# MINUTES OF SEATTLE SBI FIELD PLANNING MEETING: DECEMBER 3-5, 2003

**December 3, 2003**

**A. Introduction**: Jackie Grebmeier, SBI Project Office

**Welcome: Captain Dan Oliver**-USCGC Healy
New science system on HEALY. HEALY in dry dock until Jan.; Feb should be back in support center in Seattle. They are to set sail for last 2 wks in March to make sure all is well. Should then be ready to go in May. Daryl Peliquin was in charge of people going to see the HEALY in dry dock.

**B. Presentations**

Jim Swift
SBI Survey cruise on the Palmer: Helo & ice coverage plots of underway data, CTD data, sea surface salinity etc. 329 stations

- Palmer--Low vibration levels, good zooplankton microscopy. NSF marine mammal ops. 329 stations, no ice trouble. Dissolved oxygen, silicate, nutrient results, Barrow Canyon currents. Very large water feature off basin, much larger than an eddy, current moving westward at over 1 knot, couldn't map both sides of the feature because they ran out of cruise time.
- High oxygen supersaturation as go out BC, low near bottom with high silica concentration
- Westward flowing current offshore of eastern most line
- Cold core eddies—20 km wide, can see them in temperature plots. Linear interpolation not fit, made a total honesty fit.
- Jim's recommendations:
  1. How relevant are signals (to SBI) being seen—decisions need to be made.
  2. Cross features at right angles if possible.
  3. Quick CTD survey only in top 500 meters (overnight if possible) to scan for hot spots—can be visualized by morning.
  4. Make sections across – Barrow Canyon
  5. increase resolution for contours
  6. high chl outer slope, low chl surface offshore

*Note: If you have been talking about anything field related w/ NSF contact Louis Tupas immediately for he will be leaving at the end of January 2004.

Lou Codispoti

- Smithsonian SEARCH display on Arctic change (request for good displays, graphics)
- Lowest ice extent in 2002 since satellite imaging began.
- Not much in silicate occurring below 200m on average, a plume is coming off of the shelf, in the upper 200 m.
- we don't need hydrography casts below 500m for the next cruise (below 500 m, more like doing a topography survey instead of hydrography).

- In the upper 200m things happen very rapidly.
- +N** = net nitrogen fixation
- -N** = net denitrification
- Phosphate versus silicate → Regeneration off of the shelf would show a very large curvature. Most of the biology is probably over the shelf (curves show little curvature).
- Chemistry suggest a difference in current flow

Summary comments:

1. offshore bloom well underway
2. shelf bloom started during HLY0201
3. shelf bloom well underway or over by HLY 0203

Charlie Flagg

- Hydrographic data plots can be found at ftp.osg.bnl.gov ; all are in zip files
- Data will be moved over to JOSS once everyone is happy with them.
- Problems with what "Herald Canyon" should be called—three different versions in maps [Note: Grebmeier states HV=Herald Valley, HC=Hanna Canyon, WHS=West Hanna Shoal, EHS=East Hanna Shoal, BC=Barrow Canyon, EB=East Barrow]
- Waterfall Plot: Section T/S plots – temperature not theta ;Profiles are shifted to right. Vertical plots of sections—log plots
- CTD/Calibration plots
- Salinity/Scatter plots
- Intermediate stations would be good because sometimes stations were so far apart that it was difficult to write contours.
- MATLAB format.Plots will be genereated in color & b/w

Dean Stockwell

- Chlorophyll distributions
- Hotspots (diatoms, flagellates) offshore, variations from year to year in chlorophyll concentration.
- HLY0201 Integrated chlorophyll = 266, Integrated total pigment = 438, % chlorophyll < 5 microns = 266, range = 2-90.
- HLY0203 Integrated chlorophyll = 80, Integrated total pigment = 124, % chlorophyll < 5 microns = 44, range = 2-84.
- NBP Integrated chlorophyll = 60, Integrated total pigment = 69, % chlorophyll < 5 microns = 32, range = 1-96.
- HLY0303 Integrated chlorophyll = 21, integrated total pigment = 31, % chlorophyll < 5 microns = 31, range 3-83.
- Depth integrated to was 40 meters; shallower depths were integrated to the bottom.

John Walsh

- Winter concentrations important to set up system for following year production
- Issue of boundary conditions, need specify winter boundary conditions
- Impt ACW spring production, see downturn DIC in spring, est. spring production 2x summer production, flagellates dominate ACW in April surface waters, no diatoms*
- Biology > temperature controlling pCO2 levels and carbon cycling

- Whatever hits the bottom turns into organic carbon within upper one cm sediment, don't allow for burial in model.
- Decadal shifts in biology results coming out in press. Says if seen one you have seen all (??); 1980 – 1989 data talked about; Paper is coming out in JGR soon about the model results.
- A numerical model of neglected spring primary production (spring cruise), spring production is 2 times larger than summer on all surface water 0-3 meters
- Rules of competition: Unanswered question: what happens in diatom versus dinoflagellate competition?
- Presenting data from 1980 and 1989 for the same area of the Chukchi/Beaufort Seas.
- High nitrate levels found in field, where model said that there wasn't any nitrate. Wrong boundary conditions?
- Now looking at consequences of spring production and if it affects the system substantially.
- Healy data is being incorporated into the model.
- March and April nutrient data is important, but scarce.
- ACW (Alaska Coastal Water) nutrient stripping occurs very quickly.

*Comment: Diatoms are seen at 15 m, they are sinking and degrading; data indicates ACW is only water that shows no diatoms in surface waters. Other water masses are still showing diatoms and flagellates.

