



SETAC Europe 19th Annual Meeting

31 May – 4 June 2009, Göteborg, Sweden



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A01 - Animal alternatives in ecotoxicology: experimental and computational approaches

Suggested chairs: Scott Belanger (Procter & Gamble, CINCINNATI, OH, United States of America), Melanie Gross (Wca environment limited, FARINGDON, United Kingdom) and Frederic Leusch (Griffith University, GOLD COAST, Australia)

The replacement of traditional whole animal tests with assays that reduce, refine, or replace (the 3-R's) animal use has historically been a long-term goal in toxicity testing, though its prominence in the field of environmental toxicology has come about more recently. New techniques, such as omics and other high-throughput applications, computational biology and bioinformatics, structure-activity relationships ((Q)SAR), cell-based technologies, strategies to link biological effects and predictive modeling, use of non-protected stages, and integrated testing strategies have lead the way in both human and ecological toxicity evaluations, both from a regulatory and basic research standpoint. This session, sponsored by the SETAC Global Science Advisory Group on Animal Alternatives in Environmental Science, will provide a forum to explore the new developments in the broad area of animal alternatives, and will help to foster links between often disparate scientific areas. The session will consider submissions from a broad range of disciplines in basic and applied research and risk assessment pertaining to animal alternatives in ecotoxicology.

A02 - Application of OMICS technologies to identifying critical pathways or biomarkers of toxicity that impact risk

Suggested chairs: Yue Ge (US Environmental Protection Agency, DURHAM, United States of America) and Xuanxian Peng (Sun Yat-Sen University, GUANGZHOU, China)

Use of OMICS technologies to identify key toxicity pathways and biomarkers of exposure and toxicity is required for a complete understanding of chemical-induced toxic responses and mechanisms. While recent developments have allowed novel toxicity pathways and biomarkers to be investigated at an unprecedented level of detail, further advances are needed in order to fully illuminate the interplay among the many pathways governing toxic response. Specifically, new OMICS technologies and approaches are needed with the capability of providing quantitative information with greatly enhanced levels of sensitivity and throughput. This session will focus on the development of these OMICS technologies and their application to identification of toxicity pathways and biomarkers. Of particular interest are papers describing advances in global analysis of the effects of environmental toxicants including carcinogens on gene, protein expression, and their modifications such as DNA adducts, protein phosphorylation, glycosylation, and oxidation in animal tissues and human cells. Papers are also sought that present research on the development of OMICS technologies for investigation of dose response, and especially low-dose-mediated molecular changes to meet the requirements of toxicity studies and risk assessment research.

A03 - Assessing the ecological relevance of OMICS and biomarkers

Suggested chairs: Tamara Galloway (University of Exeter, EXETER, United Kingdom), Lúcia Guilhermino (University of Porto, ICBAS & CIIMAR, PORTO, Portugal) and Martin Eriksson (Göteborg University, GÖTEBORG, Sweden)

It is recognised that protecting environmental quality means avoiding damages to structure and functions of biological communities and ecosystems. Therefore, ecotoxicology by definition implies that studies conducted to determine the effects of environmental stressors on ecological systems include an understanding of how these stressors are causally related to ecological relevant responses. While responses at lower levels of biological organization are important for determining the mechanistic basis of stress effects on biological systems (rapid genome responses, molecular and cellular biomarkers), measures at higher levels of organization are critical for understanding the ecological consequences of such stress (histopathology, bioenergetic parameters, growth, reproduction, population-level metrics). Linking 'omics' and/or biomarkers to ecological relevant parameters and using these powerful tools in real scenarios have been identified in the SETAC Europe meetings of Porto and Warsaw as a challenge for modern ecotoxicology. Therefore, the objective of this session is to present and discuss recent advances on relationships among genomics, biomarkers and ecological relevant endpoints (e.g. behaviour, development, reproduction, population dynamics, biodiversity, productivity etc.) in relation to exposure to chemical and non-chemical stressors and on the contribution of 'omics' and biomarkers to understanding complex ecotoxicological problems in real scenarios. Such integrative studies help improve the predictive capability of Ecological Risk Assessment and also serve as the basis for more informed environmental management and regulatory decisions.

A04 - Chemical mixtures, sequential and time-varying exposures

Suggested chairs: Thomas Backhaus (Institute for Plant and Environmental Sciences, GÖTEBORG, Sweden), Nina Cedergreen (University of Copenhagen, TÅSTRUP, Denmark) and Claus Svendsen (Centre for Ecology and Hydrology, HUNTINGDON, CAMBRIDGESHIRE, United Kingdom)

Typical ecotoxicological investigations record the effects of a single pure chemical after constant exposure over a fixed, pre-defined time interval - which is in sharp contrast to the actual situation in the environment where organisms are exposed to chemical cocktails of time-varying, fluctuating composition. This pattern is not specific for any particular group of chemicals or a certain environmental compartment. Hence, acknowledging this pattern and extending ecotoxicological testing and assessment strategies accordingly is an important step for improving the realism in chemical assessments. The session aims at providing an overview of recent advances in the field. Both, experimental results from studies on different levels of biological complexity, as well as novel conceptual and modelling approaches shall be presented and discussed.

A05 - Ecotoxicology of natural compounds

Suggested chairs: Stephan Pflugmacher (IGB, BERLIN, Germany) and Vitor Vasconcelos (University of Porto, PORTO, Portugal)

Due to many man-made changes in the ecosystems, terrestrial as well as aquatic, many organisms have the chance to grow in mass developments and produce compounds which are natural, but do have adverse effects on other organisms of the despite ecosystem. So can e.g. eutrophication of water bodies lead to increases of mass development of cyanobacteria (blue-green algae) yielding in so-called bloom formation. Cyanobacteria are now common in many freshwater lakes and rivers throughout the world. Many of the bloom forming cyanobacteria are known to produce different types of toxins including hepatotoxins, neurotoxins and cytotoxins, which yield in a variety of ecological and even human health effects. In many countries the use of water from sources which might contain cyanobacterial blooms and toxins for spray irrigation is common. Therefore a possible transfer into the food-web might happen. Cyanobacterial secondary metabolites are a field of research, which is from great interest for the aquatic environmental research and also for terrestrial ecosystem research. In order to achieve this aim the proposed session gives an overview on toxin detection in European waterbodies, ecotoxicological/ecophysiological effects of toxins in various organisms and implications on human health. But not only cyanobacterial toxins are important, halogenated compounds will also be discussed looking at their possible effects on the ecosystem compartments.

A06 - Ecotoxicology of radioactive substances

Suggested chairs: Clare Bradshaw (Stockholm University, STOCKHOLM, Sweden), Rodolphe Gilbin (IRSN, SAINT-PAUL-LEZ-DURANCE CEDEX, France) and Hildegard Vandenhove (SCK-CEN, MOL, Belgium)

Radioactive substances have received little attention in the field of ecotoxicology and at previous SETAC meetings, despite being important environmental contaminants. However, the International Union of Radioecology (IUR) is looking to bridge the gap between radioecology and other environmental sciences. There was a joint IUR-SETAC Meeting in 2002 and an IUR task group on Radioecology and Non-radioactive Pollutants was launched in 2004 which gained new momentum at the International Conference on Radioecology & Environmental Radioactivity (June 2008, Bergen).

We invite contributions on:

- The fate of radioactive substances in the environment
- The effects of radioactive substances on organisms and ecosystems
- Effects of either external or internal radiation to organisms.
 - Experimental or field studies
 - Risk assessment of multipollutant mixtures or multiple stressor exposures (where radionuclides are included)
- Other relevant topics.

A07 - EDCs: Individual and population level responses

Suggested chairs: Mary Ann Ottinger (University of Maryland, COLLEGE PARK MARYLAND, United States of America) and Annegaike Leopold (Wildlife International - European Office, WARNSVELD, The Netherlands)

Exposure to endocrine disrupting chemicals (EDCs) exerts long term effects on reproductive behavior. In birds, EDCs are maternally deposited into the egg, thereby exposing the embryo throughout development. Similarly, fish, amphibians and invertebrates experience exposure from maternally deposited EDCs as well as from the environment. The objective of this session is to

examine individual and population level responses to EDCs in order to establish if long-term adverse effects are to be expected. Additionally, variation due to differing species sensitivities will be considered relative to mechanisms of EDC actions. Potential mechanisms operating during sexual differentiation will also be considered, especially in terms of neuroregulatory systems that are targets of EDC actions. Other effects of EDC exposure will be considered, including fertility, sperm quality, and immune function. Finally, long term consequences of exposure will be discussed in the context of reproductive strategies, life history, and relative sensitivity.

A08 - Effects of environmental pollutants in birds; field studies and experimental models

Suggested chairs: Björn Brunström (Uppsala University, UPPSALA, Sweden) and Bengt Silverin (University of Gothenburg, GÖTEBORG, Sweden)

Birds are exposed to environmental contaminants in various aquatic and terrestrial environments and there are several examples of population effects from pollutants in avian wildlife. In particular, there is a large literature on endocrine and behavioural components of reproduction in avian species. However, the linkage of these underlying mechanisms to potential adverse effects from endocrine disrupting chemicals (EDCs) has not been clearly delineated. The aim of the proposed session is to bring together researchers involved in field and laboratory studies on pollutant effects in birds. Experimental laboratory studies are important to clarify which compounds that may cause adverse effects in wild birds and to elucidate mechanisms and sensitive life stages. Early life stages of birds seem to be particularly sensitive to pollutants. Various avian in vitro and in vivo models to study effects of chemicals have recently been developed and new molecular methods are introduced into avian toxicology. The session should include presentations on pollutant effects observed in bird populations in different geographical areas and papers describing avian models and new techniques and how these can be used to study effects of emerging pollutants in birds.

