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New Challenges for Nutrient Management in the Danube Basin – the daNUbs project

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Introduction

Worldwide it is recognized that river basin management can play a key role for sustainability in water and land use as well as coastal management. While this task is already difficult on smaller scale for river basins influencing only the national coastal areas it becomes even more complex in trans-boundary river basins which may affect a multi-national coastline. It is therefore critical to base coastal water quality management on sound scientific understanding of the relation between pollution and water quality in the whole catchment. Successful strategies for sustainable coastal development consequently need to be based on sound political and economic considerations on full catchment scale.

The Danube River catchment including its receiving Black Sea coastal area is an excellent example for such a situation. 13 countries featuring a broad variety of languages, religions and different levels of economic development form the Danube catchment. The International Commission for the Protection of the Danube River (ICPDR) and the International Commission for the Protection of the Black Sea (ICPBS) have been established in order to find management solutions which are then adopted by the member states for implementation.

The economic crisis, following the dramatic political changes in several Eastern Danubian Countries (EDC) during the last decade resulted in dramatic changes in nutrient management in the agricultural and industry sectors. This has created the opportunity to study the cause effect relationship of a management change in full scale.

Coastal nutrient loads: a challenge for trans-boundary management

Discharges from the rivers influence strongly the quality of the receiving seas. Therefore the mitigation of problems in the Sea requires a proper management of emissions in the catchments of the rivers. Within this context, nutrients (nitrogen and phosphorus) play a dominant role:

- even if river quality standards are met, nutrients may still have a strong effect on the marine coastal areas and result in eutrophication;
- pollution from both diffused and point sources is important;
- the nutrient storage in the catchment (soil, groundwater etc.) are orders of magnitude higher than the yearly nutrient turnover;
- the entire population is contributing to the problem by its life style;
- economic development or crises have a strong triggering effect;
- the complex relations between anthropogenic and natural processes effecting nutrient fluxes and coastal loads result in a rather poor understanding of the cause-effect relationships;
- adequate mathematical models are required to support optimal application of scientific knowledge for management;
- the development of management tools has to take into consideration the specific regional, political, economical and natural conditions.

Most of the topics mentioned above are addressed in the project "Nutrient Management in the Danube Basin and its Impact on the Black Sea" (daNUbs) which started in 2001 and will be finished in 2005. The project is coordinated by the Institute for Water Quality and Waste Management, at the University of Technology, Vienna, Austria. Within the research team of 17 partner institutions the ICPDR plays an active role.

This paper sketches the project findings to date and aims to show the complexity of aspects that have to be considered in context of river basin management on an international scale. Figure 1 shows a scheme of the basic concept of the daNUbs project. Research elements of 3 different foci are included: (I) improvement of process understanding, (II) improvement and application of mathematical models and (III) considerations of strategic planning of nutrient management. A combined research approach aims at improved process understanding

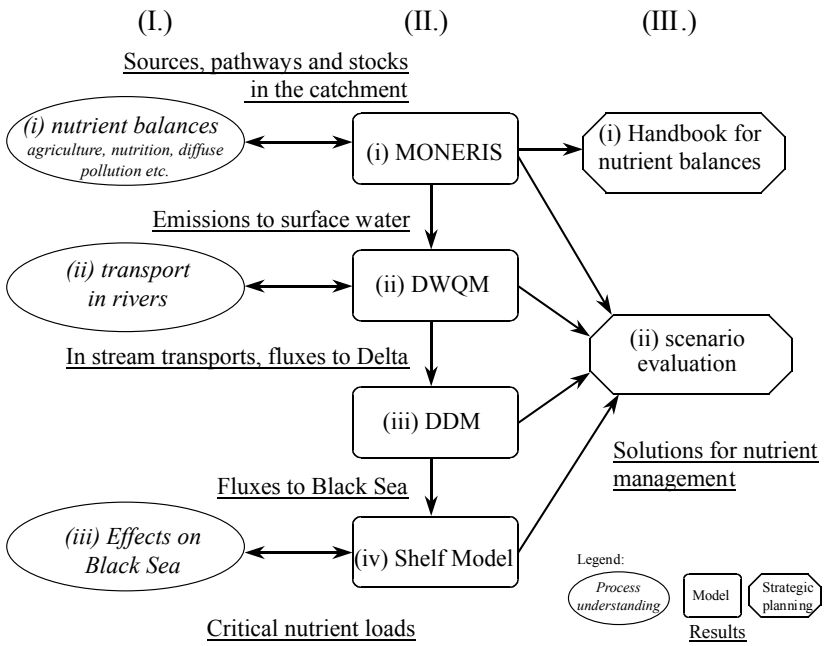

Figure 1 Basic concept of the daNUbs project; MONERIS = MOdelling of Nutrient Emissions into RIver Systems; DWQM = Danube Water Quality Model; DDM = Danube Delta Model

and quantitative modeling in respect to sources, pathways and stocks of nutrients in the catchment, emissions to surface waters, instream transport and retention in the river system and effects on the Black Sea. It ultimately serves as a basis for the evaluation of scenarios that showcase possible solutions of future nutrient management.

