

Norwegian Coastguard to the Rescue!

Statoil is extending an ocean current and ice thickness monitoring program which started in the Greenland Sea in 2012 (in partnership with NPI and NTNU) by deploying four moorings in the Barents Sea. The moorings ASL recovered from the Greenland Sea in August and September 2013 were refurbished and re-deployed in the Barents Sea in Oct 2013. The four Ice Profiler/ADCP/CTD Logger taut-line moorings were successfully deployed from the R/V Lance out of Tromso Norway. Deployment duration will be one year.

One week after deployment, one of the moorings was accidentally cut loose by a fishing trawler! ASL was alerted immediately, 4000 km away, by an automatic message sent from the Xeos Iridium Satellite Beacon, which was also part of the mooring.

The Norwegian Coastguard vessel NOCG Andenes was sent to the rescue and successfully recovered the buoy.



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Shallow Water Ice Profiler™

Peace River Flood and Power Production Management

ASL has successfully refurbished and redeployed 2 real-time Shallow Water Ice Profilers in the Peace River for BC Hydro. The SWIPs have been deployed every year since 2004.

The data collected is relevant to river flood management and is used to calibrate BC Hydro's model of the river which is vital for flood and power production management. The data is internet enabled – it can be downloaded remotely. Data from the 2012-13 season shows concentrations of frazil ice much less than generally expected and implies large underestimates of anchor ice growth. The 2013-14 program is directed at getting further information regarding these same issues.

Recent Projects on the North BC Coast

For many years, ASL has been **collecting oceanographic data** in the north BC coast region for engineering firms, pipeline firms, and oil and gas companies. The data is collected using various moorings and instruments, depending on need, and is used as input into terminal design, pipeline design, and as baselines for environmental assessments. Recently ASL has been working extensively in the Prince Rupert, Kitimat, Stewart and Kitsault areas.

Our remote sensing team, with experts in coastal bio-oceanography and bio-ecology, has been mapping phytoplankton blooms and shoreline ecosystems all over the world since 1983. Airborne and satellite remote sensing data provide a cost-effective tool to create detailed and accurate maps that are critical for effective coastal and marine management: Baseline maps of marine vegetation habitats are key for successful environmental impact assessments, and for monitoring cumulative impacts from various stressors that have profound implications in coastal bio-physical processes.

Mapping and monitoring of marine habitats using remote sensing is essential, not only for their intrinsic value in the overall bio-ecological system, but also for their associated economic value as habitats to valued species in fisheries (salmon, herring) and harvesting (kelp farms), as well as for coastal erosion protection (kelp beds).

During the last 12 months, ASL has been engaged in many projects in the northern BC coast. Seven of these projects were metocean studies conducted for industry applications related to north coast ports and underwater pipeline routes. Two of the studies were related to habitat mapping as described above, and nine were **advanced numerical modeling studies**.

ASL has developed and continues to refine the high-resolution 3D Coastal Circulation Model (COCIRM) used in support of determining the transport and fate of sediments released from proposed industrial developments, such as dredging for ports, installation of marine pipelines and disposal at sea (DAS) of dredged materials in designated ocean disposal sites. ASL's model includes a modular version (COCIRM-SED) that allows detailed modelling at very high spatial resolution in both the horizontal (< 100m) and the vertical layers (from a few to tens of meters in size) of sediment transport and fate due to 3D ocean currents and episodes of waves. Figure 2 shows an example of ASL-COCIRM-SED numerical model results, representing the total bottom deposition resulting from the disposal at sea of dredge materials 21 days after completion of all disposals at the Brown Passage regional disposal site in the Prince Rupert Area.