A09 - Histopathology in ecotoxicology

Suggested chairs: Gerd Maack (Federal Environment Agency, DESSAU, Germany) and Burkard Watermann (LimnoMar, HAMBURG, Germany)

There is a growing awareness supporting the use of histopathology to assess the adverse effects at sublethal, acute and chronic exposures in ecotoxicology. While the abiotic effects of pollution i.e. water quality are usually well documented, biological responses of individual organisms are less well described. This session will provide an opportunity to present the evidence and discuss the benefits of adopting histopathological examination to detect and link causative agents to environmental effects (including disease). The presentations will cover a range of effects from the cellular level up to impacts on organs, including effects on reproduction and population relevant end points, including for example; changes in the sex-ratio. Contributing speakers will include representatives from academia, industry / consulting, and government.

A10 - Indirect ecological effects of pollutants - Challenge or nightmare?

Suggested chairs: Vincent Pettigrove (Melbourne Water, MELBOURNE, Australia) and Silvia Mohr (Federal Environment Agency, BERLIN, Germany)

An important challenge for ecotoxicologists is to understand the indirect effects of toxicants on ecosystems. Indirect effects may be changes in predation pressure and competition, species shifts due to the lower sensitivity of some species to pollutants, the influence of diseases (parasites) or other. Laboratory toxicity tests are characterised by a lack of "ecological realism". They are designed for assessing relatively simple responses of individuals or populations to the direct effects of chemicals. Therefore it is difficult to translate these results to ecosystem effects. Multi-species tests, such as the use of microcosms and mesocosms, can provide a more realistic reflection of potential effects of toxicants which can occur in complex communities. However, distinguishing between direct and indirect effects is difficult as there is often insufficient information on species ecology or other relevant data. Moreover, indirect effects are the result of multi-stress exposure (toxicants, climatic factors, habitat changes, land use, etc.) and of interactions among populations. In this session preference will be given to contributions focussing on the following questions: How can indirect effects be identified? How to interpret them? How can the results be integrated in the risk assessment of pollutants?

A11 - Microbial community ecotoxicology

Suggested chairs: Hans Blanck (Göteborg University, GÖTEBORG, Sweden) and Ingela Dahllöf (National Environmental Research Institute (NERI), ROSKILDE, Denmark)

Microbial communities consist of interacting organisms of many kinds. The small scale make them suitable for experimental studies of bacteria, cyanobacteria, microalgae, protozoans and others.

Functional responses (community metabolism, functional diversity) can be coupled to structural endpoints (species composition, biochemical constituent composition, genetic variability) and community tolerance. (Meta-)genomics, transcriptomics, proteomics and metabolomics - emerging approaches applicable also on the community level - need to be compared to the traditional endpoints.

Discussions on test strategies and methodological considerations is encouraged. Contributions shedding light on interesting problems like functional redundancy, discrimination between direct and indirect effects, the presence of co-tolerance, and the relative resolution of taxonomic and molecular indicators of biodiversity, are welcomed. The session will deal with ecotoxicological responses to environmental contaminants in both terrestrial and aquatic environments.

A12 - New developments in environmental genomics, including epigenetics

Suggested chair: Juliette Legler (VU University Amsterdam, AMSTERDAM, The Netherlands)

In recent years, the field of genomics has exploded and made its mark on modern environmental toxicology. This session is intended to highlight some recent developments in genomics and gene expression analysis in environmental toxicology, including pathway and mechanism of action analysis, biomarker development and application to complex mixtures. The up and coming field of environmental epigenetics will also be highlighted in this session. Epigenetics is defined as the study of mechanisms or pathways that initiate and maintain heritable patterns of gene expression and gene function without changing the DNA sequence. A number of epigenetic pathways have been identified, such as DNA methylation and histone modifications. A growing body of literature has demonstrated the crucial importance of epigenetics for health, and research shows that environmental factors, including contaminants, can alter epigenetic control of gene expression, with important implications for development and susceptibility to disease.

A13 - Occurrence, fate and effects of perfluorinated organic compounds

Suggested chair: Pim de Voogt (Kiwa, RIJSWIJK, The Netherlands)

Anthropogenic perfluorinated compounds (PFCs) have recently gained socio-economic and scientific interest. PFCs constitute a newly emanating group of environmental contaminants, with physico-chemical as well as toxicological properties different from those of other halogenated compounds. As a result their environmental fate and effects are likely to diverge from what known paradigms and modeling predict. PFCs are generally persistent in the environment, and can be found over a broad concentration range and within most parts of the aquatic and terrestrial ecosystems. Recently agricultural hot spots in Europe have been shown to lead to high loadings of adjacent waters and drinking water. Large programs have recently started in North America, Europe and the Far East that aim to elucidate pathways of PFCs in the environment and to explain why both the general human population everywhere and the fauna in pristine areas of the Globe are exposed to these chemicals. Whatever the sources, PFCs have indeed been found to be present at a global scale in blood of the general population. The session will continue the tradition of recent SETAC meetings in North America and Europe to bring together chemists and ecotoxicologists working in the area of perfluorinated compounds and report on their analysis, sources, environmental chemistry, exposure assessment, effects and ecological and human risk assessment.

A14 - Pesticide ecotoxicology

Suggested chair: Marco Vighi (University of Milano Bicocca, MILANO, Italy)

For many reasons, pesticides are a class of chemicals with particular ecological relevance: they are toxicants by definition; they are often specific for different groups of living organisms (plants, invertebrates, vertebrates, micro-organisms and fungi); they are intentionally emitted into the environment, often in large amounts; due to the variability of physico-chemical characteristics, they can be a threat for all environmental compartments (water, soil, air). It is now recognised that, in areas subject to relevant agricultural pressure, they represent the major danger for biodiversity, in particular in terrestrial ecosystems. Therefore, managing pesticide use is a key issue for ecosystem protection. The information requirements of European regulation are suitable for allowing a preliminary assessment of exposure and effects. However, they are not capable to cover a number of key issues extremely important for complete assessment of the risk of pesticide use for ecosystem health, such as: effects of environmental parameters on persistency and environmental fate; responses of populations and communities to mixtures of pesticides, variability of mixture composition during the annual cycle, recovery of ecosystems after a pesticide stress, indirect effects on relevant ecosystem functions, effects on ecosystem services. The objective of this section is to cover the gaps between regulation requirements and a more ecologically-based assessment of pesticide damages to actual ecosystem health.

A15 - Wildlife toxicology: it's the ecology

Suggested chairs: Nico van den Brink (Alterra, Wageningen UR, WAGENINGEN, The Netherlands) and John Elliott (Environment Canada, OTTAWA, Canada)

Recently, more and more insight is gained in the interactions between animal behaviour, environmental and ecological factors and chemicals, in relation to risks that these chemicals may pose to wildlife. Effects of chemicals on long range migratory birds for instance, may expand well beyond the region of contamination. Furthermore, food web interactions may result in temporal and spatial exposure regimes due to seasonality or habitat structuring. In this session abstracts are invited that describe latest findings on effects of biological and ecological factors on risks of chemicals to wildlife. This may include experimental or field studies on temporal and spatial specific accumulation patterns, behavioural studies etc. The presentations should not just present data on contaminant levels in wildlife, but will have to discuss processes leading to the observed accumulation patterns. The aim of the session is to present the latest research in this field, in order to gain better understanding of the dynamics of food web accumulation of contaminants to wildlife.

B - ENVIRONMENTAL AND ANALYTICAL CHEMISTRY

B01 - Adsorption, speciation and bioavailability of metals

Suggested chairs: Karel De Schamphelaere (Ghent University, GHENT, Belgium), Erik Smolders (Leuven University, LEUVEN, Belgium) and Antonio Cobelo-Garcia (Instituto de Investigaciones Marinas (IIM-CSIC), VIGO, Spain)

Within the EU, several metals have been considered in the context of legislative frameworks such as the Existing Substance Regulation and the Water Framework Directive. With REACH assessments will also need to be made for the less prominent (low production volume) metals as for example platinum group elements (Au, Ag: Pt, Pd, Rh, Ir, Os, Ru). In recent years, a great deal of fundamental research has been carried out for the high production volume metals as Cu, Ni, Zn to aid these regulatory exercises to come up with scientifically sound decisions. Nevertheless, several aspects of metals and especially of the less prominent metals in aquatic and terrestrial systems require further study to improve regulatory decisions. These aspects include, but are not limited to adsorption, speciation, fate of metals, bioavailability, acclimation, adaptation, the relative importance of exposure routes, mode of action and distribution of metals within the organisms, defence mechanisms, the relation between bioaccumulation and toxicity, toxicity of metal mixtures, linking aquatic and sediment compartments and how to interpret information on body burdens. This session will cover all fundamental aspects of metal chemistry, speciation, fate and ecotoxicity in aquatic and terrestrial systems.

The objective of this session is to present the state of the science on (1) assessment of speciation, adsorption, fate and exposure of metals in the environment and (2) bioavailability and toxicity assessment of metals in the environment.

Note: the scope of this session is scientific developments on fate, exposure, bioavailability and toxicity of metals. Presentations related to application of this knowledge in risk assessments will be addressed in session G13.

