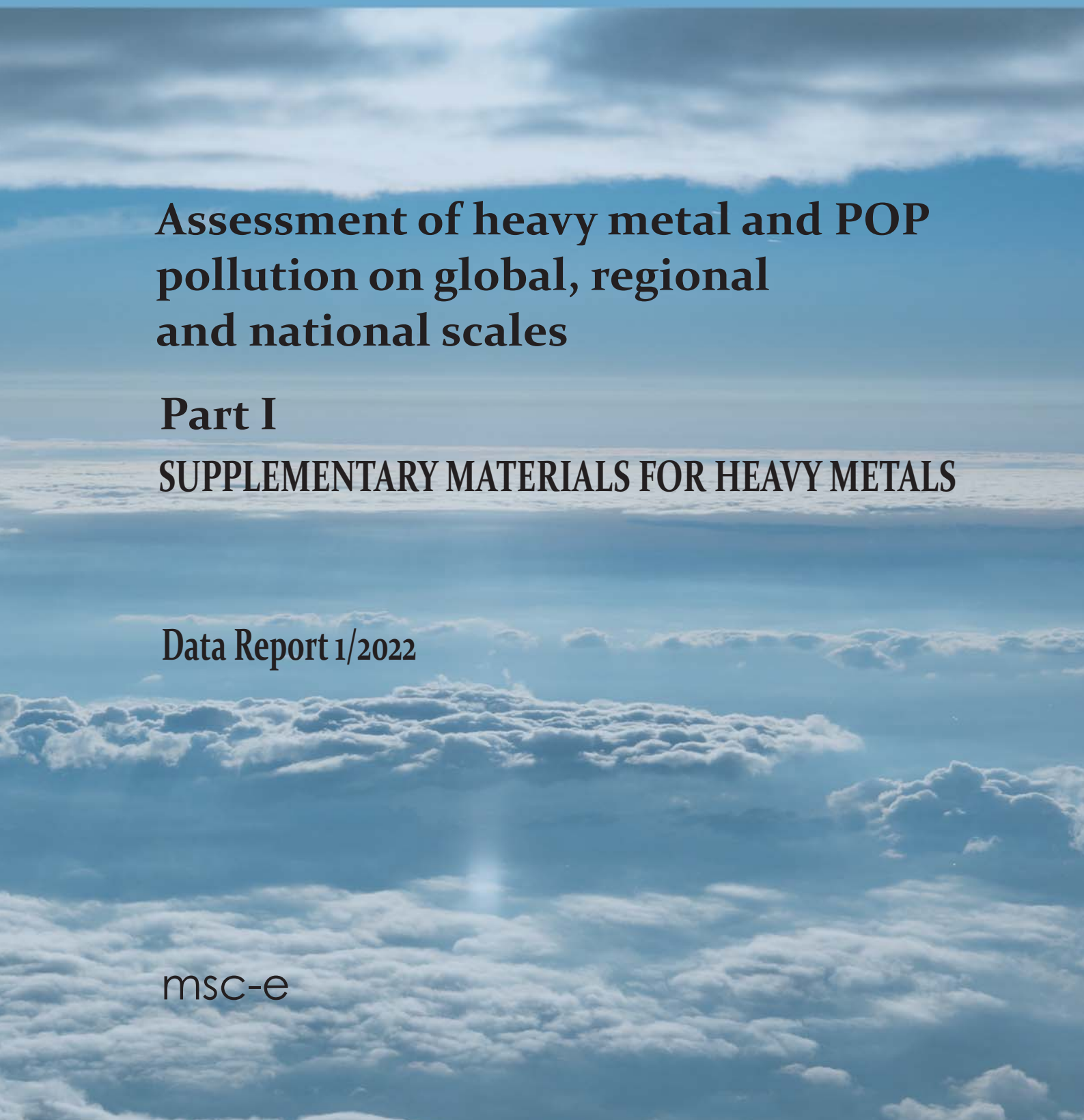
Convention on Long-range Transboundary Air Pollution

emep

Co-operative programme for monitoring and evaluation of the long-range transmission of air pollutants in Europe

DATA REPORT
1/2021 July 2022



Assessment of heavy metal and POP pollution on global, regional and national scales

Part I

SUPPLEMENTARY MATERIALS FOR HEAVY METALS

Data Report 1/2022

msc-e

MSC-E Data Report 1/2022

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Assessment of heavy metal and POP pollution on global, regional and national scales

PART I

SUPPLEMENTARY MATERIALS FOR HEAVY METALS

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Contents

Introduction

This report is a supplement to the EMEP Status Report 2/2022 and summarizes the main output modeling results for 2020 on lead (Pb), cadmium (Cd) and mercury (Hg), presented in a form of maps, graphs and tables. Besides, the report contains evaluation of the calculated concentrations and deposition against measurements. The modelling results are based on meteorological data related to 2020, and emission data related to 2019 (the numerical data are available in the internet: http://en.msceast.org/index.php/pollution-assessment/emep-domain-menu?id=119). The updated Information based on emissions for 2020 will be available on the internet (www.msceast.org).

In *Chapter 1* maps of annual mean air concentrations, total and wet deposition of Pb, Cd and Hg are presented. Spatial resolution of the maps is 0.1°x0.1°.

Chapter 2 is focused on transboundary aspects of atmospheric pollution in the EMEP region. It presents country-averaged deposition fluxes split in three components: contribution of EMEP anthropogenic emissions, secondary sources (wind re-suspension and natural emission) within the EMEP region and sources outside the EMEP countries (non-EMEP sources). Furthermore, for each EMEP country fraction of anthropogenic deposition caused by national and foreign sources is presented. Finally, export of emitted lead, cadmium and mercury to other countries is characterized. Deposition to the EMEP region caused by sources of each EMEP country is presented as a sum of two parts. First part is a mass deposited within national's territory. The second part means mass of a pollutant emitted by a country and deposited to other EMEP countries.

Source-receptor tables are presented in *Chapter 3*. The tables give information about contribution of emission sources of each EMEP country to deposition in other EMEP counties. The columns of the table reveal deposition from a country to other countries. The rows contain deposition to a country from countries-contributors.

Chapter 4 is focused on the evaluation of modelling results against concentrations and wet deposition observed at the EMEP monitoring stations. The chapter contains tables with statistical indicators for each station, diagrams showing comparison of modelled and observed annual mean air concentrations or annual sums of wet deposition, and time series of modelled and measured monthly mean pollution levels. The possible reasons of the discrepancies between calculated and observed levels are discussed.

Statistical indicators used in the chapter for evaluation of the agreement between modelled (*M*) and observed (*O*) parameters include Mean Relative Bais (MRB), Pearson's correlation coefficient (Rc) and Normalized root mean square error (NRMSE), calculated by formulae (1), (2) and (3), respectively:

$$MRB = \frac{(\bar{M} - \bar{O})}{\bar{O}} \cdot 100\% \quad (1)$$

$$Rc = \frac{\sum_1^N (M - \bar{M}) \cdot (O - \bar{O})}{\sqrt{\sum_1^N (M - \bar{M})^2 \cdot \sum_1^N (O - \bar{O})^2}} \quad (2)$$

$$NRMSE = \frac{1}{\overline{O}} \cdot \sqrt{\frac{\sum_{i}^{N} (M_i - O_i)^2}{N}} \quad (3)$$

Besides, fraction of fitting modelled and observed values within two-fold or three-fold difference (F2, F3) was calculated.

Maps of deposition of Pb, Cd and Hg to marginal seas (the Baltic, Black, Caspian, North and Mediterranean) of the EMEP region and maps of ecosystem-dependent deposition are presented in *Chapters 5* and *6*, respectively.

1. Pollution of the EMEP domain in 2020

1.1. Lead

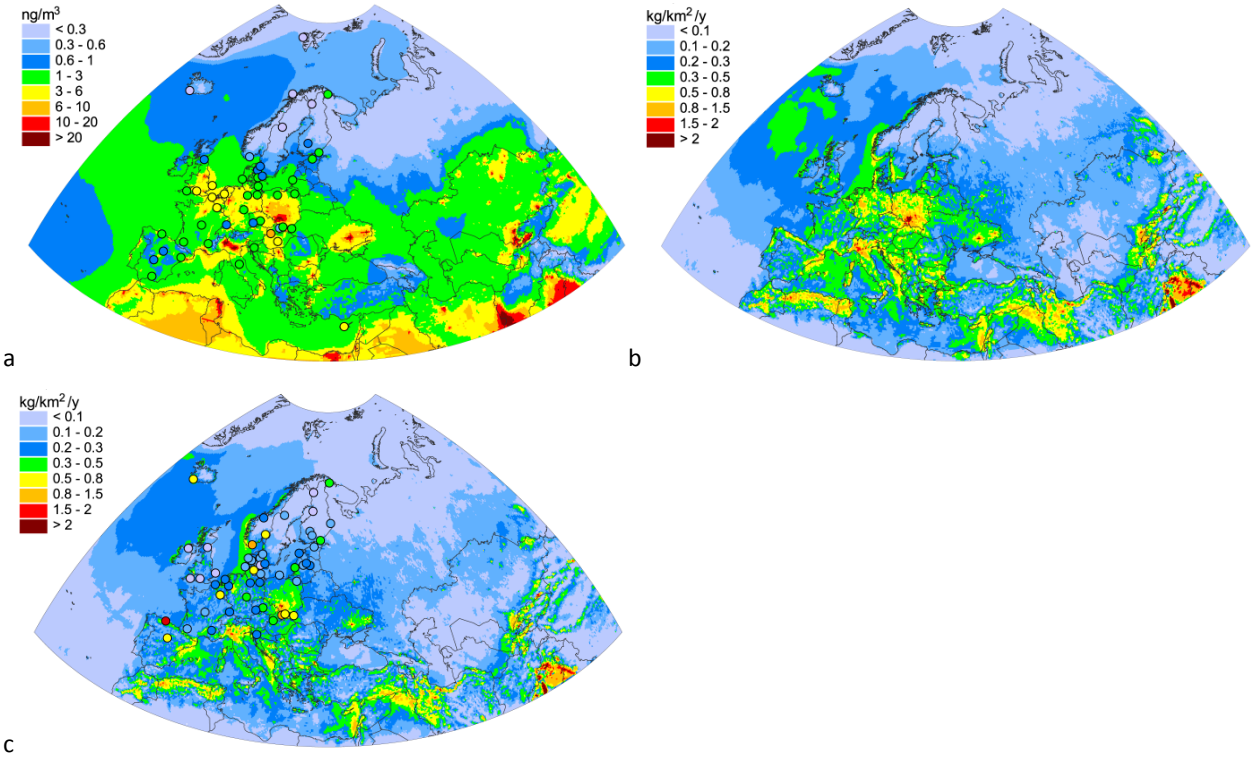


Fig. 1.1. *Concentrations in air (a), total (b) and wet (c) deposition flux of Pb in 2020.*

1.2. Cadmium

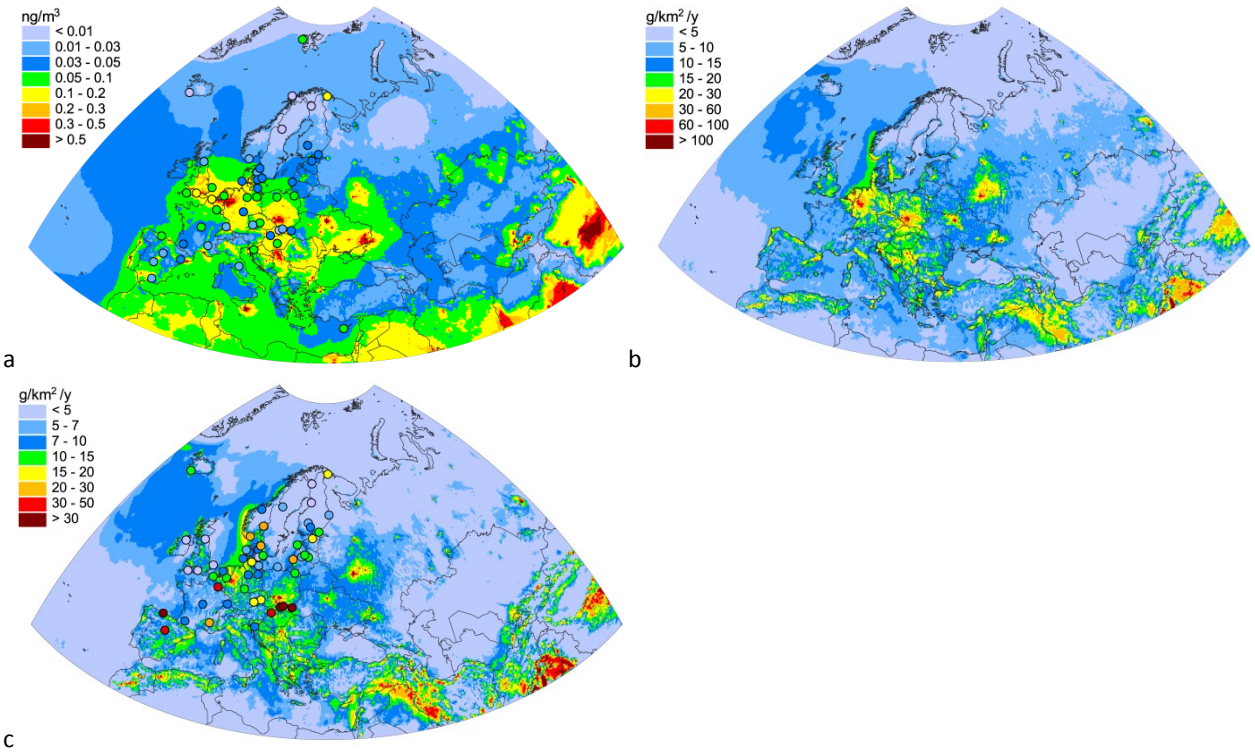


Fig. 1.2*.Concentrations in air (a), total (b) and wet (c) deposition flux of Cd in 2020.*

1.4. Mercury

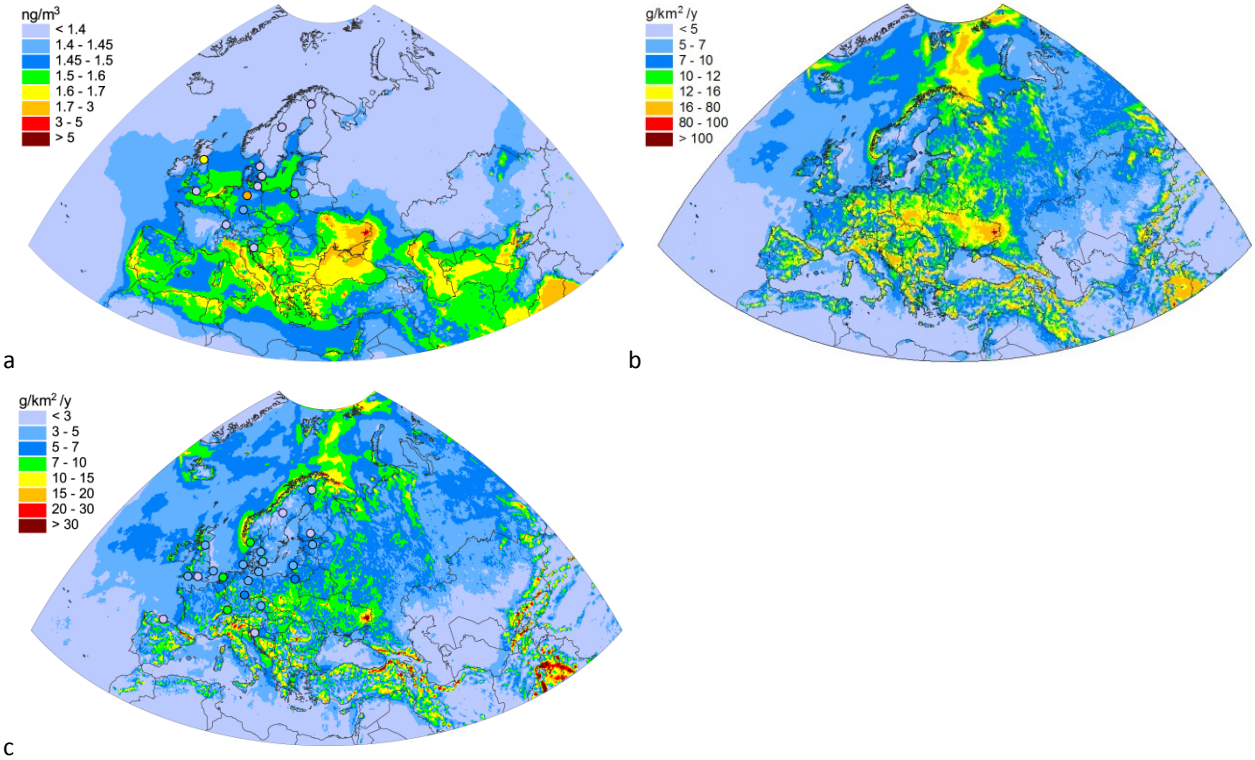


Fig. 1.3*.Concentrations in air (a), total (b) and wet deposition flux (c) Hg in 2020.*

2.TRANSBOUNDARY POLLUTION OF THE EMEP COUNTRIES

2.1. Lead

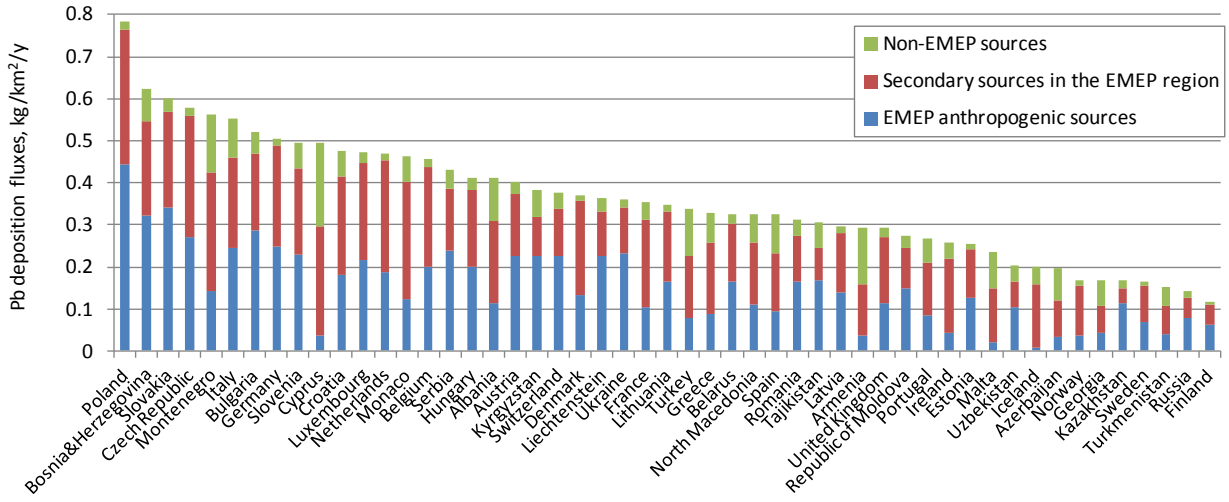


Fig. 2.1. *Country-average deposition fluxes of Pb to EMEP countries in 2020.*

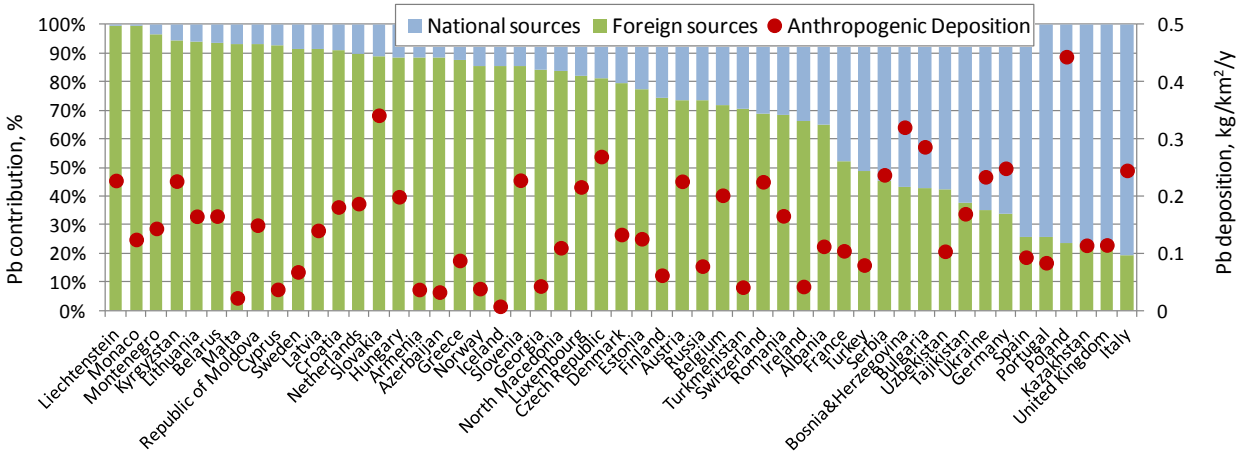


Fig. 2.2. *Relative contribution of national sources and transboundary transport to Pb deposition in the EMEP countries in 2020.*

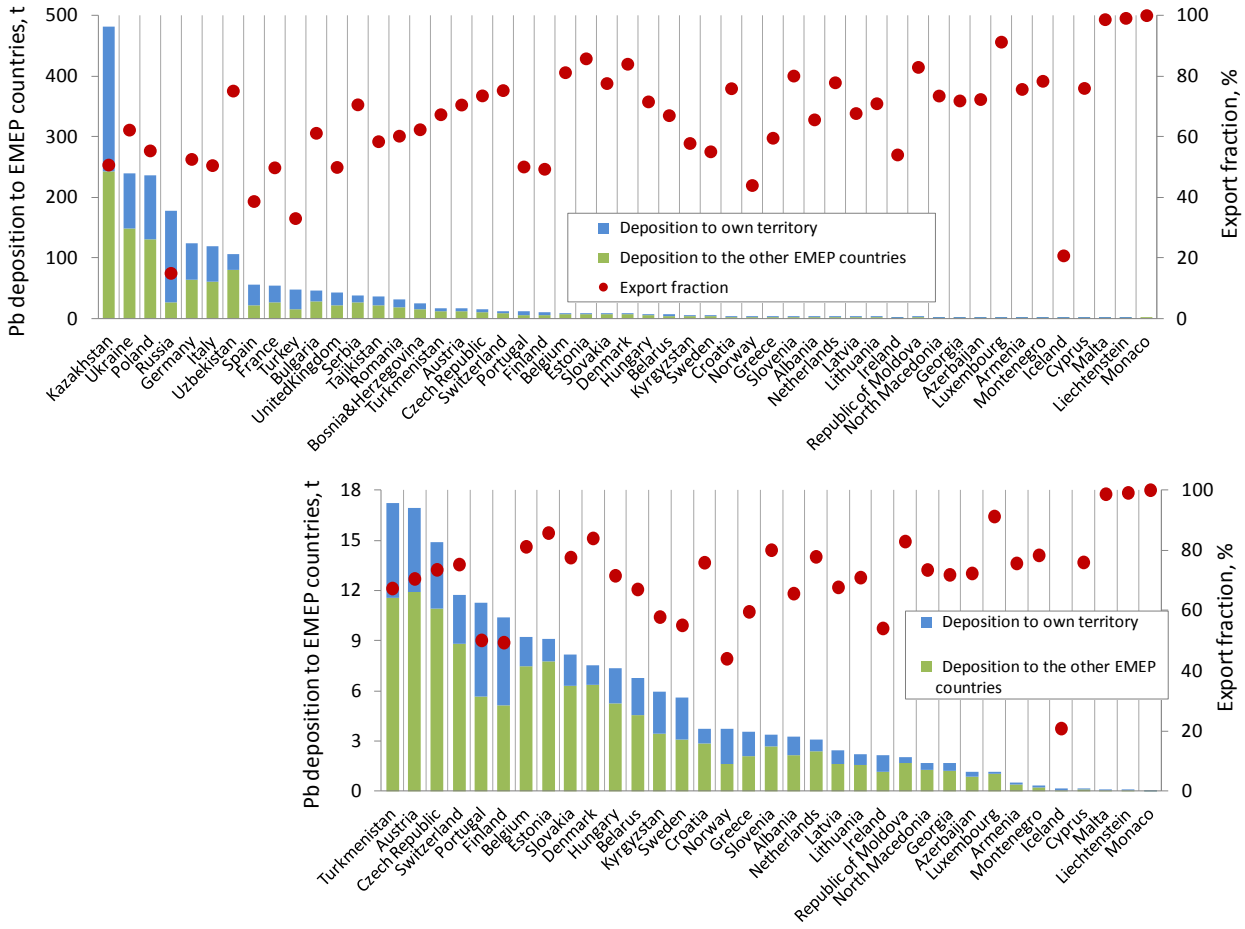


Fig. 2.3. *Contribution of EMEP countries to transboundary transport of Pb. Red circle - fraction of total anthropogenic deposition to the EMEP countries exported outside the country in 2020.*

2.2. Cadmium

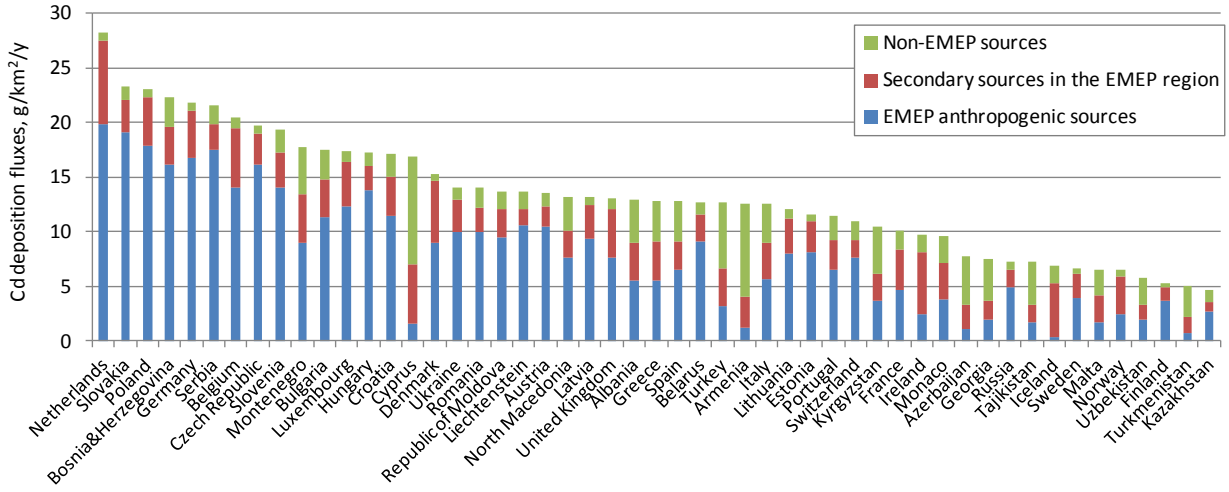


Fig. 2.4. *Country-average deposition fluxes of Cd to EMEP countries in 2020.*

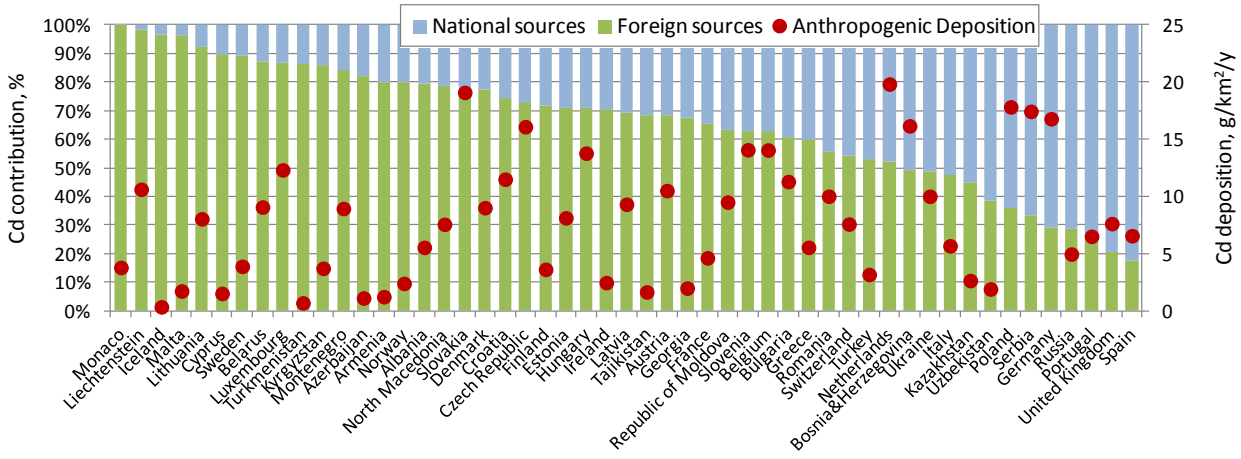


Fig. 2.5. *Relative contribution of national sources and transboundary transport to Cd deposition in the EMEP countries in 2020.*

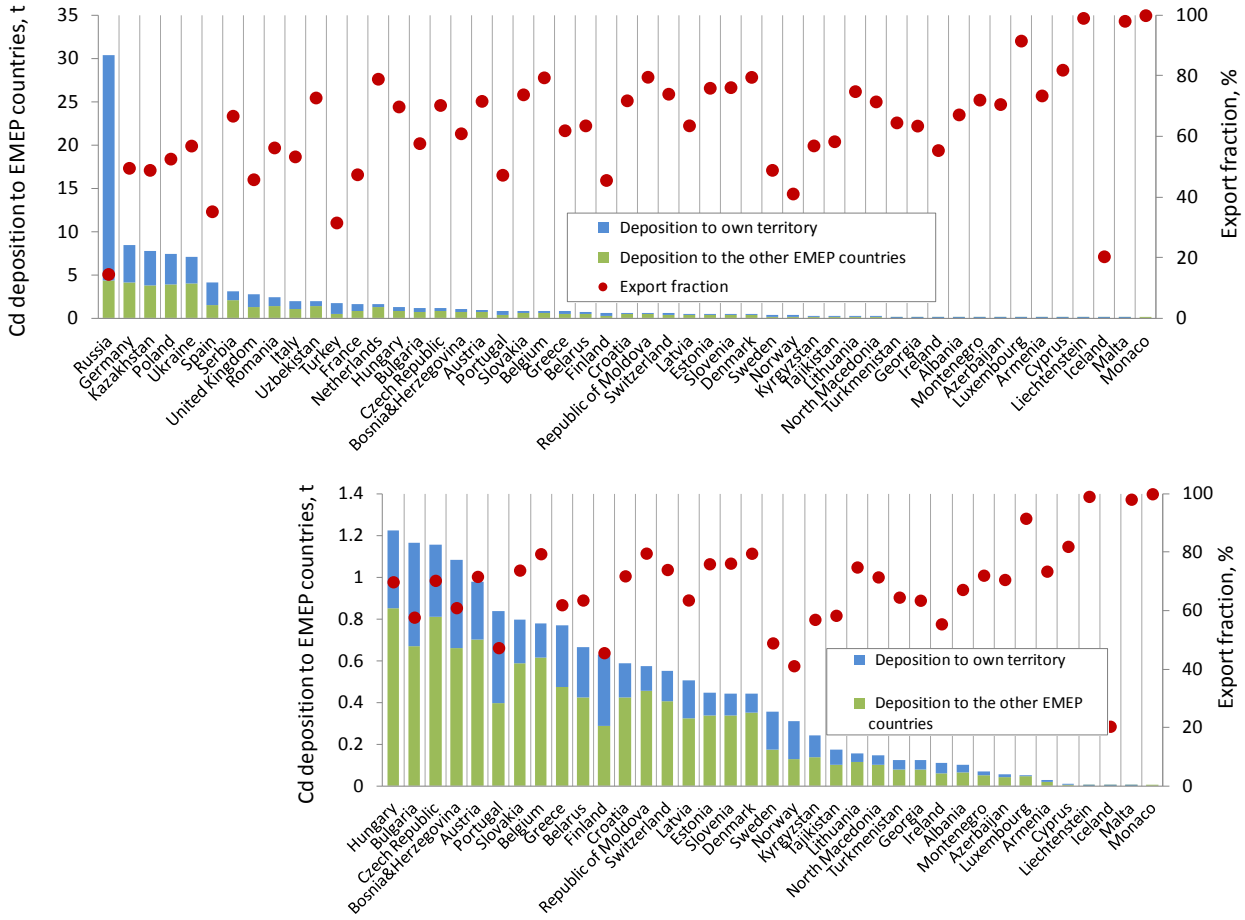


***Fig. 2.6**. Contribution of EMEP countries to transboundary transport of Cd. Red circle - fraction of total anthropogenic deposition to the EMEP countries exported outside the country in 2020.*

