

American Society of Limnology and Oceanography Meeting Announcement and Call for Papers

Research Across Boundaries

June 5-9, 2000 in Copenhagen, Denmark

<http://www.aslo.org/copenhagen2000>

Abstract Deadline: January 15, 2000

Early Registration Deadline: April 1, 2000

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We welcome you to the ASLO 2000 Aquatic Sciences Meeting in Copenhagen

For the first time in the history of ASLO a meeting is taking place outside North America. About one third of the membership of ASLO is not from North America. In the spirit of international co-operation and realizing that science crosses boundaries, the ASLO Board is conducting an experiment and calls a meeting in Europe. A Scandinavian team of aquatic scientists took the challenge and invites the membership of ASLO and all other interested in aquatic sciences to join us in Copenhagen 5 to 9 June in the year 2000.

The theme of the meeting

The theme of the meeting is Research Across Boundaries. In plenary talks, special and contributed sessions, workshops and field trips, the meeting program demonstrates that aquatic sciences cross many different types of boundaries and not only those we traditionally identify; like sediment-water and water-air interfaces. The Program and your participation vouch for an exciting meeting. A newcomer is the tutorial lectures, which will introduce all Special Sessions. These should guaranty overview and good discussions of the most "hot" issues within our science. Contributed Sessions are as always covering the width of aquatic science and should provide an opportunity for all to contribute. An overwhelming space is available for posters. ASLO meetings over the last couple of years have shown the poster sessions not only to be most enjoyable, but to provide the most lively crowd of interested people. Use the opportunity to present a Poster.

ASLO, the Local Organizing Committee, and the Program Committee invite you to Copenhagen to make this meeting a success

Sponsors

The City of Copenhagen (join the reception at the City Hall)
 SAS (Scandinavian Airline System)
 The Faculty of Natural Sciences, University of Copenhagen
 The Faculty of Natural Sciences, University of Aarhus

Early registrations of commercial and non-commercial Exhibitors

The Danish Fisheries Research Institute
 The National Environmental Research Institute
 The Danish Environmental Agency
 Unisense Microelectrodes and Measuring Systems
 KC Research Equipment
 Backhuys Publishers B. V.
 Hydros-Bios Apparatebau GmbH
 bbb-Moldaenke
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 American Society of Limnology and Oceanography

Conference Bureau

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The following information is available on:

<http://www.aslo.org/copenhagen2000>

Conference venue and site

Copenhagen is easily approached from most countries and should be a pleasant place to visit in early June. Although the meeting will take much of your time, do not miss the many historic buildings, museums, Tivoli and other places of interest. We believe Copenhagen is a relaxed town inhabited with friendly people, but also showing the busy city life -both day and night. It is very easy to get around with the efficient public transport system, which includes buses and trains. Copenhagen and suburbs has a population of about 1 million so by most standards it is not a big town.

The meeting, exhibitions and most workshops will take place at The Bella Center, just outside Copenhagen (see the enclosed map). It is one of Northern Europe's most modern conference centers, a flexible multi purpose venue only a 15 min. drive from the city center. All oral and poster sessions and the exhibitions are under one roof and just a few minutes walk apart. The Bella Center has plenty of parking space, a restaurant and a few shops.

Transportation

Most conference hotels are within walking distance from the Central Station. To get to the conference site just walk to the Central Station and take bus no. 46 to the Bella Center, it runs every 10 to 15 min. Extra buses will run during rush-hours (morning and afternoon). A bus card allowing free use of the public bus and train service within the city center is available for each participant. Please ask at the Registration desk.

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The Scientific Program

The scientific program includes all normal ASLO activities and a few more: Plenary talks, Special Sessions with tutorials, Contributed Sessions, oral and poster presentations, workshops, a pre- and post-meeting course and post-meeting excursions. ASLO awards and the Minorities program are also present.

Plenary speakers

Each day starts with a plenary where different aspects of Research Across Boundaries are presented:

Allan G. Hildrew: Discovering the Habitat Boundaries for Aquatic Insects

Queen Mary and Westfield College, University of London, United Kingdom

Carlos M. Duarte: Land Use and Coastal Ecosystems

Instituto Mediterráneo de Estudios Avanzados, CSIC- Univ., Palma de Mallorca, Spain

Mary I. Scranton: The Ocean Oxygen Minimum Layer as a Boundary

State University of New York at Stony Brook, USA

Tom Fenchel: The Aquatic Sediment: a Multi-Boundary System

University of Copenhagen, Denmark

Marten Scheffer: Links Between Empiricism and Modelling

Wageningen Agricultural University, The Netherlands

Special Sessions and Tutorials

A large number of suggestions for Special Sessions (SS) were forwarded by ASLO members and condensed to an exciting Program covering the desired width of the meeting theme: Research Across Boundaries. About 40 Special Sessions are supplemented with Contributed Sessions of a more general character. The Program Committee invites Convenors to introduce each Special Session with a TUTORIAL presentation. A tutorial is allocated 30 minutes and it is the purpose to present the session subject in a more

comprehensive lecture which 1) identifies the development of the field in a mini-review, 2) summarizes state-of-the-art, and 3) identifies important gaps and questions for the future. By this initiative we hope to make it easier for the non-specialists to join the sessions and to understand what is going on, to encourage discussions, and not least to educate and guide the many Ph.D. students normally attending ASLO meetings. The Convenors invite you to submit papers for the Special Sessions. Indicate your choice on the Abstract submission form.

Session topic codes

- SS 01 The interface between theory and field experiment: getting beyond yes-or-no answers
- SS 02 Thermodynamics of aquatic systems
- SS 03 Astrolimnology: Measuring the quality of lakes from heaven
- SS 04 Sensor technology for remote interactive experiments in aquatic environments
- SS 05 High resolution pigment distribution processes and fate
- SS 06 Microorganisms in stream systems
- SS 07 Sub-aquatic and sub-aerial biofilms- myth or reality
- SS 08 Microbial diversity and community structure in aquatic environments - regulating mechanisms in different habitats
- SS 09 Bacterioplankton communities in lakes and oceans - Functional and structural similarities and differences
- SS 10 Microbe-particle interactions in pelagic ecosystems
- SS 11 Microbial microscale patchiness: chemosensory behavior of bacteria
- SS 12 The significance and control of water column respiration in aquatic systems
- SS 13 Microbial ecology of the Arctic Oceans
- SS 14 Crossing the membrane boundary between life and death: The biogeochemistry of lysis and EOC production by phytoplankton and bacteria
- SS 15 Organic matter as a linkage between terrestrial and freshwater ecosystems
- SS 16 Transport and transformation of DOM from land to sea
- SS 17 Approaches to regional monitoring and assessment of surface water quality
- SS 18 Integrating river basins: linking fluxes between catchments, rivers and estuaries with numerical models
- SS 19 Lakes in flood-pulsed environments
- SS 20 The role of aquatic macrophytes in lakes
- SS 21 Aquatic species invasions
- SS 22 Quantitative links between past and present - Paleolimnological contributions to contemporary process studies
- SS 23 The recovery of freshwater ecosystems from acidification: the role of air, land and sediment boundaries
- SS 24 Sustainable use and management of international fresh waters
- SS 25 Ecological processes and ecosystems: functioning towards water purification
- SS 26 Role of aquatic colloids in the speciation, bioavailability and fate of trace elements, nutrients and contaminants
- SS 27 Climate change, weather patterns and aquatic systems
- SS 28 Climate variation, regime shifts and fisheries: lessons from the Atlantic and Pacific
- SS 29 Coupled physical-biological processes on continental shelves and the shelf break
- SS 30 What is controlling the distribution of seagrasses?
- SS 31 Influence of primary producers on nutrient cycling in coastal marine areas
- SS 32 Biogeochemical processes in estuaries
- SS 33 Coastal embayments as important land-margin ecosystems: Fate and transformations of reactive nutrients
- SS 34 Biochemistry of food quality in relation to production across pelagic systems
- SS 35 Small-scale physical-biological interactions in the plankton
- SS 36 Physical and chemical influence on the life history of marine and freshwater organisms: The consequence of environmental change
- SS 37 Spatial and temporal scales controlling plankton dynamics
- SS 38 Biological, chemical, physical and sedimentological interactions in polynyas
- SS 39 Benthic filter-feeding and plankton dynamics- importance of currents and mixing
- SS 40 Bioturbation: the water-sediment interface is under control
- SS 41 Chemical ecology of freshwater and marine benthos
- SS 42 The microbial ecology and biogeochemistry of aquatic sediments
- SS 43 Oxic-anoxic boundary phenomena
- SS 44 Biogeochemical processes and their microenvironmental controls at the sediment-water interface.
- SS 45 Biogas cycling and emission along the aquatic continuum: From freshwater to coastal zone

Contributed Sessions

- CS 01 African fresh water systems
- CS 02 Analytical procedures and methods
- CS 03 Applied marine sciences
- CS 04 Aquatic chemistry
- CS 05 Arctic/Antarctic ecology
- CS 06 Benthos
- CS 07 Biodiversity
- CS 08 Biofilms
- CS 09 Biology and ecology of deep oceans
- CS 10 Biomanipulation
- CS 11 Ecotoxicology
- CS 12 Education
- CS 13 Environmental hazards
- CS 14 Extreme environments (e.g. saline lakes, high/low temperatures)

- CS 15 Lakes, inland waters
 CS 16 Microbial food web interactions
 CS 17 Optics
 CS 18 Organic carbon turnover
 CS 19 Phytoplankton ecology (incl.toxic algae)
 CS 20 Plankton and nutrient dynamics
 CS 21 Primary producers
 CS 22 Stable isotopes
 CS 23 Streams
 CS 24 The air-water interface
 CS 25 Trace metals at boundaries
 CS 26 UV-radiation and aquatic biota
 CS 27 Zooplankton ecology
 CS Other (specify on abstract submission form)
-

Special Session Abstracts

SS 01 The interface between theory and field experiment: getting beyond yes-or-no answers

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 Sebastian Diehl (*diehl@zi.biologie.uni-muenchen.de*), Zoologisches Institut der LMU, Karlstr. 23, D-80333 Muenchen, Germany. FAX: ++49 (0) 89 5902-461

There is little explicit connection between theory and experimental studies in limnology and oceanography. Explicit models are often used to assess the relative contributions of different processes to a particular phenomenon (sensitivity analysis), but field experiments typically ask whether or not a particular process has a statistically significant effect. By tying experimental questions explicitly to theoretical predictions, we can go beyond yes-no answers. Unfortunately, theoretical papers rarely provide explicit suggestions for how models might be tested experimentally. This session will bring together aquatic ecologists with an interest in models that can be tested experimentally or in testing explicit theory with field experiments.

SS 02 Thermodynamics of aquatic systems

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 Colin S. Reynolds (*creynolds@jfe.ac.uk*), Inst. of Freshwater Ecology, Ambleside, Cumbria LA22 0LP, United Kingdom

The physical, abiotic environment is one important factor in determining the behaviour and evolution of aquatic ecosystems. The physical environment defines a "window of

viability" in which the biological part can carry out their various activities. The highly variable environment set out in aquatic systems in turn requires high variability in the function of, not only the individual organisms, but also the constellations of organisms, the trophic network of the ecosystems. The organisms and the ecosystem need to fit to the prevailing environment. As the environment is changing, either for natural reasons like yearly fluctuations or as a consequence of human influence, like pollution, the ecosystems have to respond with changes that fits the environment.

During the recent decades fitness have often been discussed in terms of a thermodynamic understanding of organism or systems and knowledge about the importance to especially aquatic system is increasing. The experiences gained up to now indicates that fitness, in the sense of thermodynamic efficiency, forms an important entrance point for increasing our understanding of and finding causal explanations to processes like adaptation, succession, etc. At the end an improved understanding will serve to improve our management of aquatic ecosystems. The convenors call for contributions that may serve to illustrate how energetics and thermodynamical efficiency determine aquatic ecosystem behaviour at all levels of biological hierarchy.

SS 03 Astrolimnology: Measuring the quality of lakes from heaven

Patrick L. Brezonik (*brezo001@tc.umn.edu*), Department of Civil Engineering, University of Minnesota, Minneapolis, MN 55455, USA. Fax: (612) 625-1263.

Advances in satellite technology, computer hardware, and image processing software over the past two decades have greatly expanded the feasibility of monitoring lake conditions such as trophic state by use of satellites orbiting the earth. This session will describe these advances and discuss challenges and limitations that must be overcome to further popularize this technology. Contributions are sought that illustrate the use of satellite and other remote sensing imagery to measure specific characteristics such as chlorophyll levels, transparency, and macrophyte abundance in lakes and coastal waters.

