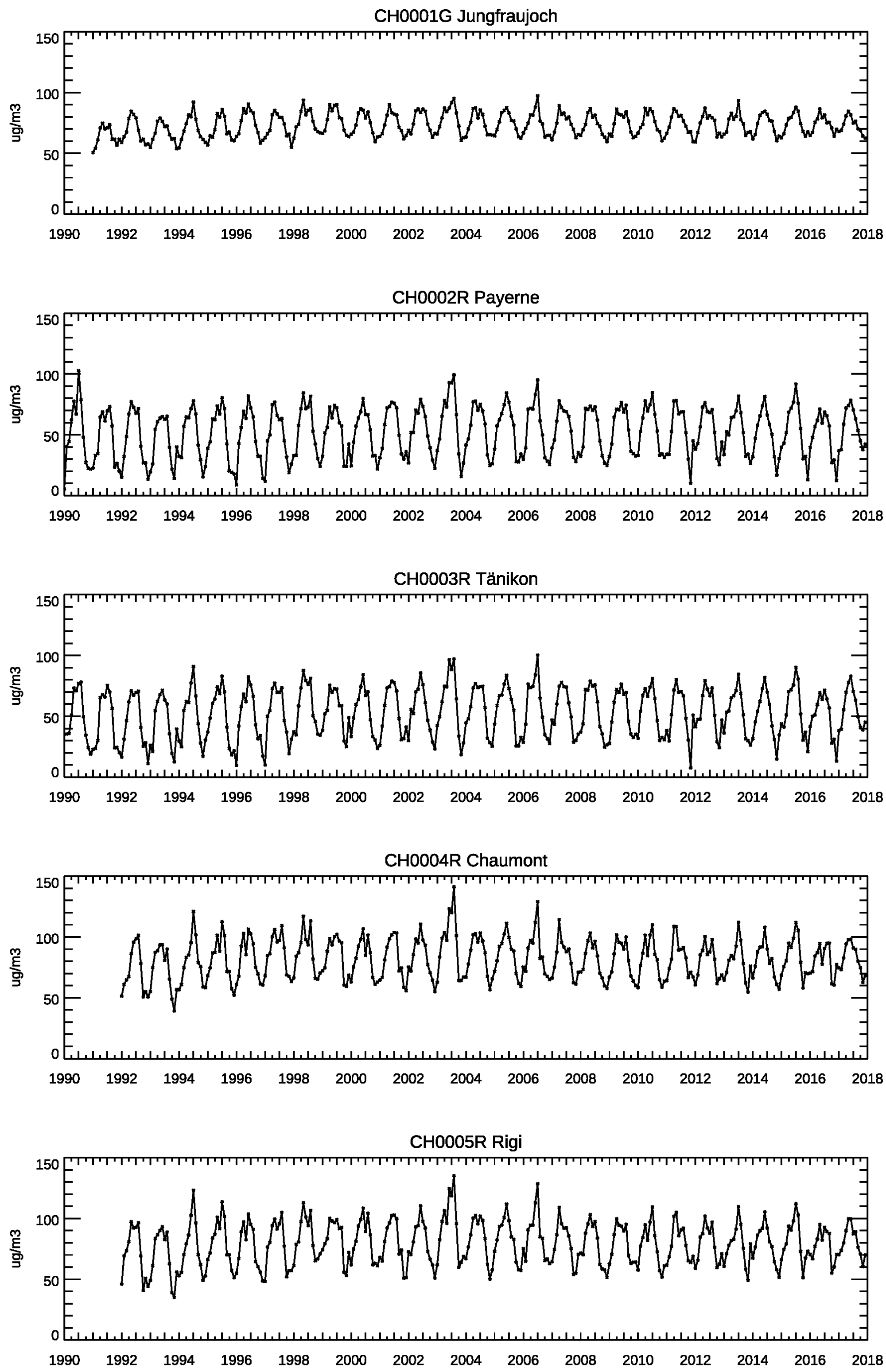

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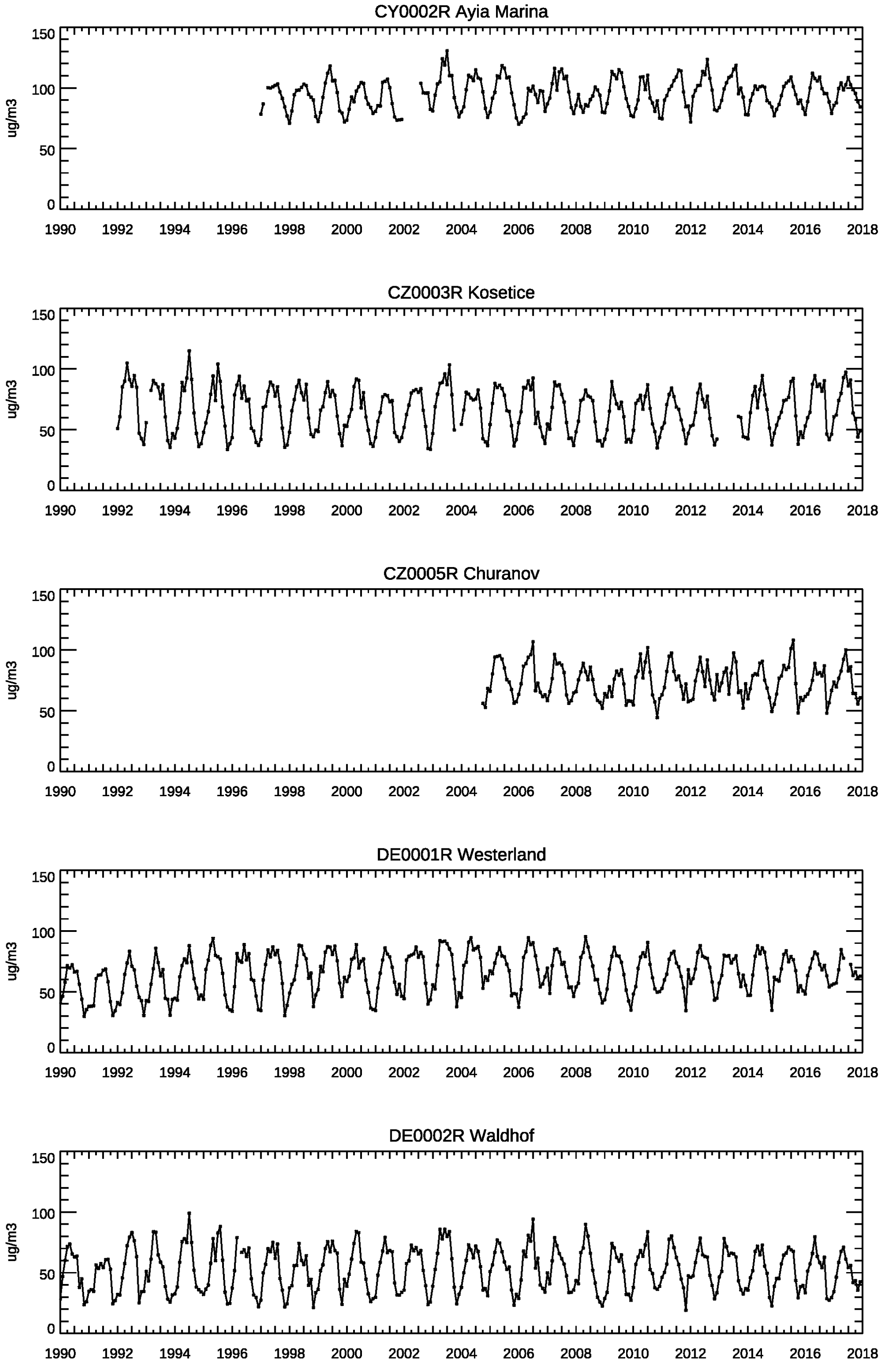

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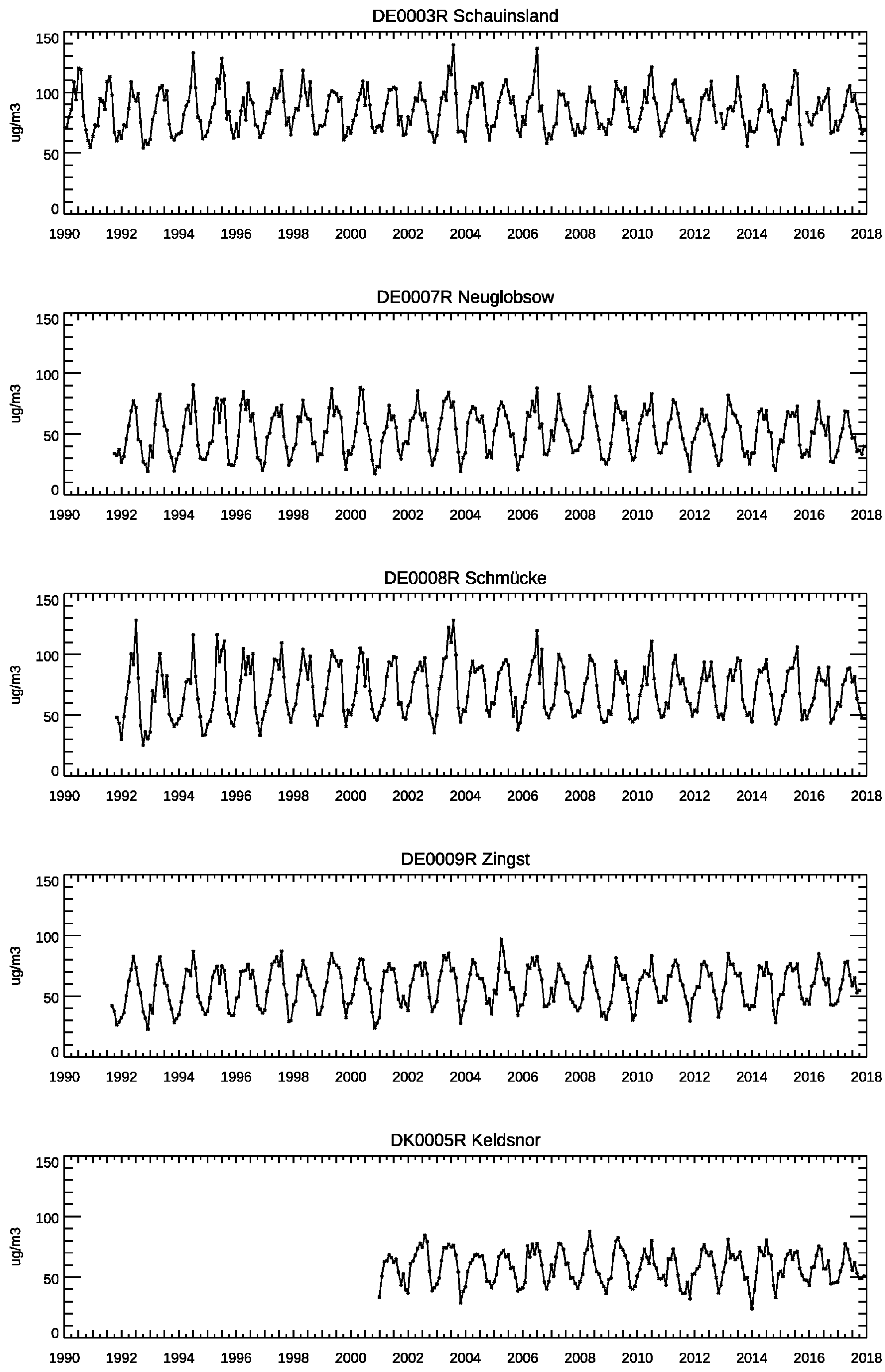

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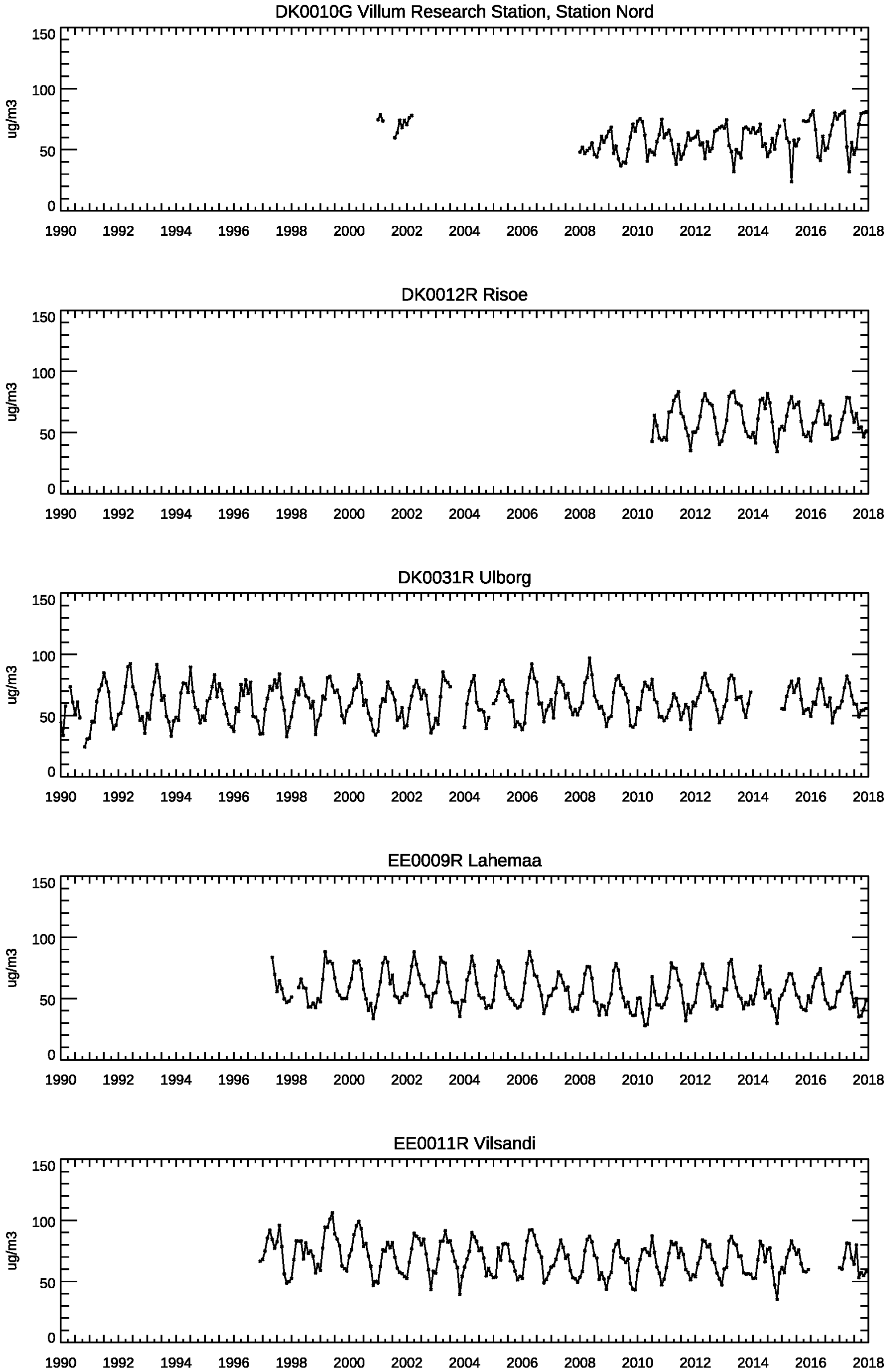

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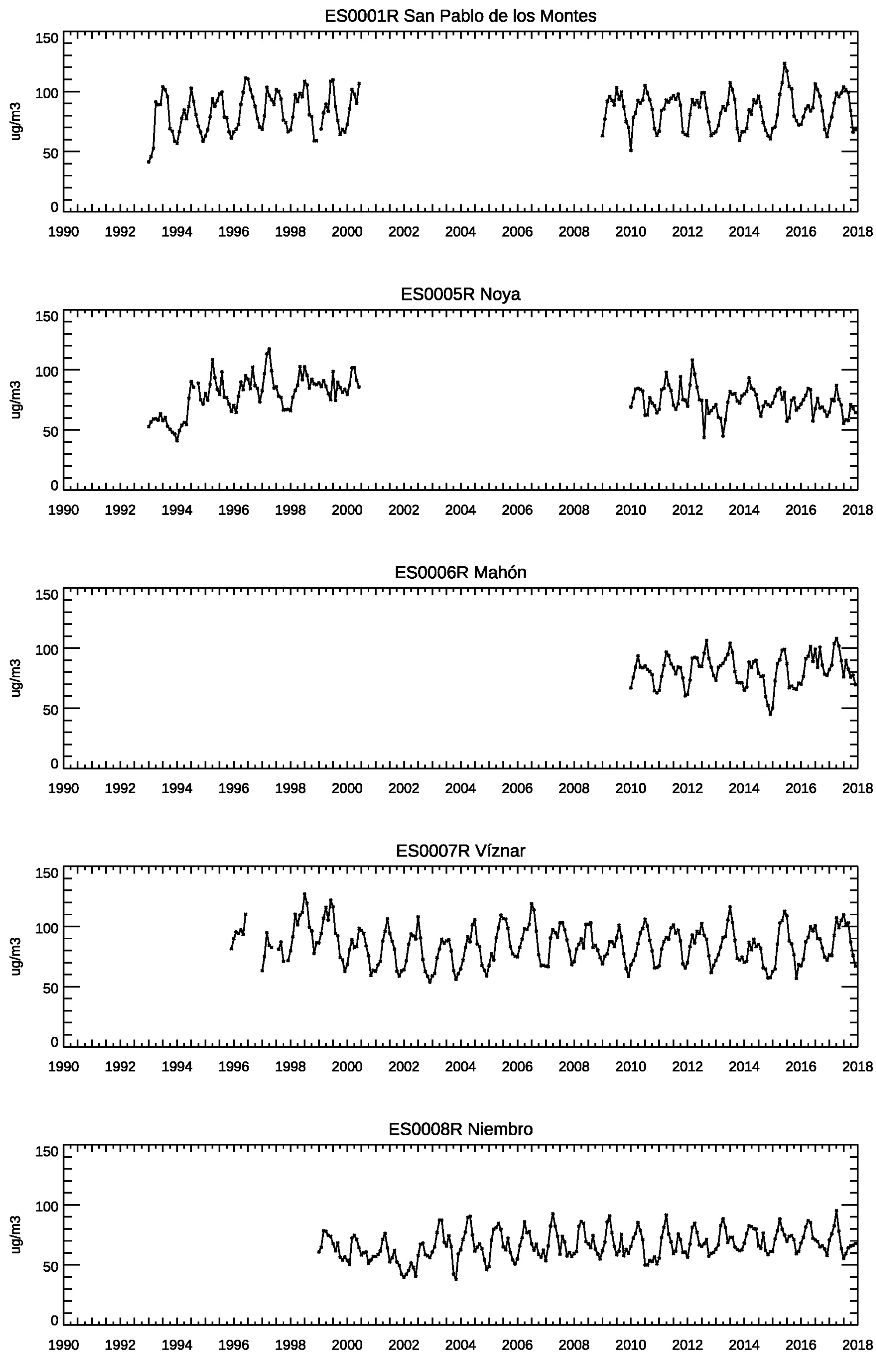

