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LIST OF TOPICS

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A - Ecotoxicology

A01 - A Systems Biology approach to predictive Ecotoxicology

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Ecotoxicology is concerned with understanding how animals are affected by pollutants in the ecosystem. Recent developments in this area empowered by the widespread availability of functional genomics technologies (e.g. high throughput sequencing, expression profiling, proteomics and metabolomics) have been successful in increasing our understanding of specific mechanism of actions and have provided the community with useful biomarkers (1,2).

However, the full potential of predictive toxicology can only be achieved by taking a systems level approach, which integrate these complex multi-level molecular and physiological measurements within a unifying interpretative model (3). In order to address this issue, a number of approaches have been developed to infer computational models of regulatory networks from experimental data. Given the overall lack of information on the specific dynamics of the interactions for the majority of the biological components, network inference methods tend to be based on information theory or probabilistic methods (4). However, more recently approaches that allow modeling complex process dynamics such as State Space models and Ordinary Differential Equations (4) approaches have become commonly used.

This session aims to present to a broad audience an overview of the research ongoing in the area of predictive Ecotoxicology, with a specific focus on case studies based on a Systems biology approach. We envisage a series of contributions bringing together a broad, interdisciplinary range of presentations focusing upon predicting impacts of pollutants on animals and populations. Although the emphasis will be on the application of computational methods to problems of ecotoxicological relevance we fully embrace a broader vision of Systems Biology where integration may be achieved via descriptive interpretative models. The ultimate aim of the proposed session is to provide an overview of very recent approaches in the area of predictive toxicology and promote a broader application of Systems Biology approaches in ecotoxicology.

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A02 - Advanced statistical methods in quantitative ecotoxicology

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The use of risk-based approaches in ecotoxicology has been accompanied by an increasing level of mathematical and statistical sophistication. While there is a substantial history of interaction between statisticans and ecotoxicologists, the integration of disciplines has been patchy with organic rather than planned growth and development. Although concerns have been raised over a number of years over aspects of ecotoxicological practice (such as the philosophical basis of SSDs and the use of NOECs), the reality is that the paradigm is firmly entrenched and there appears to be a high degree of resistance to change. This inertia has been accompanied by a tendency to develop more and more metrics or indexes that claim to summarise complex and multi-faceted ecological assessments in a single measure.

Whether this helps or hinders is an open question that is attracting much discussion as is the recent suggestion of Landis and Chapman to ban NOELs and LOELs.

The aim of this session is to encourage a wide-ranging discussion about the use of advanced statistical tools, methods, and metrics in ecotoxicology. Technical presentations that are consistent with this objective are most welcome although we particularly encourage contributions from a broad cross-section of the ectotox community that talk to issues such as:

- The balance between statistical sophistication and ease of use and implementation;
- Minimum statistical skills that ecotoxicolgists should have;
- Strengths and weaknesses of certain statistical paradigms used in ecotoxicology;
- Development of metrics and indices - should there be more or less?
- Statistical training for ecotoxicologists - what's required in university course and on-going professional development?;
- Statistical software tools for ecotoxicologists - what's available and what's required?
- Engagement with the professional statistical community - how to increase and maintain?
- Strengths and weaknesses of current concentration-response modelling and future directions;
- New or novel statistical methods for setting hazardous concentrations.

A03 - Animal Alternatives: methods, endpoints, and testing strategies

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This session aims to explore animal alternative methods and strategies based on 3R principles (reduce, replace, refine) which have received increasing attention for use in environmental risk assessment (ERA), hazard screening and effluent toxicity assessment. Target organisms have included fish, amphibians, and birds for endpoints such as bioaccumulation, acute and chronic toxicity, and endocrine disruption. In this session, sponsored by the SETAC Animal Alternatives in ERA Advisory Group, we continue to explore the state of the science in method and strategy development. Use of Adverse Outcome Pathway and genomic analyses, advances for in vitro approaches, statistical modeling, and improvements in use of existing data among others are within the scope of this session. The session will complement a Special Session on Alternative Animal Testing Strategies with invited speakers.

A04 - Bioaccumulation - impact of environmental, biological and ecological variation

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Current approaches for bioaccumulation measuring and modelling are often inadequate to account for the complexity of some bioaccumulation patterns. Recent studies have clearly pointed out that current B-assessment methods are not able to capture all variation in bioaccumulation processes that may occur under field conditions.

Environmental, biological and ecosystem variables may affect the transfer of contaminants from the abiotic to the biotic compartment including variation in contaminant concentration, in sediment constituents (e.g., labile organic matter, black carbon) as well as in physiological parameters like biotransformation ability. In addition, food web dynamics may add variability to accumulation patterns towards predators.

Another aspect concerns the conventional flow-through fish test according to OECD 305 reducing the manifold uptake and elimination mechanisms in aquatic organisms to respiratory absorption via gills and diffusion through the skin, but neglecting accumulation from food. Furthermore, a range of substances show specific (i. e. active) mechanisms of uptake in the gastro intestinal tract or specific protein binding, for example, poly- and perfluorinated carboxylic acids. A realistic assessment of bioaccumulation at low dose exposures therefore requires to address mechanisms and processes beyond thermodynamic equilibrium partitioning expressed e.g. by the 1-octanol/water partition coefficient log Kow.

Computational models, in vitro methods, modified in vivo test strategies, and field studies are all means to address bioaccumulation assessment for regulatory purposes. These approaches should elucidate underlying structures in the variation (e.g. spatial-temporal variation, behavioural patterns, variation in bioavailability) and provide more realistic assessments of bioaccumulation potential of contaminant under field conditions. Furthermore, more complex bioaccumulation models differentiate multiple uptake and (pseudo-) elimination processes like excretion with faeces, metabolism and dilution by growth. The process-based assessment of bioaccumulation calls for revised/extended test guidelines and has major implications for bioaccumulation modelling.

The proposed session invites studies based on laboratory or field data or on modelling approaches which are focused to explain variation in bioaccumulation patterns. Moreover, papers that deal with

the inclusion of new approaches, based on other concepts than BCFs, in current regulatory frameworks are solicited for. Presentations could address questions like: how is contaminant accumulation affected by environmental (e.g. sediment composition), biological (e.g., uptake route, bioavailability, biotransformation) and ecological (e.g., food web level/type, seasonality, migration) parameters? Which species traits define the relative contribution of those parameters to the variation in bioaccumulation? What are the main driving factors in the transfer of contaminants from the abiotic to the biotic compartment? Are such drivers depending on tropic level or other factors? How can we best optimize and implement variation in regulatory assessment?, and include presentations addressing the use of alternative concepts for the assessment of bioaccumulation under REACH.

A05 - Ecotoxicology and ecosystem services: A southern perspective

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Notwithstanding the large array of excellent tools that have been developed, the state of ecosystems is on the decline through continued production and release of contaminants to the environment; habitat destruction due to development pressures; exploitation of natural resources, etc. Ecosystems may be valued much more by people if ecosystem health is related to how it changes ecosystem services, which ultimately affect human well-being in both monetary and health terms. Ecosystem services such as climate regulation, disturbance regulation/storm protection, water regulation/flood protection, sediment regulation/erosion control, nutrient regulation, waste treatment, biological control, habitat/refugia, food production, genetic resources, recreation potential, cultural/aesthetic are reflected implicitly in many ecotoxicological studies, but explicit linkages to ecosystem services are rarely made. Trade-offs between ecosystem services mean that not all services can be maximised simultaneously and therefore ecosystems will have to be managed to provide a portfolio of services, the exact composition of which will depend on how different services are valued. For this session we would like to invite researchers to submit abstracts that report on studies where the interrelationship between ecotoxicological assessment and measurement endpoints can be related to ecosystem services. Presentations highlighting different cultural valuations of ecosystem services (i.e. perspectives from Central and South America, Africa, South-east Asia, Australasia, etc.) are strongly encouraged.

A06 - Ecotoxicology of amphibian and reptiles. Novel approaches for linking contaminant effects with population declines

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The session overall theme and objectives are linking causes and effects through integrated and novel approaches in the ecotoxicology of amphibians and reptiles, with a special focus on these aspects that may be related with population declines of these two taxa. Background and significance are the increasing evidence and concern about amphibian and reptile population declines, with chemical environmental contaminants being among the major causes. However, the role contaminants play either exclusively or in combination among other environmental factors has rarely been assessed. The population decline phenomenon triggered intense research activities, and the available information on the ecotoxicology of these two vertebrate classes has considerably increased, with the numbers of existing pertinent publications roughly doubling for both taxa only during the last decade. However, much work is yet to be conducted to expand our understanding of contaminant effects on amphibians and reptiles, especially the latter. Future scientific challenges include conceptual biosurvey, bioassay, and biomarker development and validation, as well as (not mutually exclusively) micro-pollution, multi-stressor, and effects of priority concern targeted research eventually aiming at predicting spatial and temporal exposure and effect cascades through ecosystem structural, functional and trophic integration. Finally, integrating ecosystem approaches into Ecological Risk Assessment is an ultimate requirement to eventually predict spatial and temporal exposure and effect cascades and considering management and remediation measures.

A07 - Environmental OMICs: a global answer to environmental questions

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OMICS technologies have being increasingly used to address and answer environmental questions in

relation to stressors effects and risks. Environmental proteomic research focuses on the analysis of an organism's proteome and the detection of changes in the level of individual proteins in response to environmental stressors. Proteins are key elements of the cellular machinery and changes in the environment will result in changes in the expression of proteins. The study of changes to the gene expression is an alternative and complementary approach. Genes do not show the same diversity in the level of regulation or function that is found for proteins but they could provide preliminary information of global regulations. Environmental OMICS can therefore provide a robust approach for the assessment of (the cause and effects of) environmental stress. This area of research is built by a strong cross-disciplinary collaboration between analytical chemistry, system ecology, biology and biochemistry. These collaborations are needed to successfully implement the use of protein and gene expression patterns for the identification of stressors affecting ecosystems. The latest mass spectrometry technology and next generation sequencing technologies could provide quantitative and qualitative tools to address important ecological research topics, and will give the possibility of applying new, integrated approaches to the assessment of environmental health risks and consequences that will support European policy on environmental health. As an vibrant emerging field in environmental science and pollution research, we anticipate that this session at the SETAC Wold Congress in Berlin will be of great benefit not only to the OMICS community working in academia, but also to regulator and industrial scientists from field such as biotechnology, agrochemical and biocide production, drug discovery, food safety and public health protection with an emerging interest in this promising field of research. Thus, we invite you all working in this field to submit your abstract to this session!

A08 - Ethics in ecotoxicology

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Scientific ethics represents an invaluable basic for every scientific discipline. In the times of 'publish or perish', 'contract research',' IP violations', etc., scientists face more and more pressures and problems to follow the ethical codex. Some actual public examples of plagiarism have contributed to revive the discussion about an ethical codex in science. This session convenes contributions on ethical aspects in publication, research design, data interpretation, research communication, independent consultancies, contract research in the field of environmental toxicology and chemistry. This session aims to present some rules and examples for: responsible use of experimental animals (incl. GMOs, fish, stem cells), experimental design, data interpretation and science communication, co-authorship, paper submission, simplification in science communication, use of funding, handling of ideas and inventions, etc.
The scientific community should develop a comprehensive ethical codex, to be accepted and controlled worldwide.

A09 - Extrapolation within wildlife toxicology

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When assessing risks of environmental contaminants to wildlife, data are always limited. That may be in part due to limited resources, but generally relevant species-specific information on sensitivity, exposure conditions, food web dynamics and additional site specific information are lacking. These challenges may be overcome by conducting extensive field studies, but that is not always or even generally feasible. Therefore, alternative approaches are needed, which use information from for instance other species, sites or time periods. For such approaches, methods for extrapolation of information are essential. An approach for instance to derive toxic threshold levels, based on SSD-curves may be well established to interpolate toxicity data between species. However, its use for wildlife is generally restricted due to lack of enough relevant toxicity data from different species on the specific compound in question. On the other hand, the use of lab species as indicators for wildlife species may also be limited due to its single species approach.
In order to gain better insight in the currently used methods for interpolation in wildlife ecotoxicology we propose this session. We will solicit presentations which address risk assessment of contaminants for wild life, with focus on methods of extrapolation of data, e.g. inter-species, inter-site, inter-season. This may include specific studies on the use of indicator species, but also on field studies using literature data to derive toxic thresholds.

A10 - Global climate change and the scientific foundations and future of environmental toxicology and chemistry

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This session originates from a SETAC Pellston Workshop, developed with international leadership, support and participants, on The Influence of Global Climate Change (GCC) on the Scientific Foundations and Applications of Environmental Toxicology and Chemistry held on July 16-21, 2011. At least nine papers are planned based upon the working groups constituted as part of the Pellston. The first presentation will be an overview of the workshop, how it was organized, and the collaboration process. Next 6 papers based on the 6 working groups are planned for presentation. The working groups include: 1) Chemical Fate and Transport, 2) Toxicological Mechanisms, 3) Effects on Populations and Species, Ecosystems and Landscapes, 4) Human Health Risk Assessment, 5) Ecological Risk Assessment, and 6) Damage Assessment, Restoration and Adaptive Management. At least two case studies that carry through the themes of the workshop will be presented to illustrate the inclusions of climate change into environmental toxicology and chemistry. The final presentation will be a set of overarching conclusions derived from the workshop and a call for action for new ways of conducting research, writing regulations and managing the environment with climate change as a forcing function.

A11 - Linking functional traits, functional endpoints and ecosystem processes

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Aim: Ecosystem processes are under continuous pressure from environmental pollution arising from human activities. This session will explore how stressor regimes affect the functional diversity of food webs and the services provided by ecological communities.

Motivation: Ecological quality is currently assessed by the level of similarity between the observed species composition at a given location in relation to a defined reference state, to obtain a parameter which summarizes the degree of disturbance. A number of limitations of this approach are evident: 1) Indigenous species are replaced by both native and alien invasive species and this process might accelerate under progressive climate change such that a connection with the original reference state is no longer achievable; [2] Undisturbed reference states are often difficult to define, as human influences are globally pervasive; [3] Poor ecological quality begs the question of causality, including indirect effects from toxic substances that act on the life-cycle of individuals and are not often easily observed. These limitations necessitate the development of other, ecologically relevant approaches in relation to ecotoxicity testing, which more appropriately address these effects of toxic substances on ecosystem functioning. This session invites contributions:

- Expressing the response of organisms to toxic substance exposure in terms of their ecological characteristics (functional traits) in addition to their taxonomic identity.
- Assessing effects of toxic substances on the functional role of organisms in the delivery of ecosystem goods and services (functional effect traits/response traits).
- Addressing effects of toxic substances on ecosystem functional endpoints in order to develop rapid indicators of ecosystem functional state and ecosystem processes (e.g. production, decomposition, community respiration, element cycling).

A12 - Long-term ecotoxicological impact: trans-generational effects and evolutionary responses to pollutants

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The long-term consequences of pollutants on natural populations are increasingly documented in the field of ecotoxicology [1,2]. This growing corpus of knowledge is expected to make a significant contribution to the understanding of population responses to human-induced disturbance. It also provides strong arguments for the need to incorporate these impacts into future ecological risk assessment procedures [3,4].

