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A peek at the aquarium
Our clown fish caring for their brood



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OFF TO MELANESIA

for four years of ZMT research in the Pacific

They have taken their bearings, got their roadmap and packed their bags – three PhD students from ZMT and their project leader, Sebastian Ferse, will leave Bremen in March and fly out to islands in the Pacific. Their various expeditions will take them to Papua New Guinea, Fiji, the Solomon Islands, New Caledonia and Hawaii where they will spend many months collating new research findings on the interplay of worlds above and below water.

A complex system under scrutiny

How resistant is the underwater world of the Tropics to different stress factors? On the one hand, climate change is having a negative impact; on the other, there are people whose behaviour towards their natural environment is changing with globalisation: If, for example, fishermen in Melanesia are able to trade with Hong Kong, they will go for different types of fish in their fishing grounds than they have done traditionally. What changes coral reefs can withstand is the focus of the project to be conducted in Melanesia, whereby humans and nature will not be considered in isolation. The ecologists and social scientists involved will scrutinise the elasticity of a complex system – similar to a rubber ball, as Sebastian Ferse explains: “How much pressure can the ball bear before the whole thing loses its structure forever?”

Observing – comparing – tessellating

In contrast to other tropical regions, the marine ecosystems of the Pacific islands are more intact but have been investigated in less detail. Global warming, ocean acidification and fishing leave their traces here, too, but the region is thinly populated and the fishing grounds of the individual coastal communities are more clearly defined. Good conditions for the social-ecological research they are planning, according to Sebastian Ferse. “We hope this will mean we can study the impact of humans on reef systems much more precisely than we can in other research locations.” In the ZMT project, which is funded for four years by the Federal Ministry of Research, doctoral students from Fiji, the USA and the UK will cooperate with experts from Hawaii, Australia, Sweden, France and South Africa. The results are supposed to flow into resource management in the region, the project leader notes. “We all need to know which screws have to be turned rather more gently in future if we want to conserve valuable reef ecosystems.” > [READ MORE](#)



EXPERTISE IN WARM DEPTHS

ZMT's Diving Centre set to train scientific divers for warm water missions

Two weeks on Crete – and the weather was beautiful when 11 scientists from ZMT arrived on the Mediterranean island in November 2013. But instead of relaxing in the sun, the men and women in the group went diving with two instructors from the Alfred Wegener Institute (AWI), plumbing the warm depths and testing their physical limits. One or two dives per day, instruction in theory, and three days of tests required their complete dedication in order to achieve a particular goal: to be the first to practise scientific diving in accordance with Germany's newly-adapted regulations for warm water conditions.

“Research diving is an essential scientific method at ZMT,” explains Georgios Tsounis, marine biologist, scientific diver and head of ZMT's Scientific Diving Centre. But, so far, training in Germany has been conducted in accordance with regulations devised for cold water at a number of government-approved training centres, such as AWI and the universities in Oldenburg and Kiel. ZMT's scientific divers also started their training on the deep-sea island of Helgoland where AWI operates the largest scientific diving centre in Germany. “Just transferring the lessons learned in the cold North Sea to diving in the Tropics doesn't guarantee optimum safety, and that would not make for efficient research,” says Tsounis. That is why they concentrated on the systematic analysis of local conditions and how to adapt safety measures.

The right diving course for the Tropics

With more than 20 years' experience of diving in the Tropics, the ZMT Scientific Diving Centre is set to become Germany's first government-approved training institute with a focus on warm water. To this end, ZMT scientists drew up strict regulations and a course programme for the warm water sector and started training divers together with AWI in 2013. The committed team around Georgios Tsounis soon completed all the formalities needed to prepare ZMT for membership of the German Commission for Research Diving (KFT).

Strict, specific safety regulations for cold and, in the case of tropical research, also for warm water are essential for scientific divers. To ensure their safety, at least three people must be on board during diving: the dive leader, the diver's attendant and at least one diver who is in constant contact with the attendant via a lifeline or radio. “During training we focus on accurate risk assessment and drawing up the relevant rescue chains,” Tsounis explains. With the help of ZMT's Diving Centre it is now possible to learn what dangers one may encounter specifically in the Tropics. The hard work on Crete paid off: all the participants now hold the title “Certified Research Diver” – with special expertise in diving in warm water. [> READ MORE](#)

Professional diving by German rules

“Certified Research Diver” is a vocational qualification in Germany, based on the regulations governing German Statutory Accident Insurance, which is recognised across Europe. The German Commission for Research Diving is an association of research institutions that offer vocational training courses in research diving on the basis of these regulations. ZMT is now on board and, in 2014, is preparing to be licensed as Germany's first government-approved institution for training research divers to work in warm water.



NATURE IN TRANSFORMATION – PEOPLE ON THE MOVE

People leave their home when their living conditions change too radically. Achim Schlüter and Hildegard Westphal are investigating the dynamics of this in tropical coastal regions.

What changes are societies in tropical coastal regions experiencing at present?

Westphal: Coastlines are changing significantly. One reason is the rise in the sea level in the context of climate change; another is human intervention in the shape of river barrages that hold back sediment. This results in coastal erosion. As part of a new project, we want to elucidate what impact this has on the behaviour of riparians from a number of different angles.

Schlüter: As well as environmental changes there are also social changes: new transportation routes open up access to new, often global, markets. This leads to migration – people go where the markets are. When the ecological, economic or social situation alters, acquired rights are called into question and institutions change – that is, the formal and informal rules by which people live.

What does that mean for the immediate future?