**BREAK**

Wieslaw Maslowski

- 9 km resolution model movie: 1979-2001 measurements
- Slower spots in currents seem to be biological benthic hotspots.
- Net 1979-2001 Mean Volume Transport—Full water column
- Imbalance of >16 mSv suggests a source of freshwater
- Moran's tracer data versus model Pacific tracer distribution across the 3 SBI shelf-slope section data . Moran data is May 2002, Model is May 2001.
- Wieslaw's suggestions for 2003:
  1. Adjustments to SBI box
  2. Sections in between WHS, EHS, BC, moorings
  3. Zig-zag on boundary currents
  4. Line perpendicular to deep ends of the stations.

R. Muench –Suggestions were on his poster.

Dennis Hansell

- Non-Conservative behavior of terrigenous DOC in the western Arctic Ocean.
- 11% of global discharge is into the Arctic Ocean.
- Low salinity water, high DOC*
- In Spring, a very low intercept
- Basin 14 yrs surface layer DOC, removal terrigenous DOC in western Arctic Ocean, age slope water 13 yr.

- Residence time river water 11-15 yr
- Terrigenous DOC exported to N. Atlantic, 21-32% escapes, the balance consumed by Arctic Basin
- River water has an average residence time in the surface Arctic of 11-15 years.
- Terrigenous DOC would be reduced to 21-32% of input before export to the North Atlantic.

*Comment: O18 data corresponds with lower Ra levels, seems to correspond with river discharge and not melting ice

*Comment: One would expect big time changes. In DOC, some Issues with the decay constant for terrigenous TOC and its half-life vs removal issues

**LUNCH**

Dave Kadko

- Evaluation of SBI-importance of jets and eddies, Ra-224
- "Typical" SBI transects are not demonstrating rapid SBI (steep age gradient offshore)
- Random (but common?) features responsible for transport? Eddies, jets, meanders.
- Data indicates not rapid shelf-basin interactions, see steep age gradients offshore
- Wants spatial vs temporal resolution
- Considers exchange primarily by eddies, jets, meanders

Rolf Gradinger

Sea ice to carbon cycles

- How representation was 2002 when it comes to ice conditions? (Entire SBI)
- What controls amount & signature of ice algae (experience)
- How is it expressed after release (later sampling) (cooperation with Dunton et al)
- Feeding experiments with pelagic biota ice extent summer 2002
- Distribution of algal communities
- Biomass (POC & chl) are exceptionally high
- Nitrogen limited growth.
- Measurements are mostly in first year sea ice.
- Ice thickness data is missing
- This year, 2003, is the second lowest ice extent [Sereeze et al., 2003]
- 50% ice algae is diatoms, up to 1000 gC/m2 integrated
- ice algae, heavy del-13 C

*Question: How much flushing does the bottom of the ice get? Ans. Unknown

Carin Ashjian

- VPR data
- Very high marine snow concentrations right off of the shelf break
- Carin wants higher resolution sampling in transect lines, because feature only appeared in one station per line.
- Elevated marine snow at the shelf break, usually in coldest water.

- Low horizontal resolution sampling in this region.
- Increase spatial resolution, especially at the shelf break (=shelf-basin interface).
- Sample eddy feature if we find one.

John Christensen

- Helicopter transects survey in 2003
- About 8 km between stations
- Found a shelf-break current along every transect.
- Each station took approximately 2 hours, could, in theory, be sped up.
- Land-based helo operations versus marine-based helo operations.
- Team was equipped for solid-surface, not open-water. In theory they could be equipped otherwise for next year.
- Lines can be moved depending on conditions.
- Sediment sampling on summer cruise with Al Devol
- Fluxes: O, N, total CO2, Ca, inorganic nutrients, tracer Bromide
- BC does not seem to be a hotspot of sediment metabolism*

*Note: Grebmeier found hotspot at head of Barrow Canyon, shallowest site not sampled by Christensen; similar difference in data sets observed since Grebmeier samples southern Chukchi sea, but not Al and John

Cooper and Grebmeier

- Be-7: a very high proportion reached the benthos from the sea ice between spring and summer.
- More Cs-137 off the shelf than expected, almost all of it is attached to clay particles, even at 3000 m.
- Gravity coring to see limits of Cs137 next 2004 cruise.
- Spring cruise had more cDOM than summer.
- Highest numbers on EB line—"Particle focusing"

Rebecca Woodgate

- SST on the Beaufort line
- Massive storm in the middle of the cruise
- Results of a strong westward wind: effects on ADSP. Storm responses.
- Eddies were observed (warm core) in 4 sections.
- Chukchi is a very advective system.
- see train of eddies, with Atlantic intrusion about 100m
- nutrients-Herald Valley area
- upwelling Atlantic and halocline water

*Question: How do we distinguish between possible sources of high nutrients? Ans. Look at T-S.]

- Revisions of flows: 3 mean outflows, BC, Central Gap, Herald Canyon.
- Most nutrients in west, outflows more east and north, seasonal and interannual variability.
- Taylor columns separating flow streams (e.g. Hanna Shoal).

- Wind-driven undercurrents
- Eddies
- Offshore and onshore flow at Chukchi Slope
- TS advection from the south (at Chukchi and Beaufort slopes)
- Inertial/tidal flows 20cm/second
- 321 stations were done for the mooring cruise. Hit on few things to do for the next year
- Sea surface temp. on the Beaufort line, note the movement of time scale days. Very fast scale changes on slope. Results of change is very strong westward winds. Eddies were everywhere

Bob Pickart

- Mooring recoveries, eddy signatures
- Tentative hydrographic transects: vessel-mounted ADCP
- ARP arrays deployed this summer on Healy. Acoustic recording packages.
- Issues with "whaling zone" stations—one station not done twice because of that issue.
- It would be good to have somebody on the cruise to babysit the ADCP in order to get quality data.
- "Blobs"—subsurface mesoscale features that are not defined enough to be defined as eddies.
- 15 cross-slope sections→ 24 eddy/lens features
- Eddies are probably the dominant mechanism by which water is transported off of the shelf.