Toxicant long-term effects may have both genetic and non-genetic bases. Pollutants may cause direct alterations of DNA, or they may trigger micro-evolutionary processes such as adaptation, or interactions with other selective forces (fitness cost), random genetic drift, inbreeding, and gene flow. Pollutants may also have effects that are passed on to subsequent generations without being

genetically inherited in the classical Mendelian way, yet with some influence on offspring phenotype. This can result from the transfer of epigenetic, cytoplasmic or somatic factors, nutrients, or extra-organismal environment from parents to offspring [5,6].
Both types of effects are expected to affect ecotoxicity testing. Thus, population adaptation to chemical stress alters the dose-response curve expected from non-adapted populations. Similarly, toxicity tests that ignore the genetic attributes of populations or lines (genetic diversity, inbreeding level...) should not be used to extrapolate from the laboratory to the field. With regard to non-genetic trans-generational effects, exposed individuals may not be the right ones to focus on, as effects may only be detected after one or several generations.
Arguments for the incorporation of population genetics and trans-generational endpoints into ecological risk assessment are thus now clearly identified. However, fundamental work is still needed before concrete recommendations can be made.
The present session will welcome contributions on population long-term effects of pollutants, through approaches addressing the question of evolutionary or trans-generational impact, using laboratory experiment as well as natural population comparison, and molecular and / or quantitative markers. As a guiding principle, methods/results will have to be discussed in terms of applicability/relevance for ecological risk assessment.
[1] Ecotoxicology Special issue 20(3) 2011. Evolutionary process in ecotoxicology
[2] Coutellec MA, Barata C. 2011. An introduction to evolutionary processes in ecotoxicology. Ecotoxicology 20, 493-495
[3] Breitholtz M et al. 2006. Ten challenges for improved ecotoxicological testing in environmental risk assessment. Ecotoxicol Environ Saf 63, 324-335
[4] Special Session on evolutionary processes in ecotoxicology, SETAC 20th Europe Annual Meeting, Seville 2010
[5] Bonduriansky R, Day T. 2009. Nongenetic inheritance and its evolutionary implications. Annu Rev Evol Ecol Syst 40, 103-125
[6] Vandegehuchte M, Janssen CR. 2011. Epigenetics and its implications for ecotoxicology. Ecotoxicology 20, 607-624

A13 - Marine environmental chemistry and ecotoxicology

Kevin Thomas
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Marine systems are special in terms of their geochemical characteristics and the biochemical, physiological and ecological traits of the organisms that inhabit such ecosystems. They provide essential ecosystem services and have hence also attracted considerable attention from a societal and regulatory perspective. Recent developments include for example the continuous implementation of the European Marine Strategy Framework Directive. Also international organizations such as OSPAR or ICES are working together with the aim of developing integrative assessment strategies, including chemical, (eco)toxicological and ecological parameters.
A diverse set of classic and emerging pollutants impacts marine and estuarine ecosystems, and will continue to do so for the foreseeable future. The aim of this session is hence to present current research activities on marine environmental chemistry and ecotoxicology, biomonitoring activities, research on biomarkers as well as novel techniques and assessment strategies for describing and modeling the impact of chemicals on marine ecosystems. We would like to add to an overview on the state of the marine environment with respect to chemical pollution. Case studies on integrated assessments linking the presence of chemicals in marine ecosystems and their ecological effects are therefore particularly welcome.

A14 - Mixtures in soil: fate and effect of chemicals in soil amendments and waste materials

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In contemporary world, most of the chemicals enter soils not as pure compounds but as complex mixtures because of application of fertilizers, manure, compost, wastes, sewage sludge, dredged sediments etc. A lot of materials are applied to the soils with the aim to improve their quality and in many cases they really are able to do it, because they contain nutrients, organic matter, essential trace elements and suitable particles. Application of such materials can improve fertility of soils and their texture and structure. In particular, agricultural soils with high productivity suffer from organic matter loss due to annual yield removal and application of organic rich matter like sewage sludge, compost or dredged sediments may help to solve this problem. When sustainability is considered, it is always better to find appropriate utilization of a material than to treat it as a waste. This is a case of

the dredged sediments which are treated like waste in many countries, although their positive properties could prevail after application on soil. On the other hand, contamination of this kind of materials with organic and inorganic materials has been frequently reported and is probable because they have high sorption capacity (high organic matter content, fine particles, high active surface ...). Therefore, their application to the fields must be strictly regulated and possible risks to soil must be carefully predicted. Contaminants bound to waste, sediments, sludge can be released after their application on the land surface and harm soil biota, soil chemistry and cause risks to terrestrial wildlife and human. They can be also accumulated in the crop growing in that area.
This session is focused on all aspects of the application of sewage sludge, manure, waste, dredged sediments, complex fertilizers, composts and similar materials on soils. Case studies are welcome that will present the fate and effects on the contaminants present in these materials. Session is also focused on methodologies for the risk assessment, prediction of the effects, models of the fate of chemicals in these materials and after their application on soil. Monitoring studies are also welcome which will show changes in soil contamination and long time effects of soil amendments. Special contributions focused on wastes applied on soils are welcome as well.

A15 - Natural toxins and bioactive compounds

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Eutrophication of limnic waterbodies causes worldwide a shift of the phytoplankton community towards potentially toxic cyanobacteria.
Cyanobacterial toxins such as hepatotoxic, neurotoxic and cytotoxic amongst others are potent toxins to aquatic and terrestrial vertebrates. This decrease of water quality comes along with loss of aquatic biodiversity, and with that changes ecosystem structure and services. Furthermore human health is impacted by potentially food web accumulation, and decreased availability of suitable water for water suppliers for food and potable water production. Moreover, the pathway of cyanotoxins from cyanobacteria to humans through the food web, its persistence, biomagnification, etc. requires more intensive research than currently reported. In coastal and marine zones, similar mechanisms favor harmful algal blooms, known for synthesis of e.g.
paralytic shellfish poisons that accumulate in the food web.
On the other hand, an emergent research field looks to describe effects of plant derived bioactive compounds in the environment. As they are produced naturally in a wide range of plants, particular legumes, those bioactive compounds occur as drainage from the cultivating sites (agricultural fields) and further processing industry. They hence have the potential of leaching into the soil and into adjacent streams. So called phytoestrogens as example strongly impacted sex ratio of fish. To properly evaluate the ecotoxicological consequences of (emerging) anthropogenic contaminants, the background stress/toxicity to ecosystems exerted by the presence of natural toxins needs to be better understood as well; in contrast to many anthropogenic chemicals, natural toxins are compounds that by definition (and purposely) have toxicological effects; many natural toxins are produced in large amounts. This session welcomes contributions covering scientific progress in: Mechanisms driving the toxicity of cyanobacterial and harmful algal blooms and other natural occuring toxins, in particular in the context of global warming, eutrophication and human food resources; Advances in analytics of all mentioned toxins and bioactive compounds, including assessment of their accumulation in the food web; Widening the mechanistic understanding how organisms are affected, and the consequences for the organism, respectively adaptation processes. Moreover, applications for reducing entry of nutrients or bioactive and phyto-derived bioactive compounds into surface waters and from there to water supplies are also considered within this session.

A16 - Bringing ecological processes into ecotoxicological risk assessment

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Current procedures for ecotoxicological risk assessment still present significant uncertainties, and despite safety factors being applied, protection of ecosystems as a whole (in their structure and functioning) is not certain. Many ecological processes and characteristics (e.g. ecosystem sensitivity and vulnerability) that may enhance, buffer or simply mask real effects of chemical exposure in the environment are not considered in the current ERA.
Researches in the last years have been developing methods to predict environmental effects at the

species level: ecological and biological traits of species have been used to achieve a mechanistic understanding of sensitivity and vulnerability of organisms. Nevertheless further studies are needed to get a suitable predictive power including within-species variability and individual responses.
Key aspects to get a greater understanding of environmental effects of chemicals include the upscale from the individual to higher hierarchical levels of biological organization (population, community, ecosystem and landscape) and the interaction of scaling effects with ecosystem processes. Despite some insights have been already presented, new tools should be proposed. More ecologically relevant indexes, models, and endpoints are needed, especially focusing on high level of organization.
To incorporate this kind of evaluation into risk assessment procedures, it is very important that new tools embrace the complexity of ecological systems and their evolutionary processes, providing at the same time easily understandable and measurable endpoints.
We want the proposed session to give an overview of the various (experimental and modelling) approaches to quantify stress responses within an ecosystem, food web or community. We welcome methodological papers as well as case studies where such approaches are used to quantify ecosystem responses to stress.
Two key aspects to be explored would be: 1) how to scale lower-level responses to impacts on higher levels of ecological complexity and functioning, including trait-based approaches; and 2) what are the evolutionary implications of observed response patterns. We welcome presentations that aim at testing hypotheses on community and ecosystem responses, resilience and stability from structural and functional points of view.

A17 - Pesticide fate and ecotoxicology

Adrian Terry[1], Gary Mitchell[2]
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Every year thousands of tons of pesticides are used for modern agricultural practices and also for controlling domestic pests. The fate of these compounds into different environmental compartments is governed by both physico-chemical and biological issues (volatilization, absorption, transport, chemical and biological degradation, etc.). After distribution in the environment, pesticides affect target and non-target organisms, causing undesirable effects from cellular to ecological levels.
The main goal of this session is to discuss novel approaches to the study of pesticide fate into the environment and its effect on the biota, particularly in non-target species. Issues related to “new born” pesticides and long term effects are also welcomed.

A18 - Quantitative Structure Activity Relationship (QSARs) and similar models for predicting the toxicity of chemicals, mixtures and combined stress factors

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Prediction of hazard and risk of chemicals to environment using models of quantitative structure - activity relationships, quantitative activity - activity relationships, physiological kinetic models will be presented among other models. Cells, organs, organisms and communities will serve as test objects. Discussion on a role of hydrophobic, reactivity and steric properties in mechanisms of biological effects will contribute to recognition of more complex situation with effects under combined stress factors (mixtures of chemicals, joint effect with infections, diseases, environmental conditions, etc.). In the models both chemical and biological views will be involved. The session intends to stimulate discussion between the different communities working in this area. There will be a discussion on validation and evaluation of the models. Problems of reproducibility of results and predictability of the models will be involved.

A19 - Soil biodiversity and ecotoxicology

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The huge diversity of soil organism communities (both micro-organisms and invertebrates) is still not legally covered by EU or national governments. According to the Soil Framework Directive (2006; still a draft) this situation is caused by the fact that “not enough is known about soil biodiversity”. However, in the last ten years various initiatives and projects (to name just a few: ENVASSO (FP6) or EcoFINDERS (FP7)) were performed or started in order to improve our knowledge on the diversity and functions (i.e. the ecosystem services) of soil organisms. In particular methodological improvements, such as the identification of organisms (e.g. DNA barcoding) or the standardisation of sampling methods (e.g. ISO 23611-1/6) helped to get a better overview on their numbers and diversity. While

the testing of (very few) selected species of soil organisms or single activity parameters are an accepted part of the prospective risk assessment of chemicals (especially pesticides) and, in some countries, of the site-specific retrospective assessment of contaminated soils, the structural and/or functional biodiversity of soil organism communities in toto is not (yet) evaluated.
On a global level, the science of soil ecotoxicology is advancing steadily with application of standardized methods, development of new techniques involving single species and community level assays beyond agricultural settings and regulatory implementation of these methodologies in risk assessment and management of chemicals and mixed contamination at impacted sites. Traditional soil toxicity test methods have focused on techniques relevant to agricultural land, and test organisms that are commonly-used worldwide.
This session aims for contributions in the following areas:
1) What is known about the “normal” properties of soil organism communities? How much do they differ in different regions or land use forms and which factors govern their occurrence or distribution? How could reference communities (i.e. communities which can be used as a yardstick for the assessment of impacted sites) look like?
2) What is known on the status of soil organism communities in Europe? Besides chemical contaminants, other factors such as soil compaction or climate change can stress soil organism communities - but have examples been identified in the field?
3) Which consequences does a decline of soil biodiversity have on the ecosystem services provided by these microbes and invertebarates?
4) Are there examples from other parts of the world which could be extrapolated to the European situation and vice versa?
5) Look at emerging soil methods or endpoints.
6) Consider both contaminated soil and chemical testing in soil.
7) Identify research gaps in assessing contaminated soils.
8) Seek perspective from risk assessors to identify their current needs.
9) Explore how to shape novelty in design into ecological relevance.
Case studies as well as methodological improvements could be presented in the proposed session.

A20 - Trait-based approaches in prospective and retrospective risk assessment

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In ecology, linking environmental parameters with species traits is used with increasing success to understand natural ecological complexity and to improve both diagnosis and prognosis of anthropogenic impacts. Also in ecotoxicological risk assessment trait-based approaches are currently proving their potential to improve prospective and retrospective risk assessment. Based on mechanistic understanding trait-based approaches improve our ability to predict (i) sensitivity of organisms and the effect and recovery from toxicant stress on (ii) populations, (iii) communities and (iv) ecosystems. Additionally, traits can be used to evaluate biomonitoring data and mesocosm investigations. This session welcomes contributions dealing with the aspects of trait-based approaches in prospective and retrospective risk assessment.
Studies dealing with the use of trait-based approaches in both basic ecology and ecotoxicology, as well as with the use of traits for describing effects of stress factors other than chemicals will be welcome.

A21 - Tropical ecotoxicology

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Research into the environmental toxicology and chemistry of pollutants has focussed almost exclusively on temperate countries. Subsequently, environmental risk assessors in tropical countries often have to rely on data generated in the temperate zone, even though the fate of chemicals and their potential environmental side-effects may be very different between climatic distinct regions. Presentations concerning 'tropical ecotoxicology' in previous sessions of SETAC meetings indicated only little differences in sensitivity between temperate and tropical species. However, these tropical studies were only conducted for a limited number of species and compounds, and mostly used single-species tests rather than higher-tier (model ecosystem, field) approaches. Hence, direct effects on (semi-) field level, indirect effects as well as recovery potential of tropical ecosystems remain largely unknown. Furthermore, adjustment of techniques developed in temperate regions , particularly, testing of local more sensitive indigenous species may be necessary to meet requirements for tropical regions. This

session invites presentations on ecotoxicological studies in tropical regions, which includes sensitivity of tropical terrestrial and aquatic biota and ecosystems to chemical stress, indirect effects and recovery potential of impaired tropical ecosystems, comparisons and extrapolation of results from ERA studies over climate zones, and development/adaptation of techniques and modelling approaches for tropical ERA. It is intended that implications of presented study outcomes for the ERA in tropical countries and indications of how these could be integrated in policy making and future research will be discussed.