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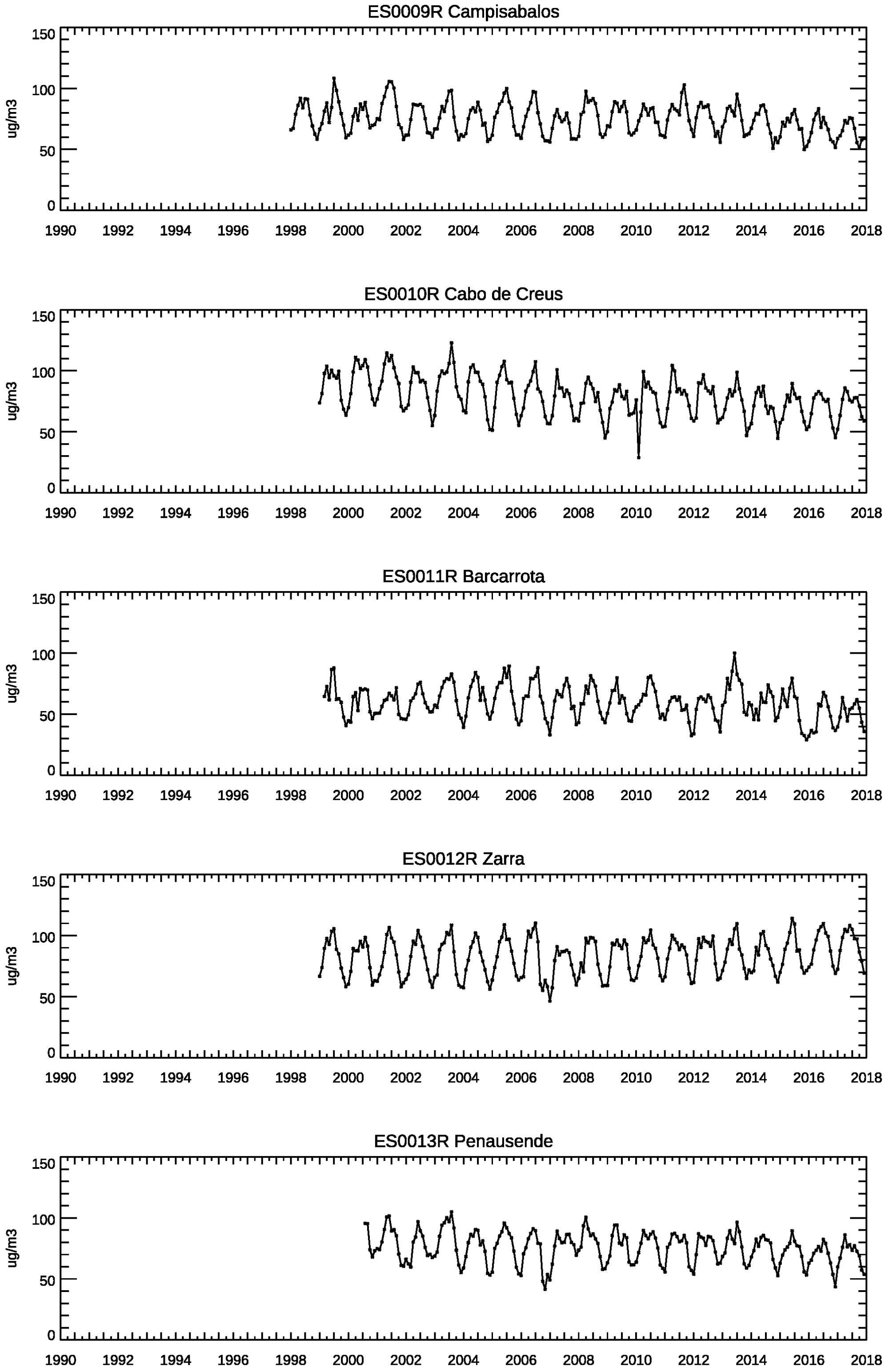

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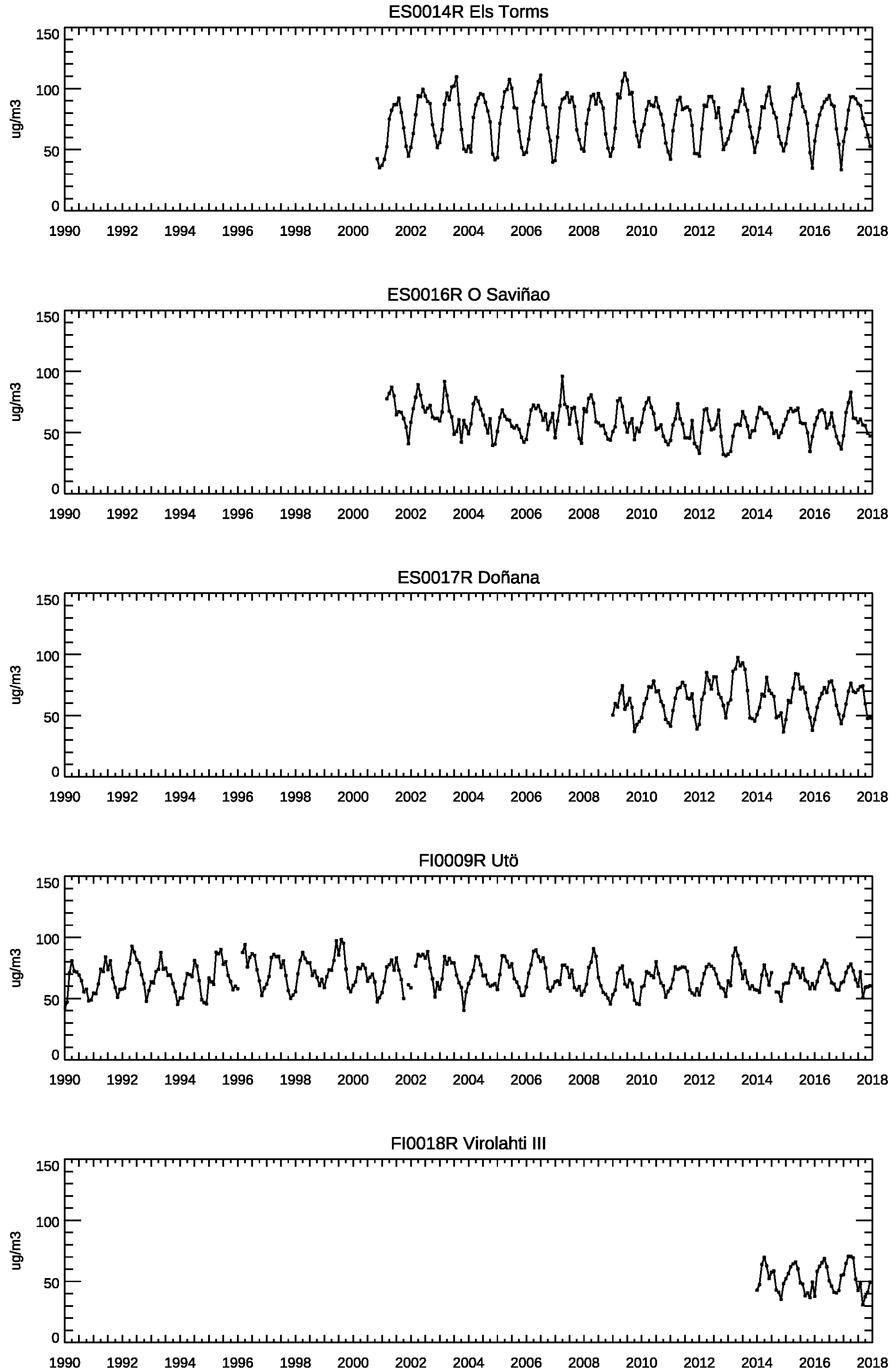

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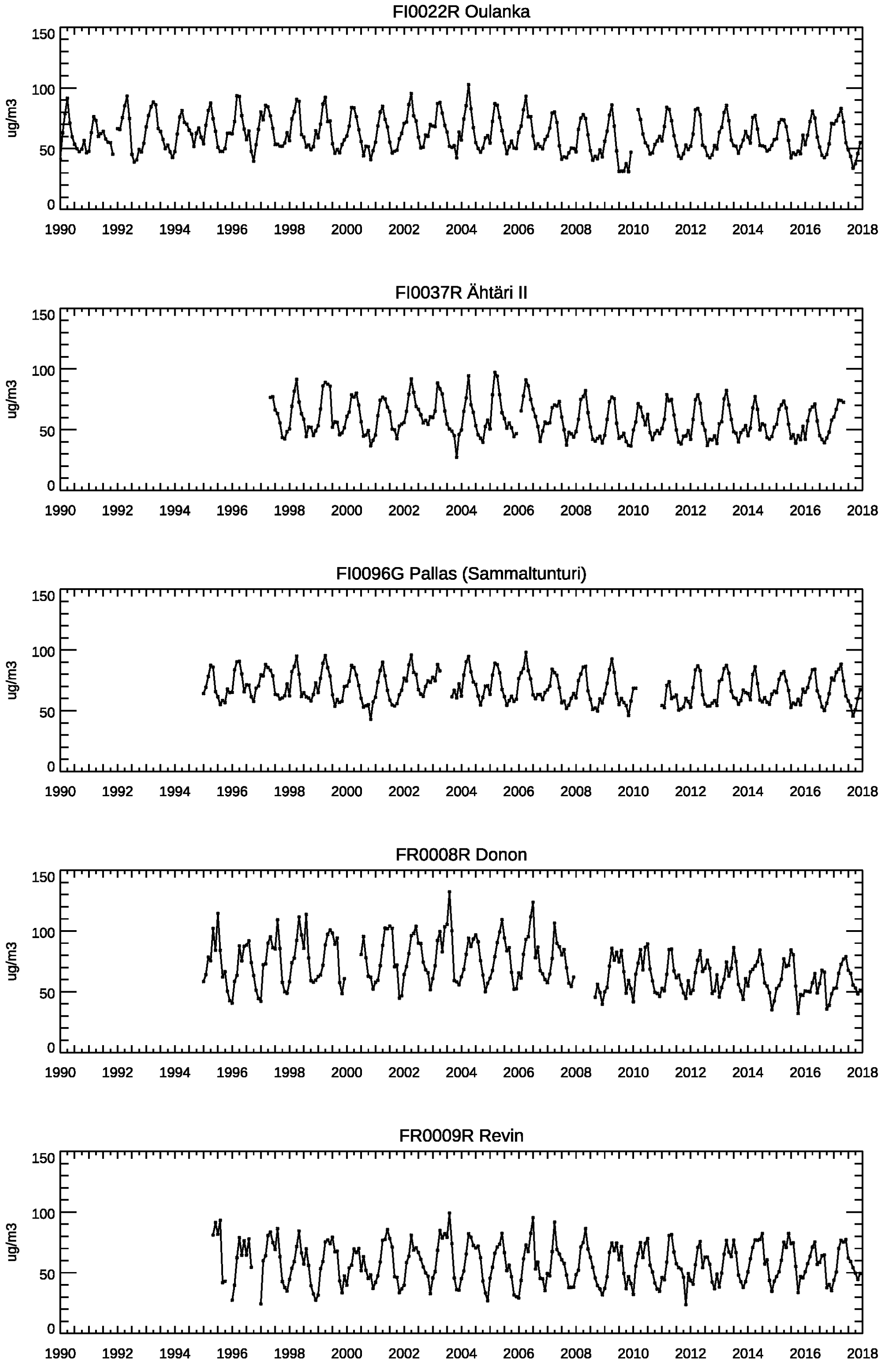

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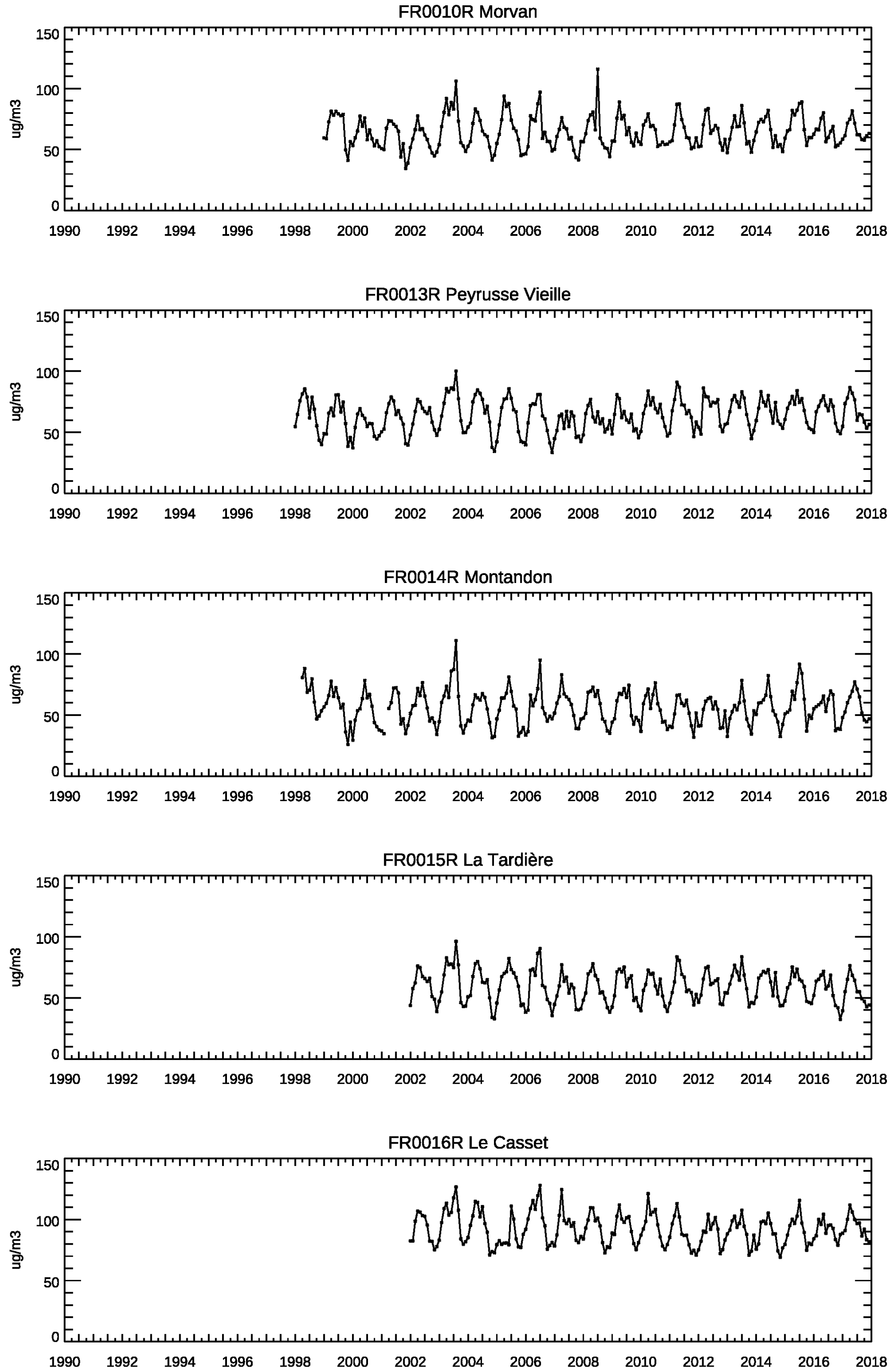

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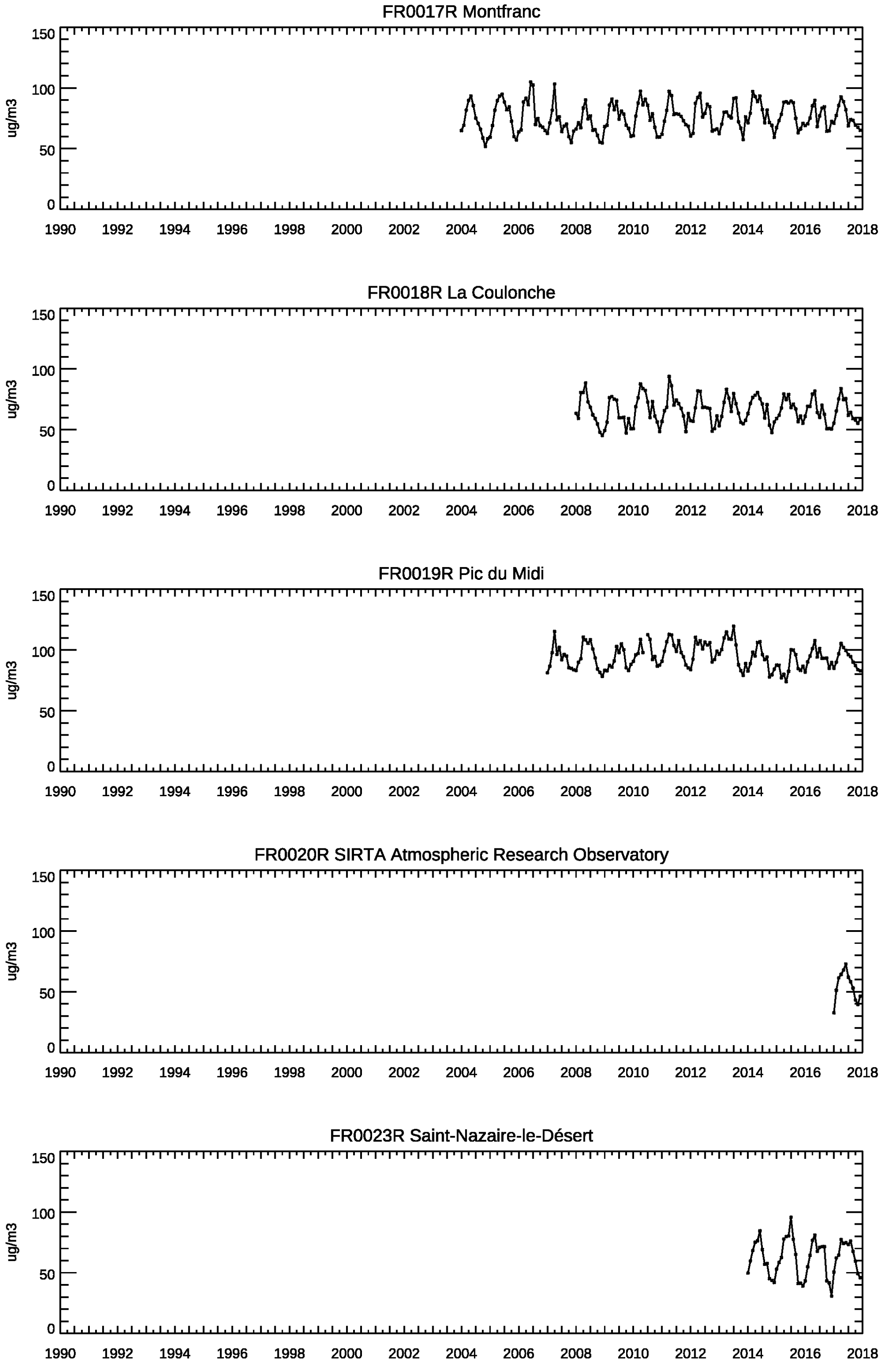

