

MSC-E work plan, 2015

Task	Item
Calculations of HMs/POPs for 2013	1.3.2b
Testing of HM/POP models in the new EMEP grid	1.3.4
Long-term trends of contamination	1.1.8, 1.1.4
Cooperation with national experts (EECCA countries)	1.3.5
Intercontinental transport and secondary sources	1.3.6, 1.6.2
Research activity: - interaction with atmospheric aerosols - Hg dispersion in the environment - wind re-suspension	1.3.8c
Contribution to KM 5,7,16 of the Assessment Report	
Co-operation and dissemination of information	1.1.7, 1.3.9, 4.3, 1.6.2, 1.6.3

Long-term trends

Contribution to the Assessment Report

I. Model vs. observations (annual, monthly)

Trends of HM/POP modeled and observed pollution levels at monitoring stations (1990-2012)

II. Trends based on model assessment

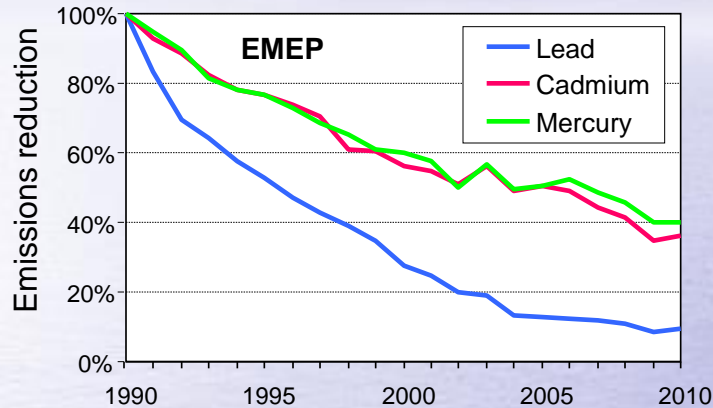
for EMEP domain and selected countries (1990-2012)

Changes of:

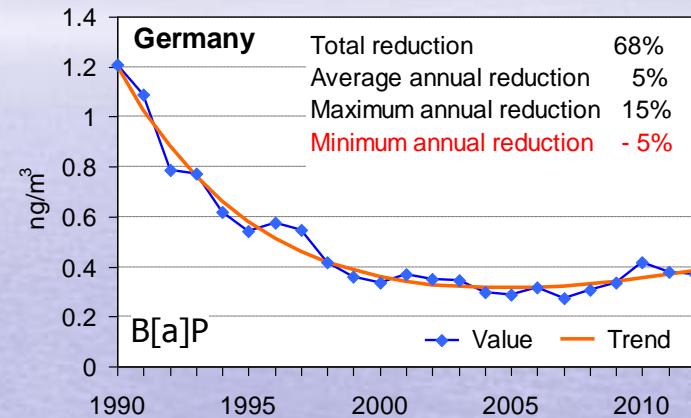
- Air concentrations and total deposition
- Transboundary transport
- Deposition to the marginal seas
- Ecosystem-dependent deposition
- Contribution of secondary and non-EMEP sources
- Contribution of emission source categories
- Pollution in EU and EECCA countries
- . . .

Comparison of calculation/measurement/emission trends

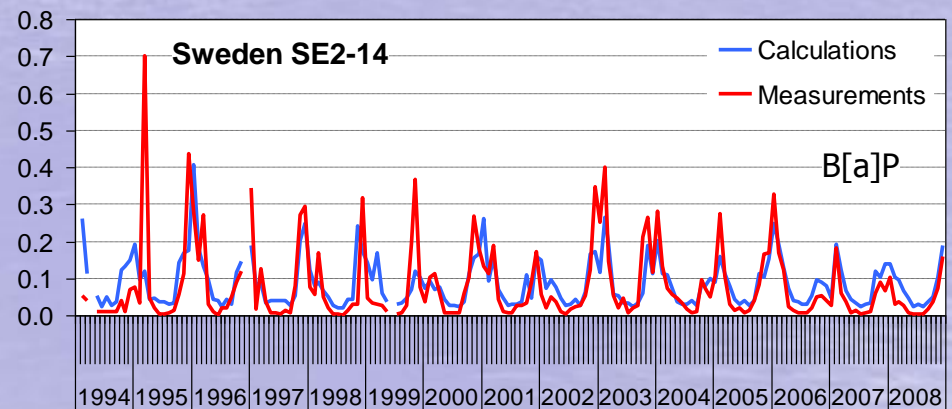
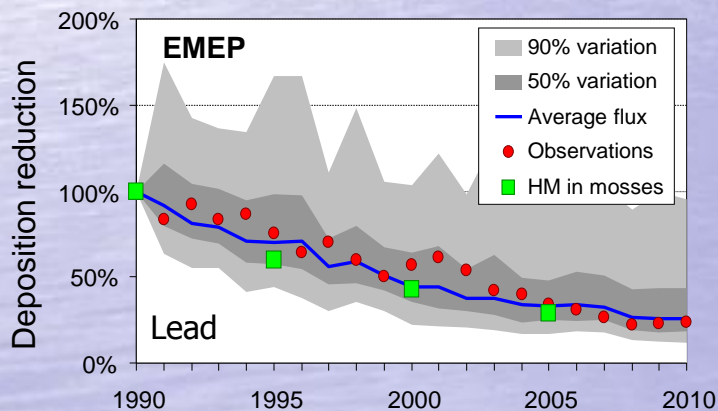
Emissions



