



SETAC Europe 20th Annual Meeting

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SETAC Europe



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A - Climate change and environmental quality

A01 - Climate change and quality of water resources: what needs for research?

Suggested chairs: Olivier Thomas (EHESP-School of public health, RENNES, France) and Chris Freeman (Bangor University, BANGOR, United Kingdom)

Climate change models predict a global increase in water scarcity for the next decades with a rise in hydrological risks. While several works focus on floods and droughts impacts in terms of water availability, consequences on water quality related to the resources and drinking water production are just beginning to be studied. Climate change could act indirectly on water pollution due to human activities, surface waters being particularly vulnerable. Furthermore, with increasing extreme events (floods and droughts), a degradation trend of resources and drinking water quality leading to potentially deleterious health impacts is expected. This session will be set around four main topics:

- Biological: waterborne vectors and pathogens.
- Chemical (1): increase of organic carbon and nutrients.
- Chemical (2): emerging substances, particularly in rural area.
- Biochemical: increase of cyanotoxins and other natural toxins.

For each topic, a focus will be made on health risk assessment and ways of research for the next future will be drawn.

Interesting general communications covering several topics could also be selected. Presenters will be encouraged to submit a paper to be published after peer reviewing either in a special issue of a scientific journal, or at least on the web site of the ERA-Net "Environment and Health" consortium working on the relation between climate change and water quality (website under construction).

A02 - Ecotoxicology and ecotoxicological risk assessment in a changing climate

Suggested chairs: Keith Solomon (University of Guelph, GUELPH, Canada), Jose Rodrigues Gil (University of Madrid, MADRID, Spain) and Anja Coors (ECT Oekotoxikologie GmbH, FLOERSHEIM/MAIN, Germany)

Extrapolation is a key part of risk assessment and becomes more complex when this extrapolation is between climatic regions. There has been considerable discussion related to susceptibility of organisms from different climatic regions but this same discussion relates to environmental fate and the issue of multiple stressors, one of those being climate and how this is expected to change in the future. Climate change is also a critical factor setting the frame for the ongoing evolution of species worldwide.

This topic is currently relevant in the context of the range of climates across the globe as well as in a more regional sense in Europe, from the polar regions to the Mediterranean. More and more information on susceptibility of organisms to environmental pollutants has become available and, while this mostly suggests that there is no significant difference in susceptibility between organisms in different climatic zones, there are interesting exceptions where adaptations of organisms to extreme environments may alter their ability to tolerate toxic substances. The session considers similar impacts of climate change, triggered for example by land use change, invasion of antagonistic species, or conditions exceeding physiological niche limitations of a species, resulting in population bottleneck. In addition to these critical components of risk assessment being affected by climate, they are also susceptible to changes in climate and the change may, in of itself, become an additional stressor.

This session will compliment some of the key areas identified for the meeting and will rely on invitations of a few key speakers as well as submission by participants.

A03 - The other CO₂ Problem: Effects of ocean acidification on marine organisms

Suggested chair: Renée Bechmann (IRIS, RANDABERG, Norway)

Background on ocean acidification (OA):

Rising Acidity in the Ocean: The Other CO₂ Problem.

Orr et al. (2005): "Ocean uptake of CO₂ will help moderate future climate change, but the associated chemistry, namely hydrolysis of CO₂ in seawater, increases the hydrogen ion concentration. Surface ocean pH is already 0.1 unit lower than preindustrial values. By the end of the century, it will become another 0.3-0.4 units lower under the IS92a scenario, which translates to a 100-150% increase in hydrogen ions. Simultaneously, aqueous CO₂ concentrations will increase and carbonate ion concentrations will decrease, making it more difficult for marine calcifying organisms to form biogenic calcium carbonate."

In addition, increased pCO₂ may have effects on the physiology, growth and reproductive parameters both in calcifying and non-calcifying organisms. In a 2008 review Fabry et al. concluded that ocean

acidification and the synergistic impacts of other anthropogenic stressors provide great potential for widespread changes to marine ecosystems.

References:

- Fabry VJ, Seibel BA, Feely RA, Orr JC. 2008. Impacts of ocean acidification on marine fauna and ecosystem processes. *Ices Journal of Marine Science* 65:414-32
- Orr JC, Fabry VJ, Aumont O, Bopp L, Doney SC, et al. 2005. Anthropogenic ocean acidification over the twenty-first century and its impact on calcifying organisms. *Nature* 437:681-6

B - Environmental chemistry

B01 - Current trends and new findings in plant uptake of organic chemicals

Suggested chairs: Charlotte Legind (DTU Environment, KGS. LYNGBY, Denmark) and Chris Collins (Soil Science, University of Reading, READING, United Kingdom)

Plant uptake of organic chemicals is relevant in the context of human and wildlife exposure. Chemicals present in the environment may transfer from soil, air and water to plants; whereby they enter the terrestrial food chain. The immense number of organic chemicals present in the environment today requires measurements as well as predictive tools to estimate their transfer to plants. These tools could be models that range from very simple empirical based regressions to more complicated mechanistic models.

This session aims at giving:

- an overview of current trends in research on plant uptake of organic compounds
- examples of measurements and model applications
- insight to areas where research improvements are needed

Papers addressing plant uptake models as well as innovative experimental work on the transfer of organic chemicals to plants are invited. Also, discussions on future needs in research on plant uptake are encouraged.

B02 - Environmental chemistry of ionizable organics

Suggested chairs: Ángeles Rico (Institute for Risk Assessment Sciences-Utrecht University, UTRECHT, The Netherlands) and Steven Droge (UFZ Helmholtz Centre for Environmental Research, LEIPZIG, Germany)

Ionizable organics, or permanently charged structures, comprise an important fraction of illicit drugs, (fluorinated) surfactants, pharmaceuticals and pesticides. Ionizable organic chemicals receive widespread attention in monitoring studies, mainly due to considerable advancements in LC-MS/MS. They can be present in relatively high concentrations in industrial and household waste water streams, and the efficiency of treatment plants for reducing hydrophilic compounds is not always optimized, resulting in considerable amounts of these chemicals in various environmental systems. Current risk assessment models are typically based on the behaviour of nonionic chemicals. It is unlikely that these models can account for all the ionic interactions that ionizable organic chemicals undergo in the environment. Kow-based models might even be inadequate if the ionic species dominate under environmental conditions. The current knowledge on the environmental chemistry of ionic species is sparse and scattered, and a good overview on the effect of relevant environmental parameters on their partition behaviour is still lacking. This strongly hampers the initiation of improved risk assessment models. Advanced understanding on the sorption behaviour is especially required on the electrostatic interactions that occur between ionized compounds, charged sites on geochemical and organic sorbents, etc. We therefore aim for a SETAC platform where scientists can share their views on topics that are specifically relevant for ionic species, e.g. the mechanisms underlying ion-exchange processes and the relative importance of hydrophobic interactions, interactions with inorganic sediment and soil phases and cellular uptake mechanisms.

B03 - Fate and biogeochemistry of metals

Suggested chairs: Nelson O'Driscoll (Acadia University, WOLFVILLE, Canada), João Canário (INRB/L-IPIMAR, LISBOA, Portugal) and Stefano Covelli (University of Trieste, TRIESTE, Italy)

The fate and biogeochemistry of metals in ecosystems is a major topic in environmental toxicology and chemistry. Over the past several years there have been significant advances in the understanding of the biogeochemistry of metals and the implications of biogeochemical processes for the uptake of metals by organisms in the environment. For example, recent discoveries in mercury science include: (i) advances in mercury isotopic fractionation; (ii) whole ecosystem isotope addition experiments; (iii) reproductive impacts due to mercury exposure; (iv) the development of mercury photo-chemistry in fate processes; and (v) advances in mercury predictive models. Comparable advances have also been

made in the environmental chemistry of other metals. The session will present and discuss recent developments in the environmental fate of metals and related issues including chemistry, toxicology, monitoring, effects, modeling, and risk assessment.

B04 - Fate and exposure modelling

Suggested chairs: Michael Matthies (University Osnabrück, OSNABRÜCK, Germany) and Martin Scheringer (ETH Zürich, ZÜRICH, Switzerland)

Environmental fate and exposure models of chemical substances are well established tools to assess the exposure for man and ecosystems. They can also be helpful to better estimate persistence and bioaccumulation in the context of PBT/vPvB assessment and POP classification and to reduce uncertainties in decision making. The aim of this session is to discuss the influence of environmental fate processes on the assessment of exposure, persistence and bioaccumulation. Process-based as well as simulation models are invited for presentation. In particular, contributions are welcome on the role of partitioning between environmental compartments, degradation vs. dissipation, uptake and bioavailability, polar and ionisable compounds, transfer in aquatic and terrestrial food chains, atmospheric transport and degradation, spatial scale and geo-referenced approaches, steady and non-steady state modelling, pharmacokinetic models, bioaccumulation and long-range transport with biota. Other new directions in fate and exposure modelling are also welcome.

B05 - Fate of pesticides in soil, water and air

Suggested chairs: William C. Koskinen (University of Minnesota, SAINT PAUL, MN, USA), Juan Cornejo (IRNASE-CSIC, Seville, Spain) and Bernhard Gottesbueren (BASF SE, LIMBURGERHOF, Germany)

Over the past 40 years there has been significant research in the fate of agricultural pesticides in soils, water, air and plant. Sorption-desorption, leaching, volatilization and degradation (chemical, photochemical and biological) are processes involved in the environmental fate of these compounds. Availability/bioavailability of pesticides in the soil is an integration of various processes and controls transport to water, air and through soil and uptake by target and nontarget organisms and degradation. Recent advances in analytical techniques now allow identification and quantification of these compounds and their metabolites in soil, water and air at the ppt level, which facilitates research on the processes. Also the advances in modelling have contributed to an improvement in the accuracy in pesticide fate prediction in the environment. The session will give an overview of the recent developments in the environmental chemistry of pesticides.

B06 - Passive sampling and dosing techniques

Suggested chairs: Georg Streck (Helmholtz Centre for Environmental Research, LEIPZIG, Germany) and Jan Balaam (Cefas, LOWESTOFT, United Kingdom)

In recent years, passive sampling and dosing techniques have experienced a dynamic development. These techniques are increasingly used (1) for exposure determination in water, sediment, air or soil, (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 biotests. Great progress could be observed in the last years e.g. in determining the influence of various environmental conditions on sampling rates of passive samplers. Calibration procedures as well as the search for performance reference compounds for devices targeting polar organic compounds gained growing attention. Besides established passive sampling techniques, e.g. solid phase microextraction, SPMDs or POCIS, new types of samplers have been developed for specific purposes or tailored for specific classes of compounds. Interesting new developments are the combination of passive samplers and bioassays. New dosing techniques emerged enabling researchers to maintain exposure conditions constant during bioassays. This session will serve as a platform for all scientists working with passive sampling or dosing techniques to present their work, exchange ideas and to foster co-operations. A special focus will be given to new concepts, techniques or devices, and to applications of the developed methods, e.g. in monitoring programmes, demonstrating their advantage over classical approaches.

