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Contents

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Editorial

This is the last issue of ENVIRONMENTAL RESEARCH NEWSLETTER published under my responsibility as I'll retire on June 30.

Hopefully, somebody else in the Environment Institute will be appointed to take over this task so as to assure the continuity in the publication of a journal born with a modest target and pioneered in a very limited effort in terms of staff and budget, yet having reached a success far beyond the most optimistic expectations.

As a matter of fact, ERN has collected so far more than 5,000 subscribers all over the world - the majority being found, obviously, in the EU Member Countries - but the steadily increasing rate of new subscribers is the best indicator of appreciation of its success.

Subscribers include a wide ranging population of readers facing environmental problems or tackling them under different approaches. Thus, besides research organisations and universities, environmental and "green" organisations, public administrations, consultancy and legal offices, financial bodies - both public and private -, libraries are the most significant.

Definitively, ERN has come out of its infancy now and has reached a development stage where a more solid structure of the editorial board would be required to further go ahead. Possibly, a reconsideration of the target of the Newsletter, of its style and content would also contribute to expand its popularity. These are tasks which are remaining to be carefully considered by my successor, to whom I wish the highest and long lasting success.

I take this opportunity for expressing my warmest thanks to my close collaborators - Mr Realini, Mrs Borlé and Mrs Acevedo - for their invaluable assistance in the editorial work, to the numerous contributors from the Institutes of the Joint Research Centre as well as from the Directorates General in Brussels - special credit being, obviously, deserved by the Environment Institute and by the Directorates General XII and XI - who have made feasible the continuity in the publication.

Last but not least, all the readers deserve special thanks and gratitude as they have represented the key factor of the success. Their continuous encouragement and appreciation coupled to the fact that ERN had been meeting since its very beginning its primary goal of promoting the awareness of the EU efforts in the environmental field, have been the driving forces for the editor and his coworkers.

The Editor

European Commission
Edith Cresson, Member of the Commission
responsible for research, innovation, training and youth

Programme News

Environment and Climate

The RENCO (Risk of Endocrine Contaminants) Project

The project, *Risk of Endocrine Contaminants* (RENCO), is aimed at providing a scientific basis for adverse health effects, with special emphasis on developmental effects in human infants, following background environmental exposure to potential endocrine active organohalogenated substances (OHS).

The five research groups involved (cf. below) in the project are covering research on identification of endocrine disruptors in human samples, identified through bioassays and sophisticated chemical analysis. The work includes synthesis of "new" OHS, chemical characterization, X-ray crystallography of OHS and binding proteins and toxicological experimental studies. Detailed structural requirements for endocrine disrupting effects (structure-activity relationships) are provided within the RENCO project. Potentially endocrine OHS are measured in human blood of non-fish eaters and in subjects with a high fish consumptions; in mothers and their children, to correlate any epidemiological data on these study groups. The toxicological impact of the OHS is studied. The integrated data obtained is used to assess human risk of perinatal exposure to OHS with special emphasis on thyroid and sex hormone systems and developmental effects.

The second working group meeting of the RENCO project was held in the Netherlands April 22-24, 1997. This EU research project is financially supported within the frame of the "Environment and Climate" program.

The results presented at the 2nd working group meeting include:

- A preliminary report on the determination of more than 100 phenolic (hydroxylated) OHS in human blood. Pentachlorophenol is the dominating compound in the plasma. As many as 30 hydroxylated OHS originate from PCB (polychlorinated biphenyls).
- A previous report on the presence and pattern of hydroxy-PCB in humans is confirmed in plasma samples from ca. 40 Swedish non-fish eaters and in fish eaters. The concentrations of the total hydroxy-PCB are only slightly lower than the concentration of PCB in the blood.
- Also, a number of polybrominated diphenyl ethers (PBDE), substances used as flame retardants, have been determined in human blood plasma. The concentrations are in the low ppb (ng/g lipid weight) range and at least two orders of magnitude lower than PCB.
- In an epidemiological study of fishermen from Sweden higher PCB, hydroxy-PCB and hexachlorobenzene have been correlated with moderate/high fish intake and with age of the fish consumer. Correlation with endocrine related parameters are under way.
- A large number of the compounds synthesised within the RENCO project have been used for identification of OHS present in the blood.
- Certain PBDE substances have been shown to be transformed to metabolites that compete with thyroxine for the transport protein TTR (transthyretin), suggesting a potential endocrine disturbing effect.
- Hydroxy-PCBs and -PBDEs will be studied for functionality effects using in vitro assays developed within the RENCO project.
- Pentachlorophenol (PCP), hydroxy-PCB, hydroxy-PBDE, and a highly used flame retardant, tetrabromobisphenol A (TBBPA), are now under investigation by X-ray diffraction methods for their binding to TTR, a thyroxine transporting protein in blood.
- Synthesis of hydroxy-PCB and hydroxy-PBDE will be prioritized for in depth endocrine related studies at developmental toxicological endpoints.
- A protocol has been agreed on by the RENCO working group for a prospective study in the Netherlands aiming at exposure effect assessment studying thyroid and sex hormone related effects on the newborn as well as on the development of the child. Recruitment of pregnant mothers has started. Results will be expected within the next two years.

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Searching for the Next Human Carcinogens

Application of state of the art techniques to identify presumptive human carcinogens.

Despite the extensive and widespread use of genetic toxicity assays, no attempt has yet been made to integrate genetic toxicity data with human exposure data to anticipate the most likely undiscovered human carcinogens. This knowledge would enable human surveillance and epidemiological resources to be concentrated on cohorts of people most exposed to presumptive human carcinogens. Such a project is being undertaken under the auspices of the EU *Environment Programme*. Interrogation of the *IUCLID* database of existing chemical substances (compiled by the European Chemicals Bureau at the Joint Research Centre at Ispra) has enabled identification of a group of discrete organic chemicals that are produced in significant quantity and which have a variety of indications of genetic toxicity.
These chemicals are being subjected to a range of genetic toxicity assessments in rodents, and it is planned to reduce the group to

the most likely potential human carcinogens within the next two years. Given that no reliable cancer data currently exist for these chemicals it is necessary to study a range of rodent tissues for evidence of mutation induction, and in order to make this a practical proposition, the novel approach of determining mutation frequencies using pooled tissue samples has been validated.

In the project it is assumed that a hierarchy of events leads to chemically induced carcinogenesis. The hierarchy distinguishes the ability of chemicals to damage DNA (measured using the comet assay) from their ability also to induce mutations (measured using transgenic rodent mutation assays) and cancer (evaluated using hemizygous p53 mice). It was anticipated at the start of the project that induced mutations (and subsequently, induced cancer) would be most marked in cases where DNA damage is accompanied by increased cell turnover (mitogenesis) in the target tissue(s) as the result of chemically induced tissue toxicity. Preliminary data using model chemicals has supported this assumption. For example, Thybaud's group have studied a mouse liver-specific dibenzocarbazole carcinogen. They found that it induced DNA adducts in the liver, and that above a threshold dose level the mutation frequency in the liver increased both dramatically and in direct relation to a concomittant increase in liver cell division. Thus, DNA adducts in the mouse liver only provided the environment from which mutations could arise following induced mitogenesis. Similarly, Ashby's group have studied a potent rat liver azocarcinogen and found that it is both mutagenic and mitogenic to the rat liver. Such findings offer the prospect that primary damage to DNA can be used to recognize possible sites of carcinogenesis, while the addition of mitogenicity data can increase the level of certainty of the projected carcinogenic outcome. However, this model also implies that the choice of dose levels (including for the rodent cancer bioassays) will be critical to the experimental outcome by virtue of the effect that dose may have on tissue toxicity. An example of this is provided by Schmezer's studies on ethylene dibromide (EDB). EDB is carcinogenic to rat and female mouse nasal turbinates, but not to those of the male mouse. Schmezer found that EDB induces DNA damage (comets) in his male CD2 mice, and the critical question therefore became whether it will also be mutagenic to the male transgenic mice. However, assessment of this seemingly simple question was complicated by his finding that the inhalation dose levels used by the US NTP in their male B6C3FI mouse carcinogenicity bioassay of EDB caused gross toxicity in the male CD2 used for the comet and transgenic mutation assays. This toxicity was not evident 2 hours after exposure when the comet assays were conducted, but was evident at 14 days when the mutation experiments were done. Consequently, the original question of the mutagenicity of EDB to CD2 male mice cannot be reliably answered using animals exposed to such toxic dose of the test agent, and the experiments are being repeated using a lower and toxicologically more appropriate dose level.

Taken together, these examples illustrate the care that must be taken in dose selection in order to generate meaningful genetic toxicity data. Currently, little attention is paid to dose selection in rodent genetic toxicity studies, but the aims and findings of this project mandate that this matter should assume critical and central importance, despite the extra studies required to set appropriate dose levels. Ideally, assessment of the short-term genetic toxicity of chemicals to rodents should not be made above the dose level that is consistent with the long term survival of the animals and avoidance of gross tissue toxicities. These concerns apply beyond the present project, and they have been echoed and elaborated within a broader context in the recent ILSI Monograph *Principles for the Selection of Doses in Chronic Rodent Bioassays* (1997). A major early conclusion of this project is that there are no short-cuts to the generation of meaningful rodent genetic toxicity and carcinogenicity bioassay data.

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Stratospheric Ozone Research

Third successive winter with large ozone loss in the Arctic stratosphere

For the third winter in succession, record low temperatures in the Arctic's lower stratosphere, coupled with the presence of man-made pollutants, have resulted in extensive chemical destruction of the ozone layer. The latest European research, sponsored by the European Commission's Environment and Climate Programme and national agencies, has found evidence of up to 40% ozone depletion in the Northern Hemisphere. There is also concern that the low spring temperatures may be part of a longer-term trend, perhaps resulting from chemistry-climate feedback. These results confirm that the efforts being made to reduce emissions of ozone-depleting substances according to the Montreal Protocol and its amendments have not yet reversed the damage done to the ozone layer.

The largest losses were contained within the polar vortex, a mobile meteorological feature which stayed close to the North Pole for most of the winter. Measurements of ozone from ground-based and balloon-borne instruments deployed across the European Arctic found that ozone levels inside the polar vortex were up to 40% lower than those outside. The European GOME satellite instrument confirmed the picture of low ozone values, measuring total ozone as low as 270 Dobson Units near the pole during March this year.

A European coordinated Arctic ozone sonde campaign has studied the ozone losses this spring in detail. The losses, locally as much as 50% compared with the normal expected values for this time of year, were concentrated in the region between 16-24 km altitude. Similar losses have been indicated by numerical models which show that up to 50% of ozone was destroyed at 19 km. These losses are similar to those experienced during the winters of 1994/95 and 1995/96.

The conditions for ozone loss include low temperatures, sunlight and a high abundance of chlorine species, mostly the by-products of degraded CFCs. The low temperatures can give rise to polar stratospheric clouds within which chlorine and bromine species are converted to forms which can destroy ozone catalytically in the presence of sunlight. Ground-based instruments at Spitzbergen and aircraft-borne instruments flown from Kiruna, Sweden found that the level of the main ozone-destroying chlorine species (chlorine monoxide) reached a maximum of 1.6 ppbv (part per billion by volume) during late February and remained high during March.

Analyses of stratospheric temperature data shows that the stratosphere during March 1997 was by far the coldest on record. The average monthly mean over the Pole was some six degrees lower than the previous minimum average. These very low temperatures in the Arctic springtime for the third successive year give rise to the concern that they may be part of a longer-term trend. It is important to understand whether, for example, this represents part of changes induced by chemistry-climate feedback.

Long-term measurements at Thessaloniki, Garmisch, Uccle (Brussels) and Reykjavik show that spectral UV-B levels continued to increase at rates close to about 2% per year at lower wavelengths (305 nm), which are important because of their effects on humans and on other life on earth. These increasing rates are a result of the long-term depletion of the protective ozone layer that has been observed since the late 1970s and amounts to approximately 0.6% per annum.

The European research programme during winter 1996/97

The scientific findings described above are the result of work carried out within the research programmes of the European Union. The European Commission (EC) supports a balanced programme of research on stratospheric ozone in the framework of the Environment and Climate programme, part of the Fourth Framework Programme for research and technological development. The European Commission's research is closely coordinated with national research programmes. Since the beginning of 1996, 34 projects have been funded by the EC under the Fourth Framework Programme. The research projects involving field measurements concentrated on ozone loss in the winter and spring of 1996/97, and involved more than 200 participants from over 20 European countries, as well as Canada, Japan, Russia and the US.

EC-supported projects of long-term atmospheric monitoring using balloons and ground-based instruments continued at a number of permanent stations in Europe and in the Arctic. Moreover, the Global Ozone Monitoring Experiment (GOME), a satellite instrument operated jointly by a number of European partners, produced near-real-time maps of total ozone which were used in the operational planning of field experiments and provided up-to-date information about the state of the ozone layer. In addition, many field activities took place in the 1996/97 winter, including the following:

- Three platforms deployed this winter significantly improved our ability to make measurements, using instruments from nearly every EU country:
  - the Russian stratospheric aircraft, Geophysika, flew from Finland during the early winter to study polar stratospheric clouds (PSCs) as part of the Airborne Polar Experiment (APE), an Italian-planned international collaboration, with EC and European Science Foundation support (see press release of 10 January 1997);
  - the German DLR Falcon was improved to double its effective range, allowing measurements to be made of PSCs and constituents, and chlorine-containing chemicals over much larger areas;
  - the innovative MIR balloon platform run by the French CNRS and CNES provided long-duration stratospheric balloons, whose two demonstration flights in the vortex lasted 13 and 22 days with an instrument making, in this instance, measurements of ozone, nitrogen dioxide and other trace species.
- A balloon measurement campaign at the Swedish balloon facility of ESRANGE at Kiruna to validate the measurements of the Japanese ILAS research satellite was funded by the French CNES, the Japanese Environment Agency, the EC and the German BMBF.
- A carefully planned series of small balloon flights to measure in-situ ozone loss by tracking the same air masses, a technique (MATCH) developed by European scientists, required cooperation between European, American, Canadian, Japanese and Russian researchers organised by the Alfred Wegener Institute at Potsdam.

