7. Atmospheric Supply of PCDD/Fs to the Baltic Sea in 2007

In this chapter the results of model evaluation of dioxins and furans (PCDD/Fs) atmospheric input to the Baltic Sea and its sub-basins for 2007 is presented. Modelling of PCDD/F atmospheric transport and deposition was carried out using MSC-E Eulerian Persistent Organic Pollutant transport model MSCE-POP (*Gusev et al.*, 2005). Latest available official information on PCDD/F emission from HELCOM countries and other European countries was used in computations. Based on these data annual and monthly levels of PCDD/F deposition to the Baltic Sea region have been obtained and contributions of HELCOM countries emission sources to the deposition over the Baltic Sea are estimated.

7.1 PCDD/Fs emissions

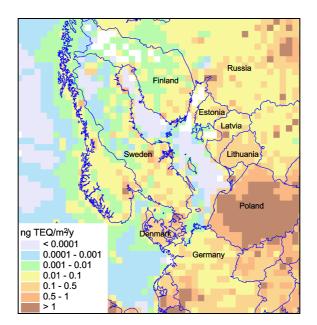


Figure 7.1. Annual total anthropogenic emissions of PCDD/F in the Baltic Sea region for 2007, ng $TEQ/m^2/y$.

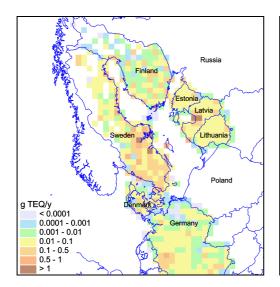


Figure 7.2. Annual PCDD/F emission of HELCOM countries from Combustion in Power Plants and Industry sector for 2007, g TEQ/y.

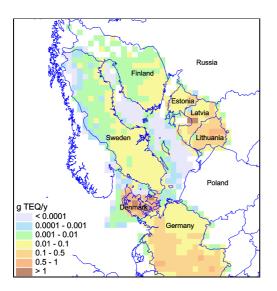


Figure 7.4. Annual PCDD/F emission of HELCOM countries from Commercial, Residential and Other Stationary Combustion sector for 2007, g TEQ/y.

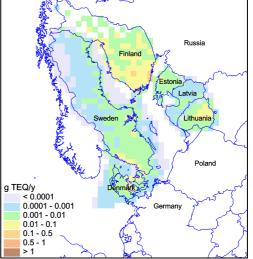


Figure 7.3. Annual PCDD/F emission of HELCOM countries from Transport sources below 1000 m sector for 2007, g TEQ/y.

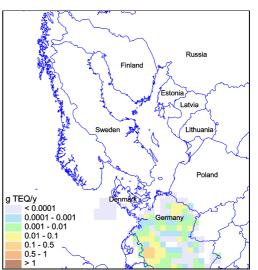


Figure 7.5. Annual PCDD/F emission of HELCOM countries from Fugitive Emissions From Fuels sector for 2007, g TEQ/y.

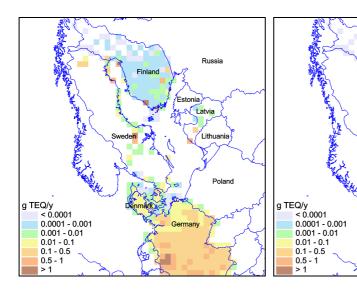


Figure 7.6. Annual PCDD/F emission of HELCOM countries from Industrial Processes sector for 2007, g TEQ/y.

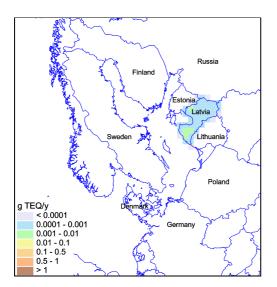


Figure 7.8. Annual PCDD/F emission of HELCOM countries from Agriculture sector for 2007, g TEQ/y.

Figure 7.7. Annual PCDD/F emission of HELCOM countries from Solvent and Other Product Use sector for 2007, g TEQ/y.

Finland

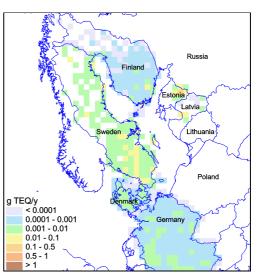


Figure 7.9. Annual PCDD/F emission of HELCOM countries from Waste sector for 2007, g TEQ/y.