B02 - Chemometrical tools for predicting chemical pattern and properties

Suggested chairs: Patrik Andersson (Umeå University, UMEA, Sweden) and Paola Gramatica (Insubria University, VARESE, Italy)

Various computational methods, including receptor modelling and (Q)SARs can be used to study complex patterns of chemicals and to predict fate and toxicity. Monitoring programs, and chemical inventories generate huge amounts of data that are difficult to overview. Chemometrics including multivariate statistics play an important role to increase our understanding of complex patterns in these data bases. We seek applications and new tools in this area. This session will also cover developments in computational methodologies to predict environmentally relevant properties, such as physicochemical properties, partitioning coefficients, and persistence measures (QSPRs). Grouping, read-across and QSARs are key tools to reduce animal tests and these techniques have gained increased interest under REACH to fill data gaps and to aid risk assessments. This session also invites abstracts covering state of the art developments and applications of these tools.

B03 - Effect directed analysis to identify key environmental toxicants

Suggested chair: Marja Lamoree (Institute for Environmental Studies, AMTERDAM, The Netherlands)

Through the application of advanced analytical chemical techniques it is possible to determine the presence of known contaminants in the environment. In addition, the ecotoxicological behaviour of these known contaminations can be studied by implementation of a broad range of biological and toxicological techniques. In order not to overlook any unknown key contaminants with adverse toxicological properties, and also to use various resources for environmental monitoring to their best potential, Effect Directed Analysis (EDA) has been developed. EDA integrates the use of chemical sample treatment and fractionation techniques, biological assays and chemical analysis to pinpoint the toxicant responsible for an observed biological/toxicological effect.

In order to broaden its power to unravel ecotoxicological causes and effects, several aspects of EDA need to be addressed in more depth. Topics are, among others, (i) the expansion of the range of assays suitable for toxicity characterization, i.e. at the gene expression level, (ii) metabolic (de-)activation of key toxicants, (iii) progress in the field of identification of unknown toxicants, (iv) chemical analytical data treatment and (v) toxicity confirmation. To bring the applicability of EDA to a higher level, (vi) harmonization of sample treatment and fractionation methods may need to be explored.

B04 - Emerging contaminants: identification strategies and occurrence

Suggested chairs: Peter Haglund (Umeå University, UMEA, Sweden) and Katherine Langford (NIVA, OSLO, Norway)

Over the past years our awareness of what contaminates our environment has demonstrated that we do not know about all of the possible chemicals present and resulted in many exciting areas of research. It is likely that there are many more chemicals that we have yet to establish as environmental contaminants. In this session we encourage the reporting of newly identified contaminants that merit further work and assessment. Papers on the identification strategies used to identify new contaminants, reports on the identification of new contaminants and occurrence data are requested.

B05 - New directions in fate and exposure modeling of environmental contaminants

Suggested chairs: Matthew MacLeod (ETH Zurich, ZURICH, Switzerland), Todd Gouin (University of Alaska Fairbanks, FAIRBANKS, United States of America) and Ian Cousins (Stockholm University, STOCKHOLM, Sweden)

The year 2009 marks the 30th anniversary of 'Finding Fugacity Feasible', the seminal paper by Don Mackay that demonstrated how mass balance models based on the fugacity principle could provide significant insights into the partitioning, fate, transport and bioaccumulation of environmental contaminants. To celebrate this anniversary, this session will feature new research on fate and exposure modeling of environmental contaminants, with an emphasis on the important role that these models play in the science of environmental chemistry, as well as highlighting the growing role of models in chemical management applications. Papers are sought dealing with the development, parameterization, application and evaluation of models that quantify the relationship between sources of contaminants and exposure, including all relevant transport, fate, and accumulation pathways. This session is a contribution of the Exposure Modeling Advisory Group (a SETAC Global Advisory Group).

B06 - Partitioning processes and bioavailability of organic chemicals

Suggested chairs: Tobias Schulze (Helmholtz-Centre for Environmental Research UFZ, LEIPZIG, Germany), Martin Krauss (Eawag, DÜBENDORF, Switzerland) and Kirk Semple (Lancaster University, LANCASTER, United Kingdom)

Bioavailability and bioaccessibility is a further discussed and not fully understood issue in environmental chemistry and ecotoxicology. The underlying chemical and biological processes and mechanisms are an important field of scientific work (e.g. partitioning between phases or protection of cells against xenobiotics using carrier proteins). The objective of this session is to provide a platform for discussion of the state of the art, the challenges as well as case studies on partitioning and distribution between solid phases, water phase and biota. Contributions examining the role of black carbon in the behaviour of POPs and interactions of polar organic chemicals with soils and sediments are expected. An important issue is also the mode of action and distribution of toxic compounds within the organisms and defence mechanisms against the xenobiotics. The session welcomes research from freshwater, marine and terrestrial environments.

B07 - Passive sampling and dosing as tools to measure and control exposure

Suggested chairs: Philipp Mayer (University of Aarhus, ROSKILDE, Denmark), Georg Streck (Helmholtz Centre for Environmental Research - UFZ, LEIPZIG, Germany) and Joop Hermens (Utrecht University, UTRECHT, The Netherlands)

Passive sampling and dosing techniques are increasingly being used (1) to quantify exposure in different matrices (air, water, soil, sediment, biota), (2) to study, understand and predict sorption, partitioning and diffusion processes and (3) to control and maintain exposure in laboratory tests of organic chemicals. These methods have been applied in different areas within Environmental Toxicology and Chemistry, and during the last years results have been presented in many different sessions at Annual SETAC meetings. For example, substantial progress has been made in determining the influence of various environmental conditions on sampling rates, in calibration procedures, and use of performance reference chemicals. The purpose of this session is to offer (1) a platform to present work related to passive sampling and dosing, (2) to enhance the communication between parallel developments within this field and (3) to demonstrate the substantial potential of passive sampling and dosing techniques. Special attention will be paid to new concepts, new analytical approaches and to applications where the applied methods provide results and answers, which cannot be provided with conventional techniques.

B08 - The global cycle of organic micropollutants

Suggested chair: Rosalinda Gioia (Lancaster University, LANCASTER, United Kingdom)

Semi-volatile organic compounds (SOCs) are chemicals that have become a major concern because of their toxicity, persistence, bioaccumulation tendency, and susceptibility to undergo long-range atmospheric transport (LRAT). Among them persistent organic pollutants (POPs) are the most notorious. Our current knowledge indicates that the cycling of these chemicals in the environment is highly complex; indeed their global cycle is controlled by repeated air-surface exchange.

POP transfer between the atmosphere and the other environmental compartments (soils, sediments, marine waters) is an important link to the foodweb. For example, in marine environments, once they are in the dissolved phase they can volatilize back to the atmosphere or can sorb to particles and organisms such as phytoplankton, and they can be removed from the surface waters and delivered to the deep ocean by sinking of particles and by zooplankton vertical migration. Exchange of pollutants between air and ocean water, is in large part controlled by the dynamics affecting phytoplankton biomass. How do such alterations affect the air water exchange of POPs? What will be the implication at the global scale? What about deposition onto terrestrial environments? Current knowledge cannot yet provide a satisfactory answer.

B09 - The role of environmental specimen banking

Suggested chairs: Jan Koschorreck (Umweltbundesamt, BERLIN, Germany) and Anders Bignert (University of Stockholm, STOCKHOLM, Sweden)

Environmental specimen banking programs and the specialized facilities required to support such programs have existed in Europe and North America since the 1970s. Examples of specimens collected and cryogenically stored include tissues of biota, sediments, soils, ice cores, etc. Specimen banking is particularly valuable for providing research materials for retrospective study of environmental conditions, and for future verification of analytical results (quality assurance). With the increased interest in emerging chemicals of concern and the present emphasis on climate change, the value of such programs for establishing timelines and historical patterns of environmental contaminants is being recognized and is resulting in the development of environmental specimen banking programs world-wide. This session aims to bring together researchers from established environmental specimen banking programs in Europe, North America, and Asia to present and discuss the latest results regarding temporal changes in concentrations of emerging contaminants in their regions through use of banked specimens. In addition, we welcome presentations on the design of new specimen banking programs.

B10 - Transformation products of organic chemicals - Analysis, fate, and risk assessment

Suggested chairs: Kathrin Fenner (Eawag/ETH Zurich, DÜBENDORF, Switzerland) and Jani Olavi Honkanen (Akvaplan-niva, TROMSØ, Norway)

The session will bring together different lines of research related to assessing the prevalence, significance and risk of transformation products of organic chemicals such as industrial chemicals, biocides and pharmaceuticals. This session covers both transformation products of abiotic and in vivo and in vitro biotransformation processes.

Specifically, the following topics should be covered:

- Formation and identification of transformation products;

- Analysis of transformation products in different environmental compartments and experimental studies;
- Models to predict transformation pathways and chemical and ecotoxicological properties of transformation products;
- Methods for including transformation products into risk assessment.

C - LIFE CYCLE ASSESSMENT AND LIFE CYCLE MANAGEMENT

C01 - Advances in Life Cycle Inventory modeling

Suggested chairs: Alessandra Zamagni (ENEA, BOLOGNA, Italy) and Angeline De Beaufort (FEFCO-CCB, SWALMEN, The Netherlands)

In the last years a vivid debate has been opened on several methodological issues, with special focus on LCI modeling. In particular, several contributions have been proposed to deepen the current LCI modeling, sometimes going beyond the basic structure of LCI, in order to improve reliability, significance and usability of LCA applications. Deepening of LCI modeling means including more mechanisms (beyond technological relations) and sophistication in modeling, like: economic relations; inclusion of behavioural aspects; time and space modeling; etc. "Hybrid approaches", i.e. the use of other methodologies (like Input Output Analysis) combined with LCA, have been also developed and applied.

This session invites all stakeholders to present and discuss their approaches and ideas related to how to include more mechanisms and sophistication in LCI modeling. The consequences on the overall uncertainties should be also addressed. Contributions from other scientific domains are strongly encouraged.

