



GENASIS

GLOBAL ENVIRONMENTAL ASSESSMENT AND INFORMATION SYSTEM

SUPPORTING THE SYNERGISTIC IMPLEMENTATION OF THE BASEL, ROTTERDAM, AND STOCKHOLM CONVENTIONS

Ladislav Dušek, Jana Klánová, Miroslav Kubásek, Roman Baroš, Jiří Jarkovský, Richard Hulek, Jakub Gregor, Jiří Hřebíček, Ivan Holoubek

dusek@iba.muni.cz

klanova@recetox.muni.cz

holoubek@recetox.muni.cz











- <u>Synergies decisions</u> by the Conferences of the Parties to the Basel, Rotterdam and Stockholm conventions invite Parties to <u>coordinate their efforts when implementing the three</u> <u>conventions</u> to ensure close cooperation among relevant programmes at the national levels.
- The Regional centre for capacity building and transfer of technology in the region of Central and Eastern Europe **RECETOX answered this call by activating the GENASIS project** (www.genasis.cz).





GENASIS GLOBAL ENVIRONMENTAL ASSESSMENT AND INFORMATION SYSTEM

Introducing
GENASIS information system













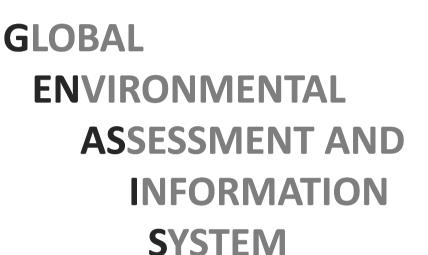






Research Centre for Toxic Compounds in the Environment

www.recetox.muni.cz







Institute of Biostatistics and Analyses

www.iba.muni.cz

Environmental chemistry

Ecotoxicology

Ecological risk assessment

National **POPs centre**

Regional POPs centres



Professional data analysis

Computational biology

Development of information systems

Environmental informatics

Health care informatics

Health technology assessment

www.genasis.cz



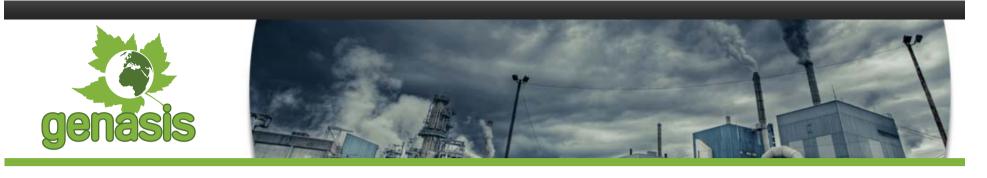
The aim of GENASIS is to

- <u>compile validated data on persistent organic pollutants</u>, including their properties, sources, long-term levels, life times, transport mechanisms, effects and risks, scattered throughout various institutions and ministries, and to
- <u>provide tools for their visualization</u>, analyses, <u>interpretation</u>, <u>assessment</u> of environmental and human risks or <u>modelling</u> of fate
- significantly <u>enhance comprehensive understanding</u> of the fate of POPs in the environment, their impacts on ecosystem and the human population.



As recommended by the synergies decisions, the **GENASIS system provides**

- <u>a national information database</u> available to experts as well as to the general public,
- useful <u>tool for preparation of national positions</u>
 for meetings of the conferences of the Parties and other
 bodies of the three conventions,
- tool for the <u>development of regional policies</u>, and
- measures <u>protecting human health and the environment</u> from the harmful impacts or <u>adverse effects of</u> <u>hazardous chemicals and wastes.</u>



GENASIS target groups



• Legal authorities in environmental protection



Managers



• Scientists



General public



KEY PLATFORM: GENASIS PORTAL



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

Menu options

Description

of project

aims and

importance

- CZ/ENG language switch
- RSS channel with news

www.genasis.cz



User's view on GENASIS portal content





User's entry to GENASIS



www.genasis.cz

Fate in the

environment



Panel of

experts





Dose response

modelling (ADRIS)

I. Mapping of data sources II. Analysis and modeling III. E-learning Projects and Analytical Environmental Ecological risk POPs Guide partners. Data sources modules modeling assessment information Monitoring POPs under Description of Description of Interactive Project networks in data → Stockholm models monitoring network, methodology objectives description Conventions objectives, content Tutorial of Development Contamination → Model calculators Relevant **EcoRA** history status Size of monitoring sources Database of networks Spatial and time ecotoxicological Properties of → Data providers → trends of tests (DATEST, POPs GIS presentation of contamination version 2.0) monitoring network Factors related to

contamination

Comparison of

sites





GENASIS GLOBAL ENVIRONMETAL ASSESSMENT AND INFORMATION SYSTEM

11.

