

BOEM ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies

Region: Alaska

Planning Area(s): Chukchi Sea

Title: Application of High Frequency Radar to Potential Hydrocarbon Development Areas in the Northeast Chukchi Sea (AK-09-06)

BOEM Information Need(s) to be Addressed: The collection of surface current data will be useful for validating the ocean circulation model of the Chukchi Sea that will support the BOEM Oil-Spill-Risk Analysis (OSRA) used in regional EISs, environmental assessments (EAs), and oil-spill contingency planning. Information from this study will be used in NEPA analysis and documentation for Chukchi Sea lease sales, EPs and DPPs.

Total Cost: \$1,193,586 plus Joint Funding **Period of Performance:** FY 2009-2013

Conducting Organization: University of Alaska Fairbanks

BOEM Contact: [Warren Horowitz](#)

Description:

Background: Ocean currents play a critical role in the transport and fate of spilled oil, but there is lack of direct circulation measurements for the Chukchi Sea either within the open leads, during breakup and ice melt-out, or during the open water season. Presently, the ocean circulation models that support BOEM's oil-spill trajectory analysis do not capture the nearshore surface current circulation fields or the finer scale circulation patterns that are an important consideration for the Chukchi Sea. Surface circulation currents captured by HF radar would be very useful for validation of a Chukchi ocean circulation model.

The University of Alaska-Fairbanks, under contract to MMS successfully collected surface current measurements within the central Beaufort Sea Outer Continental Shelf out to 70 km, covering an area over 2500 km². These measurements were collected during break up of the landfast ice zone, under mixed ice and open water conditions, and during the fall freeze-up period. The processed data will be used in validating surface currents generated by the Beaufort Sea ocean circulation model in the near future. This knowledge and experience in the Beaufort Sea will be applied to the Chukchi Sea where surface current information would also be useful for model validation.

Ocean current circulation fields will be collected and analyzed within the northeastern Alaskan Chukchi Sea through the deployment of coastal HF radar systems and offshore bottom mounted Acoustic Doppler Current Profilers (ADCPs). These instruments shall capture the changes in surface and subsurface currents. Surface current fields will be collected on an hourly basis out to 180 km from shore from three coastal locations proposed for Barrow, Wainwright, and Point Lay. Autonomous Underwater Vehicles (AUV) shall be deployed to measure the changes in water stratification. Data collection will continue throughout the open water season,

approximately July through mid November. The Principle Investigator will work with industry and government agencies in a collaborative effort to deploy, maintain, and to collect data from these instruments.

Objectives:

- The deployment of HF radar instruments along the Chukchi Sea coast for the purpose of collecting high resolution surface currents within a portion of the proposed OCS Chukchi lease sale boundary from July through October for four field seasons.
- Provide hourly data measurements in near real time over the internet.
- Analyze surface current data against existing temperature and salinity measurements, sub-surface currents from existing ADCPs, gliders, wind data from coastal meteorological stations, and varying ice conditions from satellite imagery.
- Provide final report, and spatial database.

Methods: This study will: 1) field test potential locations to deploy long range HF Doppler radar systems along the Chukchi Sea coast beginning near Barrow and extending down the Chukchi coast to Point Lay; 2) work with Alaska Native groups and scientific organizations on the North Slope and along the Chukchi coast to enhance their participation in the project; 3) collect surface current measurements on an hourly basis between the months of July and November for three field seasons in near real time and distribute over the Internet; 4) collaborate with other agencies and industry to obtain needed data on subsurface currents and surface current parameters; 5) deploy ADCPs to measure subsurface currents, changes in bottom temperature and salinity; 6) deploy AUVs to measure the changes in water stratification; 7) analyze the changes and connectivity between the surface current and subsurface current circulation fields for the northeast Chukchi Sea; 8) compare changes in surface and subsurface currents to the changes in measured wind fields; 9) provide surface and subsurface current data to modeling group for model validation; 10) provide final report of results.

Current Status: Awaiting Final Report

Final Report Due: January 2013

Publications Completed: None

Affiliated WWW Sites: <http://www.boem.gov/akstudies/>
<http://www.ims.uaf.edu/hfradar/>

Revised Date: December 2012

ESPIS: Environmental Studies Program Information System

All *completed* ESP studies can be found

here: http://www.data.boem.gov/homepg/data_center/other/espis/espisfront.asp