



European Commission

Environmental Research Newsletter

No 18 December 1996

A FREE-OF-CHARGE HALF-YEARLY PUBLICATION

S.P.I. 97.02

Contents

| | |
|---|----|
| Editorial | 1 |
| Programme News..... | 2 |
| Aquatic Ecosystems | 2 |
| - Community Water Policy | 2 |
| - WAtER - Wetland and Aquatic Ecosystem Research..... | 2 |
| - Functional analysis of European wetland ecosystems - Phase 1 (FAEWE) | 3 |
| - EROS 2000..... | 4 |
| - Water Quality Research at the EI, JRC Ispra .. | 5 |
| Energy and Environment..... | 7 |
| Other Activities Relevant to EC Environmental Programmes..... | 8 |
| - Technologies to protect and rehabilitate the European Cultural Heritage..... | 8 |
| EC Legislation | 11 |
| EC Regulatory Activities | 11 |
| - General Provisions and Programmes..... | 11 |
| Meetings of International Organizations | 15 |
| Information..... | 16 |
| Conference Announcements..... | 17 |
| Conference Reports..... | 20 |
| Publications..... | 22 |

Editorial

Environmental Research and Framework Programme V

In 1996, the Commission issued two documents related to the preparation of the Fifth Framework Programme for Research & Development.

The first of these two papers, *Inventing Tomorrow* (EUR 16961), set preliminary guidelines for the Fifth Framework Programme. It stresses the purpose behind European research as being "to meet common objectives" and to make research more efficient and increasingly directed toward meeting basic social and economic needs by bringing about changes, which each individual citizen desires". The second document, a Commission Working paper (ref. COM(96)595-EN/20-11-96/15:52) discussed by Council of Ministers on December, 5, 1996 addresses important aspects among which the structure envisaged for Framework Programme V. The Commission foresees inter alia to deal with thematic aspects grouped under 3 headings **(a) unlocking the resources of the living world and the ecosystems (b) creating a user-friendly information society and (c) promoting competition and sustainable growth**. Each of these programmes would encompass several targeted research activities, activities for the development of generic technologies and more fundamental research.

Besides thematic aspects, the Commission working document envisages also horizontal aspects to be dealt with: **(a) Confirming the international role of European research (b) Innovation and participation of SMEs and (c) Improving human capital**.

These programmes would encourage coordination and support for activities conducted in the same areas within the programmes dedicated to thematic aspects, as well as more general initiatives relating to each of the three topics.

The Commission is proposing a set of criteria for the selection of activities to be carried out within FP V.

The scientific & technical objectives should in particular:

- (a) correspond to activities with a high European added-value;
- (b) help to achieve societal and economic objectives among which quality of life, health and environment;
- (c) open up new avenues for research where there are serious gaps in knowledge; take advantage of strengths and overcome weaknesses of European RTD.

The Commission document states that the focal point of the Union's research policy, namely boosting Europe's competitiveness, should serve as a guide.

Thus FP V is expected to contribute to satisfy the needs of citizens and economic actors, in particular, the requirements for sustained economic growth, competitiveness, high employment and quality of life.

A second working document will be issued by the Commission in January 1997.

The formal proposal for FP V is expected to be submitted by the Commission to the Council and to the European Parliament in March 1997.

C. Paternmann
Director DG XII-D

Editor Dr. G. Rossi

Assistant Editor Dr. G. Realini with the collaboration of Dr. M. Borlé-Talpaert (presently Ministry of Environment, Rome)

Environment Institute
Joint Research Centre
I-21020 ISPRA (VA), ITALY
Tel.: ++39-332-789981
Fax: ++39-332-785631

Correspondent from DG XII-D EU Brussels:
Mrs. J. Acevedo

The Environmental Research Newsletter can be accessed on the Internet using the command:
<http://www.ei.jrc.it/newsletter>

Programme News

Aquatic Ecosystems

Community Water Policy

The Commission is currently in the process of focusing and refining Community Water Policy. The main shot being the Communication on Community Water Policy adopted in February 1996 and the ensuing consultation with the Community institutions, Member states and interested parties. This should lead to the adoption of a Framework directive on Water early 1997.

Another go at the Water Policy was made with the adoption in July of an action programme on groundwater management and protection to be adopted by Parliament and Council under article 130 s 3. The action programme will establish objectives for the Community and the Member states for groundwater quality and quantity.

The groundwater action programme will be followed by a revision of the present Groundwater Directive, where quantity aspects will be added and the whole directive fused with the future Framework Directive on Water.

Further information can be obtained from:

Asgar Olsen
EC - DG XI
Rue de la Loi - B-1049 Brussels
Tel. +32 229 51604

WATER Wetland and Aquatic Ecosystem Research

Background Information

Catchment areas of rivers, lakes and wetlands have attracted anthropogenic activities since prehistoric times. The vast majority of human population settlements have occurred in the vicinity of lakes, rivers and ocean shores.

They needed and still require freshwater for many different purposes, such as drinking water supply, food production, transport, industrial processes and recreation. Compared to the population density in river catchments there is a wide variation in the extent of freshwater availability among European regions, ranging between 9000 m³ per inhabitant and year in some parts of Scandinavia and less than 0.5 m³ per inhabitant and year in the Thames River catchment.

Nowadays, wetlands and aquatic ecosystems are increasingly endangered in Europe and elsewhere by global or regional environmental changes, due to discharges or depositions of excess nutrients and/or harmful substances, to the reclamation of wetlands for agriculture, forestry, urbanisation/industrialisation, engineering of water flows, etc. This has resulted in increasing conflicts over the use of natural waters and is threatening the integrity of aquatic and wetland ecosystems.

Since the fundamental ecological functioning of wetlands and aquatic ecosystems is severely endangered a large number of them are degrading rapidly or are on the way to extinction. Yet, the European Union has a major Treaty obligation under the Ramsar Convention to insure *inter alia* the "wise use" of the wetland resources within the boundaries of the Member States.

The availability of water of good quality and the very functioning of aquatic and wetland ecosystems will be decisive factors for the maintenance of the quality of our life, or even for the bare survival of human and biotic populations in dry regions of Europe and elsewhere. A sustainable use of freshwater depends on good management practices based on sound scientific knowledge, on appropriate planning and setting of priorities.

Many research projects have been launched and co-funded by the EC Environment RTD Programmes since the mid 70ies (recently also including work on climate change and anthropogenic impacts

on European water resources in the Environment and Climate Programme), but most of them were running uncoordinated between each other and were insufficiently directed towards agreed common goals. Therefore, the Environment and Climate Programme assembled a group of experts to develop a strategic approach for Wetland and Aquatic Ecosystem Research (WATER).

The results are brought together in a WATER Science Plan which has been published as volume 23 of the Ecosystem Research Reports series.

The specific research objectives and foci of the WATER Science Plan can be summarised as follows:

1. Key process and Functioning of Wetland and Aquatic Ecosystems: New Development

Objective:

To determine the role of key processes in the functioning of whole catchments in the perspective of global environmental changes.

Focus 1 Ecosystem Functioning and Biodiversity

Focus 2 Infochemicals and Ecosystems Dynamics and Functioning

Focus 3 Effects of Cyanobacteria Toxins on Ecosystem Structure and Functioning

Focus 4 Cycling of CO₂, CH₄ and N₂O in Wetland and Aquatic Ecosystems

Focus 5 Processes of Transport and Retention of Nutrients and Pollutants

2. Up-scaling and Connectivity

Objective:

To assess the problems of scaling up from the level of functioning of individual processes and ecosystems to the dynamics of the catchment.

Focus 6 Modelling the Functioning of Catchments in Response to Environmental Changes

Focus 7 Integrative Tool Development

Focus 8 Scale-up and Long Distance Connectivity

Focus 9 Palaeo-Ecological Reconstructions

3. Applications

Objective:

To translate the science base into effective methods, actions and protocols for the management and sustainable utilisation of wetlands and aquatic ecosystems.

Focus 10 Integrated Management

Focus 11 Appropriate Protocols for Functional Analysis

Focus 12 Biomanipulations

Focus 13 Wetland Restoration

Focus 14 Mesocosms and Microcosms Approaches

The WATER Science Plan intends not only to define more precisely the research priorities for the thematic network on "Aquatic and Wetland Ecosystems" (now called "WATER") as briefly described in the Workprogramme of the Environment and Climate Programme (1994-1998) which is open for submission of proposals until January 1997, but also to formulate a mid-term strategy for research on wetland and aquatic ecosystems in connection to global research initiatives and programmes, such as the IGBP (International Geosphere-Biosphere Programme) of ICSU (International Council of Scientific Unions), and in particular the IGBP Core projects BAHG (Biological Aspects of the Hydrological Cycle) and GAIM (Global Analysis, Interpretation, and Modelling). The WATER research intends to be aligned as well to the objectives of the World Conservation

Union (IUCN). Overall, the cooperative integrated research results from the "WATER" network will provide a more appropriate scientific basis for the formulation of EU aquatic and wetland policies.

Finally, WATER bridges the existing thematic networks TERI (Terrestrial Ecosystems Research Initiative) and ELOISE (European Land-Ocean Interaction Studies) along the water continuum from the land to the ocean.

Further informations as well as copies of the WATER Science Plan can be obtained (free of charge) from:

Hartmut BARTH
European Commission
DG XII-D-1 / Environment and Climate Programme
200, rue de la Loi - B-1049 Brussels
Fax +32-2-295.20.97

Functional analysis of European wetland ecosystems - Phase 1 (FAEWE)

The function of river marginal wetland ecosystems

Improving the science base for the development of procedures of functional analysis

Final report - EC DG XII CT90-0084
European Commission
ECOSYSTEMS RESEARCH REPORT No 18
Edited and compiled by E. Maltby, D.V. Hogan, R.J. McInnes
Directorate-General - Science, Research and Development
EUR 16132 - ISBN 92-827-6606-3

The overall objective was the development of assessment procedures for the functional analysis of European Wetland ecosystems. The project is divided into two Phases (I: 1991-94 and II: 1994-96) in different landscape contexts:

The need in Europe for a functional approach to wetland assessment and the requirement for a better science base to improve the understanding and quantification of dynamic processes results from the failure of traditional nature conservation criteria to protect wetlands against loss and degradation. The rationale behind the development of the functional assessment procedures is built on the possibilities of predicting wetland ecosystem functioning by characterisation of distinctive ecosystem/landscape complexes called hydrogeomorphic units (HGMUs). The final goal of this project is the development of science-based assessment procedures for the functional analysis of European wetland ecosystems - procedures that are as rapid and simple to use as possible by professionals who may not have in-depth knowledge of wetland ecosystems or functioning. The objectives of Phase I project FAEWE have been:

- i. To identify, assess and measure the key processes operating in river marginal wetland ecosystems;
- ii. To assess the resilience to and the effects of ecosystem disturbance which result from a range of human activities. Impacts include altered hydrological regime sedimentation and fertilizer application;
- iii. To link dynamic models and evaluations of the effects of anthropogenic disturbance into an overall system of functional analysis.

Four study areas were selected along a climatic and environmental gradient, from the oceanic conditions of Ireland through the euoceanicity of south west England to the continental regime of central France and the highly seasonal, semi-arid regime of central Spain. Paired sites were selected to measure the relative effects of a specific anthropogenic impact. The study site were characterised in terms of hydrology, geomorphology, soil and vegetation properties, that control or contribute to functioning.

Three types of hydrological modelling have been used; i.e.:

Groundwater flows

The finite difference model FLOWNET to assess the groundwater flow of the floodplains, the extent to which there is a contribution from regional systems and the degree to which the floodplain acts as a recharge area for groundwater flow towards the river.

The finite difference code MODFLOW to construct three dimensional steady state and unsteady state models of the groundwater system as a check on the development of qualitative conceptual models and to assess the vulnerability of water systems to stress.

Qualitative conceptual models applied in hydrological studies of the Loire/Allier sites.

Numerical groundwater flow models to interpret the role of groundwater in the Cigüela system. In order to check and validate conceptual models 2-dimensional steady state models were adopted, PLASMA for groundwater flow and WATEQF for solute transport.

Water budgets have been calculated for flooded and non-flooded periods on the Shannon. In nonflooded conditions the information used to calculate the annual budget is:

inputs: precipitation entering the soil, groundwater inflow and infiltration of river water;

outputs: actual evapotranspiration, groundwater outflow and runoff of excess precipitation.

The investigations carried out under Phase 1 establishing links between processes and functions, have highlighted some important inter-relationship among factors needing to be considered when selecting options for the management of wetland within the context of environmental change.

Recommendations for further research

A number of gaps within the understanding of the dynamic processes operating in river marginal wetlands and the limitations in the knowledge of the predictive relationships between process and function have been identified. The proposed research programme for FAEWE Phase II will provide additional scientific information to improve substantially the already advanced science-base and the ability to predict functioning through the use of the functional assessment procedures.

Phase II innovations will include the extension of the functional assessment procedures to the catchment scale the development and application of a GIS and the integration of socio-economic valuations into the assessment scheme.

Specific objectives will focus on:

- The investigation of nutrient dynamics in order to assess N and P movements between hydrogeomorphic units; changes in nitrate and phosphate levels under variable soil and hydrological conditions; and a determination of the importance of local complexities in surface hydrology to the nutrient removal function.
- Plant trait responses to chemical stresses due to the mobility and availability of potentially toxic elements under differing environmental conditions.
- Identification of sub-sets of vegetation which can be used as bio-indicators of stress that will allow for the development of statistical models to establish the linkage between plant traits and specific wetland functions.
- Integration of the hydrological and nutrient dynamic models to develop a more general application in predicting effects of environmental change.
- Continued data correlation and modelling to refine the controlling variables of nutrient and primarily production related functions.
- Extending the invertebrate group diagnostic potential beyond the floodplain to the wider catchment scale combined with calibration of the predictive models from other sites both within and outside the European Union.
- The production of interpretative maps to enable the identification of key plant and vegetation characteristics in the functional assessment procedures and the use of plant assemblage characteristic and cover to predict the degree of human impact and neglect and to indicate artificiality/naturalness.
- The development and integration of socio-economic valuation of river marginal wetland functions.
- The development of more operational approaches to catchment management through the integration of the computer models, the GIS and the functional assessment procedures all of which are driven by the advancements made in the underlying science base.

The Phase II work programme commenced in July 1994 and is due to continue for a further two years.

EROS 2000

The Interactions between the River Danube and the Northwestern Black Sea

Pilot Phase (1994-1996)

General scientific objectives

The main objective of the pilot phase was to implement in the northwestern Black Sea an integrated methodological approach to assess the eutrophication and contamination problems of this severely damaged coastal ecosystem, to determine the sediment transfer and to evaluate the production and release of climatically relevant biogases from the Black Sea sediments through the water column to the atmosphere.