2.3. Mercury

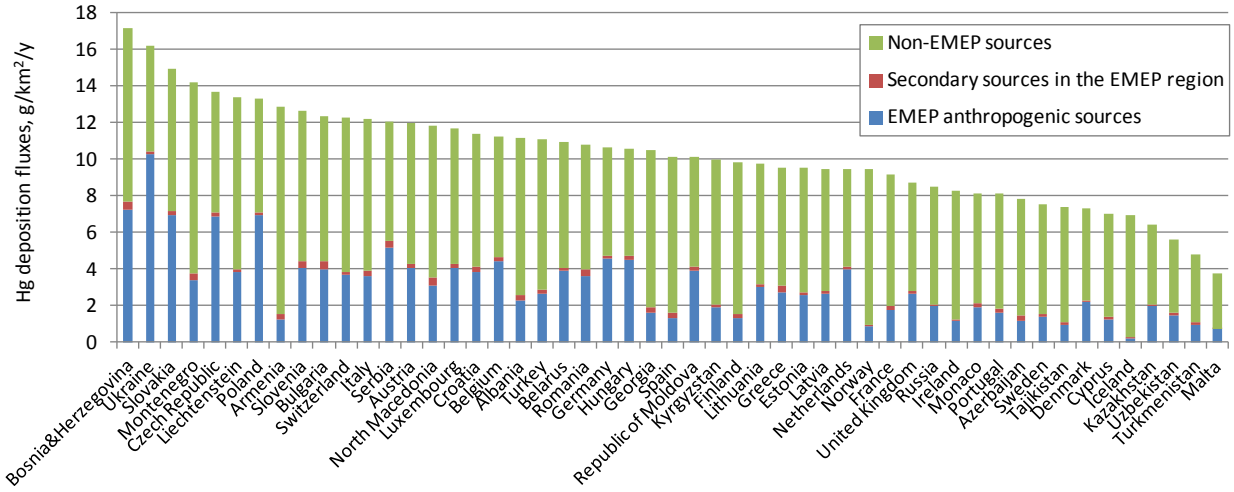


Fig. 2.7. *Country-average deposition fluxes of Hg to EMEP countries in 2020.*

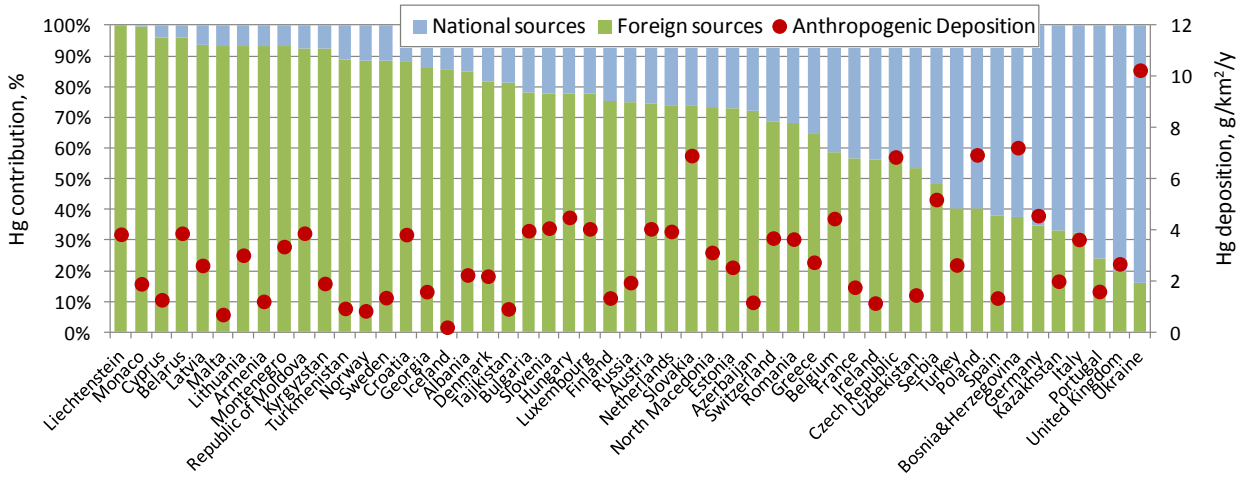


Fig. 2.8. *Relative contribution of national sources and transboundary transport to Hg deposition in the EMEP countries in 2020.*

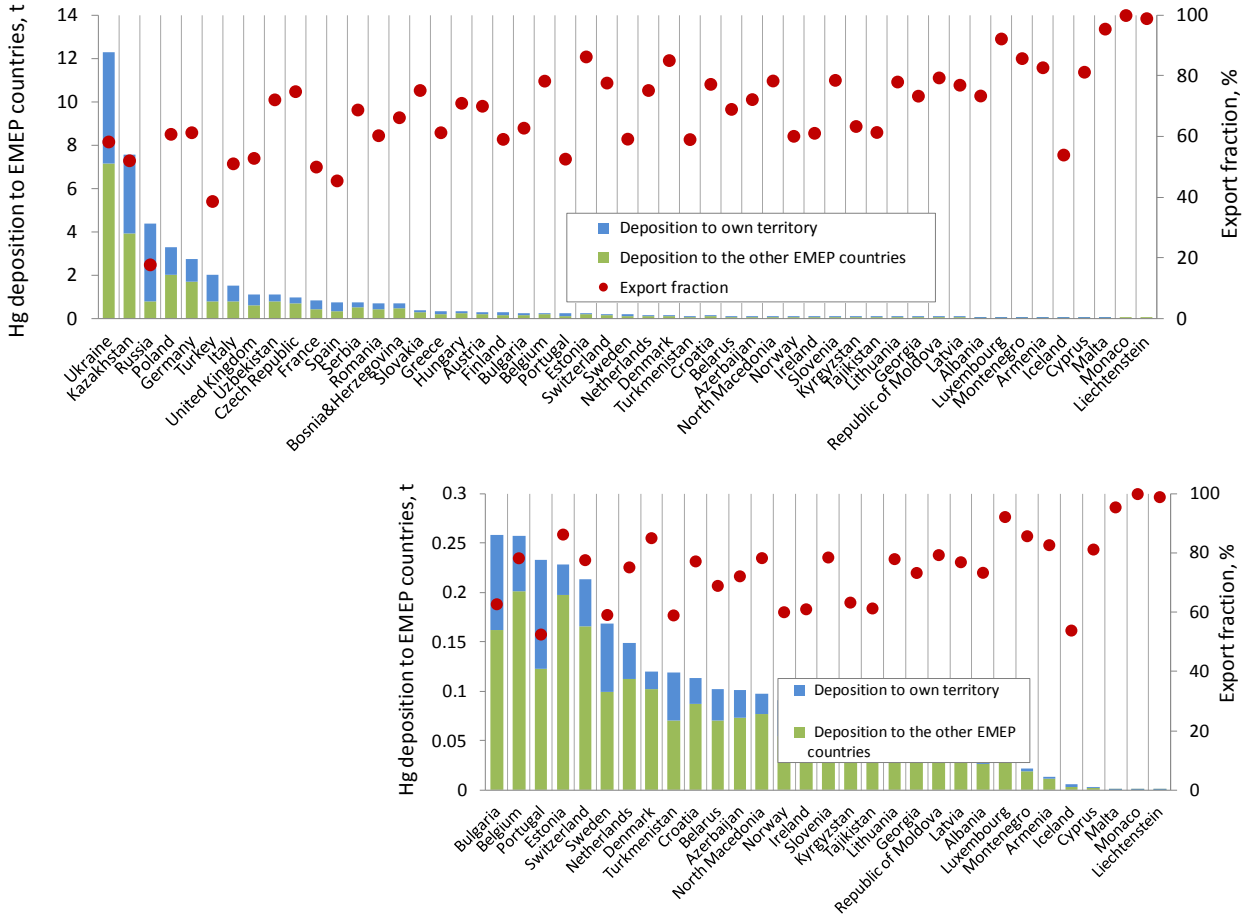


Fig. 2.9. *Contribution of EMEP countries to transboundary transport of Hg. Red circle - fraction of total anthropogenic deposition to the EMEP countries exported outside the country in 2020.*

3. SOURCE-RECEPTOR TABLES

Table 3.1. *Codes of countries, regions and seas*

Country/Region/Sea	Code	Country/Region/Sea	Code
Albania	AL	Monaco	MC
Armenia	AM	Montenegro	ME
Austria	AT	Netherlands	NL
Azerbaijan	AZ	Norway	NO
Belarus	BY	North Macedonia	MK
Belgium	BE	Poland	PL
Bosnia and Herzegovina	BA	Portugal	PT
Bulgaria	BG	Moldova	MD
Croatia	HR	Romania	RO
Cyprus	CY	Russian Federation	RU
Czech Republic	CZ	Serbia	RS
Denmark	DK	Slovakia	SK
Estonia	EE	Slovenia	SI
Finland	FI	Spain	ES
France	FR	Sweden	SE
Georgia	GE	Switzerland	CH
Germany	DE	Tajikistan	TJ
Greece	GR	Turkey	TR
Hungary	HU	Turkmenistan	TM
Iceland	IS	Ukraine	UA
Ireland	IE	United Kingdom	GB
Italy	IT	Uzbekistan	UZ
Kazakhstan	KZ		
Kyrgyzstan	KY		
Latvia	LV		
Lithuania	LT		
Luxembourg	LU		
Malta	MT		

Table 3.2. *Matrix of Pb country-to-country deposition from anthropogenic sources in 2020, kg*

Receptors ↓ Emitters →

code	AL	AM	AT	AZ	BA	BE	BG	BY	CH	CY	CZ	DE	DK
AL	**1123.8**	0.1	17.7	0.1	134.5	1.3	132.6	1.1	6.5	0.0	9.9	28.1	1.0
AM	1.1	**125.3**	1.2	62.7	3.3	0.2	13.4	0.4	0.8	1.0	0.5	3.4	0.2
AT	9.7	0.1	**5007.8**	0.1	235.8	51.6	55.3	3.7	673.1	0.0	497.0	2962.4	30.0
AZ	1.8	41.5	3.7	**320.0**	8.0	0.6	31.5	1.9	2.1	0.8	2.0	11.3	0.8
BA	68.0	0.1	230.2	0.1	**9402.6**	8.4	134.5	4.6	36.4	0.0	126.6	246.5	10.1
BE	0.2	0.0	14.1	0.0	1.1	**1740.2**	3.9	1.0	41.9	0.0	14.6	1174.3	19.0
BG	112.6	0.6	132.4	1.1	581.4	8.4	**18180.6**	22.6	34.5	0.8	75.8	212.3	8.7
BY	20.5	1.6	326.6	6.0	327.6	75.8	552.5	**2241.6**	120.4	0.4	407.5	1891.7	146.0
CH	0.5	0.0	85.0	0.0	7.6	35.2	2.2	0.5	**2912.6**	0.0	15.9	927.8	5.5
CY	1.3	0.1	0.7	0.1	3.8	0.1	16.6	0.2	0.4	**25.1**	0.3	1.3	0.1
CZ	6.9	0.1	1216.3	0.3	261.2	79.7	93.7	12.5	300.2	0.0	**3956.8**	4184.6	62.1
DE	4.7	0.1	1190.8	0.7	86.2	2098.5	66.3	27.9	2531.9	0.0	1442.0	**58608.8**	501.2
DK	0.6	0.0	27.6	0.1	11.0	195.2	10.7	3.7	44.5	0.0	38.8	1934.9	**1218.5**
EE	1.4	0.1	54.8	0.2	28.9	39.0	27.2	71.9	30.4	0.0	64.1	570.6	87.7
ES	20.7	0.0	82.1	0.1	173.9	151.6	104.7	2.4	130.4	0.0	42.3	952.5	29.7
FI	6.2	0.4	144.8	1.2	107.1	109.2	118.3	125.1	92.2	0.1	184.5	1615.1	284.6
FR	17.0	0.1	275.0	0.2	194.9	1061.4	87.0	7.0	1538.5	0.0	138.3	5549.7	97.6
GB	0.7	0.0	38.3	0.1	11.9	338.9	7.8	6.5	57.9	0.0	44.0	1530.0	159.1
GE	5.3	41.9	8.5	32.6	24.2	0.7	122.3	2.7	4.8	1.3	3.0	17.9	1.1
GR	319.6	0.6	67.7	1.1	323.1	6.3	2581.7	12.3	23.2	1.0	38.6	127.9	4.4
HR	45.7	0.1	454.4	0.1	1714.6	11.5	78.4	3.3	45.7	0.0	150.4	318.0	9.2
HU	40.5	0.1	901.8	0.4	1185.4	21.0	412.6	14.5	80.2	0.0	368.1	645.5	18.8
IE	0.1	0.0	5.3	0.0	2.2	43.1	0.8	0.8	9.1	0.0	6.8	225.6	20.0
IS	0.4	0.1	2.9	0.1	3.7	13.3	3.5	1.3	5.1	0.0	4.3	88.1	9.1
IT	201.1	0.3	660.5	0.5	1474.2	50.1	320.4	5.5	758.5	0.1	164.7	1199.9	22.4
KY	1.4	3.6	2.9	9.6	5.2	0.7	12.7	1.0	3.0	0.4	1.3	9.9	0.6
KZ	33.7	38.1	110.2	159.1	192.6	22.8	736.7	92.4	54.0	2.6	93.4	469.9	45.2
LI	0.0	0.0	2.2	0.0	0.0	0.2	0.0	0.0	15.6	0.0	0.1	7.7	0.0
LT	5.0	0.2	110.0	0.6	93.6	58.3	77.1	433.3	49.9	0.1	159.2	1104.6	162.6
LU	0.0	0.0	2.7	0.0	0.2	35.3	0.1	0.1	9.6	0.0	2.3	166.4	1.4
LV	2.9	0.2	95.8	0.5	64.1	64.2	52.8	185.9	47.6	0.0	122.8	1005.7	175.3
MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MD	6.6	0.6	25.6	1.3	53.6	2.9	433.6	12.4	8.3	0.1	17.2	69.2	4.0
ME	91.1	0.0	17.5	0.0	345.7	1.1	56.0	0.9	5.4	0.0	9.9	25.3	1.1
MK	280.6	0.1	22.2	0.2	104.5	1.4	282.9	2.2	7.1	0.0	12.4	36.3	1.4
MT	0.2	0.0	0.1	0.0	0.5	0.0	0.4	0.0	0.0	0.0	0.0	0.1	0.0
NL	0.3	0.0	20.8	0.0	4.2	1137.5	7.8	1.0	38.3	0.0	18.8	2006.5	31.5
NO	4.6	0.3	89.6	1.0	51.1	316.8	76.1	30.4	103.2	0.0	120.0	2856.1	694.6
PL	33.2	0.8	1342.8	2.7	752.6	346.2	453.5	406.8	480.8	0.1	3187.9	11925.6	424.7
PT	1.3	0.0	4.3	0.0	8.3	17.3	5.5	0.2	9.2	0.0	3.2	103.9	5.3
RO	103.9	1.7	441.3	2.9	1204.2	24.9	4602.0	51.4	103.3	0.8	206.5	707.0	25.4
RS	162.0	0.1	232.0	0.3	1724.5	9.6	1019.0	11.0	39.2	0.1	128.1	289.9	11.5
RU	219.1	106.8	1393.4	378.8	1716.0	434.3	5582.9	2265.6	644.9	11.2	1333.9	7955.0	933.8
SE	11.8	0.7	232.8	1.7	140.3	458.0	234.2	128.5	241.1	0.1	349.3	6288.4	2132.1
SI	9.1	0.0	469.2	0.0	187.1	6.0	17.6	1.1	30.6	0.0	58.4	193.7	4.3
SK	16.9	0.1	532.2	0.2	531.3	18.0	182.4	13.8	77.1	0.0	589.1	606.6	20.8
TJ	0.9	1.7	1.2	5.2	2.5	0.2	7.0	0.4	1.1	0.2	0.4	3.3	0.2
TM	3.1	8.4	5.6	42.8	11.1	0.8	35.7	2.6	3.5	0.5	2.6	15.5	1.3
TR	162.0	120.1	113.7	61.9	418.6	14.4	5631.9	55.9	62.7	54.3	64.5	313.1	18.5
UA	93.4	9.0	691.2	28.1	973.8	79.3	3984.4	495.4	206.5	2.0	602.7	2077.5	103.2
UZ	4.1	6.3	7.2	26.5	13.9	1.1	57.2	4.3	3.7	0.5	4.0	22.2	2.3
SUM, t	**3.3**	**0.5**	**16.9**	**1.2**	**24.9**	**9.2**	**46.7**	**6.8**	**11.7**	**0.1**	**14.9**	**123.3**	**7.5**
code	**AL**	**AM**	**AT**	**AZ**	**BA**	**BE**	**BG**	**BY**	**CH**	**CY**	**CZ**	**DE**	**DK**

Table 3.2. *Matrix of Pb country-to-country deposition from anthropogenic sources in 2020, kg (continued)*

Receptors ↓ Emitters →

code	EE	ES	FI	FR	GB	GE	GR	HR	HU	IE	IS	IT	KY	KZ
AL	0.6	108.3	0.4	39.5	4.8	0.3	106.7	13.4	14.2	0.2	0.0	750.8	0.0	10.5
AM	0.2	4.5	0.2	2.1	0.7	205.2	2.4	0.3	0.5	0.0	0.0	18.9	0.4	105.3
AT	2.9	277.2	3.4	581.5	111.8	0.3	4.5	152.0	154.9	3.1	0.1	5198.7	0.0	12.8
AZ	1.5	6.9	1.0	4.3	2.7	134.0	3.2	0.9	1.5	0.1	0.0	38.4	2.9	621.7
BA	3.4	263.1	2.6	159.1	27.2	0.4	15.3	307.7	186.6	1.0	0.0	2107.9	0.0	17.5
BE	0.6	190.0	1.2	1854.3	543.7	0.0	0.3	0.3	0.5	9.8	0.1	62.7	0.0	2.4
BG	8.4	138.7	5.4	91.5	23.5	3.7	195.3	53.2	131.4	0.7	0.0	1055.4	0.5	226.2
BY	159.8	153.6	87.6	309.2	352.6	7.5	25.4	52.4	161.8	9.5	0.5	991.1	2.8	741.9
CH	0.4	276.1	0.5	904.7	72.1	0.1	0.2	3.2	2.6	2.1	0.0	3911.4	0.0	1.0
CY	0.1	5.8	0.1	1.9	0.3	0.2	4.8	0.4	0.3	0.0	0.0	31.8	0.0	2.9
CZ	8.2	189.8	8.6	472.9	179.8	0.4	4.9	77.1	229.2	4.6	0.1	1001.3	0.0	24.8
DE	31.6	1009.9	38.2	6145.3	2945.1	0.7	2.7	27.4	67.0	63.5	1.1	2494.1	0.1	40.9
DK	4.9	113.9	4.8	461.1	827.0	0.1	0.5	1.9	7.4	19.0	0.4	76.4	0.1	18.0
EE	**1304.0**	37.6	148.9	106.4	217.1	0.3	1.6	7.3	18.8	5.1	0.2	136.3	0.2	50.4
ES	1.6	**34380.6**	3.0	2166.8	554.1	0.2	13.5	33.4	21.2	32.3	0.5	2778.2	0.0	5.4
FI	1462.1	199.4	**5289.5**	350.0	607.5	2.0	7.3	20.7	47.4	15.6	1.1	466.9	1.7	302.4
FR	6.4	8656.7	14.0	**27307.3**	2977.9	0.4	10.3	50.8	38.1	101.0	1.0	6059.9	0.0	13.5
GB	9.7	718.4	14.1	1449.5	**21758.7**	0.1	0.5	3.3	4.3	578.7	3.2	236.2	0.0	18.7
GE	1.1	13.4	0.9	9.4	2.8	**466.1**	8.5	2.5	3.9	0.1	0.0	114.5	1.2	189.7
GR	4.2	200.2	2.7	103.3	19.5	3.0	**1427.9**	33.4	48.8	0.6	0.0	1546.1	0.2	99.4
HR	2.5	330.2	2.1	228.7	31.3	0.3	12.5	**903.6**	222.5	1.0	0.0	2767.6	0.0	11.0
HU	9.7	223.0	8.3	206.2	49.5	0.6	25.2	255.4	**2096.8**	1.4	0.0	1945.4	0.1	41.7
IE	1.9	156.2	2.5	183.9	1029.1	0.0	0.1	0.6	0.5	**979.6**	1.1	54.8	0.0	1.5
IS	3.8	23.3	5.3	53.5	178.4	0.2	0.4	0.5	0.7	10.4	**103.4**	22.9	0.1	26.7
IT	3.4	2152.4	3.2	2599.9	138.7	1.7	85.5	353.5	141.7	6.0	0.1	**59219.6**	0.1	42.6
KY	0.8	15.5	0.8	6.9	4.1	8.4	2.3	0.7	0.8	0.1	0.0	43.8	**2503.9**	12565.1
KZ	94.6	153.6	72.4	123.9	174.6	128.1	44.1	22.9	56.9	4.8	0.4	891.4	2269.7	**237406.0**
LI	0.0	1.0	0.0	3.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	8.3	0.0	0.0
LT	61.2	61.6	35.3	181.6	278.7	0.9	4.9	17.8	48.3	7.5	0.3	332.0	0.3	88.9
LU	0.0	19.5	0.1	166.3	16.9	0.0	0.0	0.1	0.1	0.4	0.0	10.5	0.0	0.1
LV	227.7	57.1	75.2	175.5	303.7	0.7	3.3	14.1	37.7	7.6	0.4	259.7	0.3	80.4
MC	0.0	0.1	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
MD	4.4	19.8	2.4	19.8	8.0	3.1	12.2	7.0	18.3	0.2	0.0	179.3	0.7	129.0
ME	0.6	79.7	0.4	28.6	4.0	0.1	9.7	17.2	17.1	0.2	0.0	603.3	0.0	5.1
MK	0.9	55.4	0.6	28.0	4.6	0.4	182.0	10.1	21.4	0.2	0.0	354.7	0.0	16.4
MT	0.0	0.6	0.0	0.3	0.0	0.0	0.1	0.1	0.0	0.0	0.0	3.9	0.0	0.0
NL	1.3	159.0	2.0	1166.1	1082.1	0.0	0.3	0.8	1.5	17.8	0.2	47.9	0.0	2.5
NO	84.3	361.8	145.7	926.1	2323.2	1.6	4.7	7.3	29.7	69.6	5.7	289.2	0.7	231.6
PL	123.9	417.9	86.7	1155.7	1179.7	3.3	29.1	161.0	554.4	30.6	0.7	2373.3	1.1	332.1
PT	0.1	1390.6	0.3	125.0	89.5	0.0	0.8	1.2	1.0	5.6	0.1	105.8	0.0	0.5
RO	24.5	265.4	15.2	236.3	66.2	8.6	133.5	148.3	593.6	1.8	0.1	2638.8	2.2	509.8
RS	6.5	180.9	4.4	120.3	30.6	0.7	82.6	128.0	389.9	1.1	0.0	1385.9	0.1	60.0
RU	4842.2	1379.8	3368.7	1812.8	2398.8	436.2	322.8	253.4	642.3	66.1	6.0	7236.7	755.4	204405.0
SE	409.3	417.5	847.6	1264.0	2310.5	3.1	12.7	22.1	64.0	55.5	2.6	681.2	1.9	446.6
SI	0.7	127.4	0.7	118.1	14.2	0.2	2.7	265.3	52.2	0.4	0.0	1783.0	0.0	4.4
SK	9.8	117.3	7.3	139.9	46.5	0.3	11.0	95.2	608.6	1.2	0.0	1019.8	0.1	22.8
TJ	0.3	6.0	0.3	2.5	1.2	4.0	1.5	0.3	0.3	0.0	0.0	20.5	77.4	1859.0
TM	2.3	12.2	1.8	7.1	4.8	26.5	4.4	1.3	2.2	0.1	0.0	67.7	33.7	4877.0
TR	22.1	492.1	18.3	212.1	52.9	131.0	544.3	44.0	62.7	1.9	0.1	2702.2	4.6	783.0
UA	127.0	342.0	78.0	448.5	301.0	44.8	147.1	156.8	533.2	8.1	0.4	3243.2	7.9	2824.6
UZ	3.2	12.8	2.4	7.9	7.8	19.8	5.7	1.5	3.0	0.2	0.0	72.2	251.0	11297.4
SUM,t	**9.1**	**56.0**	**10.4**	**54.3**	**43.4**	**1.6**	**3.5**	**3.7**	**7.3**	**2.1**	**0.1**	**119.4**	**5.9**	**480.6**
code	EE	ES	FI	FR	GB	GE	GR	HR	HU	IE	IS	IT	KY	KZ

Table 3.2. *Matrix of Pb country-to-country deposition from anthropogenic sources in 2020, kg (continued)*

Receptors ↓ Emitters →

code	LI	LT	LU	LV	MC	MD	ME	MK	MT	NL	NO	PL	PT
AL	0.0	0.3	0.2	0.2	0.0	1.7	12.0	81.6	1.1	0.4	0.2	122.7	12.9
AM	0.0	0.1	0.0	0.1	0.0	0.4	0.1	0.7	0.0	0.1	0.1	8.7	0.7
AT	2.5	1.3	11.2	1.1	0.2	1.8	1.6	4.7	0.3	15.5	3.1	1611.6	26.9
AZ	0.0	0.3	0.1	0.3	0.0	1.3	0.1	1.3	0.0	0.2	0.4	41.5	1.0
BA	0.1	1.8	1.3	1.5	0.1	3.4	28.7	10.3	1.2	3.0	1.2	1051.5	28.5
BE	0.0	0.4	178.2	0.4	0.0	0.2	0.0	0.1	0.0	120.5	3.2	90.5	15.6
BG	0.1	4.6	1.2	3.6	0.1	66.4	10.1	118.7	0.9	2.9	1.8	973.8	14.4
BY	0.2	210.5	7.8	99.5	0.1	92.2	3.4	12.4	0.4	35.2	22.9	12744.1	21.8
CH	5.3	0.2	7.2	0.1	0.2	0.2	0.1	0.2	0.2	8.2	1.0	67.3	22.7
CY	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.6	0.1	0.0	0.0	4.0	0.6
CZ	0.6	5.2	17.8	4.1	0.1	2.0	1.8	5.8	0.1	25.8	6.3	7625.6	16.9
DE	4.4	13.2	388.5	13.1	0.2	4.0	0.8	2.8	0.3	761.4	34.2	6832.4	88.8
DK	0.1	3.0	11.0	3.1	0.0	0.9	0.2	0.5	0.0	95.0	12.1	575.2	11.4
EE	0.1	63.1	2.4	185.0	0.0	3.4	0.2	0.8	0.0	17.7	21.2	1740.4	4.8
ES	0.2	0.8	14.4	0.6	0.2	2.1	2.1	7.2	1.2	41.7	5.7	447.7	3733.9
FI	0.2	88.0	8.6	167.3	0.0	12.8	1.0	3.9	0.1	48.0	173.0	4272.4	30.5
FR	1.0	2.9	152.0	2.3	2.4	3.3	2.0	6.1	1.9	199.3	20.8	1087.4	612.1
GB	0.1	3.6	14.9	3.4	0.0	0.7	0.1	0.4	0.0	139.6	28.7	531.6	111.0
GE	0.0	0.5	0.1	0.4	0.0	3.8	0.4	3.7	0.1	0.3	0.3	53.3	1.5
GR	0.0	2.2	0.9	1.7	0.0	22.2	7.6	193.0	2.3	2.0	0.9	511.8	21.9
HR	0.1	1.2	1.6	1.0	0.1	2.1	7.1	9.5	1.1	3.8	1.2	961.6	32.3
HU	0.2	4.9	3.2	4.3	0.1	4.7	10.0	28.3	0.8	6.9	2.6	3829.4	23.4
IE	0.0	0.6	2.4	0.6	0.0	0.1	0.0	0.1	0.0	14.9	4.2	84.6	36.1
IS	0.0	0.8	0.9	0.9	0.0	0.3	0.0	0.2	0.0	4.6	13.8	59.5	3.8
IT	1.5	1.8	8.2	1.4	2.6	8.9	17.1	45.3	8.1	13.6	2.9	1177.8	215.4
KY	0.0	0.2	0.1	0.2	0.0	0.3	0.1	0.9	0.0	0.2	0.5	21.6	2.7
KZ	0.1	17.4	2.0	19.1	0.1	50.9	3.1	21.3	0.6	11.7	24.3	2259.5	20.2
LI	**0.2**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.4	0.1
LT	0.1	**633.6**	4.7	108.3	0.0	11.3	0.8	3.2	0.1	27.1	12.0	5063.7	7.9
LU	0.0	0.0	**99.3**	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.2	12.5	1.7
LV	0.1	271.4	4.3	**786.5**	0.0	8.0	0.5	1.8	0.1	28.0	20.9	3529.5	7.7
MC	0.0	0.0	0.0	0.0	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MD	0.0	2.1	0.4	1.6	0.0	**353.0**	0.8	4.1	0.1	1.0	0.8	388.2	1.9
ME	0.0	0.3	0.2	0.2	0.0	0.9	**67.0**	10.0	0.8	0.3	0.2	120.5	9.3
MK	0.0	0.5	0.2	0.4	0.0	2.8	3.3	**453.6**	0.4	0.5	0.3	155.9	7.0
MT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.5**	0.0	0.0	0.2	0.1
NL	0.0	0.6	24.4	0.6	0.0	0.2	0.1	0.2	0.0	**681.9**	3.8	130.8	13.8
NO	0.1	16.3	20.4	20.2	0.0	5.9	0.7	3.4	0.1	143.8	**2082.8**	1997.7	44.9
PL	0.9	113.1	36.2	73.7	0.1	34.0	6.4	23.4	0.6	146.7	36.4	**105278.0**	44.6
PT	0.0	0.1	1.5	0.1	0.0	0.1	0.1	0.2	0.1	5.4	0.8	43.2	**5647.9**
RO	0.2	12.3	3.8	10.6	0.1	229.2	14.8	78.0	1.3	8.9	5.4	3365.8	25.5
RS	0.1	3.5	1.5	3.0	0.1	9.8	50.2	252.6	0.8	3.5	1.5	1429.0	18.9
RU	1.1	520.9	39.0	723.4	0.4	425.0	23.6	138.5	2.9	187.9	432.2	32685.7	182.4
SE	0.4	94.5	33.5	117.8	0.0	21.9	1.9	7.9	0.3	205.0	692.5	6373.1	50.4
SI	0.1	0.3	1.0	0.3	0.1	0.8	1.3	2.3	0.3	1.9	0.5	308.9	11.0
SK	0.1	5.1	2.8	4.5	0.1	3.2	4.5	11.4	0.3	6.1	2.6	8171.1	13.1
TJ	0.0	0.1	0.0	0.1	0.0	0.2	0.1	0.5	0.0	0.1	0.2	7.5	1.0
TM	0.0	0.5	0.1	0.6	0.0	1.4	0.2	2.1	0.1	0.3	0.7	55.5	1.4
TR	0.1	9.8	2.0	8.9	0.1	101.8	8.7	87.8	6.5	5.3	5.3	1135.8	51.9
UA	0.4	57.4	9.0	49.7	0.2	552.0	12.4	59.4	1.2	32.5	23.0	16242.7	32.3
UZ	0.0	0.9	0.1	0.9	0.0	2.2	0.3	2.4	0.1	0.5	1.1	87.7	1.6
SUM,t	**0.0**	**2.2**	**1.1**	**2.4**	**0.0**	**2.1**	**0.3**	**1.7**	**0.0**	**3.1**	**3.7**	**235.4**	**11.3**
code	**LI**	**LT**	**LU**	**LV**	**MC**	**MD**	**ME**	**MK**	**MT**	**NL**	**NO**	**PL**	**PT**

***Table 3.2**. Matrix of Pb country-to-country deposition from anthropogenic sources in 2020, kg (continued)*

Receptors ↓ Emitters →

code	RO	RS	RU	SE	SI	SK	TJ	TM	TR	UA	UZ	SUM, t
AL	54.8	264.1	11.0	0.3	4.9	9.9	0.0	0.4	34.7	86.2	0.5	**3.2**
AM	6.0	4.6	29.9	0.1	0.3	0.5	1.3	53.5	283.8	103.4	30.7	**1.1**
AT	64.5	303.7	26.5	5.8	548.3	100.2	0.1	0.7	16.7	126.9	0.8	**18.9**
AZ	19.2	12.6	175.0	0.7	0.9	1.7	12.6	366.8	249.5	388.3	218.3	**2.7**
BA	171.4	1433.5	33.7	2.4	47.8	82.3	0.1	0.7	25.1	194.8	0.9	**16.5**
BE	2.6	1.1	5.7	2.6	0.6	1.0	0.0	0.2	1.4	47.9	0.1	**6.1**
BG	3265.8	1950.5	348.4	3.8	32.6	91.7	1.2	3.6	655.9	2844.9	7.4	**31.7**
BY	588.2	616.5	1695.7	55.7	50.8	267.5	7.3	51.6	346.4	7927.6	80.7	**34.1**
CH	4.0	4.9	2.8	1.0	4.9	2.5	0.0	0.1	0.9	11.3	0.1	**9.3**
CY	3.9	3.2	4.6	0.0	0.3	0.2	0.1	0.5	186.7	34.1	0.9	**0.3**
CZ	86.0	489.8	29.1	14.7	83.4	189.5	0.1	2.5	25.0	116.8	1.8	**21.1**
DE	54.4	118.2	77.7	67.8	47.6	68.4	0.2	4.6	26.3	547.0	3.0	**88.6**
DK	9.8	20.5	14.0	22.2	2.3	7.9	0.1	0.4	5.3	66.4	0.8	**5.9**
EE	24.6	45.7	192.2	79.0	8.5	29.2	0.5	2.1	17.2	276.0	4.0	**5.7**
ES	70.3	124.1	18.2	7.0	30.2	17.4	0.0	0.3	10.6	87.1	0.4	**46.3**
FI	107.5	155.2	1592.3	930.7	24.3	63.3	4.2	9.3	97.1	1122.8	26.0	**20.5**
FR	98.9	170.3	37.8	22.6	60.2	36.3	0.1	0.8	13.8	197.7	0.8	**56.9**
GB	9.6	13.4	23.7	21.9	4.5	4.7	0.1	0.6	3.8	72.9	0.8	**28.0**
GE	58.5	40.4	174.0	0.6	2.5	3.3	4.1	56.4	637.5	793.8	52.6	**3.0**
GR	510.4	651.7	172.2	1.9	17.2	35.2	0.4	2.7	871.7	1453.2	4.4	**11.5**
HR	115.1	1217.8	30.8	2.1	230.1	71.5	0.1	0.4	15.6	91.7	0.6	**10.1**
HU	536.1	3642.2	72.9	5.7	155.8	1233.6	0.2	3.2	34.3	272.1	2.9	**18.4**
IE	0.9	1.4	3.2	3.4	0.8	0.7	0.0	0.1	0.4	11.7	0.1	**2.9**
IS	2.6	3.5	18.0	6.3	0.5	0.9	0.3	0.5	6.0	33.1	1.7	**0.7**
IT	297.1	931.1	72.4	5.0	369.0	86.3	0.1	1.8	71.9	540.1	2.3	**73.5**
KY	6.8	5.5	108.0	0.6	0.8	0.8	6257.6	444.0	82.6	105.4	22845.7	**45.1**
KZ	604.9	287.7	11493.3	42.4	23.7	81.4	6106.3	3786.5	1007.2	10648.8	30361.9	**310.4**
LI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	**0.0**
LT	87.1	164.5	200.6	38.0	18.8	80.1	0.8	7.2	49.9	755.0	10.0	**10.7**
LU	0.2	0.2	0.4	0.2	0.1	0.2	0.0	0.0	0.1	5.0	0.0	**0.6**
LV	57.3	107.8	238.7	73.6	15.6	58.9	0.9	5.2	43.6	663.3	8.8	**9.0**
MC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MD	530.4	107.0	152.6	1.8	6.2	20.0	1.8	9.5	167.7	2201.9	14.7	**5.0**
ME	40.1	320.0	6.5	0.3	4.2	10.6	0.0	0.2	13.2	47.9	0.2	**2.0**
MK	90.9	406.9	18.5	0.5	5.2	14.9	0.0	0.4	59.7	137.6	0.6	**2.8**
MT	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	**0.0**
NL	4.1	5.6	5.2	3.2	1.3	1.2	0.0	0.2	2.6	29.3	0.1	**6.7**
NO	68.1	86.7	360.0	268.4	7.7	35.4	1.6	6.9	49.1	481.9	13.5	**14.5**
PL	480.1	1517.8	412.4	99.5	166.7	1126.5	2.8	23.3	140.7	2268.4	29.4	**137.9**
PT	2.2	6.4	1.0	1.1	1.0	1.0	0.0	0.0	1.4	2.4	0.0	**7.6**
RO	**12299.3**	4791.2	496.6	10.9	104.2	390.2	5.6	15.6	817.1	4321.6	33.1	**39.2**
RS	736.5	**11414.6**	91.8	3.3	42.5	201.6	0.3	1.5	58.0	503.6	2.5	**20.8**
RU	4490.8	2779.8	**151061.0**	1184.4	268.3	941.8	2552.4	4213.2	6787.8	93825.7	12835.5	**567.2**
SE	196.2	224.1	765.9	**2508.5**	26.1	87.1	4.8	11.3	114.0	1502.1	32.6	**29.8**
SI	27.4	192.0	12.4	0.9	**671.8**	18.5	0.0	0.2	4.9	32.3	0.2	**4.6**
SK	216.2	1393.5	34.0	5.6	76.0	**1834.4**	0.1	1.6	17.1	181.3	1.7	**16.7**
TJ	3.3	2.5	42.1	0.2	0.3	0.3	**15029.9**	414.2	43.5	43.0	6460.5	**24.0**
TM	21.1	15.6	236.8	1.1	1.4	2.5	1178.5	**5643.9**	168.9	341.6	6261.1	**19.1**
TR	1265.2	603.9	1673.6	11.3	31.7	56.6	15.4	115.8	**31634.6**	12639.5	155.6	**61.8**
UA	3422.1	1975.0	4876.0	49.7	147.4	773.4	23.2	230.5	2138.6	**90657.4**	295.6	**139.3**
UZ	29.9	20.1	316.8	1.7	1.6	3.6	4837.7	1716.2	140.3	513.6	**26601.7**	**46.1**
SUM,t	**30.8**	**38.6**	**177.5**	**5.6**	**3.4**	**8.1**	**36.1**	**17.2**	**47.2**	**239.4**	**106.4**	
code	**RO**	**RS**	**RU**	**SE**	**SI**	**SK**	**TJ**	**TM**	**TR**	**UA**	**UZ**	