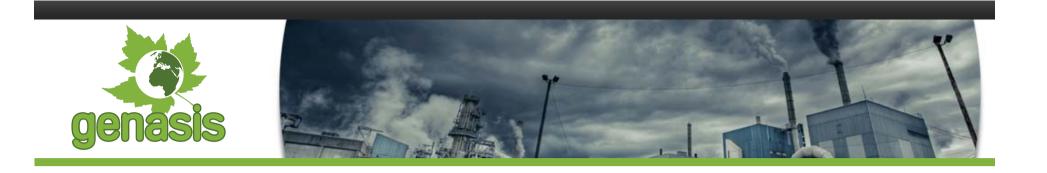
GENASIS data sources





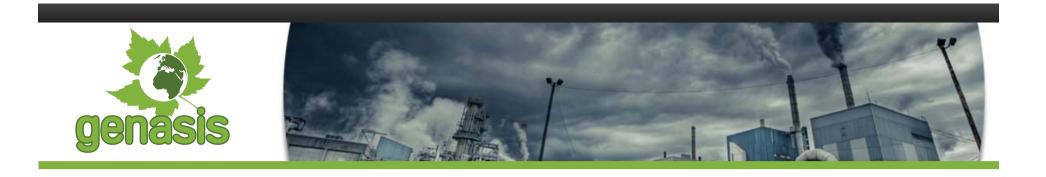






The GENASIS system is built as a <u>modular structure providing</u> <u>complex services</u> to a wide range of potential users. It contains

- data from the <u>long-term integrated monitoring</u> at the Košetice observatory which is a part of the European Monitoring and Evaluation Programme, (EMEP),
- <u>long-term data from the MONET</u> (MOnitoring NETwork), ambient air monitoring network in the Czech Republic,
- data from the <u>international MONET networks</u> (Europe, Africa)



The user has currently an access to

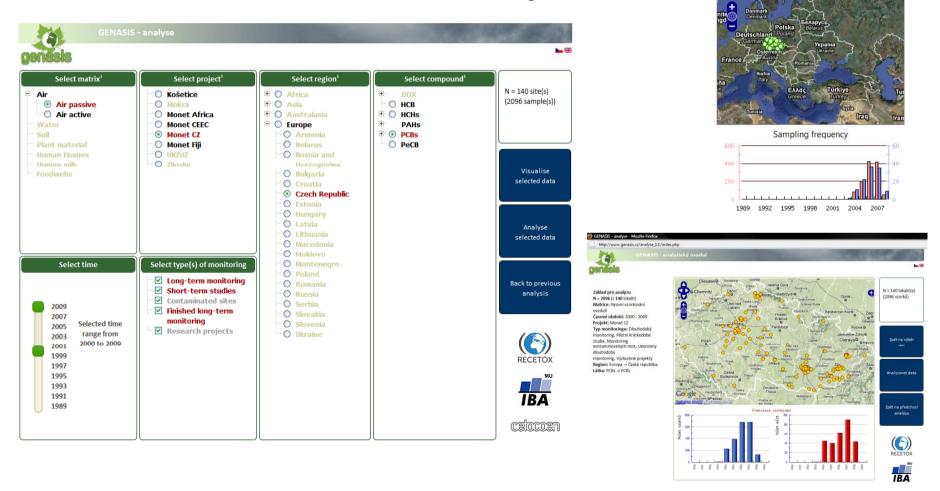
- maps and descriptions of the sampling sites,
- POPs concentration values at all sites
- descriptive <u>summary statistics</u>
- basic analyses of <u>time series</u> (seasonal and long-term patterns, robust trend estimates)

Analyses: data selection



ANALYTICAL MODULE

Selection of the data set for analysis







GENASIS GLOBAL ENVIRONMENTAL ASSESSMENT AND INFORMATION SYSTEM

III.