C02 - Life Cycle Impact Assessment: Methodological advances and biodiversity damage assessment

Suggested chairs: Michael Hausschild (Technical University of Denmark, LYNGBY, Denmark) and Jerome Payet (EPFL, LAUSANNE, Switzerland)

Life cycle impact assessment (LCIA) as a substantial part of LCA has to be continuously advanced to provide improved methods for environmental fields already covered and new emerging impact categories. The session addresses existing approaches (e.g. ecotoxicity of metals) and supplies new metrics closing the methodological gaps (e.g. indoor exposure impacts, noise impact). Also impact categories of particular significance for developing countries and tropical regions such as land use and erosion will be focused at. A major challenge for LCIA remains the assessment of damages to biodiversity in order to progressively integrate very different stressors such as toxic impacts on aquatic and terrestrial ecosystems. This session further aims at presenting results of methodological work and case studies supporting the improvement of damage modeling for both human health and ecosystems. Presentations that take LCIA a step ahead are invited to the LCIA session.

C03 - Life cycle management - from scientific knowledge to decision making

Suggested chairs: Gerald Rebitzer (Alcan Packaging, NEUHAUSEN, Switzerland), Sebastien Humbert (University of California, Berkeley, BERKELEY, United States of America) and Anne-Marie Tillman (Chalmers University of Technology, GÖTEBORG, Sweden)

Life Cycle Management (LCM) focuses on the implementation of life cycle approaches (LCA, life cycle costing, social life cycle assessments, etc.) in organizations (business and other). Essential are efficient and effective tools as well as the appropriate processes for the application of these tools and for bringing new insights into decision-making. In this context, a key question is how to efficiently transfer scientific development and environmental practices into the corporate world? Transferring both 1) the scientific knowledge to company thinking and management and 2) company needs and demands to the scientific community is challenging. For this session, presentations on using life cycle approaches for routine decision making as well as on the integration of LCA and related tools in business processes such as purchasing, product development, and marketing are invited. Intra- and inter-organizational interactions for the improvement of product life cycle performances are also addressed. The focus will be on how to leverage life cycle thinking and make it an integral organizational element, similar to quality management.

C04 - Life Cycle Sustainability Assessment of Products

Suggested chairs: Walter Klöpffer (LCA Consult & Review, FRANKFURT, Germany) and Christian Bauer (European Aluminium Foil Association e.V., DÜSSELDORF, Germany)

Sustainability assessments of products are becoming increasingly important. While many different heterogeneous schemes have been proposed by industry, coherent approaches for the integration of environmental, economic, and social aspects in product assessments are still a major task. For this session we invite contributions elaborating new approaches for integrating the three different pillars of sustainability into a sustainability assessment scheme performed on a product-system basis.

C05 - Life cycle thinking and assessment supporting environmental policies and environmental standards

Suggested chairs: Rana Pant (Joint Research Centre, ISPRA, Italy) and Ellen Riise (SCA Personal Care, GÖTEBORG, Sweden)

The stage of development and the scope of policies for environmental sustainability on different levels (EC, national, regional) varies significantly. In parallel, environmental sustainability aspects in national and international standards are gaining more and more ground. These efforts can and should be supported by Life Cycle Thinking (LCT) and Life Cycle Assessment (LCA). LCT is a structured approach to evaluate goods and services ("products") in a comprehensive way to avoid overlooking relevant aspects and to avoid shifting of burdens. LCA is the method that quantifies life cycle thinking in the environmental domain. In this session we want to encourage contributions from all stakeholders which demonstrate the variety of available supporting applications, including tools and indicators, exemplifying both their strengths and weaknesses.

C06 - Regionalisation in LCA - managing global life cycle and regional needs

Suggested chairs: Ralph Rosenbaum (CIRAIG, Ecole Polytechnique de Montreal, MONTREAL, Canada) and Rosalie van Zelm (Radboud University, NIJMEGEN, The Netherlands)

With the spread of LCA and Life Cycle Thinking (LCT) into new geographies, the topic of regionalization is timely and increasingly important. It might reduce uncertainties and increase the relevance and interpretability of LCA results, while on the other hand inflating data demand and complexity of a study. On the inventory (LCI) side, regionally variable aspects such as energy production or end-of-life options are issues which might call for regionalisation. From the impact assessment (LCIA) perspective, a need for regionally differentiated characterisation can be demonstrated for non-global impact categories, such as land use, human and eco-toxicity, acidification, or eutrophication. Questions between LCI and LCIA emerge in terms of data availability, consistency, practicability, and implementation into LCA software: This session is intended to be a broad exchange forum providing an overview and technical insights of ongoing research related to regionalisation in LCA. It aims to bring together experts in LCI and LCIA as well as LCA practitioners to improve the linkage between inventory, impact assessment and applicability around regionalisation. A global SETAC LCA Working Group recently has been formed on this topic and will provide important input for the session.

C07 - Assessing water use in LCA and water footprinting

Suggested chairs: Annette Koehler (ETH Zurich, ZURICH, Switzerland) and Emmanuelle Aoustin (VEOLIA Environnement, PARIS, France)

The topic of water use and depletion of freshwater resources is rapidly gaining increasing attention and nowadays is perceived (almost) as important as climate change. While water use was mainly disregarded in LCA in the past, new methodological approaches are being developed both for an appropriate inventory modeling of water use and for impact assessment describing the impact pathways up to different areas of protection. This session invites presentations on method development for water-use related LCI schemes, complex LCIA metrics, and simplified assessment approaches for water footprinting. Aspects of spatial differentiation and data availability as well as applications to specific case studies will be discussed. The purpose of this session is to gather researchers and practitioners from business and industry dealing with environmental assessment schemes of freshwater use.

D01 - Biomonitoring and integrative assessment of marine pollution

Suggested chairs: Juan Bellas (University of Vigo, VIGO, Spain) and Ricardo Beiras (University of Vigo, VIGO, GALICIA, Spain)

In June 2008 the EU implemented the Marine Strategy Framework Directive, which added to the Water Directive, demands the development of tools to assess the ecological status of the water bodies in order to protect and restore them, and defines environmental objectives which should be attained by 2020. Institutions such as OSPAR and ICES, devoted to the study of the marine environment, have been recently working together with the aim of developing integrative assessment strategies, including chemical, toxicological and ecological parameters, and the development of assessment criteria for those parameters. These assessment criteria will allow the classification of the water bodies into discrete categories according to their ecological status, providing useful management tools for the decision makers, either international institutions or national administrations. This is currently one of the major applied research topics concerning aquatic ecotoxicology in Europe.

The aim of this session is to gather current research useful for the application of biological, chemical and ecotoxicological techniques useful for linking quantities of pollutants with their harmful effects on the living resources of coastal ecosystems.

D02 - Fish health and integrated monitoring

Suggested chairs: Lars Forlin (Göteborg University, GÖTEBORG, Sweden) and Ketil Hylland (University of Oslo, OSLO, Norway)

Fish have a long history in ecotoxicity testing and monitoring. Fish in marine, brackish and freshwater environments represent trophic levels that may integrate effects of pollutants at low trophic levels and form an important link to top trophic level consumers including humans. Fish is an indispensable part of national monitoring programs in many countries around the world. The objectives of such programmes vary, but commonly include temporal and spatial assessments of contaminant levels and/or effects in addition to methods to identify the presence or impacts of novel substances. In recent years there has been an increasing focus on integrating information about the physical and chemical environment with chemical analyses, fish health and population endpoints to identify and assess the consequences of contaminant inputs in aquatic ecosystems.

The aim of this session is to gather current and science based research with a focus on environmental chemistry, fish individual health, fish ecology and the functional performance of fish, integrated to assess spatial and particularly long term trends of fish health at individual and population levels. Methods to quantify fish health may include biomarkers, pathology, reproductive performance, population parameters, but also multi-endpoint techniques such as microarray, proteomics or metabolomics.

D03 - Persistent organic pollutants in marine mammals: Levels, trends, and effects

Suggested chair: Susan Shaw (Marine Environmental Research Institute (MERI), BLUE HILL, MAINE, United States of America)

This session will focus on the bioaccumulation of POPs (legacy and current-use compounds) and their metabolites in a variety of marine mammal species from different regions: assessment of current body burdens, congener patterns, spatial and temporal trends. Studies are also sought on assessment of extrinsic and intrinsic factors influencing POP burdens and the health status of marine mammals, biomarker studies examining relationships between exposure and markers of effects (immune, endocrine, and developmental effects) in marine mammals. Furthermore, the session will cover novel strategies and tools to examine relationships between exposure and effects such as the identification of contaminant-regulated genes, enzyme induction, and hormone/receptor activation. We also call for abstracts dealing with predictive models and risk assessment, and the influence of global climate change on contaminant-stressed marine mammal populations.

This session will enhance this field of research by facilitating (1) a global perspective on the problem of POPs in marine mammals through the sharing and exchange of information among scientists; and (2) the reporting of new findings using standard as well as novel techniques to quantify and further elucidate POP body burdens and health effects in marine mammals.