***Table 3.3**. Matrix of Cd country-to-country deposition from anthropogenic sources in 2020, kg*

Receptors ↓ Emitters →

code	AL	AM	AT	AZ	BA	BE	BG	BY	CH	CY	CZ	DE	DK
AL	**32.66**	0.00	1.00	0.01	5.51	0.09	3.56	0.10	0.31	0.00	0.63	1.75	0.05
AM	0.03	**7.29**	0.06	2.39	0.12	0.01	0.30	0.03	0.04	0.07	0.03	0.21	0.01
AT	0.34	0.00	**278.52**	0.01	10.44	3.63	1.60	0.33	32.46	0.00	37.35	202.14	1.41
AZ	0.05	2.26	0.18	**16.89**	0.30	0.04	0.71	0.16	0.10	0.06	0.13	0.66	0.04
BA	3.17	0.00	14.53	0.01	**424.06**	0.58	3.68	0.41	1.72	0.00	8.92	15.68	0.47
BE	0.00	0.00	0.67	0.00	0.05	**160.45**	0.08	0.09	1.89	0.00	1.01	86.03	0.98
BG	3.13	0.04	7.48	0.05	23.97	0.59	**493.07**	1.96	1.62	0.07	5.13	13.51	0.37
BY	0.60	0.07	17.78	0.30	13.11	5.70	12.29	**243.51**	5.35	0.04	29.56	114.35	7.93
CH	0.02	0.00	4.93	0.00	0.27	2.26	0.05	0.04	**143.29**	0.00	1.06	68.99	0.29
CY	0.04	0.01	0.04	0.00	0.14	0.00	0.35	0.02	0.02	**1.43**	0.02	0.08	0.00
CZ	0.23	0.00	81.13	0.02	12.05	6.07	2.65	1.12	14.80	0.00	**344.06**	302.79	2.92
DE	0.15	0.01	68.84	0.03	3.49	186.11	1.47	2.43	117.60	0.00	112.64	**4248.69**	26.88
DK	0.02	0.00	1.53	0.00	0.45	16.34	0.26	0.33	1.82	0.00	3.10	133.94	**90.52**
EE	0.04	0.00	3.02	0.01	1.17	3.09	0.61	6.75	1.26	0.00	4.83	36.04	4.81
ES	0.66	0.00	4.16	0.00	6.72	10.52	2.34	0.20	5.72	0.00	2.81	63.17	1.32
FI	0.17	0.03	7.58	0.07	4.17	8.20	2.73	10.49	3.86	0.01	13.42	99.14	14.21
FR	0.51	0.00	13.54	0.01	7.42	83.24	2.08	0.60	70.57	0.00	9.31	412.27	4.38
GB	0.02	0.00	1.96	0.01	0.48	26.41	0.19	0.54	2.71	0.00	3.02	107.43	6.75
GE	0.13	2.29	0.42	1.54	0.93	0.05	2.84	0.23	0.22	0.10	0.21	1.13	0.05
GR	8.29	0.03	3.72	0.05	12.99	0.43	63.85	1.02	1.07	0.09	2.52	7.85	0.21
HR	1.90	0.00	29.38	0.00	83.59	0.80	2.37	0.30	2.20	0.00	11.02	21.23	0.41
HU	1.50	0.01	61.67	0.02	53.75	1.50	10.84	1.26	3.91	0.00	26.67	42.67	0.80
IE	0.00	0.00	0.25	0.00	0.09	3.16	0.02	0.07	0.41	0.00	0.42	15.62	0.88
IS	0.01	0.00	0.15	0.01	0.13	1.01	0.08	0.10	0.22	0.00	0.33	5.49	0.51
IT	6.83	0.02	35.50	0.02	59.08	3.17	8.27	0.47	36.14	0.01	10.60	76.11	0.96
KY	0.03	0.17	0.13	0.43	0.18	0.04	0.29	0.08	0.15	0.03	0.07	0.60	0.02
KZ	0.87	2.36	5.51	8.09	6.85	1.62	17.01	7.99	2.51	0.22	6.22	27.44	2.25
LI	0.00	0.00	0.15	0.00	0.00	0.01	0.00	0.00	0.78	0.00	0.01	0.55	0.00
LT	0.14	0.01	6.00	0.03	3.70	4.50	1.67	44.89	2.12	0.00	11.31	67.31	9.28
LU	0.00	0.00	0.13	0.00	0.01	3.94	0.00	0.01	0.43	0.00	0.15	13.27	0.07
LV	0.08	0.01	5.33	0.02	2.57	5.11	1.18	18.32	2.04	0.00	9.00	63.32	9.91
MC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MD	0.20	0.03	1.38	0.06	2.18	0.22	9.43	1.16	0.39	0.01	1.17	4.55	0.18
ME	5.09	0.00	1.01	0.00	14.67	0.07	1.59	0.08	0.26	0.00	0.66	1.62	0.05
MK	6.76	0.00	1.26	0.01	4.33	0.09	9.14	0.19	0.34	0.00	0.82	2.27	0.06
MT	0.01	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
NL	0.01	0.00	1.04	0.00	0.15	104.25	0.16	0.09	1.70	0.00	1.39	134.19	1.63
NO	0.14	0.02	4.77	0.05	1.98	24.76	1.85	2.61	4.22	0.00	8.88	186.67	40.99
PL	0.99	0.04	80.22	0.13	32.35	26.71	10.57	39.60	21.46	0.01	249.45	660.73	21.78
PT	0.04	0.00	0.22	0.00	0.31	1.27	0.10	0.02	0.43	0.00	0.22	7.32	0.24
RO	3.34	0.10	26.09	0.15	52.42	1.84	116.10	4.62	5.02	0.07	14.46	47.15	1.11
RS	6.77	0.01	14.18	0.01	77.82	0.69	33.26	0.96	1.87	0.01	9.09	18.87	0.54
RU	5.98	6.11	72.07	19.44	64.47	31.86	124.28	207.98	28.58	0.93	90.36	479.27	48.33
SE	0.34	0.05	12.30	0.09	5.32	37.78	5.26	11.11	10.06	0.01	25.86	411.72	130.76
SI	0.35	0.00	27.26	0.00	8.70	0.42	0.55	0.10	1.51	0.00	4.08	13.10	0.20
SK	0.63	0.00	37.38	0.01	24.05	1.30	4.90	1.25	3.85	0.00	46.13	40.29	0.98
TJ	0.02	0.09	0.05	0.23	0.09	0.01	0.16	0.03	0.05	0.02	0.02	0.20	0.01
TM	0.07	0.57	0.26	2.14	0.40	0.05	0.85	0.23	0.16	0.04	0.18	0.94	0.07
TR	4.06	4.91	5.71	2.18	15.63	0.99	121.52	4.86	2.92	4.42	4.20	18.90	0.84
UA	2.80	0.42	39.29	1.46	40.94	5.93	86.27	47.98	9.64	0.16	42.99	132.03	5.10
UZ	0.10	0.41	0.35	1.31	0.50	0.08	1.31	0.38	0.18	0.04	0.28	1.33	0.10
SUM	**99.32**	**27.39**	**980.12**	**57.31**	**1084.16**	**777.02**	**1163.72**	**667.06**	**549.97**	**7.87**	**1155.80**	**8410.61**	**441.68**
code	**AL**	**AM**	**AT**	**AZ**	**BA**	**BE**	**BG**	**BY**	**CH**	**CY**	**CZ**	**DE**	**DK**

***Table 3.3**. Matrix of Cd country-to-country deposition from anthropogenic sources in 2020, kg (continued)*

Receptors ↓ Emitters →

code	EE	ES	FI	FR	GB	GE	GR	HR	HU	IE	IS	IT	KY	KZ
AL	0.02	8.93	0.02	1.31	0.24	0.03	14.75	1.53	2.18	0.01	0.00	24.11	0.00	0.14
AM	0.01	0.37	0.01	0.07	0.03	6.11	0.45	0.04	0.07	0.00	0.00	0.58	0.02	1.53
AT	0.13	17.93	0.19	16.65	5.82	0.03	0.74	21.09	27.76	0.15	0.00	42.78	0.00	0.18
AZ	0.05	0.55	0.05	0.14	0.12	6.87	0.62	0.11	0.21	0.00	0.00	0.87	0.11	9.51
BA	0.15	19.78	0.15	5.23	1.39	0.03	2.62	49.16	29.53	0.05	0.00	45.97	0.00	0.26
BE	0.03	10.66	0.06	51.97	34.20	0.00	0.05	0.05	0.07	0.53	0.00	0.85	0.00	0.03
BG	0.32	11.03	0.27	3.00	1.20	0.39	61.83	7.38	19.75	0.03	0.00	23.58	0.02	3.24
BY	6.93	10.95	5.09	8.47	18.95	0.64	5.96	7.62	24.36	0.46	0.00	15.38	0.11	10.83
CH	0.02	17.58	0.02	24.65	3.64	0.00	0.04	0.33	0.33	0.11	0.00	35.21	0.00	0.01
CY	0.00	0.51	0.00	0.07	0.01	0.02	1.11	0.05	0.05	0.00	0.00	1.64	0.00	0.04
CZ	0.38	11.18	0.49	13.44	9.82	0.04	0.81	12.72	40.93	0.24	0.00	12.67	0.00	0.35
DE	1.43	60.22	2.15	173.43	180.53	0.05	0.45	3.87	10.24	3.52	0.01	29.37	0.00	0.55
DK	0.22	6.27	0.27	13.07	49.42	0.01	0.10	0.28	1.12	1.02	0.00	1.08	0.00	0.23
EE	**107.26**	2.66	11.93	2.95	12.04	0.03	0.34	1.13	2.81	0.26	0.00	1.59	0.01	0.78
ES	0.07	**2688.81**	0.17	66.94	29.58	0.02	2.56	4.19	2.99	1.77	0.01	37.92	0.00	0.07
FI	73.12	13.56	**342.60**	9.38	31.82	0.21	1.44	2.99	6.65	0.76	0.01	5.85	0.06	4.32
FR	0.28	523.89	0.68	**878.73**	177.62	0.03	1.74	6.29	5.30	5.50	0.01	95.13	0.00	0.19
GB	0.37	38.93	0.72	45.87	**1482.75**	0.01	0.09	0.45	0.65	32.31	0.04	3.17	0.00	0.24
GE	0.04	1.07	0.04	0.30	0.15	**44.48**	1.74	0.31	0.59	0.00	0.00	2.24	0.04	2.69
GR	0.16	16.53	0.14	3.43	0.96	0.25	**292.57**	4.20	7.36	0.03	0.00	61.24	0.01	1.48
HR	0.11	24.69	0.12	7.77	1.60	0.03	2.02	**166.24**	40.06	0.05	0.00	53.10	0.00	0.16
HU	0.42	16.90	0.44	6.61	2.56	0.06	4.70	48.35	**370.18**	0.07	0.00	32.81	0.00	0.66
IE	0.07	9.49	0.13	5.52	69.15	0.00	0.01	0.08	0.07	**50.02**	0.01	0.67	0.00	0.02
IS	0.16	1.32	0.27	1.56	9.59	0.02	0.07	0.05	0.11	0.53	**1.19**	0.41	0.00	0.34
IT	0.15	166.17	0.18	85.19	6.82	0.12	13.91	43.69	20.51	0.30	0.00	**896.77**	0.00	0.56
KY	0.02	1.19	0.03	0.22	0.19	0.47	0.41	0.07	0.10	0.00	0.00	1.03	**104.40**	190.59
KZ	3.49	12.25	3.68	3.74	8.81	8.34	8.89	2.77	8.14	0.23	0.00	16.53	90.16	**3963.64**
LI	0.00	0.06	0.00	0.09	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00
LT	3.14	4.16	2.25	4.81	15.64	0.08	0.85	2.64	7.19	0.37	0.00	4.22	0.01	1.28
LU	0.00	1.14	0.01	4.20	1.01	0.00	0.00	0.01	0.01	0.02	0.00	0.15	0.00	0.00
LV	14.48	3.95	5.12	4.83	17.50	0.07	0.68	2.18	5.66	0.39	0.00	3.13	0.01	1.17
MC	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
MD	0.16	1.48	0.12	0.63	0.43	0.25	3.54	0.97	2.84	0.01	0.00	3.22	0.03	1.86
ME	0.02	6.44	0.02	0.93	0.20	0.01	1.62	1.90	2.65	0.01	0.00	17.44	0.00	0.07
MK	0.04	4.49	0.03	0.94	0.23	0.04	28.63	1.29	3.34	0.01	0.00	9.42	0.00	0.22
MT	0.00	0.05	0.00	0.01	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.40	0.00	0.00
NL	0.06	8.64	0.10	34.24	68.58	0.00	0.05	0.11	0.22	1.00	0.00	0.67	0.00	0.03
NO	3.69	22.26	7.58	25.95	130.73	0.14	0.90	0.98	4.33	3.53	0.07	4.58	0.02	3.33
PL	5.51	27.28	5.02	31.39	66.22	0.26	5.10	25.36	89.32	1.59	0.01	32.83	0.04	4.61
PT	0.01	123.05	0.02	3.81	5.02	0.00	0.19	0.15	0.15	0.32	0.00	1.99	0.00	0.01
RO	0.95	20.65	0.79	7.63	3.51	0.82	30.60	22.70	100.27	0.09	0.00	46.63	0.09	7.60
RS	0.27	14.29	0.24	3.93	1.62	0.07	15.16	20.85	63.73	0.06	0.00	30.45	0.01	0.90
RU	195.58	101.55	183.00	51.01	125.42	34.81	71.74	33.88	93.60	3.18	0.07	110.57	29.45	3180.19
SE	19.35	26.95	48.25	35.77	133.45	0.28	2.57	2.96	9.10	2.88	0.03	9.52	0.07	6.19
SI	0.03	9.15	0.04	3.94	0.72	0.01	0.44	41.97	9.15	0.02	0.00	24.35	0.00	0.06
SK	0.43	8.59	0.42	4.28	2.51	0.03	2.02	15.92	110.47	0.06	0.00	16.51	0.00	0.36
TJ	0.01	0.48	0.01	0.08	0.05	0.22	0.24	0.03	0.04	0.00	0.00	0.52	3.28	27.28
TM	0.09	1.04	0.09	0.23	0.25	1.63	0.81	0.16	0.31	0.01	0.00	1.42	1.39	75.32
TR	0.89	40.34	0.97	6.75	2.62	9.30	144.77	5.37	8.97	0.09	0.00	104.81	0.17	11.26
UA	4.97	25.53	4.16	13.66	16.10	4.06	36.57	24.25	89.33	0.41	0.00	51.26	0.33	43.28
UZ	0.12	1.09	0.12	0.26	0.41	1.25	1.04	0.18	0.43	0.01	0.00	1.78	12.24	184.90
SUM	**445.19**	**4146.14**	**628.29**	**1669.10**	**2731.27**	**121.61**	**767.56**	**588.90**	**1223.27**	**112.02**	**1.50**	**1918.54**	**242.10**	**7742.55**
code	**EE**	**ES**	**FI**	**FR**	**GB**	**GE**	**GR**	**HR**	**HU**	**IE**	**IS**	**IT**	**KY**	**KZ**

***Table 3.3**. Matrix of Cd country-to-country deposition from anthropogenic sources in 2020, kg (continued)*

Receptors ↓ Emitters →

code	LI	LT	LU	LV	MC	MD	ME	MK	MT	NL	NO	PL	PT
AL	0.00	0.02	0.01	0.04	0.00	0.42	3.50	7.45	0.04	0.18	0.01	3.72	0.86
AM	0.00	0.00	0.00	0.01	0.00	0.09	0.01	0.05	0.00	0.03	0.01	0.23	0.04
AT	0.33	0.11	0.45	0.20	0.00	0.46	0.33	0.43	0.01	7.49	0.25	49.24	1.62
AZ	0.00	0.02	0.00	0.05	0.00	0.34	0.02	0.10	0.00	0.10	0.03	1.09	0.06
BA	0.01	0.13	0.05	0.26	0.00	0.90	6.02	0.86	0.04	1.44	0.09	34.09	1.73
BE	0.01	0.04	7.51	0.06	0.00	0.04	0.00	0.01	0.00	64.98	0.26	2.93	0.98
BG	0.01	0.27	0.05	0.58	0.00	17.63	2.05	9.88	0.03	1.40	0.14	29.04	0.99
BY	0.03	10.98	0.32	21.10	0.00	23.88	0.62	0.93	0.01	16.71	1.82	395.35	1.42
CH	0.79	0.01	0.27	0.02	0.00	0.04	0.01	0.01	0.00	3.81	0.08	1.78	1.41
CY	0.00	0.00	0.00	0.00	0.00	0.05	0.02	0.05	0.00	0.01	0.00	0.11	0.04
CZ	0.09	0.39	0.78	0.67	0.00	0.49	0.36	0.51	0.00	13.39	0.50	266.46	1.06
DE	0.79	1.13	18.15	2.08	0.00	0.90	0.15	0.22	0.01	461.26	2.85	195.02	5.82
DK	0.01	0.28	0.52	0.50	0.00	0.21	0.03	0.05	0.00	48.85	1.10	16.89	0.76
EE	0.01	5.88	0.11	42.52	0.00	0.82	0.04	0.06	0.00	8.70	1.76	51.63	0.33
ES	0.02	0.06	0.59	0.09	0.00	0.49	0.42	0.57	0.04	20.05	0.42	12.68	271.93
FI	0.02	7.69	0.36	30.96	0.00	3.14	0.16	0.31	0.00	22.06	13.01	121.36	2.08
FR	0.13	0.22	6.69	0.35	0.02	0.78	0.36	0.49	0.06	102.88	1.57	31.28	39.99
GB	0.01	0.29	0.67	0.51	0.00	0.17	0.02	0.03	0.00	71.21	2.22	15.58	7.56
GE	0.00	0.03	0.00	0.07	0.00	0.99	0.08	0.31	0.00	0.13	0.03	1.53	0.10
GR	0.00	0.13	0.04	0.29	0.00	5.73	1.63	17.42	0.08	0.93	0.07	15.01	1.43
HR	0.01	0.09	0.06	0.18	0.00	0.59	1.66	0.80	0.04	1.88	0.09	32.07	2.00
HU	0.02	0.36	0.13	0.68	0.00	1.19	1.99	2.33	0.03	3.42	0.19	120.70	1.50
IE	0.00	0.05	0.10	0.09	0.00	0.01	0.00	0.00	0.00	7.31	0.33	2.44	2.28
IS	0.00	0.06	0.03	0.16	0.00	0.06	0.01	0.02	0.00	2.22	1.01	1.69	0.25
IT	0.17	0.13	0.30	0.24	0.02	2.13	3.66	3.86	0.30	6.04	0.22	33.11	13.16
KY	0.00	0.01	0.00	0.03	0.00	0.07	0.02	0.07	0.00	0.11	0.03	0.56	0.17
KZ	0.01	1.18	0.08	3.33	0.00	12.59	0.54	1.68	0.02	5.24	1.84	61.55	1.35
LI	**0.03**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.01
LT	0.01	**39.32**	0.19	22.28	0.00	2.80	0.14	0.24	0.00	13.35	0.98	151.79	0.52
LU	0.00	0.00	**4.23**	0.00	0.00	0.00	0.00	0.00	0.00	2.18	0.02	0.36	0.11
LV	0.01	26.16	0.19	**184.88**	0.00	1.96	0.09	0.14	0.00	14.05	1.71	105.74	0.53
MC	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MD	0.00	0.12	0.02	0.27	0.00	**117.59**	0.14	0.32	0.00	0.52	0.06	12.14	0.13
ME	0.00	0.02	0.01	0.04	0.00	0.24	**19.66**	0.82	0.03	0.16	0.01	3.80	0.58
MK	0.00	0.03	0.01	0.07	0.00	0.69	0.71	**41.30**	0.01	0.22	0.02	4.64	0.46
MT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.03**	0.00	0.00	0.01	0.00
NL	0.01	0.05	1.36	0.09	0.00	0.04	0.01	0.02	0.00	**339.24**	0.29	3.89	0.91
NO	0.02	1.35	0.89	3.48	0.00	1.45	0.14	0.28	0.00	70.06	**184.09**	56.15	3.01
PL	0.13	7.58	1.54	12.20	0.00	8.55	1.16	1.79	0.02	74.05	2.88	**3540.76**	2.84
PT	0.00	0.01	0.07	0.01	0.00	0.02	0.02	0.02	0.00	2.69	0.06	1.32	**443.21**
RO	0.03	0.77	0.16	1.73	0.00	67.10	3.02	6.40	0.04	4.47	0.40	105.87	1.71
RS	0.01	0.24	0.06	0.49	0.00	2.56	11.25	19.19	0.03	1.71	0.12	44.43	1.22
RU	0.15	38.09	1.56	143.73	0.00	104.71	4.38	11.26	0.09	86.77	32.70	935.34	12.47
SE	0.06	8.06	1.51	21.29	0.00	5.26	0.32	0.64	0.01	103.42	56.25	180.95	3.38
SI	0.01	0.03	0.04	0.05	0.00	0.21	0.30	0.21	0.01	0.91	0.04	9.81	0.65
SK	0.02	0.38	0.12	0.73	0.00	0.80	0.88	0.98	0.01	3.07	0.21	246.95	0.83
TJ	0.00	0.00	0.00	0.01	0.00	0.04	0.01	0.04	0.00	0.03	0.01	0.19	0.06
TM	0.00	0.04	0.00	0.10	0.00	0.36	0.04	0.17	0.00	0.15	0.05	1.54	0.11
TR	0.01	0.60	0.08	1.49	0.00	26.78	1.68	7.11	0.21	2.38	0.38	32.05	3.39
UA	0.05	3.51	0.38	8.55	0.00	158.98	2.50	4.83	0.04	15.77	1.72	520.65	2.15
UZ	0.00	0.06	0.00	0.15	0.00	0.55	0.04	0.19	0.00	0.22	0.08	2.47	0.11
SUM	3.05	156.00	49.68	506.68	0.07	574.90	70.22	144.44	1.26	1607.29	312.03	7457.99	839.32
code	**LI**	**LT**	**LU**	**LV**	**MC**	**MD**	**ME**	**MK**	**MT**	**NL**	**NO**	**PL**	**PT**

***Table 3.3**. Matrix of Cd country-to-country deposition from anthropogenic sources in 2020, kg (continued)*

Receptors ↓ Emitters →

code	RO	RS	RU	SE	SI	SK	TJ	TM	TR	UA	UZ	SUM
AL	3.46	33.24	1.74	0.02	0.57	0.84	0.00	0.00	1.39	2.10	0.01	**158.58**
AM	0.37	0.40	4.27	0.01	0.03	0.03	0.01	0.33	7.76	2.09	0.47	**36.13**
AT	6.95	20.53	4.30	0.39	62.64	17.53	0.00	0.00	0.55	3.95	0.01	**879.48**
AZ	1.24	1.02	27.96	0.04	0.09	0.12	0.06	2.46	6.86	8.63	3.69	**94.78**
BA	12.25	117.25	5.56	0.16	6.21	10.55	0.00	0.00	0.99	5.37	0.02	**831.54**
BE	0.15	0.10	0.85	0.18	0.07	0.13	0.00	0.00	0.06	1.10	0.00	**429.21**
BG	172.81	178.98	53.47	0.22	3.91	7.69	0.01	0.02	26.11	62.97	0.13	**1251.42**
BY	51.30	40.01	285.09	3.71	6.13	20.91	0.04	0.32	12.31	415.32	1.29	**1875.94**
CH	0.25	0.34	0.43	0.07	0.50	0.25	0.00	0.00	0.03	0.37	0.00	**313.65**
CY	0.24	0.28	0.71	0.00	0.03	0.02	0.00	0.00	5.95	0.70	0.01	**13.90**
CZ	8.62	32.52	4.63	0.96	11.55	43.93	0.00	0.01	0.83	4.62	0.03	**1263.33**
DE	4.10	7.39	11.21	4.70	5.17	10.08	0.00	0.03	0.80	16.88	0.04	**5982.91**
DK	0.97	1.29	1.98	1.65	0.26	0.90	0.00	0.00	0.16	1.66	0.01	**399.49**
EE	2.49	2.68	28.91	5.69	1.08	2.69	0.00	0.01	0.64	9.82	0.07	**371.36**
ES	3.95	10.27	2.72	0.42	3.59	1.72	0.00	0.00	0.40	2.72	0.01	**3265.86**
FI	9.85	9.16	237.62	47.43	2.90	5.80	0.02	0.06	3.16	31.77	0.42	**1206.21**
FR	5.70	12.00	5.89	1.34	7.00	3.69	0.00	0.00	0.50	5.44	0.01	**2525.69**
GB	0.71	0.95	3.14	1.36	0.54	0.59	0.00	0.00	0.14	1.90	0.01	**1862.73**
GE	4.07	3.49	25.82	0.04	0.25	0.26	0.02	0.35	18.22	17.16	0.83	**137.65**
GR	31.15	62.42	27.55	0.11	2.04	3.06	0.00	0.02	37.38	32.04	0.08	**729.07**
HR	10.90	87.67	5.54	0.14	37.08	10.90	0.00	0.00	0.62	3.44	0.01	**644.93**
HU	66.38	254.22	12.04	0.34	23.74	89.69	0.00	0.02	1.34	9.15	0.05	**1277.87**
IE	0.06	0.11	0.43	0.21	0.09	0.09	0.00	0.00	0.01	0.28	0.00	**170.10**
IS	0.22	0.24	2.76	0.35	0.05	0.10	0.00	0.00	0.17	0.79	0.03	**33.90**
IT	17.84	68.33	11.04	0.31	46.25	8.34	0.00	0.01	2.84	11.23	0.04	**1701.09**
KY	0.42	0.45	14.20	0.03	0.08	0.06	28.92	2.87	2.46	2.36	384.70	**738.58**
KZ	37.97	21.08	1915.05	2.32	2.32	5.90	29.35	25.90	31.09	268.35	523.62	**7171.96**
LI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.86**
LT	8.47	10.04	31.20	2.82	2.37	6.58	0.00	0.04	1.80	27.58	0.16	**520.27**
LU	0.01	0.01	0.05	0.01	0.01	0.02	0.00	0.00	0.00	0.11	0.00	**31.70**
LV	5.64	6.43	37.55	5.60	2.01	5.16	0.00	0.03	1.55	23.14	0.14	**598.80**
MC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.05**
MD	43.61	8.40	26.44	0.11	0.72	1.48	0.01	0.06	6.45	63.84	0.24	**319.15**
ME	2.55	34.41	1.04	0.02	0.50	0.94	0.00	0.00	0.53	1.23	0.00	**123.03**
MK	6.09	53.45	2.93	0.03	0.61	1.23	0.00	0.00	2.37	3.42	0.01	**192.25**
MT	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.64**
NL	0.22	0.34	0.77	0.21	0.14	0.19	0.00	0.00	0.08	0.70	0.00	**706.88**
NO	5.70	5.74	56.90	17.07	0.85	3.64	0.01	0.04	1.57	13.53	0.21	**911.20**
PL	51.08	98.32	62.28	6.79	22.36	127.47	0.01	0.14	5.38	70.09	0.46	**5536.44**
PT	0.13	0.53	0.16	0.07	0.11	0.10	0.00	0.00	0.06	0.11	0.00	**593.57**
RO	1050.37	344.35	85.38	0.66	13.14	30.29	0.03	0.10	31.71	108.75	0.57	**2371.85**
RS	60.14	1022.97	15.42	0.21	5.51	17.46	0.00	0.01	2.35	12.70	0.04	**1533.82**
RU	298.43	198.79	25976.20	63.26	29.24	72.19	12.17	27.86	221.63	2426.99	218.30	**36310.02**
SE	16.69	14.38	119.79	181.69	2.88	8.51	0.02	0.07	3.65	44.41	0.52	**1721.81**
SI	2.97	12.95	2.11	0.06	106.00	2.53	0.00	0.00	0.18	1.29	0.00	**286.53**
SK	27.60	93.56	5.78	0.36	10.95	209.19	0.00	0.01	0.73	6.16	0.03	**931.72**
TJ	0.20	0.20	5.38	0.01	0.03	0.02	73.34	2.75	1.28	0.93	114.55	**232.32**
TM	1.46	1.25	38.87	0.06	0.14	0.18	6.20	43.31	4.56	8.29	123.20	**318.79**
TR	77.22	52.26	280.21	0.60	3.40	4.50	0.07	0.72	1160.99	276.91	2.52	**2463.05**
UA	283.73	143.80	866.05	3.03	18.42	58.81	0.12	1.51	79.68	3057.55	5.06	**5965.81**
UZ	1.89	1.55	53.28	0.10	0.16	0.27	25.32	12.83	4.15	12.43	518.91	**844.98**
SUM	**2398.65**	**3070.21**	**30362.67**	**354.95**	**443.74**	**796.65**	**175.73**	**121.95**	**1693.45**	**7082.39**	**1900.50**	
code	**RO**	**RS**	**RU**	**SE**	**SI**	**SK**	**TJ**	**TM**	**TR**	**UA**	**UZ**	**SUM**

Table 3.4. *Matrix of Hg country-to-country deposition from anthropogenic sources in 2020, kg*

