



Solutions

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The Newsletter For The Aquatic Sciences

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Currents & Waves Projects

Drydock Currents

Current profile and water level data were required for operations at a floating drydock in Vancouver Harbour. One month of data was collected for Sandwell Engineering using an upward-looking ADCP. Tidal height and current analysis were used to generate 15-year predictions.

On the equator... For Marathon EG

A metocean measurement and analysis program was undertaken at 6 coastal locations off northwestern Bioko Island, Equatorial Guinea. At each site, the measurements included current

profiles, ocean waves, water levels, and water temperatures. A coastal weather station was also installed and operated. The measurements span a full one year period, with extensive analysis of the data, to characterize the metocean conditions for input to design of ship loading facilities.



Vancouver Harbour

Processing of ADCP Wave Data from Peru

ASL was contracted by Sandwell Engineering to extract directional spectra from raw Acoustic Doppler Current Profiler (ADCP) files, and to convert these spectra into a format consistent with Oceanweather's GROW (Global Reanalysis of Ocean Waves) model output. The directional spectra were measured by a 300 kHz RD Instruments ADCP which was rigidly attached to a heavy PVC pipe which had been jettied 2.2 m into the seabed. The ADCP was located 2.4 meters above the seabed, in a water depth of about 15m. The measurements were made off the Melchorita coast, Peru. Measurements have been made at this site starting in November 2003. The results of the analysis of the 2003-2004 data sets have been presented in a previous report (Borg and Fissel, 2005). Measurements were continued from November 2004 to February 2006 over 10 deployments

Solid-walled Aquaculture

Middle Bay Sustainable Aquaculture Institute is testing solid-walled cages in the sea for salmon farming in order to minimize exchange with local waters. The discharge would be filtered before being released. ASL was contracted by Westmar Consultants to do current measurements at the potential tank locations to provide data on the current forces in order to design the mooring system. Transects were done, then a current meter mooring was deployed for one month.



Kelowna

Goodnews Bay

ASL supplied equipment, know-how and data analysis to Eric Knudsen, Consulting Fisheries Scientist, for current meter transects near an outfall of a fish processing plant in Goodnews Bay, western Alaska. Eric is working on the project for Coastal Villages Region Fund.

Kelowna Bridge Waves

ASL is assisting the Ministry of Transportation with wave data collection in Okanagan Lake near Kelowna. Wave measurements are required to determine the effect (if any) of the construction of the new Kelowna bridge on the wave climate at a nearby marina. An ASL Wave Profiler is being used to measure waves from both wind and boat wakes. The Wave Profiler measures actual water level every half-second. Measurements will extend over a couple of years.



Renewable Energy

Great Bear River

ASL carried out current measurement transects for Tollhouse Energy Company to identify the best place to put a run-of-the-river hydro turbine in the Great Bear River, in the Northwest Territories. The nearby Dene village depends on diesel generators and would like to extract their power from the river. The lake and parts of the river freeze up but the upper section of the river remains ice free all year and should be suitable for a run-of-the-river turbine installation.

NaiKun Wind Farm

NaiKun Wind Development Inc of Vancouver BC plans to extract power from the plentiful winds of Hecate Strait. They will install wind turbines on Dogfish Bank, a shallow area to the east of Haida Gwaii (Queen Charlottes, BC). The design criteria for construction and installation of the turbine towers require knowledge of the current velocity and wave field. Dogfish Bank experiences strong tidal currents, and severe winter storms. Wave heights could reach 10 m or more. ASL was contracted by Sandwell Engineering to measure current velocity profiles and directional waves over the winter of 2006-2007. A heavily weighted, low profile bottom frame was used to house the ADCP instrument.

Exciting News - WERA Remote Ocean Sensing System

ASL is now the North American sales and service representatives for WERA Remote Ocean Sensing Systems, in cooperation with Helzel Messtechnik of Germany.

