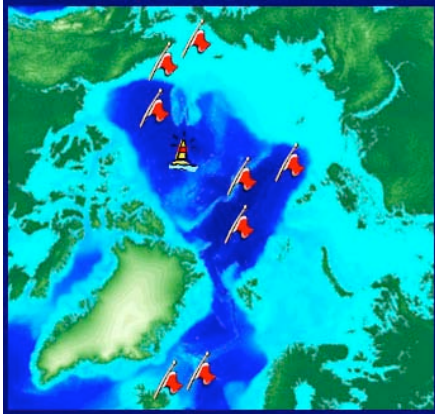
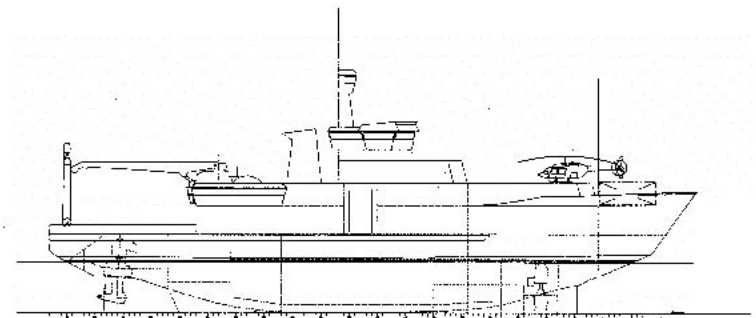


Current WHOI Arctic Studies



APOGEE: Autonomous Polar Geophysical Explorer
Beaufort Gyre Freshwater Experiment
Eddies in the Beaufort Gyre
Ice Capable Research Vessel
Arctic Ocean Model Intercomparison Project
Ice-Tethered Profiler
Arctic Observing Based on Ice-Tethered Platforms
Shelf-Basin Exchange in the Arctic
Arctic Tides

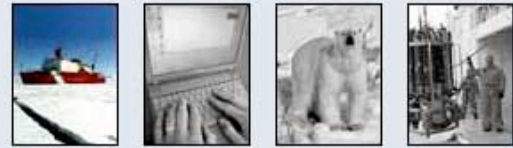


OUTBOARD PROFILE



Edge of the Arctic Shelf

Arctic West Summer 2003



The Expedition

Daily Update

Images and Facts

Science

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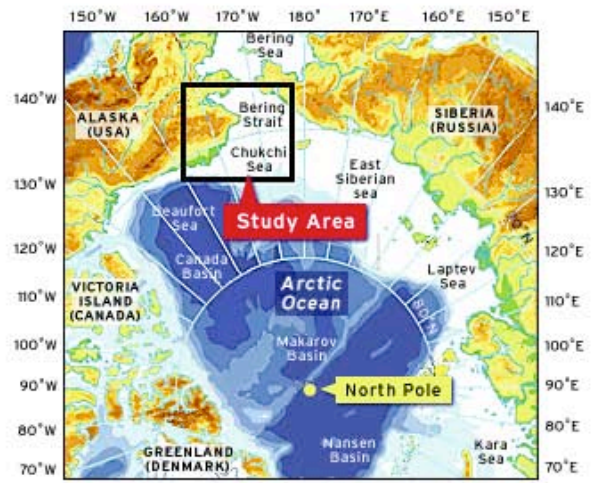
Current Position



[The Expedition - Overview](#)
[Overview](#) | [Objectives](#) | [Science Crew](#) | [The Ship](#)