The Danube River catchment is the second largest river basin in Europe. At its mouth to the Black Sea it has a mean discharge of roughly 6500 $m^3 s^{-1}$ representing a very high dilution capacity for all anthropogenic pollution loads. The whole Danube basin has an area of around 800,000 km^2. The total length of the main river is 2857 km. About 85 Mio. inhabitants are living in the catchment; the average population density therefore is little more than 100 inhabitants km^{-2}. There are 18 states which contribute to the catchment, 13 of them with more than 2000 km^2 (Austria; Bosnia-Herzegovina; Bulgaria; Croatia; Czech Republic; Germany; Hungary; Moldova; Romania; Serbia; Slovakia; Slovenia and Ukraine). Therefore: nutrient management in the Danube Basin is really a transboundary challenge.

Analysis of the water quality situation in Western Black Sea coastal areas influenced by the Danube River

- The river Danube is the main contributor to eutrophication phenomena in Western Black Sea coastal areas. About 65 – 80% of the nutrient load entering this part of the Black Sea stem from River Danube.
- The marine ecology in the Western Black Sea coastal area (WBSC) has significantly improved since the late 1980s and early 1990s, which is indicated by:
  - reduced eutrophication (algae production),
  - recovery of the zoo-benthos and phytoplankton,
  - a nearly optimal N/P ratio (redfield ratio) in WBSC.
  - a nearly complete disappearance of anaerobic conditions at the bottom of WBSC between 1999 and 2002 which is similar to the 1960s situation, whereas between 1970 up to about 1990 a steady increase in these adverse conditions had been observed;
  - However, fish stock is still out of balance, which can likely be attributed to over fishing. (Horstmann 2004)

The main causes of the improvement of the environmental state in WBSC are that:

- Phosphorus loads transported by the Danube have decreased by more than 30% as compared to the situation in the 1980s (Behrendt *et al.*, 2004). (see figure 2)
- Nitrogen loads from the Danube Basins to the WBSC have decreased as well (by ~20% as compared to 1990, Behrendt *et al.*, 2004). However, despite dramatic changes in N-fertilizer application these changes are not comparably significant indicators of society's response. This is because large nitrogen stocks (soil, groundwater) in the catchment slow down any possible effect in the coastal zone deriving from changes in diffuse N-emissions into the river system.
- Phosphorus is the limiting nutrient for algae growth in the Romanian coastal waters, in Bulgarian waters it is mainly Nitrogen (Velikova, 2004)

Reduction of nutrient discharges to the Black Sea by the River Danube were driven by:

- Economic crises in the many Danubian Countries, which resulted in the
  - closure of large industrial animal farms with manure discharges to the river system,
  - reduced fertilizer production and consequently decreasing emissions from fertilizer factories,
  - reduced animal stock and density,
  - strongly reduced market fertilizer application,
- introduction of P free detergents in Germany and Austria and the start of a similar development in the eastern Danubian countries,
- P and N removal in treatment plants in some countries (A, D,CZ),
- progress in improved agricultural practice in Austria and Germany.

Analyses of nutrient emissions and river loads

Management of nutrients is only possible if the sources of the nutrients as well as their fate in the catchment are known. For this purpose the flows, transformations and storage processes in terms of mass loads have to be identified and described. The transformation and storage processes from the sources to the large rivers can be described using the MONERIS model (fig.1), developed by Behrendt et al. (1999) and adapted and applied for the Danube catchment by Schreiber et al. (2003). The transformation of the nutrient loads along the large rivers is modelled using the DWQM and the DDM (van Gils and Constantinescu, 2002). The output data of the Danube Delta Model are used by two ocean models, a physical model describing the flow of Danube water in the WBSC and an adapted quality model (Kourafalou et al., 2004).

Results

Despite severe problems with data reliability for Nitrogen compounds in the Danube river Schreiber *et al.*, 2003 make the following calculation: the actual N emission to the Danube Basin system is ~ 690 kt y^{-1}. The natural background (N losses without any anthropogenic influence) represents about 25% of the total N-emission to the system. It ranges in the same order of magnitude as the N-discharge caused by waste water management (predominantly point sources). Another contribution of about 25% can probably be attributed to and influenced by improved agricultural practice (e.g., reduced intensity). The rest of the agricultural contribution can hardly be influenced if this sector remains a priority economic activity. About 8% can be related to air pollution by combustion and traffic mainly with NO_x.

