

Meeting Summary
Submarine Arctic Science Program
Science Advisory Committee (SAC) Meeting
14-15 February 2013
Mandex, Inc, 4001 N. 9th Street, Suite 106, Arlington, VA

Attendees

SAC members attending:

Jackie Richter-Menge (Chair) – Cold Regions Research and Engineering Laboratory
Ray Sambrotto – Lamont-Doherty Earth Observatory
Bill Smethie - Lamont-Doherty Earth Observatory
Larry Mayer – University of New Hampshire
Walt Meier – National Snow and Ice Data Center
Terry Tucker – Terry Tucker Research

Interagency Committee (IAC) members attending:

John Farrell – US Arctic Research Commission
Erica Key – National Science Foundation
Martin Jeffries – Office of Naval Research
CDR Warren Fridley – OPNAV N87 - Office of the Chief of Naval Operations
Jeff Gossett – Arctic Submarine Laboratory (by phone)

Other Attendees:

Scott Harper – Office of Naval Research
Florence Fetterer – National Snow and Ice Data Center
George Newton – US Arctic Research Commission
Paul Bienhoff – Johns Hopkins Applied Physics Laboratory
CAPT Joe Brenner – OPNAV N2/N6 - Navy Task Force Climate Change
Kathy Crane – National Oceanic and Atmospheric Administration
CDR Angie Walker – OPNAV N2/N6 - Navy Task Force Climate Change
Ann Windnagel – National Snow and Ice Data Center (by phone)
Pablo Clemente - Colon – National Ice Center

Day 1: 14 February 2013

Introduction and Overview

- Chair, Jackie Richter-Menge, reviewed the agenda and objectives of the meeting. The primary aims of the meeting were to:
 - Review the State of SCICEX
 - Assess the status of experiments and data collected on the SCICEX 2011 science accommodation mission (SAM)
 - Develop a detailed summary of the steps involved in collection, processing and delivery of data collected on a SAM

- Jackie briefly reviewed the history of the SCICEX program from the dedicated missions of the 1990s to the change in the late 1990s to SAMs. The primary challenge to

the SAM is the lack of advanced notice of a mission and, hence, the inability for advanced planning on a mission-by-mission basis. This problem was addressed by the SAC by the development of a science plan that recommended specific measurements and tracks. ASL would consider the type of transit and determine whether a SAM would be feasible.

- A key point in the SCICEX Science Plan is that that any data collected is better than none. With this in mind, current SAC objectives are to maximize the contribution of SCICEX and to provide guidance to the IAC and the Navy.

State of SCICEX

- Tim Boyd was remembered as an outstanding polar scientist, an open, unselfish colleague and a totally dedicated family man. Tim was a key member of the SAC and his hard work, insight, great sense of humor, and contributions to SCICEX and the Navy cannot be replaced.
- Jackie welcomed new committee members Larry Mayer and Walt Meier. Larry is Director of the Center for Coastal and Ocean Mapping at the University of New Hampshire. Walt is a sea ice satellite remote sensing specialist at the National Snow and Ice Data Center.

SAC Perspective on the State of SCICEX – Chair Jackie Richter-Menge

- Support of the SCICEX program was acknowledged:
 - USARC for logistics support for SAC meetings and the publication of the SCICEX Phase II Science Plan.
 - ONR for research project support and support for NSIDC data assimilation and the web site.
 - US Navy for support of ASL and providing the platforms for SAMs
- Data Management: NSIDC is doing an excellent job of managing the SCICEX data archive and hosting the SCICEX website
- ICEX 2011:
 - First SAM since 2005
 - Primary objective of mission: Data collection protocol
 - Data has yet to be posted on the NSIDC website
- Future SCICEX data collection:
 - ICEX 2014 provides the next known opportunity to plan for data collection.
 - The lessons learned from ICEX 2011 will be applied, with the primary lesson being that communication between the participants supporting data collection (e.g. SCICEX SAC, ASL, onboard personnel, etc.) is the key
- Recent efforts to promoting value of SCICEX to the Navy:
 - USARC letter to RADM Bruner (2/10/12).
 - ONR (Jeffries) flag briefing.
 - Opportunity with RADM Klunder, Chief of Naval Research, Arctic Summit, held 11 Dec. 2012