A number of research institutes are supported through the Environment and Climate programme and national programmes to provide services which underpin the main scientific activities. High quality meteorological information is essential to understand what happens to the ozone layer in a given winter. Forecasts and analyses of temperature, wind, etc. were provided by the European Centre for Medium Range Weather Forecasts. The Danish Meteorological Institute calculated a number of specialised meteorological products along with the Free University at Berlin who also provided expert advice in the planning of balloon and aircraft flights. In addition, the WMO Ozone Mapping Centre at the University of Thessaloniki produced maps of total ozone from measurements made by ground and satellite instruments. The Norwegian Institute for Air Research maintains a data centre for the use of all European ozone researchers.

The scientific results of this winters research will be discussed at the Fourth European Symposium on Stratospheric Ozone Research. This will be held in Schliersee, Bavaria in September 22-26, 1997 and be sponsored by the European Commission and the German BMBF.

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JRC-Ispra Research Activities

Atmospheric Processes

Changes in atmospheric composition pose one of the largest threats to the stability of the environment. Small changes in the release of some gases can have unexpectedly large and lasting global effects. This is of particular concern where the changes are due to the activities of man. An understanding of how anthropogenic emissions are perturbing the natural biogeochemical cycles however, requires an understanding of both the natural cycles and the processes by which the anthropogenic emissions perturb them. It is within this context that the Atmospheric Processes Unit of EI studies the complex atmospheric physico-chemical processes of both the natural and anthropogenic contributions to tropospheric ozone formation and the formation and behaviour of atmospheric aerosols. The activities of the Unit are focused on aspects of these studies that are relevant to Europe, as understanding them is a key element in environmental policy decision making.

Tropospheric Ozone

Within Europe, the Mediterranean basin is the most important source region for tropospheric ozone, and has significant emissions of both natural and anthropogenic precursor species. It is the focus for a number of collaborative shared cost action projects that the Unit either co-ordinates or participates in. The emphasis is on the investigation of the role of biogenic volatile organic compounds (VOCs) in tropospheric ozone formation, with the goals of deriving emissions data, and reaction pathways for the principal VOCs, that are applicable for the entire Mediterranean area.

One focus of this research theme is the BEMA project (**B**iogenic **E**missions from the **M**editerranean **A**rea), which is part of the Environment and Climate 1994-98 Shared-Cost Action (SCA) programme, and is a collaboration between 17 European Laboratories, coordinated by the Unit. BEMA has been divided into two phases: during the first phase, 1994-1995, field campaigns were carried out at a nature reserve at Castelporziano near Rome (Italy), a semi-natural shrubby woodland site near Montpellier (France), and a citrus orchard site at Burriana near Valencia (Spain), to evaluate both qualitatively and quantitatively the natural emission fluxes under different physiological, meteorological and soil conditions.

The results from the 1993-94 campaigns at Castelporziano are due to be published in a special issue of the Atmospheric Environment journal in 1996. Key findings from this first phase of BEMA are that:

- highly reactive oxygenated terpenoids are among the main compounds emitted by Mediterranean vegetation;
- the emissions have a marked seasonal cycle;
- current parameterizations of the emission models do not reproduce the observed emissions from common Mediterranean tree species.

A special issue of ATMOSPHERIC Environment with 22 papers presenting BEMA phase I results is in print.

Following the BEMA phase II (1996-97) objective, to scale biogenic emissions up to regional levels and to evaluate their ozone forming potential, the focus in 1996 was on modelling work at three levels:

1 modelling of vegetation emissions: for common Mediterranean plant species, the parameterization proposed in the literature could not predict emissions qualitatively and quantitatively and new algorithms have been developed and tested for some species.

2 GIS-based scaling of experimental data: validation by micrometeorological measurements of emission fluxes modelled for BEMA-test canopies gave excellent results for relatively stable compounds (e.g. isoprene or α-pinene). Problems were identified in the case of canopies such as pine forests or citrus orchards emitting highly reactive compounds (ocimene, linalool, β-caryophyllene) which disappear already within the canopy.

3 Evaluating, by chemical modelling, the ozone-forming potential of biogenic emissions in comparison with anthropogenic compound. Several workshops were organized to select and to test modelling tools satisfying BEMA requirements; for sensitivity testing, the RACM box chemical model has been selected and modified to include reactive terpenoids. For dynamic photochemistry coupling, a multidimensional meteorological/chemical model (TVM-CIT) is under development in collaboration with IFU, Garmisch and EPFL, Lausanne.

The planning of a model-driven, mesoscalic experiment for June 1997 in the Valencia citrus belt was started.

Two preparatory experiments performed in July 1995 and in May 1996 have shown that the area is well suited for a Lagrangian experiment due to the very regular land-sea breeze system and due to the homogenous, large scale emission source.

Complementary laboratory studies aimed at identifying the reaction pathways of the principal VOCs are also carried out within BEMA and, within the framework of another SCA, BIOVOC (Degradation mechanisms for **BIO**genic **V**olatile **O**rganic **C**ompounds), which is also co-ordinated by the Unit. BIOVOC will combine laboratory work and model development. One of its main aims is to improve the understanding of the influence of biogenic VOCs on tropospheric ozone levels. Much of the experimental work within BIOVOC will use the new EUPHORE facility, constructed at the Centro de Estudios Ambientales del Mediterraneo (CEAM) Valencia, Spain in partnership with the Unit and four other European laboratories. A product study on the atmospheric oxidation of linalool, a terpene alcohol emitted in large amounts from Mediterranean plant species, was finalised, showing that an unsaturaled hydroxy-aldehyde (lactol) was the main product identified. In order to estimate the atmospheric lifetime and fate of the main primary oxidation products of some of the most abundant terpenes, the rate constants for their reactions with the most important atmospheric oxidizing species (OH and NO_3 radicals as well as ozone) were determined. It was concluded that the reaction of the OH radical was the main atmospheric oxidation pathway, but the reaction with the NO_3 radical could be of importance in polluted areas. Laboratory studies of the atmospheric oxidation products of 2-methyl-3-buten-2-ol, which is emitted from vegetation, showed that this species is a potentially relevant source of acetone in the troposphere.

As a contribution to the PRICE-II SCA, a new instrument for field measurements of peroxy radicals, which play a central role on the oxidation capacity of the atmosphere along with ozone, has been developed in collaboration with the University of Bremen (Germany). The instrument for measurement of atmospheric peroxyradicals was employed in a laboratory intercomparison campaign (PRICE-II) in Jülich (D). The 'chemical amplifier' measurements of hydroperoxyradicals agreed within 30% with the delivered concentration. During the first year (1996) of the ^{14}C-VOC SCA project (biogenic and anthropogenic contributions to ambient volatile organic compounds), the JRC Ispra has developed a method for the sampling and clean-up of atmospheric carbonyl compounds for radiocarbon (^{14}C) measurements. The method has been tested by QAQC samples and has been proved to give reliable results. The results of the first field experiment show that ambient air over Ispra on a late summer day contains mainly five carbonyls (formaldehyde>acetaldehyde>acetone>propanal>butanal). The 57% contemporary carbon found in the Ispra sample indicate that it has a partly biogenic and partly anthropogenic origin of carbonyls and/or their precursors in air. The method will be used in the second year for radiocarbon (^{14}C) measurements at the other test sites of the project.

Aerosols and Climate

As with the research focused on ozone, the unit is active in investigating both the natural aerosol cycles and the perturbation of these cycles by anthropogenic emissions of aerosols and their precursors. The objective of the research is to contribute to the assessment of the impact of the atmospheric aerosol burden on the radiation budget of the Earth, and to determine the extent to which this impact is perturbed by natural and anthropogenic influences. The activities thus encompass field observations of aerosol properties and management of a world database of such observations on behalf of WMO, modelling and laboratory studies of the physico-chemical process influencing the atmospheric aerosol burden.

A key focus for this theme is IGAC's second aerosol characterisation experiment ACE-2 which is co-ordinated by the Unit. ACE-2 is planned to take place in the Azores-Madeira-Canaries triangle during the summer of 1997. It has the aim of investigating the effects of anthropogenic pollution from Europe, Saharian desert dust and natural emissions from the sea (dimethylsulphide emissions) on the radiation balance and cloud systems over the NE Atlantic. A comprehensive series of physical and chemical atmospheric measurements from airborne, seaborne and land based platforms are scheduled, as well as complementary modelling activities for data interpretation.

The 3rd pre-ACE-2 campaign has been performed, and consisted mainly of the installation and testing of a aerosol sampling facility on Tenerife, to be used by the ACE-2 community in 1997. Aerosol physical and chemical data of the previous campaigns were used to identify the ranges of the main parameters to be studied in 1997. The ACE-2 long-term aerosol network became fully operational and gives a first impression of the seasonal variability in the area. A more advanced global transport model, TM2 developed by MPI Hamburg has been implemented on JRC workstations and the supercomputer of the Centro Svizzero di Calcolo Scientifico (Mano). A simplified aerosol dynamics model M3 has been implemented in TM2 and realistic global fields of aerosol number and size have been produced. This is an important first step to assess the effect of anthropogenic aerosols on the radiative properties of clouds on the global scale. Work has initiated to describe the mixing of sulfate, black carbon, desert dust and seasalt aerosols in TM2. WMO's World Data Centre for Aerosols is operational and is gathering global aerosol monitoring data.

Complementary laboratory and modelling studies are investigating the reaction pathways of dimethylsulphide (DMS), in order to better understand the extent to which the atmospheric oxidation of DMS influences aerosol formation and growth in the marine atmosphere. The main pathways are as yet unclear, however, studies of the atmospheric oxidation of DMS have shown that dimethylsulphoxide (DMSO) and dimethylsulphone ($DMSO_2$) are important reaction products. It was found that DMSO can be rapidly oxidised by gas phase reactions in the atmosphere and thus may contribute to the formation of new particles. $DMSO_2$, on the other hand, is more likely to be removed by heterogeneous processes.

The modelling activities in the field of Aerosols and Climate project are also focused on the SCA SINDICATE (**S**tudy of the **IN**direct and **D**irect **I**nfluences on **C**limate of **A**nthropogenic **T**race gas **E**missions). A collection of models, ranging from O-D process models of aerosol dynamics (AERO2, IMAD) to 3-D models of the global atmosphere (MOGUNTIA, TM2), are used to study emissions and global transport of aerosols and to determine their effect on global climate. Within SINDICATE, emission inventories of the main aerosol components, both natural and anthropogenic, are being developed. In collaboration with the Institute for Remote Sensing Applications of the JRC, a first-time estimate of the seasonality of Black Carbon (BC) aerosol emissions from biomass burning, an important anthropogenic source, has been derived from AVHRR (**A**dvanced **V**ery **H**igh **R**esolution **R**adiometer) remote sensing observations.

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ERLAP

In the frame of the support activities the highlights of the European Reference Laboratory (ERLAP) for the Pollution in 1996, are the following:

Harmonisation of measurement techniques

Field measurement campaigns of PM10 measurements in Madrid, Berlin and Birmingham, and VOC (including benzene) measurements in London, with the scope to compare the performances of monitoring techniques and to select possible reference methods for the implementation of related EU air quality directives.

Preparatory work for new directives

Participation to the working groups for the revision of the SO_2, PM10, Pb and NO_2 directives, by providing in particular scientific/technical advice on the measurement strategy.

Organisation of pilot studies

Pilot studies for the assessment of the spatial distribution of NO_2 in Mulhouse, Palermo, Catania, Messina, and of BTX (benzene, toluene, xylene) in Catania, in view of the design/optimization of monitoring networks.

Validation of LIDAR measurements - Ozone measurement campaign

Measurement campaign in the Sevilla area (June 1996) in collaboration with the Junta de Andalucia, Agencia de Medio Ambiente (AMA) with the scope to test the performances of a new mobile LIDAR system for 3-dimensional ozone measurements and to study the ozone phenomenology in southern Europe.

Modelling urban air pollution

Compatibility study and validation of the Auto-Oil emission inventories. Evaluation of the CASPER data base for the construction of emission inventories. Assessment and optimization of the Athens monitoring network.

Auto-Oil was the first European study designed to identify the best and most cost-effective measures to reduce the emissions of automotive traffic in order to reach the EU air-quality objectives by the year 2010. It was a co-operative programme between the European Commission (DG III, DG XI and the Environment Institute of the JRC), the European automobile and oil industries.

Different predictive models were used to estimate emission reductions for urban pollutants. These were based on existing air quality objectives and on the new World Health Organisation (WHO) air-quality guidelines. These models were applied in seven representative European cities: Athens, Cologne, the Hague, London, Lyons, Madrid and Milan.

Emissions were predicted to decline significantly as a result of already agreed measures. Concentrations in all seven cities were estimated to be below target values for benzene and carbon monoxide. For nitrogen dioxide, however, the more stringent target value is expected to continue to be exceeded in all the cities. Further reductions in emissions of nitrogen oxides of between 5 and 55% must be set for meeting this value. For ozone, a regional model was used for assessing the impact of potential policies on concentrations across Europe. Emissions in one country influence the ozone concentrations observed elsewhere in Europe. A series of ozone targets, also based on existing air quality objectives and on the new WHO air quality guidelines, were used to assess future concentrations. National emissions of ozone precursors were predicted to decrease by 35 to 40% over the 1990 to 2010 years. This will not be sufficient however to meet the target values. These targets for ozone will require an integrated strategy, tackling all sources of precursor emissions, including those from stationary sources.

Diffusion of information

Organization of the workshop "Quality assurance and accreditation of air pollution laboratories" providing guidance to the network managers and the accreditation organizations on the implementation of the new Directive on Air Quality Assessment and Management (attendance of ± 100 participants).

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MAST

Large Scale Marine Research Projects

Major EU research projects of the MAST (Marine Science and Technology) Programme foster the combination of efforts in EU member states in view of getting a good grasp of physics and biology of complex phenomena such as the Gulf Steam circulation, the sea productivity off Iceland, Azores and Canary Islands, the uptake by sea waters of excess atmospheric CO_2.

For the purpose, vaste seas north of Iceland and in the triangle Canary Islands-Azores-Gibraltar are being investigated.