B07 - Sorption and bioavailability of organic chemicals

Suggested chairs: Kirk Semple (Lancaster University, LANCASTER, United Kingdom) and Andreas Schaeffer (RWTH Aachen University, AACHEN, Germany)

Extensive research has greatly developed our understanding of the fate and behaviour of organic chemicals in soils and sediments. There has been considerable interest on the influence of various types of organic carbon (particularly black carbon) on the sorption, mobility, bioavailability/bioaccessibility, sequestration and persistence of organic chemicals. Studies have ranged from fundamental investigations looking at sorption/desorption processes, diffusion, non-extractable or bound residues,

and bioavailability/bioaccessibility, to field studies investigating the efficacy of activated carbon amendment to contaminated sediments as a remediation technique. The aim of this session will be to focus on the interactions between different forms of organic carbon and organic chemicals. Also included will be studies on the implications of these processes on the bioavailability/bioaccessibility for plants and benthic organisms, as well as the persistence and formation of non-extractable residues of the compounds in soils and sediments. Further, consideration will be given to more applied investigations, looking at the spin-off of this research applied during remediation of contaminated sites.

C - Emerging pollutants

C01 - Exposure and effects of Pharmaceuticals and Personal Care Products (PPCPs)

Suggested chairs: James Lazorchak (US EPA, CINCINNATI, United States of America) and Tom Hutchinson (Centre for Environment, Fisheries & Aquaculture Science, WEYMOUTH, United Kingdom)

Environmental risk assessments needs to consider distinct risk assessment scenarios such as 'long-term' versus 'pandemic' use and, as for other drugs, could benefit from taking the mode-of-action of the drug into consideration.

This session will contain presentations that overview chemical, biological and genomic approaches that attend to exposure issues that address the following questions:

- What do we know about the environmental transport of pharmaceuticals and PPCPs in aquatic and soil systems?
- What do we know about the mechanisms of degradation and sorption in water, sediment and soil as well as the impacts of sludge manure on the fate and bioavailability of pharmaceuticals and PPCPs to aquatic or terrestrial organisms? For example, many antibiotics sorb to organic matter, but it remains undefined under what circumstances these are biologically active.
- What do we know about the patterns of exposure from point and non-point sources of pharmaceuticals and PPCPs?
- What do we know about statistical approaches or exposure modeling to simulate, predict and test the efficacy of laboratory approaches to real world low level continuous versus episodic exposure?
- What do we know about the application of structure-property (activity) and biodegradability relationships for pharmaceuticals and PPCPs?
- What do we know about bioaccumulation and trophic transfer of pharmaceuticals and PPCPs in aquatic and terrestrial organisms?
- What do we know about the differences in estimating risk using an individual substances approach vs a mixture approach? In this sense, further knowledge is needed to pragmatically assess the cumulative risk of environmental mixtures.
- What do we know about setting environmental standards at the population level vs the individual level? Which under or overestimates risk?
- How do we integrate data on pharmaceuticals and PPCPs from human/animal metabolism/excretion studies into exposure assessments?
- What do we know about estimating the ecotoxicity of pharmaceuticals and PPCPs to aquatic and terrestrial organisms based on human pharmacology or toxicity studies?
- What do we know about antibiotic release to the environment as a driver for resistance development?

C02 - Fate of emerging contaminants during wastewater treatment

Suggested chairs: Marc Mills (US EPA, CINCINNATI, United States of America), Lucia Sobrados Bernardos (Centro de Estudios y Experimentación de Obras Públicas (CEDEX), MADRID, Spain)

The quality of the water is been a subject of much research due to concerns for both environmental and human health, as well as water is a resource for future generation that must be protected. This research is not only related with the implementation of the UE Directive 2000/60/EC, but with studies of different pollutants being recently detected in effluents and receiving waters, known as compounds of emerging concern (CECs), such as endocrine disrupting chemicals (EDCs), pharmaceuticals and personal care products (PPCPs), illicit drugs, fluorinated compounds and nanomaterials.

Recently, CECs are the focus of significant research to understand the sources, transport, and fate of these low level, but often persistent compounds. Since the implementation of the UE Directive 91/271/EEC concerning urban waste-water treatment, wastewaters must be treated prior to their discharge. With this focus, this session highlights the following subjects:

1. How effective are the water line treatments (conventional, advanced and treatments for water reuse) of a WWTP in managing these CECs?

2. Considering that these compounds are eliminated from the water by different mechanisms - What is the proportion that this takes place?
3. Since a portion of these compounds are going to be sorbed by the sludge - Can the CECs be managed in the solids treatment process? (i.e. digesters, composting, pre-treatments, etc.)
4. How does small community wastewater treatment contribute to the presence of these compounds in streams and how well do the specific treatments for these communities manage these contaminants?

This session is open to studies related with different design and WWTP operations, which may increase the elimination of these pollutants from the different wastewater matrices (water and sludge).

This session will be useful to all those interested in the fate of emerging compounds present in waste waters, including engineers, pharmaceuticals and chemicals industries, regulatory organizations and facilities operation.

C03 - Integrated chemical and biological approaches for toxicant identification

Suggested chairs: Werner Brack (Helmholtz Centre for Environmental Research UFZ, LEIPZIG, Germany), Juliane Hollender (Eawag, Swiss Federal Institute of Aquatic Science and Technology, DÜBENDORF, Switzerland) and Marja Lamoree (Institute for Environmental Studies, VU University, AMSTERDAM, The Netherlands)

The identification of key toxicants in complex environmental and technical mixtures that cause effects in laboratory test systems and in situ communities and that may pose a risk to ecosystem and human health is of increasing importance. The development and application of bioassays, especially in vitro assays, has enabled the rapid, high throughput screening for biological effects in order to obtain a toxicological profile of environmental samples. In this context, many emerging chemicals having adverse ecological effects are found in the environment, but those compounds are not (yet) included in routine monitoring or on priority pollutant lists. This observation has pushed for the advancement of identification strategies for emerging contaminants employing state-of-the-art sample preparation and extraction techniques and analytical instrumentation, often combined with bioassays for toxicological characterization. In the present session integrated approaches and novel tools helping to establish reliable cause-effect relationships between chemical contamination and measurable effects should be presented. This includes Effect-Directed Analysis (EDA) and Toxicity Identification Evaluation (TIE) with a major focus on the following challenges:

- integration of bioavailability in EDA
- innovative fractionation procedures
- novel biological tools for effect diagnosis and mechanism-based toxicant discrimination
- bioresponse-linked instrumental analysis
- structure elucidation of environmental toxicants including GC-MS and LC-MS-MS-based techniques and other spectroscopic approaches to identify and quantify unknown compounds present in the environment. by the use of accurate mass spectrometric techniques (e.g. time-of-flight, Orbitrap, FTMS)
- QSAR techniques to identify potential toxicants
- Models to predict the occurrence, fate and risk of new toxicants in the environment

In addition to classical water, sediment and soil-directed approaches, applications of EDA-like techniques in biota, food, technical mixtures, consumer products and other matrixes are highly welcome.

C04 - Per- and polyfluorinated organics: tracking the sources of human exposure

Suggested chairs: Pim De Voogt (University of Amsterdam, AMSTERDAM, The Netherlands) and Bert Van Bavel (University of Örebro, ÖREBRO, Sweden)

Per- and polyfluorinated compounds (PFCs) constitute a newly emanating group of environmental contaminants, with physico-chemical as well as toxicological properties different from those of other halogenated compounds. PFCs are generally persistent in the environment, and can be found over a broad concentration range and within most parts of the aquatic and terrestrial ecosystems. Food, produced with natural ingredients, and possibly beverages, including drinking water, are likely to be contaminated with PFCs, giving rise to human exposure. Whether or not industrial food processing and packaging may give rise to additional contamination of food and beverages is currently not understood. Whatever the sources, PFCs have indeed been found to be present at a global scale in blood of the general population. There is a need to develop robust and reliable analytical tools including reference materials for the determination of PFCs in food items, and to use these to (i) qualify and quantify PFCs in our diet; (ii) understand how PFCs are transferred from the environment into dietary items, and (iii) quantify the possible contribution of food/beverage contact materials and food and water processing to

the overall PFC levels in our diet. The newly gained knowledge will enable us to evaluate the possible routes, including their relative importance, of human exposure to PFCs via our diet, to assess the role of the technosphere in the contamination of our food, and to identify ways to reduce the PFC contamination of dietary articles.

C05 - Plastics in the environment: unwrapping their fate and effects and finding solutions

Suggested chairs: Niels Jonkers (IVAM UvA BV, AMSTERDAM, The Netherlands) and Satoshi Endo (Helmholtz Centre for Environmental Research - UFZ, LEIPZIG, Germany)

Plastics play a major role in everyday life, and are produced in vast and increasing amounts, with plastics production taking up around 8% of the world oil production. The environmental consequences of the use of plastics are felt globally, with plastic debris contamination found from urban centres to remote island shores. Interest in this issue is "emerging" both in the media (e.g. the North Pacific Gyre "plastics island") and the environmental science community (e.g. Special Issue *Phil. Trans. R. Soc. B* 364 (2009); No. 1526). We should evaluate plastics -macro-contaminants with proven persistence and long-range transport properties- with regard to their environmental effects, just as we are intensively doing for molecular- or nano-sized contaminants. However, in the SETAC Europe meetings, no specific session has been devoted to plastics so far.

Therefore, a session is proposed to address various aspects of plastics in the environment from a broad perspective, bringing together knowledge from environmental chemistry and toxicology, as well as life cycle assessment and policy.

Specific topics to be addressed are:

- pathways of plastics from supermarket to remote marine environments; analytical techniques, occurrence, mechanical/chemical degradation
- leaching of plastic additives from products/waste (e.g. phthalates, flame retardants, bisphenol-A)
- sorption of POPs to plastics and subsequent transfer into the food chain
- effects on organisms: e.g. ingestion of plastics, entanglement, human health issues
- plastics as a means of long-range transportation for sessile invasive species
- which changes in policy / consumption patterns / waste management are likely to make the life cycle of plastics more sustainable?
- are bioplastics a (more) sustainable solution?

Additional interest would lie with abstracts on less-researched specific topics such as the effects of plastics in freshwater environments, and the environmental occurrence and behaviour of very small plastic particles (<0.3 mm).

C06 - Sources and environmental fate of poly- and perfluorinated compounds

Suggested chairs: Shoji Nakayama (US EPA, CINCINNATI, United States of America) and Annekatriin Dreyer (GKSS Research Centre, GEESTHACHT, Germany)

During the past decade, an increasing body of research has documented the worldwide occurrence of perfluoroalkyl compounds (PFCs) and their homologues such as perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) in environmental and biological media.

Unfortunately, the sources of these various materials remain poorly described, and little is known about how they are transported in the environment. Adding to this complexity, the chemical industry has begun changing its formulations to accommodate growing concern about historical emissions. In response to this developing situation, researchers have started looking for a wider range of target compounds, with recent studies documenting a variety of newly identified PFC congeners. Source identification and fate determination are critical ongoing concerns for risk assessment and risk management. This session will focus on recent studies which have helped to identify and prioritize PFC sources along with studies describing the large scale distribution of PFCs in various environmental media such as water, air, or biota as well as studies revealing temporal trend data of different regions of the world. On the basis of these data regional differences concerning ambient concentrations, substance spectra, or temporal trends should be comprehensively discussed. The identification and description of emerging poly- and perfluorinated compounds and their precursor materials will also be highlighted in this session.

