

EMECS NEWSLETTER

No. **8**

International EMECS Center

7th Stockholm Water Symposium-3rd EMECS-Conference Scheduled for August 1997



The working group meeting in August 1995

During the closing ceremony at the second International Conference on the Environmental Management of Enclosed Coastal Seas (EMECS '93), it was announced that the third EMECS conference would be held in 1996 in the city of Stockholm, Sweden, on the Baltic Sea. At the suggestion of the Swedish representatives, it was decided to defer the EMECS conference until the exposition in Sweden in 1997, and to hold it jointly with the Stockholm Water Symposium. The joint 7th Stockholm Water Symposium-3rd EMECS-Conference will be held in Stockholm in the middle of August 1997.

The Swedish exposition to be held in 1997 commemorates the 100th anniversary of the holding of a major exposition in Stockholm in 1897. It will run from

May 16 until August 17. The joint 7th Stockholm Water Symposium-3rd EMECS-Conference will be one of the main Expo '97 events in August.

1 The Programme Committee
The Programme Committee, which will plan conference format and programme content of the joint conference and identify key presenters and session chairs, will meet in January and August 1996.

A working group meeting for the joint conference was held on August 19, 1995 in Stockholm and was attended by the Programme Committee members from Sweden, the United States, Japan and Finland. At the meeting, the conference name, dates, theme and schedule of future events were decided as follows:

- Name: 7th Stockholm Water

Symposium-3rd EMECS-Conference

- Date: Mid-August 1997
- Theme: With Rivers to the Sea: Interactions of Land Activities, Fresh Water and Enclosed Coastal Seas
- Schedule:
 - First announcement (call for papers) - April 1996
 - Second announcement (participant registration) - January 1997

2 Stockholm Water Symposium
The Stockholm Water Symposium is a yearly future-oriented policy conference where researchers, companies and community organizations discuss issues of water quality (such as supply of drinking water and water treatment systems) and the impact of land use decisions. The Symposium's approach is international and multi-disciplinary, integrating a variety of professions and sectors of society. Since 1991, the symposium has been held every

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Stockholm City Hall

August during the Stockholm Water Festival. It is sponsored by the public utility Stockholm Water Company.

During the symposium, the Stockholm Water Prize - sometimes referred to as the "Nobel Prize of water" - is awarded by the Stockholm Water Foundation in recognition of significant achievements in improving water quality. The award is presented by the King of Sweden and the award ceremony is held at the Stockholm City Hall, the same venue as the Nobel Prize ceremony. In 1994, the award was presented to Takeshi Kubo, chairman of the International Committee of the Japan Water Treatment Systems Association; in 1995, it was given to Dr. Jon Lane of the Water Aid organization of Great Britain.

Grants for International Activities

The International EMECS Center offers grants to cover part of the costs of organizing or participating in conferences, workshops and other activities devoted to the environmental management of enclosed coastal seas, in an effort to promote research in the field of environmental preservation and the appropriate use of the world's enclosed coastal seas and to train people to contribute to these objectives.

-The schedule for applications.

Deadline for applications: End of February, 1996

Notification of decision of the selection committee: Early March, 1996

- Eligible Persons and Organizations

Individuals and organizations involved in the following activities related to the environmental preservation and appropriate use of enclosed coastal seas are eligible for grants:

- 1 Scholars, researchers and government officials participating in international training and research projects, or presenting papers at international conferences and workshops
- 2 Nonprofit organizations working for the environmental preservation and appropriate use of enclosed coastal seas that will be holding conferences, workshops or symposiums

- Grant Amounts:

Up to 500,000 yen will be awarded for the above activities.

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Marine Protected Areas of the Lithuanian Coast, the Baltic Sea

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Introduction

In 1991, the joint World Wide Fond for Nature (WWF) and the Baltic Marine Biologists association (BMB) Working Group was set up to identify a network of coastal and offshore marine areas in the Baltic Sea in need of Protection. During the next two years about 60 areas (Figure 1) were selected in accordance with certain criteria like ecological value, scientific and educational importance, state of still existing naturalness, biodiversity, etc. (Hagerhall-Aniansson, 1993). These areas will be linked by uniform methods of research, monitoring and management into the future Baltic International System of Marine Protected Areas (Dybern and Hagerholl, 1992; Schulz, 1993). Also it was agreed that the first step must be standardised status quo descriptions of the areas.