Since 1993, during 8 years, more than 70 laboratories of the EU member states are and will be cooperating in the development of 5 projects focused on the above-mentioned processes, i.e.:

- DYNAMO (**Dy**namics of **N**orth **A**tlantic **Mo**dels, coordinated by Prof. J. Willebrandt, University of Kiel; period 1993-96);
- ESOP I (**E**uropean **S**ub-polar **O**cean **P**rogramme: Sea-ice Ocean Interactions, coordinated by Dr. P. Wadhams, University of Cambridge; period 1993-96);
- ESOP II (**E**uropean **S**ub-polar **O**cean **P**rogramme: The Thermohaline Circulation in the Greenland Sea, coordinated by Prof. E. Jansen, University of Bergen; period 1996-98);
- VEINS (**V**ariability of **E**xchanges **i**n **N**orthern **S**eas, coordinated by Prof. J. Meincke, University of Hamburg; period 1997-2000);
- CANIGO (**Can**ary **I**slands, Azores, **G**ibraltar **O**bservations, coordinated by Dr. G. Parilla, University of Madrid; period 1996-99).

These projects are aimed at assessing how salt water pulses from the Mediterranean sea, sea-ice, sun, storm and algae blooms are shaping Mediterranean, Arctic and Atlantic waters into cascades filling with salt, carbon and oxygen the Atlantic Ocean depths.

One of the main issues in marine research today is to understand whether the formation of deep waters in the Atlantic Ocean and its related surface circulation patterns are stable in their present mode of operation. This so-called thermohaline circulation is tightly linked to heat and moisture fluxes in the atmosphere determine the climate over Europe and the precipitation in the Mediterranean region. The physical processes of the regions which are of paramount significance for the understanding of the thermohaline circulation are also determining the productivity of regional surface waters. This has an impact on both the exploitable fish stocks and on the ability of the ocean to sequester, to store and to transfer to depths and into sediments CO_2 from the atmosphere. Thus, interdisciplinary research aimed at understanding the thermohaline circulation and related carbon dynamics can contribute to better use of both biological production and abatement of atmospheric carbon.

After many years of extensive research, qualitative understanding of the "thermohaline circulation" is in hand indicating a delicate interplay of three dynamic centres in the central and northern North Atlantic, namely the Greenland Sea/Nordic Seas, Labrador Sea and Sargasso Sea with the salt input by Mediterranean outflow. Although many fundamental questions related to the basic nature of deep water formation by connective overturning in high latitudes are not resolved with necessary detail it seems that deep water formation in the Greenland Sea was closing down the recent years. Although consequences of a varied pattern of deep water formation in the Nordic Seas are subject to ongoing research three areas of possible impacts are evident:

- the heat and rain transported from the Atlantic Ocean to Europe may vary in amount and seasonal distribution with probable consequences for agriculture, water management and transport;
- the manner how the ocean sequesters excess CO_2 from the atmosphere and stores it in deep water masses is modulated;
- the global balance of heat and freshwater fluxes is shifted.

It is clear that if the status of the thermohaline circulation of the North Atlantic Ocean can be determined on a regular basis, a direct way towards practical applications is shown. In this sense the above mentioned projects have been conceived and addressed.

- DYNAMO has produced 3 models simulating the north-south overturning of the North Atlantic, diagnosing properly the characteristics of deep waters in the North Atlantic in relationship with regional key processes, and assessing the strength of these processes as well as their sensitivity to the applied numerical techniques;

- ESOP I has demonstrated the large annual variability of ice and deep water formation in the Nordic Seas, has quantified -for the first time- the carbon sequestering process in the Nordic Seas, has produced ocean-ice-atmosphere models and remote sensing data as well as observation techniques for the physical and biological diagnostics of one of the most dynamic seas;
- ESOP II/VEINS are aimed at understanding the thermohaline circulation of the Greenland Sea, its sensitivity and its impact, via the Atlantic Ocean circulation, on global ocean circulation, by building on a unique combination of novel experiment techniques, modelling and experience gained on ice-ocean interaction under ESOP-I in MAST-II. For the very first time a large scale tracer experiment (ESOP-II) allows to measure directly the strength of deep water formation in the Greenland Sea as well as the export of water masses into the Atlantic Ocean. Related observations, undertaken by VEINS, will constrain the flux of fresh water, heat and salt through the Greenland Sea and build the know-how for a monitoring programme addressing the regional marine climate. Thus a comprehensive budget of the Greenland Sea as part of the global heat and water flux and its monitoring is in reach.
- CANIGO will assess how Atlantic Ocean temperate and subtropical water masses re-shape their "geochemical signature" by mixing, biological production and penetration of Mediterranean outflow. Intermittent upwelling and unstable coastal boundary currents along African and Iberian coasts sustain important fisheries due to vigorous plankton growth in appropriately mixed surface water masses. The Atlantic Ocean Large feeds large amounts of lowproductive subtropical water masses into the region between Azores and Canary Islands which are transformed before being partly fed into the Mediterranean Sea or exported southward. The overall salt excess of the Atlantic Ocean, which is crucial for its role in global climate processes, stems from the Mediterranean Sea outflow spilling in depths over the sills of Gibraltar Strait and forming large, persistent subsurface whirls. Physical and biological processes in that "marine cross road" impact on climate of the North Atlantic, on fisheries in the region and on carbon export, for storage, into the depth of the ocean. Thus to understand the interplay of these processes and their unsteady balance will impact on food supply, European climate and global carbon dynamics.

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Industrial Risk

Major Accident Hazards Bureau (MAHB)

The Major Accident Hazards Bureau (MAHB) gives support to other services of the European Commission, principally to Directorate-General XI (Environment, Nuclear Safety and Civil Protection), for the successful implementation of European Union policy on the control of major hazards and the prevention and mitigation of major accidents, in particular in connection with the Directive on the Major-Accident Hazards of Certain Industrial Activities ('Seveso-Directives' 82/501/EEC and 96/82/EC) concerning the processing and storage of hazardous substances (see also MAHB's WWW home page under http://mtrls1.jrc.it:80/mahb/).

The tasks of MAHB include:

- managing the Major Accident Reporting System (MARS) database;
- managing the Community Documentation Centre on Industrial Risk (CDCIR);
- providing technical and scientific support for Technical Working Groups studying various aspects of the control of major accident hazards;
- undertaking specific tasks of information dissemination, including organising seminars with the National Authorities on relevant topics in the area of industrial risk.

Major Accident Reporting System (MARS)

The MARS database is used both to prepare regular summaries of accidents notified for the Committee of "Seveso" Directive Competent Authorities (CCA), and to prepare occasional specific studies of lessons learnt from accidents, both for the CCA and - with identifying details removed - for the general public. These studies and analyses have provided the basis for several initiatives, such as the explicit inclusion of Safety Management Systems and the criteria for accident notification mentioned below in the new Seveso II Directive.

At the end of 1996, the system held information on 250 accidents and incidents, information which had been submitted to the Commission in confidence for the use of the Commission and the CAs, allowing identification of significant dependencies among the accident descriptors and thus of overall trends and patterns in accident sequences.

Besides routine operation of the database (translation and quality check of incoming events; communication with the CAs on the technical background of information notified), a major data consistency exercise was performed in 1996 with all CAs having data in MARS. On a country-by-country basis, a number of inconsistencies in the understanding of the contents of the database between CAs and MARS were identified and solved after extensive discussions. In addition to the regular feedback of information from MARS to the Committee of Competent Authorities to share information which can help to prevent future accidents, some 15 requests were received from external institutions to perform specific analyses on non-confidential MARS data (e.g., related to circumstances of accidents in fuel storage and underground storage, oil pollution accidents and incidents, explosions). A mathematical analysis carried out in 1996, using MARS data, on the impact of near-misses on overall accident frequency estimates showed up clearly the importance of collecting and evaluating data on near-misses in accident databases.

The "Seveso II" Directive (96/82/EC) passed by the Council at the end of 1996, gives a clear and unequivocal definition of what constitutes a "major accident". This should lead to a lowering of the threshold criteria for the notification of an accident to the Commission and thus in a significantly increased number of events reported. The new Directive also calls for a more open approach to the supply of information to the public, both from the Member States and from the Commission, supported by a precise definition of what information has to be kept confidential. Given the significant MARS-related changes implied by "Seveso II", it was decided to set up a new information exchange system, "MARS 3.0", to facilitate compliance with the new requirements. For this, the software structure of MARS had to be completely changed and MARS 3.0 now consists of a distributed data logging system running on a MSWindows platform (CA-specific local databases), supported by a centralised UNIX-based data management system (MAHB's central database), which reaches the required efficiency with the help of a relational database management system. This concept ensures the management of large and complex data sets, consisting of data of several different object classes. On this basis, complex queries, including hypertext retrieval and cluster analysis are now possible.

During 1996, the detailed software specification and design were defined and discussed with various international bodies, and the new software was delivered to all CAs interested in December 1996 (DOS component).

In February 1997, a workshop will be held to discuss the practical use of the CA version of MARS 3.0, while the central UNIX component of MARS 3.0 is due to be finished in early 1997. Two further research actions based on MARS data are planned in co-operation with Universities in the Member States: the identification of human error patterns and the development of a statistical analysis method based on text retrieval. It is also proposed to study accident gravity scales and Geographical Information Systems (GIS).

Further information regarding MARS can be obtained from:
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Community Documentation Centre on Industrial Risk (CDCIR)

The Community Documentation Centre on Industrial Risk (CDCIR) creates a bibliographic and scientific environment which facilitates exchange of information between the Member States on the control of major hazard industrial activities, and which allows to gain maximum knowledge from the common European effort towards industrial safety.

At the end of 1996, the CDCIR contained 2257 reviewed documents, issued by governmental institutions, industry and research institutes, including many documents which, not having been "published" in the usual manner, are not easily found elsewhere ("grey literature"). Its bibliographic data include document-related data fields, e.g. title, original title, year of publication, source, availability, keywords and abstract. Besides routine operation of the database (acquisition of relevant public-domain material, both published and unpublished; making non-copyright material available to CAs and other parties), a new Bulletin, Bulletin No. 10, was issued in September 1996 and sent out free of cost to about 1300 receivers with details and abstracts of material recently acquired for the CDCIR. In 1996, there were about 300 requests from external institutions for material from the CDCIR, as well as a number of site visits from groups and individuals. Furthermore, the CDCIR database software development was finalised in 1996 with extensive software testing.

Bulletin 11 will be produced in early 1997, and bulletin 12 later in the year. The CDCIR bulletin (including abstracts) will also be made available in electronic form (on CD-ROM). If resources permit, it is hoped to expand significantly the material acquired.

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Technical Working Groups, Seminars and Studies

Technical Working Groups have been set up by DG XI of the European Commission in consultation with MAHB to provide a forum for discussion and comparison of national approaches to various aspects of the Seveso Directives, in particular topics which have been introduced for the first time in the Seveso II Directive. In most cases they include, in addition to representatives from the National Authorities, members from other interested parties, in particular industrial groupings, either those of the chemical or petrochemical industry in general (e.g. CEFIC) or those specifically concerned with safety or environmental issues (e.g. CONCAWE, EPSC). Currently, Technical Working Groups on "Safety Reports" (final guidance document issued in 1996), "Safety Management Systems" (final guidance document distributed to CAs in 1996), "Land-Use Planning" (first meeting in 1996), "Derogations under Article 9(6) of the Seveso II Directive" (first meeting in 1996) and on "Substances Dangerous for the Environment" (first meeting in 1996) are active and a number of guidance documents for the CAs has been produced so far.

Further information regarding the Technical Working Groups can be obtained from:
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A part of the mission of the MAHB is to enable the National Authorities responsible for the implementation of the Seveso Directive in the Member States to come together to share their experience in the development and implementation of national legislation. One important mechanism for this sharing has been a series of **seminars**, organised on a roughly annual basis. Since 1993, seminars have been organised on "Safety Management Systems", "Runaway Reactions", "Accident Scenarios" and "Chemical Risks in Ports and Marshalling Yards". Participants in these thematic seminars have included representatives of the chemical or petrochemical industry, or of other national or local Authorities as appropriate to the matter under discussion. It is proposed to hold a seminar in 1997 on "Lessons Learnt from Accidents", discussing conclusions to be drawn whether from particular accidents or from collections of accidents, and also considering the structure of accident databases needed to enable such conclusions to be drawn.

Various **studies** on topics in the area of industrial risk have been performed by MAHB, including an "Analysis of the safety-related issues of the temporary storage of hazardous materials in transportation-related activities", "Hazards and accidents involving pipelines transporting hazardous substances", "Land use planning in the context of major accident hazards", "Dangerous substances resulting from loss of control of a chemical process", etc.

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Biotechnology and Environment

Summary notifications circulated under Article 9 of Directive 90/220/EEC from 21st October 1991 to 28th February 1997

According to Article 9 of the Council Directive of 23 April 1990 on the deliberate release into the environment of genetically modified organisms, the Competent Authorities of the member states send to the Commission a summary of each notification received following a procedure laid down in Article 21 of the Directive.

The summary notification has two different formats, depending on whether it deals with the release of genetically modified higher plants or with the release of any other type of genetically modified organism. The plant-specific format has been recently transformed into an electronic version and will soon be available from the Internet (http://biotech.jrc.it).

The application of this electronic format allows the Competent Authorities to key in all data elements available and to export data at desired intervals to the Commission on one hand and to import notifications submitted by other Member States and distributed by the Commission on the other hand.

Since March 1996, the JRC manages the circulation between the member states of the summaries of the notifications under part B of the Directive (i.e. the deliberate release into the environment for the purpose of small-scale field trials).

Here we give a schematic representation in four tables of the deliberate field trials notified so far in the European Community.

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Table 1: List of SNIFs circulated under Article 9 of Directive 90/220/EEC from 21st October 1991 to 28th February 1997: breakdown per country.

Country	Total
Austria	3
Belgium	75
Denmark	31
Finland	5
France	265
Germany	53
Greece	5
Ireland	2
Italy	136
Netherlands	75
Portugal	5
Spain	43
Sweden	21
United Kingdom	117
Total for the European Union	836

Table 2: List of SNIFs dealing with genetically modified micro-organisms circulated under Article 9 of Directive 90/220/EEC from 21st October 1991 to 28th February 1997.

Vaccine	Total
Canarypoxvirus	1
Pseudorabies vaccine	2
Total number of vaccines released	3

Procaryote	Total
Autographa californica	2
Azospirillum sp.	3
Bacillus sp.	2
Bacteriophage M13	1
Pseudomonas sp.	10
Rhizobium sp.	7
Streptococcus sp.	1
Total number of procaryotes released	26

Table 3: List of SNIFs dealing with genetically modified plants circulated under Article 9 of Directive 90/220/EEC from 21st October 1991 to 28th February 1997.