SS 04 Sensor technology for remote interactive experiments in aquatic environments

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The coming decade will witness a rapid growth in moored, cabled, and autonomous observatories to investigate a spectrum of basic processes that need to be addressed through continuous interdisciplinary experiments. We anticipate the need for the development of new or re-engineered technologies and sensor designs for measuring physical, chemical, biological, and geological processes and manipulating in situ experiments. Contributions related to innovative chemical and biological sensors are particularly encouraged. A goal of this special session and a follow-on workshop is to bring together creative scientists, engineers, and technologists from diverse backgrounds to exchange ideas on new experimental approaches and methodology, particularly for remote, hostile, and poorly sampled regions.

SS 05 High resolution pigment distribution processes and fate.

Fauzi Mantoura (*RFCM@wpo.nerc.ac.uk*), Plymouth Marine Laboratory, Prospect Place, Plymouth PL1 3DH, UK.

The purpose of this session is to provide an update on any discoveries of new pigments, including carotenoids, chlorophylls and their breakdown product, in contrasting marine environments. The role of pigments in chemotaxonomy, photosynthesis and photoproduction would also be welcome. Finally, the prospect of linking large-scale pigment distributions to the recently recognized concept of ocean biogeochemical provinces could also be explored. Any contributions relating to the distribution of pigments, pigment composition and remote sensing from ocean colour would also be welcome.

SS 06 Microorganisms in stream systems

Jürgen Marxsen (*jmarxsen@mpil-schlitz.mpg.de*), Limnologische Fluss-Station des Max-Planck-Instituts für Limnologie, Damenweg 1, D-36110 Schlitz, Germany. Fax: +49-6642-6724

The heterogeneous and complicated structure of streams with several boundaries over short distances (water/sediment, stream/groundwater, land/water, ...) presents a challenge to scientists from limnology and other disciplines that still leaves plenty of questions open. This is especially true for the role of microorganisms, which in stream systems have traditionally been considered to be involved only in the decomposition of organic matter and the remineralization of nutrients, but which in recent years have been shown to be also of great importance to stream food webs. The current knowledge on the role of microorganisms in streams will be the focus of this session.

SS 07 Sub-aquatic and sub-aerial biofilms- myth or reality

W. E. Krumbein (*wek@africa.geomic.uni-oldenburg.de*), Institute for Chemistry and Biology of the Marine Environment (ICBM), Carl von Ossietzky-Universität Oldenburg, POB 2503 D-26111 Oldenburg Germany. Fax 49-441-798-3384

D. M. Paterson (*dp1@st-andrews.ac.uk*), Gatty Marine Laboratory, University of St. Andrews, St. Andrews, Fife KY16 8 LB, Scotland, UK.

The session concentrates on the different forms and ecological situations of biofilms and microbial mats. It will highlight the significance of these different community types and life styles. It will acknowledge early Danish contributions of the Odense group and in Flora Danica. Further, the question of cross relations with stromatolites, fouling communities and the formation of ore bodies will be covered. Contributions about different types of organisms contributing to biofilms and microbial mats are welcome among which, not only phototroph but also chemoorganotroph bacterial and eukaryotic organisms as well as biofilm-macroorganism interactions. Further contributions to the following questions are welcome: (i) molecular ecological and biodiversity related studies of sub-aquatic and sub-aerial biofilms; (ii) contribution of extracellular compounds to community stability; (iii) physical behaviour of water in biofilms; (iv) metal processing in biofilms (v) biofilms and UV- radiation (vi) conquering environments with stress (low water activity; temperature extremes; extreme stress through toxic substances; (vii) fossil biofilms. The major aim of the session is to demonstrate the biodiversity, ecological and geological importance and material processing potential of biofilms in all aquatic but also sub-aerial and deep geosphere (ground water, mines, etc.) environments. Contributions are also invited regarding the question why and how macro-organismic benthic ecosystems evolved at the end of the Precambrium and how biofilms interact with special benthic systems like stromatolithic mud-mounds in the ocean and in lakes or with reef communities.

SS 08 Microbial diversity and community structure in aquatic environments - regulating mechanisms in different habitats

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Molecular tools are now widely used for the determination of the community structure of natural bacterial assemblages, assessment of their diversity and in situ-identification of single cells. However, the way abiotic and biotic factors may influence the diversity, structure and dynamics of bacterial communities and populations remains largely unknown. This session aims on such regulatory factors that bring new insights in microbial community structure and dynamics, and their relation to a specific environment. Extensive data sets on a particular site, comparisons of different sites or methods would be most welcome.

SS 09 Bacterioplankton communities in lakes and oceans - Functional and structural similarities and differences

Meinhard Simon (*m.simon@icbm.uni-oldenburg.de*),
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During the last two decades, many studies were carried out which documented in many aquatic ecosystems, including lakes of different trophic states, estuaries, and various marine systems, the great significance of bacterioplankton communities for the cycling of matter and the flux of energy. With respect to the functional role, the bacterioplankton communities in marine and freshwater systems appeared to be surprisingly similar as revealed by many cross-system overviews even though some specific features of marine as compared to freshwater systems emerged. Studying the structural composition of bacterioplankton communities in freshwater and marine systems in the recent past with molecular techniques such as sequence similarities of the 16S rRNA gene and by in situ hybridization with rRNA-targeted oligonucleotide probes, striking differences were revealed. In oceanic systems typical phylotype clusters of alpha-proteobacteria were discovered which are lacking in freshwater systems. In the latter system, beta-proteobacteria are usually one of the major or the major component of bacterioplankton communities whereas they are literally absent in marine and in particular in oceanic systems. In Antarctic waters and in the mesopelagic zone Archaea were discovered which have no counterpart in freshwater systems. This session will focus on recent findings with respect to structural and functional differences and similarities in marine and freshwater systems. Two introductory talks will set the stage for invited and contributed papers.

SS 10 Microbe-particle interactions in pelagic ecosystems

Farooq Azam (*fazam@ucsd.edu*), *Scripps Institute of Oceanography, UCSD. FAX: 619-534-7313*
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New research has shown that pelagic microbes: bacteria, algae and heterotrophic protists, do not live in a homogenous environment, but rather in a highly structured one. Particulate organic matter, from colloidal polymer gels to large detrital particles, provides physical surfaces for microbial attachment, forms barriers against chemical diffusion, and furnishes refuges against grazers. This session will include invited and contributed papers on the interactions of microbes and particles, from the role of microbes in formation of gels and organic particles, to how particulate structure at scales of microns to centimeters due to gels and particles affects phylogeny, physiology, and ecology of microbes in pelagic systems.

SS 11 Microbial microscale patchiness: chemosensory behavior of bacteria (invited)

Jim Michell (*jim.mitchell@flinders.edu.au*), *Biology, Flinders University, GPO Box 2100, Adelaide, SA 5001, Australia. Voice 618 8201 3684, Fax 618 8201 3015.*

As appreciation of the importance of the microbial loop has increased, so to has the need to understand how microbes interact. The distribution and dynamics of microbes over distances of millimeters to centimeters is poorly understood in the water column. There are few in situ observations at this scale and the relative contribution of motility, buoyancy and fluid movement in determining microbial distributions and interactions remains to be fully elucidated. Contributions are invited on the measurement and theory of microscale interactions and distributions for free floating pico-, nano-, and microplankton in response to the chemical and physical environment. To encourage multidisciplinary participation, invited presentations include microbiology, biological oceanography and fluid dynamics.

SS 12 The significance and control of water column respiration in aquatic systems

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Respiration (R) is the essential counterpart to photosynthesis (P), and together the two processes define the C-balance and trophic status of aquatic ecosystems. Partitioning of P and R between microbes and metazoans profoundly impacts the fate of organic-C within aquatic environments. While traditional focus has been on factors regulating P, there is growing interest in community level R. Questions remain, however, regarding controls on R, particularly for bacteria.

This session intends to assemble marine and freshwater researchers, employing comparative and experimental approaches, to address questions of R regulation and organic C-balance at scales ranging from bacteria to whole ecosystems.

SS 13 Microbial ecology of the arctic oceans

James T. Hollibaugh (*aquadoc@uga.edu*) and Patricia L. Yager (*pyager@uga.edu*) Department of Marine Sciences, University of Georgia, Athens, GA 30602-3636. Fax: 706-542-5888

This session focuses on microbial processes in the Arctic Ocean, from organic matter distributions and productivity to species composition and endemism. Results from recent cruises suggest anomalies in coupling between primary production and bacterial production at high latitudes, yet the basis for the apparent uncoupling temporal lags, the effect of temperature on bacterial physiology, grazing pressure, etc. - is not clear. We seek papers that address these issues as well as those addressing basic questions of prokaryote physiology and biogeography.

SS 14 Crossing the membrane boundary between life and death: The biogeochemistry of lysis and EOC production by phytoplankton and bacteria

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Susana Augusti Instituto Mediterraneo de Estudios Avanzados, CSIC-Univ. Illes Balears, Carretera de Valldemossa km 7.5, 07071- Palma de Mallorca (Islas Baleares), Spain

Planktonic dynamics are necessarily based on growth (biomass accumulation) and loss. Accepted loss factors for phytoplankton are sedimentation and grazing, and perhaps secondarily, some modest diffusive losses and viral attack. Bacteria, in the modern understanding, are either grazed (50 to 90% per day) or lysed by viruses (the remaining production). Therefore the new evidence that important or even dominant fractions of the potential planktonic production are lost to direct cell death and nonviral lysis are exciting and controversial. We invite papers documenting, quantifying and/or explaining lytic and other extracellular pathways of carbon flow in fresh and marine waters.

SS 15 Organic matter as a linkage between terrestrial and freshwater ecosystems (invited)

Robert G. Wetzel (*rwetzel@biology.as.ua.edu*), Department of Biological Sciences, The University of Alabama, Tuscaloosa, Alabama 35487-0206. USA. 205-348-1793 (phone), 205-348-1403 (fax)

Organic matter drives metabolism in freshwater ecosystems. It is becoming increasingly evident that the proportion of organic matter derived from terrestrial sources can be much greater than that produced autochthonously in both lakes and rivers. Much of the allochthonous organic matter enters fresh waters as soluble and colloidal organic matter of varying degrees of biological availability. This special session will be devoted to organic loading pathways, quantities of organic matter derived from different sources, quality of the organic matter, and transformation pathways of the particulate and soluble organic matter as it passes from terrestrial sources and once it enters fresh waters.

SS 16 Transport and transformation of DOM from land to sea

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Lars Tranvik (*Lars.Tranvik@limno.uu.se*), Dept. of Limnology, Uppsala University, Norbyvagen 18D, 752 36 Uppsala, Sweden

A fraction of the organic matter originating in terrestrial primary production is lost to aquatic ecosystems as dissolved organic matter (DOM). This DOM can be a major source of energy and nutrient for aquatic food webs. During its transport from soil to sea, allochthonous DOM is subject to a variety of transformations (biological, photochemical, sedimentation) which affect the quality and quantity of DOM reaching coastal waters where mixing into saline water induces further transformation. Allochthonous DOM also has substantial effects on the structure and function of aquatic ecosystems. This session will focus on the DOM transfer from land to sea, emphasizing mechanisms involved and their ecosystem effects, as well as regional and global implications of this transfer.

SS 17 Approaches to regional monitoring and assesment of surface water quality

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Monitoring and surveillance programs have, in the past, often dealt with site-specific questions of ecosystem condition, thus concentrating on single populations or communities of individual habitats or ecosystems. For example, sites often are monitored for nutrient levels,

frequency of algal blooms, fish species present, etc. However, present day pressures on aquatic systems affect large geographic areas. Thus, it has become increasingly important to be able to describe water resources condition over these broad areas or regions. Most regional assessment approaches originate from the premise that ecosystem properties reflect the variation of the surrounding landscape. Thus, ecosystem indicator properties, when accurately compiled, permit greater focus on regional scale- as opposed to site-specific scale, aquatic resource management issues. Recent developments in statistical sampling designs, ecoregion landscape classification, and TM and AVHRR technologies coupled with GIS capabilities and other techniques make it possible to compile regional environmental resource estimates in ways that did not exist a short time ago. Abstracts directed toward this Special Session should focus on census, survey, modeling, and any other procedures designed to describe, infer, or extrapolate lake, riverine, or wetland processes, status, and trends across temporal, spatial and biological scales (boundaries). Presentations will include a variety of innovative, regionally oriented monitoring and assessment topics and case studies of interest to both the research and aquatic resource management communities.

