

USCGC Healy Evaluation for SBI-2004

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on behalf of the SBI Science party



Shelf-Basin Interactions-2004

- Much of May-October 2004
- Process (2) & mooring recovery (1) cruises + Alpha Helix
- Up to 51 science party berths occupied
- Multiple coring, grabs, CTD, nets, video and optics devices, mooring recovery, in-situ pumps
- Off-ship work for ice and sediment trap deployments and recoveries



Shelf-Basin Interactions-2004

- Public outreach accommodated
KNOM radio, News Hour with Jim Lehrer, BBC, US News and World Report; links or streaming files available at <http://sbi.utk.edu>
- Community representative from Barrow
- Ship tour and reception for
Diomedede Village
- Two K-12 teachers participated with
web-based outreach; mooring cruise also
had web-based log
- Two successful search and
rescue operations near
Shismaref and Nuiqsut



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Vice Admiral Harvey E. Johnson Jr.
Commander, Coast Guard Pacific Area
Building 51-6
Coast Guard Island
Alameda, CA 94501-5100
Ph. 510-437-3522; email: HJohnson@d11.uscg.mil

Dear Vice-Admiral Johnson:

We are writing to express our appreciation for the efforts of Captain Dan Oliver, the officers and crew of the USCGC Healy (WAGB 20) on behalf of the participants of the Western Arctic Shelf Basin Interactions (SBI) science research project that successfully completed three major research cruises in 2004. The professional character, capabilities and resources that these USCG personnel brought to our collaborative efforts were instrumental to the completion of our science missions, not only in 2004, but also previously in 2002 and 2003. The SBI program is the most complex interdisciplinary research program ever mounted from a US Coast Guard icebreaker, with upwards of 50 shipboard science party members on each cruise engaged in interdisciplinary research. This included microbiology, primary production, optics, water column and benthic biology, tracer and nutrient chemistry, physical oceanography and educational outreach, all done in the context of understanding environmental change in the Arctic. The Healy met every challenge of this broad research effort, and enabled us to collect a groundbreaking data set.

Captain Dan Oliver was a strong advocate for overall science operations. In daily meetings with him and the lead officers effective science planning and ship operations coordination were undertaken, with many issues resolved initially without significant effort. Dan is an outstanding commanding officer, is extremely knowledgeable about ice operations, ship engineering and capabilities, effective as a manager, personable, and respected. The Operations Officer LCDR Daryl Peloquin provided daily, often around-the-clock support for our science operations coincident with USCG ship needs. Executive Office CDR William Rall was a key interface for ship management issues and scientist needs. Master Chief Navigator Joe Gispert provided essential navigation oversight. Chief Engineer LCDR Gregory Stanlick (spring) and LCDR John Reeves (summer) kept the ship running smoothly throughout the experiment, and in particular, were instrumental in working on a ballast tank filling procedure that enabled our scientists to maintain the integrity of incubation experiments by providing appropriate temperature cooling water to outside incubators. Valuable support for science was provided by the lead Marine

Science Technicians MSTC Glen Hendrickson (spring) and MSTC Don Snider (summer, fall), who along with their dedicated staff (MST2 Dan Gaona, MST3 Chad Klinsteker, MST2 Josh Robinson, MST2 Eric Rocklage, and MST2 Suzanne Scriven) worked tirelessly around the clock to keep the many scientific deck operations and experiments going. The Science Officers LTJG Neal Amaral (spring) and LTJG Jessica Noel (summer/fall) were effective liaisons between the science party and crew. The Aviation Detachment under the direction of LCDR Edward Beale (spring), LCDR Mark Fluit (summer), and LCDR Dan Kenny (fall) were a valuable asset for scientific purposes, logistics, and USCG search and rescue that were necessary missions during the 2004 SBI field deployment.

We would like to highlight some key efforts made during the 2004 cruises that enabled the science party to complete the objectives of the SBI project. The spring (HLY0402) and summer (HLY0403) cruises were multi-disciplinary in scope, with a full capacity 51-person science team on both process cruises. A wide range of disciplines, from physics, to biology, biogeochemistry and geology were incorporated into the work effort, requiring the use of all types of sampling equipment (e.g., CTD deployment, optical instruments, vertical zooplankton nets, bottom-sampling grabs, cores and trawls, and off-ship ice and small boat operations). The MSTs were extremely helpful during deck operations and science operations. Ship-handling by the Captain and officers on watch enabled sampling in a wide range of ice and open water conditions. The officers and crew worked daily to keep science ongoing 24 hrs a day, 7 days a week, from food preparation to equipment repair to adjusting ship location as dictated by scientific needs. During the fall cruise (HLY0404) we successfully recovered 14 moorings throughout our work area. The crew quickly became adept at such operations that made it possible to overcome the deteriorating weather and sea conditions in late September. Finally, Captain Oliver worked with us to maintain positive relations with the local Alaskan Native community throughout our cruise operations, including hosting representatives from Nome, Little Diomed and Barrow coastal communities that were very well received. We cannot overemphasize the key role that the USCGC Healy played in these local relationships by responding successfully during two search and rescue efforts.

In conclusion, the captain, officers, and crew of the USCGC Healy were an essential and key asset for the success of the US SBI global change project during the 2004 Arctic deployment and we hope that our words convey our sincerest thanks for a job well done.

Please feel free to contact me or the other Healy 2004 chief scientists if you have any question or comments.

Best regards,

A handwritten signature in cursive script that reads "Jackie M. Grebmeier".