A22 - Veterinary medicines in the environment: Basic research for risk analysis

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More than 1 million t of antibiotics were released to environment worldwide during the last 60 years, a major portion of which being formerly used in animal husbandry. These veterinary medicines pose specific risks, since they are particularly designed to kill or inhibit microorganisms, and they may promote resistance gene accumulation. Veterinary medicines enter the environment via manure application. The fate in soils and the specific effects of such compounds on soil organisms thus track increasing attention and will be discussed in this specific session. In addition, the fate,effects and impact of veterinary medicines in aquatic ecosystems and the environment in general will also be discussed. We invite all presentations elucidating the fate of these veterinary medicines in the environment, their transformation, transport, sorption and bound-residue formation, uptake by organisms, etc. Combined with that or alternatively, studies on the effects regarding functional and structural endpoints of organisms and communities and the resistance level are welcome. Veterinary medicines usually enter soils along with manure, a matrix not yet considered in common environmental risk assessments. Hence, studies related to the environmental risks of manure and its interaction with the fate and effects of organic soil pollutants are also highly appreciated. The session therefore invites scientists from different disciplines to present their findings on effects and toxicity of antibiotics or on their environmental dispersion and fate. The presentation of novel analytical approaches to characterize any of these processes is also welcome as well as modelling approaches for fate and risk scenarios.

B - Emerging contaminants

B01 - Antimicrobial resistance in the environment

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Worldwide, antibiotics are widely prescribed to treat bacterial infections in human and animals. The development and dissemination of bacterial resistance to antibiotics used in human medicine is a crucially important public health issue. Antibiotic residues and resistant organisms can enter the environment through a variety of sources: effluents from livestock farms, aquaculture, hospitals, municipal wastewater treatment or pharmaceutical manufacturing facilities, for example. Sewage sludge recycled onto agricultural land can contain various antibiotics, and may also be enriched for enteric bacteria resistant to one or more antibiotics. Likewise animal manures from medicated animals used as fertilizer can contain a variety of antibiotic residues and resistant organisms. Selection of antibiotic resistant bacteria following exposure to antibiotic residues, and horizontal transfer of antibiotic-resistance encoding genes from resistant bacteria selected for in the gastrointestinal tract, represent mechanisms by which antibiotic resistance could be enhanced in environmental bacterial populations. These facts raise a number of questions: Is the spread of antibiotic resistance genes via environmental exposure a public health hazard? Is here a potential hazard for the ecosystem? Given that there is a normal baseline abundance of antibiotic resistance elements in the environment, how can we appropriately assess the ecological or human health risk? What are the key data gaps that would assist in such a risk assessment? How could such information be used in decision-making, particularly when taking into account the wide variety of potential antimicrobial uses (e.g., pesticide, biocide, fungicide)? This session attempts to address some of these questions.
The central topic of the session will be the role that the environmental distribution of antimicrobial resistance genes and antibiotics plays in affecting the potential risk to ecosystem and human health associated with the development of antimicrobial resistance in microbes. The spread of antimicrobial

resistance is linked to antibiotic treatment of livestock, fish and human patients. Humans and wildlife in terrestrial or aquatic environments can be exposed to antibiotics and antibiotic resistance genes via soil, water, air. Resistance to antibiotics can under some circumstances be co-selected by exposure to biocides or metals. The development in the environment of resistance to antimycotic and antiviral agents are also within the scope of this session.

B02 - Endocrine disrupting chemicals (EDCs): recent developments

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The debate on the potential impact of endocrine disrupters on human health and the environment has received increasing (regulatory) attention in the recent past. Test guidelines specifically aiming at endocrine disruption have been developed recently or are currently being developed. Further, the OECD is developing a conceptual framework dealing with endocrine disrupters. An increasing number of legislations incorporate endocrine disruption. However, the impact of these chemicals at population levels is not always well understood and while estrogen- and androgen-mediated processes have been relatively well investigated, effects on other pathways or processes are less well studied. Thyroid hormones for instance also play an important role in the maintenance of a normal physiological state and typical thyroid disrupting chemicals are e.g. hydroxylated PCB and PBDEs, TBBPA, DDE, Triclosan, PFC's.

This session not only addresses estrogen- or androgen-mediated processes but also other endocrince pathways. All research concerning the recent developments in the field of endocrine disrupters are encouraged to be submitted:

- Identification of EDCs
- Hormone disruption mode-of-action and cross-linking of effects between endocrine systems
- Innovative *in vivo* and *in vitro* bioassays applicable to relevant environmental and human samples
- Studies linking biomarker effects to organism effects and organism effects to populations
- Epidemiological studies linking EDCs to health effects of concern
- Animal studies linking exposure of emerging contaminants to EDC related effects
- Progress on EDC in (regulatory) risk assessment

The session will select abstracts that contribute to shed light on the current state of the science, including risk assessment aspects of endocrine disruption.

B03 - Environmental characterisation, fate / detection, exposure, effect and risk of nanomaterials

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Nanotechnology is fast expanding with the resulting consequence of its products ending up in the environment. Increased awareness of this industry has resulted in new data emerging on the fate, behaviour, exposure and effects of manufactured nanomaterials in the environment.

This session deals with environmental nanomaterial detection/characterisation, fate, exposure, effects, and risk assessment/management. Submissions covering these issues should be submitted to this session and they will subsequently be divided into sub-sessions dealing with the related issues.

Key focus of this session is interdisciplinary studies that contribute (or attempt) to show the link between nanoparticle distribution and fate in the environment and exposure of and effects in organisms.

We especially encourage:

- Studies that enhance our understanding or even allow prediction of environmental processes governing the detection, fate, exposure and bio-availability of nanomaterials, including detection methodologies that allow for the validation of fate-models. It is also encouraged that a wide range of biological variables are exploited for the detection.
- Studies that characterise pertinent effects of nanomaterials on all biological levels including mode-of-action studies, where the characterisation covers both nanoparticles in the pristine state as well as nanoparticles during the environmentally relevant exposure. Studies on a broad array of organisms are encouraged.
- Studies on nanomaterial risk assessment, management and monitoring, also including life-cycle analysis. Especially studies which may improve the risk management by minimizing the over- or under-estimations of the nanomaterial-related risks.

The overall aim of the session is to present the latest leading research. Each session will start with a

brief overview of the current status in the area.

B04 - Greener nanotechnology, an integrative approach to an emerging technology

James Hutchison
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Nanotechnology promises to revolutionize many areas within science and technology ranging from electronics to medicine. Unprecedented size-dependent material properties are being discovered in nanoscale materials. These properties can be harnessed to produce entirely new materials. Given the predicted widespread use of nanomaterials and the potential for new, size-dependent hazards, concerns have arisen about the biological and environmental impact of the materials and the processes used to manufacture them. The putative risks associated with manufacture and use of these new nanomaterials has been the subject of much debate. Spurred, in part, by calls for moratoria on nanomaterials and studies suggesting possible hazards, scientific and regulatory groups have come together in order to move the technology forward while concurrently considering the biological/ecological impacts. Despite the thousands of articles published on the biological impacts of nanomaterials, there is still little consensus. Though these early studies employed rigorous testing regimes, they assumed that nanomaterials would behave like their bulk counterparts, thus not considering the unique properties of nanomaterials such as size, shape, charge, surface area or purity. This led to batch-to-batch variations in toxicological responses of 'off-the-shelf' nanomaterials. Recent studies show that impurities and nanomaterial composition (e.g. surface chemistry, ligands, charge, etc.) dramatically affect the results. This partly explains why toxicological responses reported in the literature vary so widely. Adopting an integrative approach to nanoscience that incorporates the principles of green chemistry and concurrently considers the safety of nanomaterials will be crucial to moving the field forward. Green nanoscience applies the principles of green chemistry to nanoscience in order to rationally design safe, yet high-performance, nanoscale materials, develop efficient and inexpensive manufacturing approaches to these materials, and incorporate nanoscale materials into high-performance microscale or larger devices. This approach will simultaneously provide opportunities to meet these challenges and to develop sustainable technologies and materials. Although many have embraced the principles of green chemistry and recognize the need for sound science to inform policy, reducing these principles to practice remains a barrier for most commercial endeavors. This session will explore strategies to develop safer nanomaterials and nanomanufacturing methods, offer guidance to policy makers and provide tools for industry in adoption of cleaner production methods.

B05 - Non-target analysis and identification of toxicologically significant emerging contaminants

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The presence of new emerging contaminants in the environment, their potential toxicological effects, and the associated risk assessments are everlasting topics in the environmental sciences. This session will bring together different lines of research related to establishing an early-warning system to detect emerging contaminants in different environmental compartments and prioritize the risk associated with these contaminants. Critical to this effort is the need to integrate both analytical chemical and toxicological approaches especially with regard to identification. Successful implementation of this early-warning system requires the advancement of identification strategies for emerging contaminants employing state-of-the-art sample preparation, extraction and fractionation techniques, and analytical instrumentation combined with innovative bioassays for toxicological characterization.
Specifically, the following topics should be covered:

- Analytical identification approaches for non-target screening
- Implementation of software tools for identification of unknown compounds
- Compilation of user libraries to improve identification
- Methods for prioritization/ranking of relevant emerging contaminants and their toxicity
- Miniaturization of the bioassay format (e.g. chip-based) to enhance sample throughput
- Progress in exposure systems which consider bioaccessibility and bioavailablity to connect exposure and effect.

B06 - Perfluorinated compounds: From emission sources to the place of impact

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In recent years, perfluorinated compounds (PFCs), particularly perfluorooctanoate (PFOA) and perfluorooctane sulfonate (PFOS) have been described as compounds of increasing environmental concern because of their toxicity, persistence, bioaccumulation tendency, and susceptibility to undergo long-range transport. The current knowledge reveals that PFC cycling in the environment, particularly the transfer between the different compartments is highly complex and often different to that of classical POPs. This session aims to cover the latest developments and results in the following fields of PFC-research:

- PFC emissions and emission pathways to the environment
- PFC transport and cycling in the environment (air-sea transfer, water-sediment transfer, water suspended matter transfer, soil-plant transfer, air-soil transfer)
- Exposure to PFCs (e.g. from food, water, air, dust, occupation)
- New findings about PFC toxicity
- Recent method developments.

B07 - Microplastics: An emerging risk to the marine environment

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Anthropogenic items enter the marine environment from a variety of sources, often due to poor waste management systems. This “marine litter” or “marine debris” is composed of solid, persistent human-made materials from land as well as ocean-based items such as abandoned and derelict fishing gear. A significant portion of marine debris is composed of plastic materials that include both thermoplastics and thermosetting polymers. Plastic debris has attracted much attention in the past five years due to its high visibility when floating in surface waters, its ubiquity in the marine environment, and its persistence and capacity for global transport. In addition, sorptive properties of plastic polymers enable them to concentrate and transport hydrophobic organic contaminants in the marine environment. As plastics fracture into smaller and smaller pieces, termed “microplastics” when 5mm or less in length, they retain the capability for sorption, long-range transport, and ingestion by an increasing number of aquatic organisms. As a result, it has been suggested that plastic debris (and microplastics in particular) may be considered an emerging contaminant in aquatic systems. This session will provide a forum to discuss the quantity of plastic and micro-plastic debris in the global oceans, the capacity for plastic debris to transport contaminants globally, and the expected risk these particles pose to various marine environments. Papers that quantify plastics and microplastics on a regional level, in addition to the contaminants associated with the plastics, and discuss these levels in the context of known routes of exposure to marine organisms are particularly encouraged.

B08 - Towards a sound and common definition of 'endocrine disruptor'

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The term “endocrine disruptor” has become more and more widely used over the past 10 years. The U.S. Environmental Protection Agency (EPA) has established an “Endocrine Disruptor Screening Program” while the U.S. Food and Drug Administration (FDA) and the European Food Safety Administration (EFSA) have conducted evaluations of the endocrine-disrupting chemical (EDC) bisphenol-A (BPA). The European Commission has passed new legislation that regulates the approval of active substances and establishes the rules governing authorizations for plant protection products. An active substance, safener or synergist shall only be approved, if satisfies specific criteria, among others if it has no capacity to cause any adverse effects on the endocrine system. By 14 December 2013, according the Regulation provisions, the European Commission must submit a draft of the measures relating to specific scientific criteria for the determination of endocrine disrupting properties. Pending the adoption of these criteria, provisional criteria specified in the Regulation, have to be applied. Sound criteria, science based, will have to be developed in the meantime to allow proper classification to be attributed to substances. The goal of this session is to discuss the scientific evidence and information related to EDCs in order to contribute to the development of the scientific criteria for determination of these chemicals.

B09 - What is the current state of the science on the fate, exposure and effects of pharmaceuticals in the environment?

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[2]Centre for Environment, Fisheries & Aquaculture Science, DORSET, United Kingdom

[3]Utrecht University, UTRECHT, The Netherlands
Over the past 10-15 years there has been increasing interest in the impacts of pharmaceuticals in the environment. This session will provide a platform to review current work on key issues regarding the fate, exposure and ecological and human health effects of pharmaceuticals in the natural environment. The session will follow-on from a Pharmaceutical Advisory Group event entitled 'Pharmaceuticals and Personal Care Products in the Environment; What are the Key Issues?' which will run immediately before the conference. Presentations are invited covering the following broad themes: 1) prioritisation of substances for assessment; 2) Exposure; 3) Bioavailability and uptake; 4) Effects assessment; 5) Risk assessment; 6) Risk management.

C - Environmental and analytical chemistry

C01 - Advances in passive sampling and dosing techniques

Georg Streck
IUCOT - Institute f. Environmental Research, Chemistry and Ecotoxicology, LEIPZIG, Germany
Passive sampling and dosing techniques have experienced a dynamic development in recent years. These techniques are increasingly used (1) for monitoring purposes and exposure determination in air, water, sediment, soil, biota, and humans, (2) for estimating bioaccumulation in and toxicity to organisms, (3) for determining and predicting sorption or diffusion and partitioning processes between compartments, (4) and to control exposure in bioassays.
This session is seeking contributions addressing new designs and techniques for passive sampling and dosing systems for hydrophilic and lipophilic organic compounds as well as for metals. New and innovative applications as well as contributions elucidating theoretical aspects are highly welcome. Contributions addressing monitoring aspects in air, water, biota, sediment or soil with passive samplers demonstrating their possibilities and weaknesses are encouraged as well as studies dealing with the applicability and limits of passive dosing.
The application of passive sampling techniques has been recommended by several expert groups accompanying the implementation of new legislations, including the European Marine Strategy Framework Directive, the Soil Framework Directive, REACH, or the Guidance Document for the Global Monitoring Plan of the Stockholm Convention on POPs in air. Presentations demonstrating the usefulness and power of passive sampling and dosing techniques for fulfilling the requirements of these and similar legislative frameworks are therefore especially welcome.

C02 - Contaminant pathways, trends and biological effects in a warmer Arctic

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The Arctic environment is currently undergoing unprecedented changes. Physical changes to the cryosphere including diminished summer sea-ice cover, ablating glaciers and changes to permafrost regions are having marked effects on the character of the Arctic. These changes are also affecting contaminant entry, transfer, and transformations, as well as bioaccumulation pathways. With the presence of 4th level carnivores (eg. polar bears, arctic fox, and glaucous gulls), Arctic food webs have always been vulnerable to bioaccumulative chemicals and their biological effects and this may be exacerbated by warming trends. A wide range of subject areas will be addressed, in both platform talks and posters, hence broadening the appeal of this session to many scientists with areas such as emerging contaminants, predictive fate and exposure modelling, pollutant process studies and contaminant trends and biological effects. This session is timely for the SETAC World Congress given the recent scientific efforts as part of the International Polar Year (IPY) (with recent and pending IPY conferences over the 2011/12 period) as well as the growing public awareness to the geopolitical tensions within the Arctic as climate change brings new opportunities and threats. This session strongly compliments a special Session with invited speakers on "Polar regions as messengers of global processes".