*Comment: We should try to "tag" one eddy offshore, because closer to the shelf it will be more difficult to distinguish from ambient water.

- For next year: It would be great to sample the same eddy twice, spaced a week apart. Trace eddy with an isopycnal float, or calculate trajectories.
- For next year: Higher resolution in shelf-break region.
- Some people should take measurements on the mooring cruise.
- Do repeat lines
- Need ADCP for mooring cruise
- High eddy signature
- High T/S resolution, perhaps thus one high resolution line for process cruises

*Anyone that has powerpoints and that would like to have them posted on the webpage with password protect give to Jackie to put on stick and she will give them to JOSS

* Comment: Should we change our paradigm? How much lag time between CTD and samples? Ans. You can tell almost right away from CTD profiles if you have an eddy or not.

* Comment: We need get past eddy field, go further offshore

Harvey:

- Tracking particles of individual compounds for tracking purposes in terrestrial fraction, one part turns over faster than the other.
- Surface waters, POC is almost all marine.
- In sediments, there is a 50/50 mix.
- 14C ages of bulk organic matter, surface average age is 350 years, sediment average age 6000 years old, downcore average is 7200 years.
- % terrestrial increases with deeper water (sediment); box cores show 93% terrestrial in some basin samples previously.
- Shelves dominated by marine carbon (sediment).
- How much basin is in SBI? We didn't really make it out to the basin. What is this terrestrial signal precisely? Don't know the origin of the terrestrial carbon. Maybe we need to transect the ACC.
- Constraint of current flows off shelf.
- Different bacterial communities in deep water?
- Different bacterial-phytoplankton interactions in basin?

**C. Cruise plans for 2004**

- Whaling issues: overall everything approved, distance sail past Pt. Hope still in question
- Arrive Nome May 15, Depart May 16, then run line over to Little Diomede, head up line East Hanna Shoal
- 40 days Nome-Nome
- Spring and Summer cruises
- Return Nome June 23.
- Will not know if you are in the hydrographic center or if in the bathymetric middle. What if different things are happening on both sides?
- Grebmeier: Putting on a deep well gravitometer. No problem. Not one of the marine science tech, another USCG will take care of it.
- Proposal to reduce number of transect lines, will discuss
- Water column studies need to get out to boundary currents
- What about ice melt/ice rafted debris? Looked at that, particles not from ice.
- How deep is deep? Ans. Go to the plain, where it is really flat.
- How much time will it take to sample at those depths is an issue. Both time and ice are issues. Sediments are a wonderful integrator with resolution.
- ? Give up shelf stations to get deeper?
- We need to get beyond the boundary currents…don't think that it happened on the process cruise.
- Acartia sp.—coastal animal, found all along EB section. Would also like to go further offshore. 3 environments: Shelf, Slope with eddies, Canadian Basin. We need to get beyond the slope-eddy field.
- Copepods. Hyperboreous sp. is most abundant in the western most sections—might be coming from upstream.
- Need to go offshore to get more depth resolution for these organisms. New vertically sampling net from NSF, so you can tow in the ice.
- Some folks want to get further off shore

- Suggestion: samples 3 areas on shelf-slope-Canyon-basin beyond slope eddy field. Large copepod possible animals that are good whale food could be coming downward via Barrow Canyon. New net will allow vertically layered sampling for towing
- Eddies don't just stay on slope, but also go out.
- But no real clear boundary between shelf and basin in terms of water properties. Where do you define it as shelf, and where as basin?
- Eddies extended out into basin: 1) Need high resolution sampling at slope and 2) Deep basin stations, but what is "deep"?
- Might not be really basin water, when in a basin depth range. Can you decide before you out there?
- How do we use this end number if we agree on one? So far, reasons for going out to the basin are a little nebulous; playing devil's advocate, extending the lines basin-ward will be a significant time investment.
- Sharon would go to 1000-1500 m. Harvey would want to box core, or maybe use Moran's pumps. Okay, so signals change as you go into basin. Eddies decrease, but don't disappear—so when do you have a good end number and what good will it do us? Fuzzy picture.
- For instance, big difference between spring and summer in DOM gradients. Is what we measured at the deepest station, is that the lowest measurement, or if we go out farther will we see more? We don't know. Where does OM come from to support biological communities? If that doesn't sound like a reason you want to go out there….what does?
- Could you pick one line to extend?
- Source of food for populations…don't overwinter on shelf, they overwinter in Basin—emphasize that we need to sample in basin.
- We really have 3 lines, not 4 because BC kind of transects it yet. We need to say that this is something we would like to do or else we'll never do it.
- Are tracer folks more interested in surface water? Ans. Yes.
- Harvey: Need sediments from one cruise.
- Which sampling will we want to do at high resolution?
- Are we going to maintain set lines, reoccupy lines from 2002? Would we do them on 2 cruises?
- Grebmeier: We wouldn't need to do sediment respirations on 2000m, 3000 m, reduce so undertake limited gravity coring at 500-1000 m depth
- Do you think it will be much different between years? Look at what we learned and change our approach.
- Reoccupation gives a better picture.
- After hearing needs of process cruise PIs, it doesn't seem reasonable to run high resolution lines quickly, then return for extensive sampling, particularly in spring cruise
- May not need to reoccupy lines, maybe just stations.
- Thorium: Not much change in WHS & EHS in export production, would rather go out one line farther in summer, focus on Barrow Canyon. Did anybody sample in AOS or SHEBA for DOC & DOM? Only reason to go organic-wise is for dissolved, world low in particulate.
- Could do zigs and zags to catch features. We don't need to reoccupy same exact stations.
- A lot of mileage in re-doing what we've done before, between years
- But we're missing specific signals/processes and their transports.