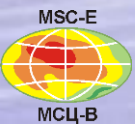
Modeling



Measurements/Modeling



To be reported at the TFMM meeting in Cracow in May 2015



GLEMOS model development (HMs)

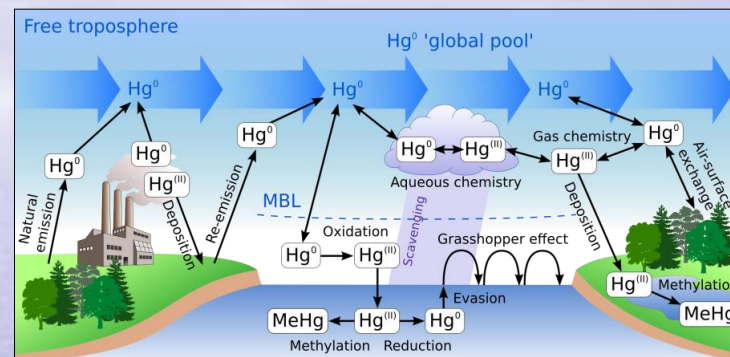
Multi-model assessment of Hg atmos. processes and pollution levels

EU GMOS Mercury Modeling Task Force

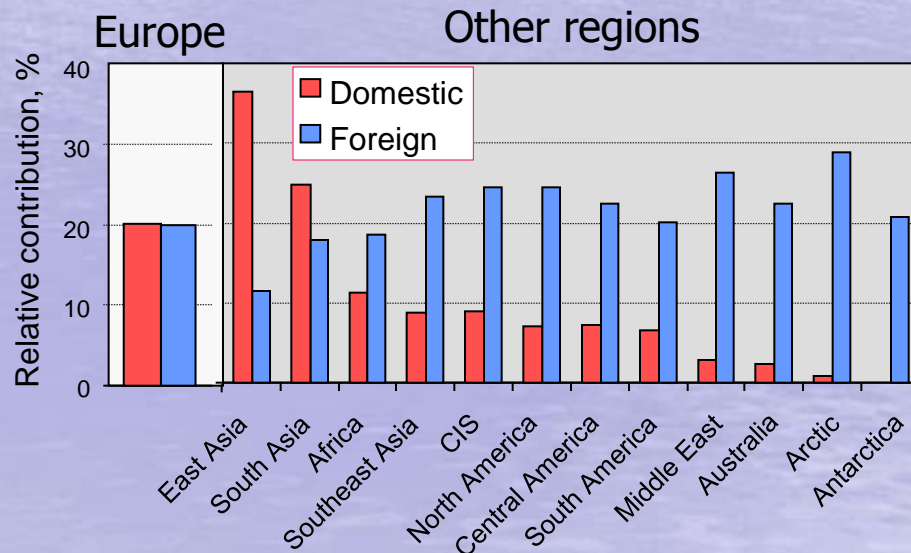
Participating models:

Model	Institution
GLEMOS	EMEP/MSC-E
ICHMERIT	CNR-IIA (Italy)
GRAHM	Environment Canada
GEOS-Chem	MIT (USA)
CMAQ-Hg-Hem	Lamar University (USA)
WRF-Chem	CNR-IIA (Italy)
CMAQ-Hg	HZG (Germany)

Hg processes



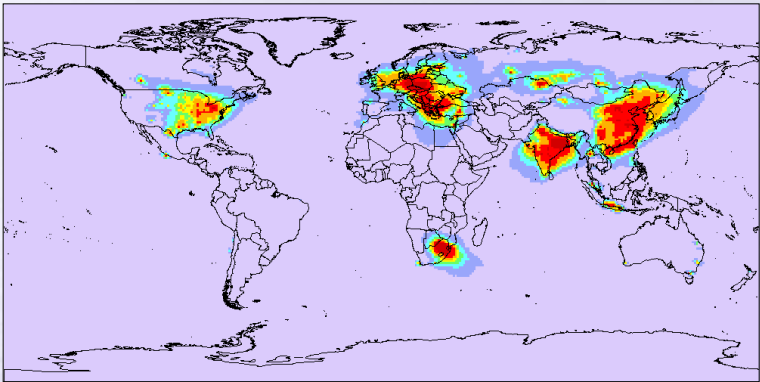
Multi-model assessment of mercury intercontinental transport