Three of the areas nominated by the experts are situated in the Lithuanian sector of the Baltic Sea coastal zone, namely: the regional park Pajuris, Kuršių Nerija national park and regional park Nemunas Delta (Figure 2). In spite of geographical nearness,

Figure1 Proposed Marine Protected Areas in Baltic Sea



geomorphological, hydrological and biological characteristic of the three areas are different. The regional park Nemunas Delta comprise a large territory of wetlands, meadows, lakes and river arms in the delta of the river Nemunas. The seashore part of Kursių Nerija (the Curonian Spit) national park is a typical open sandy coast with dunes, broad sandy beaches and gently sloping sandy bottom. The regional park Pajūris mainly is interesting by its stony bottom localities and comparatively diverse fauna and flora associated with hard bottoms. Presently this area is investigated by a group of marine biologists of Klaipėda University. The aim of study is detailed documentation of the marine protected area (MPA) according to the standard elaborated by the joint WWF/BMB Working Group.

Methods of Research

The work was started from an analysis of existing sources of information: scientific literature, unpublished research reports, nautical charts, geological maps, etc. An underwater video survey of the Lithuanian coastal zone including the area of interest was performed by a joint Lithuanian-German expedition on board of the research yacht "Aldebaran" in the end of August, 1993.

During the field seasons 1993-1994, samples of bottom fauna and flora were collected by divers. In addition grabs and benthic trawls were used, mainly at the depths beneath 8-10 m. Species composition,

abundance and biomass of macro fauna was determined by methods adopted for marine biological research in the Baltic (HELCOM, 1988). Fish catches of small private companies, operating in the area and its surroundings were analysed also.

Results of literature analysis; materials of field observations and laboratory works were formalised, and computer data bases were developed. Further these data were used for statistical calculations and for GIS applications.

Physical-Geographical Considerations

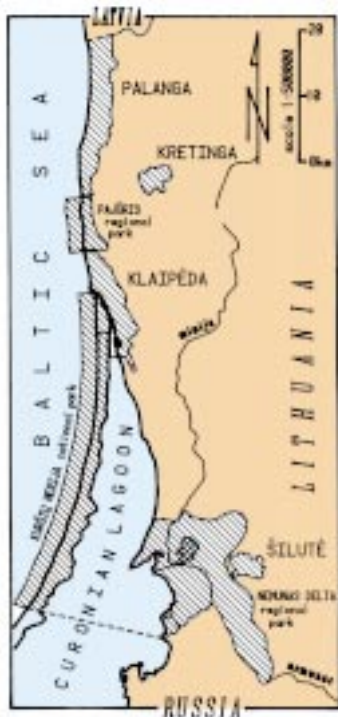
The regional park is situated in the northern part of the Lithuanian coast in between the maritime health resort Palanga and a suburb of Klaipėda, the main city of the Lithuanian Coastal Region. The park includes 2,700 ha of land and about 6,000 ha of the inshore waters. Its terrestrial and marine parts comprise a variety of coastal and marine biotopes: a) coastal forests; b) coastal "grey" and "brown" dunes; c) a moraine cliff; d) sandy beaches sometimes with mixture of pebbles and gravel; e) bottoms of sand, gravel and stones, including different variations among them.

Being situated in the south-eastern part of the Baltic Proper, the area fits to the boreal zoogeographic zone.

The coastal zone itself is formed by an underwater coastal slope, extending from the shore down to the depths of 20-25 m, a narrow sandy beach of 15-30 m width, and a swell of sandy dunes. The uppermost part of the underwater slope (down to 4-5 m) is covered by a thin layer of fine sand, moving during storms. Single large boulders jut out at the shallowest (1-2 m) part of the slope. Stony bottom, or a morainic bench, lays beneath the stripe of moving sands, extending down to 25-30 m. The largest part of the area is occupied by stones, pebble and gravel, though rather large sandy fields occur also. The maximal depth within the limits of the protected area is 20 m.