Common name	Total
African violet	1
Alfalfa	2
Apple	1
Barley	1
Beet	136
Carnation	3
Carrot	1
Cauliflower	5
Chicory	36
Chrysanthemum	1
Cotton	4
Eucalyptus	3
European plum	1
Grape	2
Lettuce	4
Maize	203
Marigold	8
Melon	4
Oilseed rape	189
Petunia	2
Poplar	7
Potato	96
Rape	12
Silver birch	1
Soybean	6
Squash	2
Strawberry	1
Sunflower	6
Sweet orange	1
Thale cress	1
Tobacco	30
Tomato	54
Wheat	6
Total number of plants released	830

EC Legislation

EC Regulatory Activities

Directorate General XI[1]

Legislative instruments recently adopted

- Council Directive 96/82/EC of 9 December 1996 on the *control of major-accident hazards involving dangerous substances* [OJEC L 10, 14/01/97, p. 13].
- Council Regulation (EC) N° 338/97 of 9 December 1996 *on the protection of species of wild fauna and flora by regulating trade therein* [OJEC L 61, 3/03/97, p. 1].
- Council Regulation (EC) N° 120/97 of 20 January 1997 amending Regulation (EC) N° 259/93 *on the supervision and control of shipments of waste within, into and out of the European Community* [OJEC L 22, 24/01/97, p. 14].
- Council Decision of 27 January 1997 (97/101/EC) establishing a *reciprocal exchange of information and data from networks and individual stations measuring ambient air pollution within the Member States* [OJEC L 35, 5/02/97, p. 14].
- Council Regulation (EC) N° 307/97 of 17 February 1997 *amending Regulation (EEC) N° 3528/86 on the protection of the Community's forests against atmospheric pollution* [OJEC L 51, 21/02/97, p. 9].
- Council Regulation (EC) N° 308/97 of 17 February 1997 *amending regulation (EEC) N° 2158/92 on protection of the Community's forests against fire* [OJEC L 51, 21/02/97, p. 11].
- Commission Decision of 24 February 1997 on the *setting-up of a European consultative forum on the environment and sustainable development* [OJEC L 58, 27/02/97, p. 48].
- Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on *the assessment of the effects of certain public and private projects on the environment* [OJEC L 73, 14/03/97, p. 5].

Expected new initiatives, mentioned in ERN 18, **cancelled (c) or postponed (p):**

- VOC emissions from refuelling at service stations-Stage II (Directive) (p).
- Toxic/polluting emissions register (regulation) (c).

Pending proposals and expected new initiatives

1 With the eventual collaboration of other DGs (I, III, VI, 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	never been discussed
Cohesion policy and the Environment[pp] (Communication)	11/95	COM (95) 509	P. Jörgensen (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. Munoz Gomez (DG XI)	*Cooperation proc.* 1st reading 11/96	common position 4/97
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 modified proposal submitted 12/96 2nd reading likely 9/97	common position 4/97
Trade and Environment[pp] (Communication)	2/96	COM (96) 54	J. Garcia Burgues (DG XI)	opinion 11/96	
Implementation of Community Environmental law (IMPEL)[pp] (Communication)	11/96	COM (96) 500	D. Noble (DG XI)	EP resolution 5/97	Council resolution 6/97
Framework for voluntary Environmental protection agreements with industry[pp] (Communication)	11/96	COM (96) 561	P. Dröll (DG XI)	opinion planned for 7/97	Council resolution 6/97
Assessment of the effects of certain plans and programmes on the Environment (Strategic Environmental assessment: SEA)[pp] (Directive)	12/96	COM (96) 511	L. Feldmann (DG XI)		
Revised Community Eco-label award scheme[pp] (Council Regulation)	12/96	COM (96) 603	G. Morrison (DG XI)		
Environmental taxes and charges in the single market[pp] (Communication)	1/97	COM (97) 9	H. Bergman (DG XXI+DG XI)		
Review Agency Regulation[eni]	5/97		A. Huyton (DG XI)		
Environmental business and industry, job creation and greening of industry[eni] (Communication to be proposed)	10/97		H. Berends (DG XI)		

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

AIR Commission proposals*					
Title	**Date**	**Reference Documents**	**Contact**	**Parliament**	**Council**
Emissions of gaseous and particulate pollutants from internal combustion engines in non-road mobile machinery[pp] (Directive)	9/95	COM (95) 350	F. Lamberts (DG XI)	*Co-decision proc.* 1st reading 10/95 2nd reading 5/97	common position 6/96
A Community strategy to reduce CO_2 emissions from passenger cars and improve fuel economy[pp] (Communication)	12/95	COM (95) 689	H. Arp (DG XI)	resolution 4/97	Council conclusions 6/96
"Auto Oil" Programme: future strategy for the control of atmospheric emissions from road transport taking into account the results from the auto-oil Programme[pp] (Communication)	6/96	COM (96) 248	P. Murphy (DG XI) J.M. Mackowsky (DG XI)	resolution 4/97	
"Auto Oil" Programme: quality of petrol and diesel fuels[pp] (Directive amending Dir. 93/12/EEC)	6/96	COM (96) 248	P. Murphy (DG XI) J.M. Mackowsky (DG XI) J. Maters (DG XVII)	*Co-decision proc.* 1st reading 4/97	
"Auto Oil" Programme: measures to be taken against air pollution by emissions from motor vehicles[pp] (Directive amending Dir. 70/220/EEC 70/156/EEC)	6/96	COM (96) 248	P. Murphy (DG XI) J.M. Mackowsky (DG XI) H. Henssler (DG III)	*Co-decision proc.* 1st reading 4/97	
Monitoring mechanism of Community CO_2 and other greenhouse gas emissions[pp] (amendment to Council decision 93/389/EEC)	9/96	COM (96) 369	M. Raquet (DG XI)	*Cooperation proc.* 1st reading 6/97	
Limitation of emissions of volatile organic compounds due to the use of organic solvents in certain industrial activities (VOC's)[pp] (Directive)	11/96	COM (96) 538	H. Aichinger (DG XI)	*Cooperation proc.*	
Methane emissions[pp] (Communication)	11/96	COM (96) 557	P. Horrocks (DG XI)		
"Auto Oil" Programme: measures to be taken against air pollution by emissions from light commercial vehicles (LCVs)[pp] (Directive)	2/97	COM (97) 61	P. Murphy (DG XI) J.M. Mackowsky (DG XI) H. Henssler (DG III)	*Co-decision proc.*	
Action programme to combat acidification[pp] (Communication)	3/97	COM (97) 88	C. Agren (DG XI)		
Sulphur content of certain liquid fuels[pp] (Directive)	3/97	COM (97) 88	C. Agren (DG XI)		
NO_x emissions from new aircraft[eni] (Directive to be proposed)			A. Rowland (DG XI)		
Substances that deplete the ozone layer[eni] (amendment to Regulation 3093/94)	6/97		B. Lorz (DG XI)		
Emissions from heavy duty vehicles (HDVs)[eni] (Directive to be proposed)	mid 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 emissions for 2005[eni] (expected package of proposals)	end 98		P. Murphy (DG XI) J.M. Mackowsky (DG XI)		
Daughter directives air quality (SO_2, NO_x, particulate matters)[eni]	7/97		L. Edwards (DG XI)		
Inspection and maintenance (Auto-oil programme)[eni]	end 97		DG III		

NOISE Commission proposals*					
Title	**Date**	**Reference Documents**	**Contact**	**Parliament**	**Council**
Furure Noise Policy[pp] (Green Paper to be presented)	11/96	COM (96) 540	V. Irmer (DG XI)	6/97	
Aircraft noise[eni] (Directive to be proposed)			A. Rowland (DG XI)		
Noise emissions from auto tires[eni] (Directive to be proposed)	early 97		F. Stella, A. Slagmulders (DG III) A. Slagmulders (DG III)		
Noise from outdoor equipment[eni] (Framework directive to be proposed)	10/97		V. Irmer (DG XI)		

* 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 (DG XI) G. Wilson (DG XI)	*Co-decision proc.* 1st reading 6/96 2nd reading 5/97	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)	*Cooperation proc.*	
Codification of legislation on the classification, packaging and labelling of dangerous substances[pp]	1/94	COM (93) 638 COM (94) 103	P. Brunko (DG XI) J. Costa-David (DG XI) E. Kreutzer (DG XI)	*Co-decision proc.* 1st reading 2/95	
Contained use of genetically modified micro-organisms[pp] (Amendment to Dir 90/219/EEC)	3/96	COM (95) 640	H. Martin (DG XI)	*Cooperation proc.* 1st reading 3/97	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)	*Cooperation proc.* 1st reading 4/97	
Genetically modified organisms[eni] (revision of directive 90/220/EEC)	7/97		H. Martin (DG XI)		

NATURE Commission proposals*					
Title/content	**Date**	**Reference Documents**	**Contact**	**Parliament**	**Council**
Conservation of wild birds[pp] (Council directive amending dir. 79/409)	3/94	COM (94) 39	R. Geiser (DG XI)	*Cooperation proc.* first reading 2/96	
Wide use and conservation of wetlands[pp] (Communication)	5/95	COM (95) 189	B. Delpeuch (DG XI)	resolution 12/96	
Keeping of wild animals in zoos[pp] (Council Recommendation)	12/95	COM (95) 619	W. Wijnstekers (DG XI)	*Cooperation proc.*	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)	*Cooperation proc.* first reading 6/96	
Biodiversity strategy[eni] (Communication to be presented)	11/97		DG XI		
Habitats directive[pp] (Proposal for a Council directive modifying annexes I and II of dir. 92/43/EEC	5/97		DG XI		

WATER Commission proposals*					
Title	**Date**	**Reference Documents**	**Contact**	**Parliament**	**Council**
Quality of bathing waters[pp] (Directive)	3/94	COM (94) 36	I. Papadopoulos (DG XI)	*Cooperation proc.* 1st reading 12/96	
Ecological quality of water[pp] (Directive)	7/94	COM (93) 680	P. Campbell (DG XI)	proposal likely to be withdrawn	discussed 10/95
Drinking water[pp] (Directive) revised Directive	1/95	COM (94) 612	T. Simons (DG XI)	*Cooperation proc.* 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)	9/96	COM (96) 315	A. Olsen (DG XI)		discussed 10/95
Community water resources[pp] (Framework Directive)	2/97	COM (97) 49	A. Olsen (DG XI)		

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

NUCLEAR SAFETY AND CIVIL PROTECTION Commission proposals*					
Title	**Date**	**Reference Documents**	**Contact**	**Parliament**	**Council**
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	
Health protection of individuals against the dangers of ionizing radiation in relation to medical exposures[pp] (Council directive replacing dir. 84/466/Euratom)	11/95	COM (95) 560	D. Teunen (DG XI)	opinion 5/97	
Approximation of environment and radiation protection legislation in CEECs[eni] (Progress report)			DG XI		

WASTE Commission proposals*					
Title/content	**Date**	**Reference Documents**	**Contact**	**Parliament**	**Council**
Shipments of certain types of waste to certain non-OECD countries[pp] (Council Regulation)	6/95	COM (94) 678	F.A. Hunter (DG I) Y. Slingerberg (DG XI)	*Cooperation proc.* 1st reading 6/97	discussed 6/96
Waste management strategy[pp] (Communication)	7/96	COM (96) 399	L. Krämer (DG XI)	opinion 11/96	resolution 12/96
Marking of packaging- recyclability[pp] (EP and Council Directive)	11/96	COM (96) 191	E. Canda Moreno (DG XI)	*Co-decision proc:*	
Landfill of waste[pp] (Directive)	5/97	COM (97) 105	H. Petersen (DG XI)	*Cooperation proc.*	
End-of-life vehicles[eni] (Directive to be proposed)	11/97		M. Onida (DG XI)		
Hazardous waste[eni] (amendment to Council directive 91/689/EEC)	7/97		S. Grohs (DG XI)		
Incineration of hazardous waste[eni] (amendment to Council directive 94/67/EEC)	6/97		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		
July	2-4	ECE 1st Meeting of the Conference of the Parties to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes	Helsinki
	3-4	Annual Meeting of the International Commission for the Protection of the Rhine	Schaffausen
	7-10	ECE Working Group for the preparation of a draft Convention on access to environmental information and public participation in environmental decision making (Committee on Environmental Policy)	Geneva
	28-7/8	UNEP Convention on Climate Change: meetings of subsidiary bodies	Bonn
August	18-22	Intergovernmental Negotiating Committee on Desertification	Geneva
	27-29	ECE Working Group on Effects (Executive Body for the Convention on Long-range Transboundary Air Pollution)	Geneva
	end	Diplomatic Conference on the Convention on the Safety of Radioactive Waste Management	Vienna
September	1-3	ECE Steering Body for the Cooperative Programme for Monitoring and Evaluation of the Air Pollution [EMEP] (Executive Body for the Convention on Long-range Transboundary Air Pollution)	Geneva
	1-5	UNEP Convention on Biological Diversity: SBSTTA-3	Montreal
	1-5	Oslo & Paris Commissions Meeting and Ministerial Conference	Madrid
	8-10	ECE Meeting on Water Problems (Committee on Environmental Policy)	Geneva
	8-10	ECE Ad Hoc Preparatory Working Group of Senior Officials "Environment for Europe" (Committee on Environmental Policy)	Geneva
	9-11	Meeting of the Bonn Agreement Contracting Parties	Copenhagen
	9-17	UNEP 9th Meeting of the Conference of the Parties to the Montreal Protocol	Montreal
	15-19	ECE Working Group on Strategies (Executive Body for the Convention on long-range Transboundary Air Pollution)	Geneva
	15-19	General Conference of the I.A.E.A.	Vienna
	22-24	WTO CTE Meeting	Geneva
	22-25	ECE Work session on Methodological Issues of Environment Statistics	Neuchatel (CH)
	22-29	Expert Group Meeting to the Convention on Biological Diversity	Nuuk (Greenland)
	29-1/10	1st Meeting of the Conference of the Parties to the Desertification Convention	Rome
	29-2/10	ECE Working Group for the preparation of a draft Convention on access to environmental information and public participation in environmental decision making (Committee on Environment Policy)	Geneva
Sept./Oct.		UNEP 4th Session of the PIC Convention Negotiations	Brussels
October	6-10	UNEP 4th Meeting of the Conference of the Parties to the Basel Convention	Kuala Lumpur
	13-15	ECE 1st Meeting of the Conference of the Parties to the Convention on Environmental Impact Assessment in a Transboundary Context	Oslo
	13-17	Ad hoc Group on Biosafety	Montreal
	13-22	World Forest Congress	Antalya (Turkey)
	16-17	Committee of North Sea Senior Officials	Oslo
	20-21	Elbe Commission Meeting	Hamburg
	20-22	ECE Ad Hoc Preparatory Working Group of Senior Officials "Environment for Europe" (Committee on Environmental Policy)	Geneva
	20-31	UNEP Convention on Climate Change: meetings of subsidiary bodies	Bonn
	23-24	ECE Meeting of Experts on Electric Power Generation and the Environment	Geneva
	28-29	Special Meeting of the International Commission for the Protection of the Rhine	Koblenz
	28-30	Meeting of the Participant Pilot Programme Brazil	Manaus (D)
		European Tropical Forestry Advisers Group	Rome
Oct./Dec.		UNGA follow-up resolution on UNGASS	New York

