SCICEX SAC Meeting
24 April 2008

Ray Sambrotto/ LDEO

Water sampling – 2 basic approaches

- Underway, continuous sampling via autonomous sensors
  - No on-board processing
  - No sample storage
  - Sensors require periodic calibration by manufacturer
- Discrete water samples
  - Great variety possible
  - Some required to field calibrate autonomous sensors
  - Some need immediate (<24 hr.) processing
  - Others can be stored in various ways (poisoning, -20˚C, -80˚C)

Autonomous, hull mounted sensors

Sample	**Purpose**
Temperature	Core water property
Salinity	Core water property
Oxygen	Water mass tracer; Biological production and recycling
Chl a	Phytoplankton abundance
spectral light absorption & attenuation	Chemical and biological properties (CDOM; plankton composition)

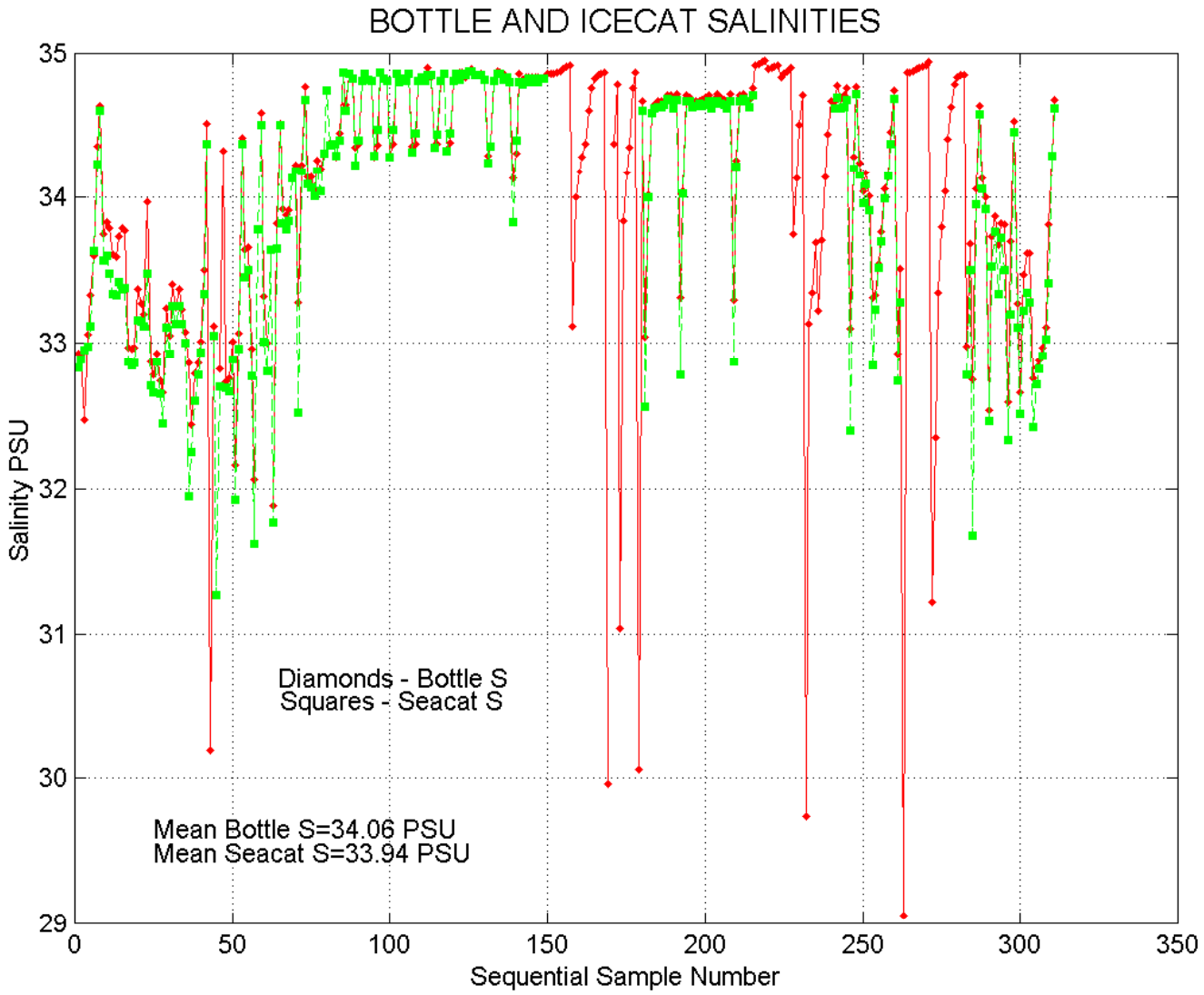
Discrete water samples - 1

Sample	Purpose	Size	Collection procedure	On board processing	Storage requirements
Salinity	Core water property; Calibrate salinity sensor on CTD	200 ml	Rinse, fill and cap a 200 ml glass bottle	Can be stored for shore based measurement or measured on board with an Autosal	Room temperature
Oxygen	Water mass tracer; Biological production and recycling; Calibrate O_2 sensor on CTD	120 ml	Rinse and fill 120 ml flask	Add reagents, follow Winkler titration procedures	Room temperature covered with water for up to one day prior to titration
Chl *a*	Biological variable; Calibrate Chl *a* fluorometer on CTD	500 ml	Filter 500 ml; place filter into 10 ml 90% acetone	Can be stored for shore based measurment or measured in an on-board fluorometer	-20° C, must not thaw