WERA is a shore-based Remote Ocean Sensing System for measuring ocean currents, waves, and wind over long distances and large areas. WERA produces ocean current maps from ranges of more than 200km offshore with good spatial and temporal resolution.

The WERA system has no in-water components, is robust and easy to handle by local experts and it is less expensive than in-water sensors. The continuously acquired data contains valuable information for multiple users

ASL has attended training sessions with Helzel and is ready to start the first joint installation in Florida for the University of South Florida.

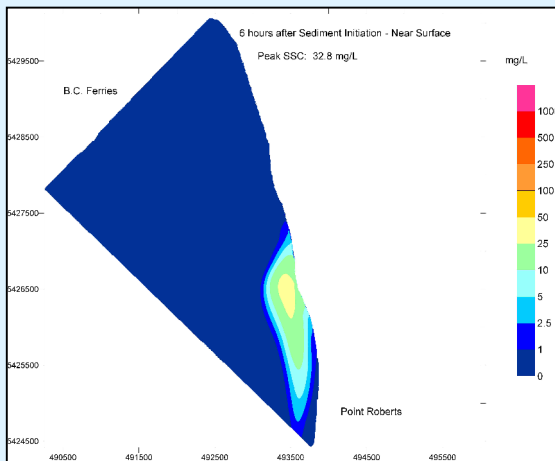
ASL will support already installed and future WERA systems.

For more info on the WERA go to: www.helzel.com



Colleen McQuade (ASL) and Thomas Helzel (Helzel Messtechnik) in our shared booth at Oceans 2007 Vancouver.

Numerical Modeling



Sediment Plume and Dispersal Modeling at Vancouver Island Transmission Refurbishment Project Landing Sites

A three dimensional (3-D) integrated numerical model for computing ocean currents and sediment transport in shallow coastal areas was applied to simulate the dispersal and deposition of suspended sediments resulting from the removal of three existing 138 kV cables and the installation of three 230 kV submarine transmission cables. This work is part of the proposed Vancouver Island Transmission Reinforcement Project planned by the British Columbia Transmission Corporation (BCTC). The underwater cables go from English Bluff Terminal in Tsawwassen to Taylor Bay Terminal on Galiano Island and then across Trincomali Channel from the Montague Bay Terminal to the Maracaibo Bay Terminal on Saltspring Island.

Numerical Modeling in support of Waneta Expansion Project Engineering and Environmental Issues

Based on the previous development of a very high resolution 3-D numerical model in the area of the confluence of the Columbia and Pend d'Oreille rivers, the model was applied to provide input to engineering and environmental issues. The model was operated to compute water level profiles in the tailrace and further downstream of the planned Waneta Expansion Project power plant as well as the existing Waneta Dam. The model results were also used to compute near-bottom flow speeds for application to determine the likelihood of predation of white sturgeon eggs under varying Pend d'Oreille river discharges.

Modeling Ocean Bottom Currents for Underwater Power Cables

As a part of their Vancouver Island Transmission Reinforcement Project (VITR), British Columbia Transmission Corporation is in the process of upgrading their underwater power transmission cables supplying power to Vancouver Island in the existing Southern Strait of Georgia corridor. One of the challenges to the seafloor installation of the replacement high voltage power cables is the Galiano Ridge feature off the east coast of Galiano Island.

High resolution 3-D numerical modeling of ocean currents was carried out by ASL for the area. Historical current meter data were obtained and analysed to derive estimates of extreme values of ocean current speeds, based on separation of the data analysis between tidal and non-tidal currents. In addition, a detailed measurement program conducted by ASL in the Galiano Ridge area was used to calibrate and validate the model. ASL collected both moored and transect current profile measurements over a 1-month period. The current measurements showed various features in the tidal circulation caused by the Ridge.

Ocean Wave Analysis and Modeling

ASL has compiled and analysed historical wind and wave data sets and conducted a very high resolution wave model study of Victoria Harbour in the area of the Fisherman's Wharf facility for the Greater Victoria Harbour Authority.