- But what are we missing? Going to only 2 lines would be a big mistake.
- Maybe some stations would be just CTD, at end do a box core, flow through, XCTD, ADCP, zigging and zagging as we go.
- Bob made a good point, XCTD without sampling refines picture so that we could go back and look at changes.
- Best case scenario-rapid CTD section to see what is out there. In spring, won't be enough time because of ice. Maybe in summer something else can be done.
- Concern: worried about ending up taking VPR at same resolution as before.

* Grebmeier: Not too much negative feedback on doing the same lines with some sort of extension. Some suggestions to bring lines shallower and go deeper into basin. We're keeping four lines, what/where we do them is the next question. Do zif/zags across BC, limited sampling at high resolutions sites at slope

- More grazing experiments on the shelf, possibly following Maslowski's proposed lines (figure); however, most of Maslowski's lines look at along shelf, not across shelf flow.
- Is everyone planning on doing measurements at 300-700 m?
- 5km resolution with XCTD's should be done, starting at 50m stations or wherever you choose; a suggestion to start finer scale at 100m.
- What is high resolution? 10–30 km, from 50-700 m (from 100-700 m isobath is 90 km)
- Need closer spacing of stations over outer shelf
- What's the difference between doing CTD and XCTD? Ans. Sensors and cost (would cost more in ship time used for CTD deployment)-at least 3/4 hour for a CTD pop.
- What spacing? Ans. 25 or 30 km.
- For the Healy to stop, it sometimes took an hour in 2002.
- About 45 minutes was the best time for stopping during the 2003 mooring cruise (put this in calculations).
- We can tell you exactly where you want on higher resolution from previous 4 lines.

*Grebmeier: Say, 5 stations on shelf break, 10-30 km spacing. Who will do measurements on high resolution? 1. CTD rosette, DOC, DIC, POC and 2. VPR

- Concern: Carbon analysis take a long time. Need to really reduce down what you want on rosette casts, maybe go back and get the rest of samples on reoccupation.
- Could almost do it without water samples.
- Grebmeier: In spring we'll only be going in one direction.
- Then you have to do it with XCTD's.
- Concerned about skipping production stations because they need to be started at a specific time per day.
- I didn't say rapid, I said high resolution. I know we can't do it rapidly; can't do rapid, high resolution in spring, could be rapid in summer; If you can't do it rapidly, then what does high resolution bring you?
- If found feature, would love to get on one on either side. Maybe in ice there aren't any upwellings. Can't tell you anything spatially about feature at all.
- Boundary currents are pretty much always there. For spring, the best you can do is throw stuff between them and go

- Really unclear how far eddy's go out on Canyon basin. Most were found shallow; can't go pass ice; that will determine how far out to go.

*Grebmeier: How deep to go? Ans. bottom 4000m box core, nets: 1500m vertical

- What "would be end number"? And what good would it do for you.
- concentrations all the way out into Canada Basin important. Are we supporting far enough out for organic matter?
- Extend one line to 3800 m basin depth would be minimum; others 3 lines
- Possibly do spatial extend WHS & EHS rather than go deeper in summer; if one line focus more BC & focus less on EHS
- Wieslaw's suggestion to be able to do zig zags to do what is needed through lines
- What are we missing? Could extend EHS to go w/ Maslowski map.
- Do zig zag on BC. Right now have to go EHS then go back to mooring cross BC come back to WHS then back to Nome.
- Need go back to target places to see changes for people not sampling each place.
- Rapid shallow CTD would be good but doesn't think in spring but could do them in summer
- Keep 4 lines just make modifications. If spend to much time of shelf will not get all of what is needed.

*Grebmeier: Come up with a draft map, extend shallow a little and deeper a little, perhaps focus EHS and BC; high resolution 100-700m

- All planning 50m station & 100m station
- Ashjian – 1 station in hot spot – like to have one on each side of it not anything rapid.
- Swift: need to go out 15-20 miles farther out to get basin, go out to **3700m isobath.**
- Can Hansell's crew keep up with high resolution? Yes, they did on Swift's cruise.
- No benthic sampling on high resolution.
- Woodgate: We need to check if 100-700m is really the depth range we need. Also need to bring a lot of extra bottles, lots of backing up.
- Ashjian**: replace XCTD with a VPR, not a CTD.** Will get same data.
- XCTD doesn't require stopping the ship, minimum 30 minutes to deploy VPR.
- Harvey: Should we throw out a line in order to do high resolution on the other three?
- Maybe no sediment sampling in spring at 4000 m.
- Who is going to deal with the XCTD data?
- 40 process stations. Can we give up measurements on process stations to get more process stations in high resolution?
- We won't be losing days going west this year because of community approval in spring
- Need to choose minimum number of zigzags across BC.
- Would be great to look at XBTs to look for eddies, during transit. Who will do them? Science party's responsibility if we do it, not MSTs. Will just do it on the mooring cruise.
- High resolution 100-700m, with 50 km spacing now, need 5-10 km spacing
- Each CTD 45-60 min minimum stop
- High resolution: CTD/XCTD only

- VPR, If add POC/DOC is 1.5 hr to empty cast

***DECIDED KEEP STANDARD STATIONS 2002, ADD HIGH RESOLUTION AT SLOPE 5-10 km spacing , on shelf/deep basin 10-30 km spacing**

END OF MEETING FOR DAY

**DECEMBER 4, 2003-THURSDAY**

- Schedule adjusted for all USCG logistics to be done today.
- SBI issues: need multiple spigets on foc'sle
- Insulation break
- Check valves
- Depth intake
- Residence time in sea chest
- Differential between ambient temp. and tank temp

**D. USCG Seawater System Upgrade: Greg Stanclik, Engineering Officer**

- Needed more uncontaminated seawater, and issues with sea chest jamming.
- Minimum flow of 8 feet/second needed to prevent marine growth
- Seawater has to be no more than 0.5C higher than ambient
- New sea chest
- About $800K in refit

*Question: What is the volume of sea chest for "dead space" calculations, because it isn't flushed completely, turnover.