Nutrients (PO_4, NO_3, SiO_2)	Water mass tracers; Biological production and recycling	50 ml	Rinse, fill and cap a 50 ml plastic tube	Quick freeze as soon as possible at –20° C	-20° C, must not thaw

Discrete water samples - 2

Sample	Purpose	Size	Collection procedure	On board processing	Storage requirements
microplankton & bacterial genomics	Biological diversity & abundance	5-10 liters	Filter water through cartridge	None	-80° C, must not thaw
Inorganic carbon system	Carbon fluxes and biological production & recycling	250 ml	Rinse, fill and add $HgCL_2$ (a poison) to plastic bottle.	None	Room temperature
Oxygen-18	Determine fresh water sources	100 ml	Rinse, fill and cap 100 ml glass bottles	None	Room temperature
SF6, CFCs	Age information; Calculation of anthropogenic CO2; Water mass tracer	1-2 liters	Rinse and fill a 250 – 500 ml glass stoppered bottle, insert glass stopper, place the bottle in a jar and fill the jar with sample water	None	Refrigerated at a temperature of 0-2° C
Helium isotopes	Age information; Water mass tracer	50 ml	Flush a 50 ml copper tube with the sample and crimp the ends of the tube with the water flowing. Rinse the crimped ends with fresh water.	None	Room temperature
Tritium	Age information; Water mass tracer	500 ml	Fill a 500 ml bottle without rinsing and cap.	None	Room temperature
Iodine-129	Circulation time of Atlantic water	1 liter	Rinse, fill and cap a 1-liter plastic bottle	None	Room temperature