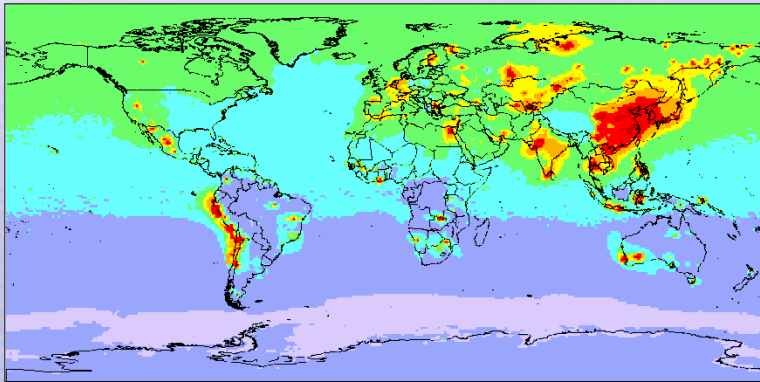
GLEMOS model development (POPs)

Hg global transport from **different emission sectors**
(UNEP/AMAP expert estimates), 2013

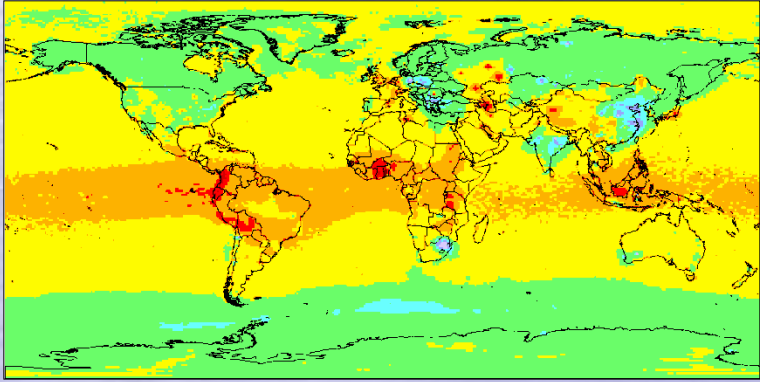
Stationary combustion



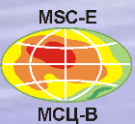
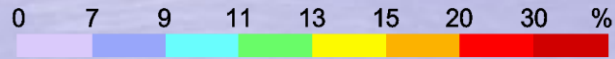
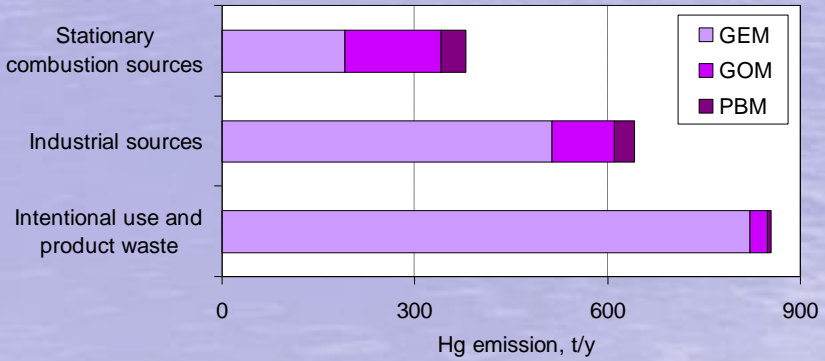
Industrial sources