C03 - In situ remediation of metal(loid) contaminated soils: Exploration of emerging technologies and long-term effects of previously remediated sites.

Bradley W. Miller
United States Environmental Protection Agency, CINCINNATI, United States of America
This session will bring together scientists using emerging technologies (green chemistry, nanoparticles,

beneficial re-use of byproducts) with researchers using existing technologies for *in situ* remediation of contaminated soils. Depending upon the severity of contamination and toxicological risk, remediation strategies may include removal of top soils, capping sites with clean fill, phytoremediation, or *in situ* remediation through chemical transformation. *In situ* remediation treatments that sequester or transform metal(loid)s to reduce or prevent toxicity and bioavailability provides risk assessors and stakeholders confidence that the danger to human health has been significantly reduced or eliminated. Concurrently, *in situ* remediation may achieve substantial cost savings in comparison to the standard practice of soil excavation and off site landfill deposition. The goal of this session is to advance the science of *in situ* remediation of metal(loid) contaminated sites through presentations of emerging technologies and by reviewing lessons learned from previously remediated soils.

C04 - Metal speciation to unravel the fate of metals and metalloids in the environment using hyphenated techniques with ICP/MS detection

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It is now well understood that it is the chemical formulation of a metal or metalloids that conditions its reactivity, life time, toxicity and fate in the environment. Despite of the advances in knowledge, many "metal speciation" concepts are still operationally defined, masking the real chemical identity of the species of interest and hence its environmental significance. As a result the development of ongoing improvement with hyphenated techniques, coupling of both liquid or gas chromatography with ICP/MS as detector is now mature and allows to have excellent results for metal species determination in all compartments of the environment (air, water, sediment, soils and biological tissues). Sample preparation techniques have also tremendously progressed however the last decade bringing more focused information to unravel biogeochemical pathways or ecotoxicity aspects.
The use of ICP/MS as detector also allow to promote speciated isotopic dilution approaches, allowing to introduce quality control right from the sampling steps to the detection. It also offers overall improved sensitivity and precision in the environmental data sets offering better comparisons between data sets or trends for example. There are also very important novel aspects with these techniques in terms of environmental assessment. The overall sensitivity of the hyphenated system permits the spiking of environmental mesocosms at very low levels resulting in minimal ecological system contamination and displacement. Further, this also allows introducing differential isotopically enriched chemical species and follows the differential kinetics of transformation: kinetics a parameter most often forgotten. New trends are also now promoting the hyphenation to High Resolution ICP/MS for improved selectivity and accuracy and even to Multicollector ICP/MS bringing then new concepts for addressing high precision at the molecular level, challenges that will be needed to promote improved understating of reactivity, fate and discrimination of origin of metal in the environment. All these development plead for new reference material to improve sample preparation methods and in establishing method accuracy and traceability of the results and increase the overall confidence in the pathways and mechanisms under investigation.
Finally these developments will be most need for follow and accompany the development of environmental regulation in Europe (European Water Frame Work Directive, the REACH legislation).

C05 - Novel approaches to addressing metal and metal nanomaterial bioavailability in soils

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The use of total metal concentration in soils for risk assessment does not adequately address the true bioavailability of metals to terrestrial plants and animals. Estimating bioavailability in soils has proved challenging given the diverse physical and chemical conditions found among different soils. As a result, examining metal uptake and storage by terrestrial plants and animals in contaminated soils may provide a more accurate assessment of the truly bioavailable metal fraction in these systems. In this session we will present and recruit speakers that are working on non-traditional methods to address availability of metals and metallic nanomaterials in soil systems. Approaches in this session could include stable isotopes, radioactive isotopes, and unique chemical or biological extraction methods. Also speakers addressing the weathering and long term fate of metals and metal nanomaterials in soils will be encouraged.

C06 - Occurrence, fate and impact of atmospheric pollutants on environmental and human health

Laura McConnell[1], Jordi Dachs[2]
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Throughout the world, urban and agricultural communities have become more spatially intertwined resulting in blurred land use boundaries. Both urban and agricultural areas emit greenhouse gases which contribute to global warming. Emissions from urban areas such as NO_x, particulate matter (PM_{10}, $PM_{2.5}$), and VOCs can contribute to photochemical pollution, decreasing overall air quality and can negatively affect human health. Thousands of persistent and non-persistent organic pollutants are also emitted to the atmosphere from primary and secondary sources. After being emitted to the atmosphere, organic pollutants are subject to a variety of processes such as diffusive air-water, air soil air-vegetation exchanges, gas-particle partitioning, dry/wet deposition, degradation, transport, etc. All these processes exert a control on their atmospheric occurrence and on their long range transport potential. Therefore, terrestrial and marine ecosystems close to sources may be impacted differently than remote regions. The combined effects of urban and agricultural emissions is an emerging issue. For example, high summertime ozone concentrations and excessive particulate matter buildup have been observed in agricultural areas that are near urban centers. Quantifying these interactions and effects requires numerous simultaneous types of measurements and cooperation between existing monitoring networks with smaller scale research efforts. This session will bring together all those groups performing research into agricultural and/or urban pollutant emissions and on processes affecting the occurrence of organic pollutants in the atmosphere, quantifying atmospheric deposition and its physical and biogeochemical controls, as studying the role that depositional fluxes has as an input of pollutants to aquatic systems and their biota, soils and vegetation. The session will cover all the environmental chemistry processes that are mediated by the atmosphere and that affect the fate and impact of organic pollutants at different temporal and spatial scales.

C07 - Sorption and bioavailability in sustainable remediation of organic chemicals

Jose-Julio Ortega-Calvo[1], John Parsons[2]
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Bioavailability-modulating strategies have become an important innovative step towards sustainable remediation of organic pollutants. Instead of trying further pollutant removals which are hardly possible or sustainable, approaches such as sorbent amendments and modern bio- and phytoremediation consider efficient risk reductions as valid remediation goals. Furthermore, bioavailability can also be increased for an optimized pollutant removal by biological means (plants and microorganisms). The aim of this session is to discuss the key mechanisms governing bioavailability, the suitable measurement tools, and how bioavailability can be modified in remediation scenarios either by physico-chemical or biological agents. Contributions are welcome, for example, on recent work on the sorption and bioavailability of ionic, polar and nonpolar organic chemicals, on laboratory and field studies addressing soil and sediment remediation through strong sorbents such as activated carbon, or the effect of dissolved organic carbon on toxicity and biodegradation of organic pollutants. Presentations describing new findings on the biological promotion of bioavailability are also encouraged.

D - Exposure modelling (environment & human)

D01 - Collection and use of monitoring data for environmental risk assessment of chemicals

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Legislations as the European REACH Regulation, Water Framework Directive (WFD) and Plant Protection Products Directive all have triggered the development of continental and regional scale monitoring datasets on chemicals and physico-chemical properties of different environmental media. This is especially the case for metals and properties such as pH, DOC, hardness, AVS, CEC, organic matter, clay, etc., influencing the bioavailability and toxicity of metals in water, sediment, particulate matter and soils.

An important advantage of the use of monitoring data is the elimination of uncertainty associated with modelled concentrations, which are often based on estimated emissions and the predicted fate and

behaviour of chemicals in the environment. Therefore, monitoring data are generally preferred over model calculations when sufficient representative and reliable data are available.
Extensive datasets have been built through the collection of existing local and national datasets and by the organisation of large scale monitoring projects. These datasets are being used under various European legislations to assess risks to the environment, due to emissions from operations and from the use of products. However, the development of large scale monitoring datasets has learned that the comparison and use of various datasets can be questionable. Factors as sampling methods, analytical methods, quality control programs, sample locations (affecting the level of anthropogenic inputs), sampling density, and temporal trends all influence the quality and relevancy of datasets. All these factors can hamper the development and use of harmonised datasets and, if not considered properly, may significantly affect the outcome of risk assessments and compliance assessments.
A proper implementation of environmental bioavailability models (e.g. BLM for metals) at large scales requires data on both the chemical concentrations and bioavailability parameters. Current knowledge has shown that the availability of data for both can differ significantly across substances, environmental compartments and among different countries or regions.
So far, the aim of this session is to present results and lessons learned from:

- the collection of existing regional or national monitoring datasets for the development of large scale datasets (*i.e.* national, regional, international levels).
- the organisation of large scale monitoring programs for the collection of new harmonised data, for use in risk assessment and compliance checking of chemicals in the environment.

This session has a special focus on metals, but also abstracts on other chemicals are highly welcome. With the recent implementation of bioavailability models under the WFD, and future registrations under various legislations, these lessons learned can contribute to the further improvement of future monitoring datasets.

D02 - Fate and exposure modelling

Michael Matthies[1], Thomas McKone[2], Bernhard Gottesbueren[3]
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[2]University of California, BERKELEY CA, United States of America
[3]BASF SE, LIMBURGERHOF, Germany

A robust scientific description of the interacting network of environmental fate and transport processes is fundamental to calculate concentrations of chemicals in the various compartments, their spatial range and travel distance as well as their persistence and accumulation in vulnerable components of the Earth's surface and biosphere. Fate and transport modeling is an essential part of environment exposure assessments used to evaluate chemical risks to human and ecosystem health. Close interactions between exposure modelling and ecotoxicology risk assessment is key for successfull development of guidance documents in the regulatory frameworks.
The session focuses on modelling of a wide variety of contaminants in various environmental compartments. Main issues addressed are

- geo-referenced modelling for aquatic and terrestrial ecosystems
- upscaling from local to regional, continental and global scale
- uncertainty and sensitivity analysis
- new approaches for bioaccumulation, bioavailability and biotransformation modelling
- persistence and long-range transport modelling
- source-receptor relationships
- exposure models for nanomaterials
- uptake into microorganisms
- coupling of exposure modelling with mechanistic ecological effects modelling
- fate and exposure modelling in developing countries
- accounting for climate change in fate and exposure modelling
- fate and exposure modelling links between urban and indoor environments
- Recent developments of regulatory frameworks (*e.g*. zonal approaches in the EU) exposure models, scenarios (*e.g.* FOCUS groundwater 2009) and guidance documents by EFSA workgroups.

This session proposal is on behalf of the SETAC Exposure Modelling Advisory Group (EMAG).

D03 - Global scale modeling of environmental cause-effect chains for risk assessment and life cycle assessment: Quo vadis?

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Global scale modeling is gaining an increased interest so as to address environmental issues in every area of the world. Environmental modeling usually is divided into exposure (or transport) modeling and effect modeling. Exposure modeling involves the prediction of environmental concentrations of toxicants to which biota are exposed.
This often includes predicting the movement or transport of toxicants within and between different media. Usually, transport models track toxicant concentrations from a point source or non-point source to the medium in which the biota are exposed. Effect modeling usually starts with the environmental exposure concentrations and predicts the effect of the exposure to those concentrations.
Fate, exposure as well as effects can be modeled geographically-explicit on a worldwide scale. With this, links can be established between chemical emissions in industrialized regions and their presence in remote areas. But toxicity is not the only research field interested in global scale modeling. Also in, for example, soil biogeochemistry, biodiversity, ecosystem services, climate change, and ozone depletion modeling, questions need to be solved on a global scale to serve, among others, risk assessment and life cycle assessment. Which country has the largest potential to suffer from drought? In which ecoregion takes most acidification place due to worldwide nitrogen emissions?
Fate, exposure and effects do not always need to be modeled separately as they depend highly on each other. Examples of linked models include
1) atmospheric transport models uptake integrated with the effect of gaseous and particulate toxicants over space and time, 2) plume models of the discharge of toxicants into a lake or stream and the exposure and effect on aquatic organisms, and 3) modeling the transport of toxicants in lake or river sediments and the effect on biota in the sediment and the water column above. The integration of exposure and effect models will add to model complexity and may require the use of parallel computing on high-performance computing clusters.
In this session we want to bring together modeling activities in the various research areas to show their work and specific outcomes, and to address issues such as data availability, spatial and modeling detail, aggregation level, model complexity, and integration of models. We therefore encourage researchers in any field that work on environmental modeling on a global scale or with a regional focus but a link to global scale modeling to submit their abstracts.

E - Life cycle assessment (LCA) and life cycle management (LCM)

E01 - Broadening the life cycle toolbox: accident and risk related life cycle assessment

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Traditionally, Life Cycle Assessment has focused on the regular operation of technologies and services. Harm to humans due to accidents and emissions to nature due to fires and other accidents have been mostly a blind spot. Risk Assessment of technical systems, in contrast, has traditionally been performed with Fault tree analysis and Cause-effect chain modeling, centered around causes and accidents, without taking a life cycle persective. A comprehensive, quantitative assessment of the overall impacts on human health (e.g. lethal and non-lethal accidents, health impacts due to chemical exposure) and the natural environment other than locally (e.g. via emissions from fires) has rarely been done. Approaches are being developed to bridge the divide between Risk Assessment and Life Cycle Assessment of technological systems: Accidents are addressed as one component of Life Cycle Working Environment Assessment, as Life Cycle Accident Assessment, and in wider systems analysis. Such approaches provide valuable information for risk management in companies and governments alike, helping to focus efforts and resources, as well as to bring impacts due to regular operation and due to accidents into perspective. These approaches complement insights on the impacts during regular production, operation and end-of-life of products and other systems covered by LCA, as well as non-risk related social aspects covered under Life Cycle Working Environment and social LCA and finally indoor emission impacts. In contrast to classical Risk Assessment, these approaches quantitatively integrate all environmental and health impacts, bring in the life cycle perspective, and finally relate the impacts to the performance of the assessed system (e.g. a technology or a product) via working with its functional unit. Thereby they allow for direct comparisons of systems.
This session will give a platform to researchers that work on an integrated, quantitative assessment of impacts of products and technical systems related to risks, providing crucial methods for better Risk Assessment and Management and for a more complete Life Cycle (Assessment) toolbox.

E02 - Certified Sustainability in LCA?

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The recognition of the principles of sustainable development within the production of raw materials has become state of the art in a variety of sectors. Increasingly certification schemes guarantee a high level of compliance along all three pillars of sustainable development.
Examples are advanced multi criteria approaches like stewardship schemes in forestry and mining and rather focused approaches like certified GHG mitigation programmes for off-setting or green energy certificates. Rather simplistic examples are e.g. approaches which invite to assess the criticality of a resource use or impact prior to establish the life cycle inventory as given practice in water footprinting suggests.
For LCA this is challenging as physical flows are usually assessed without a further qualification in advance. Having no qualification in place may end up in an unfavourable indicator profile for a preferable alternative from a 'sustainability' point of view. Introducing qualification may cause double counting or burden shifting depending on the accounting of qualified flows.
This session intends to discuss this obvious contradiction and in particular contributions are invited which deal with certification and LCA in a harmonized and consistent manner.