- Pumps are going to be 200 gallons/minute
- Has Telloy C-276 nickel-based alloy
- Will try to get us on the drydock floor today for tour

*Question: What is going to be the output of Foc'sle? Seven spigots on each side...how will it be separated? Need to make sure they know the position of "trees". Insulating the actual breakouts. Need a check-valve, because last time pumps were turned off, it siphoned the water back okay (Stanclik said that we aren't using the same system after refit).

*Question: Is this the flowthrough system as well?
Ans. Yes, it ties into the whole system. Sharon's space down in the hold will have an uncontaminated spigot. The lab still exists, could thread through with garden hose.

*What is the depth of intake valve? Ans. Intake is 15 ft above the keel.

- Lane: Closer we can collect zooplankton to thermosalinograph and fluorometer, the better. Can we elbow into sink?

*Comment: Not sure until we talk about configuration of lab. Could we figure out a spigot just outside that lab, because of space issues. Is there a pipe leading into sea chest? The nearest sensor is on outlet from sea chest (thermosalinograph). Most mixing will occur in sea chest.

Thinks that there will be a significant residence time because of baffling. That signal will average out over quite a big distance. Could be good or bad, but definitely needs to be known. Ans. We don't even know how long it stays in the current system. New sea chest will be about 2X as big as original.

*Question: Can we still have a small AO pump? Ans. Yes. Nothing has been removed in refit, only added. Nothing changed at all where Sharon and Peter are, there is no change from last time. No plumbing at all.

*Note: About 6 minutes of residence time with larger sea chest. If Step change…maybe about 20 minutes will be with baffle.

*What will be temperature difference at foc'sle? Ans. Worst change was measured as 25 degrees.

* What will be the volume at foc'sle. Want to drain it through as fast as possible. There was to be a way to drain it off. Need to decrease/minimize residence time in pipes to minimize temperature differential.

*What are the temperature sensors? Ans. Remote temperature sensor and one by sea chest. First one will be in motor room just after the bulkhead penetration, given wiring and connection box.

- Outflow aft seawater
- Ice removal pump. 400 gallons per minute are coming out of tank? 200 going into seawater, 200 going out with ice. 5 times as fast with same size tanks so about 2-3 minutes residence time.
- 400 gallons at most because of variable speed pump options.
- How many incubator tanks? Total of 7 from last year. Put pictures of layout on CD for USCG.
- Engineers need to talk to scientists, because different ice conditions will require different pump speeds, which could affect results.
- Could somebody recheck differential between ambient and foc'sle?
- Run the pump @ max at all times would be a goal. Keep as close to surface water as possible.
- Minimize the residence time
- Temperature sensor by remote by sea chest. Another one in the system that will tie in, most likely somewhere in motor room. 1st bulk head as possible.
- Will make sure that this works during 2 wk trial at sea.
- Note: Glenn Hendrickson (lead MST) and Neal Amaral (Marine Science Officer) are both leaving this summer, but will probably be on for the first spring cruise.
- April 12-16 was initial suggestion for both cargo load and people pre-load
- With further discussion determined **April 12-16 for cargo arrival, April 19-23 for people pre-load, set-up**
- Plan cargo tracking system, HAZMAT forms, MSDS sheets

**E. Logistics for stations**

- Ice work first—Gradinger will only be on spring cruise, but same space as Devol/Christenson in spring, need space; same issue with cold room.

**ACTION: NEED ADDITIONAL VAN-DONE**

- Floating sediment traps—time factor would be removed from benthic sampling, mounted on ice floe, let people off on ice. Half hour deployment, only occurring at stations at least 12 hours long, pull out before benthic sampling. Can provide samples for biomarkers, thorium, particulates, most likely only in spring; possible move independent from ship in summer.

- Ice, then CTD work. In 2002, 6- 7 CTDs per station, beyond hydrography work

- Depending on time of day, primary production collections

- Service cast takes 1.5 hours to take empty samples, VPR will be deployed after that.

- Primary Production: Dave Ruble needs sun on starboard side-if ship is making a shadow, the measurement is useless; ANS. Captain Oliver says it all depends on wind when parking the ship.

- Harvey: Problem with casts not being in the same depths as survey cast—not getting good matches, need nutrients. ANS. Hydro team will do nutrients on their casts

- Codispoti: Biggest issues are running nutrients on ice samples. Salinity can range from 0-60 ppt, took a lot of time. Adding bottle samples is not a big deal. Need Sargasso Sea water to dilute samples with water with no nutrients.

- May need to compromise volume and depths in order to get volume needed on deep water.

- Schonberg: Where is water for POM? We are doing water collections (Cota summary sheets said otherwise). Needs 60L at 2 depths (for replicates), 12 –30 L bottles on rosette. Moran's group helped out on those days doing pump stations. Need it at 10m and 30 m, about 25 L per replicate. ANS. Could possibly use niskin bottles on grazing casts (every 2 days). Also, can use submersible pump (Moran and Grebmeier have) for collections.

- Might be a problem with moving up grazing cast because Glenn Cota wants to compare with biomarkers? Cast sequence?

- Mesoplankton sampling requests.
  - New instruments: multi-net for zooplankton; Needs a test cast off of Nome (suggested do now after leaving Dutch Harbor). Supposed to go much more quicker than a Mocness tow.
  - Zooplankton plans for both spring and summer. Nets: Grazing stations, 4-5 ring nets
    - Process stations, 1-2 ring nets, bongo tows (2-3)
    - In 202 all net tows were done while CTD was being emptied; will do again in 2004
  - Long process stations: Same as process, but will substitute multi-net for bongos.