C07 - Volatile methyl siloxanes in the environment

Suggested chairs: Todd Gouin (Unilever, SHARNBROOK, United Kingdom) and Michael McLachlan (Stockholm University, STOCKHOLM, Sweden)

Cyclic volatile methyl siloxanes (cVMS) are present in a wide range of consumer and personal care products. Recently, several regulatory jurisdictions have expressed concern regarding their persistence and bioaccumulation in the environment. Consequently, a number of cVMS are currently under review for priority pollutant classification in North America and Europe. The motivation for this session is to

explore recent developments regarding the environmental fate and bioaccumulation of cVMS, with a goal of advancing our understanding of the processes that influence their emissions, distribution, levels in the environment, and potential risk. Presentations, including methodologies for trace analysis, field measurements, laboratory experiments addressing key processes, and environmental fate modelling, will address the challenges associated with advancing our understanding.

D - Ecotoxicology

D01 - Advances in bioaccumulation assessment: from models to the field

Suggested chairs: Beate Escher (The University of Queensland, COOPERS PLAINS, Australia) and Michelle Embry (ILSI Health and Environmental Sciences Institute (HESI), WASHINGTON, DC, United States of America)

Information on the uptake and elimination of substances by aquatic organisms is vital for understanding their potential for bioaccumulation in aquatic systems. Bioaccumulation data are used for hazard identification of chemicals, PBT screening and risk assessment. The cost of bioaccumulation testing (e.g., OECD 305 guidelines), practicality issues (e.g. screening of large chemical inventories) and animal welfare considerations have driven the need for reliable alternative methodologies. Modeling, in-vitro methods, modified in vivo test strategies, and field data collection are vital components of a tiered testing approach to address bioaccumulation testing for regulatory purposes. This session will explore the spectrum of advances in bioaccumulation assessment. Presentations invited to this session include but are not limited to: refinement and development of predictive models, case studies of in vitro data used in bioaccumulation assessments, optimization and validation of novel assays, techniques to translate in vitro data into in vivo bioaccumulation estimates, enhancement or modification of in vivo assays, examination and use of field data, comparison of invertebrate and vertebrate responses, and more. In addition, talks related to the quality and quantity of underlying experimental data and relating data from standard and non-standard tests to models will be of interest to this session. This proposed platform session is coordinated by the global SETAC Advisory Group for Advances in Bioaccumulation Assessment.

D02 - Aquatic macrophytes ecotoxicology and risk assessment: state of the art

Suggested chairs: Gertie Arts (Alterra WUR, WAGENINGEN, The Netherlands) and Katja Knauer (Federal Office for Agriculture, Plant Protection Products Section, BERN, Switzerland)

The importance of aquatic macrophytes in maintaining ecosystem function, structure and overall stability is well recognized. The Aquatic Macrophyte Risk Assessment workshop for Pesticides (or AMRAP, which was held under the auspices of SETAC Europe in The Netherlands in January 2008) has recommended an improved approach to the risk assessment of aquatic macrophytes and identified the need for standardized tests for aquatic macrophytes to characterize toxicity in regulatory ecological risk assessment. Four workgroups were established to generate information to support Tier 1 and higher-tier risk assessment and a SETAC Advisory Group (Aquatic Macrophytes Ecotoxicology Group) was founded as a platform for scientific discussions and initiatives in the field of aquatic macrophyte risk assessment and ecotoxicology. This session will invite all experts and scientists to present studies and new knowledge on the ecotoxicology and ecology of aquatic macrophytes, on aquatic macrophyte risk assessment and corresponding tools. The session topics include 1. Lower and higher tier tests and experimental design issues in studies with aquatic macrophytes (e.g., species, endpoints, mode of action, optimization of test approaches, single- and multi-species tests); 2. The use of aquatic macrophyte data in lower and higher tier risk assessments and associated tools (species sensitivity distributions (SSDs), microcosm and mesocosm tests); 3. tools for the temporal-spatial extrapolation of macrophyte data to discuss the environmental representativeness of test systems for the environment and ecological modeling, amongst other topics.

The session is an initiative of the Steering Committee of the SETAC Aquatic Macrophytes Ecotoxicology Group.

D03 - Ecosystem vulnerability to stress factors

Suggested chairs: Marco Vighi (Universirty of Milano Bicocca, MILANO, Italy) and Jack Faber (Alterra, WAGENINGEN, The Netherlands)

For a proper assessment of ecotoxicological risk, information is needed on effects of the chemicals, exposure conditions, and characteristics of the biological systems potentially exposed. For a site-specific assessment, the characteristics of the endangered biological community (structure, function, sensitivity, vulnerability, naturalistic value, etc.) are needed. Therefore, the description of the biological systems

becomes a relevant component of the precise characterisation and quantification of the actual risk for an ecosystem. It calls for a change in thinking, from sensitivity at the individual level to vulnerability at the higher organization levels, and thus forms the link from laboratory toxicology to field effects at population, community or ecosystem level.

To do so, the biological and ecological characteristics of the ecosystems under concern are essential in a specific risk assessment. This recent insight has increased the use of ecological information in ecological risk assessment, i.e. the development of trait-based ecological risk assessment and ecological vulnerability analysis for different wildlife species.

It follows that assessing sensitivity and vulnerability of ecological systems is a key issue in ecotoxicology. However, in spite of its relevance, ecosystem vulnerability is a concept frequently overlooked in ecotoxicological risk assessment and a few example of vulnerability assessment are present in the literature.

D04 - Environmental animal alternatives in the 21st century

Suggested chairs: Scott Belanger (Procter & Gamble, CINCINNATI, OH, United States of America) and Adam Lillicrap (NIVA, OSLO, Norway)

The session, initiated by the Global Science Advisory Group of SETAC on Animal Alternatives in Environmental Science, seeks submissions on all aspects of environmental animal alternatives research that support the 3Rs concept of reducing, refining, and replacing existing whole animal tests. Recent efforts have focused on acute fish toxicity alternatives, however, work to address other endpoints such as chronic effects, endocrine disruption, toxicity to amphibians, birds, and wildlife are also underway. Such efforts span subcellular, cellular, omics, statistical relationships, QSAR, read-across, and a host of other possibilities. Work exploring the utility of alternatives in intelligent testing strategies, influence in risk assessments of chemicals and discharges and identification of barriers to adoption are also within the scope of this session.

D05 - Hazard, exposure and risk assessment of pesticides, biocides and their mixtures

Suggested chairs: Thomas Backhaus (University of Gothenburg, GÖTEBORG, Sweden) and Silvia Mohr (Federal Environment Agency, BERLIN, Germany)

The assessment of pesticide and biocide risks might be considered one of the most advanced areas in chemical risk assessment. Not only are the effects of the active ingredients investigated intensively as single compounds, but also the formulated products are tested in order to account for the total environmental impact of the mixture of active ingredients, detergents, preservatives, and other additives. However, considerable extrapolations are still needed during the environmental risk assessment of pesticides and biocides: the compounds are emitted into the environment where they mix with other environmental pollutants to form chemical cocktails of varying complexity and the results from experimental studies need to be extrapolated to real field situations, which also involves the consideration of time-varying exposure situations, such as repeated pollution pulses. Higher tier studies (microcosms, mesocosms, pond studies, etc.) can be a helpful tool in getting closer to reality but uncertainties remain.

Important questions in this context are: How reliable are model predictions e.g. for mixture toxicity and/or FOCUS surface water scenarios? Does recovery still occur if a stressed community experiences a number of pesticide pulses? Are there seasonal differences in the sensitivity of the exposed ecosystems? Can the effects on communities be assessed by the same metrics in lotic and lentic conditions? The proposed session is supposed to provide a platform to present and discuss recent experimental results in the area, as well as put forward new conceptual and regulatory developments. Contributions focusing on realistic exposure scenarios in multispecies and mesocosm test systems are especially welcome.

D06 - Histopathology in ecotoxicology

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

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

D07 - Indirect effects in ecotoxicology

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

When assessing the effects of toxic chemicals in biological communities and ecosystems a distinction can be made between direct and indirect effects. Direct (or primary) effects are toxicological effects on the behaviour, survival, growth or reproduction of organisms. Organisms in ecosystems may also be affected in an indirect way when a change in behaviour or reduction in abundance of toxicant-susceptible species results in a disturbance of biological interactions and processes. These changes that follow and result from direct toxic effects are termed indirect (or secondary) effects. It has been reported that in chemically-stressed ecosystems the interplay between direct and indirect effects may result in nonlinear exposure-response relationships of effects. In addition, the indirect effects in ecosystems may be more persistent than the direct toxic effects. Understanding the interplay between direct and indirect effects of toxicants at the ecosystem level requires an integrative approach based on laboratory toxicity experiments (to assess concentration-response relationships for direct toxic effects), ecological knowledge of populations inhabiting the ecosystem, ecosystem-level experiments (e.g. micro/mesocosm experiments) and/or modelling approaches to integrate and extrapolate the experimental results (e.g. food web models). This session invites papers that address:

- The interplay of direct and indirect effects of toxicants in experimental terrestrial and aquatic ecosystems
- The possible consequences of exposure to mixtures and repeated stress for the occurrence of indirect effects in ecosystems
- Population and food-web models as integrative tools to understand and predict indirect effects
- How to deal with indirect effects in a regulatory context?

D08 - Linking sub-individual effects with ecologically relevant parameters

Suggested chairs: Carlos Gravato (University of Porto, CIIMAR, PORTO, Portugal), Natalia Vinas (Jackson State University, VICKSBURG, USA) and Katja Broeg (AWI, BREMERHAVEN, Germany)

Molecular and biochemical studies can provide important information about the effects of environmental stressors. These responses, determined at lower levels of biological organization are important for establishing the mechanistic basis of stress effects on biological systems. However, most of those sub-individual tools do not allow the understanding of how these stressors are causally related to ecologically relevant responses. In order to understand the ecological consequences of stress determined at sub-individual levels, such measures need to be coupled to measures at higher levels of biological organization. The application of systems biology approaches in linkage of changes at the molecular to higher levels by examining the system as a whole could be a challenge for modern ecotoxicology. The objective is to describe all the elements of the system, define the biological networks that interrelate the elements of a system and characterize the flow of information that links these elements, and their networks, to an emergent biological process. The objective of this session is to present and discuss recent advances on relationships between sub-individual responses and ecologically relevant endpoints, for example endpoints estimating effects on behaviour, population or community dynamics. It will also seek to present work that translates changes at the molecular level to effects at higher levels of organization. This session will be especially focused on bringing together a broad, interdisciplinary range of presentations that focus upon using mechanistic approaches to predict impacts of pollutants on populations and communities. Such studies will help to determine which early-warning tools are linked to ecologically relevant effects and will thus improve the predictive capability of Ecological Risk Assessment.

