

BOEM ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies

Study Area(s): Beaufort Sea, Chukchi Sea

Administered By: Alaska OCS Region

Title: Sea Level Measurements along the Alaskan Chukchi and Beaufort Coasts (AK-13-03-09)

BOEM Information Need(s) to be Addressed: This study will deploy a network of tide gauges that will provide information to examine the relationships between ocean processes and sea level along the entire Chukchi-Beaufort coast in a systematic manner. A better understanding of local sea levels in this region and their relationship to both local and remote wind forcing will aid with improving the ocean circulation models that support BOEM's oil-spill trajectory modeling for lease sales, EPs and DPPs.

Total Cost: \$72,178
plus Joint Funding (\$72,222)

Period of Performance: FY 2014-2017

Conducting Organization: CMI, UAF

BOEM Contact: [Dr. Heather Crowley](#)

Description:

Background: Changes in coastal sea level are caused by ocean currents, storm surges, winds, and tides. Local observations and recent measurements acquired by current meters in the northern Chukchi Sea and western Beaufort Sea indicate that sea level and coastal currents sometimes change rapidly even if local winds are calm. These changes are responses to wind forcing in the southern Chukchi/northern Bering Sea. These remote winds initiate sea level changes that propagate northward along the Chukchi coast toward Barrow and then eastward along the Beaufort coast.

Presently, there are NOAA tide gauges (sea level recorders) at Red Dog dock and at Prudhoe Bay. These two monitoring sites are too few and too distant from one another to investigate relationships between sea level and ocean processes along the entire Chukchi-Beaufort coast in a systematic manner.

Objectives: The overall goal of this study is to improve understanding of ocean circulation and improving computer models of ocean circulation in the Chukchi and Beaufort Seas. Specific objectives include:

- Investigating relationships between landfast ice breakout events and sea level changes;
- Assessing the sea level responses to local and remote wind forcing during open water and ice covered seasons; and
- Computing tidal harmonics and other relevant statistics for each location.

Methods: This project will deploy tide gauges (water level recorders) to acquire year-long (summer 2014 – summer 2015) records of local sea level at five locations in Alaska: Pt. Hope, Pt. Lay, Wainwright, Barrow, and Kaktovik. Local boats and crews will be chartered in each community and provided with necessary instruction to deploy and recover the moorings. The moorings will be deployed in lagoons or protected waters near the sentinel communities at locations and depths, identified by local crews, where the potential for instrument loss and/or damage associated with ice scouring is minimized. Sea level signals in lagoons are typically comprised of signals associated with large-scale processes occurring external to the lagoons and small-scale processes occurring within the lagoons. Accordingly, three (one primary and two secondary) moorings will be deployed near each community.

Current Status: Awaiting final report

Final Report Due: February 2017

Publications Completed: None

Affiliated WWW Sites: <http://www.boem.gov/akstudies/>
<http://www.sfos.uaf.edu/cmi/>

Revised Date: April 21, 2017

ESPIS: Environmental Studies Program Information System

All *completed* ESP studies can be found here: <https://www.boem.gov/ESPIS/>