BOEM ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies

Region: Alaska

Planning Area(s): Chukchi Sea

Title: Satellite-Tracked Drifter Measurements in the Northeast Chukchi Sea (AK-08-12-08)

BOEM Information Need(s) to be Addressed: This study will provide information on surface currents in the vicinity of the Chukchi Sea Lease Area during the open water season. Results from his study will provide model validation data for BOEM modeling efforts, and provide new information regarding current shear in the upper ocean and its relation to changes in stratification and winds.

Total Cost: $459,892 plus Joint Funding **Period of Performance:** FY 2011-2014

Conducting Organization: CMI, UAF

BOEM Contact: Warren Horowitz

Description:

Background: The oil and gas industry plans to drill exploratory wells within the Chukchi Sea during the open water season within the coming years to assess the extent of potential hydrocarbon resource within the subsurface formations. The BOEM and the oil and gas industry are presently sponsoring a physical oceanographic study in the Chukchi Sea to measure ocean current circulation fields from High Frequency (HF) radar sites located along the northwestern coast of Alaska at Barrow, Wainwright and Point Lay. The data from this study are providing us with significant new information on Chukchi Sea surface current circulation within the boundary of the radar coverage. The drifter measurements as proposed within this CMI study will provide information on near surface current movements, augmenting the HF radar effort by extending the surface current measurements beyond the range of HF radar coverage. In addition, the drifter measurements will answer critical questions on not only how currents flow at the surface, as HF radars define, but how currents flow below the surface, where pollutants could also get transported.

Objectives: The objectives of the drifter deployment program are to:

- Map the surface current drift within the upper water column at one meter and ten meter water depths.
- Document the differences in the surface and subsurface flow fields as related to the bathymetry, seasonally-varying winds, stratification, and/or ice-edge fronts.
- Display the daily results of the drifter trajectories on a project website open to the public.

Methods: A ship will deploy CODE-type drifters to measure the upper meter surface current flow and WOCE-drifter drogues to measure current speed and direction at a depth of 10 meters. Each drifter will contain a surface thermistor to measure surface water temperatures. The

drifters will be deployed from a ship from two different oil and lease block locations, on a weekly basis, beginning in early August and ending by mid-September. The drifter positions will be determined by satellite GPS fixes twice every hour during its time of operation. Repeated drifter deployments will allow statistical analysis of the spatial and temporal distribution of upper ocean flow, its vertical shear, and surface water motion. Comparison of drifter movements will also be made against available subsurface current measurements from current meters and ADCPs and surface measurements collected from HF radars. The impacts on drifter motion from the seasonal changes in ocean stratification will also be examined. Synthetic Aperture Radar (SAR) satellite imagery will be analyzed to document whether drifter motion is impacted by ice edge fronts. These drifter deployments will encompass a near full range of sea ice concentrations, meteorological, and oceanographic conditions that would be expected during the July/August through September/October open water season in the northeast Chukchi Sea. Their individual trajectories will be updated daily to a map on the publically available, University of Alaska Fairbanks project web site. A second field season has been added to this program.

Current Status: Ongoing

Final Report Due: December 2013

Publications Completed: None

Affiliated WWW Sites: http://www.boem.gov/akstudies/
http://dm.sfos.uaf.edu/chukchi-beaufort/index.php

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