



Newsletter 1/2012

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Proud of ZMT's success: founding director Gotthilf Hempel, present director Hildegard Westphal and former director Venugopalan Ittekkot

Dear colleagues, dear friends and partners of ZMT, dear alumni,

A happy new year to you all! In 2012, ZMT is launching a newsletter that will inform you twice a year about new developments, projects, and people at ZMT. We invite you to enjoy the news and follow the links given in the texts that lead you to the ZMT web presentations.

Celebrating an impressive past

ZMT turned 20 in 2011. The past year has thus offered us the opportunity to reflect on the impressive development of our institute – its growth, its path into the Leibniz Association, the uniqueness of its approach – and to celebrate! On the 4th of November, many dear guests from all over the world honoured us with their presence and attended the function and talks at the large concert hall “die Glocke” in Bremen. We enjoyed the reflections of founding director Gotthilf Hempel and former director Venugopalan Ittekkot, the speeches by Leibniz president Karl Ulrich Mayer and the Senator for Education and Science in Bremen, Renate Jürgens-Pieper, as well as the talk by Indra Jaya, Dean of the Department of Fisheries and Marine Sciences at Bogor University. It was also a great opportunity to meet former and current colleagues, partners, and friends. At the function, the first ZMT Leibniz Chair was inaugurated with the appointment of anthropologist Bettina Beer. Read more about her on page 2 of this newsletter.

Turning to an exciting future

2011 was very busy with adjusting the internal structure of ZMT to the rapid growth in personnel, expertise, and laboratory facilities, besides initiating new projects and partnerships. 2012 will be equally busy: we have announced three new professorial positions (marine botany, ecotoxicology, social sciences) and plan to fill them in the next months. New projects are starting. New initiatives are being negotiated. ZMT continues to develop enthusiastically!

Let me now introduce you to the idea behind the newsletter. The newsletter will have regular columns where we will inform you about progress in different fields: Under “ON BOARD”, the work of ZMT scientists in ongoing projects and their newest findings will be presented. Under “ON TOPIC” you will find central themes currently under discussion at ZMT. The texts under “ON EXPEDITION” describe current field activities. “ON GOING” introduces new publications, news from the laboratories, new faces, new projects and completed projects.

I hope you enjoy the newsletter and that the newsletter will induce you to get back to us, to initiate and renew collaboration with us.

With best regards from Bremen,

Hildegard Westphal
Director of Leibniz Center for Tropical Marine Ecology (ZMT)



A NEW ANGLE

Ethnologist Bettina Beer comes to ZMT

Bettina Beer identifies closely with northern Germany – even though, over the years, she has always been drawn further and further south. Born in Frankfurt am Main in 1966, she grew up in Hamburg where she then studied Ethnology, Folklore and Spanish. She was appointed to her first professorship in Ethnology at Heidelberg University in 2003 and, since 2008, has been teaching and conducting research at the University of Lucerne in Switzerland. In-between times, the 45 year-old Ethnologist has spent months travelling in Papua New Guinea and the Philippines where she immerses herself in everyday life, learning the language and adopting the local ways of thinking, reasoning and behaving. “This approach generates detailed insights into social and cultural relationships that often contradict global findings,” Bettina Beer explains.

The Leibniz Chair at ZMT is an opportunity for Bettina Beer to build a bridge to the north: she will spend the next three years working together with scientists at ZMT to initiate new, interdisciplinary projects that link socio-cultural knowledge with

“The Leibniz Chair gives me the chance to turn ideas into projects..”

scientific investigations. “I’ll contribute expertise in cultural comparisons,” Bettina Beer explains. And she will focus the attention of the natural scientists, who may be working on issues like the impact of local actions on the environment, firmly on people. “Or how certain environmental conditions in turn influence the behaviour of the people I investigate” – an interdisciplinary approach promoted by the national German Young Academy to which Bettina Beer belonged from 2003 to 2008.

Field work side by side

The Ethnologist was not expecting such an honour. “I was rather surprised that the Director of the Institute, Hildegard Westphal, wanted to introduce me to the heads of department on one of my visits to Bremen,” Bettina Beer recalls. But that this was effectively a “covert interview” had not occurred to her. “The Leibniz Chair gives me the chance to

turn ideas into the sort of projects I don’t usually have time for when I’m at university.” She has lots of ideas and projects in mind, including a concrete research project she is already planning on Taku’u Atoll (Papua New Guinea): under the leadership of Bettina Beer and in cooperation with ZMT, a doctoral student of Ethnology and a Sedimentologist are set to work side by side investigating alterations in the environment and how they are perceived in the context of global climate change.