The major hydrological features are determined by the interaction between the offshore south-eastern Baltic waters (salinity 7-8 ‰ C365) and River Nemunas runoff, which enters the Baltic through the narrow outlet of the freshwater Curonian Lagoon. The mixed, Lagoon-and-Sea water of lowered salinity (3-7 ‰ C365) usually occupy surface layer. This water mass forms either a "plume", or a number of "lenses" directed northward or north-westward off the La-

Figure2 Marine and Coastal Protected Area in Lithuania



goon's outlet. The closer to the outlet, the lower salinity is. Often a stripe of the sea and fresh waters contact (a hydro-front) is very narrow (some 20-30 m), and it may be easily observed from ships or plains due to differences in the water colour and transparency. The vertical salinity gradient is weak and do not forms up a halocline. A pronounced thermocline occurs rarely even at summer, and due to quite intensive mixing of the water all the year round there is no oxygen limitation to marine wildlife.

The runoff of the Curonian Lagoon, containing huge amounts of mineral and organic particles, significantly increases the turbidity of the inshore waters, that, in turn, effects thickness of euphotic layer. The transparency declines to 0.7-1.5 m in spring during the period of the most intensive runoff and in summer during a peak of algae bloom in the Lagoon.

Phytoplankton and Algae Blooms

Totally about 180 species and forms of planktonic algae were recorded in the south-eastern Baltic inshore waters, including the area of interest (Olenina and Kavolyte, in press).

Summer algae blooms, caused by intensive growth of the blue-greens *Microcystis*, *Gomphosheria*, *Aphanizomenon*, *Nodularia* are usual phenomena. Most of these species are dominant as in the inshore waters, as in the Curonian Lagoon also. Some of them are known to be toxic. The "blooming" water spreads out from the Lagoon's outlet northward over 20-30 km along the shore. It may seriously worsen a recreational value of the area.

Bottom Vegetation

Phytobenthos is presented mainly by green (*Enteromorpha intestinalis*, *Cladophora spp.*); brown (*Pyraliella litoralis*) and red (*Furcellaria lumbricalis*, *Ceramium sp.*) algae. In the most shallow waters (0-2 m depth) single stones are covered by a thick carpet of filamentous green algae during the vegetation season; in the winter time the stones are almost free of the fouling. The red algae *Furcellaria* appears at the depths of 4-5 m; it covers steady large boulders down to the depths of 14 m (light limitation). Beneath that depth only single specimens of another red algae, *Ceramium sp.* occur (it was found as deep as 20 m). Benthic vegetation depends on the hard substrates existence, while soft bottoms analysed were free of macroflora. The area covered by *Furcellaria* decreased drastically in 1990-s versus 1960-s (Lab-

nauskas, 1993).

Bottom macro fauna

A stony bottom community is dominated by the blue mussel *Mytilus edulis*. With is 40 species it shows the highest biodiversity in the entire south-eastern Baltic. The community is characterised by largest biomass and abundance as well (up to 2 kg/m²). The blue mussel densely fouls the surface of large boulders. Being a suspension feeder, *M. edulis* together with other sessile invertebrates function as a powerful natural biofilter. The blue mussel shells create additional microbiotopes for abundant sessile and motile benthic fauna. These habitats serve as a refuge (shelter) for small crustaceans, worms and other benthic invertebrates. Sandy bottoms are inhabited by the *Macoma baltica* community. Mostly it consists of infaunal species with biomass varying from 5 to about 200 g/m².