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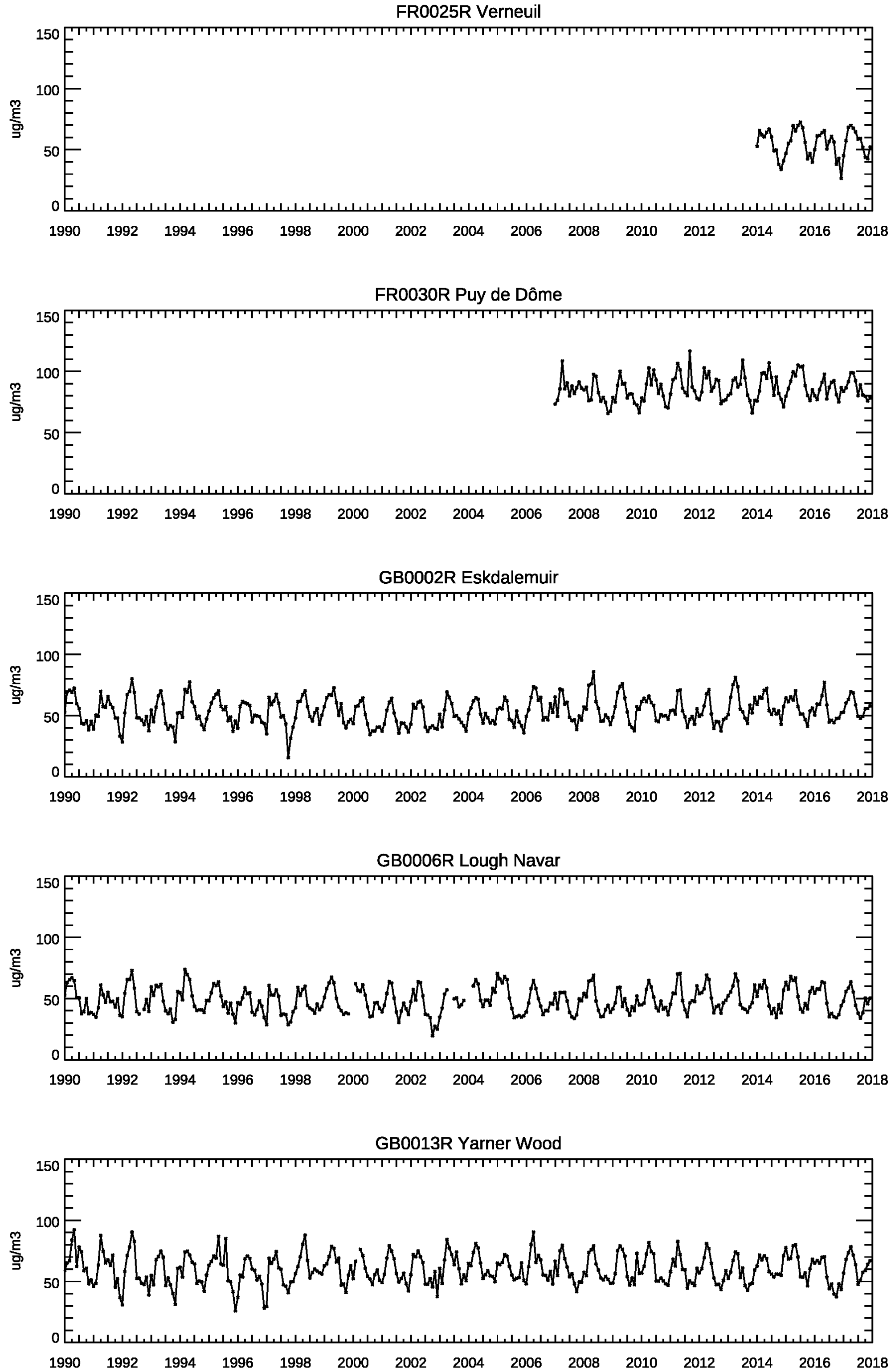

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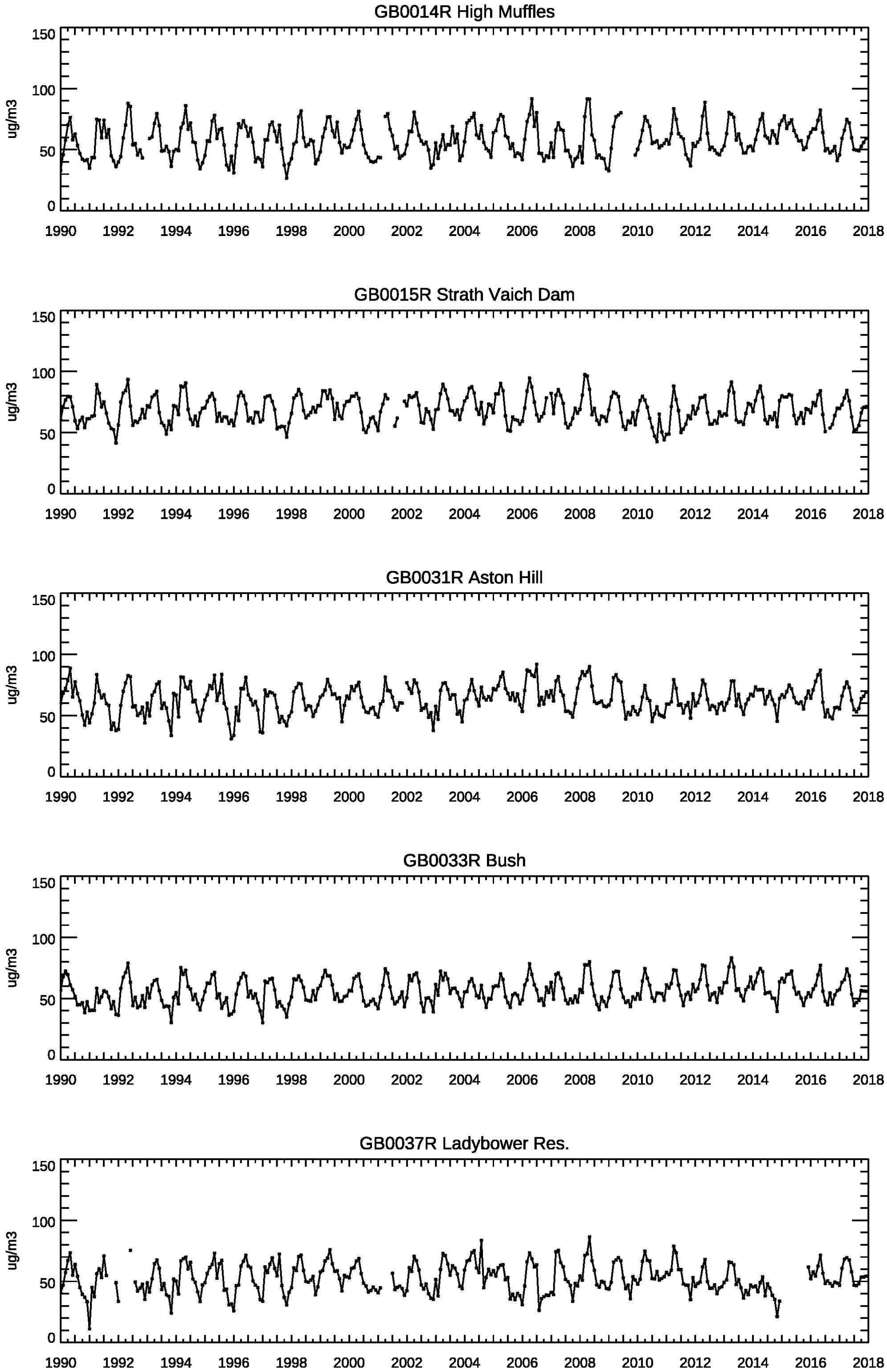

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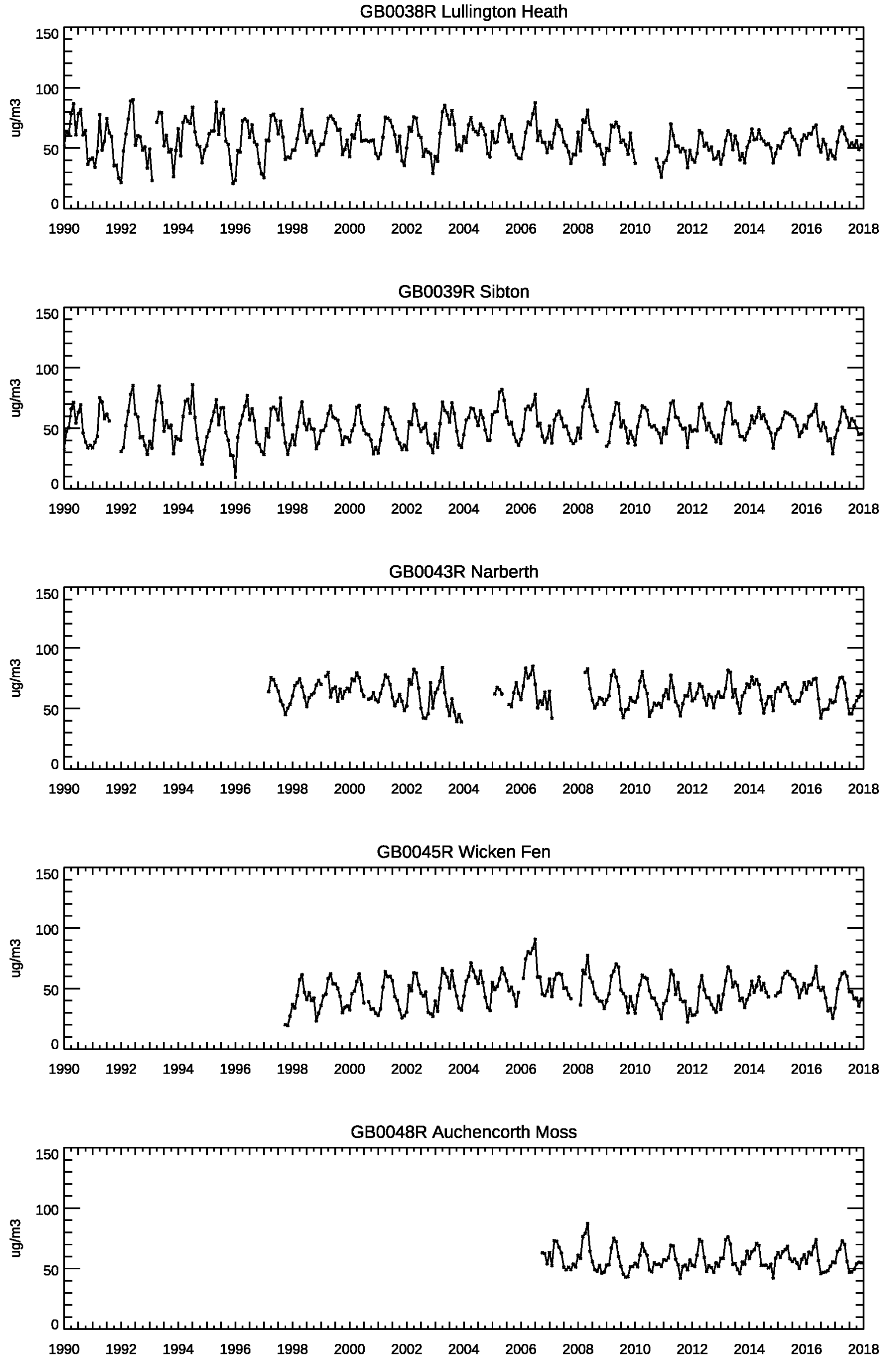

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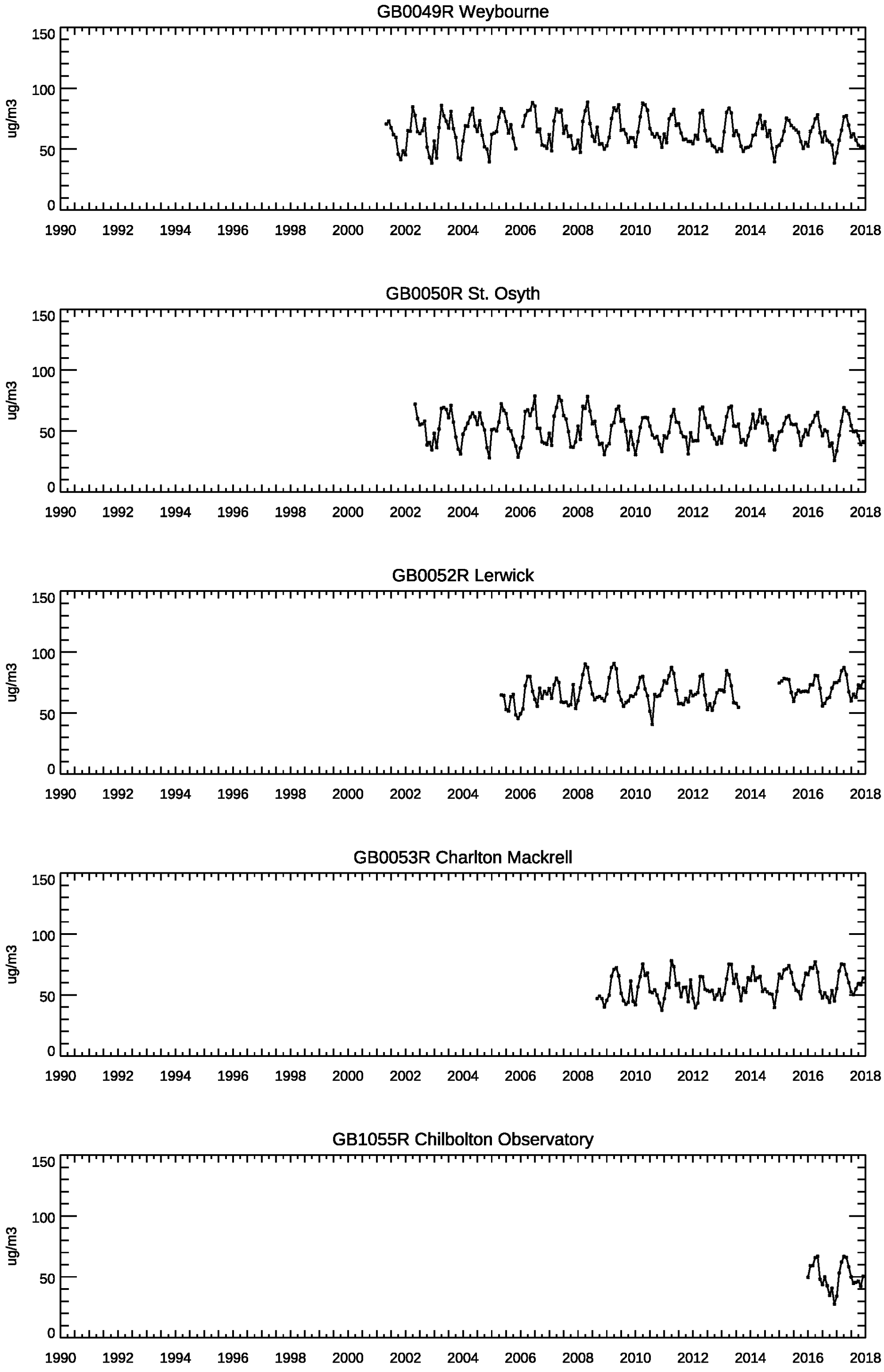

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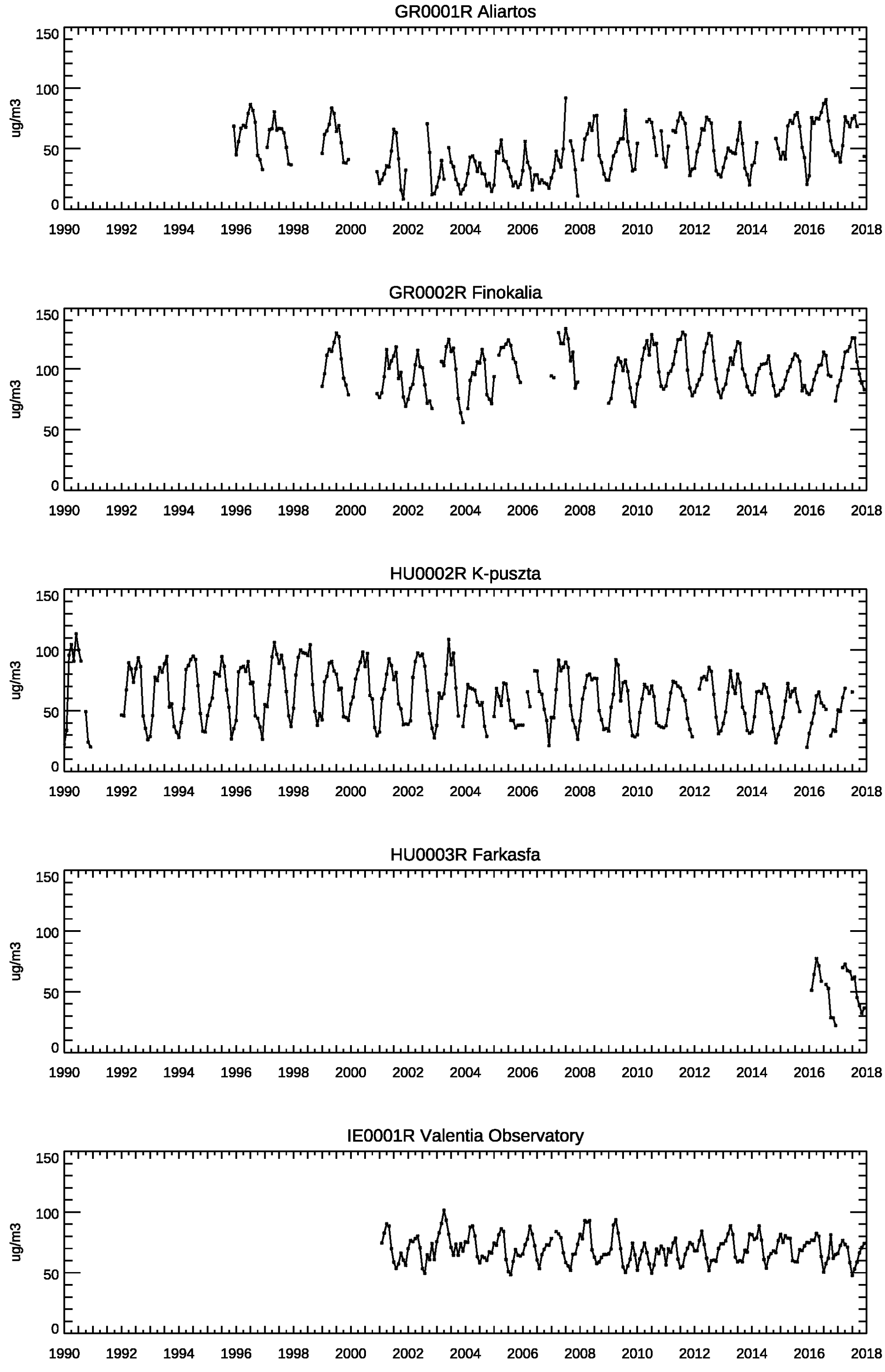