D04 - Polar marine ecotoxicology, risk assessment and monitoring

Suggested chairs: Mathijs Smit (StatoilHydro, TRONDHEIM, Norway) and Rainer Lohmann (University of Rhode Island, NARRAGANSETT, United States of America)

Intensified shipping and oil and gas activities are examples of potential threats to the arctic. Long range transport of contaminants and climate change are already threatening arctic environments. As arctic environments are considered to be sensitive to physical-chemical stress there is a need for sound ecological management of these areas. However, to date it is not clear whether species within the arctic are more sensitive than non-arctic species. In polar environments there is also limited functional redundancy due to shorter food chains. As a result ecosystem function might not be protected when ecosystem structure is preserved. Risk assessments focussing on the preservation of the most sensitive species might not be valid. Environmental managers are interested whether they can use temperate criteria and guidelines to protect polar marine organisms from contaminants. Knowledge on the sensitivity of arctic species and communities is however limited. A special challenge is presented by oil spills in cold climates, such as arctic, as the oil can be rapidly frozen into the ice sheet. The oil will be to some extent preserved, in the sense that evaporation, dissolution, and degradation are expected to be reduced. Estimates of the pathways, release rates, and chemical characteristics of the remaining oil will provide the basis for environmental exposure assessments. Finally, the harsh conditions in arctic environments combined with seasonal variability require dedicated tools for environmental monitoring.

The aim of this session is to present new tools linking the fate and effect of contaminants in the Arctic (from chemical fate via exposure to effects on species and communities) and how this information can be used in environmental risk assessments and the design of environmental monitoring programs of polar regions.

E - NANOMATERIALS

E01 - Environmental characterization and dose metrics of engineered nanoparticles

Suggested chairs: Edward Heithmar (US Environmental Protection Agency, LAS VEGAS, United States of America) and Damjana Drobne (University of Ljubljana, LJUBLJANA, Slovenia)

Much of the promise of nanotechnologies is related to properties that materials exhibit only at the nanoscale. Novel properties of nanoparticles offer new kinds of possibilities in their application, but at the same time they underlie new kinds of environmental behavior and biological effects. This session focuses on two tool sets needed to understand these characteristics: 1) sampling and analysis techniques for the characterization of engineered nanoparticles in environmental media; and 2) dose metrics for nanoparticles. All classes of engineered nanoparticles will be included - fullerenes, carbon nanotubes, metals and metal oxides, quantum dots, and dendrimers. A closing panel discussion on the current state of the science and future directions is envisioned.

E02 - Fate and effects of nanoparticles

Suggested chairs: Janeck Scott-Fordsmand (Aarhus University, National Environmental Research Institute, SILKEBORG, Denmark) and Paul Bacchus (Environment Canada, GATINEAU, Canada)

Nanomaterials are becoming widely used, and may end up in the environment. Data are rapidly emerging on the fate, behaviour and effects of various manufactured nanomaterials. Given the rapid evolution in research on manufactured nanomaterials, papers are invited to discuss the effect and fate of nanomaterials in the environment.

E03 - Life cycle assessment of nanotechnologies

Suggested chairs: Paolo Masoni (ENEA, BOLOGNA, Italy) and Stig Irving Olsen (Technical University of Denmark, LYNGBY, Denmark)

Nanosciences and Nanotechnologies (N&N) offer a number of beneficial applications. However the potential impact on the environment and on human health of specific "nanomaterials" and "nanoproducts" is not yet fully understood and the potential environmental benefits of N&N over the life-cycle has only been scarcely investigated. LCA is a powerful methodology for a comprehensive assessment of N&N. Indeed, the EU proposed "...to take into account the impacts of nanotechnologies throughout the whole of their life-cycle, for example, by using Life Cycle Assessment (LCA) Tools."

But LCA of N&N still requires resolving many modelling and impact assessment issues, as:

- an appropriate choice of functional unit, taking into account the new functionalities nanotechnologies can add to products;

- selection of system boundaries;
- data collection in inventory analysis, particularly what and how to model or measure concerning nanoparticles release;
- rebound effects;
- specific impact assessment characterization factors, etc.

Authors are invited to present recent advances in data and methodological developments for the application of LCA of N&N, as well as full case studies.

E04 - Risk management in nanotechnology - are we focusing on the right issues?

Suggested chair: Teresa Fernandes (Napier University, EDINBURGH, United Kingdom)

In this session, 5 areas will be addressed: behaviour, fate, interactions, effects and risk assessment. Priority will be given to addressing realistic processes and effects prediction. This session invites contributions on understanding the deposition and movement of engineered nanomaterials in various environmental media. Information provided should focus on issues raised by the questions highlighted below. By what means do manufactured nanomaterials enter the environment? What forms of nanomaterials may be bioavailable? What are the modes of dispersion/aggregation for nanomaterials in the environment? Are more toxic metabolites formed? How do nanomaterials transfer from one media to another? In addition, the fate of engineered nanomaterials after they enter various environmental media, would also be addressed. What are appropriate testing procedures, models, and biomarkers to evaluate the potential toxicological effects of nanomaterials on species in natural ecosystems? Do nanoparticles impact ecological (animal/plant) receptors? What is the mode of action and mechanism of toxicity? Can similar nanomaterials be grouped with respect to bioactivity? What extrapolation models are needed to evaluate or predict toxicity? In addition, work undertaken in the area of QSAR development should also be included.

F - PHARMACEUTICALS

F01 - Fate and effects of pharmaceuticals and personal care products (PPCPs) in marine ecosystems

Suggested chairs: Tom Hutchinson (Plymouth Marine Laboratory, PLYMOUTH, United Kingdom) and Kevin Thomas (Norwegian Institute for Water Research, OSLO, Norway)

The United Nations has reported that three-quarters of the world's megacities are by the sea and that by 2010, 80% of people will live within 100 kilometres of the coast. Against this background, it is likely that human pharmaceuticals and personal care products will enter coastal ecosystems if residues are not removed by sewage treatment processes. A limited number of studies have reported the presence of selected analgesic, cardiovascular and anti-cancer drugs in European coastal ecosystems (Weigel et al (2002) *Sci Total Environ* 295: 131-141; Thomas & Hilton (2004) *Mar Pollut Bull.* 49: 436-444; Roberts & Thomas (2006) *Sci Total Environ* 356: 143-153). Additionally, pharmaceuticals used in aquaculture can enter the wider marine ecosystem, with evidence for example of persistent antibacterial agents in marine sediments (Hektoen et al., (1995) *Aquaculture* 133: 175-184). On the effects aspect, an increasing number of studies are now being conducted regarding the potential impacts of pharmaceuticals and their metabolites on marine organisms (Roepke et al (2005) *Aquat Toxicol* 71:155-173). This proposed session will invite scientific contributions on individual pharmaceuticals, personal care products and complex mixtures in the context of marine risk assessment. Contributions will be also sought from researchers looking for new drugs from marine organisms using molecular approaches (Hunt & Vincent (2006) *Ambio* 35: 57-64).

F02 - Fate, effects and risk assessment of pharmaceuticals in the environment

Suggested chairs: Jürg Oliver Straub (F. Hoffmann-La Roche Ltd, BASEL, Switzerland) and Alistair Boxall (Central Science Laboratory, YORK, United Kingdom)

With first measurements in environmental media going back to the 1970s, with several hundred dedicated scientific articles and several specialist books published, pharmaceuticals in the environment (PIE) cannot really be called an emerging topic any longer. However, an overall picture or well-founded broad assessment is still missing. What is needed now are experimental data, conceptual interpretations and concise models in order to improve our understanding of PIE issues. Contributions are invited both for new fate and effects results, for mechanistic explanations allowing dependable extrapolations and forecasts as well as for targeted assessment of the potential risks posed by PIE, singly or in combination.

F03 - Targeted test strategies for environmental risk assessment of pharmaceuticals based on mode of action

Suggested chairs: Joakim Larsson (Göteborg University, GÖTEBORG, Sweden) and Bryan Brooks (Baylor University, TEXAS, United States of America)

Pharmaceuticals generally target specific molecules where therapeutic mode of action (MOA) is related to specific physiological effects. In contrast, environmental risk assessments procedures for pharmaceuticals do rarely consider drug MOA of when test species or endpoints are selected. Rather, endpoints and species are included from standardized toxicity tests, which are not sensitive to predict adverse effects of select therapeutics to non-target organisms. This session would like to receive contributions that considered mode of action a priori in their selection of test species, organ, or endpoints. Vitellogenin analysis in fish exposed to estrogenic drugs is a typical example, but we would also like to receive papers on other classes of drugs and other alternative endpoints. Studies on effects as well as on pharmacokinetics (uptake, distribution, metabolism, elimination) in non-target organisms are invited. Abstracts on drugs (or mixtures) intended to act on any organism from humans down to viruses are welcome. More targeted approaches in the future have the potential to support more efficient risk assessments, although challenges are associated with such a strategy: For example how do we interpret presumably more sensitive, sublethal responses as opposed to more frequently used endpoints (e.g., reproduction, growth, survival) for the risks at the population level of biological organization? Papers addressing such aspects are also within the scope of this session.

G - RISK ASSESSMENT AND REGULATION

G01 - Aquatic ecosystem and wetland health - risk assessment and remediation

Suggested chairs: Mohiuddin Munawar (Fisheries and Oceans Canada, BURLINGTON, ONTARIO, Canada), Gertie Arts (Alterra, WAGENINGEN, The Netherlands) and Jo Davies (Syngenta, BRACKNELL, BERKSHIRE, United Kingdom)

Ecosystem health differs from human health, where the focus is on the function and wellbeing of the individual (human health). Ecosystem health is instead focused on populations and communities. The concept is more recent but nevertheless crucial for environmental protection. Aquatic ecosystem health, its assessment, protection and management is the foundation for the European Water Framework Directive. The importance of aquatic macrophytes in maintaining ecosystem function and stability is well recognized. Despite their ecological relevance and role as key species, few standardized tests exist for these organisms to characterize toxicity for use in the regulatory ecological risk assessment processes for plant protection products and other contaminants.

The aim of this session is to highlight research needed in support of the concept of Aquatic ecosystem health and its importance in protecting our water resources. The role of macrophytes in maintaining ecosystem function is one example of this.