Intentional use and product waste

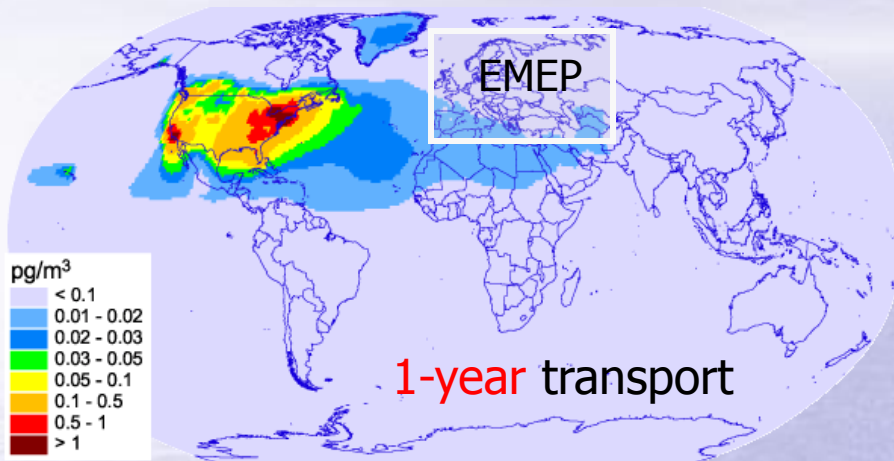


Speciation of Hg emissions

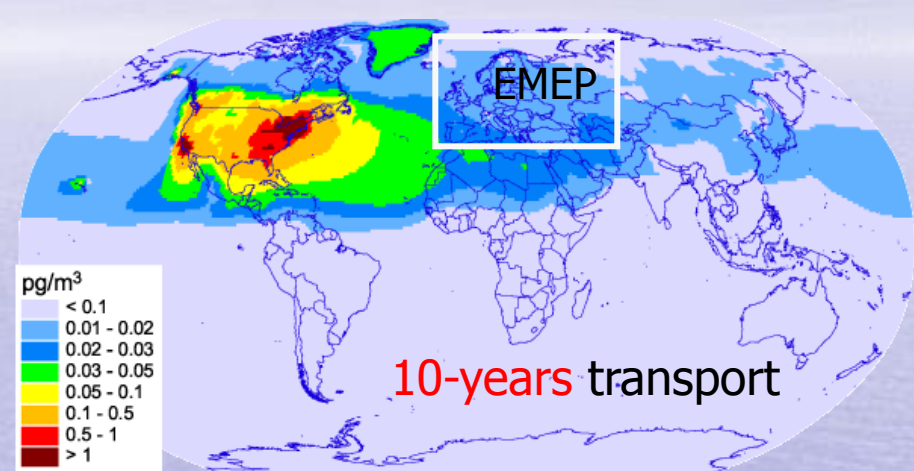


GLEMOS model development (POPs)

Investigation of multi-hop transport and **contribution of secondary sources**



Air concentrations in 2000



Air concentrations in 2010

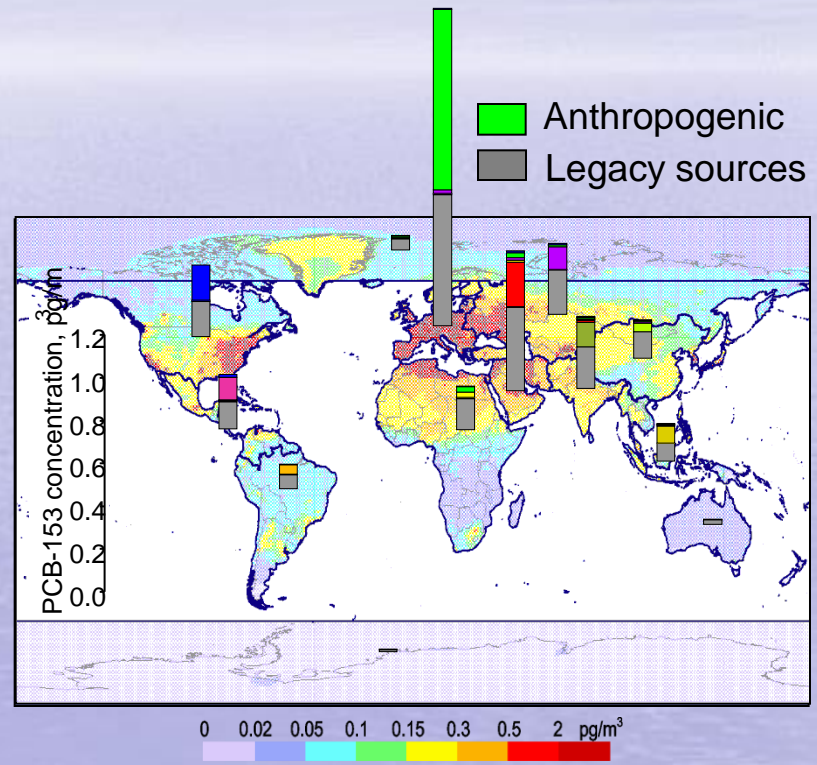
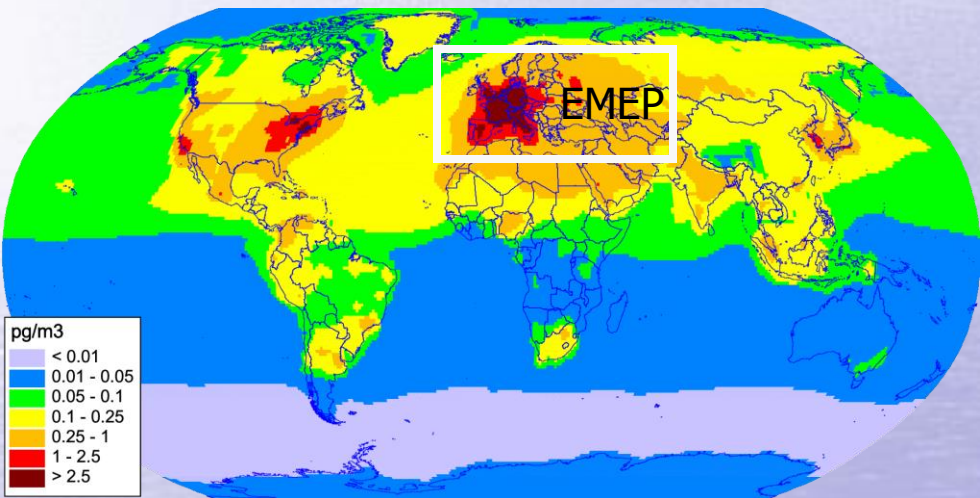
Two model runs were performed for PCB-153 transport from North American sources:

- first run for year 2000
- second run for the period from 2000 to 2010 for PCB-153 transport from North American sources

GLEMOS model development (POPs)

Investigation of multi-hop transport and **contribution of secondary sources**

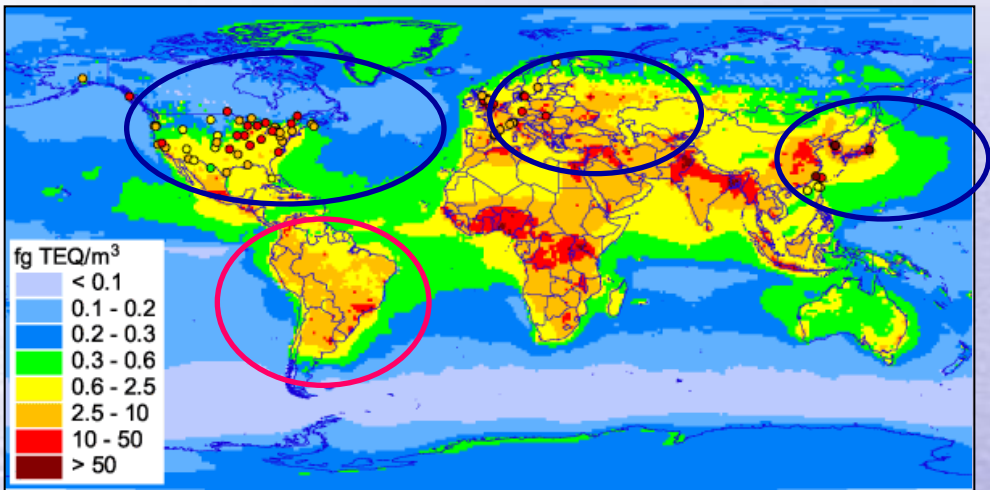
Modeled annual mean PCB-153 air concentrations for 2012



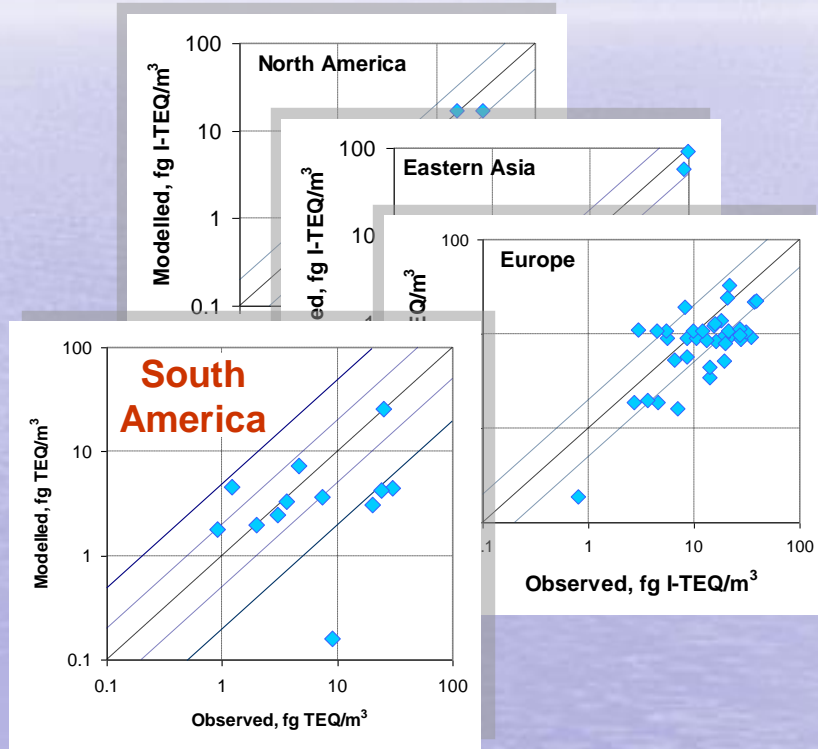
Source-Receptor modeling experiments using new HTAP division by sources/receptor (HTAP2)

GLEMOS model development (POPs)

Investigation of PCDD/F global transport and fate based on UNEP SC emission inventory and research monitoring data (2015)



Modeling results against observed PCDD/F air concentrations in various regions



Comparison of modeled PCDD/F air concentrations against measurements made in South America in 2012 (*Schuster et al., EST, 2015*)

Assessment of Pb pollution levels with fine resolution in EECCA countries (Belarus)