Receptors ↓ Emitters →

code	AL	AM	AT	AZ	BA	BE	BG	BY	CH	CY	CZ	DE	DK
AL	**9.58**	0.00	0.45	0.02	4.28	0.09	1.04	0.03	0.22	0.00	0.89	1.26	0.03
AM	0.02	**2.41**	0.07	4.13	0.24	0.03	0.14	0.02	0.07	0.02	0.15	0.38	0.01
AT	0.10	0.00	**86.69**	0.02	4.93	1.67	0.22	0.06	12.75	0.00	34.80	61.07	0.40
AZ	0.04	0.87	0.18	**28.10**	0.48	0.07	0.32	0.07	0.16	0.02	0.38	0.94	0.04
BA	0.92	0.00	4.63	0.02	**232.25**	0.36	0.68	0.07	0.90	0.00	8.56	8.22	0.15
BE	0.01	0.00	0.22	0.00	0.09	**55.92**	0.03	0.01	0.65	0.00	1.28	24.13	0.22
BG	1.12	0.02	2.46	0.11	16.04	0.42	**96.02**	0.44	0.89	0.02	6.20	7.79	0.20
BY	0.27	0.05	4.09	0.44	7.90	2.01	2.54	**31.62**	2.03	0.01	21.06	49.07	2.22
CH	0.01	0.00	1.49	0.00	0.37	0.89	0.04	0.01	**47.60**	0.00	1.61	16.12	0.09
CY	0.03	0.00	0.03	0.01	0.18	0.01	0.11	0.00	0.02	**0.45**	0.04	0.09	0.00
CZ	0.07	0.00	15.94	0.03	4.96	2.17	0.32	0.19	4.45	0.00	**237.53**	105.17	0.76
DE	0.08	0.01	16.69	0.08	2.15	53.68	0.33	0.38	32.63	0.00	96.55	**1061.19**	6.05
DK	0.01	0.00	0.31	0.01	0.23	3.37	0.04	0.05	0.40	0.00	2.14	31.94	**17.97**
EE	0.02	0.00	0.61	0.01	0.58	0.83	0.13	0.78	0.43	0.00	3.60	14.48	1.52
ES	0.41	0.00	2.50	0.02	7.57	4.97	0.89	0.05	4.19	0.00	4.40	25.31	0.45
FI	0.11	0.01	2.04	0.09	2.38	3.22	0.72	1.69	1.69	0.00	12.68	51.47	5.64
FR	0.33	0.00	4.81	0.02	8.05	33.04	0.84	0.09	28.08	0.00	11.93	128.66	1.38
GB	0.02	0.00	0.81	0.01	0.51	7.06	0.11	0.09	1.41	0.00	3.57	30.37	1.99
GE	0.08	2.05	0.31	3.06	1.08	0.08	1.05	0.07	0.24	0.03	0.53	1.19	0.04
GR	3.45	0.02	1.60	0.12	10.62	0.38	16.56	0.23	0.84	0.03	3.55	5.41	0.13
HR	0.52	0.00	9.43	0.01	48.18	0.42	0.36	0.05	1.11	0.00	10.96	10.32	0.15
HU	0.40	0.00	16.14	0.05	28.71	0.70	1.94	0.25	1.85	0.00	24.51	19.96	0.30
IE	0.01	0.00	0.13	0.00	0.14	1.06	0.02	0.01	0.21	0.00	0.63	5.02	0.25
IS	0.01	0.00	0.10	0.02	0.24	0.38	0.06	0.02	0.20	0.00	0.36	2.36	0.28
IT	3.05	0.02	14.75	0.07	46.20	2.15	2.41	0.11	16.39	0.00	14.88	32.42	0.48
KY	0.05	0.10	0.27	0.84	0.64	0.12	0.30	0.07	0.31	0.02	0.53	1.54	0.06
KZ	0.69	1.32	4.90	15.20	11.43	2.07	6.83	2.50	4.08	0.11	12.70	32.21	1.92
LI	0.00	0.00	0.04	0.00	0.00	0.01	0.00	0.00	0.28	0.00	0.01	0.13	0.00
LT	0.06	0.01	1.29	0.06	1.92	1.29	0.42	4.73	0.78	0.00	8.25	26.54	2.21
LU	0.00	0.00	0.04	0.00	0.01	0.94	0.00	0.00	0.11	0.00	0.18	3.40	0.01
LV	0.04	0.01	1.04	0.04	1.32	1.30	0.26	2.25	0.68	0.00	6.32	23.76	2.46
MC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MD	0.09	0.01	0.47	0.09	1.69	0.11	1.92	0.25	0.21	0.00	1.46	2.38	0.09
ME	1.52	0.00	0.40	0.01	11.56	0.06	0.37	0.02	0.16	0.00	0.83	0.98	0.02
MK	2.08	0.00	0.47	0.02	3.36	0.09	2.96	0.04	0.20	0.00	1.01	1.36	0.03
MT	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
NL	0.00	0.00	0.30	0.00	0.11	27.88	0.03	0.02	0.49	0.00	1.48	31.23	0.45
NO	0.08	0.01	1.40	0.11	2.01	6.96	0.51	0.49	1.58	0.00	7.39	57.43	11.67
PL	0.39	0.02	15.29	0.22	15.81	7.85	2.76	4.90	6.46	0.01	165.33	311.20	5.57
PT	0.02	0.00	0.15	0.00	0.39	0.61	0.04	0.00	0.32	0.00	0.37	2.87	0.07
RO	1.20	0.05	8.25	0.28	33.82	0.98	22.36	1.04	2.43	0.02	16.88	22.17	0.53
RS	1.88	0.00	4.15	0.03	47.92	0.43	6.40	0.20	0.88	0.00	9.43	9.32	0.18
RU	3.20	3.29	28.40	31.11	57.91	17.35	33.90	36.50	20.42	0.33	100.03	281.62	21.93
SE	0.17	0.02	2.94	0.14	4.04	9.45	1.23	1.79	3.31	0.00	19.73	128.03	28.98
SI	0.09	0.00	8.55	0.01	3.92	0.21	0.07	0.01	0.65	0.00	4.20	5.30	0.06
SK	0.18	0.00	7.97	0.02	12.19	0.58	0.93	0.23	1.60	0.00	35.47	17.74	0.27
TJ	0.03	0.05	0.14	0.50	0.34	0.05	0.16	0.03	0.16	0.01	0.26	0.71	0.02
TM	0.11	0.39	0.62	5.56	1.46	0.22	0.84	0.22	0.56	0.04	1.28	3.38	0.17
TR	2.20	2.58	4.16	5.46	19.01	1.17	30.06	1.17	2.95	1.13	8.35	16.70	0.58
UA	1.15	0.27	10.64	2.00	26.77	2.53	17.77	8.79	4.35	0.06	37.55	62.30	2.10
UZ	0.11	0.26	0.57	2.91	1.38	0.22	0.84	0.24	0.50	0.03	1.25	3.32	0.18
SUM	**35.99**	**13.91**	**288.93**	**101.05**	**687.41**	**257.45**	**257.90**	**101.89**	**212.93**	**2.38**	**943.09**	**2739.94**	**120.32**
code	**AL**	**AM**	**AT**	**AZ**	**BA**	**BE**	**BG**	**BY**	**CH**	**CY**	**CZ**	**DE**	**DK**

***Table 3.4**. Matrix of Hg country-to-country deposition from anthropogenic sources in 2020, kg (continued)*

Receptors ↓ Emitters →

code	EE	ES	FI	FR	GB	GE	GR	HR	HU	IE	IS	IT	KY	KZ
AL	0.02	1.70	0.02	1.05	0.37	0.01	7.69	0.57	0.73	0.03	0.00	9.74	0.00	0.26
AM	0.02	0.24	0.03	0.18	0.13	3.98	0.33	0.04	0.08	0.01	0.00	0.65	0.01	3.08
AT	0.12	4.38	0.14	9.02	3.53	0.02	0.35	3.09	5.22	0.26	0.01	51.38	0.00	0.44
AZ	0.09	0.41	0.09	0.33	0.31	3.57	0.52	0.08	0.18	0.02	0.00	1.20	0.05	13.66
BA	0.09	3.86	0.07	3.23	1.31	0.02	1.48	7.99	7.62	0.11	0.01	25.51	0.00	0.68
BE	0.03	2.42	0.05	25.03	10.25	0.00	0.05	0.03	0.05	0.39	0.01	0.82	0.00	0.06
BG	0.29	2.87	0.22	2.52	1.55	0.13	15.66	1.68	6.46	0.12	0.01	13.09	0.01	3.05
BY	4.22	3.13	2.48	4.85	9.12	0.30	2.68	1.26	5.61	0.46	0.07	12.08	0.04	11.81
CH	0.02	4.11	0.03	13.31	1.99	0.00	0.05	0.18	0.15	0.17	0.00	59.91	0.00	0.07
CY	0.00	0.13	0.00	0.07	0.03	0.01	0.54	0.03	0.03	0.00	0.00	0.51	0.00	0.04
CZ	0.27	2.82	0.27	6.95	4.60	0.02	0.35	1.22	6.63	0.27	0.01	10.42	0.00	0.63
DE	0.99	14.00	1.16	73.29	57.93	0.04	0.41	0.64	2.28	2.45	0.08	30.26	0.00	1.35
DK	0.16	1.32	0.16	4.02	16.86	0.01	0.06	0.04	0.17	0.65	0.03	0.71	0.00	0.23
EE	**31.40**	0.76	3.72	1.35	4.83	0.01	0.18	0.12	0.48	0.22	0.02	1.34	0.00	0.72
ES	0.12	**414.12**	0.20	38.91	18.43	0.02	1.97	2.26	1.40	1.86	0.07	36.56	0.00	0.41
FI	33.68	3.79	**110.35**	5.95	20.01	0.06	0.95	0.45	1.32	1.05	0.14	5.56	0.02	4.51
FR	0.41	109.78	0.72	**417.05**	72.00	0.02	1.49	2.66	2.06	5.67	0.11	62.55	0.00	0.72
GB	0.31	9.25	0.43	18.45	**525.83**	0.01	0.14	0.14	0.23	21.53	0.14	3.21	0.00	0.38
GE	0.07	0.63	0.07	0.49	0.34	**15.32**	1.19	0.16	0.34	0.02	0.00	2.22	0.02	4.55
GR	0.15	4.15	0.13	3.23	1.36	0.13	**127.00**	1.45	2.65	0.12	0.01	21.18	0.00	1.75
HR	0.07	4.21	0.06	3.85	1.36	0.01	1.01	**25.79**	9.93	0.12	0.01	31.90	0.00	0.30
HU	0.24	3.34	0.18	3.62	1.85	0.03	1.84	5.55	**92.32**	0.13	0.01	19.95	0.00	0.93
IE	0.06	2.60	0.07	2.90	25.46	0.00	0.03	0.04	0.05	**34.47**	0.05	0.80	0.00	0.06
IS	0.09	0.72	0.12	1.02	4.63	0.01	0.07	0.04	0.05	0.51	**2.84**	0.59	0.00	0.36
IT	0.19	32.16	0.20	39.69	7.35	0.08	10.00	17.02	6.30	0.71	0.03	**737.95**	0.00	1.97
KY	0.12	0.92	0.13	0.66	0.59	0.34	0.63	0.11	0.20	0.04	0.01	2.15	**29.04**	113.50
KZ	5.17	8.90	5.43	8.09	13.84	5.57	8.05	1.82	4.92	0.84	0.19	26.09	32.82	**3627.42**
LI	0.00	0.01	0.00	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00
LT	1.71	1.14	0.95	2.28	5.75	0.04	0.51	0.34	1.50	0.27	0.03	3.56	0.00	1.74
LU	0.00	0.29	0.00	1.99	0.38	0.00	0.00	0.00	0.01	0.02	0.00	0.12	0.00	0.00
LV	5.34	1.03	1.74	2.05	6.65	0.03	0.35	0.26	1.04	0.30	0.04	2.63	0.00	1.17
MC	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
MD	0.15	0.51	0.11	0.49	0.46	0.08	1.22	0.22	1.01	0.03	0.00	2.24	0.01	1.54
ME	0.02	1.14	0.01	0.70	0.27	0.01	0.82	0.51	0.80	0.02	0.00	6.89	0.00	0.17
MK	0.03	1.00	0.03	0.73	0.31	0.02	10.55	0.40	1.03	0.03	0.00	4.72	0.00	0.35
MT	0.00	0.02	0.00	0.01	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.09	0.00	0.00
NL	0.04	1.60	0.06	12.49	20.54	0.00	0.04	0.02	0.05	0.56	0.01	0.66	0.00	0.07
NO	2.47	6.04	4.28	11.75	60.53	0.08	0.63	0.32	1.03	3.22	0.41	4.75	0.02	4.60
PL	3.41	7.04	2.27	15.17	25.65	0.14	3.21	2.87	18.59	1.22	0.08	24.32	0.02	6.15
PT	0.01	19.62	0.02	2.65	3.00	0.00	0.12	0.10	0.09	0.32	0.01	1.77	0.00	0.02
RO	0.81	5.20	0.56	5.13	3.40	0.27	11.20	4.20	27.83	0.23	0.02	29.63	0.02	5.59
RS	0.19	2.95	0.13	2.67	1.39	0.03	5.41	3.53	16.41	0.10	0.01	16.21	0.00	1.28
RU	120.22	40.10	106.12	47.12	106.79	17.13	39.55	9.54	30.84	6.34	1.24	115.75	11.01	3338.15
SE	9.67	6.84	22.00	14.69	52.47	0.11	1.26	0.60	2.06	2.31	0.22	8.67	0.03	5.33
SI	0.02	1.59	0.02	1.72	0.57	0.01	0.23	6.47	2.08	0.05	0.00	17.11	0.00	0.11
SK	0.24	2.00	0.16	2.54	1.49	0.02	0.87	1.98	26.89	0.09	0.01	10.94	0.00	0.53
TJ	0.05	0.47	0.05	0.32	0.25	0.18	0.37	0.06	0.10	0.02	0.00	1.15	1.11	22.41
TM	0.42	1.31	0.43	1.05	1.33	1.47	1.39	0.25	0.54	0.08	0.02	3.80	1.08	133.32
TR	0.88	12.53	0.89	8.54	4.98	5.48	49.32	2.87	4.90	0.41	0.05	42.39	0.05	16.06
UA	4.12	7.80	2.83	8.83	10.69	1.68	14.80	4.00	23.23	0.61	0.10	37.05	0.12	41.94
UZ	0.46	1.18	0.46	0.97	1.34	0.98	1.27	0.22	0.52	0.08	0.02	3.40	3.66	186.50
SUM	**228.68**	**758.13**	**269.66**	**833.05**	**1114.09**	**57.44**	**327.86**	**113.22**	**318.00**	**88.54**	**6.16**	**1506.25**	**79.17**	**7559.98**
code	**EE**	**ES**	**FI**	**FR**	**GB**	**GE**	**GR**	**HR**	**HU**	**IE**	**IS**	**IT**	**KY**	**KZ**

***Table 3.4**. Matrix of Hg country-to-country deposition from anthropogenic sources in 2020, kg (continued)*

Receptors ↓ Emitters →

code	LI	LT	LU	LV	MC	MD	ME	MK	MT	NL	NO	PL	PT
AL	0.00	0.01	0.01	0.01	0.00	0.05	0.56	4.92	0.01	0.04	0.01	2.16	0.31
AM	0.00	0.01	0.00	0.00	0.00	0.02	0.01	0.08	0.00	0.02	0.01	0.45	0.05
AT	0.01	0.05	0.33	0.03	0.00	0.05	0.09	0.17	0.00	0.73	0.10	21.93	0.71
AZ	0.00	0.02	0.01	0.02	0.00	0.06	0.02	0.14	0.00	0.04	0.04	1.39	0.09
BA	0.00	0.04	0.06	0.02	0.00	0.07	1.90	0.54	0.01	0.19	0.05	13.02	0.67
BE	0.00	0.01	4.11	0.01	0.00	0.00	0.00	0.02	0.00	5.77	0.10	1.42	0.34
BG	0.00	0.13	0.06	0.07	0.00	1.68	0.76	6.40	0.01	0.23	0.11	17.31	0.55
BY	0.00	3.84	0.21	1.92	0.00	1.37	0.25	0.83	0.00	1.53	0.84	183.53	0.62
CH	0.02	0.01	0.18	0.00	0.00	0.01	0.01	0.02	0.00	0.31	0.03	1.14	0.58
CY	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.06	0.00	0.00	0.00	0.12	0.02
CZ	0.00	0.14	0.45	0.08	0.00	0.05	0.09	0.21	0.00	1.07	0.16	90.79	0.45
DE	0.02	0.42	9.20	0.24	0.00	0.09	0.06	0.18	0.00	30.24	0.85	86.35	2.11
DK	0.00	0.10	0.18	0.06	0.00	0.02	0.01	0.03	0.00	3.94	0.48	6.52	0.24
EE	0.00	1.81	0.05	2.85	0.00	0.05	0.02	0.06	0.00	0.81	0.59	23.77	0.14
ES	0.00	0.03	0.58	0.02	0.01	0.08	0.26	0.67	0.01	1.99	0.20	7.06	69.94
FI	0.00	2.55	0.25	2.89	0.00	0.16	0.10	0.36	0.00	2.88	5.44	66.30	0.85
FR	0.00	0.08	5.08	0.05	0.04	0.10	0.23	0.58	0.01	9.22	0.78	13.59	12.47
GB	0.00	0.09	0.34	0.06	0.00	0.02	0.01	0.05	0.00	6.55	0.79	9.28	2.05
GE	0.00	0.02	0.01	0.02	0.00	0.14	0.05	0.32	0.00	0.04	0.04	1.68	0.13
GR	0.00	0.07	0.06	0.04	0.00	0.62	0.59	11.46	0.02	0.18	0.07	9.24	0.71
HR	0.00	0.03	0.07	0.02	0.00	0.05	0.37	0.35	0.01	0.21	0.05	12.49	0.71
HU	0.00	0.11	0.12	0.06	0.00	0.15	0.74	1.11	0.01	0.36	0.09	48.01	0.59
IE	0.00	0.02	0.07	0.01	0.00	0.00	0.00	0.01	0.00	0.69	0.11	1.59	0.82
IS	0.00	0.03	0.02	0.02	0.00	0.01	0.01	0.03	0.00	0.33	0.38	0.97	0.24
IT	0.00	0.08	0.34	0.04	0.04	0.22	1.51	3.07	0.08	0.91	0.20	18.23	4.77
KY	0.00	0.03	0.01	0.02	0.00	0.04	0.03	0.18	0.00	0.06	0.06	1.63	0.21
KZ	0.00	1.03	0.22	0.82	0.00	1.50	0.50	2.56	0.01	1.38	2.38	57.93	1.96
LI	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
LT	0.00	**12.95**	0.11	1.81	0.00	0.18	0.06	0.19	0.00	1.12	0.37	66.77	0.21
LU	0.00	0.00	**2.31**	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.01	0.14	0.04
LV	0.00	8.80	0.09	**10.38**	0.00	0.11	0.04	0.12	0.00	1.21	0.59	47.44	0.20
MC	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MD	0.00	0.07	0.01	0.04	0.00	**9.94**	0.07	0.29	0.00	0.07	0.05	8.21	0.10
ME	0.00	0.01	0.01	0.00	0.00	0.02	**3.16**	0.55	0.01	0.03	0.01	1.96	0.21
MK	0.00	0.02	0.01	0.01	0.00	0.09	0.23	**21.18**	0.00	0.04	0.01	2.56	0.19
MT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.02**	0.00	0.00	0.01	0.00
NL	0.00	0.02	0.54	0.01	0.00	0.00	0.00	0.01	0.00	**36.98**	0.12	2.53	0.25
NO	0.00	0.64	0.40	0.46	0.00	0.11	0.08	0.25	0.00	7.15	**36.33**	29.85	1.29
PL	0.00	2.66	0.86	1.28	0.00	0.68	0.41	1.23	0.01	6.03	0.99	**1287.43**	1.20
PT	0.00	0.00	0.06	0.00	0.00	0.00	0.01	0.03	0.00	0.28	0.02	0.81	**110.62**
RO	0.00	0.33	0.15	0.20	0.00	6.10	1.29	4.42	0.01	0.55	0.26	62.36	0.95
RS	0.00	0.09	0.07	0.05	0.00	0.24	3.54	10.66	0.01	0.22	0.07	20.73	0.53
RU	0.01	16.89	1.58	17.64	0.01	8.11	2.36	11.20	0.04	13.34	22.34	560.47	8.60
SE	0.00	3.25	0.66	2.30	0.00	0.28	0.18	0.55	0.00	9.13	13.79	91.26	1.29
SI	0.00	0.01	0.04	0.00	0.00	0.02	0.06	0.07	0.00	0.09	0.02	3.94	0.25
SK	0.00	0.11	0.10	0.07	0.00	0.09	0.30	0.49	0.00	0.31	0.08	79.50	0.37
TJ	0.00	0.01	0.01	0.01	0.00	0.02	0.02	0.11	0.00	0.03	0.03	0.78	0.10
TM	0.00	0.09	0.03	0.07	0.00	0.16	0.07	0.41	0.00	0.14	0.20	5.07	0.28
TR	0.00	0.39	0.17	0.24	0.00	2.80	0.94	7.23	0.05	0.62	0.44	28.30	2.44
UA	0.00	1.63	0.30	1.02	0.00	12.41	1.00	3.94	0.01	1.75	1.13	275.57	1.44
UZ	0.00	0.10	0.02	0.07	0.00	0.16	0.06	0.39	0.00	0.14	0.21	5.41	0.26
SUM	**0.08**	**58.85**	**29.52**	**45.02**	**0.14**	**48.14**	**22.09**	**97.73**	**0.37**	**149.10**	**91.01**	**3278.98**	**233.14**
code	**LI**	**LT**	**LU**	**LV**	**MC**	**MD**	**ME**	**MK**	**MT**	**NL**	**NO**	**PL**	**PT**

***Table 3.4**. Matrix of Hg country-to-country deposition from anthropogenic sources in 2020, kg (continued)*

Receptors ↓ Emitters →

code	RO	RS	RU	SE	SI	SK	TJ	TM	TR	UA	UZ	SUM
AL	1.35	7.90	0.40	0.02	0.17	0.60	0.00	0.01	1.29	4.18	0.01	**64.11**
AM	0.31	0.27	1.47	0.02	0.03	0.07	0.00	0.41	8.91	6.71	0.39	**35.72**
AT	1.80	3.92	0.83	0.21	9.61	8.86	0.00	0.01	0.64	7.75	0.02	**338.52**
AZ	0.82	0.56	6.28	0.07	0.06	0.17	0.02	2.42	10.01	23.98	1.94	**100.36**
BA	3.31	25.30	0.94	0.10	1.29	5.71	0.00	0.01	1.49	7.78	0.03	**371.28**
BE	0.08	0.07	0.15	0.10	0.02	0.10	0.00	0.00	0.17	1.52	0.00	**135.74**
BG	53.93	47.17	6.35	0.21	0.85	4.84	0.00	0.05	20.53	99.33	0.09	**440.04**
BY	11.78	9.83	37.82	2.01	1.00	7.19	0.01	0.35	15.19	338.17	0.72	**800.44**
CH	0.16	0.19	0.11	0.05	0.17	0.18	0.00	0.00	0.13	0.85	0.00	**152.40**
CY	0.14	0.13	0.10	0.00	0.02	0.02	0.00	0.00	7.48	1.24	0.00	**11.74**
CZ	2.01	5.39	0.98	0.44	1.41	18.57	0.00	0.03	0.97	8.50	0.03	**537.87**
DE	1.48	1.71	2.73	2.02	0.91	4.53	0.00	0.06	1.82	25.26	0.05	**1625.02**
DK	0.20	0.22	0.36	0.93	0.04	0.25	0.00	0.00	0.29	2.44	0.01	**97.21**
EE	0.62	0.59	3.51	2.45	0.13	0.75	0.00	0.01	0.68	9.07	0.03	**116.13**
ES	2.24	3.96	0.73	0.31	1.45	1.47	0.00	0.01	1.21	6.63	0.02	**666.00**
FI	2.56	2.21	32.20	19.68	0.45	1.93	0.01	0.07	3.17	32.87	0.24	**446.77**
FR	2.97	4.65	1.54	1.04	1.89	2.27	0.00	0.01	1.78	11.74	0.02	**962.64**
GB	0.40	0.42	0.84	0.75	0.13	0.35	0.00	0.01	0.49	5.24	0.01	**653.88**
GE	2.11	1.46	5.38	0.06	0.12	0.28	0.01	0.46	29.83	32.96	0.52	**110.85**
GR	11.58	18.03	3.85	0.13	0.59	2.22	0.00	0.03	35.77	58.63	0.07	**360.22**
HR	3.01	17.33	0.62	0.09	6.44	6.28	0.00	0.01	0.92	4.89	0.01	**214.08**
HU	19.40	51.90	1.96	0.20	3.70	44.20	0.00	0.04	1.97	16.81	0.04	**416.39**
IE	0.07	0.08	0.15	0.11	0.03	0.08	0.00	0.00	0.07	1.05	0.00	**79.06**
IS	0.16	0.15	0.45	0.24	0.03	0.06	0.00	0.01	0.38	1.42	0.02	**20.02**
IT	6.05	16.76	2.19	0.33	11.80	5.60	0.00	0.03	5.70	23.75	0.07	**1088.36**
KY	0.69	0.61	6.30	0.10	0.09	0.20	9.67	2.12	6.90	14.03	183.57	**379.85**
KZ	20.24	12.37	394.89	3.67	1.50	5.44	11.40	23.01	74.91	677.54	301.16	**5441.50**
LI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	**0.67**
LT	2.29	2.32	4.45	1.28	0.31	2.13	0.00	0.05	2.32	28.60	0.09	**194.98**
LU	0.01	0.01	0.02	0.01	0.00	0.02	0.00	0.00	0.01	0.17	0.00	**10.41**
LV	1.39	1.47	4.50	2.30	0.24	1.54	0.00	0.03	1.87	23.47	0.07	**167.96**
MC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.02**
MD	9.25	2.54	2.87	0.10	0.15	0.92	0.00	0.06	6.80	71.61	0.10	**130.09**
ME	0.86	8.44	0.23	0.02	0.13	0.60	0.00	0.00	0.52	2.06	0.01	**46.09**
MK	2.38	11.66	0.53	0.03	0.16	0.79	0.00	0.01	1.95	6.69	0.01	**79.36**
MT	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	**0.26**
NL	0.08	0.10	0.15	0.13	0.03	0.10	0.00	0.00	0.14	1.13	0.00	**140.48**
NO	1.93	1.87	10.95	9.99	0.26	1.32	0.01	0.07	3.07	23.62	0.18	**319.60**
PL	14.43	20.40	11.61	3.39	2.68	39.91	0.00	0.22	9.69	102.14	0.33	**2153.52**
PT	0.11	0.22	0.05	0.04	0.06	0.10	0.00	0.00	0.08	0.30	0.00	**145.40**
RO	275.16	84.52	10.54	0.55	2.60	17.92	0.01	0.15	29.87	160.30	0.25	**862.58**
RS	18.37	236.71	2.13	0.15	1.14	9.59	0.00	0.02	1.92	18.94	0.04	**456.33**
RU	100.58	65.68	3611.61	42.48	7.91	36.26	4.40	24.40	347.73	4651.61	116.31	**14297.45**
SE	4.32	3.99	15.42	68.95	0.55	2.85	0.01	0.08	4.78	50.29	0.30	**600.34**
SI	0.77	2.40	0.24	0.03	18.31	1.50	0.00	0.00	0.23	1.85	0.00	**82.89**
SK	7.54	18.54	1.17	0.18	1.59	88.79	0.00	0.02	1.04	11.80	0.03	**337.04**
TJ	0.37	0.31	2.78	0.04	0.05	0.10	24.39	2.05	3.70	6.35	59.39	**129.67**
TM	2.24	1.51	23.30	0.31	0.20	0.57	2.95	48.76	15.02	61.87	114.20	**438.78**
TR	30.26	22.69	36.28	0.73	1.67	4.29	0.02	1.15	1225.39	437.59	1.35	**2049.88**
UA	68.91	37.70	110.68	2.37	3.11	25.95	0.04	1.36	93.76	5128.92	2.39	**6109.52**
UZ	2.10	1.44	25.00	0.33	0.18	0.55	10.15	11.31	12.70	62.17	303.28	**648.90**
SUM	**692.82**	**757.71**	**4387.61**	**168.76**	**85.30**	**358.01**	**63.09**	**118.93**	**1995.28**	**12275.85**	**1087.43**	
code	**RO**	**RS**	**RU**	**SE**	**SI**	**SK**	**TJ**	**TM**	**TR**	**UA**	**UZ**	

4. EVALUATION OF MODELLING RESULTS VS. OBSERVATIONS

Comparison of modelled and observed air concentrations and wet deposition fluxes was carried out to verify the modelling results. Observed concentrations and wet deposition fluxes were measured at the EMEP monitoring stations and extracted from the EBAS database (https://ebas.nilu.no/). Modelled and measured annual mean values of air concentrations and wet deposition fluxes of Pb, Cd and Hg for each station are summarized on Tables 4.2 – 4.7. The corresponding bar charts and time series for monthly values (Fig. 4.1-4.12) are demonstrated for visualization purposes. Overall statistics are summarized in Table 4.1.

The data from some of the EMEP stations were not involved into the evaluation of the modelling results. Station NO0098R (Karpdalen, Norway) is located close to strong emission source. Therefore, measured concentrations in air and in precipitation from this station were not used in the model-to-measurement comparison. Station SK0002R is located in mountainous region at 2008 m altitude. Since the model does not fully takes into account processes of atmospheric transport and vertical mixing in complex terrain conditions, the data from this station also were not included into statistics. Period of measurements at station CZ0003R cover about one third of the year that is not enough to characterize annual values of Cd and Pb deposition fluxes.

At some of stations the model underestimates the observed values by more than three fold. These are stations DK0005R, ES0008R, ES0009R, FR0009R, NO0056R, SE0005R for wet deposition of Pb, and ES0008R, ES0009R, FR0009R, FR0013R, FR0023R, SE0005R, SK0004R, SK0006R and EE0009R for wet deposition of Cd. The uncertainty of the modelled deposition derived from the results of the model intercomparions [*UNEP*, 2010a,b] is estimated at a value of a factor of two. Therefore, this high difference is caused not only by the model uncertainties, but by other factors like uncertainties of measurement or emission data. The values from these stations were not included into the statistical analysis. Nevertheless, modelled and measured values from these stations are presented on diagrams and graphs in Fig. 1.1-1.3 as well as in Tables 4.2 – 4.5.

Comparison of Pb air concentrations was performed for 46 stations. Mean relative bias is 17% indicting that the model tends to somewhat overestimate the observed levels (Table 4.2). Spatial correlation coefficient is 0.73. At about 80% of stations modelled values agree with the observed one within a factor of two. Relatively good agreement (within ±50%) is noted for stations Spain, Poland, Latvia, Slovenia, Hungary, most stations in France and the United Kingdom. The model tends to overestimate air concentrations of Pb at stations in Germany, Sweden, Denmark and Belgium.

Comparison of Pb wet deposition fluxes was presented for 44 stations. The model underestimates the observed wet deposition fluxes by 15% on average (Table 4.3). Spatial correlation coefficient between annual fluxes at the stations is 0.62. For 64% of stations the model matches the observations within a factor of two, and for 90% of stations – within a factor of three. The model performance differs substantially for different countries and stations. Relatively good fit between the modelled and the observed fluxes is noted for the Czech, Belgian stations, most of German stations and some stations in Denmark, Estonia, Latvia, Sweden and Slovakia. The levels at Finnish, Latvian, French and Norwegian stations were mostly underestimated, while the levels at the British, Polish and some Swedish stations were exceeded by the model.

Concentrations of Cd in air measured at 46 stations were used in the model verification. The model tends to overestimate the observed concentrations of Cd at most of the EMEP stations. Mean relative

bias is about 60% (Table 4.4.). For about one half of stations the difference between modelled and observed concentrations in air falls within a factor of 2. Reasonable agreement is noted for the Estonian, Latvian, some French, British and Norwegian stations. For some stations in Finland and France and for station in Cyprus the model underestimates the observed levels. It is important to note that even if only anthropogenic component of the modelled concentrations is considered, the overestimation still exists amounting to 24%.

Observed wet deposition fluxes from 41 stations were used in the evaluation of the modelling results. Mean relative bias between modelled and observed values is about -30% indicating general underestimation of the observed levels (Table 4.5). For a number of stations the agreement between modelled and observed fluxes lies with ±50% limits. These are station in Belgium and Slovenia, most of stations in Germany, some stations in Denmark, the Netherlands and Sweden. At one station in Germany, Denmark and Netherlands and at stations in the United Kingdom the model overestimates the observed fluxes (Fig. 4.7, Table 4.5). Similar to Cd in air, at some of stations, e.g., at NL0091R, GB0017R, GB0048R and GB1055R the overestimation of the modeling results takes place even if only anthropogenic component is considered. One of possible reasons of overestimation of Cd concentrations in air at most of stations and wet deposition at some of stations is distribution of emissions along the vertical. Emission of more Cd to the upper model layers could result to decrease of near-surface concentrations in air and increase of in-cloud scavenging of Cd. However, special investigation of this idea, including various modeling tests, is needed.

Information on measurements of Hg^0 or total gaseous mercury in air was available from 15 EMEP stations. However, the data from SI0008R, DE0002R, DE0008R and GB1055R were not used in the analysis because of low temporal coverage. Besides, the observed concentrations at the ES0008R station were suspiciously low (0.39 on average) and, hence were not used also. The data from the remaining stations were used in the evaluation of the modeling results. Mean relative bias was about 7% that means reasonable agreement between modelled and observed concentrations of Hg in air. The difference between modelled and observed values at particular stations did not exceed 15%.

Wet deposition fluxes of Hg were compared at 22 EMEP stations. On average, the model tends to overestimate observed Hg wet deposition by 33% (Table 4.7). Almost 90% of modelled / observed pairs of values lie within a factor of two, and 95% - within a factor of 3. At most of the stations the agreement between modelled and observed wet deposition fluxes of Hg is within ±50%. Significant overestimation of the observed values is noted for stations in Finland, one station in the Czech Republic, Germany, Norway and Sweden. Overestimation of the observed Hg levels can be caused by uncertainties of atmospheric chemistry of mercury and insufficient information on speciation of Hg in the anthropogenic emissions.