SS 18 Integrating river basins: linking fluxes between catchments, rivers and estuaries with numerical models

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Individual components of river basins have been modeled with varying levels of success to attempt to understand the inter-disciplinary nature of processes operating at the watershed level or within a river or estuary. To develop a truly integrative approach that addresses anthropogenic impacts and sustainable management of river basins requires links between models of watershed runoff and composition, and river and estuary water transport and biogeochemical transformations. Are entire river basins amenable to this modelling approach or are they too complex, chaotic and non-linear to be amenable to process modelling? What are the effects of various flux process descriptions, parameter calibrations and upstream forcings? This session will be a forum for scientists, engineers and managers who wish to understand and predict how river basins function, the key fluxes and transformations of energy and material across boundaries, and how to modify or interrupt flux paths within the basin to beneficially influence downstream water quality.

SS 19 Lakes in flood-pulsed environments

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Situated in the floodplains or deltas of large rivers, aquatic communities of shallow lakes are to a varying degree steered by the hydrological regime of the river. In lowland rivers, such as the rivers Rhine, Danube and Kissimmee, restoration focusses on the aquatic-terrestrial transition zone between floodplains and the main channel by reintroducing the natural flooding process. Floodpulses set back the autogenic succession and "rejuvenate" the plankton, macrophytes and fish communities. In the session we propose to unravel the role of inundation frequency and water level fluctuations in conjunction with "classical" determinants of lake ecosystem development like morphometry and trophic state.

SS 20 The role of aquatic macrophytes in lakes (invited)

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Aquatic macrophytes play a major role in structuring lake ecosystems, particularly in shallow lakes. The plants act as a buffering zone between the terrestrial and the pelagic environment, although the plants during autumn may act as a major source of nutrients and organic matter to the pelagial. Aquatic plants are inhabited by other autotrophic components, invertebrates, fish and birds and may therefore enhance biodiversity. In addition, plants provide a shelter for invertebrates and fish against predators. In some lakes, major seasonal and diel migration of invertebrates and fish occurs between the plant beds and the pelagial. Such migration may have strong cascading effects on the entire food web and ultimately on lake water quality. This session focuses on the recent development within this growing field of research with special emphasis on how interactions between plant beds and the pelagial change along a gradient in nutrients and salinity.

SS 21 Aquatic species invasions

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Gregory M. Ruiz (*ruiz@serc.si.edu*), Smithsonian Environmental Research Center, P.O. Box 28, Edgewater, Maryland 21037 USA. Tel. 301-261-4190; Fax 301-261-7954

The problem of species invasions is growing in recognition as a problem that threatens the biodiversity of ecosystems on a global scale. This Special Symposium will cover a broad array of relevant, interrelated topics concerning aquatic species invasions that should be of interest to the marine, estuarine, and freshwater scientific communities. We seek contributions for the following special focus topics: patterns of invasion in space and time; transfer and invasion of microorganisms in aquatic systems; nonindigenous aquatic species and their interactions with invaded ecosystems; risk assessment and predictability of bioinvasions; understanding invasion pathways; control and management of invasive species; and international government policies and institutional arrangements for dealing with aquatic invasive species. Several sub-sessions are possible, depending on the number of contributions for each of these topics. In addition, a lunchtime or evening workshop on Invasive Species Databases will be conducted (see workshop announcements). Contributors should identify for which of the above listed special focus topics they would like to be considered.

A related pre-conference Workshop titled "Invasion of European & North American Ecosystems by Ponto-Caspian Species" will be held Friday and Saturday, June 2-3, 2000, just prior to the start of the main ASLO 2000 Conference. Presentations are by invitation only, but individuals interested in the workshop are welcome to attend and should indicate their interest in doing so. See workshop announcements. Please contact any of the conveners for more information.

SS 22 Quantitative links between past and present - paleolimnological contributions to contemporary process studies

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The limited timescale of contemporary monitoring and experimental studies of lakes, means that there is a clear role for palaeolimnology in extending our knowledge of e.g. natural variability. Palaeolimnological data can be used to determine whether the inherent temporal variability of processes has been altered substantially with anthropogenic disturbance. However, to link across the different timescales of neo- and sediment records, palaeolimnologists must utilize the information contained in lake sediments in a more rigorous fashion. The session will cover a range of applied issues: eutrophication, atmospheric deposition, erosion, climate change – and illustrate the increased effort towards quantifying the magnitude/rates of change and mechanistic linkages to modern-day processes.

SS 23 The recovery of freshwater ecosystems from acidification: the role of air, land and sediment boundaries

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John Gunn (*jgunn@nickel.laurentian.ca*), *Ontario Ministry of Natural Resource, c/o Biology Department, Co-operative Freshwater Ecology Unit, Laurentian University, Sudbury, Ontario, Canada P3E 2C6. Phone: 705 675-4831, FAX 705 671-3857.*

Given the recent large SO₂ emission reductions in Europe and in North America, the focus of acid rain research has shifted from damage estimation to the recovery process. We have only a nascent understanding of the rate, degree and regulators of water quality improvement and the re-assembly of damaged aquatic communities. Central to the study of recovery is research on the changes in fluxes of both materials and organisms (i.e. colonists) across limnological boundaries. We invite contributions that quantify these fluxes, both chemical and biological, especially those that link the fluxes to the limnological recovery process.

SS 24 Sustainable use and management of international fresh waters

Maria José Lemos Boavida (*zboavida@fc.ul.pt*), *Universidade de Lisboa. Portugal.*

Because ecological systems are natural and do not conform to (artificial) political boundaries, freshwater ecosystems are often shared by two or more countries, thereby creating a need to establish rules for their sustainable use and subsequent management. Traditionally four doctrines of International Law have been providing the rules for the utilization of shared water resources; since those doctrines followed each other historically, they reflect the successive ways of looking at problems generated by sharing of critical water resources. Sustainability is closely related to security and it often results in disputes over international waters. Interdisciplinary collaboration (limnologists, hydrologists, geologists, sociologists, lawyers), as well as public participation, are mandatory in the elaboration of international conventions which should be tools for cooperation, bound to the principles of International Law for sustainable water resources utilization.

SS 25 Ecological processes and ecosystems: functioning towards water purification

Sergei A. Ostroumov (*saostro@glasnet.ru*), *Dept. of Hydrobiology, Moscow State University, Moscow, 119 899, Russia.*

The focus is on how do ecosystems and organisms (microorganisms, plants, animals) upgrade the quality of water and contribute to making it pure and clear, removing organic matter, xenobiotics/contaminants and extra nutrients (P, N) and performing natural bioremediation. All processes contributing and leading to that, e.g. biotransformation, oxidation, adsorption, accumulation, filtration, and sedimentation in ecosystems, mesocosms and laboratory systems. Roles of wetlands, plankton, benthos, periphyton - (all marine and freshwater) organisms and their enzymes - including bacteria, cyanobacteria, algae, fungi, protozoans, higher plants, and invertebrates.

SS 26 Role of aquatic colloids in the speciation, bioavailability and fate of trace elements, nutrients and contaminants

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 Kevin J. Wilkinson (*kevin.wilkinson@cabe.unige.ch*), CABA, Analytical and Biophysical Environmental Chemistry, University of Geneva, Sciences II, 30 quai Ernest-Ansermet, CH-1211 Geneva 4, Switzerland

Recent advances suggest that the speciation, bioavailability and fate of trace elements, nutrients and contaminants in aquatic systems (both fresh and marine) can be closely linked to that of colloidal materials, which are mainly composed of macromolecular organic matter (mostly carbohydrates, proteins and humic substances) and mineral colloids in freshwaters. Aquatic colloids display excellent complexation capacity due to their polyfunctional properties. Contrary to low molecular weight ligands, however, macromolecular organic matter can coagulate and remove with it bound trace metals, radionuclides and trace organic contaminants from the water column. This session should bring together limnologists and oceanographers studying physical, chemical, microbiological and environmental aspects of aquatic colloids.

SS 27 Climate change, weather patterns and aquatic systems

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 Jean-Pierre Gattuso (*gattuso@obs-vlfr.fr*), Observatoire Oceanologique, Villefranche-sur-mer, France. Fax: +493763834.

The water surface defines the boundary between the atmosphere and aquatic systems but does not prevent interaction between them. Noteworthy effects of the atmosphere on the functioning of aquatic ecosystem include global change, such as rising concentrations of CO₂ in the atmosphere, stochastic extreme weather events and pseudo-

cyclical large-scale weather patterns such as the North Atlantic Oscillation. The aim of this special session is to review current ideas on the sensitivity of freshwater and marine systems to atmospheric perturbation and elucidate the consequences for ecosystem function.

SS 28 Climate variation, regime shifts and fisheries: lessons from the Atlantic and Pacific

Dr. Jeffrey J. Polovina (*Jeffrey.Polovina@noaa.gov*), Honolulu Laboratory, SWFSC, NMFS, NOAA, 2570 Dole St., Honolulu, HI 96822-2396 USA
 Dr. Keith Brander (*Keith@ices.dk*), ICES/GLOBEC Secretary, Palaegade 2-4, 1261 Copenhagen K, Denmark

Understanding how physical variation in the ocean impacts population dynamics of important fisheries resources is the focus of considerable attention in both the Atlantic and Pacific basins. Insights into physical-fisheries links are being developed from basin-scale data sets collected from satellite remote sensing, ocean models, moored arrays. The recent strong El Nino and La Nina has provided important physical contrasts in the system to evaluate some of these linkages. Historically, fisheries management in the Pacific has emphasized the importance of climate variation as a factor in fisheries dynamics while in the Atlantic the focus has frequently emphasized exploitation. What are the current perspectives on physical variation and its impacts on fisheries in the Atlantic and Pacific? Are there regime shifts which are coherent between the two ocean basins so a global perspective improves our ability to detect regime shifts? This session solicits presentations on physical- ecosystem links and implications for fisheries management from research in the Atlantic and Pacific. Furthermore papers which take a comparative or global perspective on these linkages are also encourage.

SS 29 Coupled physical-biological processes on continental shelves and the shelf break

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 Hal Batchelder (*halbatch@socrates.berkeley.edu*), University of California, Dept. Integrative Biology, 3060 Valley Life Sciences Building, Berkeley, CA 94720-3140. Phone: 510-642-7452. Fax: 510-643-1142

The main theme is biological responses to physical forcing, with a focus on marine zooplankton and fishes. We seek papers that discuss coupled physical-biological processes that operate at or near the interface of the continental shelf and shelf-break, approached from the perspective of modeling and/or in situ process studies. Site-specific studies might include the influence of shelf break upwelling and fronts on plankton production in Eastern Boundary Current systems (California, Peru-Chile, Iberian Peninsula, NW Africa, SW Africa), fronts and eddies associated with

Western Boundary Currents (Gulf Stream, Kuroshio), tidal mixing fronts in continental shelves (e.g., Bering Sea, Argentine Shelf, Celtic Sea) and shelf break processes in downwelling systems (Gulf of Alaska, Norwegian Shelf).

SS 30 What is controlling the distribution of seagrasses?

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Marianne Holmer (*holmer@biology.sdu.dk*), *SDU-Odense University, Campusvej 55, DK5230 Odense M, Denmark.*

The value of seagrasses as structuring elements of coastal ecosystems can hardly be overestimated, and over the years a substantial knowledge about general seagrass ecology has accumulated. Grey spots exist in the literature, however, when it comes to the understanding of sudden large-scale die backs and the subsequent unsuccessful recolonisation. Although the apparent environmental key factors should allow regrowth of the seagrasses, large areas remain unvegetated and restoration projects are often initiated. Many of these projects have only been partly successful, probably because the understanding of primary growth conditions in, for example, the sediment is inadequate. New experimental tools provide us with the opportunity to do detailed studies of the seagrass rhizosphere, and this has at some occasions inverted existing hypotheses. The aim of this session is to present new learnings about temperate and tropical seagrasses with special emphasis on the importance of the environment for the distribution and recolonization of seagrasses and the impact of the biogeochemical cycles of seagrass sediments.

SS 31 Influence of primary producers on nutrient cycling in coastal marine areas

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It is often claimed that different types of primary producers dominate habitats of different nutrient loading, so that seagrasses and slow-growing macroalgae dominate in pristine, nutrient-poor, areas while increasing nutrient richness leads to dominance by fast-growing macroalgae and phytoplankton. In this session, we would like to ask the questions: How does dominance by different types of primary producers affect nutrient cycling in coastal marine areas? How is remineralization of different primary producers affected by grazing and decomposition? Finally: does this affect loss processes such as denitrification and permanent burial of nutrients in the sediment?

SS 32 High Resolution Studies of Biogeochemical Processes in Estuaries.

