Global Monitoring Plan data reporting and visualization tool

www. pops-gmp.org

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The Global Monitoring Plan: data management and visualization tool

The goal is to

- enhance **visibility of the GMP** and relevant data,
- facilitate **improved interpretation, spatial visualization, and modeling** of available monitoring data,
- improve **the flow of relevant data** to the environmental and health communities,
- enhance our **understanding of environmental factors affecting human health** and well-being,
- promote **a focus on prevention** of environmental and human impacts.

First monitoring report

Chemicals in the Stockholm Convention

- Aldrin
- Chlordane
- DDT
- Dieldrin
- Endrin
- Heptachlor
- Hexachlorbenzene (HCB)
- Mirex
- Polychlorinated biphenyls (PCB)
- Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDDs/PCDFs)
- Toxaphene
- Pentachlorbenzene (PeCB)
- Tetrabromodiphenyl ether (tetraBDE)
- Pentabromodiphenyl ether (pentaBDE)
- Heptabfomodiphenyl ether (hepta BDE)
- Hexabromdiphenyl ether (hexa BDE)
- Chlordecone
- Hexabrombiphenyl
- Perfluorooctane sulfonic acid (PFOA), its salts and perfluoroctane sulfonyl fluoride
- Alpha hexachlorocyclohexane (a-HCH)*
- Beta hexachlorocyclohexane (b-HCH)*
- Lindane (g-HCH)*
- Endosulfan

Chemicals identified in GMP reports
(isomers, sums, transformation products)

Aldrin

Cis- (alpha-) chlordane, Trans- (gamma-) chlordane, **Oxychlordane**, **Cis- and Trans-nonachlor,** Chlordane (as a group), Chlordane + Nonachlor, Chlordane + trans-nonachlor

DDT, DDE, DDD, **o,p'-DDT**, **o,p'-DDE**, **o,p'-DDD**, **p,p'-DDT**, **p,p'-DDE**, **p,p'-DDD**,
Sum of DDTs, Sum p,p-DDX (p,p-isomers together), Sums of various number of DDT isomers, DDT + p,p-DDE

Dieldrin, Endrin (also **ketone** and Endrin group = sum of)

Heptachlor, Heptachlorepoxide, **Heptachlorepoxide cis-, Heptachlorepoxide trans-**, Heptachlor group (sum of)

Hexachlorbenzene (HCB)

Mirex

36 various PCBs: indicator PCBs (**PCB 28, PCB 52, PCB 101, PCB 118, PCB 138, PCB 153, PCB 180**) and 29 others. Various PCBs WHO-TEQ and PCBs I-TEQ**,** Sum of 3, 10, 14, 21, 25, 48 PCBs, dl-PCBs (also with WHO-TEQ), Mono-ortho and Non-ortho PCBs in TEQs

PCDDs and PCDFs (**15 congeners**) in sum or separately - PCDDs, PCDFs, PCDDs/Fs – often as various TEQs: WHO-TEQ, Nordic-TEQ and I-TEQ, **OCDD, OCDF**

Parlar (Toxaphene) **26 isomers**, Parlar (Toxaphene) 50, Parlar (Toxaphene) 62, Toxaphene (as a group), Parlar 40, Parlar 41, Parlar 44

Pentachlorbenzene (PeCB)

Reported only as a sum of 3 PBDEs

a-HCH, b-HCH, g-HCH, d-HCH, HCHs (sum of)

Endosulfan I, Endosulfan II, Endosulfan SO4, Endosulfans (sum of)

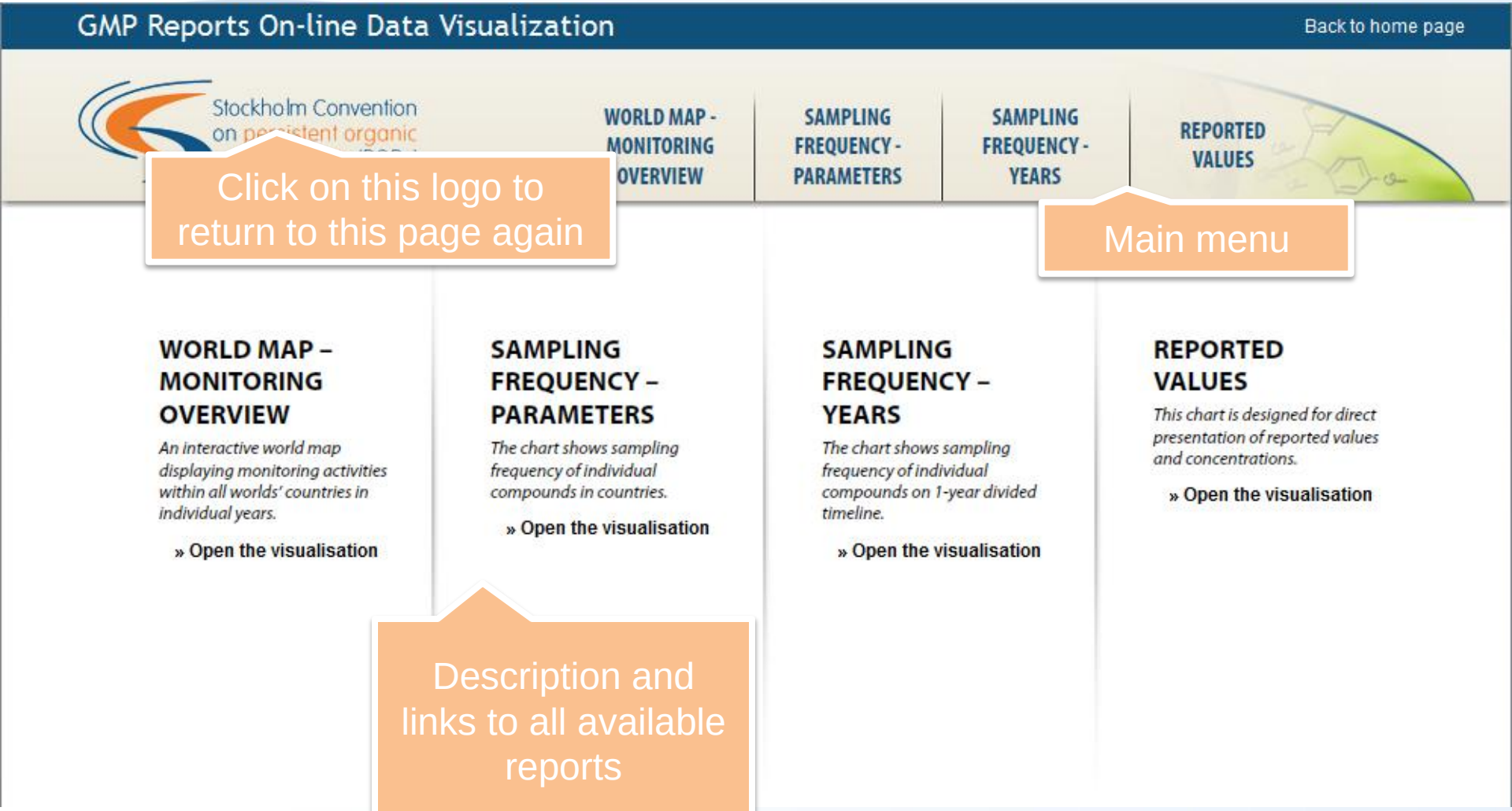
+ **other chemicals** not listed in the Stockholm Convention Dacthal, Isodine, Methoxychlor, trifluralin and delta-HCH