Table 4.1. *Statistical indices of comparison of modelled and observed mean annual concentrations in air and wet deposition fluxes in 2020.*

Substance	Parameter	N	MRB, %	Rc	F2(%)
Pb	Air conc.	46	17	0.73	80
	Wet dep.	44	-15	0.62	64
Cd	Air conc.	46	62	0.54	52
	Wet dep.	41	-29	0.66	56
Hg	Air conc.	10	7	0.68	100
	Wet dep.	22	33	0.61	86

4.1. Lead

4.1.1. Air concentrations

Table 4.2. *Annual mean modelled and observed Pb air concentrations, ng/m^3, temporal correlation coefficient (Rc and relative bias (Bias)) at EMEP stations in 2020.*

Station name	Code	Longitude	Latitude	Observed	Modelled	Rc	Bias
Koksijde	BE0014R	2.66	51.12	3.05	6.31	0.80	106.99
Ayia Maria	CY0002R	33.06	35.04	3.53	1.11	0.39	-68.45
Kosetice (NOAK)	CZ0003R	15.08	49.57	1.62	2.53	0.62	55.86
Churanov	CZ0005R	13.6	49.07	0.77	1.44	0.74	87.54
Westerland	DE0001R	8.31	54.93	1.16	2.15	0.75	85.33
Waldhof	DE0002R	10.76	52.8	2.16	3.13	0.74	45.35
Schauinsland	DE0003R	7.91	47.91	0.84	2.02	0.65	140.38
Neuglobsow	DE0007R	13.03	53.17	1.66	2.24	0.57	34.95
Schmucke	DE0008R	10.767	50.65	1.19	2.15	0.68	80.38
Zingst	DE0009R	12.72	54.44	1.36	2.15	0.66	58.30
Anholt	DK0008R	11.52	56.72	0.79	1.63	0.47	106.81
Riscoe	DK0012R	12.09	55.69	1.10	3.32	0.77	202.00
Lahemaa	EE0009R	59.5	25.9	1.28	0.67	-0.16	-47.41
San Pablo de los Montes	ES0001R	-4.35	39.55	0.92	1.02	0.28	11.01
Viznar	ES0007R	-3.53	37.23	1.15	1.16	0.11	0.83
Niembro	ES0008R	-4.85	43.44	1.70	2.43	0.30	42.82
Campisabalos	ES0009R	-3.14	41.28	0.70	0.76	-0.01	8.90
ElTorms	ES0014R	0.72	41.4	1.11	1.55	0.55	39.45
Virolahti III	FI0018R	27.67	60.53	1.24	0.67	0.46	-46.29
Pallas (Matorova)	FI0036R	24.24	68	0.29	0.20	0.42	-31.72
Hyytiälä	FI0050R	24.28	61.85	0.92	0.33	0.48	-63.66
Revin	FR0009R	4.633	49.9	3.02	1.57	0.77	-48.04
Peyrusse Vieille	FR0013R	0.183	43.617	1.25	1.02	0.60	-18.14
Saint-Nazaire-le-Desert	FR0023R	5.279	44.569	0.94	1.03	0.64	9.67
Vemeuil	FR0025R	2.61	46.815	1.26	1.48	0.43	17.46
Yarner Wood	GB0013R	-3.71	50.6	1.53	1.97	0.49	28.85
Heigham Holmes	GB0017R	1.62	52.72	3.04	3.62	0.49	19.24
Auchencorth Moss	GB0048R	-3.24	55.79	0.80	1.31	0.48	63.36
Chilbolton Observatory	GB1055	-1.44	51.15	3.53	3.25	0.39	-7.77
K-puszta	HU0002R	19.58	46.97	5.19	4.12	0.69	-20.69
Vestmannaeyjar	IS0091R	-20.28	63.4	0.07	0.65	0.48	780.76
Monte-Martano	IT0019R	12.56	42.8	1.15	2.18	-0.44	89.98
Rucava	LV0010R	21.17	56.16	1.29	1.49	-0.04	14.99
Bilthoven	NL0008R	5.2	52.12	3.23	4.04	0.60	24.98
Birkenes II	NO0002R	8.25	58.39	0.49	0.65	0.20	32.13
Zeppelin mountain (Ny-Alesund)	NO0042G	11.89	78.91	0.26	0.14	0.26	-43.85
Alomar	NO0090R	16.01	69.28	0.10	0.43	-0.24	351.65
Karpdalen	NO0098R	69.65	30.43	2.09	0.31	-0.11	-85.06
Diabla Gora	PL0005R	22.07	54.15	1.62	2.27	0.74	40.14
Zielonka	PL0009R	17.93	53.66	2.60	2.75	0.86	5.58
Bredkälen	SE0005R	15.33	63.85	0.16	0.18	0.41	14.19
Råö	SE0014R	11.91	57.39	0.66	1.25	0.40	88.13
Hallahus	SE0020R	13.15	56.04	0.93	2.06	0.61	120.98
Iskrba	SI0008R	14.87	45.57	1.55	1.93	0.64	24.34
Chopok	SK0002R	19.58	48.93	0.37	1.65	0.76	349.16
Stara Lesna	SK0004R	20.28	49.15	2.54	1.92	0.43	-24.30
Starina	SK0006R	22.27	49.05	2.02	1.85	0.58	-8.62
Topolniky	SK0007R	17.86	47.96	6.03	4.55	0.76	-24.52

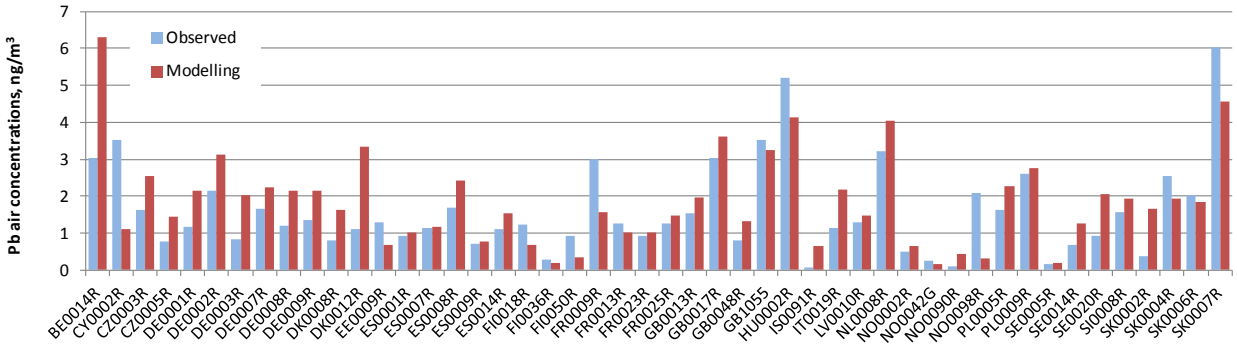
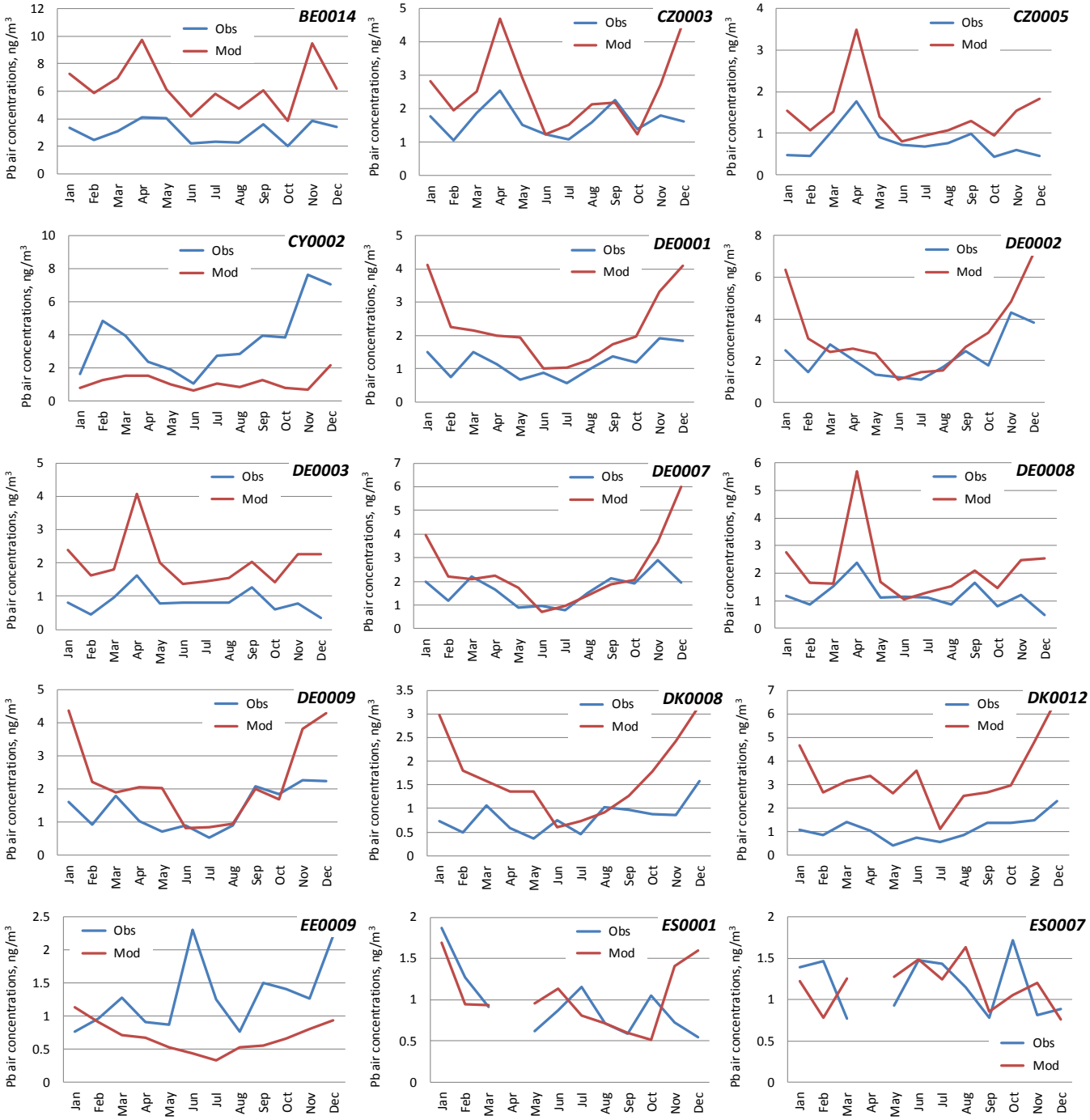
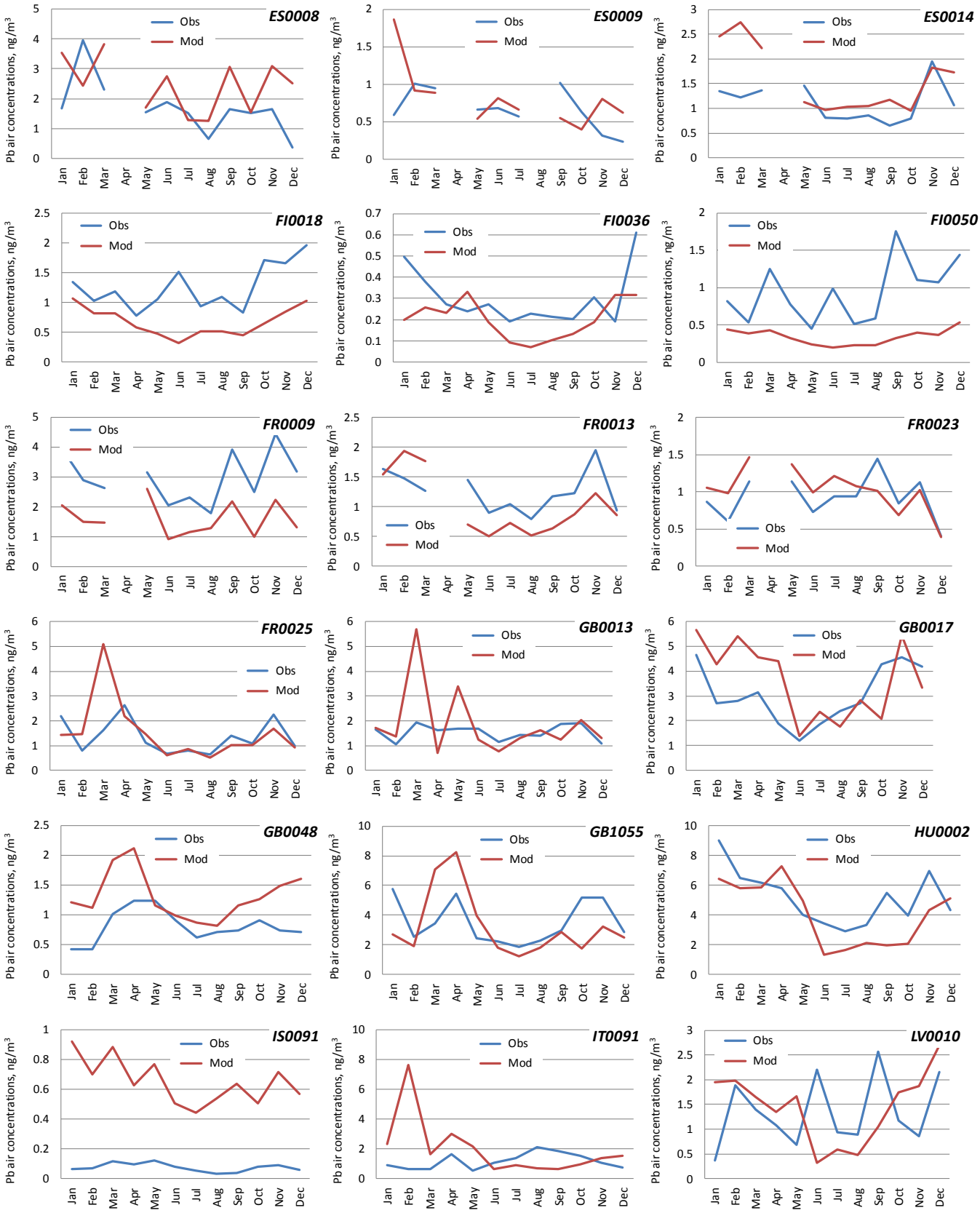


Fig. 4.1. *Modelled and observed annual mean concentrations of Pb in air at the EMEP stations in 2020.*

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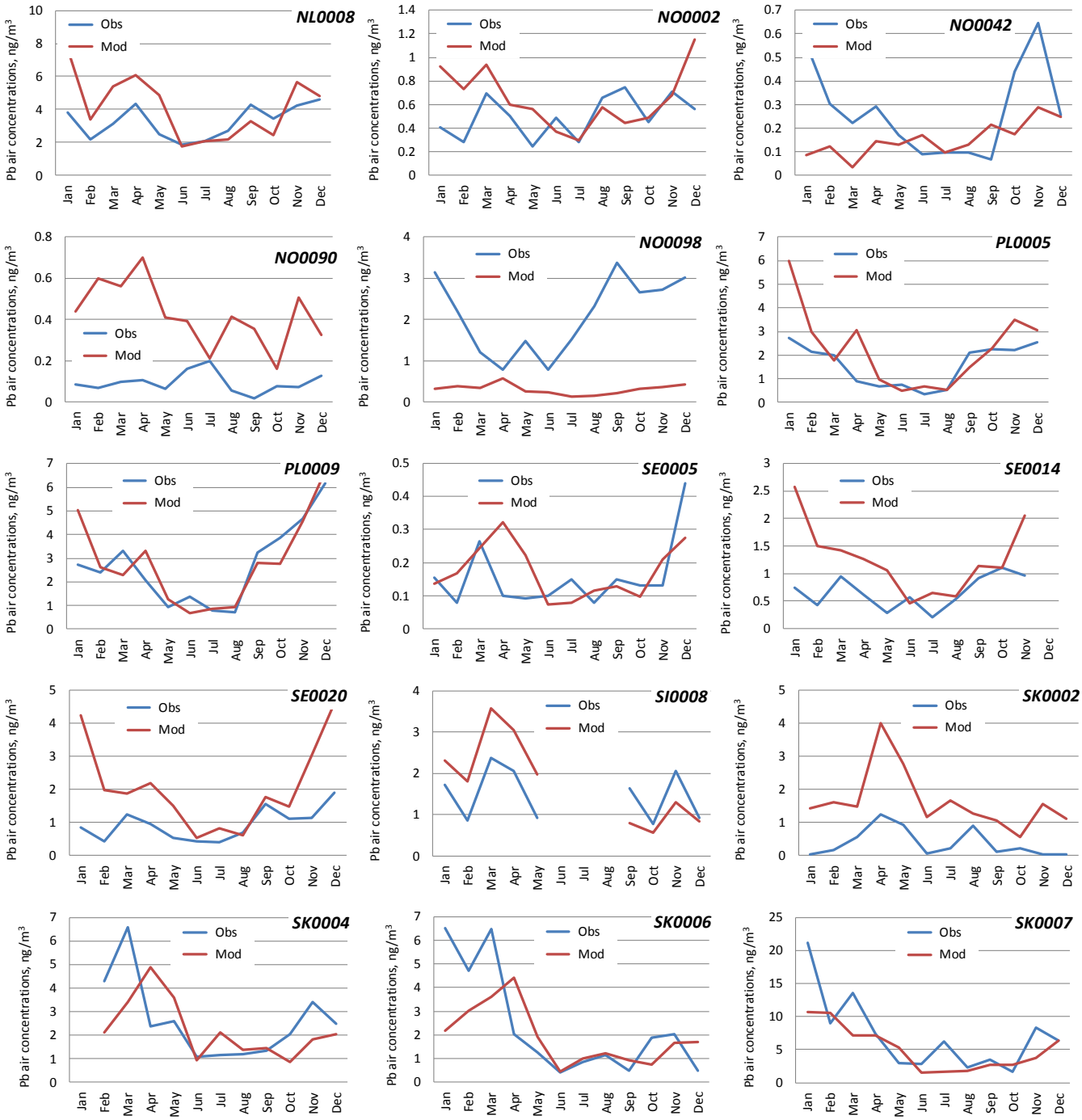


Fig. 4.2. *Modelled and observed monthly mean concentrations of Pb in air at the EMEP stations in 2020.*

4.1.2. Wet deposition

Table 4.3. *Annual sums of modelled and observed Pb wet deposition fluxes, g/km^2/y, temporal correlation coefficient (Rc) and relative bias (Bias) at EMEP stations in 2020.*

Station name	Code	Longit	Latit	Observed flux	Modelled flux	Rc	Bias
Koksijde	BE0014R	2.66	51.12	281.33	349.32	0.54	24.2
Kosetice (NOAK)	CZ0003R	15.08	49.57	459.78	178.73	0.76	-61.1
Churanov	CZ0005R	13.6	49.07	280.28	206.88	0.27	-26.2
Westerland	DE0001R	8.31	54.93	181.91	428.26	0.85	135.4
Waldhof	DE0002R	10.76	52.8	202.39	202.25	0.64	-0.1
Schauinsland	DE0003R	7.91	47.91	273.89	259.35	0.57	-5.3
Neuglobsow	DE0007R	13.03	53.17	208.45	234.09	0.41	12.3
Schmucke	DE0008R	10.767	50.65	347.35	253.74	0.75	-26.9
Zingst	DE0009R	12.72	54.44	122.62	148.57	-0.14	21.2
Keldsnor	DK0005R	10.73	54.74	617.24	140.65	0.47	-77.2
Anholt	DK0008R	11.52	56.72	162.04	204.55	0.37	26.2
Riscoe	DK0012R	12.09	55.69	0.89	239.40	0.06	26735.4
Sepstrup Sande	DK0022R	9.42	56.08	168.79	238.01	-0.01	41.0
Uiborg	DK0031R	56.28	8.43	103.53	353.53	-0.03	241.5
Lahemaa	EE0009R	59.5	25.9	133.44	80.81	0.23	-39.4
Vilsandi	EE0011R	58.38	21.86	223.59	195.57	-0.08	-12.5
Niembro	ES0008R	-4.85	43.44	1717.47	171.23	0.31	-90.0
Campisabalos	ES0009R	-3.14	41.28	503.35	48.75	-0.24	-90.3
Virolahti III	FI0018R	27.67	60.53	389.30	148.82	0.88	-61.8
Pallas (Matorova)	FI0036R	24.24	68	62.69	30.23	0.53	-51.8
Hyytiälä	FI0050R	24.28	61.85	151.81	69.22	0.67	-54.4
Hailuoto II	FI0053R	24.69	65	95.01	67.62	0.72	-28.8
Hietajärvi	FI0092R	30.72	63.17	144.99	64.03	0.90	-55.8
Kotinen	FI0093R	25.07	61.23	193.50	97.56	0.79	-49.6
Revin	FR0009R	4.633	49.9	722.15	169.16	0.62	-76.6
Peyrusse Vieille	FR0013R	0.183	43.617	165.73	63.06	0.21	-61.9
Saint-Nazaire-le-Desert	FR0023R	5.279	44.569	285.78	132.56	0.66	-53.6
Verneuil	FR0025R	2.61	46.815	191.30	136.01	0.93	-28.9
LoughNavar	GB0006R	-7.87	54.44	52.75	140.90	0.74	167.1
Yarner Wood	GB0013R	-3.71	50.6	33.23	112.04	0.90	237.2
Heigham Holmes	GB0017R	1.62	52.72	78.51	56.07	0.26	-28.6
Auchencorth Moss	GB0048R	-3.24	55.79	29.26	91.61	0.90	213.1
Chilbolton Observatory	GB1055	-1.44	51.15	15.21	99.76	0.87	555.8
Vestmannaeyjar	IS0091R	-20.28	63.4	520.86	250.02	0.47	-52.0
Rucava	LV0010R	21.17	56.16	386.86	300.70	0.76	-22.3
Dobele	LV2000R	23.32	56.62	141.90	91.29	0.46	-35.7
Skriveri	LV5000R	25.13	56.64	249.09	163.67	0.59	-34.3
Riga	LV6000U	56.95	24.10	280.09	132.55	0.11	-52.7
Vredepeel	NL0010R	5.85	51.54	263.71	135.55	0.50	-48.6
De Zilk	NL0091R	4.5	52.3	287.22	274.74	0.21	-4.3
Birkenes	NO0001R	8.25	58.38	1062.91	442.25	0.73	-58.4
Kårvatn	NO0039R	8.88	62.78	242.50	142.19	-0.07	-41.4
Hurdal	NO0056R	60.37	11.07	631.36	194.98	0.88	-69.1
Karpdalen	NO0098R	69.65	30.43	339.18	51.48	0.08	-84.8
Leba	PL0004R	17.53	54.75	124.58	189.52	0.44	52.1
Diabla Gora	PL0005R	22.07	54.15	129.63	299.77	0.07	131.2
Bredkälen	SE0005R	15.33	63.85	140.99	44.02	-0.11	-68.8
Råö	SE0014R	11.91	57.39	186.35	332.97	0.77	78.7
Hallahus	SE0020R	13.15	56.04	265.58	373.93	0.50	40.8
Iskrba	SI0008R	14.87	45.57	230.43	241.77	0.27	4.9
Chopok	SK0002R	19.58	48.93	1293.19	303.77	0.86	-76.5
Stara Lesna	SK0004R	20.28	49.15	597.47	377.93	0.44	-36.7
Starina	SK0006R	22.27	49.05	571.66	451.73	0.38	-21.0
Topolniky	SK0007R	17.86	47.96	414.76	286.30	0.66	-31.0

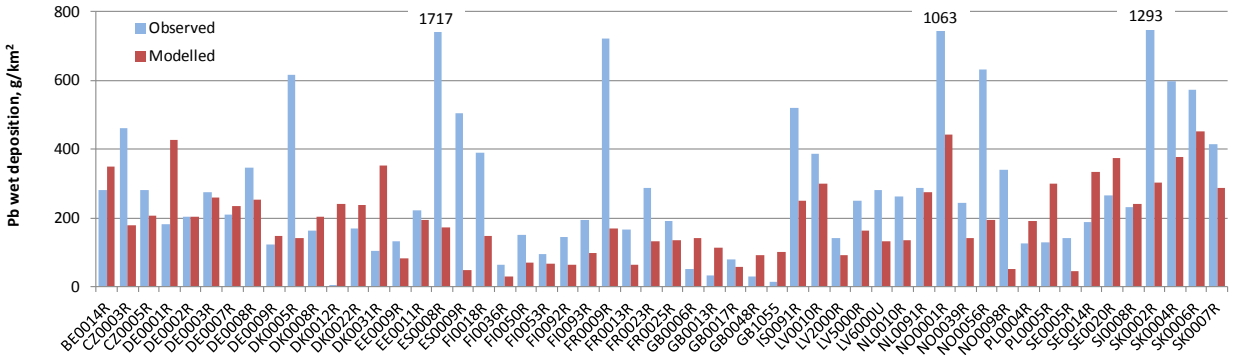
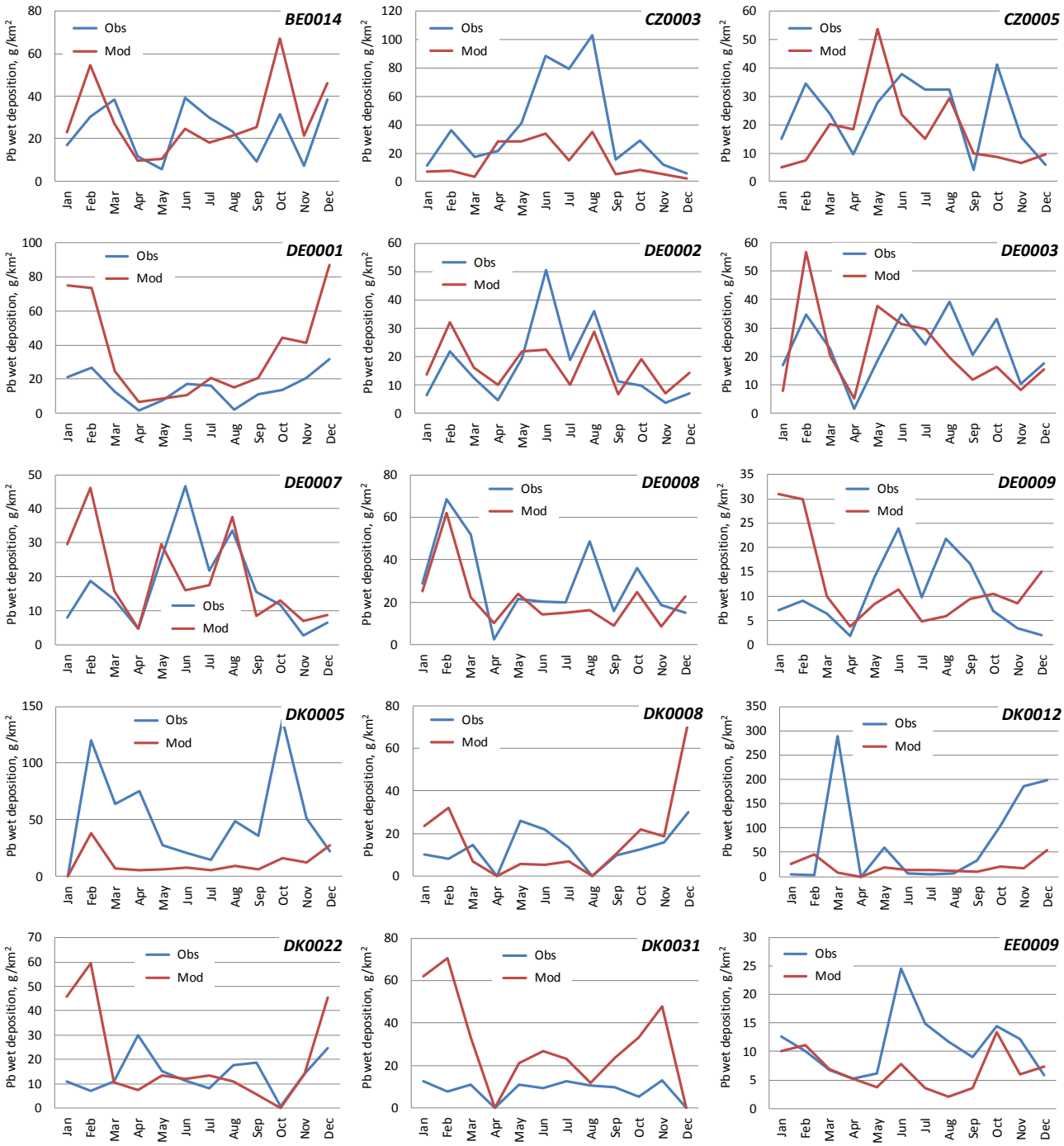
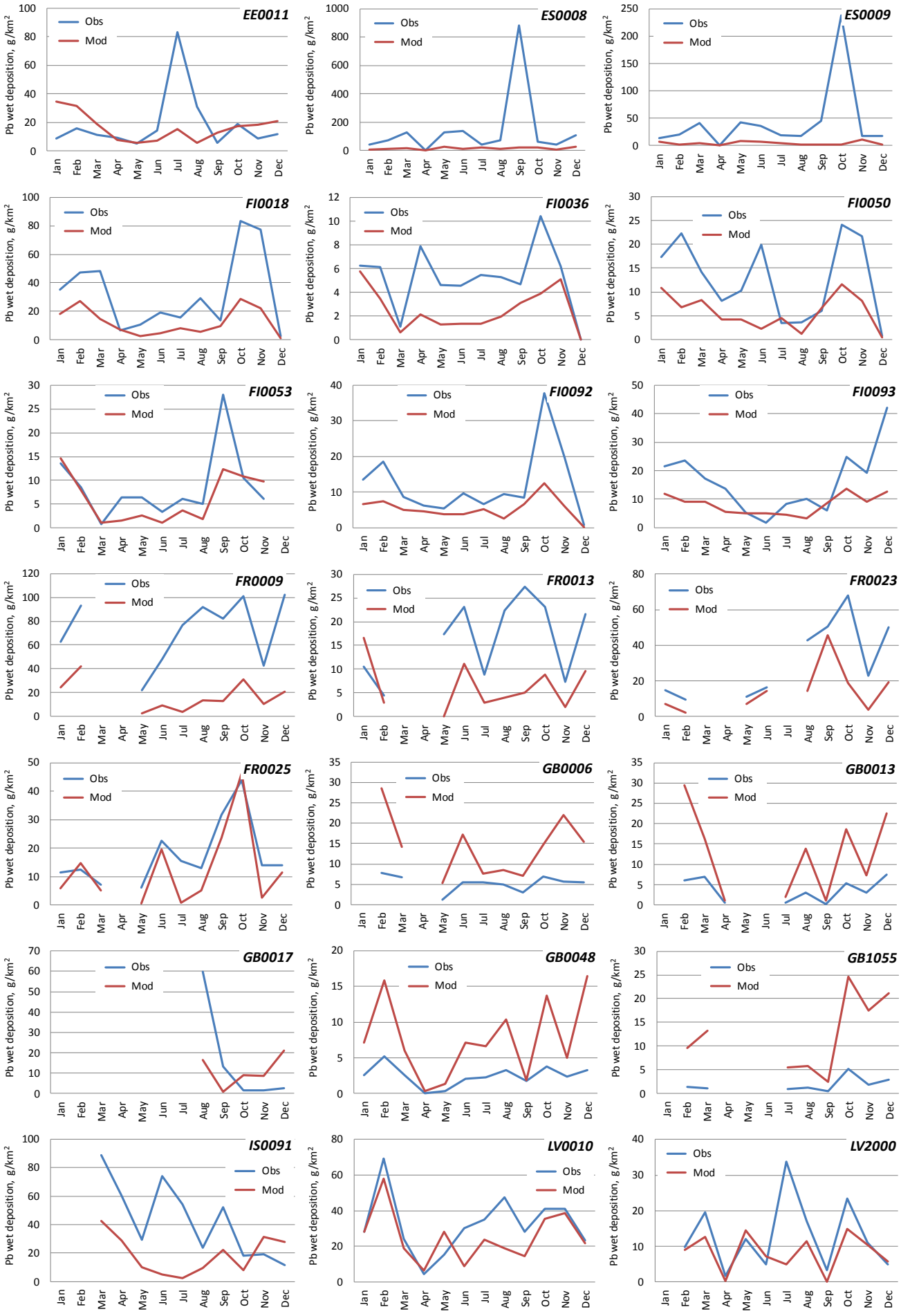


Fig. 4.3. *Modelled and observed annual wet deposition fluxes of Pb at the EMEP stations in 2020.*

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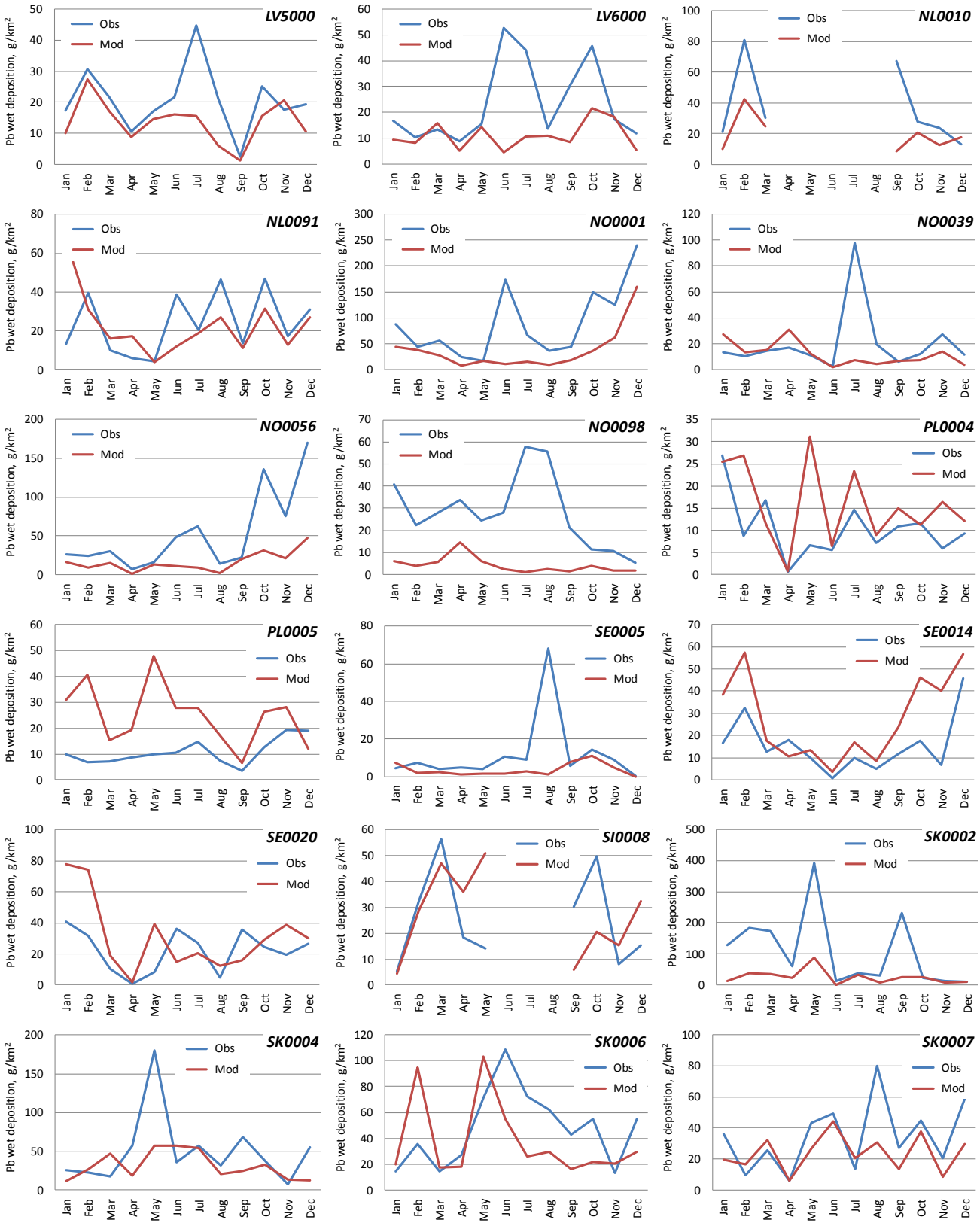


Fig. 4.4. *Modelled and observed monthly wet deposition fluxes of Pb at the EMEP stations in 2020.*

4.2. Cadmium

4.2.1. Air concentrations

Table 4.4. *Annual mean modelled and observed Cd air concentrations, ng/m^3, temporal correlation coefficient (Rc) and relative bias (Bias) at EMEP stations in 2020.*