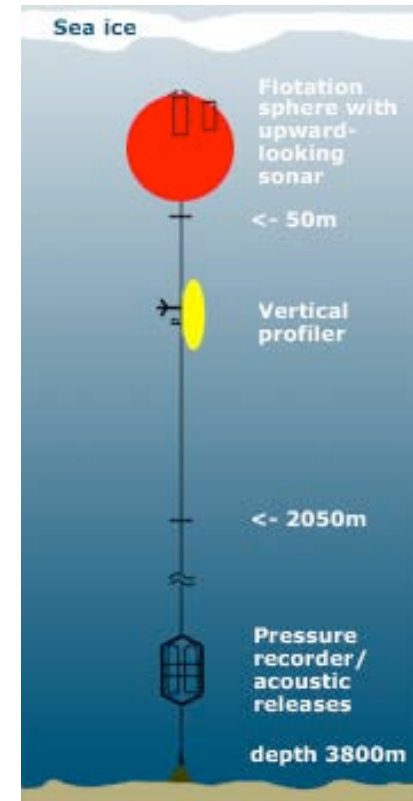
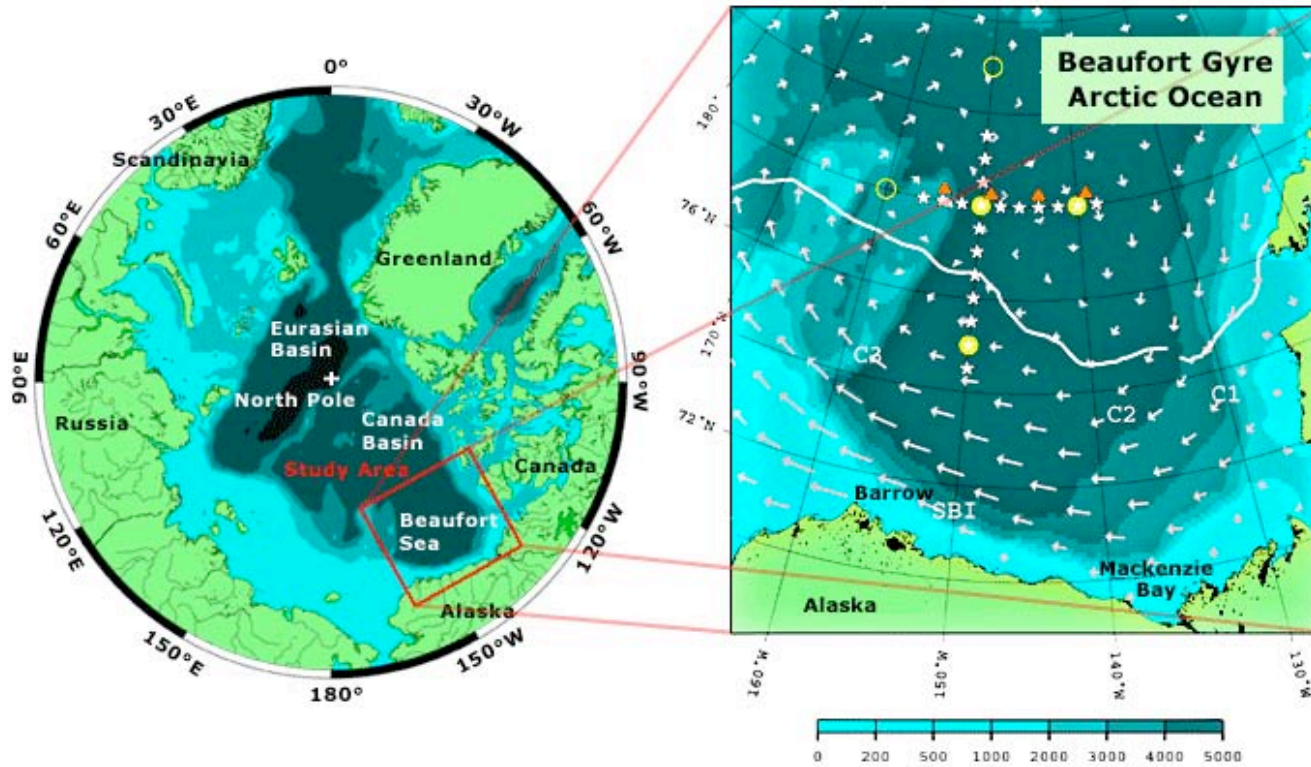
This cruise is our second year of oceanographic field work as part of the Western Arctic Shelf Basin Interactions (SBI) Experiment. To read dispatches from last year's cruise, check the [2002 website](#).

SBI is a multi-year, multi-disciplinary program sponsored jointly by the National Science Foundation's Office of Polar Programs and the High-latitude branch of the Office of Naval Research. The overall goal is to understand how the Arctic shelves communicate with the interior basin from a coupled physical--biogeochemical standpoint. The premise is that this system is in a delicate balance that could be upset by global change, which in turn could have important ramifications. These include possible melting of portions of the polar ice cover, changes in export of water to the global ocean, and alteration of the food web with significant consequences for native populations. From the physical oceanographic perspective the goal is straightforward: understand how shelf water is transferred, at the continental shelfbreak, to the interior basin in order to help maintain the "cold halocline" of the Arctic Ocean. This is the salty layer at mid-depth which shields the surface ice cover from the warm deep water. If this shield is weakened, there is more than enough heat contained in the underlying Atlantic-origin water to start melting the ice from below.