Specific scientific objectives were:

- To conduct a comprehensive analysis of existing historical and more recent biological and chemical data sets (NW Black Sea and Danube river) tracing back to the 1960's for establishing the link between phytoplankton bloom development and related harmful phenomena in the NW Black Sea and changes in the Danube watershed (land use, fertiliser utilization, waste water treatments) as well as hydraulic managements of the Danube.
- To conduct process-level studies to improve the knowledge on mechanisms determining the present-day structure and functioning of the pelagic (herbivorous versus microbial versus gelatinous food chain) and benthic food-web as well as biogeochemical transformations in sediments and nutrient exchanges at the sediment-water interface;
- To provide the numerical code of a coupled-pelagos-benthos-1D-ecological model describing the carbon and nutrient (N, P, Si) cycling through the planktonic food-web of the NW Black Sea and at the sediment-water interface;
- To implement the RIVERSTRAHLER model in the Danube river system and validate its results with existing biogeochemical data sets as well as data collected in 1995 along the Bulgarian and Romanian section of the river;
- To apply the GHER 3D hydrodynamical model to study the general circulation of the Black Sea, its associated synoptic/mesoscale structures, and to identify its seasonal variability; to develop an embedded high resolution model of the Romanian-Ukrainian continental shelf;
- To assess contaminant sources and levels through the analysis of existing records and the collection of new data;
- To assess the sediment transfer and deposition in the Danube delta and on the northwestern shelf
- To evaluate the production of climate-relevant biogases produced in the water column and the sediments and their transfer to the atmosphere

Project methodology

The methodological approach involved and integrated the following tasks: critical review of existing data, field work and numerical modelling.

Two field cruises were conducted aboard of the Ukrainian RV «Professor Vodanytsky» in the Ukrainian, Romanian and Bulgarian exclusive economic zones. The first leg of 17th July-1st August 1995, jointly led by C. Lancelot (Belgium) and V. Egorov (Ukraine) was devoted to the study of the ecological functioning of the pelagic realm under summer conditions. Particular attention was given to investigate the degradation of microbial organic matter and its controlling mechanisms, including the availability of redox species; the food chain structure and functioning with special emphasis on key gelatinous organisms like the jellyfish *Aurelia aurita* and the combjelly *Mnemiopsis*; production of biogases and their emissions into the atmosphere. It was the first time that phytoplankton nutrient dynamics and the feeding behaviour of all zooplankton functional groups - protozooplankton, copepods, gelatinous organisms - were fully addressed.

The second leg, led by N. Panin (Romania) and V. Egorov (Ukraine), took place in the period between 4 and 28 August 1995 and was focusing on benthic communities, on sedimentation and processes occurring within sediments, and exchange processes at the sediment-water interface. For the first time a benthic lander was successfully used on this continental shelf and during one-year a sediment trap was collecting at monthly intervals sediments in the water column.

A total of 77 stations were sampled in the northwestern shelf area, including reference deep stations in the central anoxic basin as well as a longitudinal profile with a rubber boat in the Sulina Branch of the Danube delta. Furthermore, methane seeps were acoustically localized.

Main results

1 Nutrient changes and the structure and functioning of the northwestern Black Sea ecosystem since 1960: analysis of existing data

Current Knowledge

During less than 30 years the Black Sea ecosystem has been evolving from a highly biodiverse ecosystem characterized by a high biological productivity at all trophic levels to a low biodiversity ecosystem dominated by a gelatinous food-chain. Beside the explosive development of opportunistic autotrophic and mixotrophic phytoplankters, the current food chain is dominated at higher levels by different gelatinous organisms. Among these, the giant omnivorous dinoflagellate *Noctiluca* and the jellyfish *Aurelia aurita* and the combjelly *Mnemiopsis leydii*. The latter Ctenophora, feeding voraciously on zooplankton, fish eggs and larvae constitute, at high food resources, efficient competitors of planktonic fishes and were claimed as responsible for the decrease of fish catches during the late eighties.

Analysis of ecosystem changes

An analysis of recorded data since 1960 on changes in the structure and functioning of the Black Sea ecosystem [source: published data by the Romanian Marine Institute at Constanta (Romania) and the Shirshov Institute of Oceanology at Moscow (Russia)] in relation with concomitant changes in nutrient delivery by the Danube river [source: Tolmazin, 1985 and the Romanian Marine Institute at Constanta] concluded that man-induced changes in the river watershed (land-use, agricultural fertilizers, detergents, hydraulic managements) conducted since the 60ies were the driving force of the observed dramatic changes in the Black Sea ecosystem.

2 Ecosystem dynamics in summer 1995

The EROS cruise took place in mid-summer, when a strong thermal stratification should have been established with an expected oxygen depletion, sulfate-reduction and methanogenesis in the bottom waters and the superficial sediments of key areas of the northwestern Black Sea. Physico-chemical and biological observations recorded during the two legs supported previous conclusions but revealed also some unexpected results:

- As expected, nutrient concentrations were the highest in the vicinity of the Danube mouth and were assimilated by phytoplankton in the close vicinity of the river mouth, between salinity 8-12 psu. Unexpected in eutrophicated areas, the inorganic nutrient environment showed during this summer period an excess of silicate as compared to phosphate and nitrogen (mostly nitrate).
- As expected, bacterial biomass and activity were extremely high in the whole investigated area. Bacterial organic carbon demand was always significantly higher than the authogenic gross primary production indicating that summer bacterial activity couldn't have been sustained by dissolved organic matter originating solely from phytoplankton exudation or autolysis. The necessary dissolved organic matter could have been produced either by a former phytoplankton bloom and/or by mortality of freshwater microorganisms when mixed with salt waters and/or by continental dissolved organic matter discharged by the rivers Danube, Dniepr and Dniestr. Unexpectedly, dissolved organic carbon concentration while elevated (-300 μM) was constant in the whole area and didn't show any apparent utilization.

- Protozoa were present at high numbers in the whole investigated area. However, their feeding activities were not controlling the development of their preys, i.e. nanophytoplankton and bacteria.
- As expected in summer, mixotrophs were recorded in the investigated area. However, their presence was strongly localized, coinciding with high bacterial concentrations and depleted inorganic nutrient levels.
- As expected, gelatinous organisms - *Noctiluca*, *Mnemiopsis leidyi*, *Aurelia aurita* - were blooming during this summer period.
- As expected, benthic mineralisation rates were the highest in the front of the major rivers (Dnepr, Dnestr, Danube) but in the starvation zone as well.

3 Numerical development

The integrated approach to the eutrophication problem of the northwestern Black Sea involves the hierarchical development of biogeochemical models of the river and marine system and their off- or on-line coupling. Numerical work performed in the scope of the EROS-2000 pilot phase involved the parallel development of a suite of models of different levels of spatial and trophic resolution.

The Danube river model

The RIVERSTRAHLER model (Billen et al., 1994; Garnier et al., 1995) describing biogeochemical transformations in the river system as functions of hydrometeorological conditions and point and non-point sources of nutrients has been implemented in the Danube river system. A total of 12 sub-basins and 3 main branches have been chosen for describing the Danube network from the source to the delta.

Ecological model of the northwestern Black Sea

The ultimate objective is to develop a high resolution (spatial and trophic) coupled physical-biogeochemical model of the northwestern Black Sea ecosystem, describing the ecological functioning and associated biogeochemical transformations in the pelagic and benthic realm, as forced by the meteorological conditions and nutrient inputs by the Danube river.

- A high resolution hydrodynamic model of the Romanian-Ukrainian shelf embedded in the Black Sea GCM model of GHERDMG is being implemented for coupling with the biological module.
- The numerical code of a 0D mechanistic biogeochemical model - BIOGEN - describing the present-day functioning of the NW Black Sea shelf ecosystem and its evolution over the three past decades has been developed.
- The dynamic numerical model for early diagenetic processes of Soetaert et al., 1995 has been implemented for describing organic matter degradation and nutrient transformations in the benthic system of the northwestern Black Sea.

The Black Sea General Circulation Model

The Black Sea general circulation model has been further developed in close collaboration with DMG-Sofia University (Bulgaria).

The present version has a 15 Km horizontal resolution and 25 vertical levels. It has been applied to investigate the seasonal variability of hydrodynamic and hydrological fields in response to forcing by i) the climatological monthly mean fields of surface temperature, salinity and wind stresses, and (ii) the corresponding river discharges and water exchange at the straits.

Further information can be obtained from:

Prof. J.M. Martin
EC - JRC - Environment Institute
I-21020 Ispra (VA), Italy
Tel. +39-332-789601
Fax +39-332-789222

or

Prof. C. Lancelot
Université Libre de Bruxelles
Boulevard de Triomphe, 1050 Bruxelles
Tel. +32-2-6505989
Fax +32-2-6505993

Water Quality Research at the EI JRC, Ispra

Institutional activities

Aquacon

The main aim of the AQUACON project is to help laboratories in improving the quality of analytical measurements, through inter-laboratory exercises.

The results of the fifth intercomparison exercise on rainwater samples, performed in the framework of the project "Analytical Quality Control and Assessment Studies in the Mediterranean Basin (AQUACON)", as a part of the "Protection of the Environment" program, executed by the Environment Institute of the Joint Research Centre, in collaboration with the Istituto Italiano di Idrobiologia of the Italian National Research Council (CNR-III) are presented. This activity is the continuation of a study started in 1989 in Italy, part of a larger project (RIDEP) sponsored by the Ministry of the Environment, with the aim of harmonizing the results obtained by different Institutes studying atmospheric deposition chemistry.

Following the procedures used in the previous exercises two types of samples were prepared: artificial rainwater, to measure pH, conductivity and major ion concentrations, and a solution of sodium hydrogen carbonate, stabilized with chloroform, to measure alkalinity. Simulated rainwater (samples A, B) was prepared at the JRC-EI using water of the highest quality and the purest chemicals available. The carefully weighed chemicals were dissolved and water added to make up the master solution (1 l), which was then analyzed to check the correctness of the envisaged analyte concentrations. The master solution was diluted with nanopure water to 20 l in a 100 l polyethylene container, previously conditioned with the same quality of water for two weeks. The calculated quantity of Suprapure HCl required to reach the previously fixed pH value of the final solution was added and the solution made up to a total of 100 l. Samples C and D, prepared specifically for alkalinity measurements, were obtained by dissolving in nanopure water sodium hydrogen carbonate; potassium chloride was also added to increase the ionic strength, up to a conductivity of about 30 $\mu\text{S cm}^{-1}$ at 20 °C. The prepared solutions were stabilized with the addition of about 0.2% volume of chloroform. Bottling was performed by hand, rinsing the previously conditioned 500 ml polypropylene bottles, with the samples and then filling them up to the top.

The concentrations of samples A and B were chosen in the upper and lower ranges of the concentration values most often measured in atmospheric deposition in Northern Italy. The alkalinity values for samples C and D were also chosen in the range of those present in some episodes of atmospheric deposition; however, these values are in the same range as those measured in many European remote lakes, and in areas characterized by poorly buffered water.

Altogether 142 laboratories participated in the exercise; 115 out of them presented results.

The number of analyses is higher than the number of laboratories, as in some cases several techniques were used by the same laboratory and all the results were considered. On the other hand, several laboratories did not perform all the determinations.

pH values show similar dispersions in sample A and sample B. Several values exceed the ± 0.3 u interval around the expected value. It must be stressed that in this range of pH, this variation is very large, if considered from the point of view of the ion concentrations. For example, in solution B some results are around 3.2, vs. the expected value of 3.84; the respective hydrogen ion concentrations are 631 and 145 $\mu\text{eq l}^{-1}$.

Errors of this magnitude can be easily detected both from the ionic balance and the comparison between measured and calculated conductivity. In fact the equivalent conductivity of hydrogen ion is very high (315.5 $\mu\text{S cm}^2 \text{eq}^{-1}$ at 20 °C) if compared to the values of the other ions, which are mainly between 45 and 70 $\mu\text{S cm}^2 \text{eq}^{-1}$.

Several outlier values are present for conductivity in sample A, which is characterized by the lowest concentrations; the tendency is to overestimate of the true value. Most of these errors were made by laboratories participating in the exercise for the first time. The Youden plot of pH and conductivity shows a prevalence of systematic errors, probably indicating bad calibration of the measurement instruments.

Regarding the other ionic species, the distribution plot was made taking into account the methods of analysis. The method most commonly used for sulphate, nitrate and chloride was ion chromatography, which in general gives results in the range of the expected values $\pm 20\%$. Unreliable results were obtained for sulphate by the turbidimetric method, and were of course more accentuated in sample A. The Youden plots of sulphate and nitrate show the prevalence of systematic errors.

Atomic absorption spectrophotometry was the main method used for Ca, Mg, Na and K analyses, followed by ion chromatography and, for Na and K only, atomic emission spectrophotometry. Only three laboratories measured cation concentrations using ion capillary electrophoresis. The plots of the results show a high number of outliers for the lowest concentrations of calcium and magnesium. There are no marked differences in the results obtained by the different analytical techniques, with the exception of results of the EDTA titration, which in general overestimates the concentrations. In the case of sodium and potassium, AAS, AES and IC show the same percentage of outliers, probably due to errors in calibration or standards preparation. Indeed the Youden plots show a prevalence of systematic errors. Ammonium measurements performed by ion selective electrode, although low in number, show an overestimation of values for the lowest concentrations. Ammonium was measured mainly by spectrophotometric methods and ion chromatography; also in this case the Youden plot indicates a large proportion of systematic errors.

As in the previous exercises, several analytical techniques were used for the determination of alkalinity. In this case a systematic difference in the results is apparent. The best results were obtained by potentiometric titration with the evaluation of the inflection point made by extrapolation, as in the Gran titration, the two end-point titration and the conductometric titration. The colorimetric titration tended to overestimate the concentration, mainly in sample C, which had a lower alkalinity value. The Youden plot clearly shows the prevalence of systematic errors. These results are in agreement with those of preceding exercises.

The results of the 1995 exercise, examined through the Youden's plot, clearly show that systematic errors largely prevail over random errors. This is usually due to faulty preparation of the calibration solutions (bad quality reagents, inaccuracy in the preparation of solutions, pollution of calibration solutions used for more than one batch of analyses); a further cause is bad calibration of the instruments. This can be the principal cause in the measurements of pH and conductivity, as the calibration of the relative instruments is often neglected. In addition to the calibration standards, prepared for every batch of analyses, the use of secondary standards, to test the repeatability of measurements among different batches of analyses is suggested. Secondary standards can be prepared from natural samples, with concentrations in the range of those dealt with in the laboratory, stabilized and used for several months. The plot of these results, which constitute a control chart, is a useful aid to verifying if the whole analytical process is under control. Examples of this control chart, to be performed for all the chemical variables, are reported e.g. from A.P.H.A., A.W.W.A., W.E.F., 1992. Equally important is a regular check of blanks; control charts for blanks should be part of the normal laboratory routine.