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Gary P. Klinkhamer (*gklinkhamer@oce.orst.edu*), *College of Oceanic and Atmospheric Sciences, Oregon State University, Corvallis, OR 97331-5503.*

Estuaries are some of the most dramatic boundaries on Earth. Estuaries are dynamic chemical, biological, and physical systems that experience rapid changes over relatively small spatial scales as compared to either rivers or the ocean. These changes ultimately exert a major influence over the chemistry and biology of the near-continent ocean. For this session, we specifically seek abstracts that focus on biogeochemical processes in estuaries. The session will be broad in scope, but it is anticipated that abstracts will focus on either temporal studies, with resolution ranging from tidal to seasonal, or high resolution spatial studies, where large data sets are used to address biogeochemical problems.

SS 33 Coastal embayments as important land-margin ecosystems: Fate and transformations of reactive nutrients

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Iris C. Anderson (*iris@vims.edu*), *School of Marine Science, College of William and Mary, Gloucester Point, VA 23062, Phone: 1-804-684-7242*

Shallow coastal lagoons and bays are a major type of land-margin ecosystem on most continents, yet the retention and transport of nutrients through these systems have received far less attention than in large estuaries. Papers are invited that focus on the links between the ecological, biogeochemical, and physical processes that govern the response to and recovery from nutrient enrichment, and the extent to which shallow lagoons act as a "filter" for terrestrial nutrient inputs.

SS 34 Biochemistry of food quality in relation to production across pelagic systems

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Food quality is known to be one of the major factors controlling secondary production in the aquatic environment. However, a knowledge of what food quality specifically is has for the longest time been limited. The field of aquaculture has had a leading role in investigating effect of food quality for growth of various aquatic animals and the current knowledge of those studies have for the last decade slowly been seeping into freshwater and marine studies. This session concentrates on one aspect of food quality: biochemical composition, such as specific lipids, fatty acids, sterols, amino acids, vitamins and their role in growth and development of micro/ and mesozooplankton. Studies from oligotrophic through to eutrophic systems are of interest, both in fresh/ and marine environments, as well as experimental studies simulating these conditions.

SS 35 Small-scale physical-biological interactions in the plankton (invited)

Thomas Kjørboe (*TK@DFU.MIN.DK*) and André Visser (*WV@DFU.MIN.DK*), Danish Institute for Fisheries Research, Charlottenlund Castle, DK-2920 Charlottenlund, Denmark. Tel: +45 33 96 34 01, Fax: +45 33 96 34 34.

The adaptations of planktonic organisms, from vira and bacteria to larval fish, can be understood only in the context of the physical and chemical environment in which they live. Nutrient uptake, motility patterns, feeding and encounter rates, signal transmission and perception are all constrained by often non-intuitive interactions between organism biology and small-scale physical and chemical characteristics of fluid media (e.g. viscosity, fluid motion, diffusion). This session focusses on attempts to understand such interactions and on their implications to pelagic food web structure (trophic interactions, vertical fluxes).

SS 36 Physical and chemical influence on the life histories of marine and freshwater organisms: The consequences of environmental change

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The physical and chemical attributes of aquatic systems around the world are changing in the face of human-induced environmental change. To understand the consequences of such changes on the ecological integrity of aquatic systems, we must understand how these physical and chemical changes affect the basic life histories of aquatic organisms. For example, physical changes in the thermal structure of water bodies caused by urbanization or global warming may alter zooplankton life history processes important to survival and reproduction. Similarly, there is overwhelming evidence that chemical contamination from anthropogenic sources is altering fundamental life history processes in aquatic

systems.

SS 37 Spatial and temporal scales controlling plankton dynamics

Hans W. Paerl (*hans_paerl@unc.edu*) University of North Carolina at Chapel Hill, Institute of Marine Sciences, Morehead City, NC 28557 USA
Kaisa Kononen (*kaisa.kononen@nessling.fi*), Maj and Tor Nessling Foundation, 00260 Helsinki, Finland.

Variations in plankton communities result from small-scale biogeochemical processes that are modified by climatological, seasonal, meteorological and hydrodynamic forces. In the fields of meteorology, physical limnology and oceanography, examination of fluctuations in time and space have been made using spectral analysis of large databases leading to a classification with variability scales. Meanwhile, biologists have mainly focused on small-scale (i.e., microns to cm, minute to hours) processes. During the past few decades, the evidence of the strong impact of physical forcing on plankton dynamics has emerged in the marine and freshwater ecological literature. Concurrently, limnologists and biological oceanographers are facing societal demands to extrapolate their results for predicting changes on ecosystem, regional and global scales. This progress makes identification and integration of a range of relevant spatial and temporal scales unavoidable in comparative studies of freshwater and marine plankton dynamics. This session will provide the opportunity to synthesize the roles and impacts of spatial and temporal scales in the context of environmental controls of planktonic productivity, biodiversity and function.

SS 38 Biological, chemical, physical and sedimentological interactions in polynyas

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Polynyas are areas of open waters in the polar ice pack. The physical processes responsible for the opening of polynyas, i.e. the influx of (sensible) heat or/and winds (latent heat), determine the physical and hydrodynamic characteristics of polynyas. These largely govern the biological and chemical processes within and downstream of polynyas, that are reflected in the benthos and sediments. The session will explore biological, chemical, physical and sedimentological interactions in both Arctic and Antarctic polynyas.

SS 39 Benthic filter-feeding and plankton dynamics-importance of currents and mixing

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Filter-feeding, benthic macroinvertebrates are important components in coastal ecosystems where they remove suspended food particles from the water. They dwell in the boundary zone between substratum and water column where they conform an extremely active part of the system, exploiting production from the water column transported by current flows. A key to the understanding of spatial and temporal variations in pelagic biomass is knowledge of the circumstances under which filter feeding takes place. Until now it has often been disregarded that both large and rapid variations in phytoplankton biomass in shallow coastal waters and fjords are likely to be the results of a complicated interplay between hydrography and filter-feeding benthos. Knowledge about the interactions between currents, wind- and biomixing, density-driven circulation, and filter feeders, may explain otherwise unaccountable large variations in the plankton biomass. Such insight is of great importance for a general basic understanding of the dynamics in coastal ecosystems.

SS 40 Bioturbation: the water-sediment interface is under control

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Among the different aquatic interfaces, the water-sediment boundary is the most biota-influenced interface. The different activities of meio-, macro- and mega-benthos (e.g. burrowing, bio-irrigation, faeces deposition) modify the characteristics of the sediments with major effects as on the solutes exchanges between the porewater and overlying water. The knowledge of the different aspects and effects of bioturbation on the physical, chemical and biological properties of the sediments are thus indispensable to understand and model the processes at the sediment-water interface.

SS 41 Chemical ecology of the freshwater and marine benthos

Elisabeth M. Gross (*Elisabeth.Gross@uni-konstanz.de*), *Limnological Institute, Faculty of Biology University of Konstanz, P.O. Box 5560 X913, D-78457 Konstanz, Germany. Phone +49 7531 88 3112, Fax +49 7531 88 4136*
 Mark Hay (*mark.hay@biology.gatech.edu*), *School of Biology, Georgia Institute of Technology, Atlanta, GA 30332-0230. Phone: +1 404-894-8429, FAX: +1 404-894-0519*

Bioactive metabolites play critical roles in affecting species interactions in aquatic communities. Activity appears to be higher in benthic than pelagic systems, potentially due to the high densities of interacting species in the benthos. Biofilms and microbial mats frequently exhibit allelopathic activity; and macroalgae and macrophytes commonly employ chemical defenses against both herbivores and fouling organisms. Researchers rely heavily on ecologically appropriate bioassays that parallel field situations. Presentations of field and laboratory investigations are invited to stimulate discussion of the status, opportunities, and challenges in this field. Attention will be focused on comparing ecological and evolutionary processes between marine and freshwater systems. Potential contributors should not hesitate to contact the convenors.

SS 42 The microbial ecology and biogeochemistry of aquatic sediments

Bo Thamdrup (*bot@biology.ou.dk*)
 Kirsten Habicht (*khabicht@biology.ou.dk*), *Danish Center for Earth System Science, Inst. of Biology, SDU Odense University, Campusvej 55, DK-5230 Odense M, Denmark. Fax: +45 65 93 04 57.*

John W. Morse (*morse@astr.tamu.edu*), *Texas A&M University, Eller O&M Rm. 502, College Station, Texas 77845. Fax: +1 409 845 9631*

We seek contributions crossing the boundary between the fields of benthic biogeochemistry and microbial population ecology. Contributions should combine investigations of bacterial community size and structure with determination of rates and pathways of biogeochemical processes. Specific topics could include: Identification of metabolically active microbes, competition between natural microbial populations, population dynamics and their regulation by environmental factors (e.g. sedimentation, bioturbation, temperature), novel types of microbial metabolisms and their biogeochemical significance, and microbial control on rates and pathways of carbon mineralization.

SS 43 Oxic-anoxic boundary phenomena

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Both verbal and poster presentations are invited in the broad
area of biogeochemical processes related to the REDOX
boundary in different aquatic systems (freshwater, marine,
wetlands, peatlands, etc.). Areas of interest would possibly
be, but not limited to:

development and movement of boundaries;
interfacial transport of chemical species,
redox reactions, related to organic matter mineralization and
gas production, and
microbiology - e.g. gas consumption, such as methanotrophy
limiting GHG emissions

SS 44 Biogeochemical processes and their microenvironmental controls at the sediment-water interface.

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The sediment-water interface is an important and highly
dynamic zone within shallow water environments. The
activity within this mm to cm thick horizon has important
implications on the nutrient and carbon cycles within aquatic
ecosystems. The interface is characterized by steep gradients
in water flow, and (in shallow waters) light, which together
with carbon and nutrient availability set the boundary
conditions for the benthic microbial activity. In this context
the transition from turbulent mixing to diffusive mediated
solute transport at the interface is of prime importance. Daily
and seasonal variations of environmental variables (e.g.
salinity and temperature) can further regulate the microbial
activity in the steep and dynamic chemocline that is
associated with the benthic interface. Recent advances in
experimental techniques, especially microsensor and
molecular techniques, now allow more detailed insights in
the structure, function and regulation of microbial
communities at the sediment-water interface. It is the aim of
the session to discuss the microenvironmental controls of
benthic microbial communities at the sediment-water
interface. How are they adapted to the unique environment
of the interface, what regulates the coupling between and the
activity of the various metabolic pathways?

SS 45 Biogas cycling and emission along the aquatic continuum: From freshwater to coastal zone

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The aquatic continuum (lakes, rivers, estuaries, shelves) is
often site of intense biogeochemical processes which are
liable to generate important biogas concentration (e.g. CO₂,
CH₄, CO, N₂O, DMS) with further transfer to the
atmosphere. During this session, priority will be given to the
relevant processes within the sediment and the water
column, and to the related atmospheric exchanges. This
session will then mainly cover the following
boundaries: water/air, sediment/water, rivers/lakes and
freshwater/marine.

Special Events

Workshops

All inquiries regarding the workshops must be directed to the
responsible organizers

WS-1 The Response of Northeast and Northwest Atlantic Shelf Ecosystems to Climate Variability and Change

Organizer: **Charles Greene** (*chg2@cornell.edu*), USA and
B. Planque (*b.planque@cefas.co.uk*) UK

Time: A late afternoon and dinner (16:00 -21:00) session on
Friday June 2 and a morning session (9:00- 12:00) on
Saturday June 3.

Place: University of Copenhagen

Abstract: Predicting the response of North Atlantic shelf
ecosystems to climate variability and change will require an
improved understanding of the basin-scale coupling between
physical and biological processes. This session will focus on
processes affecting large marine ecosystems (LME's) in both
the Northeastern and Northwestern Atlantic. Specifically,
comparisons will be made between climate variability,
physical oceanography, biological oceanography, and the
physical-biological coupling on both sides of the North
Atlantic. One perspective that will be explored throughout
the session views the North Atlantic as a composite of
LME's, each possessing its own characteristic internal
ecological dynamics, but also influenced to varying degrees
by advective exchanges with its neighbouring ecosystems.

Contact: Charles Greene, Ocean Resources & Ecosystem
Program, Centre for the Environment, Dept. Of Geological
Sciences, 2130 Snee Hall, Cornell University, Ithaca, NY
14853, USA

WS-2 Stable Isotopes In Aquatic Systems

Organizer: **Jon Grey** (j.grey@lancaster.ac.uk), UK; **Roger Jones** (r.jones@lancaster.ac.uk), UK; and **Anders Jonsson** (anders.jonsson@eg.umu.se), Sweden

Time: Monday June 5

Place: Bella Center

Abstract: Stable isotope analysis has emerged as a useful investigative tool in the repertoire of aquatic scientists. Many studies have been conducted in America and Canada, with increasing interest apparent in Europe. Approaches and problems with methodology and application are common across oceanic, estuarine and lacustrine systems, yet communication between the scientists in different fields is often limited. A workshop at the ASLO conference may help to identify weaknesses, further research, initiate collaborative work and possible inter-laboratory calibration in terms of methodologies.