About 65% of the Nitrogen emissions to the river system (450 kt y^{-1}) are discharged to the Black Sea. The rest of the emissions are removed from the river system by denitrification. The river network of smaller rivers is much more effective in this respect as the Danube (including its main tributaries) as well as the Danube Delta, which contribute to these losses with only about 2% each (van Gils, 2004).

For Phosphorus the situation is different. The annual total emissions to surface waters in the Danube Basin is actually about 70 kt. Waste water discharges (point sources, combined sewer overflows and emissions from non sewered areas) contribute up to about 45% of the total and roughly 65 to 75% of the dissolved easily accessible P-emissions to the catchment river system. About 44% of total P-load originates from agricultural land due to a high extent of erosion and is therefore mainly in particulate form. The natural background is about 10%, air pollution is negligible. About 35% (about 25 kt y^{-1}) of the emissions to surface waters reach the Black Sea (van Gils, 2004). The rest is stored in the rivers and the river corridor of the catchment. The region of the Iron Gate reservoir plays a significant role as point sink in this respect (P-storage of about 8-10 kt y^{-1}, van Gils, 2004). Nevertheless the main part of the storage of emitted Phosphorus takes place in the network of small to medium size tributaries. The Danube Delta only contributes about 0.7 kt y^{-1} to this retention (van Gils, 2004).

Possibilities for future management

Despite the fact that the actual situation indicates a major improvement of the environmental quality in the WBSC risks of not reaching good ecological status in respect to eutrophication will persist and may even grow in the future. This risk is linked to expected recovery of the economy in the Eastern Danubian Countries (EDC) at the expense of environmental quality. Special attention needs to be paid to the agricultural development as the actual situation is economically not sustainable. In addition sewer development and recovery of industrial production (especially fertilizers) might lead to an increase of nutrient (Phosphorus!) discharges with negative effects on the Black Sea ecosystem. As figure 2 shows, the implementation of EU Urban Waste Water Directive (UWWD) in respect to connections to sewer systems for all settlements > 2000 inhabitants alone might lead to an increase of P-emissions and discharges to the Black Sea coastal area. Only if P-removal in waste water treatment as required for sensitive areas is effectively implemented as well the river load is expected to decrease (scenario 2).

Conclusions

Analysis of nutrient balances on catchment scale as a basis for improved management including coastal waters is a highly complex subject. The daNUbs-project tries to combine a set of modeling approaches in order to cover the different aspects of nutrient emission, transformation and their effects on the marine ecosystem. From the analysis of the actual situation and the historic development the following conclusions can be drawn for future nutrient management:

- a "stand-still" scenario would be recommendable for the nutrient loads to the Black Sea but clearly contradicts the economic development especially in the eastern Danubian countries;
- economic development in these countries is desirable even if it leads to a certain increase of nutrient emissions (e.g., from agriculture in some regions);
- this increase of nutrient emissions has to be compensated by reductions at other sources;
- a development in the agricultural sector similar to the period 1970 to 1990 has to be avoided, e.g.,
  - redevelopment of centralized (industrialized) animal production,
  - strong intensification of agricultural production by excessive industrial fertilizer application or fodder import,
  - Strong export oriented production (especially of animals).
- strict control of Phosphorus and Nitrogen emissions from point sources in the whole catchment should be applied. This can be achieved by:
  - implementation of EU Urban Waste Water Directive (271/91) using the requirements for "sensitive areas", as it is the case in Austria and Germany, (see fig.2);
  - introduction of P-free detergents;
  - implementation of EU ICCP Directive for industrial and trade effluents with special emphasis on nutrient control.
- development of sewerage treatment systems (fulfilling EU UWWD) has to strictly including N and P removal. Alternative sanitation systems with nutrient recovery should be considered as well for areas not connected to sewer systems yet. Actually only about 50% of the population in eastern Danubian

