

RESEARCH FOR TOMORROW

THE TASK

The future of mankind depends on the future of the ocean. The world ocean plays a key role in the global climate, holds dangers, but simultaneously provides opportunities in the form of resources that can be exploited by mankind.

The scientists in the Kiel Cluster of Excellence „Future Ocean“ have a common goal: to reassess the opportunities and risks of global change for the ocean and to allow a sustainable management of the ocean's resources based on these insights.

[Understanding the ocean sustaining our future](#)

THE IMPLEMENTATION

The Kiel Cluster of Excellence „Future Ocean“ pursues an approach to research that is unique in Germany: marine researchers, geologists, economists as well as medical scientists, mathematicians, legal and social scientists are contributing their expertise to investigate ocean and climate change. The Cluster of Excellence is therefore expressly including specialist fields that, to date, had little interaction with marine research. A total of over 250 scientists from six faculties at [Kiel University](#), the [Leibniz Institute of Marine Sciences \(IFM-GEOMAR\)](#), the [Kiel Institute for the World Economy \(IfW\)](#) and the [Muthesius Academy of Fine Arts and Design](#) have joined forces. The Integrated School of Ocean Sciences (ISOS) has been created as a central element within the Cluster of Excellence in order to transfer this interdisciplinary approach to the education of young scientists. The Cluster of Excellence „Future Ocean“ has established marine sciences as a main field of research at Kiel University.

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FUTURE OCEAN KIEL MARINE SCIENCES

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OCEAN CHANGE AND ITS CONSEQUENCES

Mankind's impact on the ocean is substantial:

- ▶ Increasing temperatures as a result of global climate change are leading to a sea level rise and change the living conditions for marine organisms.
- ▶ The increasing uptake of carbon dioxide and other greenhouse gases is acidifying the ocean and leads to long-term effects on biological and chemical processes.
- ▶ Some fish stock is over-fished, species are going extinct and the ecological balance in the ocean is shifting.
- ▶ The coasts are becoming more heavily populated and exploited. This results in an increase in pollution and threatens coastal zones.

OCEAN RESOURCES AND OPPORTUNITIES

The ocean offers a huge diversity of mineral and biological resources. Sustainable use of these natural resources will benefit biodiversity and mankind:

- ▶ Novel medical therapies will be made possible through research on marine organisms.
- ▶ Researchers are investigating the possibilities of mining valuable resources such as minerals or gas hydrates on the ocean floor.
- ▶ Scientists investigate procedures to deposit carbon dioxide beneath the ocean floor, in order to reduce the consequences of global change.
- ▶ Fishery biologists provide the basis for sustainable fishery management to produce the fish of tomorrow.

OCEAN RISKS AND MANAGEMENT

Floods, tsunamis, sea level rise or sub-marine earthquakes are increasingly threatening the growing population in coastal zones:

- ▶ Researchers are driving forward the development of early warning systems and develop strategies for an integrated coastal zone management.
- ▶ Legal scientists search for practical solutions to cases where the international Law of the Sea doesn't contain clear regulations. This pertains for example to the exploitation of marine mineral resources or the patenting of substances and organisms for medical use.



View from the research submarine JAGO: a reef of the cold water coral »Lophelia pertusa«.



Deep-sea test of the remotely operated vehicle »ROV Kiel 6000« off the coast of New Zealand.



In 2005, a tsunami devastated entire villages on Sri Lanka (Satellite view).