G02 - Ecosystem services: a new approach in ecological risk assessment

Suggested chairs: Joke Van Wensem (Soil Protection Technical Committee, THE HAGUE, The Netherlands) and Lorraine Maltby (University of Sheffield, SHEFFIELD, United Kingdom)

The session will address the meaning of the concept of ecosystem services for ecological risk assessment (ERA). Ecosystem services are the benefits people obtain from ecosystems. The concept has been re-introduced by the Millennium Ecosystem Assessment (2005), where it was used to explain the link between the condition of ecosystems and human well-being. Four different types of services have been distinguished in the Millennium Assessment: provisioning services (e.g. food, fuel), regulating services (e.g. air quality, pollination), cultural services (e.g. educational values, sense of place), and supporting services (e.g. photosynthesis, nutrient cycling). The concept of ecosystem services may be better in communicating the importance and urgency of environmental management and protection, as it shows our dependency on ecosystems, while acknowledging that humans are part of ecosystems. Risk assessment for ecosystem services could (and should) become a new field in environmental sciences.

Current ecological risk assessment approaches tend to focus on a specific threat (e.g. pollution) in a specific ecosystem compartment (e.g. soil or water), and are concerned primarily with the protection of species. The sustainable use of multiple ecosystem services is dependent on the protection of ecosystem processes that may depend on several ecosystem compartments, and on the trade-offs between ecosystem services.

The session will evaluate how an ecosystem services approach could strengthen ERA, and will address questions such as: To what extent do current ERA approaches protect ecosystem services? Which services are being protected and are they the 'right' ones? By focusing on species are we being over- or under-protective with respect to services? How do we assess the risks of multiple threats to ecosystem services? Should we change ERA approaches in order to assess ecosystem services explicitly and if so, what changes are required? What are the trade-offs between services and how do we manage them?

As this is a relatively new topic, we would like to address both fundamental and applied aspects of ecosystem services that are important for answering our questions. Besides a general introduction to ecosystem services, we intend to address issues related to the economical valuation, restoration, quantification and risk assessment of ecosystem services.

G03 - Environmental Risk Assessment in the context of climate change

Suggested chairs: Matthias Liess (UFZ, LEIPZIG, Germany) and Ben Kefford (RMIT University, BUNDOORA, Australia)

Climate change will alter both the exposure of chemicals in the environment as well as environmental parameters which may modify the sensitivity of organisms, populations and communities to toxicants. Relevant to exposure assessment for example, more extreme weather events are predicted due to climate change which will likely result in increased transport of chemicals in episodically events and also increased maximum suspended sediment concentrations. The latter in turn will alter the bioavailability of contaminants in the aquatic environment. Regarding effect assessment, species are expected to respond to climate change differently: some may increase in their abundance or distribution range, others may decline. The timing of biological processes that allows species to co-exist may be altered and may lead to changes of communities, reduced biodiversity or increased occurrence of invasive species. In view of such climate change impacts, environmental risk assessment has to be adapted. This session invites contributions that are showing examples or are exploring the effect of climate change on the environmental risk assessment of chemicals.

G04 - Groundwater: a receptor or an exposure route for setting soil quality standards?

Suggested chairs: Marylène Moutier (SPAQUE, LIÈGE, Belgium) and Ilse Schoeters (Rio Tinto Minerals, GHENT, Belgium)

The EU groundwater directive specifies that groundwater is a valuable natural resource and as such should be protected from deterioration and chemical pollution. This is particularly important for groundwater-dependent ecosystems and for the use of groundwater in water supply for human consumption. The directive articulates the need for the identification of substances of concern and the setting of groundwater threshold values for these substances by member states. At the same time, several EU member states have soil quality standards, some of which include the protection of the quality of groundwater. The need for consistency in protection levels among compartments is recognised. Questions have been raised on what should be the protection target and how should groundwater be protected. The following cases can be distinguished, where groundwater may be considered:

- as a valuable resource for drinking water, therefore using existing drinking water standards as groundwater threshold values;
- as an ecosystem that should be protected, therefore using groundwater threshold values to protect this ecosystem;
- as a pathway by which contaminants migrate from soil to surface water, therefore using freshwater quality standards for the groundwater compartment.
- This session aims to present an overview on the following topics:
- when should groundwater be included when deriving soil quality standards?
- what should be the protection goal of groundwater threshold values?
- what ecotoxicity tests can be used to derive threshold values that protect the groundwater ecosystem?
- can freshwater quality standards be used as groundwater threshold values or should the soil buffer capacity be considered and if so, how?
- when separate standards/threshold values are derived for soil and groundwater, how to ensure that soil quality standards will lead to an exceedance of the groundwater threshold values?

G05 - Guidance documents for environmental risk assessment of plant protection products: new developments and progress

Suggested chairs: Robert Luttik (RIVM, BILTHOVEN, The Netherlands) and Christine Füll (European Food Safety Authority (EFSA), PARMA, Italy)

In 2006, the responsibility for producing new or for revising already existing Guidance Documents addressing risk assessment was transferred from the European Commission to the European Food Safety Authority (EFSA). The Scientific Panel on Plant Production products and their Residues (PPR Panel) started with the revision of the Guidance Document on Risk assessment for Birds and mammals (opinion adopted in 2008). In the course of the revision of the Guidance document for birds and mammals the Panel; recognized that the task required several risk management decisions which are not within EFSA's and the PPR Panel's remit.

The aim of this session is to explain how new guidance documents are developed: which guidance document has to be revised, who should be involved and how many risk management issues could be addressed. In addition the results of the new guidance documents will be presented.

G06 - Impacts of the European Environmental Liability Directive on ecological restoration

Suggested chairs: Joshua Lipton (Stratus Consulting, BOULDER, COLORADO, United States of America) and Jason Weeks (CEFAS, WEYMOUTH, DORSET, United Kingdom)

The European Environmental Liability Directive (ELD), adopted by the European Parliament in 2004, entered into force on April 30, 2007. The ELD provides for compensation for damage to natural resources through the implementation of ecological restoration actions. Quantifying environmental damage and necessary environmental restoration requires the application of ecological, toxicological, economic, and legal principles. The ELD establishes a preference for the use of relatively novel ecological and resource equivalency methods to scale the benefits of remediation projects to the nature and extent of environmental damage. In this session, we welcome presentations that review the ELD and related laws enacted by Member States, describe state-of-the-art of resource equivalency methods used to identify and scale ecological restoration under the ELD, and report on European case study applications of ELD methods.

G07 - Improving risk assessment of biocides: bridging regulatory and scientific questions

Suggested chair: Erik Van de Plassche (Joint Research Centre, ISPRA, Italy)

The EU Directive 98/8/EC regulates the placing on the market of biocidal products. Many of the active substances used in these products show a specific biological activity and are known to cause adverse effects in biota. Consequently, the risk of these substances needs to be carefully assessed towards human health as well as towards the different environmental compartments.

This risk assessment of biocides is highly depending on the appropriate models to estimate exposure and assess the specific biological effects of these substances and, where relevant, their metabolites. First, this session will devote specific attention to recent developments in the regulatory status of biocides within the so-called Review Programme in which for all active substances on the European market a risk assessment is carried out, taking into account the current Commission proposal on the revision of the Directive. Second, the session will devote specific attention to the implementation of the state-of-the-art effect but especially exposure studies of these substances for classes like rodenticides, wood preservatives, antifouling products, disinfectants and insecticides. These classes are currently evaluated within the Review Programme and specific workshops at EU level have already been devoted to environmental risk assessment for some. However, it is clear that there is room for improvement of the current methodologies, especially related to exposure assessment.

We invite scientists studying the effects and fate of biocides as well as regulators dealing with the risks of these substances to submit abstracts into this session.

G08 - Managing priority substances under the Water Framework Directive

Suggested chair: John Munthe (IVL Swedish Environmental Research Institute, GÖTEBORG, Sweden)

The Water Framework Directive sets the goal of achieving a "good status" for all of Europe's surface waters and groundwater by 2015. This is a major challenge, as recent assessments estimate that at least 40% of the EU's surface water bodies are at risk of not meeting the 2015 objective. For an identified list of priority substances (PS), the European Commission has proposed environmental quality standards which should not be exceeded in European waters. The introduction on this legislation puts considerable pressure on member states and the identified water districts to manage releases and environmental contamination of the PS.

This session is focussed on research and the development of tools in support of the management of PS. It will include presentations on emissions from industrial, urban, and agricultural sources; possibilities for source control and treatment; models and empirical research on transport and

transformations of PS in watersheds; models and decision support tools for the implementation of the WFD as well as research on contamination levels, impacts and remediation.

G09 - Mechanistic effect models for ecological risk assessment

Suggested chairs: Valery Forbes (Roskilde University, ROSKILDE, Denmark) and Roman Ashauer (Eawag, DÜBENDORF, Switzerland)

Chemical risk assessment aims at quantifying adverse effects on individuals and populations of organisms. Laboratory toxicity tests provide basic data but the extrapolation and quantification of toxic effects requires mathematical models. However, in order to ensure sustainable use of chemicals without compromising societal benefits, it is important to gain a better understanding of how anthropogenic stressors may interact with ecological systems than what current regulation allows for. Such an understanding will lead to more ecologically relevant risk assessments as well as to improvements in risk mitigation strategies and ecosystem management. Current regulatory risk assessments of chemicals focus on the level of the individual organism, but in most regulatory contexts the minimum level of protection is the population. Population-level effects and therefore risks of chemicals depend not only on exposure and toxicity but also on a suite of important ecological factors of the species of concern and the landscape under consideration. It is virtually impossible to fully address all these factors empirically for all possible organisms and environmental conditions. Mechanistic effect models, i.e., ecological models that explicitly represent key ecological processes, enable the inclusion of these factors and simulate how they modify the impact of toxic effects at population and community levels. In this session we aim to bring together a range of examples or case studies to demonstrate how mechanistic effect models can improve the ecological basis of risk assessment. In particular, we seek studies where the robustness of both the modelling process and the models is demonstrated. This can be achieved by explicit communication of model assumptions and their justification, justification of the model type, documentation of calibration and parameter estimations, testing models with independent datasets, sensitivity and robustness analyses, quantifying model uncertainty, and testing model extrapolations. The topics may cover a wide range of contaminants such as pesticides, human or veterinary pharmaceuticals, metals or mixtures of these and their effects on marine, freshwater or terrestrial organisms, while taking into account different environmental stressors and scenarios.