Russia

Estonia

Germany

🔨 Latvia

Lithuania

Poland

NFR emission sector	Sector name	DK	EE	FI	DE	LV	LT	PL	RU	SE
1	Combustion in Power Plants and Industry	1.5	2.8	4.8	7.1	5.35	1.5	50.6	808	26.9
2	Transport	0.2	0.05	2.8	3.16	0.02	0.3	0.7		0.6
3	Commercial, Residential and Other Stationary Combustion	20	1.6	1.1	21.04	6.7	9.1	188.4		4.01
4	Fugitive Emissions From Fuels	< 0.001	NA	0	1.72			3.1		0.19
5	Industrial Processes	6.1	0	3.0	50.206	1.2		15.5		3.8
6	Solvent and Other Product Use	0	0	0.002	NA			NA		NA
7	Agriculture	0		0	NA	0.02		0.3		NA
8	Waste	0.04	0.3	0.1	0.13	0.07		183.01		1
9	Other				NA					
Total		27.8	4.8	11.8	83.4	13.3	10.9	441.6	808	36.5

Table 7.1. Annual total PCDD/F anthropogenic emissions of HELCOM countries from different sectors for 2007, in g TEQ/year

NA not available

NO not observed

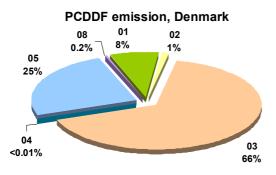


Figure 7.10. Contributions of different sector to total annual PCDD/F emission of Denmark in 2007

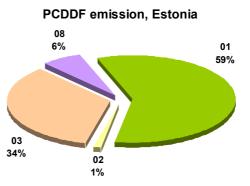


Figure 7.11. Contributions of different sector to total annual PCDD/F emission of Estonia in 2007

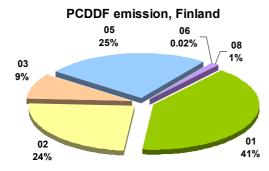


Figure 7.12. Contributions of different sector to total annual PCDD/F emission of Finland in 2007

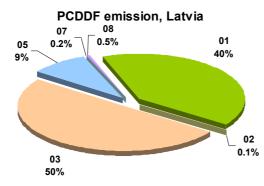


Figure 7.14. Contributions of different sector to total annual PCDD/F emission of Latvia in 2007

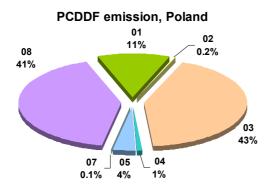


Figure 7.16. Contributions of different sector to total annual PCDD/F emission of Poland in 2007

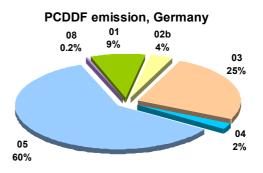


Figure 7.13. Contributions of different sector to total annual PCDD/F emission of Germany in 2007

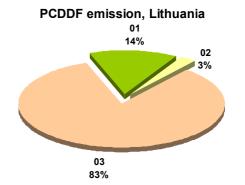


Figure 7.15. Contributions of different sector to total annual PCDD/F emission of Lithuania in 2007

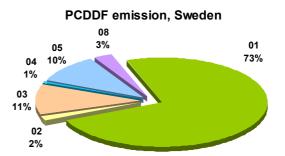


Figure 7.17. Contributions of different sector to total annual PCDD/F emission of Sweden in 2007