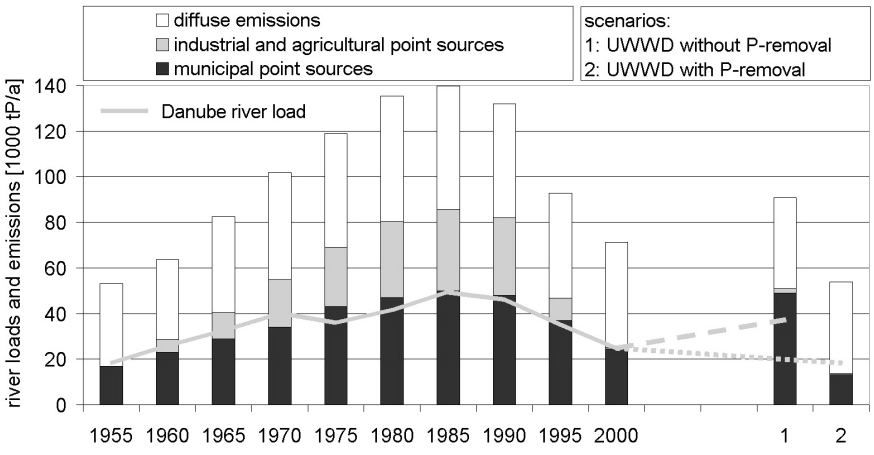

Figure 2 Development of Phosphorus emissions and river loads (Danube discharges to the Black Sea) in the Danube catchment 1955-2000 (adapted from Behrendt *et al.*, 2004) and scenarios of future development.

countries is connected to sewer systems. From the nutrient management point of view sewerage should actually have a rather low priority although this is in obvious conflict with the ground water protection strategy;
- improved nutrient management in agriculture (diffuse sources) has to be achieved by better agricultural practice throughout the basin taking into account economical and ecological considerations but also the specific local climatic, geological and hydrologic situation;
- erosion prevention is important to reduce the input of particulate Phosphorus into the river system and the Black Sea since particulate Phosphorus is not immediately available for algae growth but represents a potential P-source for eutrophication.

Acknowledgements
To the daNUbs Team: Most of the results presented have been elaborated by researchers of the daNUbs team, which consist of the following partner institutions:
- Institute for Water Quality and Waste Management, TU Vienna, AUSTRIA; Co-ordinator
- Danube Delta National Institute for Research and Development, Tulcea, ROMANIA
- Stichting Waterloopkundig Laboratorium, Delft Hydraulics, Delft, NETHERLANDS
- Bureau of Sustainable Agriculture, Hanhofen, GERMANY
- Institute Fisheries, Berlin, GERMANY
- Institute of Hydraulics, Hydrology and Water Resources Management, TU Vienna, AUSTRIA
- Institute for Land and Water Management, Petzenkirchen, AUSTRIA
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- Hellenic Centre for Marine Research, Athens, GREECE
- National Institute for Marine Research and Development "Grigore Antipa", Constanta, ROMANIA
- Institute for Water Pollution Control, Vituki Budapest, HUNGARY
- Department of Sanitary and Environmental Engineering, Budapest, HUNGARY
- Institute of Public Finance and Infrastructure Policy, TU Vienna, AUSTRIA
- Department of Meteorology and Geophysics, University of Sofia, BULGARIA
- Institute of Water Problems, Bulgarian Academy of Sciences, Sofia, BULGARIA
- Department of Systems Ecology, University of Bucharest, ROMANIA
- ICPDR has the status of a continuous observer

To the EU 5th framework programme: Results presented derive to a large extent from the project "Nutrient Management in the Danube Basin and its Impact on the Black Sea" (daNUbs) supported under contract EVK1-CT-2000-00051 by the Energy, Environment and Sustainable Development (EESD) 5th EU Framework Programme. Further detail on the project can be found on the project homepage: http://danubs.tuwien.ac.at/.

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References

Behrendt H., Huber P., Kornmilch M., Opitz D., Schmoll O., Scholz G. und Uebe R. (1999) Nährstoffbilanzen deutscher Flußeinzugsbiete, Forschungsbericht 296 25 515, Umweltbundesamt Berlin.

Behrendt H., van Gils J., Schreiber H., Zessner M. (2004) Changes of nutrient emissions from point and diffuse sources and loads in the Danube river system within the last decades, Archiv Hydrobiol., accepted.

Kourafalou V., Staneva J. and Tsiaras K. (2004) Report on realistic simulations performed by model HB and 3-D coupled physical and biogeochemical model calibrated and validated for the Black Sea, deliverable D8.7 and D8.8 of the EU-funded Project daNUbs, "Nutrient Management in the Danube Basin and its Impact on the Black Sea, contract EVK1-CT-2000-00051 by the Energy, Environment and Sustainable Development (EESD)

Schreiber H., Constantinescu L., Cvitanic I., Drumea D., Jabucar D, Juran St., Pataki B., Snishko S., Zessner M. and Behrendt H. (2003) Harmonised Inventory of Point and Diffuse Emissions of Nitrogen and Phosphorus for a Transboundary River Basin, Research Report 200 22 232, on behalf of the federal environmental agency, Berlin, Germany.