- Grazing days every 2 days – Susan S. can get the water from that cast

- Kadko: Needs 2 casts, not 1, <250 m.

- Moran: Needs 4-5 L per depth, for stations between main stations. Will pick the depths. Also needs to get the samples at stations that pumps will be put in. Not doing lead this year, doing thorium. Wants to get as many 4L high resolution thorium samples as possible. Will have twice as many pumps as last year (7-9). Goal: 15-20 pump stations per cruise.

- Don't know if Scripps CTD will become available. ANS. Hendrickson: Healy has a CTD with 12 bottles, 30L bottles.
- Codispoti: Spring release differences between Scripps and Healy CTDs may be an issue.
- Swift: Would not recommend using an external spring system.

- Benthic: ≤500 for van veen grabs; first grab for some sediments and animals for Dunton/Schonberg; next 4 grabs for population studies; multi haps corer used for population studies >500 m
- Sediment respiration: >500m X-haps + gravity core (max. 2m core-Grebmeier owns, 4 x/cruise)
- Harvey will be cutting down box cores, not repeating them, maybe 6 total.
- 2 requests to trawl on WHS and EHS, 50m depth, benthic dredge.

**F. Wire requirements**

- Need .322 for starboard CTD
- Used 3/8th in for stern benthic ops (van veen grabs, multi-Haps corers, multi-corer, box corer (need to go 3700m w/ box core)
- 9/16$^{th}$ cable needed for 2 trawls, or 3/8$^{th}$ not a problem
- .680 for vertical net; Net is going into Sharon's inventory, she should buy a winch to go with it. Should buy the whole system.
- Glenn Hendrickson is not sure that the multi-net will work well with 680.
- Need another winch with ~3000m of mechanical wire. 3/8's wire. How to request this? From whom?
- Glen Henriksen: Prefer not to have .322 cable used for benthic work, will ask around, Terry ask around, Allan ask UW
- Mechanical wire?
- Christensen/Devol using X-corer to do 1000m or less on upper slope.
- Mammal community participants not just looking at marine mammals.
- 51 cap of spring cruise berth space
- 2-teachers this year 1 spring/ 1 summer: Dunton/Moran; ?Pickart (Mooring )
- Chief Sci. Summer cruise any one? [ans. L. Cooper]
- ≤500m 5 van Veen grabs, 1 multi-HAPS core
- >500 2 X-HAPS corers
- 2m gravity core (~400+ lbs); Will reduce deep stations to get gravity cores
- 3/8th, .322 vs .680, 9/16th
- Wires take up both oceanographic winches
- Can't use heavy cable in shallow depths because it will sail too much.

- Glenn Hendrickson would prefer not to have a 322 cable because of slip rings and configuration on deck. Glenn will ask around on V-tech.
- Susan has to come with trawl, using 3/8". <Glenn Hendrickson says that there will be an option of either cable).

**G. Community Observers**

- slots for coastal communities participants: 1 per each cruise
- Diomede, St. Lawrence Island, and Barrow are very supportive of our science.

**H. Berthing**

- 5 media, 2 observers, 51 total for spring
- 2 teachers will be going, 1 on each cruise. Duntion will have one, Moran will have another. Grebmeier has one in the works too.
- CBS and newspaper—5 days
- 3 person rooms on spring cruise, will back down to 2 people for many rooms on summer.
- Grebmeier is chief scientist on spring-YES
- Cooper for summer-YES
- Gradinger: Measurements on ice while ship was moving taking pictures of ice extent, mounting an ice pigment sensor, hang from side of ship at height of about 12m, needs a pole of 15 cm diameter to hang instrument.
- Ruble's hoses drain over side, might splash on Rolf's gear.
- Rolf will have 4 people—1 from Japan, his instrument for continuous measurements. Will get ice volume data for SBI area first time.

**I. Cruise Logistics: Andy Heiberg**

Logistics
Heiberg – 206-543-1348
Huney – 206-543-1261
Andy 15 April – 8 May will be at the North Pole

Nome
R & B same as 2002

Alaska Air
3 flights / day, 7 days/wk ETA 8, 12, 19 hrs.
Flight outbound still restricted

Other freight options:
Lynden 3-4 flights / wk
NAC 2 flights day 7days/wk
UPS as before works with Lynden
Fedex now uses NAC – North bound still hanger South bound pay freight at NAC
Minimum labeling "SBI PROJECT" as part of address
Inform Andy and Sue by email of all shipments
heiberg@apl.washington.edu
huney@apl.washington.edu

Hotel information from last field season

- Heiberg or a representative will be in Nome or Barrow during rotations.
  It is therefore requested that Heiberg by e-mail be kept informed of participants traveling itineraries for Nome.
  Listed below is information on some hotels:

  NOME NUGGET INN, 1 FRONT STREET, P.O. BOX 1470, NOME, ALASKA 99762
  Tel: 907-443-2323
  Fax: 907-443-5966
  Rooms: 47
  Price: US$ 75 - 100
  www.nomenuggetinn.com

  Polaris Hotel, P.O. Box 741, Nome
  Tel: 907 443-2000
  Fax: 907443-2217
  Rates: Single (shared bath) $40 +Tax, Double (private bath) $80 +Tax,
  Small House $90 day, Igloo Efficiency Apts. $90 day, Max. Capacity: 35
  Rooms/4 apts.

