

# MEETING

## Bridging Time Scales, Disciplines, and Generations to Better Understand the Arctic Marine Ecosystem

**Overcoming Challenges of Observation to Model Integration  
in Marine Ecosystem Response to Sea Ice Transitions;  
Sopot, Poland, 22–26 October 2012**

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Understanding and predicting how ecological and biogeochemical processes in the Arctic Ocean are affected by global changes require an integrated approach. Modifications in the Arctic system may feed back to the Earth's climate, and shifts in food web functions could affect the people who depend on marine resources. Connecting information obtained along the circum-Arctic, across disciplines and time scales as well as over generations, is thus key to gaining new insights on the interactions that drive the mechanics of change (Arctic in Rapid Transition Implementation Plan; <http://www.iarc.uaf.edu/ART/implementation-plan>). Such a framework is needed if the linkages between atmosphere-ice-ocean forcing, land-ocean exchanges, biodiversity, and the productive capacity of the Arctic Ocean are to be properly understood.

Within this context, the Arctic in Rapid Transition (ART) network (<http://www.iarc.uaf.edu/ART/>) and the Association of Polar Early Career Scientists (APECS; [\[apecs.is/\]\(http://www.apecs.is/\)\) organized a joint workshop hosted at the Institute of Oceanology of the Polish Academy of Sciences. The emphasis of the workshop was on building the capacity of the emerging generation of scientists that is progressively playing an increasing role in Arctic science planning. The event was entirely developed by early-career scientists and gathered 23 students, 25 postdocs, and 16 senior scientists from 12 different countries. The workshop greatly benefited from the support of the International Arctic Science Committee, the Prince Albert II of Monaco Foundation \(<http://www.fpa2.com/>\), and the Polish Academy of Sciences.](http://www.</a></p></div><div data-bbox=)

The overarching goal of the workshop was to bring together participants from different backgrounds to think beyond their scientific expertise through a series of seminars, practical sessions, and subgroup breakouts. Among other events, this included lectures on natural versus human-driven climate change and the geological evolution of the Arctic, the consequences of sea ice decline for marine biota and carbon-nitrogen fluxes, and the

importance of the human dimension in the past, present, and future Arctic environment. These were supplemented by focused training sessions on paleo and modern ice-ocean modeling, the coupling of physical-biological processes in numerical models, and the reconstruction of food web energy flows with inverse analyses.

A major challenge of the workshop was to develop interdisciplinary research papers that would integrate paleostudies with modern observations and predictive modeling. This activity resulted in the conception of eight manuscripts dealing with crosscutting aspects of Arctic change. The planned papers address, for example, the controlling mechanisms of the seasonal-to-decadal variability of the marginal ice zone, the role of Atlantic water inflow in historical and future heat budgets, the status and current trends in carbon cycling and food web efficiency, and the state and fate of terrigenous material delivery and related geochemical impact. The original papers resulting from workshop discussions are currently in the process of being fully developed and will be published in a thematic cluster in the international peer-reviewed journal *Polar Research* (<http://www.polarresearch.net/>).

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