

Weekly Seminar: Spring 2011

Speaker: Dale Chayes | Columbia University

Title: *"Development and operation of an aircraft-based through-ice CTD Rosette"*

Date: Friday, March 18, 2011

Time: 9:30 AM

Location: 209 Hackerman Hall (Note Special Seminar Location)

Abstract

We have developed a lightweight modular CTD and rosette system designed to be launched and recovered from aircraft in ice-covered waters through a 12 in. diameter hole in the sea ice. The small diameter is achieved by the modular design based on a combination of COTS and custom components, in which a CTD module is attached to the end of a conducting cable and water bottle modules (four 4-L bottles per module) are positioned vertically above it. A novel tripping mechanism based on melting a link of monofilament line is used to close the water bottles at the desired depths. After launching the rosette, the cast proceeds like a normal rosette cast with the traces of temperature, salinity, oxygen and other desired sensors being displayed on a computer screen during the down and up casts and tripping the bottles electronically at the desired depths on the up cast. A Seabird 19+ CTD and Seabird 43 oxygen sensor are mounted in the CTD module and data acquisition and bottle tripping are controlled using a Seabird 33 deck unit and Seabird's SeaSave software run on a laptop computer. Deployment and recovery are done in a heated tent attached to the aircraft to prevent the water from freezing. After recovery the bottle modules are placed in coolers with bags of snow to stabilize the cooler temperature close to 0 C, which is within ± 1.8 C of the in situ temperature, and the modules are transported back to a base camp for subsampling and sample processing. This system has been used to collect over 250 water samples in the ice-covered Lincoln Sea and the quality of the samples for dissolved gases and other constituents has been excellent.

Recent Reference: W. Smethie Jr., D. Chayes, R. Perry, P. Schlosser, A lightweight vertical rosette for deployment in ice-covered waters, Deep Sea Research Part I: Oceanographic Research Papers, 2011,

DOI: <http://dx.doi.org/10.1016/j.dsr.2010.12.007>