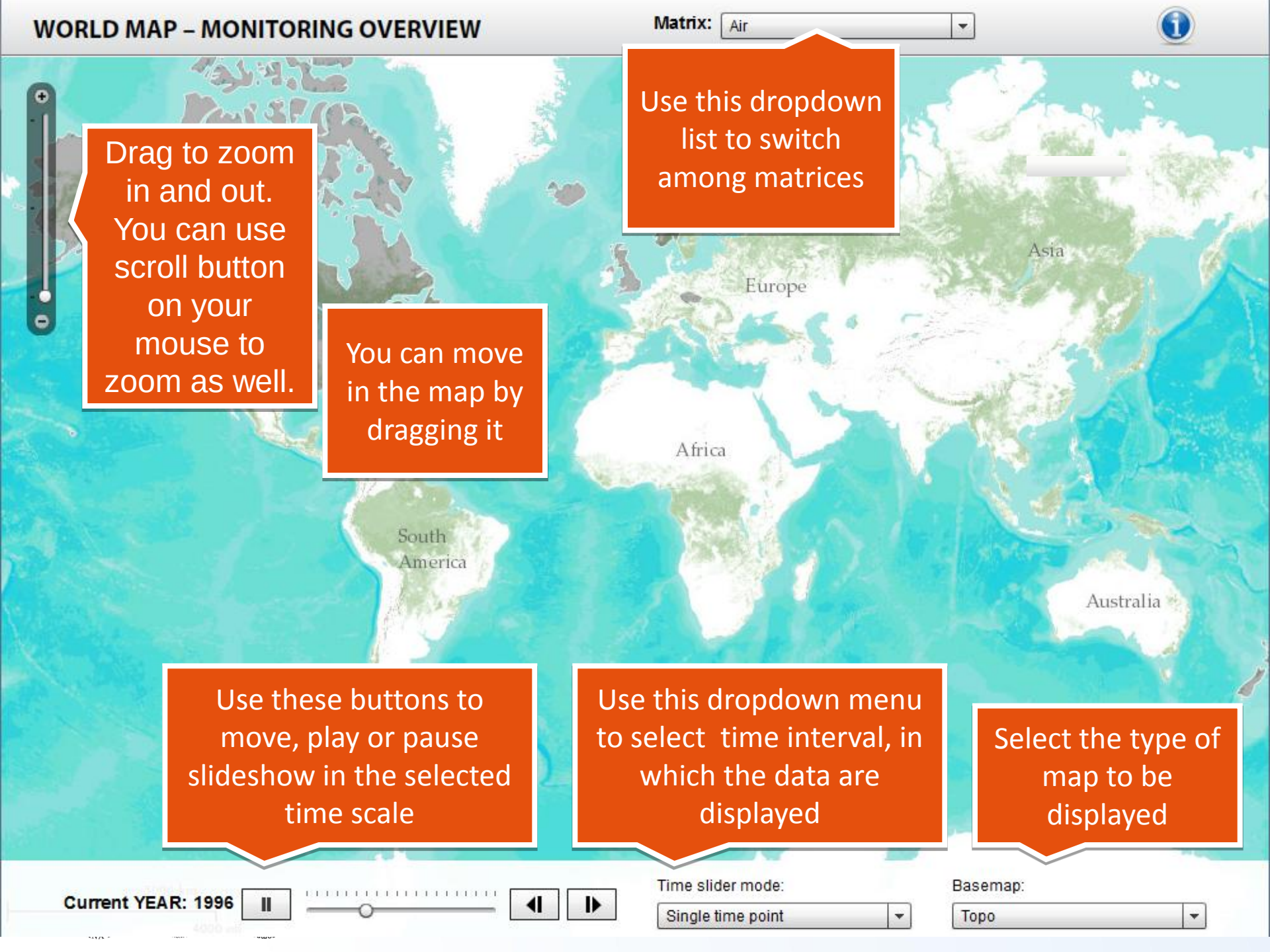
Identified data challenges

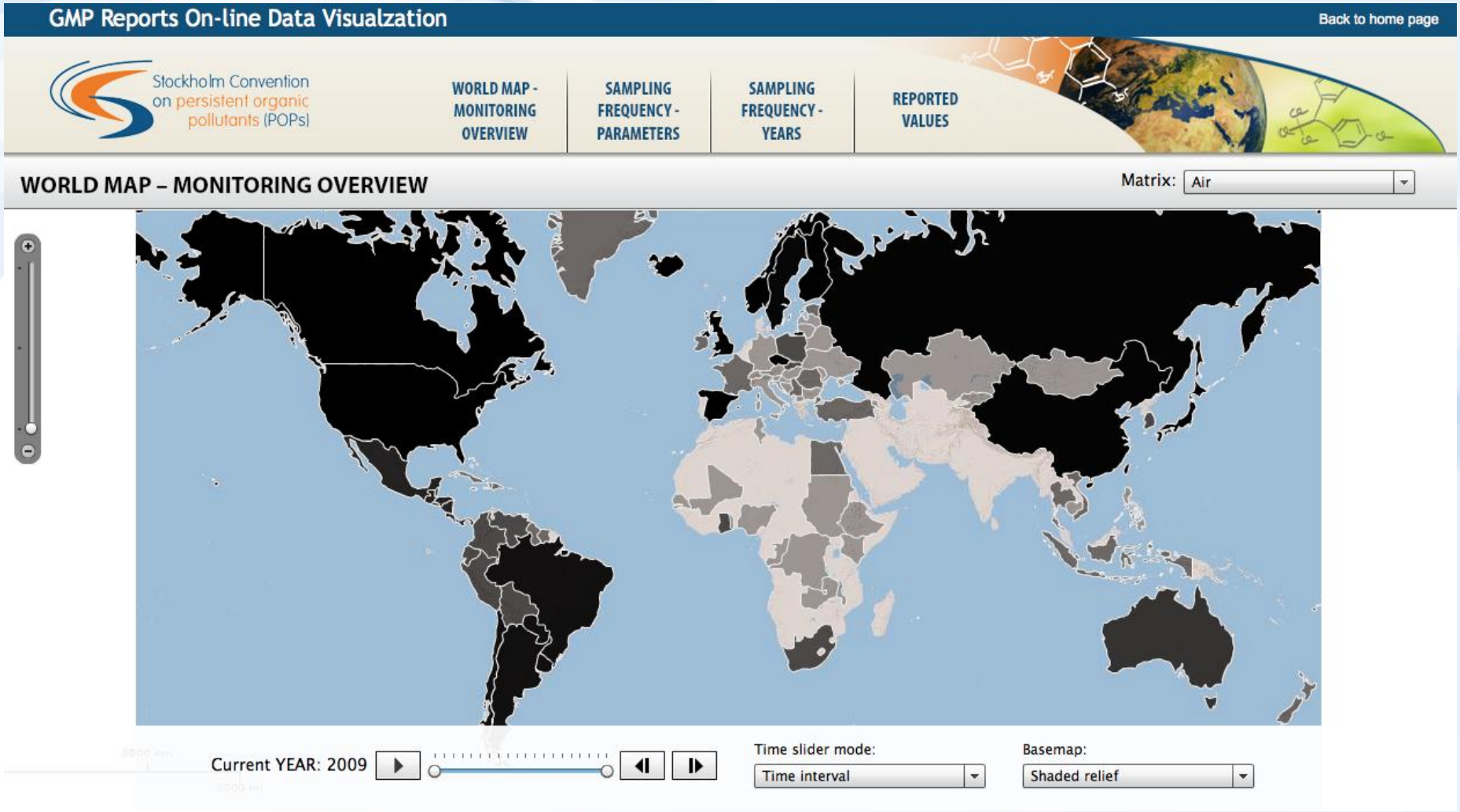
- heterogenous **nomenclature** (i.e. trans-chlordane vs. gamma-chlordane)
- unclear reporting or **missing units**
- parameters **without specification which isomers or degradation products summed up** (“chlordanes”, “PCBs”, “DDTs”, “heptachlor)
- Difference in labeling of PCBs summations
- **Limit of Quantification** (LOQ) not reported
- **Ambient air** data reported as **spatially aggregated values**, often without specific information on number and type of sampling site
- **Missing or wrong specification of the TEF values** used for calculation of the TEQ (year).
- Various WHO-TEQ values used (WHO-TEQ 1995, 1997, 1998, 2001, 2005)

Consequence

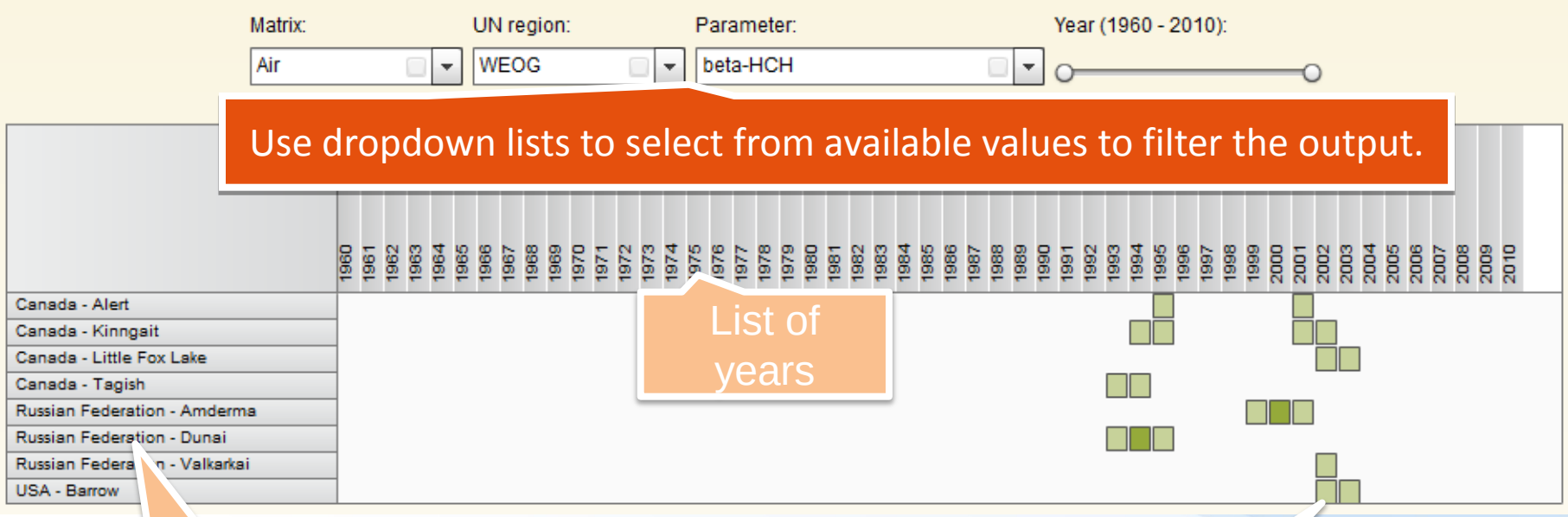
- reliability of collected GMP1 data significantly influenced
- narrowed data pool for future comparisons BUT could be improved if we can find the way how to amend/complement problematic records in GMP1 and effectively link them to GMP2


GMP Reports On-line Data Visualization
Back to home page
Stockholm Convention on persistent organic
WORLD MAP - MONITORING OVERVIEW
SAMPLING FREQUENCY - PARAMETERS
SAMPLING FREQUENCY - YEARS
REPORTED VALUES
Click on this logo to return to this page again
Main menu
WORLD MAP – MONITORING OVERVIEW
An interactive world map displaying monitoring activities within all worlds' countries in individual years.
» Open the visualisation
SAMPLING FREQUENCY – PARAMETERS
The chart shows sampling frequency of individual compounds in countries.
» Open the visualisation
SAMPLING FREQUENCY – YEARS
The chart shows sampling frequency of individual compounds on 1-year divided timeline.
» Open the visualisation
REPORTED VALUES
This chart is designed for direct presentation of reported values and concentrations.
» Open the visualisation
Description and links to all available reports


WORLD MAP – MONITORING OVERVIEW
Matrix:
Air
Use this dropdown list to switch among matrices
Drag to zoom in and out. You can use scroll button on your mouse to zoom as well.
You can move in the map by dragging it
Asia
Europe
Africa
South America
Australia
Use these buttons to move, play or pause slideshow in the selected time scale
Use this dropdown menu to select time interval, in which the data are displayed
Select the type of map to be displayed
Current YEAR: 1996
Time slider mode:
Single time point
Basemap:
Topo


GMP Reports On-line Data Visualzation
Back to home page
Stockholm Convention on persistent organic pollutants (POPs)
WORLD MAP - MONITORING OVERVIEW
SAMPLING FREQUENCY - PARAMETERS
SAMPLING FREQUENCY - YEARS
REPORTED VALUES
WORLD MAP – MONITORING OVERVIEW
Matrix: Air
Current YEAR: 2009
Time slider mode:
Time interval
Basemap:
Shaded relief

SAMPLING FREQUENCY – YEARS



GMP Reports On-line Data Visualization

AVAILABLE DATA – YEARS

Matrix: **Air** | Sampling method: **active** | UN region: **WEOG** | Parameter: **null** | Year range: **1965,2010**

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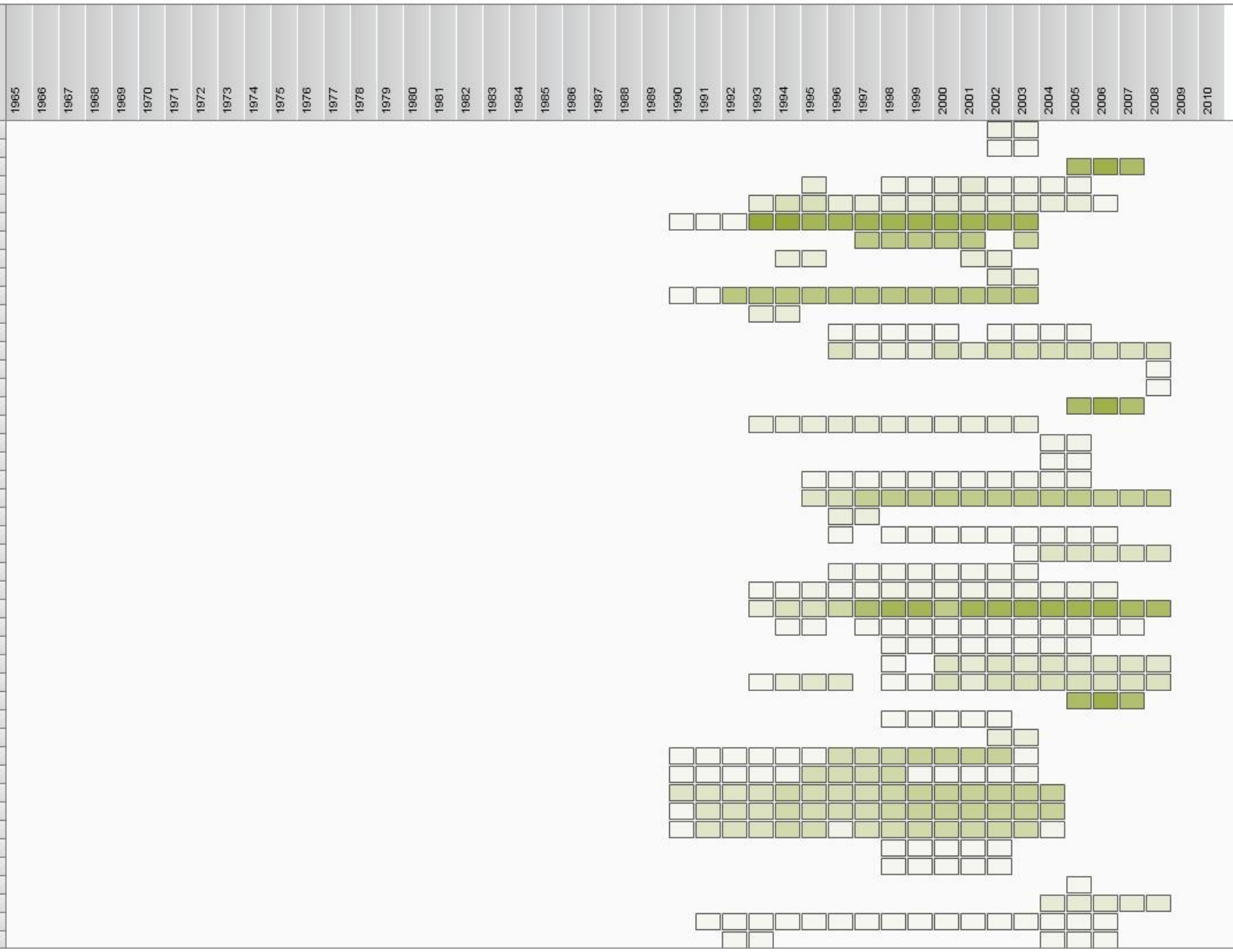
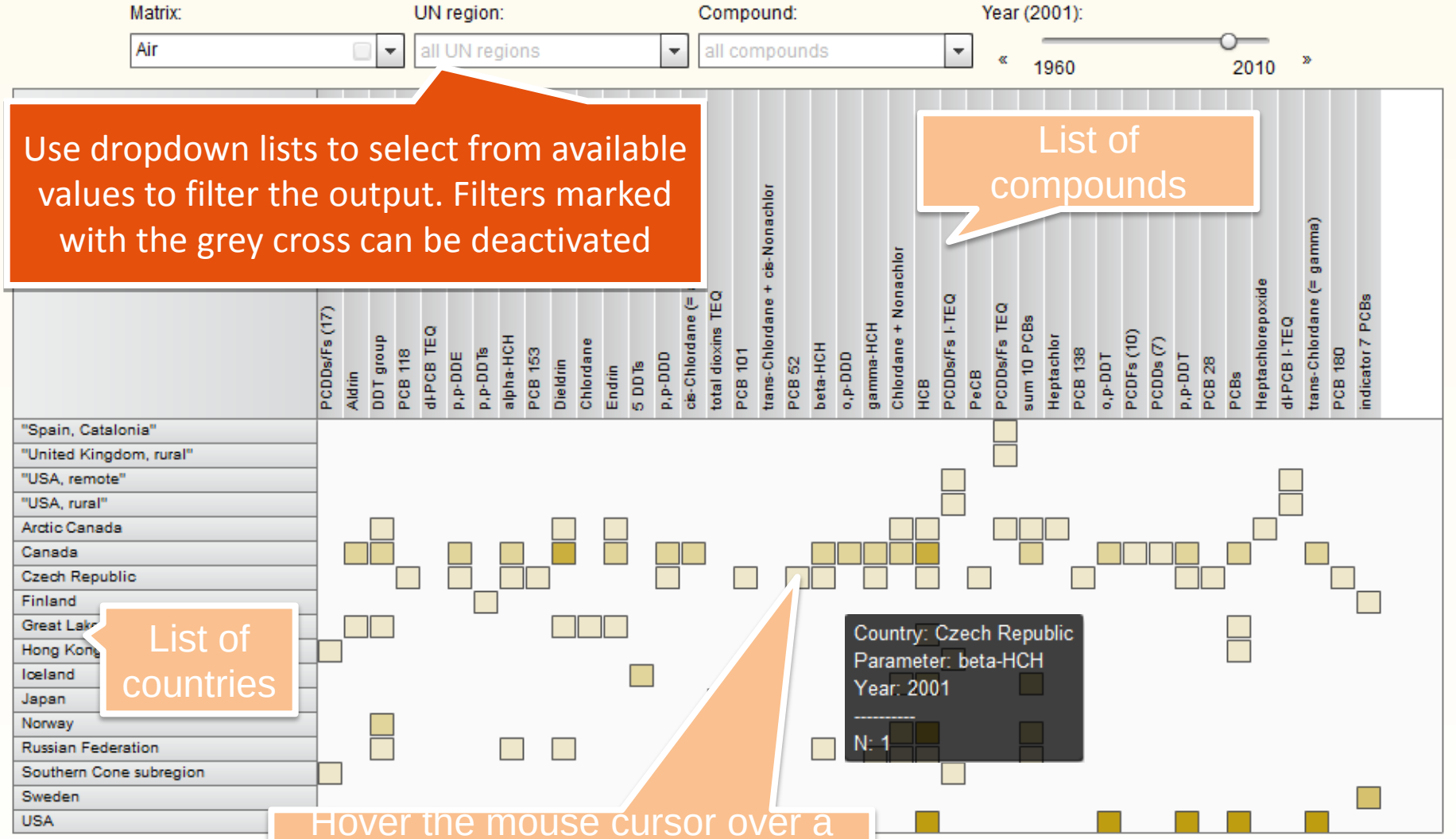