Fish

Fish community is a mixture of the marine and freshwater species: 1) small sand eel *Ammodytes tobianus*, Baltic herring *Clupea harengus membras*, baltic sprat *Sprattus sprattus*, common goby *Pomatoschistus microps*, flounder *Psetta maxima*, fluke *Platichthys flesus flesus*, etc.; 2) freshwater roach *Rutilus rutilus*, common perch *Perca fluviatilis*, bream *Abramis brama*, sander *Lucioperca lucioperca*, three-spined stickleback *Gasterosteus aculeatus*. Stony bottom localities are the main spawning ground for the Baltic herring and a nursery place for a number of other commercial and rare fish.

Anthropogenic Influence

Any public activity, including fishing was prohibited in the area, where the "Pajūrio" regional park presently is situated until recently (1992), since it was a "closed" Soviet military area.

Nowadays the whole shoreline, including the marine park is divided by several small private fishing companies- "co-operatives". They intensively use the "passive" (stable nets) fishing method. State fishery authorities try to steer the process by selling the licences, but in fact no proper control of fishery activities is elaborated yet.

The area is open for visiting and recreation, however there are no large tourist complexes within it. Recreation makes no threat to underwater wildlife, since SCUBA diving is not popular due to unfavourable

light conditions. Part of the area (particularly the southern one) is influenced by the eutrophied runoff of the Curonian Lagoon and municipal and industrial waste waters of Klaipėda.

Conservation values

It is well-known, that the diversity of the enclosed, brackish Baltic Sea wildlife decreases along the salinity gradient from the entrances towards the interior. The Lithuanian coast lays in the middle of the Baltic gradients, and therefore this part of the Sea is beyond distribution areas of many marine species. Thus, the marine protected area described here is rather poor in terms of biodiversity versus similar sites in the North Sea or even in the Western Baltic.

Nevertheless, in the Eastern Baltic context the area may be considered as a peculiar reserve, supporting biodiversity in the whole Lithuanian coastal zone. Several important features worth of protection may be listed: a) the area is important as a spawning and nursing place for fish; b) the largest part of its bottom is occupied by the community of blue mussel, which serves as a biofilter cleaning and lightening the water by redistributing of the suspended organic and non organic matter between the water body and the bottom; c) one of few sites in the south-eastern Baltic, where the red algae *Furcellaria* still vegetates is located within the marine protected area investigated.

Acknowledgements

Field studies in the marine protected area are carried out in a framework of the joint WWF/Lithuanian Fond for Nature project and supported by the WWF International Baltic Programme. I am grateful to F. Schweikert and a team of the research yacht "Aldebaran" (Germany) for fruitful co-operation perform-



Fishing in the MPA is performed from small boats.

ing underwater video survey in the Lithuanian coastal zone in 1993; to researchers and students of Klaipėda University for help in collecting and analysing material. Computerised maps were made by Vytautas Labanauskas.

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An Overview on the Buoyancy Forces in Enclosed Coastal Seas



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Introduction

Coastal shelf sea regions are highly susceptible to waste inflows frequently supplied by river and pipe discharge from human activities, and sources of potential pollution such as offshore mining and coastally located industrial projects. Dispersion of such contaminants can be predicted by simulating the important exchange processes involved and estimating the all important flushing time which is controlled by buoyancy inputs and wind/tidal mixing.

The importance of buoyancy forces was demonstrated to an exemplary extent by oil spillage along the Kuwait coastline during the Gulf War, which circulated cyclonically along the east coast of Saudi Arabia due to buoyancy driven circulation in the Arabian Gulf. Further, in the Baltic Sea significant inputs of human contaminants are flushed only sporadically by density-driven exchange flows.

Gulfs and enclosed coastal regions have many common characteristics such as shallow water depth and important freshwater inflows from river run-off. Consequently, the important driving forces of circulation include buoyancy inputs, wind forcing and turbulent vertical mixing processes.

A thorough understanding of the importance of buoyancy effects is therefore essential in predicting the coastal water response to wind forcing and tidal mixing.

What are buoyancy forces?

The term buoyancy or rather relative buoyancy describes the reduced gravity of a particular water parcel, i. e. the apparent weight of a water parcel when referenced to the ambient density.