Collecting data at Galiano Ridge

Recent Sales

Launch of Latest Ice Profiler – the IPS-5

ASL announces that the next generation of the ASL Ice Profiler is now available. The Ice Profiler has become the global leader in the autonomous measurement of sea ice thickness in remote areas. ASL has taken 4 large orders, **totalling 26 units**, for the new Ice Profiler known as the IPS-5 model.

The Norwegian Polar Institute has ordered and now received 3 Ice Profilers, which will be used to observe the thickness of the sea ice as it is exported through Fram Strait off of Northeast Greenland.

The University of Pierre and Marie Curie, France has ordered 7 Ice Profilers to be used in the French Damocles project component and will be mounted in Argo drifting buoys that operate under the Arctic ice.

Laval University has bought 12 Ice Profilers to be used to provide year-round records of ice draft at the mooring sites and are needed to determine the actual rate of ice volume loss. They are on moorings deployed in the Beaufort Sea, North Water, Hudson Bay, and the mooring operated by Laval University in the Laptev Sea in collaboration with NABOS.

The latest orders are for 4 Ice Profilers for Woods Hole Oceanographic Institute in Massachusetts; and Hokkaido University, Japan for upgrades to 3 Ice Profilers.

Wave Profiler

Institut Teknologi Bandung, Indonesia
BC Ministry of Transport

Shallow Water Ice Profiler (SWIP)

University of Alberta
BC Hydro
Makivik Corporation, Quebec

IRIS - Image Recorder for the Imagenex Sonar

Virginia Institute of Marine Science
Coastal Carolina University

ADCP's in Action

ASL's Senior Oceanographer, Rick Birch, was invited to present *ADCP Applications In Renewable Energy & Resource Projects in British Columbia* at the ADCP's in Action seminar held in San Diego this November by Teledyne RD Instruments. It was enthusiastically received.



Ice Profiler Projects

Second Year of Data Collection in the Beaufort Sea

ASL has been contracted by IMV Projects to recover and redeploy three Ice Profiler/ADCP mooring sites in the Beaufort Sea, to be carried out from the CCGS Sir Wilfred Laurier. This is part of a 3-5 year study of ice at three measurement sites. The equipment is recovered and redeployed each summer. ASL processes and analyses the data each fall after recovery.

Refurbishment of Equipment for SEIC 2006-2007 Ice Measurement Program

Upgrades and refurbishments were made to a suite of Ice Profiler, ADCP, and other oceanographic equipment supplied previously by ASL in 1996-1997. These instruments have been used extensively for ice measurement programs off the east coast of Sakhalin Island, Russia and now are being used in support of the operational phase of the Sakhalin II project.

Analysis of Ice Drafts and Velocities in the Canadian Beaufort Sea

In this study, a two-year long record of Ice Profiling Sonar/ ADCP measurements of ice drafts and velocities off western Banks Island was processed and analysed for the Institute of Ocean Sciences.

Sea Ice Thickness near Tuktoyaktuk in the Canadian Arctic

Processed and analysed year-long Ice Profiler and ADCP data sets from the 2003-2004, and the 2002-2003 ice seasons for Humfrey Melling, Arctic Research Oceanographer at the Institute of Oceans Sciences, Canada.

Barrow Strait, Canadian Arctic Ice Study

In this study, a year-long data set of ice drafts obtained with an Ice Profiler was processed and analysed for the Bedford Institute of Oceanography.

Meet Us at 2008 Events:

ASL will be attending the following trade shows & conferences. We would welcome the opportunity to meet with you.

IEEE Currents.....	March.....	Charleston, SC
OI 08 UK.....	March.....	London, UK
OTC 08.....	May.....	Houston, TX
ISOPE.....	July.....	Vancouver, BC
IAHR Ice.....	July.....	Vancouver, BC
Ice Tech.....	July.....	Banff, AB
Oceans 08.....	September.....	Quebec City