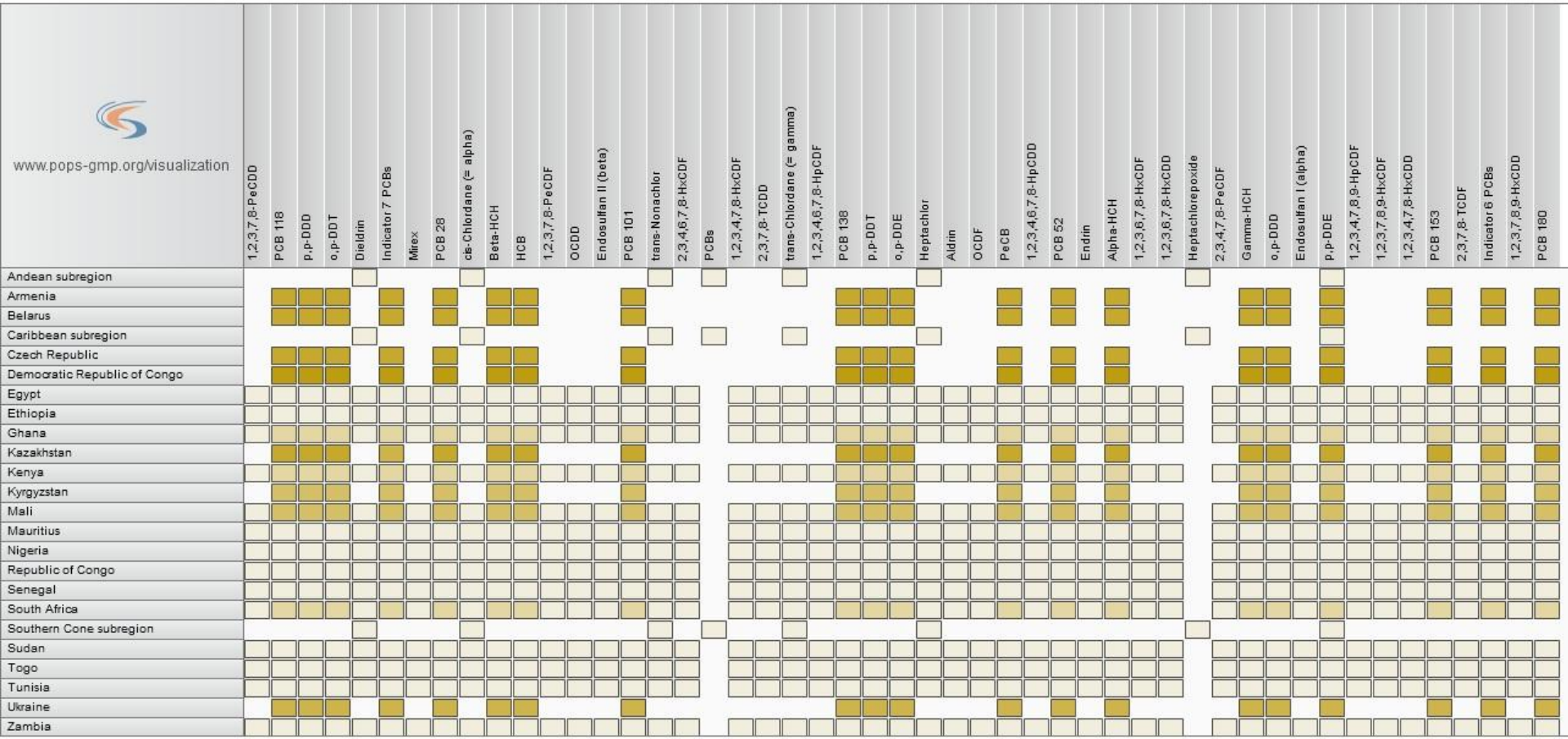
SAMPLING FREQUENCY – PARAMETERS



GMP Reports On-line Data Visualization

AVAILABLE DATA – PARAMETERS

Matrix: **Air** | Sampling method: **passive** | UN region: **null** | Compound: **null** | Year: **2008**