A further important point in assessing the final quality of the data is the check for the internal consistency of the results. A very simple "a posteriori" check of the data may be made by evaluating the ionic balance and by comparing measured and calculated conductivity. Of

course this is only possible if the analysed compounds cover most of the ions present in solution, which is the case for solutions A and B. The presence of data which are clearly inconsistent from the chemical point of view indicates that these controls are not regularly carried out by all the participating laboratories; we think it very important that this check become part of laboratory routine.

Further information can be obtained from:

H.W. Muntau
EC - JRC - Environment Institute
Tel. +39-332-789758
Fax +39-332-785212

SALMON

Under the fourth Framework Programme a new **Shared-Cost-Action (SCA)** was established: the **SALMON Project (SA**ttellite remote sensing for **Lake MON**itoring). The overall objective of the project is the evaluation of the capabilities of current and forthcoming spaceborne remote sensing for the monitoring of European lake water quality. New cost-effective tools for monitoring emergencies in European lakes will be designed. The project involves public and private water management agencies and enterprises, and eighth research institutions from three Member States.

Competitive activities

An **Open Competitive Action (OCA)** in support to DG XI to assess the presence of trihalomethanes in water intended for human consumption was successfully completed and the results were presented at the experts meeting on drinking water Directive in October, 1996.

The availability of the EI scientific experience in setting up safeguarding plans and prevention pollution schemes for the rational management of surface waterbodies was requested by Member States Authorities (i.e. Regione Lombardia). A lake restoration project is currently running:

A study contract was signed with the Regione Lombardia (Italy) to contribute the solution of the problems due to the massive production of weeds in the lake Iseo. The research attempt at gathering and collecting data for both the major nuisance species and other aquatic weed problems.

Integrated control methods will be considered in order to minimize negative side effects, to improve the effectiveness of control and to reduce costs.

A full evaluation of the trophic condition of the waterbody is also considered.

Sicily Project

As support to regional development, the Sicily Project (aimed at providing tools for rational water management, identifying water quality objectives and assessing trophic conditions in surface waterbodies) was completed. The results obtained will be presented in a workshop planned for the beginning of next year.

Further information can be obtained from:

G. Premazzi
EC - JRC - Environment Institute
Tel. +39-332-789266
Fax +39-332-789352

Energy and Environment

The ExternE Project: Assessing the External Costs of Energy

It has long been accepted that environmental factors need to be better integrated into decision making processes. This is particularly true for the energy sector, which in addition to bringing major benefits to society also imposes significant external costs. These arise through effects of air pollution on human health, buildings and ecology, the consequences of global climate change, emissions of noise and other impacts.

In theory, one of the most attractive ways to bring externalities into a decision making framework is to quantify them in economic terms, permitting true cost-benefit analysis of cleaner technologies (such as emission abatement options and renewable energy sources), optimisation of environmental taxation, etc. However, early attempts at quantification for the energy sector were heavily criticised. Results were sometimes contradictory and generally regarded as being too preliminary for use in the development of policy.

In response, the ExternE Project started in 1991, funded by DG XII of the European Commission, under the YOULE Programme. The first two phases of the project developed the methodology and applied it to a broad range of fuel cycles for electricity generation (coal, oil, natural gas, lignite, uranium, wind, hydro, biomass, solar and waste) and energy conservation and the domestic use of gas. This work culminated in the publication of a set of six reports at the end of 1995. The present phase of the study, running until 1997 is split into three parts;

- Maintenance and further extension of the methodology;
- Implementation of the methodology throughout the EU;
- Extension to the transport sector.

The multi-disciplinary project team now includes experts and organisations from all member states of the European Union (excluding Luxembourg) and Norway, providing a solid base of externalities knowledge throughout western Europe.

The ExternE Methodology

The methodology starts with definition of the 'fuel cycle' - the full sequence of activities that surround energy use. For the coal fuel cycle not just effects linked directly to electricity generation were therefore considered, but also effects resulting from the mining of coal and other raw materials, transport of bulk goods, construction of plant, and disposal of wastes.

Next, specific technologies and locations are selected for each stage of the fuel cycle, in recognition of the major influence that they have on the magnitude of damages. Choices are realistic for the country and time period under investigation. Burdens (e.g. the emission of a pollutant, or a change in the risk of an accident) and their impacts are then identified for each stage. This is followed by the application of the 'impact pathway approach' for the estimation of externalities. This approach follows a logical route from quantification of burdens through to the estimation of biological, physical, chemical or social impacts, and then monetary valuation in terms of willingness to pay. It has been used to characterise a wide range of effects, drawing on the latest scientific data and models available.

Earlier authors dismissed this type of approach on the grounds that it was too intensive in its requirements for data collection and modelling. This was certainly true for small scale studies. However, by investing in a major research programme, bringing together experts from a variety of fields, the European Commission has overcome this problem. The structure of the study enabled an exchange of information throughout Europe, and also with experts in the USA, enhancing the debate considerably, and allowing effective use of resources.

The methodology that has been developed is consistent between fuel cycles, allowing proper comparison of results throughout the energy sector. Much emphasis has been devoted to transparency to enable policy makers and other interested parties to identify the

methods used and assumptions made and to understand the uncertainties associated with the final results. The analysis permits calculation of marginal damages, as required by energy sector planners for inclusion in Energy-Economy-Environment models, contrasting with the average damage estimates made in earlier studies.

In essence, the basic methodology resembles traditional life cycle analysis. It differs, however, in three important ways. Firstly, it includes a broader range of burdens than is normally the case for LCA, such as noise, visual intrusion and occupational health effects. Secondly, more priority is given to some types of burden than others, with effort concentrating on those perceived to be of the greatest concern. Thirdly, the analysis extends further, to a detailed quantification of prioritised impacts and their costs; it is after all effects that people are most concerned with rather than the scale of emissions.

Within the current phase of the work the methodology developed earlier is being refined, partly to keep pace with developments in fields such as ecology and human epidemiology, and also to improve assessment of the potential impacts of climate change, the treatment of uncertainty and the analysis of major accidents. On going work on climate change should provide a much more transparent assessment of costs than has previously been the case.

Consequences and Benefits

The output of the ExternE Project has many applications and benefits, including

- Prioritisation of environmental impacts, so that future policies can be closely targeted.
- Provision of a consistent and transparent framework, which should lead to a better informed debate on the environment than previously, which will then help to accelerate the development of sound environmental policy.
- Future policy analysis should come closer to an optimal solution for European industry and the environment through the provision of a more thorough understanding of the balance between the costs and benefits of pollution abatement and other measures.
- Promotion of harmonisation of standards around the world through the dissemination of the methodology to an international audience.

The application of the methodology is currently being assessed through a series of case studies. The first of these deals with cost benefit analysis at scales ranging from individual power plants up to the whole of the European Union. Another case study will address the use of externalities in the optimisation of energy systems. This is enabled by the compatibility of the methodology for assessment of damages with the E3 models developed by DG XII. The use of externalities data in the development of product standards will also be investigated.

The work is being actively disseminated through publication of a series of 6 reports on phases 1 and 2 of the research, the publication of a newsletter, and the development of a central database of information on externalities which will soon be available through the Internet.

In summary, the ExternE Project has been funded by DG XII of the European Commission since 1991, under the YOULE Programme. In that time a methodology has been developed that allows the externalities of different parts of the energy sector to be assessed using a consistent and transparent methodology. The methodology and the results generated are already being used in the development of environmental legislation within Europe, though a number of important issues necessarily remain the subject of active research. Researchers in other parts of the world are now using the ExternE study as the central reference for their own externalities work.

For further information on the ExternE Project please contact:

Dr. Jacquie Berry
ETSU
Harwell Oxfordshire OX11 1ORA - UK

Other Activities Relevant to EC Environmental Programmes

Technologies to protect and rehabilitate the European Cultural Heritage

Archeometric Study to Reconstruct the Pollution and the Climate of the Past and their Effects on Cultural Heritage

Contract: CT95-0092 - Duration: 36 months

Coordinator:

Université Paris Val-de-Marne - Laboratoire Interuniversitaire des Systèmes Atmosphériques
Avenue du Général de Gaulle 61 - FR - 94010 Créteil
R. Lefevre
Tel.: +33-1-45171676 - Fax: +33-1-45171675

Partners:

Università degli Studi di Bologna
Dipartimento di Scienze della Terra e Geologico-Ambientali
IT - 40127 Bologna
M. Del Monte
University of East Anglia - School of Environmental Sciences
GB - NR4 7TJ Norwich
P. Brimblecombe
Consorzio Padova Ricerche - IT - 35127 Padova
D. Camuffo

Objectives:

- To contribute at a quantitative evaluation of the local climate and pollution of the last millennium, beside results obtained on ice, lake or marine sediments archives far from sources,
- To relate this evaluation to the past weathering of monuments,
- To distinguish the past weathering from present day cumulative effect

Assessment of Environmental Risk Related to Unsound, Use of Technologies and Mass Tourism

Contract: CT95-0088 - Duration: 36 months

Coordinator:

Consorzio Padova Ricerche
Corso Spagna 12 - IT - 35127 Padova
D. Camuffo
Tel.: +39-49-829 59 02 - Fax.: +39-49-829 59 15

Partners:

University of East Anglia - School of Environmental Sciences
GB - NR4 7TJ Norwich
P. Brimblecombe
Universität Wien - Institut für Mikrobiologie und Genetik
AT - 1030 Wien
H. Busse
Universitaire Instelling Antwerpen - Department of Chemistry
BE - 2610 Wilrijk
R. Van Grieken

Objectives:

- Assessment of the environmental risk factors related to: unsound use of technologies, mass tourism and inappropriate environmental management.
- Mapping of the environmental factors and risk areas on the microscale.

- Suggest remedies or mitigative methods to reduce the negative impacts of mass tourism. Suggest heating/air conditioning systems which take into account the problem of how to reduce the suspended particulate matter and the coiling of exhibits. Provide the scientific basis for the proper location of objects and vents and regulation about the spatial intake and distribution of heat, humidity, light.

Environmental Deterioration of Ancient and Modern Hydraulic Mortars (EDAMM)

Contract: CT95-0096 - Duration: 36 months

Coordinator:

Katholieke Universiteit Leuven
Departement Burgerlijke Bouwkunde
Faculteit Toegepaste Wetenschappen
Center for the Conservation of Historic
Towns and Buildings
Kardinaal Mercierlaan 92-94 - BE - 3000 Leuven
D. Van Balen
Tel.: +32-16 32 16 99 - Fax.: +32-16 32 19 83

Partners:

Consejo Superior de Investigaciones Científicas
Instituto de Ciencias de la Construcción 'Eduardo Torroja'
ES - 28033 Madrid
T. Blanco Varela
Consiglio Nazionale delle Ricerche
Istituto per lo Studio dei Fenomeni Fisici e
Chimici della Bassa e Alta Atmosfera
IT - 40129 Bologna
C. Sabbioni

Objectives:

- To improve scientific understanding of the decay mechanisms in hydraulic mortars used for historic masonry-work and of the parameters of mortars responsible for the type and speed of degradation both due to environmental action.
- To identify the environmental effects in existing historic buildings where hydraulic mortars were utilized and use trace elements to define the origin of atmospheric deposition
- To simulate the sulphation process on different types of hydraulic mortars in a laboratory
- To analyze the origin of the materials used for marking the hydraulic mortars.
- To study the change of physical properties of the hydraulic mortars with increasing degradation due to atmospheric pollution in view of evaluating compatibility with other masonry materials.
- To study the effect of previous restoration techniques involving cement as a binder on the durability of masonry and define criteria for decisions concerning the treatment or replacement of cement mortars in view of the predicted deterioration.

Development of a New Non-destructive Method for Analysis of the Atmospheric Corrosion and Corrosion Protection of Copper and Copper Alloys

Contract: CT95-0098 - Duration: 24 months

Coordinator:

Forschungszentrum Karlsruhe GmbH - Technik und Umwelt
Institut für Radiochemie - DE - 76021 Karlsruhe
H. Klewe-Nebenius
Tel.: +49-7247-82-3879 - Fax.: +49-7247-82-2370

Partners:

Aristotle University of Thessaloniki - School of Chemistry

GR - 54006 Thessaloniki

P. Misaelides

Hochschule für Angewandte Kunst Wien

Institut für Silikatchemie und Archaometrie - AT - 1013 Wien

A. Vendl

Objectives:

As a contribution to the increasing efforts for the conservation of historical monuments and other metallic objects a research program is proposed aiming at a novel non-destructive in-situ analytical method for control of patina layers as well as of effects and durability of protective organic coatings interacting with the metal, the corrosion layer (patina) and with the environment. The main part of the project will be the development and application of a new non-destructive, in-situ, analytical method on the basis of the photo-thermal deflection spectroscopy.

Development of Evaluation Criteria, Prediction and Control Methods Concerning Sea-salt Effects on Monument Stones

Contract: CT95-0100 - Duration: 36 months

Coordinator:

Comunità delle Università Mediterranee

Scuola Conservazione dei Monumenti

Piazza Umberto I 1 - IT - 70121 Bari

F. Zezza

Tel.: +39-80-5442376 - Fax.: +39-80-5442529

Partners:

National Technical University of Athens

Department of Chemical Engineering - GR - 15773 Athens

A. Moropoulou

Universidad de Santiago de Compostela

Departamento de Edafología e Química Agrícola - Facultad de Biología

ES - 15706 Santiago de Compostela

D. Silva Hermo

Universitaire Instelling Antwerpen - Department of Chemistry

BE - 2610 Wilrijk

R. Van Grieken

Consejo Superior de Investigaciones Científicas

Instituto de Recursos Naturales y Agrobiología de Salamanca

ES - 37080 Salamanca

M. Vicente

Université de la Rochelle

Laboratoire de Construction Civile et Maritime

FR - 17026 La Rochelle

F. Auger

Objectives:

To develop predictive models of susceptibility to sea-salts for stone materials of different origins (magmatic, metamorphic and sedimentary), at different distances from the sea and at different altitudes.

To develop a combined non-destructive technique through ultrasonic pulses and picture processing for the automatic processing maps of the textural characteristics of the stones and of their decay patterns for damage evaluation.

