The "Future Ocean": Cluster of Excellence now established in Kiel

http://www.uni-kiel.de/future-ocean

By M. Botros, C. Devey, K. Lochte, M. Lüning, U. Riebesell, R. Schneider, M. Visbeck, D. Wallace

As part of an initiative to promote excellence in research, the German federal and state governments have awarded the network "Future Ocean" in Kiel a grant of 36 million euros over the next five years. The group of more than 100 scientists participating in the proposal were able to succeed in a nationwide competition that involved a highly selective review process. "We are very pleased about the confirmation of the quality of marine science that we cover here in Kiel and look forward to a new and very dynamic development", said Klaus Wallmann, Speaker of the cluster and Professor at IFM-GEOMAR, Leibniz Institute of Marine Sciences.

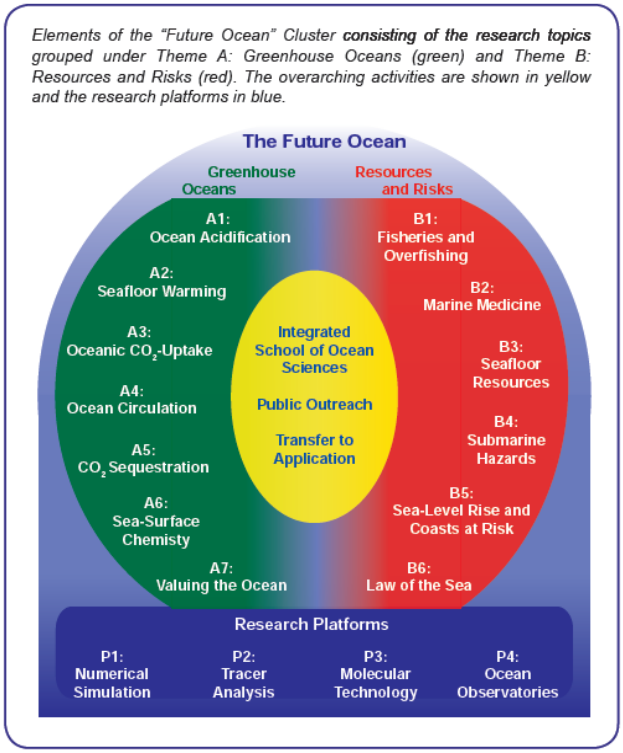
The oceans host our planet's largest ecosystem, help regulate the composition of the atmosphere and global climate, and provide us with essential living and non-living resources. Coastal regions are home to the majority of the world's population and the open seas are important for global trade and security. Today, this vital habitat is at risk, primarily because mankind has been altering the ocean in both direct and indirect ways on a global scale.

The "Future Ocean" Cluster at the Christian Albrecht University in Kiel (CAU) aims to (1) improve our understanding of ocean changes in response to human activities; (2) provide the scientific basis to develop, implement and assess sound global and regional ocean management options; (3) build our capacity to reliably predict the risks associated with ocean change and natural hazards; and (4) explore new marine resources and develop strategies for their sustainable use. This will be achieved by a multidisciplinary research strategy focussing on pathways, impacts and feedbacks of ocean change and their interaction with society in terms of ocean resources, usage and risks.
The Cluster is fully integrated into the University of Kiel and will function as a virtual institute to strengthen multidisciplinary cooperation among several faculties of the University and the three partner institutes: IFM-GEOMAR, the Kiel Institute for the World Economy, and the Muthesius School of Art. A major impetus to achieve important scientific goals is the establishment of 14 new Junior Research Groups in key interdisciplinary areas (A1 - B6 in Fig. 1). The "Future Ocean" Cluster is currently inviting applications from interested candidates.

The new Junior Research Groups will address Cluster objectives in collaboration with the participating scientists following two main themes:

- Oceans in the Greenhouse World: The human-induced rise in atmospheric CO_2 will affect the ocean in two ways: increased surface warming and seawater acidification. These changes may, in turn, trigger major shifts in ocean circulation, ecosystem structure, marine carbon cycling, and exchanges with the atmosphere. These issues, as well as an evaluation of carbon abatement strategies, will be assessed by the Future Ocean Cluster through a highly multidisciplinary approach integrating climate sciences, oceanography, biogeochemistry, marine biology, geosciences and economics.
- Marine Resources and Risks: The depletion of resources on land and the changing regulatory and geopolitical environment will lead to increasing pressure to develop marine resources in the future. Concomitantly, ocean change will have immediate implications for the exploitation of marine resources and will increase the likelihood of hazardous and extreme events. This will lead to both new opportunities and new risks for the growing world population. The Future Ocean Cluster will combine

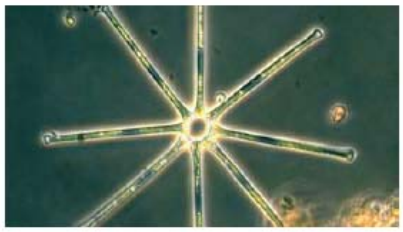
natural sciences with medicine, economics, social sciences and law to explore these opportunities and risks in an integrated approach.



Elements of the "Future Ocean" Cluster ***consisting of the research topics*** *grouped under Theme A: Greenhouse Oceans (green) and Theme B: Resources and Risks (red). The overarching activities are shown in yellow and the research platforms in blue.*

Since launching of the "Future Ocean" network in November 2005, participating scientists in Kiel have risen to the challenge of establishing a new level of cross-disciplinary collaboration that addresses the full breadth of research topics related to oceanic processes and their future development. Rarely have experts from such a wide range of disciplines and proven excellence merged to focus on questions of key relevance to society. The scientists in Kiel are hopeful that new avenues of research will emerge from the multidisciplinary cooperation. Based on this innovative approach, the Future Ocean Cluster will be able to better assess the chances and risks associated with oceanic change and provide sound guidance to both decision makers and the general public.

Cluster research will be supported by four fundamental research platforms (P1 - P4 in Fig.1). The platforms will offer a wide range of services including numerical expertise, ocean modeling, and super-computer support, isotope and trace element analysis, access to high-throughput molecular analysis facilities, and cutting-edge marine technology to explore and observe the global ocean in space and time from the oceanic crust to the air-sea interface. The Cluster platforms permit the more efficient use of resources and will be further developed and strengthened according to the scientific needs of the Cluster. The multidisciplinary approach of the "Future Ocean" Cluster will be complemented by an integrated educational program in ocean sciences.


The diatom Asterionella bleakley. Photo: A. Stuhr, IFM-GEOMAR.

The Christian Albrecht University in Kiel and IFM-GEOMAR are proud of having a long tradition of excellence in marine science. The "Future Ocean" Cluster will build on the existing infrastructure by forming a consortium of more than one hundred scientists, including 66 full professors, from six faculties. Together with the partner institutes, this initiative will further broaden and strengthen the CAU's profile as a leading European university in ocean sciences.