



#### **FUTURE OCEAN – KIEL MARINE SCIENCES** **Understanding the Ocean — Sustaining Our Future**

The Cluster of Excellence “The Future Ocean” pursues a research approach that is unique in Germany: marine researchers, geologists and economists join forces with mathematicians, computing, medical, legal, and social scientists to investigate ocean and climate change from a multidisciplinary perspective. A total of over 200 scientists from Kiel University, the GEOMAR Helmholtz Centre for Ocean Research Kiel, the Institute for the World Economy (IfW) and the Muthesius Academy of Fine Arts are using innovative means to share their findings with the scientific community, stakeholders, decision makers, civil society and the public at large. The “Future Ocean” is funded by the German Research Foundation (DFG). Cluster researchers from geosciences, coastal engineering, economics, and law have been jointly investigating oceanic and coastal geohazards and their socio-economic consequences.

#### **SUMMER SCHOOL**

The summer school is organized by the Cluster of Excellence “The Future Ocean” of Kiel University, Germany, and will take place from 8<sup>th</sup> to 18<sup>th</sup> September at UFRN Natal directly before the Congresso Brasileiro de Geologia in Salvador, Bahia (21<sup>st</sup> to 26<sup>th</sup> September 2014).

For further information please visit:  
[www.futureocean.org/summer-school-change](http://www.futureocean.org/summer-school-change)

[www.futureocean.org](http://www.futureocean.org)

#### **SCIENTIFIC STEERING COMMITTEE AND TEACHERS**

**Karl Stattegger** / Kiel University  
**Helenice Vital** / UFRN Natal  
**Moab Gomes** / UFRN Natal  
**Sebastian Krastel** / Kiel University  
**Athanasios Vafeidis** / Kiel University  
**Peter Feldens** / Kiel University  
**Jan Scholten** / Kiel University

#### **VENUE**

UFRN Natal, Centro de Ciências Exatas e da Terra /  
Pós-Graduação em Geodinâmica e Geofísica

#### **PARTICIPATION**

Students in their last year of graduação, in mestrado or doutorado

#### **REGISTRATION**

Places are limited, so registration is required and is binding.  
Please send a letter of motivation and a brief CV (pdf-file) to:  
geofis@ccet.ufrn.br or helenice@geologia.ufrn.br

#### **REGISTRATION DEADLINE**

1<sup>st</sup> August 2014  
Participation is free of charge

#### **FOR FURTHER INFORMATION**

Please send an e-mail to  
geofis@ccet.ufrn.br or helenice@geologia.ufrn.br

This summer school is supported in part by the UNESCO Chair in  
Marine Geology and Coastal Management at Kiel University.



future ocean  
KIEL MARINE SCIENCES

Summer School

# Coastal Change

8<sup>th</sup> — 18<sup>th</sup> September 2014

UFRN, Natal

## SCIENTIFIC PROGRAM

Two thirds of the world's population lives within 50 km of the coast-line. Therefore, coastal zones and shelf seas play an important role with respect to climate variability and human activities. Ongoing global climatic change is evidenced by sea-level rise and by an increase in the frequency and intensity of storms. Together with intensive human use of resources and habitation we observe rapid reorganization and often deterioration in the coastal zone and adjacent shallow seas. The summer school "Coastal Change" aims to provide insights into modern strategies and scientific techniques in coastal and marine research. The eleven day course will be shaped by various lecturers from Kiel University and the UFRN Natal with acknowledged expertise in their field. The course is comprised of lectures and practical work in the laboratory and in the field.



### 08<sup>th</sup> SEPTEMBER / 08.30—17.00

- **Course introduction (8.30—12.00)**
- **Coastal sediments and environments, PART 1**  
[Karl Stattegger](#)  
Basic Principles
- **Shallow water geophysics, PART 1 (13.30—17.00)**  
[Peter Feldens](#)  
Principles of acoustic imaging in shallow water  
Seafloor mapping: Side scan sonar and multibeam technology

### 09<sup>th</sup> SEPTEMBER / 08.30—17.00

- **Shallow water geophysics, PART 1 cont.**  
[Peter Feldens](#)  
Subsurface mapping: Seismic systems
- **Shallow water geophysics, PART 2 (13.30—17.00)**  
[Peter Feldens](#)  
Integrated processing, visualisation and interpretation of geophysical data

### 10<sup>th</sup> SEPTEMBER / 08.30—17.00

- **Shallow water geophysics, practical exercises on boat**  
[Peter Feldens](#) / [Moab Gomes](#)  
Side scan sonar and sub-bottom profiling  
Underwater video recording

### 11<sup>th</sup> SEPTEMBER / 08.00—17.00

- **Shallow water geophysics, PART 2 cont. (8.30—12.00)**  
[Peter Feldens](#)  
Integrated processing, visualisation and interpretation of geophysical data
- **Coastal sediments and environments, PART 2 (13.30—17.00)**  
[Karl Stattegger](#)  
River mouth systems

### 12<sup>th</sup> SEPTEMBER / 08.30—17.00

- **Coastal sediments and environments, PART 3 AND 4**  
[Karl Stattegger](#)  
Barrier island – tidal flat/lagoonal systems  
Continental shelf

### 13<sup>th</sup> SEPTEMBER / 08.30—17.00

- **Sea-level change**  
[Karl Stattegger](#)  
Long-term and short-term sea-level fluctuations  
Deglacial sea-level rise and Holocene sea-level records  
Short term sea-level fluctuations and trends  
Future sea-level rise

### 14<sup>th</sup> SEPTEMBER / 10.00—17.00

- **Exhibition "The Future Ocean" (10.00—13.00)**  
[Karl Stattegger](#) / [Helenice Vital](#)
- **Discussion on International Cooperation in Coastal Research (14.00—17.00)**  
[Helenice Vital](#) / UFRN Natal  
[João Mugabe](#) / Eduardo Mondlane University, Maputo, Mozambique  
[Karl Stattegger](#) / Kiel University

### 15<sup>th</sup> SEPTEMBER / 08.30—17.00

- **Coastal geography—Coastal hazards, PART 1**  
[Athanasios Vafeidis](#)  
Coastal flooding: Drivers  
Coastal flooding: Impacts and adaptation  
Basic concepts: Exposure, vulnerability and risk

### 16<sup>th</sup> SEPTEMBER / 8.30 — 17.00

- **Coastal geography—Coastal hazards, PART 2 (8.30—12.00)**  
[Athanasios Vafeidis](#)  
Flood risk assessment: Introduction  
Flood risk assessment: Methods and tools  
Practical exercise (with data from Brazil)
- **Coastal geography—Coastal hazards, Field trip (13.00—17.00)**  
[Helenice Vital](#) / [Athanasios Vafeidis](#) / [Karl Stattegger](#)  
Ponta Negra Beach

### 17<sup>th</sup> SEPTEMBER / 8.30 — 17.30

- **Age dating of marine sediments (08.30—12.30)**  
[Jan Scholten](#)  
Age dating of marine deposits using radionuclides (Pb-210, Cs-137, C-14, Th/U)  
Pb-210 dating models: Practical exercises (Excel)
- **Pollution and groundwater (13.30—17.30)**  
[Jan Scholten](#)  
Marine deposits as archives for pollution  
Submarine groundwater discharge

### 18<sup>th</sup> SEPTEMBER / 8.00 — 17.00

- **Marine Sediments—Practical exercises on boat and at the beach**  
[Jan Scholten](#) / [Helenice Vital](#) / [Karl Stattegger](#) / [Moab Gomes](#)  
Sediment sampling  
Sample preparation and basic analytical work