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Other Positive Factors Were Excellent Support



MSTs

BASC---medical
emergency and
logistics

JOSS---shipboard
data system and real-
time ship location

LDEO---underway
instrumentation

Aviation detachment

Shipboard IT

Andy Heiberg
Univ. Washington

The Captain, officers and crew of the USCGC Healy provided outstanding support that was essential to the success of the three cruises undertaken during the SBI field program in 2004. The following evaluation is provided to improve operational capabilities of the Healy in its scientific missions.

There are six categories in the evaluation:

- 1) Healy equipment needs
- 2) ship operational needs
- 3) Healy upgrades
- 4) laboratory issues
- 5) habitability, and
- 6) ship support personnel.

1) Healy Equipment needs

- consider a cart/track system to move CTD/rosette in and out of starboard staging bay to launch point.
- useful have a bathymetry (SeaBeam?) repeater screen in view of the CTD operator
- issue regarding hydraulic system capacity, i.e. that some users had to wait for other users to complete their work, ?upgrade the hydraulic system capacity
- SeaSpace Terascan system problem: The DMSP reception quality was highly variable; nobody on the ship trained with the system to track down and solve problems.
- there seemed to be an issue with ship heading during HLY-04-03; three instruments on the ship that measured the ship heading and each one was giving different answers
- 2002 request for "Ship tracking and position displays in main science lab spaces" met via the JOSS catalog GIS map server display. Invaluable to SBI science party, suggest similar display mode should be considered for future science missions.
- the aft XCTD launch tube needs to be realigned at a slightly steeper angle; also need spare hand-held launcher

2) Ship operational needs

- MSTs provided very good deck assistance, over-side-gear support, as well as assistance for other routine operations. However, suggest MSTs should have ratings, schools, rotations, retention, UNOLS experience, etc.
- select officers partly on basis of interest in and suitability for science support; might USCG consider UNOLS experience part of icebreaker officers' training?
- reliability of the satellite internet connection seemed to be lower than in the past. It is recognized that there were many more users in 2004 than in 2002.
- e-mail had problems; (including lost messages) having the 24/7 Iridium email is a big improvement over the previous 2hr/day internet connect time on past cruises.
- computer support needs to bolster its UNIX capability
- USCG provided a large RAID array with several hundred Gbytes of available disk space, which was very useful to JOSS in backing up, transferring and archive key data from the cruise
- overall, ship operations issues improved from 2002 to 2004, so USCG is moving in the right direction.
- during the spring cruise, heavy ice conditions were the main limiting factor for not occupying all the proposed stations, particularly in the Beaufort Sea.

3) Healy upgrades

- The new USCG science seawater system (SSW) clogged in heavy ice during the spring SBI 2004 cruise, thus we initially reverted to the 2002 solution of filling and using the forecastle ballast tank. The USCG engineering division (under Engineering Officer Greg Stanlick) connected the SSW system to the E-O-W forward ballast tank and this tank was connected to the bow incubators through a spigot tree and hoses. When the seawater in the ballast tank warmed up due to daily heating, science requested a dumping of the water in transit and a subsequent refill on station, which occurred using SSW. This situation especially occurred on sunny days, and the “dump and pump” technique became standard operations between stations. As the amount of open water in ice increased later in the cruise, engineering rigged a fitting directly to the SSW system so that the ballast tank could be filled in transit. Note that keeping the tank at 30,000 gallons kept the water below the seawater line and thus cooled by the seawater surrounding the hull. There were no problems with the SSW during the summer cruise as we were able to directly use the SSW system without the ballast tank support. Further information on the ambient seawater bow system is included in Appendix A of the HLY0402 cruise report on the SBI website (<http://sbi.utk.edu>).

4) Laboratory issues

- environmental control (temperature stability) in BIO-CHEM lab (starboard side, forward lab; supposedly constructed to have tight temperature control) should be brought to specification. One wants non-cycling (i.e. non-sawtooth), +/- one degree C temperature stability in this space. This can be achieved via continuous flow of warm and cold air regulated via thermostatically controlled butterfly valves or some such arrangement. (This is not at all impossible. Much better T control than this is standard in industry).
- opportunities to clear bulkheads and make spaces more useful should be continued
- there continues to be a need for an ice-machine in the lab. The one supplied for 2004 was never connected up.
- the deionized water (DIW) system needs improvement. SBI Scripps personnel used their spare system for the lab in order to get high quality DIW. The DIW system in the main lab never rose above 16.4 or so for both trips.
- UPS system may be inadequate for full science capacity needs.

5) Habitability

- consider new traffic patterns on the 200 deck near science conference room so that day sleepers on that deck can sleep. This could also involve serious sound insulation on the affected staterooms.
- improve the sewage/toilet situation (long, daily shut-downs were the norm).
- make sure that stateroom, head, and lab cleaning supplies are kept in good order, and that scientists know where the appropriate cleaning items are located for each space.
- there should be adequate towel racks, lights, and storage space for full 3-person occupancy in the staterooms.
- some standard method for linen washing should be implemented to streamline the offload of personnel, considering the early departure time needed.

6) ship support personnel

- MSTs provided very good support to the SBI science party through all cruises, but it would be helpful if lead MST was directly involved in pre- and post--cruise planning with scientists---Marine Science Officer role sometimes unclear.
- Dale Chayes from LDEO was an extremely valuable resource to the SBI PIs concerning ship instrumentation and systems. In addition, he supported JOSS personnel when the SBI catalog computer crashed and assisted in transferring JOSS software to an LDEO machine to maintain the field catalog. Having the LDEO person onboard who is knowledgeable about the science instruments on the ship was an important USCG improvement.
- USCG also now has a full time person for science data network computer support, who was essential to solve daily computer issues and periodic system crashes, as occurred during the spring SBI cruise.
- the team support of the LDEO and USCG personnel was a real improvement to general science and computer network support.



USCGC Healy in Provideniya, Russia, Oct. 2004