

Atmospheric emissions of PCDD/Fs in the Baltic Sea region

Editor: Alexey Gusev, EMEP MSC-E

Key message

Annual emissions of dioxins and furans in HELCOM countries have decreased during the period from 1990 to 2015 by 31%.

Results and Assessment

Relevance of the indicator for describing the developments in the environment

This indicator shows the levels and trends in emissions of dioxins and furans from anthropogenic sources of HELCOM countries to the atmosphere. These emissions represent the pressure of emission sources on the atmosphere of the Baltic Sea region and subsequently on the Baltic Sea aquatic environment.

Policy relevance and policy reference

HELCOM adopted a Recommendation in May 2001 for the cessation of hazardous substance discharges/emissions by 2020, with the ultimate aim of achieving concentrations in the environment near to background values for naturally occurring substances and close to zero for man-made synthetic substances.

On the European level the relevant policy to the control of emissions of PCDD/Fs to the atmosphere is being taken in the framework of UN ECE Convention on Long-Range Transboundary Air Pollution (CLRTAP). The Executive Body of CLRTAP adopted the Protocol on Persistent Organic Pollutants on 24 June 1998 in Aarhus (Denmark). According to one of the basic obligations, Parties to the Convention shall reduce their emissions of PCDD/Fs below their levels in 1990. The Protocol has been entered into force in 2003 and has been signed and/or ratified by 36 countries.

Assessment

Annual emissions of dioxins and furans have decreased in HELCOM countries during the period from 1990 to 2015 by 31% (Figure 1). The most significant drop of PCDD/F emissions can be noted for Germany (92%) and Denmark (64%) (Figure 2). In 2015 total annual PCDD/F emissions of HELCOM countries amounted to 1.87 kg TEQ. Among the HELCOM countries the largest contributions to total annual PCDD/F emission of HELCOM countries belong to Russia (75%) and Poland (16%).

Maps with time-series of annual total PCDD/F emissions of HELCOM countries are shown in Figure 2. The diagrams on the map also show the fractions of emissions deposited to the Baltic Sea. The highest fractions belong to Denmark and Sweden (18% and 10%, respectively), and the lowest one to the Russian Federation (about 0.4%).

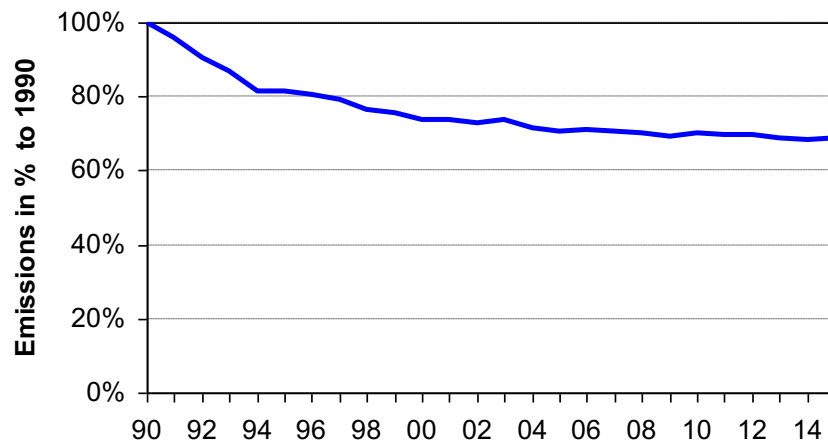


Figure 1. Total annual emissions of PCDD/Fs to air from HELCOM countries in period 1990-2015 (% of 1990).