  Aurora Inn & Suites, 527 FRONT STREET, NOME, AK 99762
  Tel: (907) 443-3838, 800 354-4606,
  Fax: (907) 443-6380
  Rates: 100 - $165
  Max. Capacity: 35 units
  aurora@nome.net

- Andy out of town April 15-May 8
- Nome room and board, same as 2002
- Evergreen: Access to hangar as needed
- Alaska Air: 3 flights/day, 7 days/week, ETA 8, 12,1900h
- Freight outbound still restricted
- Alaska Air: Freight outbound still restricted “known shipper” issues
- Other freight options: Lynden, 3-4 flights/week
- NAC, 2 flights/day, 7 days/week
- UPS works as before, carrier is Lynden
- FedEx now uses NAC as the carrier
- Labelling for Nome: Minimum “SBI Project” as part of the address
- Inform Andy and Sue by mail of all shipments.
- Give cargo manifest to Heiberg, also loading to Seattle
- Freezers on way back—can we set it up now?
- Dry ice—Heiberg will check into it
- **April 12-16 for shipments and trucks to Healy**
- Offload from Nome: Frozen goods, broken stuff. Not taking off van.

- **Can get on ship by May 15, should be in Nome on 13th**
- **Summer dates will be July 18-August 26, Nome-Nome.**
- **Fall dates will be September 2-October 1, Dutch-Nome.**
- Healy: Japan to Nome, no stop in Dutch.
- No science is going on between cruises-incubators will have to come down because of possible weather.
- Why not load in Dutch?
- At the end of the 2nd process cruise, Healy is going to Dutch to fuel.
- Christensen will be loading his boxes in Nome.
- **Healy will be going to Japan from June 23 returning July 18.**

Everyone that ships here should also send manifest to Andy and Coast Guard

Ruble – Will there be some where to put frozen samples?Dry Ice? Fish processing in Nome? Talk to Andy Heiberg about this.

**J. Neal Amaral (Marine Science Officer:MSO)**

- Wants to stagger out truck shipments to pull up to the pier.
- Shipping/tracking site with Dave Forcucci, enter weight and dimension specifics.
- Lead PI or lead technician will log in to site
- Small packages were lost before, will include these in tracking system.
- Concerns raised about chemicals ordered and sent directly to ship will not have specific dimensions and weights
- Neal Amaral– namaral@healy.uscg.mil
- Last two weeks of March will be a shakedown cruise
- April 12 – 16 shipments & trucks – deadline for arrival
- **PI's can come to set up April 19th –23rd**
- **PI's can come with your stuff 12th – 16th**
- **Question Can we leave things on ship for both cruises? Ans. Don't see problem**
- Shipping – tracking site with specific weight and size, Lead PI & Tech
- Chemicals need to be ordered ASAP-see below
- Chemicals do not ship w/other shipments
- Ship separately or identify well HAZERDOUS stuff
- MSDS sheets sent ahead of time
- **Can PI's and Tech's stay on ship during loading? Ans. YES**
- **Ship will return to Seattle – 9 November**
- **Medical forms needed 1 month in advance before set sail in May 2004.**

**K. Chemical Ordering**

**[UPDATE Mar. 2004-All chemicals should be shipped to UW per email sent to group. See SBI website: http://sbi.utk.edu under 2004 Logistics info site]**

- NOTE: Make sure of lead time on chemicals, back order problems. Will chemicals have SBI and PI name on containers? You can request it when ordering, but there is no guarantee.
- Idea brought forward to coalesce chemical order and get from a local supplier? Decision was each PI handle own chemical order.

- Hendrickson: Email Neal with message like "today we ordered chemicals from this company" and include purchase order and invoice numbers.
- Neal will give us the web address soon.
- Healy will not be back until mid-November to Seattle
- Will be pier-side for all of April.
- Between sailing and Nome will be buoys, labs will be available to set up, no one will be there to baby sit gear. GOA can be rough.
- If people come during on load, they could direct where to take it—distinguish between lab and cargo hold.
- **Email to Kim who is going to come onload (by March 1)**
- Jackie G. will be conduit for pre-planning guide.
- Mooring cruise can load some small things in Dutch Harbor.
- Fueling in Japan between process cruises and fueling after process cruise in Dutch.

**L. Cruise Dates**

| | | | |
|---|---|---|---|
| Spring | 15 May – 23 June | Nome – Nome | (SBI Process) HLY-04-02 |
| Summer | 18 July – 26 Aug. | Nome – Nome | (SBI Process) HLY-04-03 |
| Fall | 6 Sept. – 1 Oct. | Dutch – Nome | (Mooring) HLY-04-04 |

**LUNCH**

**M. Logistics**

- Multibeam technician—chart-making type accuracy
- Multi Beam operation used particularly in Canyon Stations & can continue to use it operationally; Question: For process-oriented experiments, don't maybe need a multi-beam technician, the question is available berth space.
- Do we need tech for data (optional) [UPDATE: agreed to release one berth to tech for science sensor maintenance, including ADCP and multi-beam
- VANS – are at UW – RAD – OPTICS – Extra van (empty)
- **When do you load vans? [UPDATED: MARCH 8, 2004]**
- 2 vans on bow: Kirchman rad van and Sherr storage van
- What would go into the van & who would request it?
- Who goes in it & where will it be? Dean – Find out condition of vans & who would be there. Lou will take care of contacting the person at UW about the vans **[UPDATE: JACKIE HANDLED THIS]**
- Incubator and hoses
- Need the 2 low temp stand-up VWR incubators from storage, used in 2002
- Also 2 ultra-low freezers
- Vans: NSF: 2 vans on fantail deck, one Kirchman van on foc'sle
- Scripps will set up hydro lab.

*Comment: Rad van should have only tracers, some of other UNOLS vessels are essentially contaminated from prior work.