Contact **Jon Grey**, Aquatic Sciences, IENS, Lancaster University, Lancaster, LA1 4YQ, UK

WS-3 Ocean Science Education Partnerships: How can research institutions impact informal education?

Organizer: **George I. Matsumoto** (mage@mbari.org), USA and **Randall Kochevar** (rkochevar@mbayaq.org), USA

Time: Thursday June 8

Place: Bella Center

Abstract: Partnerships between formal education and research institutions and informal education organizations can maximize resources, effectiveness of their educational efforts, and numbers and kinds of audiences reached. Such collaborations are usually based on local partnerships, but with the advent of the world wide web, have the potential to reach a much wider audience. The broad appeal of ocean sciences coupled with the fascination of being able to find out about current research engages students of all ages and can easily be linked to regional and national education initiatives. In this special session, we will start with a short tutorial to review some of the basic questions: How are educational collaborations formed? What are some of the challenges that face the partners and the partnership? What are the outcomes? How can the partnerships and outcomes be evaluated? What directions should these partnerships take in the future? We ask that submissions to this session include a discussion from the point of view of each partner and an overview of the questions above.

Contact: Dr. George I. Matsumoto, Education and Research Specialist Monterey Bay Aquarium Research Institute, P.O. Box 628, 7700 Sandholdt Road, Moss Landing, California

WS-4 Invasion of European & North American Ecosystems by Ponto-Caspian Species

Organizer: **Hugh MacIsaac** (hughm@uwindsor.ca), USA

and **David Reid** (reid@glrl.noaa.gov), USA

Time: June 2 and 3 (Friday and Saturday before the meeting)

Place: University of Copenhagen

Abstract: Species from the Ponto-Caspian region (Black, Aral Seas, Caspian Lake) have spread to habitats in Eurasia and North America, sometimes with catastrophic ecological consequences. The Baltic Sea and River Rhine currently support 21 and 9 Ponto-Caspian species, respectively. Seventy percent of recent invaders to the Laurentian Great Lakes in North America are Ponto-Caspian endemics. Several have also spread to inland lakes and river systems. Prevention of future invasions is dependent on identification of species posing a high invasion risk and identification and elimination of the 'invasion corridors' utilized by these species. This two-day workshop will examine patterns of Ponto-Caspian invasions, mechanisms and routes of transfer, physiological requirements for survival and success, ecological consequences in invaded European and North American habitats, and strategies for assessing future invasion potential and reducing or preventing future invasions.

Presentations are by invitation only, but individuals interested in the workshop are welcome to attend and should indicate their interest in doing so by contacting either of the Conveners. This workshop is being organized by the Working Group on Aquatic Invasive Species of the International Association for Theoretical and Applied Limnology (or SIL - Societas Internationalis Limnologiae), in association with ASLO2000.

Contact **Hugh MacIsaac**, Great Lakes Institute for Environmental Research University of Windsor, Windsor, Ontario N9B 3P4, USA

WS-5 Sensor Technology for Remote Interactive Experiments in Aquatic Environments

Organizer: **Kendra Daly** (kdaly@nsf.gov), USA; **H. Lawrence Clark** (hclark@nsf.gov), USA; **Gwyn Griffiths** (Gwyn.Griffiths@soc.soton.ac.uk), UK and **John Delaney** (jdelaney@u.washington.edu), USA

Time: Sunday, June 4 (whole day)

Place: Bella Center

Participants: Max. 30

Abstract: We anticipate the need for the development of new or re-engineered technologies and sensor design for use in continuous interdisciplinary experiments associated with moored, cabled, and autonomous observatories. Two goals of this workshop are to bring together scientists and engineers with diverse backgrounds to assess current challenges for in situ experimentation in remote or hostile aquatic environments, and to exchange new ideas and promote dialogue on innovative experimental approaches and sensor design, particularly for chemical and biological measurements. Interested parties should submit a brief statement of interest and references, if appropriate, to K. Daly and L. Clark by 15 January 2000. Students are

encouraged to apply.

Contact: **Kendra Daly**, National Science Foundation, Division of Ocean Sciences, 4201, Wilson Blvd, Arlington, VA 22230, USA (Fax 703-306-0390)

WS-6 Impacts of major engineering structures on the aquatic environment: A challenge for co-operation between scientists and engineers.

Organizer: **Carsten Jurgensen** (crj@cowi.dk), Denmark

Time: Tuesday, June 6th, 2000 Excursion: Wednesday, June 7th, 2000

Place: The Bella Center and site view

Fee: 375 Dkr that must be paid by the registration deadline to assure space at the workshop and on the excursion (lunch included). Tick the box on the Registration form

Abstract: The environmental impacts of major marine structures play an increasing role during all phases of the construction: planning, decision, design, construction and operation. Complex environmental processes in combination with strict administrative requirements and a sensitive public forum often lead to a long and fruitful development. Scientific progress is needed to fulfil the requirements, and the requirements on their side have to be adapted to scientific thinking in order to ensure sound verification. Further, a large amount of valuable data have been produced during investigations and monitoring, which have improved our understanding of regional hydrography as well as marine biology. All interested experts are invited to present their investigations, results and experience from their specific cases. Since several major traffic links recently have been planned and built in Danish waters, the workshop also will draw upon the experience gained from them, mainly from the Great Belt Link, the Oeresund Link and the planned Fehmern Belt Link.

The following themes are suggested: 1) Environmental principles and requirements, 2) Scientific advances: simulation and assessment, and 3) Data collection and treatment.

A guided one day excursion is planned to the Oeresund Link or to the Great Belt Link. The excursion gives opportunity for discussions, informal conversations and a magnificent "on-site" experience. Please send an Abstract in accordance with the principles provided in the Abstract submission procedures, which also includes your name and address (email) to Carsten Jurgensen, crj@cowi.dk. Be sure to specify any AV or computer equipment you require.

Contact: **Carsten Jurgensen**, COWI, Consulting Engineers and Planners, Parallevej 15, DK - 2800 Lyngby,

WS-7 Development and application of tracer methodologies for marine and freshwater biogeochemical studies

Organizer: **Raphael Kudela** (rmkudela@cats.ucsc.edu), USA, **Dennis R. Phillips** (drp@lanl.gov), USA and **Veronique Martin-Jezequel** (vmartin@univ-brest.fr),

France

Time: June 4 - whole day arrangement

Place: Bella Center

Abstract: Methodologies have been developed for quantifying the elemental fluxes (C, N, P, O, Si, Fe) of biogenic matter in marine systems and organisms. A workshop gathering the researchers producing and using tracers provides the opportunity to share experiences and knowledge in classical or new topics: 1 Quantifying aspects of elemental cycles such as Biological production (gross rates, kinetic studies), Recycling (reminceralization, dissolution), Differential discrimination ("living" vs. detrital), and Studies of the phytoplankton cell physiology (uptake, intracellular transport and storage) 1 Utilization of new tracers and newly described elemental cycles, problem of production and relative applicability of the various existing and new tracers, tracer experiments coupled to other techniques, multi tracer techniques, comparison of radioactive versus stable isotopes used.

Contact: **Veronique Martin-Jezequel**, Charge de Recherche, CNRS, UMR 6539, IUEM, UBO, Technopole Brest-Iroise, F-29280, FRANCE

Field trips

Remember to tick the appropriate boxes on the registration form for booking and payment.

1. Research, management and restoration of freshwater and brackish lakes in Denmark - a field excursion to the Jutland peninsula

Time: June 9 at 6. p.m. to June 11 at 10 p.m.

The excursion will take you to Central and Northern Jutland. In Central Jutland, we will show examples of research on trophic structure and dynamics in shallow lakes and visit a number of large-scale field set-ups. Also examples of lake restoration projects will be demonstrated (e.g. biomanipulation, hypolimnion oxygenation with oxygen and nitrate). We will visit and spend the nights at The Freshwater Centre in Silkeborg around which several environmental research institutions are situated together with Europe's largest freshwater aquarium. In North Jutland, examples of re-establishment of wetlands and lakes will be shown and we will visit "Vejlerne", a brackish wetland of 60 sq km, today considered the largest bird sanctuary and reserve in Northern Europe. We will arrange a guided tour in the area and you will gain insight into the history of Vejlerne and the extensive research on brackish lakes taking place here and in elsewhere in Denmark. Finally, we will visit the sand dunes along the coast before returning to Copenhagen.

Excursion leaders: Erik Jeppesen and Martin Søndergaard, National Environmental Research Institute, Denmark and Søren Berg, Danish Inst. for Fisheries Research, Denmark.

Price: DKK 2,600. Remember to tick the box on the Registration form.

2. Ploen - the historical place of August Thienemann, a modern institute and the Holstein lake district

One-day excursion Saturday June 10.

Tentative program includes: Bus from Copenhagen and breakfast on the ferry. Guided tour at the Max-Planck Institute followed by a walk downtown past Thienemann's institute. Boat tour on Grosser Ploener See. Home with the bus and stop at Plussee (eagle's nest). Return from Luetjenburg to Copenhagen (dinner on the ferry). A guide from the Max-Planck Institute will participate.

Price: 575DKK (lunch included)

A minimum of 25 participants are required

Winfried Lampert, Max-Planck-Institut fuer Limnologie,
Postfach 165, D-24302 Ploen, Germany
Tel. (0)4522 763 270
Fax. (0)4522 763 310
E-mail: lampert@mpil-ploen.mpg.de
www.mpil-ploen.mpg.de

3. Limnology, marine ecology and culture in Southern Sweden - a visit to the Einar Naumann laboratory, Kalmar marine science department and glass factories in Småland

Time: June 09 at 6 p. m. to June 11 at 10 p. m.

The excursion will take you to the South Swedish highlands, with oligotrophic, clear and humic lakes, and to the medieval city of Kalmar, at the Baltic coast. We will also visit world famous glass factories (e. g. Orrefors, Kosta, Boda). The small Einar Naumann laboratory is the birthplace of limnology in Sweden, situated in a landscape rich in lakes and bogs. In the nearby city of Växjö pioneering lake restoration experiments have been done, starting in the 1960-ies. At Kalmar university we will visit the recently inaugurated marine science department, with research e. g. on ecophysiology of toxic algae and marine microbiology. Time and weather permitting there will also be an opportunity to visit Öland, an island with a very special flora, characterized by calcareous meadows and wetlands. A visit to the "Kingdom of Crystal", with numerous glass factories, art glass exhibitions and ample opportunities for shopping is a must on this excursion. The two nights will be spent in Växjö/Aneboda and Kalmar.

Excursion leaders: Wilhelm Granéli, Sven Björk, Edna Granéli

Price: DKK 2,500.

A minimum of 25 participants are required

4. The Faeroe Islands - green spots in the Ocean!

Time: 10 - 14 June 1999

It is said that the weather on and around the Faeroe Islands changes every minute, so you may experience bright sunshine, fog, rain and wind even if this trip is only due to last four days. There are 18 islands in total and they are quite unique because of their greenness, fresh air and special light conditions. You are never more than 5 km from the sea. The capital Torshavn is a very relaxing place despite the fact that it is also an important and bustling business centre. On this tour you will be taken to a number of places and villages to see fisheries, sheep and fish farming as well as interesting nature sites. Despite the steepness of the landscape, there are plenty of lakes. The bird life is diverse and there are numerous cultural/historical monuments. There will also be time for touring on your own : you can rent a car or use transport (busses are frequent). All the islands are connected by ferries and helicopters. Given the unpredictability of the weather - don't forget to bring a raincoat and an umbrella!

The price is approx. 4,000 DKR, which includes airfare, accommodation in a youth hostel (in Torshavn), breakfast and two whole day excursions with a bus. There will be a local English-speaking guide. Please contact Kirsten Christoffersen (kcfbl@ibm.net) if you are interested in this trip.

5. Limnology of West Greenland lakes - an excursion to the Arctic

The vast and harsh low Arctic landscape surrounding Kangerlussuaq (Søndre Strømfjord) in West Greenland contains a huge number of lakes, from oligotrophic, crystal clear ones to glacially influenced silty lakes, and even a few salty ones! On this excursion, a range of lakes will be visited and you will learn about these fascinating ecosystems from both an ecological and paleolimnological point of view. Details of plankton structure, fish populations, invertebrates and food web interactions as well as effects of climatic changes since deglaciation will be demonstrated on location and discussed further during the evenings. A tour around the former American military base, a barbecue trip to the ice cap, photo safari and walks on a fossil plain are also included. Last but not least, there will still be time to investigate the local terrestrial fauna and flora - if you haven't met a musk ox before (or reindeers, Arctic foxes and hares, ravens or eagles) this is the trip! The Kangerlussuaq Science Support Centre (KISS) will accommodate the group and provide access to labs and meeting rooms as necessary.

