

The newsletter for aquatic sciences and monitoring

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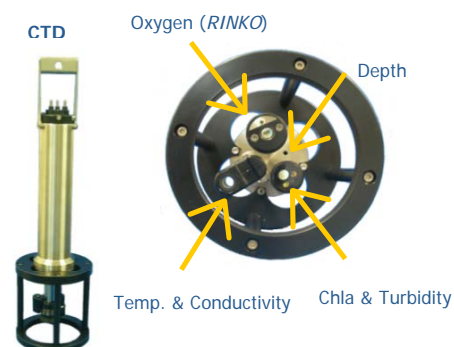
by Tomo Horiuchi
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New CTD & AAQ Instruments

Upgraded sensors and technologies

ALEC has improved the functionality of the **CTD** and the **AAQ** instrument series. They are scheduled for release in November 2009. Upgrades include

- Integration of fast-response optical oxygen sensor, **RINKO**;
- Temperature & conductivity sensors;
 - Accuracy: temperature: $\pm 0.01^{\circ}\text{C}$, salinity: $\pm 0.01\text{psu}$.
 - Conductivity measurement range: oceanic, brackish, fresh water
- Software upgrades allowing more flexible deployment setup.
 - sampling-number: 1 to 18,000 per burst
 - sampling-interval: 0.1 sec to 600 sec
 - burst-interval: 1 min to 1,400 min

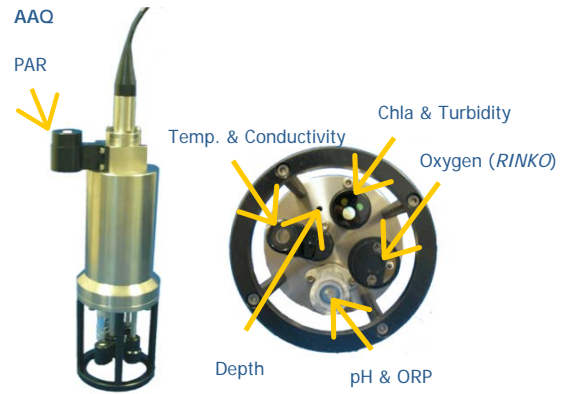


The **CTD** is an autonomous self-deployable data logger with a re-chargeable* battery. The instrument is small and portable; it weighs only 2 kg in air. It has a patented wet connector for communication between a PC and the instrument so that data can be downloaded rapidly, even in harsh field conditions. The instrument is capable of a 10-hour continuous measurement or over a 40-day period with a burst measurement (e.g., 10 samples collected every 60 minutes). As optional sensors, the chlorophyll fluorescence/turbidity sensors and the RINKO fast-response oxygen sensor are available. The titanium pressure housing is robust and corrosion resistant. The maximum depth rating is 1000 m.

*The battery will last for 500 charge cycles. If the CTD is deployed and re-charged once a week, the battery last more than 10-year.

An estimate of operating cost reduction with JFE ALEC's CTD	
Instrument & battery lifetime	10 years
Disposable battery cost/week	\$ 30
Savings of rechargeable battery	~ \$ 14,400

The **AAQ** is a cabled multi-parameter water-quality meter. Available sensors are: conductivity, temperature, depth, chlorophyll fluorescence, turbidity, RINKO fast-response oxygen sensor, pH, ORP, PAR. There are three types of interfaces available. (a) pro-model: a watertight interface, (b) smart handy: A water-proof compact data storage with a touch keypad, (c) an interface unit to transform signals to RS-232c or RS-485 for the communication with a PC.



Socio-economic benefits of coastal monitoring with the AAQ

Hypoxia and algal bloom monitoring for fish farmers



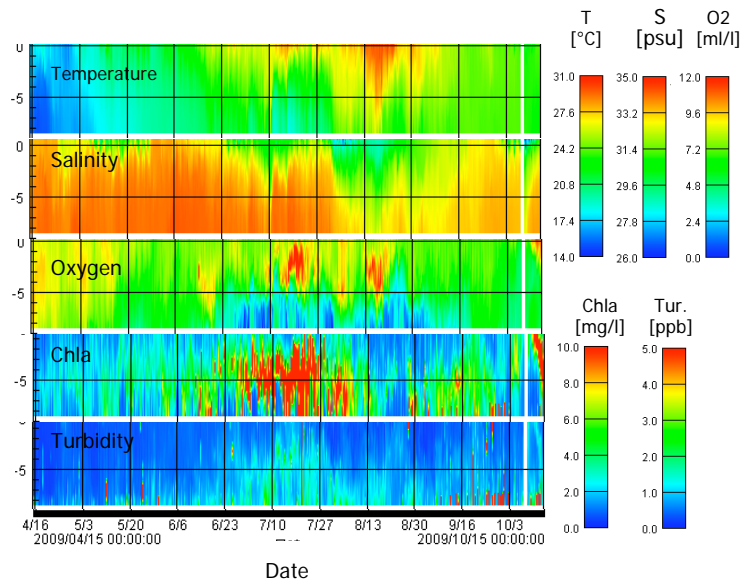
Since 2004, Mie prefecture in Japan has continuously monitored water-quality with **AAQ** in Ago Bay, where the **AAQ** is integrated buoy system with automatic winch. The buoys are moored at three locations in the bay.