Main goal: Evaluate and analyze Pb pollution levels in Belarus with high (10 x 10 km²) spatial and temporal resolution

Data involved in the study:

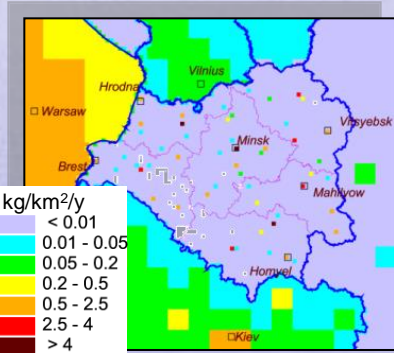
Gridded Pb emissions

- Belarus (10x10 km²): from national experts
- Other countries (50x50 km²): CEIP

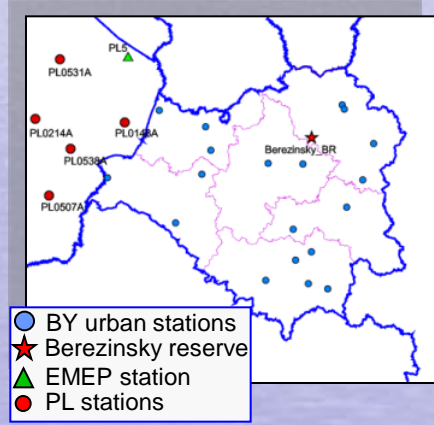
Monitoring data (conc. in air)

- 1 background site (Berezinsky reserve, Belarus)
- 19 urban stations (Belarus)
- 5 background urban sites in Poland (EU AirBase data)
- 1 EMEP station in Poland