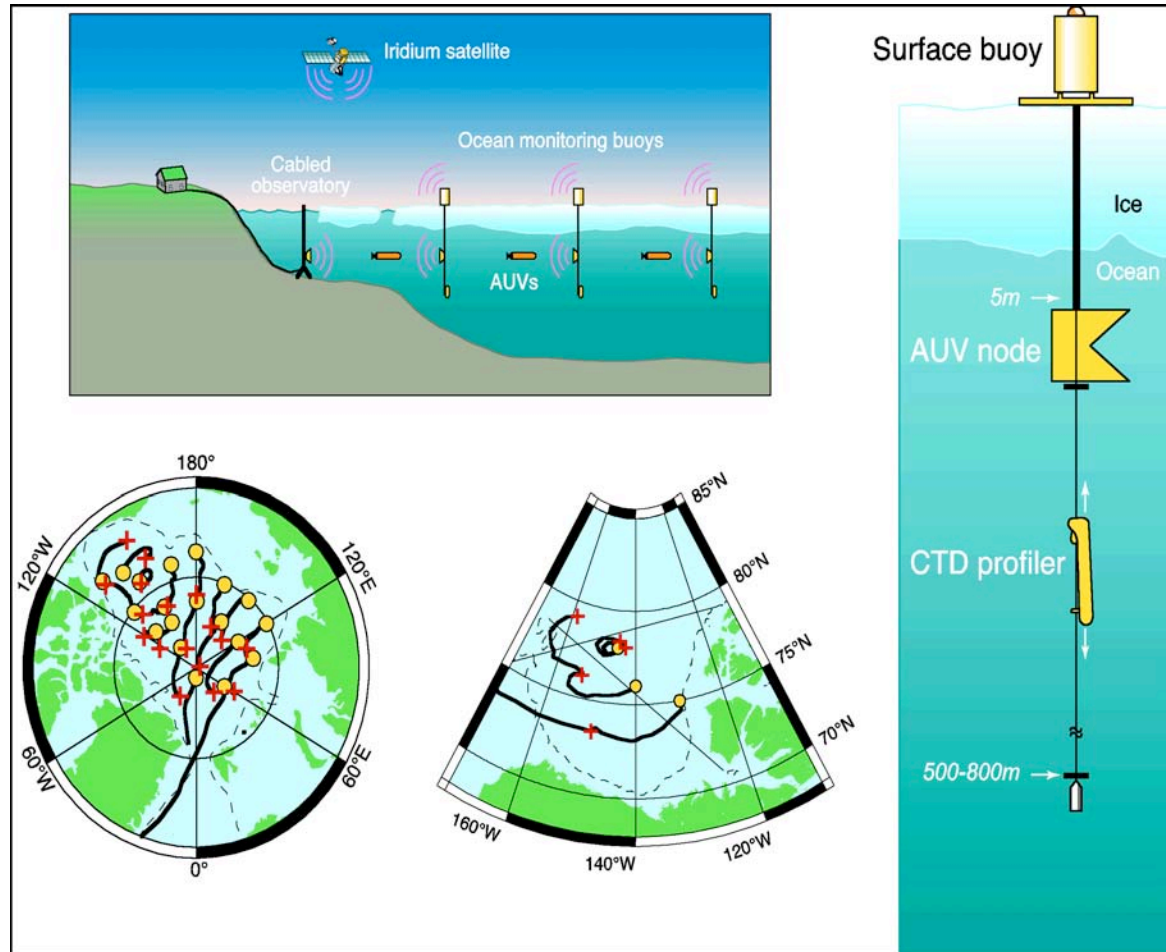


Polar projection map of the Arctic Ocean and expedition study area.

Beaufort Gyre Freshwater Experiment



Arctic Ocean monitoring system



ICE-TETHERED PROFILER

Overview

Technology

Field work

Data

Workshops

[Background](#) . [Investigators](#) . [Publications](#) . [Links](#)

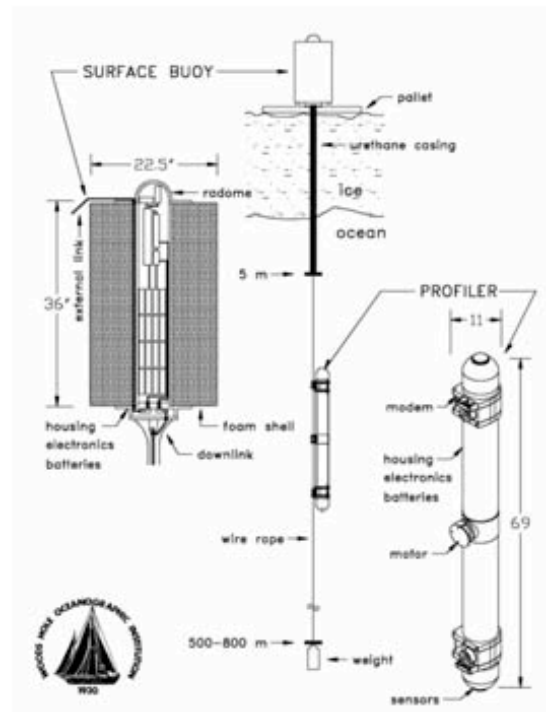
Background

An Ice-Tethered Profiling Instrument for Sustained Observation of the Arctic Ocean