Schlüter: From an economic point of view, rules are public goods. This means that the necessary transformation of institutions in changing coastal communities is a complex problem of collective action. It takes time to organise joint action, and it's not easy because developing rules that are in the interest of the community as a whole, but not of much use to the individual, is a protracted process. Take conservation: unless it gets the support of important tourist associations with affluent clients it has great difficulty finding a foothold.

What can be done to meet these challenges?

Westphal: When we are dealing with the conservation of tropical coasts we have to understand all aspects of the dynamics. In our project we want to discover the exact reasons for migration on the coasts of Ghana and Indonesia. How much is due to changes or loss of habitat; how much

to economic pressure? To do this, we need to link the expertise of natural science and social science.

Schlüter: Institutions reflect the ecological, technological and social conditions of the environment in which they are valid. I can't analyse a process like that on my own. The perspectives of people like Hildegard Westphal, who focuses on the changes in the natural environment, or cultural and social scientists like Volker Heins from KWI, are important building blocks for what I am doing. By sharing views, I can understand why rules change or why collaboration breaks down or develops.

Westphal: It would be possible to influence some of the factors responsible for changes in coastlines – not the rise in the sea level, of course, but barrages. If we want to make constructive suggestions it is essential that we understand the reactions of the population. That's why our joint project has a focus on social science.

New regional formations: Rapid environmental change and migration in coastal regions of Ghana and Indonesia

Together with the Sustainability Research Centre (artec) at the University of Bremen, the Institute for Advanced Study in the Humanities (KWI) in Essen and the Institute of Geographical Sciences at FU Berlin, ZMT will investigate the relationship between environmental change and migration in Ghana and Indonesia over the next three years. In addition to the social anthropological, human geography, and sociology dimensions, the project will include experiments by behavioural economist, **Achim Schlüter**, and field work by geologist **Hildegard Westphal**. This interdisciplinary enterprise is coordinated by Michael Flitner (artec) and funded by the Volkswagen Foundation. > [READ MORE](#)

PACE-Net+

ZMT in Pacific Europe Network for Science, Technology and Innovation

16 countries in Europe and the South Pacific are partnered in the new Pacific Europe Network for Science, Technology and Innovation – ZMT is one of the partner institutions. Financed by the European Commission, the project is designed to strengthen Europe's cooperation with the region in science and technology. The aim is to promote dialogue and spark joint research by connecting research, industry, government and civil society.

In the context of the project, which has been granted funding for three years, ZMT is coordinating international encounters in the field of climate protection and the use of resources as well as marine and maritime research, bio-economy, and sustainable agriculture. [> READ MORE](#)

SUMMER SCHOOL WITH ZMT

Climate – Ecology – Man

How do people perceive climate change? This is an issue that plays a role in ZMT's interdisciplinary work to generate scientifically-based knowledge for political decision-making in tropical coastal regions. Against this backdrop, ZMT's director, Hildegard Westphal, and the incumbent of the ZMT Leibniz Chair, the social anthropologist Bettina Beer, led one of the Swiss Study Foundation's summer academies at Sils Maria this year, focusing on climate change and how it is perceived by humans. The participants intensively explored various models to explain climate change and time-dependent perception as well as issues relating to responsibility and compensation.

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Happy award winners: ZMT's Robin Remmers (centre) received one of the two training awards for apprentices at German marine research institutes. To his left, his mentor Thomas Rau, head of ZMT's IT Department.

PRIZE TRAINEE

ZMT trainee Robin Remmers receives award

Robin Remmers is an apprentice in IT for application development at ZMT. Research institutes rely on bright minds to create a good infrastructure and provide ideal

ZMT FACES

The new head of ZMT's Chemical Laboratory is **Donata Monien**, a geochemist from the University of Oldenburg. Her research interests include rapid environmental change. The Chemistry Lab not only provides support for the Bremen institute's biogeochemical, biological and chemical research projects, it also helps partner institutes in tropical countries to establish analytical methods.



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For decades, the ecologist **Ulrich Saint-Paul** has conducted research at ZMT and helped to shape the development of the institute. This year, the head of Mangrove Ecology is retiring. His research work has had an international impact and, on 13 March 2014, ZMT is holding a celebratory colloquium in his honour entitled "From Mangroves to Mankind - ecological research and human affairs."



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PUBLICATIONS**Doctorate "summa cum laude"**

Top result for ZMT ecologist Gustavo Castellanos-Galindo

Tidal, diel and seasonal effects on intertidal mangrove fish in a high-rainfall area of the Tropical Eastern Pacific

G. Castellanos-Galindo and U. Krumme, December 2013. Marine Ecology Progress Series 494, 249-265. doi:10.3354/meps10512 [> ABSTRACT](#)

Articles

Biogeographical patterns of phytoplankton community size structure in the oceans

E. Acevedo-Trejos, G. Brandt, A. Merico et al., June 2013. Global Ecology and Biogeography, 22(9), 1060-1070. doi: 10.1111/geb.12071. [> ABSTRACT](#)

conditions for research. Robin Remmers is already excellent at his job, even though he has not been training for very long. This was the opinion of the jury of five which granted him the 2013 AWI-DKB Training Award, sponsored by the Alfred Wegener Institute (AWI) and the German Credit Bank (DKB). The young IT specialist had decided to think up an easier way of searching to find items in ZMT's stocks. Thus in his very first year of training, he dedicated time and creativity to developing an electronic warehouse management system. Now people can quickly track down what they are looking for – a valuable service for ZMT.

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