GEBCO-Related High Arctic Activities - Summer 2011
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Geological Survey of Israel (Retired)
HEALY-1102

Law of the Sea

and why we are here
HEALY-1102

What we’ve done
HEALY-1102
15 Aug - 28 Sept 2011

ECS data 9,188 kms bathy
~875 km seismic
Total trackline - 11,447 km

Area mapped ~ 58,000 km²

Average sea ice state... 9/10
Average speed in ice..... 3.5 knts
Barrow Margin Survey
16–21 August
Before HLY-2011
Rendezvous 23 August
LSSL discovers loose prop on 20 SEPT.
LSSL Monitor Records

Chukchi

Line 1

Line 2

Line 3

A/M

Line 4b

Makarov Basin

Alpha/
Mendelev

Lomonosov
Marvin Spur 3-6 Sept.

CPA NP -- 88° 27.4626' N
159° 22.05' E
Hyperbolic Echoes on Alpha/Mendeleev Ridge
12 Sept

18 Sept

Sever Spur

2 seismic lines
AUV deployment
Sever Spur

+ AUV SURVEY
Advanced Microwave Scattering Radiometer
Spreen et al 2007
Ocean Acidification

pH and CO₂

8 CTD's
ICE OBSERVATIONS and BUOYS

1 - UpTempO buoy
2 - AXIB's
8 - Surface Velocity Program Drifters

0-3/10ths
10-20% Old ice
remainder Thick 1st year ice and new ice

OPEN WATER

9-10/10ths
70-100% Old ice
remainder Thick 1st year ice
HEALY 1102
15 Aug – 28 Sept 2011

operations ................... 44 days
transits ........................ 8 days
average speed (in ice) ......... 3.5 kts
average sea-ice state .......... 9/10
tracklines..(ECS) ............ 9,188 km
total trackline ............. 11,447 km
Area mapped ............. 57,817 km²
US ECS Arctic Mapping

operations .................. 191 days
transits ..................... 43 days
average speed (in ice) ...... 4 kts
average sea-ice state ........ 9/10
tracklines .................... ~50,787 km
Area mapped ............... ~320,000 km²
R/H SABVABAA - In the Eastern Arctic
By now, we have logged 1.700 n.m. driving north of the ice edge. This is equivalent to 3x the great circle distance from the ice edge north of Svalbard to the North Pole. Ice conditions this year were the best we have had and we were able to average over 7 knots over several 10’s of nautical miles. With the rocks we recovered from the sea bed earlier and now from as far as 82 N, we are able to deliver what we promised and have had support from the Norwegian Petroleum Directorate for 3 seasons now.

We are slowly getting acceptance for the notion that hovercraft is a useful alternative platform for science in the Arctic Ocean as the Germans have come and asked us to join their icebreaker expedition into the central Arctic Ocean in 2014. The craft continues to impress me with respect to traversing difficult ice. Damage to skirt segments is minimal, but safety links are regularly consumed. Have junked only 4-5 segments so far.

2011 - 30 dredges, CSP, seismic buoys, E/S buoys tested.
Tests of geophysical acoustical equipment
Seismic Profiler – 20 in and 6 element array
CHIRP, 12/200 kHz Echo Sounder
Some scenes from Summer 2009-2010-and-2011 activities

A CTD lowering through a seal’s breathing hole
The Aagaard ADCP Current Profiler being set up for measurements while the crew sleeps.
More tests of one of our two autonomous drifting seismic profiling buoys
Details:
OD 4 inches
E/S 12 kHz
Capability 5000 m
Weight 40 kg
Lifetime: 4 years
Cost: $3,000 (?)

Christian Michelsen
Research AS,
Bergen
Summer 2009 tests will use a SyQwest EchoBox configured to use a 3.5 kHz transducer to obtain 4000 m bathymetry, Maybe a drifting subbottom profiler?
In 2010 our payload was raised by 50% - we carried 2500 liters of diesel - note fuel bladder in addition to the 1500 liters in Vetus tanks.
A first: Dredging for rocks in 400-800 m of water over the Yermak Plateau
The Hydraulic Winch with Capstan Drive - three turns of kevlar aramid fiber rope
Freshwater Switchyard CTDs through a 12" hole
Possible Future SSPARR E/S Buoy Implantations?
Thank you for your attention

Photo courtesy Dave Monahan, UNH-CCOM-GEBCO/Nippon