E03 - Development in life cycle inventory analysis and modelling

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The focus of LCA was initially on physical flows and interactions. However, the life cycle of a product is a large, sociotechnical system, which is governed also by, for example, economics. Consequently, LCA has over the years been enriched through the use of economic concepts, methods, and models. The boundaries of life cycle inventory analyses (LCIs) have been expanded through the use of input-output tables.
With the consequential LCA some market mechanisms started to be introduced, besides those technological and environmental already taken into account in inventory and impact assessment, respectively. Input data to consequential LCIs have been generated in economically optimising models and in equilibrium models. An example is the consideration of Direct and Indirect Land Use Change (ILUC) in the sustainability assessment of bioenergy systems. However, since mechanisms are connecting links between activities, they can show up everywhere, involving a variety of domains and giving rise to different consequences. Market mechanisms are part of broader economic mechanisms, which recall concepts like employment and growth. These in turn function within a cultural, social, political and regulatory context. How can these mechanisms be incorporated or dealt with in LCA? How to evaluate rebound effects? Which developments are needed to address such complexities? How can scenario modelling further structure the analysis?
This session invites presentations and discussions on new aspects of these tools and on novel approaches to integrate economics for inventory modelling in LCA. We are particularly interested in contributions that show which approaches are available, which are lacking and thus what is needed to better address mechanisms in the analysis.

E04 - Developments in life cycle sustainability assessment (LCSA)

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Life cycle sustainability assessment builds upon traditional, environmental LCA by bringing the life cycle approach to bear in considering performance across a broader suite of relevant sustainability domains, including social, economic, and institutional aspects. As such, it is contributed to by researchers representing multiple disciplinary perspectives. Sustainability is a multi-dimensional concept, which involves different areas (economic, environmental and social), normative positions and empirical knowledge. Thus, in order to move from LCA to a life cycle based analysis for sustainability, first of all we need to broaden the scope of LCA, by including economic and social dimensions. This is the present state of the art in LCA, described by the equation LCSA (Life Cycle Sustainability Assessment) = LCA + LCC + S-LCA, based on three separate life cycle assessments, carried out under specific consistency requirements. Other methodologies and appropriate tools are also useful for estimating socio-economic impacts in order to consider the three pillars of the sustainability, including variations on the method such as externalities, input-output (IO) models, hybrid models (LCA-IO), cost-benefit analyses (CBA), among others.

This session aims at reporting methodological developments in sustainability assessment of products and systems using life cycle approaches. Explorations of normative foundations for life cycle sustainability assessment, defining sustainability domains and impact category sets, and integrating sustainability impact assessment results are welcome. It also includes current and alternative frameworks for choosing functional units, developing impact assessment methods, considering endpoints, identifying system boundaries, and for accommodating temporal and spatial issues in both LCI and LCIA as relevant to sustainability assessment.
An area where sustainability requirements are currently high on the agenda is for renewable energy systems. For example, the European Renewable Energy Directive (RED) 2009/28/EC requires EU Member States to ensure that the share of energy from renewable sources in transport in 2020 is at least 10% of the final consumption of energy in road transport. Renewable fuels counting towards the target must meet minimum standards for life-cycle GHG emissions (35% from 2013 and 50% from 2017 for existing production plants, and 60% for new production), and sustainability standards (including the requirement that biofuels are not made from raw materials obtained from land with a high biodiversity, wetlands and continuously forested areas, or areas that were once woodlands). However broadening indicators is not enough, since it is also necessary to further sophisticate and deepen the modelling, in order to take more mechanisms and relations into account.
We are particularly interested in contributions that show opportunities and challenges in combining or integrating models with appropriate consistency, including but not limited to mechanisms within an economic and social context. Hence, examples from life cycle approaches including, but not limited to, Life Cycle Costing (LCC), Value-Chain Analysis (VCA), social LCA, as well as Multi-Criteria Decision analysis (MCDA) and Cost-Benefit Analysis (CBA) in the context of life cycle sustainability assessment are invited.
Submissions are welcome for application and case studies of the aforementioned methods in all sectors.

E05 - Established and emerging footprints - striving towards a valid and comprehensive support for decision-making processes

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Life cycle assessment (LCA) aims to support decision-making processes with the most accurate and reliable overview of the environmental performances of the products/services/systems under study. Within LCA, The Life cycle impact assessment (LCIA) framework developed as comprehensive environmental assessment method facilitating the evaluation of a multitude of environmental damages both as single issues and integrated into more complex multi-impact metrics. However, how valid and comprehensive is our LCIA practice today? And what can be done to move towards a better support for industries/authorities/government?
Despite the powerful framework, various environmental footprint concepts have entered the sustainability metric arena and are under international debate. Some single-dimension indicators such as carbon footprint and cumulative energy demand evolved as standardized metrics which can be fully integrated into a conventional LCA study. Other indicators such as water footprint, chemical footprint, and biodiversity footprint are under (early) development, with the water footprint being the most advanced emerging indicator.The session focus will be on the discussion of the benefits and drawbacks of LCIA methods and the methodological gaps, barriers or other challenges such as double counting, (in)consistency in scope definition, and specific requirements from particular application fields.
Examples of issues could be:

- Lack of consensus in the methodologies for assessing certain categories of impacts (e.g. toxic impacts, water use, ...)
- Midpoint versus damage-based assessments
- Use of optional steps in LCA (e.g. normalization/weighting)
- Incompleteness in the impact coverage (e.g. water use, land use, resource depletion, exposure to emerging chemicals (e.g. nanoparticles), indoor exposure in toxic impacts...)

The choices made by the LCA practitioner for performing the impact assessment as well as his/her eventual interpretation of the results are often constrained by these issues, which also constitute impediments for a broader use and acceptance of LCA. The scope of the session thus encompasses research outcomes describing quantitatively the inconsistencies introduced in the decision-making processes with current practice and proposing solutions to improve the validity of the results to be interpreted and communicated by the LCA practitioner. This session also invites presentations on new methodologies and concepts for environmental footprint indicators for application as stand-alone method and incorporated into complete LCAs.

E06 - Increasing scientific and policy understanding through meta-analysis of life cycle assessments

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The body of life cycle assessment (LCA) literature is vast and has grown over the last decade at a dauntingly rapid rate. Many LCAs have been published on the same or very similar technologies or products, in some cases leading to hundreds of publications. One result is the impression among decision-makers that LCAs are inconclusive owing to perceived and real variability in published estimates of life cycle impacts. Despite the extensive available literature and policy need for more conclusive assessments, only modest attempts have been made to synthesize previous research. A significant challenge to doing so are differences in the technologies considered throughout the life cycle and inconsistencies in methodological choices (e.g. system boundaries, co-product allocation and impact assessment methods) among the studies that hamper easy comparisons and related decision support.

An emerging trend in LCA is for meta-analysis, which have the potential to clarify the impacts of a particular technology, process, product, or material, and produce more robust and policy-relevant results. Meta-analysis is defined here as analysis of a set of published LCA results, either in a statistical sense (e.g., following the practice in the biomedical sciences), or by quantitative adjustment of the underlying studies to make them more methodologically consistent. One example of the latter approach was published by Farrell and colleagues in Science in 2006 clarifying the net energy and GHG emissions of ethanol.

In early 2012, the Journal of Industrial Ecology plans to publish a special supplemental issue on meta-analysis of LCAs. The goal of this special issue is to contribute to the state of the science in LCA beyond the core practice of producing independent studies on specific products or technologies, by highlighting the ability of meta-analyses of LCAs to advance understanding in areas of extensive existing literature. Two of the editors of this special issue (Garvin Heath and Miguel Brandão) are the authors of this special session proposal. More than 20 manuscripts were submitted for consideration for the issue. Authors of manuscripts accepted for publication in JIE's special issue will be solicited for inclusion in this special session; unsolicited abstracts submitted under normal SETAC procedures will also be considered.

Reference

Farrell, A. E., R. J. Plevin, B. T. Turner, A. D. Jones, M. O'Hare, and D. M. Kammen. 2006. Ethanol Can Contribute to Energy and Environmental Goals. Science 311(5760): 506-508.

E07 - Latest developments in uncertainty management - adding value to LCA studies

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Uncertainties in LCA studies are a challenge to manage, quantify, and communicate. They are often perceived as detrimental to the results of an LCA study or even LCA as such. Yet, they are the principal reason behind the iterative structure of LCA methodology, intending to lower uncertainty with each iteration. They are also the motivation behind any LCI or LCIA methodological development, or data quality improvement. The latest developments in the area of uncertainty management in LCA are promising potentially important improvements for its implementation into daily practice. This sessions aims to present new approaches and proposals towards a practical integration of uncertainty management into LCA methodology and resulting decision processes. Where are we regarding the feasibility of providing uncertainty measures for LCA results? How can we use these results to better support decisions? How can uncertainty information be used to optimise LCAs, focusing resources spent on a study towards those issues that offer the best improvement potential per iteration? What is the added value of managing uncertainties in LCA and what are currently the main resistances and obstacles for its implementation? This session explicitly invites all stakeholders from developers to practitioners and decision-makers to present and discuss their views, experiences and ideas related to practical uncertainty management in LCA.

E08 - Monetisation for weighting and aggregation in Life Cycle Impact Assessment and Cost-Benefit-Assessment

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Monetisation, or economic valuation, of environmental and health impacts makes it possible to identify the impacts that are most important in the perception of society. It also makes it possible to compare

the importance of these impacts in relation to other costs (of, e.g., the implementation of a policy or the generation of electricity) in a cost-benefit analysis. Several methods for monetisation have been developed as part of, for example, the EU project series ExternE, NEEDS and EXIOPOL. Methods for monetisation have been used to assess technologies for energy conversion, waste management, transport, etc. They have also been used for policy assessment within, e.g., the Clean Air for Europe (CAFE) Programme, and in the management of healthcare costs. Research within the highly interdisciplinary work on environmental damage cost (EDC) assessment continues, including development of emission inventories, dispersion and chemical transformation models, effect modelling and non-monetary and monetary valuation studies. Meanwhile, concern is raised regarding the consistency of the methodologies of monetisation, the important subjective methodological choices made, the large uncertainties, and also regarding the ethical implications of aggregating all impacts into a single, one-dimensional indicator. These problems are important and decision-makers have to be made aware of the assumptions, uncertainties and implications. This session invites contributions to the methodology of monetisation, interesting cases of application of the method, and, not least, approaches to use monetisation in governance to stimulate learning, debate, and knowledge-based decisions.

E09 - Life cycle management (LCM): Success factors and barriers

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LCA and LCM have come a long way, but there is still a fundamental gap between sound LCA science and practical application in decision making. With the growing interest and need for sustainable production and consumption and the further development of databases and methodologies in each of the 3 pillars in sustainability (environmental LCA, social LCA and Life cycle costing) the toolbox of decision makers is growing. These assessment tools are now available on top of others such as environmental risk assessment or other tools building on the life cycle thinking concept (e.g. full cost analysis, carbon footprints). Each of these tools is built from its own framework and provides answers to specific questions. But there is some overlap, for example should toxicity decisions be driven by LCIA, water footprint or just be handled in risk assessment? The overlap on the one hand may lead to confusion, but applying these tools in a complimentary way is a means to address sustainability questions more comprehensively and might help to make more robust decision making. Which developments are needed to help decision makers reach this goal?

This session will elaborate on the practical aspects of LCA and LCM and specifically on the process of using LCA for decision making in industry, governmental institutions and other organizations. It will discuss how LCA and LCM are successfully implemented and will address questions such as who uses these approaches and when, what are the audiences, what tools and procedures can be used, etc. We are particularly interested in contributions that show successes or issues for decision making on sustainable production and consumption using a variety of complimentary tools and the role of each of them in coming to robust decisions.

However, it is not intended to be an LCA case study session. Rather than discussing specific LCAs, LCA tools or their results, the session will focus on success factors and barriers to implementing LCA and LCM. Invited are papers from scientists, practitioners, and decision makers who focus on using LCA results and LCM tools and processes for improved decision in relation to sustainability of products, services or organizations.

E10 - The UNEP-SETAC Life Cycle Initiative: a decade of supporting the global LCA community

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UNEP
SETAC

The UNEP-SETAC Life Cycle initiative has been a major factor in the development and dissemination of approaches, methods, and tools for analysis and management of products, materials, and services across their lifecycle for nearly 10 years. Now in its second phase the Initiative has an active program to support technical projects, workshops, capacity building, and outreach to the LCA community and beyond to the users and would be users of life cycle approaches. This session will provide the participants with an overview of the accomplishments of the work to date as well as a prospectus on the next phase of the Initiative. Session presenters will be encouraged to provide details of specific project results. The orientation of the Initiative is moving toward evolution of life cycle methods for support of Sustainability assessments, which fits well within the theme of the Congress. SETAC's role in assembling and coordinating the science behind the Initiative's efforts will be highlighted.

F - Risk assessment, risk management and regulation

F01 - Applying models to Risks Assessment: from the organism to the ecosystem level

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Models are widely discussed as a means for addressing issues in ecological risk assessments that cannot be easily addressed by experiments. Frequently named examples for the need of modeling approaches are the assessment of temporally and spatially varying exposure to pollutants, particularly pesticides, and assessment of risks for populations and higher levels of organization. A combination of toxicokinetic/-dynamic models, often originating from pharmacological / toxicological studies, and various kinds of population or ecosystem models can be valuable tools for such assessments. This prompts the questions like: Which endpoints are relevant for populations and what level of impact on these endpoints is tolerable? Further, apical (integrative) and mechanistic endpoints to investigate specific modes/mechanisms of action (e.g. endocrine disruption) need to be weighted in the overall evaluation.

Development and the refinement of these models and, most importantly, their applicability for addressing the needs from the level of the organism up to the population and ecosystem level are vital for risk assessment and for a better protection of our environment. Datadriven, knowledge based and mechanistic approaches can serve as input, their combination might offer new levels of refinement.

The goal of the session is to present contributions in which actual applications of eco(toxi)cological models to different questions are described. It shall be discussed how and why the modeling approach was defined and how the model results were implemented in the risk assessment. Typical questions to be addressed are:

- How to address the relevant protection goal (choice of species, temporal and special scale of modeled scenario, …)?
- Which model endpoints to be used for the risk assessment? (maximum effect, time to recovery, probability of recovery, …)
- How to consider uncertainties (assessment factor, stochastic modeling, …)?

F02 - Approaches for comparative hazard and risk assessment of chemicals

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Comparative assessment is implemented as a new regulatory instrument by recent EU legislations for biocides (1451/2007 EEC) and plant protection products (1107/2009 EEC). This new instrument is intended to promote the use of chemical products which are considered significantly safer for the environment compared to technically equivalent alternative products. However, explicit guidance and decision making criteria to conduct such a comparative assessment are still lacking. Against this background, the proposed session is aiming to present and discuss science-based approaches for a comparative ecotoxicological hazard and environmental risk assessment of chemicals and proposals for a respective decision making, respectively. Presentations of more focused comparative assessment approaches (i.e. on intrinsic chemical properties or ecotoxicological / environmental hazard profiles) are as welcome as more integrative approaches covering aspects of hazard, exposure and risk. The presentation of case-studies is especially invited.