Station name	Code	Longit	Latid	Observed	Modelled	Rc	Bias
Koksijde	BE0014R	2.66	51.12	0.08	0.25	0.67	210.66
Ayia Maria	CY0002R	33.06	35.04	0.07	0.03	0.19	-56.10
Kosetice (NOAK)	CZ0003R	15.08	49.57	0.06	0.10	0.80	53.73
Churanov	CZ0005R	13.6	49.07	0.02	0.06	0.56	144.95
Westerland	DE0001R	8.31	54.93	0.04	0.09	0.77	124.18
Waldhof	DE0002R	10.76	52.8	0.07	0.11	0.70	55.85
Schauinsland	DE0003R	7.91	47.91	0.02	0.07	0.59	364.82
Neuglobsow	DE0007R	13.03	53.17	0.06	0.07	0.63	17.71
Schmucke	DE0008R	10.767	50.65	0.04	0.08	0.58	129.64
Zingst	DE0009R	12.72	54.44	0.05	0.08	0.52	60.84
Anholt	DK0008R	11.52	56.72	0.03	0.07	0.52	159.33
Riscoe	DK0012R	12.09	55.69	0.04	0.13	0.77	217.63
Lahemaa	EE0009R	59.5	25.9	0.05	0.04	-0.21	-26.54
San Pablo de los Montes	ES0001R	-4.35	39.55	0.02	0.06	0.46	140.13
Viznar	ES0007R	-3.53	37.23	0.03	0.06	-0.07	124.67
Niembro	ES0008R	-4.85	43.44	0.07	0.07	0.33	5.46
Campisabalos	ES0009R	-3.14	41.28	0.01	0.03	0.59	149.13
ElTorms	ES0014R	0.72	41.4	0.04	0.07	0.14	97.00
Virolahti III	FI0018R	27.67	60.53	0.04	0.03	0.52	-32.99
Pallas (Matorova)	FI0036R	24.24	68	0.01	0.01	0.64	-16.14
Hyytiälä	FI0050R	24.28	61.85	0.03	0.01	0.91	-60.63
Revin	FR0009R	4.633	49.9	0.09	0.05	0.40	-36.90
Peyrusse Vieille	FR0013R	0.183	43.617	0.05	0.03	0.02	-36.87
Saint-Nazaire-le-Desert	FR0023R	5.279	44.569	0.03	0.03	0.35	-9.02
Verneuil	FR0025R	2.61	46.815	0.05	0.04	0.56	-20.48
Yarner Wood	GB0013R	-3.71	50.6	0.06	0.09	0.57	39.32
Heigham Holmes	GB0017R	1.62	52.72	0.09	0.15	0.40	77.35
Auchencorth Moss	GB0048R	-3.24	55.79	0.02	0.06	0.46	188.44
Chilbolton Observatory	GB1055	-1.44	51.15	0.11	0.14	0.67	21.36
K-puszta	HU0002R	19.58	46.97	0.07	0.19	0.45	165.03
Vestmannaeyjar	IS0091R	-20.28	63.4	0.00	0.02	-0.03	526.33
Momte-Martano	IT0019R	12.56	42.8	0.03	0.05	-0.19	88.25
Rucava	LV0010R	21.17	56.16	0.04	0.05	0.50	6.87
Bilthoven	NL0008R	5.2	52.12	0.08	0.24	0.81	223.36
Birkenes II	NO0002R	8.25	58.39	0.02	0.02	0.38	36.78
Zeppelin mountain (Ny-Alesund)	NO0042G	11.89	78.91	0.06	0.01	0.11	-90.94
Alomar	NO0090R	16.01	69.28	0.00	0.01	-0.17	368.89
Karpdalen	NO0098R	69.65	30.43	0.13	0.01	-0.13	-89.64
Diabla Gora	PL0005R	22.07	54.15	0.06	0.05	0.80	-9.13
Zielonka	PL0009R	17.93	53.66	0.10	0.06	0.85	-35.01
Bredkälen	SE0005R	15.33	63.85	0.00	0.01	0.42	39.10
Råö	SE0014R	11.91	57.39	0.03	0.05	0.60	67.14
Hallahus	SE0020R	13.15	56.04	0.03	0.07	0.41	110.17
Iskrba	SI0008R	14.87	45.57	0.08	0.11	0.58	38.42
Chopok	SK0002R	19.58	48.93	0.01	0.07	0.21	1117.10
Stara Lesna	SK0004R	20.28	49.15	0.02	0.08	-0.01	317.20
Starina	SK0006R	22.27	49.05	0.03	0.07	0.38	101.33
Topolniky	SK0007R	17.86	47.96	0.03	0.15	0.64	343.16
Hallahus	SE0020R	13.15	56.04	265.58	373.93	0.50	40.8
Iskrba	SI0008R	14.87	45.57	230.43	241.77	0.27	4.9
Chopok	SK0002R	19.58	48.93	1293.19	303.77	0.86	-76.5
Stara Lesna	SK0004R	20.28	49.15	597.47	377.93	0.44	-36.7
Starina	SK0006R	22.27	49.05	571.66	451.73	0.38	-21.0
Topolniky	SK0007R	17.86	47.96	414.76	286.30	0.66	-31.0

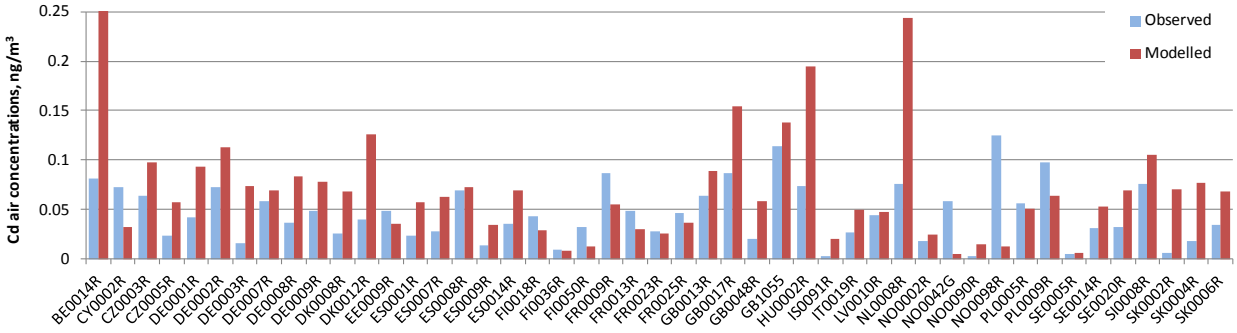
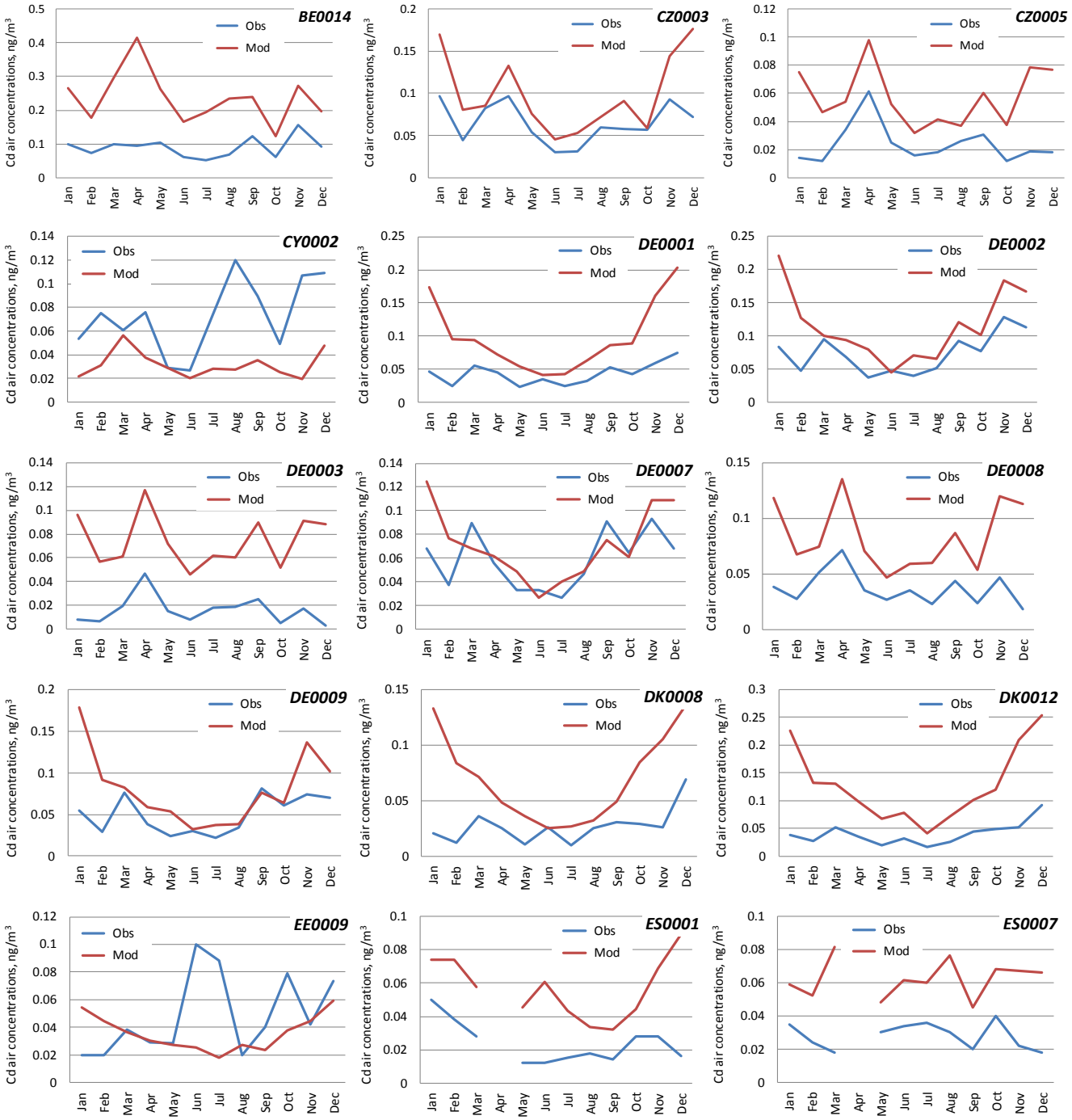
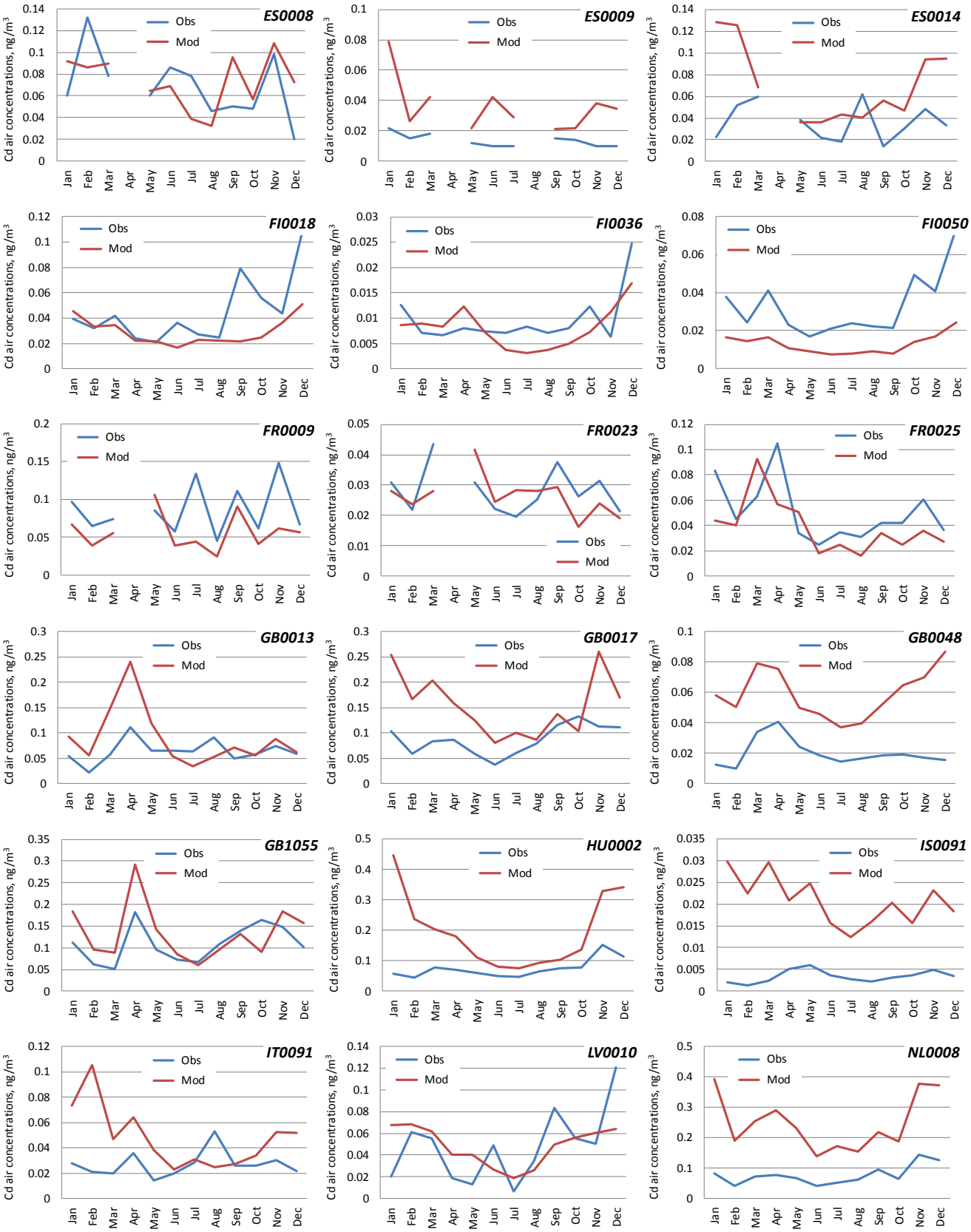


Fig. 4.5. *Modelled and observed annual mean concentrations of Cd in air at the EMEP stations in 2020.*

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ES0009
ES0014
FI0018
FI0036
FI0050
FR0009
FR0023
FR0025
GB0013
GB0017
GB0048
GB1055
HU0002
IS0091
IT0091
LV0010
NL0008
Obs
Mod
Cd air concentrations, ng/m³
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

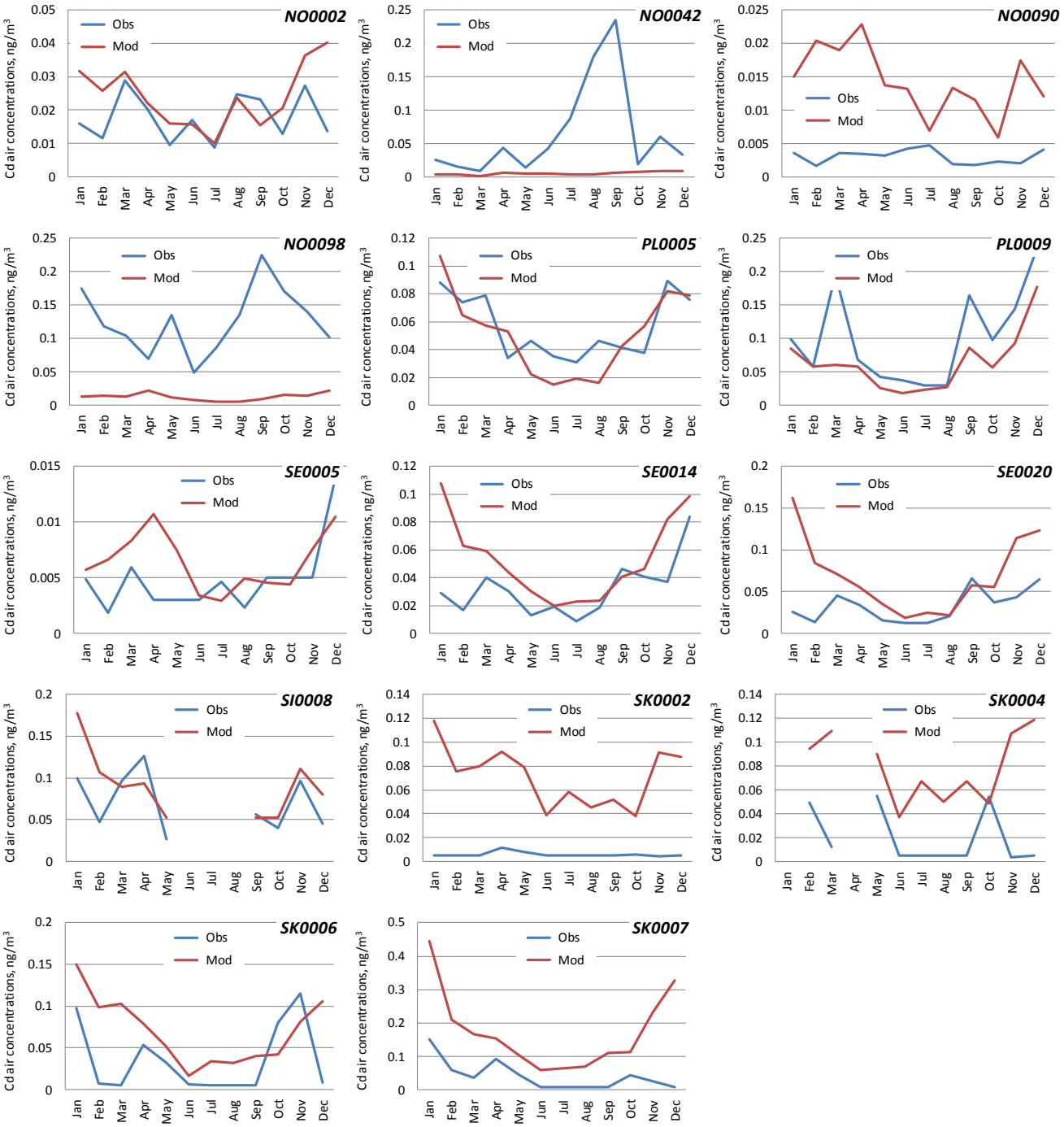


Fig. 4.6. *Modelled and observed annual mean concentrations of Cd in air at the EMEP stations in 2020.*

4.2.2. Wet deposition

Table 4.5. *Annual sums of modelled and observed Cd wet deposition fluxes, g/km^2/y, temporal correlation coefficient (Rc) and relative bias (Bias) at EMEP stations in 2020.*

Station name	Code	Longit	Latit	Observed flux	Modelled flux	Rc	Bias
Koksijde	BE0014R	2.66	51.12	14.70	12.39	0.44	-15.7
Kosetice (NOAK)	CZ0003R	15.08	49.57	18.94	6.74	0.78	-64.4
Churanov	CZ0005R	13.6	49.07	17.31	7.40	0.64	-57.2
Westerland	DE0001R	8.31	54.93	7.47	15.05	0.70	101.5
Waldhof	DE0002R	10.76	52.8	7.46	8.60	0.64	15.2
Schauinsland	DE0003R	7.91	47.91	9.33	8.10	0.73	-13.3
Neuglobsow	DE0007R	13.03	53.17	7.32	8.43	0.66	15.2
Schmucke	DE0008R	10.767	50.65	12.01	10.40	0.75	-13.4
Zingst	DE0009R	12.72	54.44	5.46	5.68	0.22	4.0
Keldsnor	DK0005R	10.73	54.74	15.31	6.85	0.05	-55.2
Anholt	DK0008R	11.52	56.72	7.35	6.59	0.13	-10.3
Riscoe	DK0012R	12.09	55.69	0.07	9.31	-0.14	12636.7
Sepstrup Sande	DK0022R	9.42	56.08	9.69	9.64	-0.31	-0.5
Uiborg	DK0031R	56.28	8.43	6.78	13.02	-0.51	92.0
Lahemaa	EE0009R	59.5	25.9	16.87	3.51	-0.01	-79.2
Vilsandi	EE0011R	58.38	21.86	12.42	6.79	0.53	-45.3
Niembro	ES0008R	-4.85	43.44	61.26	3.81	0.06	-93.8
Campisabalos	ES0009R	-3.14	41.28	35.44	1.75	-0.04	-95.1
Virolahti III	FI0018R	27.67	60.53	10.35	5.16	0.87	-50.1
Pallas (Matorova)	FI0036R	24.24	68	2.56	1.48	0.05	-42.2
Hyytiälä	FI0050R	24.28	61.85	6.95	2.81	0.67	-59.6
Hailuoto II	FI0053R	24.69	65	4.08	2.68	0.58	-34.4
Hietajärvi	FI0092R	30.72	63.17	5.83	2.72	0.79	-53.3
Kotinen	FI0093R	25.07	61.23	7.82	3.90	0.68	-50.1
Revin	FR0009R	4.633	49.9	31.20	4.84	0.08	-84.5
Peyrusse Vieille	FR0013R	0.183	43.617	9.23	2.15	0.28	-76.7
Saint-Nazaire-le-Desert	FR0023R	5.279	44.569	22.44	4.28	0.84	-80.9
Verneuil	FR0025R	2.61	46.815	7.83	4.06	0.72	-48.2
LoughNavar	GB0006R	-7.87	54.44	0.88	2.35	0.71	168.2
Yarner Wood	GB0013R	-3.71	50.6	0.42	1.45	0.99	242.7
Heigham Holmes	GB0017R	1.62	52.72	0.30	0.85	1.00	179.8
Auchencorth Moss	GB0048R	-3.24	55.79	0.77	2.65	0.86	243.8
Chilbolton Observatory	GB1055	-1.44	51.15	0.98	2.40	0.47	146.1
Vestmannaeyjar	IS0091R	-20.28	63.4	12.88	8.44	-0.42	-34.5
Rucava	LV0010R	21.17	56.16	22.26	10.61	0.70	-52.4
Dobele	LV2000R	23.32	56.62	6.59	3.45	0.52	-47.7
Skriveri	LV5000R	25.13	56.64	14.42	6.73	0.44	-53.3
Riga	LV6000U	56.95	24.10	10.25	6.92	0.19	-32.5
Vredepeel	NL0010R	5.85	51.54	13.44	10.23	0.58	-23.9
De Zilk	NL0091R	4.5	52.3	7.43	15.58	0.70	109.6
Birkenes	NO0001R	8.25	58.38	28.44	17.47	0.86	-38.6
Kårvatn	NO0039R	8.88	62.78	7.53	5.35	0.46	-28.9
Hurdal	NO0056R	60.37	11.07	20.19	7.07	0.79	-65.0
Karpdalen	NO0098R	69.65	30.43	17.83	2.12	0.13	-88.1
Leba	PL0004R	17.53	54.75	5.89	6.20	0.45	5.4
Diabla Gora	PL0005R	22.07	54.15	14.37	7.97	0.51	-44.5
Bredkälen	SE0005R	15.33	63.85	5.73	1.82	0.35	-68.2
Råö	SE0014R	11.91	57.39	27.42	13.03	-0.18	-52.5
Hallahus	SE0020R	13.15	56.04	15.00	13.51	0.40	-9.9
Iskrba	SI0008R	14.87	45.57	8.96	7.29	0.36	-18.6
Chopok	SK0002R	19.58	48.93	56.69	9.70	0.61	-82.9
Stara Lesna	SK0004R	20.28	49.15	116.87	12.53	0.24	-89.3
Starina	SK0006R	22.27	49.05	66.62	13.43	0.12	-79.8
Topolniky	SK0007R	17.86	47.96	32.20	11.95	0.62	-62.9

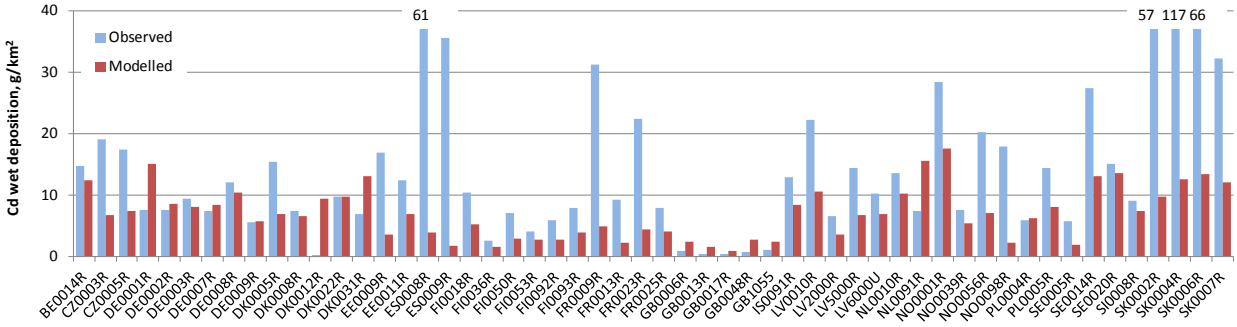
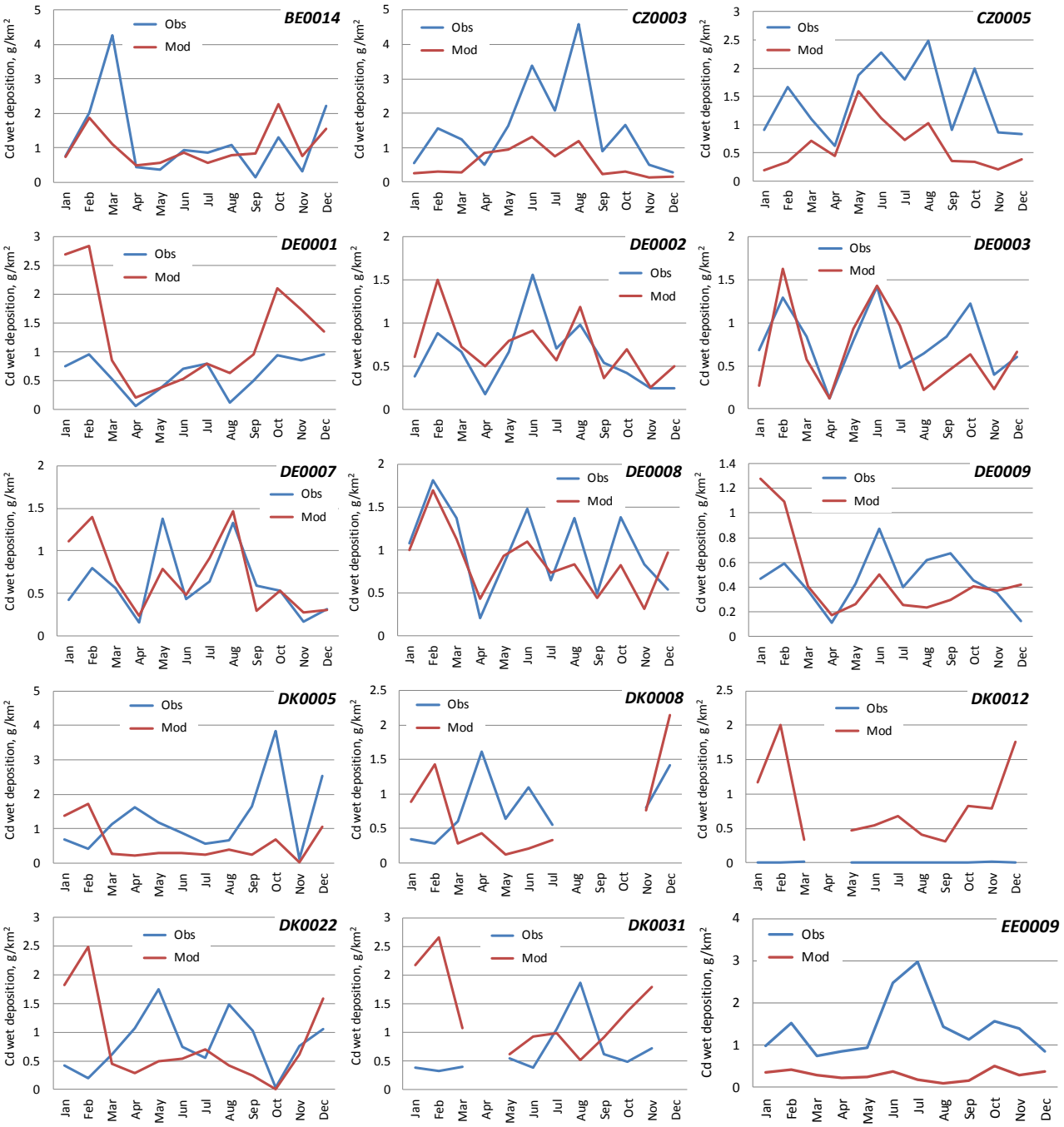
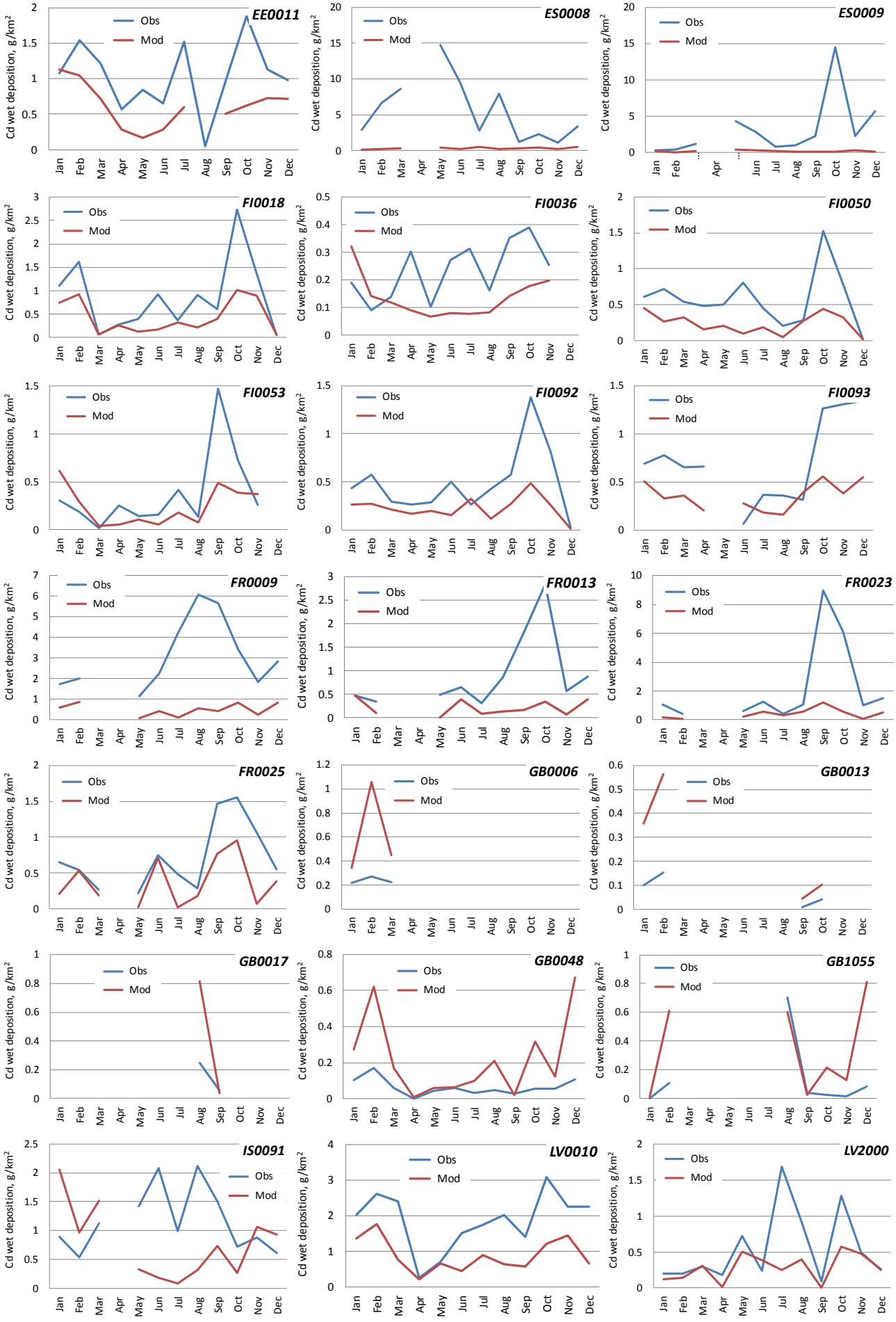


Fig. 4.7. *Modelled and observed annual wet deposition fluxes of Cd at the EMEP stations in 2020.*

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FI0036
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FI0093
FR0009
FR0013
FR0023
FR0025
GB0006
GB0013
GB0017
GB0048
GB1055
IS0091
LV0010
LV2000
Obs
Mod
Cd wet deposition, g/km²
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Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