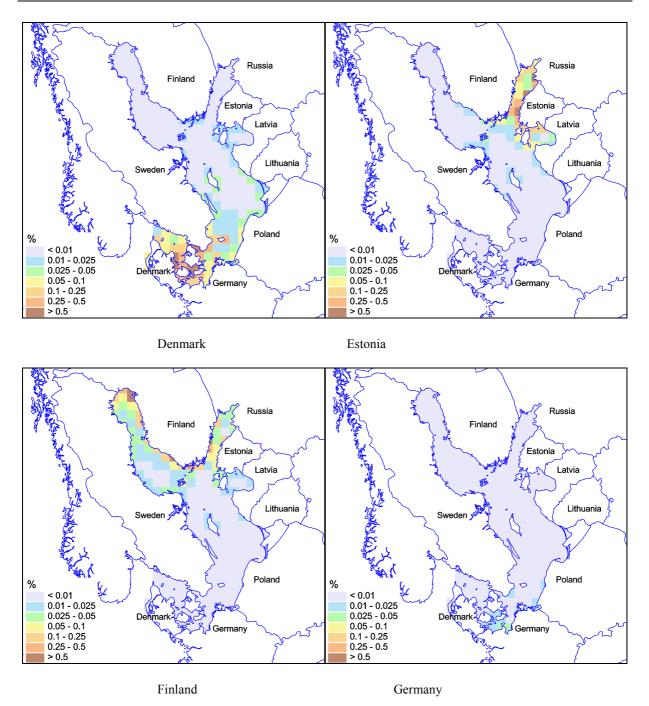


Figure 7.18. Maps with the contributions of annual total anthropogenic PCDD/F emissions from HELCOM Parties to total PCDD/F deposition over the Baltic Sea in 2007 (fraction of total deposition in % over the 50x50 km grid cell).

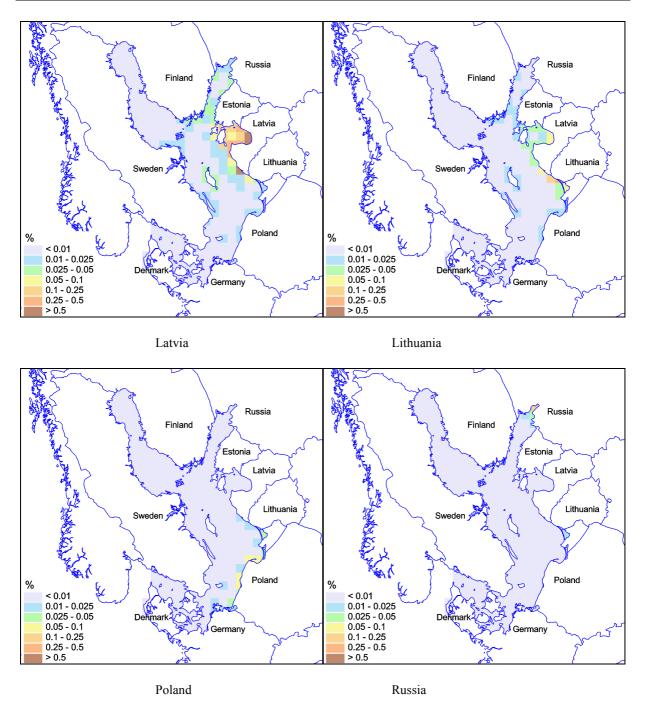
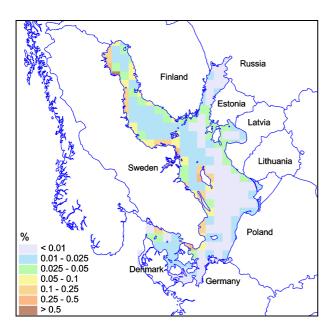


Figure 7.18. (cont.) Maps with the contributions of annual total anthropogenic PCDD/F emissions from HELCOM Parties to total PCDD/F deposition over the Baltic Sea in 2007 (fraction of total deposition in % over the 50x50 km grid cell).



Sweden

Figure 7.18. (cont.) Maps with the contributions of annual total anthropogenic PCDD/F emissions from HELCOM Parties to total PCDD/F deposition over the Baltic Sea in 2007 (fraction of total deposition in % over the 50x50 km grid cell).

Table 7.2. Annual total anthropogenic emissions of PCDD/Fs of HELCOM countries and other EMEP countries in period 1990-2007, g TEQ/year (Unofficial emissions are shaded).

