

## MMS ENVIRONMENTAL STUDIES PROGRAM: ONGOING STUDIES

**Region:** Alaska

**Planning Area:** Beaufort Sea

**Title:** Feasibility and Study Design for Boundary Oceanography of the Beaufort Sea (AK-06-03)

**MMS Information Need(s) to be Addressed:** This study is needed by MMS to better understand the oceanography of Beaufort Sea and to insure that first-order oceanic physics are understood and appropriately represented in MMS circulation models and oil spill risk analyses. This information will be used to evaluate oil spill contingency plans for Liberty, if approved, and other developments. It would also be used in NEPA analysis and documentation for proposed Beaufort Sea Lease Sales, EPs, and DPPs.

**Total Cost:** \$179,000

**Period of Performance:** FY 2006-2008

**Conducting Organization:** University of Alaska Fairbanks

**MMS Contact:** [Chief, Alaska Environmental Studies Section](#)

### **Description:**

*Background* MMS sponsored two international workshops designed to provide MMS with recommendations regarding future Arctic oceanographic research needs. The 2003 MMS/UAF CMI workshop on small sea-ice and ocean modeling in the Beaufort and Chukchi seas reflects discussions of international sea ice modelers and observers who developed strategies to advance the state-of-art in Arctic ice modeling. Following recommendations from this workshop, MMS and NASA signed an IA in 2003 to research sea-ice modeling in nearshore Beaufort and Chukchi Seas.

Also in 2003 MMS held a workshop on physical oceanography of the Beaufort Sea. The proceedings of that workshop reflect discussions of international experts in Arctic oceanography on state-of-knowledge of Beaufort Sea physical oceanography and recommend long-range goals for oceanographic research to meet MMS needs. Several of the recommendations articulate the need to better understand the coastal boundary (buoyancy-forced coastal circulation), lateral ocean boundaries, and the offshore boundary. Two MMS 2003 studies, on Beaufort Sea nearshore currents, an ADCP along coast mooring study, and on mapping and characterization of recurring spring leads and landfast ice in the Beaufort Sea, addressed a portion of these recommendations. However, other recommendations require more resources than MMS can provide alone. Thus, they are best suited for interagency, international partnerships.

*Objectives* Provide MMS with design and costs for research to meet the recommendations of the Beaufort Sea Workshop. These recommendations cover:

1. Lateral Ocean Boundaries: Develop better understanding of western and eastern boundary influences.
2. Offshore Boundary:
  - a. Conduct shipboard and moored measurements of currents, sea-ice drift, and hydrography across Beaufort Sea shelf.
  - b. Establish fate of Barrow Canyon outflow.
  - c. Establish the degree of infiltration of Mackenzie River plume into eastern Alaskan Beaufort Sea.
3. Buoyancy-forced Coastal Circulation:
  - a. Gain better understanding of the processes which enhance or inhibit transport across the landfast/pack ice margin.
  - b. Gain better understanding of the behavior of the snowmelt freshwater plumes beneath landfast ice in spring.
  - c. Make better estimates of the freshwater discharge cycle for North Slope rivers.
  - d. Make observations of open water period 3-D circulation and thermohaline field associated with river discharge.
  - e. Develop geochemical discrimination techniques and apply to keying of low salinity to their freshwater sources.

### Methods

1. Prioritize specific research objectives based on criteria including potential mutual interest (i.e. co-funding opportunities) and maximization of scientific gain.
2. Provide as a final report a study design and cost estimate for research on the boundary oceanography of the Beaufort Sea that would address the stated objectives. MMS would consider implementation of some, or all components, in future fiscal years.
3. This project will consider results of the FY 2005 workshop on hydrological modeling for freshwater discharge from the Alaska arctic coast, and it will coordinate with other ongoing environmental studies, as appropriate.

### **Current Status:**

The Principle Investigator is working on his report and has developed a co-funding opportunity to pursue some of these research objectives through the National Oceanographic Partnership Program.

**Final Report Due:** September 2008

**Publications Completed:** None

**Affiliated WWW Sites:** <http://www.mms.gov/alaska/>

**Revised Date:** March 2008