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

Date		Meeting	Place
Month	Day		
November	4-6	GEF Council Meeting	Washington
	4-6	WTO CTE Meeting	Geneva
	12-14	ECE Regional Conference on Transport and the Environment	Vienna
	12-13	Head of Delegation of Oslo & Paris Commissions	London
	12-14	UNEP Governing Council Special Session	Nairobi
	18-21	Conference of Contracting Parties to the Barcelona Convention	Tunisia
	24-26	8th EAP Task Force Meeting	Paris
	24-26	ECE Committee on Environmental Policy (special session)	Geneva
	25-28	OECD EPOC Directors General level	Paris
	26-27	Follow up of EUROMED	Helsinki
Nov./Dec.		UNEP Conference of Plenipotentiaries for Adoption of a Prior Informed Cons. (PIC) Convention	Rotterdam
December	1-3	ECE Meeting on Water Problems (Committee on Environmental Policy)	Geneva
	1-4	ECE Working Group for the preparation of a draft Convention on access to environmental information and public participation in environmental decision making (Committee on Environmental Policy)	Geneva
	1-12	UNEP 3rd Meeting of the Conference of the Parties to the Climate Change Convention	Kyoto
	15-19	ECE Executive Body for the Convention on Long-range Transboundary Air Pollution	Geneva
	end 97/ Beginning 98	ECE Workshop on Sustainable Consumption Patterns	Austria

Information

The 5th RTD Framework Programme (1998 - 2002)

On April 9th the European Commission has adopted the project proposal made by the EU Commissioner Mrs E. Cresson for the 5th Framework Programme of Research and Technological Development covering the period 1998 - 2002.

The new FWP should represent - as it has been conceived - a real breakthrough in respect of the preceeding one for what it concerns both the approach and its operation.

As a matter of fact, the research efforts will be focused on a limited number of themes - to say six - which are aimed at meeting the wishes of the EU citizens and the competitive requirements of the EU enterprises. Thus, the structure of the new FWP is based on three thematic programmes ("Life and Ecosystem Resources"; "Information Society"; "Competitive and Long-lasting Development") encompassing some 16 key actions ("Health and Food"; "The Town of Tomorrow"; "Water Management and Water Quality"; just to name few of them as an example) and on three horizontal programmes ("International Role of the European Research"; "Innovation and Participation of SME"; "Human Resources") which, apart from their own objectives, are intended to favour the implementation of the above mentioned thematic programmes.

On the other hand, the FWP will be characterised by a more effective coordination between the different activities as well as with the national research programmes, and by an increased flexibility in its management in view of facing urgent needs.

As far as it concerns the financial resources, a formal proposal has not been presented so far. In fact, the European Commission will provide budget data at the very moment when its new financial framework is proposed and accepted, taking as the basis the cost of the on-going FWP expressed as percentage of the EU GNP. This should be considered as the minimum value to be allocated to the 5th FWP.

However, since now, the following share of financial resouces has been proposed:

- CE FWP: 91% of the resources, 86 out of them for indirect actions and 5 for direct actions (Joint Research Centre)
- EURATOM FWP: 9% of the resources, 7 out of them for indirect actions (Fusion and Fission) and 2 for direct actions (Joint Research Centre).

A first debate on the above proposal of the EU Commission has taken place at the EU Minister Council for Research on May 15-16. As the issue of the debate, 14 out of the 15 member Countries have approved the structure of the new FWP as well as the principle of reducing the number of themes (4 to 6 as compared to 20 of the preceeding FWP) and that of the key actions (a maximum of 25).

Conference Announcements

International Symposium on Atmospheric Chemistry and Future Global Environment

November 11-13, 1997
Nagoya, Japan

organized by: Science Council of Japan
National Space Development Agency.

According to human activity, chemical composition of the atmosphere has been changing rapidly. Increase of the concentrations of greenhouse gases, oxidants and aerosols is a direct cause of global environmental change. Atmospheric chemistry which aims to study the global change of the atmosphere is a rapidly growing research field and better communication of worldwide scientists is essential for successful achievement of IGAC (International Global Atmospheric Chemistry Program) under IGBP.

The purpose of this IGAC/IGBP symposium is to summarize and enhance our knowledge of current activity of atmospheric chemistry and future global change, and to enhance communication between scientists in Asia and the rest of the world in this field.

This International Symposium will focus on papers relating to the three sessions described below.

Session 1: Material cycles of Greenhouse Gases Convener: T. Nakazawa (Touhoku Univ.)

Session 2: Tropospheric photochemistry and ozone budget Convener: Y. Kondo (Nagoya Univ.)

Session 3: Aerosols and their climale impact. Convener: K. Kawamura (Hokkaido Univ.)

For further information, please contact:
Dr. Yoshizumi Kajii - RCAST, University of Tokyo
4-6-1 Komaba, Meguro-ku, Tokyo 153, Japan
Tel: 81-3-3481-4563 - Fax: 81-3-3481-4562
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A Symposium on Ocean Data for Scientists

October 15-18, 1997
Dublin, Ireland

The following is an indication of possible topics and questions which it is hoped will be addressed by the Symposium, but the organisers would be happy to receive contributions on related material:

- Role of the ocean in climate change
- Statistics for ocean scientists
- Data types for ocean studies
- Implications of ocean colour research
- Data precision and quality
- How to preserve data for future use
- The Global Ocean Observing System (GOOS) What are the needs of global programmes?
- Data archaeology
- The problems associated with integrated datasets
- Case studies, from both large and small scale projects
- What do scientists expect from data centres?
- The importance of metadata to science and data management
- Advances in information technology
- What are the most effective data exchange mechanisms?
- Standards and formats
- Requirements for modelling
- What lessons can be learnt from past science programmes?
- Data management decision support tools
- Visualisation and management of ocean data, as well as telecommunications and data exchange systems.

Further information can be obtained from:
OD Conference Desk
Irish Marine Data Centre,
80, Harcourt Street - Dublin 2, Ireland
Tel. +353-1-4757100 - Fax +353-1-4757104
E-mail: data.centre@marine.ie

Fourth European Workshop on Stratospheric Ozone

September 22-26, 1997
Schliersee, Bavaria

The workshop will be on studies (measurements and models) of the 1996/97 Arctic winter and so will be more focussed than previous ones. It will start on Tuesday 23 and end on Thursday 25. As with previous Schliersee workshops, there will be a programme of invited talks and the poster sessions will play a central part.

The workshop on the 1996/97 winter will be followed by a discussion of the plans for the Third European Stratospheric Experiment on Ozone (THESEO). This part of the meeting will finish on Friday 26.

Further information can be obtained from:
Neil Harris - European Ozone Research Coordinating Unit
14 Union Road - Cambridge - CB2 1HE

6th FECS WPCE Conference on Chemistry and the Environment Atmospheric Chemistry and Air Pollution

Oxidants, Particles and VOC - Sources, Measurements Chemistry and Effects

August 23-26, 1998
Copenhagen

Place: H.C. Oersted Instituttet, University of Copenhagen

For more information, please contact:
Allan Astrup Jensen, Research Director
DK-TEKNIK Energy & Environment - 15 Gladsaxe Moellevej
DK-2860 Soeborg - Tel +45-3969-6511 - Fax +45-3969-6002
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Miller Freeman (Pollutec), has been commissioned by the AGHTM and the CFRP to organize the exhibition for the world congresses of the IAWQ and the ISWA on water and waste in the year 2000

The IAWQ (the International Association for Water Quality) and the ISWA (the International Sewage and Waste Association) have selected Paris as the venue for their world congresses in the year 2000, and their French members, the CFRP (the French Committee for Research into Water Pollution) and the AGHTM (the General Association of Municipal Health Officers and Technicians), will be responsible for the organization.

It is planned that the 18th Congress of the IAWQ and the 8th Congress of the ISWA should be accompanied by a technical exhibition and they have chosen the Miller Freeman Group (Pollutec) to be its organizer.

The Porte Maillot "Palais des Congrès" in Paris will be the venue in July 2000 for this series of events, following its complete redesign by Christian de Portzamparc.

The IAWQ gathers together scientists and technicians working in public or private research laboratories, universities or colleges, businesses, national and local authorities, water agencies... who have a common interest in aquatic environments, in understanding the problems of pollution, and in the methods and techniques of preventing pollution and treating waste water.

With 4,000 individual members and 650 associate members (businesses or institutions), in 90 countries, and with 25 years experience, it is the most important International Association in its field.

The ISWA was founded in 1970 and brings together individuals, businesses, authorities and public bodies, and associations from 70 countries to create a forum for research, meetings and exchanges of information regarding the treatment of sewage.

Miller Freeman, the world's leading show organizer, is also a leading international trade press publisher. In France, the Group organizes such well known exhibitions as Pollutec, Batimat, Interclima, Midest, Europlast, etc.

Further information can be obtained from:
AGHTM/CFRP/ISWA: 83 av. Foch - F-75116 Paris
Tel. +33-1-53701353/56 - Fax +33-1-53701340

Miller Freeman Group: 70, rue Rivay - F-92532 Levallois Perret
Tel. +33-1-47562115 - Fax +33-1-47562110

Conference Reports

Ecosystems Research Report No. 16 Environment Research Programme

Change in marine benthos: the case for long-term studies

Symposium proceedings
(Glenlo Abbey, Galway, Ireland; May 1994)

Editors: B.F. Keegan, P.J.D. Lambshead, B.C. Coull, M. Overcash, C. Nolan

Directorate-General XII
Science, Research and Development
EUR 16965 EN, ISBN 92-827-7194-7

The EU co-ordinated COST 647 Project on Coastal Benthic Ecology (1979-1991) made the case for long term benthic studies. Clearly, this is not solely of European interest, and so a joint U.S. and European symposium was convened at Glenlo Abbey, (Galway, Ireland; May 1994) to compare experiences in this research area. The ultimate aim was to reaffirm the case for long term studies and to address related inadequacies in scientific design and funding policies. Accordingly, delegates included both scientists and representatives of funding and regulatory agencies. Papers were invited not only from benthic specialists but also from investigators who had shown the value of long term studies in cognate fields (e.g. the Continuous Plankton Recorder).

This volume records the proceedings of the symposium, and is arranged in four sections: 1) A Perspective, written by the editors, which provides an overview of the essence of the symposium and recommendations deriving from the formal presentations and attendant discussions, 2) Case Histories, incorporating examples of long term studies which give insight as to the use of their results by environmental managers and policy makers, 3) Protocols, Procedures and Methodologies, dealing with 'ways and means' and new technologies, and 4) Historical Archived Data, examining the value of traditional biological collections in addressing current environmental issues.

The principal conclusions of the symposium follow:

- The time scale for long term studies should accommodate the likely spread of natural variation if it is to permit differentiation between long and short and short term events.
- Only a long term study can determine whether a putative anthropogenic impact is 'real' or merely part of a long term natural cycle. It is critical to isolate the natural from the artificial.
- The time scale is primarily dictated by the life spans of the studied taxa which can extend form weeks to decades. It should be at least twice that of any natural cycle in the data for statistical validation.
- It is not cost-effective to treat long term study as merely a short term study repeated through time and to use the same intensity of sampling.
- Many short term pollution monitoring surveys are of limited value since they fail to address natural temporal variability.
- With sufficient background on community structure, it may be more cost effective to focus on species which have key roles in communities.
- By concentrating on key components, it should be possible to enhance our predictive capacities in relation to whole communities.
- Rigorous quality controls on acquisition and management will greatly improve the resolution and reliability of data for intercomparability.
- Sampling intervals need to be flexible in the interests of cost effectiveness.
- Adoption of new technologies will greatly augment traditional data acquisition and can, correspondingly accelerate the turn around in reportage while reducing costs.
- Every effort must be made to promote a renaissance of interest in taxonomy.
- Efficient archiving of biological material constitutes a valuable resource for future taxonomic, biological and chemical analysis.
- Scientists and funding agencies need to harmonise their views on what is scientifically realisable, applicable, and financially sustainable from long term studies.

Recycling Technologies, Treatment of Waste and Contaminated Sites

Workshop co-organized by:
The Environment and Climate Programme of the European Commission, DG XII/D-1 and Preussag AG

Report 15

Editors: J. Barton, B. Bilitewski, J. Büsing, D.V. Jackson, J. Jager, M. Jauzein, P. Krejsa, K.H. Ujma

20-24 May 1996, Hannover, Germany, ISBN-3-9500255-5-3

The workshop was jointly organized by the Environment and Climate Programme of the European Commission (DG XII/D-1) and the PREUSSAG AG in Hannover, Germany and is a continuation in the series of workshops held in previous years. However, in contrast to earlier events, this workshop established for the first time the links between scientists working in the interrelated research areas with partly overlapping interests, i.e. life-cycle assessment, recycling, treatment of waste and problems related to contaminated sites.

