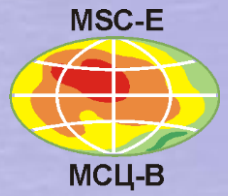
Heavy metal and POP pollution:
Dissemination of output information

Oleg Travnikov on behalf
of MSC-E and CCC



EMEP activities on HMs and POPs in 2013

- Monitoring of HMs and POPs within EMEP (CCC)
- Operational modelling of HM and POP transboundary pollution within EMEP region
- Assessment of long-term changes of POPs transboundary pollution (1990-2011)
- National/local scale pollution assessment – Case studies
- Quality analysis of HM and POP assessment results
- Research and development:
  - Further development of GLEMOS multi-scale modelling system
  - Model study of major Hg oxidation processes in the atmosphere
  - Assessment of the role secondary emissions in POP pollution
  - Application of inverse modelling for evaluation of primary and secondary emission sources
- Co-operation with national experts, international organizations and programmes

EMEP activities on HMs and POPs in 2013

- Monitoring of HMs and POPs within EMEP (CCC)
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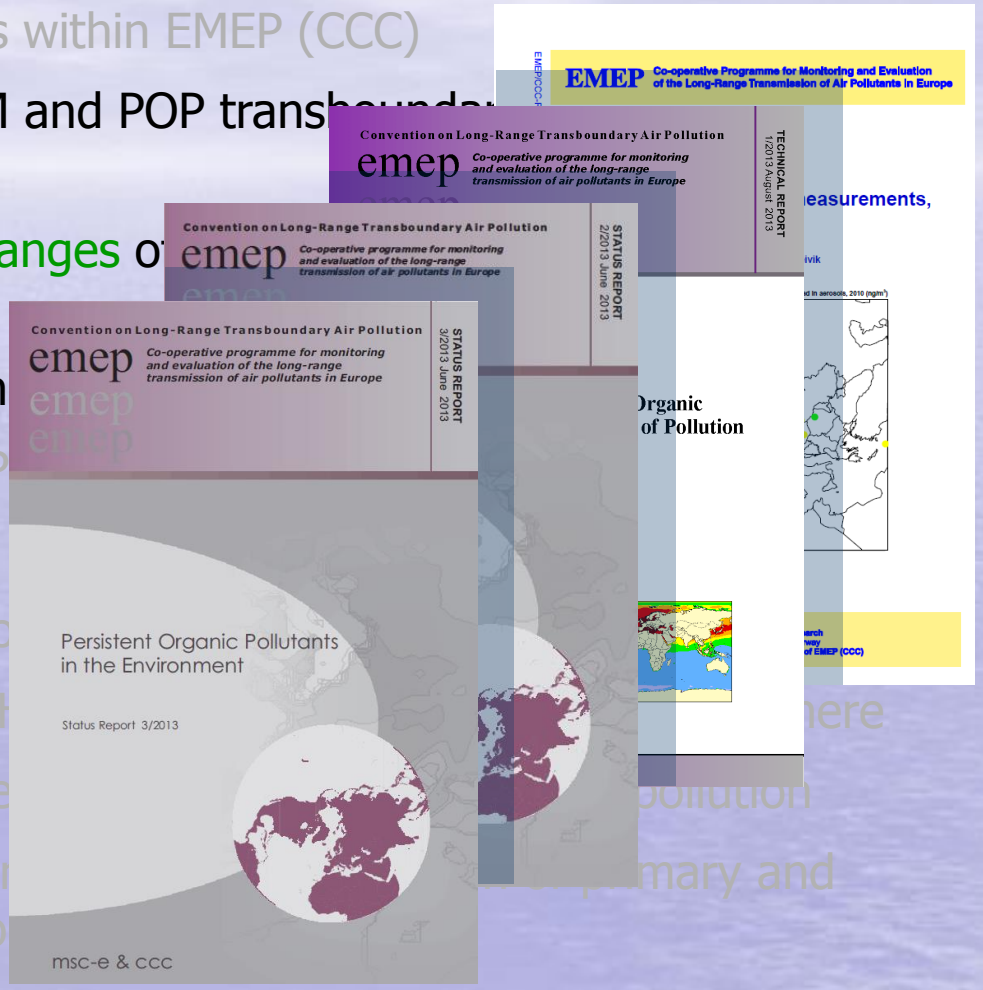


- Co-operation with national experts, international organizations and programmes

MSC-E publications on HMs and POPs

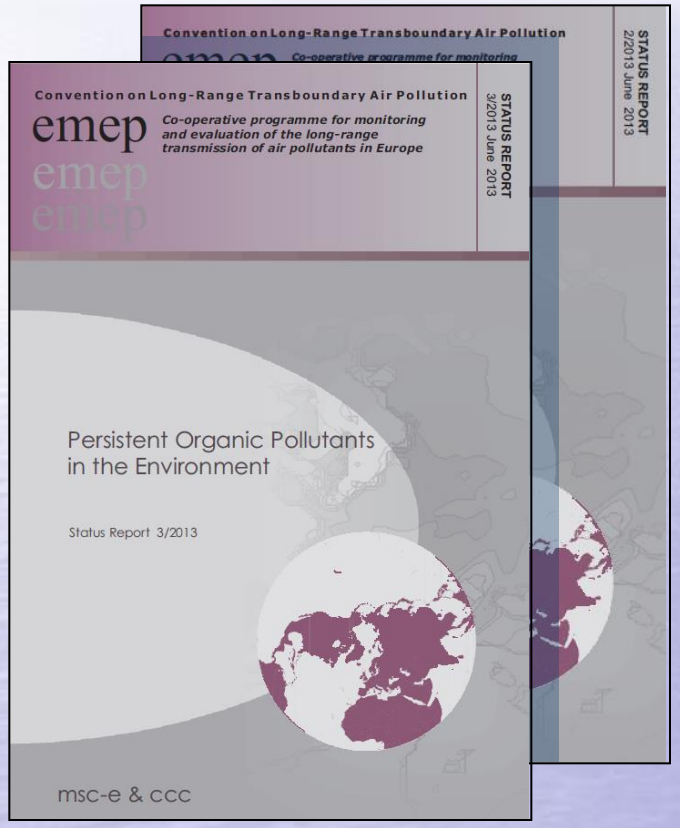
Peer-reviewed publications:

- Gusev A., MacLeod M., Bartlett P. (2012) Intercontinental transport of persistent organic pollutants: a review of key findings and recommendations of the task force on hemispheric transport of air pollutants and directions for future research. *Atmospheric Pollution Research* 3, 463-465
- Shatalov V., Johansson J.H., Wiberg K., Cousins I.T. (2012) Tracing the origin of dioxins in Baltic air using an atmospheric modeling approach. *Atmospheric Pollution Research* 3, 408-416
- Goodsite M.E., Outridge P.M., Christensen J.H., Dastoor A., Muir D., Travnikov O., Wilson S. (2013) How well do environmental archives of atmospheric mercury deposition in the Arctic reproduce rates and trends depicted by atmospheric models and measurements? *Science of The Total Environment* 452–453, 196–207
- Batrakova N., Travnikov O., Rozovskaya O., Sprovieri F. (2013) Chemical and physical transformations of mercury in the ocean: a review. *Ocean Science*, submitted

New format of Status Report

In accordance with recommendations of EMEP Bureau

MSC-E Status Reports 2013

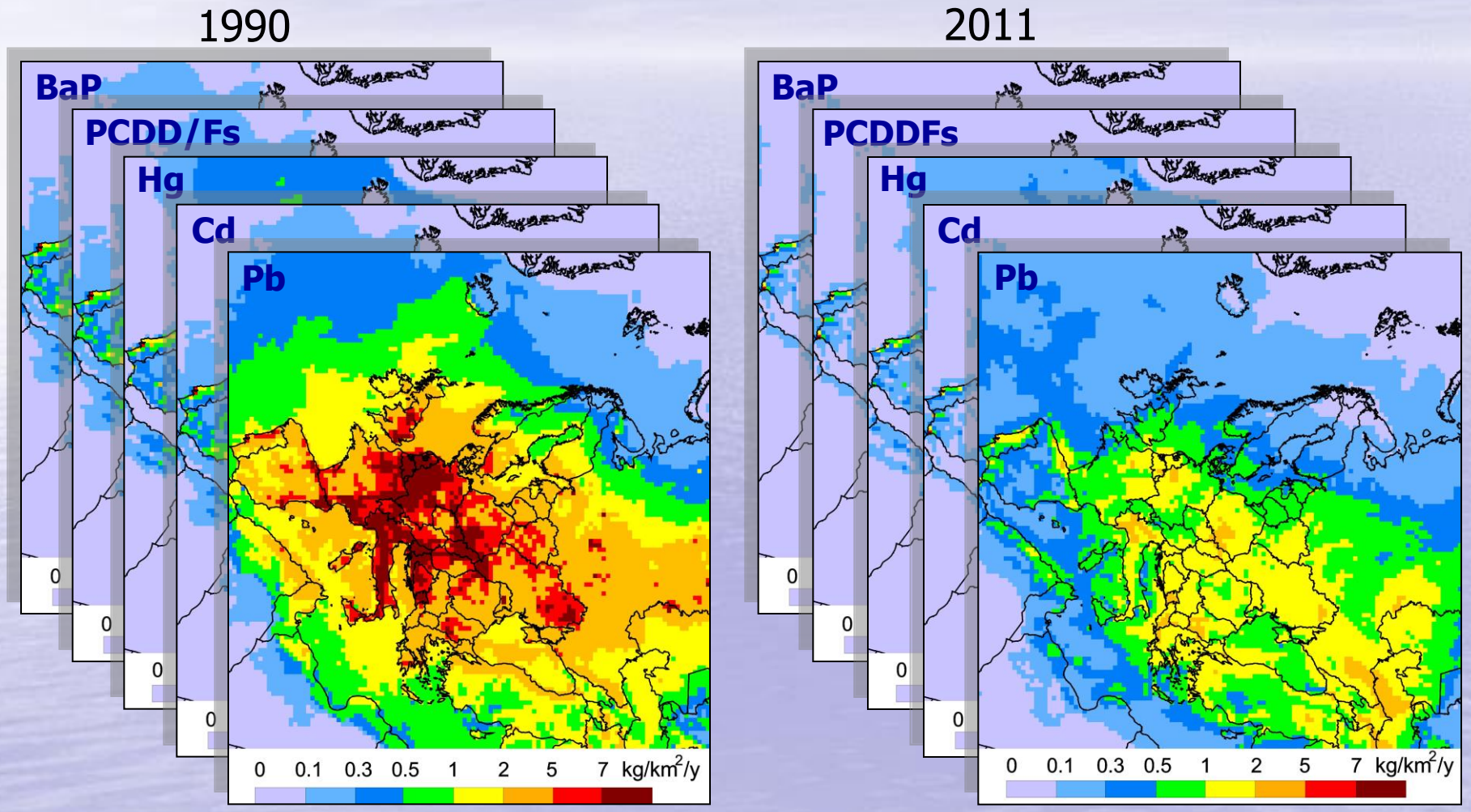


Main topics:

1. EMEP contribution to HM and POP Protocols
2. Pollution assessment in the EECCA countries
3. Country-specific information
4. Dissemination of information

EMEP contribution to HM and POP Protocols

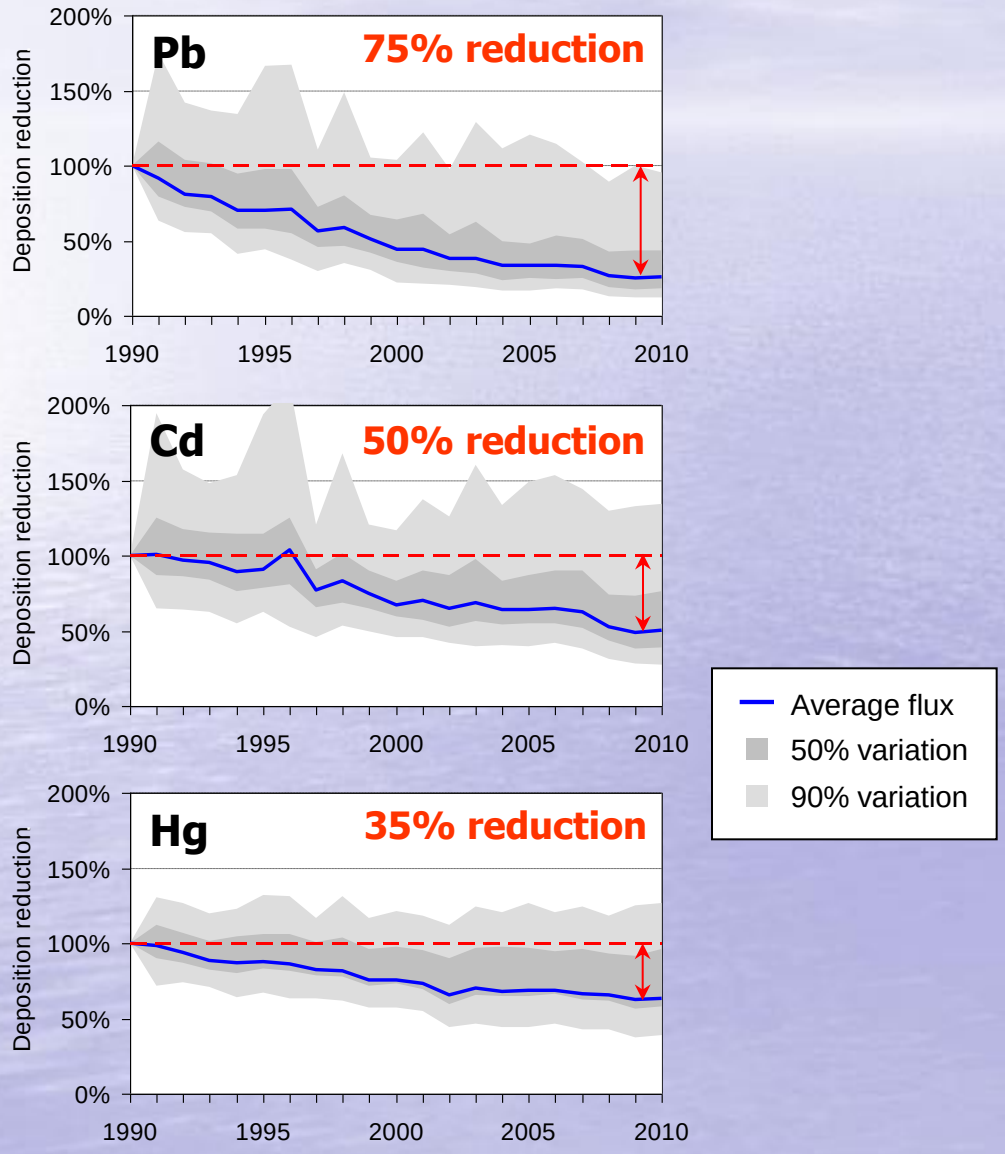
Spatial distribution of heavy metal and POP pollution levels (1990-2011)

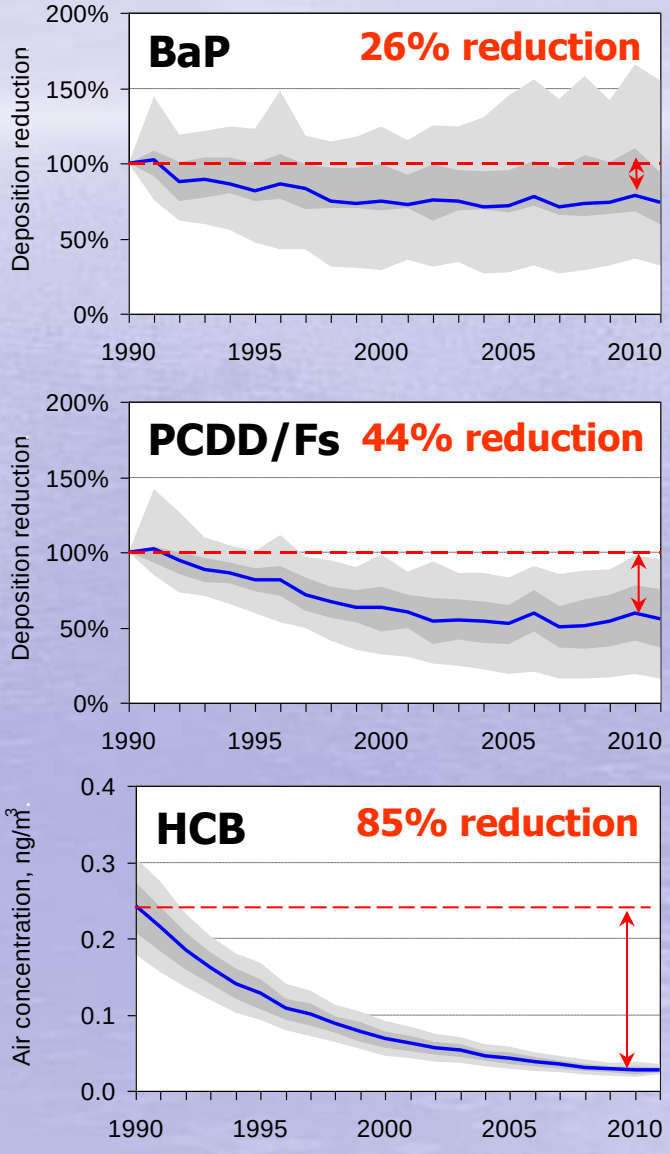


EMEP Steering Body, Geneva, 2013

Long-term trends of HM and POP pollution

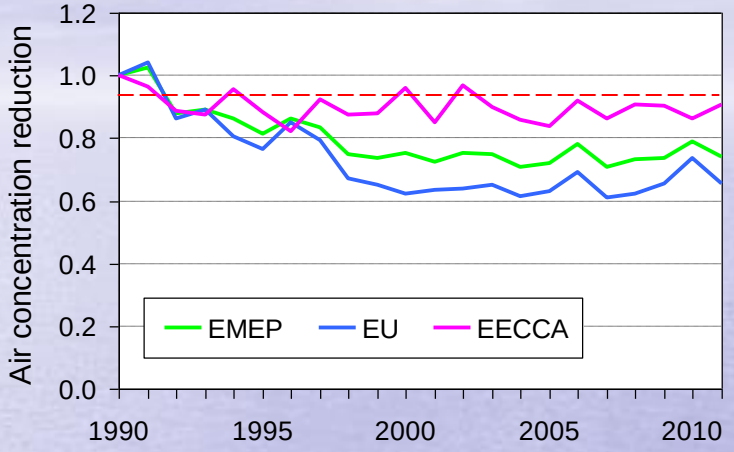
Reduction of heavy metal and POP deposition in EMEP countries (1990-2011)





Long-term trends of HM and POP pollution

Reduction of B[a]P air concentration in different groups of countries



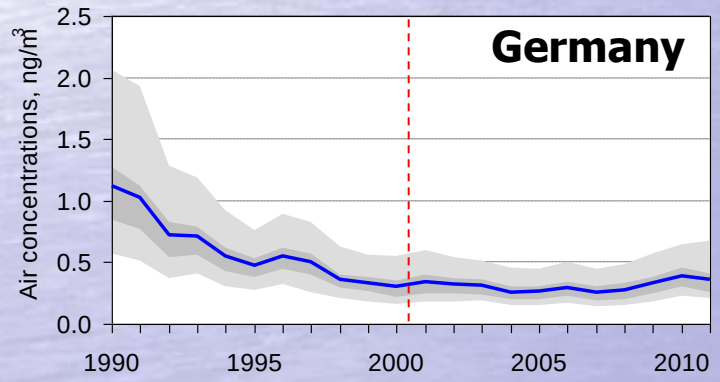
Reduction:

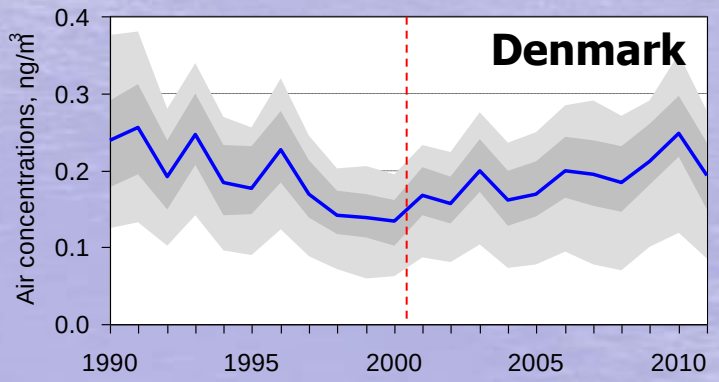
EMEP – 26%

EU27 – 34%

EECCA – 10%

Reduction of B[a]P air concentrations in EU countries

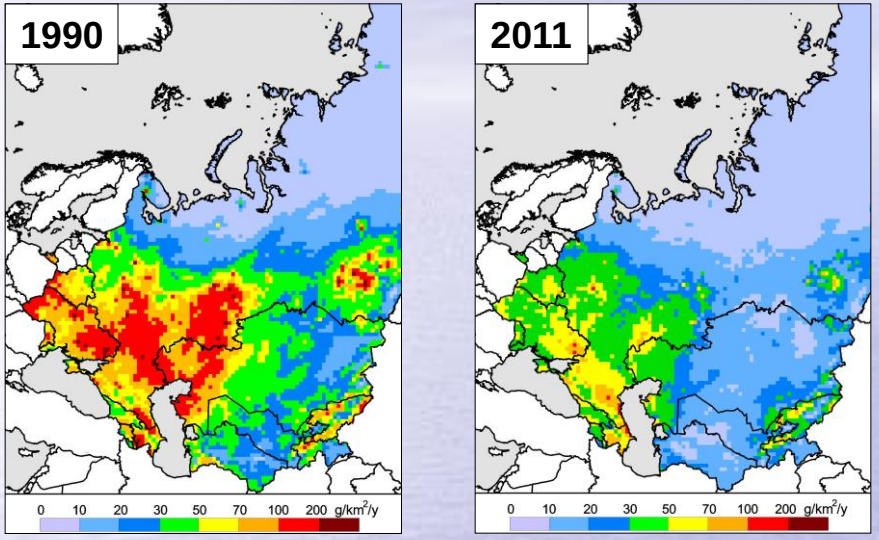




Note: Increase of B[a]P concentration in the most of EU countries after 2000

HM and POP pollution in EECCA countries

Deposition of Cd in the EECCA countries



Pollution levels:

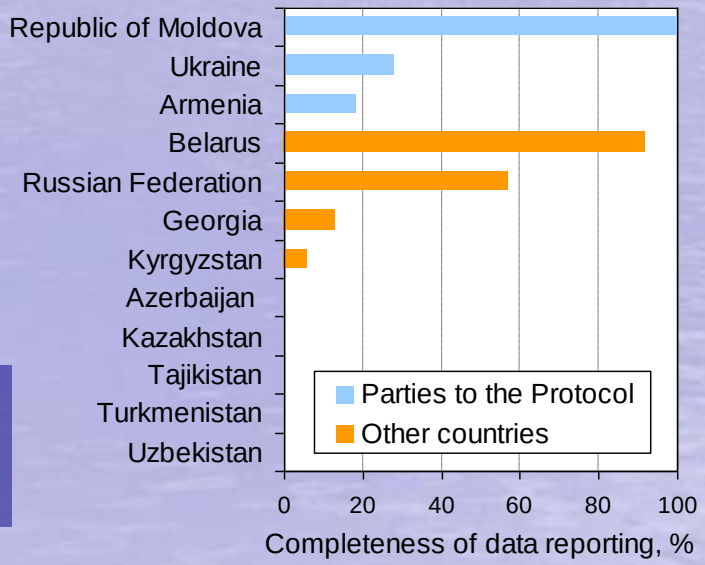
- Relatively low reduction of HM and POP deposition in EECCA countries
- The largest decrease in the western part of the region

Data reporting in the EECCA countries:

- Low completeness of emissions reporting
- Few monitoring data are reported so far

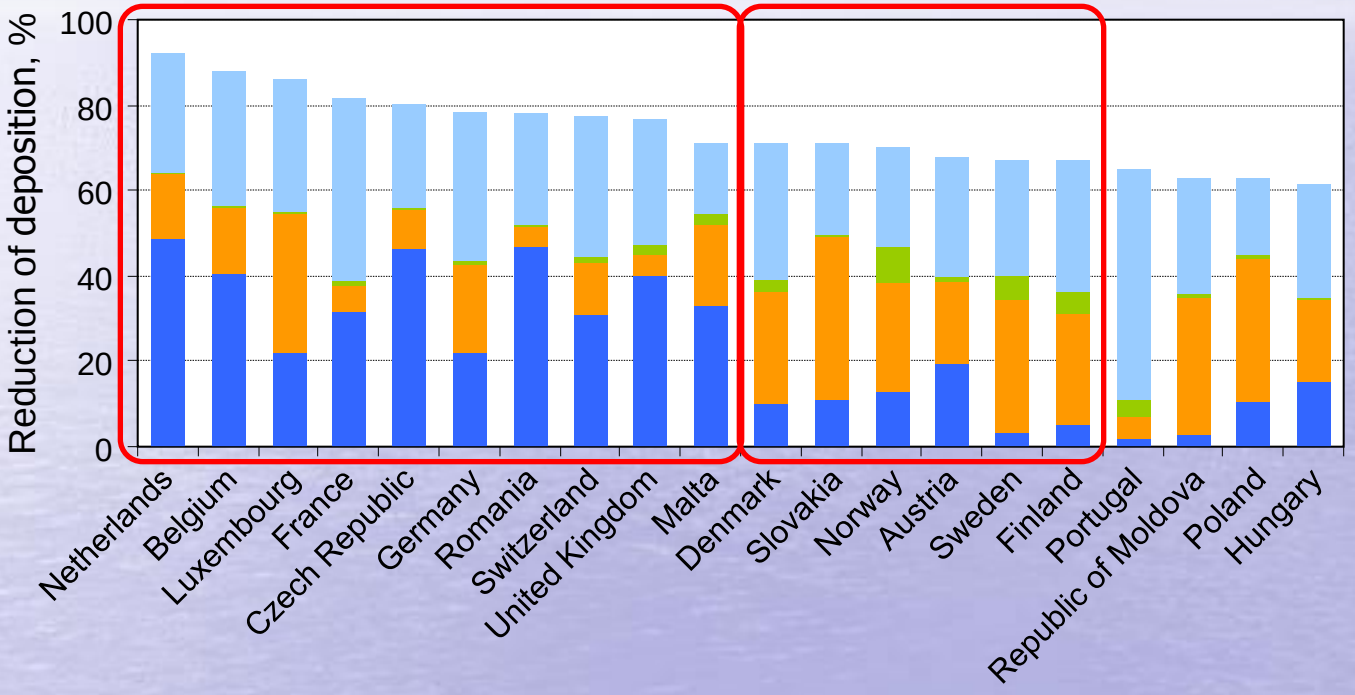
More efforts are needed to involve EECCA countries in the Convention activities

HM and POP emission reporting



Long-term trends of HM and POP pollution

Contributors to reduction of **PCDD/F** deposition (1990-2011)

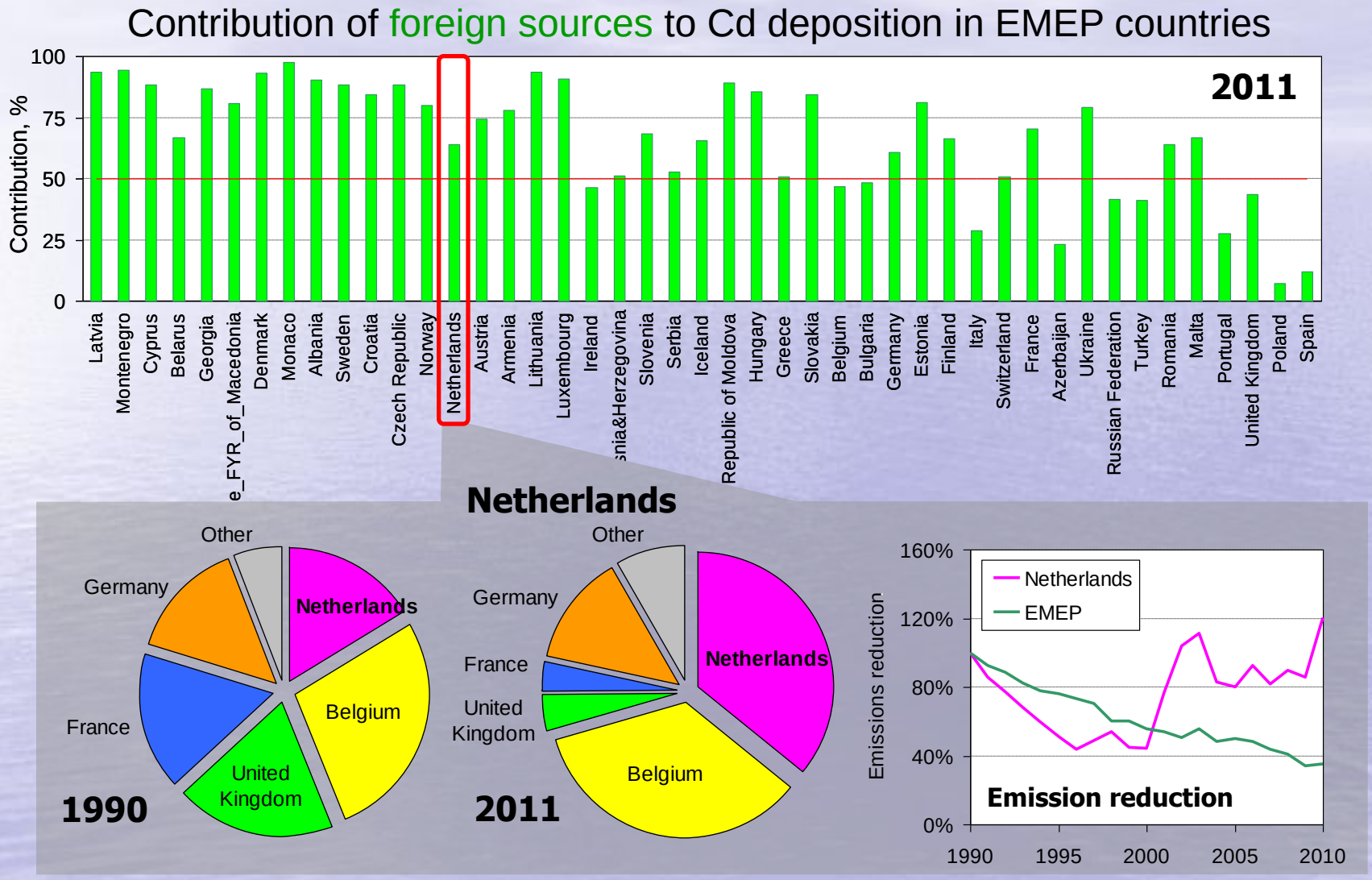


Deposition reduction due to changes in:

- National emissions
- Transboundary transport
- Non-EMEP sources
- Re-emission

EMEP Steering Body, Geneva, 2013

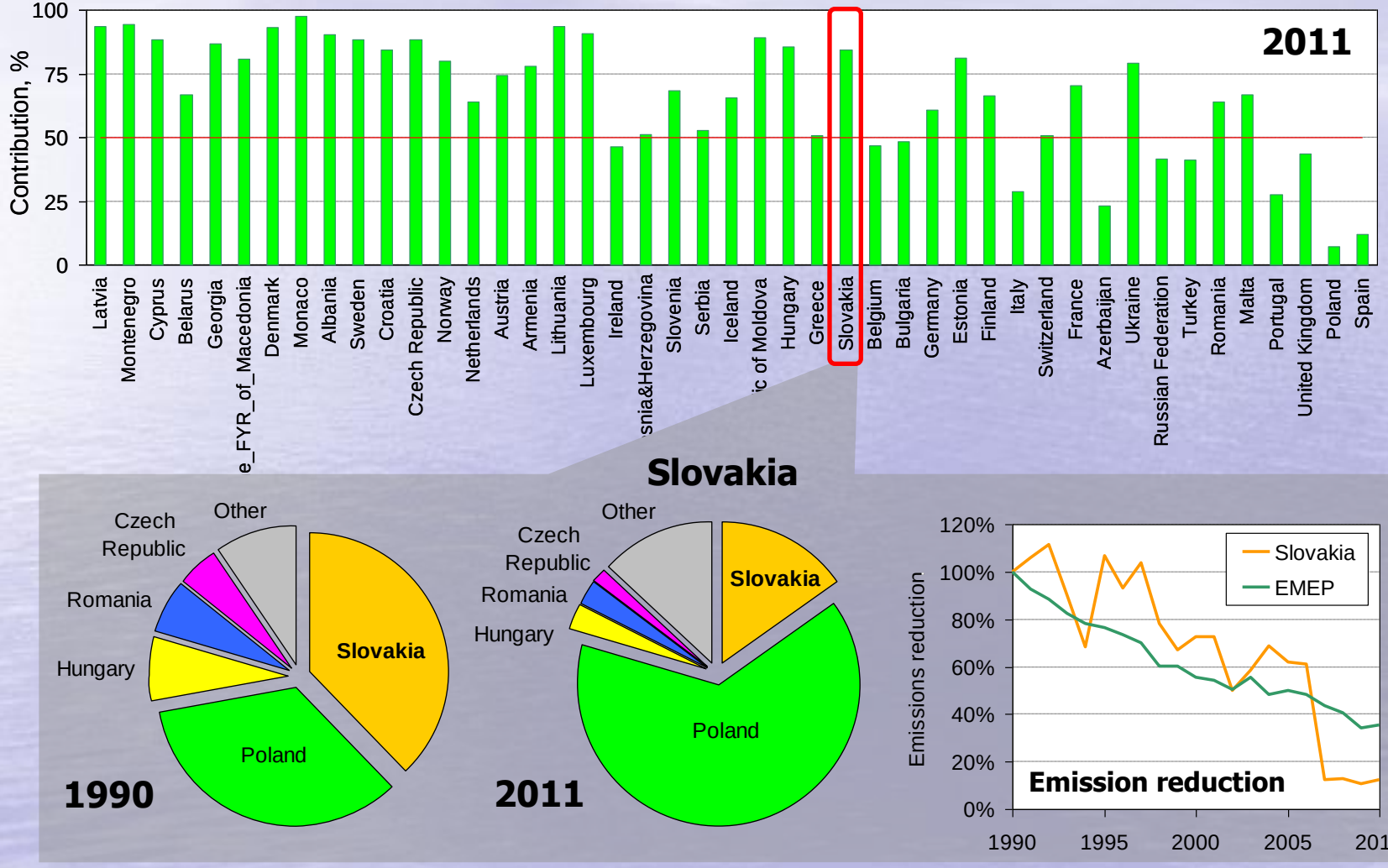
Transboundary pollution



EMEP Steering Body, Geneva, 2013

Transboundary pollution

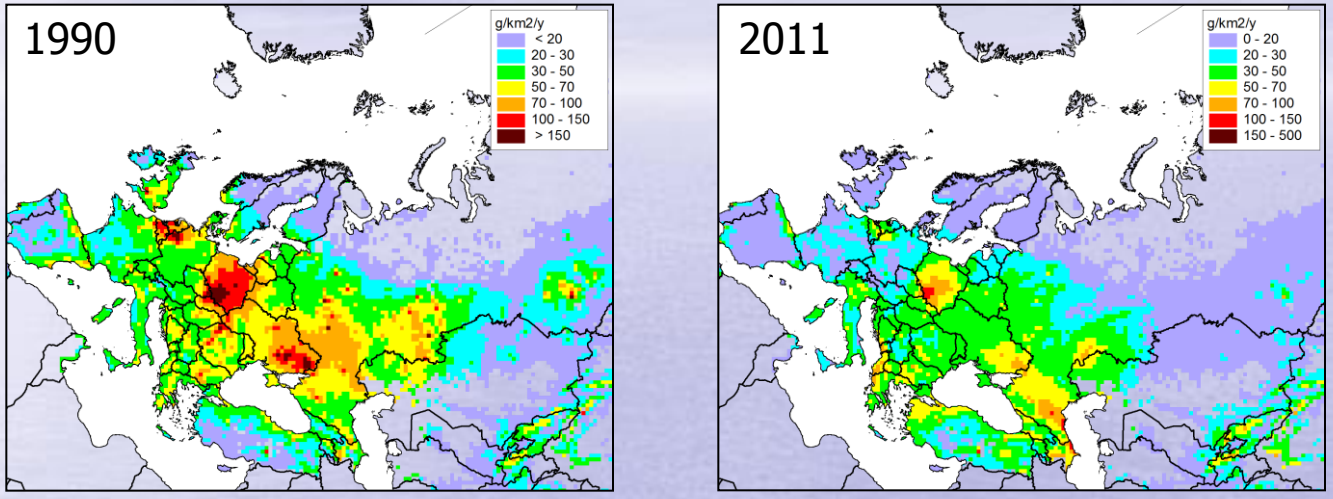
Contribution of foreign sources to Cd deposition in EMEP countries



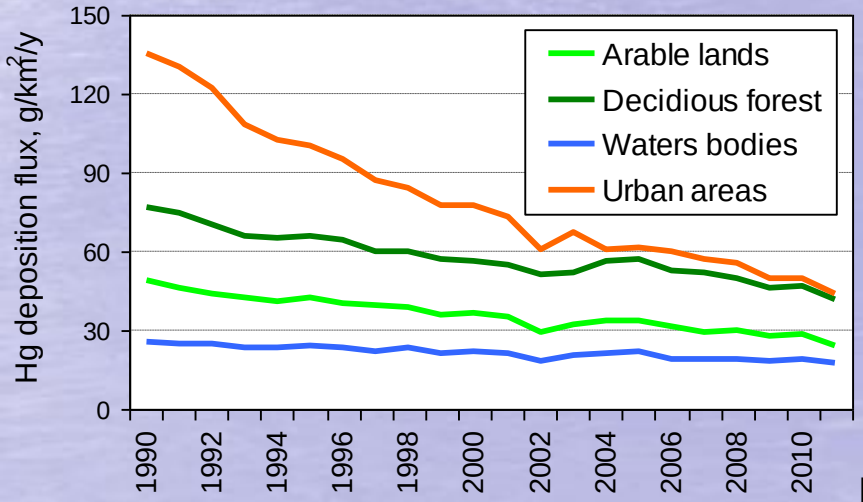
EMEP Steering Body, Geneva, 2013

Ecosystem-specific deposition

Spatial distribution of Pb deposition to arable land



Long-term changes of Hg deposition to different land use categories

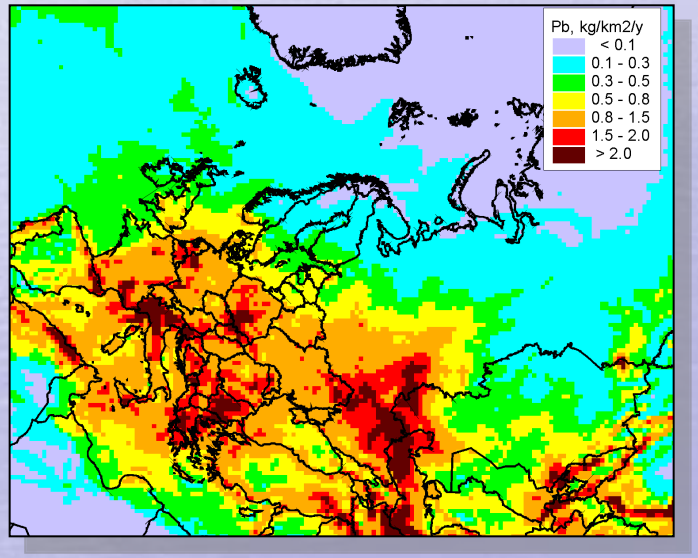


EMEP Steering Body, Geneva, 2013

‘Near-real time’ assessment

Aim: Preliminary assessment of pollution levels in the EMEP countries with minimum time delay (2 months)

Pb deposition in 2013
(available in ~~May 2015~~) **Feb 2014**



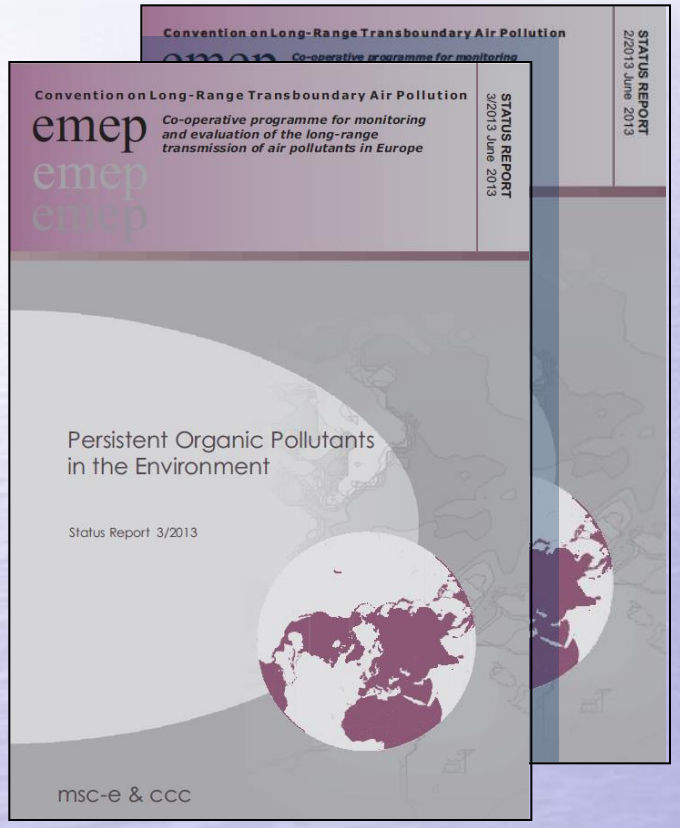
Limitation: Use of emissions data for previous years

Question: Is this information useful for the countries?