- Incubator connectors, hoses.
- No sink in future lab

- Pickart brought up point that mooring recovery is going to take up a lot of storage space. Could store anchors inside of vans? Ans. No, operational deck space is forward of the towing bit; these are UNOLS finished lab vans
- Moran needs van space

**ACTION: Benches in Future lab may be lowered to normal chair height.**

- Issues about not being able to connect computers (especially Macs) to network. Ashjian said it's a lot easier with OSX. No problems with PC's either.
- Repeater for CTD in lab is now there.
- Screen in lab—environmental lab.
- Better way to push floes away from side than bowhooks?
- Still 2 hours for internet , time will be up to us.
- Internet time lag is still being looked into.
- **Hendrickson needs to know about pullouts for gravity core.**
- Boxcore used 3/8th. Don't need 9/16, except maybe for trawls. .
- Will we want helo river sampling? Yes, spring and summer in Colville River from the EB line.
- Summertime- poss. Extend 15 to 20 miles farther than normal on transect lines
- No sediment sampling 4000m in spring
- Will have dive team aboard. Possible media interest, butno specific science projects.

*Question: Urea: Who cares about measuring urea? Ans. Yes, still in ice and Devol sediment. Do we need to measure it in the water column? High resolution versus urea measurements. Comment made that only time you need to worry about it is over the shelf.

**N. JOSS Field Catalog**

- Real-time display of ship track, station and mooring locations
- Event log
- Mirrored site in Boulder
- Satellite imagery
- Onboard plots/listings
- Web forms to help PIs
- Journal for teacher
- Consider forward-looking web cam
- GIS implementation to compare all cruises.
- News regarding datasets they receive. He's in charge of posting data.
- Need final cruise reports for this year: still need HLY0303 cruise report, station locations, CTD data, bottle data, underway data, and seabeam
- Still need NBP03-4A cruise report, satellite data, 2003 –14 HELO
- Interactive data mapper; HLY04 deployment plans – Intergrate the Int. Data Mapper W/ JOSS field catalog aboard ship and in Boulder.
- Built on Open GIS Mapserver software
- Creating a shapefile to make maps
- Preparation of integrated datasets to aid analysis efforts
- "Basin-wide" SBI high resolution bathymetry

- Consolidated station list (all cruises)
- Integrated hydrographic analyses
- Are there special transect (eg. EB, BC, WHS) datasets that need to be prepared?
- Are there other integrated datasets that should be built?
- Do we have a workable base map for analysis?
- Are there data from other projects that need to be available during SBI analysis?
- Does this GIS mapping include password protection? It's our call.
- Provide 2002/2003 catalog products for comparison (eg. Seabeam, station, location data plots)
- JOSS can provide other assistance to document/logging tasks
- Be sure to look at front page at all times data changes quite a bit. Any problems or questions be sure to contact Greg directly. gstoss@ucar.edu
- Ice motion
- Keep real time ship track & station information in the IDM
- Mirror this data back to Boulder w/ a suitable time delay
- Maintain layers for all past SBI cruises
- Include current seabeam data (Save data picture pig file not gif)
- Advance open GIS
- Will you be able to pull seabeam realtime?

END OF MEETING FOR DAY
**DECEMBER 5, 2003-FRIDAY**

**P. Jackie – Talking about all projects involved.**

- Joint meeting between CASES & SBI would be very productive
- RUSALCA cruise—would be next year. Chukchi Sea to Herald Canyon slope. RV Khromov; July, August, or September—ice minimum time. Nome-Nome for Khromov.
- Russian American Long term Census of the Arctic through NOAA
- Focus Chukchi Sea to slope Herald Canyon
- Can leave vans on for NOAA cruise on HEALY
- Snow Dragon going out in 2005
- Oden will be out in 2005
- Tandem Healy/Oden cross-Arctic section
- NOAA will be getting on Healy after mooring cruise is over.
- Cadiz IPY07-08 plans. White paper is being presented at the international Paris meeting today.

**Q. Standardized SBI Transect Names**

- Issues with station names, how close casts are to actual station coordinates. Terry likes to use the CTD cast number.
- 1 station=5 nm radius. Only way to get all of our measurements in.

Transect Names
EB – East Barrow
BC- Barrow Canyon
EHS - East Hanna Shoal
WHS - West Hanna Shoal

HV - Herald Valley*
HC - Hanna Canyon
BS – Bering Strait
* Herald Valley evolution to Herald Canyon name change between cruises. HC=Hanna Canyon, not Herald Canyon

**Note for Process cruises**: had 5 nm circle around center station point, complete circle and interior consider "a station"

**R. Terry Whitledge**

- RUSALCA cruise (means mermaid), 65m ship, Profesor Khromov
- Mid-August through Mid-September, 45 days Vladovostok-Vladovostock
- 21 days Nome-Nome
- 30 science berths-6 Russian techs=24 berths
- Letters of intent followed by proposal on Dec. 5, Russian collaborators will be known after Feb. 10

**S. DSR Papers**

Papers all go to Jackie March 1st (deadline) If you use other peoples data you should offer co-authorship to them.

END OF MEETING

**FRIDAY AFTERNOON: OPEN TOPICS FROM SBI AC MEETING**

- NSF supplement funding provided for: hydrography interpretation, XCTDs

- SBI Phase 3: pan-Arctic synthesis, SBI in pan-Arctci partnerships

1. modeling-scale up issues
2. measurements vs. modeling
3. work towards pan-Arctic models
4. scaling issues: response to change, ask questions "what happens if removed all ice cover over slope"
5. How will the Arctic system respond to Arctic change? E.g., Currents, productivity, zooplankton
6. What do we need to answer these questions?
7. priorities and themes for modeling, need questions to guide modeling effort, an interactive process
8. need be pro-active, ACTION: SBI AC draft Phase III plan from SBI science and implementation plans, input from pan-arctic meetings; Phase III: Synthesis, Integration and Modeling
9. **ACTION: debrief NSF, OPP, OCE, ONR, NOAA on SBI Phase II results Fall 2004, plans for Phase III**