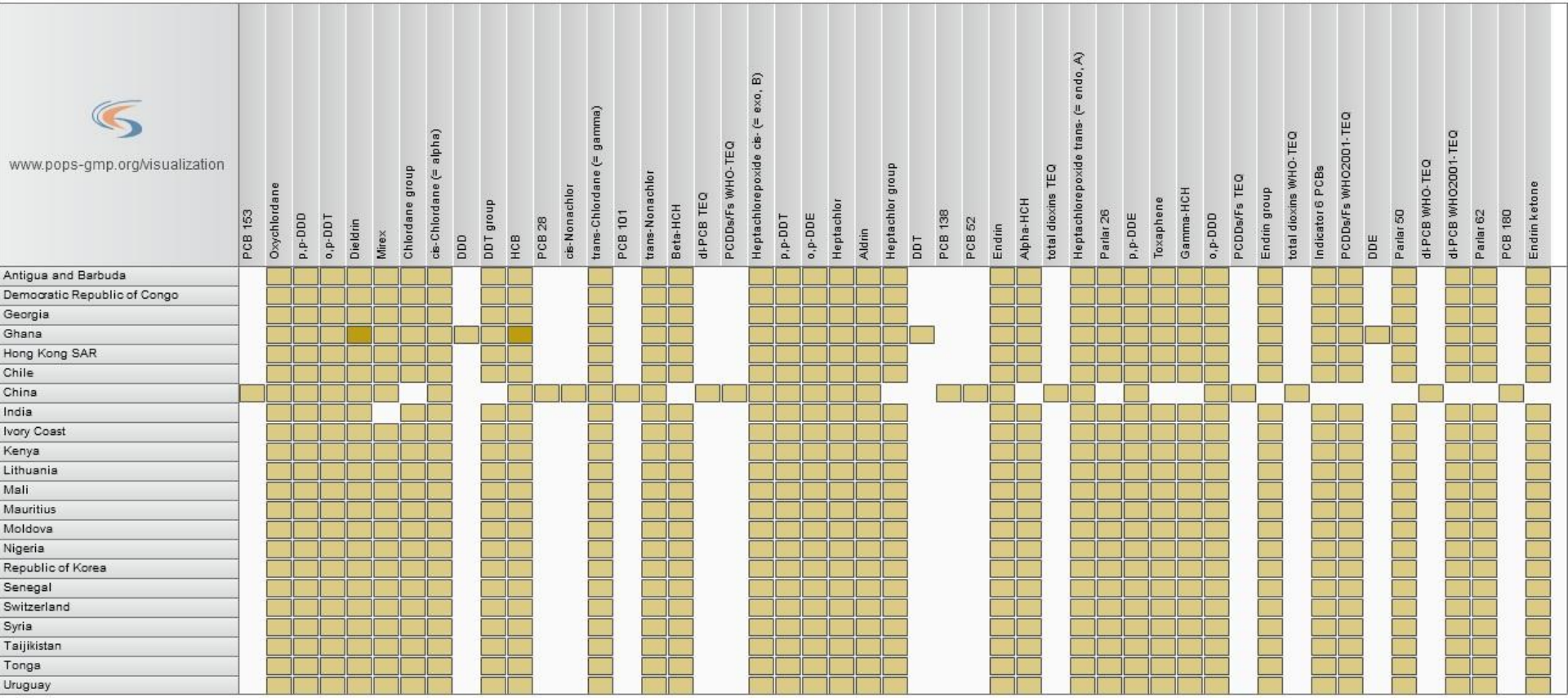


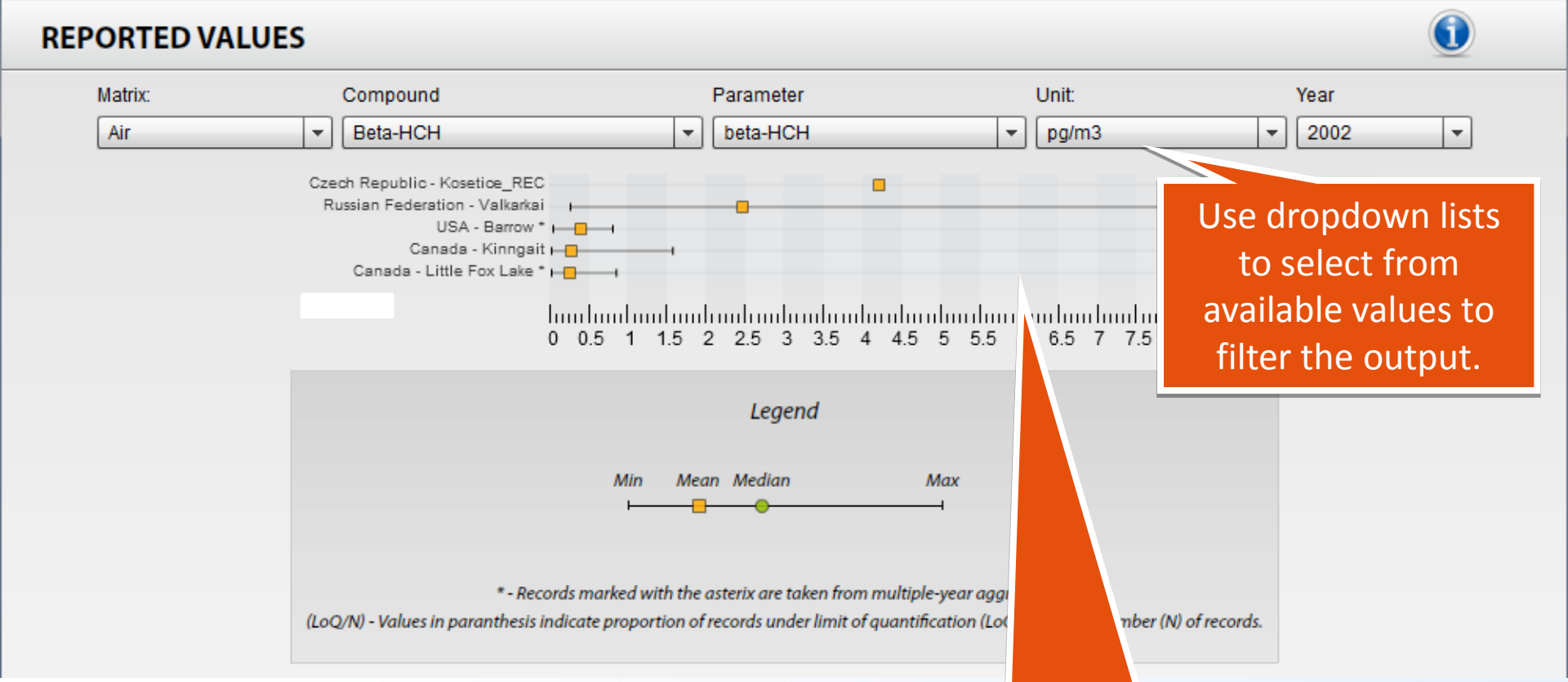
GMP Reports On-line Data Visualization

AVAILABLE DATA – PARAMETERS

Matrix: **Breast milk** | Sampling method: **null** | UN region: **null** | Compound: **null** | Year: **2008**

www.pops-gmp.org/visualization





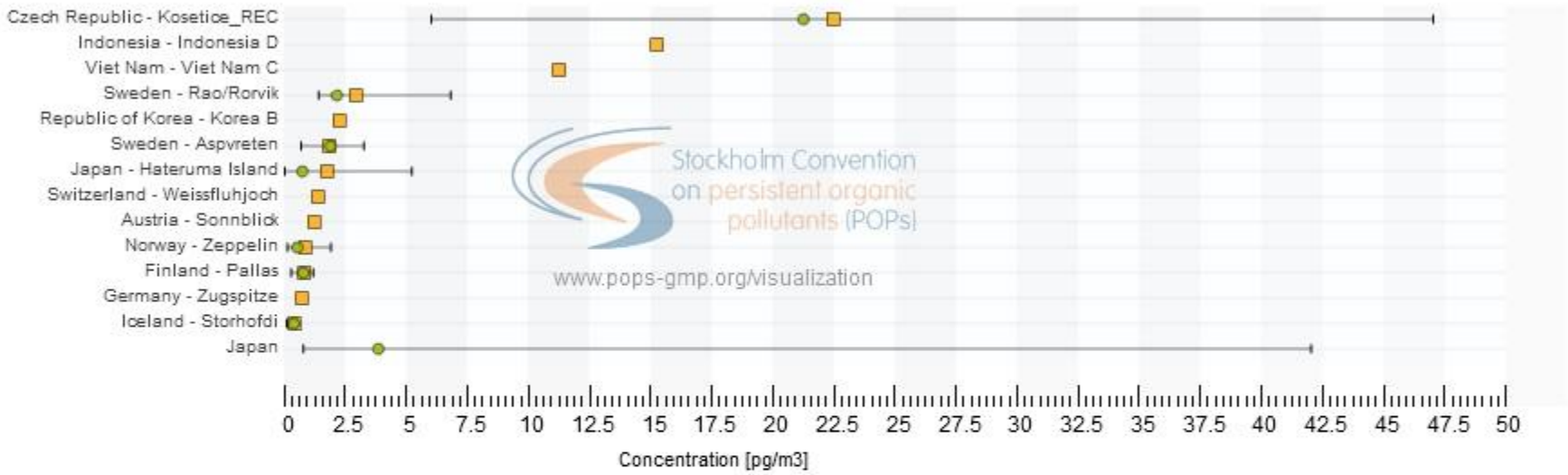
Use dropdown lists to select from available values to filter the output.

Reported values are shown as a box-and-whisker plot. A plot consist of minimum, maximum, mean and median. If a value is unavailable, appropriate sign is not displayed

GMP Reports On-line Data Visualization

REPORTED VALUES - backgroud sites only

Matrix: **Air** | Sampling method: **active** | Compound: **DDT** | Parameter: **p,p-DDE** | Unit: **pg/m3** | Year: **2005**



Legend

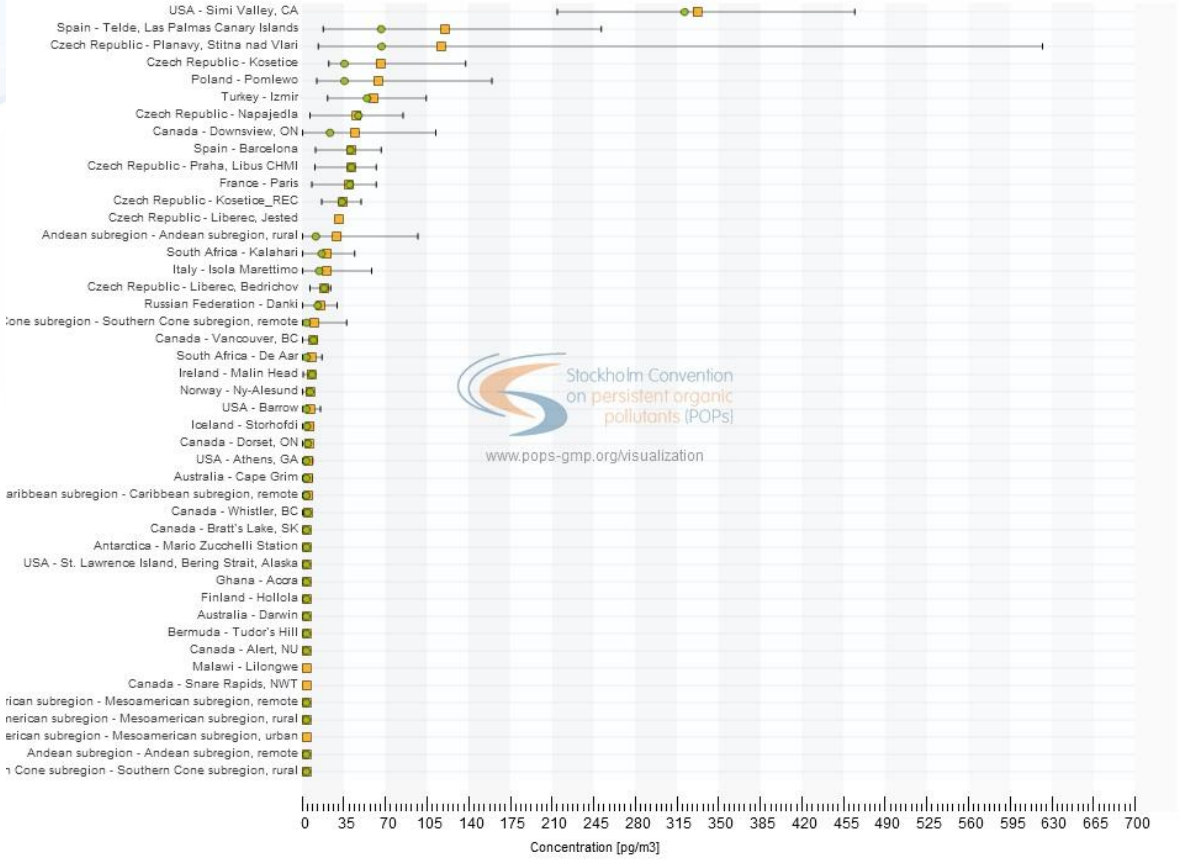
** - Records marked with the asterix are taken from multiple-year aggregation.*

(LoQ/N) - Values in paranthesis indicate proportion of records under limit of quantification (LoQ) and total number (N) of records.

GMP Reports On-line Data Visualization

REPORTED VALUES - backgroud sites only

Matrix: **Air** | Sampling method: **passive** | Compound: **DDT** | Parameter: **p,p-DDE** | Unit: **pg/m3** | Year: **2005**



Legend

Min *Mean* *Median* *Max*

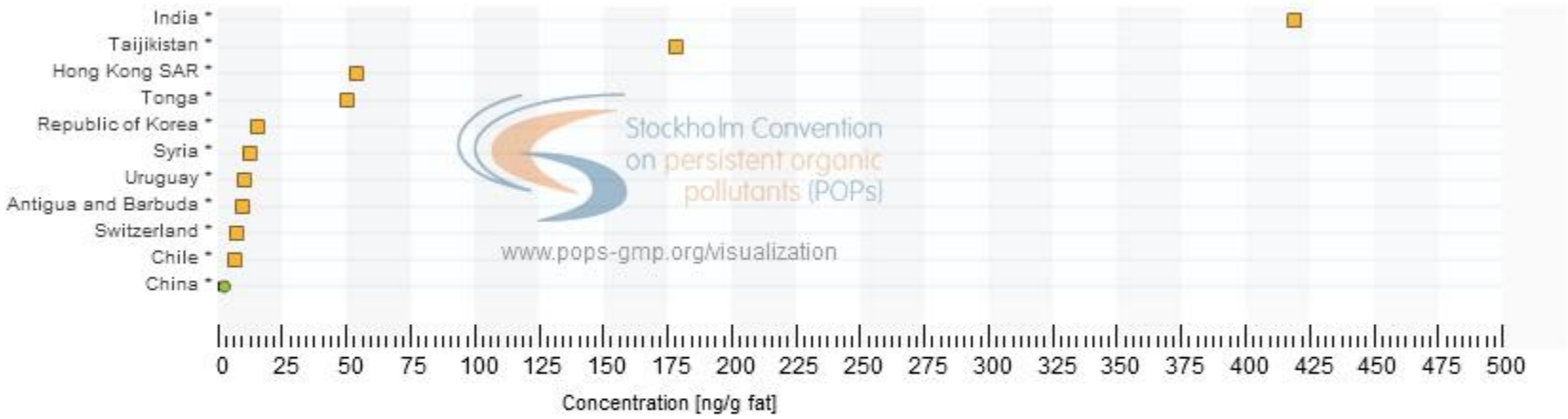
** - Records marked with the asterix are taken from multiple-year aggregation.*

(LoQ/N) - Values in paranthesis indicate proportion of records under limit of quantification (LoQ) and total number (N) of records.