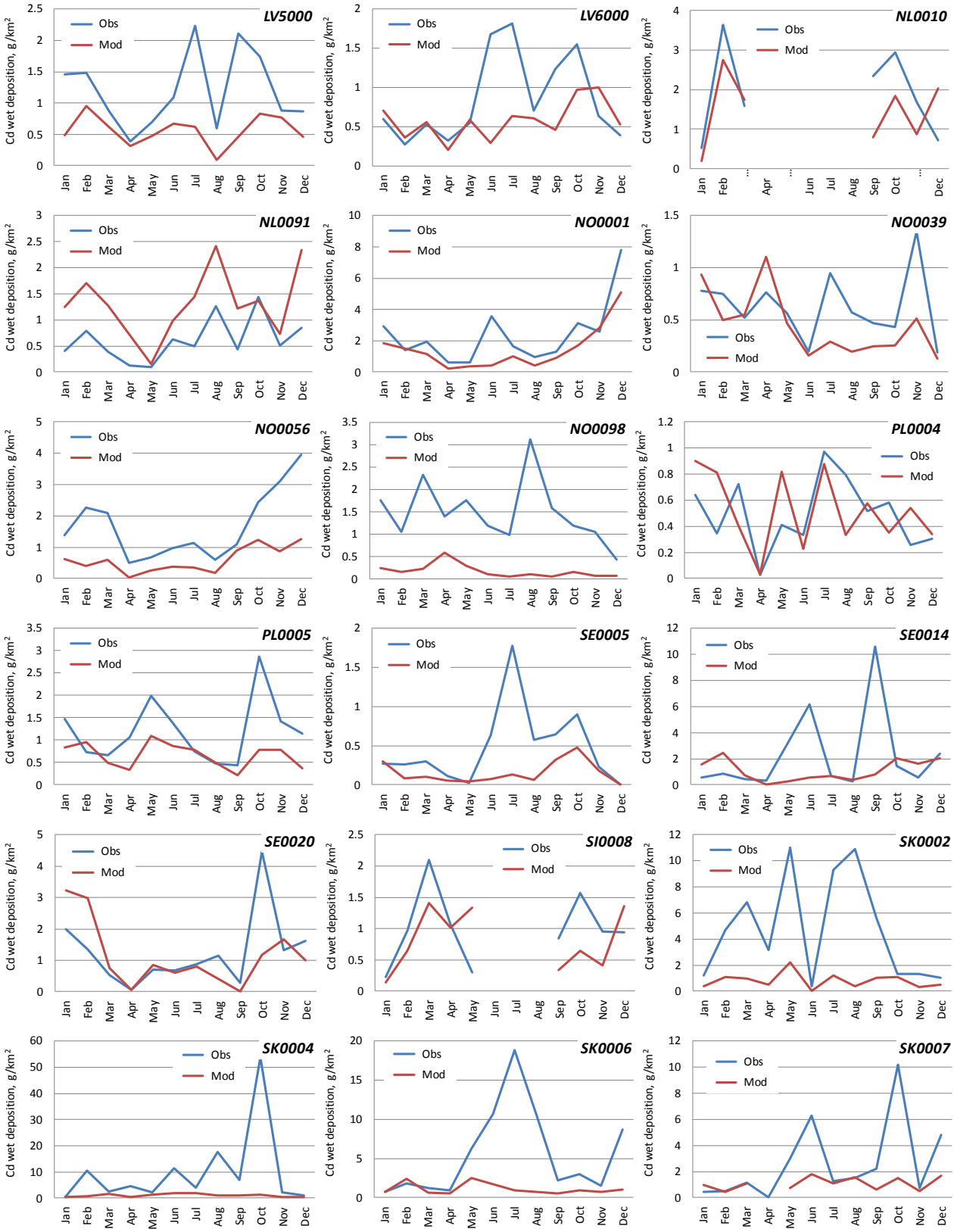


Fig. 4.8. *Modelled and observed monthly wet deposition fluxes of Cd at the EMEP stations in 2020.*

4.3. Mercury

4.3.1. Air concentrations

Table 4.6. *Annual mean modelled and observed Hg air concentrations, ng/m^3, temporal correlation coefficient (Rc) and relative bias (Bias) at EMEP stations in 2020.*

Station Name	Code	Longitude	Latitude	Observed	Modelled	Rc	Bias
Waldhof	DE0002R	10.76	52.8	1.76	1.36	-0.97	-22.85
Schauinsland	DE0003R	7.91	47.91	1.29	1.36	-0.62	6.09
Schmucke	DE0008R	10.767	50.65	1.44	1.41	0.48	-2.39
Zingst	DE0009R	12.72	54.44	1.38	1.51	0.09	9.35
Lahemaa	EE0009R	59.5	25.9	1.40	1.43	-0.80	2.33
Pallas (Matorova)	FI0036R	24.24	68	1.22	1.35	0.02	10.27
Auchencorth Moss	GB0048R	-3.24	55.79	1.64	1.40	-0.49	-14.86
Diabla Gora	PL0005R	22.07	54.15	1.54	1.43	-0.15	-7.55
Bredkälen	SE0005R	15.33	63.85	1.27	1.35	-0.40	6.52
Råö	SE0014R	11.91	57.39	1.18	1.35	0.85	14.43
Hallahus	SE0020R	13.15	56.04	1.27	1.45	0.48	13.53
Iskrba	SI0008R	14.87	45.57	1.34	1.41	-0.56	5.10
Iskrba	SI0008R	14.87	45.57	1.34	1.41	-0.56	5.10

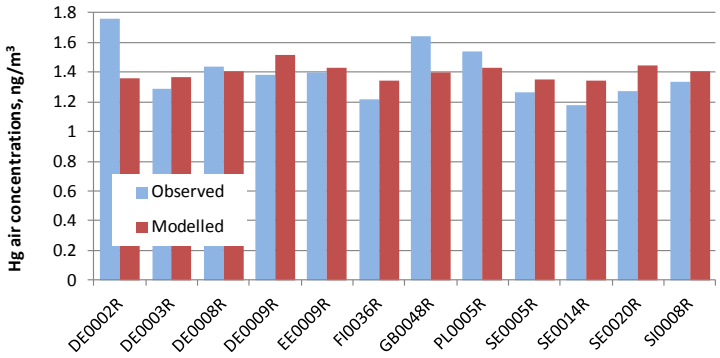
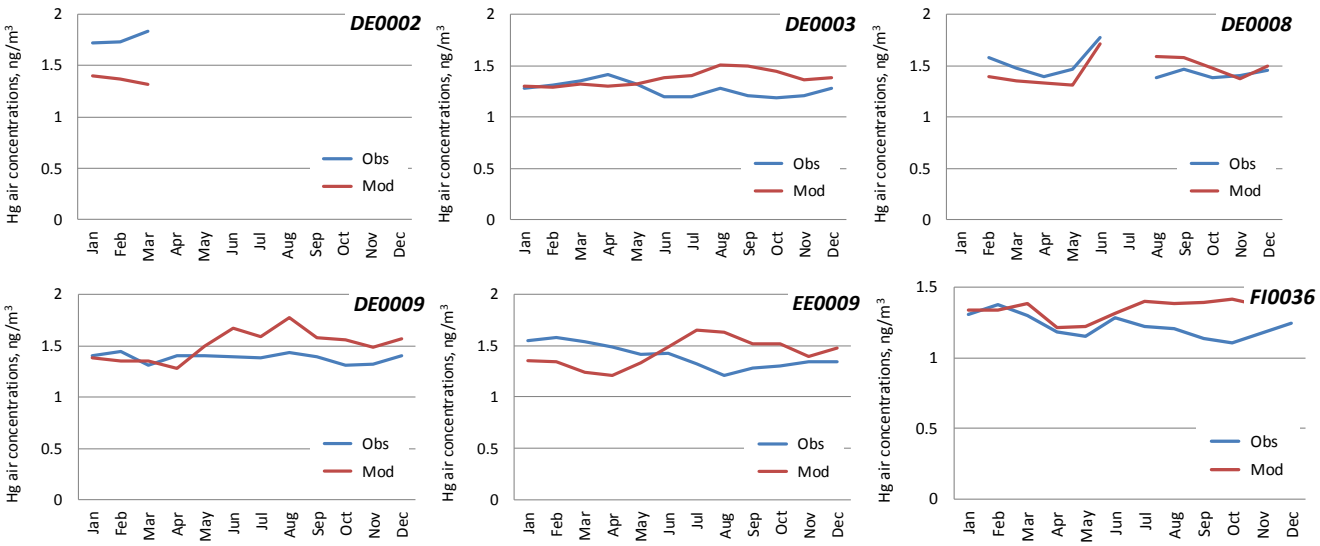


Fig. 4.9. *Modelled and observed annual mean concentrations of Hg in air at the EMEP stations in 2020.*



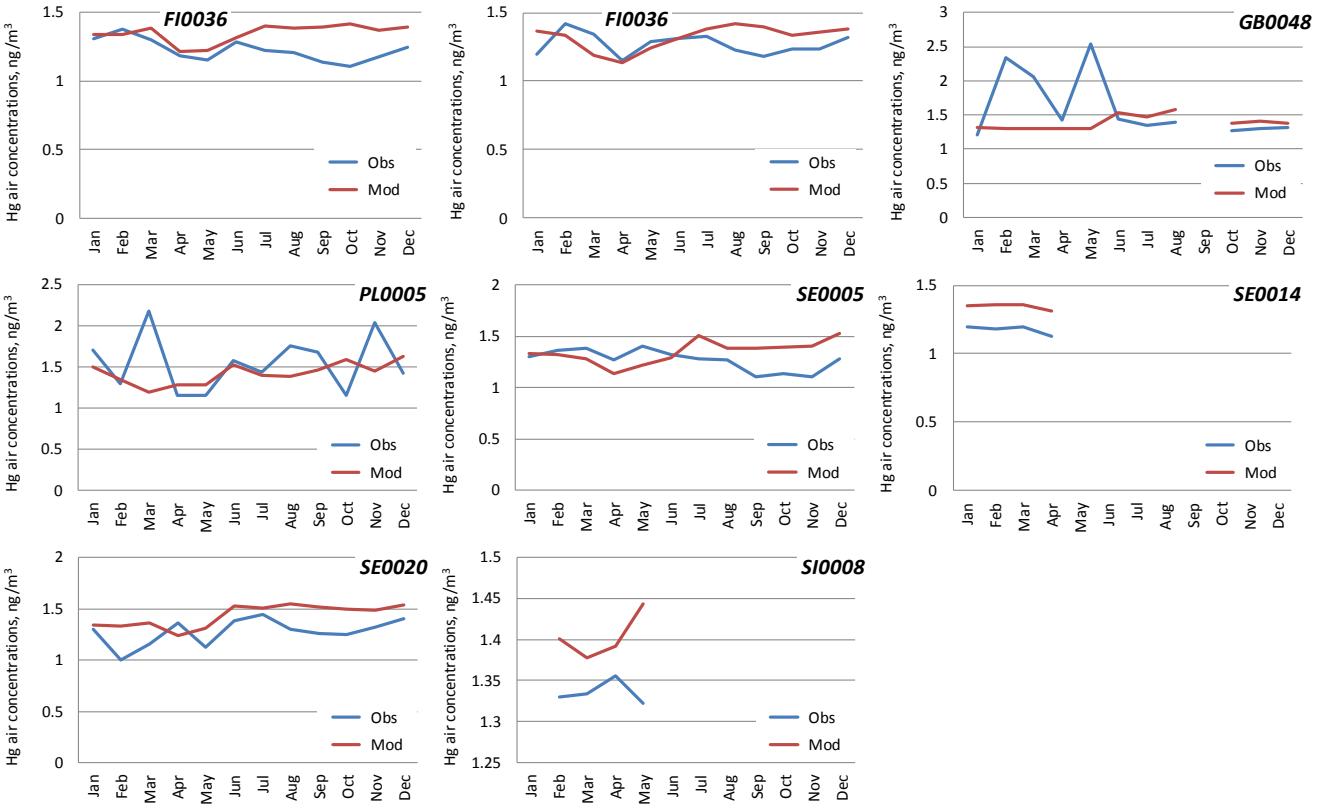


Fig. 4.10. *Modelled and observed monthly mean concentrations of Hg in air at the EMEP stations in 2020.*

4.3.2. Wet deposition

Table 4.7. *Annual sums of modelled and observed Hg wet deposition fluxes, g/km^2/y, temporal correlation coefficient (Rc) and relative bias (Bias) at EMEP stations in 2020.*

Station name	Code	Longit	Latit	Observed flux	Modelled flux	Rc	Bias
Kosetice (NOAK)	CZ0003R	15.08	49.57	3.91	9.93	0.77	154.3
Westerland	DE0001R	8.31	54.93	3.14	5.79	0.82	84.3
Waldhof	DE0002R	10.76	52.8	3.49	4.13	0.92	18.6
Schauinsland	DE0003R	7.91	47.91	8.05	10.05	0.72	24.9
Schmucke	DE0008R	10.767	50.65	5.96	7.74	0.91	29.9
Zingst	DE0009R	12.72	54.44	4.27	3.67	0.37	-13.9
Lahemaa	EE0009R	59.5	25.9	3.96	4.49	0.24	13.4
Niembro	ES0008R	-4.85	43.44	2.93	2.29	-0.30	-21.9
Pallas (Matorova)	FI0036R	24.24	68	1.58	5.71	-0.18	261.6
Kotinen	FI0093R	25.07	61.23	1.77	4.49	0.44	153.1
Yamer Wood	GB0013R	-3.71	50.6	5.00	6.30	0.65	26.0
Heigham Holmes	GB0017R	1.62	52.72	3.05	3.03	0.63	-0.8
Auchencorth Moss	GB0048R	-3.24	55.79	3.89	3.99	0.92	2.6
Chilbolton Observatory	GB1055	-1.44	51.15	2.45	4.85	0.85	98.0
Rucava	LV0010R	21.17	56.16	3.78	5.59	0.59	48.0
De Zilk	NL0091R	4.5	52.3	8.09	4.72	0.65	-41.7
Birkenes	NO0001R	8.25	58.38	7.21	10.82	0.40	50.1
Diabla Gora	PL0005R	22.07	54.15	6.45	6.53	0.61	1.2
Bredkälen	SE0005R	15.33	63.85	1.99	2.82	0.67	41.9
Råö	SE0014R	11.91	57.39	4.18	6.39	0.24	52.9
Hallahus	SE0020R	13.15	56.04	5.00	6.37	0.60	27.4
Iskrba	SI0008R	14.87	45.57	2.31	3.26	-0.004	41.5

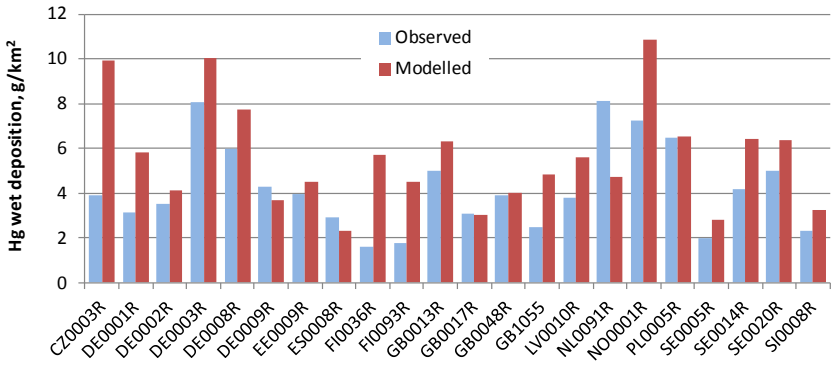
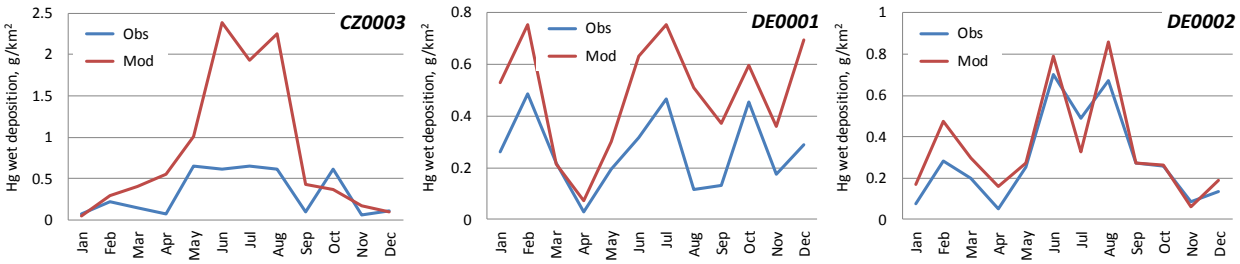


Fig. 4.11. *Modelled and observed annual wet deposition fluxes of Hg at the EMEP stations in 2020.*



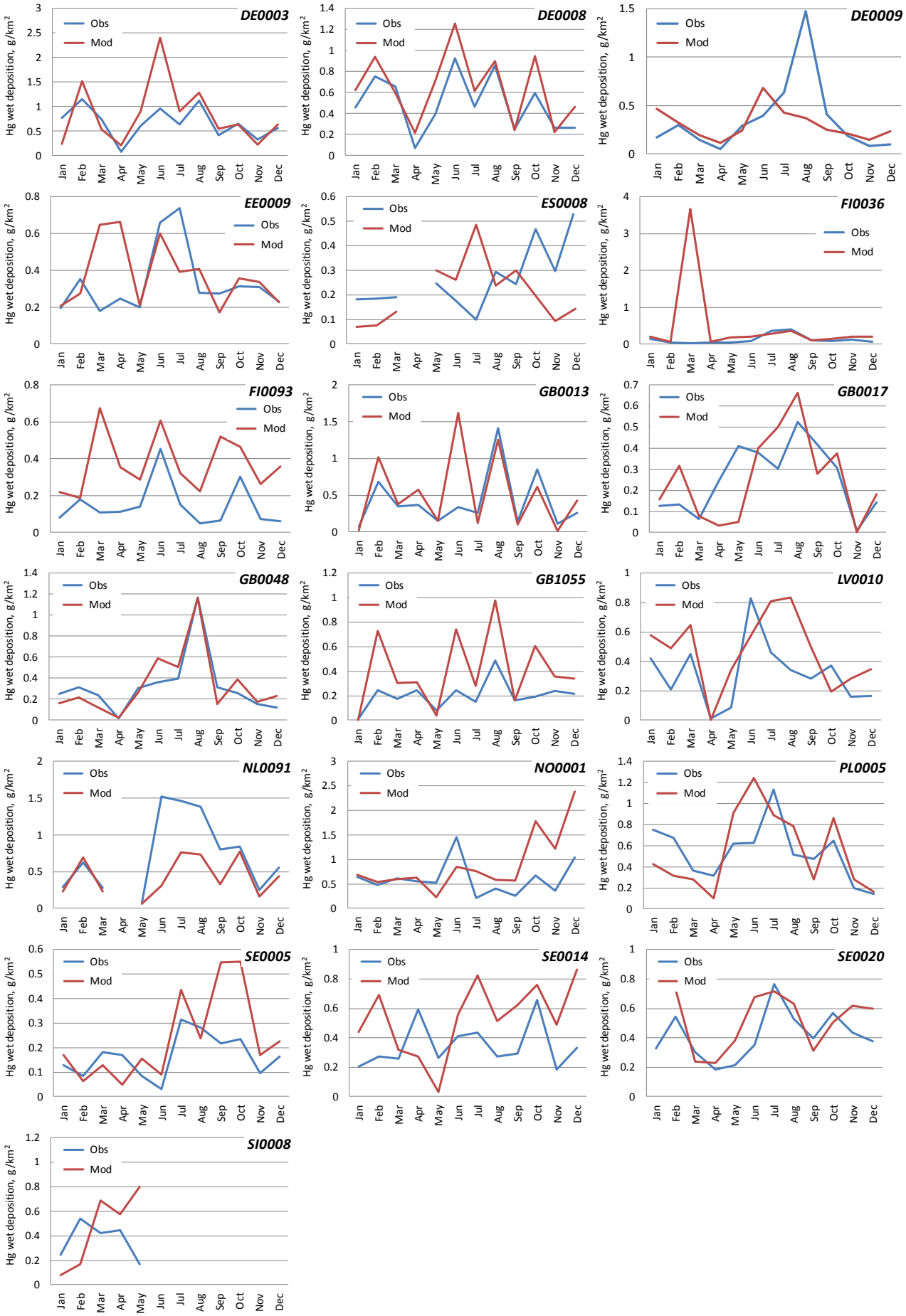


Fig. 4.14. *Modelled and observed monthly wet deposition fluxes of Hg at the EMEP stations in 2020.*

5. POLLUTION OF MARGINAL SEAS

5.1. Lead

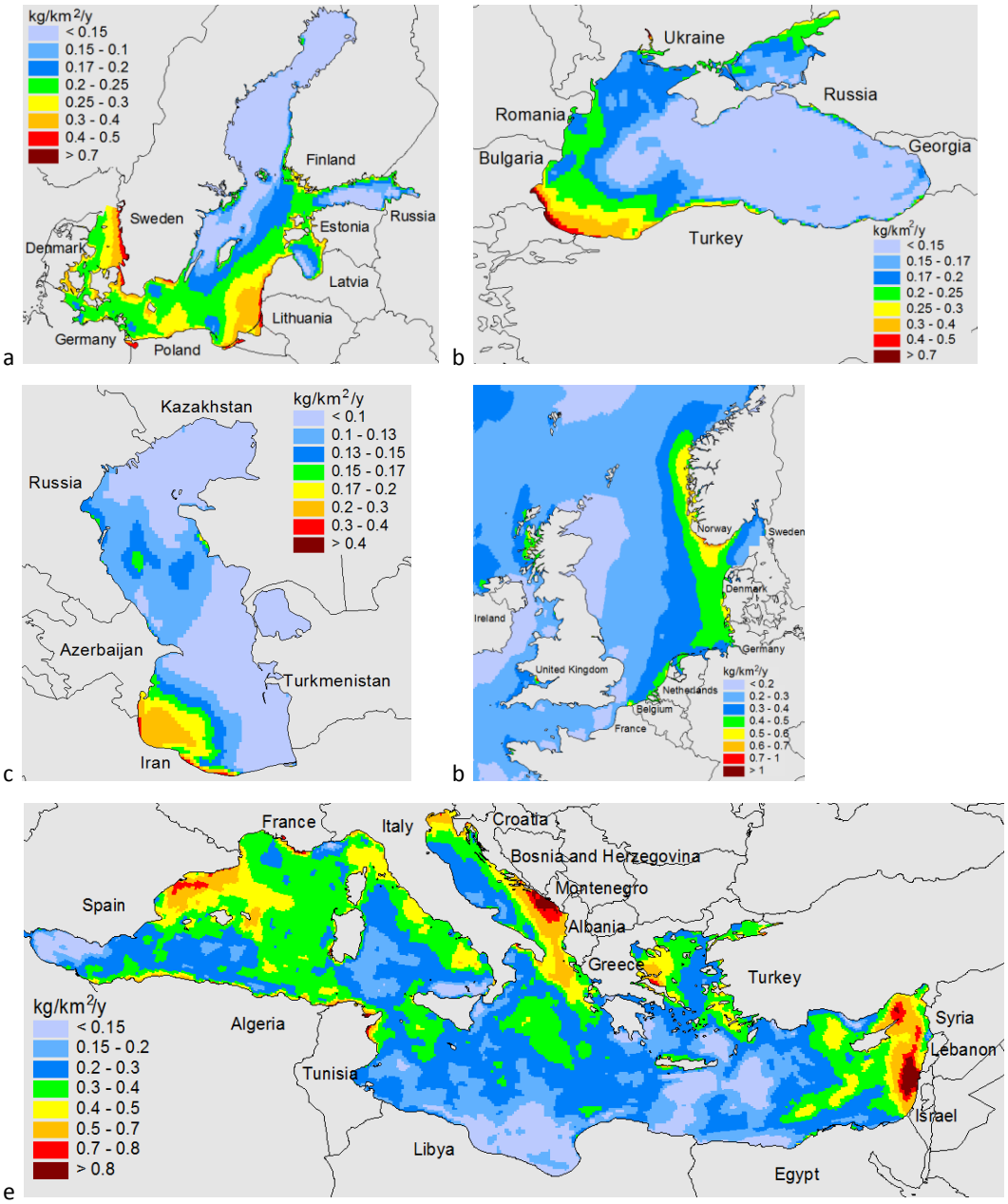


Fig. 5.1. *Lead atmospheric input to the Baltic (a), Black (b), Caspian (c), North (d) and Mediterranean (d) Seas.*

5.2. Cadmium

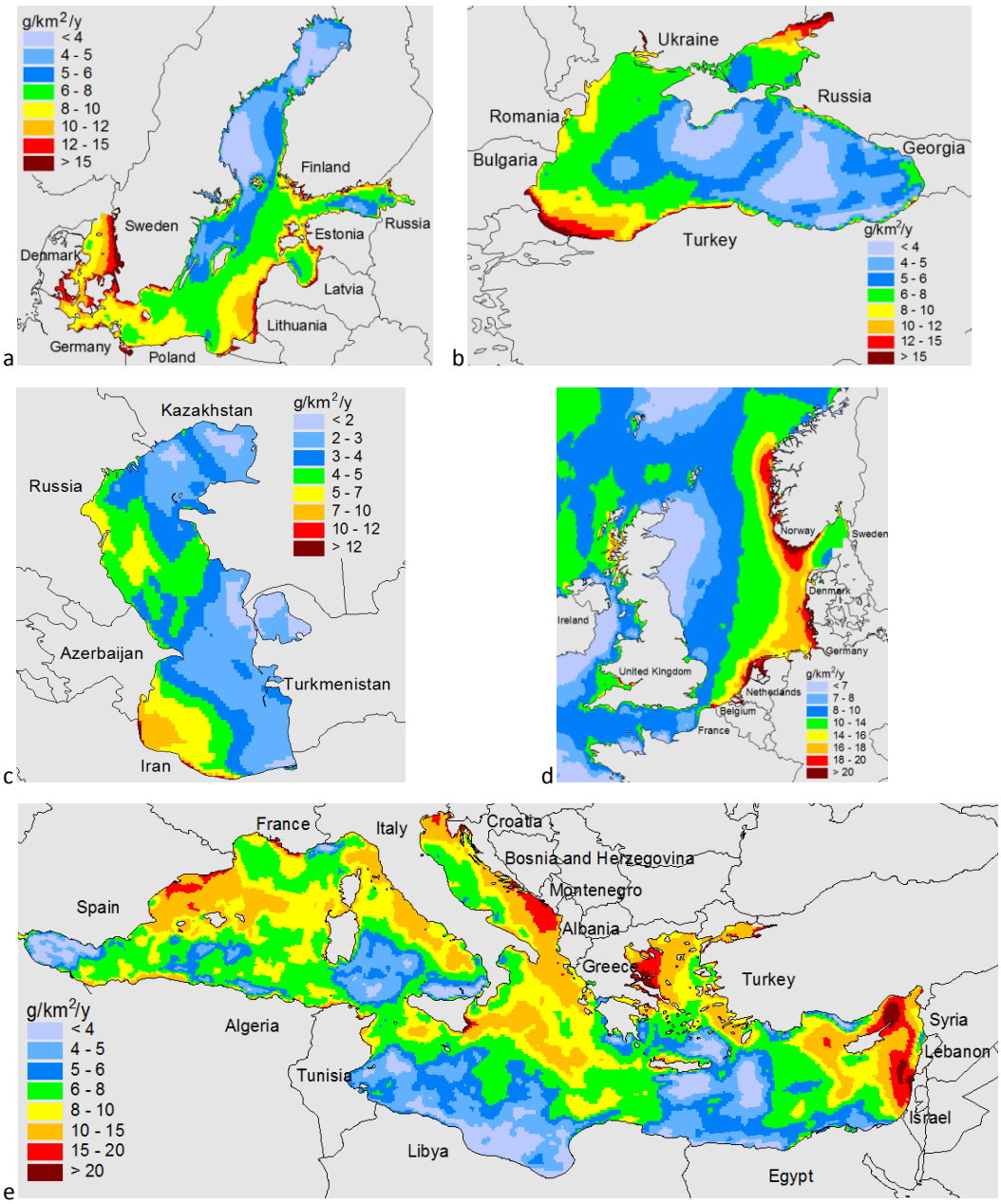


Fig. 5.2. *Cadmium atmospheric input to the Baltic (a), Black (b), Caspian (c), North (d) and Mediterranean (d) Seas.*

5.3. Mercury

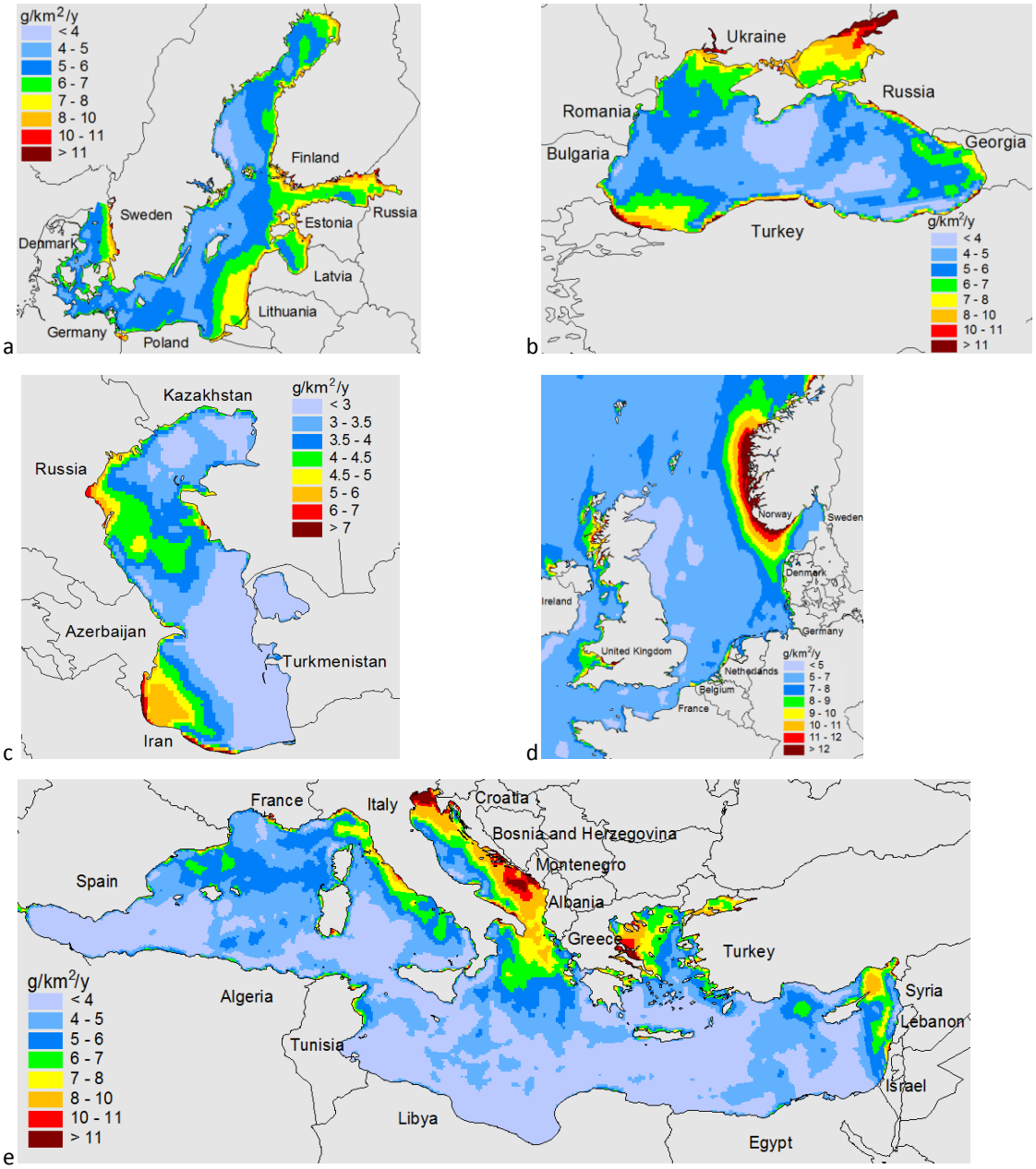


Fig. 5.3. *Mercury atmospheric input to the Baltic (a), Black (b), Caspian (c), North (d) and Mediterranean (d) Seas.*

6. ECOSYSTEM-SPECIFIC DEPOSITION

Table 6.1. *Classification of land-cover types used for modelling of ecosystem-dependent deposition [Strahler et al, 1999]*

Land-cover type	Description
Evergreen Needleleaf Forests	Lands dominated by woody vegetation with a percent cover >60% and height exceeding 2 meters. Almost all trees remain green all year. Canopy is never without green foliage.
Evergreen Broadleaf Forests	Lands dominated by woody vegetation with a percent cover >60% and height exceeding 2 meters. Almost all trees and shrubs remain green year round. Canopy is never without green foliage.
Deciduous Needleleaf Forests	Lands dominated by woody vegetation with a percent cover >60% and height exceeding 2 meters. Consists of seasonal needleleaf tree communities with an annual cycle of leaf-on and leaf-off periods.
Deciduous Broadleaf Forests	Lands dominated by woody vegetation with a percent cover >60% and height exceeding 2 meters. Consists of broadleaf tree communities with an annual cycle of leaf-on and leaf-off periods.
Mixed Forests	Lands dominated by trees with a percent cover >60% and height exceeding 2 meters. Consists of tree communities with interspersed mixtures or mosaics of the other four forest types. None of the forest types exceeds 60% of landscape.
Closed Shrublands	Lands with woody vegetation less than 2 meters tall and with shrub canopy cover >60%. The shrub foliage can be either evergreen or deciduous.
Open Shrublands	Lands with woody vegetation less than 2 meters tall and with shrub canopy cover between 10-60%. The shrub foliage can be either evergreen or deciduous.
Woody Savannas	Lands with herbaceous and other understory systems, and with forest canopy cover between 30-60%. The forest cover height exceeds 2 meters.
Savannas	Lands with herbaceous and other understory systems, and with forest canopy cover between 10-30%. The forest cover height exceeds 2 meters.
Grasslands	Lands with herbaceous types of cover. Tree and shrub cover is less than 10%.
Permanent Wetlands	Lands with a permanent mixture of water and herbaceous or woody vegetation. The vegetation can be present in either salt, brackish, or fresh water.
Croplands	Lands covered with temporary crops followed by harvest and a bare soil period (*e.g.*, single and multiple cropping systems). Note that perennial woody crops will be classified as the appropriate forest or shrub land cover type.
Urban and Built-Up Lands	Land covered by buildings and other man-made structures.
Cropland/Natural Vegetation Mosaics	Lands with a mosaic of croplands, forests, shrubland, and grasslands in which no one component comprises more than 60% of the landscape.
Snow and Ice	Lands under snow/ice cover throughout the year.
Barren	Lands with exposed soil, sand, rocks, or snow and never has more than 10% vegetated cover during any time of the year.
Water Bodies	Oceans, seas, lakes, reservoirs, and rivers. Can be either fresh or salt-water bodies.