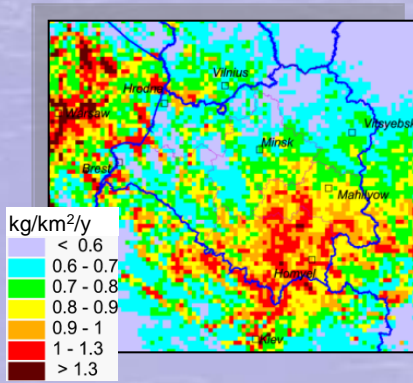
Modeling data



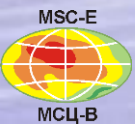
Pb emissions, 2012



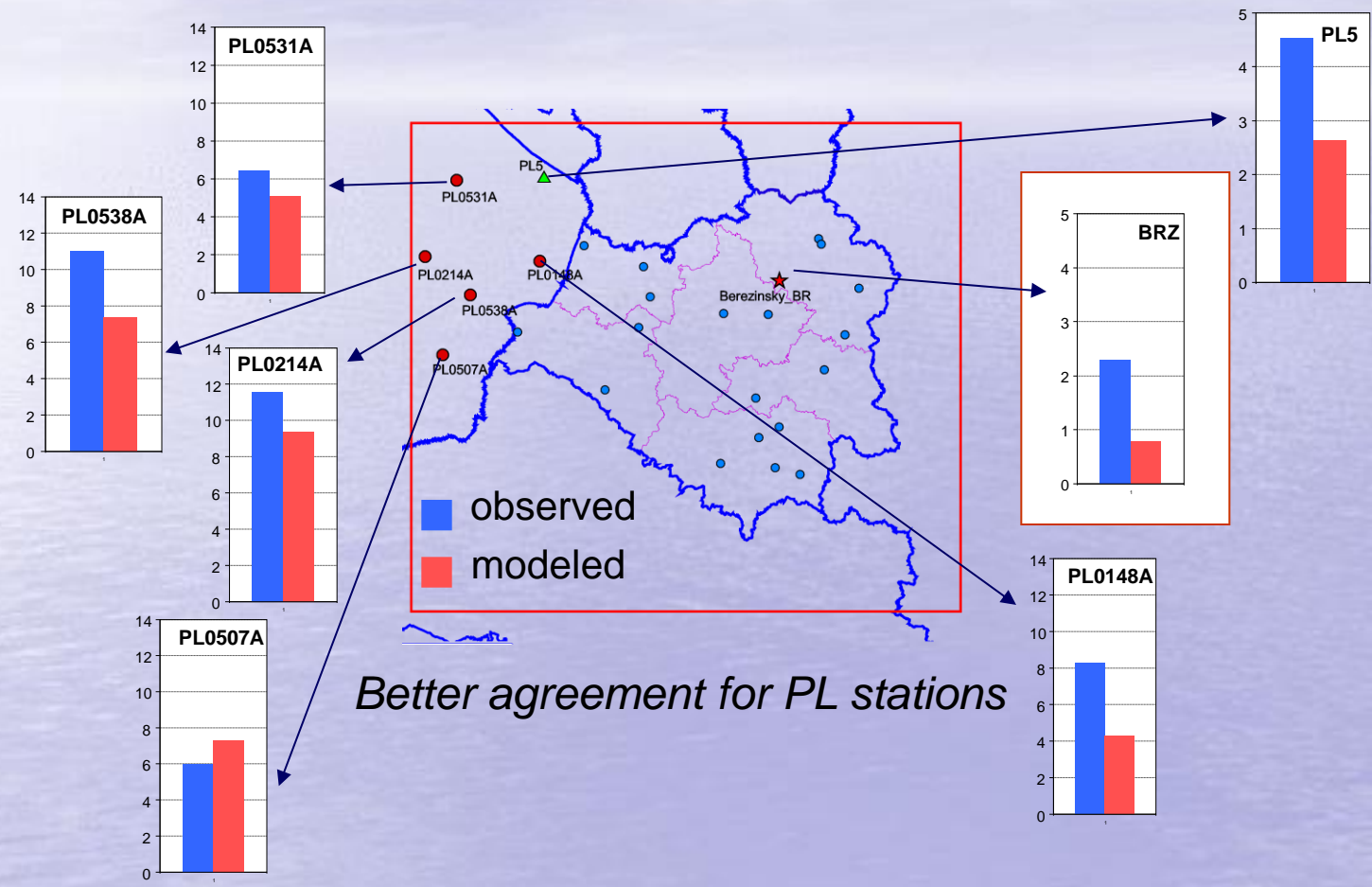
Monitoring stations



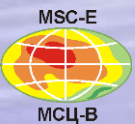
Pb deposition, 2012



Modeled vs. observed levels: preliminary results for Belarus



Joint meeting of MSC-E and BY is planned to discuss indicated discrepancies between modeled and observed Pb levels

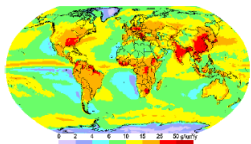


Cooperation with international bodies (2014-2015)

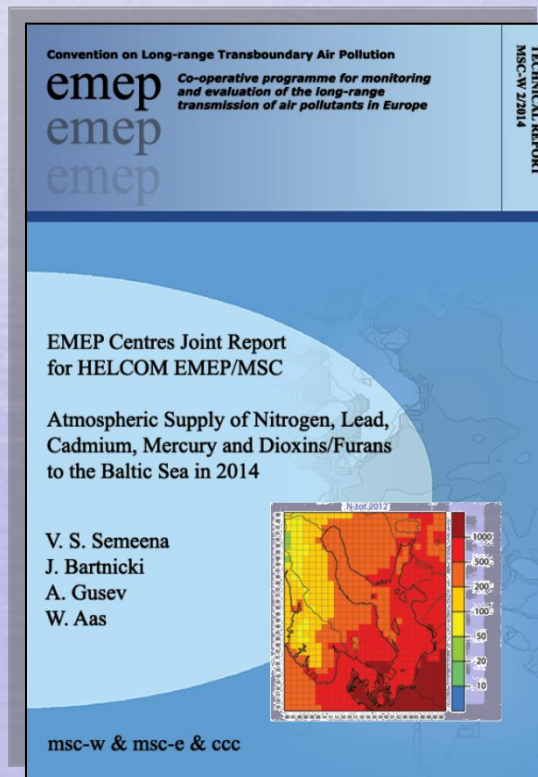
Cooperation with UNEP Minamata Convention, 2014