Van Gils J. and Constantinescu A. (2002) Draft Danube Delta Model and Danube Water Quality Model, first applicatons, deliverable D5.2 and D5.6 of the EU-funded Project daNUbs, "Nutrient Management in the Danube Basin and its Impact on the Black Sea, contract EVK1-CT-2000-00051 by the Energy, Environment and Sustainable Development (EESD)

Van Gils J. (2004) Transport and Retention of Nutrients in the Danube River and its Large Transboundary Tributaries, ICPDR – UNDP/GEF workshop documents: Nutrients as a Transboundary Pressure in the Danube River Basin. 26 – 27 January 2004, Sofia, Bulgaria

Velikova V. (2004) Deliverable D7.6 internal working paper of the daNUbs project (unpublished)

Land-Ocean interactions and integrated management of the Oder/Odra estuary region

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The Oder estuary (figure 2) is suffering from heavy eutrophication and water quality problems. Source for this pollution is the river Oder (in Polish Odra) and its 120.000 m² large catchment area. Poor water quality is a serious problem for tourism development, nature conservation and other coastal activities in Germany and Poland. The fact that the Oder river controls the water quality of coastal waters means that river basin management in this regions is at the same time coastal water management (figure 1).

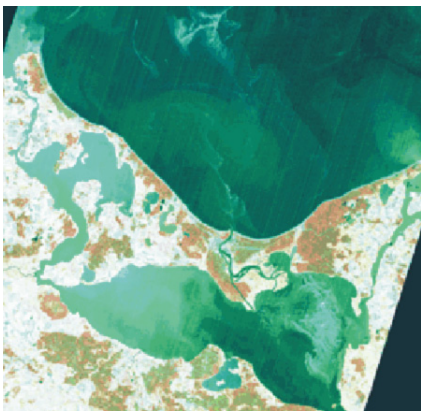

Figure 1 The Oder estuary from space: The dark Oder river plume enters the Szecin Lagoon. White ares indicate a lower transparency due to increased primary production and floating algae accumulations (from Schernewski, Neumann, Podsetchine & Siegel 2001).

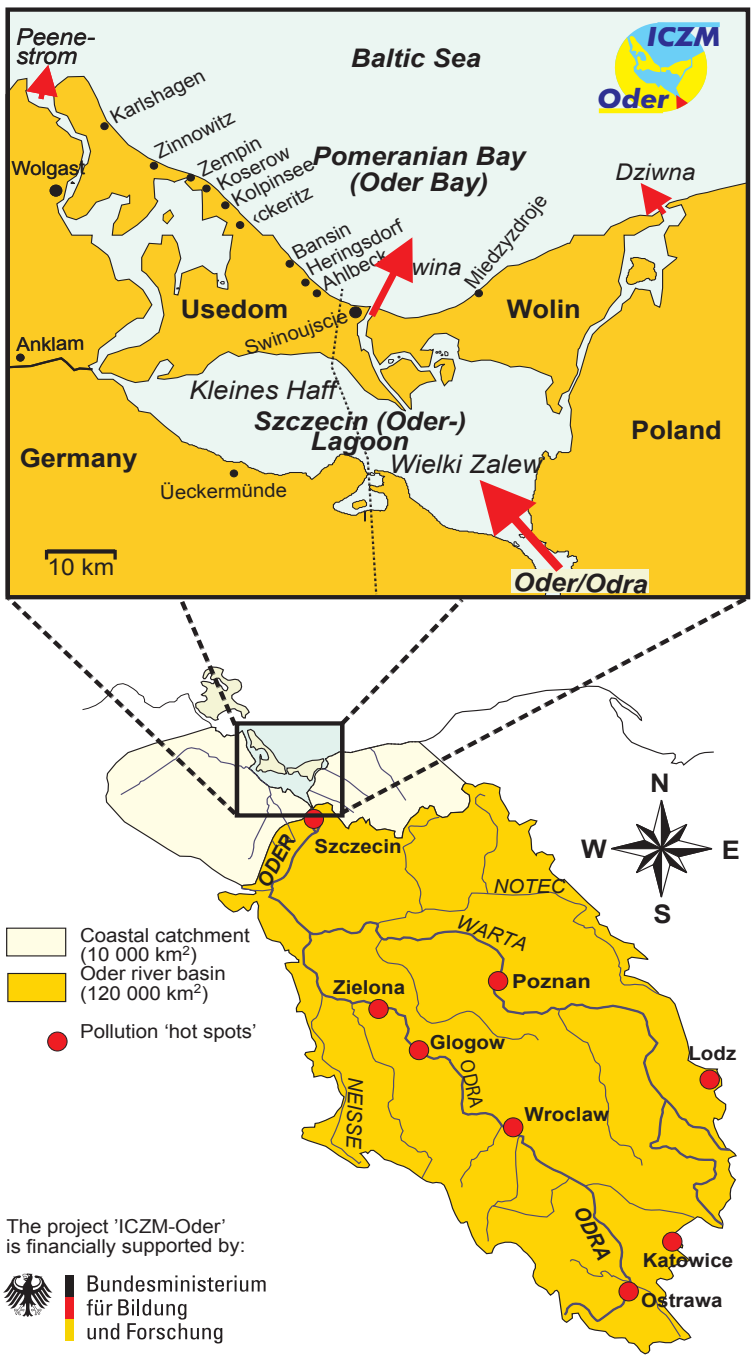

Figure 2 The Oder river basin (bottom) and the German/Polish Oder estuary region, area of the project ICZM-Oder.