G10 - Mixture toxicity in environmental risk assessment and regulatory decision making - relevance and state-of-the-art

Suggested chairs: Tobias Frische (Federal Environment Agency (UBA), DESSAU, Germany) and Katja Knauer (Eidgenössisches Volkswirtschaftsdepartement EVD, BERN, Switzerland)

This session aims to explore and discuss (i) the general relevance of mixture toxicity in environmental protection, (ii) whether current risk assessment regimes adequately take mixture toxicity into account and (iii) what are the potentials and restrictions of existing scientific approaches for assessing mixture toxicity from a scientific and regulatory point of view. Highly requested contributions include: (i) significant case studies describing the relevance and/or experiences from consideration of mixture toxicity in environmental risk assessment and regulatory decision making, (ii) reviews of the state-of-the-art from both a scientific and regulatory perspective and (iii) well-justified proposals on how to proceed with the implementation of the current scientific knowledge on mixture toxicity in regulatory regimes.

G11 - REACH: State of the art and the way to go for academia, industry and regulatory authorities

Suggested chair: Michael Neumann (Federal Environment Agency, DESSAU, Germany)

This session combines the scientific, industrial, and regulatory cognition of the impact of REACH. We want to explore the improvements and difficulties of the new legislation from all involved perspectives. The backbone of this session is the risk assessment of chemicals including the complete chain from emission and distribution, to exposure of ecosystems, and to effects under REACH. However, we expect contributions to focus on the regulatory meta-level, to close gaps to existing legislations, and to share latest trends and new concepts. We feel certain that this session will help to create an understanding of the pan-European significance of REACH.

G12 - Recovery endpoints in risk assessment and management

Suggested chairs: Carsten Brühl (University Landau, LANDAU, Germany), Frank Bakker (MITOX Consultants, AMSTERDAM, The Netherlands) and Jörn Wogram (Federal Environment Agency, DESSAU, Germany)

The direct effect of a toxicant may be short-lived at the level of exposed individuals, while at the level of populations or communities effects may be apparent at longer time-scales. The long-term ecological consequences of ppp exposures depend on the intensity and frequency of the exposure relative to the rates of recovery of the exposed populations. Effects on many populations at a location translate then to community level changes also potentially affecting ecosystem services. Therefore recovery is recognized as an important endpoint in ecotoxicological testing (e.g. aquatic mesocosms, earthworm and non-target arthropod field experiments) and is often used in higher tier risk assessment.

Risk management may be restricted to (1) use of short-lived effects without consideration of recovery, such as in the use of the NOEC; (2) involve the use of potential for population recovery (e.g. life history parameters returned to standard level); (3) require the assessment of actual recovery of affected populations (e.g. populations at same density as corresponding unexposed control populations). In addition, community recovery may be invoked, such as demonstrated with the use of multivariate techniques (e.g. PRC-analysis).

In this session, we wish to critically evaluate the concept and merits of recovery in regulatory testing and risk management. We would like to address questions such as: Should immigration/re-colonisation and true population recovery be considered separately? What is the relationship between spatial and temporal scale (i.e. plot size and study duration) in recovery studies and how does this relate to life history characteristics? Do we need long-term monitoring data for recovery processes?

We invite contributions that empirically or theoretically evaluate population recovery and opinions on the application of recovery in the risk assessment process.

G13 - Risk assessment of metals

Suggested chairs: Adam Peters (Wca environment limited, FARINGDON, United Kingdom), Marnix Vangheluwe (EURAS / ARCADIS Belgium nv, GHENT, Belgium) and Katrien Delbeke (European Copper Institute, BRUSSELS, Belgium)

Metals are a category of substances of which some are often found on regulatory priority lists (EU Existing Substances, EU Water Framework directive, national soil legislation,...). Driven by the EU Existing Substances regulation, a large amount of knowledge and experience has been gathered over the last decade on how to accurately assess the risks of metals in the environment (aquatic and terrestrial) at local and regional scales. These advances are mainly related to an improved understanding of the exposure, fate and especially the bioavailability and toxicity of a limited number of metals as Cu, Ni, Zn, Pb and Cd. There are however many other metals in use for which this detailed knowledge is not available. Examples of such metals are the precious and platinum group elements (Au, Ag, Pt, Pd, Rh, Ir, Os, Ru). Their use has increased drastically over the last decades amongst other as catalytic converter of motor vehicles.

While detailed knowledge on exposure and toxicity is available for some metals, some knowledge on exposure, speciation and toxicity is available for other metals while very limited knowledge is available for other metals.

The outcome of a risk assessment depends highly on the model and methods used. One risk assessment method which fits all metals is therefore not warranted and a tiered methodological approach is needed which takes into account the available knowledge of the metals.

This session will devote specific attention to the implementation of the state-of-the-science in risk assessments at national and EU level.

The objective of this session is to present (1) the state of the art on risk assessment of metals and (2) tiered approaches for risk assessment of metals taking into account the different levels of knowledge on the specific metals.

Note: the scope of this session is application of scientific knowledge in risk assessment. Presentations related to assessment of fate, exposure, bioavailability and toxicity of metals will be addressed in session B01.

G14 - Sediment quality assessment and management

Suggested chairs: Richard Wenning (ENVIRON, EMERYVILLE, United States of America), Javier Rufino Viguri Fuente (University of Cantabria. ETSIIT., SANTANDER, Spain) and Gregory Durell (Battelle, DUXBURY, MASSACHUSETTS, United States of America)

Sediments are complex environmental compartments which are often contaminated with multiple chemicals, making risk assessment and management difficult and challenging. The development of frameworks based on gathering measures from multiple lines of evidence and the use of tools to provide an integrated interpretation of such information, are key issues to allow for an informed decision. For instance, some contaminated sediment remedy- and management decisions may be based purely on surface sediment contaminant concentrations, other on measured or modeled bioavailability of sediment contaminants, contaminant accumulation in selected biota, or measured sediment toxicity to selected water-column organisms. In the 1990's the sediment quality triad approach was developed and proposed for integrating chemistry, toxicity, and community impact in the decision making process. Subsequently, it has become evident that contaminant toxicity alone does not necessarily drive the ecological risk, and additional methods to document lines of evidence (LOE) of potential ecological impact have been developed. Furthermore, various multicriteria decision analysis tools have been developed to, in an integrated manner, interpret the information, and establish links between potential stressors, ecological impact, and sediment quality. Moreover, management of contaminated sediments requires the integration of multiple technical, social, economic and environmental criteria when choosing among the wide variety of possible remediation options; since financial resources will presumably be limited, it may also be necessary to prioritise the need for sediment management in different areas.

This session aims at discussing use of sediment decision frameworks to effectively assess potential risks for the ecosystem and/or human health, as well as presenting multicriteria approaches for decisions in sustainable sediment management.

G15 - Applications of environmental standards and site-specific risk assessment

Suggested chairs: Natalie Wilson (ARCADIS, BRIGHTON, MICHIGAN, United States of America), Stefano Della Sala (VERITAS, VENICE, Italy) and Claire Cailles (Environment Agency, CHESHIRE, United Kingdom)

In a world with competing priorities for environmental expenditures, when the cost of a remediation project is high, there should be convincing expectation of commensurate benefit. Environmental standards are in general used for first decisions about potential remediation sites. The methods used to derive these standards vary widely depending on the organisation, country, and type of pollutant. For example, standards for protection against radioactive substances vary between organisations and countries, and some pollutants do not fit well with the standardised derivation techniques (e.g., metals).

When pollutant concentrations exceed environmental standards, human health and ecological risk assessments are useful for defining the need for and extent of remedial action at contaminated sites. However, when site data are too limited and screening exposure models (e.g., those underlying environmental standards) do not reflect current or reasonably anticipated future conditions, or alternatively when data, methods, and results of a complex analysis are not successfully communicated to stakeholders, then risk assessment becomes ancillary to the risk management process. All stakeholders are best served when risk assessments are sufficiently comprehensive to justify commitment of resources to remedial action, and also sufficiently focused to provide implementable guidelines for remedial design. The sessions seeks contributions on:

- the comparison of risk assessments between chemical and radionuclide contaminants, and the development of numeric benchmark values to be used in radiological risk assessment;
- the validation of current environmental standards in order to highlight any potential under or over precautionary measures against the intended protection goals;
- data collected and exposure models used to support site-specific risk assessment, preferably with a focus on how the findings were summarized and prioritized for risk managers and the public;
- presentations detailing why and how a project moved from a screening analysis covering multiple chemicals, receptors, and exposure pathways to a detailed assessment of a subset. Of particular interest is experience in achieving stakeholder acceptance of site-specific risk-based action levels and translating them into design (i.e., "footprints") for remedial action.