In the long run, the researcher has a particular project in mind: field research in northern Germany – at ZMT itself. She wants to know how scientific knowledge is generated there and how people work. For Bettina Beer an ethnological investigation of the Leibniz Institute would be “a very exciting undertaking”.

Leibniz Chair

Bettina Beer is Professor for Social and Cultural Anthropology at the University of Lucerne. In November 2011, the 45 year-old became the first holder of the “Leibniz Chair” at the Leibniz Center for Tropical Marine Ecology. This appointment facilitates close cooperation between ZMT and the Department of Social and Cultural Anthropology at the University of Lucerne over a three-year period and lays the foundations for close collaboration in future. www.bettinabeer.info





MURKY PROSPECTS?

The tropical seas off Mauritania show what climate change could mean in future

The air has a yellow glint and the water along the Atlantic coast of Mauritania is as murky as milk. “Even where the water depth is very shallow you can’t see more than two metres below the sea surface,” explains Hildegard Westphal. In autumn 2010, the ZMT’s director led an expedition on the research vessel Maria S. Merian to the Golfe d’Arguin. The destination was the exceptional shallow water zone which stretches for 150 kilometres along the coast and about 50 kilometres into the sea. “On a map of knowledge this enormous zone is an equally enormous empty space.”

The ZMT scientists set out for the shallow bank in a dinghy and took samples from the seabed. “It’s a natural laboratory, and a quite unique model of over-fertilisation,” says the geologist.

The nutrient-rich water in this upwelling region forces its way to the surface. The sun in the tropical belt heats it up to a temperature of up to 25 degrees centigrade on the flat continental shelf. Dust from the desert adds further fertiliser in the form of iron.

“In the over-fertilised tropical seas there are plenty of a few species instead of a few of many.”

“Here you can see what climate change could do to tropical coasts in future,”

Westphal comments. If rain and desert belts shift, the introduction of sediment into tropical coastal seas could increase and change nutrient patterns elsewhere, too. Human-induced over-fertilisation could have a similar effect.

No coral reefs

The results of this can be seen under comparable conditions off Mauritania: no corals, no clear water, almost no algae or photosynthesising plants, no reef belt and no lagoons to protect or stabilise the coast. “All we find are loose sediment – masses of seashells and shell fragments being washed around by the water,” Hildegard Westphal reports. In over-fertilised tropical seas productivity may be very high, but biodiversity drops enormously. “There are plenty of a few species instead of a few of many.” The consequences for the coasts are obvious: few ecosystem niches and hardly any natural coastal protection against extreme events like storms and, worst case, tsunamis.

The aim of the research trips to Mauritania – a pilot project in 2006/07 and the expedition in 2010 – was to close this gap in our knowledge. “First of all, we want to classify the range of species,” Westphal explains. Since 2011, an extended team has been evaluating the sediment samples. The first articles have been published. Research is coordinated with a local oceanographic institute, and geologists and biologists from the Senckenberg Gesellschaft have been involved from the very beginning. They investigate the deep water regions and will continue to be part of future expeditions currently under preparation in Bremen. As ever, the ZMT’s guiding theme remains the same: “We want to understand the system in its entirety.”

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Mauritania Expedition

Date: 13.10. to 20.11.2010

on board the Maria S. Merian

Participants: ZMT (Geology / Carbonate Sedimentology) +++ Senckenberg am Meer, Wilhelmshaven, +++ MARUM Zentrum für marine Umweltwissenschaften, Bremen, +++ National Mauritanian Institute of Oceanography and Fisheries Research (IMROP), Nouadhibou

Head: Prof. Dr. Hildegard Westphal (ZMT)

Destination: Golfe d’Arguin

Research interest: Classification of species (Taxonomy)

Publications (selection): The mollusk fauna of soft sediments from the tropical, upwelling-influenced shelf of Mauritania (northwestern Africa). Julian Michel et al., 2011. *Palaios* 26, 447-460. doi: 10.2110/palo.2010.p10-148r. [> READ MORE](#)

TV TIP

The TV channel ARTE is discussing the results. You can watch "Die Sahara - Wüste mit Wirkung" (The Sahara – a desert with an impact) on ARTE on Thursday, 9.02.2012



OFF TO THE CORAL REEFS OF THE RED SEA

An excursion by ZMT scientists and students

Dahab, Egypt, 9.10.11, air temperature 30°C by day and 26°C by night, water temperature 28 °C – sounds like a good beginning to the trip undertaken by ten Master's students from the University of Bremen. Under the leadership of ecologist Christian Wild (ZMT) they spent a fortnight on the northern Red Sea. Since the turn of the millennium, Bremen reef ecologists have been monitoring and investigating the coral reefs to be found there. The main aim of the trip in autumn 2011 was to train young scientists on the spot. The involvement of ZMT researchers in the teaching programme at the university strengthens the close relations between the university and the research institute.