Denmark 67 Estonia 6 Finland 36 Germany 114 Latvia 7 Lithuania 20 Poland 529 Russia 991 Sweden 60 MELCOM 1829 Albania 43 Armenia 47 Austria 160 Belgium 592 Bosnia and Herzegovina 67 Bulgaria 554 Croatia 160 Zyprus 8 Czech Republic 1252 France 1763 Georgia 122 Greece 279 Hungary 196 Iceland 9 Ireland 27 Italy 472 Kazakhstan 40 Luxembourg 45 Malta 4 Monaco 2 Norway 129 Portuaal </th <th>644 55 35535 947 566 7773 988 987 1355 5522 677 5355 5522 677 12200 1814 1222 2799 1755</th> <th>59 4 33 86 7 16 517 901 50 1673 43 47 77 98 16 520 67 515 139 8 1220 1836 122 279 132</th> <th>544 4 355 82 8 8 8 8 8 8 8 8 8 4 7 7 9 8 7 9 8 6 7 7 9 8 6 7 7 9 8 8 16 4 55 2 9 9 8 8 8 8 8 8 8 7 8 7 8 7 8 7 8 7 8 7</th> <th>51 4 41 80 9 9 12 520 825 44 1585 43 47 56 98 16 481 67 476 118 8 1135 1893 122 279</th> <th>4995 41189 100 100 5155 515 515 515 515 40 433 477 433 477 433 477 433 477 438 88 166 445 567 108 88 108 109 100 100 100 100 100 100 100</th> <th>47 5 40 85 5 85 43 8 48 4 63 7 8 8 43 5 9 8 8 43 5 9 67 67 7 7 922 97 9 922 279</th> <th>4445 39989 12266 440614 377 1284 43347 59988 166374 374 67310 95577 31095 8300 8300 10433122</th> <th>37 4 4 40 83 31 6 6 381 6 6 35 1203 43 43 47 56 6 7 8 8 8 16 245 5 67 7 288 111 8 767 938</th> <th>31 3 41 80 12 5 381 625 381 625 381 1212 43 47 54 98 155 67 245 98 7 7 643 611</th> <th>32 32 82 10 4 333 631 33 631 33 631 43 47 52 98 186 67 233 109 7 744 520</th> <th>30 3 31 81 11 13 447 643 34 1293 43 47 57 57 99 99 23 80 65 201 76 76 70 620 384</th> <th>27 4 32 80 111 12 433 655 34 128 8 44 47 48 100 25 58 63 219 75 77 177 7 357</th> <th>29 4 32 80 12 482 686 33 1371 44 4 47 51 101 260 60 61 255 97 6 114 235</th> <th>24 4 32 82 13 11 387 716 36 1305 44 47 52 102 25 62 259 239 93 67 187 315</th> <th>25 3 26 80 13 11 416 747 39 1361 44 47 53 102 24 61 57 230 91 6 179</th> <th>26 3 14 14 11 449 778 388 141 44 47 53 103 27 55 56 247 93 6 175 121</th> <th>28 5 12 83 11 442 808 36 1438 448 48 48 48 104 27 58 548 548 79 3 148</th>	644 55 35535 947 566 7773 988 987 1355 5522 677 5355 5522 677 12200 1814 1222 2799 1755	59 4 33 86 7 16 517 901 50 1673 43 47 77 98 16 520 67 515 139 8 1220 1836 122 279 132	544 4 355 82 8 8 8 8 8 8 8 8 8 4 7 7 9 8 7 9 8 6 7 7 9 8 6 7 7 9 8 8 16 4 55 2 9 9 8 8 8 8 8 8 8 7 8 7 8 7 8 7 8 7 8 7	51 4 41 80 9 9 12 520 825 44 1585 43 47 56 98 16 481 67 476 118 8 1135 1893 122 279	4995 41189 100 100 5155 515 515 515 515 40 433 477 433 477 433 477 433 477 438 88 166 445 567 108 88 108 109 100 100 100 100 100 100 100	47 5 40 85 5 85 43 8 48 4 63 7 8 8 43 5 9 8 8 43 5 9 67 67 7 7 922 97 9 922 279	4445 39989 12266 440614 377 1284 43347 59988 166374 374 67310 95577 31095 8300 8300 10433122	37 4 4 40 83 31 6 6 381 6 6 35 1203 43 43 47 56 6 7 8 8 8 16 245 5 67 7 288 111 8 767 938	31 3 41 80 12 5 381 625 381 625 381 1212 43 47 54 98 155 67 245 98 7 7 643 611	32 32 82 10 4 333 631 33 631 33 631 43 47 52 98 186 67 233 109 7 744 520	30 3 31 81 11 13 447 643 34 1293 43 47 57 57 99 99 23 80 65 201 76 76 70 620 384	27 4 32 80 111 12 433 655 34 128 8 44 47 48 100 25 58 63 219 75 77 177 7 357	29 4 32 80 12 482 686 33 1371 44 4 47 51 101 260 60 61 255 97 6 114 235	24 4 32 82 13 11 387 716 36 1305 44 47 52 102 25 62 259 239 93 67 187 315	25 3 26 80 13 11 416 747 39 1361 44 47 53 102 24 61 57 230 91 6 179	26 3 14 14 11 449 778 388 141 44 47 53 103 27 55 56 247 93 6 175 121	28 5 12 83 11 442 808 36 1438 448 48 48 48 104 27 58 548 548 79 3 148