Against this background the project 'Research for an Integrated Coastal Zone Management in the Oder Estuary Region' was initiated. The special challenge of the project lies in carrying out science on an international level and, at the same time, to establish and support the implementation of ICZM within the regional Agenda 21. The project was a consequence of the EC Recommendations on Integrated Coastal Zone Management (ICZM). The aims and tasks within the project result from the specific situation and demands of the region. At the same time the project tackles the aspects "Strategic Approach", "Principles", "National Status Quo" and "National Strategies" as recommended by the EC (EC 413/2002). The creation of sustainable perspectives and structures, exceeding the duration of the project, is the core of all activities. In general the project aims are covered:

- Science, Innovation and Perspectives: To answer scientific and innovative questions on ICZM, which are of essential and national importance, but based on concrete regional requirements. In addition shortcomings must be exposed and scientific prospects for the future created.
- Regional-National-International: To support a regional ICZM, which essentially can be transferred regionally, supports the development of a national ICZM strategy in Germany and can be regarded as a successful international case study.
- Catchment area – Coast – Baltic Sea: Spatially integrative perspective on processes, structures, planning on the background of a desired catchment – coast – management (Water Framework Directive, UNEP, LOICZ).
- Infrastructures: To create structures that function as a sustainable umbrella for ICZM, exceeding the project duration, including regional projects and to promote the practical regional implementation of ICZM in the long run. The project does not deal with the practical implementation of single measures, but supports the initiation and implementation with scientific advice, the search for funding, the provision of a supporting infrastructure and the integration in the project.
- Participation and communication: To test and evaluate procedures to integrate the public (regional Agenda 21 in cooperation with local agenda's), to improve cross-border communication, information flow and cooperation as well as to promote the coastal catchment area dialogue. The goal is not the creation of further new structures, but the support, exploitation, concentration and optimization of existing activities and structures with regard to ICZM.
- Vision and strategy: To stimulate a vision and strategy for ICZM through a synthesis of existing approaches. The strategy should have a cross-border approach, integrate coastal waters and land and consider the interactions between coast and catchment. The strategy is future-oriented by including foreseeable problems such as global climate change.

Altogether 11 partners from different disciplines are involved in the project, which started in May 2004. The project has a budget of about 2 Mio. Euro and is funded by the German National Ministry for Education and Research (BMBF, No.03F0403A). It belongs to the LOICZ inititaive (Land-Ocean-Interactions in the Coastal Zone) and is part of UNEP-ICARM (Integrated Coastal Area and River Basin Management). For more information about the project please contact the coordinator, Gerald Schernewski (schernewski@eucc-d.de) or visit the website http://www.ikzm-oder.de/.

"Zukunft Kueste – Coastal Futures" – A German contribution to LOICZ research in Integrated Management and coastal governance

Andreas Kannen

Zukunft Küste – Coastal Futures is a research project focussing on sustainable coastal development, but working on different scales from the North Frisian islands and adjacent counties as a local investigation area up to the Wadden Sea and North Sea level. In collaboration with LOICZ Zukunft Küste – Coastal Futures aims to use its investigation area focussed activities as a case study for the development and application of integrative research concepts and assessment tools, which can be applied in other parts of the world as well.

The project involves a total of 50 project partners and consists of four interrelated project modules with 12 sub-projects, each of which is guided by specific research questions. Zukunft Küste – Coastal Futures is coordinated by the Research and Technology Centre Westcoast in Buesum, a branch of Kiel University and funded since April 2004 as one of two pilot projects by the German Federal Ministry of Education and Research (BMBF). The scientific concept is based on linking tools from both natural and social sciences - e.g. scenario techniques, modelling, stakeholder dialogues and Multi-Criteria Analysis - in order to develop planning and management options at the local, regional and national level (Kannen 2004a). Assessments will be based largely on available data, a comprehensive stakeholder mapping, modelling exercises and expert assessments.

The project activities directly assist the national German ICZM strategy, currently under development (Gee at al. 2004). Especially the work across several scales is expected to contribute to governance structures and spatial planning concepts for marine areas. While aiming to translate the exemplary concepts, methods and tools into approaches that can be transferred to other coastal regions worldwide, Zukunft Kueste – Coastal Futures contributes to theme 5 (Towards coastal system sustainability by managing land-ocean interactions) in the LOICZ II science plan and implementation strategy. Other LOICZ themes, which relate to the project are theme 1 (Vulnerability of coastal systems and hazards to human societies) and 2 (Implications of global change for coastal ecosystems and sustainable development).