“We spent the first week practising taxonomic identification,” Christian Wild explains: diving down and naming the diversity of life on the reef. In the second week, the students were introduced to key methods of coral reef ecology. “The work they did provided the final data for a scientific publication on a ten-year project monitoring eight coral reefs in the Red Sea,” says Wild. Even before Christmas 2011, the publication had been submitted to an international journal.

Above and below water

The teaching programme also included overland excursions to the Sinai Peninsula, accompanied by social scientists and geologists from ZMT. “I think it's very important that the students don't only see the coral reefs under water but the cultural environment, too: the people and their activities as well as the fossilised coral reefs above water,” the ecologist comments. The research institute has made it part of its mission to use an interdisciplinary approach to coastal ocean ecosystems. “Our research findings show, for example, that the coral reefs south of Dahab are very badly damaged,” Wild reports. This can only be explained by considering social and economic aspects: How is waste water disposed of? Are the hotel developments in the south connected to the central sewage plant in Dahab? These issues were also discussed.

This was the first group of students to undertake an excursion of this kind and they confirmed that it had been highly successful. “All the students gave us outstanding marks for our excursion,” Christian Wild is pleased to note.

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TRACKING DOWN THE CHOLERA PATHOGEN

A 10-year project nears completion

In January 2012, Marc Einsporn returned to Bremen from Kolkata in West Bengal. A doctoral student in the “Wetland Dynamics” group, he spent a whole year in India taking water and sediment samples in the largest mangrove forest, the Sundarbans. He was searching for *Vibrio cholerae*, the pathogen causing the deadly disease of the same name.

[> READ MORE / BLOG](#) (in German only)

Together with the National Institute of Cholera and Enteric Diseases (NICED) in Kolkata the BIOVIBEN research project has undertaken the first systematic studies of this kind. Interest was focused on the impact of the environment on the spread of Cholera in India, and drew attention to human-induced water contamination and over-fertilisation as well as the effects of climate change. An increase in the number of flood events each year could have an influence on Cholera outbreaks. More will be revealed when the

results of the long-term project have been analysed.

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Unearthing the threat: Mark Einsporn searching the bank mud for the cholera bacterium



Lone angler or entire crew?

FROM LONER TO TEAMPLAYER

Cooperation is a crucial organising principle of human society – from communities of hunter-gatherers to nation states. Three questions for Achim Schlüter and Agostino Merico

When don't people act as competing individuals but for the long-term good of all?

Merico From a strictly Darwinian point of view “cooperation” in nature is a puzzling concept: why should certain individuals increase the fitness of others at a cost to themselves? Natural selection, in fact, implies competition unless a specific mechanism that can promote cooperation is at work. Using game theory, scientists have identified five of such mechanisms; kin selection, direct reciprocity, indirect reciprocity, network reciprocity, and group selection.

Schlüter For a long time, economists painted a dismal picture in which the Tragedy of the Commons – the over-exploitation of the environment – seemed almost inevitable. But there are other possibilities. Especially at local level people are actually capable of managing Common Pool Resources sustainably.

What is the role of the ecological environment in this?

Merico When managing Common Pool Resources, various other cooperation-promoting mechanisms appear. They include communication amongst individuals, punishment, or information. In our modelling studies of a group of users and a common pool resource, for example, harvest decision is described as a dynamic process that balances the current harvest potential with the expected future productivity of the resource. Our results suggest that users are willing to cooperate, if the resource productivity is high and the certainty that they will benefit from this future production is sufficiently large.

Schlüter When you are looking for the key to success the ecological environment becomes an ever more important focus for analysis – even for economists. Joseph Henrich and others have conducted investigations using economic experiments and ethnographic methods in 15 traditional communities. They discovered that ecology and culture are co-evolve systems. The famous Lamalera whale hunters in Indonesia are significantly more willing to cooperate than, say, the Machiguenga people in Peru, who cultivate the forest. The Lamalera know that cooperation is a survival strategy: they can only hunt and slay the whale together.

Do the same strategies develop when dealing with similarly disposable resources?