Baroque Artificial Marble: Environmental Impacts, Degradation and Protection (ENVIART)

Contract: CT95-0103 - Duration: 24 months

Coordinator:

Universität Hamburg - Institut für Anorganische und Angewandte Chemie

Martin-Luther-King-Platz 6 - DE - 20146 Hamburg

C. Wittenburg

Tel.: +49-40-41233124 - Fax.: +49-40-41232893

Partners:

Institute of Catalysis and Surface Chemistry

Polish Academy of Sciences

PL - 30 239 Krakow

R. Kozłowski

Koninklijk Instituut voor Het Kunstpatrimonium Laboratory

BE - 1040 Bruxelles

J. Wouters

Hochschule für Angewandte Kunst Wien

Institut für Silikatchemie und Archaometrie

AT - 1013 Wien

J. Weber

Objectives:

- A complete inventory and digitised documentation of the current state of the chapel preservation.
- The determination of the structure and chemical composition of both inorganic and organic components of the artificial marble, including binders, filling materials, pigments and coating.
- To identify significant steps of the original technology of preparing and applying the material.
- The determination of factors relevant for the decay of the material.
- The identification of discontinuities in the structure of the system wall-layer and gradients of the physical properties.
- Gaining information on diurnal and seasonal variations of the microclimate and the interaction with the material.
- The alteration of the original composition by chemical and physical attack.

Deterioration of Prehistoric Rock Art in Karstic Caves by Mass Tourism: Integrated Study (Environment, Geology, Geochemistry and Microbiology) for their Conservation

Contract: CT95-0104 - Duration: 36 months

Coordinator:

Consejo Superior de Investigaciones Científicas

Instituto de Recursos Naturales y Agrobiología de Sevilla

ES - 41012 Sevilla

C. Saiz-Jimenez

Tel.: +34-5-4624909 - Fax.: +34-5-4624002

Partners:

Consejo Superior de Investigaciones Científicas

Museo Nacional de Ciencias Naturales

ES - 28006 Madrid

M. Hoyos Gomez

Universitaire Instelling Antwerpen

Department of Chemistry

BE - 2610 Wilrijk

R. Van Grieken

Comunità delle Università Mediterranee

Scuola Conservazione dei Monumenti

IT - 70121 Bari

F. Zezza

Objectives:

The aim of this project is to study the deterioration processes that take place in caves with rock painting following their opening, excavation and adaptation for mass tourism, and the effects of microclimate, environment, geology, geochemistry and biology on the conservation of the paintings developing the following issues:

- A comprehensive database of microclimatological and environmental pollution information relevant to the deterioration of rock art caves.
- A predictive deterioration of rock art caves.
- A set of recommendations for cave management and conservation of rock art.

Development of Innovative Techniques or the Improvement of Stability of Cultural Heritage, in Particular Seismic Protection (ISTECH)

Contract: CT95-0106 - Duration: 36 months

Coordinator:

FIP Industriale SpA
Via Scapacchio 41
IT - 35030 Selvazzano Dentro

R. Medeot

Tel.: +39-49-8225511 - Fax: +39-49-638567

Partners:

Università degli Studi di Roma "La Sapienza"
Dipartimento di Ingegneria Strutturale e Geotecnica
IT - 184 Roma

G. Croci

Istituto Superior Técnico
Departamento de Engenharia Civil - PT - 1096 Lisboa

J. Azevedo

Communauté Européenne
Commission des Communautés Européennes
Institute for Safety Technology Ispra - IT - 21020 Ispra - Varese

V. Renda

Enea - Ente per le Nuove Tecnologie, L'Energia e l'Ambiente
Dipartimento Energia - IT - 40129 Bologna

A. Martelli

Aristotle University of Thessaloniki
School of Civil Engineering - GR - 54006 Thessaloniki

G. Manos

Objectives:

The development of innovative techniques for the improvement of the overall stability, in particular seismic protection, applicable to the rehabilitation of cultural heritage.

To achieve the aforesaid purposes, it is intended:

- to identify representative study cases for cultural heritage,
- to check the state-of-the-art on the rehabilitation techniques in use for the protection of cultural heritage, in particular as regards earthquakes,
- to define levels of seismic actions and other loads to be used for the purpose of the study,
- to investigate the features of highly ductile dissipative materials in detail in order to identify the most suitable,
- to develop innovative protection systems using such materials,
- to develop and use experimental and numerical procedures in order to evaluate design methodologies and technological solutions,
- to develop relevant design recommendations for the rehabilitation of cultural heritage using the innovative techniques combined with the design of a pilot application.

System and Methods for Assessing Conservation State and Environmental Risks for Outer Wooden Parts of Cultural Buildings

Contract: CT95-0110 - Duration: 27 months

Coordinator:

Norwegian Institute for Air Research Instituttveien 18
NO - 2007 Kjeller

S. Haagenrud

Tel.: +47 63 898000 - Fax: +47 63 898050

Partners:

Norwegian Heritage - Norsk Kulturarv Foundation
Conservation Centres for Rural and Coastal Culture
NO - 2680 Vaga

C. Sulheim

Deutsches Zentrum für Handwerk und
Denkmalpflege, Propstei Johannesberg, Fulda e.V.
DE - 36041 Fulda

J. Veit

Hochschule für Technik, Wirtschaft und
Sozialwesen Zittau/Gorlitz
Fachbereich Bauwesen - DE - 2763 Zittau

E. Kothe

Kungliga Tekniska Hogskolan
Department of Built Environment - SE - 801 02 Gavle

K. Sjoström

Norgit-Senteret A/S - NO - 1605 Frederikstad

R. Hamre Jakobsen

Amtliche Materialprüfungsanstalt der Freien Hansestadt Bremen
Analytische Baustoffmikroskopie - Institut für Werkstofftechnik
DE - 28199 Bremen

H. Juling

Polish Association of Building Mycologist Laboratory
PL - 50 066 Wroclaw

H. Nowak

Kungliga Tekniska Hogskolan - Department of Building Sciences
SE - 100 44 Stockholm

K. Odeen

Objectives:

Develop and validate.

- Systems and methods for assessing the conservation state for the outer wooden parts of cultural buildings.
- Methods for measuring 1) continuous surface time of wetness (TOW) and resulting moisture content inside wood (INWOOD), 2) integrative damage to wood.
- Methods for assessing and mapping environmental risk factors and area for wood on meso and micro scale in some locations in Europe.

An Expert Chemical Model for Determining the Environmental Conditions Needed to Prevent Salt Damage in Porous Materials

Contract: CT95-0135 - Duration: 36 months

Coordinator:

University College London - Institute of Archaeology
Gordon Square 31-34 - GB - London WC1H 0PY

C. Price

Tel.: +44-171-387.7050 ext 4774 - Fax: +44 -171-383.2572

Partners:

University of East Anglia
School of Environmental Sciences - GB - NR4 7TJ Norwich

S. Clegg

Universität Hamburg
Institut für Anorganische und Angewandte Chemie
DE - 20146 Hamburg

M. Steiger

Objectives:

To predict the behaviour of contaminating salts in stonework.

This project will create a significant advance in the prevention of salt damage in stone, ceramics, wall paintings and other porous materials. It will provide a vital tool for all those who are charged with the conservation of European cultural heritage, informing them fully about the environmental and climatic conditions required to mitigate or prevent salt damage.

Further information can be obtained from:

J. Acevedo
EC - DG XII-D
200, rue de la Loi, 1049 Brussels
Fax +32-2-2963024

EC Legislation

EC Regulatory Activities

Directorate General XI¹

Legislative instruments recently adopted

- Directive 96/1/EC of the European Parliament and of the Council of 22 January 1996 amending Directive 88/77/EEC on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous and particulate pollutants from diesel engines for use in vehicles [OJEC L 40, 17/02/96, p.1].
- Council Directive 96/35/EC of 3 June 1996 on the appointment and vocational qualification of safety advisers for the transport of dangerous goods by road, rail and inland waterway [OJEC L 145, 19/06/96, p.10].
- Council Directive 96/49/EC of 23 July 1996 on the approximation of the laws of the Member States with regard to the transport of dangerous goods by train [OJEC L 235, 17/09/96, p.25].
- Directive 96/56/EC of the European Parliament and the Council of 3 September 1996 amending Directive 67/548/EEC on the approximation of laws, regulations and administrative relating to the classification, packaging and labelling of dangerous substances [OJEC L 236, 18/09/96, p.35].
- Council Directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT) [OJEC L 243, 24/09/96, p.31].
- Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control [OJEC L 257, 10/10/96, p.26].

- Council Directive 96/62/EC of 24 September 1996 on ambient air quality assessment and management [OJEC L 296, 21/11/96, p.55].
- Directive 96/69/EC of the European Parliament and of the Council of 8 October 1996 amending Directive 70/220/EEC on the approximation of the laws of the Member States relating to measures to be taken against air pollution by emissions from motor vehicles [OJEC L 282, 1/11/96, p.64].
- Council Regulation (EC) N° 1404/96 of 15 July 1996 amending Regulation (EEC) N° 1973/92 establishing a financial instrument for the environment (Life) [OJEC L 181, 20/07/96, p.1].
- Commission Regulation (EC) N° 1492/96 of 26 July 1996 amending Annex II and Annex III to Council regulation (EEC) N° 2455/96 concerning the export and import of certain dangerous chemicals [OJEC L 189, 30/07/96, p.19].

Expected new initiatives, mentioned in ERN 17, cancelled (c) or postponed (p):

- Pentachlorophenol (PCP) (Directive) (c)
- Incineration of waste (Directive) (p)
- Contaminated land strategy (Measure) (p)
- Used tyres (Directive) (p)
- Health care waste (Directive) (p)
- Electrical and electronic waste (Directive) (p)
- Construction and demolition waste (Directive) (p)
- Small quantities of hazardous waste in the domestic waste stream (Directive) (p).

1 With the eventual collaboration of other DGs (I, III, VII, XVII, XXIII, ...)

| GENERAL PROVISIONS AND PROGRAMMES | | | | | |
|--|-------|---------------------|------------------------------------|---|--|
| Commission proposals** | | | | | |
| Title | Date | Reference Documents | Contact | Parliament | Council |
| Environmental indicators and green national accounting-integration of environmental and economic information systems ^{pp} (Communication) | 12/94 | COM (94) 670 | G. Aubree (DG XI) | Consultation proc. opinion 10/95 | |
| Community Action Programme in the field of civil protection ^{pp} (Council Decision) | 5/95 | COM (95) 155 | C. Kesteloot (DG XI) | Consultation proc. opinion 4/96 | |
| Cohesion policy and Environment ^{pp} (Communication) | 11/95 | COM (95) 509 | DG XVI | | |
| Community action programme promoting non-governmental organisations primarily active in the field of environmental protection ^{pp} (Council Decision) | 12/95 | COM (95) 573 | S. Monoz Gomez (DG XI) | Cooperation proc. 1st reading 11/96 | |
| Review of the European Community Programme of policy and Action "Towards Sustainability" ^{pp} (EP and Council Decision) | 1/96 | COM (95) 647 | R. Donkers (DG XI) | Co-decision proc. 1st reading 11/96 | |
| Environmental impact assessment of public and private sector projects ^{pp} (amendment to Directive 85/337/EEC) | 1/96 | COM (95) 720 | C. Pleinevaux (DG XI) | Cooperation proc. 1st reading 10/95 2nd reading 11/96 | political agreement on common position 12/95 |
| Trade and Environment ^{eni} (Communication) | 2/96 | COM (96) 54 | J. Garcia Burgues (DG XI) | opinion 11/96 | |
| Implementation of Community environmental law ^{eni} (Communication) | 11/96 | COM (96) 500 | G. Kremlis (DG XI) | | |
| Framework for voluntary environmental protection agreements with industry ^{eni} (Communication to be presented) | 11/96 | COM (96) 561 | P. Dröll (DG XI) | | |
| Environmental impact assessment of development policies and programmes ^{eni} (proposal to be presented) | 12/96 | | P. Pleinevaux, L. Feldmann (DG XI) | | |
| Use of "green" levies and charges ^{eni} (Communication to be presented) | 12/96 | | H. Bergman (DG XI) | | |
| Toxic/polluting emissions register ^{eni} (Regulation to be proposed) | | | L. Rubinacci (DG XI) | | |
| Action plan combining the environment and tourism ^{eni} (Measure to be proposed) | | | L. Sforza (DG XXIII) | | |

* Pending proposals (pp), expected new initiative (eni)

| AIR Commission proposals* | | | | | |
|--|---------------|------------------------------|--------------------------|--|---|
| Title | Date | Reference Documents | Contact | Parliament | Council |
| Mutual exchange of information and data provided by networks and individual stations measuring pollution of the ambient air in the MS^{PP} (Council Decision) | 9/94 11/95 | COM (94) 345 COM (95) 468 | P. Hecq (DG XI) | <i>Cooperation proc.</i> 1st reading 6/95 2nd reading 9/96 | Final adoption 12/96 12/95 |
| CO₂/energy tax^{PP} (Directive) | 5/95 | COM (95) 172 | J. Delbeke (DG XI) | <i>Consultation proc.</i> hearing on climate change 2/96 | in discussion |
| Emissions of gaseous and particulate pollutants from internal combustion engines in non-road mobile machinery^{PPi} (Directive) | 9/95 | COM (95) 350 | F. Lamberts (DG XI) | <i>Co-decision proc.</i> 1st reading 10/95 2nd reading 12/96 | political agreement on a common position 6/96 |
| A Community strategy to reduce CO₂ emissions from passenger cars and improve fuel economy^{PP} (Communication) | 12/95 | COM (95) 689 | H. Arp (DG XI) | | Council conclusions 6/96 |
| "Auto Oil" Programme^{PP} (Communication) | 6/96 | COM (96) 248 | J.M. Mackowsky (DG XI) | | |
| Framework Directive on fuels^{PP} | 6/96 | COM (96)248 | L. Maters (DG XVII) | <i>Co-decision proc.</i> | |
| Reduction of air pollution from motor vehicles ("ETAPE 2000")^{PP} (Directive) | 6/96 | COM (96) 248 | H. Henssler (DG III) | <i>Co-decision proc.</i> | |
| Monitoring mechanism of Community CO₂ and other greenhouse gas emissions^{PP} (amendment to Council decision 93/389/EEC) | 9/96 | COM (96) 369 | D. Triantafillou (DG XI) | <i>Cooperation proc.</i> | |
| Emissions from organic solvents from certain processes and industrial installations (VOC's)^{PP} (Directive) | 9/96 | COM (96) 538 | S. Brockett (DG XI) | <i>Cooperation proc.</i> | |
| Methane emissions^{PP} (Communication) | 11/96 | COM (96) 557 | D. Jedrezejczak (DG XI) | | |
| NO_x emissions from new aircraft^{eni} (Directive to be proposed) | 11/96 | | A. Rowland (DG XI) | | |
| Action programme to combat acidification^{eni} (Communication to be presented) | 3/97 | | C. Agren (DG XI) | | discussed 12/95 |
| Sulphur content of certain liquid fuels^{eni} (Framework Directive to be proposed) | 3/97 | | C. Agren (DG XI) | | |
| Substances that deplete the ozone layer^{eni} (amendment to Regulation 3093/94) | 3/97 | | B. Lorz (DG XI) | opinion mid 97 | |
| Emissions from heavy duty vehicles (HDVs)^{eni} (Directive to be proposed) | early 97 | | H. Henssler (DG III) | | |
| Emissions from light commercial vehicles (LCVs)^{eni} (Directive to be proposed) | early 97 | | H. Henssler (DG III) | | |
| Emissions of certain pollutants into the air from large combustion plants^{eni} (amending Directive to be proposed) | late 97 | | D. De Meis (DG XI) | | |
| Auto oil II-fuel standards and automotive emission for 2005^{eni} (expected package of proposal) | end 89 | | | | |
| VOC emissions from refuelling at service stations-Stage II^{eni} (Directive to be proposed) | | | | | |

| NOISE Commission proposals* | | | | | |
|---|-----------|---------------------|---------------------------------------|-----------------|------------------|
| Title | Date | Reference Documents | Contact | Parliament | Council |
| Furure Noise Policy^{PP} (Green Paper to be presented) | 11/96 | COM (95) 540 | V. Irmer (DG XI) | | |
| Aircraft noise^{eni} (Directive to be proposed) | early 97. | | A. Rowland (DG XI) | possibly mid 97 | possibly late 97 |
| Noise emissions from auto tires^{eni} (Directive to be proposed) | early 97 | | F. Stella, A. Slagmulders (DG III) | possibly mid 97 | possibly late 97 |