Problems of spatial consistency for calibrating autonomous sensors

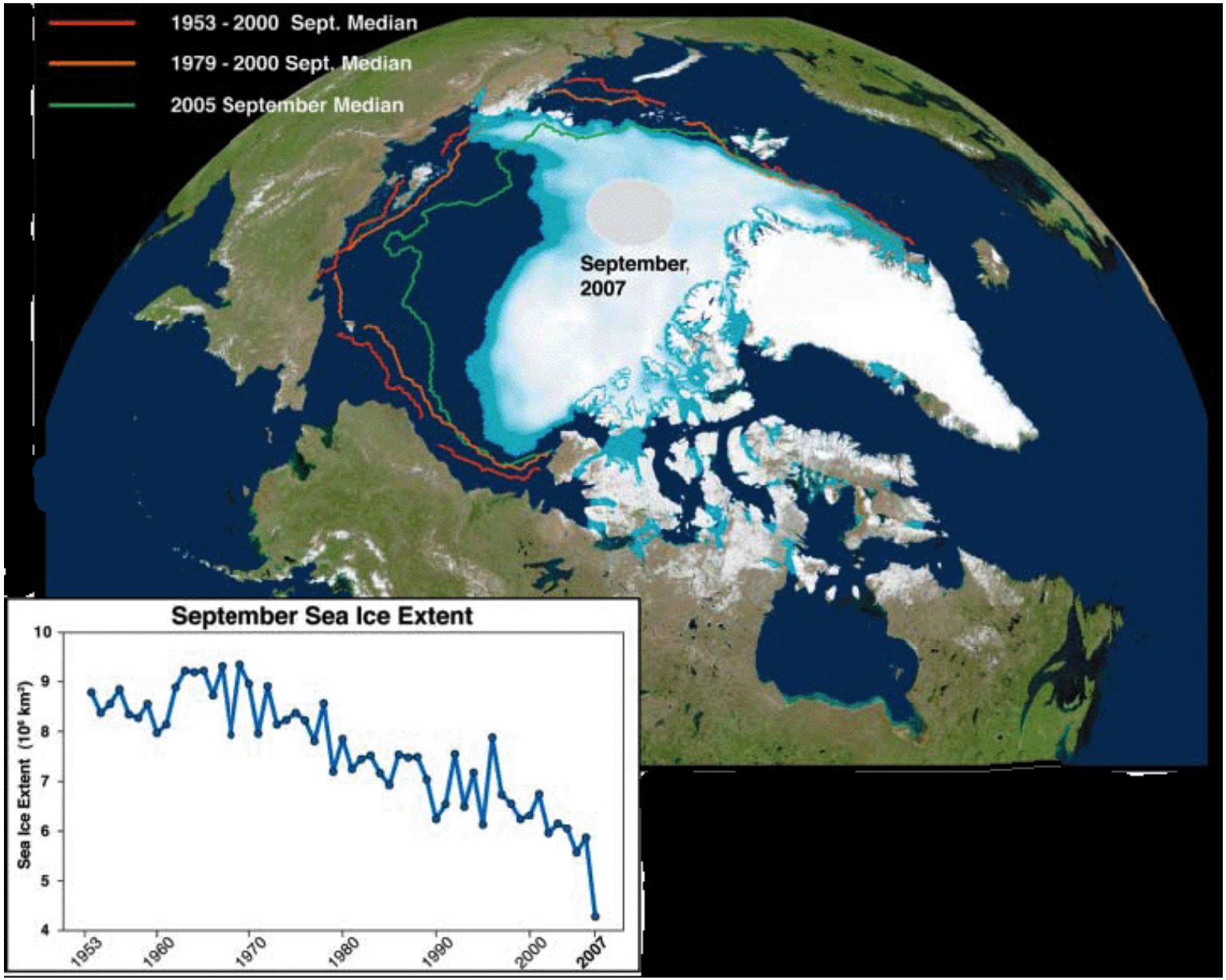