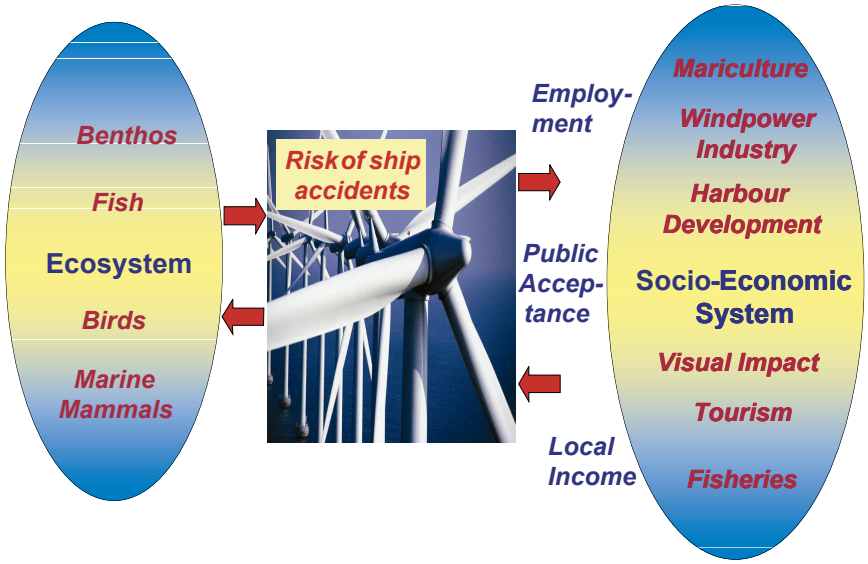

Figure 1 Offshore wind farms and their most important interactions with the ecosystem and the socio-economic system (Kannen 2004b)

A key theme will be the assessment of interactions resulting from offshore wind farm development, including impacts on ecosystem and habitat structures, economy and infrastructure, conflicts between stakeholders and social values such as perception of the coast by local people (Figure 1). To ensure methodological integration, indicators based on the DPSIR approach and integrated assessment form the overall framework. Another level of integration is the comprehensive dialogue with local, regional and national stakeholders, which aims to integrate these actors as active research partners.

Using offshore wind farms as an example, changing spatial structures through new forms of use are form a focal point of the project. The impact of such developments, on established economic sectors, e.g. tourism, will be analysed. At the same time the joint project will use offshore wind park development/mariculture/tourism as a case study to assess options for implementing multiple use areas, providing specific suggestions for multi-functional use of coastal space in the form of "polycultures".

The research approach aims to raise awareness for the complexities surrounding coastal zone decision-making. Apart from a comprehensive assessment of interactions, communication plays an essential role in implementing integrated management. The project therefore analyses and supports communication processes between different actors on different scales including interactions between European, national and regional levels of decision making.

References

Gee, K, Kannen, A, Glaeser, B, Sterr, H (2004): National ICZM strategies in Germany: A spatial planning approach. In: Schernewski G, Loeser, N (eds., 2004): Managing the Baltic Sea, Coastline Reports 2 (2004), pp. 23-33. ISSN 0928-2734.

Kannen, A (2004a): Holistic Systems Analysis for ICZM: The Coastal Futures Approach. In: Schernewski G, Dolch, T (eds., 2004): Geographie der Meere und Küsten. Coastline Reports 1 (2004), pp.177-181. ISSN 0928-2734.

Kannen, A (2004b): The need for Integrated Assessment for large scale offshore wind farm development. In: Managing European Coasts: Past, Present and Future, Vermaat, JE, Ledoux, L, Turner, RK, Salomons, W (eds. 2004), Environmental Science Monograph Series, Springer, Berlin, Germany, submitted for print.

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(under construction)