Environmental protection and conservation of the European cultural heritage

An area of research funded by the EC Environment R&D programme

Degradation and conservation of granitic rocks in monuments

Proceedings of the EC workshop held in Santiago de Compostela (Spain) on 28-30 November, 1994

Directorate-General XII,
Science, Research and Development
1996

This report contains the proceedings of the EC Workshop on "Degradation and Conservation of Granitic Rocks in Monuments" which took place in Santiago de Compostela (Spain) on 28 - 30 November 1994.

The major objectives of this workshop were mainly:

1. The presentation and discussion of research activities, conclusions and recommendations of two STEP research projects on Granite Monuments Conservation funded by DG XII of the European Commission within the Area of Research for the Protection and Conservation of the European Cultural Heritage:
   - STEP-CT90-0110 "Conservation of granitic rocks with application to the megalithic monuments".
   - STEP-CT90-0101 "Granitic materials and historic monuments: study of the factors and mechanisms of weathering and application to historical heritage conservation";
2. To review the state of the art in the European Union and to promote mutual exchange of information on common strategies for future research in the area of granite monuments conservation.

Granite is a major construction material of European historical buildings and monuments. This type of rock is not only one of the most abundant in the earth, but also one of the hardest and most durable, and is widely used for construction in historic cities, including the place in which the workshop was held, Santiago de Compostela (Spain).

The aims of the EC project STEP-CT90-0110 are to improve knowledge of how granite rocks degrade and to develop more effective conservation procedures (in particular for megalithic monuments, such as dolmens). The research covers the study of rock decay mechanisms, including biodegradation, the use of non-destructive methods for characterization of stone properties, the evaluation of treatment products and also the construction technology used in megalistics monuments.

Project STEP-CT90-0101 aims to study the weathering behaviour of different types of granite rocks under different environmental conditions, in order to improve the restoration and maintenance of historic buildings such as cathedrals. It includes the study of weathering patterns of different types of granite in Spain, France and Portugal. In all cases, the behaviour of the stones from the monuments is compared to that of freshly quarried stones.

European Workshop on the Impact of Endocrine disrupters on Human Health and Wildlife

2-4 December 1996, Weybridge, UK

Endocrine disruption has become a significant focus of environmental toxicology and medicine in the last few years. It is on the agenda of many expert groups, panels and steering committees of governmental organisations, industry and academia in Europe and the USA.

In the light of the uncertainties and concerns relating to this topic, there was clearly a need to establish an agreed, integrated plan to direct future international research and monitoring activities within this field. This document records the output from the workshop "The Impact of Endocrine Disrupters on Human Health and Wildlife" held in Weybridge UK, 2-4 December 1996 to address this issue. The specific objectives of this workshop were to: assess the scope of the problem in Europe; identify gaps in present knowledge and outstanding epidemiological questions; summarise current research activities in Europe; define research priorities for EC Framework Programme 5 and for national research programmes; define monitoring needs and, if appropriate, strategies; assess whether existing testing and screening methodologies are adequate and to recommend method development where appropriate; and to provide a forum for informal international discussion on research and testing of endocrine disrupters. The workshop was organised by the European Commission, the European Environment Agency, the WHO European Centre for Environment and Health, the OECD, national authorities and agencies of the UK, Germany, Sweden (Chemicals Inspectorate) and The Netherlands as well as CEFIC and ECETOC.

It was agreed that an enclocrine disrupter could be adequately defined only in terms of effects on intact animals, although identification of potential endocrine disrupters was possible in vitro. The following definitions were endorsed:

"An endocrine disrupter is an exogenous substance that causes adverse health effects in an intact organism, or its progeny, secondary to changes in endocrine function"

"A potential endocrine disrupter is a substance that possesses properties that might be expected to lead to endocrine disruption in an intact organism."

(Adverse hormonal effects may relate to disturbances in any of the major endocrine systems, including the reproductive, thyroid and adrenal systems).

A number of conclusions were reached by the workshop participants. With respect to human effects, it was concluded that sufficient evidence existed that testicular cancer rates were increasing and that the apparent decline in sperm counts in some areas was unlikely to be attributable to the known confounding variables. The existing exposure information was considered generally insufficient to definitely associate the health effects seen in humans with chemical exposure. Similarly, for wildlife there were considered to be few cases within the EU where effects could be clearly ascribed to the effects of endocrine disrupters. It was suggested that the critical factor for survival of wildlife populations and the maintenance of biodiversity was identified as the effectiveness of reproduction, including offspring survival. The requirement for adequate background data and for a broad testing strategy for field studies using suitable sentinel species and biomarkers, was recognised. The subgroup considering mechanisms concluded that animal models were available which would permit the detection of many endocrine disrupting substances on the basis of recognised adverse reproductive effects, but considered that there was a need for further development work and validation. It was also suggested that priority should initially be given to the detection of effects rather than to mechanistic studies. It was concluded that an integrated strategy was necessary to monitor chemical levels in the environment, with the initial focus generally on those substances that have been shown to have endocrine disruptive activity in *in vivo* animal studies. It was identified that exposure monitoring studies should be integrated with studies on human or wildlife effects; there was also a call for the establishment of national specimen banks and better use of existing databases. The need to establish agreed experimental methodologies was recognised. The methodology working group concluded that the initial priority was to identify active chemicals rather than elucidate their mechanisms of action. To this end they developed proposals for a tiered screening strategy for endocrine disrupting substances that would be directed by the quantity and type of toxicological data already available for the chemical and suggested a range of possible model systems.

It was accepted that resource allocation to this area should be balanced against other important public health issues. It was recommended that policy should be based upon scientific principles, following a weight-of-evidence approach and that studies should be performed following rigorous scientific principles and practice. When deemed necessary consideration should be given to measures to reduce exposure to endocrine disrupters in line with the Precautionary Principle, as described in Principle 15 of the 1992 Rio declaration.

The following key research and monitoring needs were identified by the working groups:

Human epidemiology

- Focus human epidemiology studies on compounds established, by *in vivo* animal studies, as endocrine disrupters except where high exposures to otherwise suspect chemicals is known.
- Consider possible pre- and post-natal exposure effects in all studies.
- Collect tissue and body fluid samples for possible future analysis from ongoing epidemiology studies and situations where exposure to possibly relevant chemicals is known to be occurring.
- Investigate reproductive health in cohorts having differential general exposures to pollutants, industrial chemicals or naturally occurring endocrinologically active substances; investigate influences of "lifestyle" related factors including dietary and socio-cultural differences.
- Conduct follow-up epidemiology studies after any action is taken to reduce exposure to substances thought relevant to human reproductive health.
- Continue current investigations into known changes in reproductive health and areas of uncertainty, focusing on establishing baseline measurements and geographical differences (e.g. pan European studies on testicular cancer, semen quality, cryptorchidism, hypospadias and female breast cancer).
- Establish common standards for measuring important end-points where inter-laboratory differences may hamper regional comparison.
- Include additional, readily measurable end-points (e.g. testis, penis and clitoral size in the new born, twinning rates, sex ratios) in epidemiological studies.
- Identify and apply blood markers that are associated with sperm and ovarian function in humans and animals.
- As the working group did not contain experts in the field of female reproductive health and breast cancer, it was considered inappropriate to make recommendations for research in this area. It was recommended that a working group should be convened to consider this aspect and other adverse effects in women potentially associated with endocrine disruption.

Wildlife

- Field studies are required where endocrine disrupting substance effects are suggested; these should involve a broadly based screen including assessment of gonadal function, behavioural patterns and offspring sex ratio, numbers and survival. Such studies should include comparison with control (unimpacted) areas.
- Conduct basic research into comparative endocrinology and baseline (unaffected) populations.
- Identify sentinel species using agreed selection criteria.
- Develop biomarkers which predict impact on reproductive effectiveness.
- Study the fate and bioavailability of known endocrinological disrupters; apply the insights gained to other substances.
- Determine regional variations in the distribution of endocrine disrupting substances and wildlife populations.
- Ensure all currently available data are utilised.

Mechanisms and models

- Extend basic knowledge of hormonal systems and their role in pathophysiological conditions.
- Validate current animal models with particular reference to human relevance and establish new, meaningful animal models for testicular cancer and control of testicular descent.
- Perform basic research into the mechanisms of testicular descent, hypospadias and polycystic ovaries in humans. Where appropriate identify non-hormonal pathways and conduct epidemiological studies.
- Urgently investigate the aetiologies of persistent oestrus in rodents and polycystic ovaries in humans for similarity.

- Obtain expert opinion on potential significance of endocrine disrupters in breast and prostatic cancer and selection of suitable animal models.
- Develop non- or minimally-invasive biomarkers for endocrine function and disruption, and testicular function and establish their cross-species consistency and predictability.
- Investigate techniques to study neurodevelopmental and neurobehavioural effects and to relate animal and human systems.

Exposure

- Conduct effects driven studies into exposure assessment in wildlife populations, both aquatic and terrestrial, targeted to well-defined end-points to establish what is "normal" as a baseline.
- Conduct effects driven studies into exposure assessment in humans comprising epidemiological (including case-control) studies linked to evaluation of exposure and other lifestyle factors at critical life-stages.
- Develop multi-media environmental fate and behaviour models and validate them against established databases of well characterised compounds and systems.
- Improve current risk assessment methodologies so that the potential interactive effects of multiple exposures (i.e. exposure to several chemicals) are taken into account.
- Develop a Europe-wide strategy for monitoring endocrine disrupting substances (EDS), focusing on those substances known to be active in recognised *in vivo* tests and including data on observed effects, external and internal exposure and key pathways. The outputs should be incorporated in IUCLID and other relevant databases.
- Undertake studies of the cost and effectiveness of reductions in exposure to recognised EDS.

Methodology

- Prioritise and integrate structure activity relationship (SAR) development in association with new data acquisition.
- Assess if *in vitro* assays can be developed that predict changes in biosynthesis and degradation of hormones in whole organisms.
- Attempt to develop and validate *in vitro* models for thyroid gland function.
- Develop a source of auxiliary metabolism suitable for *in vitro* assay systems.
- Develop and validate novel whole organism assays for endocrine disruption in birds and fishes, both to assess hazards to those species and as a possible replacement for rodent studies.
- Evaluate the usefulness of monitoring arthropod metamorphosis and moulting.
- Investigate if endocrine disruption effects in neonates or weanlings can be predicted by measurements made in exposed parent; if not, testing must include assessment of the effect of exposures in utero and during lactation.
- Characterise a hierarchy of sensitivities for appropriate biomarkers in mammals, birds, fish and invertebrates, using a set of appropriately selected model chemicals.
- Identify suitable sentinel species and endpoints to use where an evaluation will most usefully commence in wildlife species; including a comparison of benefits of using species with either fixed or variable sex ratios.

European Workshop on Environmental Technologies 1996

Waste Water Treatment and Monitoring, Abatement of Emissions to the Atmosphere, Cleaner Technologies

DOCUMENTATION

13- 15 November 1996
Domus Technica, Copenhagen, Denmark

Organised by: The European Water Pollution Control Association e.V. (EWPCA)
Sponsored by: The European Commission, Environment and Climate Programme, DG XII-D I

ISBN: 3-927729-47-7

An important aim of the workshop was to encourage networking between researchers covering a broad spectrum of scientific disciplines, the relevant industries and policy makers.

Waste Water Treatment

Eight presentations were given within the field of waste water treatment. Four projects were in their terminating phase or finished and four in their early stages. Within this set of projects the paper by Hawkes (Univ. Glamorgan, UK) should be mentioned because of its integrated approach to water recycling and emission abatement in the textile industry. Other talks encompassed a large range of technologies including biofilm, membrane and electrochemical reactors. Livingston (Imperial College, London) presented interesting results on the coupling of biological and physicochemical treatments of industrial waste waters. Arcangeli (IESE, Lyngby) presented a two stage anaerobic-aerobic reactor where chlorinated ethylenes were degraded, avoiding the formation of innyl chloride.

Other papers dealt with biological uranium elimination, extractive membrane bioreactor development, waste water dissinfection, temperature dependent chelating ion exchange resins, and electrochemical effluents treatment.

Waste Water Monitoring

Monitoring is internationally recognised as a key element in environmental technologies at three levels: it is fundamental to the design and implementation of best available techniques, it provides the basis for end-of-pipe control, and facilitates the assessment of damage to the natural environment. The first presentation in the waste water monitoring session by Hennion (ESPCI, Paris) considered the use of novel immunoaffinity solid phase cartridges capable of operation in the presence of organic solvent and effluent. The importance of this approach was illustrated by preconcentration of polyaromatic hydrocarbons, detergents and dyes prior to conventional analysis. The next presentation by Buscher and Twiehaus (ICB, Münster) concerned a proposal for on-site monitoring of, in particular, absorbable organic halogens (AOX). This was followed by Benfenati (Inst. Mario Negri, Milan) who described an evaluation of the relationship between conventional chemical analyses of effluent fractions and commercially available assays proposed for ecotoxicity measurement. Professor Tingyao (Tongji Univ., Shanghai) presented a review of waste water problems and water quality in the Shanghai area and we learnt of the immense problems facing this highly populated area. In the first of the biosensor presentations, exceptional performance for a methane sensor based on wholeorganism was presented by Revsbech (Univ. Aarhus, Denmark). This formed one of an array of sensors for aquatic systems. Turner (Cranfield, UK) described a proposal for a concerted action on biosensors for environmental monitoring. This action would elucidate new needs and the most effective analytical solutions to problems in waste disposal, control of clean technology and water resources. An addition to the programme was an idea presented by Tacke (Fraunhofer Institut, Freiburg) for the use of polymer coated optical fibres for the measurement of small organic molecules using infra red spectroscopy.

Clean Technology

The presentations in the clean technology session covered the leather, textile, paper and metal surface finishing industries.

The clean(er) approached included substitution of toxic compounds and application of improved novel control and process solutions to reduce or eliminate waste effluents. All projects had strong industrial involvement and project objectives that conformed with the aims of this programme. Generally the presentations showed sound applications of scientific methods to solve practical problems. For some projects the next step of wider implementation should be relatively easy (eg. environmentally friendly paints), for others (eg. substitution of chromium in metal surfaces) pilot/larger scale engineering/demonstrations would be needed to confirm the promise of laboratory development.

Comment was made on the real "life cycle" benefits from the work. A view was expressed that LCA was important, but that the current state of development required too complex a procedure with inadequate data support to facilitate use on a routine basis [This view needs to be passed on to the existing concerted action LCANET group]. However, it was still considered that contractors should at least provide information such as the mass and energy balance anticipated from successful development of their concept.