Water sampling

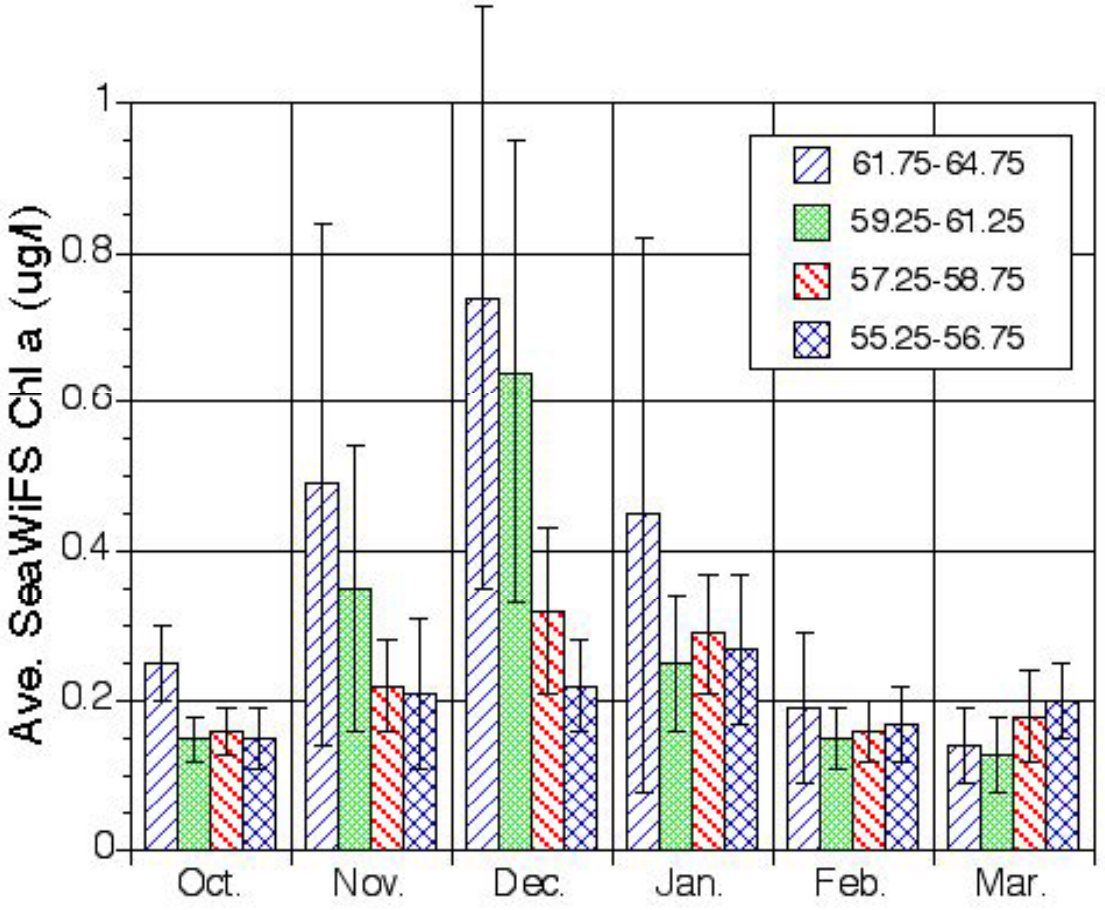
Torpedo room lab.