* Pending proposals (pp), expected new initiative (eni)

| CHEMICALS, INDUSTRIAL RISKS, BIOTECHNOLOGY Commission proposals* | | | | | |
|--|--------------|------------------------------|--|--|--|
| Title | Date | Reference Documents | Contact | Parliament | Council |
| Placing of biocidal products on the market ^{PP} (Directive) | 7/93 7/95 | COM (93) 351 COM (95) 387 | M. Debois, G. Wilson (DG XI) | <i>Co-decision proc.</i> 1st reading 6/96 | political agreement on common position 6/96 |
| European ship reporting system for vessels carrying dangerous goods (Eurorep) ^{PP} (Directive) | 12/93 | COM (93) 647 | G. Bergot (DG VII) | <i>Cooperation proc.</i> | |
| Codification of legislation on the classification, packaging and labelling of dangerous substances ^{PP} | 1/94 | COM (93) 638 | P. Brunko, J. Costa-David, E. Kreutzer (DG XI) | <i>Co-decision proc.</i> 1st reading 2/95 | |
| COMAH: Control Of Major Accident Hazards ^{PP} (amendment to the "Seveso Directive") | 3/94 | COM (94) 4 | K. Krisor (DG XI) | <i>Cooperation proc.</i> 1st reading 2/95 2nd reading 7/96 | common position 3/96 Final adoption 12/96 |
| Contained use of genetically modified micro-organisms ^{PP} (Amendment to Dir 90/219/EEC) | 3/96 | COM (95) 640 | H. Martin (DG XI) | <i>Cooperation proc.</i> | discussed 10/96, 12/96 |
| Notification requirements for vessels carrying dangerous goods ^{PP} (Amendment to Dir. 93/75/EEC) | 9/96 | COM (96) 455 | G. Bergot (DG VII) | <i>Cooperation proc.</i> | |

| NATURE Commission proposals* | | | | | |
|---|-------|---------------------|------------------------|---|--|
| Title/content | Date | Reference Documents | Contact | Parliament | Council |
| Possession of and trade in specimens of species of wild fauna and flora (CITES regulation) ^{PP} (Council regulation) | 12/91 | COM (91) 448 | W. Wijnstekers (DG XI) | <i>Cooperation proc.</i> first reading 6/93 second reading 9/96 | common position 2/96 Final adoption 12/96 |
| Conservation of wild birds ^{PP} (Council directive amending dir. 79/409) | 3/94 | COM (94) 39 | R. Geiser (DG XI) | <i>Cooperation proc.</i> first reading 2/96 | |
| Wide use and conservation of Wetlands ^{PP} (Communication) | 5/95 | COM (95) 189 | B. Delpeuch | opinion 12/96 | |
| Keeping of wild animals in zoos ^{PP} (Council Recommendation) | 12/95 | COM (95) 619 | B. Julien (DG XI) | <i>Cooperation proc.</i> | political agreement 6/96 |
| Prohibition of the use of leghold traps in the Community ^{PP} (Council Regulation amending Regulation 3254/91) | 12/95 | COM (95) 737 | B. Julien (DG XI) | <i>Cooperation proc.</i> first reading 6/96 | |

| WATER Commission proposals* | | | | | |
|---|------------|-------------------------------|----------------------------------|---|--------------------------|
| Title | Date | Reference Documents | Contact | Parliament | Council |
| Quality of bathing waters ^{PP} (Directive) | 3/94 | COM (94) 36 OJEC C 112/94 | I. Papadopoulos (DG XI) | <i>Cooperation proc.</i> 1st reading 12/96 | discussed 10/95 |
| Ecological quality of water ^{PP} (Directive) | 7/94 | COM (93) 680 OJEC C 222/94 | P. Campbell (DG XI) | proposal likely to be withdrawn | discussed 10/95 |
| Drinking water ^{PP} (Directive) | 1/95 95 | COM (94) 612 C 131/95 | P. Gammeltoft, T. Simons (DG XI) | <i>Cooperation proc.</i> 1st reading 12/96 | discussed 10/96 |
| European Community water policy ^{PP} (Communication) | 2/96 | COM (96) 59 | A. Olsen (DG XI) | opinion 10/96 | Council conclusions 6/96 |
| Integrated Groundwater Protection and Management ^{PP} (Action programme) | 7/96 | | A. Olsen, (DG XI) | | discussed 10/95 |
| Community water resources ^{eni} (Framework Directive to be proposed) | 2/97 | | P. Campbell (DG XI) | | |

* Pending proposals (pp), expected new initiative (eni)

| WASTE Commission proposals* | | | | | |
|---|--------------|------------------------------|--|--|---|
| Title/content | Date | Reference Documents | Contact | Parliament | Council |
| Landfill of waste ^{PP} (Directive) | 5/91 6/93 | COM (91) 102 COM (93) 275 | A. Piavaux (DG XI) | <i>Cooperation proc.</i> opinion: 6/92, 10/93 1st reading 5/95 2nd reading 5/96 (common position rejected) | common position 10/95 discussion 6/96, called for new proposal |
| new proposal | late 96 | | | | |
| Shipments of certain types of waste to waste to certain non-OECD countries ^{PP} (Council Regulation) | 6/95 | COM (94) 678 | F.A. Hanter (DG I) Y. Slingerberg (DG XI) | <i>Cooperation proc.</i> | discussed 6/96 |
| Supervision and control of shipment of waste within, into and out of the EU ^{PP} (amendment to Regulation 259/93/EEC) | 4/95 | COM (95) 143 | Y. Slingerberg (DG XI) | <i>Cooperation proc.</i> 1st reading 1/96 2nd reading 9/96 | discussed 3/96 common position 5/96 Final adoption 12/96 |
| Waste management strategy ^{PP} (Communication to be presented) | 7/96 | COM (96) 399 | L. Krämer (DG XI) | opinion 11/96 | discussed 12/96 |
| Marking of packaging- recyclability ^{PP} (EP and Council Directive to be proposed) | 11/96 | COM (96) 191 | L. Krämer (DG XI) | <i>Co-decision proc.</i> | |
| End-of-life vehicles ^{PP} (Directive to be proposed) | 12/96 | | M. Onida (DG XI) | | |

Further information can be obtained from:

Documentation Center
EC - DG XI
200, rue de la Loi
B-1049 Brussels
Fax +32-2-2969560

* Pending proposals (pp), expected new initiative (eni)

Meetings of International Organizations* (to be attended by government representatives)

| Date | | Meeting | Place |
|-----------|---------|--|------------|
| Month | Day | | |
| January | 6-17 | Intergovernmental Negotiating Committee of Desertification Convention | New York |
| | 13-14 | 4th Advisory Group on the Harmonization of Classification and Labelling (OECD) | Paris |
| | 13-15 | Commission on Sustainable Development (CSD) High Level Advisory Board meeting | Monaco |
| | 22-24 | Expert Workshop: Fostering the linkage between Energy and Sustainable Development within international institutions | Austria |
| | 27-7/2 | 19th Session of the UNEP Governing Council | Nairobi |
| February | 10-14 | 2nd session of the Intergovernmental Forum on Chemical Safety | Ottawa |
| | 10-21 | Fourth Session of the Intergovernmental Panel Forests | New York |
| | 24-7/3 | CSD Intersessional | New York |
| | 24-7/3 | Convention on Climate Change: AGBM-6, SBSTA-5, SBI-4, AG 13-4 | Bonn |
| | 28-1/3 | Informal Development Council Meeting | Appeldorne |
| March | 3-4 | E.U. Environment Council | Brussels |
| | 7-8 | Ministerial Conference on Sustainable Tourism | Berlin |
| | 11-13 | 18th meeting of the Helsinki Commission | Helsinki |
| | 12-14 | North Sea Conference Intermediate Ministerial Meeting on "Fisheries and Environment" | Bergen |
| | 13-19 | Rio plus 5 (organised by Earth Council) | Rio |
| April | 3-4 | OECD Environment Policy Committee | Paris |
| | 7-16 | Convention on Migratory Species: 7th Meeting of the Scientific Council (7-8); 15th Meeting of the Standing Committee (9); 5th Meeting of the Conference of the Parties | Geneva |
| | 7-25 | 5th Session of the Commission on Sustainable Development (CSD) | New York |
| | 8-9 | G7 Environmental Futures Forum | Washington |
| | 18-20 | E.U. Informal Environment Council | Amsterdam |
| | 28-27/5 | 16th Session of the Commission on Human Settlements (UNEP) | Nairobi |
| April/May | | G7 Informal Meeting of Environment Ministers | USA |
| May | 12-16 | Heads of Delegation of Oslo & Paris Commissions | London |
| | 12-16 | Ad Hoc Expert Group on Biosafety | Montreal |
| | 20-22 | GEF Council Meeting | Washington |
| | 26-30 | 3rd and final Session of the PIC Convention Negotiations | Rotterdam |
| June | 2-5 | 14th Working Group on the Protocol of Montreal | Geneva |
| | 9-20 | Tenth Meeting of the Conference of the Parties to CITES (UNEP) | Harare |
| | 19-20 | E.U. Environment Council | Brussels |
| | 23-28 | UNGA Special Session to review the Rio Agreements | New York |
| | 23-28 | Oslo & Paris Commissions meeting and Ministerial Conference | Madrid |
| June/July | | Diplomatic Conference on the Convention on the Safety of Radioactive Waste Management | Vienna |
| Summer | | 1st Conference of the Parties to the Espoo Convention (EIA) | Oslo |

Information

European Working Group on Research and Biodiversity (EWGRB)

The European Working Group on Research and Biodiversity (EWGRB), supported by the European Commission DG XII (Contract ENV4 CT96 6140) will suggest research tasks to produce information to fulfil the Community policy concerning biodiversity. In this framework the Group will propose a Biodiversity Science Plan for possible implementation in the fifth Framework research programme.

Mandate for a European Working Group on Research and Biodiversity (EWGRB)

In the current Community programme of policy and action in relation to the environment and sustainable development "TOWARDS SUSTAINABILITY" is stated:

In spite of measures taken by international agencies, the Community and individual Member States, the major threats to nature conservation and maintenance of biodiversity persist and in some areas are increasing. The case for preserving nature and biodiversity ... is a necessary element in the overall maintenance of the ecological balance; furthermore, nature provides an invaluable genetic bank which is essential to medical, biological, agricultural and other scientific progress.

The working group should suggest the research tasks to produce information to fulfil the Community policy concerning biodiversity. A major issue for the European union is to:

- Monitor the European state and dynamics of Biodiversity;
- Formulate critical scenarios of sustainable development of Biodiversity in Europe and the EU Member States;
- Develop a European policy for the sustainable use and conservation of Biodiversity.

In this framework the Group will have the following specific objectives:

- act as a forum for information exchange and coordination;
- identify the relevant current international, European and national research activities;
- analyze the European and Members States R&D policies on Biodiversity;
- make recommendations for future actions for possible implementation in the fifth Framework programme, e.g. in the form of a Biodiversity Science Plan.

The Group, to be convened by the Commission, will include:

- one expert from each Member State, as well as states associated with the programme;
- policy makers from national and Community administrations. The Group may decide to co-opt experts from other organisations as necessary.

The Group will agree its own workplan including priorities and delimitations of the problem area. It will report in agreement to the contract article.

The work will start with forming an ad hoc group of 5-6 experts. This group will meet twice in preparing the only personal meeting of the entire Group. The report of the Group will be produced in spring 1997.

The EWGRB has started by forming an ad hoc group:

Dr Joop Brouns, IBN-DLO, Netherlands
Dr Mario Catizzone, DG XII
Prof Georg Grabherr, Univ of Vienna, Inst Pflanzt Physiologie
Prof Lennart Hansson, Swedish University of Agricultural Sciences, Dept of Wildlife Ecology
Prof Eckhart Kuijken, Inst of Nature Conservation, Brussels
Dr Endre Laczko, Solvit, Kriens, Switzerland
Dr Tor-Bjorn Larsson, Swedish Environmental Protection Agency
Dr Serge Neunlist, Ecole Normale Supérieure de Clima de Mulhouse, France
Dr Antonio Onorati, Assessorato allo Sviluppo del Sistema Agricolo della Regione Lazio, Roma
Prof Bernt Erik Saether, Univ Trondheim, Norway
Prof Andreas Troumbis, Univ of Aegean, The Biodiversity Conservation Lab, Greece
Dr Stig Wanden, Swedish Environmental Protection Agency

Further information can be obtained from:

Tor-Bjorn Larsson - e-mail: tbl@environ.se
Swedish Environmental Protection Agency
or
<http://www.odn.se/~ewgrb/index.html>

The Princes' award 1996

On 5 June 1996 (World Environment Day), the European Environment Agency organised The Princes' Award 1996 in the Town hall of the City of Copenhagen.

The nominees in the category "Documentary" were: Carl A. Fechner (Focus Film/ZDF, Germany) with "Das jüngste Gericht", Lars Mortensen (TV2, Denmark) with "Wheel of Hormones" and Dmitry Sidorov (ECAT, St Petersburg; Russia) with "Première of an Annual Performance". The winner in the category "Documentary" was: Dmitry Sidorov with "Première of an Annual Performance".

The nominees in the category "Fiction/Shows" were: Frédérique Chabaud (Arte/Gaie Communications, France) with "Après Nous le Déluge", Emanuel Hägglund. (Gluggen Film and Video Production/Swedish Environmental Protection Agency, Sweden) with "Please bring your life-jacket!", and Ignacio Rodrigo Salazar (SPA/TVE, Spain) with "Raiders of the Lost Rubbish - The Fantastic world of Cubi". The winner in the category "Fiction/shows" was: Emanuel Hägglund with "Please bring your life-jacket!"