Ago Bay is a famous pearl production area. Recently, the frequency of algal bloom and hypoxia events has increased. One of the core

targets in this project is the monitoring and prediction of these events to prevent damages to the pearl and fish farms.

The winch system is programmed to deploy the AAQ once per hour. The data are transferred via a mobile telephone communication to the land-laboratory. The

profiles and the time-series contours are published on the internet in near real-time (www.agobay.jp, Japanese only). The monitoring systems with the AAQ sensors have been an essential service to provide a social and economic benefit to the Mie prefecture industries.



LDEO Investigates Deep Water Formation in Antarctic with Infinity EM

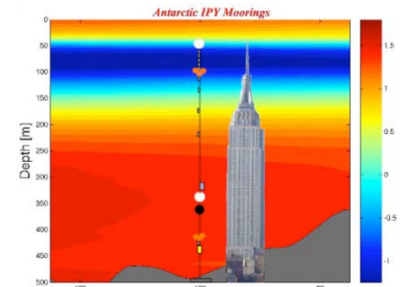
Columbia University's Lamont-Doherty Earth Observatory (LDEO) chooses ALEC's current meters for Amundsen Sea study.



Infinity-EM

The research is a part of the International Polar Year, ASEP (Amundsen Sea Embayment Plan) project, to study a relationship between glacial melt and sea level rise in the Amundsen Sea. In February 2009, LDEO scientists deployed ten ALEC **Infinity-EM** electromagnetic current meters to measure the apparent pathway of the deep-water inflows. The **Infinity-EMs** are moored alongside other instrumentation at several stations between 500 m and 800 m depth. Recovery of the instruments is planned for February, 2011. LDEO scientists selected the Infinity-EM because of it's:

- low noise in floor in clear water conditions,
- small and light weight, good for light mooring setup,
- low price compared to acoustic methods.

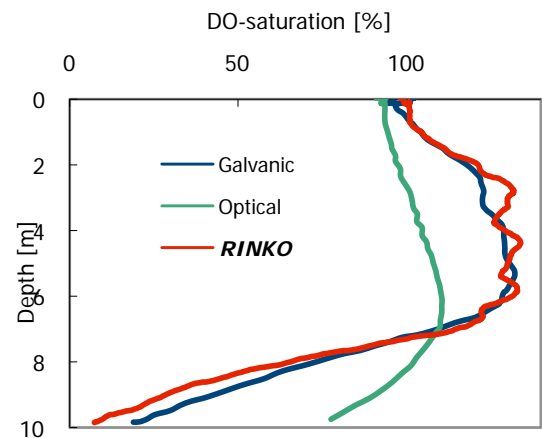


LDEO deployed two units in 2007 and confirmed that the EM current meters provide stable long-term readings of bottom currents along the slope in near-zero temperature conditions. The EM measurement principle makes it possible to measure weak currents with a high degree of accuracy, even in clear water where acoustic measurement methods fail due to the lack of scatterers.

Why fast-response DO is important

RINKO provides advantages for oxygen profiling

The right figure shows a field-comparison of oxygen profiles among three different principle and manufacture sensors, the ALEC galvanic- (5-sec, 90%), another manufacturer's optical DO sensor (15-sec, 63%) and the RINKO-sensor (1-sec, 90%), at the coastal marine bay site in July, 2009. All sensors were lowered together, at a rate of 0.1 m/s.



The observed profiles from the three instruments are quite different. Even with the extremely slow profiling speed the response time of the other instruments is too slow to detect the correct vertical distribution of DO. The galvanic sensor

showed a slightly better response than the optical sensor in the middle of the water column, but showed significant differences of 10-15% compared to **RINKO** in the strongly stratified bottom layer (high oxygen gradients).

The fast fast-response provides:

- high-accuracy and high-resolution oxygen profiling,
- shorter observing time,
- reducing the costs.

Meet us at these upcoming conferences

- AGU Ocean Sciences Conference, February 22-25, 2010, Portland, OR
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More info about JFE ALEC products: www.jfe-alec.com