The price is approx. 10,000 Dkr (the exact price will depend on the number of participants) and includes airfare and airport taxes from/to Copenhagen, accommodation in double rooms with breakfast, one helicopter flight and two four-wheel-drive excursions.

Tour leaders: Kirsten Christoffersen and N. John Anderson (University of Copenhagen).

A minimum of 12 participants are required for this tour to run. More information and registration forms can be obtained from Kirsten Christoffersen (kcfbl@ibm.net). Deadline for registration and pre-payment is 15 January 2000.

Pre-meeting course: Ecosystem theory - application in environmental management of aquatic systems

Time: May 31 to June 3 - 2000

Background: Since Lotka at the beginning of this century stated his maximum power principle for living systems many concepts have been proposed that may eventually increase our insight and understanding of how living systems may work, how they communicate internally and how they interact with the surroundings. The externalization of nature from human society and economy leads to a non-holistic practise which as a consequence brings us directly into local, regional and eventually a global environmental crisis. The big question is whether we can learn anything from an increased understanding of ecosystems - and if this will help us in the formulation of an improved management strategy - that may, if possible, help us define what sustainability is all about?

Scope of course: The aim of the course is to introduce participants to some of the concepts introduced and used in modern ecosystem theory during this century. Lectures and discussions will attempt to point out distinct areas that will improve and optimise existing managing and policy approaches.

Target group: The course will be held at postgraduate level, but will be open to students possessing a bachelor degree (or equivalent), managers and others dealing with or interested in an increased understanding of human interference with nature. The lectures will aim at a high level of multidisciplinary

Topics/keywords: ascendancy, maximum power, energy, chaos & catastrophes, environmental theory, indirect effect, utility and synergism thermodynamic concepts: first and second law analysis, entropy analysis, maximum and minimum dissipation exergy, information, hierarchies, ecosystem health, precautionary principles, application perspectives

Invited Lecturers: S. Bastianoni, G. Bendoricchio, H. Bossel, S.E. Jørgensen, J. J. Kay, J.C. Marques, F. Müller, H.T. Odum, B.C. Patten, M. Straskraba, and R.E. Ulanowicz

Contact person: Søren Nors Nielsen (snn@dfh.dk), Environmental Chemistry Section, Royal Danish School of Pharmacy, Universitetsparken 2, DK-2100 Copenhagen Ø, DENMARK.

Phone: +45 35 30 64 55, Fax: +45 35 30 60 10.

Fee: Early registration (untill February 1., 2000): Dkr. 2000,- kr. After this date - 2500,- Dkr. This includes lunch and study materials. Registration and payment are handled by the course organizer.

Post-meeting course: Sediment/water interfaces in freshwater lakes: sampling, handling and analyzing with emphasises on gases

Organizer: Peter Casper, Institute of Freshwater Ecology and Inland Fisheries, Berlin, Stechlin, Germany; Donald D. Adams, State University of New York, Plattsburgh; Scientists from IGB, (Institute of Freshwater Ecology and Inland Fisheries, Berlin, Stechlin, Germany) and Universities of Berlin.

Time: June, 10th to 17th

Place: Institute of Freshwater Ecology and Inland Fisheries, Dept. Of Limnology of Stratified lakes.

This workshop will offer a program of practical demonstrations, involving personal participation by attendees, for conducting studies at the sediment-water interface in aquatic ecosystems (lakes, reservoirs, etc.). Included will be theoretical interpretations of the generated results. Methods for sampling the sediment-water interface and oxic-anoxic transition zones will be demonstrated. The main topics will be: 1) "hands on" use of sediment cores, processing of sediments using oxygen-free methodology and the introduction of laboratory techniques for measuring sediment gases, and 2) laboratory measurements for evaluating the microbiology of oxic and anoxic sediments. Gas chromatographic analysis of the major sediment gases (CH₄, CO₂, N₂, and argon) will be demonstrated along with the required calculations for determining their pore water concentrations. The microbiological section will include measurements of microbial activity (e.g. methanogenesis) and the description of organisms involved in these processes. Various other techniques will be demonstrated in the laboratory, such as DNA-extraction from sediments, PCR with specific primers, in-situ hybridization with oligonucleotide probes, etc.

Fee: \$350 including lodging for one week, lunch during workshop and two dinners (arrival and departure weekends). Scholarships could be available for scientist from developing countries. Handling of fee will be done by the course organizer.

Participants: Max. 24 participants

Contact: Peter Caspers (pc@igb-berlin.de), Institute of Freshwater Ecology and Inland Fisheries, Dept. Of

Limnology of Stratified lakes, Alte Fischerhuette 2, D-16775, Neuglobsow, Germany.

Summary of deadlines

December 15, 1999..... Awards for young scientists from developing countries (applications)

January 15, 2000..... Students travel awards (applications)

January 15, 2000..... Abstract submission

February 20, 2000..... Authors notified

April 1, 2000..... Early Registration

June 5 - 9, 2000..... Meeting

Abstract submission

Please submit abstracts using the conference web site (<http://www.aslo.org/copenhagen2000>). If this is not possible, then follow the instructions for non-electronic submission below. Payment of registration fee cannot be done electronically according to Danish law. Please follow the below guidelines for Registration and payment. No abstract will be accepted before registration has been completed.

Abstract Preparation Specifications

The following guidelines must be followed exactly. If not, your paper will not be accepted. All abstracts must be in English, using metric units. Do not include chemical or mathematical formulae, Greek characters, illustrations, figures or photos. Use no smaller than 10-point type. Do not use any formatting such as italics, bold, or subscript (CO₂ becomes CO2). Do not indent paragraphs. Use a single space between sentences. Use only the ANSI (American National Standards Institute) character set. Adhere to a width of 105mm and a maximum height of 115mm (approx. 4.2" x 4.5").

Each author citation should begin with a new line and be formatted as follows: last name and a comma, followed by the first initial (plus period) and the middle initial (plus period) and a comma, then institution and a comma, then mailing address and a comma, then country and a comma, then e-mail address.

The title of the abstract must be in all caps and must not exceed 160 characters. The body of the abstract must adhere to a maximum count of 180 words, exclusive of the title and the author citations. Please make the abstract as informative and representative of your presentation as possible.

The abstract text should be followed by your three session choices (in all capital letters) separated by one (1) space on a separate line. (Please list a specific "Other" last). The next new line should list your presentation preference (Oral or Poster). The last line of your abstract submission should identify the presenting author. If you choose a Special Session for your presentation please notify the Convenor(s) to aid the planning.

A sample of how the typed abstract should be formatted is enclosed. This format sample should be followed. An abstract must conform to all guidelines in order to be published.

Submitting an Abstract

Abstracts can be submitted one of two ways:

1. Submission via the internet is *highly preferred*. Go to the web site for complete instructions: <http://www.aslo.org/copenhagen2000>

2. Mailed on a 3.5" floppy disk (formatted for DOS) accompanied by one (1) original hard copy of the abstract on white paper. All documents must be submitted in either WordPerfect for Windows or Microsoft Word for Windows file formats. Abstracts submitted in any other format are not acceptable and will be returned. Disks must be clearly and fully labeled with the name of the author to contact, institution name, mailing address, phone number, and e-mail address. Disk submissions must include a hard copy of the abstract, no exceptions. Fax copies of abstracts are not acceptable. Include the Abstract Submission Form in the letter. Please use a laser-quality printer to print the one hard copy that is required for mailed submissions.

Send abstract, abstract form, and disk to:

DIS Congress Service, ASLO2000, Herlev Ringvej 2C, DK-2730 Herlev, Denmark

If you are not able to submit your abstract by one of these two methods, please contact Pia Zelander at +45 44 92 44 92 or via e-mail at aslo@discongress.com.

Any author who submits an abstract on a disk and then also submits via the internet will be charged a non-refundable duplicate submission fee of 200 DKr.

Session Topic Codes

To assist the organizing committee in assigning your abstract to an appropriate special or contributed

session, please use the session codes listed in this booklet. Please enter your first, second, and third choices under the topic code portion of the abstract form. If you do not find an appropriate choice do not hesitate to suggest a short title for a Contributed Session.

Abstract Submission Requirements

All persons wishing to contribute an abstract must send a registration form with full payment when submitting their abstract. Only one abstract per first author will be accepted. Exceptions must be approved by the meeting co-chairs.

Please keep in mind that it may be necessary to accept for poster presentation abstracts submitted for oral presentation.

Accepted abstracts will be posted on the web site, and you will receive confirmation by electronic means. If confirmation by this method is not possible, please indicate the preferred method on your abstract submission form.

All originals, diskettes, and internet submissions must be received by the **submission deadline of January 15, 2000.**

Important Notes

Abstracts will not be considered unless the presenting author has registered for the meeting. Payment of the registration fee is carried out by completing the Registration form. Fax or mail the form to DIS Congress Service (ASLO2000), Herlev Ringvej 2C, DK-2730 Herlev, Denmark. Telefax: +45 4492 5050
Abstracts will not be accepted by fax.

Abstracts must adhere to the guidelines and sample that follows.

Duplicate submissions will be charged a non-refundable processing fee of 200 Dkr.

It may be necessary to accept for poster presentation some abstracts submitted for oral presentation.

The submission deadline is January 15, 2000 and will be strictly adhered to.

Oral Presentations

Talks will be a total of 15 minutes in length, including questions and discussion. Tutorial speakers are provided two consecutive slots. The time limit will be strictly enforced to facilitate movement between sessions.

Basic audio-visual equipment will be in each room, including an overhead projector, 35 mm slide projector, and a screen. All special requests (i.e. rental of VCR, monitor, audio systems, computers, provision of extra power outlets, tables, stands, etc.) related to the presentation of individual papers should be made at the time that the abstract is submitted. Any costs will be billed to the abstract's presenting author.

We have room for 7 concurrent sessions, so space for oral presentations is limited. When completing the submission form, please check if you prefer to do an oral or a poster presentation. This will assist the selection committee in the proper placement of your paper. Our space for posters is rather large and we have no restrictions to the number of posters. **Why not consider a poster at this meeting?**

Poster Presentations

Poster space will be 1.39 m (height) by 1.23 m (width) in size. Poster sessions will be in a hall just opposite the registration area and together with the exhibition. Each poster will be exposed for 2 days.

Sample Abstract

Each author citation is as complete as possible and identical for abstract and registration

Each author starts on a new line

One blank line between authors and title and title and text

Title in all caps and max. 160 characters

No indents

No blank lines in body of text

Abstract text no longer than 180 words. No italics, bold, super/subscript, mathematical formulae and illustrations

One blank line between text and codes for session choice and presentation preference

Final line: Name of presenting author

Keep text within a box of 105 (width) x 115mm (height), appr. 4.2" x 4.5".

Sondergaard, M., Freshwater Biol. Lab., Univ. Copenhagen,
Helsingorsgade 51, DK-3400 Hillerod, Denmark,
flabms@inet.uni2.dk
Borch, N.H., Freshwater Biol. Lab., Univ. Copenhagen, Denmark

ACCUMULATION OF NEW SEMILABILE DOC DURING A STIMULATED FRESHWATER PHYTOPLANKTON BLOOM

Dissolved organic carbon (DOC) accumulated at a rate of approximately 4.5 $\mu\text{M C/day}$ during a stimulated phytoplankton bloom and decay experiment in four freshwater mesocosms. This accumulation occurred almost continuously during the experiment and was not related to either the dynamics of POC nor the concentration and activity of free-living bacteria. The fraction of carbohydrates to total DOC increased during the experiment while proteinaceous matter decreased.

Subsequent decomposition experiments under nutrient replete conditions showed that degradation of this newly formed DOC was not limited by the availability of nutrients. Two different degradability assays; traditional batch incubations and a bioreactor, gave identical results. Of a total accumulation of 65 $\mu\text{M C}$, 80% was degraded within 90 days confirming other studies on the turnover rate of semilabile DOC.

SS16 CS18
POSTER
BORCH, N.H.

The following information is available on:
<http://www.aslo.org/copenhagen2000>

Registration and Hotel booking

Please return the Registration Form *by fax or mail* to DIS Congress Service, as specified on the Registration Form, along with corresponding payment. Due to Danish law it is, unfortunately, not possible to register via e-mail or internet. The registration is considered effective when payment is received. Hotel reservation can only be guaranteed when DIS has received the deposit. It is very advisable to submit the hotel deposit to DIS together with the Registration Form and along with all payments. All hotels are located in the center of Copenhagen within walking distance from The Central Station (see section on accommodation below). Remember also to tick for optional tours, field trips and work shop.

