Session „Levels in soil and water“
Chairs: Mats Tysklind (Sweden) and Walter Vetter (Germany)

More than 35 abstracts have been submitted to this session covering almost as many different aspects. The contributions varied both with respect to the substance classes and the regions analyzed, as well as the scopes of the studies. We asked for revision in roughly 1/3 of the contributions, mostly due to minor errors in the manuscript and/or problems with format and style, and all contributions but one were accepted for presentation.

The analytes investigated comprised PCDD/Fs, PCBs, DDT and other pesticides, polychlorinated paraffins, hydroxylated PCBs, polybrominated diphenyl ethers, etc., but also combinations of some of the analytes mentioned afore. The investigated regions covered different countries from the five settled continents. Some contributors were investigating point scenarios (local environments), some were focussing on geographic differences, and others were studying trends.

Matrices analyzed were sediment, soil, water, precipitation, and two contributors also studied concentrations in air. Soils could be from industrial, agricultural, and remote areas or from forests. Some manuscripts additionally contained results of biological samples.

The bulk of the studies dealt with PCDD/F measurements. It is highly acknowledged that most contributors have calculated TEQ based on WHO-TEFs. The TEQ-based contamination levels are widely used to establish worldwide inter-comparable data on the global pollution with “dioxins”. Furthermore, individual PCDD/F congener concentrations were frequently reported which may be suitable for residue pattern analysis and leading thus to the source or kind of pollution. Most PCDD/F data were obtained from GC/MS measurements, but in one study a bioassay (CALUX) was used for PCDD/F quantification.

Data on PCDD/F background levels were established in regions from Australia, Brazil, Estonia, Japan, Korea, Pakistan, Taiwan, among others. To our knowledge, first PCDD/F data were presented for Estonia and Pakistan. Regular monitoring programs have been described and evaluated as well.

In addition, effects of different scenarios on the contamination levels were studied. The scenarios included war, flood, industrial activities, landfill fires, harbour pollution, waste water discharge, accidents accompanied with contamination, and sludge-amended soils.

Next to case studies, several efforts were made towards evaluating the source of or contribution to a certain contamination event. For instance, chemometric methods have been used to assign PCDD/F and PAH residues in sediment cores to the scenarios incineration-oil contamination-background sources. Distance vector models have been used to qualify the distribution of PCDD/Fs in soil with increasing distance from a point source of contamination originating from incinerators. Major wind directions have been used to explain direction-specific distribution patterns.

Contaminations of the Venice lagoon was investigated as well. The lagoon was shown to be contaminated with PCDD/F concentrations that were one or two orders of magnitude above the background levels, and the largest contribution arose from industrial activities. In addition, the contamination load of rivers has been studied and surface sediments along northwest part of the Mediterranean Sea were analyzed for PCBs and chloropesticides.

Several manuscripts were dealing with the impurities of PCDD/F in pentachlorophenol and chloronitrofen (CNP) formulations identified as a source of PCDD/F contamination in Japanese paddy fields and rivers polluted from these fields, similarly to problems connected to the use of 2,4-dichlorophenoxyacetic acid in Brazil.

PCDD/Fs and PCBs were analyzed in different types of soil samples in order to correlate specific parameters such as land use, land quality, soil quality with the actual concentration levels. In one contribution air samples representing industrial/agricultural/remote soil sites were collected and analyzed over the whole year giving so an impression on the evaporation of PCDD/Fs from different scenarios in dependence of the season/temperature. Temperature effects or attempts to elucidate the apparent soil:air equilibrium by correlation of PCB concentrations with air temperature.

Long-term evaluations were made possible by analysis of age-dated sediment core slices which provided insights into the PCB and PCDD/Fs or PCP/chloronitrophen contamination trends and correlations between the pesticides and PCDD/Fs. Similar factors could be investigated by the analysis of archived samples collected and stored over a period of some some twenty years. Biowaste effects following a 40-years period of composting sludge have been studied as well.

Next to PCDD/Fs, other POPs were also investigated in addition to the cases already mentioned. One study dealt with concentrations of DDT and metabolites in dependence of the depth of sediments from a channel system. Sediments from different locations along rivers and river systems were analyzed for diverse POPs and PCDD/Fs. Soil and snow samples of Lake Baikal were analyzed for PCBs in order to get a better understanding of the sources for the high pollution level recently determined in this huge and deep freshwater lake. Remarkably high local contaminations in Bosnia and Herzogovina were found due to military activity during war time which deserves particular attention.

Two studies dealt with scarcely investigated groups of compounds, namely chloroparaffins which were determined in sediments from the Baltic and North Seas and hydroxylated PCBs (OH-PCBs). OH-PCBs were detected in precipitation (rain and snow) as well as surface waters. A large number of isomers of different degrees of chlorination were detected and most of them did not match the structure of commercially available standards.

The high number of contributions along with the wide range of research topics investigated made it difficult for us to select eight abstracts for oral contributions. As requested by the organizers, all contributions submitted for poster presentation have been actually accepted as posters but several contributions initially submitted by the authors for oral presentation could not be accepted as talks. Note that less than 25% of the contributions could be accepted for platform presentation. In our final selection, we put emphasis on covering a wide range of facets to be presented in the oral session. However, it has to be highlighted that the poster contributions are equal with the oral presentations, and all contributions together will mark an interesting session at Dioxin 2004.