The dynamical significance of buoyancy inputs are that they can induce horizontal mixing in one of two ways:

- i. A baroclinic density field (a horizontal buoyancy gradient caused by mutually inclined isobars and isopycnals) generates a horizontal pressure gradient.
- ii. Even though the buoyancy body force acts vertically, and therefore cannot usually provoke horizontal motion, an inclined sea-bed allows a down-slope component of the buoyancy force to act directly on fluid parcels close to the bottom.

Vertical buoyancy forces however, tend to counteract both vertical motion and mixing. Hence, water

parcels displaced vertically from their neutrally buoyant level are exposed to buoyancy restoring forces causing oscillations about the neutrally buoyant reference level with a buoyancy frequency (Hill, 1995).

Mechanisms for the establishment of density gradients in coastal seas

There are numerous distinct regions where the direct influence of buoyancy forcing inevitably establishes density-driven circulation of a cyclonic nature, the effects of which have been regarded both observationally and theoretically by many scientists. Coastal oceans receive buoyancy inputs both at the surface and laterally from adjacent waters. Buoyancy is redistributed internally by advection and mixing which also contribute to the total buoyancy flux. Surface fluxes result from heating, cooling, freshening (ice-melting or precipitation), and salinization (evaporation or brine release from freezing). These fluxes (Fig 1) generally initiate horizontal density gradients due to spatial diversity in bathymetry (Fig 1a, b), buoyancy input (Fig 1c), vertical mixing (Fig 1d) or any combination of these (Hill, 1995).

Figure1 Buoyancy effects to the coastal shelf seas

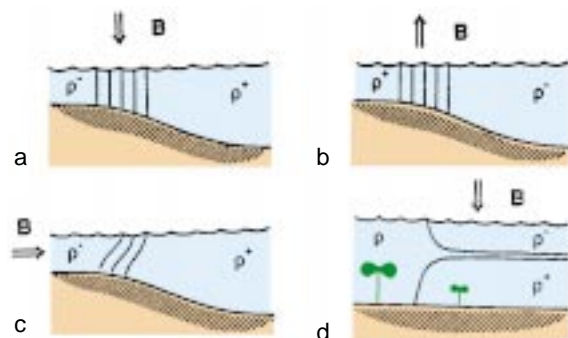


Figure 1a, b: show that surface cooling and evaporation over variable topography leads to the formation of dense water in shallow coastal regions e. g. Lake Ontario and Jervis Bay.

Figure 1c: Lateral input of buoyancy by river discharge, e. g. Yangtze River.

Figure 1d: Surface buoyancy input over regions of spatially varying vertical mixing, e. g. Irish Sea.

Buoyancy-driven regimes in some enclosed coastal seas

Regions where a significant part of the flow is density-driven include:

- a. the Arabian Gulf, the Strait of Hormuz, and the Strait of Oman

Cyclonic residual circulation driven by density and pressure gradients in the Arabian Gulf have been described by many scientists such as Schott (1918), British Admiralty (1941), Hartman et al. (1971), Grasshoff (1976) and Brewer et al. (1978). Sewell (1934a, b) and Emery (1956) to name a few, reported that there was an outflow of deep saline water from the Strait of Hormuz into the Gulf of Oman. Sugden

Figure 2 Argos buoy tracks showing cyclonic flow in the Arabian Gulf from May 1983 until June 1985 (Tawfig 1987)



(1963) found cyclonic density-driven circulation with surface inflow and subsurface outflow in the Gulf of Oman. Freshwater input from northern rivers and heating-cooling mechanisms further affect the density gradient as quite fresh coastal waters of the northern Arabian Gulf and more saline off-shore waters create coastal density currents. Subsequent deflection to the right by the Coriolis force on the Arabian side is followed by the Strait of Hormuz acting as a sink. The use of free drifting Argos buoys in May 1993 (Fig 2) provided an improved picture of north-west Arabian Gulf circulation (Tawfig, 1987). Results strongly described the existence of cyclonic circulation in the upper layers of the north-western Arabian Gulf.