- Recent examples of value to scientific community:
 - NASA Icebridge Science Team meeting (Jan 2013) – topsounder draft data remains the gold standard for verification of satellite derived ice thickness
 - Arctic Observing Summit 2013 – white paper being prepared

SAC Concerns of the SCICEX program

- Overall – “use it or lose it”
- Need to demonstrate rapid access to quality SAM data
- Need to look for opportunities to engaging operational Navy to ensure the sustained and, perhaps, increased support for SCICEX:
 - Demonstrating value of program
 - Improving safety and efficiency of operation
 - Keeping abreast of rapidly changing environment
 - Increased Arctic presence
- Are there SAM opportunities other than submarine activities associated with ICEX?
- Decreasing resources – ASL budget down
- SCICEX is currently a non-PI driven data collection program.
 - Requires sustained support for certain equipment (e.g. sample bottles, chemical agents) and initial data processing.
- Discussion followed regarding operational Navy support of SCICEX in tight budget times.
 - Current budget is extremely tight; Navy watching every dollar.
 - Navy needs to see that an operation will save the US Treasury a like amount of funds or that it is necessary to protect the U.S. This requirement is a challenge for the SCICEX program to address
 - ASL supports the program and allocates SAM time even though SCICEX is not currently recognized as high value to operational Navy
 - Priority operational challenges the submarine force faces in arctic operations are engineering and technical, and these issues are typically classified.
 - Suggests need to strategically identify issues of interest when considering opportunities to discuss the importance of program to very high levels that define tasking to the Navy
 - National security a possible avenue?

IAC Perspective on SCICEX – Martin Jeffries

- ONR support of SCICEX activities:
 - NSIDC – web site and archive of previous SCICEX data
 - ICEX 2011 support:
 - LDEO water sampling (Smethie and Sambrotto)
 - XCTD testing (Boyd)
 - Recommended award for joint Johns Hopkins APL and NUWC digital topsounder recorder as answer to collect original raw topsounder data
 - Recommended award to Boyd for continued XCTD purchases and Royal Navy; collaboration is currently on hold, while investigating how best to proceed

(Update as of 05/20/2013: ASL will be responsible for continuing work to collect XCTD data and evaluate instrument performance. Action still required on the part of ONR to identify party responsible for data QA/QC.)

ASL Perspective on SCICEX – Jeff Gossett

- ICEX 2014
 - At least one submarine and 2 week camp
 - Opportunity to collect baseline data, to include:
 - XCTD; some performance issues remain to be resolved
 - Water samples
 - Topsounder data
 - Bathymetry
 - Hull mounted CTD
 - Supporting navigation data
- ASL concerns about Interagency Committee (IAC):
 - Last meeting of IAC was 18 months ago.
 - IAC is not aware of other opportunities because meetings have, to date, been unclassified; suggest holding a classified meeting in the near future
 - Need to make decisions on SCICEX funds:
 - Funding ASL costs – meeting attendance, plan/execute SCICEX SAMs, prepare data for release
 - Science costs – SAC travel, SAC work on SCICEX issues, process data/water samples, purchase XCTDs
- ASL will need funds to sustain SCICEX effort
 - It was pointed out that the MOA indicates cost will be shared and suggested that this is a topic that should be taken up by the IAC

NSIDC Perspective on SCICEX – Florence Fetterer

- Steps from SAM to Archive:
 - Data collection
 - Processing and transition to NSIDC
 - Archive available to scientists
- Accomplishments:
 - Updates to web site – redesigned inventory page
 - 2700 hits on the web site in 2012
 - All data on Lamont Doherty Earth Observatory SCICEX site has been transferred and downloaded to NSIDC site
 - Identified data gaps
- NSIDC needs:
 - 2011 SAM data and navigation data; none has been posted – what is available?