Finland 36 Germany 114 Latvia 7 Lithuania 20 Poland 529 Russia 991 Sweden 60 HELCOM 1829 Albania 43 Armenia 47 Austria 160 Azerbaijan 98 Belarus 16 Belgium 592 Bosnia and Herzegovina 67 Bulgaria 554 Croatia 160 Cyprus 8 Czech Republic 1252 France 1763 Georgia 122 Greece 279 Hungary 196 Iceland 9 Ireland 27 Kazakhstan 40 Luxembourg 45 Maita 4 Monaco 2 Netherlands 742 Norway 129	355 105 8 8 9 47 566 535 545 545 545 545 545 545 545	33 86 7 16 517 901 50 1673 43 47 77 77 98 16 520 67 515 515 5139 8 1220 1836 122 279 132 132	35 82 8 14 592 878 47 1713 43 47 67 98 16 455 67 495 129 8 1140 1893 122 279	41 80 9 12 520 825 44 1585 43 47 56 98 16 481 67 67 476 118 8 1135 1893 122 279	41 89 10 515 769 40 1527 43 47 58 98 165 445 67 456 108 8 1135 1694 122	40 85 11 8 484 637 38 1355 43 47 60 98 166 359 67 341 97 7 922 1478 122	39 89 12 6 440 614 37 1284 43 47 59 98 16 374 67 310 95 77 830 1043	40 83 11 606 381 43 43 47 56 98 16 245 67 288 111 8 767 938	41 80 12 5 381 625 34 121 2 43 47 54 98 15 135 67 245 98 7 643	32 82 10 4 333 631 33 1162 43 47 52 98 18 116 67 233 109 7 744	31 81 11 643 447 643 43 43 43 47 57 57 99 23 80 65 201 76 7 620	32 80 11 433 655 34 128 44 47 48 100 25 58 63 219 75 7 7 7 7	32 80 12 482 686 33 1371 44 47 51 101 26 60 61 255 97 6 114	32 82 13 11 387 716 305 1305 44 47 52 102 25 62 59 239 239 3 6 187	26 80 13 11 416 747 39 1361 44 47 53 102 24 61 57 230 91 6 179	14 82 14 11 449 778 141 449 778 141 44 47 53 103 27 57 57 57 56 247 93 66 175	12 83 13 11 442 808 1438 44 48 48 48 48 48 44 27 58 54 54 55 54 79 3 148
Germany 114 Latvia 7 Lithuania 20 Poland 529 Russia 991 Sweden 60 HELCOM 1829 Albania 43 Armenia 47 Austria 160 Azerbaijan 98 Belarus 16 Belgium 592 Bosnia and Herzegovina 67 Bulgaria 554 Croatia 160 Cyprus 8 Gecorgia 1252 France 1763 Georgia 122 Greece 279 Hungary 196 Iceland 9 Italy 472 Kazakhstan 40 Luxembourg 45 Malta 4 Monaco 2 Netherlands 742 Norway 129	105535 94775 56 17733 43 47 1355 5522 677 55525 677 5525 5522 677 12200 18144 1222 2799	86 7 901 50 1673 43 47 777 98 16 520 67 515 139 8 1220 1836 1222 132	82 8 8 47 1713 43 47 67 98 165 67 495 129 8 1140 1893 122 279	80 9 12 520 825 44 1585 43 47 56 98 167 476 118 8 1135 1893 122 279	89 10 515 769 40 1527 43 47 58 98 16 445 67 456 1008 8 1135 1694 122	85 11 8 484 637 38 1355 43 47 60 98 16 359 67 341 97 7 7 922 1478 122	89 12 6 440 614 37 1284 43 47 59 98 6 7 310 95 7 830 1043	83 11 606 381 406 35 1203 43 47 56 98 16 245 67 288 16 245 67 288 11 8 767 938	80 12 5 381 625 34 1212 43 47 54 98 155 135 67 245 98 7 643	82 10 4 333 631 33 1162 43 47 52 98 116 67 233 109 7 744	81 11 13 447 643 34 1293 43 47 57 99 99 23 80 65 201 76 7 620	80 11 12 433 655 34 1288 44 47 48 100 25 58 63 219 75 7 7 7	80 12 12 482 686 33 1371 44 47 51 101 26 60 61 255 97 6 114	82 13 11 387 716 36 1305 44 47 52 102 25 62 59 239 239 36 187	80 13 11 416 747 39 1361 44 47 53 102 24 61 57 230 91 6 179	82 14 11 449 778 38 1414 44 47 53 103 27 57 57 57 56 247 93 6 175	83 13 11 442 808 36 1438 44 48 48 48 104 27 58 54 58 54 58 79 3 148
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Armenia47Austria160Azerbaijan98Belarus16Belgium592Bosnia and Herzegovina67Bulgaria554Croatia160Cyprus8Czech Republic1252France1763Georgia122Greece279Hungary196Iceland9Ireland27Italy472Kazakhstan40Luxembourg45Malta4Monaco2Norway129	47 135 98 16 552 67 535 150 7 1220 1814 122 279 175	47 77 98 16 520 67 515 139 8 1220 1836 122 279 132	47 67 98 16 455 67 495 129 8 1140 1893 122 279	47 56 98 16 481 67 476 118 8 1135 1893 122 279	47 58 98 16 445 67 456 108 8 1135 1694 122	47 60 98 16 359 67 341 97 7 922 1478 122	47 59 98 16 374 67 310 95 7 830 1043	47 56 98 16 245 67 288 111 8 767 938	47 54 98 15 135 67 245 98 7 643	47 52 98 18 116 67 233 109 7 744	47 57 99 23 80 65 201 76 7 620	47 48 100 25 58 63 219 75 7 7 177	47 51 101 26 60 61 255 97 6 114	47 52 102 25 62 59 239 93 6 187	47 53 102 24 61 57 230 91 6 179	47 53 103 27 57 56 247 93 6 175	48 48 104 27 58 54 58 79 3 148