F03 - Are Environmental Specimen Banks ready to face future challenges of environmental chemistry and regulatory toxicology?

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Historically, the primary reason for environmental specimen banking was to provide materials that could be used for analyzing trends in exposure to previously unrecognized pollutants or for pollutants for which analytical techniques were inadequate at the time of collection. 21st century's ESBs should continue playing this important role, especially in the assessment of emerging substances. The use of archived biological samples allows very fast analysis of samples from different years and regions. The results of such retrospective monitoring could help to assess the relevance of the compound in question (levels and trends). Together with ecotoxicological information, these exposure data are helpful in deciding whether a compound has to be considered as an emerging substance. Present ESBs

should be used more broadly for the assessment of potential emerging substances. Without considering the existing stepping up in the production/use/release of new chemicals, several thousands of emerging pollutants will be released to the toxicosphere since today to 2050, but those scientists performing retrospective monitoring in the future will need specimens suitable for molecular science-based analysis together with the analytical chemical approaches presently carried out. We need to adapt existing ESBs for this purpose and modify specimen preparation and storage methods accordingly. It is also crucial that we foresee the need and the opportunity to investigate how former specimens could be treated to be analysed in the future with the methodologies then available.
Thus, ESBs provide and will provide scientifically based support to the application of active environmental regulations (WFD, MSD, ESD, REACH, etc) and to environmental managers and decision-makers (accidental spills, etc). For these purposes chemical endpoints alone will be useless as regulatory criteria unless in combination with biological endpoints and therefore banking methods and specimen types should be adapted to these needs. ESBs will provide useful information about long-term variability and temporal trends in biota and ecosystems others than pollutant levels, trends and toxicity. Long-term variations and trends in growth, reproduction, metabolic rates, etc., driven by global factors (e.g., oceanographical cycles and oscillations, climate trends and changes, large scale processes such as ocean acidification, etc.) may condition bioaccumulation and biological responses to pollutants and alter baseline values for environmental relevant parameters and may hence render any data on tissue concentration of pollutants in biota or on biological impact less valuable. Sections of EEBs devoted to samples for biometry, reproduction or general physiological condition determinations might also result very helpful to interpret pollutant levels, trends and toxicity.

F04 - Chemical footprint: towards sustainability assessment of chemicals

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In the last few years, environmental footprints concept has obtained an increasing interest by both the scientific and political communities. Analogously to, e.g., carbon and water footprint, the chemical footprint evaluation aims at assessing the chemical pressure caused by human activities, and at which extent actual emission of chemicals harm the ecosystems above their capability to recover.
Within the recent scientific debate is said that thresholds for a safe space for humanity were already set for some environmental issues. This means that it is possible to evaluate the relative performance of human activities against these thresholds. For chemical pollution, it is very critical to define thresholds based on natural limits. Actually, the potential harm caused by chemical depends on a number of interrelated factors, including chemical properties, emission's compartment, geographical variability of fate, and vulnerability of exposed ecosystem. Due to the complexity of this interaction, especially for ecosystem, a specific multidisciplinary effort has to be made.
The evaluation of the chemical footprint requires a multidisciplinary effort, bringing together approaches and results from various disciplines: from ecotoxicology to ecology, from ecological/human risk assessment to life cycle thinking and related tools. At national and international level some attempts have been made and projects are on-going to define chemical footprint, but usually the methodological approach comes from different disciplines and lack of a real integrated and multidisciplinary assessment. This session focuses on the discussion and presentation of new and integrated methods and approaches for sustainability assessment of chemicals and chemical footprint, how it may support policy development and Eco-innovation.
Multidisciplinary approaches and case studies are welcome.

F05 - Classification and risk assessment of metals and inorganic substances

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The GHS (Globally Harmonized System of Classification and Labelling of Chemicals) and REACH (Registration, Evaluation, Authorisation and Restriction of CHemicals) have significant implications for environmental protection, transport, insurance and market access, both within the EU (European Union) and worldwide. Under the REACH System, enterprises that manufacture or import more than one tonne of a chemical substance per year within the EU are obligated to gather information on the properties of their substance and to register the information in a dossier in a central database. There has been a great deal of research into the environmental fate, behaviour and effects of trace metals over the past few decades, although the majority of this research has considered only a limited number of elements. The information requirements for the registration chemicals under REACH, and

the development of standards under the Water Framework Directive, have raised the need for information also on metals which have previously received relatively little attention. The registration of metals and compounds of Al, Mn, Fe, Co, Mo, Ru, Pd, Sn, and Sb under REACH, and the derivation of standards under annex VIII of the WFD for Fe, Mn, and Ag in the UK, and other countries such as the Netherlands, call for an improved understanding of the environmental fate and effects of these metals. Within the GHS framework, a scheme to classify chemical substances with respect to the hazards they may present to the aquatic environment has been developed (UN 2009), a section of which has been adapted to enable the classification of metals and metal compounds. To meet the requirements for data to be used in the hazard classification of metals, metal compounds and alloys, an international team of researchers developed and validated a Transformation/Dissolution Protocol (T/DP) within the framework of the OECD (Organization for Economic Cooperation and Development). The T/DP is designed to determine the rate and extent to which metals and sparingly soluble metal compounds can produce soluble, available metal species under conditions representative of those generally found in the environment. It is aimed at standardizing the principle test variables such that the level of the dissolved ion can be directly related to the loading of the substance added to an aqueous environmental medium. To derive a hazard classification, T/D data, consisting of dissolved metal concentrations in the aqueous test media, are compared to acute or chronic ERVs (Ecotoxicity Reference Values).
In the last 10 years, a considerable amount of research has been conducted into the T/D characteristics of a wide range of metals, metal compounds and alloys for the purposes of hazard classification. Until recently, the T/D data have been retained within a relatively small group of producers, primarily for use in REACH registration. Now, there is the possibility of disseminating this information to a broad audience. The purpose of the proposed SETAC session is to show how T/DP data have been successfully applied to derive hazard classification levels for metal-bearing substances, and to provide a platform for the presentation and review of T/D data.
Possible themes:
1. classification schemes and approaches: UN GHS, EU CLP, MERAG, CSA-TU approach
2. T/DP: conditions, parameters, OECD validation study
3. T/D data: metals, metal compounds, alloys, speciation
4. Market implications of hazard classification of metals, metal compounds and alloys: markets affected, evidence of environmental improvements, outlook

F06 - Contaminated sediments in a changing environment

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Sediments are an integral part of the river basin. As such, they are affected by permanently changing conditions on different kinds of scales. On river basin scale, sediment source and transport varies during flood or high water discharges as a consequence of seasonal changes. On the microscale, their contaminant load is affected e.g. by sedimentation-resuspension cycles. Oxygen concentration, temperature, salinity, exposure to light etc - they all have some impact on mobility and availability of contaminants that at some stage have been adsorbed to sediment surfaces.
Knowledge on the impact of these changing environmental conditions on bioavailability and toxicity of contaminants should help us linking sediment quality to ecosystem protection criteria, as well as linking river basin target values to marine target values.
This session invites papers on micro- and on macro-scale processes:

- On micro-scale, abstracts are welcome that focus on basic research on processes and interactions between matrices and substances in sediments as well as at interfaces between sediment, soil, water and biological surfaces. This session will emphasize chemical processes that occur or are influenced by environmental conditions (e.g. temperature, redox state, fluid dynamics, sediment type, etc), that may lead to sequestration, transport or transformation of pollutants. How do these conditions affect bioavailability, and thus, risk, of contaminants in sediments? How might this affect management strategies? How can we integrate such bioavailability aspects into regulation?
- On macroscale, papers are invited that address the process of sediment transport along river basins and consequences of climate change e.g. in form of increased frequencies of floods and droughts, on erosion stability, geochemistry, and toxicity.

International case studies are welcome.

F07 - Environmental problems of estuaries

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In the whole world, estuaries are the seat of the same paradox: they are among the most productive ecosystems while being strongly impacted by anthropogenic activities. The public and scientists realized environmental problems of estuaries first because of the disastrous depletion of populations of migratory fish, especially salmons and eels. This blindness is partly explained by the erroneous confidence in the power of dilution of pollutant fluxes in huge volumes of seawater at river mouths, and in the ability of estuarine species to cope with chemical stress as they are able to cope with dramatic changes of ecological conditions. The aim of the session will be to answer a series of core questions. 1) What is the pollution problem and its implications in terms of goods and services (water quality, potential for the production of safe food products, ecosystems of floristic and faunistic interest)? 2) What are the sources, both qualitatively and quantitatively (influx of nutrients, eutrophication, hypoxia, contaminated urban and industrial effluents and microbes, contaminated sediments and dredging, diffuse inputs of pesticides...)? 3) How can we assess the problem using the classical triad of analyses (chemical analyses, biotests, biological responses at different levels of organization) in environments where unique and complex dynamic processes are at work (salinity effects, temperature, pH, dissolved O_2, redox potential, hydrodynamics and sedimentary processes and their spatio-temporal changes). The concept of the reference, against which most of the indicators/indices selected to characterize the health status of estuaries must be compared, is thus an important topic of debate. 4) How can we solve the problem (establishing environmental quality standards, developing environmental technology for remediation, carrying out predictive risk assessment of new and existing chemicals, implementing transnational legislation...)? 5) How should we consider the problem in a general environmental strategy (ecocentric approach aiming at the recovery of the garden of Eden versus anthropocentric approach based on the conservation of goods and services)?

F08 - Escape from the Ivory Tower - Environmental sciences should impact public and policy

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The term 'Ivory Tower' is generally used to depict intellectuals that are disconnected from everyday life and reality. As environmental sciences live through a concern about the environment as a whole, disconnection from our outside is more than just a typical academic characteristic. In the end it is a complete failure of our fundamental intentions.

Connections from the laboratory to the public of course exist, via e.g. press relations offices, news on institute web sites, or reception of important findings in newspapers. However, the crucial question is: what is perceived by the public that can generate impact on policies?

Communication means to convey meaningful information to create shared understanding. If messages from environmental science are not suitable to produce public endorsement, we remain in the Ivory Tower despite all connections there might be. This demands easily comprehensible communication and also for subsequent confirmation of the right understanding.

Consequently, to truly escape from the Ivory Tower it is not sufficient for environmental science to merely contact the public outside but to effectively and sustainably distribute its findings for a safer and healthier environment.

We invite scientists from all over the world to share their ideas, thoughts and experiences regarding the communication of scientific findings to the public. In particular presenters with expertise and special skills in public relations, press work, etc. are most welcome. The session will have a final panel discussion and an associated poster corner to summarize and substantiate the key topics. Based on the results we want to develop a strategic communication framework that environmental scientists can easily adapt to their specific needs for a successful transfer into public opinion building.

F09 - Focal species of birds and mammals and their ecological behaviour for refined risk assessments of plant protection products in Europe

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In Europe the most recent scientific regulatory guidance document (GD) to conduct risk assessments (RAs) for birds and mammals (B&M) for plant protection products (PPPs) was issued by EFSA [EFSA Journal 2009, 7(12): 1438]. This GD proposes generic species to conduct at tier 1 RAs. The GD acknowledges a high proportion of failures at tier 1 and hence refined RAs are necessary for a high proportion of PPPs. A key refinement step proposed by the GD is the identification of focal species (FS)" (i.e., real B&M species present in the crop at the time of PPPs application) and their ecological behaviour [mainly proportion of time exposed (PT) and proportion of diet (PD)]. Data for such

refinement steps need to be evaluated carefully in an interdisciplinary way to reach wide agreement on final output values for RAs. Although the selection of FS for specific crops, growth stages and regions of Europe has been a recurrent and controversial issue for many years during the official EU and national evaluations of active substances and PPPs, EFSA (2009) did not include lists of specific FS. The need for reaching an agreement on FS, PT and PD to be used for refined RAs in Europe has being identified by regulators and industry as a crucial step to make the PPPs evaluation more consistent and transparent. The common interest to regulators and industry of this topic is well expressed by the different affiliation of the two requesters of this session. J Pascual is chair of the industry's European crop protection association (ECPA) team dealing with B&M topics and M Foudoulakis is an official with the Hellenic authorities and long experience in the evaluation of ecotoxicological dossiers at country and EU (EFSA) levels.
The timing of SETAC 2012 is very well timed for this session for two reasons. First, industry has been conducting field studies across Europe on FS for a wide range of crops. Most industry data are confidential but ECPA has the intention to make data on FS publicly available in 2012. Some EU Member States (MSs) are also actively working to propose lists of FS for RAs (e.g. Denmark, France, Hellas, Sweden, UK). Second, the experience in the use of EFSA (2009) by regulators is scheduled to be officially reviewed by the EU Commission, EFSA and MSs in 2012. Feeding such official review with the outcome of the requested session at SETAC 2012 on the most recent developments on FS and their relevant ecological behaviours will be a timely and valuable contribution to the regulatory evaluation of PPPs in Europe.
The two requesters are well positioned to stimulate active participation to the session. Both have scientific publications on birds and have an extensive network of key European players (academia, regulators of MSs and EFSA and industry) on this topic. Therefore, we are confident that the session would be well attended and serve as a timely forum to make steps to harmonize methods and agree lists of species of B&M for refined RAs for PPPs in Europe.

F10 - From structure to functions: Integrating ecosystem functions and services in Ecological Risk Assessment

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Human societies are dependent on ecosystem services such as provisioning of food and water (Costanza et al., 1997). The Millennium Ecosystem Assessment highlighted that many of these services are under threat of deterioration or have already deteriorated in the last decades (MEA, 2005). The stressors responsible are multiple and include toxicants e.g. heavy metals, salinity, pesticides (MEA, 2005). Toxicants can change the structure of biotic communities, and these changes can propagate to alterations of ecosystem functions, which are essential for the provisioning of ecosystem services (Chapin et al., 2000). The current ecological risk assessment focuses mainly on effects on structural biotic properties such as individuals, species or communities, whereas ecosystem functions or ecosystem services are not considered. Given the lack of a predictive framework for effects on ecosystem functions from alteration of the biotic structure (Woodward, 2009), it remains open whether current endpoints on the level of structural properties are protective for ecosystem functions and thus ecosystem services. Although a few studies identified effects of toxicants on ecosystem functions, these effects were rarely translated to their consequences for ecosystem services. By contrast, several conceptual models are available that suggest specific ecosystem functions and their relation to ecosystem services but applications and quantification of these models are scarce (see upcoming Special Issue on "Biodiversity, ecosystem functions and ecosystem services in ecological risk assessment" Science of the Total Environment 2011).
The aim of this session is to further elucidate (1) the relationship between effects of toxicants on biotic structures and ecosystem functions and (2) qualify and if possible quantify the consequences of alterations in ecosystem functions for ecosystem services. The session builds on and advances the progress made in related sessions on the 2010 and 2011 SETAC Europe and SETAC North America meetings. It will include contributions on methods for the measurement of ecosystem functions in different ecosystems, on the effects of toxicants on ecosystem structure and functions and presentations on the effects of toxicants on ecosystem services. The session will bring together researchers investigating the effects of toxicants on ecosystem functions and services from around the world and therefore spur future collaboration which is urgently needed on this topic. In addition, it will highlight deficits of current approaches. Finally, the session topic will stimulate the bridging of the gap between ecological and ecotoxicological research and link them to the social sciences.