2011 SCICEX Data: Status

- ASL Report – Jeff Gossett.

- XCTD data was delivered to Tim Boyd; while Tim prepared a report on these data, they have not been posted on the NSICD site
- Transit data – about 150 hours of transit data were collected
- A CD contains topsounder, bathymetry, hull CTD and navigation data for the transit tracks. (Note: Previously (last meeting), the SAC understood, perhaps incorrectly, that topsounder data was not retained by the Common system)
 - The CD will be delivered to NSIDC with any available documentation for data
- Issues were brought up regarding usability of topsounder data and quality of CTD data.
 - Suggested that Mark Wensnahan evaluate topsounder data.
 - Hull mounted CTD will require proposal to evaluate and process.
- XCTD – Jackie Richter-Menge (based on T. Boyd report)
 - 7 of 8 probes launched (4 additional failed pre-launch test) produced generally successful profiles.
- Water samples – Bill Smethie and Ray Sambrotto.
 - New boats, new sampling systems
 - Presented opportunity to assess sampling and quality with limited training of crew
 - Samples were generally acceptable
 - More training would improve quality and quantity
 - Any available data will be delivered to NSIDC

ONR SCICEX Brief (During Lunch)

- Martin Jeffries presented a briefing on SCICEX prepared for flag officers.
 - Briefing showed major findings by SCICEX.
 - Demonstrated that SCICEX data helps ONR meet its goals.
 - Discussion ensued regarding whether the briefing should be classified and presented to high-level Navy commands.

SCICEX Support Requirements

A working session was held to define needs associated with routine collection, processing, delivery and distribution of SCICEX data. Activities included:

- Hydrography – Gossett and Richter-Menge
- Water samples – Sambrotto and Smethie
- Ice draft – Meier and Tucker
- Navigation and bathymetry – Mayer, Newton, Farrell

Steps in the process (as well as resources required) addressed by each activity were:

- Need for TEMPALT
- Preparation for SCICEX data collection opportunity
 - Required equipment (e.g. sample bottles, chemicals, XCTDs, etc.)
 - Calibration
 - Training

- TEMPALT delivery and installation
- Data collection
 - Descriptive data taken on board (e.g. logs)
- Transfer of data/samples from boat to ASL
 - Assign classification level
 - Raw, unclassified data to NSIDC
- Transfer of data/samples from ASL to lab for processing (e.g. water samples will normally be transferred directly from the sub to the lab)
- Data/sample processing and QA/QC
- Transition to archive
- Alert community of data availability

Day 2: 15 February 2013

Summary of Yesterday's Meeting by Jackie Richter-Menge

- Overall – SCICEX is at a “collect (versus ‘use’) it or lose it” point
- Strong evidence of user support:
 - Validation of satellite-derived ice thickness
 - Bathymetry fills existing gaps
 - Key contributor to AON/SAON

Opportunities to increase USN Support

- Jeffries to brief Oceanographer of the Navy with Task Force Climate Change
- Make effort to identify key personnel within OSD responsible for tasking operational Navy
- CNO is interested, Roadmap of the Arctic will be updated
- Point out that an existing resource is being utilized to achieve objectives

Summary of State of SCICEX

- ONR award for digital topsounder recorder
 - Potential to shorten turnaround time
- Agreed to hold IAC meeting this spring
 - Classified level discussions
 - Support for SAMs on direct transits
- Historic data
 - Actions to continue recovery
 - Find and include cruise summaries for users
 - Recovery is close to completion
 - If SCAMP cannot be recovered, it will be removed from table

SCICEX 2011 Review

- Raw data from ICEX2011 is on its way to NSIDC

- Added description of topsounder data
- Water sample and XCTD data headed to NSIDC
- Mark Wensnahan to be engaged for quick look at topsounder data
 - Discussion ensued regarding quality of topsounder.
- Consult with Robin Muench to determine who might be recruited to examine XCTD and CTD data.