Austria160Azerbaijan98Belarus16Belgium592Bosnia and Herzegovina67Bulgaria554Croatia160Cyprus8Czech Republic1252France1763Georgia122Greece279Hungary196Iceland9Ireland27Italy472Kazakhstan40Luxembourg45Malta4Monaco2Norway129	135 98 16 552 67 535 150 77 1220 1814 122 279 175	77 98 16 520 67 515 139 8 1220 1836 122 279 132	67 98 16 455 67 495 129 8 1140 1893 122 279	56 98 16 481 67 476 118 8 1135 1893 122 279	58 98 16 445 67 456 108 8 1135 1694 122	60 98 16 359 67 341 97 7 922 1478 122	59 98 16 374 67 310 95 7 830 1043	56 98 16 245 67 288 111 8 767 938	54 98 15 135 67 245 98 7 643	52 98 116 67 233 109 7 744	57 99 23 80 65 201 76 7 620	48 100 25 58 63 219 75 7 7 177	51 101 26 60 61 255 97 6 114	52 102 25 62 59 239 93 6 187	53 102 24 61 57 230 91 6 179	53 103 27 57 56 247 93 6 175	48 104 27 58 54 58 79 3 148
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Greece279Hungary196Iceland9Ireland27Italy472Kazakhstan40Luxembourg45Malta4Monaco2Netherlands742Norway129	175	132		-	279	270		122	122	122	122	111	98	85	85	85	85
Hungary196Iceland9Ireland27Italy472Kazakhstan40Luxembourg45Malta4Monaco2Netherlands742Norway129	-	132	129	-		219	279	279	279	279	255	231	207	183	159	135	111
Iceland9Ireland27Italy472Kazakhstan40Luxembourg45Malta4Monaco2Netherlands742Norway129	-			124	116	113	109	98	99	97	98	98	99	97	95	92	85
Italy472Kazakhstan40Luxembourg45Malta4Monaco2Netherlands742Norway129	9	9	8	7	6	5	5	4	3	3	3	3	2	1	1	1	1
Kazakhstan40Luxembourg45Maita4Monaco2Netherlands742Norway129	27	26	26	25	25	25	24	21	21	22	22	30	34	26	22	22	15
Luxembourg45Malta4Monaco2Netherlands742Norway129	495	475	451	441	460	419	426	413	388	369	293	283	282	289	294	302	318
Malta4Monaco2Netherlands742Norway129	40	40	40	40	40	40	40	40	40	40	40	41	41	41	42	42	42
Monaco2Netherlands742Norway129	40	34	29	23	24	16	16	8	7	5	4	3	2	2	2	2	2
Netherlands742Norway129	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Norway 129	2	3	3	3	3	3	4	4	4	4	4	4	3	3	3	2	3
	548	427	306	185	66	54	50	43	33	31	30	29	26	28	36	26	25
Portugal 19	97	95	95	93	70	49	40	34	38	34	33	32	29	32	24	24	23
ruluyai 10	18	18	18	18	18	19	21	18	17	15	11	11	11	10	9	9	9
Republic of Moldova 14	11	7	6	5	3	3	3	6	2	2	2	3	4	5	5	6	6
Romania 1537	1444	1352	1260	1168	1075	983	891	799	706	614	522	430	338	245	297	268	216
Serbia and Montenegro 172	172	172	172	172	172	172	172	172	172	172	170	169	167	166	164	162	161
Slovakia 136	132	128	124	120	116	106	96	109	98	90	87	91	70	65	86	67	66
Slovenia 16	17	15	14	13	12	12	12	11	11	11	10	10	10	9	9	8	8
Spain 181	187	195	192	186	161	160	133	134	140	147	141	142	147	150	149	157	160
Switzerland 175	159	148	135	122	105	96	88	81	63	54	42	29	17	16	16	16	15
The FYR of Macedonia 166	166	166	166	166	166	166	166	166	166	166	166	166	163	163	163	163	163
Turkey 1012	1 .00	1012	1012	1012	1012	1012	1012	1012	1012	1012	1018	1024	1029	1035	1041	1047	1053
Ukraine 1022	1012	1022	1022	1022	1022	1022	1022	1022	1022	1022	1024	1026	1027	1029	1030	1032	1033
United Kingdom 1143		1022			733	470	374	200				100	197	227	198	197	190
EMEP, kg TEQ/ year 14	1012	1022	886	686	133	470	574	280	254	226	216	199				6.3	6.0