D09 - Metals in the environment: Speciation, bioavailability, effects and adaptation

Suggested chairs: Karel De Schampelaere (Ghent University, GHENT, Belgium) and Erik Smolders (Leuven University, LEUVEN, Belgium)

Within the EU, several metals have been considered in the context of legislative frameworks such as the Existing Substance Regulation and the Water Framework Directive. The REACH assessments will soon also need to be made, including for the less prominent (low production volume) metals as for example platinum group elements. In recent years, a great deal of fundamental research has been carried out for the high production volume metals as Cu, Ni, Zn to aid regulators to make scientifically sound decisions. Research with low-production volume metals is much scarcer, yet hardly needed. In general, several aspects of all metals in aquatic (freshwater, marine, sediment) and terrestrial systems require further study to further improve regulatory decisions in the next decade. These aspects include, but are not limited to speciation, bioavailability, effects of metals and (genetic) adaptation responses in natural populations and communities. This session welcomes contributions covering such aspects.

D10 - Natural toxins in the environment

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

Due to environmental pollution not only xenobiotics are the main players in our ecosystem. More and more toxins naturally produced in our environment play a pivotal role and became also a human health risk. It is necessary to know which toxins are produced, and the fate of the produced toxins. Further toxic effects, biotransformation, metabolism and a possible transfer in different food webs is necessary to know and understand better. Controlling factors to reduce toxin burdens in the marine and freshwater system is therefore an important issue.

D11 - New endpoints in genotoxicity and cytotoxicity studies

Suggested chairs: Maria Conceição Santos (University Aveiro, Department of Biology, AVEIRO, Portugal) and Helena Oliveira (Associated Laboratory Centre for Environmental and Marine Studies (CESAM), AVEIRO, Portugal)

Exposure of organisms to chemicals results in complex changes at cell level. Understanding the mechanisms of homeodynamics evolved by cells under environmental stress is a challenge. Particularly challenging is the use of a new discipline quantitative cytometry or analytical cytology (where e.g. image or flow cytometry provide multiparametric structural and/or functional information of samples) to redefine new tools to assess environmentally induced cyto and genotoxicity. Also, in the toxicology field, DNA damages (assessed by e.g. COMETS), or advances in quantitative analyses of transcripts strongly support that gene expression changes are sensitive and occur early in response to stress. In these new tools several researchers search for putatively new endpoints to assess toxicity in field.

D12 - OMICS: From gene to ecosystem

Suggested chairs: Yue Ge (US EPA, DURHAM, United States of America), Mónica Amorim (University of Aveiro, AVEIRO, Portugal) and Anthony Chariton (CSIRO Land and Water, BANGOR, Australia)

Ecotoxicology has been developed mostly on the basis of traditional effect assessment bioassays, e.g. measuring effects at the organism level, such as survival and reproduction or community studies. By measuring toxicological effects at the molecular/cellular level, a better insight can be generated into the mode of action of a chemical and could eventually lead to improved risk assessment of these chemicals. Toxicity sensors, targets or biomarkers can help to determine the nature of the toxicity and toxic injury and serve as indicators of environmental exposure, effect and toxicity. They have great value and predictive accuracy that could be used for risk assessment. Recently, environmental biomarker discovery studies have been a popular area of research in environmental OMICS due to efficiency or capacity of OMICS in identification of biomarkers and the increasing need for biomarkers of exposure and toxicity for risk assessment. Therefore, ecotoxicogenomics has become more and more important and also an extra tool for effect assessment. This session intends to include research on various omics aspects such as microarrays, data mining, gene regulation, biomarkers, proteomics, metabolomics, and other system biology approaches and highlighting the relationships between changes at gene and higher levels of organization. Papers are also sought that present research on application of OMICS and biomarker data to the improvement of our understanding of toxic mechanisms, toxicity and safety prediction models, or risk assessment.

We welcome studies that help to unravel the molecular mechanisms underlying stress responses in populations. Furthermore, the link between genetic elements accounting for these ecophysiological responses and their impact on evolution.

D13 - Responses to combined stressors including chemical mixtures

Suggested chairs: Ryszard Laskowski (Jagiellonian University, KRAKÓW, Poland) and Martin Holmstrup (National Environmental Research Institute, SILKEBORG, Denmark)

It has been shown in a number of studies that natural environmental conditions can significantly modify responses of organisms to toxicants. Even earlier it was known that chemicals themselves can interact significantly with each other, showing either antagonistic or synergistic behaviour. These two phenomena combined together may lead to serious deviations of actual toxic effects from those predicted by standard ecotoxicological tests because all current standard tests are performed with single toxicants under some "standard" conditions, which usually mean that animals are kept at a constant and optimal temperature and moisture, pH or dissolved oxygen levels, being either fed ad libitum or starved. These are certainly not the conditions that an animal is usually exposed to in the field, where large fluctuations in climatic factors as well as in food availability are the norm. Moreover, because of large climatic differences between different regions of the world, results of such standard tests can be representative for only a narrow strip of Earth where average climatic conditions resemble those used in the particular ecotoxicological tests. This session aims at addressing this important issue.

Thus, studies showing effects (or lack of these) of environmental factors on toxicity of chemicals as well as interactions between different toxicants are welcome.

D14 - Trait-based approaches in ecotoxicology

Suggested chairs: Francesco Pomati (EAWAG, KASTANIENBAUM, Switzerland) and Paul Van den Brink (Alterra and Wageningen University, WAGENINGEN, The Netherlands)

Traits are the physiological, morphological and ecological attributes of species, or other taxonomic entities, which describe their physical characteristics, ecological niche and functional role within an ecosystem. There has been a recent interest in trait-based approaches in ecology because these approaches hold the potential of increasing our ability to explain the organization of ecological communities and predict their reorganizations under global change. Trait-based approaches are now being introduced into the field of Ecological Risk Assessment (ERA) and bioassessment of ecological quality of aquatic ecosystems. This is a consequence of our realisation that taxonomy-based descriptions of natural systems place limitations on our ability to describe ecological responses to stress. Currently traits are used to evaluate biomonitoring data, to develop stress indicators and to get a mechanistic understanding of responses of individuals, populations, communities and ecosystems to stress. The major components of trait-based approaches are traits, environmental gradients and species interactions. Despite recent advances in trait-based approaches, significant hurdles exist in realizing their full potential, at least partly because in many systems it is difficult to determine what traits define the state of organisms and to measure those traits. This session will deal with the pros and cons of applying trait-based approaches in ecotoxicological assessment, at different hierarchical level, from individuals to communities.

D15 - Tropical ecotoxicology

Suggested chairs: Eduardo Da Silva (Federal University of Bahia, SALVADOR, BAHIA, Brazil) and Kees Van Gestel (Vrije Universiteit, AMSTERDAM, The Netherlands)

It is widely accepted that tropical and temperate regions present profound ecological differences, but do they lead to a tropical ecology or ultimately a tropical ecotoxicology? If higher temperatures and water stress for animals and plants; higher organic matter turnover, with faster oxidation-reduction activities and anthropogenic modifying factors (e.g., eutrophication and desertification) are factors to speak in favour of a tropical ecology (ecotoxicology), counter-arguments also exist. Inter- and intra-specific relationships between species and ecological mechanisms do not show major differences along latitudinal gradients, in spite of the obvious increase in biodiversity from the poles to the tropics. High biodiversity may lead to functional redundancies, or it may not - an issue regarding population-level impacts, not yet determined. It is at least theoretically possible to have reduced biodiversity with no functional changes, as even fewer species might perform, as far as ecological function is concerned, similarly as in the original biodiversity levels. The direct application of temperate species toxicity tests to tropical ecosystems is a rule, as environmental managers prefer the practice of transferring technology, regardless of their merit, rather than provide the means for developing appropriate tools. The increasing agricultural and industrial activities in tropical regions, and the concomitant increasing use of pesticides and industrial chemicals, are asking for tools and methods that take into account the specific conditions of the tropics. This could include the use of new test substrates representative of tropical regions or making use of materials readily available in these areas, the use of 'new' tests species that are more ecologically relevant for the tropics, or the performance of tests at tropical different conditions. Risks to biodiversity associated with the application of models developed for temperate regions need to be reassessed in face of the tropical reality. This session will give the floor to presentations dealing with such new ecotoxicological approaches specially designed to meet requirements of tropical regions. It will also invite research on the validation of new methods and the comparison with existing methods. Finally, the floor is open for presentations on the potential applicability of new and existing ecotoxicological test methods for risk assessment in tropical regions.

D16 - Wildlife toxicology: temporal and spatial facets of exposure and effects

Suggested chairs: Nico Van den Brink (Alterra Wageningen UR, WAGENINGEN, The Netherlands) and John Elliott (Environment Canada, Pacific Wildlife Research Centre, DELTA, BC, Canada)

Wildlife species live in a very heterogeneous environment which is variable in space and time. For instance, levels of contaminants may vary in space and time, habitats may be structured, and the occurrence and behavior of animals may also variable. This variation may result in a temporal and spatial variable exposure of organisms to contaminants. In addition to this spatial and temporal variation of the exposure of organisms to contaminants, organisms may also show variable sensitivity towards this exposure. For instance, in developing organisms the earlier life stages may be more susceptible to contaminants in comparison to adult life stages (temporal windows of sensitivity).

Temporal exposure to other stressors may affect the sensitivity of organisms. Early exposure to contaminants may also result in delayed effects at a later life stage or even in offspring. Currently, research on risks that contaminants may pose to wildlife is more and more focused on the spatial and temporal aspects of exposure and sensitivity in order to create more ecologically realistic assessment procedures. In the proposed session abstracts will be selected that present the cutting edge of such research. The combined focus on temporal and spatial variation in exposure and sensitivity allows for integrated presentations.

E - Handling, monitoring and remediation of pollution

E01 - Advances in sustainable remediation of contaminated soils, sediments and groundwater

Suggested chairs: Joop Harmsen (Alterra Wageningen UR, WAGENINGEN, The Netherlands) and Fayaz Lakhwala (Adventus Group, UNION, NJ, United States of America)

If an assessment procedure applied on a contaminated site leads to the conclusion that risk are not acceptable, it is necessary to reduce these risks. Removal of the contaminated material is not always an option and a local solution has to be found, which is economical feasible but should also be sustainable without causing an undesirable effect like a high CO₂-footprint. These additions lead to another focus in development and application of remediation technologies (green remediation). In this session we will focus on existing and new treatment technologies and management practices that fit in this new and promising approach. It includes:

1. Stimulation of biodegradation, on site and in-situ for instance by application of stimulating agents.
2. Immobilization of contaminants, by capping, adding adsorbing materials but also by stimulating chemical reactions that precipitate contaminants.
3. Use of local conditions, land-use and the factor time to reduce risks.

Abstracts are encouraged from projects that support sustainable remediation to full scale applications.

E02 - Environmental impact of amendments on soil ecology and soil organic matter quality

Suggested chair: Heike Knicker (CSIC-IRNAS-Sevilla, SEVILLE, Spain)

Increasing human population enhanced the demand for agricultural land which at the same time had to withstand intensified management practices. The latter abet soil compaction and acidification but also erosion, soil organic matter losses and nutrient depletion.