John M. Toole, Andrey Proshutinsky, Richard A. Krishfield, Kenneth W. Doherty

Sea ice presents a significant impediment to sustained observation of the Arctic Ocean. Polar field operations are largely restricted to summer, and the more difficult and thus expensive logistics of ice-capable ships and aircraft severely limit human sampling. Furthermore, perennial sea ice precludes the use of many modern automated observational instruments such as profiling and/or acoustically-tracked expendable floats. As a result, the Arctic Ocean under the ice pack remains very poorly sampled in comparison to the temperate seas.

This observational gap represents a critical shortcoming, both for operational programs at high northern latitude and for the envisioned "global" ocean observing system. Building on the ongoing success of ice-tethered drifters that support multiple discrete subsurface instrumentation on tethers and the WHOI-developed Moored Profiler instrument capable of moving along a tether to sample at better than 1-m vertical resolution, we are presently engaged in the preliminary engineering design of an automated, easily-deployed Ice-Tethered Profiler (ITP) for Arctic study. Conceptually, the system will consist of a small surface capsule that will house a controller interfaced to an Iridium data telemetry unit and inductive modem, and support a conventional plastic-jacketed wire rope tether with ballast termination weight extending down 500 to 800 m into the ocean. A new variation of the WHOI Moored Profiler (in shape and size much like an ARGO float) will mount on this tether and cycle vertically along it. Communication between the Profiler and surface controller will be supported by an inductive modem (utilizing the wire tether).



[\[Larger image\]](#)

Ice-Tethered Profiler schematic.



Workshop Information

- Overview
- [Agenda](#)
- [Registration](#)
- [Logistics](#)
- [Organizers](#)

NSF Sponsored Workshop

Arctic Observing Based on Ice-Tethered Platforms

June 28 to 30, 2004

At the Woods Hole Oceanographic Institution, Woods Hole, MA

Overview

In order to effectively address the highly complex arctic environmental science questions of the 21st century, scientists, resource managers, decision makers, and interested citizens will need access to more detailed and more frequent observations. This new generation of arctic information could be obtained in part by means of an observing system based on ice-tethered drifting platforms. In many cases, entirely new approaches to Arctic data gathering will be required, as well as advances in areas such as Arctic acoustic navigation, communication and tomography, automated unmanned vehicles, and remote sensing.

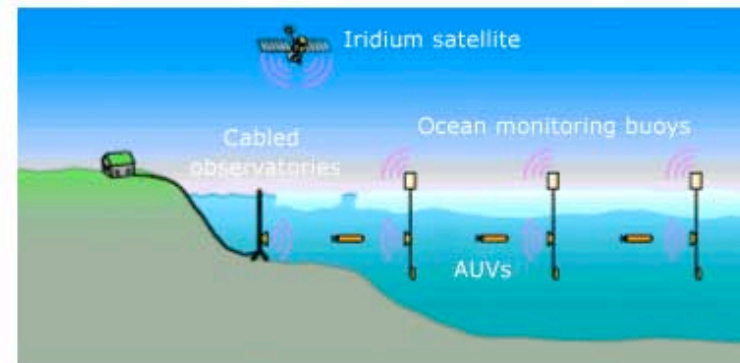
Organization

The present workshop is being convened to bring together a group of experts to evaluate and develop the ice-tethered observing system concept and to contribute significantly to the design and implementation of a full Arctic Ocean observational array. It is expected that this workshop will push the boundaries in environmental measurements and telemetry capabilities, as well as the collection, integration, analysis, synthesis, access, and long-term preservation of the observations. The three day workshop will focus on the development of an integrated Arctic observing system capable of measuring oceanic, atmospheric, and sea ice parameters from the ice-tethered platform. Each day/session will consist of three parts:

- Presentation of ideas
- Group discussion
- Coordination of efforts, system improvements, plans and recommendations.

Details

The meeting will begin daily at 9:30 a.m. and adjourn at 5 p.m. with a lunch time from 12:00 to 1:30 p.m. Coffee, fruits and pastries will be provided at 8:00 a.m. and 3 p.m. We will also have a shuttle bus from the hotel to the Quissett campus main parking lot depending on participant's needs. For more information on directions and hotel accommodation please visit the [Logistics](#) page. Please register for the meeting and submit your abstract on the [Registration](#) page.



Schematic of an Arctic observing network consisting of ITPs, AUVs and cabled observatories.