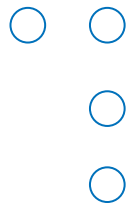




The Sea and its Resources

Special Courses

Biogeochemistry of Tropical Coastal Seas



Objectives

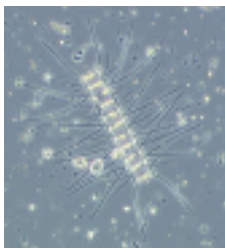
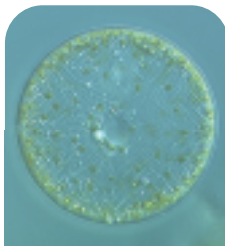
Tropical coastal seas harbour some of the most diverse and productive ecosystems on earth. The vast majority of carbon and nutrient inputs into the ocean occur along tropical coastlines, fueling the productivity of the coastal seas. Because of their wealth in natural resources these furnish economically important services to the population.

The land-ocean transition forms a highly dynamic interface where ecologically important ecosystems, sensitive to environmental change, meet the economic demands of an ever-growing population. Stress caused by increasing economic pressure and global climate change, however, endangers the functioning of these ecosystems. Upsetting the delicate ecological balance alters the biogeochemical cycling of elements which, in turn, will affect foodwebs and the release and uptake of climate-relevant greenhouse gases.

Although tropical coastal seas are considered to have important regulatory functions in the global biogeochemical cycles, knowledge on the respective processes and fluxes from these areas is still scarce. The ongoing degradation of tropical coastal ecosystems due to rapidly changing environmental conditions underscores the need for improved coastal zone management.

This requires a well-founded understanding of the biogeochemical processes that are sustaining the natural resources of tropical coastal seas.

The major goal of this course is to provide background knowledge on the biogeochemical cycling of elements in the aquatic environment. It will specifically highlight processes in tropical coastal ecosystems and emphasize the effects of natural and man-made environmental change. The course also provides training in the application of state-of-the-art techniques and tools for the assessment of water quality and understanding of biogeochemical processes.



Contents

The 2-weeks course will be held at the ZMT or in one of its partner institutions.

General introduction

- Hydrological cycle
- Rock cycle
- Origin of life
- Transport processes (surface water circulation, thermohaline circulation, particle flux)
- Production, transformation and fate of organic matter
- C, N, P, Si, O cycles
- Effects of environmental change

Tropical ecosystems discussed

- Upwelling systems
- Rivers and estuaries
- Natural and reservoir lakes
- Mangroves
- Coral reefs
- Coastal seas

Practical work and tools

- Measurement of water quality parameters
- Collection of water samples
- Chemical analysis of water samples
- Interpretation of data
- Calculation of nutrient fluxes and budgets

Center for Tropical Marine Ecology

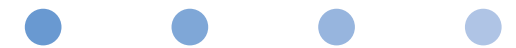
Fahrenheitstraße 6
28359 Bremen
Germany
Tel +49 (0)421 23800 21
Fax +49 (0)421 23800 30
www.zmt-bremen.de

Bremen 2004

for further information and requests
please contact:
contact@zmt-bremen.de



Design: kube und trinch, Bremen
Photography: T. Jennerjahn, S. Klöpfer, U. Saint-Paul, M. Wunsch



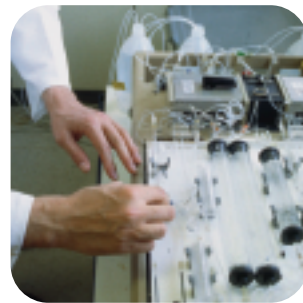


Participants and Fees

The course (15–20 participants) is intended for students, lecturers, researchers, coastal managers and those interested in understanding the processes determining the biogeochemical cycling of elements and water quality in tropical coastal seas.

Participants should be proficient in English and hold an undergraduate degree in biology, chemistry, geology or have equivalent experience.

ZMT certificates for successful participants can be issued on request. The ZMT is a non-profit institution. Participation fees will be fixed in accordance with the hosting institution.



Background

Since 1991 the ZMT has been engaged in educational and training activities in tropical aquatic ecology. This includes special courses for postgraduates in Bremen and at partner institutions around the world. Based on this experience, the ZMT offers tailor-made training courses within its course curriculum "The Sea and its Resources". They are carried out in close cooperation with scientists from other German research institutions and cover a wide range of topics, including:

- Coastal Marine Systems
- Sampling Strategies and Methods
- Tropical Ecosystems and Resources
- Resource Availability and Vulnerability



Further

ZMT – Special Courses

Ecology and Taxonomy

- Ecology and early life stages of marine organisms; ZMT Bremen
- Coral reef ecology; State Polytechnic College of Palawan, Philippines
- Mangrove ecology; Bung Hatta University, Indonesia
- Benthos ecology with emphasis on tropical coastal ecosystems; ZMT Bremen; CIMAR, Costa Rica
- Taxonomy of corals; Bung Hatta University, Indonesia
- Fish ecology; Belem / Bragança, Brazil
- Taxonomy and ecology of reef fishes; Bung Hatta University, Indonesia

Physiology

- Ecophysiology of tropical marine organisms; Bung Hatta University, Indonesia
- Respiration, activity and behaviour of tropical fishes; Bung Hatta University and Soedirman University, Indonesia
- Respiration physiology of fishes; Belem / Bragança, Brazil

Fisheries Biology

- Population dynamics of marine fishes / Ecology of eggs and larvae of marine fishes; College of Fisheries Mangalore, India
- Fisheries biology and marine fishes; University of Cape Coast, Ghana; State Polytechnic College of Palawan, Philippines
- Early life history of fishes (within BENEFIT); ZMT Bremen
- Fishes in estuaries; Bragança, Brazil
- Introduction to fisheries science; Bragança, Brazil
- Fish population dynamics; Soedirman University, Indonesia

Biogeochemistry

- Coastal pollution, its effect and diagnosis in natural communities; ZMT Bremen
- Biogeochemistry and ecology of tropical coastal seas; Institute of Oceanography, Nha Trang, Vietnam
- Aquatic chemistry; Universidade Federal do Pará, Brazil

Coastal Management

- Coastal zone management planning; Universitas Riau, Pekanbaru, Indonesia
- Coastal management: Options and issues in interdisciplinary work between the social and natural sciences; ZMT Bremen
- Coastal resources management; State Polytechnic College of Palawan, Philippines

Methodology

- Sampling strategies for marine ecological research; ZMT Bremen
- Relational databases in interdisciplinary research; Universidade Federal do Pará, Brazil
- Experimental ecology using different methods of the analysis of variance; Universidade Federal do Pará, Brazil
- Methodology in social sciences, participation and interdisciplinarity; University of Bragança, Brazil
- Introduction into systems analysis; Universidade Federal do Pará, Brazil

Ecosystem Modelling

- Trophic modelling using ECOPATH II – steady state and concepts; ZMT Bremen; Universidad Católica del Norte, Chile; Centro de Investigaciones Pesqueras, Cuba
- Modelling and simulation in ecology and species conservation; Pesina, Italy
- Mathematical modelling in ecology; Universidade Federal do Pará, Brazil
- Food webs and energy flow in marine ecosystems including modelling; Universidad Agraria, Perú
- Neighbourhood modelling in plant ecology; online course, (www-user.uni-bremen.de/~uberger/seminars.html)