DIOXINE AND POP_S – AN UBIQUITOUS CHALLENGE FOR MONITORING AND DATA MANAGEMENT, EVALUATION AND ASSESSMENT

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Introduction

Data on sources and data on monitoring programmes of Dioxins, PCBs and other POPs often exist in various forms, qualities, files and databases. Each agency or even each institute has an individual system to store, manage, handle and document the results of monitoring and research activities. If the documentation does not include all relevant parameters, e.g. the scale of time and space and quality assurance, the datasets are impractible for further use. The so called metadata is an essential issue for an integrated approach for evaluation and assessment.
General objectives in context of an European Integrated Environment and Health Monitoring Strategy are generating synergies and to facilitate the sharing of data and methodologies. The Web Service improves the accessibility and comparability of data and information via a platform about POPs and enhanced exchange of information. The methodology of the POP-database will forward the harmonization of sampling and analysing procedures.

Materials and methods

Since 1991 in Germany an administrative agreement has been issued to compile, document, and evaluate data from monitoring and surveillance programs at federal and Laender level. Data of more than 200 monitoring programs in respect to PCBs and dioxins in several environmental and human compartments are collected and administrated in a large database system, accessible via a web-based service http://www.pop-dioxindb.de.

The collected data includes measurements from the environmental sector – air (emissions, ambient air, and deposition), soil, water, bioindicators, foodstuffs, animal feed and even from human tissue, e.g. breast milk. The monitoring data is managed in a harmonized manner with specific metadata for each compartment inter alia:

- reason and target of investigation: e.g. incident investigation, detection of background contamination
- location data: e.g. community indicators, easting/northing values, dioxin-relevant industrial area
- sampling procedure: e.g. way of sampling, transport of samples
- laboratory data: e.g. storage conditions, regulation for the preparation of samples
- administrative data: e.g. contact information of the data supplier, name of institute or authority

The complete analytical dataset is stored as congeners. A lot of background information about measurement programs, results of monitoring and aggregated calculations of TEQ with different approaches can be accessed over the web service - also in English language.