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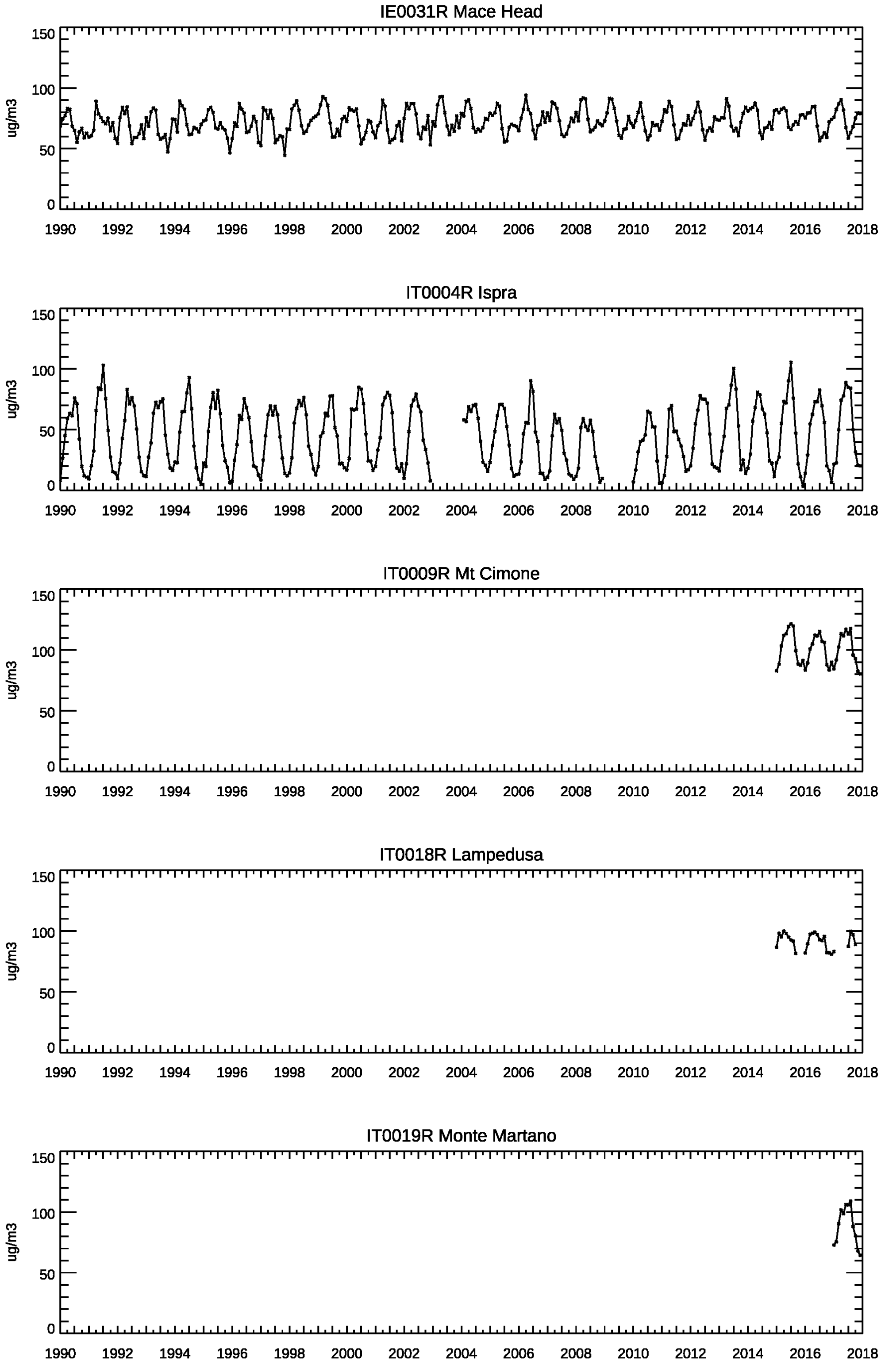

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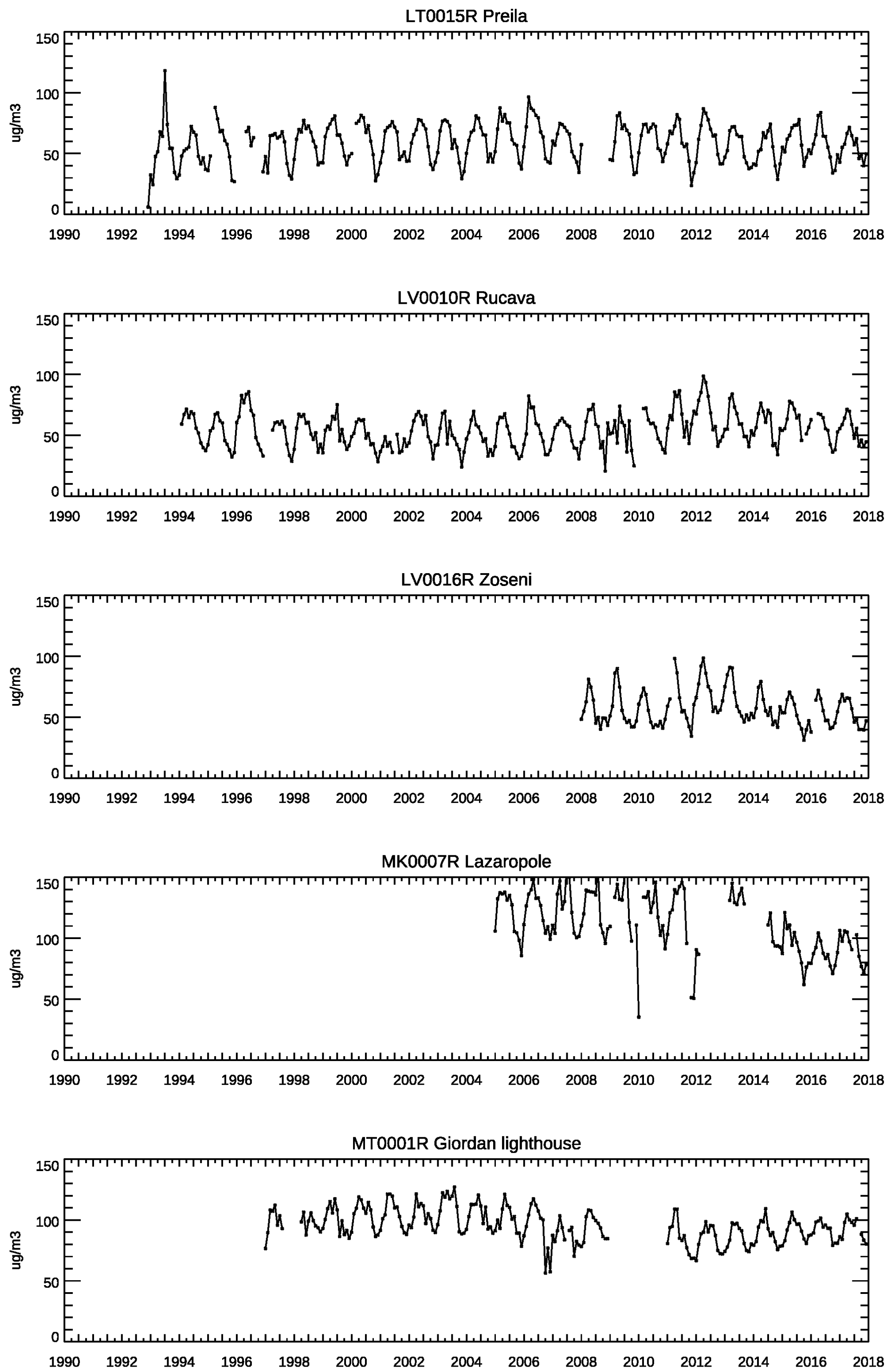

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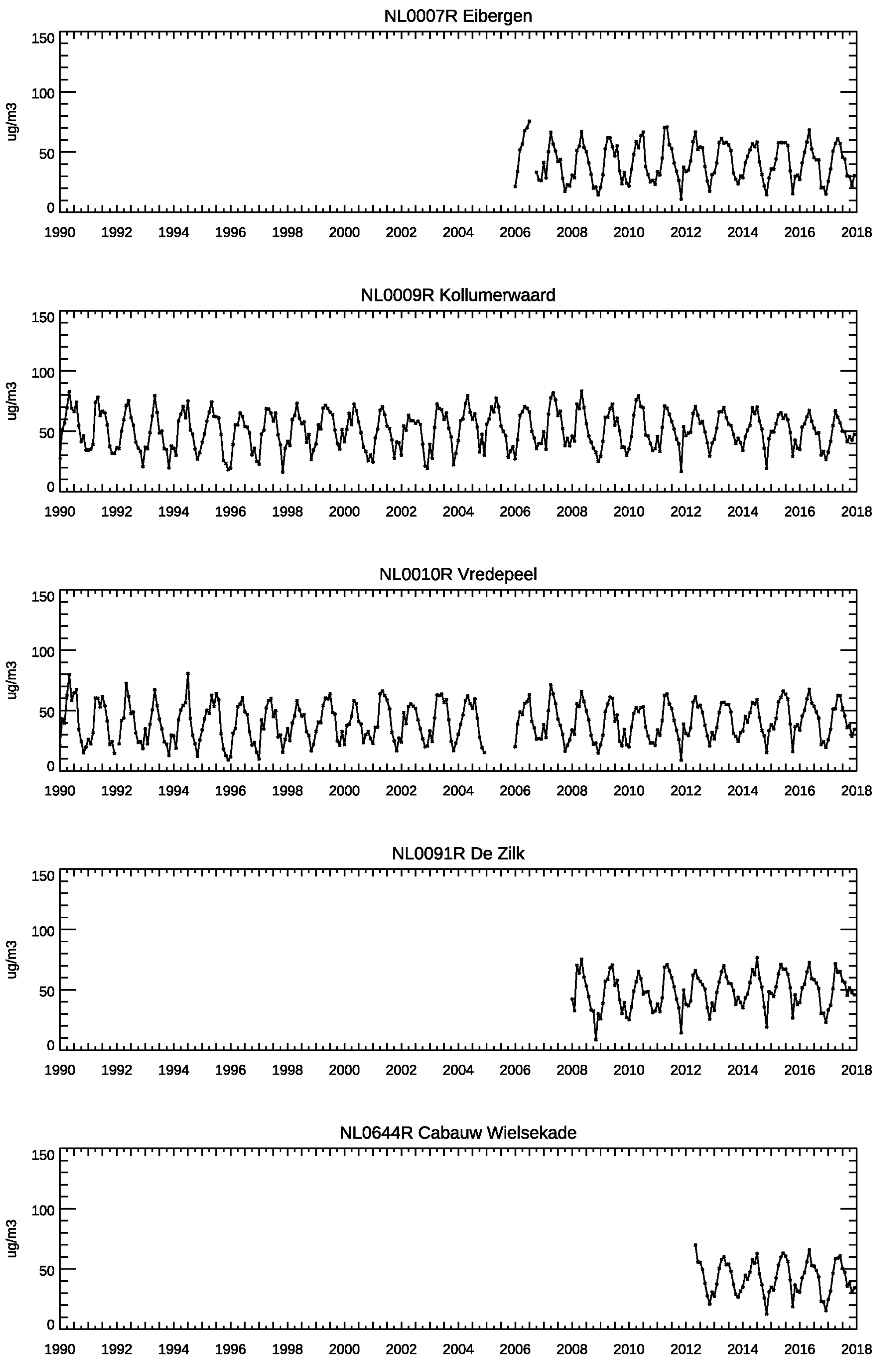

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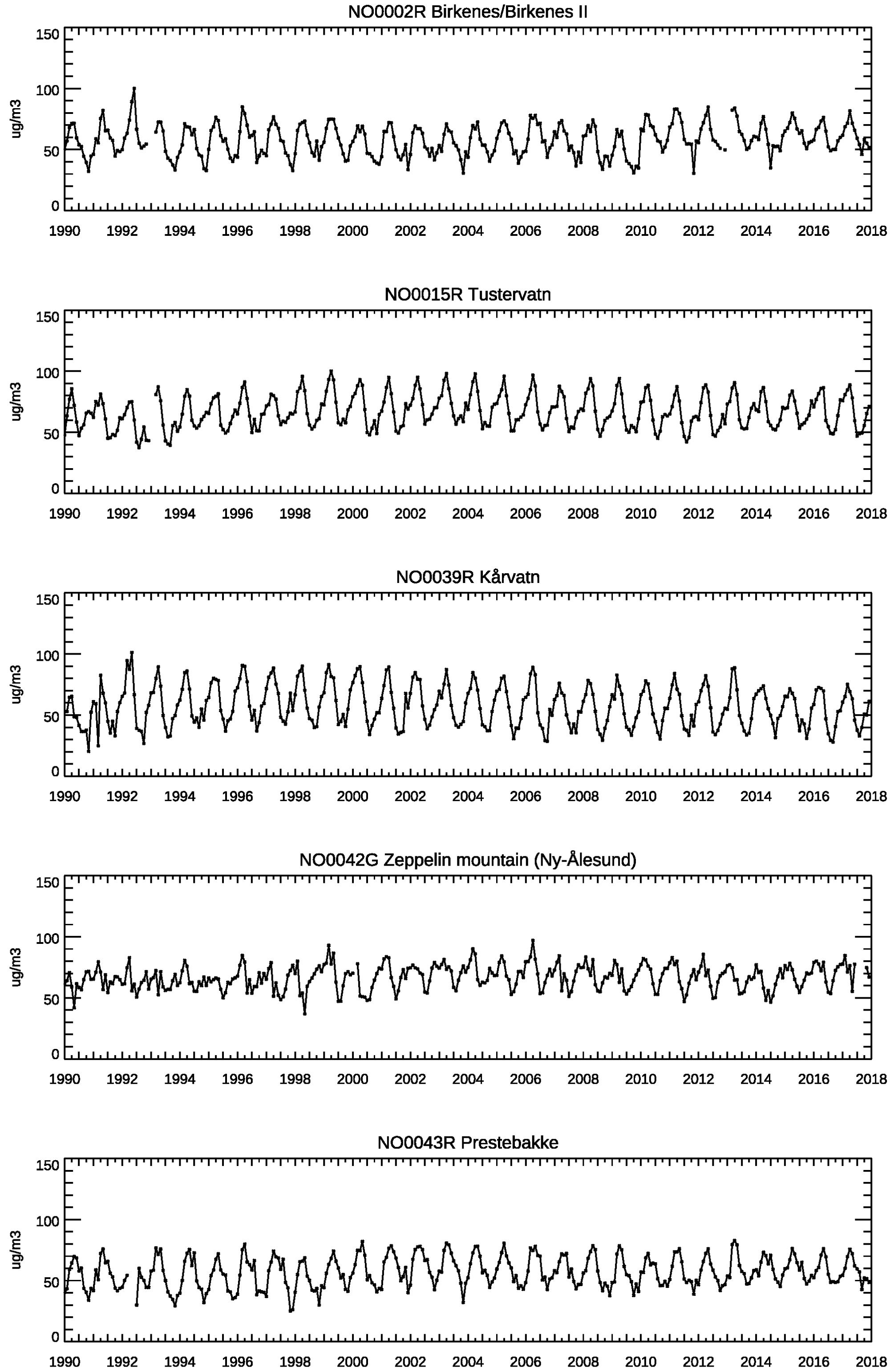

