**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).
In the summer term 2013 researchers from geosciences, coastal engineering, economics, and law jointly investigate oceanic and coastal geohazards and their socio-economic consequences.

**SUMMER SCHOOL**

The summer school "Coastal hazards" will take place from 16th to 20th September, a week before the 6th International Symposium on Submarine Mass Movement and their Consequences [ISSMMTC6] 23rd — 25th September 2013.

For further information please visit:
www.futureocean.org/summer-school-hazards
www.geomar.de/en/research/fb4/fb4-gdy/research-topics/6th-international-symposium

**www.futureocean.org**

**SCIENTIFIC STEERING COMMITTE**

**Prof. Sebastian Krastel** / Institute of Geosciences, CAU
**Prof. Karl Stattegger** / Institute of Geosciences, CAU
**Prof. Athanasios Vafeidis** / Institute of Geography, CAU
**Prof. Jan Behrmann** / GEOMAR Helmholtz Centre for Ocean Research Kiel
**Prof. Roberto Mayerle** / Research and Technology Centre [FTZ]

**VENUE**

Kiel University (CAU)
Research and Technology Centre [FTZ], Büsum

**PARTICIPATION**

The course is aimed at towards PhD students and young Postdocs from Kiel and Germany as well as from abroad.

**SPONSORSHIPS DEADLINE**

The Cluster of Excellence "The Future Ocean" will sponsor the accomodation for all participants of the summer school coming from outside Kiel (Germany). In addition the Future Ocean will sponsor travel for a certain number of foreign participants from developing countries, depending on the available budget. If you would like to attend and apply for this sponsorship, please send

- a letter of motivation
- a brief CV and
- an estimation of your travel costs

in a single PDF file to summerschool@futureocean.org
by 1st August 2013. You will be notified about the outcome of your proposal by 9th August 2013.

**REGISTRATION**

Places are limited, so registration is required and is binding.
Please send a letter of motivation and a brief CV (pdf-file) to summerschool@futureocean.org

**REGISTRATION DEADLINE**

1st August 2013. Participation is free of charge.

**FOR FURTHER INFORMATION**

please send an eMail to
summerschool@futureocean.org

CAU Christian-Albrechts-Universität zu Kiel · ifw · muthesius kunsthochschule · GEOMAR

future ocean
KIEL MARINE SCIENCES

# Summer school Coastal hazards

16th — 20th September 2013
Kiel University (CAU)
Research and Technology Centre [FTZ], Büsum
Germany

## SCIENTIFIC PROGRAM

Dramatic events from the recent past, such as the Sumatra Tsunami in 2004, Hurricane Katrina in 2005 or the earthquake and subsequent tsunami in Japan 2011, have shown that the ocean holds diverse and concrete threats to densely populated coastal zones. The reconstruction of different past-, catastrophic events using geological and geophysical methods confirms the scientists' perception that coastal zones have always been high-risk settlement areas.

The summer school "Coastal hazards" aims to provide insights into modern strategies and scientific techniques. The five day course will be shaped by various international lecturers with acknowledged expertise in their field. The course is comprised of lectures and practical work in the laboratory and in the field. In addition participants will report about their current work.

## 16th SEPTEMBER / 9.00 — 17.00

Risk Assessment for Storm Surges
**Andreas Kortenhaus,** Leichtweiß-Institute for Hydraulic Engineering and Water Resources, TU Braunschweig

**09:00—10:30**
- Introduction to coastal flood risk assessment
- Examples from recent events and case studies

**11:00—12:30** Specific topics
- Risk Sources: Storm surges, Sea level rise, Water level and sea states, statistics
- Risk Pathways: Coastal flood defences, failure analysis and probability, dike breaching, inundation modelling
- Risk Receptors: Vulnerability, tangible and intangible losses, loss of life, risk mapping

**13:30—15:00** Practical work
- Exercise 1: Return period for storm surges in the North Sea
- Exercise 2: Failure probability of a sea dike subject to wave run-up

**15:30—17:00** Presentations of students

## 17th SEPTEMBER / 9.00 — 17.00

**08:30** Transfer to FTZ, North Sea (Büsum)
**Roberto Mayerle,** Research and Technology Centre [FTZ]

**10:00—13:00** Research activities at FTZ [Lecture and Discussion]
- Extreme occurrences
- Dyke design North Sea

**14:00—16:00** Field trip / Excursion
- Eider flood barrier
- Flood barrier control
- Tide dynamics, Storm flood protection

**16:00—17:00** Presentations of students / **17:00** Return to Kiel

## 18th SEPTEMBER / 8.30 — 17.00

**Field Trip: Baltic Sea, Kiel – Heiligenhafen**
Introduction in Risk asessement
**Karl Stattegger,** Institute of Geosciences, CAU

The field trip will bring you to an interesting section of the southern Baltic Sea shoreline east of Kiel
**Key points**
- evolution and present-day state of the Baltic Sea including sea-level history
- risk of flooding by storm surges
- coastal protection

## 19th SEPTEMBER / 9.00 — 17.00

Deltas: Holocene Evolution, Recent Changes and Human Impacts
**Yoshiki Saito,** National Institute of Advanced Industrial Science and Technology [AIST], Japan

Deltas are one of the principal coastal landforms and an important area for human activities. Most deltas in the world today were initiated about 8000 years ago when decelerated sea-level rise or slightly falling sea levels since 8000 years ago allowed the seaward migration of the shoreline at river mouths and the formation of deltas. A sea-level rise is a typical example of a change in the ocean that may severely affect the coastline.

Decreases in sediment and water discharge caused by dam construction, sand dredging in river channels, and water usage in drainage basins are typical examples of changes on the land that also impact coasts.

## 20th SEPTEMBER / 9.00 — 17.00

Morphodynamics and Subsidence of Deltas – Observations and Modeling
**James Syvitski,** University of Colorado at Boulder, USA

The architecture of deltaic systems is controlled by the interaction between boundary conditions and forcing factors such as sediment supply, accommodation space, coastal energy and dynamics of discharge plumes.

Human-induced subsidence by sediment compaction from the removal of oil, gas, and water from the delta's underlying sediments accelerates lithospheric subsidence by high sediment loading from river discharge considerably. Many deltas are sinking at rates much faster than global sea level is rising and are therefore exposed to a high relative sea-level rise.

## SOCIAL EVENTS

**16TH SEPTEMBER / 19:00** Ice-Breaker
Forstbaumschule, Düvelsbeker Weg 46, Kiel

**17TH SEPTEMBER / 19:00** Public Lecture
**Mike Orbach,** Professor of the Practice of Marine Affairs and Policy Direktor Duke University Marine Laboratory, North Carolina