The nominees in the category "Multi-Media/CD-ROM" were: Jari Mutanen (South Savo Environment Centre, Finland) with "Natura" and Svein Tveitdal (GRID arendal/ UNEP/ Norwegian Ministry of Environment, Norway) with "The State of the Environment: Norway 1995". The winner in the category "Multi-Media/CD-ROM" was: Jari Mutanen with "Natura".

MEET (Multi-Media and Environmental Education)

The information age has arrived. In today's world, societies need to adapt themselves to the various developments seen in the field of information technology and telematics, and sectors such as schools are no exception. There are various advantages in using multi-media for environmental education, but to date none of the possibilities on a European level have been scientifically analysed. **MEET**, which complement initiatives such as EURO-AWARENESS (undertaken by the European research and Training Centre on Environmental Education/ERTCEE) and EUROPE 2000 (undertaken by the Commission of the European Communities), is an attempt to fulfil this information gap.

In a first step in fostering the use of multi-media in environmental education in Europe, **MEET** will attempt to systematically identify the current provisions in this field in secondary schools across the EU (Phase 1).

Following this, experiences from European countries in the field of multi-media will be documented and recorded in a guide of provisions (Phase 2).

Finally, on the basis of the trends and provisions recorded in the execution of the projects, as well as on the basis of the needs identified, recommendations for further action-including on the preparation of materials - will be put forward (Phase 3).

Results of **MEET** will be available at the **EUROPEAN ENVIRONMENTAL EDUCATION FAIR**, a Forum for the display of multi-media environmental education and information technology, to be held in Lüneburg, Germany in late September 1997.

This project is partly funded by the Commission of the European Communities / DG XI.

MEET is being co-ordinated by the Department of Ecology and Environmental Education of the University of Lüneburg, Germany. Drawing on the experience and network facilitated by the European Research and Training on Environmental Education (ERTCEE), **MEET** counts on the support of a group of specialists and institutions in *Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Norway, Portugal, Spain, Sweden, The Netherlands and the United Kingdom*, who are joining efforts in the execution of the project.

For further information on **MEET** and on the **EUROPEAN ENVIRONMENTAL EDUCATION FAIR**, please contact:

MEET Co-ordinating Office - University of Lüneburg
Department of Ecology and Environmental Education
Wilschenbrucher Weg 84 - D-21335 Lüneburg, Germany
or phone/fax Prof W Leal Filho
on tel: +49-4131-714373 fax: 714202,
e-mail: leal@uni-lueneburg.de

Germany Advisory Council on Global Change "WBGU"

The constitutional meeting for the second term of office of the German Advisory Council on Global Change (WBGU) has taken place in Bonn on September 20, 1996. The physicist Prof. Dr. Hans-Joachim Schellnhuber, Potsdam was elected chairman of the 12 members of the council. The lawyer Prof. Dr. Juliane Kokott, Düsseldorf was elected deputy chairman. The next annual report will have its focus on water.

The Council compiles annual reports about current trends of global change and the resulting social and economic impacts. Furthermore, the reports take into account the international agreements discussed at the Rio summit (1992) and the AGENDA 21. Moreover the reports give recommendations for environmental policy and environmental research. Up to date the Council has published four annual reports in the series "World in Transition": Basic Structure of Global People-Environment Interactions (1993), the Threat to Soils (1994), Ways Towards Global Environmental Solutions (1995) and the Research Challenge (1996).

For further information, please contact:

Germany Advisory Council on Global Change - "WBGU"
Secretariat at the Alfred-Wegener Institute
for Polar and Marine Research
P.O. Box 12 01 61 - 27515 Bremerhaven, FRG
Tel. +49-471-4831349 - Fax +49-471-4831218
<http://www.awi-bremerhaven.de/WBGU/>
e-mail: wbgu@awi-bremerhaven.de

Conference Announcements

ETEX Symposium on Long-range Atmospheric Transport, Model Verification and Emergency Response

May 13-16 1997, Vienna (Austria)

This symposium, jointly organized by JRC, WMO and IAEA, provides a forum for discussions of long-range atmospheric diffusion and transport models focusing on data from the European Tracer Experiment (ETEX). This experimental data set will be presented and compared to model predictions. The symposium will focus on the following main themes:

1. Experimental data bases for validation of long-range transport models, including atmospheric tracer techniques, balloon trajectories and experimental design.
2. Comparison of model results and experimental data on long-range transport.
3. Meteorological and dispersion modelling focusing on accuracy of meteorological input, mixed layer height, atmospheric stability, orography.
4. Real-time modelling, quality of emergency response forecasts and their policy implications.

For further information, please contact:

Katrin Nodop - Joint Research Centre Environment Institute
T.P. 510 - I-21020 Ispra (VA), Italy
Fax +39 332 78 5924 - e-mail: symp.etex@jrc.it
<http://www.ei.jrc.it/etex/symp>

Summer School for a Multidisciplinary Assessment of Contaminants in the Environment and of Risks for Human Health

May 4 to 17, 1997, Certosa di Pontignano, Siena, Italy

by Università degli Studi di Siena
Consiglio Nazionale delle Ricerche

The School will focus on the following main themes:

- Distribution, levels and fate of contaminants
- Comparative aspects of metabolism and toxicity

DG XI Documentation Centre

The DG XI Documentation Centre gives the bibliographic service to support the DG activities. The new project "Center de Référence" enlarges this activity and gives a better support to the users.

From January 1997 new possibilities to borrow specialized magazines will be operational. It is also available the "Central Access Agent" to research information on many data bases of the Commission. CAA is the fundamental tool to find information on the European Community activities.

The DG XI Documentation Centre is open non stop from 9.00 to 17.45 p.m. every day, except for Friday.

Further information can be obtained from:

Gian Luigi Ruzzante
Documentation Centre
EC - DGXI
200, rue de la Loi - B-1049 Brussels
Fax +32-2-2969560

- Biomarkers of environmental contamination
- Damage to biological structures
- Risks for human health

Free food and lodging provided for 15 Italian and 15 foreign students. A few fellowships are available to cover part of the travel expenses for students coming from Less Developed Countries.

Degree in Medicine or Biology is required. Degrees in related fields will be also considered. Official language: English. Immediately forward a letter of application, curriculum vitae, list of publications, letter(s) of recommendation and a brief abstract of your personal research.

Further information can be obtained from:

Prof. A. Renzoni - Dipartimento di Biologia Ambientale
Via delle Cerchia 3 - 53100 Siena, Italy
Tel. +39-577-298831 - Fax +39-577-298806

GREEN 2 2nd International Green Symposium on Geotechnics and the Environment

Theme: Contaminated and Derelict Land

September 8-11 1997, Kraków, Poland

organised jointly by Bolton Institute (UK) and the Agricultural University of Kraków (Poland)

The scope of the symposium is all geotechnical aspects of working with contaminated or derelict land (whether it be for containment of pollution or redevelopment/rehabilitation of a site etc), together with the interaction/input from other disciplines. All of the stages of such geotechnical work will be addressed, from investigation/identification/quantification of the problem, through suitable remedial options, to the performance of treatment processes and assessment/monitoring of their effectiveness.

Specific areas to be considered include:

- Site investigation.
- Problem definition/quantification
- In-situ ground remediation
- Ex-situ contaminant treatment
- Pollution containment.

Further information can be obtained from:

Prof R.W. Sarsby - School of Civil Engineering & Building
Bolton Institute - Deane Road - Bolton BL3 5AB UK
Tel. +44-1204-528851 - Fax +44-1204-399074
e-mail: rws1@bolton.ac.uk

Prof K.M. Skarzynska
Dept of Soil Mechanics - Agricultural University of Kraków
24 Aleja Mickiewicza - 30-059 Kraków, Poland
Tel. +48-12-33-90-98 - Fax +48-12-33-62-45
e-mail: rmskarzy@cyf-kr.edu.pl

International Conference on Contaminated Sediments, including the 2nd International IAWQ Specialist Group Conference on Contaminated Sediments

September 7-11, 1997, Rotterdam, The Netherlands

The aim of this conference is to unite all parties involved in sediment remediation, such as port and water management authorities, scientists, policy makers, contractors, consultants, technology vendors and dredging companies.

Contaminated aquatic sediments pose major problems for water management in various countries. The exchange of experience and know-how between the organisations mentioned above will further the development of solutions to these problems. Removing the sources of sediment contamination and cleaning up the contaminated sediment in many locations are among the solutions now being pursued.

The conference is a joint initiative of POSW (the Development Programme for Treatment Processes for Contaminated Sediments in The Netherlands) and the Rotterdam Municipal Port Management, in co-operation with the IAWQ (International Association on Water Quality).

For more information please contact the conference secretariat:

ICCS - G. Bosgra or S. Pauwels
P.O. Box 1558 - 6501 BN Nijmegen - The Netherlands
Tel. +31-24-3234471 - Fax +31-24-3601159

9th International Symposium on Environmental Pollution and its Impact on Life in the Mediterranean Region

October 4-9, 1997, S. Agnello di Sorrento, Italy

by MESAEP Mediterranean Scientific Association of Environmental Protection

The objectives of the symposium are to provide opportunities for scientists of different countries to:

- exchange recent results related to the processes of pollution in the Mediterranean region
- discuss current technological and/or legal measures to avoid or to reduce the degradation of environmental compartments
- present suggestions and recommendations to the regulatory authorities on environmental quality and safety in the Mediterranean and other neighbouring countries.

More information can be found at the Internet address <http://www.gsf.de/mesaep>

Further information can be obtained from:

Prof Alessandro Piccolo - MESAEP 1997
Dipartimento di Scienze Chimico-Agrarie
Università di Napoli "Federico II"
Via Università 100, 80055 Portici, Italy
Tel. +39-81-7755672 - Fax +39-81-7755130
E-mail: alpiccol@ds.unina.it

GEOANALYSIS 97 3rd International Conference on the Analysis of Geological and Environmental Materials

June 1-5 1997, Vail Cascade Hotel & Club, Vail, Colorado USA

Organized by the United States Geological Survey

Further information can be obtained from:

Belinda Arbogast - U.S. Geological Survey, Federal Center
Box 25046, Mail Stop 973 - Denver, CO 80225
Tel. 303-236-2495 - Fax 303-236-3200
E-mail: geo97@helios.cr.usgs.gov

Third Loicz Open Science Meeting Global Change Science in the Coastal Zone

October 10-13 1997, Leeuwenhorst Conference Centre
Noordwijkerhout, The Netherlands

The Symposium will consist of a number of plenary sessions, concurrent topical sessions, small evening working groups and contributed posters. Plenary sessions will consist of invited keynote papers on coastal typology and scaling issues central to LOICZ research. Concurrent sessions will consist of invited papers on more specific LOICZ initiatives. A forum for in-depth review and discussion of these initiatives will be provided by small evening group sessions. Individual researchers will be encouraged to contribute posters that summarise concepts, results and models that are relevant to the objectives and goals of the Project. Initially, concurrent sessions are planned for the following topics:

- Horizontal flux of water and materials into the coastal zone;
- Fluxes of water and materials across the continental shelf;
- Biogeochemical studies - coral reefs and deltas as examples; and
- Integration of socio-economic and natural sciences.

Further information can be obtained from:

LOICZ Core Project Office
Netherlands Institute for Sea Research
P.O. Box 59, 1790 AB Den Burg-Texel
The Netherlands
Tel. +31-222-369404 - Fax +31-222-369430
e-mail: loicz@NIOZ.NL

IGAC/SPARC Conference on Global Measurement Systems for Atmospheric Composition

May 20-22, 1997, Toronto, Ontario, Canada.

The aim of this conference is to bring together managers, scientists and policy makers to discuss current knowledge of and predictive capabilities for atmospheric composition, to define the near-term requirements for global measurement systems, and to begin developing a framework for more comprehensive systems in the future.

Further Information can be obtained from:

IGAC-OMAC - Department of Physics
University of Toronto
60 St. George Street - Toronto, Ontario M5S 1A7 - Canada
Tel. (1) 416-978-4723 - Fax (1) 416-978 8905
e-mail: gomac@atmosph.physics.utoronto.ca
WWW: <http://WWW.atmosph.physics.utoronto.ca/gomac>

The Fourth International Symposium on Responses of Plant Metabolism to Air Pollution and Global Change

April 1-5, 1997, Hotel Zuiderduin, Egmond aan Zee
The Netherlands

Further information can be obtained from:

Symposium Secretariat:
Department of Plant Biology
University of Groningen,
P.O. Box 14 - 9750 AA Haren, The Netherlands
Tel. +31 503632277/2373/2281 - Fax +31 503632273
e-mail: l.j.de.kok@biol.rug.nl - g.stulen@biol.rug.nl

Substantial Sustainability The Relevance and Feasibility of Managing Substance and Material Flows

February 21, 1997, Vrije Universiteit Amsterdam

Preceded by SENSE workshops: Thursday, 20 February 1997

Further information can be obtained from:

Institute for Environmental Studies (IVM)
Vrije Universiteit Amsterdam
Tel. +31-20-4449555 - Fax +31-20-4449553
e-mail: secr@ivm.vu.nl - www.vu.nl/ivm/congress.htm

Seminar on International Environmental Education Policies in Europe

February 24-26, 1997, University of Lüneburg, Lüneburg, Germany

Organised by
University of Lüneburg, Institute of Environmental Sciences.
German Association for Environmental Education, DGU

In cooperation with
Commission of the European Communities/DG XI

For further information, please contact:
University of Lüneburg, Institute of Environmental Sciences,
Wilschenbrucher Weg 84
D-21335 Lüneburg, Germany
Tel: +49-4131-714 373 - Fax: +49-4131-714 202

Securing the Marine Environment: a Northern Perspective

487th Wilton Park Conference

January 13-17, 1997

This conference will examine progress on initiatives to promote international agreement and cooperation in efforts made to protect the marine environment, and attitudes to them in the Northern Hemisphere. How effective are the efforts to mitigate adverse effects of land and sea-based activities such as shipping, off-shore installations, disposal of waste at sea and fishing? What are the implications for those industries, including the insurance industry, most closely affected? Are international agreements working, does regional and international co-operation need strengthening, and what is the appropriate role for the UN and its specialised agencies?

For further information, please contact:

Jackie Nicholls
Wilton Park Conferences
Wiston House, Steyning, West Sussex BN44 3DZ
Tel. +44-1903-815020 - Fax +44-1903-815931
E-mail: wilton@pavillion.co.uk

International Conference Biological Waste Treatment Into the Next Millennium

September 3-5, 1997, Harrogate, UK

Organised by NCDA and ORCA

Sponsored by the European Union

Purpose of the Conference
Composting and anaerobic digestion are seen as two key processes in relation to sustainability in waste management. This conference aims to address their current roles in the context and look forward to the role they will play in the next millennium.

