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Atmospheric Supply of Nitrogen, Lead, Cadmium, Mercury and Dioxines/Furanes to the Baltic Sea in 2006

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Summary

The results presented in this EMEP Centres Joint Report for HELCOM are based on the modelling and monitoring data presented to the 33th Session of the Steering Body of EMEP in Geneva in September 2008. It includes measurements, as well as emissions and depositions calculated by the EMEP models of nitrogen compounds, heavy metals and PCDD/F for the year 2006.

The measured monthly and annual 2006 concentrations in air and precipitation for nitrogen species, heavy metals, as well as air concentrations for lindane are presented in the report. Both for nitrogen and heavy metals a significant south-east gradient can be noticed in the measured concentrations in 2006. The temporal patterns of monthly Cd and Pb concentrations show a strong winter maximum and temporal pattern of Hg monthly concentrations weaker winter maximum. During winter the atmospheric residence time is longer due to reduced vertical mixing.

Annual emissions from the HELCOM Contracting Parties in 2006 are shown below for all pollutants considered in the report. The annual nitrogen oxides emission from the international ship traffic on the Baltic Sea in 2006 is 346.7 kt NO₂).

Country	POLLUTANT					
	NO ₂ kt N	NH ₃ kt N	Cd tonnes	Pb tonnes	Hg tonnes	PCDD/F g TEQ
Denmark	56,4	73,7	0.7	6	1.3	25
Estonia	9,3	7,7	0.5	34	0.5	3
Finland	58,7	30,3	1.3	25	1.0	14
Germany	424,4	511,3	2.7	108	2.8	85
Latvia	13,3	12,0	0.6	18	0.0	14
Lithuania	18,7	28,8	0.4	6	0.4	11
Poland	270,8	236,1	42.2	524	21.3	449
Russia	1019,6	495,8	59.4	355	14.0	778
Sweden	53,1	42,8	0.5	14	0.6	37
HELCOM	1924,2	1438,2	108	1089	42	1416

Annual depositions of all considered pollutants in 2006 are shown in the Table below for 6 sub-basins of the Baltic Sea and for the entire Baltic Sea.

Basin	POLLUTANT					
	Ox-N kt N	Red-N kt N	Cd tonnes	Pb tonnes	Hg tonnes	PCDD/F g TEQ
GUB	16,6	10,4	1.0	33	0.68	9
BAP	7,2	4,4	4.4	137	1.80	23
GUF	5,5	3,8	0.5	16	0.23	5
GUR	61,0	50,1	0.4	13	0.16	3
BES	8,8	14,2	0.5	17	0.24	6
KAT	8,1	9,5	0.4	18	0.25	4
BAS	107,1	92,4	7.1	234	3.4	50

Oxidised nitrogen depositions in 2006 were slightly higher than in 2005 in all sub-basins and in the entire Baltic Sea Basin. Contrary, reduced nitrogen depositions in 2006 were slightly lower or remained on the same level as in 2005. Levels of lead and cadmium deposition to the entire Baltic Sea slightly decreased in 2006 comparing to 2005 by 4% and 2%, respectively. At the same time mercury deposition to the entire Baltic Sea for 2006 were almost 13% higher than for 2005. In case of PCDD/Fs there is a decrease of net deposition from 2005 to 2006 by 11%.

Preface

The Co-operative Program for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe (EMEP) and the Baltic Marine Environment Protection Commission (HELCOM) are both conducting work on air monitoring, modelling and compilation of emission inventories. In 1995, HELCOM decided to rationalize its current programs by avoiding duplication of efforts with specialised international organizations. At the request of HELCOM, the steering Body of EMEP at its nineteenth session agreed to assume the management of atmospheric monitoring data, the preparation of air emission inventories and the modelling of air pollution in the Baltic region.

Following the coordination meeting held in Potsdam in Germany and the Pollution Load Input meeting held in Klajpeda-Joudkrante in Lithuania, both 1996, it was agreed that EMEP Centres should be responsible for regular evaluation of the state of the atmosphere in the Baltic Sea region and should produce an annual joint summary report which includes updated emissions of selected air pollution, modelled deposition fields, allocation budgets and measurement data.

This report was prepared for the HELCOM, based on model estimates and monitoring results presented to the thirtieth session of the Steering Body of EMEP. Following decision of the HELCOM /MONAS-10 Meeting, it presents the results for the year 2006.

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