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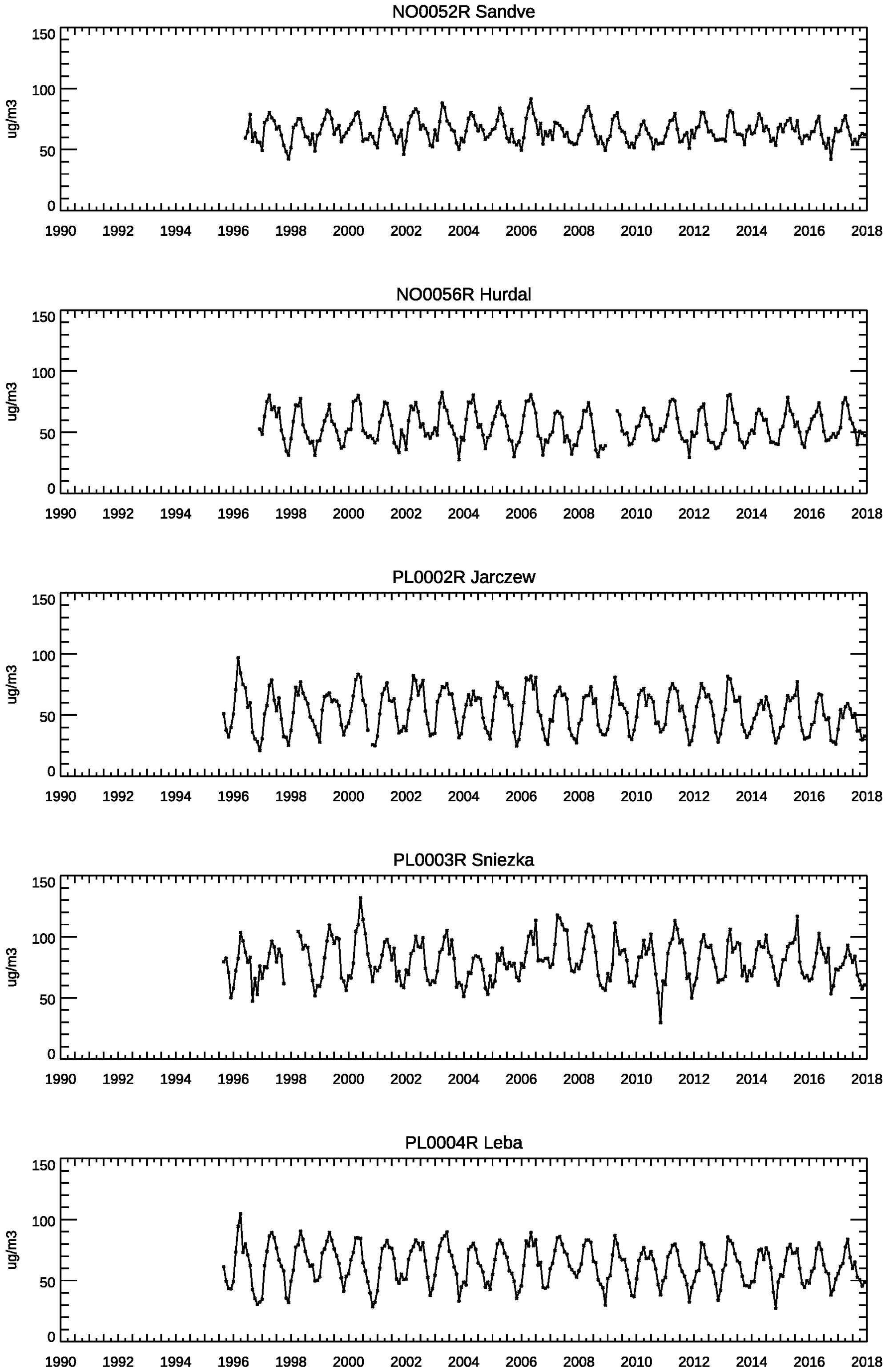

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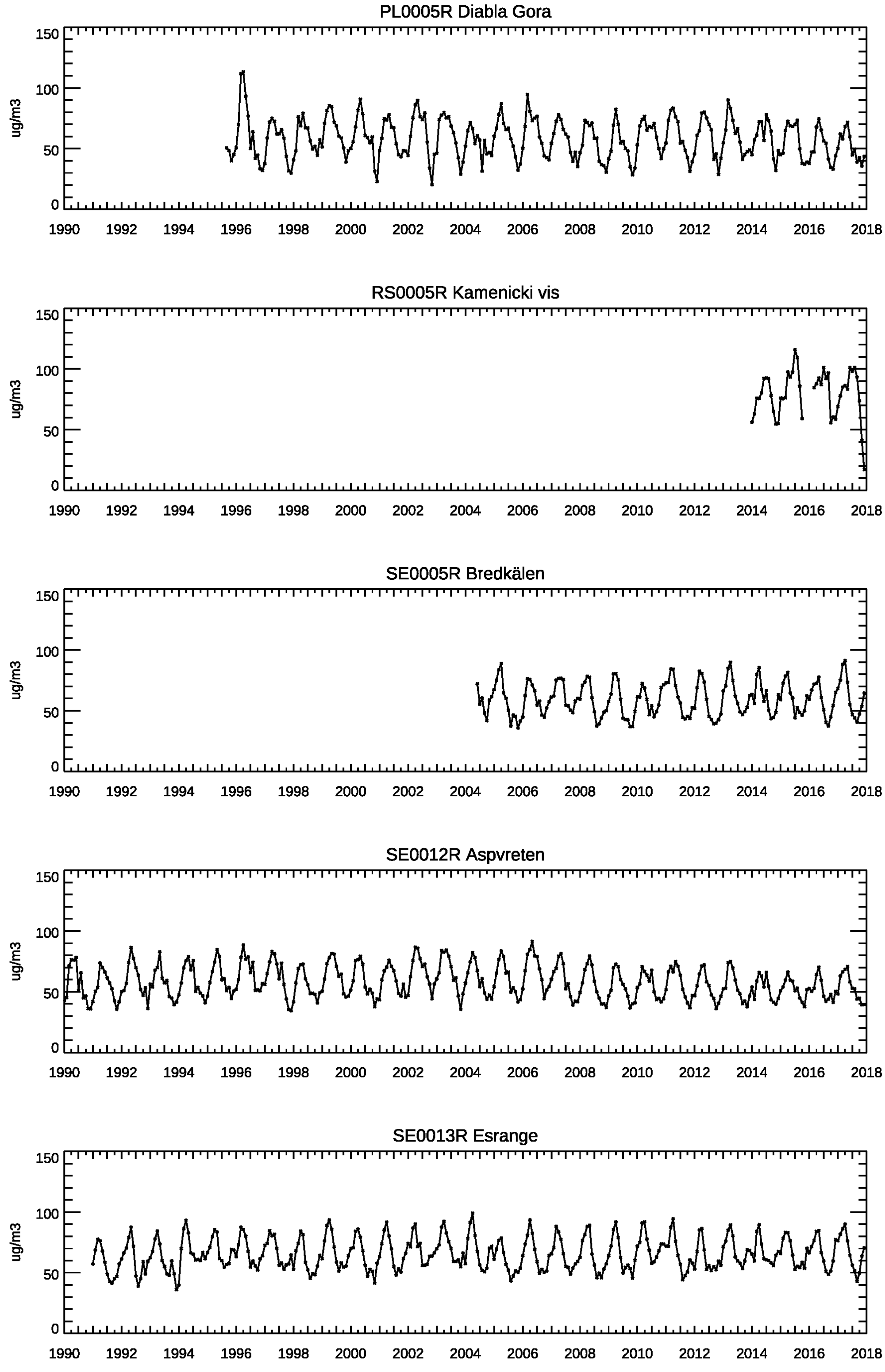

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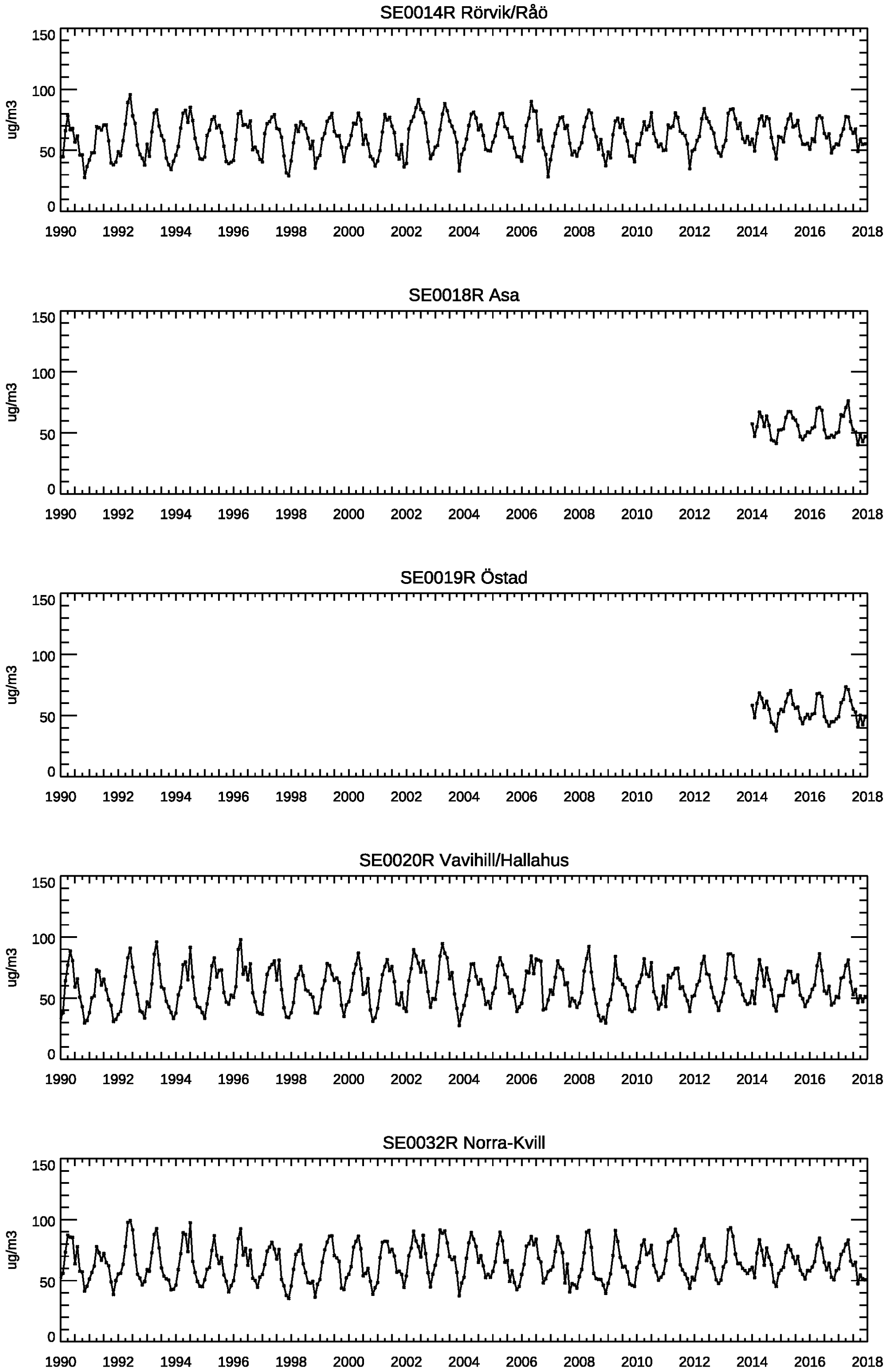

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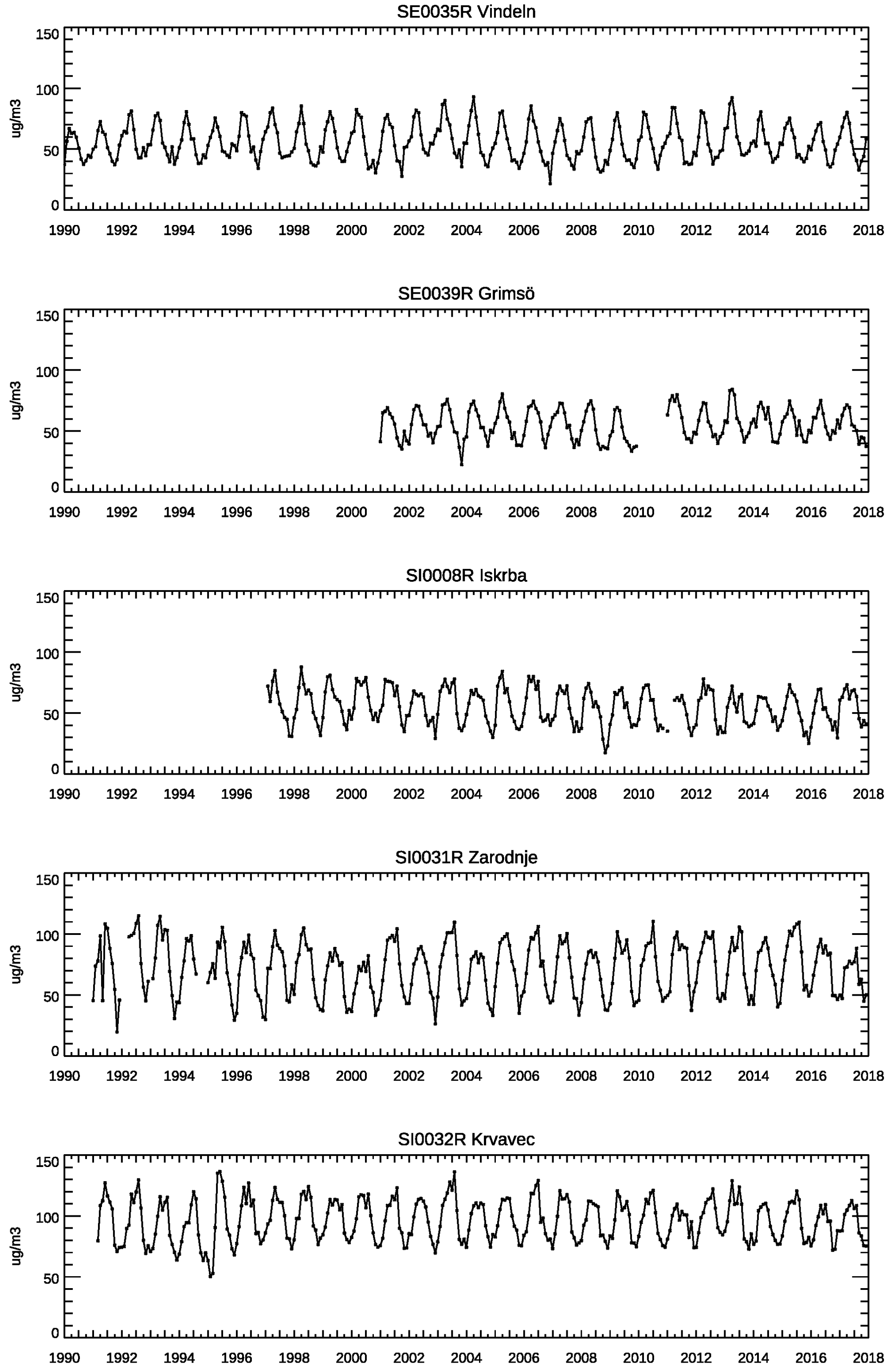

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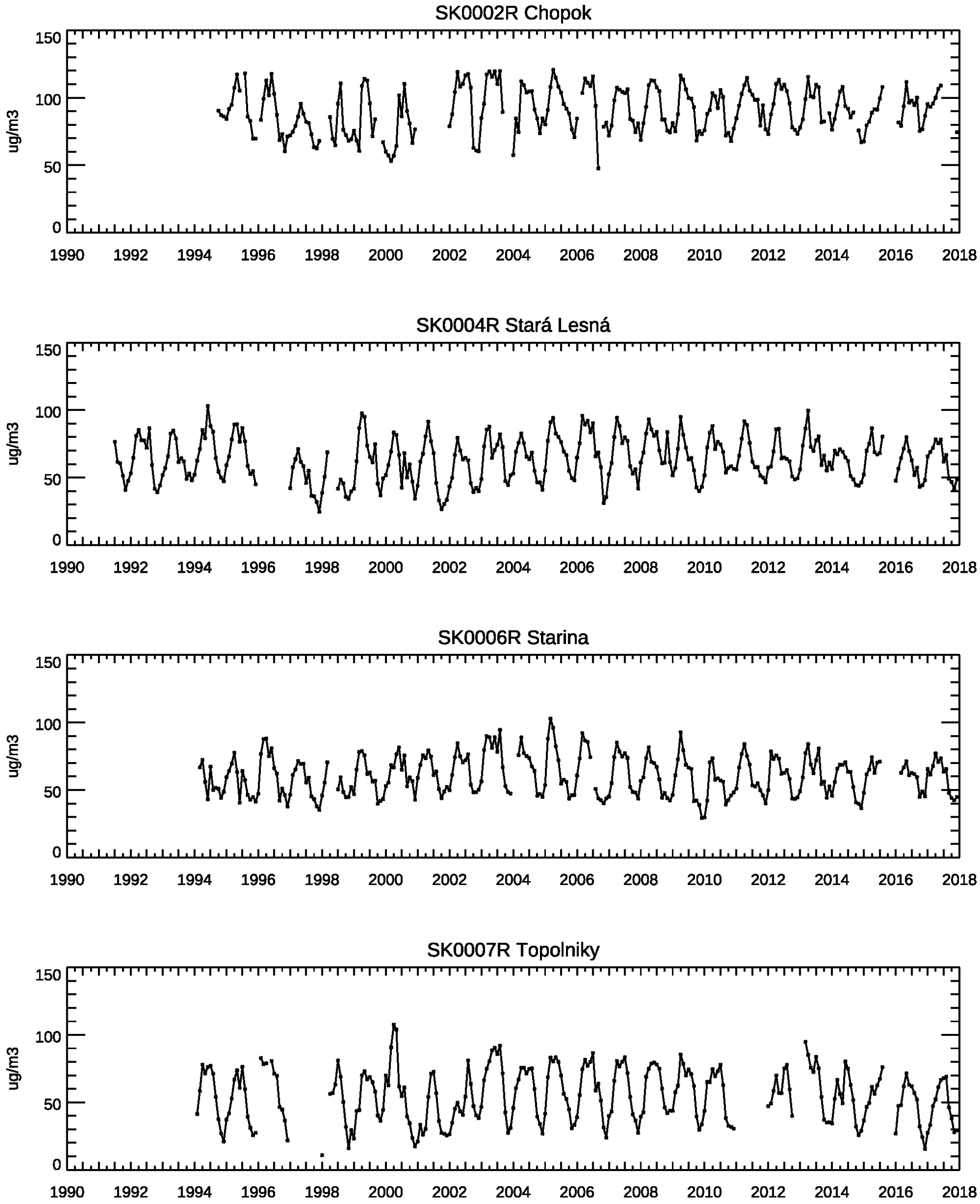


Figure 3.1, cont.