Expert estimates:

§ Denier van der Gon, H.A.C., M. van het Bolscher A.J.H. Visschedijk P.Y.J. Zandveld [2006]

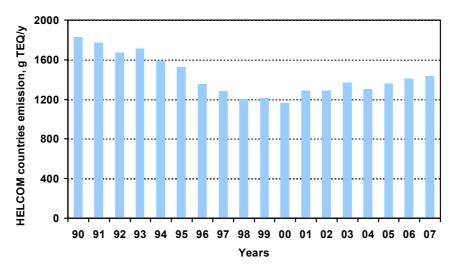
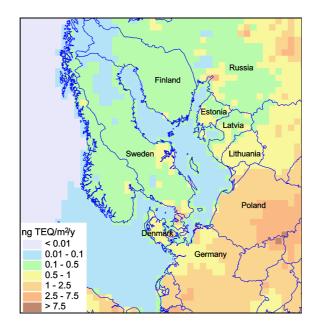
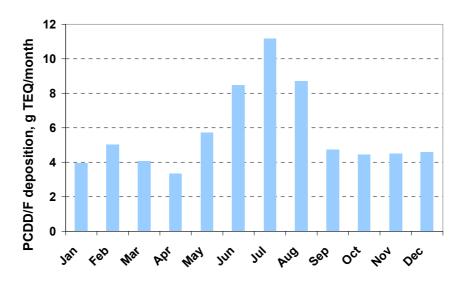


Figure 7.19. Time-series of total annual PCDD/F emissions of HELCOM countries in 1990-2007, g TEQ/year.



7.2 Annual total deposition of PCDD/F

Figure 7.20. Annual total deposition fluxes of PCDD/Fs over the Baltic Sea region for 2007, ng $TEQ/m^2/year$.

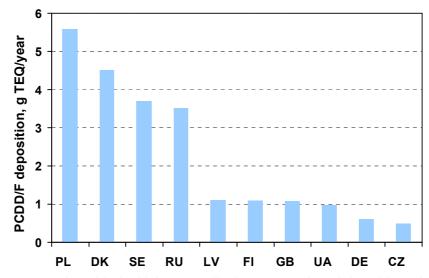


7.3 Monthly total deposition of PCDD/F

Figure 7.21. Monthly total deposition of PCDD/Fs over the Baltic Sea for 2007, g TEQ/month.