GMP Reports On-line Data Visualization

REPORTED VALUES - backgroud sites only

Matrix: **Breast milk** | Sampling method: **null** | Compound: **DDT** | Parameter: **p,p-DDT** | Unit: **ng/g fat** | Year: **2008**



Legend

** - Records marked with the asterix are taken from multiple-year aggregation.*

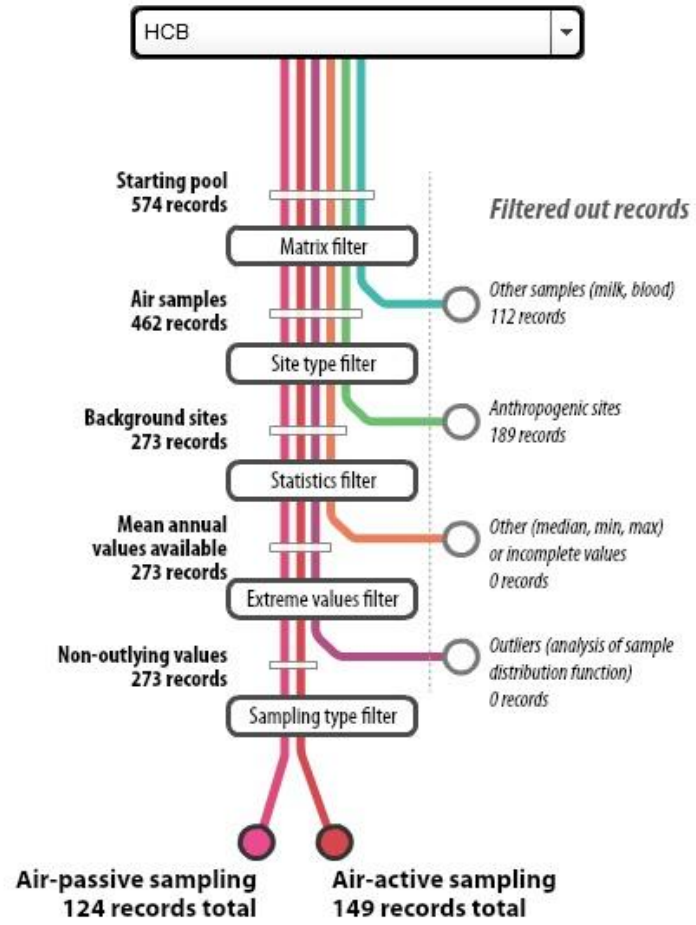
(LoQ/N) - Values in paranthesis indicate proportion of records under limit of quantification (LoQ) and total number (N) of records.

GMP Reports On-line Data Visualization

REGIONAL BACKGROUNDS - data validation

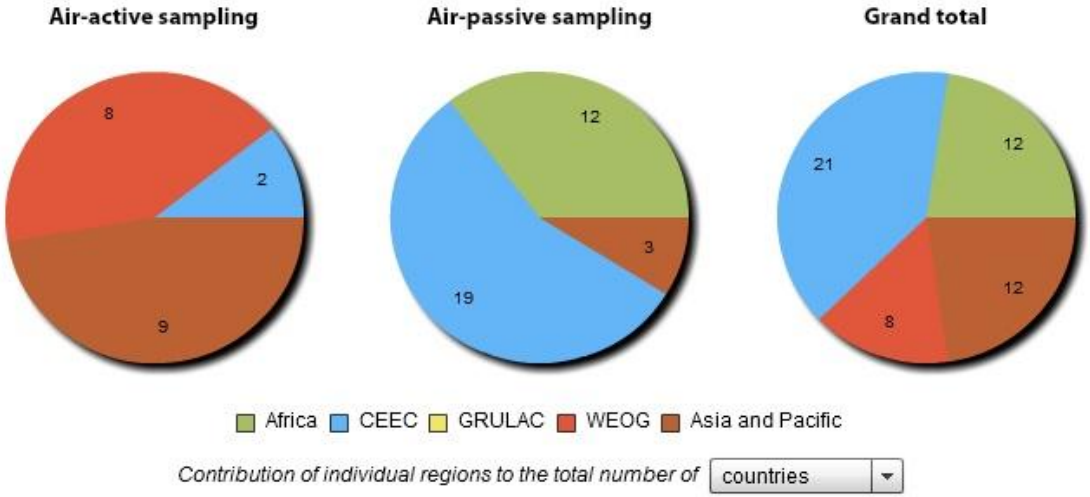
Parameter: HCB |

Process of Data Validation



Results of Data Validation

Sampling method	Africa	CEEC	GRULAC	WEOG	Asia and P...	TOTAL
HCB Air-passive sampling	12 countries 16 sites 16 records 2008 - 2008	19 countries 66 sites 97 records 2003 - 2008	0 countries 0 sites 0 records	0 countries 0 sites 0 records	3 countries 8 sites 11 records 2006 - 2008	34 countries 90 sites 124 records 2003 - 2008
HCB Air-active sampling	0 countries 0 sites 0 records	2 countries 3 sites 16 records 1998 - 2008	0 countries 0 sites 0 records	8 countries 19 sites 95 records 1998 - 2008	9 countries 32 sites 38 records 2004 - 2007	19 countries 54 sites 149 records 1998 - 2008



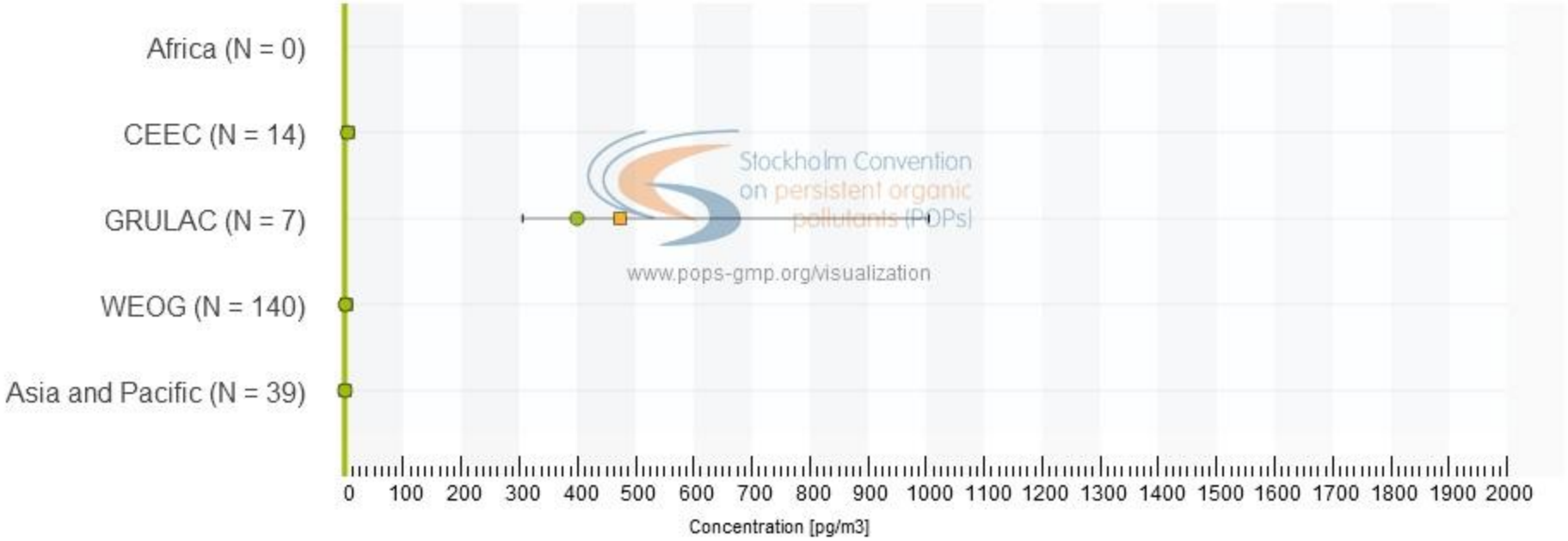
Stockholm Convention on persistent organic pollutants (POPs)

www.pops-gmp.org/visualization

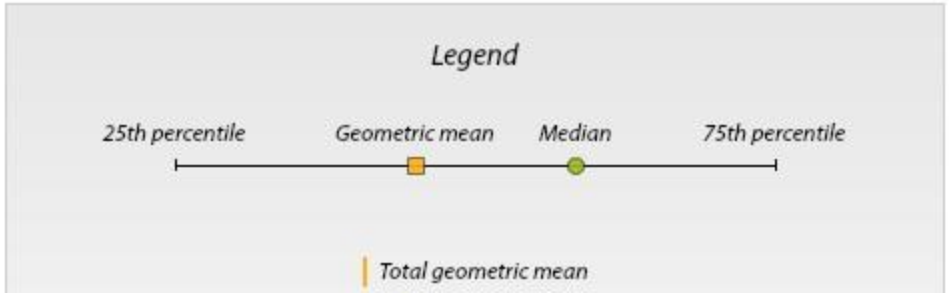
GMP Reports On-line Data Visualization

REGIONAL BACKGROUNDS - Inter-regional Variability

Parameter: **p,p-DDT** | Sampling method: **active**



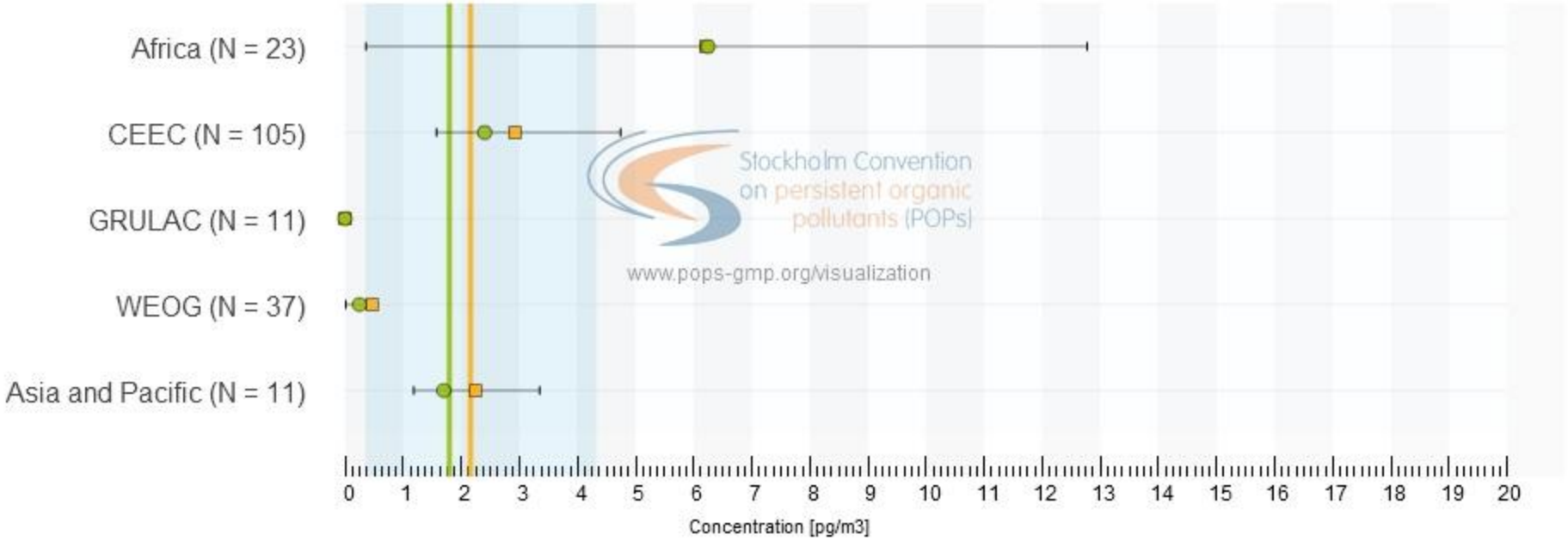
Total median: 0.796 pg/m3
Total geometric mean: 1.76 pg/m3
Total 25th percentile: 0.25 pg/m3
Total 75th percentile: 2.596 pg/m3



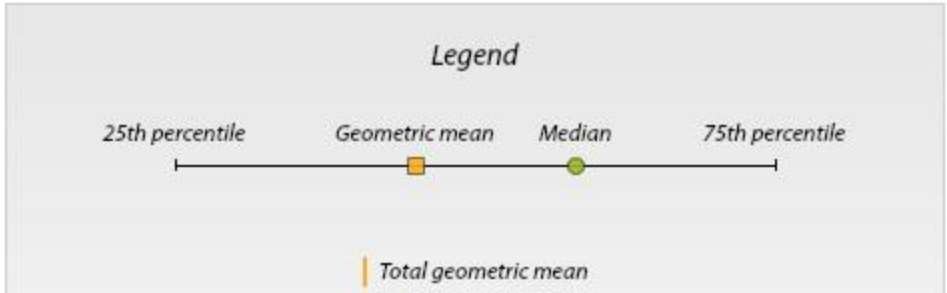
GMP Reports On-line Data Visualization

REGIONAL BACKGROUNDS - Inter-regional Variability

Parameter: **p,p-DDT** | Sampling method: **passive**



Total median: 1.813 pg/m3
Total geometric mean: 2.173 pg/m3
Total 25th percentile: 0.35 pg/m3
Total 75th percentile: 4.33 pg/m3