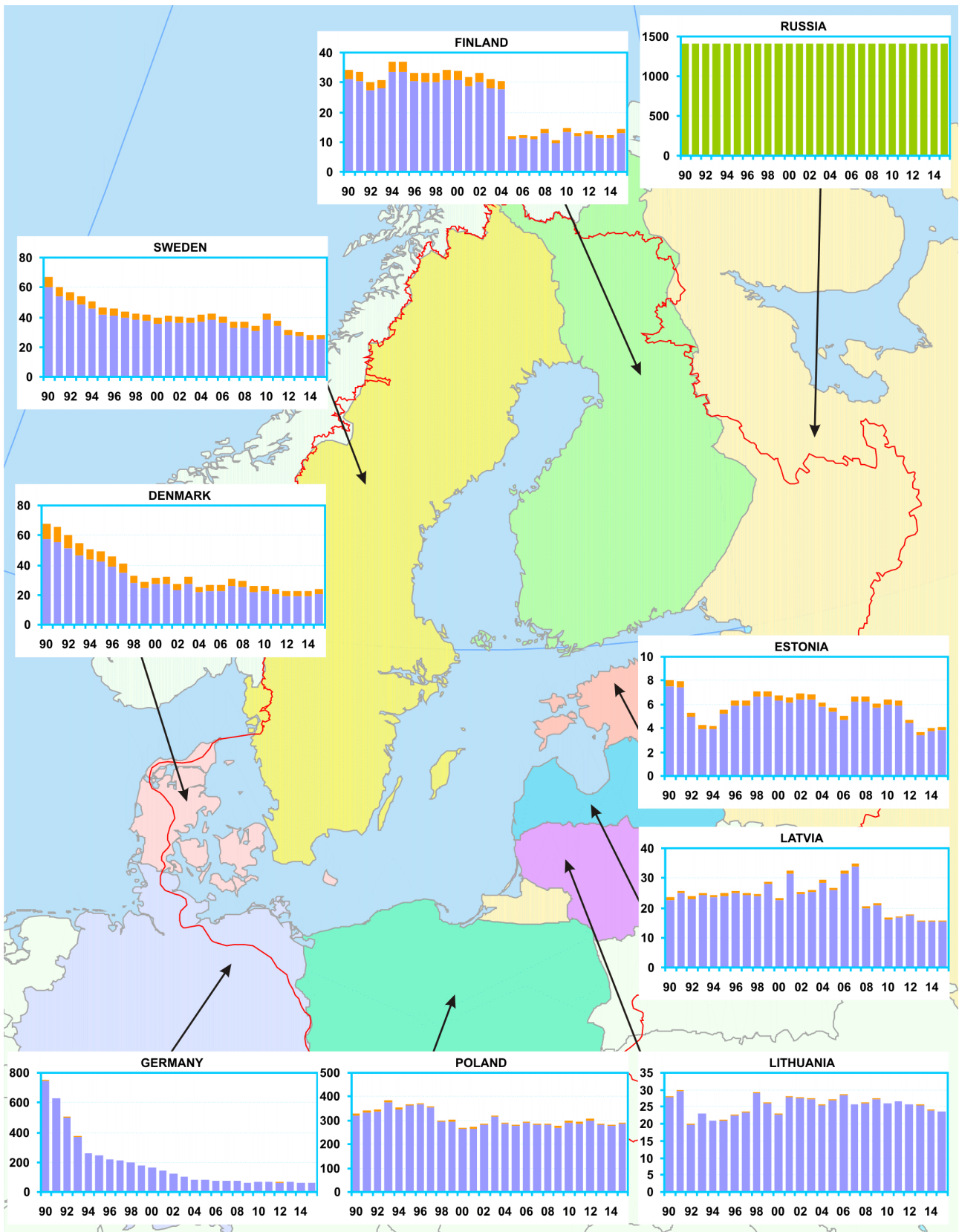


Figure 2: Map of PCDD/F emissions of HELCOM Contracting Parties (CP) to air as totals in tonnes/year for the period 1990-2015. Red sections of the bars identify the fraction of emission deposited to the Baltic Sea. Green bars indicate expert estimates. (Emission data of the CP refer to the total area of the CP except for Russia, where emissions from the territory of Russia within the EMEP domain is used).

Note: different scales have been used for different countries!

Data

Numerical data on PCDD/F anthropogenic emissions of HELCOM countries are given in the following table that can be found in the attached Microsoft Excel file (PCDDF_emissions_data.xls).

Table 1. Total annual PCDD/F emissions from anthropogenic sources of HELCOM countries in period from 1990 to 2015.

Meta data

Technical information:

1. Source:

EMEP/MS-CHE
UN ECE Secretariat

2. Description of data:

Annual total emissions of dioxins and furans were officially reported to the UN ECE Secretariat by HELCOM countries. These data can be obtained from the EMEP Centre on Emission Inventories and Projections (CEIP) (<http://www.ceip.at/>).

3. Geographical coverage:

European region

4. Temporal coverage:

Data on PCDD/F annual emission totals are available for the period 1990 – 2015 for all HELCOM countries but Russia. The Russian Federation did not submit the information on emissions. Values of PCDD/F emissions from Russia were estimated by CEIP (*Tista et al., 2017b*).

5. Methodology and frequency of data collection:

National data on PCDD/F emissions are annually submitted by countries Parties to CLRTAP Convention to the UN ECE Secretariat. The methodology is based on combination of emission measurements and emission estimates based on activity data and emission factors. Submitted data are processed using quality assurance and quality control procedure and stored in the UN ECE/EMEP emission database at EMEP/CEIP Centre.

Quality information:

6. Strength and weakness:

Strength: data on emissions are annually submitted, checked and stored in the database

Weakness: gaps in time series of national emissions, uncertainties in national emissions, lack of gridded emissions, and incompleteness

7. Uncertainty:

Among the HELCOM countries the level of uncertainty of official data on PCDD/F emission was reported by Denmark, Estonia, Finland, Latvia, Poland, and Sweden. From the other EMEP countries the information on uncertainties of PCDD/F official emissions is available for Belarus, Belgium, France, Croatia, Cyprus, and the United Kingdom. The uncertainty of reported data on PCDD/F emissions expressed as percentage relative to mean value of emission is as follows:

Finland:	±40 – 53%
Denmark:	296%
Estonia:	89%
Latvia:	73%
Poland:	66%
Sweden:	133%
Belarus:	144%
Belgium:	237%
France:	36%
Croatia:	314%
Cyprus:	211%
UK:	±>50%

8. Further work required:

Further work of national experts on emissions of dioxins and furans is required to fill the gaps in the emission time-series and to reduce their uncertainties.

References

Tista M., Wankmueller R. and K.Mareckova [2017b] Methodologies applied to the CEIP GNFR gap-filling 2017. Part II: Persistent organic pollutants (Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Indeno(1,2,3-cd)pyrene, Dioxin and Furan, Hexachlorobenzene). Technical report CEIP 03-2/2017. (http://www.ceip.at/fileadmin/inhalte/emep/pdf/2017/POP_gap-filling_documentation_2017.pdf)