

Image: JAGO-Team, GEOMAR

2

How do marine communities respond to man-made changes?



Image: NASA Johnson Space Center

4

How can we identify the natural hazards of the sea at an early stage?

GEOMAR IN NUMBERS

- 70** million euro annual budget, including **16** million euros of project funding
- 950** employees from more than 40 different countries
- 500** days at sea per year, of which 50 percent is on large research vessels
- 400** scientific articles in international journals per year
- 4** research vessels (ALKOR, POSEIDON, LITTORINA, POLARFUCHS)
- 4** deep-sea underwater vehicles (ROV Kiel 6000, ROV PHOCA, AUV Abyss, HYBIS)
- 1** manned research submersible (JAGO)
- 10** oceanographic gliders (one of the largest glider fleets in Europe)
- 10** deep-sea landers
- 10** offshore mesocosms (KOSMOS)
- 100** ocean bottom seismometers (OBS)
- 35** geodetic seafloor transponder
- 6** onshore benthocosms
- 1** 3D seismic system (P-CABLE)

Image: M. Schmidt-Aursch

GEOMAR
 Helmholtz Centre
 for Ocean Research Kiel
 Wischhofstraße 1-3
 24148 Kiel, Germany
 Tel +49 431 600-0
 Fax +49 431 600-2805
info@geomar.de
www.geomar.de



klimaneutral
powered by ClimatePartner®
Druck | ID: 11709-1503-1001

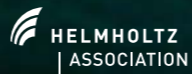


Image: Björn Henke

From the Deep Sea
to the Atmosphere

GEOMAR Helmholtz Centre
for Ocean Research Kiel



Visualization: ocean modelling group, GEOMAR

1

How does the ocean influence our climate system?

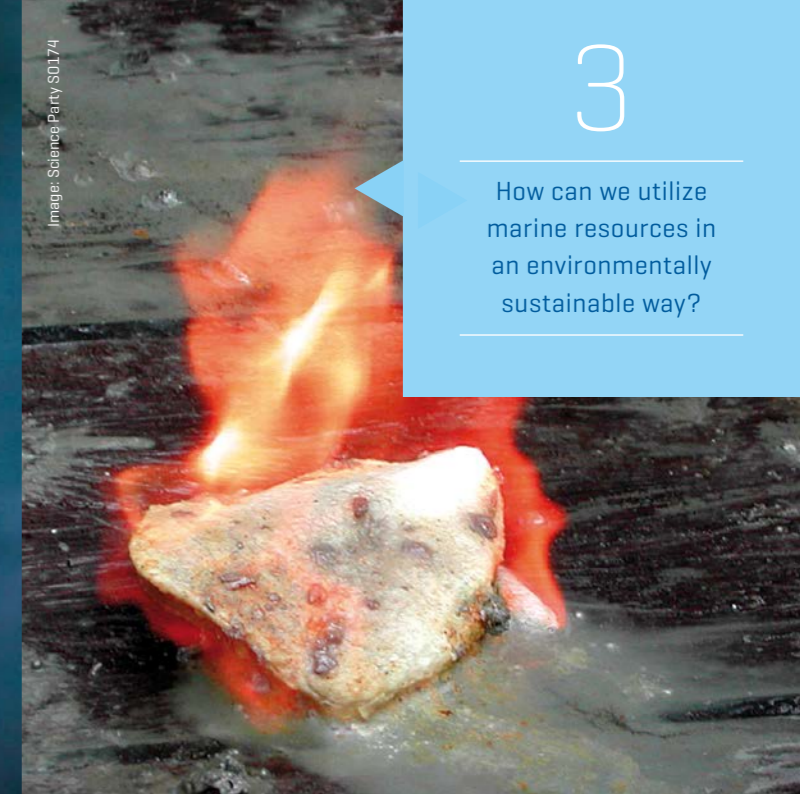


Image: Science Party S0174

3

How can we utilize marine resources in an environmentally sustainable way?

AN OVERVIEW OF GEOMAR

GEOMAR Helmholtz Centre for Ocean Research Kiel

is one of the world's leading institutes in the field of marine sciences. The institute investigates the chemical, physical, biological and geological processes of the seafloor, oceans and ocean margins and their interactions with the atmosphere. With this focus, GEOMAR covers a unique spectrum of research in Germany.

GEOMAR's four research divisions are Ocean Circulation and Climate Dynamics, Marine Biogeochemistry, Marine Ecology and Dynamics of the Ocean Floor. Together with Kiel University and other national and international partners, GEOMAR also leads a number of national research programs, including the Cluster of Excellence "The Future Ocean" and the Collaborative Research Centre 754 "Climate-Biogeochemistry Interactions in the Tropical Ocean".

