ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2013-2015

Region: Alaska

Planning Area(s): Beaufort Sea, Chukchi Sea

Title: Enhanced Verification and Interpretation of Arctic Ice Formation, Distribution, and Density (AK-13-04)

BOEM Information Need(s) to be Addressed: This study will provide improved analytic interpretation and decision-making tools about inter-annual ice characteristics for offshore lease areas in the Beaufort and Chukchi Seas during freeze-up conditions (October/November). The study will improve resolution and interpretation of available data about ice formation, including new ice as well as pack ice incursion timing, growth, distribution, density, and velocity. BOEM's NEPA analysts often require detailed spatial and temporal information about freeze-up conditions over specific locations within the OCS. Data will be provided in a format that is compatible with existing BOEM digital databases and products. Study products will be used for NEPA analysis, including region specific environmental assessments, and during regulatory review of applications for permit to drill (CFR§250.417).

Total Cost: TBD **Period of Performance:** FY 2013-2015

Conducting Organization: TBD

BOEM Contact: TBD

Description:
Background: BOEM has proposed a restriction on late season (freeze-up) drilling operations that would assure a greater opportunity for spill response and cleanup. As a consequence of this proposed mitigation measure, BOEM requires information on the timing of freeze-up conditions over the proposed drilling locations. BOEM utilizes spatial data from the BOEM Sea Ice Database and from the study "Mapping and Characterization of Recurring Spring Leads and Landfast Ice in the Beaufort and Chukchi Seas" (OCS Study MMS 2005-068) to provide Environmental Assessment Analysts with the information needed to determine the timing of freeze-up conditions, and when drilling activities must cease at the proposed drill site. This information is produced on an annual basis based upon information from the five previous ice seasons. For the 2012 drilling season, the information was calculated from 2007-2011. The BOEM Sea Ice Database contains weekly and sometimes biweekly National Ice Center (NIC) interpreted spatial and temporal sea ice polygons in ESRI GIS format. The sea ice polygons contain attributes of ice concentration and ice type. The database contains NIC sea ice data from the 1970's to present. The BOEM Sea Ice Database is used internally to investigate sea ice concentration and ice type both seasonally and interannually and to determine the timing of freeze-up conditions (new ice) over the proposed drill sites.

Although the data contained within BOEM Sea Ice Database is considered high quality, it is not peer-reviewed by outside sources, it lacks resolution at times, and the satellite imagery used to

the interpret the data is inaccessible to the user. This study will provide an independent assessment of the offshore ice conditions during the freeze-up period, improve the spatial and temporal resolution of these data by providing a more refined analysis of late season ice conditions within the Chukchi and Beaufort seas. This new study will enhance the resolution of regional scale ice data through analysis of bi-weekly satellite data and improvements in ice data interpretation through ground-truthing utilizing available oceanographic instruments and potential aerial surveys. The new data analysis will provide a more refined product describing the type and extent of new ice formation beyond the landfast ice boundary and improve interpretation of the timing, characteristics, and speed of the main pack ice incursion into the active OCS lease area.

Objectives: The study will achieve the following objectives pertaining to the months of October/November during the years 2007-2013 for the areas which include the Chukchi and Beaufort Sea active OCS lease areas:

- (New Ice Formation from Shore) Interpret, analyze and document the seasonal and interannual spatial and temporal characteristics of timing, growth and persistence of new ice formation, and its relationship to atmospheric forcing and available oceanographic measurements.
- (Pack Ice Incursion) Interpret, analyze and document the seasonal and interannual spatial and temporal characteristics of timing and growth of pack ice incursion with changing atmospheric forcing conditions.
- Interpret, analyze and document the seasonal and interannual variation in freeze-up conditions within the Chukchi and Beaufort Seas active lease areas from 2007-2013.
- Enhance the analytical capabilities of the BOEM Sea Ice Database with additional data and information provided by this study.

Methods: This new study will enhance the resolution of regional scale ice data 1) through analysis of bi-weekly satellite data (high resolution Synthetic Aperture Radar) and other imagery; and 2) as a result of improvements in ice data interpretation through ground-truthing from available meteorological and oceanographic measurements of offshore conditions. High resolution Synthetic Aperture Radar (SAR), thermal, MODIS sea surface temperature, and other satellite imagery will be processed and analyzed to map late season new ice formation from shore out to the active lease areas and pack ice incursion into the active lease areas from the north. Available atmospheric model data, local meteorological data, and oceanographic measurements will be collected to document the seasonal growth of new ice from shore. Atmospheric model data will be used to estimate the daily, weekly, and late season movement of pack ice into the active lease areas. The derived data and analysis will be delivered in appropriate database formats that will enhance the current BOEM Sea Ice Data Analysis. A final report and peer-reviewed journal article will be produced to document the results.

Current Status: Planned new start

Final Report Due: TBD

Publications Completed: None

Affiliated WWW Sites: http://www.boem.gov/studies/

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