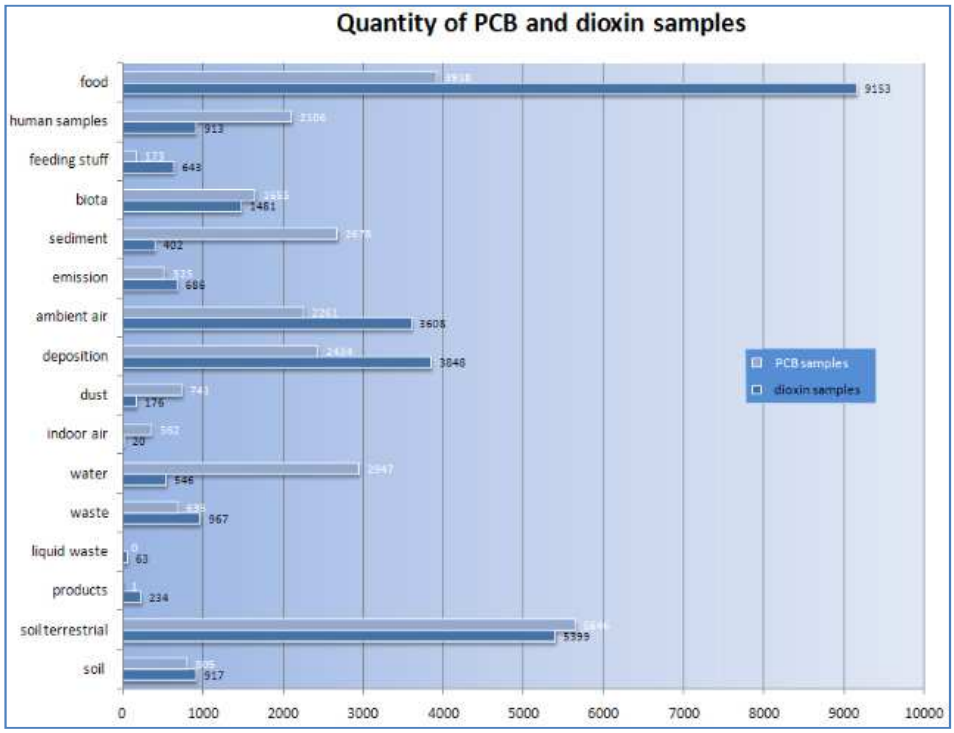

Figure 1: Quantity of PCB and dioxin samples, Status: 2011

The POP-Dioxin-Portal provides the retrieval of data and information for POPs via a central platform. The documentation and evaluation of data on POPs, in particular on dioxins/furans and PCB contamination, of different environmental media is a basis for the specification of scientifically verified standard and limitation values, in order to fulfil national and international obligations to report and to document the state of the environment. The Web Service is also an instrument for the realization of the agreements of the POP-Convention in Germany.
On the one hand the public section of the Web Service is constantly developing to accomplish a service that informs regularly about POP-related events and actual topics. On the other hand an administrative agreement has been issued to compile, document, and evaluate data from monitoring and surveillance programs at federal and Laender level of Germany.

Results and discussion:

The compartment choice of aggregation variables offers users a question-oriented preparation, optional in a visualized diagram view. Regularly performed scientific adjustments carry actual statistical methods into the database. To offer an actual calculation of toxicity, updated calculation models (e.g. of the World Health Organisation WHO 1996, 2006) are integrated into the research layer. Further contingencies of statistical analysis (graphical and static) for expert users are under development.

Figure 2 shows a congener profiles for the matrix of soil and sewage sludge (Fig.2), Figure 3 describes the pattern of the percentage of the Indicator-PCBs in this compartments including the pattern of sediments (Fig.3).

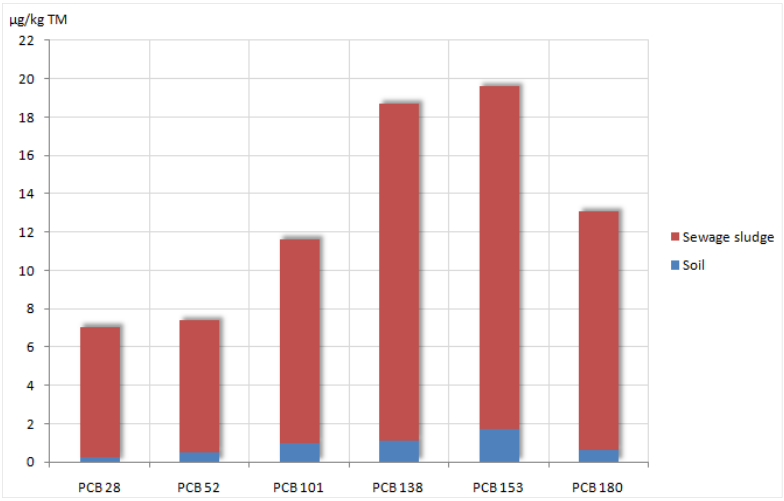

Figure 2: Congener profile of the Indicator- PCBs for soil and sewage sludge (median) and the pattern of their percentage

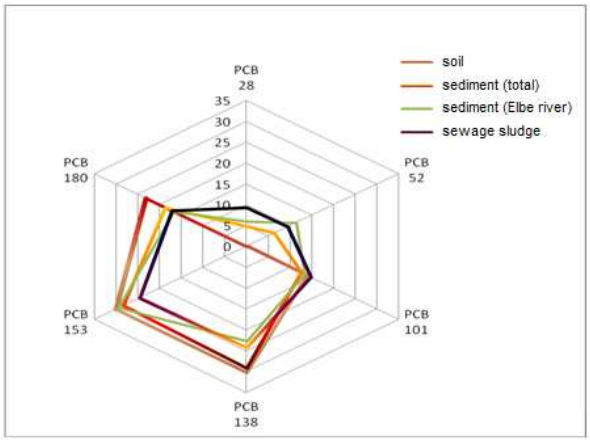

Figure 2: Percentage of the concentration of Indicator-PCBs in soil, sediments and sewage sludge

The objective of the database is, in the field of persistent organic pollutants (with its known potential for long-range dispersal), to produce distinctive patterns for analysis. Therefore, the central archiving of data on dioxins, furans and PCB's of all compartments has a high scientific value.

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