Please note the following:

All participants are required to register including authors and session chairs.

Registrations received after *1 June 2000* will be handled as on-site registrations and no confirmation should be expected by the participants.

The registration fees are in Danish Kroner (September 1: 1\$ = 7.1 kr and 1Euro = 7.4 kr):

Participant fee member, *before 1 April 2000*: DKK 2300
 Participant fee non-member, *before 1 April 2000*: DKK 2700
 Participant fee member *from 1 April 2000*: DKK 2600
 Participant fee non-member, *from 1 April 2000*: DKK 3000
 Participant student fee, *before 1 April 2000*: DKK 1300
 Participant student fee, *after 1 April 2000*: DKK 1500
 Accompanying person: DKK 700

The registration fee for all participants covers the following conference activities:

All scientific sessions
 Exhibition
 Meeting program and abstract book
 Coffee / tea in breaks
 Get-together reception
 City Hall Reception
 Buscard for the public bus- and train service

The registration fee for Accompanying Person covers the following:

Get-together reception
 City Hall Reception

Buscard for the public bus- and train service

Please remember to tick the appropriate boxes on the registration form.

This will secure you the right number of tickets and correct registration of what your payment covers.

Cancellation of Participation

Provided a written notice of cancellation to DIS Congress Service (by letter or fax) is received *before 1 April 2000*, pre-registered participants and accompanying persons will get a refund of their paid Registration fee(s) with a deduction of a processing fee of DKK 500 per participant. From 1 April 2000 no refund can be expected. All refunds will be processed after the conference

Accommodation

The Congress Bureau offers hotel accommodation at a special reduced congress price at hotels in the city centre. The different price levels are stated on the Registration Form. Hotel rooms will be booked on a first-come first-served basis at the time of receipt of deposit payment (per room) by the Congress Bureau. **All hotel prices include breakfast, 25% VAT and 15% service charge.**

Deposit

All reservations of hotel rooms must be backed up by deposit payment according the price levels stated on the first page of the Registration Form. The deposit serves as a guarantee to the hotel for the first and/or last night and will be deducted from the participant's final hotel bill upon check-out.

Cancellation of accommodation

In case of cancellation, please note that the hotel deposit less an administration fee of DKK 500 will be refunded *until 1 April 2000*. After this date, refunds (less the administration fee) will be made only if the cancelled room can be relet to a third party. Please note that the hotels are legally authorized to charge the entire stay as booked by the customer.

Alternative accommodation

DIS Congress Service is unfortunately not able to offer private accommodation or accommodation at youth hostels. Please use the following contact addresses for these alternatives:

Copenhagen Youth Hostel, Vejlandsallé 200, DK-2300
 Copenhagen S. (just opposite the Bella Center), Phone: +45 3252 2908

Bellahøj Youth Hostel, Herbergsvejen 8, DK-2700 Brønshøj,
(closed January 15 - March 1), Phone: +45 3128 9715
Private accommodation: Copenhagen Tourist Information,
Bernstorffsgade 1, DK-1577 Copenhagen V., Phone: +45
3312 4045

Payment

All payment must be made **in Danish Kroner (DKK)** to "**ASLO 2000**", c/o DIS Congress Service Copenhagen A/S. No registration, abstract acceptance or hotel reservation will be confirmed until DIS Congress Service Copenhagen A/S has received the corresponding payment.
Please indicate your preferred mode of payment on the Registration Form:

- a) by **banker's draft or cheque** drawn on *Den Danske Bank*
- b) by **bank transfer** to bank account No. 4180 – 4180634215 (Reference: "ASLO 2000") in *Den Danske Bank*, Frederiksberggade 1, DK-1012 Copenhagen K, Denmark (**not applicable for payments made in Denmark**). Swift code: DABADKKK
- c) by **postal giro transfer** to BG Bank account no. 4 02 46 80 (Reference: "ASLO 2000").
- d) by **credit card**. By your signature you authorize DIS to charge your credit card. The total amount in Danish Kroner must be written on the front page of the Registration Form in the box "Total amount in Danish Kroner". The following cards are accepted for payment:
Diners, Eurocard, Mastercard, Visa, Access, AmExpress, Dankort

Remember to state name of participant and "ASLO " on all payments! Please adhere to the same initials in your Abstract and on the Registration form.

Liability and insurance

Neither the Organisers nor DIS Congress Service Copenhagen A/S will assume responsibility whatsoever

for damage or injury to persons or property during the Conference. Participants are recommended to arrange their own travel and health insurance.

Registration / Hospitality Desk - Opening hours:

The Registration / Hospitality Desk is located in the lobby at the "Conference Entrance" at Bella Center. It will be operated by DIS Congress Service and members from the Local Organising Committee. Opening hours are as follows:

Sunday, 4 June	15:00 - 20:00
Monday, 5 June	07:30 - 17:00
Tuesday, 6 June	08:00 - 17:00
Wednesday, 7 June	08:00 - 14:00
Thursday, 8 June	08:00 - 17:00
Friday, 9 June	08:00 –15:00

Participants are kindly asked to collect their badge, tickets, program and abstract book during the above mentioned opening hours.

Secretariat

Before and after the Meeting:
ASLO Summer Meeting

c/o DIS Congress Service Copenhagen A/S

2 C, Herlev Ringvej
DK-2730 Herlev
Denmark
Telephone: +45 4492 4492
Telefax: +45 4492 5050
e-mail: aslo@discongress.com

During the Meeting:
ASLO Summer Meeting
c/o Bella Center / DIS
Center Boulevard
DK-2300 Copenhagen S
Denmark
Telephone: +45 3252 8811
Telefax: +45 3251 9656

ASLO 2000 Summer Meeting
Copenhagen, Denmark
5-9 June 2000
REGISTRATION FORM

For secretariat use
005

Fill in with block letters or type and return the form together with your payment to: **"ASLO 2000"**,
c/o DIS Congress Service Copenhagen A/S, Herlev Ringvej 2 C, DK-2730 Herlev, Denmark
Tel.: +45 4492 4492 - Fax: +45 4492 5050

PARTICIPANT (Mr. , Mrs. Ms.)

Only one participant per form

Family name: _____ First name(s): _____

Institute / Organization: _____

Postal address: _____

Postal code: _____ City: _____ Country: _____

Telefax: _____ e-mail: _____ ASLO member (yes or no): _____

Accompanying person:

Family name: _____ First name(s): _____

	No. of pers.	REGISTRATION FEES In DKK per person	Before 1 April 2000	From 1 April 2000	TOTAL DKK
02/03		Member fee	2300	2700	
04/05		Non-member fee	2600	3000	
06/07		Student fee (copy of student card must be enclosed)	1200	1600	
10		Accompanying person's fee	600		
Hotel accommodation					
60		Price level Deluxe, deposit per room		1800	
61		Price level A and B, deposit per room		1400	
62		Price level C, deposit per room		750	
Social Events (Yes / No MUST be stated)					
30/50		Get-together party, 4 June 2000		<input type="checkbox"/> Yes <input type="checkbox"/> No	
31		Boat trip and Dinner, 6 June 2000		475	
32/52		City Hall Reception, 7 June 2000		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Sightseeing Tours (please see the announcement for tour descriptions)					
40		The Castles of North Zealand, 5 June 2000		725	
41		Kings and Vikings, 6 June 2000		715	
42		The City, the Canals and Harbour, 7 June 2000		210	
43		Louisiana Museum and Karen Blixen, 8 June 2000		675	
Workshop and Field Trips					
44		WS-6 "Aquatic environment and engineering structures ...", 6 June 2000		500	
45		1. "Danish lakes: Research and restoration ...", 9-11 June 2000		2600	
		2. "Ploen – The historic place of August Thienemann", 10 June 2000		575	
46		3. "Southern Sweden: Limnology, marine ecology and culture," 9-11 June 2000		2500	
Total amount					

Please turn over for information on payment and accommodation ⇒

PAYMENT

All payments must be made in Danish Kroner (DKK) and payable to **ASLO 2000**, c/o DIS Congress Service Copenhagen A/S. Please note that VAT is not added on conference payments in Denmark, and therefore is not deductible. Registration or hotel reservation will be confirmed when DIS Congress Service Copenhagen A/S has received the payment. Payment must be remitted as follows:

- by **banker's draft or cheque** drawn on Den Danske Bank
- by **bank transfer** to bank account No. **4180-4180 634215 (Ref.: ASLO 2000) SWIFT code: DABADKKK** in Den Danske Bank, Frederiksberggade 1, DK- 1012 Copenhagen K, Denmark (**Not applicable for payments made in Denmark**).
- by **postal giro** transfer to BG Bank account no. 4 02 46 80 (**ASLO 2000**).
- by **credit card**. By my signature I authorize DIS to charge my credit card. The total amount must be written on the front page in the box "Total amount".

- Diners Dankort Eurocard Mastercard Visa Access AmEx

Card No.: _____ Expiry date: _____

Name of cardholder.: _____

Signature of cardholder: _____

*Remember to state **Participant's NAME** and **ASLO 2000** on all payments!*

Hotel Reservation

Arrival date: _____ June 2000 - Departure date: _____ June 2000

Hotel Price level	Single room DKK per night	No. of rooms	Double room DKK per night	No. of rooms
Deluxe	1400 - 1600		1600 - 1800	
A	950 - 1200		1150 - 1400	
B	800 - 950		1000 - 11500	
C	450 - 600		600 - 750	

Prices include service charge, taxes, and breakfast. All rooms are with bath or shower. Please note that the price level C hotels are, to some extent, self-service hotels (the rooms are like cabins on a ship). The conditions for reservation and cancellation are stated in the final announcement. You are kindly asked to read these conditions carefully.

I wish to share a room with: _____

I will arrange my own accommodation

Special wishes: _____

If you fly SAS Airlines, please state flightnumber and date: _____

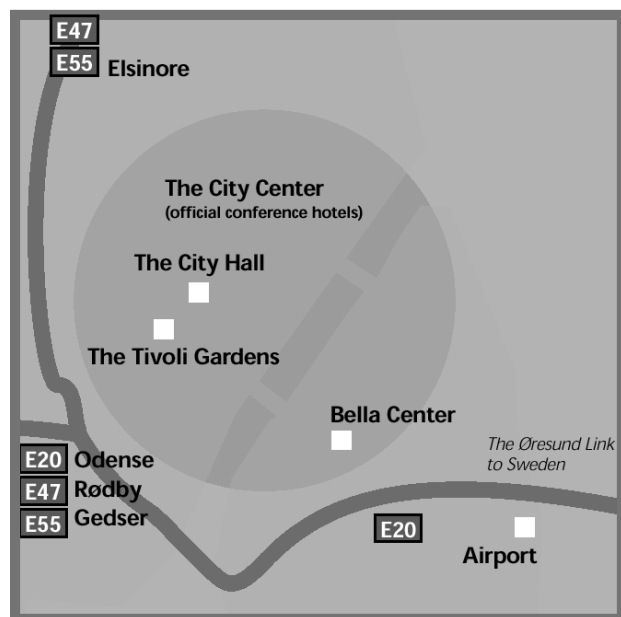
I herewith confirm by my signature below that I have read, and am fully aware of the cancellation conditions and the liability/insurance conditions stipulated in the announcement.

Date: _____ **Signature:** _____

Remember to make a copy of this form for your own files

Come to Copenhagen

Scandinavian Airlines System (SAS) is the official airline and offers all delegates to the ASLO Summer Meeting special discounts and Congress fares. To obtain information about the fares and/or tickets at the discounted prices, you should contact the nearest SAS office or SAS appointed travel agent, referring to the following fare reference: *DK 0006*. Please see advertisement on the inside of the backcover. For **North American delegates**, please contact Conferences International Inc., phone +1 800 221 8747, the designated SAS Ticketing Agency, and inquire about special airfares to Copenhagen. Make sure to ask about SAS Scandinavian Airpasses for travel within and between the Scandinavian countries. For more information: www.sas.dk and www.conferencesintl.com



Arrival / Departure in Copenhagen

Railway and public bus service connect the airport with the city center (Central Station). The railway depart from Terminal 3 at the airport every 20 min. It costs DKK 17 and takes 15 min. to the city center. Tickets are sold at the “DSB” counter at the entrance to the trains. The public bus 250S departs outside Terminal 3, costs DKK 17 and takes 30 min. to the Central Station. SAS Airlines operate a bus service from the airport to the Central Station every 15 min., price DKK 40. Also plenty of taxis are available and costs approx. DKK 150 between the airport and the city center.