Prior to industrial age, animal manure including humane waste were the primary amendments to improve agriculturally used soils. Growing industrial activity augmented waste production and the need for land for its disposal. Increasing costs of the latter, together with legislative limitations enhanced the interest in alternatives. One of those represents the use of waste as soil conditioner, preventing the wasteful loss of plant nutrients by economically desirable means. Whereas treated biowaste can be used as soil fertilizer, addition of lime maintains aggregate stability and enhances soil pH. Other soil amendments were suggested to improve soil structure and to fight soil erosion. Newer approaches propose biochars or coal mining residues to additionally enlarge the slow cycling soil organic C pool which is serving as a long-term C sink within the global C cycle. However, although many of the newly suggested amendments may be favourable to soils and their environment by certain means, some of them may have undesirable characteristics that still need exploration. Their long term effects may be detrimental for crop production and even hazardous for the sensitive balance of the soil ecosystem. Therefore, the intention of the session is to bring together researchers and soil amendment producers to discuss the beneficial and adverse aspects of soil amendments with particular interest on long term effects. Since soil organic matter largely determines soil properties and fulfils a special role in soil ecology and long-term C sequestration, a special focus is given towards its alteration caused by soil amendments.

E03 - New approaches in bioremediation

Suggested chairs: Joseph M. Suflita (University of Oklahoma, OKLAHOMA, USA) and Juan L. Ramos (Estacion Experimental del Zaidin-CSIC, GRANADA, Spain)

Microbial biotechnology makes possible, through a wide variety of options, the reduction of the risk caused by many industrial emissions in soils, sediments and waters. However, as any other environmental technology, bioremediation presents today a strong need for innovation. The aim of this session is to discuss how microbial capabilities can be exploited further to mitigate chemical pollution. Contributions are encouraged, for example, on recent developments on aerobic and anaerobic pathways for biodegradation of organic chemicals (pesticides, emerging pollutants),

microbial actions on inorganic pollutants, regulation, metagenome analysis, mechanisms of tolerance, and promotion of bioavailability.

E04 - Phytoremediation as a sustainable management tool for contaminated land

Suggested chairs: Engracia Madejon (Instituto de Recursos Naturales y Agrobiología de Sevilla, SEVILLA, Spain) and Nicholas Lepp (Liverpool John Moores University, LIVERPOOL, United Kingdom)

Phytoremediation is an all-encompassing term to describe plant-based technologies that can be potentially deployed as sustainable management tools for soils contaminated with both organic and inorganic pollutants. This session will address the current status of these technologies with regard to successes and failures in managing contaminated sites, producing a valuable reality check for practitioners. Natural attenuation and phytostabilisation are two procedures where there is field-based evidence for sustainability, whilst there are problems with phytoextraction for metals and metalloids. Plants have been used to treat soil contaminated with more volatile organic pollutants, but solutions for more recalcitrant compounds are still being pursued. The long-term management of soils under remediation, together with the issues that surround the disposal or further use of biomass produced by phytoremediation are crucial issues that need resolution. This session will provide state-of-the-art assessments of phytotechnologies and a forum to discuss future R&D requirements.

E05 - Risk Mitigation Measures to protect the environment in the authorization procedure of plant protection products

Suggested chairs: Martin Strelöke (Federal Office of Consumer Protection and Food Safety, BRAUNSCHWEIG, Germany) and Anne Alix (AFFSA, PARIS, France)

Risk mitigation measures like buffer zones to waterbodies are widely used within the EU-member states to protect the environment when authorizing plant protection products. Annexes IV and V of directive 91/414/EEC contain several SPe phrases which may be used by member states but overall the degree of harmonization is low. Even the upcoming new EU-regulation leaves flexibility for member states when making risk management decisions but there is a clear need for more harmonization in future.

When deciding upon risk mitigation measures legal, administrative, practical, enforcement issues are to be considered but also the degree of risk mitigation achieved with measures or their effectiveness under realistic conditions. These items have led to specific research projects. GIS-Tools have for example been used to come to localized risk mitigation measures.

Communication with and acceptance by farmers are key when developing new mitigation measures. Simple SPe-phrases like for example the ones in annex V are usually easy to communicate and acceptance is high. On the other hand the risk for the environment is often very different in specific use situations and simple phrases cannot mirror these differences. Furthermore practitioners are not only faced by use restrictions for plant protections but also from other regulations like for example the water framework directive or nature conservation, within which subsidy systems are in place. Harmonised approaches increase acceptance considerably.

Presentations or poster should tackle one of the aforementioned items. Quantification of exposure reductions like for example by new machinery or specifically tailored runoff-models may be presented. Results of studies investigating the effectiveness of measures under practical conditions or development of effective enforcement techniques (eg residues measurements) might be reported. Overviews or even evaluations of different risk mitigation measures used in member states are expected. New approaches should also be presented. Overall the session should be an integrating platform for those who are working in this heterogeneous area.

F - Life Cycle Assessment (LCA) and Life Cycle Management (LCM)

F01 - Critical reviews in Life Cycle Assessment and related studies

Suggested chairs: Walter Klöpffer (LCA Consult & Review, Frankfurt, Germany) and Pere Fullana i Palmer (Escola Superior de Comerç Internacional Universitat Pompeu Fabra, BARCELONA, Spain)

Quality assurance, especially by critical reviews, has played a great role in the harmonization (SETAC 1993) and standardization (ISO 14040ff 1997-2006) of LCA. The main aim has been the increase in credibility of LCA studies and the prevention of misuse in marketing. Despite the importance of critical reviews, there is not much literature about it and also scientific conferences did hardly deal with the topic. Given the recent increase in the importance of LCA (not only due to "carbon footprint" and "water footprint" studies), the quality assurance and the critical review will need an open discussion. Recent plans by ILCD (Ispra) to create a certification scheme for reviewers and a draft handbook sent around for public consultation should increase the awareness that there is real need to critically accompany this

process. Colleagues from ILCD would be invited to present their plans.

F02 - Handling time in LCA

Suggested chair: Alessandra Zamagni (ENEA, BOLOGNA, Italy)

LCA is based on a steady state linear equilibrium model, i.e. a model that indicates a hypothetical equilibrium situation with ceteris paribus assumptions, and in which changes in time are ignored because time is out of the model. Nevertheless, dynamics are of fundamental importance both in industrial and political contexts, and ignoring them could lead to reduce the relevance of some results. In the last years several approaches have been proposed and, due to the complexity of the dynamic model, there is still an open question if the use of scenarios, for decisions related to the long period, could be more relevant and feasible.

This session invites all stakeholders to present and discuss their approaches and ideas related to how to include the time dimension in a proper way.

F03 - Land use impacts on biodiversity and ecosystem services in Life Cycle Assessment

Suggested chairs: Thomas Koellner (University of Bayreuth, BAYREUTH, Germany), Miguel Brandao (European Commission - DG Joint Research Centre (JRC), Ispra, Italy), Manuele Margni (CIRAIG- École Polytechnique de Montréal, MONTREAL, Canada)

Using a land area for human purposes may cause a multiplicity of environmental impacts. This session will focus on two impacts that are generally recognized as being environmental relevant: the impact on biodiversity and the impact on the area's potential for delivering ecosystem services.

The goal of this session is to present original papers which address land use impacts on biodiversity and ecosystem services in Life Cycle Inventories and Life Cycle Impact Assessment. Indeed, this topic is an open field of research: LCA, developed primarily for industrial systems, cannot be applied to land-use systems without methodological developments for the modelling of the impacts of land use on ecosystems services/functions and biodiversity.

The guidance and recommendations of the first phase of the UNEP/SETAC life cycle initiative on LCIA land use methods (Mila i Canals et al., 2007) are the starting point. In order to enhance global relevancy of LCIA research it is essential to link LCA activities to the globally acknowledged work of the Millennium Ecosystem Assessment (MA). In the second phase of the working group "Land use in LCA" within the UNEP/SETAC Life Cycle Initiative we therefore distinguish between Biodiversity Damage Potential (BDP) and Ecosystem Services Damage Potential (ESDP).

Currently, proposals exist for LCA to integrate the land use impacts on the potential of the ecosystem to produce biomass (biotic production potential) and the climate impact by influencing the carbon sequestration in the top soil and land cover (carbon sequestration potential). Additionally, we propose further developing methods linking other so called midpoint indicators to Ecosystem Services Damage Potential, i.e. impacts on water quantity and quality (Fresh Water Regulation Potential, and Water Purification Potential) and soil quantity and quality (Erosion Regulation Potential). The framework remains open to include additional midpoint oriented impact indicators if needed, such as the microbial activity indicating soil fertility.

F04 - Life Cycle Inventories - Appropriate for footprints and accounting?

Suggested chair: Christian Bauer (European Aluminium Foil Association e.V., Düsseldorf, Germany)

Many life cycle inventories were created with a concise definition of goal and scope. This context is oftentimes lost when inventory data is re-used in subsequent studies. For life cycle assessments the interpretation phase should and will reflect the appropriateness of the data being used also in view of the relevance for the conclusions. For "footprints" the interpretation of a single score or the difference between scores is apparently obvious but may overstretch the quality of the data involved or even lead to adverse conclusions. Despite existing or upcoming frameworks for harmonisation and reviewing it is inevitable to determine the significance and accuracy of inventory data for the plethora of current and upcoming applications. This session invites for the discussion of approaches and solutions to address LCI data appropriateness in view of footprinting and accounting itself but also in view of broader approaches.

F05 - Life Cycle Management: Putting life cycle thinking into practice

Suggested chairs: Ellen Riise (SCA Personal Care, Göteborg, Sweden) and Natalija Dimitrovska (Noble Management, SKOPJE, Macedonia)

Life Cycle Management (LCM) is an integrated concept to assist organizations in managing the total life cycle of goods and services, including the associated operations, with the goal to create more sustainable consumption and production patterns.

It focuses on the implementation of sustainability aspects in organizations (businesses and others), and

addresses improvements to technological, economic, environmental, and social aspects of an organisation and the goods and services it provides. A full systemic, or life cycle, perspective is essential to understand all impacts and benefits associated with operations and product systems and their interrelations in order to control and manage them. Essential are efficient and effective tools as well as the appropriate management processes for the application of these tools and for bringing better information and new insights into decision-making. For this Session, presentations are invited on using life cycle approaches for the strategic and operational activities of organisations as well as within value chains across businesses.

F06 - Life Cycle Sustainability Analysis

Suggested chairs: Tomas Ekvall (IVL Swedish Environmental Research Institute, Göteborg, Sweden) and Miguel Brandao (European Commission - DG Joint Research Centre (JRC), Ispra, Italy)

Sustainability aspects are becoming increasingly important in decision-making. Expanding environmental life-cycle assessment (LCA) into life-cycle sustainability analysis (LCSA) requires methods to assess social and economic aspects, methods to integrate the three pillars in a sustainability assessment, and methods to address the inherent uncertainty of long-term future perspectives. The LCSA can become more accurate through improved analyses of market mechanisms, consumer behaviour, etc. on the micro and macro level. Finally, effective LCSA requires methods to manage or counteract the increase in complexity that arises as the method becomes more comprehensive and accurate. All of this can be achieved through development of new approaches or through combination or integration of LCA with other methods. For this session we invite significant contributions aiming at making LCSA more comprehensive, accurate and effective.