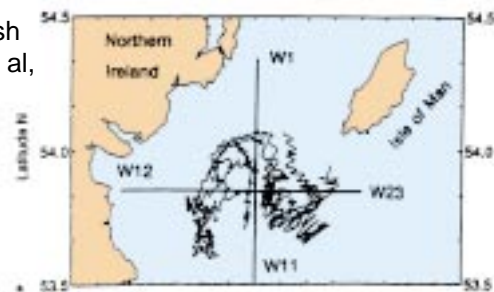
b. winter circulation in the Adriatic Sea

Orlic (1987) described the general assumption that most of the densest water in the Mediterranean Sea comes from the Adriatic Sea. The north-east winter wind blows dense water from the shallow northern basin of the Adriatic southward over the flat bottomed topography. River run-off from the Po river delta in the north-west provides a cold, fresh water influx producing a lip of light water advancing from the Gulf of Venice (Henderschott and Rizzoli, 1976). The heat and salt budgets are also influenced by other rivers and drainage basins in the region. A frequent annual salt gain and heat loss is however, capable of producing a cyclonic horizontal density field in the northern Adriatic, commonly characterized by surface influx of Mediterranean water and subsurface outflow of dense basin water. Whether this flow interacts strongly with flow in the more southern parts depends on variations to the flow field caused by bottom relief and overhead evaporation.

c. North-western Irish Sea

High density bottom water is shown to exist in a region between 53-54 ° N and 5-5.7 ° W in the western Irish Sea, characterized during the summer by strong density stratification. A net buoyancy input to the upper layers caused by heat radiation and the interaction with the atmosphere is balanced by buoyan-

Figure 3: Argos-Decca buoy tracks showing cyclonic flow in the western Irish Sea (Hill et al, 1994)



cy lost in mixing and advection at the boundaries between the stratified region and well-mixed isothermal water, characteristic of the rest of the Irish Sea (Simpson, 1971). With temperature variations controlling density in the Irish Sea, horizontal temperature gradients in the frontal region will cause large horizontal forces perpendicular to the front which must affect the residual circulation in the more stratified region.

The use of free-drifting Decca-Argos buoys and ship borne acoustic Doppler current profilers greatly enhanced the picture of circulation in the Irish Sea. Using profiling and towed-undulating CTD's to map the density structure, Hill et al. (1994) obtained results which showed convincingly the cyclonic circulation in the upper layers of the stratified western Irish Sea (Fig 3).

Conclusion

Variations of density, subject to gravity, in a fluid, cause buoyancy forces which produce many important mechanisms for fluid dynamics. Invariably, coastal seas are exposed to buoyancy forces the establish density driven circulations. Of these, the most important seemingly occur in either:

(1) regions of freshwater discharge and usually occur as buoyancy-driven coastal currents, (2) shallow semi-enclosed seas where the formation of dense water in winter produces outflows which can affect both the surrounding ocean and cause the semi-enclosed sea to be flushed when dense water is replaced from outside, (3) tidally energetic shelves where surface buoyancy inputs and tidal mixing compete to form pronounced density fronts.

Acknowledgement

I am grateful to Dr. A. E. Hill (University of Wales, Bangor) for allowing me to use figures 1 & 3.

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Ceremony and Symposium Commemorating the Opening of the UNEP International Environmental Technology Centre (IETC) Shiga Office



In March 1995, construction of the Shiga Office for the International Environmental Technology Centre (IETC) of the United Nations Environment Programme (UNEP) was completed at a location on Karasuma Peninsula in Kusatsu City. The offices of the IETC and the International Lake Environment Committee Foundation (ILEC) were moved to the new facility and operations began in April. To commemorate the opening of the UNEP/IETC Shiga Office, a joint ceremony and symposium were held in Kusatsu on June 30, attended by 250 citizens and related officials from Japan and abroad.

Ceremony

At the ceremony held in the morning, Shiga Prefectural Governor Minoru Inaba welcomed the attendees and was followed by Richard Meganck, director of the UNEP Centre, who introduced UNEP Executive Director Elizabeth Dowdeswell. Ms. Dowdeswell thanked Shiga Prefecture and the ILEC for their efforts in making the UNEP/IETC Shiga Office a reality. She quoted Nobel prize-winning novelist Kenzaburo Oe in praising Japan's contributions to the international community and global environmental preservation and expressed high hopes for the Centre's future activities.