On-board sample processing

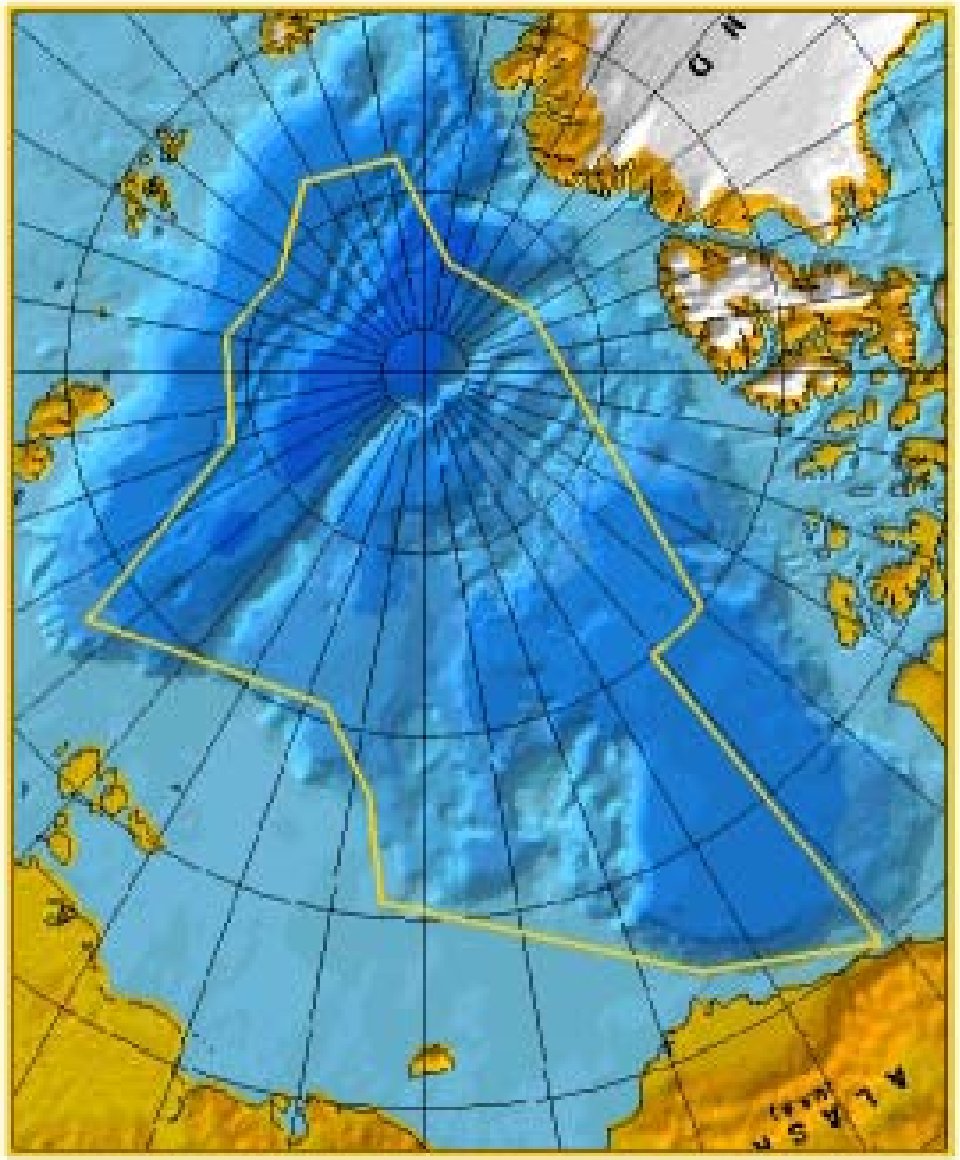
September sea ice extent



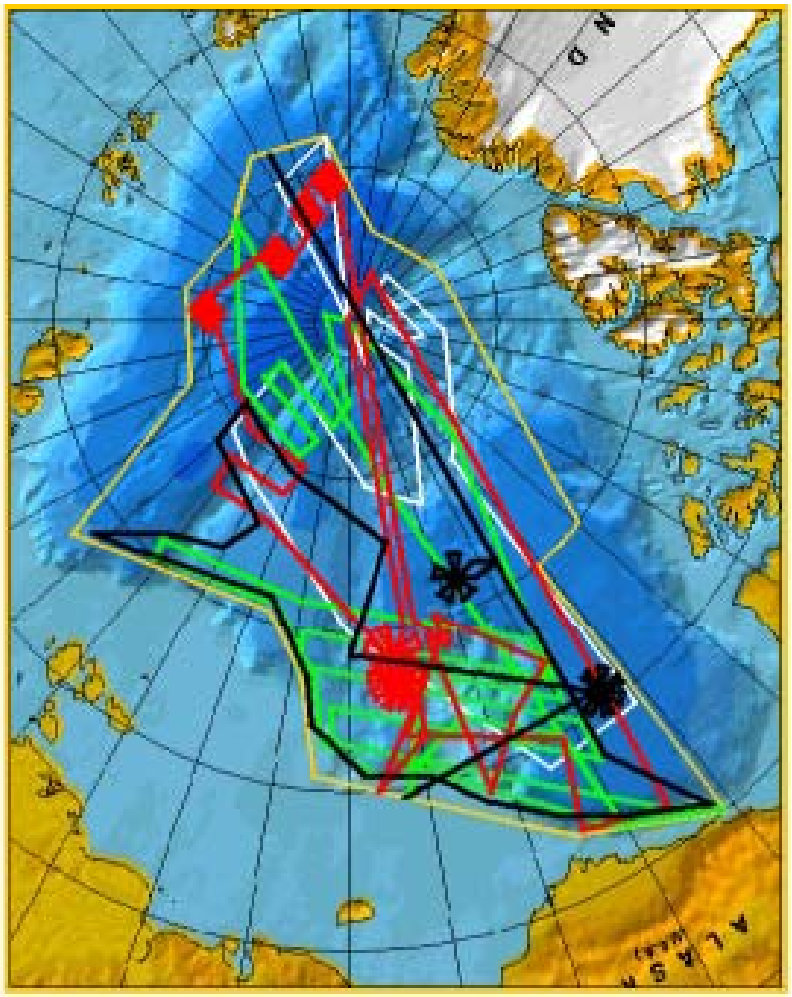
Chl *a* along Marginal ice zone along 170˚W (Sambrotto and Mace, 2000)