Further information can be obtained from:

Stuart Brown - Biotreatment Conference - PO Box 4
Grassington, North Yorkshire, BD 23 5UR, UK.
Tel: +44-1756-753450 - Fax: +44-1756-753420
E-mail: Biocon@leeds.ac.uk

International Symposium on Air Quality Management at Urban, Regional and Global Scales

10th Regional IUAPPA Conference

September 23-26, 1997, Gümüssuyu, Istanbul, Turkey

Organised by Turkish National Committee for Air Pollution Research and Control & Technical University of Istanbul

The theme of this International Symposium has a widespread background as air pollution is becoming especially a problem in the rapidly developing parts of the world.

Istanbul, which has gracefully been the centre of the region for centuries, is unfortunately suffering from entoxicating air for the recent years. Smogs, traffic exhausts, industrial emissions and heat/energy originated air pollution problems are seen. These problems are seen in many of the Turkish cities, as well as in the other countries of the world.

For further information, please contact:

Prof. Dr. Aysen Müezzinoğlu
DEU Bornova 35100, Izmir, Turkey
Tel. +90-232-3732660 - Fax +90-232-3732660
E-mail: tuncap@izmir.eng.due.edu.tr

Healthy Buildings/IAQ '97 Global Issues and Regional Solutions

September 28 - October 2, 1997, Washington DC, USA

Organized by

- International Society of Indoor Air Quality and Climate
- American Society of Heating, Refrigerating and Air-conditioning Engineers
- Virginia Polytechnic Institute and State University, Department of Building Construction, College of Architecture and Urban Studies, and Division of Continuing Education

This conference will provide a state-of-the-art perspective on ways and means of providing safe, healthy and productive indoor environments for occupants in residences and other non-industrial buildings. The Conference will strive to identify local and regional strategies that demonstrate progress toward the goal of achieving healthy buildings.

For further information, please contact:

Healthy Buildings/IAQ '97 - Prof. James E. Woods
Virginia Polytechnic Institute and State University
PO Box 7430 - Falls Church, VA 22040 USA
Tel. +1-703-6984725 - Fax +1-703-6984729
E-mail: hbiaq.97@vt.edu
<http://www.vt.edu:10021/contEd/contEd.html>

Gases in Aquatic Ecosystems Special Session on Sediment-Water Interactions

February 10-14, 1997, Santa Fe, New Mexico

This special session is part of the American Society of Limnology and Oceanography's (ASLO) Aquatic Sciences Meeting and is being coordinated with another special session on Water-Atmosphere Interactions (co-chairs: Carol Kelly, George Kling and Robert Striegl) to be organized as a 1-2 day session.

The ASLO meeting theme is: "Current and Emerging Issues in Limnology and Oceanography" to provide cutting-edge information in the full range of aquatic sciences.

For further information, please contact:

Robert Striegl
Tel: +303-236-4993 - Fax: 0303-236-5034
E-mail: rstriegl@usgs.gov

éco 1997 éco-logiques → stratégies

Congrès International, 24, 25, 26 février, Paris, France

- an exchange of information between policy makers, practitioners, and experts about goals, intentions, methods and tools
- speakers chosen for their ability to be concrete and original, as well as to advance the debate
- an assurance that all questions will be answered, that moderators will keep it lively, and that a real dialogue will occur
- a post-congress publication of all presentations and dialogues - a synthesis and two thematic résumés - which will become reference documents and strategic tools for policy development for all participants and sponsors

The three days conference will feature:

- Policy in the making
- Programs - case studies
- Cutting-edge techniques

Further information can be obtained from:

ACE (Association for Colloquia on the Environment)
Christophe Bonazzi, President
Penny Allen, General Secretary
Brice Lalonde, Honorary Chairman
73 avenue Paul Doumer - 75016 Paris, France
Tel. +33-1-45038282 - Fax +33-1-45038280

International Conference on Human Health Effects of Mercury Exposure

June 22-26, 1997, Tórshavn on the Faroe Islands,

Further information can be obtained from:

Organising Committee
Dorete Bloch - Philippe Grandjean
Marjun Hanusardóttir - Pál Weihe (chairman)
E-mail: mercury@sleipnir.fo

Atmospheric Pollution caused by Anthropogenic and Biogenic Emissions

April 7-11, 1997 - Ioannina Greece

An EURO COURSE sponsored by the Division of Analytical Chemistry (DAC) of the Federation of European Chemical Societies (FECS)

Organized by

- ELVIE X O.E., Ioannina/GR
- European Environmental Research Institute, Ioannina/GR

in association with

- Joint Research Centre - Environment institute, Ispra/ I
- National Centre for Scientific Research "Democritos", Athens/GR

This course is a part of the A.C.T.I.V.E. Association project: "Professional Training in Analytical Chemistry" supported by the EC - LEONARDO DA VINCI Programme.

Objectives of the course

Introduction and overview on the state of the art of atmospheric pollution caused by anthropogenic and biogenic emissions.

Information on concepts, case studies, modelling and legislation about the behaviour of organic compounds in the atmosphere.

For registration, information and any inquiry please contact:

Ms. K. Papadima or Mr. A. Mantalovas
European Environmental Research Institute
42 Dodonis str. - GR - 45221 Ioannina, Greece
Tel. +30-651-62694 - Fax +30-651-36838

Conference Reports

The Humex/Humor Project and Humic Substances

Fifth Nordic Symposium on Humic Substances in Soil and Water and the HUMEX/HUMOR Project Seminar

Lund, Sweden, 6-8 June 1995

Guest Editors

Anders Kullberg, Lars Tranvik, Bert Allard, Mats Jansson

Special issue of Environmental International (vol. 22, n° 5, 1996)

The proceedings of the above mentioned Symposium include a number of papers originating from the EC Specific Programmes STEP and Environment and Climate.

More in detail the following projects financed through the above Specific Programme are presented.

Origin and Structures of Groundwater Humic Substances from three Danish Aquifers

C. Grøn

Environmental Science and Technology Department, Risø National Laboratory, DK-4000, Roskilde, Denmark and Department of Geology and Geotechnical Engineering, Groundwater Research Centre, Technical University of Denmark, DK-2800 Denmark

L. Wassenaar

National Hydrology Research Institute, Environment Canada, Saskatoon, Saskatchewan, S7N 3H5 Canada

M. Krog

Department of Geology and Geotechnical Engineering, Groundwater Research Centre, Technical University of Denmark, DK-2800 Denmark and Department of Earth Sciences, Aarhus University, Ny Munkegade, 8000 Aarhus C, Denmark

Structural, chemical, and isotopic parameters were used to identify the origins of groundwater humic substances from three Danish aquifers. A variety of analytical techniques (visible light absorption,

molecular weight distribution, ¹³C-NMR spectroscopy, elemental composition with major elements and halogens, hydrolyzable amino acids and carbohydrates, carbon isotopes) applied to aquatic humic and fulvic acids led to consistent structural interpretations for each of the three aquifers studied. For humic substances in two aquifers, the analyses suggested source rocks in agreement with geological and hydrogeochemical information. In a third aquifer, source rock identification was inconclusive, and multiple fossil and recent organic carbon sources are suggested.

The Humic Lake Acidification Experiment (Humex): Main Physico-Chemical Results after five years of Artificial Acidification

Espen Lydersen and Eirik Fjeld

Norwegian Institute for Water Research, 0411, Oslo, Norway

Egil T. Gjessing

Agder College, Department of Chemistry, N-4604, Kristiansand, Norway

The HUMEX-project is a whole catchment manipulation experiment where the effects of the addition of H₂SO₄ and NH₄NO₃ to a humic-rich lake, Lake Skjervatjøm, and its catchment were studied. The lake was physically divided into an experimental lake (Basin A) and a control lake (Basin B). Two years after the division, Basin A and its catchment were artificially acidified. Hydrological data, meteorology, precipitation, and runoff chemistry collected during a 2-y preacidification period and during 5 y of acidification were evaluated. Randomized intervention analysis (RIA) was used to evaluate statistical significant differences between runoff chemistry from the two basins before and after the acidification. RIA showed significantly higher concentrations of SO₄²⁻, H⁺, NH₄⁺, NO₃⁻, Alⁿ⁺, Ca²⁺, Mg²⁺, total reactive Al (RAL), and labile Al (LAL) in Basin A after treatment compared with the control basin. After the treatment, the acid neutralizing capacity (ANC) in Basin A was significantly lower than in Basin B. However, the average ANC is substantially higher in the control basin after acidification compared with the two years before acidification, while unchanged in the manipulated catchment. The main reason for this is the long lasting effect of Na leakage after seasalt-episodes. No significant changes were observed regarding the amount of total organic carbon (TOC),

water color, or UV-absorbency after the treatment, but the anion deficiency (A^-) was significantly lower in the treated basin. This indicates that the organic acids are more protonated in the treated basin compared with the control basin. After a cold winter in 1993/94, an extreme NH_4^+ increase was observed in runoff water from Basin A. This increase was accompanied by increases in water color and UV-absorbency, but without any increase in TOC.

Contrasting Experimental Manipulation of the Acidity of Catchment Drainage Water: Effects on Interactions Between Humic Substances, Iron, and Phosphate

Peter J. Shaw and Roger I. Jones

Division of Biology, Institute of Environmental and Biological Sciences, Lancaster University, Lancaster LA1 4YQ, UK

Henk de Haan

Provincie Friesland, Milieu en Water, Postbus 20120, 8900 HM Leeuwarden, The Netherlands

Abiotic interactions between dissolved humic substances, iron, and phosphate were investigated by addition of radioisotope tracers ($^{55}FeCl_3$ and PO_4^{3-}) to surface water samples collected from catchments subjected to contrasting pH manipulations. Increases from pH 4 to circumneutral pH due to catchment liming resulted in increases in the proportions of added ionic ^{55}Fe and ^{32}P recovered in higher molecular size fractions following gel chromatography. Changes in ionic composition due to catchment liming did not result in marked changes in redistributions of added ^{55}Fe and ^{32}P . Comparatively small differences between the pH values and ionic compositions of the control and artificially acidified subcatchments of a humic lake did not result in substantial changes in the redistributions of added ^{55}Fe and ^{32}P .

Changes in the Volume and Composition of Phytoplankton after Experimental Acidification of a Humic Lake

Pål Brettum

Norwegian Institute for Water Research, Kjelsås N-0411 Oslo, Norway

In connection with the HUMEX project carried out in Lake Skjervatjern, near Førde, in the western part of Norway, the effects of the experimental acidification on the phytoplankton volume and composition were investigated. The lake was divided into two basins by a thick plastic curtain. One of the basins, Basin A, and its entire catchment was acidified by a mixture of ammonium nitrate and sulphuric acid, while Basin B acted as a reference. The results of the phytoplankton analyses from both basins in the investigation period are presented. In Basin B, the control basin, the succession of the main groups of phytoplankton throughout the growth season remained almost identical until 1993. The results from the acidified Basin A in 1991 and 1992 show marked changes in the phytoplankton composition and percentage of the main algae groups. The percentage of the green algae decreased, especially the species *Oocystis submarina* v. *variabilis*, while the dinoflagellates, mainly the species *Peridinium umbonatum* (*P. inconspicuum*), and the cryptomonads increased. In 1993, however, and even more in 1994, there was a marked change in the composition in the control Basin B compared to previous years, with less green algae and more chrysoomonads. The total volume was higher in Basin A in 1994 than in Basin B, especially in the autumn, while it was more or less the same in both basins in 1993. In the acidified Basin A, the dominance of the dinoflagellates was more pronounced in 1993 and 1994 than in previous years. The reason for the change in composition of phytoplankton registered in the control Basin B in 1993 and 1994 is hard to explain. As the changes in the composition of Basin A came immediately after the treatment of the Basin started, it is obvious that the addition of nitrogen, and especially the nitrate, through the treatment, was important in regulating the composition in this acid and humic lake. An increase in phosphorus seems to contribute more to the level of the total biomass of phytoplankton than to the observed changes in the composition.

The Humic Lake Acidification Experiment (Humex): Impacts of Acid Treatment on Periphyton Growth and Nutrient Availability in Lake Skjervatjern, Norway

Eli-Anne Lindstrøm

Norwegian Institute for Water Research, Kjelsås N-0411 Oslo, Norway

The aim of the Humic Lake Acidification Experiment (HUMEX) was to study the role of humic substances in the acidification of surface waters, and the impacts of acid deposition on chemical and biological properties of humic water. The dystrophic Lake Skjervatjern, Norway, was separated into two basins by a plastic curtain in 1988, and acid treatment of one basin with sulphuric acid and ammonium nitrate started in 1990. Shortly after the onset of the acid treatment, an extensive growth of filamentous green algae occurred in the acidified basin. Clay flower pots filled with nutrient diffusing agar were used to study periphyton growth. Additions of ammonium, nitrate, and bicarbonate, as well as two parallel releases of phosphate were tested. The control basin (B) proved to be N limited for most of the growth season. Consistently higher accumulation of chlorophyll a per area in the acidified basin (A) than in the control, is suggested to be due to N fertilization by the acid treatment (addition of NH_4NO_3). Both the untreated and acidified basins showed pronounced seasonal and temporal variations in nutrient limitation. The assumption that low bioavailability of DIC limits primary production in acidified water was not confirmed for acid humic water. A large increase in areal chlorophyll a in the acidified basin in 1994 occurred simultaneously with increased nutrient supply, particularly ammonia and TP. This is hypothesized to be caused, at least partly, by changed metabolism in the acidified environment, probably by reduced/disrupted nitrification.

The Zooplankton Story of Humic Lake Skjervatjern during whole Catchment Acidification

Dag O. Hessen

University of Oslo, Department of Biology, Div. Limnology, Blindern N-0316 Oslo, Norway

Espen Lydersen

NIVA, Kjelsås, N-0411 Oslo, Norway

Major trends in macrozooplankton development were monitored in humic lake Skjervatjern from 1988 to 1994. No changes were detected following division into an acidified basin (A) and reference basin (B) in 1989. Acidification was initiated in autumn 1990. During the summer of 1991, there was a normal development of zooplankton in the B-basin, while an initial increase and subsequent collapse of the dominant crustacean *Holopedium* occurred in the A-basin. Here, total zooplankton biomass dropped from a July maximum of $72 \mu g C L^{-1}$ to a September minimum of less than $4 \mu g C L^{-1}$. *Holopedium* remained dominant in the B-basin, while it was absent from the A-basin during the following years. The zooplankton perturbations occurred in spite of marginal changes in pH and Al-concentrations. Survival tests did not reveal any acute toxicity of the acidified water, nor did climatic variables offer any explanation for the zooplankton changes. There were pronounced oscillations in phytoplankton biomass and species composition. Measured grazing rates indicated that these oscillations were not caused by macrozooplankton grazing, while disappearance of key phytoplankton species, notably *Oocystis*, apparently contributed to the zooplankton decline.