Emission to the Atmosphere I

The first presentation under this section by Klemp and Romann (Fritz-Süchting-Inst., Clausthal-Zellerfeld) was about desulphurisation especially adapted for small plants. The fluoride emission of a kiln from clay products manufacturing was analysed in depth during the second presentation by Denissen (TNO, Eindhoven). Special emphasis was placed on the effects of temperature and length of the kiln on the adsorption capacity of the input material. Hoppe (Forsch. Inst. Zementindustr., Düsseldorf) presented several primary and back-end approaches to reduce the NOx emissions from cement manufacturing. Reductions of NOx were achieved by process modifications but problems with unstable kiln operation and deterioration of product quality still have to be solved.

In discussion, the importance of dioxin detection and removal in Southern Europe was highlighted. Discussion suggested this problem was one of technology transfer and affordability of available technology.

Emission to the Atmosphere II

Abatement of emissions of some pollutants was presented in this second session on emission to the atmosphere. The first paper by Avila (CSIC-ICP, San Sebastian, Spain) was on the use of new monoliths for the abatement of three VOCs. The technology presented used sunlight as the source of energy. This was interesting since it is cheap and works at relatively low temperatures, but it seems to be useful only for small (some cms) lengths of monoliths. The second presentation by Kordulis (Foundation for Research & Technology, Patras, Greece) was on NOx emissions abatement. Although there are several well known commercialised processes for this purpose, this team presented a lot of useful improvements to the catalysts used to increase their activity and lifetime. The third project presented by Lahousse (Univ. Catholique de Louvain, Belgium) compared several Pt based and metal oxide catalysts for VOC removal from flue gas. Clear advances were described, but the main conclusion (MaO2 is the best catalyst) was somewhat contradictory with the widespread use of typical commercial catalysts (Pt based) in several industrial processes. Burch's (Univ. Reading, UK) speech on novel catalytic processes was devoted to the simultaneous and difficult removal of both NOx and VOC's from stationary sources. A lot of new detail on this process was presented leading to a clear improvement of knowledge in this area. This will serve to increase the selectivity and activity of the catalysts used nowadays with a clear reduction of emissions of these pollutants.

Origin, mechanisms and effects of salts on degradation of monuments in marine and continental environments

Scientific Editor Fulvio Zezza

Protection and Conservation of the European Cultural Heritage Research Report n° 4

March 25-27, 1996
Bari (Italy)

The contributions to the workshop are divided into the following different aspects: 1) the fundamental scientific acquisitions in the framework of the E.C. Project "Marine spray and polluted atmosphere as factors of damage to monuments in the Mediterranean coastal environment"; 2) the achieved results, presented by invited speakers and participants, of the most recent researches on the degradation of monuments regarding neoformation soluble salts.

At present the researches on weathering, overcoming the limits imposed by the sectorial studies, benefit from the new stimulation given by the interdisciplinary approach to the problems of conservation and the perfecting of analysis methodologies. Also the aspects treated by each specific sector of the research are considered on a large scale so as to establish correlations and deduce appropriate conclusions. In these frameworks there are the scientific contributions of the Workshop which as regards the coastal marine environment and pollution have provided specific results regarding the pilot monuments located in different geographical position along the east-west axis of the Mediterranean Basin, equipped with stations for the environmental monitoring which has been carried out by recording the indoor and outdoor environmental parameters. The comparison of real situations with the equilibrium conditions also represents an important means to estimate the probability of the occurence in the stones of salts of marine origin. This method of planning the research represents without doubt a new step towards a more realistic modelling and forecast of spatio-temporal pure salts occurences in a monitored monument which will contribute also to a better understanding of their mechanisms in the weathering processes.

The knowledge of the occurences of salts present in the stone is of great interest for the correlation of the microclimate conditions in indoor environment with the behaviour and response of walls, on the basis of the acquisition of more reliable models of crystallization and solution cycles. On the other hand, the elaboration and correlation of the data regarding the environmental monitoring with the analyses performed on stone materials exposed to weathering have shown there is a clear relation between the chemical composition of the aerosols, of wet and dry depositions and weathering forms. This method of planning scientific research represents a promising basis for the creation of a model for the prediction of the susceptibility of stone to sea-salt decay in coastal environment which is also effected by atmospheric pollution due to anthropic activities. In this regard the "cementitious" encrustations on the stones of the monuments, completely different from the well known black crusts and formed above all by Al-silicates and heavy metals in relation to the presence of an extremely high level of air pollution, represent a precise element distinguishing polluted areas.

The present trend sees also employed the researchers in the experimentation of non-destructive control methodologies, alternative to those which are destructive, able to identify stone decay in qualitative and quantitative forms on the basis of which the most suitable techniques of conservative interventions can be adopted. Also in this field in the framework of this Workshop results have been presented of researches which permit the determination of the state of conservation of stone materials exposed to atmospheric agents and to evaluate the rate of weathering in time.

The content of the contributions offered by invited speakers is directed to the above objectives and has ranged over: 1) the nature and distribution of salts on the architectonic surfaces; evolution of a salt system through origin, transport, evaporation, concentration, precipitation, crystallization and disruption; 2) expert chemical models able to assess the risks of the actual environmental conditions with reference to salt damage in porous materials; 3) role of salts crystallization on decay of stones exposed to different environmental conditions; 4) the relationship between climate and weathering in terms of increased dampness and time of wetness, equilibrium pressure in solutions, effects of sea-salt on freezing-thawing cycles.

The communications and posters by the participants reflect the same approach presenting extremely advanced elaborations, approaches and analytical procedures regarding both the crystallization processes of salts and their mixtures, the decay form and the simulated degradation of stones under marine aerosol. Also biodeterioration has been emphasized not only as an agent in the weathering, but also as a phenomenon which must be considered with great interest in the researches on weathering. Finally, the preservation techniques for stones have been dealt with at the Workshop to increase scientific knowledge if, as is to be hoped, there will be more collaboration and new approaches between researchers and technicians which will undoubtedly facilitate experimentations and interventions carried out in the appropriate way.

The objective of the Workshop was not only to review the results of research projects funded by the European Commission, but also the state of the art in the European Union and beyond, and to promote networking between these projects and other researchers involved in the same field. On examining the results it seems that the objective has been achieved and for this reason I am grateful to the authors and the participants for their support of the Workshop.

International Conference on Plants and Environmental Pollution

ICPEP'96

Organised by: International Society of Environmental Botanists
National Botanical Research Institute, Lucknow, INDIA
1996

The problem of environmental degradation is becoming a progressively complex global issue, threatening the well-being and future of mankind, by undermining the life support system of our planet. An urgent paradigm shift is necessary to promote sustainable development by preventing pollution of air, water and soil. We have to halt over-exploitation of nature by promoting judicious use of natural resources and by taking stringent measures to conserve biodiversity. To address the complex challenges posed by the environmental problems new policy initiatives based on sound scientific principles are required. In this context a proper understanding of plant environment relationship is critical for food security and to meet basic human needs and aspirations of growing populations globally. The 'International Conference on Plants and Environmental Pollution' after extensive deliberations recommends:

1. While the widespread and insidious nature of atmospheric pollution and its hazards to human health are known since as early as industrial revolution, there is now a growing evidence that crop fields are also adversely affected causing a serious decline in food production and consequent economic losses. This threat has hitherto remained largely, overlooked. In this respect, the threat posed by increasing level of tropospheric ozone, due to its rural bias, is indeed quite alarming. It is, therefore, recommended that a national and global monitoring network be established and long term research programmes be initiated.
2. While pollution control at source and the use of clean technology should continue to be accorded highest priority for reducing environmental pollution, the role of plants in the abatement of pollution and in aesthetic improvement should receive adequate attention. Efforts should continue, to create green belts on sound scientific principles as a complementary measure for pollution abatement.
3. Heavy metal pollution of soil is a relatively undefined phenomenon, leading to irreversible deterioration of ecosystem. It may also result in the build up of metal toxins in plants that will impact on food webs, endangering animal and human health. It is, therefore, recommended that the soil quality be given the same level of environmental recognition as accorded to water and air quality.
4. Many of the modern agricultural activities are posing adverse impact on the environment, particularly through the use of excessive agricultural chemicals. It is, therefore, recommended that environmental research and education in all agricultural education and training programmes be given high priority for promoting sustainable agriculture.
5. While there is now a strong evidence of global climate change, there is a poor understanding of its implications at regional and local levels. Systematic scientific efforts are needed to ascertain the impacts of impending climate change on biodiversity and on socio-economic aspects across the wide range of Indian climatic zones.
6. Increasing emphasis on enviromental education is necessary to promote greater environmental awareness among politicians, administrators, decision-makers and, to transfer the fruits of research to grassroot level, through public participation.

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

13 - 16 May 1997, Vienna (Austria)

Experience has shown that industrial accidents causing a release of harmful material to the atmosphere can have consequences extending to hundreds and even thousands of kilometres. A variety of long-range atmospheric transport models have been established in different countries for application in emergency management, but their quality can only be assessed with difficulty. The Chemobyl accident data have been used retrospectively for model validation, but the source term associated with it is uncertain and this limits the values for model evaluation purposes. For these reasons a follow-up study called European Tracer Experiment, jointly organised by JRC, WMO and IAEA, started in 1992. The objectives of ETEX were to conduct a long-range atmospheric tracer experiment; to test the capability of institutes responsible for emergency response to produce forecasts in realtime; to evaluate the validity of their forecasts and to assemble a database which allows thc evaluation of long-range atmospheric dispersion models in general. The ETEX Symposium summarises the results of the successful project.

The Symposium was organised in four sessions. The first session focused on the aspects of real-time modelling and the quality of emergency response forecasts including policy implications. The next session gave an overview of the ETEX experiment and other experimental databases for validation of long-range transport models, including atmospheric tracer techniques, balloon trajectories and experimental design. The following sessions hosted comparisons of model results with experimental data witll particular interest in the sensitivity of the model predicted pollutant fields to meteorological inputs, mixed layer height and atmospheric stability.

World-wide interest in the topics was demonstrated by 90 participants coming from 20 European countries and Australia, Canada, Japan, Russia and the United States. The audience was made up of ETEX participants, International Agencies, Meteorological Services and the modelling community. The 56 presentations gave a summary of the state of the art of forecasting pollutant dispersion in case of a major accidental release to the atmosphere. Proceedings of the Symposium are available.

The main conclusions and recommendations from the Symposium were as follows:

- The ETEX project has been highly successful in meeting all its objectives.
- There is a high number of institutions that can (and will in case of a real accident) forecast the long-range atmospheric dispersion of a pollutant cloud.
- The rapidity of modellers in forecasting the cloud evolution and transmitting the results to a central point has been excellent. Differences of 3 to 6 hours in arrival time and a factor of 3 in surface maximum concentrations should be viewed as the current achievable limit of accuracy.
- The quality of the predictions may vary considerably with the complexity of the meteorological conditions. Further investigations are needed to determine the quality of predictions in calm weather situations or if the pollutant is subject to wet deposition.
- In both releases, the reconstruction of the cloud dispersion at short and mesoscale distances seems to have considerable importance on the long-range cloud development. The link between mesoscale and long-range dispersion models should be studied in more detail .
- It is important to maintain and improve the existing network of nation laboratories and international organizations to continue model developments and demonstrate the technical capability to support emergency management in real cases.

Further information can be obtained from:

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T.P. 510
I-21020 Ispra (VA), Italy
Fax: +39 332 78 5924
E-mail: katrin.nodop@jrc.it
http://www.ei.jrc.it/etex/symp

Courses

International Mycological Institute Training Courses 1997

- International Course on the Identification of Fungi of Agricultural & Environmental Significance

  11 August - 19 September 1997
- Mycorrhizas - Identification and Techniques

  13-17 October 1997
- Culture Preservation Techniques for Filamentous Fungi and Bacteria

  29-31 October 1997
- PCR Fingerprinting and Characterization Techniques

  17-21 November 1997

For further details and application forms for any of the above, please contact:

Mrs Stephanie Groundwater
International Mycological Institute
Bakeham Lane, Egham, Surrey TW20 9TY-United Kingdom
Tel. 01784 470111 - Fax 01784 470909
From overseas Fax +44 1784 470909
E-mail: s.groundwater@cabi.org
(please give your postal address)

Summer course Indicators for sustainable urban development

July 5-12, 1997-Delft, the Netherlands

European Commission, Directorate General XII Science, Research and Development, Environment and Climate Programme

The International Institute for the Urban Environment
Delft, The Netherlands

Aims and method of the course

The summer course will help to enlarge knowledge and disseminate available expertise on urban sustainability indicators, and to stimulate European students to help to overcome the shortcomings in their future research or in their future position as practitioners. The course aims to inform the participants about the state of the art of urban indicators and possibilities on how to use indicators for integration of urban processes and projects towards sustainability. Training in advanced urban information management systems is an element of the course.

The compact multidisciplinary advanced study course will help to lay a basis for new developments in the sciences and humanities. It will help to develop conceptually consistent frameworks, which will assist and enable development and application of integrated monitoring processes towards urban sustainability. The course will also help to define the necessary scientific monitoring tools that will have to be developed in the near future.

Proceedings will be made available to the wider scientific community, which could support scientific discussions in European and international gremia.

Course organiser

The International Institute for the Urban Environment (IIUE)
Nickersteeg 5
2611 EK Delft - The Netherlands
fax: + 31 15 2624873 - e-mail: urban@spidernet.nl

ROBENS Institute of Industrial and Environmental Health and Safety

- Occupational Health, Hygiene, Safety
- Environmental Health
- Analytical Chemistry
- Ergonomics

EDUCATION AND TRAINING PROGRAMME - 1997/98

University of Surrey

October 12-16	Occupational Health Nursing (a)*
November 9-13	Assessment and Control of Physical Hazards
November 23-27	Occupational Health Practice
November 30-December 4	Occupational Health Nursing (b)*

* only for nurses without an Occupational Health qualification

Distance learning courses on **Fitness to Work and Diving Medicine** are also available. Legal Aspects of Occupational Health Practice will be available as distance learning by Autumn 1997. Details on request.

