

• PolarTREC

• 2010 International

• Continental Shelf Survey



(A Centennial
Cyclone goes
to the
Arctic Ocean!)

PolarTREC:



- Funded by National Science Foundation
- Teachers connected with polar researchers

Teacher roles:

- Learn science
- Help researchers
- Outreach (journaling, curriculum development, etc.)



Our Expedition:



- Multi-year project to map sea floor (bathymetry), chart sub-sea floor features (subbottom profiler and seismic), and collect seabed samples in selected areas north of Alaska and Canada.
- Done in cooperation with Canada to support anticipated future extended continental shelf claims under UN Law of the Sea.



Additional Science



- Ocean acidification study and water sample recovery
- Ice monitoring and drift buoy deployment
- Marine mammal observation



Our Science Platform



US Coast Guard Cutter Healy



- 420-foot long polar-class icebreaker
- 16,000 Tons
- 30,000 Horsepower
- Crew of about 80
- Designed primarily for science support, can house 35+ scientists
- Extensive science labs
- Dedicated science computer network with map server & satellite internet
- One deck for scientist berthing, conference room, & lounge
- Dedicated water sampling gear
- Dedicated multibeam swath sonar
- Dedicated subbottom profiler
- 5 cranes & 2 A-Frames
- Helicopter deck & hangar
- 3 small boats available
- 24-hour Marine Science Technician support



Canadian Coast Guard Cutter Louis S. St. Laurent



The Louis



- Operates seismic system
- Provides helicopter support
- Can break ice for Healy when not collecting seismic data



Geophysics:



1) Reflection-seismic Profiling

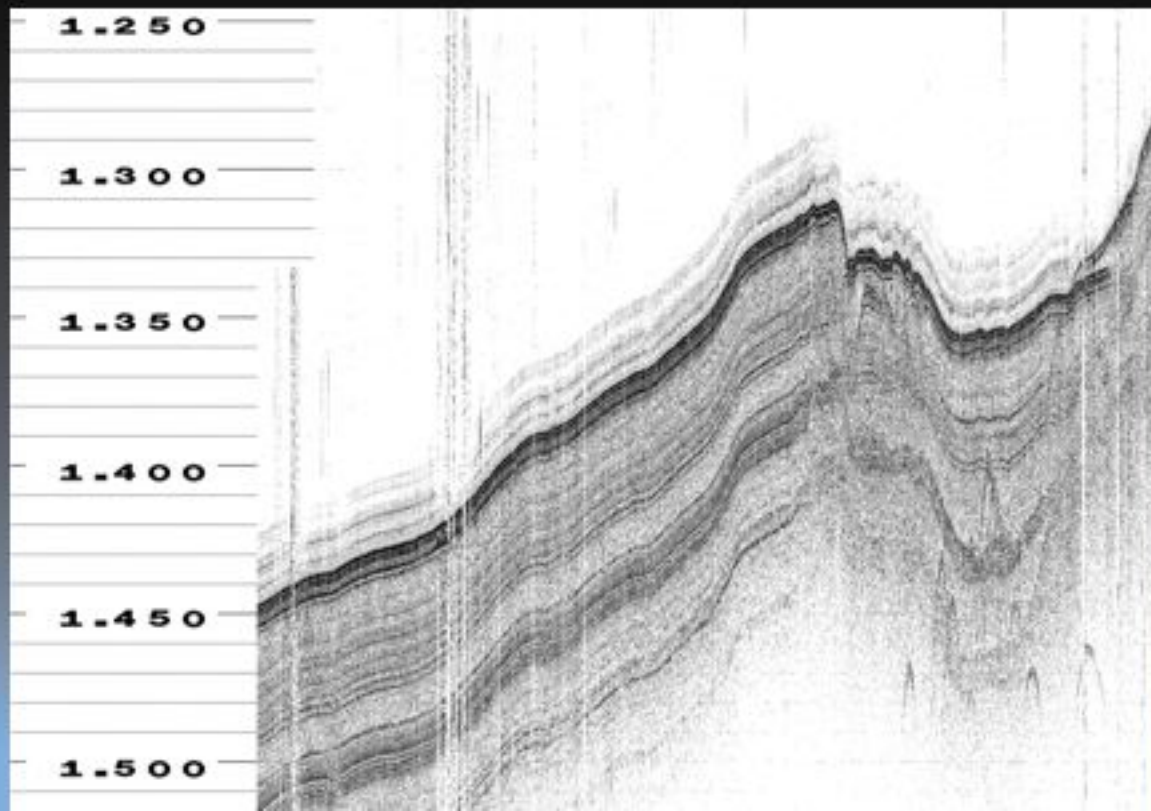
- Air-generated pulses of acoustic energy penetrate sea floor
- Returning reflected waves recorded by towed streamer containing hydrophones
- Computers sort out signals and generate subbottom profile 1000's of meters deep.