Endocrine-Disrupting Chemicals: Cause for concern, cause for action, but not cause for alarm

International Workshops on the Impact of Endocrine Disruptors on Human Health and the Environment

From sex changes in fish and alligators, to increased incidence of breast cancer and falling sperm counts, endocrine-disrupting chemicals have been accused of many things, but whereas there is evidence for effects on wildlife, the evidence linking them to human

health problems is sometimes contradictory. These uncertainties and the recognition that, due to long-range transport of environmental pollutants, this problem is international rather than national, led the European Commission (DG XII), the European Environmental Agency, and the European Centre for Environment and Health of the World Health Organization (WHO) to organize jointly an international workshop on the Impact of Endocrine Disruptors on Human Health and the Environment (2-4 December, 1996, Weybridge, England). The workshop reviewed the evidence for potential risks of effects on humans as well as wildlife, evaluated current data, identified outstanding epidemiological question evaluated possible relationships with exposure to environmental pollutants, and identified gaps in present knowledge and needs for monitoring and future research. Its conclusions: cause for concern, cause for action but no cause for alarm.

For further information, please contact:

Canice Nolan - DG XII-D-1
Tel. +32-2-2961633 - Fax +32-2-2963024/2952097
Stephen Gosden - Communication Unit, DG XII
Tel. +32-2-2960079 - Fax +32-2-2952097
E-mail: Stephen.Gosden@dg12.cec.be

Urban Air Pollution and Public Health

Proceedings of a conference held at the Environmental Change Research Centre, University College London, September 23, 1994.

Editors: C.J. Curtis, J.M. Reed, R.W. Battarbee, R.M. Harrison

The following papers have been presented and discussed in the course of three sessions

Urban Air Pollutants Chaired by Dr. John Murlis (HMIP)

R.M. Harrison - Urban Air Pollution and Public Health
D. Hutchinson - Emission Inventories
J.S. Bower - The UK National Urban Air Monitoring Networks
R.G. Derwent - Interpreting Air Quality Data

Health Impacts Chaired by Dr. Bob Maynard (Dept. of Health)

J.G. Ayres - Air Pollution and Public Health in the United Kingdom
D.W. Dockery - Acute Respiratory Effects of Particulate Air Pollution

J.L. Devalia & R.J. Davies - Mechanisms Underlying Pollution-Induced Lung Damage

M.L. Williams - Urban Air Quality: Policy Issues

Solutions Chaired by Prof. Roy Harrison (Birmingham University)

Catalytic Converters Enough?
J. Whitelegg - Traffic and Health
F. Weir - Are Catalytic Converters Enough?
J. Vanke - The Motorist's View

Poster Papers

A.R. Collier - Organic Emissions from Light-Duty Diesel Engines
S. Hedley (SEIPH) - The London Air Quality Network
R.H. Partridge - Accurate Measurements of Urban Air Pollution
J.R. Stedman - Air Quality Forecasting in the United Kingdom

1996 - ISBN 1 871275 35 0

Published on behalf of the Environmental Change Research Centre, University College London by:

Ensis Publishing, 26 Bedford Way, London WC1H 0AP

Wider Application and Diffusion of Bioremediation Technologies The Amsterdam '95 Workshop

OECD Documents

Organisation For Economic Co-operation and Development

ISBN 92-64-14869-8

Head of Publications Service, OECD, 2, rue André-Pascal, 75775 PARIS CEDEX 16, France.

This workshop has taken as its subject matter the bioremediation of soil, air and off-gases, leaving the subject of water treatment, use and conservation to be reviewed by the planned workshop to be held in Mexico in 1996.

The Netherlands workshop has examined the business opportunities and bottlenecks; the efficacy, reliability and predictability, the focus and trends in R&D; standardization and best practice; and information transfer and dissemination.

The report presents the outcomes and recommendations issued from the workshop.

Publications

Environmental Taxes

Implementation and Environmental Effectiveness

European Environment Agency - Copenhagen

Luxemburg: Office for Official Publications of the European Communities, 1996, ISBN 92-9167-000-6

Although the 5th Environmental Action Programme of the EU in 1992 recommended the greater use of economic instruments such as environmental taxes, there has been little progress in their use since then at the EU level. At Member State level, however, there has been a continuing increase in the use of environmental taxes over the last decade, which has accelerated in the last 5-6 years. This is primarily apparent in Scandinavia, but it is also noticeable in Austria, Belgium, France, Germany, The Netherlands and the United Kingdom.

Evaluation studies of 16 environmental taxes have been identified and reviewed in this report. Within the limitations of the studies, it

appears that these taxes have been environmentally effective (achieving their environmental objectives) and they seem to have achieved such objectives at reasonable cost. Examples of particularly successful taxes include those on sulphur dioxide and nitrogen oxides in Sweden, on toxic waste in Germany, on water pollution in The Netherlands, and the tax differentials on leaded fuel and "cleaner" diesel fuel in Sweden.

Most barriers to implementation, especially of energy taxes, such as the potential negative impacts on competitiveness, on employment, (particularly on specific sectors or regions), and on low income groups can be overcome by:

- careful design;
- the use of environmental taxes and respective revenues as part of policy packages and green tax reform;
- gradual implementation;
- extensive consultation, and information.

The mitigation of potential negative impacts can be ensured through the above measures, as recent experience in Scandinavia

has demonstrated. The overall competitiveness of countries may be improved by well designed taxes which can spur innovation and stimulate structural change, though the latter remains speculative.

As environmental concerns move from point-source emission and problems, such as industrial emission from pipelines and chimneys, to include more diffuse and mobile sources of pollution, such as solid waste, or from the agricultural and transport sector, there is increased scope for the greater use of taxes, as well as other market based instruments, at both Member States and EU level.

If environmental taxes are well designed and implemented to exploit the advantages described above, they could deliver improvements in four key areas of public policy:

- the environment;
- innovation & competitiveness;
- employment; and
- the tax system.

These are the main conclusion of a report on environmental taxes by the European Environment Agency (EEA), requested by the European Parliament. The report provides an overview of the main issues involved in environmental taxes, with a particular focus on their environmental effectiveness and on the political barriers to their implementation. It provides illustrative examples of environmental taxes only; comprehensive reviews are available from OECD (1995).

Further information can be obtained from:

European Environment Agency
Kongens Nytorv 6 - DK-1050 København K
Tel. +43-33-367100
Fax +43-33-367199

Environment in the European Union 1995

Report for the review of the fifth environmental action programme

Edited by Keimpe Wieringa

Prepared by the European Environment Agency in cooperation with Eurostat

Luxembourg: Office for Official Publications of the European Communities, 1996, ISBN 92-827-6957-7

Environment in the European Union - 1995; Report for the review of the fifth environmental action programme is an appraisal of the state of EU's environment. It was requested by the European Commission as part of the review process of the Fifth Environmental Action Programme "Towards sustainability", for which it serves as an up-date of the 1992 report on the state of the environment. This indicator-based report also contains an environmental assessment of the progress and prospects of current actions.

The main conclusions of this report are that the European Union is making progress towards reducing certain pressures on the environment, through this is not enough to improve the general quality of the environment and represents even less progress towards sustainability. Without accelerated policies, pressures on the environment will remain exceeding human health standards and the often limited carrying capacity of the environment. Actions taken to date will not lead to full integration of environmental considerations into economic sectors or to sustainable development.

The report covers the Member States of the European Union and is based on data from a wide range of sources, including, European Commission, Eurostat, HASA, OECD, RIVM/CCE, UNECE and the World Bank?

Further information can be obtained from:

European Environment Agency
Kongen Nytorv 6
DK-1050 København K
Tel. +43-33-367100
Fax +43-33-367199

Publications from DG XI

LIFE Environment Information Package 1997-1999.

Information on and application material for LIFE Environment in French, English, German, Dutch, Italian, Spanish, Portuguese, Danish and Greek.

48 Success Stories

Demonstration Projects for Europe's Environment. Resumes of example projects supported by UFE Environment in Denmark, France, Ireland, Italy, Spain and the UK in 1992, 1993, 1994.

The Environment and the Regions: Towards Sustainability.

28-page booklet on environment in the regional policy and in the cohesion countries, published by DG XVI in close cooperation with DG XI.

Further information can be obtained from:

T. Gröberg
EC - DG XI-B2
200, rue de la Loi, B-1049 Brussels
Tel. +32-2-2969174

Information on DG XII research

Four books resulting from research projects supported within the area on socio-economic environmental research of the RTD Programme "Environment and Climate" were recently published.

- M. Bodiguel (ed.), *La qualité des eaux dans l'Union Européenne. Pratique d'une réglementation commune.* Editions L'Harmattan, Paris, 1996.
- F. Leveque (ed.), *Environmental Policy in Europe. Industry, competition, and the policy process.* Edward Elgar, Cheltenham, UK, 1996
- F. Oosterhuis, F. Rubik and G. Scholl, *Product Policy in Europe. New Environmental Perspectives,* Kluwer Academic Publishers, Dordrecht/Boston, 1996.

Further information can be obtained from:

A. Liberatore
EC - DG XII-D5
200, rue de la Loi - B-1049 Brussels
Fax +32-2-2994462

Eurostat: New publication on "Road Transport and the Environment"

A new Statistics in Focus has just been published on the energy and fiscal aspects of road transport and the environment. Amongst other things, it contains a new statistical series showing decline in transport fuel prices relative to income.

Further information can be obtained from:

G. Lock
EC STAT. OFFICE-F
Plateau du Kirchberg
L-2920 Luxembourg
Tel. +352430194462

Plant Response to Air Pollution

Edited by M. Yunus, National Botanical Research Institute, Lucknow, India and M. Iqbal, Hamdard University, New Delhi, India.

Air pollution poses a serious threat to human health and the environment worldwide. It contributes significantly to regional and global atmospheric issues such as global warming, acidification and depletion of the ozone layer. It affects all living things, including all kinds of vegetation on which we depend for our survival.

This multi-authored work studies the varied plant growth responses to pollution stress and focuses attention on the plant rather than the pollutant. This portrays a clearer picture of plant performance versus air pollution, and helps develop a better insight into the pollution-based disturbances at the different levels of plant life.

The book is of interest both to scientist and researchers of environmental botany and forestry as well as individuals with an interest in plants, global vegetation and environmental health.

0471 96061 6, 545pp, July 1996

John Wiley & Sons Ltd., Baffins Lane, Chichester, West Sussex, PO19 1UD

Fax: +44(0)1243 770225 Attention: Jo Shawyer

Atmospheric Emission Inventory Guidebook

The Guidebook is the result of a joint activity between the EMEP Task Force on Emission inventories and CORINAIR experts from Europe, USA and Canada who produced the report in order to help national authorities, industry and others responsible for controlling atmospheric emissions to identify priorities and improve estimation methodology. The Guidebook covers 8 major pollutants and all main sources of emissions.

Further information can be obtained from:

European Environment Agency
Kongen Nytorv 6
DK-1050 København K
Tel. +43-33-367100 - Fax +43-33-367199

The Arctic Region - A "Global Warning" Area Threatened by Pollution

The report shows that some areas are already seriously contaminated. Mortality rates, especially among children, are substantially higher in the most polluted regions such as North West Russia, due to the combination of environmental factors and socio-economic conditions.

Further information can be obtained from:

European Environment Agency
Kongen Nytorv 6
DK-1050 København K
Tel. +43-33-367100 - Fax +43-33-367199

"The Environment and Public Health: Action is urgent and feasible"

Three significant environmental health issues: air pollution with suspended particles, the microbiological contamination of drinking water and road traffic accidents, are highlighted for urgent action.

Each of these three hazards is a widespread problem that causes significant damage to the health of many people throughout Europe and all are amenable to coordinated action that would result in both improved environmental quality and health benefits within a short time.

Further information can be obtained from:

European Environment Agency
Kongen Nytorv 6
DK-1050 København K
Tel. +43-33-367100 - Fax +43-33-367199

A Sourcebook for Environmental Education

A Practical Review based on the Belgrade Charter

Edited by W. Leal Filho, Z. Murphy and K. O'Loan

May 1996, ISBN 1-85070-768-5

This comprehensive book celebrates the twentieth anniversary of the initiation of the UNEP-UNESCO International Environmental Education Programme. The many authors cover both historical and international perspectives with particular reference to the recent debates in Rio (1992), which set the scene for this anniversary conference in Bradford (1995). Examples of the development and implementation of environmental education policies are given for many industrialized and developing countries. The book provides a new perspective on some areas for future action in teacher training, environmental education at university level in the context of developing countries, environmental education projects and networks for students and adults. It will be of interest to a wide audience

including anyone interested in the many disciplines which the authors show must be incorporated into successful environmental education. A true sourcebook of available resources, questions of relevance to national communities and progress made since the inception in Belgrade of the need for awareness of human influence on the environment.

Teacher Education for the Environment

European Perspectives

Edited by W. Leal Filho and K. O'Loan

May 1996, ISBN 1-85070-772-3

A collaborative European viewpoint presented by members of the Euro-Awareness project on Environmental education. Each chapter provides background information on the national perspective of the meaning of environment and the aims and objectives to teaching programmes and policies. This book will be of interest to teacher educators, co-ordinators, curriculum developers and researchers involved in or interested in environmental education.

A welcome European response to *Agenda 21* and the debate at the UN conference on the Environment in Rio de Janeiro in 1992. Many contributors stress the need for environmental education to cut across disciplines, to encourage new approaches and innovation in school curricula so as to move towards the ultimate goal of environmental sustainability.

Sustainable Development

Principles, Analysis and Policies

by I. Moffat, Department of Environmental Science, University of Stirling, Stirling, UK

Illustrated, July 1996, ISBN 1-85070-731-6

This volume provides an excellent introduction to the theory and analysis of current thinking on the science, policies and practice of sustainable development and is an ideal text for undergraduates and graduates up to MSc level in environmental sciences, geography and economics.

The Parthenon Publishing Group
UK Office: Casterton Hall, Carnforth, Lancs LA6 2LA, UK
tel: 44(0) 15242 72084 - fax: 44(0) 15242 71587

EEA Annual report 1995

European Environment Agency

Luxemburg: Office for Official Publications of the European Communities, 1996, ISBN 92-827-0365-7

This second annual report of the Agency, in accordance with EC shows through the results achieved in '95, the role that the Agency can play by providing accessible information for policy makers and the public, as required by the EC Regulation.

Much environmental information resides at national and regional levels and a major objective of the Agency is to help establish and coordinate a European Environmental Information and Observation Network (EIONET).

Further information can be obtained from:

European Environment Agency
Kongen Nytorv 6
DK-1050 København K
Tel. +43-33-367100 - Fax +43-33-367199

Note from the Editor

The information contained in this Newsletter has been drawn from material supplied by the same persons indicated in each chapter as possible correspondants for further information.

Text have been checked and apologies are given for omissions or errors.