CTD/Rosette Water Sampler Profiles
Marshall Swartz, Woods Hole Oceanographic Institution

Vertical profiles of temperature, conductivity, fluorescence, transmissivity, and nitrate and water samples along several transects of stations crossed major water masses in the northern Bering Sea, SBE911+ profiler from WHOI was equipped with a transmissometer, fluorometer, altimeter, SBE43 dissolved oxygen sensor, dual 300 KHz lowered ADCP, 21 position rosette with 10 liter western and eastern channels of Bering Strait and several transects across the Chukchi Sea.   A SeaBird model Nisken bottles and a mini-video plankton record

Video Plankton Recorder Sensor on CTD
Mark Dennett for Dr.Carin Ashjian (Woods Hole oceanographic Institution)

Hypothesis
The hydraulic control in the Herald

CTD and Mark Dennett, photo T. Whitledge

Canyon dictates the flux of Pacific water and biogenic material, including zooplankton, from the Chukchi Sea to the Arctic.
Objective
Quantify the flux of biogenic material and zooplankton out of the Chukchi Sea. The VPR data will tell us what biological indicators may be tracers of the dense water that flows through Herald Canyon and how the flux of this water impacts the zooplankton community composition and how zooplankton may impact the cycling of carbon via the utilization of primary production.

Measurements
Rapid, high-resolution hydrographic/plankton survey of Herald Canyon.

Four cross-canyon surveys were done covering the southern head of the canyon, through the narrowest constriction and finishing at the northern downstream end of the canyon. The VPR (an underwater microscope) was mounted to the frame of the CTD to measure the zooplankton and particle (marine snow) content in the water. This will provide a high-resolution description of taxonomic specific zooplankton and particle distribution coincident with the vertical and horizontal physical fields.

The Video Plankton Recorder (VPR) is an underwater video microscope system designed for rapid quantification of plankton taxonomic composition and abundance. This instrument is manufactured by Seascan, Inc. Falmouth, MA, USA. The VPR consists of an imaging head (CCD camera and strobe), wavelet compression processor and a hard drive for real-time imaging and recording of plankton and particulates. The VPR is mounted as an autonomous instrument on the CTD rosette and records wavelet

compressed video files on an internal hard drive. A separate Seabird SBE 37 collects conductivity, temperature and depth data, which are associated with each stored video image. After each deployment, the image and CTD data are transferred by an Ethernet link to an on-deck PC. A proprietary software program will inspect each image and determines if and how many in focus targets are present. An automatic identification of the plankton is done once the neural network classification program is trained. This training process requires manual sorting of ~2000 images. The neural-network training program is run on this set of training images to develop the parameter values needed for classification. The classifier is used to automatically sort images into taxonomic categories.

Sample log
Number of VPR casts = 77 CTD casts.