New format of Status Report

In accordance with recommendations of EMEP Bureau

MSC-E Status Reports 2013



Main topics:

1. EMEP contribution to HM and POP Protocols
2. Pollution assessment in the EECCA countries
3. Country-specific information
4. Dissemination of information

Brief information on a country pollution

Exemplified by the United Kingdom

BRIEF INFORMATION ON POP POLLUTION LEVELS IN THE UNITED KINGDOM FOR 1990 AND 2011

This short summary characterizes current pollution levels, transboundary transport and their changes in the country since 1990. More detailed information on POP pollution in the country can be found in Annex A and on the MSC-E website: www.msceast.org.

Table 1. *POP emissions and pollution levels in 1990 and 2011*

	B[a]P		PCDD/Fs		HCB	
	1990	2011	1990	2011	1990	2011
Emissions	t		g TEQ[a]		kg	
	61	3.4	1038	178	3156	24
Deposition to the country	kg		g TEQ		kg	
Total deposition to the country	17399.7	1628.9	5035.6	1189.4	5912.1	635.35
- Anthropogenic deposition from national sources	14171.0	818.63	2455.9	452.80	649.64	4.97
- Anthropogenic deposition from other countries	1391.5	623.23	304.45	51.92	16.41	0.80
- Intercontinental transport (non-EMEP sources)[b]	-	-	224.43	103.64	2513.4	337.53
- Secondary sources (re-volatilization)[c]	1837.3	187.07	2050.9	581.02	2732.6	292.07
Deposition from the country anthropogenic sources	kg		g TEQ		kg	
Deposition to other countries (EMEP region)	6237.0	379.59	1272.7	193.28	789.17	6.20
Deposition to the regional seas	kg		g TEQ		kg	
- Baltic Sea	368.74	22.94	37.45	5.85	13.54	0.13
- Black Sea	24.56	0.98	5.48	0.79	2.54	0.02
- Caspian Sea	5.35	0.23	1.66	0.24	0.98	0.01
- Mediterranean Sea	47.80	3.38	18.62	3.46	11.05	0.11
- North Sea	3590.5	180.28	352.29	55.14	107.27	0.85
Mean annual air concentrations	ng/m^3		fg TEQ/m^3		pg/m^3	
	0.42	0.04	37.25	8.97	235.97	25.37

Figure 1. *Maps of total POP deposition and air concentrations in the country in 2011*

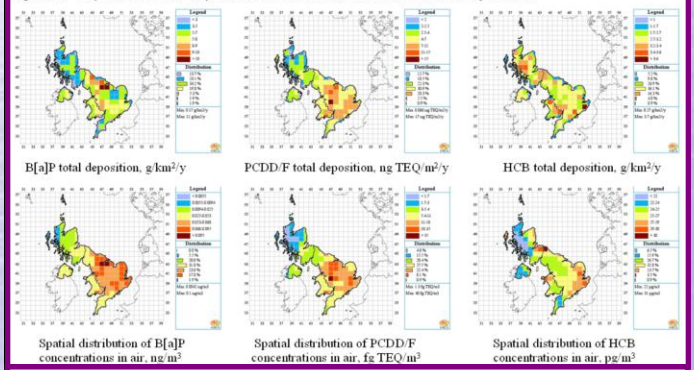
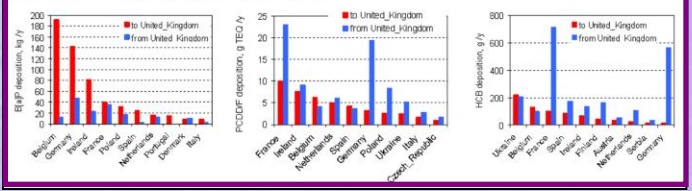


Figure 2. *Anthropogenic deposition from 10 main contributors to the country and anthropogenic deposition from the United Kingdom to these countries in 2011*



Emissions and pollution levels for 1990 and 2011

Spatial distribution of pollution levels in 2011

Transboundary transport in 2011

EMEP Steering Body, Geneva, 2013

Country-specific information

Detailed information for a country:

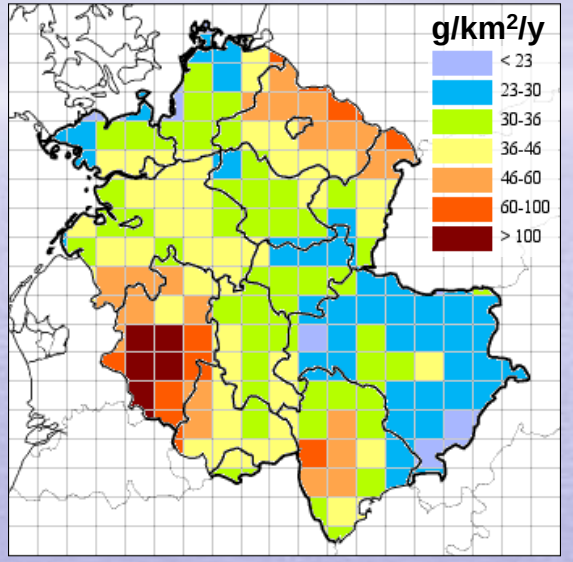
- Pollution levels and their long-term changes
- Transboundary fluxes
- Effects oriented information

Country-specific information

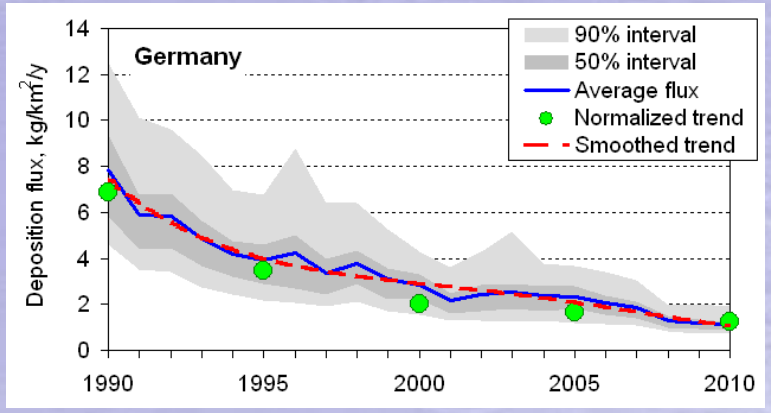
Detailed information for a country:

- Pollution levels and their long-term changes
  - Pollution distribution over a country territory
  - Long-term trends of pollution levels
  - Model evaluation vs. measurements
- Transboundary fluxes
- Effects oriented information

Cd deposition in Germany (2010)



Changes of Cd deposition in Germany



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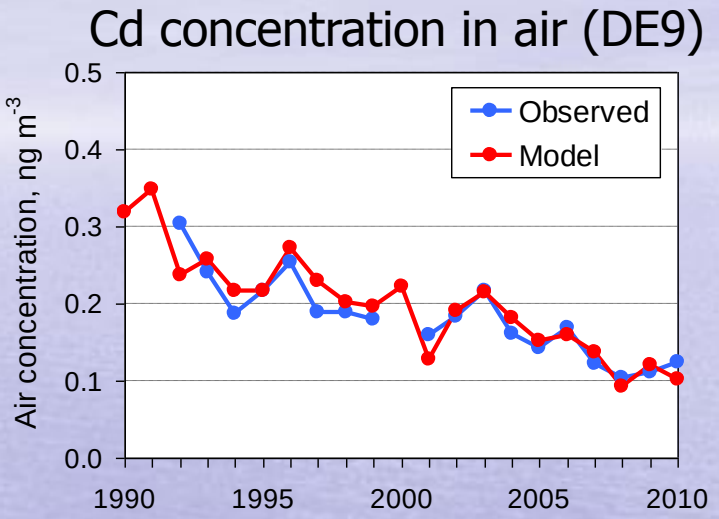
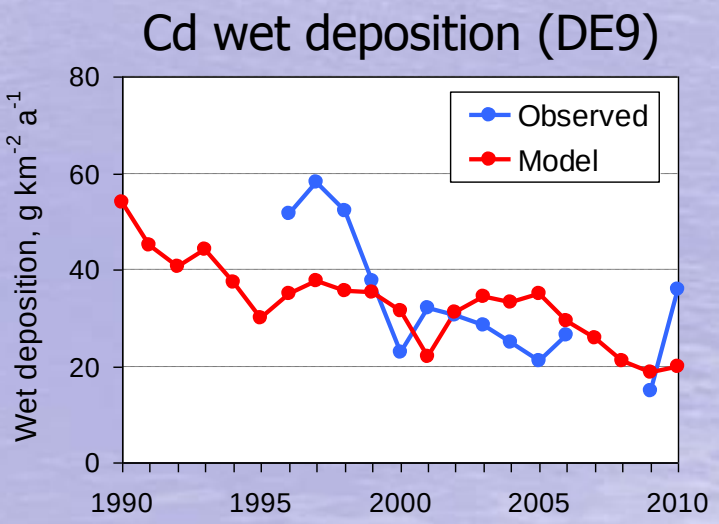


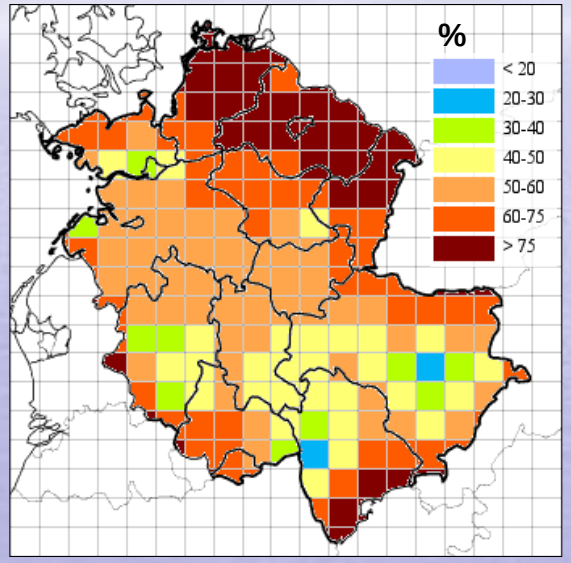


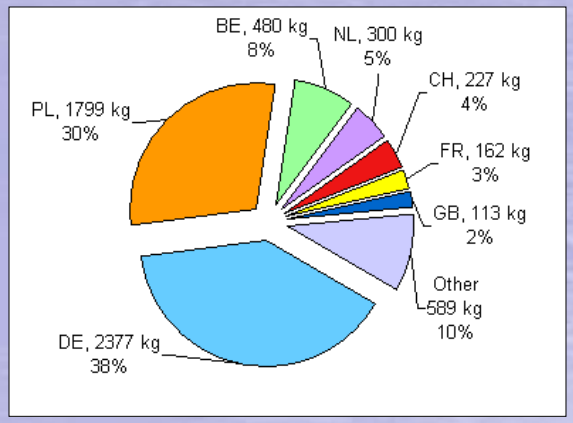
Country-specific information

Detailed information for a country:

- Pollution levels and their long-term changes
- Transboundary fluxes
  - Pollution of a country by foreign sources
  - Contribution of national sources to transboundary transport
- Effects oriented information

Contribution of foreign sources to Cd deposition in Germany





Country-specific information

Detailed information for a country:

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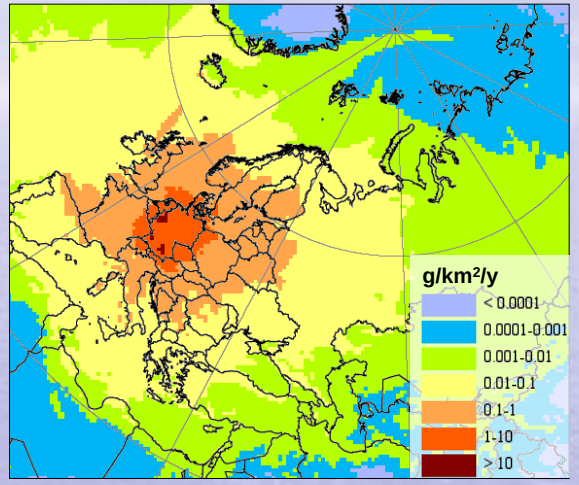
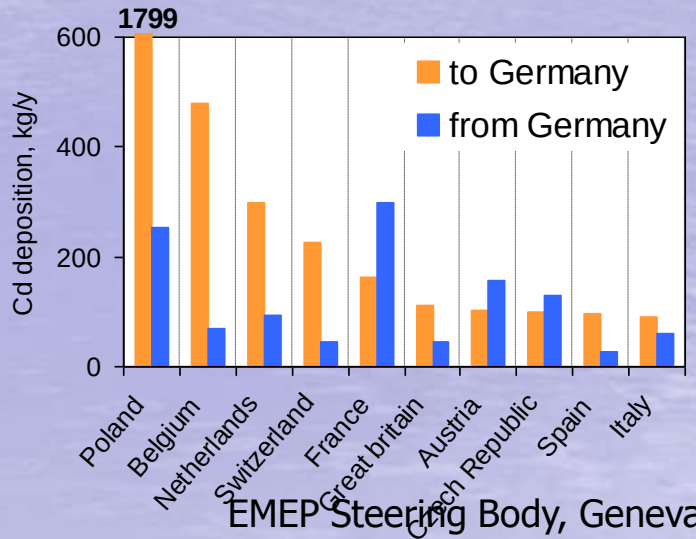
  - Contribution of national sources to transboundary transport
- Effects oriented information

Cd deposition from German sources



Mutual Cd transboundary fluxes

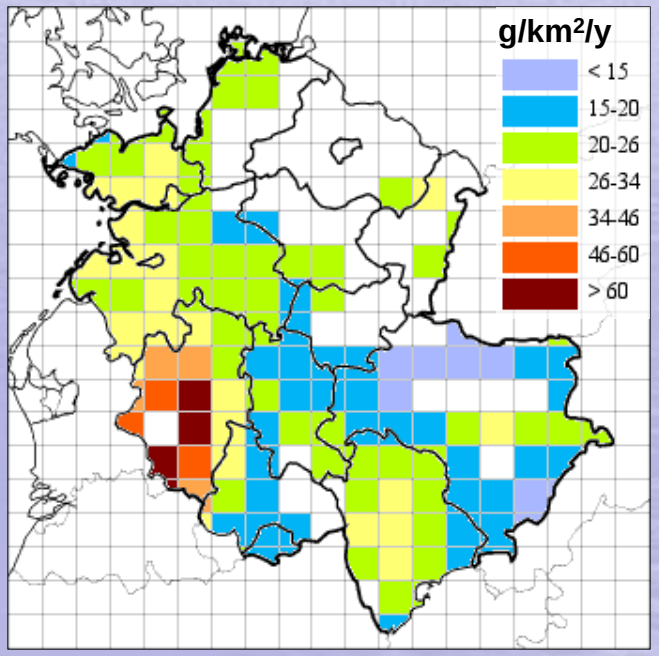


Country-specific information

Detailed information for a country:

- Pollution levels and their long-term changes
- Transboundary fluxes
- Effects oriented information
  - Ecosystem-specific deposition and critical load exceedances
  - Concentration in different media (air, soils, vegetation and water bodies)

Cd deposition to root crops in Germany (2011)



Additional information for countries

Assessment of HM pollution in selected countries (Case studies)

Approach:

Evaluation of pollution levels in a country with fine spatial resolution involving variety of national data

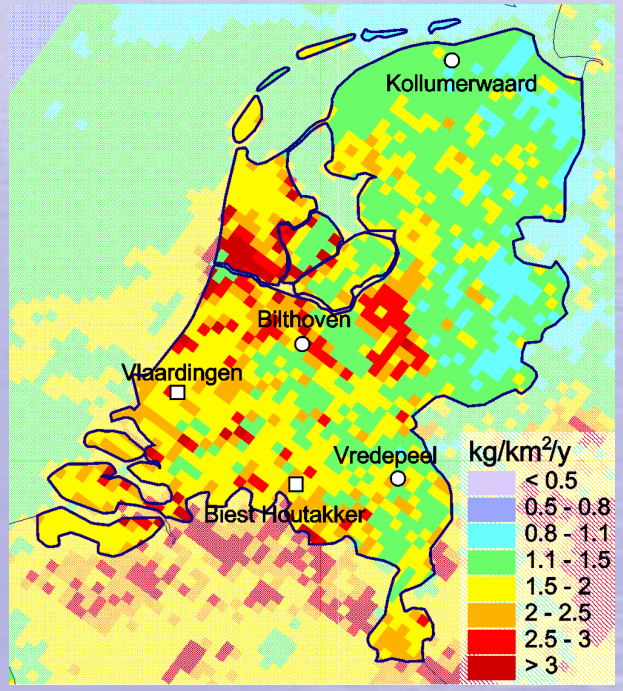
Requirements:

- Detailed emissions data (fine resolution, source categories, LPS)
- Additional measurements from national monitoring networks
- Participation of national experts in joint analysis of the results

Countries involved:

The Czech Republic, Croatia, the Netherlands

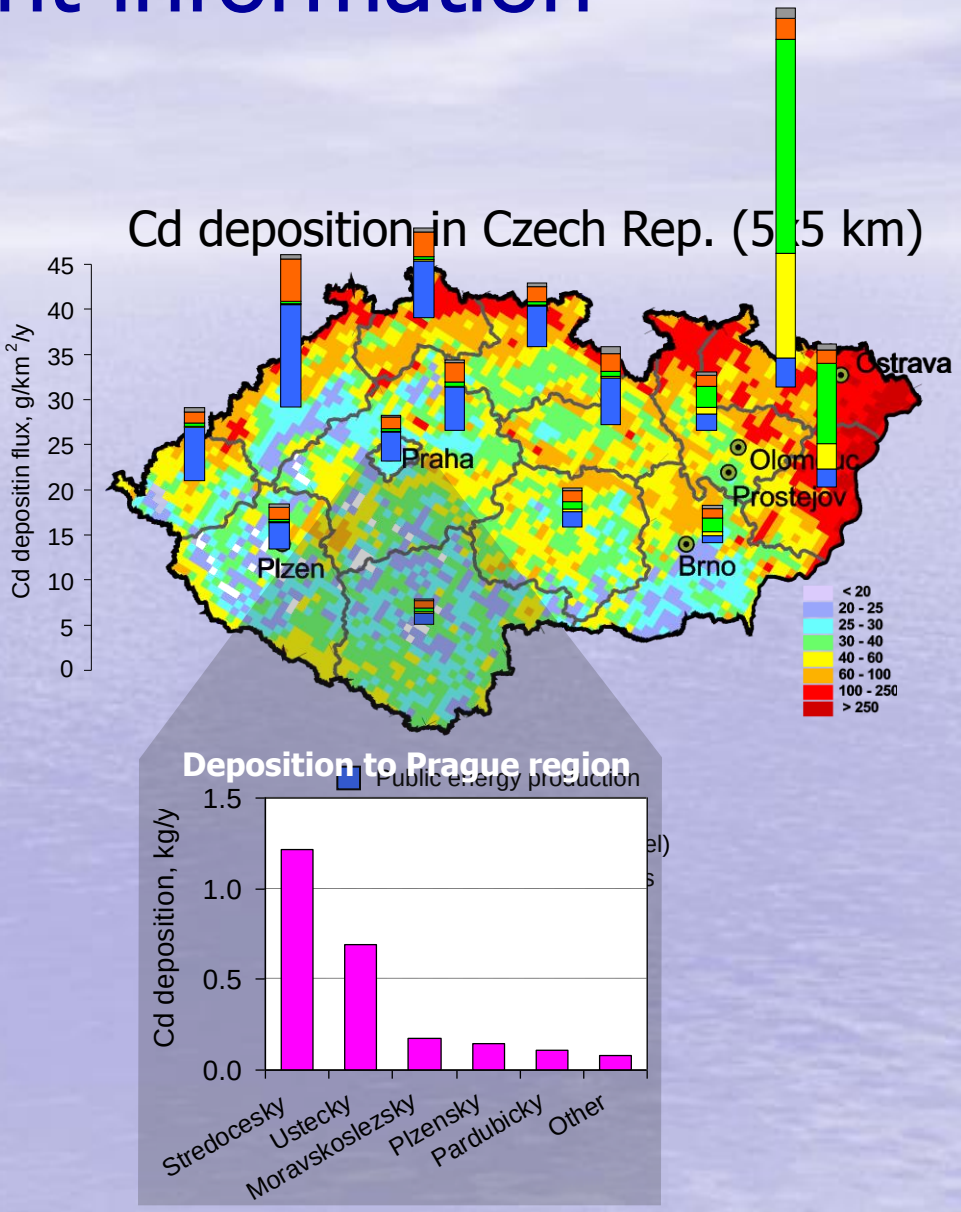
Pb deposition in the Netherlands (5×5 km^2)



Policy-relevant information

Additional information on country scale:

- Pollution levels with fine spatial resolution (down to 5×5 km^2)
- Contamination of a country provinces
- Contribution of different emission source categories
- Transboundary transport between country's provinces



EMEP Steering Body, Geneva, 2013

Policy-relevant information

Ad

-
-
-
-
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emep

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

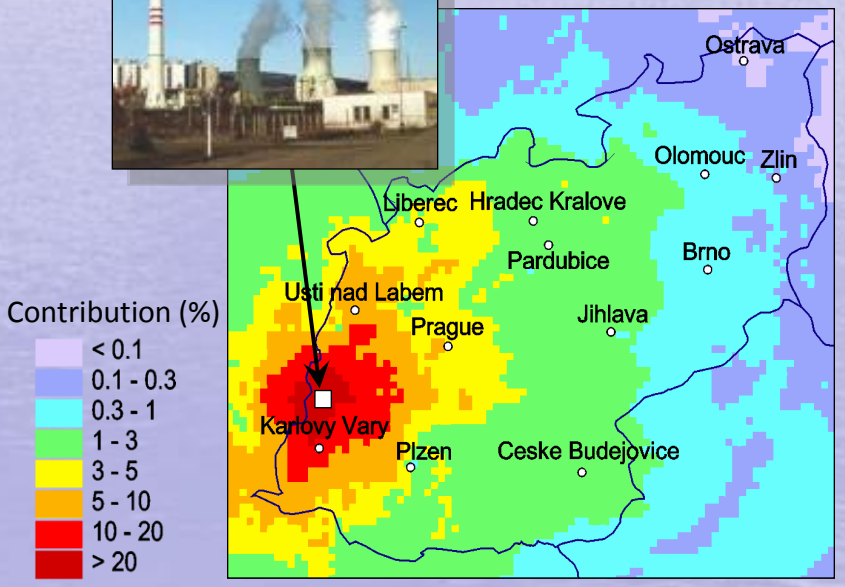
Pollution Assessment on a Country Scale

EMEP case studies on heavy metal pollution assessment with fine spatial resolution

Meteorological Synthesizing Centre – East, 2013

Contribution of LPS to Cd deposition

(Prunéřov II Power Station, Czech Rep.)

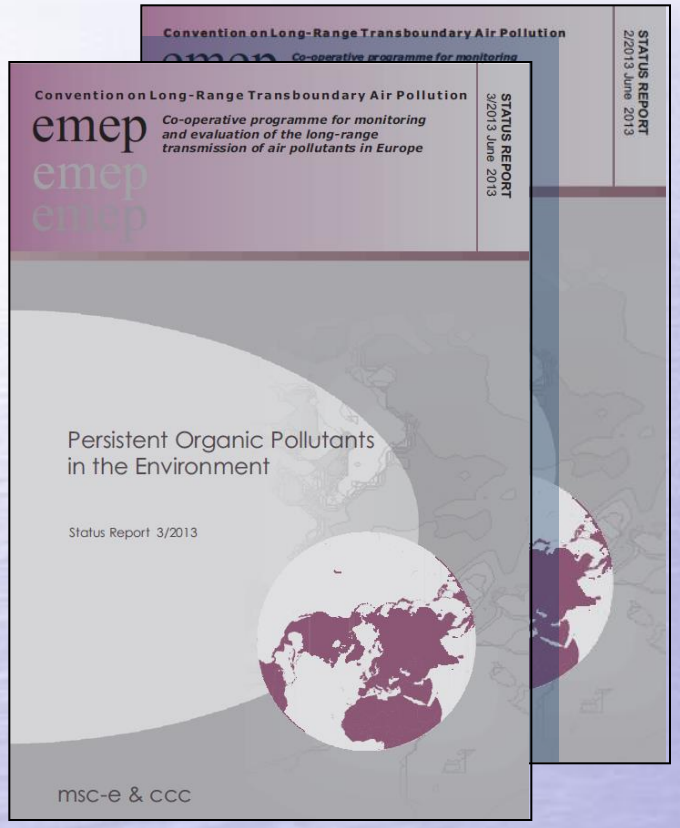


EMEP Steering Body, Geneva, 2013

New format of Status Report

In accordance with recommendations of EMEP Bureau

MSC-E Status Reports 2013



Main topics:

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2. Pollution assessment in the EECCA countries
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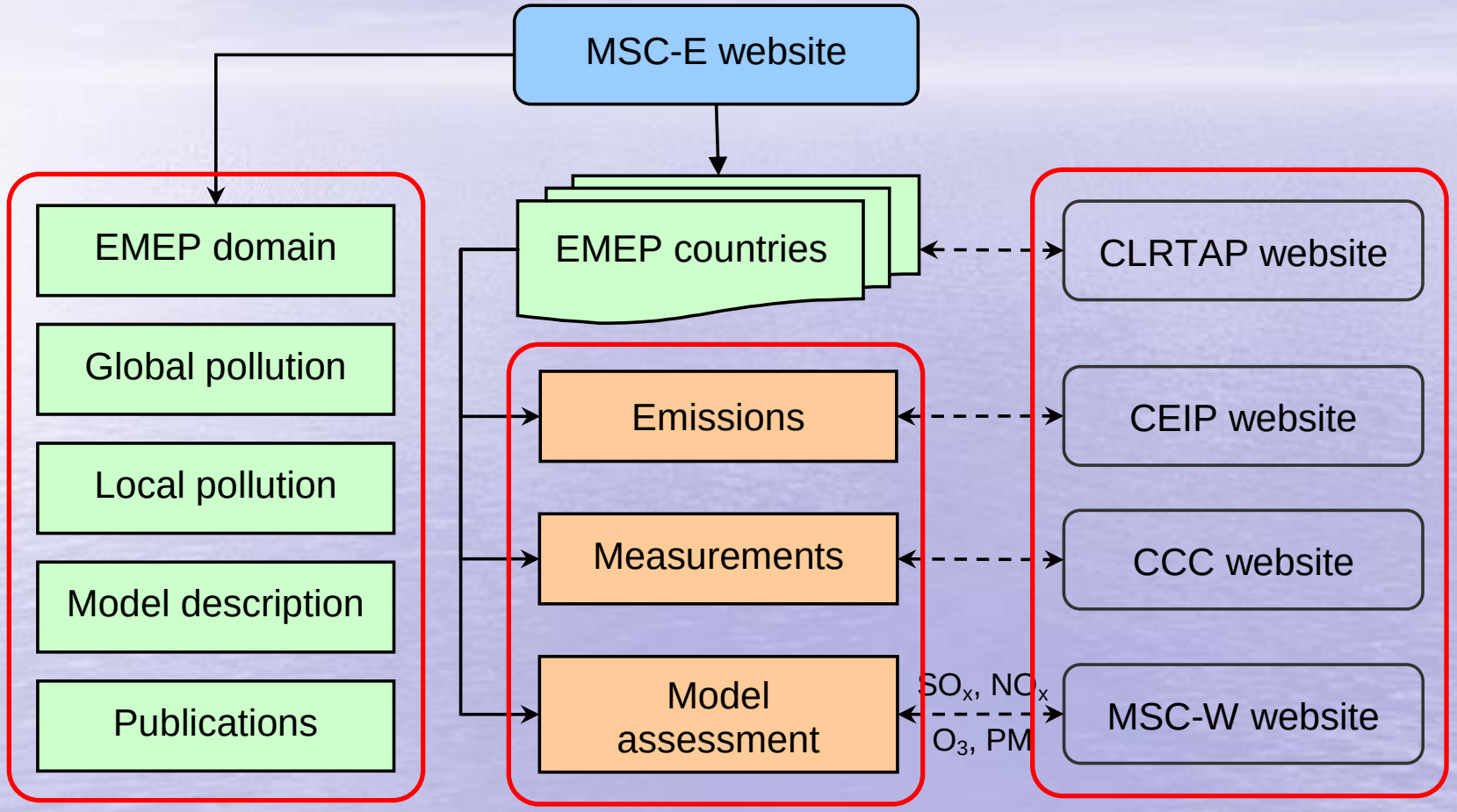
4. Dissemination of information

Dissemination of EMEP information

Information on the web



MSC-E web site: www.msceast.org

Dissemination of EMEP information

Convention on Long-Range Transboundary Air Pollution

emep

msc-e

Meteorological Synthesizing Centre-East

- General information
  - About
  - MSC-E staff
  - EMEP centres
  - Co-operation
- Publications
  - Peer-reviewed papers
  - Reports
  - Presentations
- Pollution assessment
  - Pollutants
  - EMEP domain

Pollution assessment of EMEP c

This section presents updated information on pollu
Pollutants for each country - a Party to the Conv
official data and expert estimates of emission
concentrations, their spatial distribution, deposition
and of other European countries are demonstrat
precipitation measured at monitoring stations of a
modelling results.

Country-specific report for 2010 (exapmple for the Czech Republic)

Country-specific report "Transboundary Pollution of the Czech Republic by Heavy Metals and Persistent Organic Pollutants in 2010" EMEP/MSC-E Technical Report 5/2012 (pdf)

Country-specific report "Transboundary data by main pollutants (S,N,Pb) and PM"
MSC-W Data Note 1/2012 (pdf)

Status within the Convention

Emission data

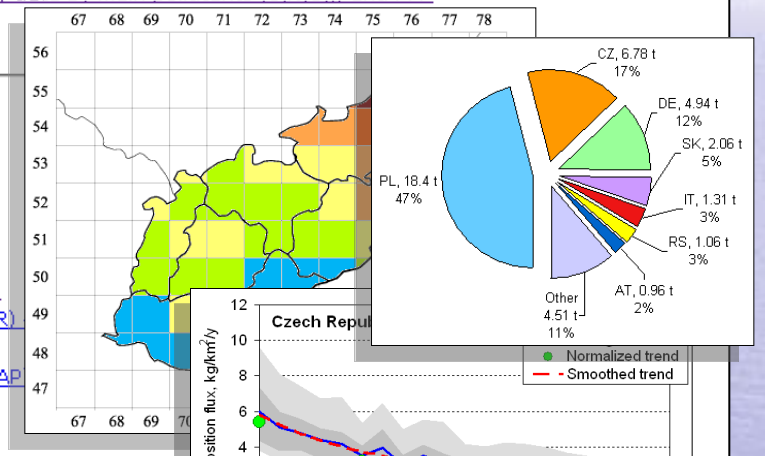
- Emission trends
- Spatial distribution of emissions
- Emission source categories (NFR) official data
- Emission source categories (SNAP) as used in EMEP models