F07 - Multi-stressor impacts in life cycle and risk assessment

Suggested chairs: Mark Huijbregts (Radboud University Nijmegen, Nijmegen, The Netherlands) and Leo Posthuma (RIVM, BILTHOVEN, The Netherlands)

Understanding and predicting biological responses to physical and chemical pressures in a multi-stress environment is one of the key challenges in both Life Cycle Assessment (LCA) and integrated Risk Assessment (RA). To allow diagnosis and prognosis, coherent frameworks and quantitative modelling tools at various spatial scales are required. This session will deal with progress in frameworks, models and case studies that allow for the assessment of multi-stressor impacts on humans and/or ecosystems in the fields of LCA and/or RA. Mutual learning and interaction between the approaches taken in LCA and RA can bring both fields forward.

F08 - New developments in life cycle impact assessment fostered by new computational and analytical tools

Suggested chair: Annette Koehler (ETH Zuerich, Zuerich, Switzerland)

Innovative computational systems and analytical methods allow for developing new and improving existing life cycle impact assessment methods. Geographic Information Systems, remote sensing tools and novel digitized data sources support an enhanced spatially and temporally resolved modelling of environmental impacts such as eutrophication, land use, water use, noise impacts and biodiversity damages. Advanced analytical methods enable a better evaluation of emerging contaminants such as endocrine disruptors and nanoparticles. This session gives a platform for impact characterization frameworks and models showing latest developments in typical and new impact categories. Regarding biodiversity damages, LCA case studies assessing damage on aquatic or terrestrial biodiversity using existing LCIA methods, and results supporting the improvement of the framework of biodiversity modelling in LCIA are welcome. Special aspects such as linking these new LCIA methods to inventory schemes, representing uncertainty and communicating LCIA results to stakeholders will be additionally discussed.

F09 - Strengthening uncertainty analysis in LCA

Suggested chair: Andreas Ciroth (GreenDeltaTC, BERLIN, Germany)

Uncertainties in LCA arise for different reasons, and at different stages, due to the cumulative effects of data variability, the modelling itself and the several methodological choices which occur along the whole LCA study. Thus uncertainty analysis is fundamental to guarantee the robustness of the studies, and it contributes also to an increased reliability and increased interpretation of the LCA results. This session will deal with approaches to uncertainty analysis at all three levels (parameter, models and methodological choices). Moreover, since the results of uncertainty analyses are not easily understood by decision makers, insights also in meaningful ways to present the uncertainty results are encouraged.

G - Marine environment

G01 - Accidental Spills at Sea - Risk assessment, treatment, mitigation and post-incident monitoring

Suggested chairs: Mark Kirby (Cefas, LOWESTOFT, United Kingdom) and Ronny Schallier (MUMM, BRUSSELS, Belgium)

The threat to our seas, estuaries and coastlines from chemical contaminants manifests itself from a wide range of potential sources. Inputs to these waterbodies from terrestrial based sources, domestic and industrial discharges, diffuse origins and from the legacy of contaminated sediments all remain important sources of potential impact. However, perhaps the largest threat, both in terms of catastrophic release and damage and the unpredictability of its occurrence, comes from accidental spills at sea. While these incidents have the obvious potential for short-term acute effects we should also not underestimate their potential to contribute to longer-term impacts which are, generally, poorly understood. Therefore, spills of oils and chemicals in the marine environment remain a significant threat.

Although there is evidence that the number of oil spills, for example, has decreased in recent decades the record is still regularly punctuated by large, high profile incidents (e.g. Prestige, MSC Napoli etc.). Furthermore, reports of smaller spills and potential incidents are occurring on a daily basis. Therefore, the requirement for response capability, improved preparedness and the application of sound science in effective post-incident monitoring and assessment remains undiminished.

A fully integrated and effective response to an oil or chemical spill incident must also include a well planned and executed post-incident assessment of environmental contamination and damage. Some national authorities have well formulated national contingency plans and environmental advice mechanisms which provide strategic planning and response frameworks with, often, a stated commitment to initiate relevant monitoring, research and environmental impact assessment. While salvage and rescue operations are well considered, including regular reviews and exercises, the expertise, resources, networks and logistical planning that are required to achieve prompt and effective environmental impact assessment and monitoring are not, in most cases, formally in place. This proposed session aims to highlight the need for pre-incident consideration of the best scientific approaches to this issue.

Why the need for this effective post-incident monitoring?

- We need to ensure we provide early evidence of potential impact to the general public from spilled oil/chemicals.
- We need to have an appropriate and effective way of investigating the impact to the wider marine environment.
- Impact assessment methodology needs to be considered that not only assess the short-term impacts but also allows the prediction of potential longer-term impacts.
- We need to ensure a more effective use of resources so that unnecessary procedures are avoided but that potentially useful ones are not overlooked.
- The monitoring and assessment may be critical in providing input to compensation issues.
- Effective monitoring not only provides information about the impact of the spill but can also provide important information about the effectiveness, or not, of spill treatment and mitigation activity.

The scientific community have a critical and central role to play in the design and conduct of effective post-incident monitoring. This session will be used to highlight and discuss that role in a broad context and may lead to recommendations or identifications of gaps where the scientific community can contribute more in this respect.

The session has relevance to a wide range of scientific disciplines and would expect to attract papers covering the following aspects:

- The use of ecotoxicological techniques.
- The use of analytical chemistry.
- Community/population impacts.
- Novel scientific approaches.
- Real incident case studies
- Spill risk assessment.
- Survey design and considerations.
- Monitoring the effectiveness of clean-up and mitigation.
- Logistics and co-ordination.

G02 - Marine and estuarine ecosystem protection: Biological tools and risk assessment

Suggested chairs: Ricardo Beiras (University of Vigo, VIGO, Spain), Ionan Marigomez (University of the Basque Country, LEIOA-BIZKAIA (BASQUE COUNTRY), Spain) and Kari Lehtonen (Finnish Environment Institute, HELSINKI, Finland)

Current European legislation (Water Framework Directive, Marine Strategy Directive) prompts an ecological approach to the assessment and remediation of coastal pollution. Current biological tools proposed (phytoplankton and benthic community index) are not protective enough, since effects may only be visible late in time, or may be impractical due to natural variability and cost-effectiveness limitations. Therefore, alternative rapid and sensitive biological tools, such as the effect biomarkers and ecotoxicological bioassay approach developed in the last few years by ICES and OSPAR, should be standardised and implemented.

Biomarkers are useful to quantify adverse effects of pollutants in lab and field studies with strong pollution gradients/inputs. In the field, however, controversial results have been often achieved, which hampers biomarker implementation in current EU (MSD, WFD) regulations aimed to protect marine and estuarine ecosystems. Thus, improving mechanistic understanding, determining natural variability/baseline values, standardising sampling/analytical procedures, integrating biomarkers as well as chemical and biological endpoints and relating biomarkers to ecological effects are issues of major concern as regards biomarker usefulness. Furthermore, more studies are needed on the role of other factors, such as time-scale of biomarker beeping (immediate, transient, long-lasting, fading, quiescent); occurrence in the field of long-term exposures that may provoke qualitatively different responses through the time; and incidence of large-scale changes that may modulate exposure severity, biomarker responsiveness and organism susceptibility to pollutants.

Regarding risk assessment for the marine environment and despite the considerable advances made in the last decades, cost-effective and ecologically relevant methods and strategies for prospective and retrospective risk assessment are still not sufficiently developed. This is especially true when taking into consideration the combination of different pollutants or the influence of other environmental factors (e.g. climate change), leading to even higher degrees of complexity and uncertainty. Integrated approaches combining knowledge and methods from ecology, ecotoxicology, environmental chemistry and other areas can be developed into powerful tools that may particularly be useful to increase the ecological relevance of biomarkers and lab bioassays in the increasingly relevant scenarios of chemical pollution and climatic change.

This session invites presentations contributing to: (i) review the state of the art on biological tools and bioassays for marine environment protection; (ii) discuss new methods and knowledge for understanding long-term environmental syndromes due to chemical pollution in marine/estuarine ecosystems; (iii) present short and long-term effects of mixtures, emerging pollutants of concern, interaction between abiotic changes and pollutants assessed in both lab and field conditions; and (iv) introduce new ideas on how to improve the applicability of biological effect measurements at different levels of biological organisation in marine ecological risk assessment.

G03 - The fate and effects of (organic) pollutants in the marine environment: from estuaries to the open ocean and the Arctic environment

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

Organic pollutants are subject to a variety of processes in the marine environment such as degradation, settling, exchange with the atmosphere, advective transport, water-sediment recycling, bioaccumulation, etc. These processes affect the pollutants' fate at various scales from local, regional to global. New insights have been gained into the occurrence and processes affecting a wide range of organic pollutants, not only legacy POPs, such as PCBs or HCH, but also emerging pollutants such as pharmaceuticals, pesticides, alkylphenols, etc.

Additionally, Arctic environments are of special concern since they are threatened by long range transport of contaminants and climate change. In addition, new potential threats are introduced to these areas (e.g. intensified shipping and oil and gas activities). This together with the fact that Arctic environments are considered to be sensitive to physical-chemical stress indicate the need for sound ecological management of these areas. Knowledge on the sensitivity of Arctic species and communities is however limited.

With this session, we want to bring together all those groups working on organic pollutants in all marine environments; from estuaries and transitional waters, coastal areas and oceanic regions to the Arctic. It will focus on the transport, transformation, fate, budget and effects of different (organic) pollutants in marine systems at different spatial and temporal scales. Furthermore, a particular focus will be given on the effects in Arctic systems (from species to communities) and on the challenges to environmental risk assessments and environmental monitoring related to those systems. Especially of interest are

studies that focus on the differences between Arctic and non-Arctic ecosystems and what these differences tell us about specific ecosystem sensitivities.

G04 - Role of ecotoxicology and risk assessment in relation to the implementation of the Marine Strategy Framework Directive

Suggested chairs: Diana Slijkerman (IMARES- Wageningen UR, DEN HELDER, The Netherlands), Peter Korytar (DG Environment, BRUSSELS, Belgium) and Mathijs Smit (Statoil, TRONDHEIM, Norway)

The European Marine Strategy Framework Directive aims to restore and protect European seas, by achieving a Good Environmental Status. This strategy asks for a description of the current state of the marine environment of the region (Initial Assessment), including an analysis of the most important pressures and consequences resulting from (mainly) human activities.

Regarding the implementation of the European Marine Strategy Framework Directive it is stated that the determination of ' Good Environmental Status' should be accompanied by clear information on the causative pressures and resulting impacts. Therefore, each European member state needs to perform an impact assessment of marine activities intended for the implementation of the Marine Strategy.

Information on causative pressures and resulting impacts on GES of contaminants is one of important descriptive elements in these assessments that need to be performed by member states. Questions rise whether contaminants still play a significant role in achieving of GES. In this scope, new tools or methodologies (evaluation wise, or technical) might be helpful to determine the causative relation between pressure (activity) to the impact on GES.

