

Towards a European Research Icebreaker and Deep Sea Drilling Facility for Polar Research: ERICON-AURORA BOREALIS



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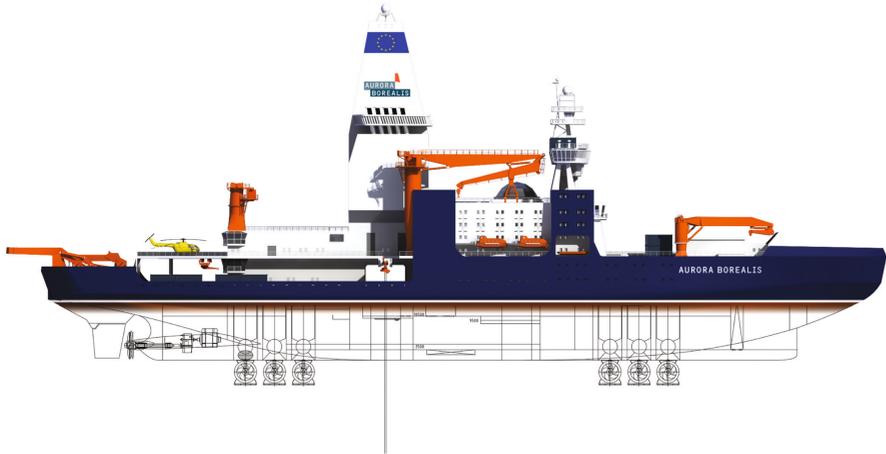
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THE PROJECT

The European Research Icebreaker Consortium - AURORA BOREALIS (ERICON-AB) was established in 2008 to plan the scientific, governance, financial and legal frameworks needed for the construction and operation of the first multi-nationally owned and operated research icebreaker and polar scientific drilling platform.



The AURORA BOREALIS is planned as:

- a heavy icebreaker with the highest ice class
- powered to break continuously in more than 2.5 m of multi-year ice and
- able to manage ridges of more than 15 m
- to autonomously perform dynamic positioning in pack ice of more than 2 m thickness while deploying the entire suite of drilling equipment and analytical tools

The ship shall perform year-round research tasks including scientific drilling in the Arctic and Antarctic without any support vessels. The main task is to perform multi-disciplinary polar and marine research as a European large-scale research infrastructure, including long-term sustained service as a mobile polar observatory and conducting extensive bathymetric, geophysical, biological and other survey works.

The ERICON-AB Science Advisory Panel (ESAP) is a scientific consultative body established within the project. It provides the Consortium with efficient expert advice for the ERICON-AURORA BOREALIS Science Plan drafting as well as other relevant scientific and professional community activities.

ERICON-AB Science Advisory Panel

Currently 28 members from 17 countries

Theme	Member	Member	Member	Member	Member	Member	Member
Theme 1 LARGE-SCALE PROCESSES OF OCEAN, ICE AND ATMOSPHERE	CHRISTIAN HAAS University of Alberta CANADA	SUSANNE HANSON Danish Meteorological Institute DENMARK	KAREN HEYWOOD University East Anglia UK	JOHNNY JOHANNESSEN NERSC NORWAY	ALEXANDER KLEPIKOV AARI RUSSIA	GERT KOENIG-LANGLU AWI GERMANY	MATTI PERTTILAE FIRM FINLAND
Theme 2 THE POLAR BIOSPHERE	ULRICH BATHMANN AWI GERMANY	ANGELIKA BRANDT University of Hamburg GERMANY	JEAN HENRY HECQ University of Liege BELGIUM	DANIEL PRIEUR University of Brest FRANCE	SØREN RYSGAARD Greenland Institute of Natural Resources GREENLAND	MARINO VACCHI ICRAM ITALY	
Theme 3 POLAR PALEO-CLIMATE AND PALAEO-ENVIRONMENT	HENK BRINKHUIS University of Utrecht NETHERLANDS	CARLOTA ESCUTIA University of Granada SPAIN	RAINA I. HRISTOVA IOMG BULGARIA	STEPHEN PEKAR QUEENS COLLEGE NY, USA	RUEDIGER STEIN AWI GERMANY	ANNE DE VERNAL University of Québec CANADA	
Theme 4 THE POLAR OCEAN'S GEOLOGICAL HISTORY	BERNARD COAKLEY University of Alaska USA	JAN INGE FALEIDE University of Oslo NORWAY	MARTIN JAKOBSSON University of Stockholm SWEDEN	YNGVE KRISTOFFERSEN University of Bergen NORWAY			
Theme 5 SEAFLOOR PROCESSES AND NATURAL HAZARDS	ANGELO CAMERLENGHI University of Barcelona SPAIN	GEORGY CHERKASHOV Moscow University RUSSIA	KARL FRIEDRIK FORSBERG NGI NORWAY	MICHAEL IVANOV Moscow University RUSSIA	NICOLAE PANIN GEOMAR ROMANIA	MICHELE REBESCO OGS ITALY	

THE SCIENCE PERSPECTIVE

The ERICON-AB project is currently generating a Science Perspective document for the first fifteen operational years of the vessel.

The Science Perspective will focus on the key questions and will provide the long-term scientific rationale and the roadmap for international strategic use of the vessel. This Science Perspective is based on:

- the scientific excellence
- the integration of the European Countries' polar capacities and perspectives

Topic 1 : The Changing Polar Oceans, Ice and Atmosphere

1. Why is Arctic sea ice decreasing and Antarctic sea ice is not?
2. Stability of ice shelves, glaciers and ice caps, and their influence on sea level rise
3. Which are the Polar sources and sinks of CO₂ and other gases?
4. Extending the global climate observing system into polar oceans
5. Which are the climatic consequences of changes in dense water formation?
6. Changing polar ocean circulation, biogeochemistry and earth system impacts
7. Improving weather and sea-ice forecasts

Topic 2 : The Polar Biosphere

1. What would humankind lose if the biosphere of Polar Regions is not investigated before irreversible changes occur in Polar ecosystems?
2. What are the likely consequences of a changing environment for ecosystem functioning and ecosystem services provided by the polar biosphere?
3. What role has a permanent ice cover in maintaining ecosystem structure and functioning?
4. How will global biogeochemical cycles be influenced by changing biological systems in Polar Regions?

Topic 3 : Polar Paleoclimate and Paleoenvironment

1. Extreme Climates - What can we learn from the past to explain the future?
2. How sensible is the climate system and which are the rates and amplitudes of sea level change?
3. Paleo-ecosystems: biodiversity and biogeography
4. Transition between Greenhouse and Icehouse Worlds
5. Bipolarity of climate change: connection between the southern and northern hemisphere polar regions
6. What is the role of polar oceans in the carbon cycle?

Topic 4 : The Polar Ocean's Geological History

1. Timing and mechanisms behind opening of Arctic and Antarctic gateways
2. Formation of Arctic and Antarctic basins
 - Dynamics
 - Subsidence history
 - Crustal thickness, composition, structure

Topic 5 : Seafloor Processes and Natural Hazards

1. Which are the sedimentary processes on shelves, slopes and deep basins?
2. Cold seeps and sub-surface fluid circulation in polar regions
3. Gas-hydrates distribution, properties and dynamics
4. Submarine permafrost: distribution, morphology, stability
5. Continental slope stability assessment in polar areas
6. Seismicity and paleoseismicity in polar areas

SCIENCE PERSPECTIVE - TIME SCHEDULE