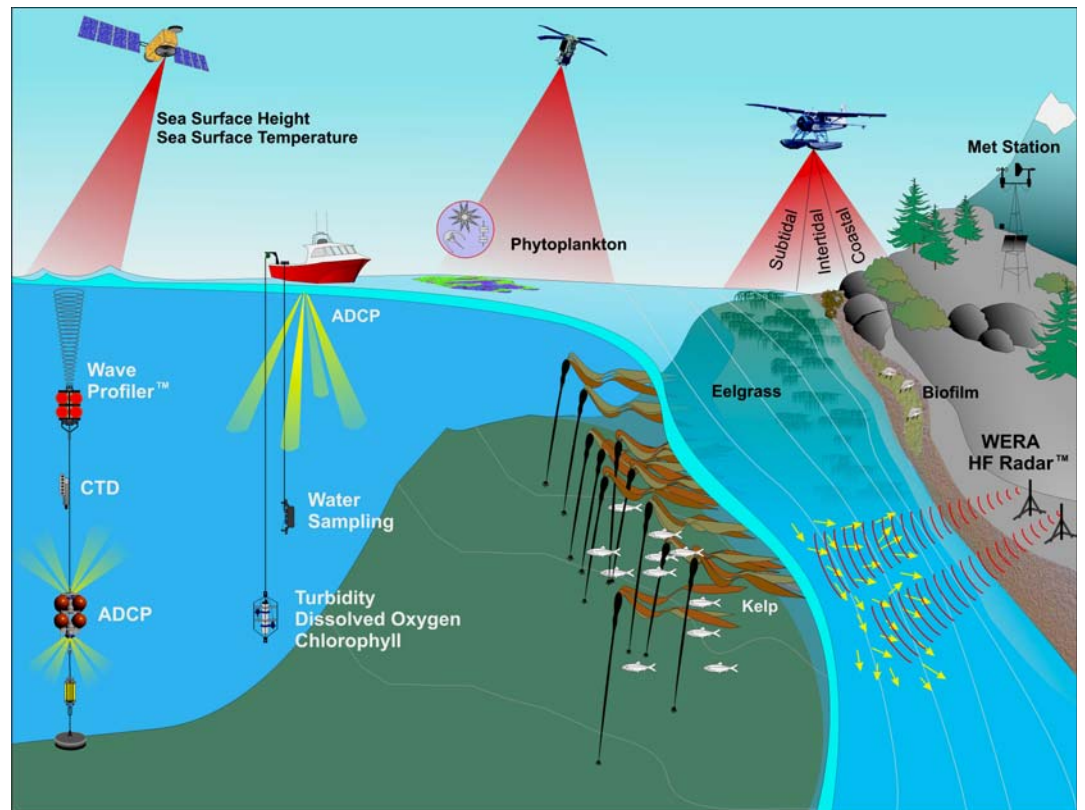


Figure 1. Integrated Multidisciplinary Approaches in the North BC Coast

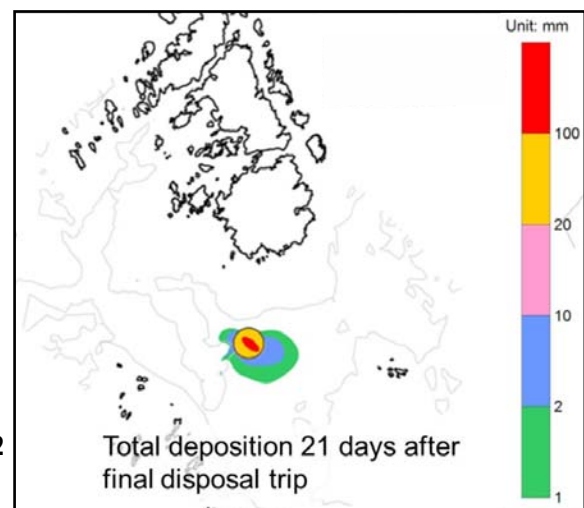


Figure 2
Total deposition 21 days after final disposal trip

Acoustic Zooplankton Fish Profiler™ news:

The AZFP provides continuous high-resolution time series of acoustic scattering strength throughout the water column. The data can be used to monitor the presence and behavior of zooplankton and fish, as well as physical processes such as internal waves, sediment suspension and scattering from bubbles.

2-Frequency AZFP to Korea

Hyoung Sul La, Ph.D. of the Korea Polar Research Institute, Division of Polar Ocean Environment has purchased a dual channel AZFP. The 38/125kHz AZFP, with optional pressure sensor and an angled cage to deploy the instrument on a taut line mooring, was deployed in the centre of the Amundsen Sea coastal polynya in the Southern Ocean in January 2014. The instrument will remain moored for 1 to 2 years at a depth of 200 – 300 m.

The Amundsen Sea coastal polynya is an ideal location to assess the seasonal variation of krill in ice covered waters because it is one of the most productive regions in the Southern Ocean. Thus, the AZFP coupled with physical sensors will help to understand the krill ecosystem and population dynamics over a period of several months to a year.

