Geophysical Research Abstracts,
Vol. 11, EGU2009-5927-2, 2009
EGU General Assembly 2009

Automated Ice-Tethered Profilers Provide Properties Under Pack Ice

R. Krishfield (1), J.C. Gascard (2), D. Meldrum (3), J. Morison (4), S. Pisarev (5), A. Proshutinsky (1), B. Rabe, U. Schauer (6), V.T. Sokolov (7), M.-L. Timmermanns, J. Toole (1), and S. Zimmermann (8)

(1) Woods Hole Oceanographic Institution, Woods Hole, MA, United States (rkrishfield@whoi.edu), (2) Universite Pierre et Marie Curie, France, (3) Scottish Association for Marine Science, UK, (4) Polar Science Center, APL/UWASH, United States, (5) Shirshov Institute of Oceanology, Russia, (6) Alfred Wegener Institute, Germany, (7) Arctic and Antarctic Research Institute, Russia, (8) Institute of Ocean Sciences, Canada

Thirty Ice-Tethered Profiler (ITP) instruments were deployed from 2004 through 2008 throughout the Arctic by an international team of scientists to monitor variability of upper ocean seawater properties. Altogether, these systems have returned over 16,000 high-vertical-resolution temperature and salinity profiles spanning approximately 7 to 760 m depth over all seasons. The ITP surface float sits atop an ice floe and suspends a weighted, plastic-jacketed 800 m long wire-rope tether for an instrumented underwater unit that profiles up and down the wire at a programmed sampling interval (typically 2-3 times per day) using a traction drive. The profiler is typically outfitted with the same Sea-Bird conductivity-temperature-depth (CTD) package that is used on Argo floats, but with full 1 Hz temporal resolution to obtain measurements vertically every 0.25 m; several also include dissolved oxygen sensors. After each profile, the underwater unit transfers files holding the oceanographic and engineering data to the surface unit using an inductive modem, and from the surface instrument to a shore-based data server using an Iridium telephone. The surface instrument also accumulates technical data, and locations from a GPS receiver at a specified interval (usually every hour) and transmits those data daily. All of the oceanographic and engineering data from all ITPs are processed, displayed and made available within hours at http://www.whoi.edu/itp. The acquired CTD profile data document interesting spatial variations in the major water masses throughout the Arctic, show the double-diffusive thermohaline staircase in the Canada Basin that lies above the warm, salty Atlantic Layer, measure seasonal surface mixed-layer deepening and fresh water variations, and document several mesoscale eddies. In addition to describing the ITP technology, field deployment considerations, data processing methods, and sample results, performance statistics for the ITP instruments will be presented and engineering improvements/enhancements that are being implemented will be described. Plans for sustaining the ITP contribution of valuable real-time upper-ocean observations to the Arctic Observing Network for operational needs, to support studies of ocean processes, and to facilitate numerical model initialization and validation will also be reviewed. Future international collaborations will be invited.