F11 - Global Mercury: Bridging science and policy

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Widespread mercury deposition and contamination is well documented and remains an environmental public-health concern in both developed and developing countries. In early 2013, the UNEP's internationally binding treaty on the control of mercury will be signed. Documentation of the pervasiveness of this contaminant is a first step toward understanding the potential environmental health and ecological implications of mercury pollution and will be critical to the success of the UNEP program. Conveying to regulators that certain ecosystems may be degraded and that, despite globally low Hg levels in abiotic matrices, policies is another critical step for developing the required regulation to reduce mercury emissions and, ultimately, improve air and water quality. In practice, a more synthesized, holistic perspective on the mechanisms related to aquatic and terrestrial biogeochemistry linkages of fate, transport, and bioavailability of mercury in aquatic ecosystems will have to result from long term, multi-ecosystem monitoring programs coupled with process-oriented research questions. At the same time, the existing (or newly developed) regulatory tools will have to combine ease of implementation and cost effectiveness with scientific soundness and the ability to detect ecosystem and human health improvements (or lack thereof) over time. A substantial harmonization effort of such tools, either globally or at least regionally, will also be needed. SETAC is particularly looking to promote advances in mercury isotope chemistry, new mercury source apportionment models, Environmental Risk Assessment protocols for mercury, and development of appropriate environmental quality standards. Contributions on all aspects of Hg research are welcome including case studies, global (or large-scale) assessments and inventories of Hg emissions, fundamental studies dealing with the biogeochemistry (including analytical aspects) and ecotoxicology of Hg, and regulatory issues and risk assessment procedures for environmental and public health.

F12 - Guidance documents for environmental risk assessment (ERA): needs, developments and progress

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Several institutions in Europe are dealing with the development guidance for ERA in Europe. For example the European Food Safety Authority (EFSA) and the Institute for Health and Consumer Protection of the Joint Research Centre (JRC-IHCP) are currently developing / updating GDs in the area of ERA for plant protection products and biocides respectively. But there are also activities in the context of other legislative frameworks (e.g. REACH), at Member State level or at research level.
The aim of this session is to create a platform:

- for giving all initiatives working on guidance for ERA an opportunity to inform the scientific and legislative community about the latest developments
- for identifying and communicating current needs for further development of GDs
- for sharing information between different legislative frameworks, as a contribution of a more harmonised approach for ERA.

F13 - Health and environmental risk assessment of pesticides and biocidal products

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This session aims at addressing the current scientific challenges encountered when performing the risk assessment of biocides and pesticides active substances and of the products they are found into, following the requirements of the Biocides and Pesticides legal frameworks. A special emphasis will be given to cumulative exposure for human health and environment.
This session is also intended to create a forum for discussing the implications of the future EU Biocides Regulation and the progress with the implementation of the Pesticides Regulation. We will include considerations on the policy and scientific challenges arising from the issues on the border line between the biocides framework and regulations like those covering the food and feed additives, cosmetics and veterinary products.
This session will be an opportunity to present the new tools and models developed for environmental, consumer or occupational exposure, like those proposed in the Evaluation Manual for the Authorisation of Biocidal Products. The meeting will facilitate the exchange of ideas between scientists, practitioners and decision makers from Europe, Asia and overseas.

F14 - Implementation of protection goals: Limits of current risk assessment and new approaches to solve old problems

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This session focuses on the question to which extent protection goals, recently defined by EFSA, are achieved by current risk assessment methodology and how risk assessment can be improved to meet protection goals better. Although protection goals are now well defined, it is sometimes uncertain if risk assessment methodology is suitable to assess these goals, i.e. if risk assessments are conservative enough to achieve protection goals or if they are more conservative than necessary for reaching the defined protection goal. Therefore, we would like to highlight areas in which alternative or new approaches could help to address protection goals in a scientifically better way, regarding both lower and higher tier risk assessment.

F15 - Landscape ecotoxicology and spatially explicit risk assessment

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Natural ecosystems are often characterised by a high spatial and temporal variability (e.g. patch dynamics) that strongly influences ecological processes and can modify the exposure and effects of toxicants on organisms. While the spatial dimension has gained increasing attention in the exposure assessments, the effects assessment still largely ignores these aspects despite its relevance for a realistic prediction of effects.
Both ecological as chemical processes exhibit different qualities on a landscape scale as compared to standardized and one-dimensional test settings. In other terms, the persistence of ecological effects of chemicals in space and time can only be assessed when appropriate spatial and temporal scales are considered.
With respect to ecology, processes such as metapopulation dynamics, competition for best habitats and re-colonisation after stress are only observable on a larger spatial scale. Some of these ecological processes are strongly influencing ERA-relevant effect end-points such as local recovery after stress, resistance or robustness against effects. Moreover, it is highly interesting and maybe relevant to investigate if and how local population disturbances are propagated to larger spatial and temporal dimensions.
Considering the environmental dynamics of chemicals, fluctuating concentrations are a common part of the biotope of possibly affected organisms in anthropogenic landscapes. Different ways of introduction (e.g. point sources, per-capita input or spray-drift/runoff), followed by degradation and dilution processes as well as simply the spatial distribution of input and reception in a landscape can result in very complex chemical exposure patterns in space and time.
This session aims at advancing the inclusion of the spatial and temporal heterogeneity of natural systems in ecotoxicology. It will bring together researchers investigating the spatial and temporal dynamics in the assessment of exposure to and effects of toxicants using field studies and modelling as well as a range of methods including genetics, biomonitoring and multivariate statistics. This session is therefore important to spur collaborations in this emerging field of ecotoxicology. Therefore, the session will focus on (1) the analysis of chemical exposure patterns and/or related effects by the means of simulations or measurements on a spatially explicit scale and (2) aspects of spatial ecology that may influence ecological effects in the environment. Topics to be touched upon in this session will be useful for understanding processes that reveal only on a larger spatial and/or temporal scale and that are relevant for risk assessment. Presentations aiming at illustrating how spatially explicit approaches might be implemented in regulation and land management are also welcome.

F16 - Linking exposure to effects in environmental risk assessment

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A critical step in the prospective and retrospective ERA of toxicants is the linking of exposure and effects data. Lack of a clear conceptual basis for the interface between the environmental exposure and ecotoxicological effects may lead to a low overall scientific quality of ERA. The ecotoxicologically relevant type of concentration (ERC) needs to be consistently applied so that exposure and effect

estimates can be compared and extrapolated as readily as possible. This session invites papers on:

- Bioavailability and spatio-temporal configuration of toxicants and organisms in the environment
- Exposure pattern and time to onset of effects, including latency
- Influence of time-variable exposure patterns on ecotoxicological effects
- Exposure-response reciprocity and the use of time weighted average (TWA) concentration in long-term risk assessment
- Toxicokinetics and toxicodynamics in ERA: experimentation and modeling.

F17 - Mode of Action in Environmental Risk Assessment

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We believe that it can greatly aid the environmental risk assessment of xenobiotics if one already understands aspects of the mechanisms or Mode-of-Action of the chemical in another biological system. Pre-clinical mammalian based data can be used to better guide the environmental testing of compounds and the principle of 'reading across' from what is known in terms of the biological target, kinetics and the resultant effect can guide the endpoints used in non-regulatory testing, and indeed guide the choice of appropriate regulatory approaches. In this session we wish to invite presentations to cover the spectrum of work in this area, wider aspects of MOA and comparative pharmacology and toxicology, and in particular presentations concerning:

- The positives and the negatives, where does MOA work and where does it fail?
- How can clinical and pre-clinical information be best used to guide testing of chemicals?
- How can we incorporate bespoke MOA endpoints into the regulatory context?
- What can be learnt about evolutionary conservation of biological targets across species and life stages?
- What is the most appropriate level to read-across is it better to compare in vitro data or population level?

F18 - Monitoring data and post-registration studies: generation, compilation and use in the environmental risk assessment and management

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Monitoring studies, in the context of the environmental impact of Plant Protection Products (PPP) or pesticides, investigate the fate and/or effects of products through their active ingredients and/or their relevant degradation products in/on the environment, following a use under realistic conditions in crop protection. There is an increasing demand for such investigations throughout Europe, that is identified during the decision making process for PPP (e.g. Directive 2010/21/EC explicitly requiring the implementation of monitoring some insecticides) either as an outcome of the risk assessment as a way to address the remaining uncertainties or as a mean to check the efficacy of risk mitigation measures coming along the placement on the market. These studies, beside valuable help in the evaluation of the impact of PPP on the environment, may be a source of field data needed to feed risk assessment tools and to calibrate ecological models. This session invites presentations on monitoring studies aimed at depicting the presence of residues of PPP in environmental matrixes (soil, surface or ground water or air), and/or their effects on non target organisms. Approaches that include aspects of refined data interpretation, extrapolation to covered non covered situations are particularly welcome, as well as approaches that illustrate the use of monitoring/post-registration data into a risk assessment, and/or as a support of an improvement of risk assessment processes.

F19 - Multiple stressors in a changing world

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Contaminants from human activities are increasingly altering the composition and integrity of ecosystems. Chemical contaminants, together with physicochemical stressors from climate change, increasing urbanisation, land use changes and altered water availability, have the potential to have both positive and negative impacts on aquatic and terrestrial biota andorganisms in their natural environment usually have to cope with several environmental stressors in parallel. Organisms, including humans, may become more or less sensitive to chemical pressures and the effects of these

multiple stressors on ecosystem and human health are likely to become increasingly important in the future. A variety of single-species studies illustrated that combined stress often differs from expectations resulting in synergistic or antagonistic responses. However, a coherent conceptional framework on stressor interaction or a mechanistic understanding on community responses towards multiple stressors is missing. This is thought provoking as, despite the relevance of the topic, aspects of combined stressors are rarely considered in a regularly context (e.g. improvements of the ecological status of a water body according to the EU-WFD). Understanding the interplay between multiple stressors and community and ecosystem responses requires an integrated approach of experimental and conceptional work and may be enhanced by considering ecological theory in the assessment of multiple stress responses. This session will showcase the latest research and modelling of multiple stressor effects on both aquatic and terrestrial ecosystems. Papers could include research on:

- Current chemical risks to ecosystems
- Main drivers of environmental change
- Changes in chemical inputs, transport and fate
- Changes in exposure and effects including bioavailability and receptor sensitivity
- Modelling of stressor interactions
- Non linear responses and thresholds/tipping points
- Diagnosis or prognosis of toxic effects in multi-stress environments (covering aspects from field observations, model community studies as well as conceptional or modelling approaches).
- Implications in terms of risk assessment and management
- Specific case studies of multiple stressors in the environment.

F20 - Non chemical soil threats

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As stated in the European Soil Strategy (2006) soil degradation is a serious problem. Good quality soil is essential to our economic activities as it provides us with food, drinking water, biomass and raw materials - and all our human activities are somehow related to soil. But soil degradation is accelerating across the EU, with negative effects on human health, ecosystems and climate change - and on our economic prosperity and quality of life. An estimated 115 million hectares or 12% of Europe's total land area are subject to water erosion, and a further 42 million hectares by wind erosion. Approximately 3.5 million sites within the EU could be contaminated. About 45% of European soils have low organic matter content. The overall objective of the EU Soil Strategy is protection and sustainable use of soil; the identified threats being: erosion, organic matter decline, salinisation, compaction, contamination, sealing, landslides, loss of biodiversity (although not directly covered by the EU Soil Strategy). Historically, effects of contamination on soil and its ecosystem are well researched and described. The time has come to gain more insight in the so-called non chemical soil threats. How do we measure the threat itself? How can we assess its impact on soil functioning? How can we assess the risk associated to these threats in order to improve decision making? How does contamination interact with those other threats? These elements will be necessary for developing any Soil Protection Directive with a scientific sound basis. We cordially invite presentations focussing on non chemical soil threats and on interactions between threats as referred to in the EU Soil Strategy.

F21 - Oil spill effects and risk assessment

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Oil spills are a threat to environmental resources and can lead to long-term damage in marine and freshwater ecosystems. Experience has learned that assessment of effects of oil spills is complex. Environmental damage is not directly related to the amounts of oil spilled. Many factors like weather conditions, type of oil and location of the spill determine to a large extend the impact of oil spills. Additionally, important effects of oil spills might not become apparent immediately after a spill. After the oil slick has disappeared and direct effects are no-longer visible, community shifts and food web effects might still occur. There is a need to better assess the impact of oil and its components on important ecological processes in order to understand these long-term effects.
Increased shipping and petroleum related activities are about to increase in vulnerable environments like the arctic. This increases even more the importance to properly assess risks and impacts related to potential oil spills. The aim of this session is to gather experts in the field of oil spill risk and impact assessment and will provide a platform for presenting the latest achievements in this field.

F22 - Plants and chemicals in the environment: risk assessment, pest management and phytoremediation

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This session is organized by the SETAC Aquatic Macrophyte Ecotoxicology Advisory Group (AMEG) and welcomes scientific contributions that highlight one of three different aspects of the relationship between plants and chemicals in the environment. Despite the main focus on aquatic macrophytes, we also welcome scientific contributions on algae or terrestrial plants within the three topics:

Risk assessment: Macrophytes are a key-component of many aquatic ecosystems by providing several ecosystem services including and among others oxygen production, habitat and shelter for other species, food and clean water for animals and humans. Therefore macrophytes are more and more considered in the risk assessment of chemicals and this session will cover contributions related to ecotoxicological tests and field monitoring to assess chemical effects on macrophytes. The session discusses laboratory and field approaches and temporal-spatial extrapolation of plant data for inclusion in the risk assessment of chemicals.

Pest management: Macrophytes are pests if they become invasive species especially outside their original geographical distribution range. Examples of serious modifications of ecosystems by invasive plants have been reported from all over the world. The threats invasive species pose to their environment include several, hampering food production by aquatic ecosystems worldwide and degradation of aquatic ecosystems like lakes and wetlands among others. Therefore, sustainable management of alien invasive macrophyte species is a world-wide concern. This session will discuss new practices on how invasive species can be managed in a sustainable way, e.g. by selectively applied pesticides, by combined chemical and biological management regimes or by other sustainable management practices.

Phytoremediation: The third topic of the session intends to demonstrate the potential use of macrophytes for phytoremediation and risk mitigation purposes. Macrophytes change their chemical environment and take up and biodegrade contaminants thereby affecting concentrations of these compounds in aquatic ecosystems. This session will highlight these processes as demonstrated in experiments at laboratory and field-scales, and also discusses the application of those principles and processes in artificial wetlands and aquatic buffer zones where macrophytes can be used to reduce the input of pesticides and other contaminants due to run-off from agricultural areas into streams, ditches and rivers.