Venue: University of Surrey, Guildford, Surrey
Course Director: Mrs P. Kenny
Course Secretary: Mrs I. Ryder
Tel: (01483) 568637 - E-Mail: I.Ryder@surrey.ac.uk

A modular training programme in environmental management and health

A part-time modular course organised jointly by the Robens Institute and Farnborough College of Technology. This course offers flexible postgraduate training for environmental management and environmental health professionals, leading to a Postgraduate Certificate, Postgraduate Diploma or Masters Degree of the University of Surrey. The modules can also be attended as stand-alone short courses.

1997

September 8-12	European Environmental Policy and Law
October 13-17	Food Quality Management
November 3-7	Assessment and Control of Chemical Hazards (Occupational Health, Hygiene, Safety Module)
November 10-14	Air Quality Management

1998

January 12-16	Concepts and Issues in Environmental Management
March 16-20	Waste Management and Recycling
May 18-22	Research Orientation
July 20-24	Land Use Planning

Specialist modules will also be offered each year covering issues at the leading edge of environmental management and health. Titles and timings to be announced.

Course Coordinator: Ms J Lynch
Venue: University of Surrey, Guildford, Surrey and Farnborough College of Technology, Farnborough, Hants.
Tel: 01483 5259935 - E-Mail: rbs1jl@surrey.ac.uk

Modular training programme in occupational health and safety validated by BEBOH, ENB and IOSH. A part-time modular course for occupational health nurses, doctors, hygienists, safety officers and other health and safety practitioners leading to Masters Degrees of the University of Surrey, and to professional qualifications for hygienists, nurses and safety practitioners. The modules can also be attended as stand alone short courses.

1997

June 16-20	Physical Environment No. 2
July 21-25	Counselling
September 15-19	Introduction to Ergonomics in the Workplace
September 29-October 3	Foundation in Occupational Health
October 6-10	Occupational Health Nursing (a)*
November 3-7	Assessment and Control of Chemical Hazards
November 17-21	Occupational Health Practice
November 24-28	Occupational Health Nursing (b)*

1998

January 26-30	Health Surveillance and Promotion
February 9-13	The Work Environment and its Effects on Health
February 16-20	An Introduction to Ergonomics in the Workplace
February 23-March 6	Assessment and Control of Chemical Hazards (Engineering Control & PPE)
March 23-27	Safety
April 27-May 1	Safety Technology
May 11 -15	Management and Communication in Occupational Health
June 15-19	Legal Aspects of Health and Safety

July 20-24	Mental Health (to be developed)
September 21-25	Introduction to Ergonomics in the Workplace
October 5-9	Foundation in Occupational Health
October 12-16	Occupational Health Nursing (a)*
November 9-13	Assessment and Control of Physical Hazards
November 23-27	Occupational Health Practice
November 30-December 4	Occupational Health Nursing (b)*

* only for nurses without an Occupational Health qualification

Distance learning courses on Fitness to Work and Diving Medicine are also available. Legal Aspects of Occupational Health Practice will be available as distance learning by Autumn 1997. Details on request.

Venue: University of Surrey,
Guildford, Surrey
Course Director: Mrs P. Kenny
Course Secretary: Mrs I. Ryder
Tel: 01483 568637
E-Mail: I.Ryder@surrey.ac.uk

Robens Institute of Industrial and Environmental Health and Safety
University of Surrey, Guildford, Surrey, GU2 5XH
Tel: 01483 259211 - Fax: 01483 503517
E-Mail: P.Elliott@surrey.ac.uk

Professional Training in Analytical Chemistry

This Professional Training follows the quality level set by the Division of Analytical Chemistry of FECS and as such is accepted as EUROCOURSES.

THEMA:Modern Instrumental Analysis, Environmental Analysis, Methods of Separation, Quality Assurance and Quality Control

Main organising partners:

- ACTIVE, Professional Association/F
- BIK, Büro für Industrie kontakt/D
- Cranfield Biotechnology Centre, Cranfield University/UK
- CREPA, Centre Régional d'Etudes des Produits Agropharmaceutiques/F
- DIT, Dublin Institut of Technology/IRL
- ELVIEX O.E.-European Environmental Research Institut/GR
- ISAS, Institut für Spektrochemie und Angewandte Spektroskopie/D
- IFA, Institut für Agrobiotechnology/A
- Reading University, Department of Agriculture/UK
- University of Crete, Environmental Chemical Processes Laboratory/GR

General objectives of the project:

Development in the analytical chemistry sector, of a transnational co-operation between enterprises, universities, scientific research institutes and professional organizations to:

- promote training in newly emerging technologies, improve and upgrade the skills and qualifications of the persons concerned;
- facilitate and develop transfer of R&D results in analytical chemistry to continuous and basic education;
- promote establishment of new professional and scientific collaborations.

Project coordination & further information:
A.C.T.I.V.E. Association Office, c/o Pharmapeptides,
Campus Universitaire - Parc d'Affaires International,
F-74166 Archamps/France
Tel. +33-6-07-52 44 28 - Fax +33-4-50-95 28 32
E-Mail: ACTIVE.info@cur-archamps.fr

Solvent selection for pesticide residue extraction, partitioning and analysis from agricultural environmental samples (plants, soils, waters)

October 6-9, 1997 Angers/France

Aim: Incorporate in analysts' practice recent knowledge (chemometrics, experimental design, colloidal systems) and new technologies (solide phase extraction, microwave-assisted extraction). Give rise to exchange of experimental and theoretical knowledge between searching and applying analysts.

Content: Solute-solvent interactions; classification of solvents; solvent effects on isomerization equilibria; solvents for liquid, solid phase and microwave-assisted extractions, partitioning and adsorption chromatography; empirical parameters of solvent polarity; solvent miscibility, binary and ternary systems; interfacial properties; toxicity of organic solvents; solvent selection.

Lecturers: Prof. Cabras; Prof. Camoès; Dr. Barcelo; Prof. Fournier et al.

Target audience: Chemists, Scientists, Technicians, Graduate et Postgraduate Students.

Organized by: Centre Régional d'Etude des Produits Agropharmaceutiques/F; Association FoSITIA/F; Lisboa University/P; Università Degli Studi di Cagliari/I

Fees: E 285.-; Students E: 70.-.

Registration & further information:
Mrs Nathalie Touret, CREPA, Angers Technopole, 8 rue Becquerel, F-49070 Beaucouzé/France.
Tel. +33-2-41-488 75 70 - Fax +33-2-41-48 7140

Quality Assurance and Control in Biological, Biochemical and Agricultural Laboratories

October 28-29, 1997 - Reading / United Kingdom

November 6-7, 1997 - Halle / Germany

November 20-21, 1997 - Tulln / Austria

Aim: To enable managerial staff and technicians in laboratories to improve QC and QA-systems. To provide managerial staff and technicians and other specialists in laboratories with up-to-date knowledge and a methodology for improving and maintaining the quality of analytical data. To promote quality control measures in biological and agricultural laboratories through interlaboratory collaborations between academia and industry.

Content: Dissemination of examples of best practices Definition of ISO 9000, UKAS and EN 4000 requirements for analytical laboratories. Presentation of methods, procedures and equipment suitable for the highest quality standards. Discussion of QC and QA implementation and training issues.

Lecturers: Dr. I. Mueller-Harvey; Dr. Schädler; Dr Frost; R. Helbig; Prof. Grasserbauer et al.

Target audience: Chemists, Biologists, Agricultural Specialists, Students at corresponding faculties.

Organized by: University of Reading/UK; FHS Anhalt/D; Dr. Felgenträger & Co GmbH/D; Institut for Agrobiotechnology-IFA/A

Registration & further information:
Dr Hubert Mech, BIK - Büro für Industriekontakt GmbH
Grosse Markerstr. 09, D-06108 Halle/Saale
Tel. +49-345-2021081 - Fax +49-345-2021069

Management, legal and technical aspects Environment and chemicil industry

September 25-26, 1997 Dublin/Ireland

Aim: To enable chemists and process engineers to manage the implementation of requirements to meet to Environmental Protection Agency approval and put in place an acceptable environmental management system.

Content: Management and Legal Environmental Law (Environmental Impact Assessment Waste Control, Water Pollution, Civil Liability, EPA Act, The European Dimension). Introduction to Environmental Science and Technology. Waste (sources, minimization, treatment, management). I.P.P.C. Batneec. ELV; EMS; Standards BS 7750, IS 310, ISO 1400; EMAS; IPC Licence requirements (heavy and fine chemicals). The course will comprise a morning session of lectures followed by an afternoon workshop using interactive software.

Lecturers: Dr. B. Fitzgerald; M.P. Ashall; M.S. Cassidy; Mrs N. Healy; M.G. Walker; Dr S. Barrett; Dr I. Mueller-Harvey; Prof. G.C. Galletti; Dr. J. Treacy; M.N. Duffy.

Target audience: Chemists, Scientists, Professors, Postgraduate Students

Organized by: Dublin Institute of Technology/IRL; The University of Reading-Faculty Analytical laboratory/UK; Gesellschaft für Weiter-

bildung Am Alexanderplatz/D; Multimedia International Consultancy Ltd/IRL; Strategi, behov, kvalifikationer/DK

Fees: E 100.-; Students: E 50 -.

Registration & further information:
Dr. P.F Kavanagh, Industrial Liaison Officer, Dublin Institute of Technology, Kevin Street, Dublin 8/Ireland
Tel. +353-1-4024583 - Fax +353-1-4024997

Validation in the pharmaceutical industry

May 7-9,1997 Dublin/Ireland

Aim: to enable chemists, engineers and quality managers in the pharmaceutical industry to develop a validation Master Plan that will meet all regulatory requirements; to gain experience in designing validation protocols and preparing validation reports using design of experiment techniques in the areas of process, equipment, cleaning and analytical validation.

Content: Why Validate? Regulatory requirements: FDA; NDAB; European guidelines; Japan Equipment/Facility Validation: Design Qualification; IQ; OQ; Calibration; Change Control. Process Validation: Finished Pharmaceutical; Bulk Pharmaceutical; Design of experiment; Process Capability, Cleaning Validation, Analytical Method Validation.

Lecturers: Dr. A. Greene; Dr. P. Fitzsimons; M.P. Hawkins et al.

Target audience: Scientists, Chemists, Postgraduate Students, Supervisors and Managers in the Pharmaceutical Industry.

Organized by: DIT Dublin/IRL; SmithKline Beecham/UK.

Fees: E 115,50; Students: E 30,80.

Registration & further information:
Dr. A. Greene, DIT, Kevin Street, Dublin 8, Ireland
Tel. +353-1-4024909 - Fax: +353-1-4024999

Chemometric approaches data analysis and experimental design

November 26-28, 1997 Archamps/France

Aim: To bring awareness of chemometric methods to the non expert: necessity for the laboratory based scientist to understand the use of chemometric tools.

Content: Multi-variate analysis Experimental design: design with mixtures, optimization, some useful software for Chemometry.

Lecturers: Prof. P. Lanteri, Prof. R. Van Grieken, Dr R. Longeray et al.

Target audience: Chemists, Scientists, Researchers and Technicians from SMEs, industry, scientific organizations, public and commercial Laboratories, Graduate and Postagraduate Students.

Organized by: ACTIVE Association/F; Université Claude Bernard-Lyon I-CPE/F; Universitaire Instelling Antwerpen/B; Centre de Compétence en Chimie et Toxicologie Analytiques/CH.

Registration & further information:
ACTIVE Association Office, c/o Pharmapeptides, Campus Universitaire-Parc d'Affaires International, F-74166 Archamps.
Tel. +33-6-07-524428 - Fax +33-4-50-952832
E-Mail: ACTIVE.info@cur-archamps.fr

At the crossroads of the main European highways and at 10 mn from the International Airport of Geneva, the Site d'Archamps has been created to improve the economic development as well as the establishment of international companies in the french Geneva country. Production, services, commercial and cultural activities are combined with training and research activities to give the Site d'Archamps its specific aspect. Accomodation is available at the Ibis Hotel. The Site d'Archamps is also equipped with two restaurants and a catering service.

The International Business Park, developed since 1989, is an ideal location for companies concerned with strengthening their position on the European market.

The French Geneva Campus, opened since 1991, houses international training and research programmes: transborder cooperations, private centres and institutes, continuing education and seminars.

The Site d'Archamps has been classified "Advanced Telecommunications Area" by France Telecom.
It is equipped with an important Internet connection and provides a distribution of its network techniques all over the region.

Information contact:
Information office - International Business Park, F-74160 Archamps, France
Tel. +33-4-50-315000
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E-mail: information@cur-archamps.fr
Internet: http://www.cur-archamps.fr/archamps/fr/site.html

New Publications

Air pollution research report 59 European stratospheric ozone research 1996-97

Edited by: G.T. Amanatidis, European Commission, DG XII/D-1 and N.R.P. Harris, European Ozone Research Coordinating Unit

EUR 16987 EN, ISBN 92-827-8729-X

This document contains an overview of the current stratospheric ozone research supported by DG XII of the European Commission (EC) within the first phase of the Environment and Climate Programme under the Framework IV Programme 1994-1998. Specifically, it describes 34 research projects which are being supported during 1996-97 in the area of "stratospheric chemistry and depletion of the ozone layer". These projects address particular aspects of the stratospheric ozone issue, as the scientific processes responsible for the ozone depletion in the polar and mid-latitude regions, the quantification of the natural variability of the stratosphere, the impact of aircrafts emissions, the evaluation of potential effects of ozone depletion (UV radiation fluxes), the development of instrumentation for both stratospheric ozone and UV radiation measurements, etc. In addition, three more projects supported by the Environment and Climate Programme (ELDONET in the UV effects area and SODA in space techniques area) or the Brite-Euram Programme (AEROJET in the aeronautics area), strongly linked with the stratospheric ozone research, are also included.

There are four sections in this document. Section I describes the scientific background concerning the polar and the mid-latitude ozone layer as well as the European research programme on this area build since 1989 by the EC and the Member States. Section 2 presents the current programme 1996-97 and particularly the complementarity of the projects in the various categories: long term field studies, process studies, stratospheric-troposphere exchange and impact of aircraft emissions, laboratory studies, UV radiation and instrument development. Section 3 concerns the coordinated field activities which will be carried out in winter 1996/97 supported by the EC and national funding agencies within Europe. Finally, section 4 includes a short description of all the 37 EC projects.

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.