Speeches were also given by Kei Yamazaki, director-general of the ILEC; Sohei Miyashita, State Minister, director-general of the Environment Agency of Japan (through a representative); Yohei Kono, Minister for Foreign Affairs (through a representative) and former Prime Minister Sosuke Uno.

A special address was given by Nobutoshi Akao, Ambassador Extraordinary and Plenipotentiary of Japan to the International Organizations in Vienna. In 1991 Ambassador Akao was instrumental in inviting the UNEP/IETC to Japan in his former capacity as director of the United Nations Bureau of the Ministry of

Foreign Affairs.

In his address, Ambassador Akao touched on the delicate negotiations in various European and African nations at the UNEP Governing Council session in Nairobi that eventually led to the Centre's establishment, making it clear that the path to the decision had by no means been a smooth one. He also stressed the importance of promoting the transfer of environmental technologies at the operational level in future Centre activities.

Symposium

In the afternoon, UNEP/IETC international advisory board members were invited to take part in a commemorative symposium to discuss the role of the Centre in global environmental issues.

The keynote address was given by Mr. Kirk Rodgers, director of the Department of Regional Environment and Development, OAS. He stressed the importance of accurately identifying technological needs as well as any factors that might interfere with the transfer of needed technologies.

The panel discussion which followed was participated in by UNEP/IETC international advisory board members and others and featured a lively exchange of views regarding the current status of water environments in various parts of the world and problems encountered in the transfer of technologies.

The day's activities concluded with a tour of the new UNEP/IETC Shiga Office by international advisory board members and other participants.
The UNEP/IETC Shiga Office

The UNEP/IETC Shiga Office facilities are divided into five areas: UNEP business center, public area, training center, lodging facility and ILEC business center. The facility itself is designed to be in harmony with nature and employs a heating and cooling system utilizing a radiating effect, with natural breezes for ventilation and plants for enhanced heat insulation, and also includes a rainwater collection system.

Total land area: 12,719 square meters
Construction: Reinforced concrete
Area: 2 floors above ground, one floor below: Floor space
3,018 square meters

Hiroyuki Takeda

International Lake Environment Committee
Foundation (ILEC)
1091 Oroshimo-cho, Kusatsu-shi, Shiga Prefecture
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"The Challenge of the Madrigal Sea: Resolving Coastal Conflicts" Video Now Available

One of the most popular events at the EMECS '93 conference was a simulated policy debate involving a fictional enclosed coastal sea called the Madrigal Sea. Eight scholars assumed the roles of community activist, commerce and industry representative, fisherman, government official in charge of environment and fisheries, politician, environmental leader, scientist and shoreline researcher. Drawing on their real experience, they took part in a discussion on the future of their precious resource, representing the often conflicting needs of these diverse groups. The session was very well received by conference participants.

Now the Madrigal Sea session is available in the form of a 37-minute video created by the Maryland Sea Grant College. This is a valuable teaching tool that can serve as a starting point for the resolution of environmental problems in enclosed coastal seas.

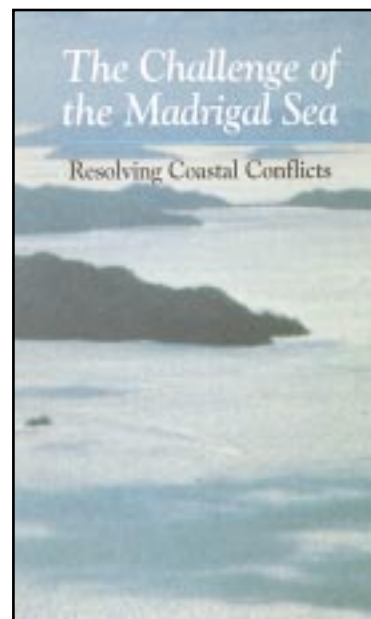
Price: US\$29.95

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Forthcoming Conferences

(1995)