Norwegian AZFP to the Antarctic

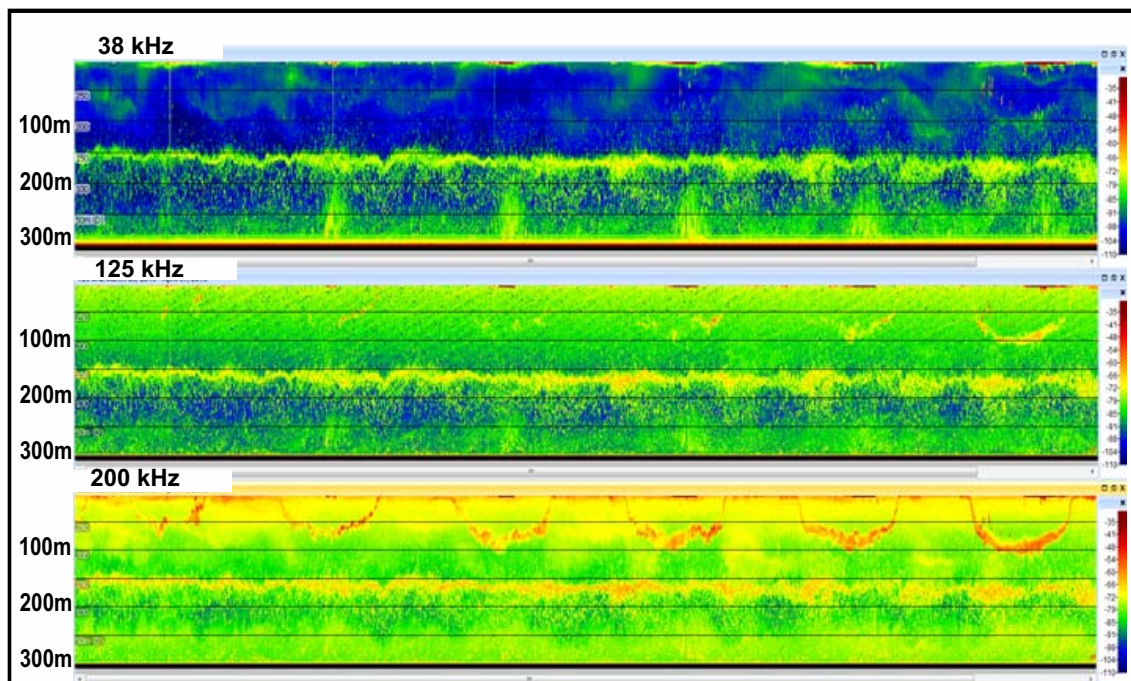
Dr. Gavin Macaulay of the Institute of Marine Research (IMR) in Bergen Norway has purchased an autonomous single channel 125 kHz AZFP, for collection of long-term acoustic backscatter data from biota.

The purpose is to study the behavior and vertical distribution of krill around the South Orkney Islands in the Southern Ocean. The instrument is moored at 200 – 300 m water depth, for 1 year starting in the 2013/2014 austral summer. Future projects will include measurements in Norwegian waters both as an autonomous deployment and as part of a larger mooring package.

Another AZFP sent to VENUS

ASL and Ocean Networks Canada have installed a bottom-mounted, upward-looking 3-frequency AZFP (38, 125 and 200 kHz) on the VENUS Cabled Observatory, at 300m depth, in the Strait of Georgia, BC. The AZFP is connected to the VENUS node, which provides power and data transmission.

ONC is developing data handling software to provide near real-time images on the ONC website as is done for the single frequency AZFPs at other VENUS sites. The data will be available for scientists interested in ecosystem dynamics, fisheries and physical oceanographic processes in the southern Strait of Georgia.