F23 - Risk assessment of chemical mixtures: where do we stand? what are the next steps?

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Since the EU environment ministers asked the European Commission at the end of 2009 to strengthen its work on managing the risks posed by chemical mixtures, the area of mixture toxicity assessment has been incredibly active. Several conferences and workshops were conducted, and a range of scientific publications, regulatory guidelines and recommendations on how to assess risks of chemical mixtures were put forward. Recently published work includes in particular the “opinion on risk assessment of mixtures” by the Scientific Committees of the European Union, and the suggested WHO/IPCS framework on risk assessment of combined exposure to multiple chemicals.

However, several open questions still remain, ranging from fundamental scientific issues to matters concerning the implementation of the mixture perspective into existing regulatory frameworks and to the development of appropriate quality targets for chemical mixtures. The session aims to provide an overview and critical reflection of the current debate, to identify gaps and hurdles and to identify the logical next steps. On the one hand, the session aims to present and analyze the specific situations in the different regulatory arenas (e.g. REACH or the Water Framework Directive). On the other hand, cross-cutting, conceptual analyses are also highly welcome. The session focuses on the risk assessment of mixtures, but also invites contributions that cover issues related to mixture exposure and hazard assessment, as well as risk management. We invite presentations that analyze the issue from the perspective of all the different stakeholders (industry, academia, environmental regulators, NGOs).

F24 - Risk communication for environmental protection: scientific and regulatory needs

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Risk communication is an interactive, complex, multidisciplinary and multidimensional process intended to exchange risk related information and opinions among experts, decision makers, stakeholders and the general public. In the risk analysis of chemical substances, risk communication is of increasing importance and covers many specific sub-processes, from the exchange of the scientific outcome of hazard and risk assessment between risk assessor and risk managers, to the communication of the "residual risks" that remain after the implementation of all feasible risk control measures. The consideration of risk perception, by employers, workers, consumers and the general population is also an essential element of the process.

This session covers all risk communication sub-processes within the communication of the environmental hazards and risks of chemicals, including the indirect environmental risk for human health. Abstracts covering the risk communication experiences achieved in other fields, such as food, workplace, etc. are welcomed as far as they present views on how to support the scope of the SETAC mission: to support the development of principles and practices for protection, enhancement and management of sustainable environmental quality and ecosystem integrity.

The main topics to be addressed include:

- Perception of environmental risks and role of risk perception in the decision and communication processes
- Communicating the outcome of risk assessments and their uncertainty to decision makers
- Communicating the outcome of risk assessment, regulatory decisions and risk management measures to stakeholders and the general public
- Regulatory needs for risk communication under general chemical legislation (REACH, CLP/GHS), specific chemical legislation (pesticides, biocides, cosmetics, pharmaceutical, etc.), and other sector specific (water protection, integrated pollution control, industrial accidents, etc.) legislative requirements.

F25 - Soil at risk? Regulatory decisions need scientific input

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Soil ecosystems support a great proportion of ecosystem services that are rated as vital for mankind. These services reach from food provision to the regulation of water, climate and air quality. Moreover, soil is an extremely diverse habitat for an extremely diverse biocoenosis. It is beyond dispute that the key drivers of essential soil processes are to be found in the (micro)organisms living in an on the soil, but the function of the single species is often unknown. Apart from the knowledge on so-called 'ecosystem engineers' (e.g. anecic earthworms), there is a gap of information regarding the effects of the presence or -more drastic- the absence of organisms' species in soil.

In the prospective risk assessment of chemicals released in the environment (e.g. pesticides, pharmaceuticals), the ecotoxicological effects of substances are compared to the respective predicted environmental concentrations. Both terms of this risk quotient are in many respects particular when coming to assess the risk for soil ecosystems compared e.g. to the aquatic environment.

On the one hand, the data base for estimating potential effects of substances on soil organisms has been for many years extremely meagre, namely based on an acute standard laboratory test with one earthworm species. It is only in the last years that the demand for a more accurate assessment has led to the implementation of higher tier studies with complex communities covering several organism groups (e.g. Collembola, enchytraeids). However, due to the lack of knowledge on the species' function in the soil ecosystem, the interpretation of such study results is still a big source of debate. We call in this session for scientific input addressing the role and the sensitivity of organisms in the soil web, and aim at discussing possible tipping points of soil ecosystems that mark the tolerable level of individual/population/ biodiversity loss. Agreed guidance is also needed on the taxonomic level required for the detection of relevant effects, on possible aggregation strategies (e.g. trait based species' units), and on appropriate statistical data treatments.

On the other hand, since no homogeneity can be assumed in the distribution of chemical in the soil matrix, also the exposure assessment and the selection of pertinent predicted environmental concentrations requires particular attention. In particular, the spatial variability of substances often follows vertical trends, due to application/spill on the soil surface: at first, all substances will show the highest concentrations in the upper soil centimeters and only progressively with time leaching and degradation processes will lead to 'dilution' over the soil horizons. We would like to highlight the importance of temporal dynamics of substance concentrations in soils, and therefore sincerely

welcome contributions addressing the time line of soil organisms' population recovery and of recolonization processes in the field.

F26 - Standard versus non-standard methods for hazard and risk assessment

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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. 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.

At the same time, scientific understanding progresses, not being reflected in standard testing schemes. As a result, the potential for the use of non-standard testing data (such as that published in peer-reviewed journals) has been discussed.

The current goal for risk assessment is testing schemes that economize, and require only the most appropriate and necessary tests, and the use of as much existing data as possible. However, the use of inappropriate tests or non-standard data in regulatory decision-making could potentially result in inappropriate or erroneous regulation.

This session aims to discuss the pros and cons of standadard test results vers non standard test results and answer the following questions:

- Why were standardized tests developed and what is the rationale for their use in regulatory decision-making? What are the pros and cons of standard vs. novel tests?
- What is the value of non-standard endpoints for risk assessment purposes?
- Can peer-reviewed and/or published data be used for regulatory risk assessment? How could it be used? How should it be weighed against standard GLP study data? Could publication standards (reporting requirements) by peer reviewed journals improve the utility of non-GLP studies for regulatory purposes? What types of evaluation criteria should be used for analysis of the peer reviewed literature for regulatory risk assessment?
- Are certain deviations from the standard testing schemes more important than others? If so, which are the most important and which are negligible? Could there be a systematic approach to evaluating this?
- Could different standards be applied to testing data used for different types of regulatory decisions? How much scientific certainty is necessary for different types of regulatory decisions?

F27 - The challenge of sustainability of marine resources: Towards the definition of an integrated environmental approach

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In the aim of promoting the responsible and sustainable management of the European fishing activity, the EU took a number of actions oriented to the implementation of “no-discard” and “zero-waste” policies to be followed by the European fishing fleets in the near future. In particular, actions were directed to the development of policies to reduce unwanted by-catches and eliminate discards in European fisheries, as well as to make the best possible use of the captured resources avoiding its waste. In this sustainability framework, several initiatives (like LIFE+ FAROS Project - www.farosproject.eu) pursue the minimization of discards/by-catch as well as their optimal valorization to recover and to produce valuable chemicals of interest in the food and pharmaceutical industry.

Based on these objectives, the aim of the session will be focused on the exchange of methodologies and tools to improve the sustainability of fish discards valorization processes and to implement basic principles of industrial ecology towards the sustainability on the use of marine resources. This goal can be achieved based on the analysis of different reuse/valorization processes and their associated scenarios under risk assessment and environmental impact criteria. Therefore, it will be necessary to integrate different environmental indicators, namely Life Cycle Assessment (LCA), Ecological Footprint (EF) and Environmental Risk Assessment (ERA). Although these indicators have been individually applied to different fields of the fishing sector, an integrative global approach is needed to perform a

reliable and complete environmental evaluation. This evaluation must be sequentially applied at different process levels (product, unit operation and global process).
At first, it could be thought that sustainable valorization of discards will have a very positive effect on the reduction of environmental impacts, since the quantity of species that are discarded both on board and on shore will be significantly decreased. Furthermore, in terms of Environmental Risk Assessment, the removal of dead fishes from the marine environment will not only benefit the preservation of marine ecosystems, but it can also pose a reduction of contaminant mass if fishes contain persistent contaminants, which can biomagnify through the food web. Consequently, these contaminants can be finally transferred to human receptors through direct or indirect (by-products) fish consumption. On the other hand, if vessels transport a heavier load, fuel consumption will be higher, this generating a negative impact. All these cases and contingencies must be evaluated by environmental indicators.
In summary, sharing available knowledge will be useful to establish optimum design, redesign and/or operating conditions, based on integrated criteria which include both technical and environmental aspects of valorization processes of fish discards, leading to minimize environmental impact and to the introduction of BAT's.

F28 - The implementation of risk mitigation measure in protecting the environment in pesticide regulation

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In assessing the impact of pesticides for the environment, specific risk mitigation measures (RMM) may be set before the authorization of a product based on the pesticide approval regulation (EC) 1107/2009 and can be accepted. RMM are tools for risk manager to guarantee a safe use of pesticides. Not all RMM can be addressed during authorization but can be tackled in other regulatory frameworks as e.g. directive 2009/128/EC on the sustainable use, good agriculture practices GAP and directive on machinery of pesticide application 2009/127/EC. Therefore, a broader strategy for a sustainable use of pesticides is desired.
Safety measures for pesticides are often required to increase protection for ground and surface waters and non-target organisms. In Europe, various RMM are in use from buffer zones, physical barriers, to techniques as drift reducing nozzles to reduce the concentration of pesticides reaching non-agricultural land. The authorization of a pesticide product is addicted to the implementation of the risk mitigation measure (for labelling requirements see EU/547/2011) and farmers are asked e.g. to establish buffer zones around treated fields to reduce risks from drift during the application of pesticides and run-off during rain events. Buffer zone distances are scenario-based using applicable site conditions and will be provided in look-up tables on product labels. Taken together, these measures are expected to directly reduce exposures and risks, improve safety and reduce the potential for accidents in the environment, while maintaining important benefits of the plant protection products.
In addition to the risk assessment, other aspects of risk reduction should be considered in the management of pesticides such as product related measure, limitation of the marketing and the use of products, the feasibility of technical solutions, substitution of substances in products, practicality of measures and effective communication with farmers.
The session aims at presenting and discussing the value and efficiency of RMM in the regulation to minimize risks of pesticides for the environment. The session further aims in compiling RMM required for an EU-wide harmonized assessment of pesticides and to discuss potential appropriate solutions to prevent identified risk.

F29 - The use of rodenticides, a nagging issue on effectiveness and risks

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Rodenticides are used globally and most use involves anticoagulants, both first and second generation compounds. Use of First Generation Anticoagulant Rodenticides (FGARs) resulted in resistance in target populations, and Second Generation Anticoagulant Rodenticides (SGARs) were subsequently developed. These SGARs are more toxic and persistent and as a result present a significant secondary exposure and poisoning risk to predators. Rodenticides are regulated in Europe as biocides under Directive 98/8/EC or as plant protection product regulated under Council Directive 91/414/EE. In North America they are regulated as pest control products under restrictive federal legislation. Some of the SGARs, are known PBT-compounds (Persistent, Bioaccumulative, Toxic), which would normally restrict their use. However, rodenticides are considered as "essential use" products, because of a lack of acceptable alternatives (Commission Regulation (EC) No 298/2010), which implies that the advantages

of their use in rodent control outweigh the risks to non-target organisms. Under such considerations it should be reasonable to: 1) assume that continued use does not have any unacceptable effect on human or animal health or on the environment and 2) that Member States impose all appropriate risk reduction measures when granting approval (Directive 98/8/EC).
Several studies have shown exposure to SGARs not only in non-target rodents but also in a wide array of predators; in some cases effects on such non-target species were evident. Exposure may be related to baiting schemes and protocols, types of compounds used, food web relationships and species specific sensitivity. Studies have shown that the toxicodynamics and the toxicokinetics of anticoagulant rodenticides are extremely complex, which hampers a proper risk assessment based on field cases and derived dose response relationships.
In the proposed session we solicit for presentations on the latest scientific insights on exposure and effects of rodenticides on (non-target) rodents and their predators. Presentations may focus on the toxicokinetics and -dynamics of rodenticides, on secondary exposure and/or poisoning in the field or on risk mitigation in the baiting procedures. In addition, specific presentations are welcomed on the view of regulators on how to deal with the unwanted risks of rodenticides, and of industrial partners on possible next generation products. The session will bring together expertise in particular from North America, Europe, Australasia and parts of SE Asia. It is designed to provide an integrated overview on the environmental impacts of rodenticide use from different stakeholders perspective.

F30 - Wastewater effluent discharges: chemical characterisation and understanding potential risks in receiving waters

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The vast majority of chemicals discharged to the aquatic environment are delivered in the form of wastewater effluents - aqueous mixtures of chemicals derived from industrial processes or the treatment of domestic sewage. While some industrial effluents are discharged directly to controlled waters, the vast majority are sent to municipal wastewater treatment works for treatment along with the domestic sewage.
Municipal wastewater treatment works are designed primarily to treat domestic wastewater and biological treatment processes are therefore employed to facilitate the nitrification of ammonia and nitrite into nitrate (e.g. activated sludge plants), rather than to deal with the vast range of substances likely to be present in industrial waste. Additional ‘tertiary’ treatments are added to some municipal treatment works to deal with specific substances in response to the requirements of the Urban Wastewater Treatment Directive or, in the receiving environment, the Water Framework Directive (WFD).
Recently, a number of so-called ‘advanced’ treatments have been trialled and implemented with the aim of reducing concentrations of trace organic chemicals (e.g. endocrine disrupting substances) which have the potential to induce long-term ecological effects. Hence, advanced treatment methods (e.g. ozone, activated carbon, nanomaterial etc.) may be appropriate to counteract the continuous release of pollutants and the potentially accompanied effects in the environment.
The regulatory burden for ensuring that the concentrations of substances in wastewaters meet environmental standards ultimately falls on the shoulders of the water treatment industry. Wastewater treatment operators therefore require a well-developed understanding of the range and concentrations of substances in their effluents and of their contribution to local measured environmental concentrations to allow a robust assessment of the treatment options available for reducing effluent concentrations. Where there is also reliable information on the sources of substances entering the sewerage systems, the appraisal of options may be widened to also evaluate the potential for upstream controls rather than treatment alone.
This session will focus upon the considerable challenges of characterising and treating wastewater effluents, and the assessment of potential ecological effects that these effluents may have on receiving waters. This is an issue of global relevance and this session will address:

- The efficiency of treatment technologies at removing specific substances or groups of substances, especially those identified as priorities under the WFD,
- Scientific knowledge concerning tertiary treatment methods in wastewater treatment plants by considering research results regarding ecotoxicological implications and fate of chemicals during the treatment application,
- The effects of treatments on other ‘non-target’ substances (especially Dissolved Organic Carbon) and the implications for chemical fate and behaviour in the receiving environment,
- Developments in the hazard and risk assessment of substances entering the environment via wastewater effluents, mixture effects, nanomaterials, etc,

- Monitoring schemes for effluents and receiving waters,
- The sources of substances entering the wastewater systems.