IPO NOTES

Around 300 participants from 180 organisations and over 40 countries met in Brisbane, Australia for the second Coastal Zone Asia Pacific conference from 5 – 9 September 2004. The focus of the conference was to explore integrated approaches to manage the pressures and impacts from "Improving the quality of life in coastal areas". LOICZ had a strong representation with Martin Le Tissier (DEO), John Parslow (Theme 4 Co-ordinator), Chris Crossland (ex-EO) attending. During the conference a full 1 day workshop was held between LOICZ and the Global Ocean Observing System (GOOS) to explore how the two programmes could collaborate to support LOICZ II and the implementation of the coastal module of GOOS. As well as presentations from Martin and John, the workshop also heard from Miguel Fortes (Marine Science Institute CS, University of the Philippines and recently seconded to UNESCO/WESTPAC), Gullaya Wattayakorn (Department of Marine Sciences, Chulalongkorn University, Thailand) and Nguyen Hoang Tri (Centre for Natural Research & Environmental Studies, Vietnam National University, Vietnam) who presented examples of LOICZ research and activity from the Asian region and looked forward to future research needs. The workshop then discussed the most appropriate modus operandi for collaboration between LOICZ and C-GOOS recognising that both needed to (1) think at local, regional and global levels, and that (2) a strong scientific underpinning of long term sustained monitoring and observation is required for managing coastal zones. The workshop concluded that there was strong potential for mutually beneficial collaboration between LOICZ and C-GOOS but there was also a need to ensure that the scientific community and funding agencies recognised the differences between the research goals of LOICZ and the C-GOOS goals of long-term, sustained observations. However, C-GOOS recognises the need for research and 'proof of concept' projects in developing and designing coastal observations. Two such projects in the Indian Ocean are led by members of the LOICZ SSC – Ticky Forbes and Nalin Wikramanayake – who also presented during the workshop.
As well as the joint LOICZ/C-GOOS workshop, LOICZ also co-presented with Envision Partners LLP a workshop on "Capacity building for integrated coastal management" that explored the mechanisms for education to integrate scientific outcomes to decision making needs.
The strong presence of LOICZ at the conference along with our sponsored workshop speakers generated much awareness in LOICZ, its new mandate and a renewed interest in the opportunity for LOICZ to work with regional scientists in the broad Asian – Oceania region.

ANNOUCEMENTS

For a complete list of future meetings and regular updates visit our web-site at www.loicz.org and click on 'Calendar'

11-12 November 2004, Santiago, Chile: The Southern Pacific University Network (RUSPUR) third meeting "Biophysical and Socioeconomic Impacts of ENSO on Marine and Terrestrial Ecosystems".
www.udep.edu.pe/rupsur/

5-7 January 2005, Manchester, UK: The International Global Atmospheric Chemistry project (IGAC), NOAA and NASA announce a speciality conference on the indirect effects of aerosols on climate.
www.al.noaa.gov/igac/

8-14 January 2005, Rio Grande do Sul, Brazil: 3rd South American Dendrochronological Field week.
www.cricyt.edu
or contact Dr Fidel A Roig,
froig@lab.cricyt.edu.ar

18-20 January 2005, Ahmedabad, India: Centre for Environment Education (CEE) workshop on Education for Ocean Conservation in association with the World Ocean Network at the International Conference on Education for a Sustainable Future (ESF).
www.ceeindia.org/esf

13-16 March 2005, Atlanta, USA: International conference-Emerging Issues Along Urban/Rural Interfaces: Linking Science and Society. Final date for abstract submission: 15 November 2004.
www.sfws.auburn.edu/urbanruralinterfaces/ or contact Dr David N. Laband,
e-mail: labandn@auburn.edu

21-23 June 2005, Oslo, Norway: International workshop on Human Security and Climate Change of the Global Environmental Change and Human Security (GECHS) Project of the International Human Dimensions Programme on Environmental Change (IHDP).
www.cicero.uio.no/humces or e-mail: humsec-secretariat@cicero.uio.no

27-29 June 2005, Plymouth, UK: Advances in Marine Ecosystems Modelling Research (AMEMR). Endorsed by: GLOBEC, NERC, IMBER and CASIX. For more info go to: www.amemr.info

START Fellowship/Visiting Scientist Program -Deadline for the thirteenth round of awards is: **December 1, 2004**. Visit www.start.org .

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FIRST ANNOUNCEMENT AND CALL FOR PAPERS

COASTS AND COASTAL PEOPLE - SCENARIOS OF CHANGE AND RESPONSES

Egmond aan Zee, Netherlands

27-29 June, 2005

Land-Ocean Interactions in the Coastal Zone
LOICZ II Inaugural Open Science Meeting

Setting the stage for research on global environmental change and human dimensions in the coastal zone.

The meeting seeks to bring together human dimension and natural scientists, decision-makers, managers and user groups in the coastal zone.

Abstracts that address one or more of the LOICZ II Themes or cross-cutting activities are solicited.

Theme 1: Vulnerability of coastal systems and hazards to human societies.

Theme 2: Implications of global change for coastal ecosystems and sustainable development.

Theme 3: Anthropogenic influences on the river basin and coastal zone.

Theme 4: Fate and transformation of materials in coastal and shelf waters.

Theme 5: Towards coastal system sustainability by managing land-ocean interactions.

www.loicz.org/conference

GLOBAL CHANGE IGBP

A core project of the International Geosphere-Biosphere Programme and the International Human Dimensions Programme on Global Environmental Change

IHDP