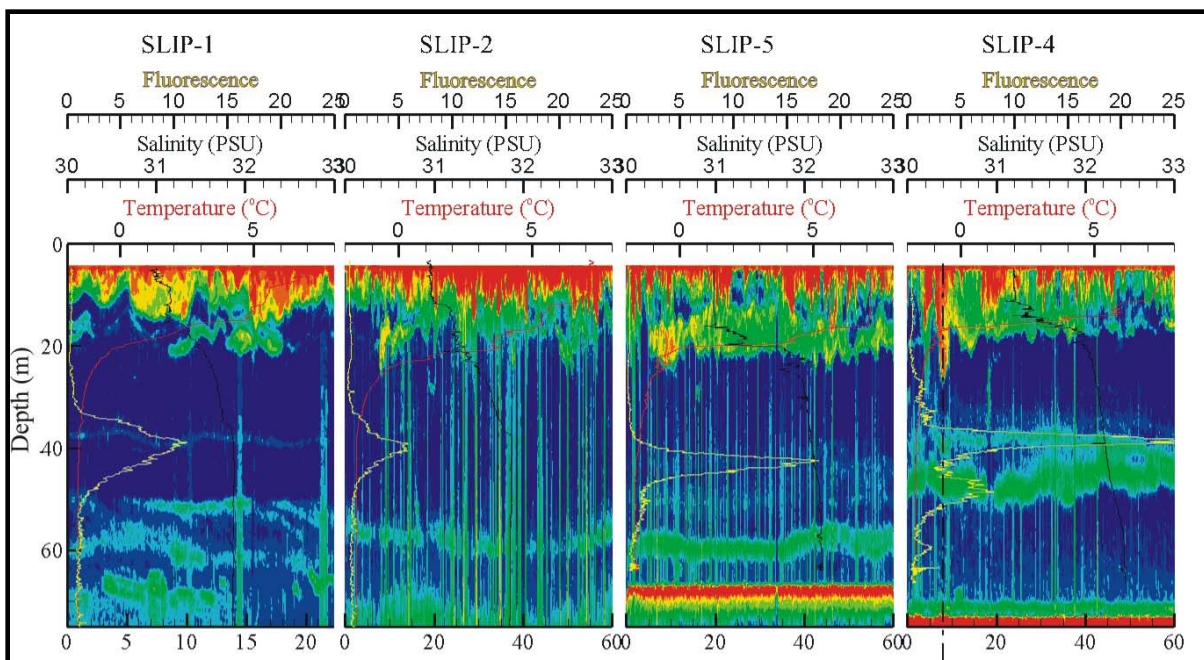
Six days of data from the AZFP. The diurnal zooplankton migration is most clearly apparent in the 200 kHz channel.

Studies of Biophysical Processes in the North Bering and Chukchi Seas

In the summer of 2013, Dr. John Nelson of Seastar Biotech, in collaboration with Fisheries and Oceans Canada and ASL Environmental Sciences deployed an instrument package consisting of a multi-frequency AZFP (125, 200, 455, and 769 kHz) fastened to a cabled ADCP (150 kHz) in the North Bering and Chukchi Seas.

The primary objective of the project is to generate taxon-specific plankton abundance estimates using the combined differential volume backscattering profiles of the biotic layers from the AZFP with current estimates from the ADCP. A secondary goal is to examine the correspondence of water column properties with layering patterns to get an idea of how water properties influence the horizontal distribution of zooplankton and phytoplankton.

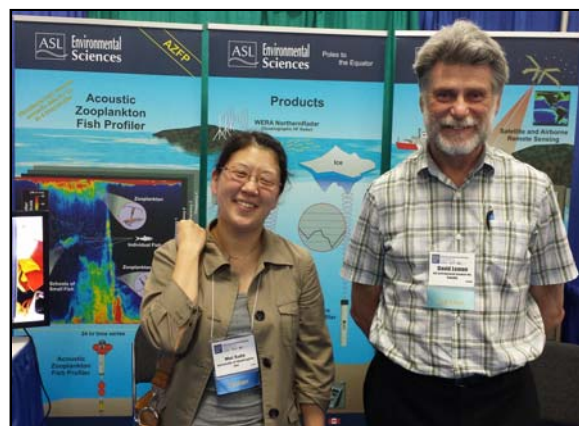
Water column properties superimposed on 125 kHz echograms from four stations in the North Bering Sea. Shown are profiles of fluorescence in yellow, salinity in black, and temperature in red.



Upcoming Conferences

Salish Seas 2014 Seattle	April 30
OTC 2014 Houston	May 5-9
CMOS 2014 Rimouski	June 1-5
ISOPE 2014 Korea	Jun 15-20
IWMO Halifax	Jun 23-27
IceTech 2014 Banff	July 28-31
Oceans 2014 St John's Nfld.	Sept 14-19

At CMOS, Mar Martinez de Saavedra Alvarez is chairing the Interdisciplinary session called "Science, Policy and Management of Northern Environments" and David Fissel is leading a workshop session titled "Arctic Special Interest Group (Arctic SIG): Arctic science infrastructure and monitoring - Are we there yet?"



David Lemon and guest at ASLO Ocean Science Meeting 2014 Hawaii Feb 2014



ASL Environmental Sciences Inc.
 #1-6703 Rajpur Place, Victoria, BC, Canada V8M 1Z5
 Phone: 1-250-656-0177 Fax: 1-250-656-2162 Email: asl@aslenv.com
www.aslenv.com