Annex 4

Diurnal variation,
April–September 2017

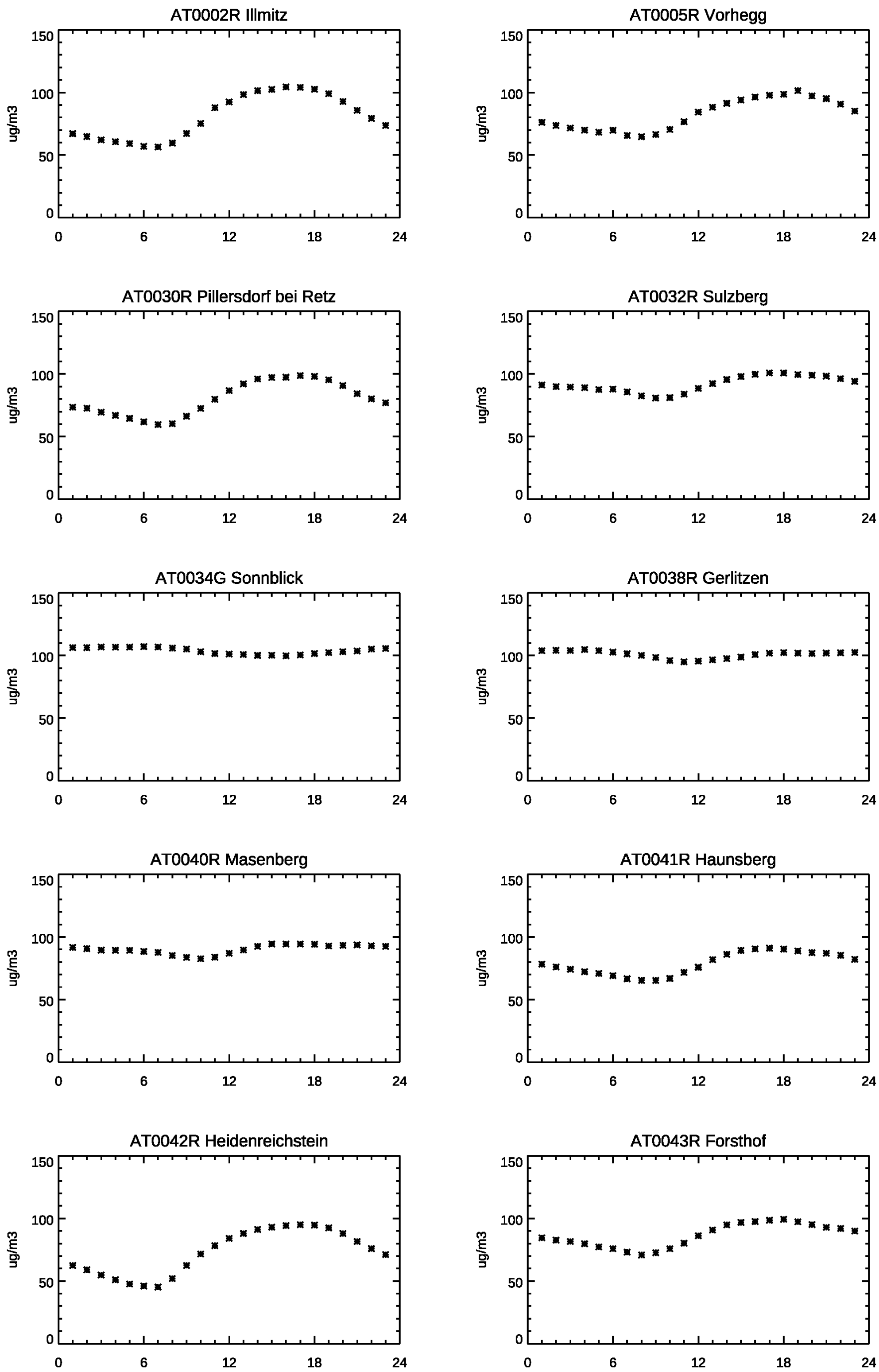


Figure 4.1: Diurnal variation, April–September 2017.

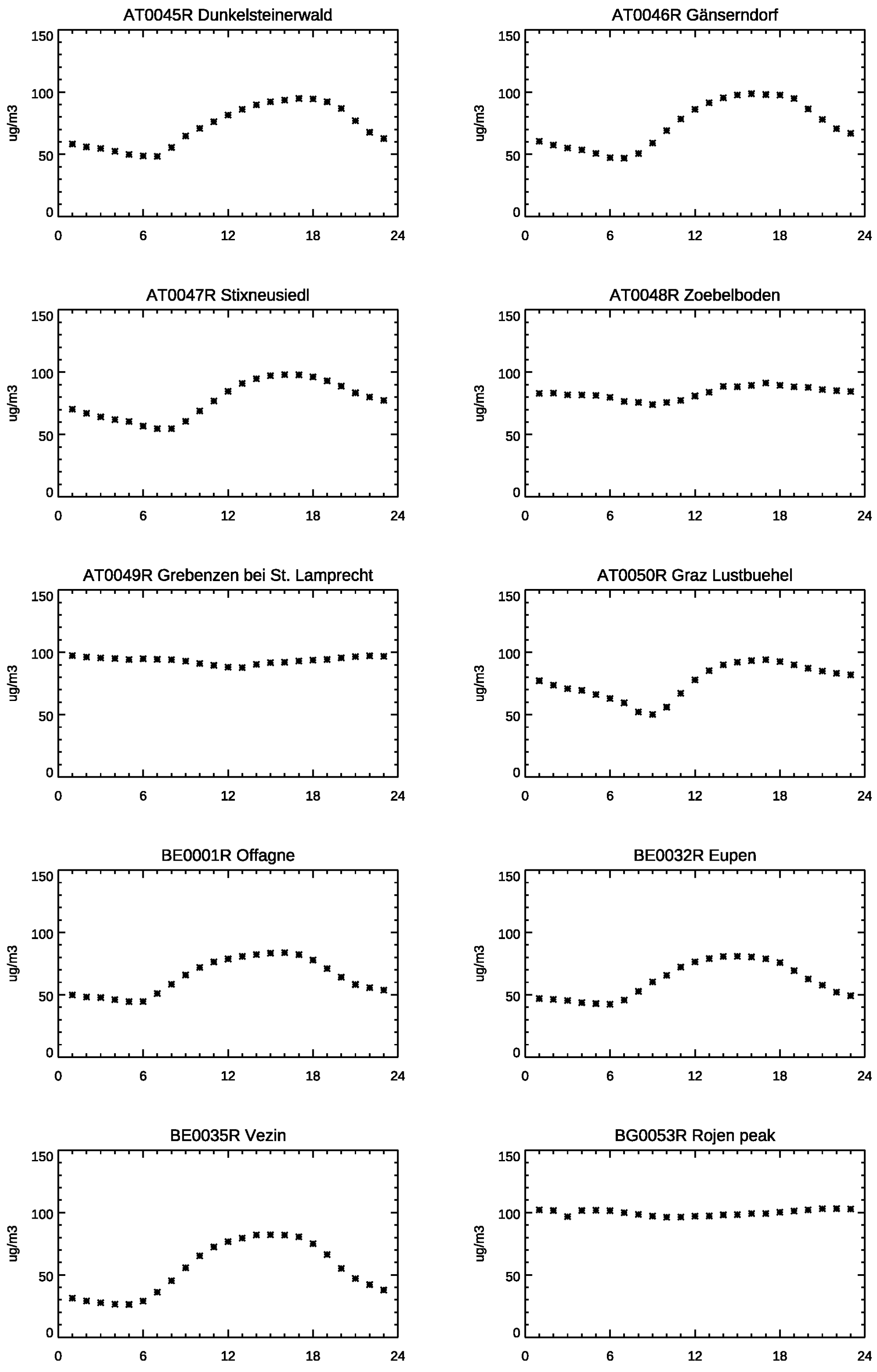


Figure 4.1, cont.

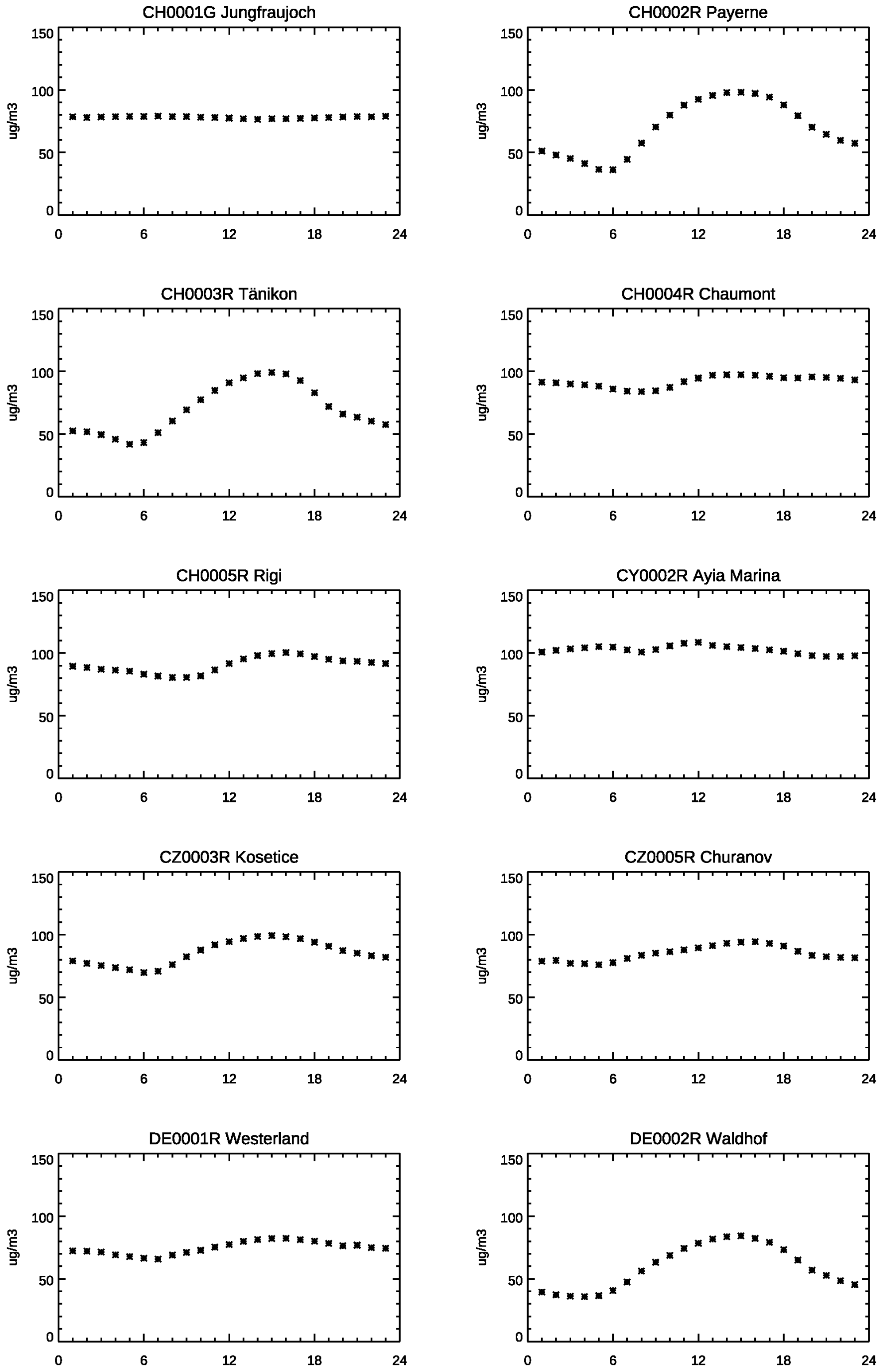
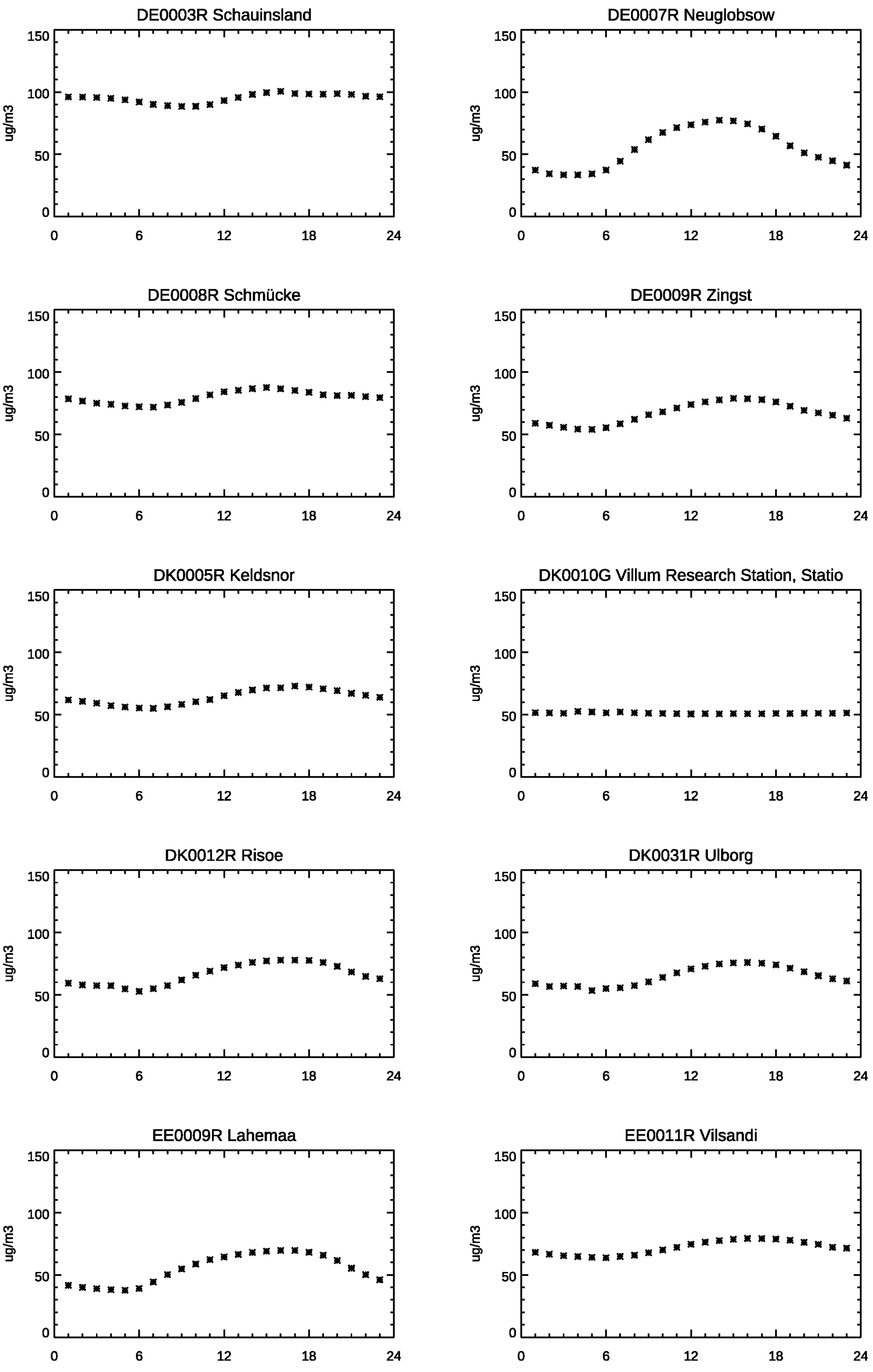


Figure 4.1, cont.



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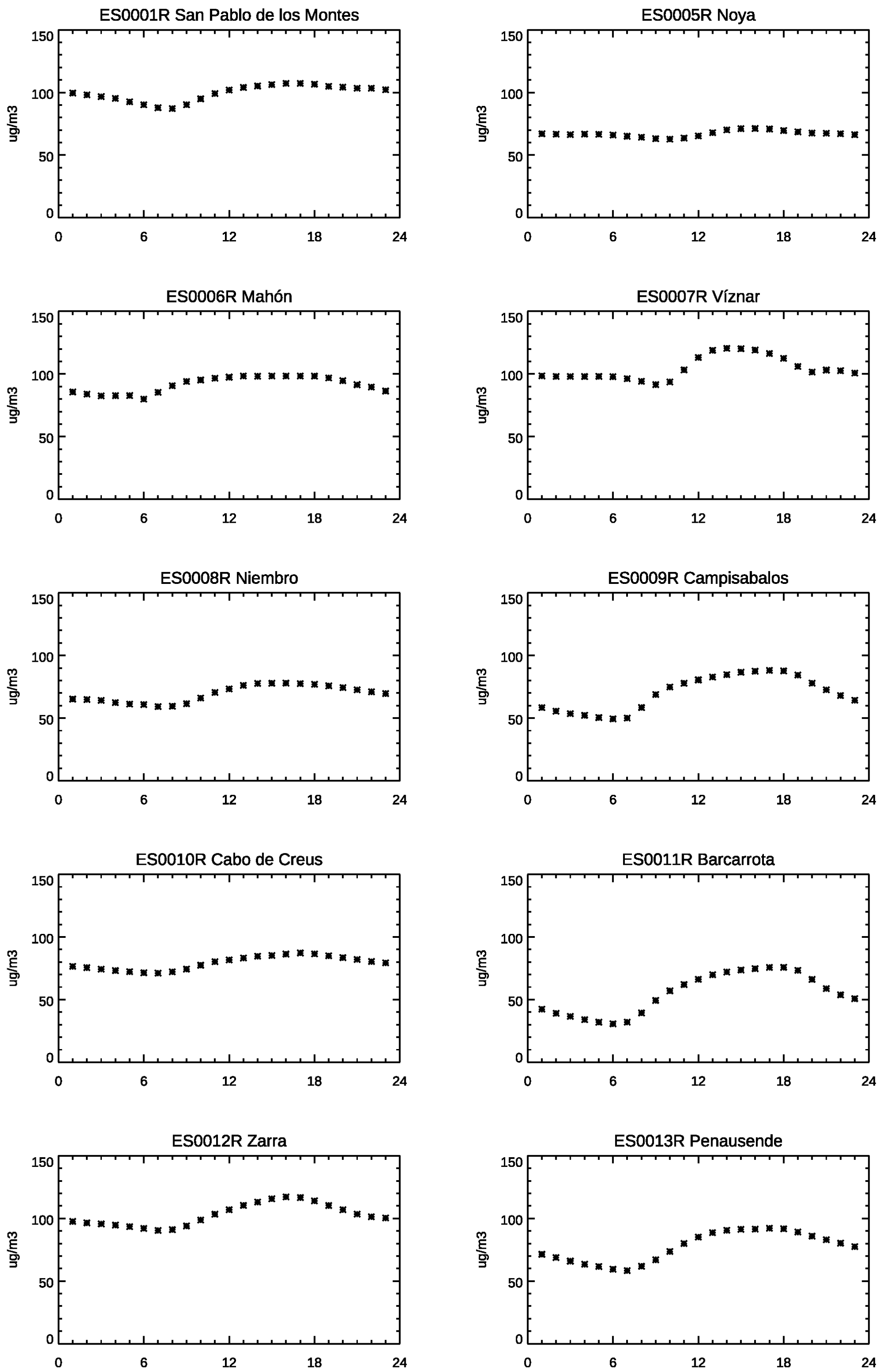