SCICEX Resource Requirements

- Good progress made on outlining resource needs for SAM measurements
- Richter-Menge to compile and use as basis of resource requirement summary

Discussion of Navy Interest in Arctic

- Mission requirement for Arctic Domain Awareness has 2 focus areas
 - Distribution of ships
 - The environment
- SCICEX should be pitched as contributing to understanding future Battlespace Environment
- CNO is very interested in the Arctic and Arctic climate change
 - Near-term – out to 7 years
 - Effects of changing Arctic on weapons
 - Lack of resources limit what can realistically be done
- Arctic Security Forces Roundtable: Opportunity?
 - Exists because Arctic Council excludes security discussions
 - Includes Arctic nations
 - Next meeting will focus on maritime awareness
 - Flag level

SCICEX 2014

Recommendations for Measurement Strategies

- Topsounder
 - Independent recorder will likely not be available for 2014
 - Keep topsounder operating continuously while under ice
 - Assure proper gain setting
 - Use constant sound speed value (4712 ft/s) to avoid negative values
- Water samples
 - Collect samples at ice camp for calibration
 - Training – Develop new, improved operating procedures – written and perhaps video
 - Improve face-to-face training – perhaps run through protocols at Scripps
 - Develop sampling schedule and get to ASL by June
 - May want vertical profile using staircase depths
- XCTD

- Martin Jeffries to resolve with SAMS whether they will continue work on XCTD issue (Update as of 05.20.13: ASL as taken over the responsibility for continued investigation of the XCTD performance)
- Determine if other UNOLS institutions, ships are using XCTDs
- Failed XCTDs (pre-launch) can be returned to Sippican
- ONR to send Tim Boyd's report to Florence and Ann
- Bathymetry
 - Larry Mayer will examine quality of SCICEX 2011 bathymetry data and develop recommendations for 2014

History of SCICEX by George Newton

- George was funded by SPAWAR in 1984 to determine who was active in Arctic science
 - Spurred by known Russian military interest in Arctic
- Determined that US Navy had little knowledge of the Arctic
- At the same time, the Soviet Union was headed towards collapse
- Navy had issues with classification and science community was distrustful of Navy
- In 1989, George initiated water samples being collected on sub for Peter McRoy, UAF
 - Samples were spoiled in shipping (delayed by response to Exxon Valdez)
- Initiated high level talks with Navy about using submarine for science
- In 1990, 1991 the depressed Russian government offered to rent a Russian submarine to US scientists
 - US decided this was not a feasible idea
 - OP-02 ADM Paul Ryan decided that using US Navy sub for science would preserve Navy capability in Arctic
 - Garry Brass of USARC formed committee led by Marcus Langseth, LDEO, to set up 1993 cruise on USS Pargo
 - First MOA between Navy, NSF and NOAA was drafted in 1994
 - Resulted in 5 SCICEX cruises between 1995 and 1999

Parting Discussion on Future of SCICEX

- George Newton thinks having Science Plan is good step to maintaining SCICEX
- Support for 2011 SAM is a positive indicator of USN support
- It will be fortunate if ICEX 2014 occurs due to current budget climate
- A real challenge is getting CNO and senior command to be convinced that Arctic is a high priority and to commit increased submarine time to the collection of data
- Another major challenge in educating USN on the benefits of SCICEX is constant mobility of Navy Officers
- Need to show the Navy that other agencies are contributing funds
- Jeff Gossett – SAM possible in 2 scenarios
 - Submarine transiting Arctic – not known to scientists in advance
 - In conjunction with ICEX camps – 3 years, can plan and get 1 or 2 transits and possible other non-SCICEX participation at ice camp (e.g. NASA, CRREL, NRL)
- Majority of boats going to Arctic will be 688I or Virginia class

- Make clear that SCICEX 2011 was a procedure shakedown for topsounder, CTD, XCTD, & water sampling for boats that had not previously used for SCICEX
 - This should be noted on NSIDC website