Table 7.3. Monthly total deposition	n of PCDD/Fs over the B	altic Sea for 2007,	g TEQ/month.
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Month	PCDD/Fs
Jan	3.19
Feb	4.05
Mar	3.29
Apr	2.71
May	4.62
Jun	6.83
Jul	9.00
Aug	7.02
Sep	3.81
Oct	3.58
Nov	3.63
Dec	3.71



7.4 Source allocation of PCDD/F deposition

Figure 7.22. Top ten countries with the highest contribution to annual total deposition of PCDD/Fs over the Baltic Sea for 2007, g TEQ/y.

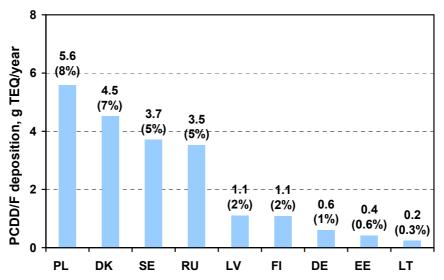


Figure 7.23. Contributions (in %) of HELCOM countries to annual total PCDD/F deposition to the Baltic Sea for 2007. HELCOM countries emissions of PCDD/Fs contributed 30% to total PCDD/F deposition over the Baltic Sea in 2007. Contribution of other EMEP countries accounted for 8%. Significant contribution was made by other emission sources, in particular, remote emissions sources and re-emission of PCDD/Fs (62%).

Sub-basin	Country (1)	%	Country (2)	%	*, %
GUB	Sweden	15	Finland	8	61
GUF	Russia	35	Estonia	4	47
GUR	Latvia	13	Poland	6	63
BAP	Poland	15	Sweden	6	62
BES	Denmark	19	Poland	3	70
KAT	Denmark	20	Sweden	4	64
BAS	Poland	8	Denmark	7	62

Table 7.4. Two most significant contributors to annual total deposition of PCDD/Fs to the six Baltic Sea sub-basins for 2007.

* - contribution of re-emission and remote sources.

7.5 Comparison of model results with measurements

PCDD/Fs are not currently included into the EMEP measurement programme. For this reason verification of the MSCE-POP model results for PCDD/Fs was based on the comparison with the data of various measurement campaigns. Due to the limited information on measured atmospheric levels of PCDD/Fs and their temporal variations the comparison with the model results for this contaminant is of a preliminary character.

The performance of MSCE-POP model for computation of PCDD/F pollution levels within the European region was evaluated during the model review carried out in the framework of EMEP Task Force on Monitoring and Measurements. In particular, MSCE-POP model results on long-range transport of one of the toxic PCDD/F congeners 2,3,4,7,8-PeCDF for the EMEP region and the period 1990-2003 were compared with measurements of EMEP monitoring network and observations of other studies within the European region (*Shatalov et al.*, 2005). One of the main conclusions of the TFMM Workshop on the Review of the EMEP Models on Heavy Metals and Persistent Organic Pollutants in Moscow in 2007 was that the MSCE-POP model represents the state-of-the-science and fits to the purpose of evaluating the contributions of long-range transport to the environment impacts caused by POPs . It was recognized that the MSCE-POP model air concentrations and deposition of POPs across Europe. The model provided reasonable agreement with long-term

temporal trends of air pollution at most EMEP monitoring sites.

Additional comparison of PCDD/Fs modelling results obtained for 2004 was carried out with the measurement data of monitoring campaign carried out in Denmark. The results of the comparison are presented in the Joint report of EMEP Centres for HELCOM (*Bartnicki et al.*, 2006).

In this report no results of comparison of modeling results with measurement is presented since there was no available measurements of dioxins and furans within the European region for 2007 were found.

7.6 Conclusions for Chapter 7

- PCDD/F emissions from HELCOM countries have decreased from 1990 to 2007 by 21%. At the same time there is some increase of dioxins and furans emission from 2006 to 2007 amounted to approximately 2%.
- Annual PCDD/F deposition to the Baltic Sea has decreased from 1990 to 2007 by 62%. Level of PCDD/F deposition in 2007 has decreased comparing to 2006 by 9%.
- The contribution of anthropogenic sources of HELCOM countries to total PCDD/F deposition over the Baltic Sea was estimated to approximately 40%. Essential contribution belongs to the anthropogenic sources of other EMEP countries and global emission sources.
- The most significant contribution to dioxins and furans deposition over the Baltic Sea was made by Poland and Denmark.