

cANIMIDA – Arctic Summer 2005

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What a great summer 2005 for cANIMIDA! We had a combination of great weather, and plenty of ice, during our three weeks of work that began on July 26. Our monitoring efforts of oil and gas development in the offshore waters of the North Slope moved forward very well. We also greatly enhanced our understanding of the natural biogeochemistry of the coastal Beaufort Sea.



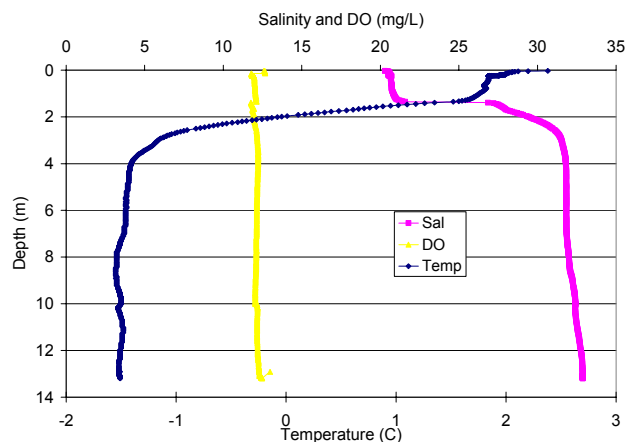
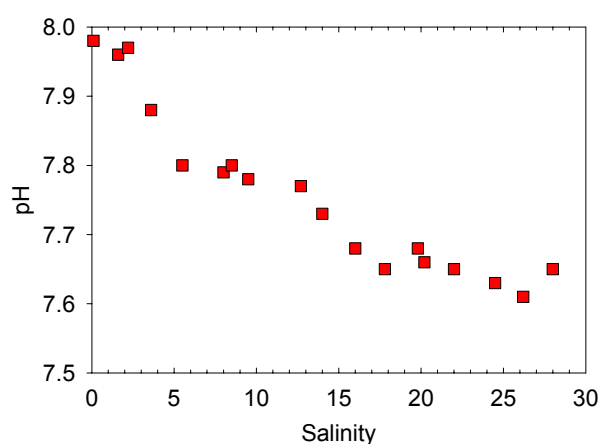
Midnight sun, Northstar Island, August 2005.



MMS Launch 1273 near ice flow, Narwal Island.

During the first few days of the trip, caged mussels were deployed at six locations to investigate the short-term uptake of potential contaminants. One mooring with a 200 pound anchor was dragged six miles by a large ice flow; good thing we had a pinger on it. Samples of fish, clams and amphipods were collected throughout the study area. In addition for 2005, phytoplankton and zooplankton were collected for chemical analysis.

The water column efforts for 2005 focused on the mouth of the Sagavanirktok River and the area of the Boulder Patch. We collected samples along the freshwater-seawater mixing zone in the area to investigate possible uptake or release of selected trace metals from suspended particles during mixing. Values for pH, for example in the graph below, show a gradient of decreasing pH seaward from the Sagavanirktok River. We are excited to track the likely behavior of metals such



Graphs showing salinity versus pH along the freshwater-seawater mixing zone at the mouth of the Sagavanirktok River and vertical profiles for salinity (psu), temperature (°C) and dissolved oxygen (mg/L) at a station near Narwal Island.



Early Warning station on Barter Island.



Ruins of Leffingwell's site on Flaxman Island.

as arsenic, cadmium and barium along the salinity gradient. Any changes observed will be factored into our overall model of metal cycles in the area.

The deeper water in Stefansson Sound was unseasonably cool this year as shown with the -1.5°C bottom water that had our collaborator Ken Dunton and his group of divers from the Universities of Texas and Alaska, Fairbanks, colder than usual. Ken and his group collected kelp for us to analyze for selected metals. We saw a nice progression of fresher surface water with salinity values that decreased from 27 to 15 as we moved seaward from the river delta to beyond Narwal Island due to ice melt. The presence of fresh water from sea ice melt is shown in the vertical profile above. We collected >140 water and suspended sediment samples for analysis.

The cANIMIDA sediment studies included both surface grab samples and cores. We extended the sediment effort from Northstar Island to Barter Island, about 110 miles to the east with some particularly interesting cores from Camden Bay. The cores will be age dated and analyzed for the history of hydrocarbon and metal input. We had the pleasure of anchoring one night at a site offshore of the ruins of Leffingwell's camp from the early 1900s. His pioneering work (e.g., USGS Prof Paper 109 in 1919) on ice wedges in coastal bluffs opened the door to extensive studies of coastline retreat and aggradation throughout the Arctic. In the cANIMIDA program, we are still wrestling with the relative importance of recently deposited river-borne sediments with deposition of the products of coastal erosion. The distinction is important in using sediments as indicators for recent inputs of potential contaminants.

We are very excited about the success of the 2005 field efforts and feel very fortunate to be able to continue to work in this beautiful Arctic setting. We thank Minerals Management Service (MMS), U.S. Department of Interior, for funding this study and especially Dick Prentki of MMS for continued support and for spending time on site with us. We thank British Petroleum (BP) for logistical support and accommodations on the North Slope and the staff of the Seawater Treatment Plant at West Dock for their interest in our work and use of their laboratory facilities.



Pumping up clean water samples using a peristaltic pump.



Sampling a freshwater pool on a large ice flow.