G16 - Spatio-temporal extrapolation in ecological risk characterization

Suggested chair: Theo Brock (Alterra, WAGENINGEN, The Netherlands)

The field of ecological risk assessment (ERA) of chemical stressors deals with prospective and retrospective approaches. New developments in ERA focus on more realistic exposure and effect estimates, e.g. addressing the spatio-temporal configuration of populations and communities as affected by the spatio-temporal distribution of the toxic chemicals in the subjected ecosystem/landscapes of concern. In this session papers are invited that address;

- Extrapolation across time-variable exposure regimes;
- Extrapolation across time-variable sensitivity;
- Spatially-explicit risk assessment;
- Geographical extrapolation.

G17 - Standard methods for hazard and risk assessments and monitoring of ecosystem health

Suggested chairs: Rick Scroggins (Biological Methods Division, OTTAWA, Canada) and Göran Dave (Göteborg University, GÖTEBORG, Sweden)

National and international standards for biological testing are used around the world in risk assessment, in the monitoring and control of pollutants released to the environment and in the remediation of historical contamination. Although scientists in academia, industry and government institutes conduct the research to develop testing methodologies, standards organizations use the best of this research to prepare environmental testing standards for application in regulatory and non-regulatory laboratory programs and field studies. The principal drivers behind the need for standardization of biological test methods are to ensure: generation of high quality toxicology data; national or international consistency in the application of test standards, guidelines or methods; and proper application and interpretation of this data in environmental regulations and guidelines. Overall, the quality of the methods and practices at laboratories or during field sampling efforts ensure that environmental protection decisions on a local, regional or global level are made in a consistent manner using the most appropriate science. The aim of this session is to highlight the availability of standards and the need for future development in relation to European and international needs. Speakers from across government, academia and industry will be asked to demonstrate how national or international biological testing standards are used in reducing or eliminating the release of harmful chemicals and in controlling pollutant levels in the discharge and emissions from industry.

G18 - The science behind REACH: existing approaches and the need for new developments

Suggested chairs: David Kent (Keller and Heckman LLP, BRUSSELS, Belgium) and Jose Tarazona (INIA, MADRID, Spain)

REACH has now come into force and the pre-registration period is complete. Now companies must put together the registration dossiers for thousands of substances. And the time is short for many high volume substances - dossiers are due by December 2010.

This session will look at the scientific approaches (including their absence due to lack of knowledge especially in the area of soils and soils strategies) in relation to demands of REACH compliance. Topics such as data gap analysis, substance grouping strategies, maximizing the value of existing data, meeting data needs through innovative and practical applications of QSARs and other non-animal testing strategies, and preparation of Chemical Safety Reports and Safety Data Sheets. Exposure based waiving strategies will be discussed. Case studies and practical applications will be included in the session.

G19 - Trait-based Ecological Risk Assessment (TERA)

Suggested chair: Paul Van den Brink (Alterra and Wageningen University, WAGENINGEN, The Netherlands)

Traits are the physiological, morphological and ecological attributes of species, or other taxonomic entities, which describe their physical characteristics, ecological niche and functional role within an ecosystem. Trait-based approaches are now being introduced into the field of Ecological Risk Assessment (ERA) and bioassessment of ecological quality of aquatic ecosystems. This is a consequence of our realisation that taxonomy-based descriptions of natural systems place limitations on our ability to describe ecological responses to stress. Whereas taxonomy can be regarded as a higher-level expression of the genetic composition of organisms, traits can be seen as their functional consequence. Currently traits are used to evaluate biomonitoring data, to develop stress indicators and to get a mechanistic understanding of responses of individuals, populations,

communities and ecosystems to stress. In this session, papers describing the application of and the pros and cons of applying trait-based approaches in ERA will be welcomed.

H - THREATS TO TERRESTRIAL ECOSYSTEMS

H01 - Advances in bioaccumulation assessment: Predicting bioaccumulation potential in terrestrial environments

Suggested chair: Mark Bonnell (Environment Canada, GATINEAU, Canada)

Traditionally, the assessment of bioaccumulation potential, whether for chemical prioritization or assessment, has focused on the aquatic environment with fish as the primary species of choice. This has largely been due to the greater availability of data for this compartment as well as a more developed area of bioaccumulation science. However, recent regulatory initiatives focusing on substances with a high degree of persistence and bioaccumulation potential would suggest that non-aquatic species (e.g., piscivores and carnivores) are mostly likely to have the greatest exposure via the food web. Substances with this profile and some degree of inherent toxicity (i.e., PBTs) are potentially a serious threat to the environment and humans. Entry of these substances to the terrestrial environment can occur when sewage sludge containing PBT substances is applied to agricultural lands as fertilizers. Terrestrial air breathers can also become exposed to substances deposited in soils and plants from air that then migrate through terrestrial food webs. Recent developments in terrestrial organism modeling, monitoring and food web analysis using physical-chemical properties and physiological parameters appropriate for air-breathers (e.g., octanol-air partition coefficient, field metabolic rate, dietary assimilation efficiency, etc) have helped to create a better understanding of potential threats to terrestrial organisms from PBTs. Efforts in this area have also shown that focusing only on pelagic species for regulatory bioaccumulation assessment can result in many false negatives. Given that regulatory initiatives are now focusing on substances with little bioaccumulation or exposure data, this session invites discussion on the predictive aspects of terrestrial bioaccumulation assessment. Predictive approaches that generate data for chemical prioritization (i.e., BMF) as well as exposure-based food web models for risk assessment are invited. Discussion of appropriate criteria for thresholds of bioaccumulation potential in terrestrial systems is also encouraged.

H02 - Chemicals, biodiversity and terrestrial ecosystem function

Suggested chairs: Marlea Wagelmans (Bioclear b.v., GRONINGEN, The Netherlands), Satish K Gupta (Swiss Federal Research Station for Agroecology and Agriculture (FAL), ZÜRICH-RECKENHOLZ, Switzerland) and Beate Strandberg (University of Aarhus, NERI, SILKEBORG, Denmark)

Biodiversity plays an important role in keeping our terrestrial ecosystems healthy for a.o. food production. This is not only "seen" biodiversity (like macro-organisms and higher organisms) but also subsurface and deep soil biodiversity (focussed on functional biodiversity). Lots of progress is being made on functional biodiversity and changes owing to all kinds of activities. However, the latest progress report from the European Environmental Agency on the 2010-target for halting biodiversity losses concludes that the target is unlikely to be reached within farmland ecosystems without additional policy efforts. Biodiversity at habitat, species and genotype levels continues to decline within farmland areas.

The biodiversity and thereby functioning of terrestrial ecosystems can be affected by contaminants and pesticides. In some cases terrestrial ecosystems may adapt to chemicals and degrade them. So on one hand we should (and have to) protect the terrestrial ecosystem but on the other hand this system offers a lot of opportunities (for instance enzymes to be used in all kinds of useful products). In this session we will discuss the interactions between biodiversity and chemicals in relation to terrestrial ecosystem function:

- Use of terrestrial biodiversity for safe food production, e.g. the influence of biodiversity on the physical properties, disease suppression and degradation of organic pollutants and their metabolites;
- Impact of pollutants and pesticides on terrestrial biodiversity;
- Impact of agricultural practice, including organic matter management, on terrestrial biodiversity.

H03 - Soil ecotoxicology

Suggested chairs: Kees Van Gestel (Vrije Universiteit Amsterdam, AMSTERDAM, The Netherlands) and Juliska Prinz (Environment Canada, OTTAWA, Canada)

This topic will include various aspects of soil ecotoxicology, focusing on novel developments in the areas of: ecotoxicological test methods; ecologically-relevant standardized test species, processes or endpoints; multi-species tests (e.g., micro or mesocosms); contaminant bioavailability in soils; test designs for assessing contaminant exposure and effects in soils; bioaccumulation of contaminants in soil biota; assessment of effects on functional endpoints; natural variability of functional endpoints; linking different endpoints in soil ecotoxicology with functioning of soil processes; role of different soil organisms in processes; ecotoxicological effects of biotreatments or application of waste materials; improvement of soil ecosystem health by interactive soil-plant management strategies; etc.

H04 - Toxicity effects of combined stressors in soil

Suggested chairs: Susana Loureiro (University of Aveiro, AVEIRO, Portugal) and Claus Svendsen (Centre for Ecology and Hydrology, HUNTINGDON, CAMBRIDGESHIRE, United Kingdom)

Environmental contamination is often characterised by a combination of stress factors of various sources (biological, physical and chemical). Climate changes (e.g. changes in temperature, water characteristics, UV radiation) might input additional stress to the environment also when considering chemical contamination. The predictability of their joint effects is an important stage in environmental risk assessment procedures that has not been taken into consideration. This session encourages submissions of contributions around the topic of multiple stressors (chemical and non-chemical), with particular focus on their combined (potential) impact on the terrestrial ecosystem. The session aims to cover examples of several stressors, endpoints and species (e.g. from microorganisms, to invertebrates or plants).

H05 - Deriving, implementing and interpreting soil quality standards: the current state of understanding and future developments

Suggested chair: Graham Merrington (Wca environment, FARINGDON, United Kingdom)

Soil quality standards are widely used to protect the environment and human health from chemicals released by human activity. Many aspects of these standards, including their derivation and application, differ between countries. Some of this diversity reflects technical differences that must be taken into account in the development of standards, but some is due to the piecemeal fashion with which the standards have been developed. Harmonisation of soil quality standards is critical to ensure efficiency, consistency and practicality for both businesses and regulators.

The aims of this session are to present:

- sources of differences in soil quality standards between countries/regions;
- recommendations for how soil quality standards could be harmonised;
- recommendations on how to take into account the functionality of soils;
- recommendations of how to derive soil quality standards that are relevant metrics to assess chemical risks to environmental and human health.