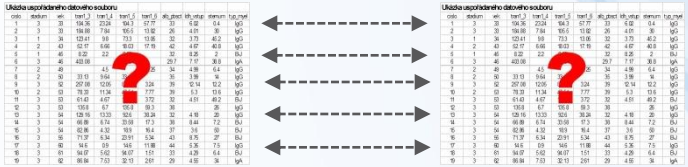
Data analysis - methodological proposal

3. Steps for standardization of the monitoring data - methodology

Case matching

GMP I ⟷ **GMP II**

Compatibility



Historical time trends

Recent fluctuation in time

Uncertainty & variability analysis

BASELINE ESTIMATES

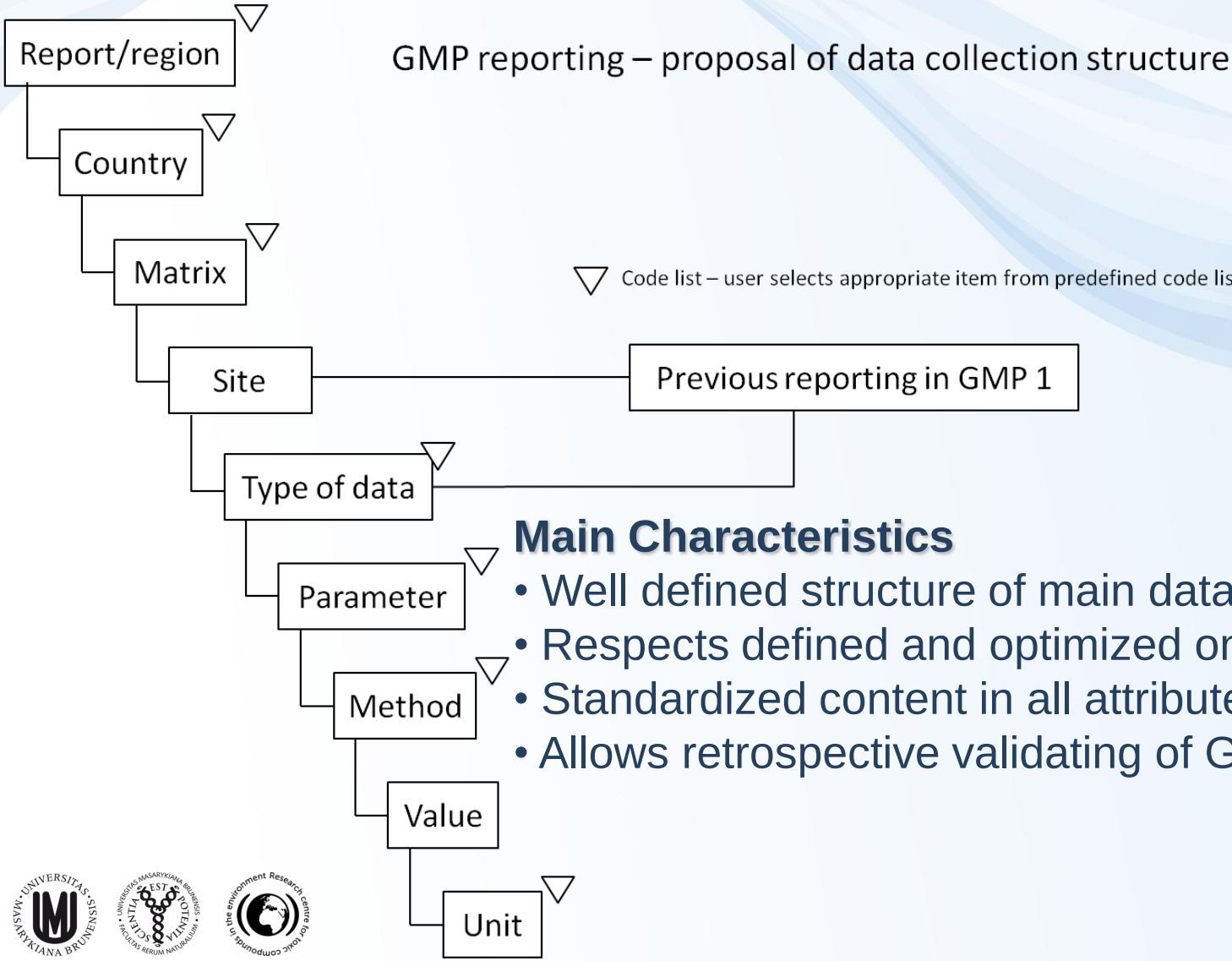
EFFECT SIZE ESTIMATES

Time-related changes & statistical significance

Proposal for e-data capture system

4. Proposal for electronic format template for the next GMP

Hierarchical structure of data entities and umbrella of ontology



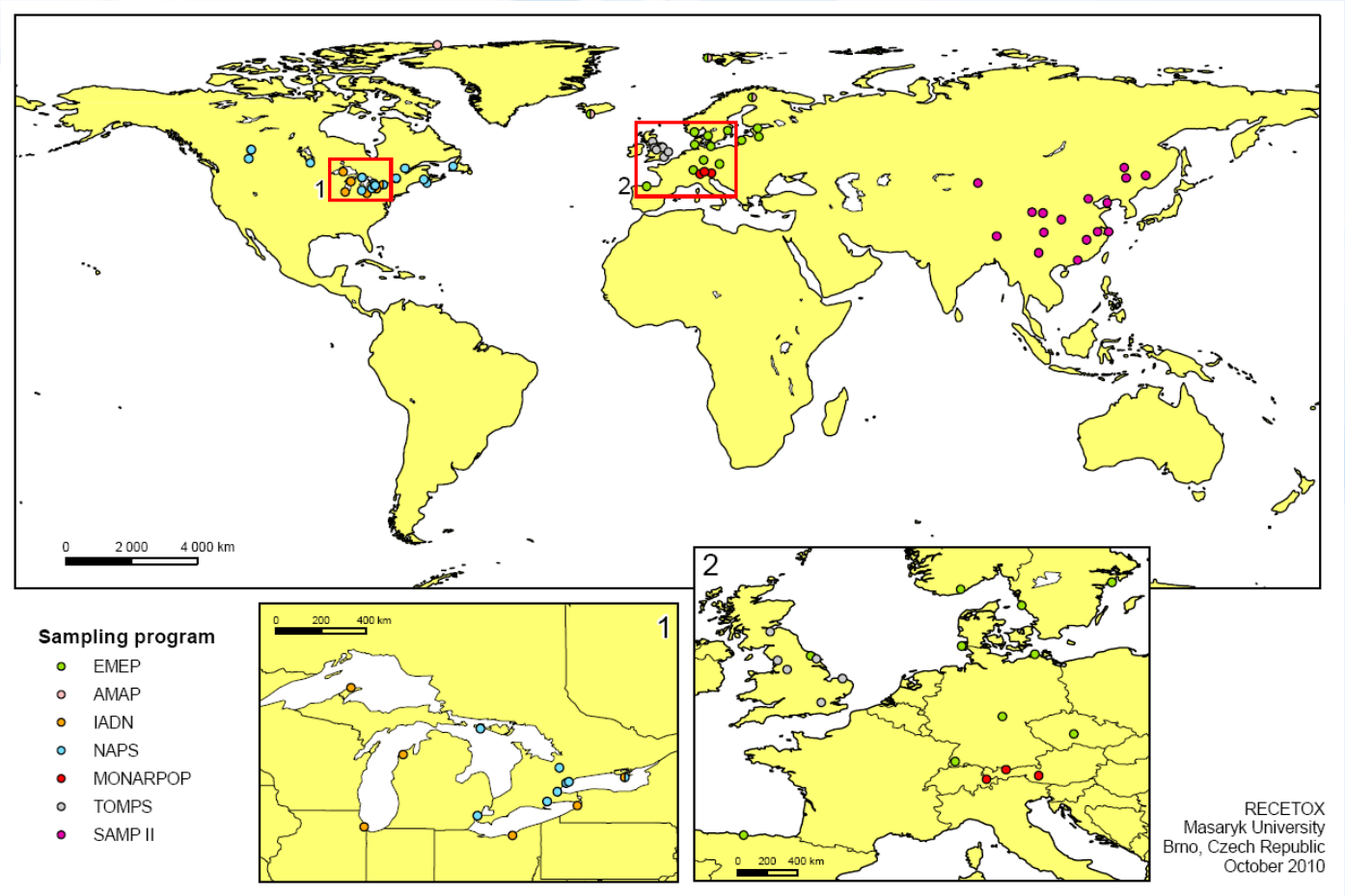
GMP reporting – proposal of data collection structure

Code list – user selects appropriate item from predefined code list.

Main Characteristics

- Well defined structure of main data fields (entities)
- Respects defined and optimized ontology
- Standardized content in all attributes
- Allows retrospective validating of GMP I data