6.1. Lead

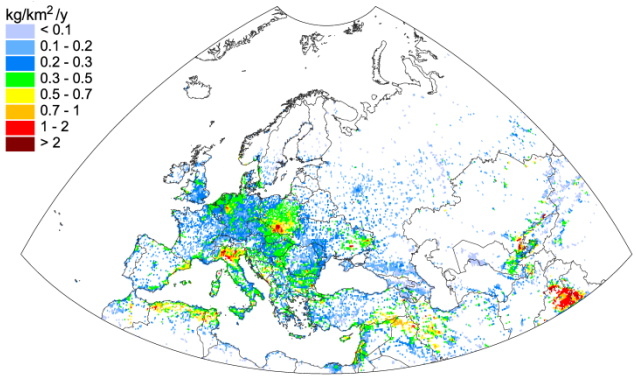


Fig. 6.1. *Annual total deposition of Pb on urban and built-up lands in the EMEP region in 2020, kg/km²/y*

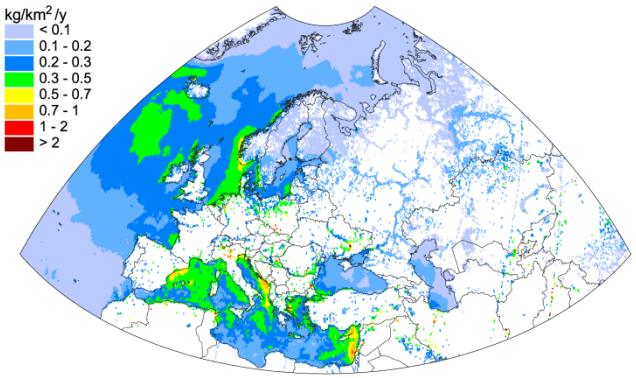


Fig. 6.2. *Annual total deposition of Pb on water bodies in the EMEP region in 2020, kg/km²/y*

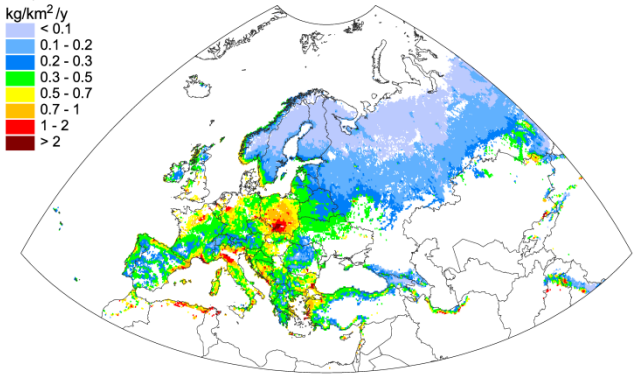


Fig. 6.3. *Annual total deposition of Pb on woody savannas in the EMEP region in 2020, kg/km²/y*

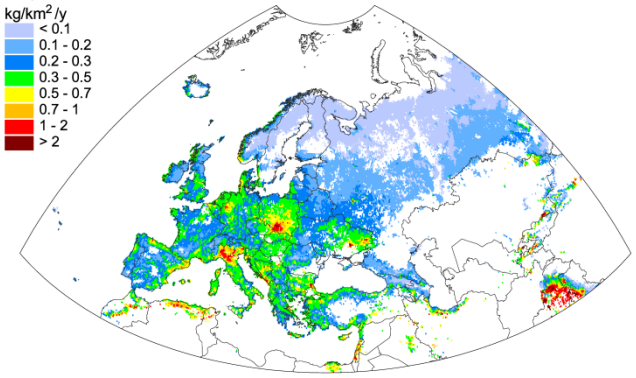


Fig. 6.4. *Annual total deposition of Pb on savannas in the EMEP region in 2020, kg/km²/y*

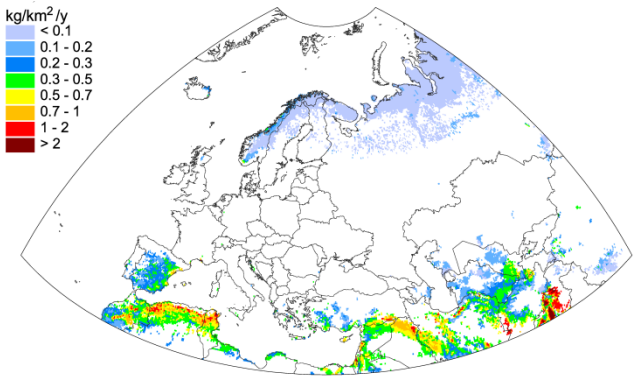


Fig. 6.5. *Annual total deposition of Pb on open shrublands in the EMEP region in 2020, kg/km²/y*

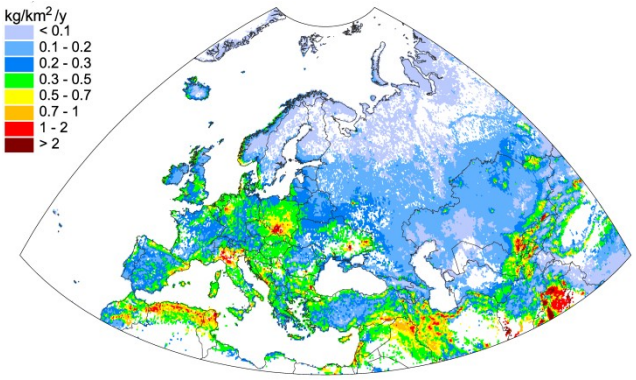


Fig. 6.6. *Annual total deposition of Pb on grasslands in the EMEP region in 2020, kg/km²/y*

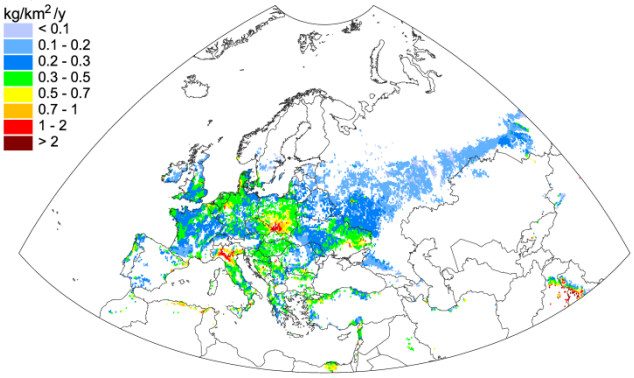


Fig. 6.7. *Annual total deposition of Pb on cropland/natural vegetation mosaics in the EMEP region in 2020, kg/km^2/y*

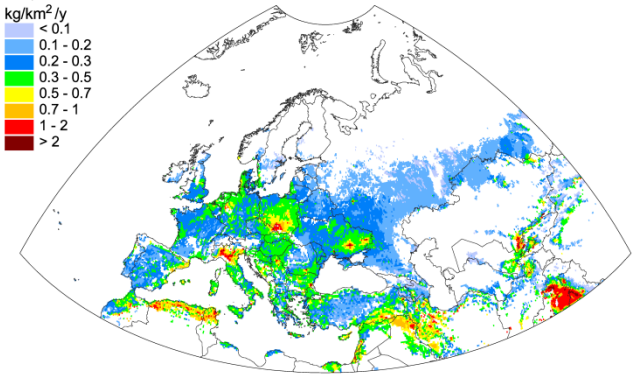


Fig. 6.8. *Annual total deposition of Pb on croplands in the EMEP region in 2020, kg/km^2/y*

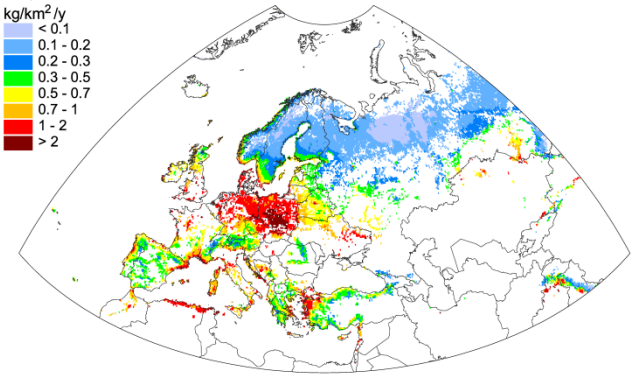


Fig. 6.9. *Annual total deposition of Pb on evergreen needleleaf forests in the EMEP region in 2020, kg/km^2/y*

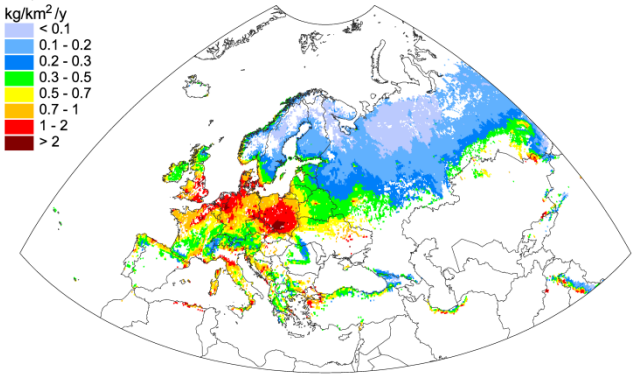


Fig. 6.10. *Annual total deposition of Pb on mixed forests in the EMEP region in 2020, kg/km^2/y*

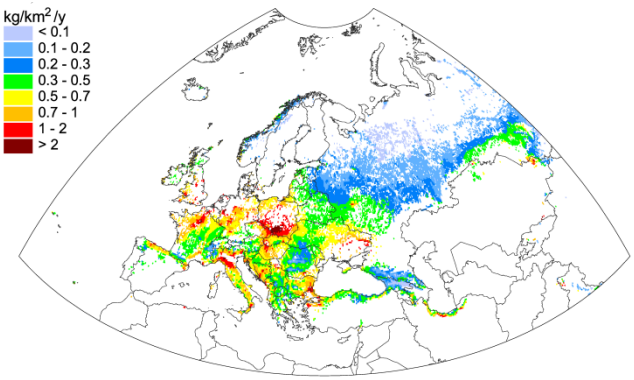


Fig. 6.11. *Annual total deposition of Pb on deciduous broadleaf forests in the EMEP region in 2020, kg/km^2/y*

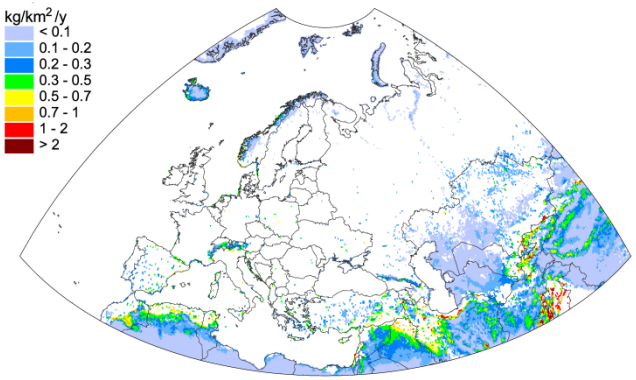


Fig. 6.12. *Annual total deposition of Pb on barren in the EMEP region in 2020, kg/km^2/y*

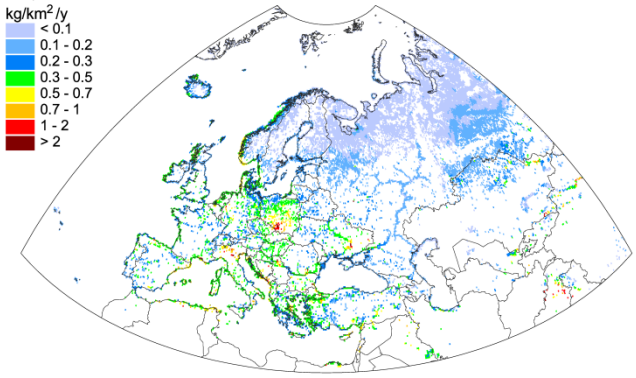


Fig. 6.13. *Annual total deposition of Pb on wetland in the EMEP region in 2020, kg/km^2/y*

6.2. Cadmium

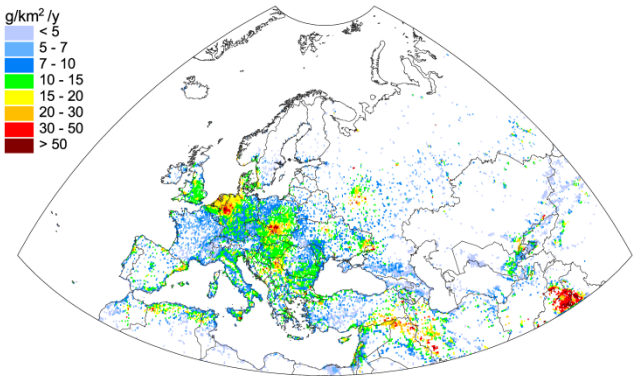


Fig. 6.14. *Annual total deposition of Cd on urban and built-up lands in the EMEP region in 2020, g/km^2/y*

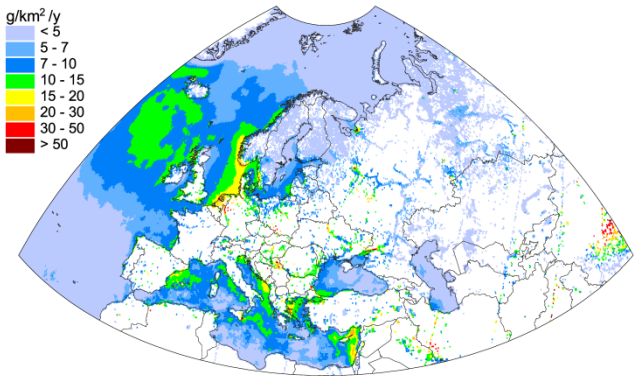


Fig. 6.15. *Annual total deposition of Cd on water bodies in the EMEP region in 2020, g/km^2/y*

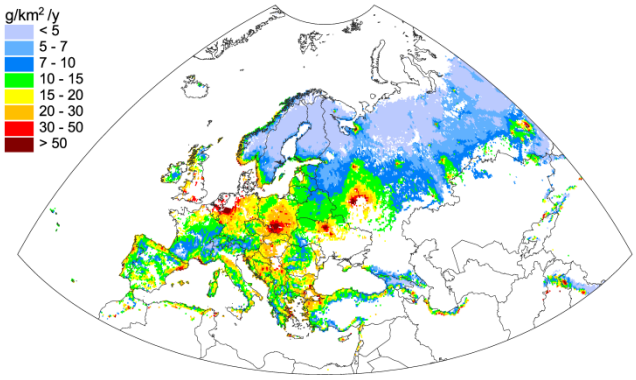


Fig. 6.16. *Annual total deposition of Cd on woody savannas in the EMEP region in 2020, g/km^2/y*

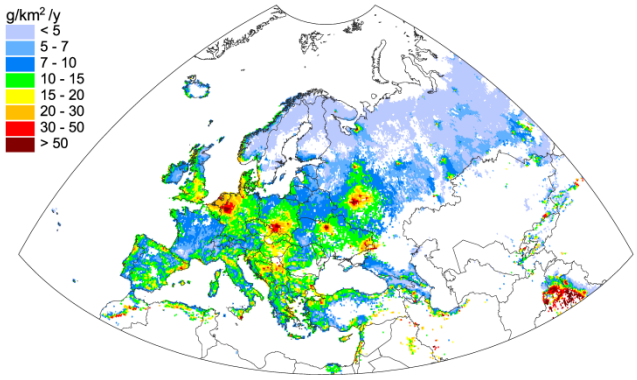


Fig. 6.17. *Annual total deposition of Cd on savannas in the EMEP region in 2020, g/km^2/y*

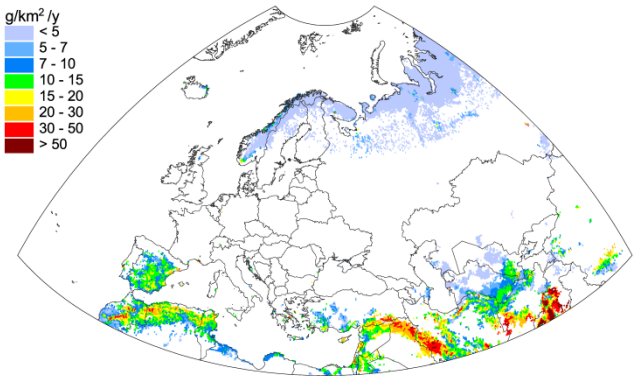


Fig. 6.18. *Annual total deposition of Cd on open shrublands in the EMEP region in 2020, g/km^2/y*

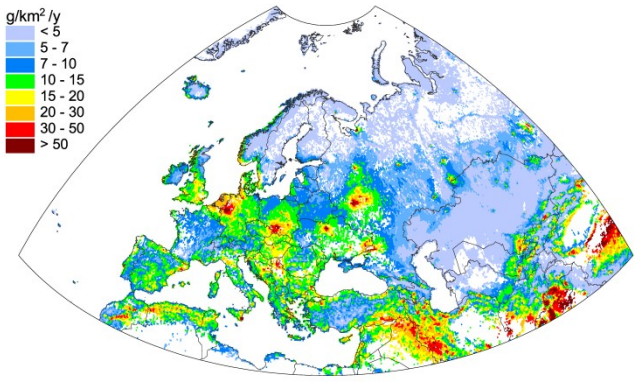


Fig. 6.19. *Annual total deposition of Cd on grasslands in the EMEP region in 2020, g/km^2/y*

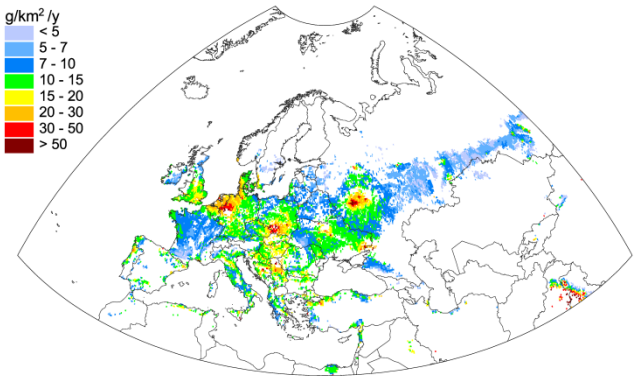


Fig. 6.20. *Annual total deposition of Cd on cropland/natural vegetation mosaics in the EMEP region in 2020, g/km^2/y*

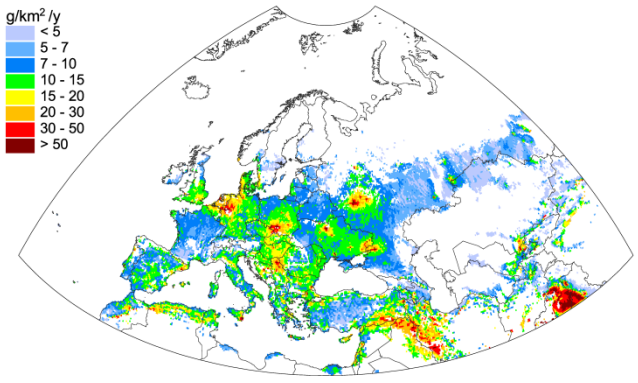


Fig. 6.21. *Annual total deposition of Cd on croplands in the EMEP region in 2020, g/km^2/y*

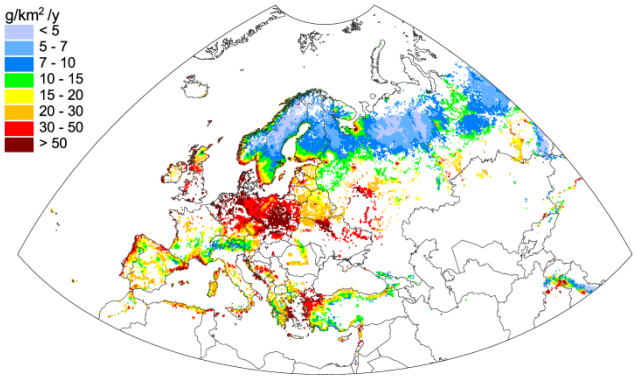


Fig. 6.22. *Annual total deposition of Cd on evergreen needleleaf forests in the EMEP region in 2020, g/km^2/y*

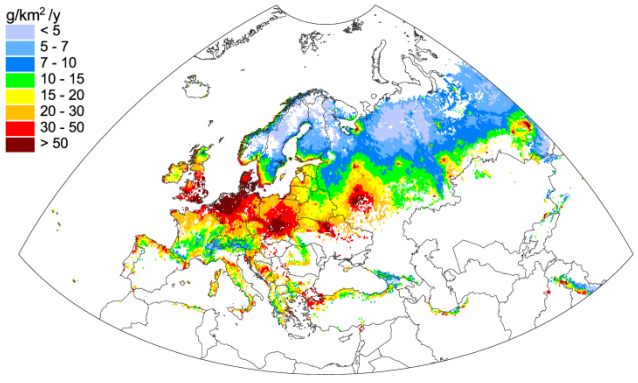


Fig. 6.23. *Annual total deposition of Cd on mixed forests in the EMEP region in 2020, g/km^2/y*

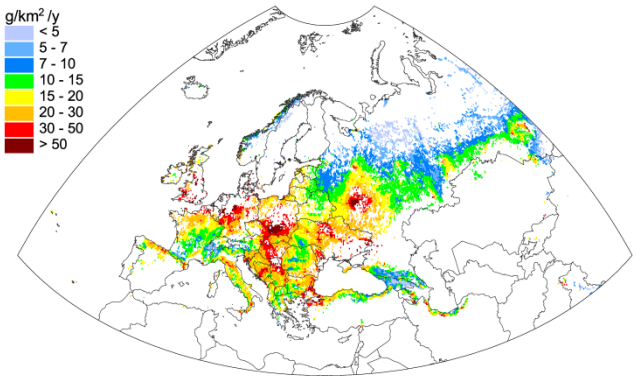


Fig. 6.24. *Annual total deposition of Cd on deciduous broadleaf forests in the EMEP region in 2020, g/km^2/y*

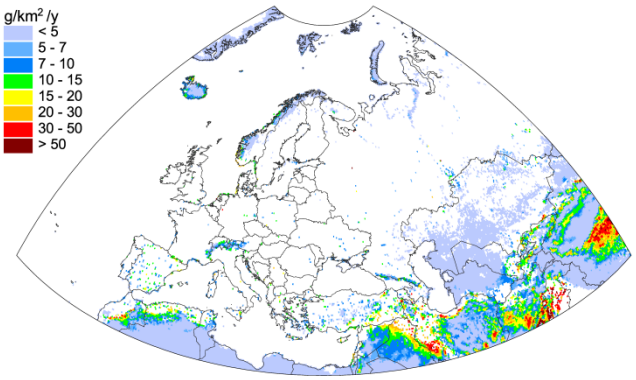


Fig. 6.25. *Annual total deposition of Cd on barren in the EMEP region in 2020, g/km^2/y*

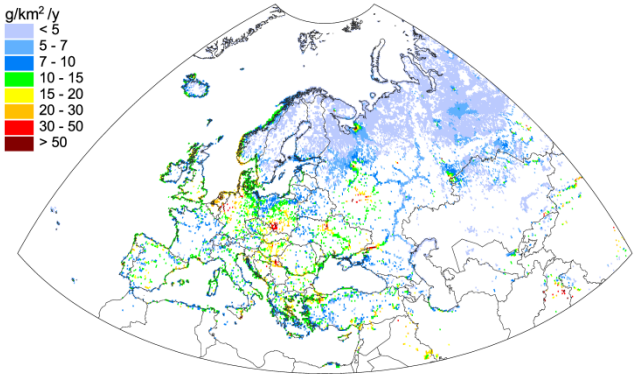


Fig. 6.26. *Annual total deposition of Cd on wetland in the EMEP region in 2020, g/km^2/y*

6.3. Mercury

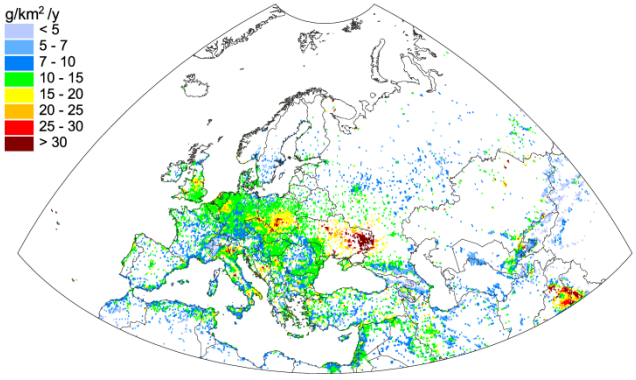


Fig. 6.27. *Annual total deposition of Hg on urban and built-up lands in the EMEP region in 2020, g/km^2/y*

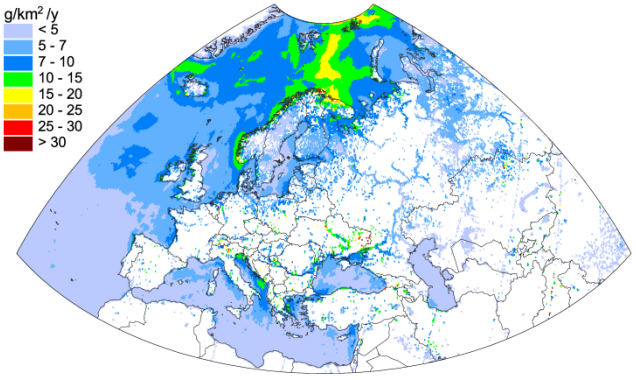


Fig. 6.28. *Annual total deposition of Hg on water bodies in the EMEP region in 2020, g/km^2/y*

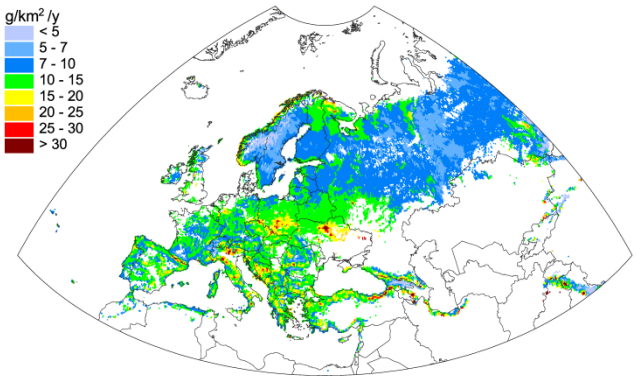


Fig. 6.29. *Annual total deposition of Hg on woody savannas in the EMEP region in 2020, g/km²/y*

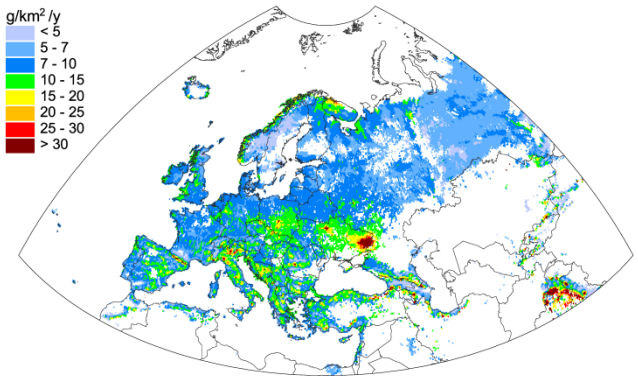


Fig. 6.30. *Annual total deposition of Hg on savannas in the EMEP region in 2020, g/km²/y*

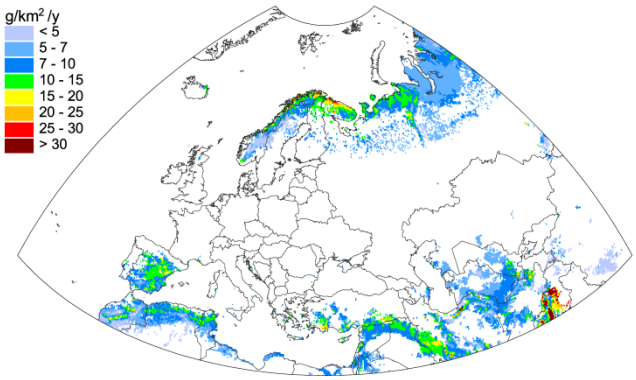


Fig. 6.31. *Annual total deposition of Hg on open shrublands in the EMEP region in 2020, g/km²/y*

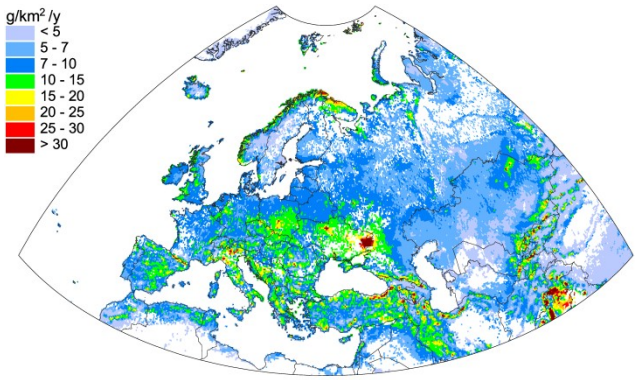


Fig. 6.32. *Annual total deposition of Hg on grasslands in the EMEP region in 2020, g/km²/y*

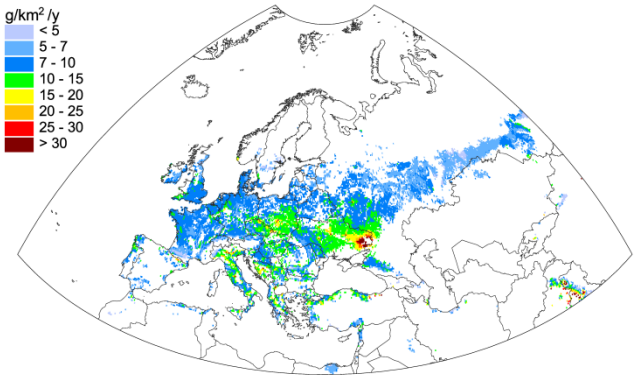


Fig. 6.33. *Annual total deposition of Hg on cropland/natural vegetation mosaics in the EMEP region in 2020, g/km²/y*

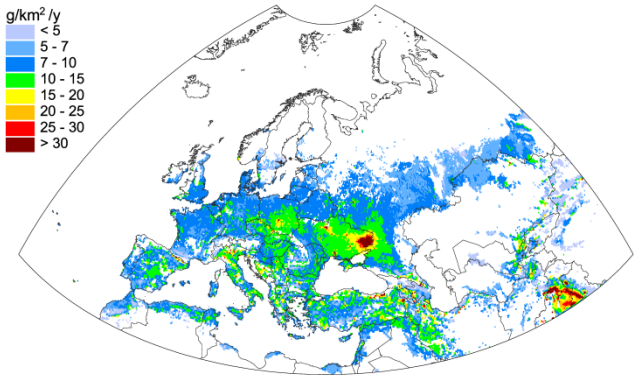


Fig. 6.34. *Annual total deposition of Hg on croplands in the EMEP region in 2020, g/km²/y*

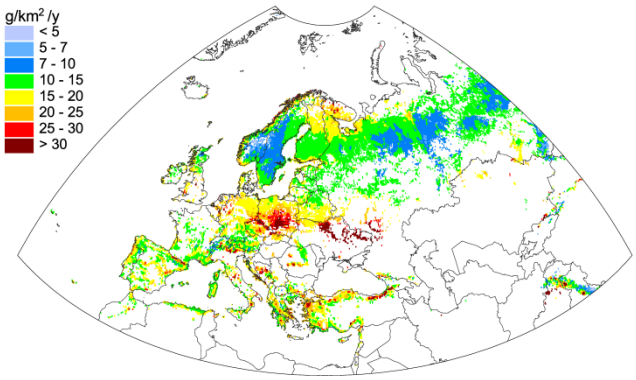


Fig. 6.35. *Annual total deposition of Hg on evergreen needleleaf forests in the EMEP region in 2020, g/km^2/y*

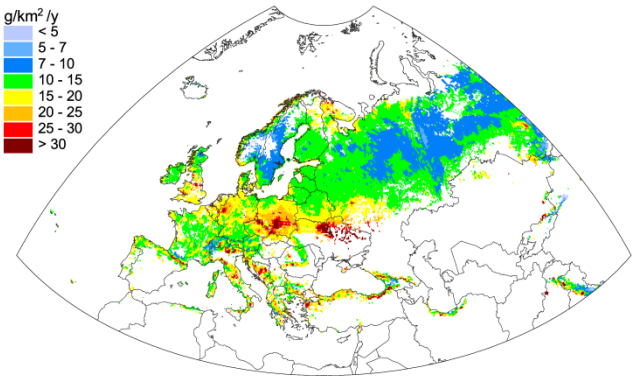


Fig. 6.36. *Annual total deposition of Hg on mixed forests in the EMEP region in 2020, g/km^2/y*

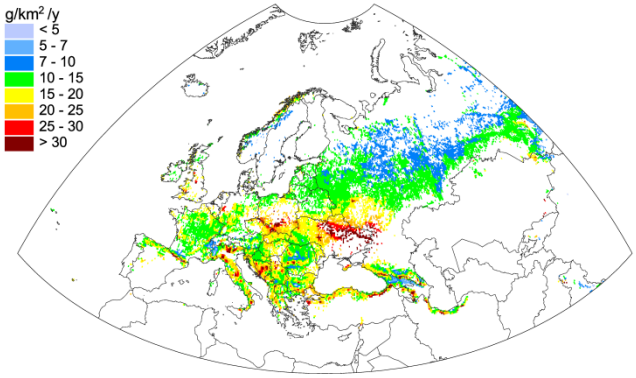


Fig. 6.37. *Annual total deposition of Hg on deciduous broadleaf forests in the EMEP region in 2020, g/km^2/y*

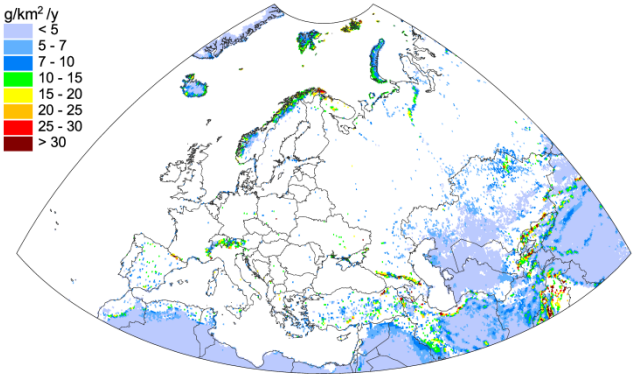


Fig. 6.38. *Annual total deposition of Hg on barren in the EMEP region in 2020, g/km^2/y*

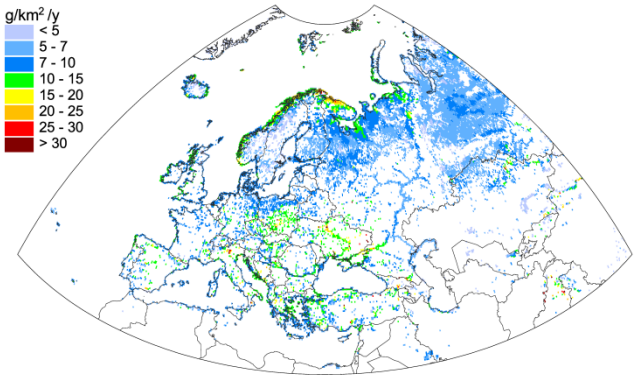


Fig. 6.39. *Annual total deposition of Hg on wetland in the EMEP region in 2020, g/km^2/y*

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