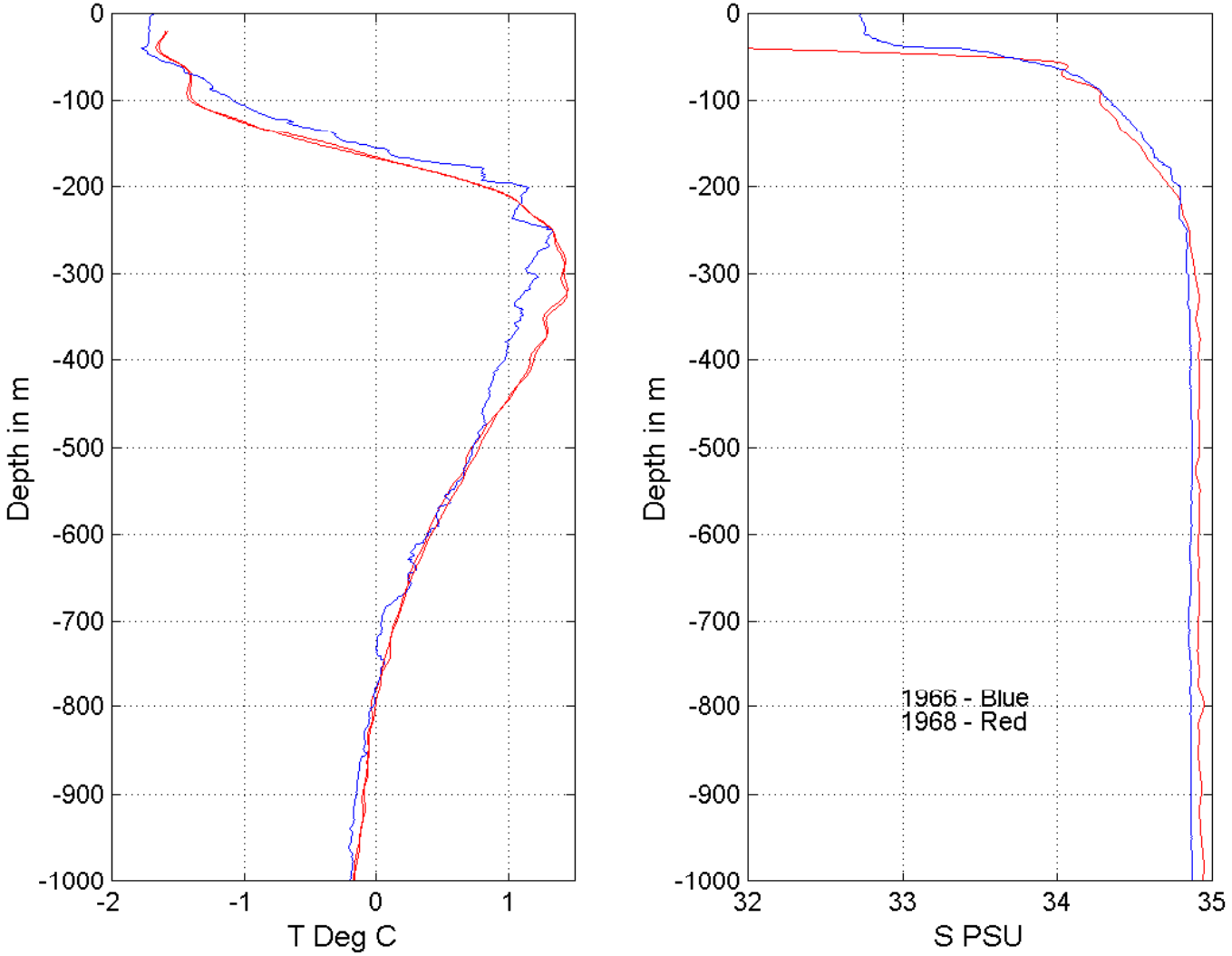
SCICEX operational region



Composite 1993-197



Characteristic T, S profiles near the North Pole



Old LDEO SCICEX page

SCICEX (Scientific Ice Expeditions)

Collaboration between the US Navy and civilian scientists for environmental research in the Arctic

SCICEX is a 5 year program (1995-1999) in which the Navy has made available a Sturgeon-class, nuclear powered, attack submarine for unclassified science cruises to the Arctic Ocean. Beginning with a test cruise in 1993, civilian scientists together with Navy personnel have collected a variety of information on the geology, physics, chemistry and biology of this critical region. The unmatched mobility of submarines in ice covered oceans has allowed data to be collected from over 100,000 miles of shiptrack in the Arctic providing samples from some regions that have never before been visited. The purpose of this page is twofold; 1) to make public information about the program and some of its accomplishments; and 2) to provide for exchange of data collected during the program by the scientist involved.

(The operating area for the program and the shiptracks for the 1993, 1995, 1996 and 1997 cruises are shown in the figure below.)

Recent additions to page