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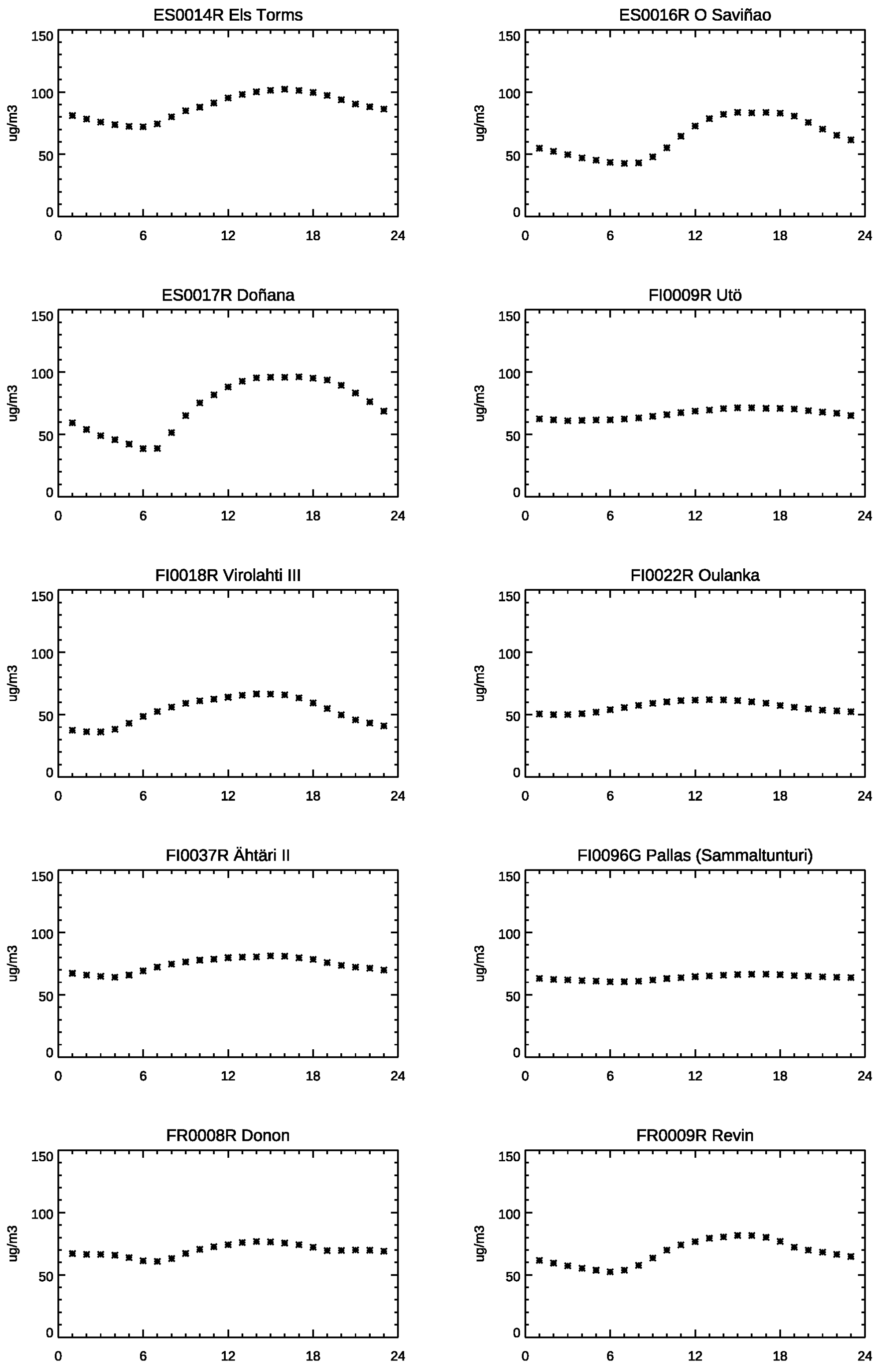

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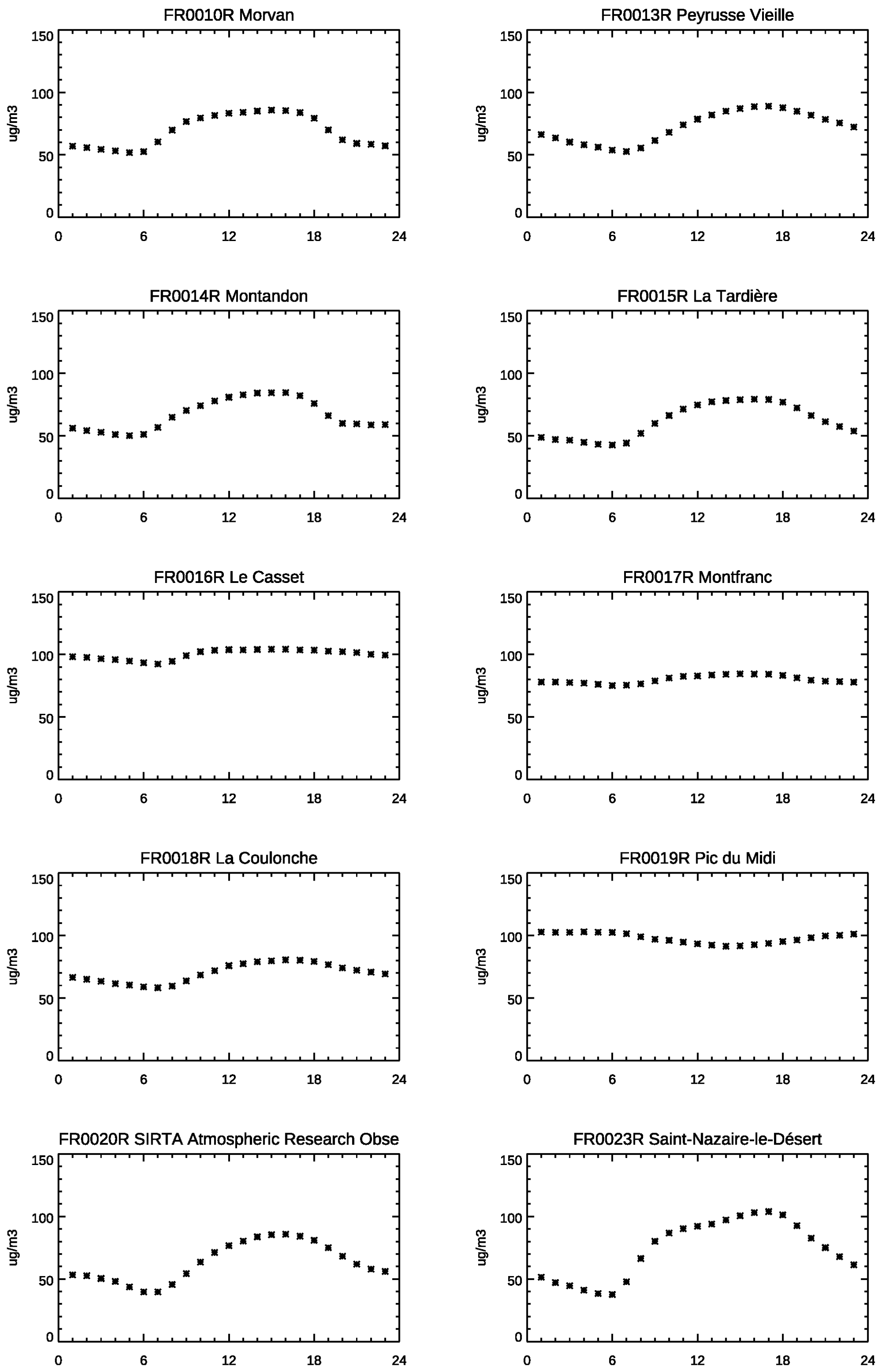

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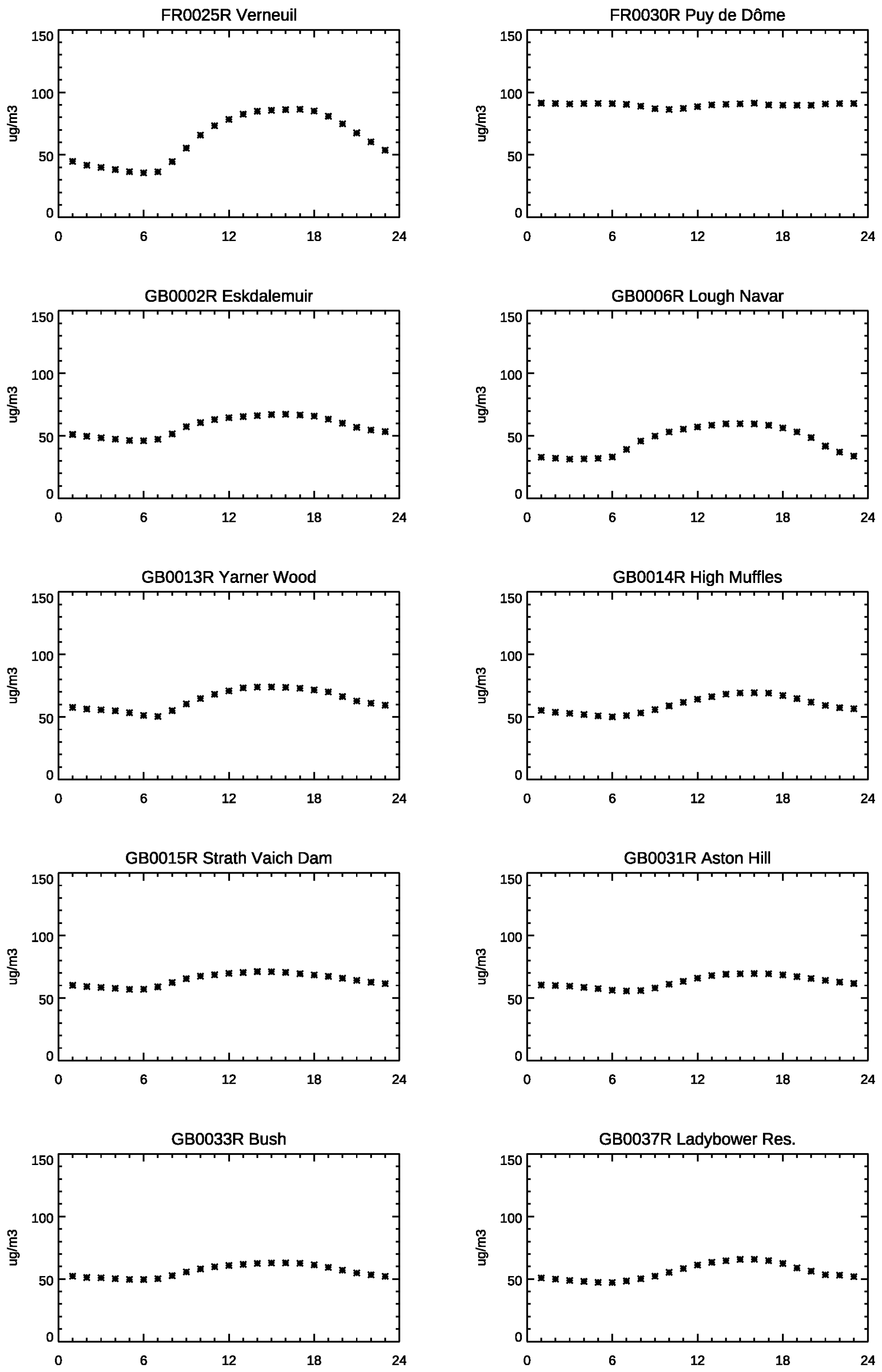

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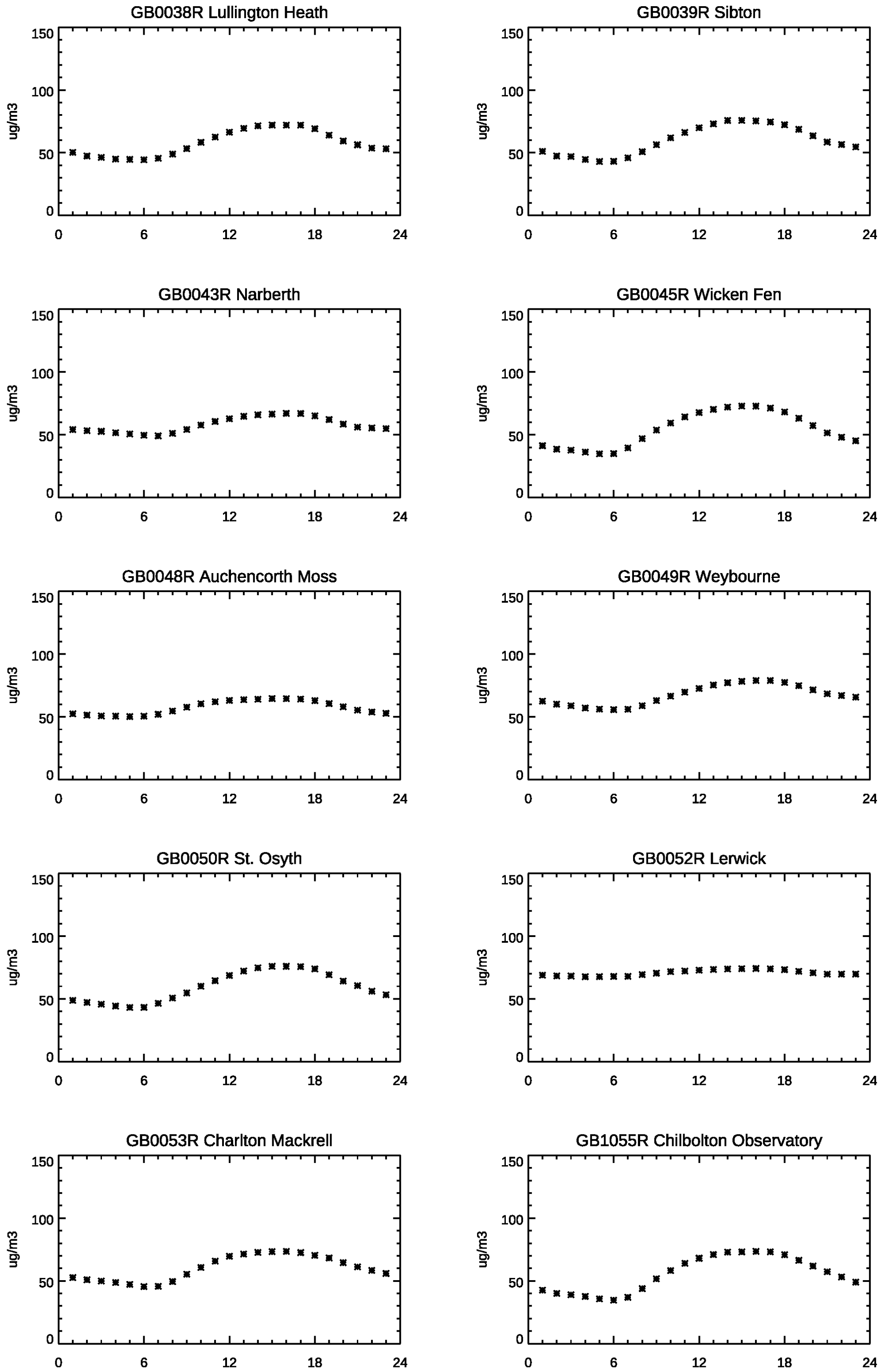

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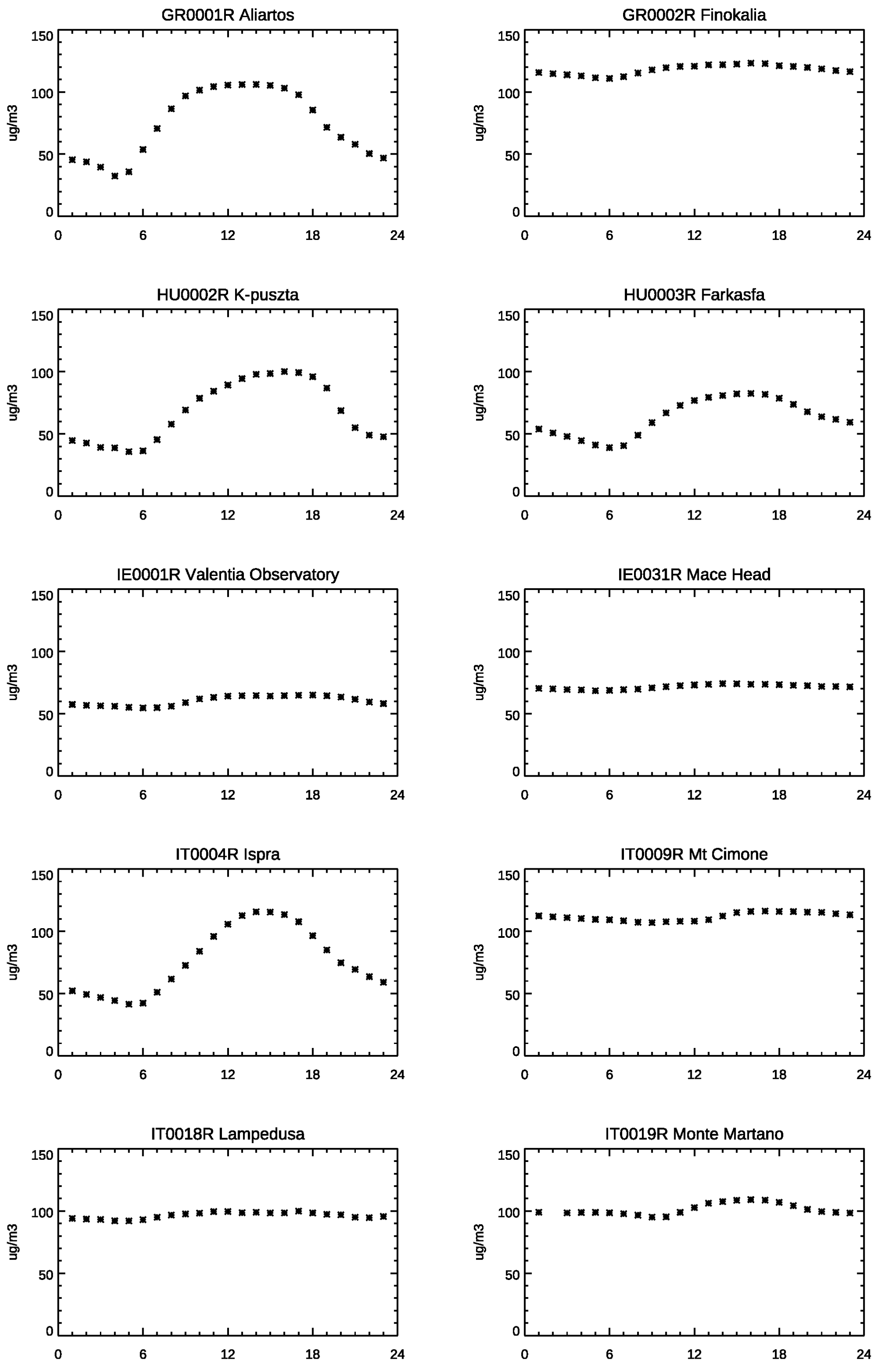