Oct.17-20

2nd Int.Sympo.on Wastewater
Reclamation & Reuse

Iraklio,Crete,Greece

Contact:Secretariat:Furnaraki,Municipal
Enterprise for Water Supply & Sewerage
of Iraklio

Address:1 Vironos Street 71202

Iraklio,Crete

Greece

Tel: + 30 81-245-851

Fax: + 30 81-245-858

Oct.21-25

WEFTEC '95

(68th Annual Conf. & Expo. of Water
Environment Federation)

Miami Beach, Florida, U.S.A.

Contact:Secretariat

Address: Water Environment Federation
601 Wythe St.,Alexandra, VA 22314-
1994 U.S.A.

Tel: + 1 703-684-2464

Oct.24-27

2nd Int.Conf.on the Med.Coastal
Environment

(MEDCOAST 95)

Tarragona,Spain

Contact:Secretariat

Address:Laboratori d'Enginyeria
Maritima(LIM/UPC)

Universitat Politecnica de Catalunya

Gran Capita s/n, modul D-1

08034 Barcelona Spain

Tel: + 34 3-401-64-68

Fax: + 34 3 401-73-57

Oct.23-27

6th Int.Conf.on the Conservation &
Management of Lakes

(Kasumigaura '95)

Tsuchiura & Tsukuba, Japan

Contact:Secretariat

Address:c/o Ibaraki Pref.Gov.

5-38,Sannomaru 1-chome,Mito 310 Japan

Fax: + 81 292-33-2351

Oct.26-28

Natural & Constructed Wetland for
Wastewater Treatment

Perugia, Italy

Contact:Secretariat

Address:Ida Basile, Centro Studi

Strada S Sisto-Settevalli 50

06126 Perugia, Italy

Nov. 5-9

2nd Society of Environmental Toxicology
& Chemistry (SETAC) World Congress

Vancouver, BC, Canada

Contact:the SETAC office

Address:1010 North 12th Ave., Pensacola
FL 32501-3307, U.S.A.

Fax: + 1 904-469-9778

Nov.12-16

13th Int.Estuarine Research Federation
Conf.

Corpus Christi,Texas,USA

Contact:ERF'95 Committee

Address:UTMSI, P.O.Box 1267

Port Aransas, TX 78373 USA

Fax: + 1 512-749-6779

E-mail:erf95@utmsi.zo.utexas.edu.

Nov.20-23

Ocean Sites 95

Monaco

Contact:Secretariat

Address:31 Ave., Hector Otto

MC 98000 Monaco

Fax: + 33 93-15-93-95

Dec.11-15

3rd Princess Chulabhorn Science
Congress

Bangkok, Thailand

Contact: Chulabhorn Research Inst.
Office of Scientific Affairs

Address: Vipavadee-Rangsit Highway

Bangkok 10210 Thailand

Fax; +66 2-247-1222

(1996)

April 16-18

HYDROTOP 96

Marseille, France

Contact:Secretariat

Address:c/o Association S.I.E.M.

314, Avenue du Prado

13008 Marseille, France

Fax: + 33 91-22-71-71

Tel: + 33 91-22-72-72

August 12-17

Coastal Zone '96

Rimouski, Quebec, Canada

Contact:Secretariat

Address:c/o Groupe de recherche en
environnement c;tier(GREC)

Université du Québec

310, allée des Ursulines

Rimouski, Québec

Canada G5L 3A1

August 11-16

6th Stockholm Water Sympo.

Stockholm, Sweden

Contact:Stockholm Water Company

Address:S-106 36, Stockholm, Sweden

Fax: + 46 8-736-2022

Call for Articles

EMECS Newsletter is targeted at researchers and individuals affiliated with organizations related to the study of enclosed coastal seas. Its purpose is to provide a forum for the exchange of information on enclosed coastal seas and to disseminate this information to as wide a readership as possible, linking concerned persons and organizations throughout the world.

Your contributions would be greatly appreciated.

All submissions to:

The publisher

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