Program Information:

- SCICEX Science Working Group
- SCICEX Publications
- SCAMP Seafloor Mapping And Characterization Pods
- SCICEX 2000 Workshop
- SCICEX Participant List

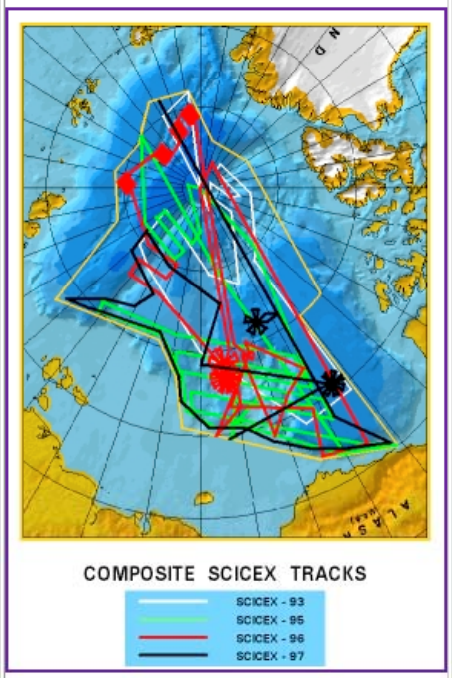
Summaries of project abstracts

Cruise Info.

- SCICEX/93 USS Pargo
- SCICEX/95 USS Cavalla
- SCICEX/96 USS Pogy
- SCICEX/97 USS Archerfish
- SCICEX/98 USS Hawkbill
- SCICEX/99 USS Hawkbill

Data

Recent Results



Advantages of a content management based solution

- Easier to manage & change dynamic content
- Do not need web designer for basic functionality
- Tools to control access; can create sub-pages for committees, working groups, etc.
- LDEO group has 4+ yr. experience with this system

Proposal to: NSF/ ONR:

Web Functionality for SCICEX: Phase 1 - Collaboration Support and Preliminary Data Organization

PIs: Raymond Sambrotto (sambrott@ldeo.columbia.edu); Dale Chayes (chayes@ldeo.columbia.edu)
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61 Rt. 9W; Palisades, NY 10964

Duration: 3 years; Start: May 1, 2008
Cost: $10,407; 10,812; 11,238 ($32,456 total)

Overall Objectives:

- Implement a coordinated set of web-based tools to facilitate the work of the SCICEX science advisory committee (SAC), operational Navy and funding agencies.