Geophysics:



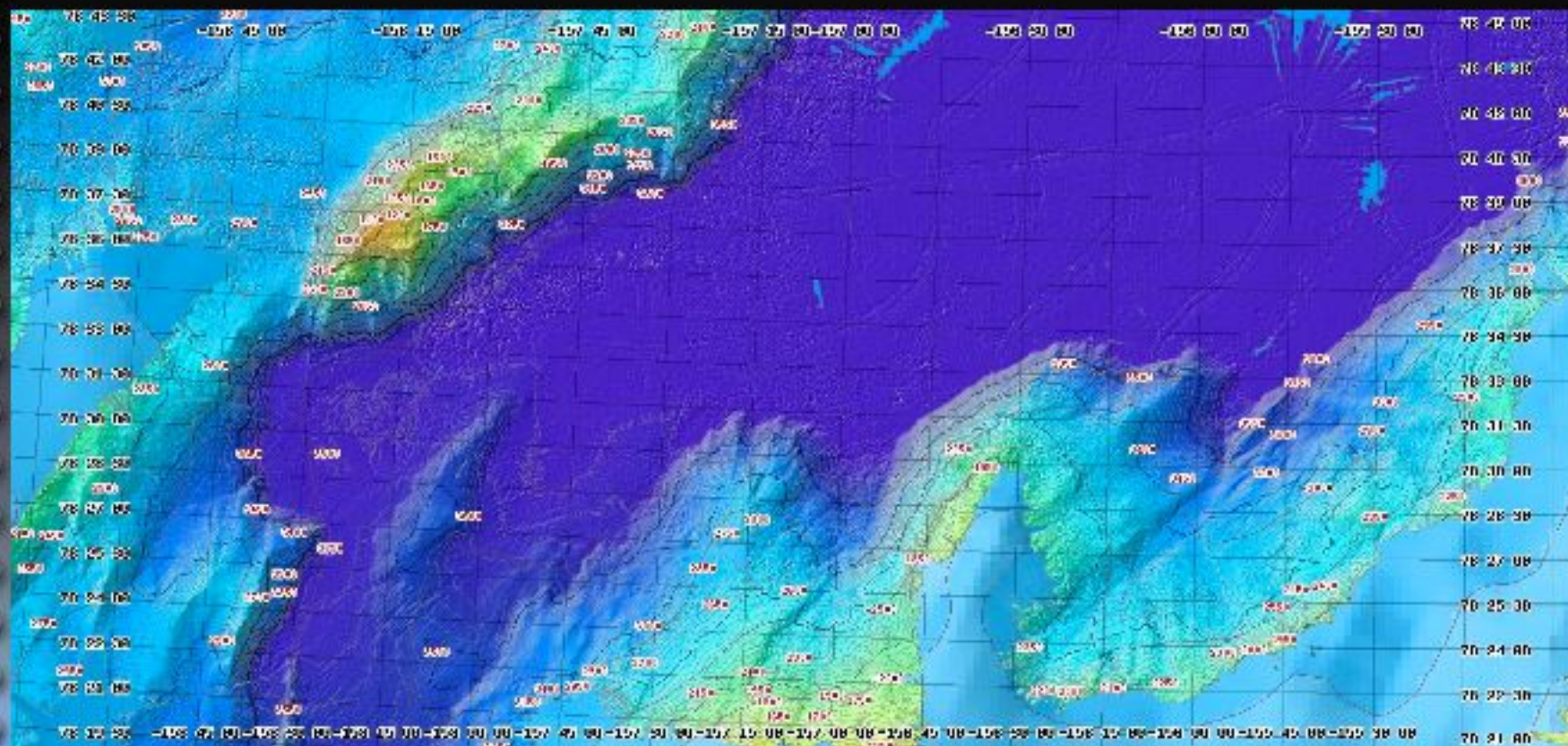
- 2) Single-beam chirp subbottom profiler
 - 2D sonar that returns bottom depth and ~ 10's of meters of subbottom profile
 - Faster results and less fussy than seismic gear



Geophysics:



- 3) Multibeam swath sonar
 - 3D sonar that maps bathymetry
 - Initial results on map server instantly



Geophysics Team:



Brian Edwards
U.S. Geological Survey
Chief Scientist



Jonathan Childs
U.S. Geological Survey
Associate Team Chief Scientist



William Danforth
U.S. Geological Survey
Scientist



Andrew Stevenson
U.S. Geological Survey
Scientist



Thomas O'Brien
U.S. Geological Survey
Scientist



David Street
Canadian Hydrographic Service
Hydrographer



Peter Triezenberg
U.S. Geological Survey
Scientist

Bottom Sampling:



- Gravity, Piston, Dart, and Box Coring
- Chain dredging



Bottom Sampling Team:



Pete dalFerro
U.S. Geological Survey
Engineering Technician



Jenny White
U.S. Geological Survey
Engineering Technician

Arctic Ocean Acidification Study:



- Increasing CO₂ dissolved in sea water lowers pH
- Precision measurements every 2 hours from surface water
- Precision measurements from water column to ~3800 meters 10 times or so via CTD cast



Ocean Acidification Team:



Christopher Dufore
U.S. Geological Survey
Scientist



Sherwood Liu
USF
Scientist



Mark Patsavas
University South Florida
Scientist



Ice observing & analysis:

- Ice observed and charted from ships and helicopter
- Satellite images analyzed for ice conditions
- Drift buoys deployed in ice pack



Ice Team:



Erin Clark
Canadian Ice Service -
Environment Canada
Ice Services Specialist



Pablo Clemente-Colon
NIC/NOAA
Scientist



Joshua Miller
NIC/USCG
Ice Analyst/Buoy Technician



Caryn Panowicz
NIC
Ice analyst (Louis)

Marine Mammal Observation:



- MMOs on duty 24/7
- If marine mammal sighted, distance maintained or sound-emitting operations stopped
- Also have Native Community Observer on board



MMO Team:



Kwasi Addae
MRAG
marine mammal observer



Sarah Ashworth
MRAG
marine mammal observer



Ralph Kaleak
BASC
Native community liaison



Justin Pudenz
MRAG
marine mammal observer

Outreach:



- Bridge between science and public
- Online journals, lesson plan & resource development



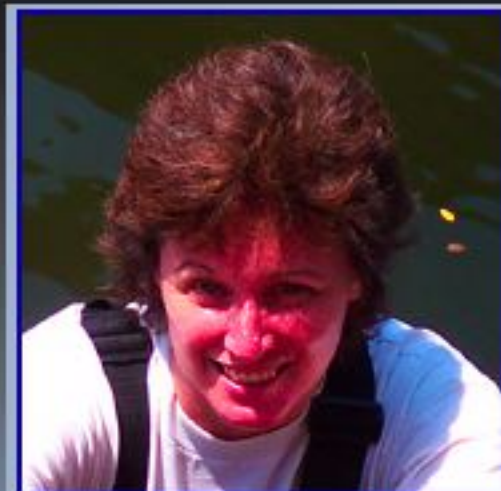
Outreach Team:



Helen Gibbons
U.S. Geological Survey
Scientist



William Schmoker
PolarTREC Arctic Research Con.
Teacher outreach



Caroline Singler
NOAA/Teacher-at-Sea
Teacher outreach

Science & Tech Support:



- Keep complex science, navigation, & computer systems running
- Consult with scientists as questions and issues arise regarding data collection, equipment support, etc.



Support Team:



Tom Bolmer
WHOI/LDEO/NSF
Data Specialist



Dale Chayes
LDEO/NSF
Science Systems Engineer



Steve Roberts
NCAR/LDEO/NSF
Computer engineer



Donny Graham
ESU
Internet Technican

Coast Guard Marine Science Technicians:



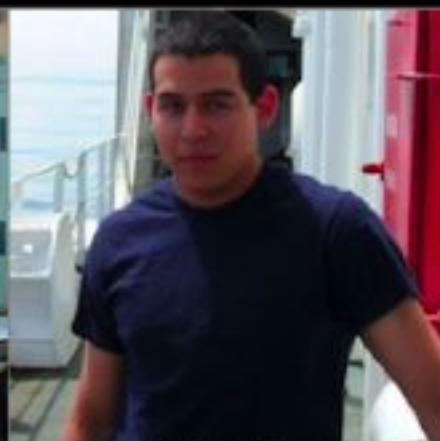
MST2 Daniel Jarrett



MST1 Horsos Brittle



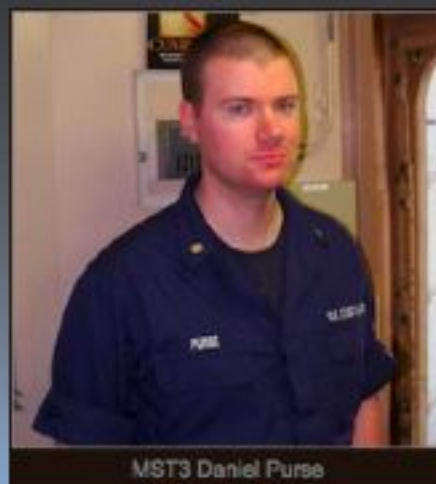
MST2 Owen Dicks



MST3 Marshal Chaidez

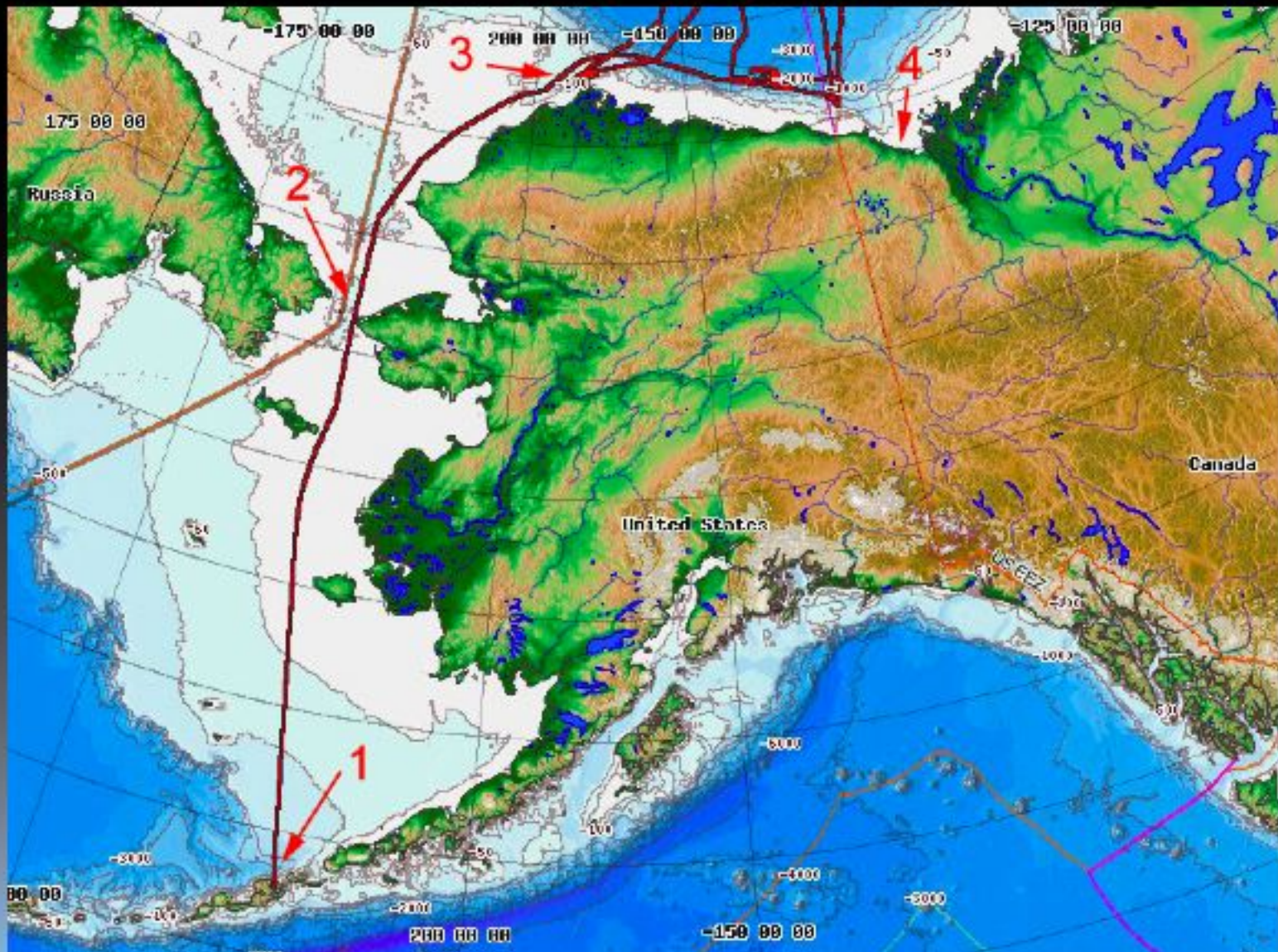


MSTC Kirt Stewart

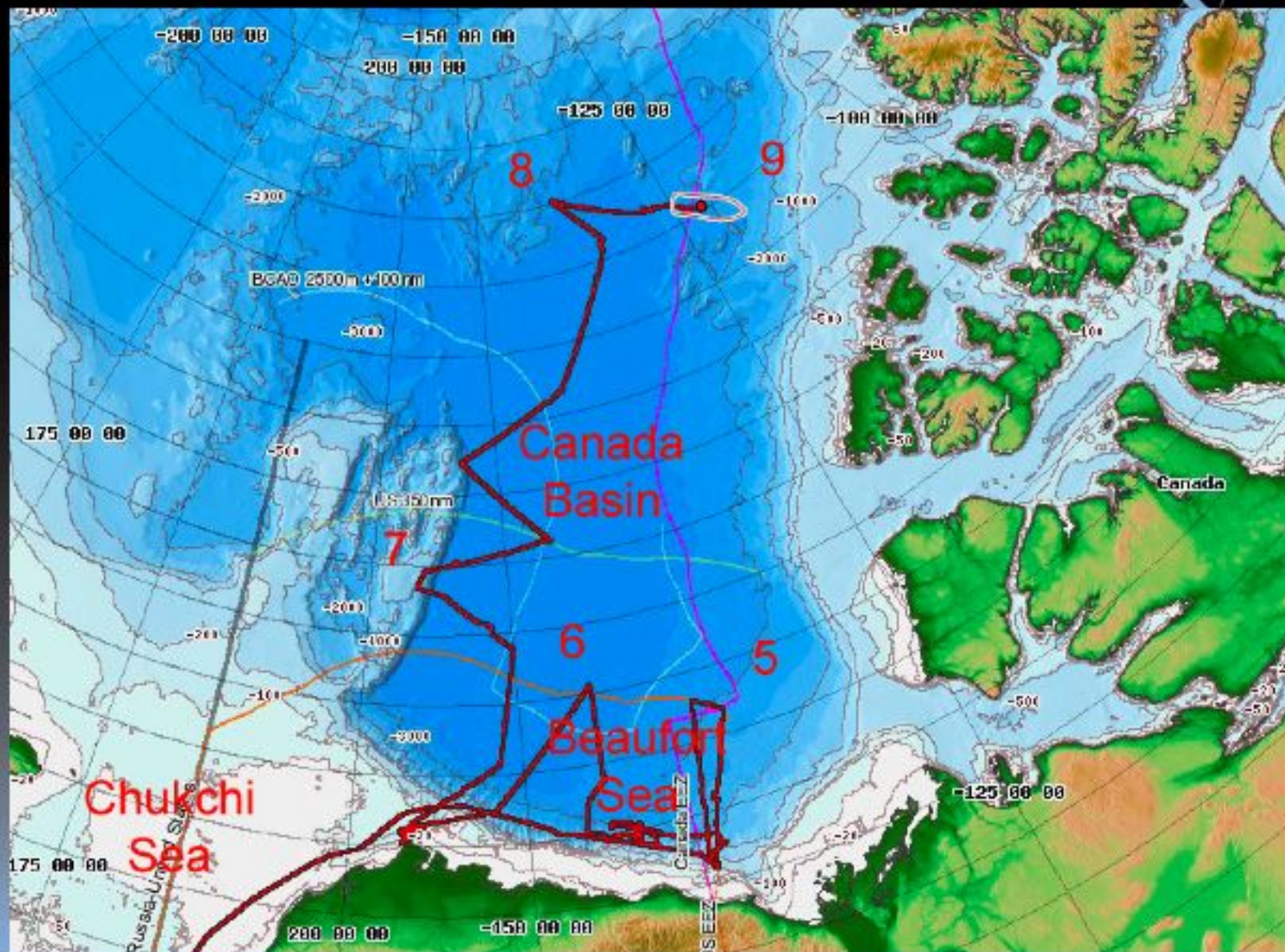


MST3 Daniel Purse

Where we've been (1):



Where we've been (2):



Daily Routine:



- Ship activities run 24/7
- Jobs divided into 'watches'
- Typical day for me:
 - ✓ 07:00 Wake up, get dressed.
 - ✓ 07:30 Breakfast
 - ✓ 08:00 - 11:15 Take photos, video. Edit photos, video. Write journal.
 - ✓ 11:15 - 11:45 Lunch
 - ✓ 11:50 - 16:00 Geophysical watch.
 - ✓ 16:00 - 17:00 More work on photos, video, writing.
 - ✓ 17:00 Dinner
 - ✓ 18:00 - 22:30 Finish photos, video, writing for day. Misc. wildlife watching, email, catch up on photos & video editing, writing. Maybe watch a movie.
 - ✓ 22:30 - 23:00 Shower, ready for bed, and in my rack.

Special Events:

- Coring opportunities
- CTD casts
- Visit the Louis / Arctic Olympics
- Saturday morale dinner, bingo, hangar movie



Thanks! Questions??