In this session we would like to invite researchers to present their data or ideas that might be of use to the implementation of the MSFD. Suggestions, although not limiting, are topics, as: (cumulative) Risk assessment, ecotoxicology (e.g. smart monitoring), determination of Good Status, emerging compounds,

H - Nanomaterials

H01 - Detection, quantification and characterization of nanoparticles

Suggested chairs: Frank Von der Kammer (University of Vienna, VIENNA, Austria) and Stephen Klaine (Clemson University, CLEMSON, United States of America)

The advancement of nanoparticle analysis in complex samples is essential to better understand nanoparticle ecotoxicological effects, their behavior in test systems and their behavior, distribution as well as the appearance and transformation in the environment.

The session focuses on the improvement and development of analytical methods and detection systems for nanoparticle analysis. This includes:

- techniques to localize engineered nanoparticles in cells, tissue or whole organisms and to distinguish them from natural particles
- methods to identify engineered nanoparticles in natural samples including soil, water and sediments
- quantification of engineered nanoparticles in complex samples in terms of mass, surface area, or number and how it relates to exposure metrics in bioassays.
- the characterization of engineered nanoparticles in terms of core integrity, surface chemistry or aggregation state

Presentations concerning new analytical concepts descriptors and new response related metrics adapted to the properties and behavior of engineered nanoparticles are encouraged.

H02 - Fate and effects of nanomaterials

Suggested chairs: Janeck Scott-Fordsmand (Aarhus University, SILKEBORG, Denmark), Teresa Fernandes (Edinburgh Napier University, EDINBURGH, United Kingdom) and Enrique Navarro (CSIC Spanish National Research Council, ZARAGOZA, Spain)

Nanomaterials (NM) have the potential to end up in the environment. The awareness of this concern is gaining huge interest, and new data are emerging on the environmental behavior, exposure and effects of manufactured nanomaterials. Given a rapid evolution in research on manufactured NM, papers are invited to discuss the mentioned topic with special focus on direct causality e.g. distinguishing between the direct particle effect versus the dissolved free ion effect, distinguishing direct toxicity from indirect stress by for example excessive mucus production. Hence, the aim of the session is to present the latest research, focusing on how nanomaterials properties (i.e.: size, aggregation state, solubility, release of compounds, surface charge, shape, etc...) relate to their toxicological effects on aquatic and terrestrial organisms at individual and population levels, as well as to trophic chain effects. This session also invites contributions on understanding movement of engineered NM in various environmental

media and assessing bioavailability. Finally, there are concerns that existing protocols may not account for aspects of dosimetry and dispersion of NM, and that exploration of various biological variables may be needed to detect specific effects of NM.

H03 - Risk management of nanomaterials

Suggested chairs: Jun Chen (Suzhou Entry-Exit Inspection and Quarantine Bureau, SUZHOU, China), Cheng Sun (School of Environmental Science, Nanjing University, NANJING, China) and Teresa Fernandes (Edinburgh Napier University, EDINBURGH, United Kingdom)

Nanotechnologies and nanoparticles represent a promising and fast-growing field. This is principally because a nanodimensional substance can have physical and chemical properties that are different from those of the same substance with larger dimensions. However, the present knowledge is not yet sufficient for the elaboration of nanospecific regulations. Many projects with the aim of completing the necessary scientific and technical basis for the assessment of nanotechnology related risks are under way. Under these circumstances close relationship between the industries and government bodies is necessary to build up safety standards or regulations by all stakeholders constituting an appropriate tool for the protection of human health and the environment.

H04 - Sources and magnitude of releases of engineered nanomaterials

Suggested chairs: Edward Heithmar (US EPA, LAS VEGAS, United States of America) and Bernd Nowack (Empa-Swiss Federal Laboratories for Materials Testing and Research, ST. GALLEN, Switzerland)

Understanding the sources, the magnitude and the spatial/temporal distribution of releases of engineered nanomaterials over their life cycle is the first step in assessing human and ecological exposures to these emerging stressors. Numerous sessions at environmental and nanotechnology conferences have addressed research on the environmental processes, transport and fate of nanomaterials, as well as their potential toxicity. However, research on evaluating sources and releases has garnered little attention. This session focuses on understanding release of nanomaterials from any source throughout their life cycles. This includes release during production of nanomaterials and product, during use and also during disposal/recycling. Contributions are solicited that use any research tool, including data mining, modeling, or measurement. Session scope extends to research on processes that affect aspects of release, such as the magnitude, physicochemical form, or target environmental compartment. Presentations describing the development and standardization of new methods to quantify releases and to capture released materials are also welcome.

I - Risk assessment and regulation

I01 - Methods for evaluating ecosystem functions, services and biodiversity in environmental risk assessment

Suggested chairs: Ralf Schaefer (RMIT University, BUNDOORA, VIC, Australia), Joke Van Wensem (TCB, THE HAGUE, The Netherlands) and Céline Boutin (Environment Canada, OTTAWA, Canada)

Ecological risk assessment used to focus on individual level toxicity data, which has been widely criticised, which in turn has stimulated the development of alternative risk assessment approaches such as species sensitivity distributions, mesocosm studies or recently trait-based ecological risk assessment. The main focus of these approaches is the protection of field populations or communities. So far the potential propagation from community effects to ecosystem functions, services or biodiversity in general has received relatively little attention. Ecosystem functions comprise the physical, chemical, and biological processes that contribute to the sustaining of an ecosystem and include the break down of organic matter, carbon fixation and respiration. Ecosystem services are the benefits people obtain from ecosystem and its functions, and are supposed to be driven by biodiversity. The session aims at evaluating the current state of methods for determining - and knowledge on - the effects of stressors on biodiversity and ecosystem functions, and at making predictions about the relevance for ecosystem services.

I02 - Environmental and human health risk assessment of chemicals in consumer articles and products

Suggested chairs: Goran Dave (University of Gothenburg, GÖTEBORG, Sweden) and Thomas Backhaus (University of Gothenburg, GÖTEBORG, Sweden)

Today the emission of chemicals has shifted from the traditional polluters (factories, energy plants, industries, mills, sewage treatment, transport) to a release from consumer products and hence from point sources to diffuse sources. Considering the sheer number of chemicals and the ever changing

amounts that are used in the multitude of consumer products on the market, it is obvious that a detailed knowledge on the use of chemicals in the various consumer articles and products and their release during use, disposal and recycling is needed in order to evaluate potential risks to humans and the environment.

The aim of this session is to collate and exchange information on conceptual, theoretical and experimental studies of chemicals in consumer articles and products, on their release and toxicity / ecotoxicity. Especially contributions on TIE (Toxicity Identification and Evaluation) studies, the application of (standardised) bioassays for the testing of product leachates and on the role of regulatory frameworks (e.g. REACH or the IPCS) for assessing chemicals in articles and products are welcome.

I03 - Environmental management tools, uncertainty and decision making

Suggested chairs: Marta Schuhmacher (Rovira i Virgili University, TARRAGONA, Spain) and Olwenn Martin (Imperial College London, LONDON, United Kingdom)

Nowadays, the Environmental Management is an issue of great concert for industries and administration. Environmental decision making is a difficult task in which different stakeholders take part. Decision making must be supported by tools which evaluate the potential future impact of managing practices.

Environmental Systems present big complexity. The decision maker deals with a set of ecological, environmental, social and economical data. Environmental decision making problems involve a set of alternatives that are evaluated on the basis of conflicting and incommensurate criteria, like technical, economical and social processes. It passes through the integration of different kind of data, such as monitoring data, field data, and environmental modelling.

In many cases, decisions have to be taken under uncertainty as is the case for climate change and related long-term environmental risks. New tools for a new paradigm helping to handle complex decision making are been developed. A diverse set of technical and intelligent methods has been used to test and develop environmental models for environmental decision Support System.

This session will focus on the general field of environmental decision making. The design, development and evaluation of such systems are issues to be discussed in this session. Works on environmental modelling and simulation and risk management are invited. New challenges in modelling integration, development of intelligent methods for environmental assessment and decision making, as well as database application and geographic information and spatial reasoning are welcome.

I04 - Environmental risk assessment of plant protection products and biocides: new developments and progress

Suggested chairs: Robert Luttik (RIVM, BILTHOVEN, The Netherlands) and Christine Füll (EFSA European Food Safety Authority, PARMA, Italy) and Erik Van De Plassche (Joint Research Centre, ISPRA (VA), Italy)

The placing on the market of plant protection and biocidal products is regulated in EU by specific legislation. Many of the active substances used in these products show specific biological activities, and are known to cause adverse effects in biota. Consequently, the risk of these substances has to be carefully assessed towards human health and environmental compartments. Risk assessment for both plant protection products and biocides is highly depending on the choice of appropriate models to estimate exposure, and on the assessment of the biological effects caused by these substances and, where relevant, their metabolites.

This session will be devoted to recent developments in the regulatory status of plant protection products and biocides, and on the most recent progress made on the development of specific guidance documents to be used in risk assessment at EU level.

Of special interest is the assessment of products containing multiple active substances.

Scientists studying the fate and effects of plant protection products and biocides as well as regulators are invited to submit abstracts into this session.

I05 - Mechanistic effect models for ecological risk assessment: improving models and risk assessment

Suggested chairs: Roman Ashauer (Eawag, DÜBENDORF, Switzerland) and Pernille Thorbek (Syngenta, BRACKNELL, United Kingdom)

To ensure sustainable use of chemicals without compromising societal benefits, it is important to gain a better understanding of how anthropogenic stressors interact with ecological systems. Such an understanding will lead to more ecologically relevant risk assessments as well as to improvements in risk mitigation strategies and ecosystem management. At the level of individuals, toxicological effects

depend on toxicokinetics and toxicodynamics. At the level of populations the effects and therefore risks of chemicals depend not only on exposure and toxicity but also on a suite of important ecological factors of the species of concern and the landscape under consideration. It is virtually impossible to fully address all these factors empirically for all possible organisms and environmental conditions. Mechanistic effect models, i.e. ecotoxicological models that explicitly represent key ecological and biochemical processes, enable the inclusion of these factors and simulate how they modify the impact of toxic effects at individual, population and community levels. Mechanistic effect models thus promote risk assessments that are more closely linked to ecological protection goals and in so doing provide a better basis for risk management. In this session we aim to bring together a range of studies to demonstrate how mechanistic effect models can add value to ecological risk assessment as well as studies where the robustness of the modelling process and the model is demonstrated (e.g. by explicit communication of model assumptions and their justification, justification of the model type, documentation of calibration and parameter estimations, quantifying model uncertainty and testing model extrapolations).