Practical Information

Shopping and Banking Opening Hours

For most major stores and banks the hours of business are as follows (lots of small shops are open at later hours and every day):

	Department Stores	Shops	Banks
Mon - Wed	10.00 – 18.00	10.00 – 17.30	09.30 – 16.00
Thu	10.00 – 18.00	10.00 – 17.30	09.30 – 18.00
Fri	10.00 – 19.00	10.00 – 19.00	09.30 – 16.00
Sat	10.00 – 15.00	10.00 – 13.00	Closed
Sun	Closed	Closed	Closed

Extended banking facilities are available at the *Central Station* 7 days/week between 07:00 hrs. and 21:00 hrs. There are automatic cash dispensers, usually located in connection with a bank branch, which accept a variety of international credit cards and bank cards. The cards accepted are indicated on the dispenser.

Currency

The currency unit in Denmark is “krone(r)” (DKK). The secondary denomination is “oere”.

Tax Free Shopping

Value-added Tax is currently 25% in Denmark. For purchases of more than DKK 500,00, it is possible to have the tax refunded when leaving the country. All stores which offer the tax-free shopping facility, carry a “Tax Free” sign. The tax - equivalent to 20% of the purchase price - is refunded upon leaving the country at the refund office at the airport.

Climate & Clothing

The average statistics for June in Copenhagen are as follows:

Month	Temperature Day °C	Temperature Night °C	Sunshine hours/day	Rainfall mm/month
June	20	11	9	56

Light clothing and lightweight rain protection are advisable.

Electricity

Electricity is supplied at 230 volts AC, 50 Hz cycle. Bring your own converter to PC etc.

Emergency Services

Police / Ambulance / Fire Brigade **dial 112**

Social events and sightseeing tours

All registered delegates and accompanying persons are invited to attend the social events and sightseeing tours offered by the Organizing Committee. In order to secure tickets, please order your tickets in advance (as soon as possible). Due to practical reasons the number of tickets available on-site is limited, and therefore no guarantee of availability can be made.

Social Program

Get-together reception at Bella Center (incl. in registration)

Sunday 4 June 17.00-19.00 hrs.

A light buffet with Danish specialities, beer and wine will be served.

Dress: Informal.

Reception at the City Hall of Copenhagen (incl. in registration)

Wednesday 7 June 18.00-19.30 hrs.

The reception is hosted by the Lord Mayor of Copenhagen. It will start at 18.00 hrs. exactly and participants are therefore kindly asked to be precise. A light buffet will be served.

Dress: Informal.

Boattrip and Dinner (optional)

Tuesday 6 June 19.00-21.00 hrs.

A unique way to see many of the old beautiful sites in Copenhagen while enjoying a 2 course dinner on board one of the canal boats.

Dress: Informal

Price: DKK 450 / person incl. wine.

Sightseeing tours (optional)

The Castles of North Sealand

5 June 09.30-16.30 hrs. incl. lunch.

This marvellous outing takes you to North Sealand - the beautiful countryside north of Copenhagen. The tour starts by driving north out of the city and through some fashionable residential areas, before passing the Deer Park. From here, follow the coastal road that borders the Sound, as it wends its way through former fishing villages dotted along the coast towards Elsinore. This tour offers great views, in the morning sun, across the Sound to Sweden and the Sound narrows to straits at Elsinore. Here you visit Kronborg Castle - built to control - and levy tolls on - shipping through the Sound but famous for prosterity as the setting for Shakespeare's dramatic masterpiece, "Hamlet - Prince of Denmark". It is not difficult to

imagine Hamlet stalking the massive castle walls - his mood as dark and inhibiting as the walls themselves. After your visit here, enjoy a hearty, Danish lunch. The tour continues from Elsinore via Fredensborg, where a stop to see Fredensborg Palace which is the Spring and Autumn Residence of the Royal Family to the small town of Hillerød. Here you will again be confronted with one of the dominant figures amongst Danish monarchs - King Christian IV - as you visit what is perhaps the finest testament to his visions as a royal commissioner of buildings - Frederiksborg Palace. Built on a small island in a lake, Frederiksborg is a magnificent Renaissance palace - beautifully situated and unbelievably detailed, both inside and out - which today houses the Museum of Danish National History. Your visit completed, the tour continues through picturesque villages and rural countryside, before reaching the outskirts of Copenhagen and shortly thereafter the City Hall Square and finally the Falconer Center.

DKK 725

Kings and Vikings - a step back in history

6 June 09.30-15.30 hrs.

The ingredients of this tour are the tough, redbarded warriors and traders who marauded, conquered and traded with most of maritime western Europe and their descendants, Royal or commoner. Taking the back roads west from Copenhagen past the long barrows near Ledøje, you reach the shallow but sheltered Roskilde Fjord which was a favoured base for the Vikings. Follow the shore of the fjord to Roskilde, where you visit the Viking Ship Museum which houses the remains of 5 Viking ships salvaged from the bed of the fjord and painstakingly preserved. A short drive to the centre of Roskilde, for a visit to the twin-spired Cathedral: until the early 15th. century, Roskilde was the capital of Denmark - proof of its strategic importance in the early Middle Ages - and all Danish monarchs were buried here. Although no longer the capital, Danish Kings and Queens are still laid to rest in Roskilde. Lunch at a country inn just outside of Roskilde, before continuing to Øm for a visit to a 4000 years old "passage grave". Your return to the present is comfortable and painless and you are soon back at your hotel.

DKK 715

The City, the Canals and the Harbour

7 June 13.00-16.30 hrs.

Copenhagen was - for Hans Christian Andersen and surely for Danny Kaye - "Wonderful, wonderful Copenhagen, friendly old queen of the sea" and this tour is one of the best ways to see what he meant.

During this charming tour of the city (approx. 1½ hour), you will see many of the main points of interest within the city: City Hall Square, the Carlsberg Glyptotek and Tivoli Gardens, the National Museum and the old “Latin Quarter” - so called because here you find the university and academic center of old Copenhagen, - the Round Tower and the Old Fish Market. Here you board our chartered, specially built canal launches and cruise through the canals and harbour for approx. 1 hour. You will see Copenhagen as sailors have seen it for several centuries, passing under the incredibly low bridges to view some of the fabulous buildings that - typically for a city with maritime associations - are all close to the sea or the waterways: Christian IV’s Stock Exchange, Christiansborg Palace and Holmens Church - the Naval church in Copenhagen - and the charming old sailor’s quarter Nyhavn, Amalienborg Palace and the Little Mermaid. Along the canals through Christianshavn, you can still see “old salts” and their descendants, sitting on the wharf enjoying tales of the Seven Seas over a Carlsberg before sailing past Christian IV’s old Brewery.

DKK 210

* The bus(es) will start at Bella Center at 13.00 hrs. and make a short stop for pick-up at the City Hall Square (in front of Palace Hotel) at 13.30 hrs.

Louisiana and Karen Blixen

8 June 09.30-16.30 hrs. incl. lunch

Drive northwards, heading out of the city past the harbour and, following the shoreline, past the Royal Deer Park before continuing along the scenic route towards Rungsted. The drive will take you through some of Copenhagens most fashionable and desirable residential areas which were once small fishing hamlets dotted along the coast. In Rungsted, visit “Rungstedlund”, the home of Karen Blixen - the world famous authoress, whose works and life have been the subject of numerous films.

From Rungsted, continue to the village of Humlebæk where the Louisiana Museum for Modern Art is beautifully located in a park, on low cliffs overlooking the Sound. The museum has a comprehensive, permanent collection of paintings and sculptures by world famous artists such as Giacometti, Henry Moore, Miró, Picasso, Max Ernst, Bonnard and many others and also regularly hosts touring exhibitions that attract visitors from all over Scandinavia. Your visit to Louisiana starts with lunch in the museum café with views across the Sound to Sweden, after which there will be time to explore the museum at your leisure before a midafternoon departure for Copenhagen.

DKK 675

Rules & Conditions

All above mentioned rates are quoted per person, valid for 1999 and are inclusive of VAT. All tours will be operated in English. During transportation participants are insured according to Danish Legislation regarding Transportation Insurance, but should otherwise be covered by their personal travel and health insurance when not on the bus. The Congress Bureau reserves the right to adjust or change the program as necessary. A minimum advance reservations for 20 persons per tour is required in order to guarantee operation. The Congress Bureau reserves the right to cancel operation in the event of insufficient advance reservations.

All tours depart from the City Hall Square and return to the City Hall Square (in front of Palace Hotel) except on Wednesday 7 June, where the bus(es) will start at Bella Center at 13.00 hrs. and make a short stop for pick-up at the City Hall Square (in front of Palace Hotel) at 13.20 hrs.

Students Travel Awards

The ASLO board has approved a limited number of need-based student travel stipends to be awarded to students who make oral or poster presentations at the meeting as a first author. These special awards are available to full-time students currently enrolled in any university or college who are not supported by a grant or other source that could provide the necessary travel support. There are no restrictions on the residence of an applicant; however, the applicant must be a member of ASLO and first author on an oral or poster presentation. The applicant cannot have received a travel award previously. All applications must be accompanied by the Student Travel Award Application or at <http://www.aslo.org/copenhagen2000>

Outstanding Students Poster Awards

ASLO will present awards for the best 10% of the posters presented by student members. Posters in all areas of aquatic science are appropriate, including theory, modeling, and laboratory or field experimentation. To be eligible, the student must be an ASLO member and first author on research that has not been presented previously at ASLO or other scientific meetings. Presentations will be judged on the basis of innovation/scientific insight, quality of experimental design/methods, and clarity/effectiveness of presentation. All posters submitted by first author students will be considered for the student poster

awards. There is no need to apply.

We encourage senior participants to enter the Poster Award Selection Committee. Please volunteer and contact Bente Lomstein (bente.lomstein@biology.aau.dk)

Minorities Program

The Committee on Under-Represented Minorities in Limnology and Oceanography (CURMLO) is preparing its annual program in conjunction with the ASLO meeting. Pending renewal of funding, plans are underway to have the 11th annual Minorities Program at the Copenhagen meeting. Students will participate in a pre-conference workshop, scientific field trip, a special student symposium to present their work, and all of the other regular features of the ASLO meetings. Those ASLO members interested in serving as "meeting mentors" to help guide the students through the sessions, or who have a student to recommend for the program, should contact:

Dr. Ben Cuker
Marine Science Department
Hampton University
Hampton, VA 23668

Phone: 757-727-5884, Fax: 757-727-5084
E-mail: benjamin.cuker@hamptonu.edu.

Travel Awards for young scientists from developing countries

The Local Organizing Committee has a small number of travel/participation awards available for young scientists from developing countries and other countries, where it is difficult to find support for participation and travel to meetings like ASLO 2000 (Third world, Baltic countries, Russia). It is expected that the successful applicants can find some support from their home countries/Institutions, either for travel, registration or accommodation. Eligibility requires: 1) that the person is < 35 years and doing active research in hers/his home country, 2) that an Abstract for oral or poster presentation is accepted by the Committee (use the format for this meeting), and 3) the application includes a short verified curriculum vitae and list of publications. A short application with Abstract, CV, a budget, and if possible verification of some self-financing should be mailed to: Professor Morten Sondergaard, Freshwater Biological Laboratory, Univ. of Copenhagen, Helsingorsgade 51, DK-3400 Hillerod, Denmark. **Deadline: December 15, 1999.**

ASLO 2000 Abstract Submission Form

Submission deadline: January 15, 2000

To submit your abstract electronically use <http://www.aslo.org/copenhagen2000>. You may not submit the form below if you choose to submit via Internet. This form must be accompanied by a DOS-formatted, 1.44 MB, 3½” disk that includes your abstract with complete author information. File format: WordPerfect or Word for Windows. You must also provide a laser quality printout on white paper. Adhere strictly to the sample abstract directions!

Author to contact (only one abstract per first author)

Last name	first name	middle initial
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Institute or organization

Department or first address line

Last address line

City	State/province	Zip	Country
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E-mail	Phone	Fax
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Abstract information

Abstract is:	<input type="checkbox"/> invited	<input type="checkbox"/> contributed
Presentation preference:	<input type="checkbox"/> oral	<input type="checkbox"/> poster

Session topic code

Choice 1: Choice 2: Choice 3:

Specify if “other”:

State any special requirements for your presentation (optional):

You will be notified by E-mail unless otherwise noted here:
fax or mail

The registration form and full payment of fee must accompany the abstract form. Mail the completed forms, disk and one copy of the abstract to:

DIS Congress Service, ASLO2000, Herlev Ringvej 2C, DK-2730 Herlev, Denmark