Schlüter If you leave out people, there is not much difference from a regulatory point of view between a mangrove forest in Brazil and a mangrove forest in Indonesia. If you focus on people, there are a number of regularities on a very general level: an increase in scarcity, for example, leads to the emergence of rules. This is true for Crusoe when Friday appears and it is also true when land becomes scarce or fishing grounds threaten to collapse due to over-harvesting. Property Rights of disposal – sometimes markets – emerge. But there are many different, institutional ways of achieving sustainable use. There are path-dependencies involved – and behaviour is influenced by culture and religion as well as by the specific perception and understanding of ecosystems.

Merico Clearly, given the high complexity of the system, we should expect different cooperative strategies to be effective in different socio-economic and political settings, even when considering the same ecological resources.

Evolution of Cooperation in Social-ecological Systems

How many fish are caught by whom? Do the fittest catch the most? Or is it a combined effort to catch just enough to ensure long-term fish-availability for all? Human communities have a wealth of options and face crucial dilemmas when managing resources. Understanding these aspects is the precondition for using natural resources sustainably. At ZMT, a joint project involving system ecologists **Gunnar Brandt** and **Agostino Merico** and behavioural economists **Björn Vollan** and **Achim Schlüter** is investigating such questions. In September 2011, they organised an interdisciplinary symposium on the theme.

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Achim Schlüter



Agostino Merico

SPICE III

Collaborative project with
Indonesia enters its third phase in 2012

Protecting the coastal ecosystem of Indonesia, a centre of biodiversity, demands appropriate management strategies. Since 2003, "Science for the Protection of Indonesian Coastal Marine Ecosystems – SPICE", a German-Indonesian programme coordinated by ZMT, has provided the necessary input. Following two successful phases (2003-2010), bilateral cooperation in 2012 will concentrate on six research projects: Marine Biodiversity, Food Security and Sustainability / Carbon Sequestration in the Indonesian Seas and their Global Significance / Understanding and Managing the Resilience of Coral Reefs and Associated Social Systems / Terrestrial Influences on Mangroves Ecology and Sustainability of their Resources / Marine Geology and Geochemistry / Ocean Renewable Energy.

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LANCET

Successfully completed

From 2006 to 2011, scientists from seven universities and research institutions in Germany and China worked together on a collaborative project coordinated by ZMT: "Land-Sea Interactions along Coastal Ecosystems of Tropical China: Hainan" (LANCET). The focus of their research was land-sea interaction, taking the tropical island of Hainan in the South China Seas as an example. Due to population density and unprecedented economic growth it is one of China's coastal regions suffering particularly from the impact of use. The results of the project have been presented and discussed at several workshops and international conferences. A continuation of this research collaboration is under consideration. > [READ MORE](#)

MAREE

New gas mixing facility installed

The beginning of December 2011 marked the effective completion of installing a gas mixing facility in the inhouse, state-of-the-art "MARine Experimental Ecology" laboratory



MAREE in pole position: there is no comparable tropical laboratory in Germany

NEW FACES

At the end of 2011, Australian scientist **Claire Reymond** joined the Department of Biogeochemistry/Geology. An expert on foraminifera, she completed her doctorate at the University of Queensland's Centre for Marine Science and is now continuing her research as a postdoc in the Geoecology and Carbonate Sedimentology working group. > [READ MORE](#)



Aquarist **Achim Meyer** is responsible for experimental organisms at ZMT's MAREE since September 2011. He was previously a research assistant at the Department for Animal Physiology at the University of Mainz. > [READ MORE](#)



PUBLICATIONS

Books

The Role of Science for Conservation

Edited by Matthias Wolff and Mark Gardener, Routledge Explorations in Environmental Economics, February 2012 > [READ MORE](#)

Articles

Climate change impedes scleractinian corals as primary reef ecosystem engineers

Christian Wild et al., 2011 > [OPEN ACCESS](#)

Modern heterozoan carbonate facies from a eutrophic tropical shelf (Mauritania)

Julien Michel et al., September 2011. Journal of Sedimentary Research, 81, 641-655. doi: 10.2110/jsr.2011.53 > [ABSTRACT](#)

(MAREE). At ZMT we are now able to regulate the precise level of CO₂ in our experimental aquaria, undertake controlled manipulation and simulate past and future atmospheres.

We want to use the new system to observe and understand the effects of ocean acidification on various organisms more precisely and effectively. The introduction of carbon dioxide in the ocean has a measurable impact on the pH value and the carbonate chemistry of seawater. Calcifying organisms are directly affected. We are currently using different concentrations of CO₂ in the water in our aquaria to analyse the physiology of the calcifying green algae *Halimeda opuntia*. We are also planning interdisciplinary investigations into ossicle production in sea cucumbers, the physiology of stony corals and calcifying red algae. > [READ MORE](#)