Measurements

Model assessment

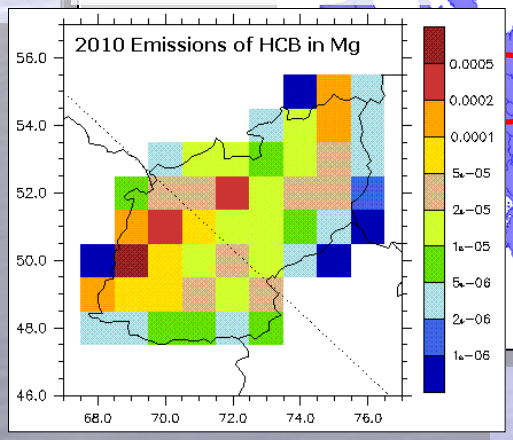
- Concentration in media
- Deposition

Modelling results



- chart
- map
- data

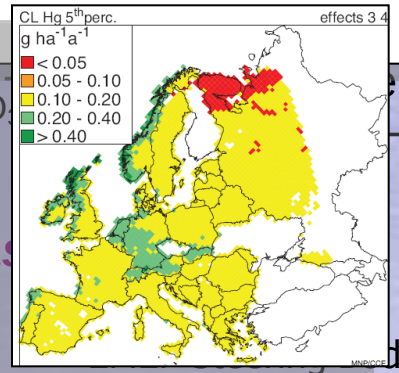
Emissions data



Measurement data

mm precip	Cd precip	Pb precip
5.400	0.087	2.270
0.000	-9999.990	-9999.990
2.900	0.270	5.900
2.900	0.460	12.700
2.700	0.170	7.500
12.400	0.050	1.400
12.100	0.130	4.600
21.400	0.040	1.200
9.300	0.050	1.500
18.100	0.040	0.700
19.300	0.010	0.900
28.400	0.010	0.250
23.200	0.010	0.250

Assessment of effects

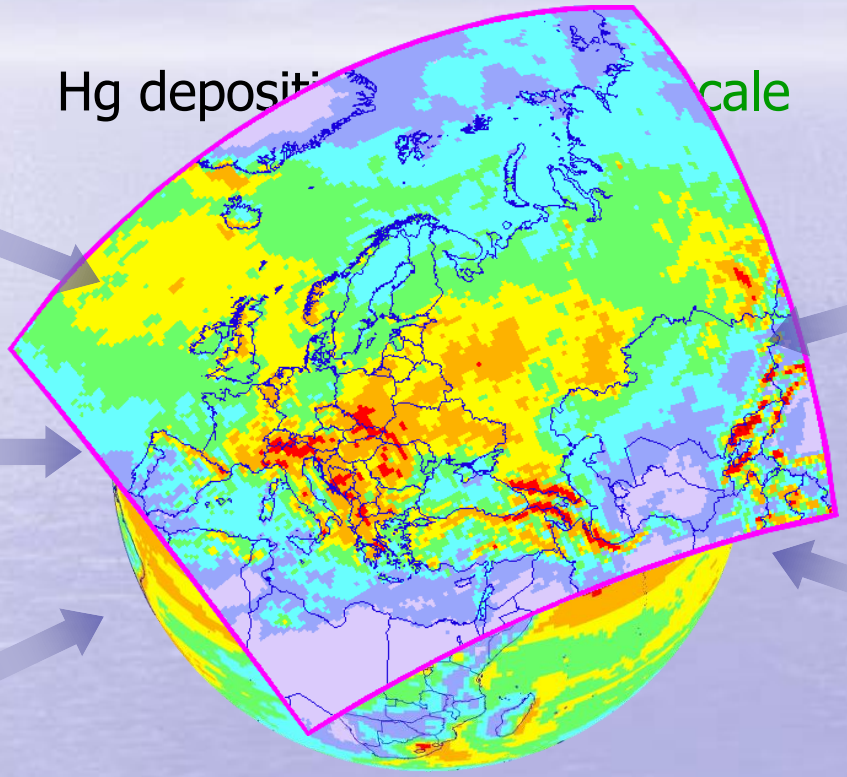


Information for EECCA countries in Russian (under development)

Dissemination of EMEP information

Hg deposition within EMEP region

Hg deposition on global scale



AMAP Arctic Monitoring and Assessment Programme

HELCOM

UNEP

OSPAR COMMISSION

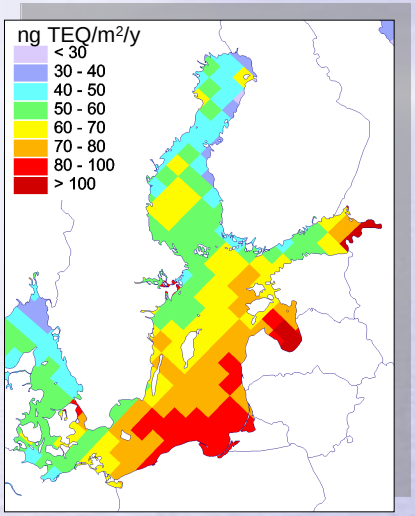
STOCKHOLM CONVENTION

Important to initiate formal co-operation between the Convention and other relevant international bodies

EMEP Steering Body, Geneva, 2013

Dissemination of EMEP information

PCDD/F deposition to the *Baltic sea*

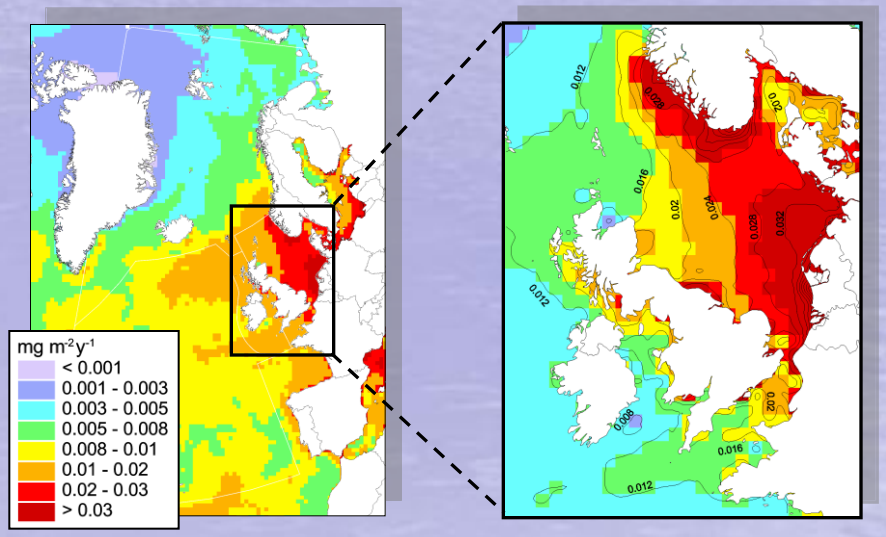


Since 1997 EMEP annually provides HELCOM/MONAS with data on atmospheric supply of HMs and POPs to the Baltic Sea (long-term EMEP/HELCOM contract)

OSPAR COMMISSION

EMEP took part in several projects on assessment of HMs and POPs deposition to the OSPAR meritime area (EMEP/HELCOM contracts)

Cd deposition to the *Northern Sea*



Dissemination of EMEP information

Minamata Convention on Mercury (UNEP)

- Adoption of the global legally binding instrument on Hg (Minamata Convention) (Geneva, January 2013)
- Support of the global Hg treaty at the International Conference on Mercury as a Global Pollutant 2013 (Edinburgh, August 2013)
- Diplomatic Conference on the Minamata Convention (Japan, October 2013)

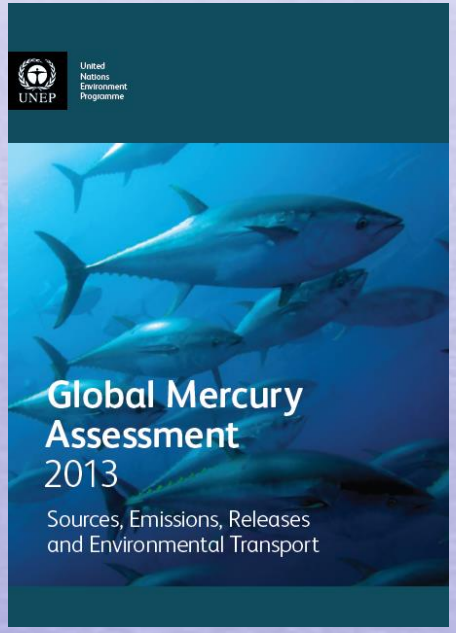
Dissemination of EMEP information

Minamata Convention on Mercury (UNEP)

- Adoption of the global legally binding instrument on Hg (Minamata Convention) (Geneva, January 2013)

  EMEP took part in preparation of the Global Mercury Assessment 2013 for the 5th session of the Intergovernmental Negotiation Committee (INC5)

- Support of the global Hg treaty at the International Conference on Mercury as a Global Pollutant 2013 (Edinburgh, August 2013)
- Diplomatic Conference on the Minamata Convention (Japan, October 2013)



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- Support of the global Hg treaty at the International Conference on Mercury as a Global Pollutant 2013 (Edinburgh, August 2013)

  EMEP presented new model results and took part in organizing the GMOS Mercury Modelling Task Force

- Diplomatic Conference on the Minamata Convention (Japan, October 2013)

Dissemination of EMEP information

Minamata Convention on Mercury (UNEP)

- Adoption of the global legally binding instrument on Hg (Minamata Convention) (Geneva, January 2013)
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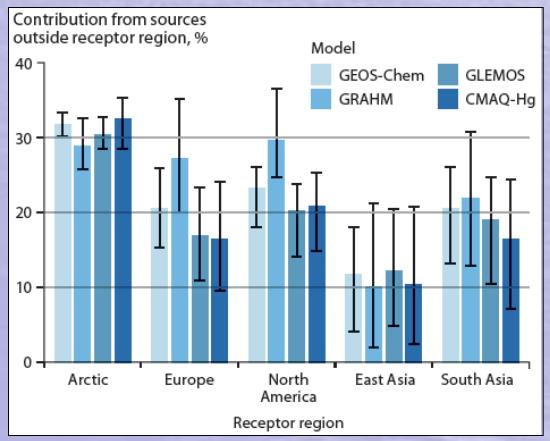
EMEP is invited to update results of the Global Mercury Assessment with new model estimates of Hg global pollution



TF HTAP plays the role of an international platform for collection, discussion and dissemination of the research results

How to improve data accessibility for countries?

- New format of Status Reports (country-specific information)
- 'Near real-time' simulations
- National scale assessments with fine resolution (case studies)
- Sharing of modelling tools for national assessments
- Development of EMEP website in Russian (for EECCA countries)
- Initiation of formal co-operation between the Convention and other relevant international bodies
- …