I06 - Monitoring data and post-registration studies in environmental risk assessment

Suggested chairs: Anne Alix (AFSSA, MAISONS ALFORT CEDEX, France) and Martin Strelake (Bundesamt für Verbraucherschutz und Lebensmittelsicherheit (BVL), Braunschweig, Germany)

Monitoring and post-registration data are identified as data that may be used into the environmental risk assessment (Directive 91/414/EEC, Annex 2 point 7.4). Such data investigate the fate and/or effects of Plant Protection Products (PPP), i.e. active substances and/or their relevant degradation products, used under realistic conditions. Their use in the risk assessment is foreseen by regulatory texts (Directive 91/414/EEC and its related updating regulation to come) as (1) a mean to raise the level of protection of human, animal, and environmental health by ensuring the traceability of potential exposure, and (2) as supporting data in the review process of active substance approvals.

The presentations or poster should present monitoring or post-registration data that were generated to monitor the presence of residues of PPP in environmental matrixes (soil, surface, groundwater or air), and/or their effects on non target organisms. These data may have been generated as a part of a generic environmental monitoring program, or they may be dedicated to a specific product (e.g. monitoring of the effects of the use of a specific product on bird populations in arable crops...). In this case, they may also be called post-registration studies. The proposals should lay emphasis on data interpretation, with a particular attention to the part of knowledge brought by these data to complete the environmental and/or ecotoxicological profile of the substance as deduced from registration dossiers. The proposal should also illustrate the use of monitoring/post-registration data into a risk assessment, and/or as a support of an improvement of risk assessment processes.

I07 - PBT substances - concerns, evaluation, regulation

Suggested chair: Peter Dohmen (BASF SE, LIMBURGERHOF, Germany)

Substances with PBT properties need specific scrutiny and for a proper evaluation often require more than a standard basic data set, since the combination of the being persistent, toxic and having a potential to accumulate in organisms and the food chain may cause unforeseen long-term adverse effects.

However, not rarely for construction or protection chemicals, durability or persistence of a compound is wanted. To avoid wash off of the substance, in addition low water solubility and then often a high Pow is needed, which in turn may cause bioaccumulation issues in standard BCF testing. Thus, to some extent PBT properties may be needed.

Contributions to this session should address the three main sub-topics:

- what are the major concerns for PBT substances;
- what information is needed for a proper evaluation of PBT substances;
- what should be done to regulate such compounds including appropriate risk reduction measures.

I08 - REACH - The role of sound science so far, and in the future

Suggested chairs: Tim Kedwards (SC Johnson, CAMBERLEY, United Kingdom), Christoph Schulte (Umweltbundesamt - Federal Environment Agency, DESSAU, Germany) and Jose Tarazona (ECHA, HELSINKI, Finland)

As practical experience of REACH is gained, it is essential that chemical management decisions made by industry and regulators are based on sound science. These sessions are aimed at providing a forum to exchange experiences gained within REACH, share scientific solutions to chemical management decisions and to propose new and emerging approaches for decision making in the future. They are an excellent opportunity for scientists from industry, consultancy, academia and regulatory authorities to come together to share and discuss approaches used within a REACH context. Special emphasis will be

put in the areas of environmental hazard, exposure, risk assessment, the identification of Substances of very high concern (SVHC), also in relation to changing scientific challenges. We would expect contributions covering many REACH related topics such as application of Intelligent testing Strategies, use of testing and non-testing (e.g. QSAR, Read across) methods, exposure scenarios, modelling and estimation, PBT/vPvB assessment, high tier risk assessment methodologies, food chain assessments, socio-economic analysis and connections to other regulations within Europe and elsewhere.

I09 - Regulatory challenges for metals

Suggested chairs: Ronny Blust (University of Antwerp, ANTWERP, Belgium) and Graham Merrington (wca environment Ltd, OXFORDSHIRE, United Kingdom)

The recent guidances developed for the implementing of REACH, GHS and the Water Framework Directive include key sections that recognize metal-specific characteristics (metal speciation, metal bioavailability and metal background levels). The guidances allow, for example, integrating chemistry related variations in metal releases, in situ-metal bioavailability as well as metal background levels in different EU regulatory frameworks. Some questions on the approaches have been raised (such as: how to deal with downstream chemistry, is dietary uptake sufficiently addressed). Papers on practical experiences, applications of the principles to hazard and risk assessments of simple as well as complex metal mixtures (alloys, ores, concentrates and intermediates produced during metallurgical processes) in laboratory as well as field set-ups would be most welcome.

I10 - Regulatory developments in the environmental risk assessment of endocrine disruptors

Suggested chairs: Lennart Weltje (BASF SE, LIMBURGERHOF, Germany) and James Wheeler (Syngenta, BRACKNELL, United Kingdom)

This session covers a topic which is highly relevant for the regulation of industrial chemicals (REACH), biocides and plant protection products (revision of 91/414/EC) both in Europe and in the United States. Various regulatory bodies (e.g. OECD and US-EPA) are developing testing and assessment schemes for chemicals showing endocrine potential. Recently, an ECETOC report and workshop findings published an approach for identifying endocrine disruptors and how to deal with them in a risk assessment context. Other national and international organisations are struggling with how to handle this complex issue within existing and revised regulatory frameworks. This session aims to discuss some of the associated issues such as how and when to enter and exit an endocrine testing scheme; which tests provide information on the endocrine properties of a compound; how can weight-of-evidence approaches be applied in decision making; risk assessment and protection goals. Such issues are important for the determination of when there is sufficient evidence to conclude on the endocrine potential of a compound and how to proceed with an appropriate risk assessment.

I11 - Regulatory needs and scientific response

Suggested chairs: Matthias Liess (UFZ, LEIPZIG, Germany) and Jörn Wogram (UBA, The Federal Environment Agency, Germany, DESSAU, Germany)

Environmental protection needs an increasing accuracy of risk assessment of chemicals. As the protective targets are populations, communities and entire ecosystems, ecological considerations are core in these assessments. Modern ecology is a rapidly developing science that has a great potential to increase the predictive power of risk assessment. Spanning from organism to landscape levels of complexity, ecological knowledge and methods provide essential scientific background for the risk assessment. However, the current practical questions are, what ecological knowledge and methods are required, and how can they improve the existing risk assessment framework? Scientists tend to approach this problem with complex analyses. Regulators on the other hand need to operate with pragmatic and easy to apply approaches. The interaction between evolving scientific developments and the current regulatory framework does ask for special attention. With this session we would like to stimulate regulators to present problems that need scientific attention - and scientist to present solutions for the regulatory assessment of chemicals. In addition scientist may want to indicate emerging concern that should be regulated.

I12 - Research for the Soil Framework Directive

Suggested chairs: Joke Van Wensem (TCB, THE HAGUE, The Netherlands) and Dominique Darmendrail (BRGM/Common Forum, ORLÉANS, France)

In 2006 the European Commission published the Soil Strategy and draft Soil Framework Directive (SFD). The publication has raised more awareness in Europe that contamination is not the only stressor to soils; loss of organic matter, compaction, sealing, erosion, flooding & land slides, salinisation, and loss of biodiversity are also identified as threats to soils.

The SFD targets at the protection of soil functions, and introduces besides a classical approach for

contamination, the concept of priority areas requiring special protection from other threats. The latter necessitates criteria for deciding which areas need to be given priority. In anticipation on the enforcement of the SFD, member states and the EC have commissioned research that is needed to implement the SFD. Issues in the debate have been the scientific feasibility of including measures to combat 'loss of soil biodiversity' in the SFD and the need for harmonisation (technically and scientifically) of risk management for contaminated soils, for which many member states already have some kind of legislation.

As a follow-up of the special symposium on these developments at the 17th annual meeting of SETAC in Porto (2007), the session aims at presenting an overview of the recent developments and the scientific underpinning of the SFD. Furthermore, presentations will be invited on a) research on the above mentioned threats, b) criteria and definitions for the establishment of priority areas, and c) the issue of harmonisation of methods, protocols and/or assessments.

I13 - Risk communication - the link between risk assessment and action

Suggested chair: Franz Streissl (EFSA, PARMA, Italy)

Risk communication is a key step in the process of risk assessment and risk management as well as in the communication to the public. Risk communication is often regarded as the final step in risk assessment. If the outcome of a scientifically sound risk assessment is not appropriately communicated then the message may be misunderstood or misinterpreted with fatal consequences to the environment or to the public. While scientists are well trained and focussed in conducting a scientific sound risk assessment there is often a lack of training and knowledge on how to communicate the outcome of the risk assessment. Scientists are often not aware that their language is not understood. Some principles of effective risk communication like transparency, clarity, consistency, and reasonableness are not always followed. Clarity is an important principle. It means that the communicated assessment is free from "obscure language and that it is easy to understand". The aim of this session is to discuss the principles of risk communication in the area of environmental risk assessment in order to improve and facilitate risk communication among scientists, decision makers, industry and public.

I14 - The EC Habitats Directive: lessons learnt from implementation

Suggested chair: Claire Cailles (Environment Agency for England and Wales, WARRINGTON, United Kingdom)

In 1992 the European Community adopted Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (the EC Habitats Directive). This legally binding directive aims to protect biodiversity in all EU member states and has led to the establishment of a network of Natura 2000 sites across Europe. The implementation of this legislation has involved assessments to be made of the impact of all authorised discharges and practices. This includes any releases of chemicals and radioactive substances which may affect the integrity of Natura 2000 sites. This session will draw together the approaches of different regulators and share their experiences of implementation of the EC habitats directive. As there is an ongoing commitment to protect the integrity of Natura 2000 sites, these experiences could be used to improve future assessments.

I15 - Innovation towards new measures for the second-generation of river basin management plans

Suggested chairs: Susanne Heise (University of Applied Sciences, HAMBURG, Germany), Hans-Christian Holten Lützhøft (Technical University of Denmark, KGS. LYNGBY, Denmark) and Gert-Jan de Maagd (Ministerie van Verkeer en Waterstaat, THE HAGUE, The Netherlands)

March 22, 2010 is the deadline for EU-Member States to submit their Water Framework Directive (WFD) River Basin Management Plans (RBMP) including measures to achieve good chemical and ecological status of surface water bodies and groundwater. It may be expected that an absence of cost-effective and technical feasible measures as well as a limited insight in measure-effect relationships hinders the achievement of good chemical and ecological status in 2015. Therefore there is a need for innovation and improved insight in measure-effect relationships in order to define additional measures in the second generation RBMP in 2015.

Due to the hydraulic connectivity within river basins, pollution sources can have far-reaching impacts within a watershed, while modifications in the sediment and/or hydrological budget can have consequences in upstream areas of a watershed. In order to quantify the risk to ecosystem services resulting from alterations in sediment and water quantity and quality, the characteristics of ecosystem functions (e.g. kind, sensitivity, and resilience) must be evaluated.

A major challenge facing scientists, water managers, and regulators is the effective assessment of these risks on a basin scale in order to fulfil the objectives of the WFD. Also given that the availability of quantitative knowledge of substance releases and emissions into the technical system and the

environment as well as monitoring data of reasonable quality is very sparse. Integral to this assessment is a comprehensive understanding of the watershed; including the importance of hydraulic and morphological structures (e.g. reservoirs, groyne fields and floodplains), the impacts of natural and anthropogenic disturbances, as well as the dynamics of ecosystem functions.

We would like to invite contributions that address management approaches focusing on measure-effect relationships, source dynamics and releases, strategic assessment as well as the experimental and modelled fate of priority substances in both environmental and technical systems.