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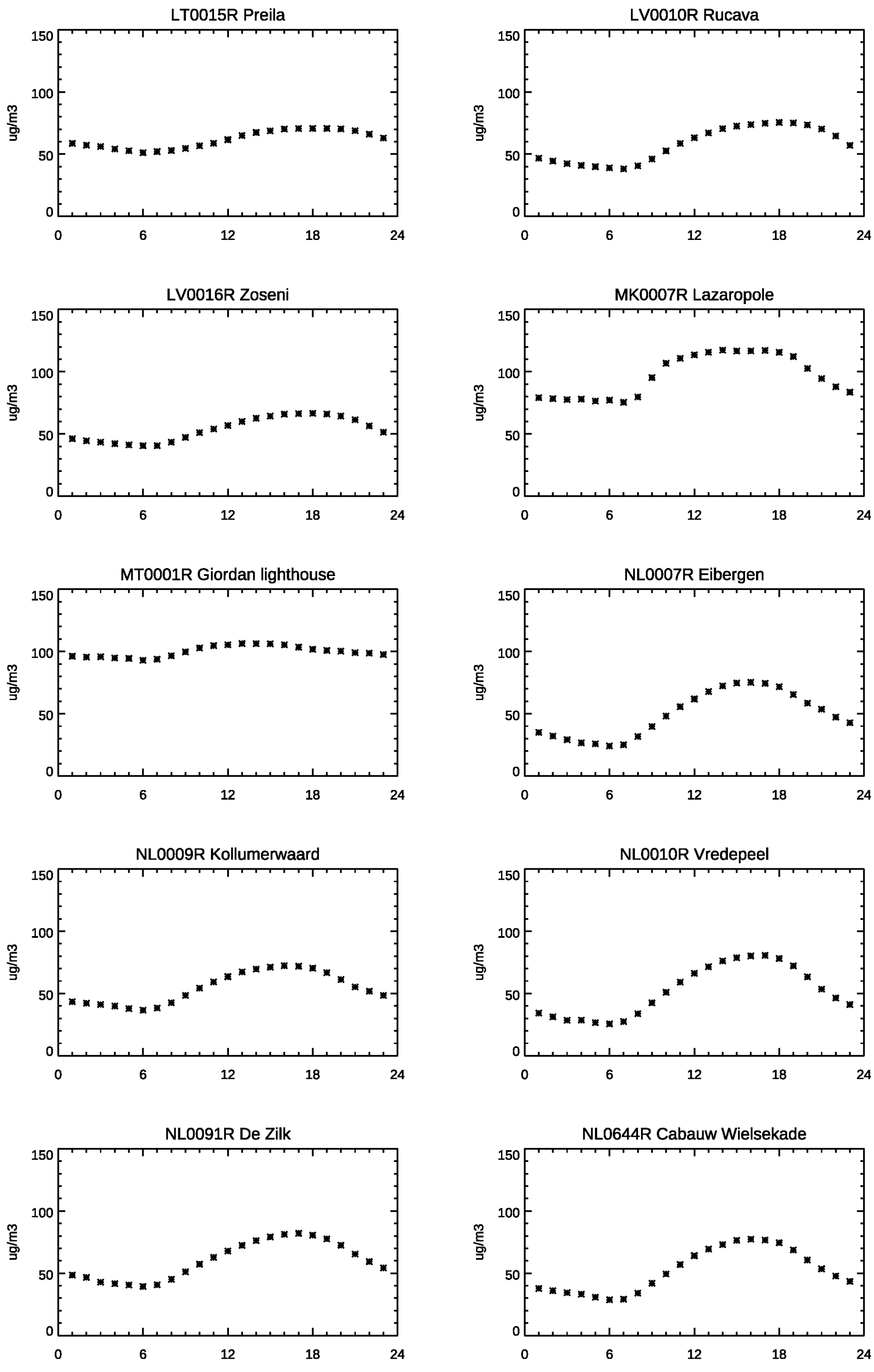

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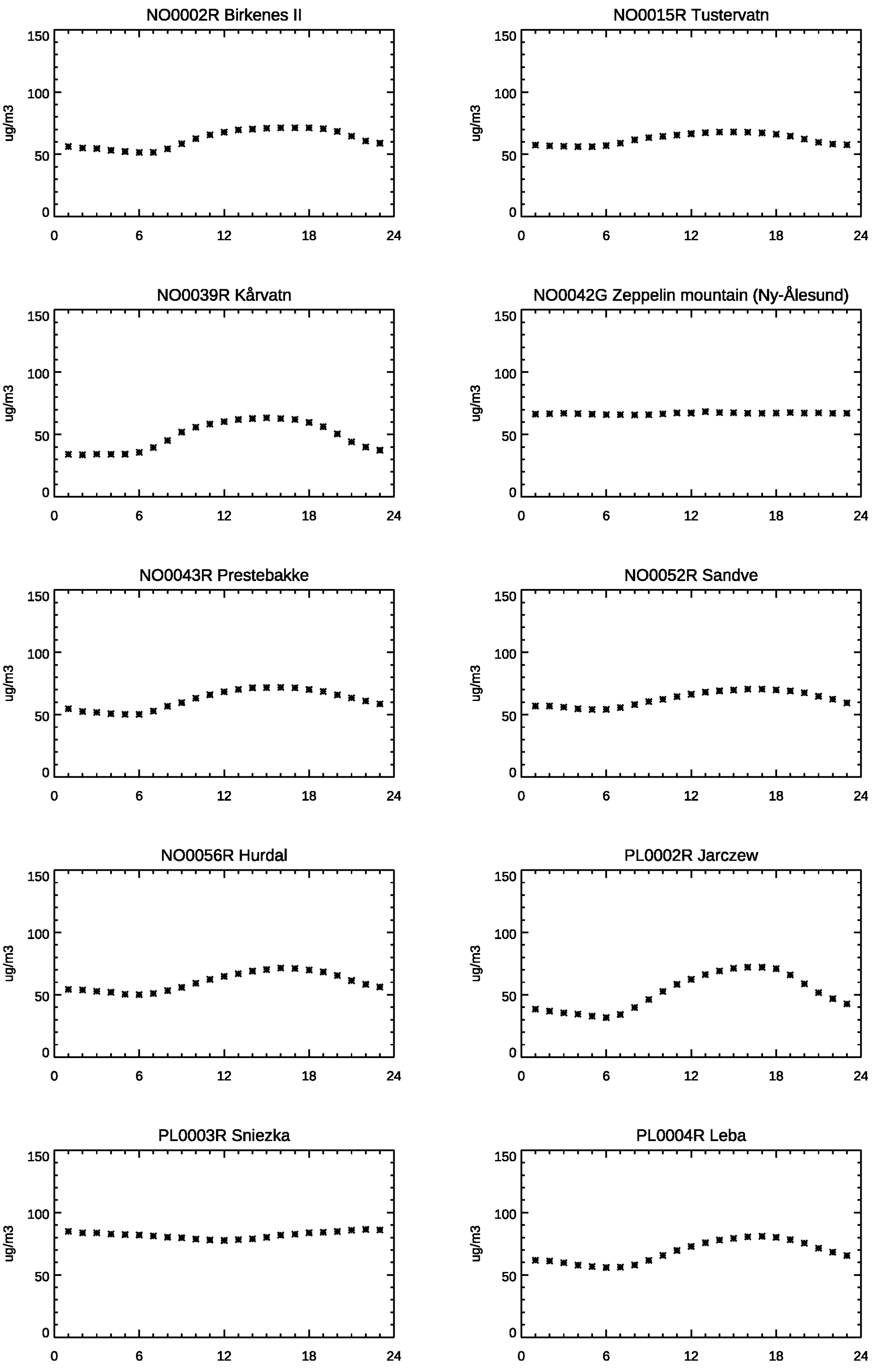

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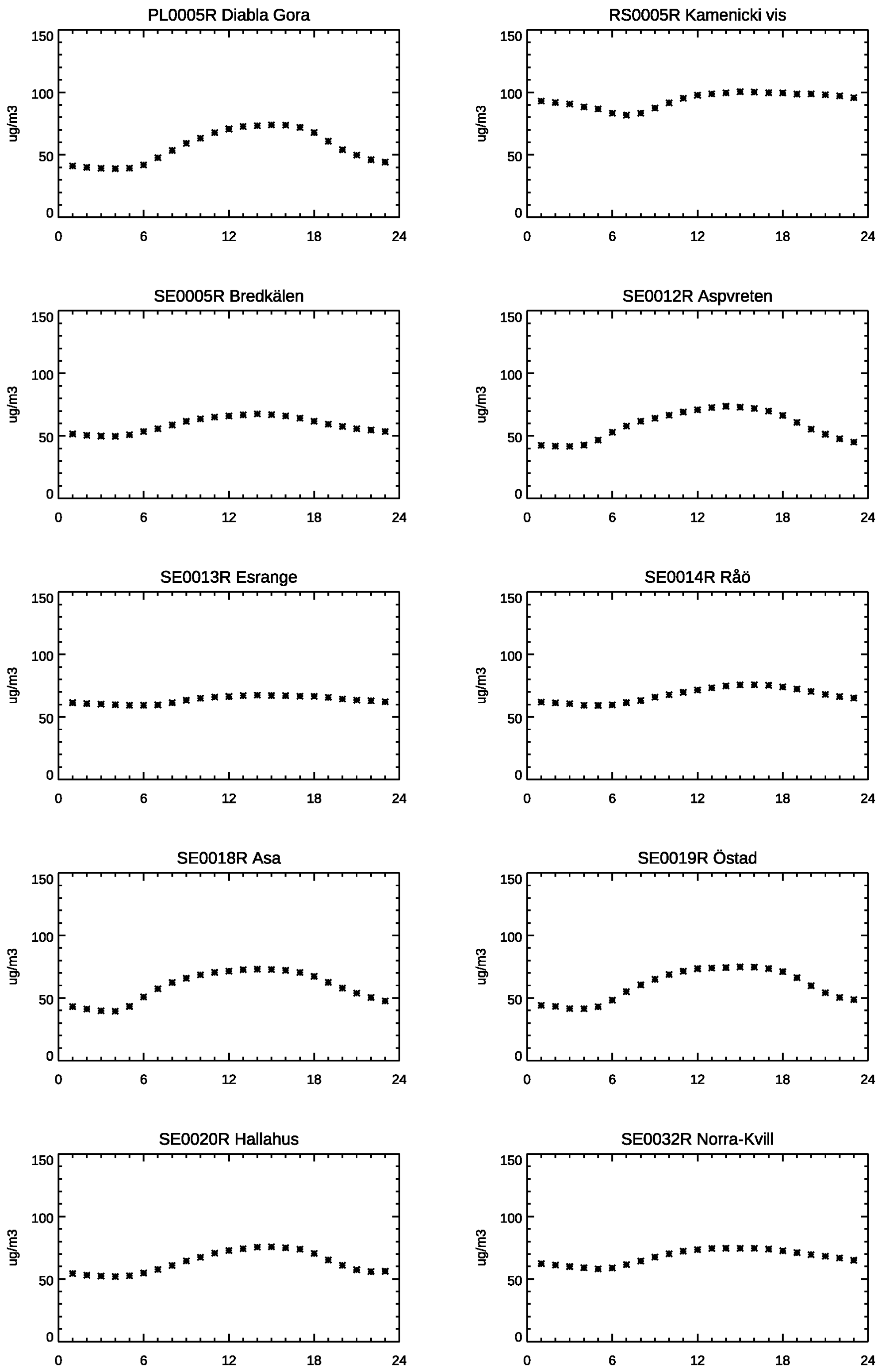

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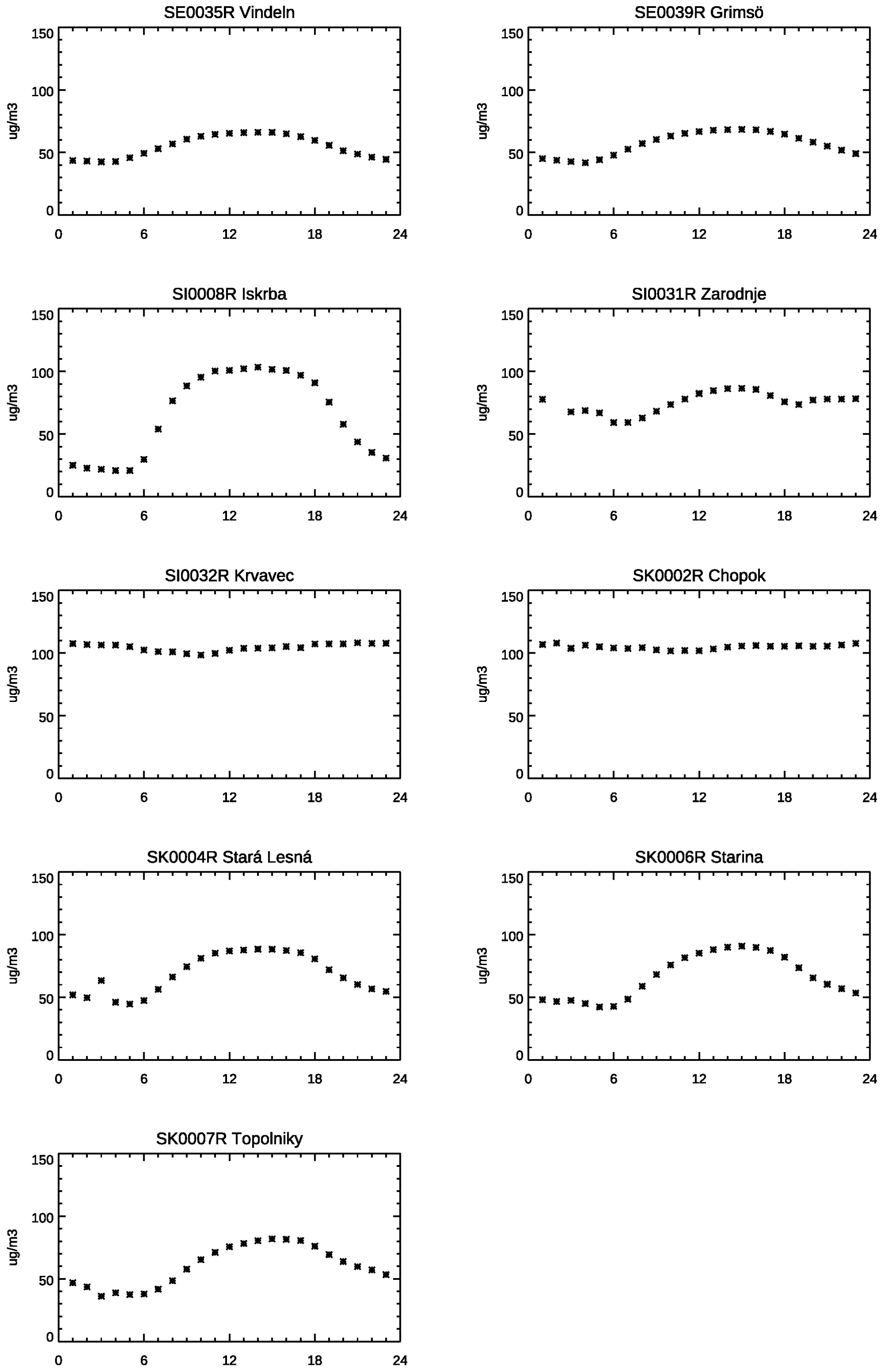

Figure 4.1, cont.

Annex 5

List of data reports

Ozone measurements in the ECE region January 1985–December 1985.
Report no. 1. EMEP/CCC-Report 3/89 by U. Feister and U. Pedersen.
Potsdam/Lillestrøm, Meteorological Service of the GDR/Norwegian Institute for Air Research, 1989.

Ozone measurements January 1986–December 1986. Report no. 2.
EMEP/CCC-Report 8/90 by U. Feister, U. Pedersen, E. Schulz and S. Hechler.
Lillestrøm, Norwegian Institute for Air Research, 1990.

Ozone data report 1988.
EMEP/CCC-Report 1/92 by U. Pedersen.
Lillestrøm, Norwegian Institute for Air Research, 1992.

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EMEP/CCC-Report 2/93 by U. Pedersen and I.M. Kvalvågnes.
Lillestrøm, Norwegian Institute for Air Research, 1993.

Ozone measurements 1990–1992.
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Kjeller, Norwegian Institute for Air Research, 1995.

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Kjeller, Norwegian Institute for Air Research, 1996.

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Kjeller, Norwegian Institute for Air Research, 1997.

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Kjeller, Norwegian Institute for Air Research, 2004.

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EMEP/CCC-Report 4/2005 by A.-G. Hjellbrekke and S. Solberg.
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EMEP/CCC-Report 2/2006 by A.M. Fjæraa.
Kjeller, Norwegian Institute for Air Research, 2006.

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EMEP/CCC-Report 2/2007 by A.M. Fjæraa and A.-G. Hjellbrekke.
Kjeller, Norwegian Institute for Air Research, 2007.

Ozone measurements 2006.
EMEP/CCC-Report 2/2008 by A.M. Fjæraa and A.-G. Hjellbrekke.
Kjeller, Norwegian Institute for Air Research, 2008.

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EMEP/CCC-Report 2/2009 by A.M. Fjæraa and A.-G. Hjellbrekke.
Kjeller, Norwegian Institute for Air Research, 2009.

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Kjeller, Norwegian Institute for Air Research, 2010.

Ozone measurements 2009.
EMEP/CCC-Report 2/2011 by A.-G. Hjellbrekke, S. Solberg and A.M. Fjæraa.
Kjeller, Norwegian Institute for Air Research, 2011.

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Kjeller, Norwegian Institute for Air Research, 2014.

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Kjeller, Norwegian Institute for Air Research, 2018.

Ozone measurements 2017.
EMEP/CCC-Report 2/2019 by A.-G. Hjellbrekke and S. Solberg.
Kjeller, Norwegian Institute for Air Research, 2019.