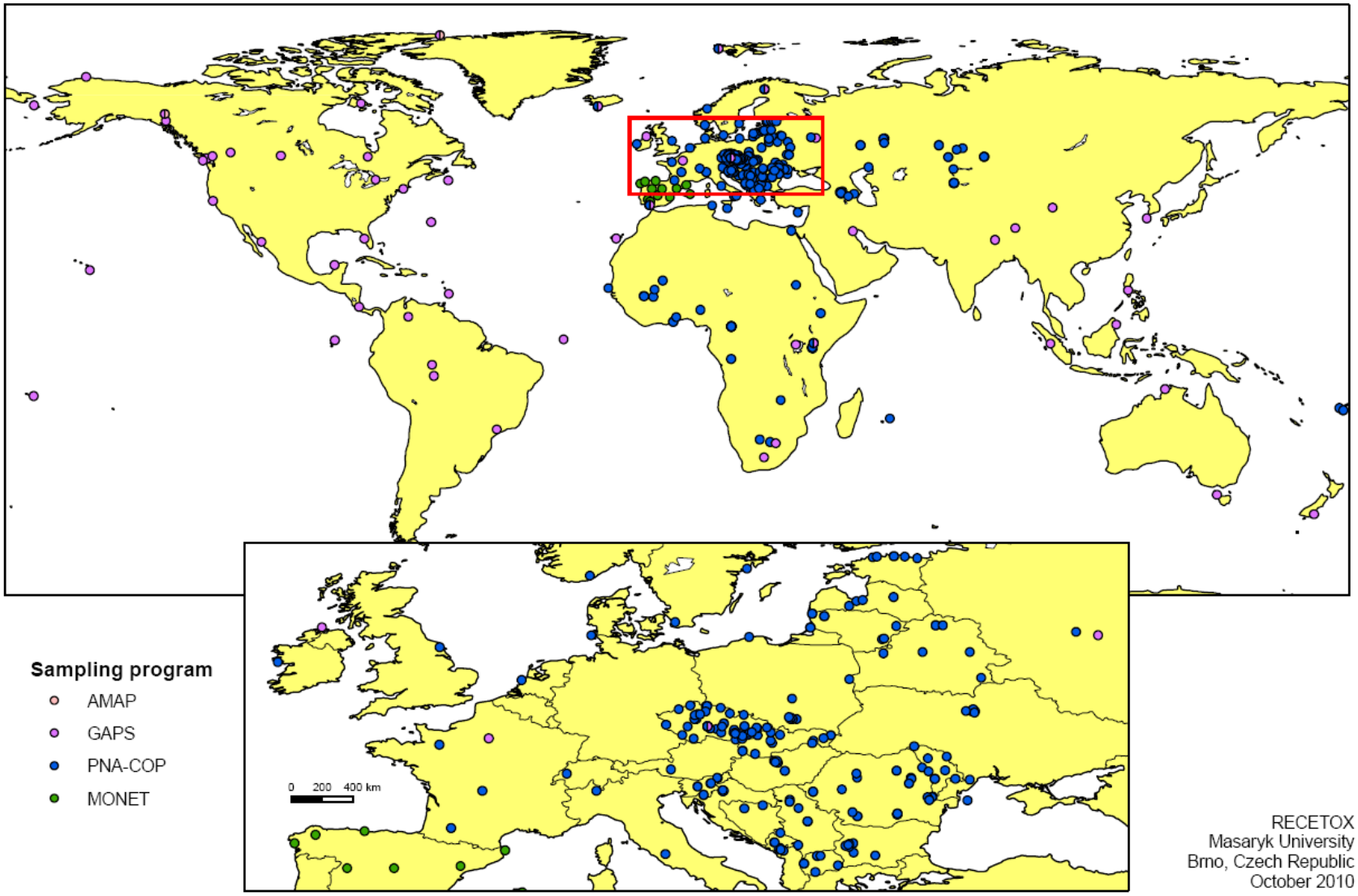
Long-term active air sampling networks



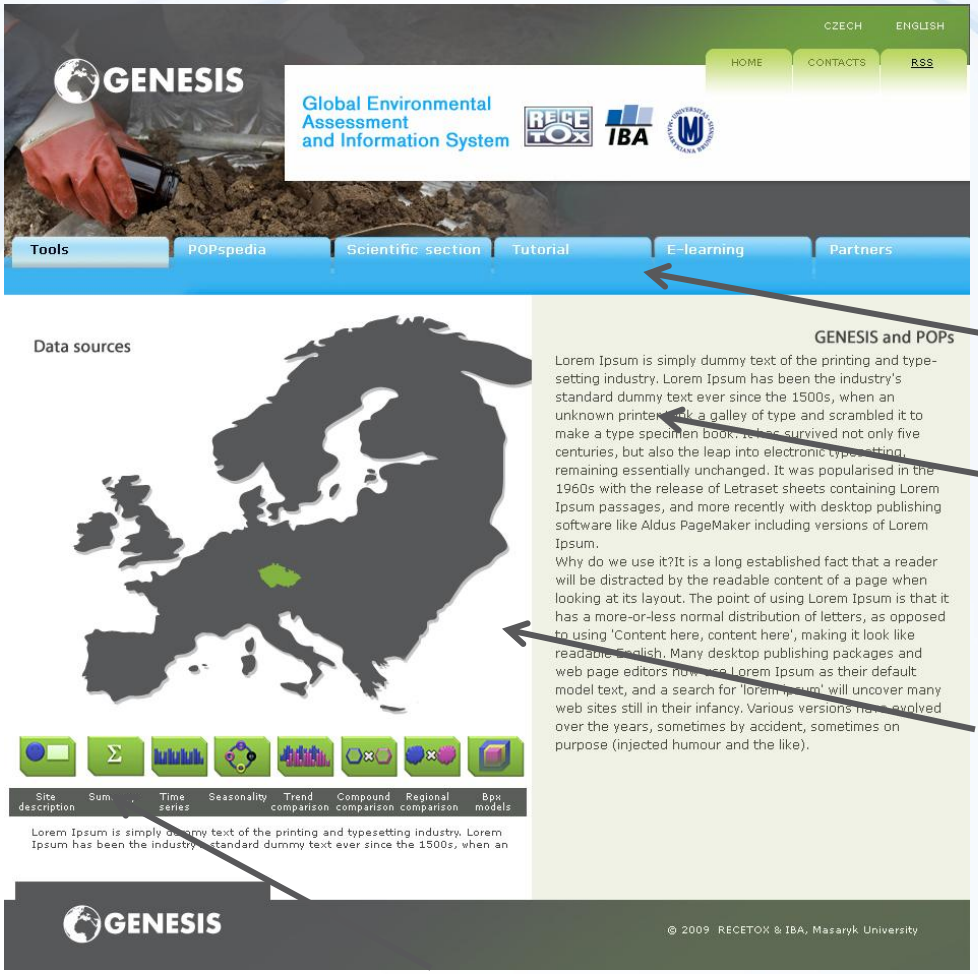
www.ebas.nilu.no operated by NILU

https://www.ec.gc.ca/rs-mn/default.asp?lang=En&n=BFE9D3A3-1Archiv

Passive air sampling networks



GENASIS portal



Menu options

Description of project aims and importance

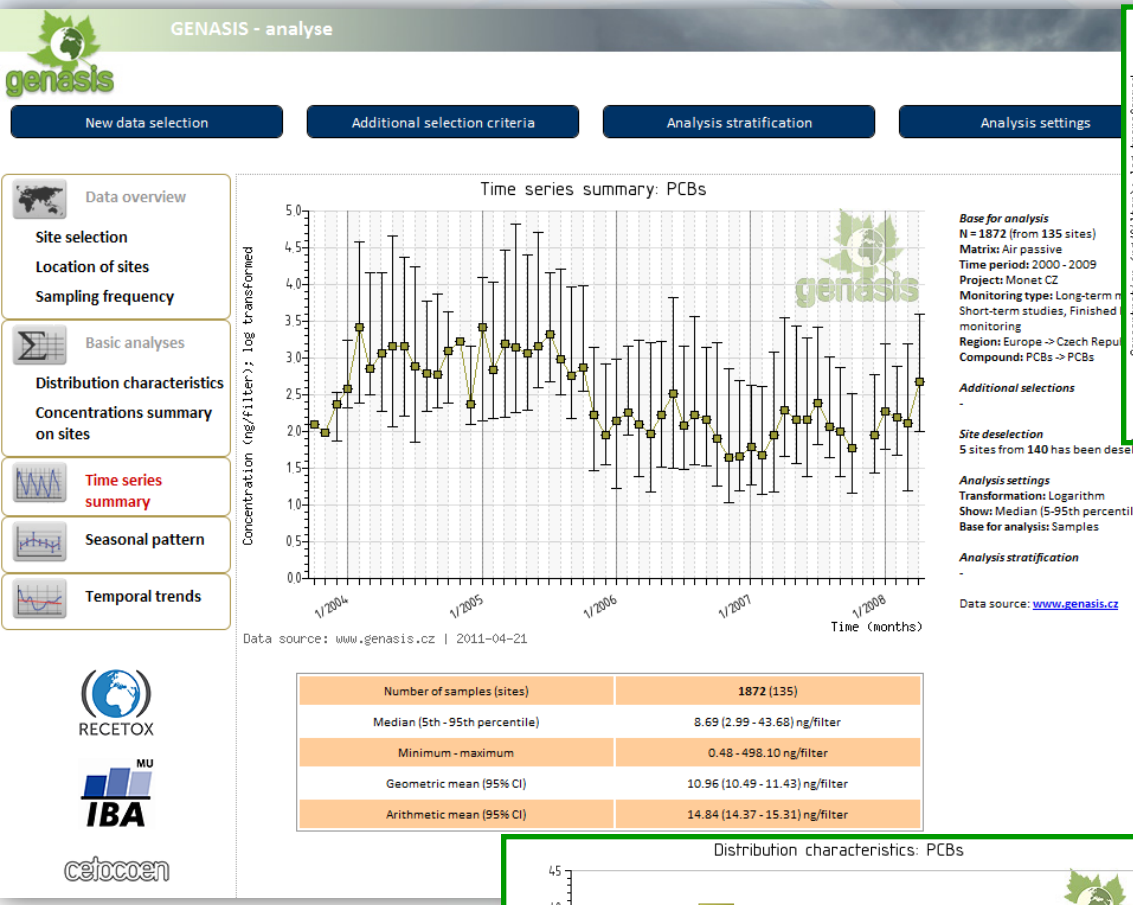
Survey of data sources

Selection of the analytical tool

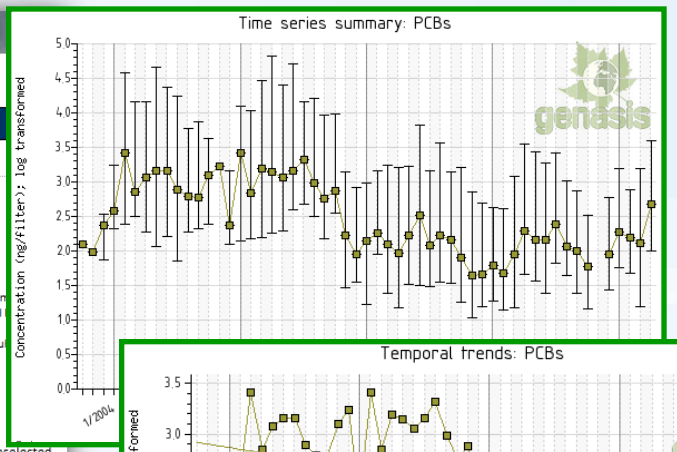
- User-friendly access to main system functions
- Main functions are directly accessible from the title page:
  - Analytical tools
    - With selection of the tool, the user runs software window and selects data for the appropriate analysis.
    - There are exceptions: 1) tool of Box models, where the Czech Republic box model window is opened directly and 2) module comparing substances.
  - Survey of data sources – opens table and map survey of all data sources.
  - Menu – access to all system functions.
  - Project aims – access to the detailed description of the project
- Other options
  - CZ/ENG language switch
  - RSS channel with news

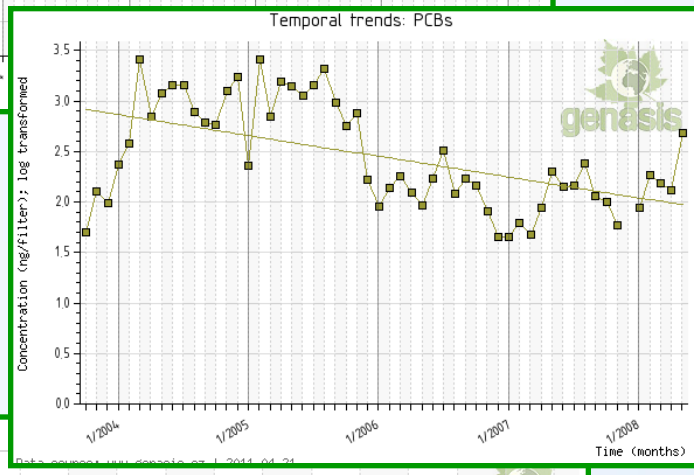
www.genasis.cz

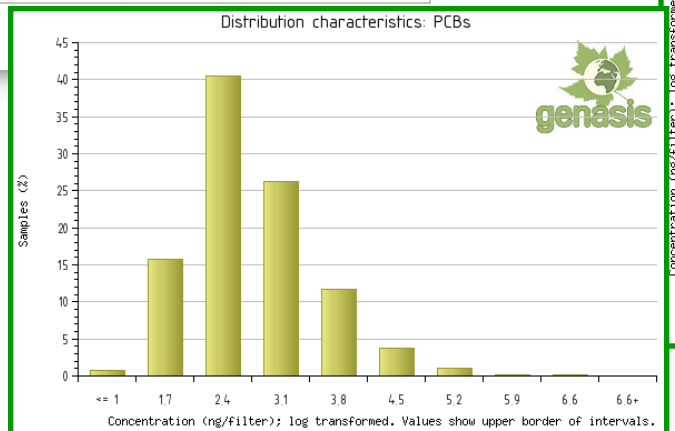
Analyses of selected data set

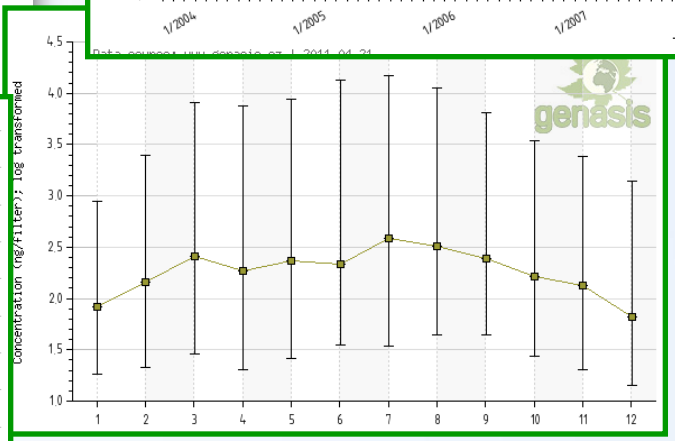


Number of samples (sites)	**1872** (135)
Median (5th - 95th percentile)	8.69 (2.99 - 43.68) ng/filter
Minimum - maximum	0.48 - 498.10 ng/filter
Geometric mean (95% CI)	10.96 (10.49 - 11.43) ng/filter
Arithmetic mean (95% CI)	14.84 (14.37 - 15.31) ng/filter