- Provide a front end Web presence for the SCICEX program that includes public access to existing SCICEX related assets and community interaction on a committee-directed basis.

- Work with NSIDC to develop the data archive in a stepwise fashion.

Approach:

i. *A web-based collaboration environment for the SCICEX SAC* based on the open source Plone content management system (www.plone.org) that includes:

- Password protected (non-public) work areas for the Science Advisory Committee and other working groups as appropriate.
- Email list servers for SAC and other working groups.
- Management of list servers and user access listt.
- Training and advice to the SAC on the use of the collaboration environment and the tools available.

ii. *A content management system for public access and interaction* that includes:

- SCICEX program information.
- SCICEX Outreach and Community Awareness opportunities.
- Links to existing SCICEX data.
- RSS (Real Simple Syndication) service for public content.
- A public list server for SCICEX news.
- Migration of existing SCICEX content at Lamont & elsewhere to the new server.

iii. Administrative support for the new web site and it's associated list servers including:

- Web site, server, hardware maintenance and security patches and updates as necessary.

- Automatic checking for broken links and (manual) repair.

- User administration and assistance for work areas.

- Management of email list server(s).

- Limited technical assistance with adding new content (data, SCICEX bibliography, etc.).

iv. Organization of existing SCICEX data and resources to make them more readily available. This is not data management but we will integrate our efforts with those of NSIDC.

v. Plan for potential future enhancements to the SCICEX web resources in collaboration with NSIDC that may include:

• Development of an index of SCICEX data still under proprietary hold.

• Ingest existing data into the Lamont Marine Geosciences Data System (MGDS).

• Creation and serving of GIS shape files for use in other applications.

• Implementation of Web Feature Services (WFS), Web Map Services (WMS), and Web Coverage Services (WCS) in the MGDS infrastructure for SCICEX data.

• Implement access to SCICEX data through a web-based GIS similar to the current shore-side Healy mapserver that is based on the Minnesota Mapserver.

• Addition of new content as it becomes available.

3 Personnel and Budget Justification:
Raymond Sambrotto is a Doherty Research Scientist at Lamont-Doherty (N/C).

Dale Chayes is a Lamont Research Engineer in the Instrument Lab at LDEO (0.25 mos./ yr.).

Bob Arko is a Lead Systems Analyst/Programmer at LDEO. (0.25 mos./ yr.).

One round trip to Washington DC is budgeted in order to provide a short tutorial for the committee members on the use of the collaboration environment and to review community needs. Small amounts are budgeted to cover materials and supplies (such as back up media), communications, shipping and support costs.

Plone features

1. Inline editing 2. Working Copy support 3. Link and reference integrity checking 4. Automatic locking and unlocking 5. Easy collaboration and sharing 6. Versioning, history and reverting content 7. Upgraded visual HTML editor 8. Powerful workflow capabilities 9. Flexible authentication back-end 10. Full-text indexing of Word and PDF documents 11. Collections 12. Presentation mode for content 13. Support for the search engine Sitemap protocol 14. Support for multiple mark-up formats 15. Wiki support 16. Automatic previous/next navigation 17. Rules engine for content 18. Auto-generated tables of contents 19. Portlets engine 20. Professional support, development, hosting & training	1. Live search 2. Outstanding multilingual content management 3. Time-based publishing 4. Human-readable URLs 5. Easy-to-use, powerful graphical page editor 6. Flexible navigation and always-updated site maps 7. Resource compression 8. Powerful caching proxy integration 9. Drag and drop reordering of content 10. XML exports of site configurations 11. Localized workflow configuration 12. Adjustable templates on content 13. Powerful standard content types 14. Content is automatically formatted for printing 15. Standards-compliant XHTML and CSS 16. Accessibility compliant 17. Pervasive RSS feed support 18. Automatic image scaling and thumbnail generation 19. Rich ecosystem of free add-on products 20. Cross-platform 21. Comment capabilities on any content 22. Microformat support 23. Simple installer packages for multiple platforms 24. WebDAV and FTP support 25. In-context editing 26. "Hot backup" support 27. Cut/copy/paste operations on content