Data processing in the GENASIS system









On-line processing of data



Automated data analyses Interactive risk assessment case studies GIS visualization and space-time modelling





Analytical tools available in version 2.0



Sampling sites

Description of selected sampling sites: geographical position in map, altitude and other abiotic characteristics non-influenced by human activities; sampled matrices and compounds, number of samples



Summary report

Summary description of contamination of selected spatial area and time range. Comparison of levels of sampled compounds and their percentage structure. Comparison with legislative norms.



Time series

Time series of environmental contamination on one site or for selected set of sites. The analysis allows aggregations on several time levels (years, months) and comparison of results with legislative norms.



Analysis of seasonality

Seasonal changes of contamination, both in absolute concentrations values or percentage structure of compounds. Comparison of seasonality between years, sites, compounds.



Comparison of trends

Comparison of contamination trends between sites, differences of time series.



Comparison of sites

Comparison of contamination levels among i) individual sites or ii) among group of sites defined by environmental parameters (altitude, land use etc.)



Comparison of compounds

Comparison of chemical and ecotoxicological properties of POPs based on information from literature in POPspedia database.

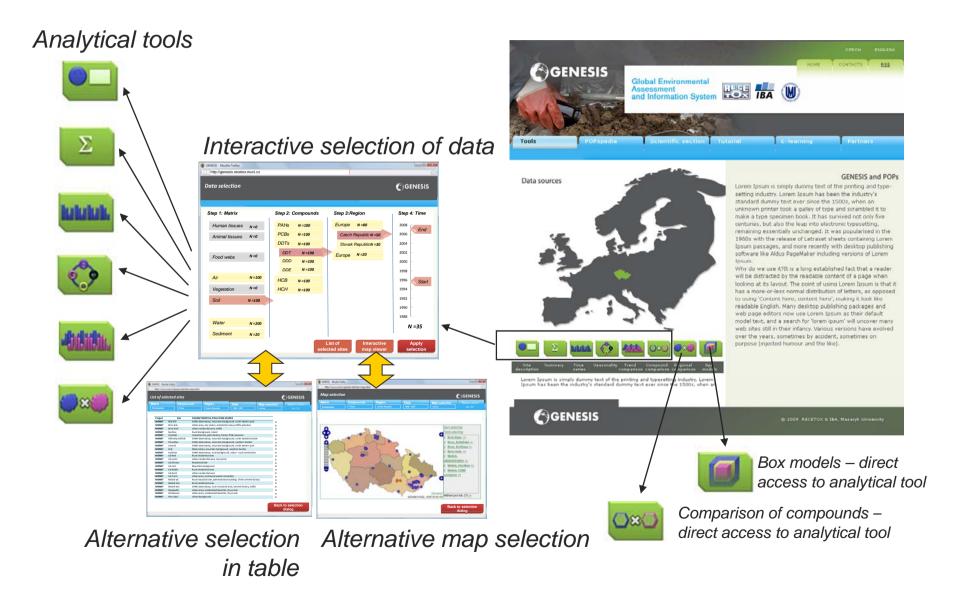


Box models

Calculator of level IV box model of the Czech Republic; provides simulation of time development of selected compound concentrations.



Launching analytical tools of the GENASIS system





Base for analysis

Matrix: Air passive

Project: Monet CZ

monitoring

N = 2096 (from 140 sites)

Time period: 2000 - 2009

Compound: PCBs -> PCBs

Additional selections

Analysis stratification

Data source: www.genasis.cz

Analysis settings

Show:

Monitoring type: Long-term monitoring,

Short-term studies, Finished long-term

Region: Europe -> Czech Republic

ANALYTICAL MODULE – sampling sites



Basic analyses

Sampling frequency

Distribution characteristics Concentrations summary on sites

Time series summary

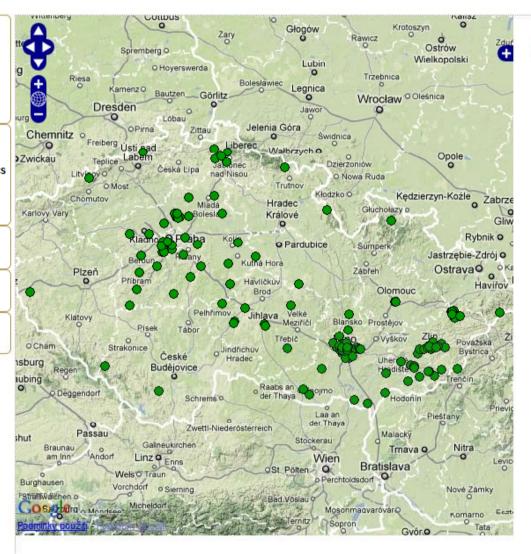
Seasonal pattern

Temporal trends





celocoen



Available analyses







Data from the <u>large-scale monitoring of soil, sediment, and</u> <u>surface water</u> will be included in a new version the GENASIS Information system, which is currently under development and will be <u>launched in 2011</u>.

Enhanced analytical tools allowing implementation of algorithms for spatial analyses, and modules enabling comparative analyses of multiple substances or matrices will be also introduced.



Based on the <u>contract signed</u> between RECETOX and the Czech Ministry of Environment, an <u>import of data</u> <u>from external sources</u> will also be initiated in 2011.

Information on <u>international trade</u>, <u>pollution sources</u>, <u>emission inventories</u>, <u>damping and disposal sites</u>, <u>old burdens</u>, <u>industrial accidents and natural disasters including fires</u>.

Supporting <u>meteorology and land use data</u> will be recorded as well.

The fully developed system will serve as an <u>interactive</u>, <u>on-line national POPs inventory of the Czech Republic</u>.





GENASIS: GLOBAL ENVIRONMENTAL ASSESSMENT AND INFORMATION SYSTEM

IV. Education and capacity building in the GENASIS portal



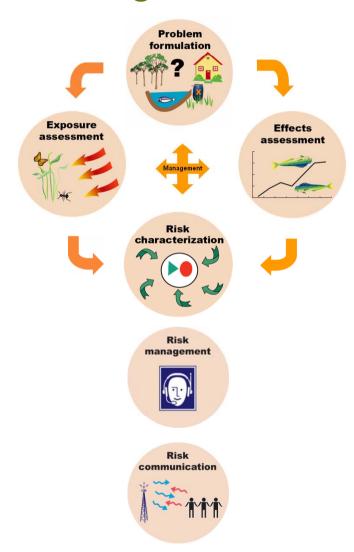








E-learning modules focused on environmental risk assessment



- The methodology of ecological risk assessment
- The basic concept involves
 - problem formulation
 - exposure assessment
 - effects assessment
 - risk characterization
 - risk management, and
 - Risk communication



RECETOX acting as the <u>National POPs centre</u> became the documentation centre gathering available national information on environmental risks and impacts on human health relevant to the three conventions, and updating a common website.

However, in the role of the <u>SC Regional Centre</u>, RECETOX also offers GENASIS as a global system for <u>information</u> <u>exchange and a clearing-house mechanism for all three</u> conventions.

It provides an opportunity for strengthening <u>technical</u> <u>assistance and capacity building</u> in the field of data collection, interpretation and visualization on the regional and global levels



By providing access to necessary information, the GENASIS system supports

- decision-making on the sound management of chemicals throughout their life cycles, as well as
- sound management of hazardous wastes. It is also
- important tool for the development of policies and measures protecting the environment and human health,
- supporting <u>sustainable development</u>. Last but not least, it is
- a tool for the <u>joint outreach and enhancement of public</u> <u>awareness</u> as an important means of prevention and environmental protection. As such, the GENASIS
- provides a <u>model of coordination mechanism</u> and example of good coordination practice.



We welcome cooperation in the field of

- improvement of geographical coverage,
- broadening the scope of database,
- data interpretation and modeling



Development of the GENASIS system is supported by the CETOCOEN project (CZ.1.05/2.1.00/01.0001) of the European Structural Funds, the INCHEMBIOL project (MSM 0021622412) of the Ministry of Education of the Czech Republic, Research Centre for Toxic Compounds in the Environment (RECETOX), and the Institute for Biostatistics and Analyses (IBA) of the Masaryk University .



Thank you for your attention