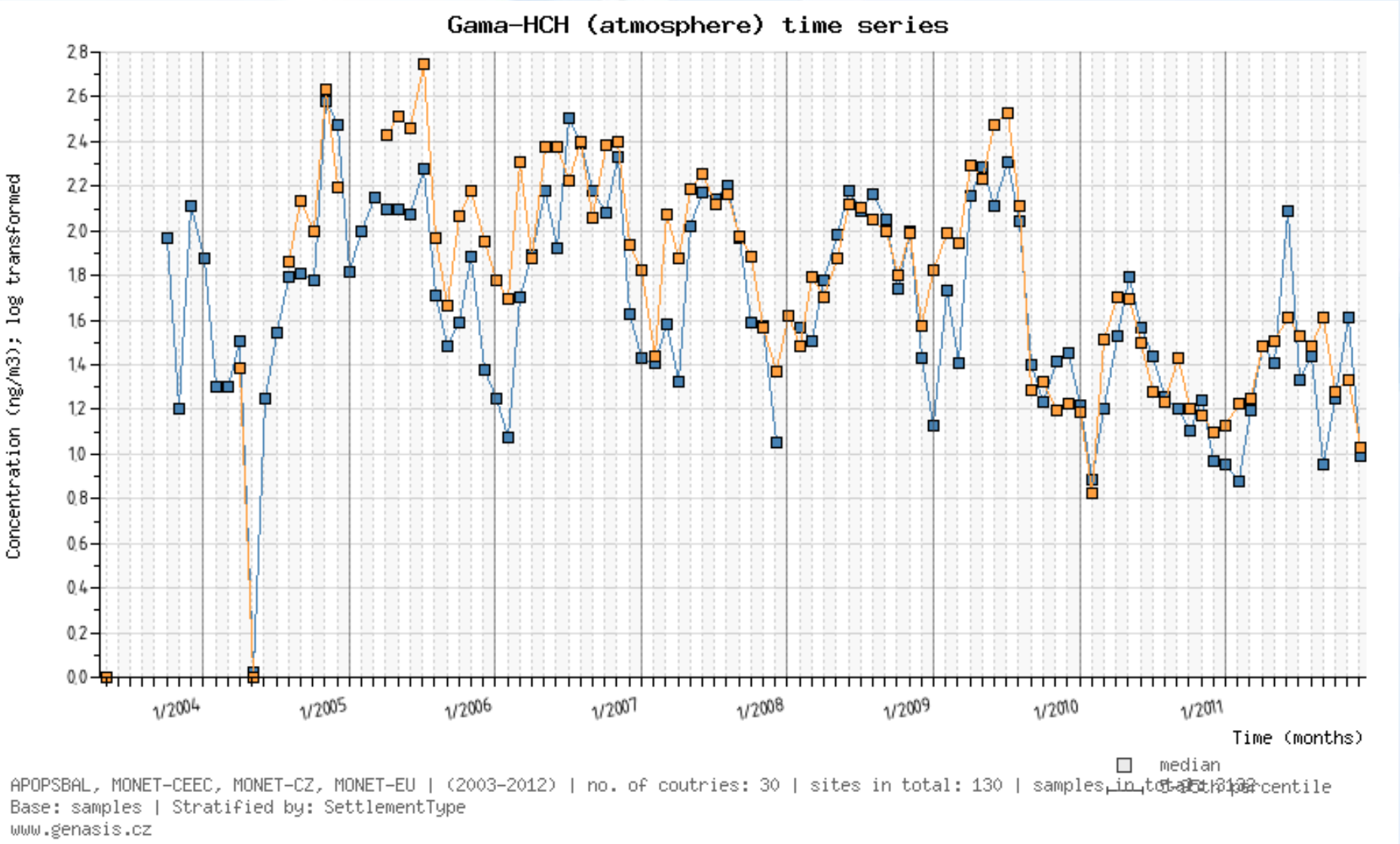




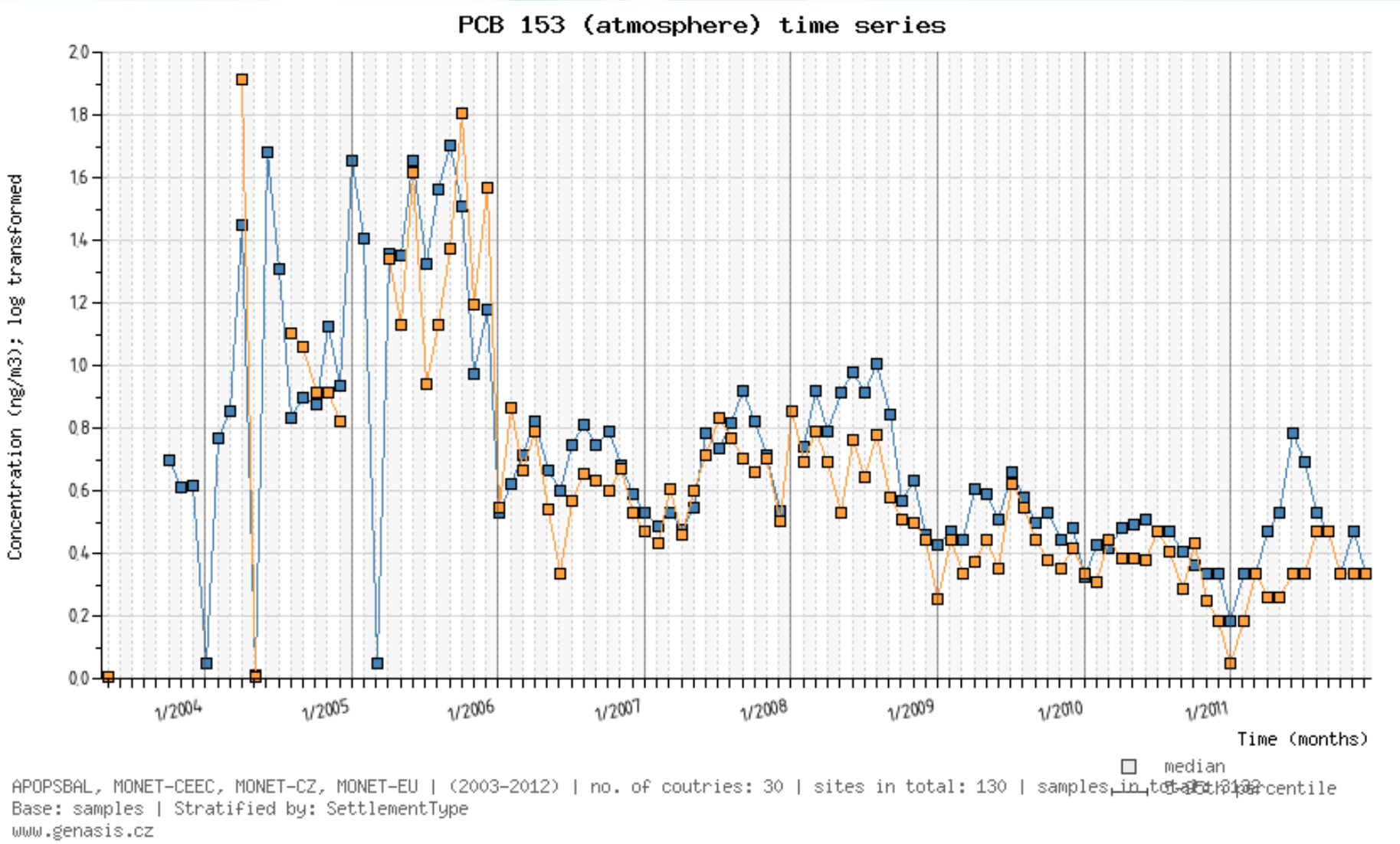
UNIVERSITAS MASARYKIANA BRUNENSIS

Research centre for toxic compounds in the environment

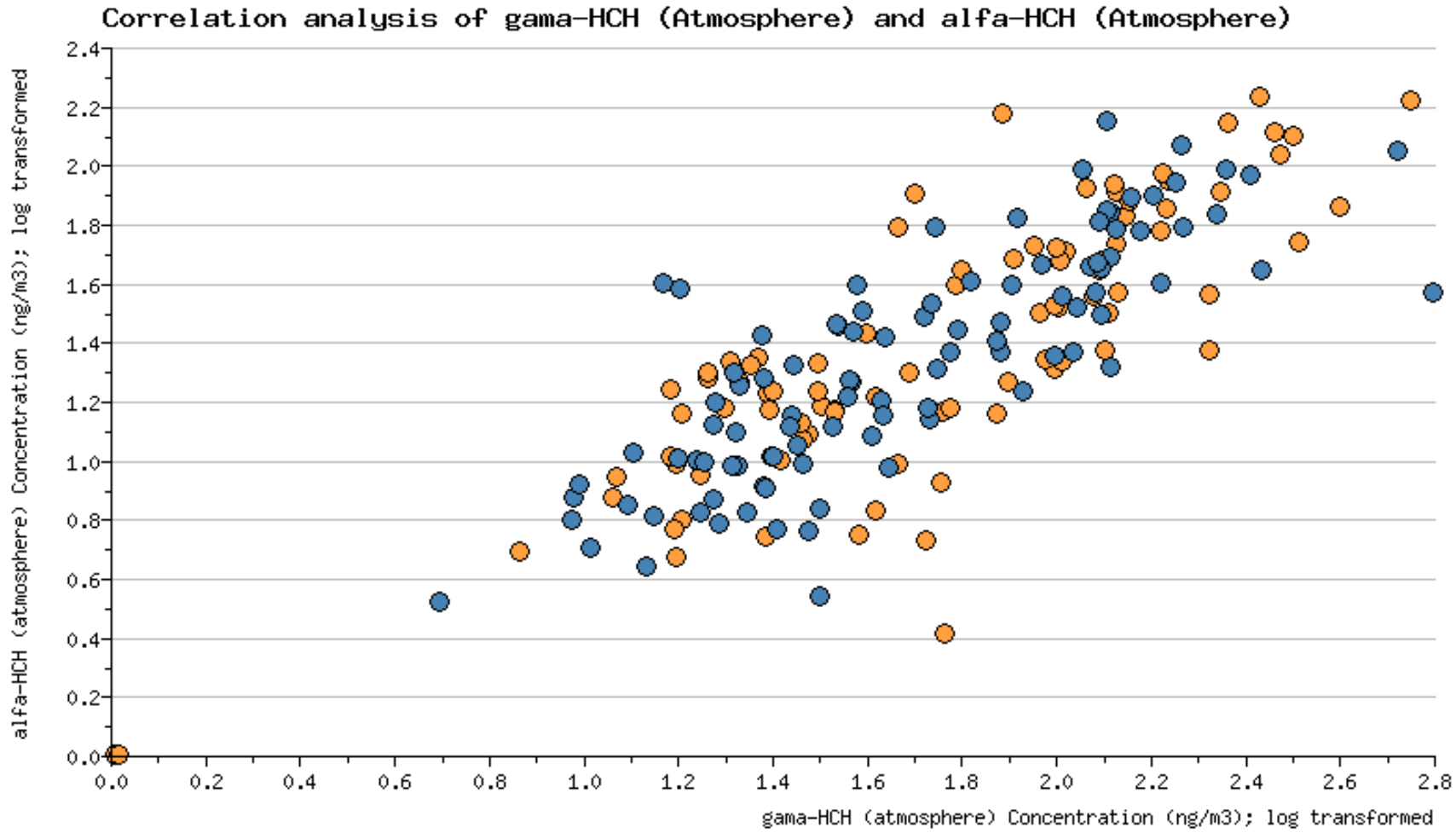
MONET EUROPE (APOPSBAL, CZ, CEE, EU)



MONET EUROPE (APOPSBAL, CZ, CEE, EU)



MONET EUROPE (APOPSBAL, CZ, CEE, EU)



APOPSBAL, MONET-CEEC, MONET-CZ, MONET-EU | (2003-2012) | no. of coutries: 30 | sites in total: 130 | samples in total: 3132
Base: samples | Stratified by: SettlementType
www.genasis.cz

Global Earth observation system of systems (GEOSS)

To **improve the flow of relevant data to the environmental and health communities,** the GMP has to be linked to available synergic instruments, especially to the GEOSS.

www.earthobservations.org

It has been incorporated in the area of health (HE-02), as one of **9 'Societal Benefit Areas'** (disasters, health, energy, climate, water, weather, ecosystems, agriculture and biodiversity) identified in the revised (2012-2015) work plan in support to the 10-Year Implementation Plan of GEOSS.

Global Earth observation system of systems (GEOSS)

Among the priority actions to be undertaken in the next 3 years in frames of HE-2, is to

(a) develop and implement a **global monitoring plan** for tracking changing levels of POPs in the natural environment and human beings,

(b) **evaluate the effectiveness** of international efforts to reduce POP releases, and

(c) **interlink relevant existing information systems** for monitoring air, water, ice caps and human health.

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Thank you for your kind attention