GEOMAR is a member of the Helmholtz Association of German Research Centres, and a leading participant in national and international strategic partnerships, such as the German Marine Research Consortium (KDM), the German Climate Consortium (DKK), the Partnership for Observation of the Global Oceans (POGO) and the European Marine Board (EMB).

Infrastructure

GEOMAR has a modern and efficient research infrastructure at its disposal. This includes four institute-owned research vessels, the only German manned research submersible JAGO, the unmanned deep-sea robots KIEL 6000, PHOCA, HYBIS and ABYSS, as well as a variety of other devices and systems. GEOMAR also hosts leading facilities in the field of isotope and trace element analysis, supercomputing, and one of the largest marine science libraries in Germany.



Continuous measurements by floats have allowed the collection of vast amounts of ocean data in only ten years – more than was ever attained by all ship-based expeditions before. Image: M. Müller, GEOMAR



Mesocosms are giant test tubes. They are small, isolated worlds in the sea, in which the reactions of marine ecosystems to global change can be studied. Image: M. Nicolai, GEOMAR



Recovery of a carbonate block: carbonates allow to reconstruct the former presence of methane and methane hydrates in the seafloor. Image: B. Grundmann



Geophysical investigations with the research vessel METEOR in the Strait of Messina during an eruption of the volcano Etna. Image: S. Krastel-Gudegast, Kiel University

MAJOR RESEARCH TOPICS

1 The Role of the Ocean in Climate Change

The ocean is the long-term memory of our climate, controlling variations in climate over time-scales that range from a few months to millions of years. With respect to anthropogenic aspects of climate change GEOMAR's research focuses on regional variations in the impacts of climate change and on abrupt changes in the climate.

2 Human Impact on Marine Ecosystems

Human activities affect marine ecosystems as a result of pollution, overfishing, the introduction of invasive species, and acidification, which all impact on the marine food web and may lead to largely unknown consequences for the biodiversity and survival of marine life forms.

3 Biological, Mineral and Energy Resources

The oceans offer enormous potential for new resources: natural marine substances, mineral resources, and gas hydrates on the seafloor could complement, and possibly replace, certain land-based occurrences. Comprehensive interdisciplinary investigations are required in order to enable a well-balanced assessment to be made of the potential provided by these marine resources, as well as the risks involved in their exploitation.

4 Plate Tectonics and Marine Hazards

Dynamic processes beneath the seafloor can cause natural hazards [such as earthquakes, landslides, tsunamis, and volcanic eruptions] that affect people living in coastal areas. A better understanding of the processes involved in the movement of tectonic plates is required in order to assess these hazards and to identify the early warning signals that precede such natural disasters.



Image: JAGO-Team, GEOMAR

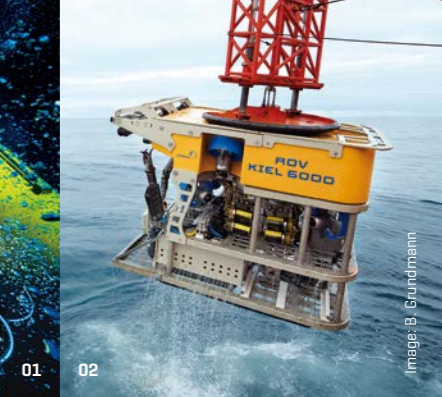


Image: B. Grundmann



Image: J. Steffen, GEOMAR



Image: Kröger/Dörmüller, Kiel University



Image: M. Nicolai, GEOMAR

01 The manned research submersible JAGO explores the ocean up a depth of 400 metres.

02 With the capability of diving to depths of up to 6,000 meters, R/V KIEL 6000 can reach 95 percent of the global sea floor.

03 GEOMAR's public aquarium invites its visitors to join a short expedition into the multi-faceted seas of our planet. Seals are also kept in a large outdoor facility on the water's edge, where they can be observed both above and beneath the water's surface. The feeding of the seals is a big attraction for visitors of all ages.

04 GEOMAR cooperates closely with the Kiel University in the education of future marine scientists. Bachelor curricula include "Physics of the Earth System: Meteorology – Oceanography– Geophysics" and internationally oriented Master courses such as "Climate Physics: Meteorology and Physical Oceanography" and "Biological Oceanography."

05 GEOMAR's two large research vessels ALKOR and POSEIDON in Kiel fjord