Getting ready for an ice-free Arctic

A major increase in our capacity to observe and study the Arctic Ocean ecosystem is urgently required before the region is transformed by rapid environmental change and commercial exploitation.

On 16 September 2012, Arctic summer ice cover reached its lowest level since instrumental records began. At just 3.4 million km^2, less than half the 1979-2000 average, the 2012 record low Arctic ice extent underlines a decadal trend that has alarmed climate and polar scientists. Many scientists are now predicting an ice-free Arctic within a few decades, much sooner than earlier IPCC predictions. The environmental and societal implications are enormous and because the ice is disappearing faster than predicted, we are largely unprepared.

Meanwhile, both governments and private enterprise are gearing up to exploit the Arctic Ocean territories in ways that have not previously been possible. Several cargo vessels have already made transits between the Atlantic and the Pacific, opening the door to new maritime trading routes and tourism opportunities. An ice-free Arctic will also revolutionize human access to Arctic resources, with opportunities for hydrocarbon exploration, mineral extraction, bioprospecting, and pelagic and demersal fisheries.

Sea ice and harsh conditions mean that the Arctic Ocean remains one of the least explored parts of the world ocean. There is very limited information on the topography, geology, physics, chemistry, biodiversity and ecosystem functioning of the water column, seafloor and sub-seabed. The retreating Arctic ice cover, therefore, raises a number of critical scientific questions:

- How will the increased wind forcing and upper ocean mixing affect heat transport from the Atlantic to the Arctic?
- How will the reduced Arctic ice cover affect future weather patterns and influence climate change?
- How will pelagic and benthic Arctic ecosystems respond to ocean acidification which is already happening more rapidly in the Arctic than in other warmer sea basins?
- How will human activities and pollution (inluding noise pollution) affect species and ecosystems?
- How will the distribution patterns of marine organisms be affected; will important commercial fish stocks move north?
- Which upper ocean organisms will thrive in conditions with strong direct sunlight in summer and complete darkness in winter?

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The research projects and measurement campaigns associated with the International Polar Year (IPY) 2007-2009 provided important data. However, addressing these fundamental scientific questions will require a much greater mobilization of scientific effort than that which exists today.

A key requirement for both industry and science will be the collection of long-term environmental and biodiversity time-series data and improved modelling capabilities to enhance predictive capacities. This will require a significant investment to upgrade and expand the existing observing infrastructure, to support research on modelling and forecasting, and a major improvement in the sharing of data and information.

Several countries already support polar research programmes and deploy research vessels and observing infrastructure to gather data in the Arctic region. A number of international initiatives are also in progress which enhance collaborative approaches in the development and joint use of large-scale Arctic and marine research infrastructures (e.g. SIOS[1], the Svalbard Integrated Arctic Earth Observing System). Such collaborative mechanisms provide a solid platform but the pace of progress, the level of investment, and the extent of collaboration must increase significantly.

The European Marine Board therefore calls for an urgent increase in multi-national and multi-sectoral collaboration and investment to establish a comprehensive and sustained marine observation and data-exchange system covering the full extent of the Arctic Ocean. This call for action is strongly supported by the European Polar Board.

Changes in the Arctic Ocean ecosystem may have fundamental implications for the global earth and climate systems. This is an issue not just of scientific importance, but of enormous societal relevance. The research and collaborative approaches advocated above are essential if these changes to be monitored and understood. Such knowledge can, in turn, underpin an ecosystem-based approach to the management of Arctic Ocean resources in the future. Let us not waste this opportunity; the time to act is now.

[1] www.sios-svalbard.org

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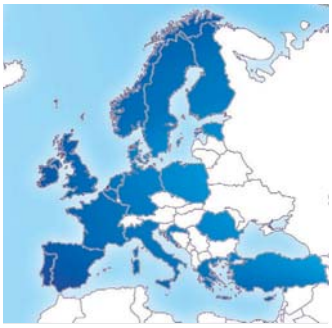
The European Marine Board provides a pan-European platform for its member organizations to develop common priorities, to advance marine research and to bridge the gap between science and policy, in order to meet future marine science challenges and opportunities

European Marine Board



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