in press

Global mercury modelling:
Update of Global Mercury
Assessment 2013



Cooperation with HELCOM LOAD-8, Finland, 2014

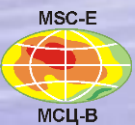


Cooperation with UNEP, 2015

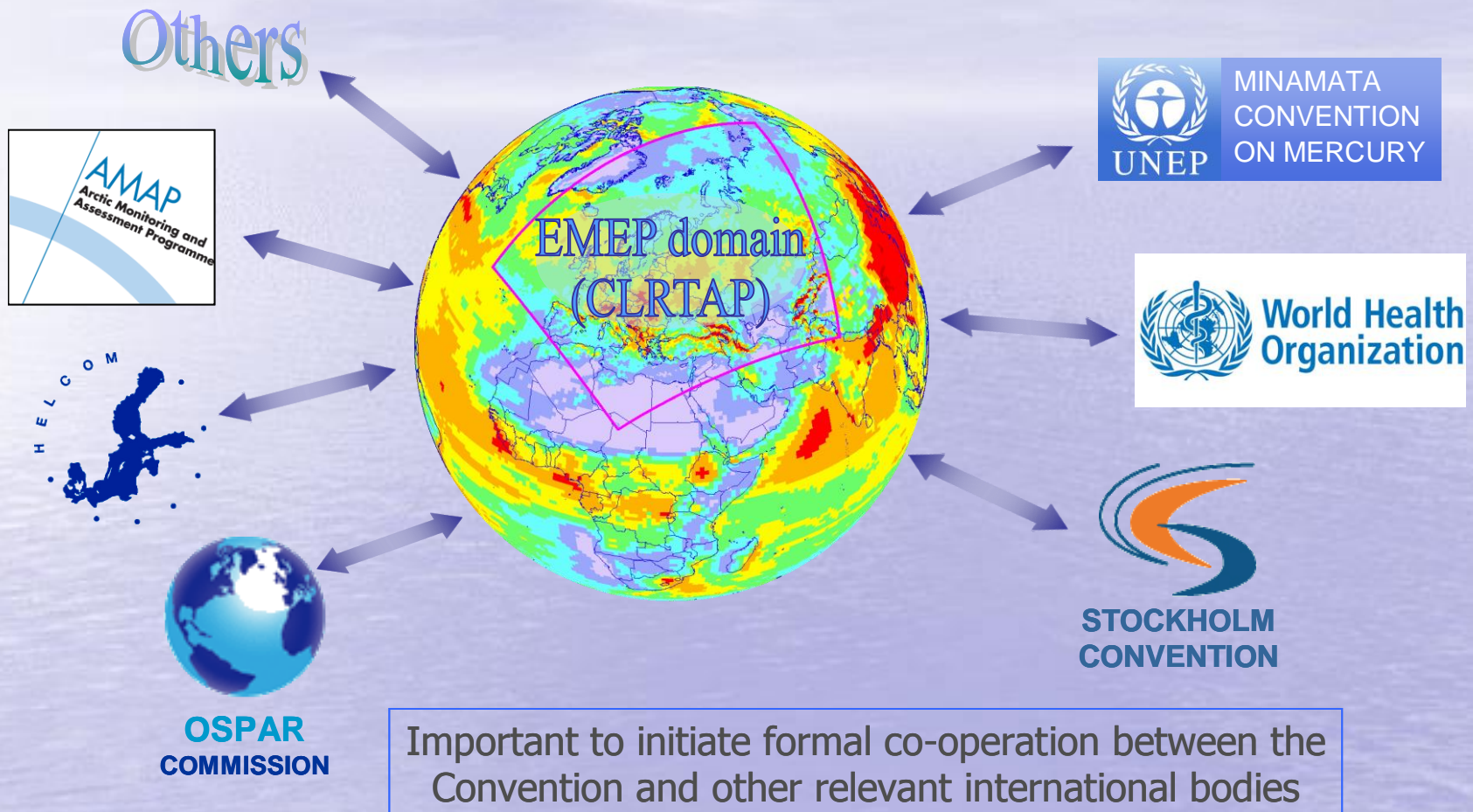
**Conference of
Basel, Rotterdam, and
Stockholm Conventions**

"Science Fair"

**"From Science to Action:
Working for a Safer
Tomorrow"
7-9 May, 2015.**



Dissemination of information



Research issues on HMs and POPs in 2016-2017

(KM5, KM7, KM16)

Develop integrated approach to exploit synergies in research of emissions, long range transport and exposure of HM and POP to allow for a systematic identification of risks and for evaluation of options for emission control:

- Contribute to the effect community work on the evaluation of the pollutants adverse effect on human health and the environment with following information on:
 - ecosystem-dependend deposition fluxes of HMs and POPs to different land use types
 - evaluation of background levels of HMs and POPs in selected cities of the EMEP countries
 - synergy of atmospheric transport of toxic substances and PM.
 - global transport and deposition of Hg and POPs to terrestrial and marine environment to better understand bioaccumulation/ biomagnification processes in food chains.
- Joint research activity with national experts of EECCA countries to support ratification and implementation of the Protocols.

Research issues on HMs and POPs in 2016-2017

(KM5, KM7, KM16)

- Develop alternative methods for emission inventories for HMs and POPs (including historical emissions) based on a combination of monitoring and modeling at regional and global scales.
- Compile national data on occurrence of HM (particularly Hg) and POPs in relevant compartments of the environment with global geographical coverage as a basis for model testing and development.
- Improve model parameterization of pollutant exchange between different ecosystem compartments (air, water, soil, vegetation).
- Develop abatement options for HM and POPs to assess benefits of action. Systematic methods for assessing and evaluating abatement options should be developed.
- Cooperate and disseminate information gathered and prepared in the framework of EMEP with other Conventions and International bodies.







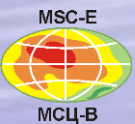
Bundesministerium
für Umwelt, Naturschutz,
Bau und Reaktorsicherheit

The role of science support in policy

Till Spranger

CLRTAP Assessment Report
Workshop, Oslo 20-22 Jan 2015

EMEP/WGE Bureaux, March 2015





1. Issue framing

- Without clear delineation of the issue
 - no public discussion
 - no policy / politic movement
- Acidification: *well established*
- Link to climate change, heavy metals, POPs, health effects: *known and used in policy*
- Link to biodiversity: *known to experts, indirectly addressed*
- Nitrogen, hemispheric transport: *known to experts, nascent*